



Electronic products and relays

Technical catalogue 2009

New Electronic Products and Relays

Three-phase monitoring relays CM range



ABB

The new generation of three-phase monitoring relays CM range

Only reliable, continuous monitoring of a three-phase network guarantees trouble-free and economic operation of machines and installations. Thus, the three-phase monitoring relays of the CM range, according to the individual requirements, monitor the phase voltages, phase sequence, phase unbalance, phase failure and the neutral.

Highlights of the new generation ¹⁾

- All new devices are working with a modern TRMS-measuring principle (True root means square)
- Interpretation of any wave forms
- Devices for mains voltages of up to 690 V
- Signals can be measured within a frequency range of 45-65 Hz as well as within a range of 45-440 Hz ¹⁾
- Interrupted neutral monitoring ¹⁾
- Monitoring of single- and three-phase mains with the same device ¹⁾
- Applicable in grounded and ungrounded mains
- Operating principle of the output contacts configurable as 2x1 or 1x2 c/o (SPDT) contacts ¹⁾
- Configurable phase sequence monitoring
- Configurable automatic phase sequence correction ¹⁾
- Adjustable ON- or OFF-delayed tripping delay
- Time delay can be adjusted via a logarithmic scale ¹⁾
- Front-face rotary or DIP switch for function selection

¹⁾ depending on device

English Version: 2CDC 112 136 B0201

German Version: 2CDC 112 136 B0101

Application Manual

Power Supply Units



ABB

New application manual Power Supply Units

For today's applications, e.g. in control engineering, it is essential to take the right decision regarding the selection and planning of the power supply. Incorrect dimensioning or wrong connection of a power supply can seriously affect the safety and/or the availability of an entire installation.

This manual provides a general overview of switch mode power supplies and thus helps to choose the optimal power supply and to avoid problems during engineering and commissioning. The manual generally shows and explains the fundamentals of and the differences between power supplies, and gives a detailed introduction to the ABB product range on the basis of the selection criteria. Finally, it describes and explains application examples for engineering and it contains selectivity tables for the selection of the right ABB MCBs in order to disconnect faulty (overload / short circuit) circuits on the secondary side.

English Version: 2CDC 114 048 M0202

German Version: 2CDC 114 048 M0102

Approvals and marks for the world market

1 ABB low-voltage switching devices are developed and produced in accordance with the applicable regulations as stated in the international IEC publications, the European EN specifications and the national VDE standards.

In most countries, low-voltage switching devices are produced according to such regulations under the responsibility of the manufacturers. This is why the devices are not subject to further approval. However, for those devices which are intended for use in household or for public use our customers can request test reports of our internal laboratory for presentation to the various qualified local organizations.

In other countries, approvals are prescribed by law.

For devices installed in ships, an approval issued by independent shipping companies, such as the GL, are demanded by the maritime insurance companies.

Marks of conformity and examples of approvals (device-dependent)

International

CB scheme



The CB (Certification Body) Scheme is a system designed to facilitate international trade by establishing mutual acceptance of test reports among participating safety certification organizations (the National Certification Bodies) in more than 30 countries. The CB Scheme was established by the International Electrotechnical Committee for Conformity Testing to Standards for Electrical Equipment (IECEE).

Europe

Conformité Européen (CE)



All devices which comply with the European low voltage directive and which are intended for sale within the European Union must have the CE sign applied. All products in this catalogue are CE marked.

The CE sign must not be confused with a certificate of quality issued by the EU. It is solely used to confirm that the respective product complies with the applicable European directives *). The CE sign is part of an administrative procedure to guarantee free movement of goods within the European Community.

*) Directives:

- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- Machinery Directive 98/37/EEC

Verband der Elektrotechnik Elektronik Informationstechnik (VDE)



Applicable for technical instruments covered by the German Gerätesicherheitsgesetz (GSG) as well as for single parts and electrical wiring devices.

Berufsgenossenschaft der Feinmechanik und Elektrotechnik (BGFE)



The BG-PRÜFZERT sign is a voluntary safety mark, awarded by the BGFE following successful safety testing.

Explosion protection (EX)



Explosion protection acc. to Directive 94/9/EG (ATEX 100a)

Swiss insurance institution (SUVA)



Department accident prevention suvaPRO

Germanischer Lloyd (GL)



Shipping approval

Lloyds Register



Shipping approval

Russia

In Russia, low-voltage switching devices are subject to certification and have to be provided with a sign.

Gost Standard (GOST-R)



Gost R certification is mandatory for many products. This certification is based on a safety test (IEC standards with Russia-specific deviations) and an EMC test.

Russian Maritime Register of Shipping RMRS



Shipping approval

Australia, New Zealand

C-Tick Mark



The C-Tick Mark certifies compliance with the Australian EMC requirements. The Mark is also recognized in New Zealand.

China

CCC (China Compulsory Certification)



In China the CCC certification mark is a compulsory certification mark in the field of safety and quality for products sold on the Chinese market.

North America

Canadian and US standards are more or less equivalent but considerably differ from the IEC and VDE regulations.

USA

Underwriters Laboratories (UL) Listing



Released for installation in systems and for sale as individual component in the USA.

Recognition



Released for installation in systems, if the respective system has been completely mounted and wired by qualified personnel.

Canada

Canadian Standards Association (CSA)



USA and Canada

The combined UL signs for the USA and Canada are recognized by the authorities of both countries. Devices with this certificate meet the requirements of both countries.

Listing



Recognition



Further product documentation see ABB Library www.abb.com/lowvoltage

When you enter "www.abb.com/lowvoltage" for the first time, you will be asked to select your country and your preferred language (see screen shot 1). You can change this setting later if you like (see screen shot 2).

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How to find "Electronic Products and Relays" in world wide web:

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Further product documentation see ABB Library www.abb.com/lowvoltage (continued)

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Product Guide > Low Voltage Products and Systems > Control Products > **Electronic Relays and Controls**

The whole world of Electronic Products and Relays

With the product line Electronic Products and Relays ABB offers a wide range and assortment of products for switchgear and control gear for the electrical equipment and automation of machinery and plants.

The versatile products offer a maximum of security, economic efficiency and capacity. Thus, they contribute considerably to increase your added value and meet the requirements of you and your customer. Constant further development of our product range always makes new applications possible. The range covers products from analog signal converter up to measuring and monitoring relays and time relays.

Easy-to-set front-face operating controls and clearly labelled connecting terminals provide high ease of use and easy handling, making wiring and commissioning quick and simple. The compact dimensions save space in the distribution panels and therefore save money.

Approvals and Marks for the World Market
All devices of this product line meet the requirements according to the international publications IEC and the European specifications EN. Additionally the devices have various specific national approvals and marks as well as approvals for special applications.

Product offering

Contact Protection Relays	Cycle Monitors
Interface Relays and Optocouplers	Isolation Monitors
Liquid Level Monitors and Controls	Logic Relays
Motor Load Monitors	Motor Protection Relays
Safety Relays	Sensor Interface Relays
Single Phase Monitors	Solid State Relays
Temperature Monitors	Thermistor Motor Protection Relays
Three Phase Monitors	Time Relays

Our further product range

Signal Converter CC-E and CC-U range	Power Supplies CP-E, CP-S, CP-C range
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Our catalogues
Catalogue
Available in the following languages: English, German, Russian, Italian, Swedish, Chinese

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Select product range
e.g. Logic Relays

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Product Guide > Low Voltage Products and Systems > Control Products > Electronic Relays and Controls > **Logic Relays**

Logic Relays

General Data System description Contacts

CL range logic relays are suitable for small and medium-sized control tasks and are able to substitute logic wiring in a quick and simple manner.

They can be used for applications in control as well as for timing functions, e.g.

- in buildings, lighting systems, air-conditioning systems, general control functions,
- in small machines and systems or as stand-alone control module for small applications.

Steps to the application of CL logic relays

- CL logic relay can be used easily, rapidly and comfortably without any time-consuming planning and programming.
- The user can discover the advantages and the benefit of these logic relays in no time at all.
- The CL logic relays provides for the control statements according to a simple circuit diagram.
- Setup, storage, simulation and documentation are performed using the compact and user-friendly CL-SOFT software (CL-LAS.P6002).

Software characteristics (CL-SOFT)

- Display on a PC monitor according to IEC, ANSI
- Up to 10 languages to choose
- Easy installation on all Microsoft Windows™ operating systems

Technical Data

- Logic relays
 - 8 or 12 digital inputs

Documentation and downloads
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Please select category

Catalogue

File Name	Language	Size
Catalogue 2006/2007 - Chapter "Logic relays CL range"	English	1.16 MB
CBA 22.2 (haz.loc.) Certificate - CL range logic relays and accessories	English	0.63 MB
Environmental Information - CL range logic relays and Display system, and their expansions, modules, power supplies and further accessories	English	0.02 MB
GL Certificate - CL range logic relays	English	0.81 MB
GOST Certificate - CL range logic relays and accessories	English Russian	1.20 MB
LR Certificate - CL range logic relays	English	0.19 MB
UL 508 Certificate - CL range logic relays and accessories	English	0.03 MB
CE Declaration of Conformity - Memory	English	0.07 MB

Declaration of conformity

Download area

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Electronic timers

CT range

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Electronic timers CT range Overview



2CDC 255 056 FD006

Special features and differences of CT-D, CT-E and CT-S range

Electronic timers CT-D range the modular timers

Ideally suited for installation
in distribution panels

- Diversity:
 - 2 multifunction timers
 - 10 single-function timers
- Devices with:
 - 1 or 2 c/o contacts
 - Control input: voltage-related triggering, polarized, capable of switching a parallel load
- Width of only 17.5 mm, this corresponds to one rail division in the distribution panel.
- Light-grey enclosure in RAL 7035, same colour as MDRC range

Electronic timers CT-E range the economic range

Perfect price-performance ratio
for OEM users

- Diversity:
 - 2 multifunction timers
 - 56 single-function timers
 - 4 switching relays
- Devices with:
 - solid-state output for contactless switching (CT-MKE, CT-AKE und CT-EKE)
- Wide connecting screws in M3 (Pozidrive 1) for easy and fast connection

Electronic timers CT-S range the high end timers

Universal and
economic

- Diversity:
 - 8 multifunction timers
 - 13 single-function timers
 - 8 switching relays
- Devices with:
 - 1 or 2 c/o contacts
 - 2nd c/o contact can be selected as instantaneous contact
 - Control input: volt-free or voltage-related triggering
 - Remote potentiometer connection: When an external potentiometer is connected, the internal potentiometer is disabled.
- Sealable transparent cover for protection against unauthorized changes of time and threshold values
- Integrated marker label

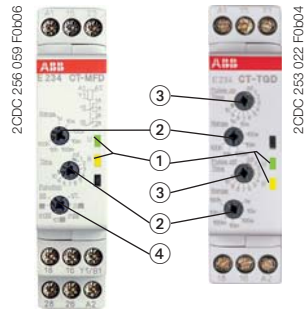
Electronic timers

CT range

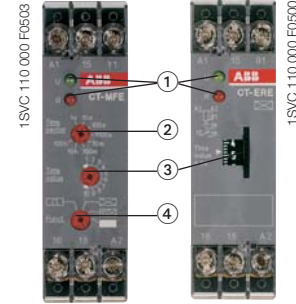
Overview

- ① LEDs for status indication
- ② Time range adjustment
- ③ Fine adjustment of the desired time delay
- ④ Preselection of the desired timing function
- ⑤ Set the 2nd c/o contact as an instantaneous contact

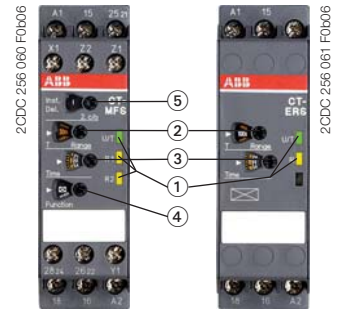
CT-D range



CT-E range



CT-S range



Timing function	multifunctional	single-functional	multifunctional	single-functional	multifunctional	single-functional
☒ ON-delay	CT-MFD	CT-ERD	CT-MFE, CT-MKE	CT-ERE, CT-EKE	CT-MVS, CT-MFS, CT-MBS, CT-WBS	CT-ERS
■ OFF-delay	CT-MFD	CT-AHD	CT-MFE	CT-AHE, CT-ARE, CT-AKE	CT-MVS, CT-MFS, CT-MBS	CT-APS, CT-AHS, CT-ARS, CT-VBS
☒■ ON- and OFF-delay					CT-MVS, CT-MXS, CT-MFS, CT-MBS	
1□☒ Impulse-ON	CT-MFD	CT-VWD	CT-MFE, CT-MKE	CT-VVE	CT-MVS, CT-MFS, CT-MBS, CT-WBS	
1□■ Impulse-OFF	CT-MFD			CT-AWE	CT-MVS, CT-MFS, CT-MBS	
1□☒ Impulse-ON and OFF					CT-MXS	
□☒ Flasher starting with ON	CT-MFD	CT-EBD	CT-MFE, CT-MKE		CT-MFS, CT-MBS, CT-WBS	
□■ Flasher starting with OFF	CT-MFD		CT-MFE, CT-MKE	CT-EBE	CT-MFS, CT-MBS, CT-WBS	
□☒ Flasher starting with ON or OFF					CT-MVS	
☒□ Pulse generator starting with ON or OFF		CT-TGD			CT-MXS	
□□ Pulse former	CT-MFD		CT-MFE		CT-MVS, CT-MXS, CT-MFS, CT-MBS	
△ Star-delta change-over		CT-SDD, CT-SAD				CT-SDS
△1□ Star-delta change-over with impulse					CT-MVS.2x, CT-MFS, CT-MBS	
△☒ Star-delta change-over twice ON-delayed				CT-YDE, CT-SDE		
☒+ □☒ □■ □ further functions (depending on device)					CT-MVS, CT-MXS, CT-MFS, CT-MBS, CT-WBS	
□ Switching relay				CT-IRE		CT-IRS

Technical data (extract)			
Time ranges	7 (0.05 s - 100 h) CT-SDD, CT-SAD: 4 (0.05 s - 10 min)	Multifunction devices: 8 (0.05 s - 100 h) Single-function devices: 5 single ranges (0.05-1 s, 0.1-10 s, 0.3-30 s, 3-300 s, 0.3-300 min)	10 (0.05 s - 300 h) CT-ARS, CT-SDS: 7 (0.05 s - 10 min)
Control supply voltage	Wide and multi ranges	Wide ranges	Single and dual ranges
Type and number of contacts	1 or 2 c/o contacts CT-SDD, CT-SAD: 2 n/o contacts	1 c/o contact CT-SDE: 1 n/o contact and 1 n/c contacts CT-MKE, CT-EKE, CT-AKE: 1 thyristor	1 or 2 c/o contacts CT-MVS.21, CT-MFS, CT-MBS: 2nd c/o contact selectable as inst. contact CT-SDS: 2 n/o contacts
Control inputs	voltage-related triggering, polarized, capable of switching a parallel load	voltage-related triggering, polarized CT-MFE, CT-AHE, CT-AWE: with auxiliary voltage	voltage-related triggering, non-polarized, capable of switching a parallel load CT-MFS, CT-MBS, CT-AHS: volt-free triggering

Electronic timers

CT range

Approvals and marks

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<input checked="" type="checkbox"/> existing <input type="checkbox"/> pending		CT-D																	
		CT-MFD.12	CT-MFD.21	CT-ERD.12	CT-ERD.22	CT-AHD.12	CT-AHD.22	CT-VWD.12	CT-EBD.12	CT-TGD.12	CT-TGD.22	CT-SDD.22	CT-SAD.22						
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		CT-MVS.12	CT-MVS.2x	CT-MXS.22	CT-MFS.21	CT-MBS.22	CT-WBS.22	CT-ERS.12	CT-ERS.2x	CT-APS.12	CT-APS.2x	CT-AHS.22	CT-ARS.11	CT-ARS.21	CT-VBS.1x	CT-SDS.2x		CT-IRS.1x	CT-IRS.2x	CT-IRS.3x
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Marks																				
	CE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	C-Tick	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



Electronic timers

CT-D range

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Electronic timers

CT-D range

Benefits and advantages

CT-D range - the modular timers

Ideally suited for installation in distribution panels



2CDC 255 088 F0b06

- Diversity:
 - 2 multifunction timers
 - 10 single-function timers
- Control supply voltages:
 - Wide range: 12-240 V AC/DC
 - Multi range: 24-48 V DC, 24-240 V AC
- 7 time ranges, from 0.05 s to 100 h or 4 time ranges, from 0.05 s - 10 min
- Width of only 17.5 mm
- Light-grey enclosure in RAL 7035
- Devices with:
 - 1 c/o contact (250 V / 6 A) or 2 c/o contacts (250 V / 5 A)
 - Control input: voltage-related triggering, polarized, capable of switching a parallel load

■ Approvals / Marks (partly pending)



Direct reading scales

Direct setting of the time delay without any additional calculation provides accurate time delay adjustment.



2CDC 253 066 F0006



2CDC 253 132 F0006

LEDs for status indication

All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

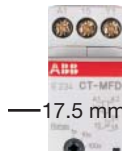
Connecting terminals

Wide terminal spacing allows connection of wires:

- 2 x 1.5 mm² (2 x 16 AWG) with wire end ferrules or
- 2 x 2.5 mm² (2 x 14 AWG) without ferrules.



2CDC 253 033 F0004



2CDC 253 021 F0004

Width 17,5 mm

With their width of 17.5 mm only, the CT-D range timers are ideally suited for installation in distribution panels.

Switching currents

The CT-D range timers allow an output load of up to 6 A on devices with 1 c/o contact and up to 5 A on devices with 2 c/o contacts.



2CDC 252 048 F0b06

Operating controls

① LEDs for status indication

U - green LED:

control supply voltage applied



timing

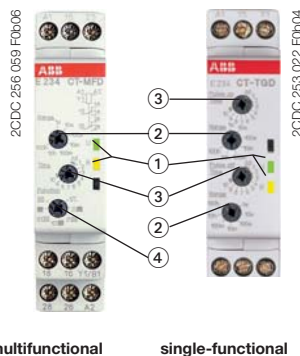
R, R1, R2 - yellow LED:

output relay energized

② Time range adjustment

③ Fine adjustment of the time delay

④ Preselection of the timing function



2CDC 256 089 F0b06

2CDC 253 022 F0b04

Synonyms

used expression	alternative expression(s)	used expression	alternative expression(s)
1 c/o contact	SPDT	voltage-related	wet / non-floating
2 c/o contacts	DPDT	volt-free	dry / floating

Electronic timers

CT-D range

Ordering details



Type	Rated control supply voltage	Control input	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
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Multifunction timers

CT-MFD: 7 functions ¹⁾, 7 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs

CT-MFD.12	24-48 V DC, 24-240 V AC	■	1SVR 500 020 R0000	1		0.060 / 0.132
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CT-MFD: 7 functions ¹⁾, 7 time ranges (0.05 s - 100 h), 2 c/o contacts, 2 LEDs

CT-MFD.21	12-240 V AC/DC	■	1SVR 500 020 R1100	1		0.065 / 0.143
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ON-delay timers ☒

CT-ERD: 7 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs

CT-ERD.12	24-48 V DC, 24-240 V AC		1SVR 500 100 R0000	1		0.060 / 0.132
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CT-ERD: 7 time ranges (0.05 s - 100 h), 2 c/o contacts, 2 LEDs

CT-ERD.22	24-48 V DC, 24-240 V AC		1SVR 500 100 R0100	1		0.065 / 0.143
------------------	----------------------------	--	---------------------------	---	--	---------------

OFF-delay timers ■

CT-AHD: 7 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs

CT-AHD.12	24-48 V DC, 24-240 V AC	■	1SVR 500 110 R0000	1		0.060 / 0.132
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CT-AHD: 7 time ranges (0.05 s - 100 h), 2 c/o contacts, 2 LEDs

CT-AHD.22	24-48 V DC, 24-240 V AC	■	1SVR 500 110 R0100	1		0.065 / 0.143
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¹⁾ Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Flasher starting with ON, Flasher starting with OFF, Pulse former

• Function diagrams.....13	• Connection diagrams.....16	• Technical data.....17
• Technical diagrams.....19	• Wiring notes.....20	• Dimensional drawings.....20

Electronic timers

CT-D range

Ordering details

1



Type	Rated control supply voltage	Control input	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
------	------------------------------	---------------	------------	-------------------	---------------	------------------------

Impulse-ON timers $\square \square \square$

CT-VWD: 7 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs

CT-VWD.12	24-48 V DC, 24-240 V AC		1SVR 500 130 R0000	1		0.060 / 0.132
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Flasher, starting with ON $\square \square \square$

CT-EBD: 7 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs

CT-EBD.12	24-48 V DC, 24-240 V AC		1SVR 500 150 R0000	1		0.060 / 0.132
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Pulse generators $\square \square \square$

CT-TGD: 2 x 7 time ranges (0.05 s - 100 h)²⁾, 1 c/o contact, 2 LEDs

CT-TGD.12	24-48 V DC, 24-240 V AC	■	1SVR 500 160 R0000	1		0.060 / 0.132
-----------	----------------------------	---	--------------------	---	--	---------------

CT-TGD: 2 x 7 time ranges (0.05 s - 100 h)²⁾, 2 c/o contacts, 2 LEDs

CT-TGD.22	24-48 V DC, 24-240 V AC	■	1SVR 500 160 R0100	1		0.065 / 0.143
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Star-delta timers \triangle

CT-SDD: 4 time ranges (0.05 s - 10 min), transition time 50 ms fixed, 2 n/o contacts, 3 LEDs

CT-SDD.22	24-48 V DC, 24-240 V AC		1SVR 500 211 R0100	1		0.065 / 0.143
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CT-SAD: 4 time ranges (0.05 s - 10 min), transition time adjustable, 2 n/o contacts, 3 LEDs

CT-SAD.22	24-48 V DC, 24-240 V AC		1SVR 500 210 R0100	1		0.065 / 0.143
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²⁾ ON and OFF times adjustable independently: 2 x 7 time ranges 0.05 s - 100 h

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• Technical diagrams.....19	• Wiring notes20	• Dimensional drawings.....20

Electronic timers

CT-D range

Function diagrams

Remarks

Legend

- Control supply voltage not applied / Output contact open
- Control supply voltage applied / Output contact closed
- A1-Y1/B1 Control input with voltage-related triggering

Terminal designations on the device and in the diagrams

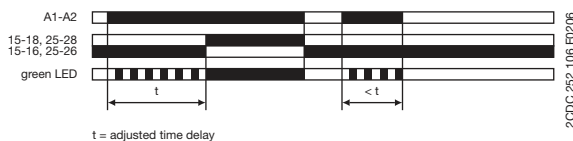
- The 1st c/o contact is always designated **15-16/18**.
- The 2nd c/o contact is designated **25-26/28**.
- The n/o contacts of the star-delta timers are designated with **17-18** and **17-28**.
- Control supply voltage is always applied to terminals **A1-A2**.

Function of the yellow LED

The yellow LED **R** glows as soon as the output relay energizes and turns off when the output relay de-energizes.

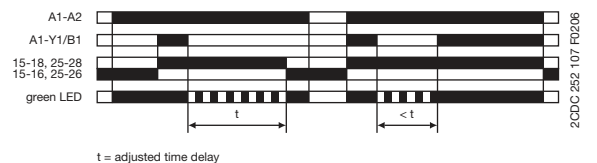
☒ **ON-delay** **(Delay on make)** **CT-ERD, CT-MFD**

This function requires continuous control supply voltage for timing. Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



■ **OFF-delay with auxiliary voltage** **(Delay on break)** **CT-AHD, CT-MFD**

This function requires continuous control supply voltage for timing. If control input **A1-Y1/B1** is closed, the output relay energizes immediately. If control input **A1-Y1/B1** is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de-energizes and the flashing green LED turns steady. If control input **A1-Y1/B1** recloses before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input **A1-Y1/B1** re-opens. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



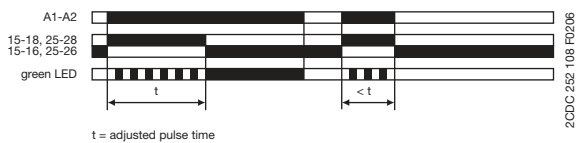
Electronic timers

CT-D range

Function diagrams

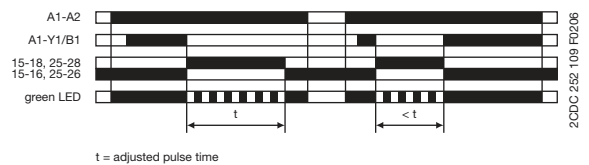
1. Impulse-ON (Interval) CT-VWD, CT-MFD

This function requires continuous control supply voltage for timing. The output relay energizes immediately when control supply voltage is applied and de-energizes after the set pulse time is complete. The green LED flashes during timing. When the selected pulse time is complete, the flashing green LED turns steady. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



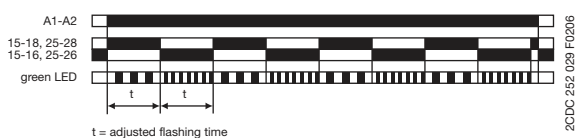
1. Impulse-OFF with auxiliary voltage (Trailing edge interval) CT-MFD

This function requires continuous control supply voltage for timing. If control supply voltage is applied, opening control input **A1-Y1/B1** energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady. Closing control input **A1-Y1/B1**, before the time delay is complete, de-energizes the output relay and resets the time delay. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



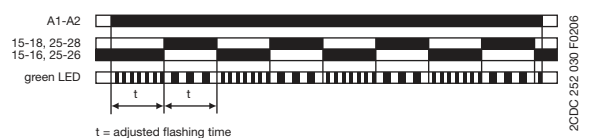
Flasher, starting with the ON time (Recycling equal times, ON first) CT-EBD, CT-MFD

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



Flasher, starting with the OFF time (Recycling equal times, OFF first) CT-MFD

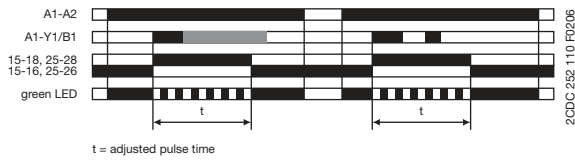
Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Control input **A1-Y1/B1** of the CT-MFD is disabled when this function is selected.



Electronic timers CT-D range Function diagrams

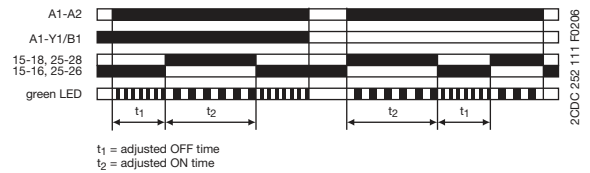
Pulse former (Single shot) CT-MFD

This function requires continuous control supply voltage for timing. Closing control input **A1-Y1/B1** energizes the output relay immediately and starts timing. Operating the control contact switch **A1-Y1/B1** during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input **A1-Y1/B1**. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



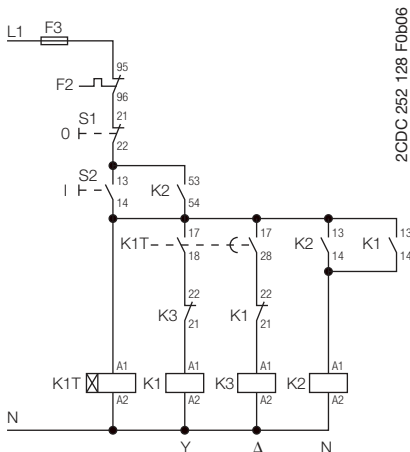
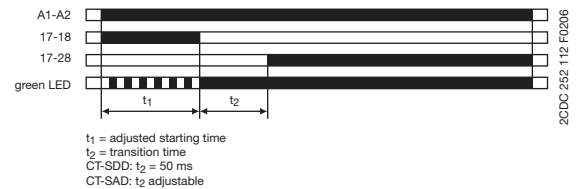
Pulse generator, starting with the ON or OFF time (Recycling unequal times, ON or OFF first) CT-TGD

This function requires continuous control supply voltage for timing. Applying control supply voltage, with open control input **A1-Y1/B1**, starts timing with an ON time first. Applying control supply voltage, with closed control input **A1-Y1/B1**, starts timing with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. The ON & OFF times are independently adjustable. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

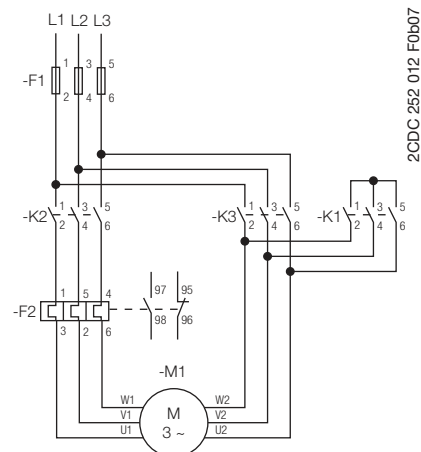


Star-delta change-over (Star-delta starting) CT-SDD, CT-SAD

This function requires continuous control supply voltage for timing. Applying control supply voltage to terminals **A1-A2**, energizes the star contactor connected to terminals **17-18** and begins the set starting time t_1 . The green LED flashes during timing. When the starting time is complete, the first output contact de-energizes the star contactor. Now, the transition time t_2 starts. When the transition time is complete, the second output contact energizes the delta contactor connected to terminals **17-28**. The delta contactor remains energized as long as control supply voltage is applied to the unit.



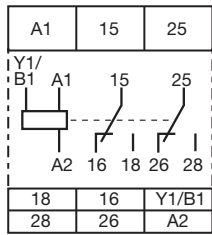
Control circuit diagram



Power circuit diagram

Electronic timers CT-D range Connection diagrams

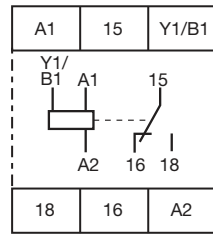
CT-MFD.21



2CDC 252 113 F0b06

A1-A2 Supply: 12-240 V AC/DC
15-16/18 1. c/o contact
25-26/28 2. c/o contact
A1-Y1/B1 Control input

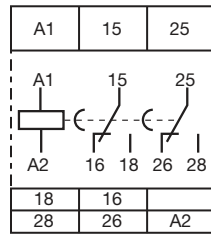
CT-MFD.12



2CDC 252 114 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
A1-Y1/B1 Control input

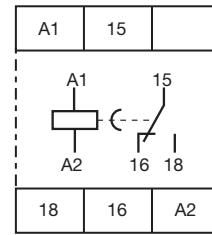
CT-ERD.22



2CDC 252 115 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
25-26/28 2. c/o contact

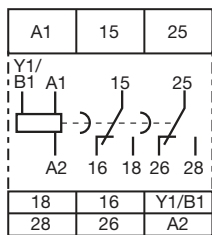
CT-ERD.12



2CDC 252 177 F0b05

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact

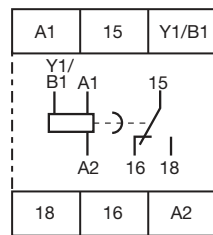
CT-AHD.22



2CDC 252 116 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
25-26/28 2. c/o contact
A1-Y1/B1 Control input

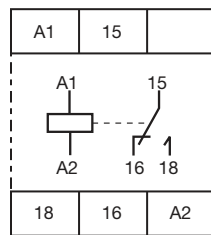
CT-AHD.12



2CDC 252 117 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
A1-Y1/B1 Control input

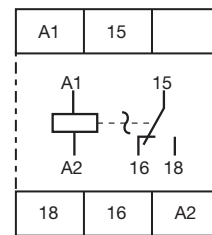
CT-VVD.12



2CDC 252 179 F0b05

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact

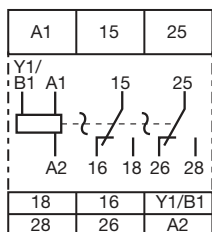
CT-EBD.12



2CDC 252 180 F0b05

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact

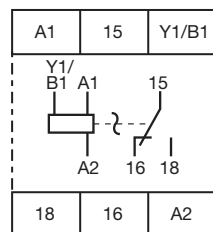
CT-TGD.22



2CDC 252 118 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
25-26/28 2. c/o contact
A1-Y1/B1 Control input

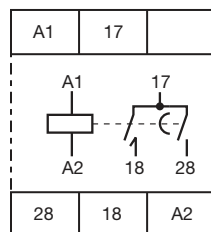
CT-TGD.12



2CDC 252 119 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
15-16/18 1. c/o contact
A1-Y1/B1 Control input

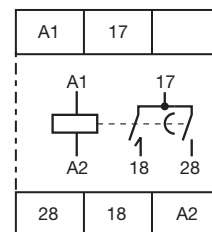
CT-SDD.22



2CDC 252 160 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
17-18 1. n/o contact (star contactor)
17-28 2. n/o contact (delta contactor)

CT-SAD.22



2CDC 252 160 F0b06

A1-A2 Supply: 24-48 V DC or 24-240 V AC
17-18 1. n/o contact (star contactor)
17-28 2. n/o contact (delta contactor)




Electronic timers

CT-D range

Technical data

1

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Type		CT-D with 1 c/o contact	CT-D with 2 c/o contacts
Input circuit - Supply circuit			
Rated control supply voltage U_s	A1-A2	24-240 V AC / 24-48 V DC	
	A1-A2	-	12-240 V AC/DC (CT-MFD.21)
Rated control supply voltage U_s tolerance		-15...+10 %	
Rated frequency	AC/DC versions	DC or 50/60 Hz	
	AC versions	50/60 Hz	
Frequency range	AC/DC versions	DC or 47-63 Hz	
	AC versions	47-63 Hz	
Typical current / power consumption	24 V DC	- / 0.6 W	see data sheet
	230 V AC	- / 1.3 VA	see data sheet
	115 V AC	- / 1.3 VA	see data sheet
Power failure buffering time		min. 20 ms	min. 30 ms
Input circuit - Control circuit			
Kind of triggering		voltage-related triggering	
Control input, Control function	A1-Y1/B1	start timing external	
Parallel load / polarized		yes / yes	
Maximum cable length to the control input		50 m - 100 pF/m	
Minimum control pulse length		30 ms	
Control voltage potential		see rated control supply voltage	
Current consumption of the control input		max. 4 mA	see data sheet
Timing circuit			
Time ranges	7 time ranges 0.05 s - 100 h	1.) 0.05-1 s 4.) 0.5-10 min	2.) 0.5-10 s 5.) 5-100 min 7.) 5-100 h
	4 time ranges 0.05 s - 10 min (CT-SDD, CT-SAD)	1.) 0.05-1 s	2.) 0.5-10 s 4.) 0.5-10 min
Recovery time		< 50 ms	
Accuracy within the rated control supply voltage tolerance		$\Delta t < 0.005\% / V$	
Accuracy within the temperature range		$\Delta t < 0.06\% / \text{°C}$	
Star-delta transition time	CT-SDD	fixed 50 ms	
	CT-SAD	adjustable: 20 -100 ms in steps of 10 ms	
Star-delta transition time tolerance	CT-SDD, CT-SAD	$\pm 3\text{ ms}$	
Indication of operational states			
Control supply voltage / timing	U: green LED	 : control supply voltage applied  : timing	
Relay status	R: yellow LED	 : output relay 1 or 2 energized	
Output circuit			
Kind of output	15-16/18	relay, 1 c/o contact	-
	15-16/18; 25-26/28	-	relay, 2 c/o contacts
	17-18; 17-28	relay, 2 n/o contacts (CT-SDD, CT-SAD)	
Contact material		Cd-free, see data sheet	
Rated operational voltage U_o		250 V	
Minimum switching voltage / minimum switching current		12 V / 100 mA	
Maximum switching voltage / maximum switching current		see load limit curves	
Rated operational current I_o (IEC 60947-5-1)	AC12 (resistive) at 230 V	6 A	5 A
	AC15 (inductive) at 230 V	3 A	3 A ¹⁾
	DC12 (resistive) at 24 V	6 A	5 A
	DC13 (inductive) at 24 V	2 A	3 A ¹⁾
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300	B 300 ²⁾
	max. rated operational voltage	300 V AC	
	max. continuous thermal current at B 300	5 A	5 A ²⁾
	max. making /breaking apparent power at B 300	3600/360 VA	3600/360 VA ²⁾

¹⁾ CT-MFD.21: Rated operational current AC15 (n/c contact) = 0.75 A; Rated operational current DC13 = 1 A

²⁾ CT-MFD.21 (n/c contact): Utilization category = C 300, max. continuous thermal current at C 300 = 2.5 A, Make / Break at C 300 = 1800/180 VA

Electronic timers

CT-D range

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Type		CT-D with 1 c/o contact	CT-D with 2 c/o contacts
Mechanical lifetime		30 x 10 ⁶ switching cycles	
Electrical lifetime	at AC12, 230 V, 4 A	0.1 x 10 ⁶ switching cycles	
Short-circuit proof / maximum fuse rating (IEC/EN 60947-5-1)	n/c contact	6 A fast-acting	
	n/o contact	10 A fast-acting	
General data			
Duty time		100%	
Repeat accuracy (constant parameters)		$\Delta t < \pm 0.5\%$	
Dimensions (W x H x D)		17.5 mm x 70 mm x 58 mm (0.69 x 2.76 x 2.28 inches)	17.5 mm x 80 mm x 58 mm (0.69 x 3.15 x 2.28 inches)
Weight		see ordering details	
Mounting		DIN rail (EN 60715), snap-mounting without any tool	
Mounting position		any	
Minimum distance to other units	horizontal / vertical	no / no	
Degree of protection	enclosure / terminals	IP50 / IP20	
Electrical connection			
Wire size	fine-strand with(out) wire end ferrule	2 x 0.5-1.5 mm ² (2 x 20-16 AWG) 1 x 0.5-2.5 mm ² (1 x 20-14 AWG)	
	rigid	2 x 0.5-1.5 mm ² (2 x 20-16 AWG) 1 x 0.5-4 mm ² (1 x 20-12 AWG)	
Stripping length		7 mm (0,28 inches)	
Tightening torque		0.5-0.8 Nm	
Environmental data			
Ambient temperature range	operation / storage	-20 ... +60 °C / -40 ... +85 °C	
Damp heat (cyclic) (IEC/EN 60068-2-30)		6 x 24 h cycles, 55 °C, 95 % RH	
Vibration (sinusoidal) (IEC/EN 60068-2-6)		40 m/s ² , 20 cycles, 10...150...10 Hz	
Shock (half-sine) (IEC/EN 60068-2-27)		100 m/s ² , 11 ms	
Isolation data			
Rated impulse withstand voltage U_{imp} between all isolated circuits (VDE 0110, IEC/EN 60664-1)		4 kV; 1.2/50 μ s	
Pollution category (IEC/EN 60664-1, VDE 0110, UL 508)		3	
Overvoltage category (IEC/EN 60664-1, VDE 0110, UL 508)		III	
Rated insulation voltage U_i	input circuit / output circuit	300 V	
	output circuit 1 / output circuit 2	300 V	
Basic insulation (IEC/EN 61140)	input circuit / output circuit	300 V	
Protective separation (VDE 0106 part 101 and part 101/A1; IEC/EN 61140)	input circuit / output circuit	250 V	
Power-frequency withstand voltage test (test voltage, routine test) between all isolated circuits		2.5 kV, 50 Hz, 1 s	
Standards			
Product standard		IEC 61812-1, EN 61812-1 + A11, DIN VDE 0435 part 2021	
Low Voltage Directive		2006/95/EC	
EMC Directive		2004/108/EC	
RoHS Directive		2002/95/EC	
Electromagnetic compatibility			
Interference immunity		IEC/EN 61000-6-1, IEC/EN 61000-6-2	
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)	
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)	
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 4 (2 kV L-L)	
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)	
Interference emission		IEC/EN 61000-6-3, IEC/EN 61000-6-4	
electromagnetic field (HF radiation resistance)	IEC/CISPR 22, EN 55022	Class B	
HF line emission	IEC/CISPR 22, EN 55022	Class B	

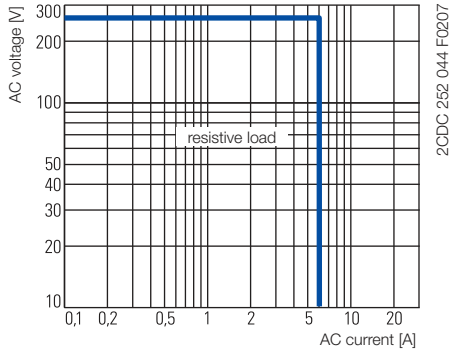
• Approvals 8

Electronic timers CT-D range Technical diagrams

Technical diagrams

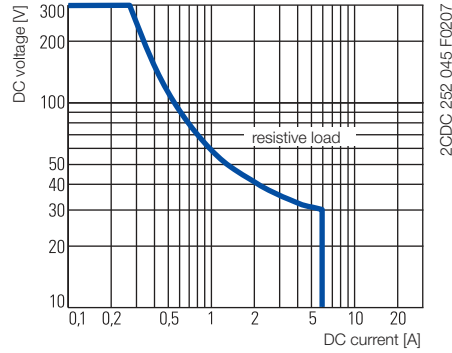
Load limit curves

AC load (resistive)

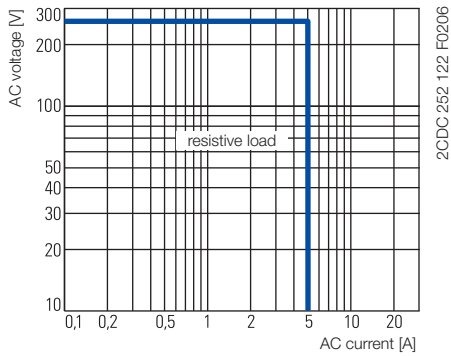


CT-D.1x

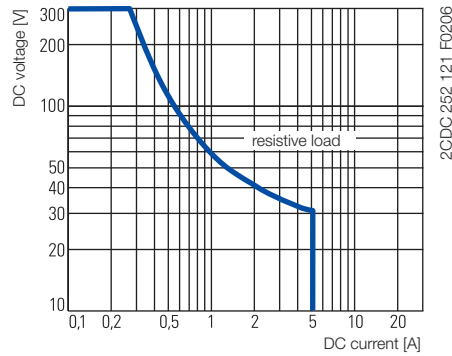
DC load (resistive)



CT-D.1x

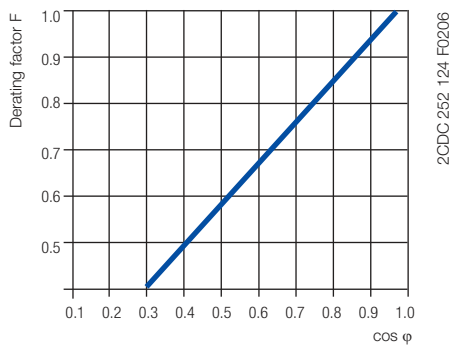


CT-D.2x

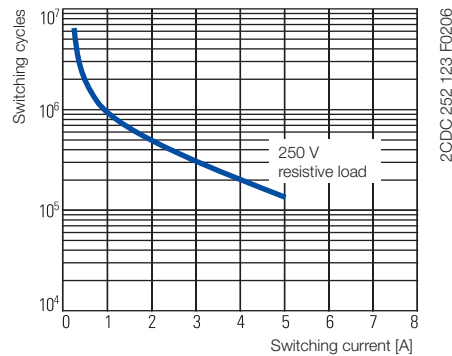


CT-D.2x

Derating factor F for inductive AC load



Contact lifetime



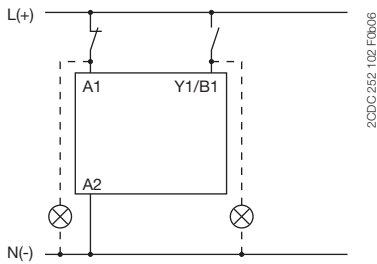
Electronic timers CT-D range

Wiring notes, Dimensional drawings

1

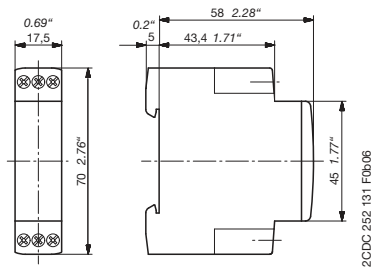
Wiring notes for devices with control input

A parallel load to the control input is possible

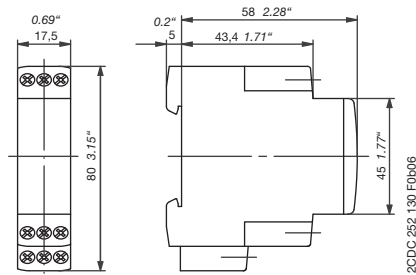


Dimensional drawings

dimensions in mm



CT-D devices with 1 c/o contact or 2 n/o contacts



CT-D devices with 2 c/o contacts



Electronic timers

CT-E range

Contents

Benefits and advantages.....	22
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Electronic timers

CT-E range

Benefits and advantages

CT-E range - the economy range

Perfect price-performance ratio for OEM users



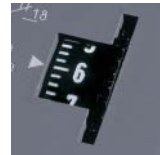
2CDC265 011 F0605

- Diversity:
 - 2 multifunction timers
 - 56 single-function timers
 - 4 switching relays
- Control supply voltages
 - Single range: 110-130 V AC, 220-240 V AC
 - Dual range: 24 V AC/DC
 - Wide range: 24-240 V AC/DC (CT-MFE)
- Time ranges:
 - 5 single time ranges: 0.05-1 s, 0.1-10 s, 0.3-30 s, 3-300 s, 0.3-30 min
 - 8 time ranges: 0,05 s - 100 h (CT-MFE)
- Devices with:
 - 1 c/o contact (250 V / 4 A) or solid-state output for high switching frequencies (thyristor 0.8 A)
- Wide connecting screws for easy and fast connection
- Switching relay CT-IRE for added switching contacts with either side-by-side or diagonal positioned connection terminals
- Approvals / Marks (depending on device)



Direct reading scales

Direct setting of the time delay without any additional calculation provides accurate time delay adjustment.



1SVC 110 000 F0508



1SVC 110 000 F0500

LEDs for status indication

All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

Connecting screws in M3 (Pozidrive 1)

Easy and fast tightening and release of the connecting screws with pozidrive, pan- or crosshead screwdriver.



1SVC 110 000 F0506

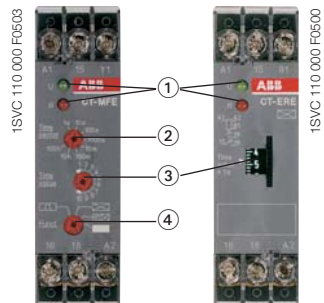
Operating controls

- ① LEDs for status indication

U - green LED:
 control supply voltage applied

R2: red LED:
 output relay energized

- ② Time range adjustment
- ③ Fine adjustment of the time delay
- ④ Preselection of the timing function



multifunctional

single-functional

Synonyms

used expression	alternative expression(s)	used expression	alternative expression(s)
1 c/o contact	SPDT	voltage-related	wet / non-floating
2 c/o contacts	DPDT	volt-free	dry / floating

Electronic timers

CT-E range

Ordering details



CT-MFE



CT-ERE



CT-AHE



CT-ARE

Type	Rated control supply voltage	Time range	Control input	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
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Multifunction timer

CT-MFE: 6 functions¹⁾, 8 time ranges (0.05 s - 100 h), 1 c/o contact, 2 LEDs

CT-MFE	24-240 V AC/DC	0.05 s - 100 h	■	1SVR 550 029 R8100	1		0.08 / 0.18
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ON-delay timers ☒

CT-ERE: 1 c/o contact, 2 LEDs

CT-ERE	24 V AC/DC, 220-240 V AC	0.1-10 s		1SVR 550 107 R1100	1		0.08 / 0.18
		0.3-30 s		1SVR 550 107 R4100	1		0.08 / 0.18
		3-300 s		1SVR 550 107 R2100	1		0.08 / 0.18
		0.3-30 min		1SVR 550 107 R5100	1		0.08 / 0.18
	110-130 V AC	0.1-10 s		1SVR 550 100 R1100	1		0.08 / 0.18
		0.3-30 s		1SVR 550 100 R4100	1		0.08 / 0.18
		3-300 s		1SVR 550 100 R2100	1		0.08 / 0.18
		0.3-30 min		1SVR 550 100 R5100	1		0.08 / 0.18

OFF-delay timers ■

CT-AHE: 1 c/o contact, 2 LEDs

CT-AHE	24 V AC/DC	0.1-10 s	■	1SVR 550 118 R1100	1		0.08 / 0.18
		0.3-30 s	■	1SVR 550 118 R4100	1		0.08 / 0.18
		3-300 s	■	1SVR 550 118 R2100	1		0.08 / 0.18
	110-130 V AC	0.1-10 s	■	1SVR 550 110 R1100	1		0.08 / 0.18
		0.3-30 s	■	1SVR 550 110 R4100	1		0.08 / 0.18
		3-300 s	■	1SVR 550 110 R2100	1		0.08 / 0.18
	220-240 V AC	0.1-10 s	■	1SVR 550 111 R1100	1		0.08 / 0.18
		0.3-30 s	■	1SVR 550 111 R4100	1		0.08 / 0.18
		3-300 s	■	1SVR 550 111 R2100	1		0.08 / 0.18

CT-ARE: without auxiliary voltage, 1 c/o contact, 1 LED

CT-ARE	24 V AC/DC, 220-240 V AC	0.1-10 s		1SVR 550 127 R1100	1		0.08 / 0.18
		0.3-30 s		1SVR 550 127 R4100	1		0.08 / 0.18
	110-130 V AC	0.1-10 s		1SVR 550 120 R1100	1		0.08 / 0.18
		0.3-30 s		1SVR 550 120 R4100	1		0.08 / 0.18

¹⁾ Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Flasher starting with ON, Flasher starting with OFF, Pulse former

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Electronic timers

CT-E range

Ordering details

1



Type	Rated control supply voltage	Time range	Control input	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
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Impulse-ON timers 1□□

CT-VWE: 1 c/o contact, 2 LEDs

CT-VWE	24 V AC/DC, 220-240 V AC	0.1-10 s		1SVR 550 137 R1100	1		0.08 / 0.18
		0.3-30 s		1SVR 550 137 R4100	1		0.08 / 0.18
		3-300 s		1SVR 550 137 R2100	1		0.08 / 0.18
	110-130 V AC	0.1-10 s		1SVR 550 130 R1100	1		0.08 / 0.18
		0.3-30 s		1SVR 550 130 R4100	1		0.08 / 0.18
		3-300 s		1SVR 550 130 R2100	1		0.08 / 0.18

Impulse-OFF timers 1□■

CT-AWE: without auxiliary voltage, 1 c/o contact, 2 LEDs

CT-AWE	24 V AC/DC	0.05-1 s		1SVR 550 158 R3100	1		0.08 / 0.18
	110-130 V AC			1SVR 550 150 R3100	1		0.08 / 0.18
	220-240 V AC			1SVR 550 151 R3100	1		0.08 / 0.18

CT-AWE: with auxiliary voltage, 1 c/o contact, 2 LEDs

CT-AWE	24 V AC/DC	0.1-10 s	■	1SVR 550 148 R1100	1		0.08 / 0.18
		0.3-30 s	■	1SVR 550 148 R4100	1		0.08 / 0.18
		3-300 s	■	1SVR 550 148 R2100	1		0.08 / 0.18
	110-130 V AC	0.1-10 s	■	1SVR 550 140 R1100	1		0.08 / 0.18
		0.3-30 s	■	1SVR 550 140 R4100	1		0.08 / 0.18
		3-300 s	■	1SVR 550 140 R2100	1		0.08 / 0.18
	220-240 V AC	0.1-10 s	■	1SVR 550 141 R1100	1		0.08 / 0.18
		0.3-30 s	■	1SVR 550 141 R4100	1		0.08 / 0.18
		3-300 s	■	1SVR 550 141 R2100	1		0.08 / 0.18

Flasher, starting with OFF 1□■

CT-EBE: with symmetrical ON & OFF times, 1 c/o contact, 2 LEDs

CT-EBE	24 V AC/DC, 220-240 V AC	0.1-10 s		1SVR 550 167 R1100	1		0.08 / 0.18
	110-130 V AC			1SVR 550 160 R1100	1		0.08 / 0.18

Star-delta timers Δ□□, Δ1□

CT-YDE: ON-delayed, OFF-delayed without auxiliary voltage, 1 c/o contact, 2 LEDs

CT-YDE	24 V AC/DC, 220-240 V AC	0.1-10 s		1SVR 550 207 R1100	1		0.08 / 0.18
		0.3-30 s		1SVR 550 207 R4100	1		0.08 / 0.18
		3-300 s		1SVR 550 207 R2100	1		0.08 / 0.18
	110-130 V AC	0.1-10 s		1SVR 550 200 R1100	1		0.08 / 0.18
		0.3-30 s		1SVR 550 200 R4100	1		0.08 / 0.18
		3-300 s		1SVR 550 200 R2100	1		0.08 / 0.18

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Electronic timers

CT-E range

Ordering details

2CDC 251 059 F0603



CT-SDE

2CDC 251 128 F0604



CT-IRE

1SVR 550 019 F0000



CT-MKE

1SVR 550 509 F2000



CT-EKE

1SVR 550 519 F1000



CT-AKE

Type	Rated control supply voltage	Time range	Control input	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
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CT-SDE: ON-delayed with fixed transition time, 1 n/c contact, 1 n/o contact, internally wired, 2 LEDs

CT-SDE	24 V AC/DC, 220-240 V AC	0.3-30 s		1SVR 550 217 R4100	1		0.08 / 0.18
	110-130 V AC			1SVR 550 210 R4100	1		0.08 / 0.18
	380-415 V AC			1SVR 550 212 R4100	1		0.08 / 0.18

Switching relays

CT-IRE: Impulse-OFF, A1/A2 diagonally, 1 c/o contact, 2 LEDs

CT-IRE	24 V AC/DC			1SVR 550 228 R9100	1		0.08 / 0.18
	220-240 V AC/DC			1SVR 550 221 R9100	1		0.08 / 0.18

CT-IRE: Impulse-OFF, A1/A2 on top, 1 c/o contact, 2 LEDs

CT-IRE	24 V AC/DC			1SVR 550 238 R9100	1		0.08 / 0.18
	220-240 V AC/DC			1SVR 550 231 R9100	1		0.08 / 0.18

Solid-state output / contactless

Multifunction timer

CT-MKE: 4 functions¹⁾, solid-state output, functions and time range selection via external jumpers, 1 LED

CT-MKE	24-240 V AC/DC	0.1-10 s, 3-300 s		1SVR 550 019 R0000	1		0.08 / 0.18
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ON-delay timers

CT-EKE: solid-state output, 1 LED

CT-EKE	24-240 V AC/DC	0.1-10 s		1SVR 550 509 R1000	1		0.08 / 0.18
		0.3-30 s		1SVR 550 509 R4000	1		0.08 / 0.18
		3-300 s		1SVR 550 509 R2000	1		0.08 / 0.18

OFF-delay timers

CT-AKE: solid-state output, 1 LED

CT-AKE	24-240 V AC	0.1-10 s		1SVR 550 519 R1000	1		0.08 / 0.18
		0.3-30 s		1SVR 550 519 R4000	1		0.08 / 0.18
		3-300 s		1SVR 550 519 R2000	1		0.08 / 0.18

Notice:

CT...KE are solid-state timers with thyristor output for 2-wire applications. They are connected directly in series with the control coil of contactors or relays. Voltage should not be applied without a load connected, because there is no current limiting in the unit.

¹⁾ Functions: ON-delay (AC/DC), Impulse-ON (AC only), Flasher starting with ON (AC only), Flasher starting with OFF (AC only)

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Electronic timers

CT-E range

Function diagrams

1 Remarks

Legend

- Control supply voltage not applied / Output contact open
- Control supply voltage applied / Output contact closed
- A1-Y1/B1 Control input with voltage-related triggering

Terminal designations on the device and in the diagrams

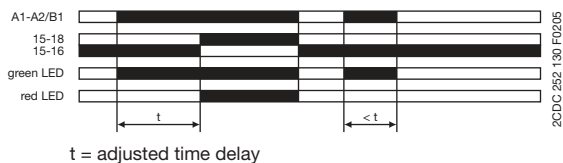
- The c/o contact is always designated **15-16/18**.
- The n/o contacts are designated with **15-16** and **15-18**.
- Control supply voltage is always applied to terminals **A1-A2/B1**.

Function of the red LED

The red LED **R** glows as soon as the output relay energizes and turns off when the output relay de-energizes.

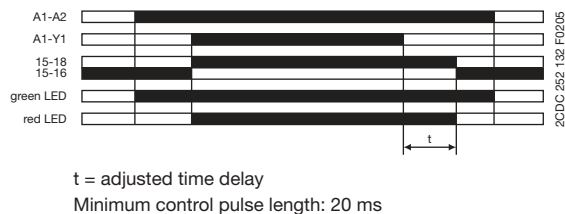
☒ ON-delay (Delay on make) CT-ERE, CT-MFE

Timing begins when control supply voltage is applied. When the selected time delay is complete, the output relay energizes. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset. Interrupting control supply voltage before the time delay is complete, resets the time delay. The output relay does not energize. Control input **A1-Y1** of the CT-MFE is disabled when this function is selected.



■ OFF-delay, with auxiliary voltage (Delay on break) CT-AHE, CT-MFE

Timing requires continuous control supply voltage for timing. Timing is controlled by a control input, connected to terminals **A1-Y1**. If the control contact is closed, the output relay energizes. If control input **A1-Y1** is opened, the selected time delay starts. When the time delay is complete, the output relay de-energizes. If control input **A1-Y1** closes before the time delay is complete, the time delay is reset. Timing starts again when the control input re-opens.



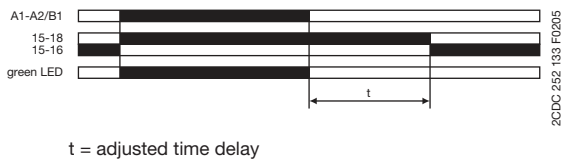
Electronic timers

CT-E range

Function diagrams

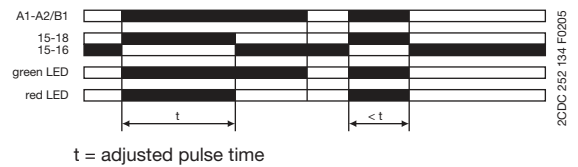
OFF-delay, without auxiliary voltage (true delay on break) CT-ARE

The OFF-delay function without auxiliary voltage does not require control supply voltage for timing. Applying control supply voltage, energizes the output relay. If control supply voltage is interrupted, the OFF-delay starts. When timing is complete, the output relay de-energizes. If control supply voltage is re-applied, before the time delay is complete, the time delay is reset and the output relay remains energized. Control supply voltage must be applied for the minimum energizing time (200 ms), for proper operation.



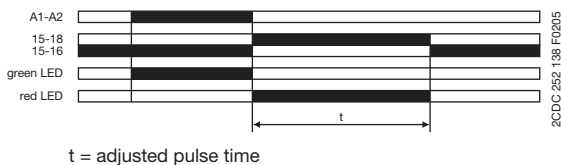
Impulse-ON (Interval) CT-VWE, CT-MFE

The output relay energizes immediately when control supply voltage is applied and de-energizes when the selected time delay is complete. If control supply voltage is interrupted before the time delay is complete, the output relay de-energizes and the time delay is reset. The control input **A1-Y1** of the CT-MFE has to be jumpered if this time function is configured.



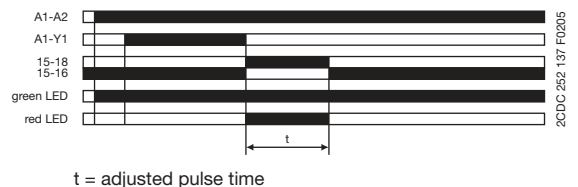
Impulse-OFF, without auxiliary voltage (True trailing edge interval) CT-AWE

The Impulse-OFF function without auxiliary voltage does not require control supply voltage for timing. If control supply voltage is interrupted, the output relay energizes and the OFF time starts. When timing is complete, the output relay de-energizes. If control supply voltage is re-applied, before the time delay is complete, the time delay is reset and the output relay de-energizes. Control supply voltage must be applied for the minimum energizing time (200 ms), for proper operation.



Impulse-OFF, with auxiliary voltage (Trailing edge interval) CT-AWE

This function requires continuous control supply voltage. Opening control input **A1-Y1**, energizes the output relay immediately and timing begins. When the selected time delay is complete, the output relay de-energizes. Interrupting control supply voltage or closing control input **A1-Y1**, before the time delay is complete, de-energizes the output relay and resets the time delay.



Electronic timers

CT-E range

Function diagrams

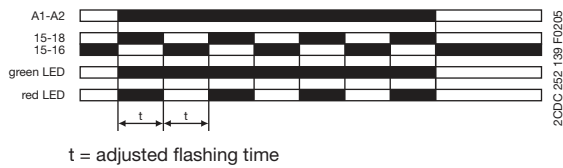
1

Flasher starting with ON (Recycling equal times, ON first) CT-MFE

Applying control supply voltage, starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

Control input **A1-Y1** of the CT-MFE is disabled when this function is selected.

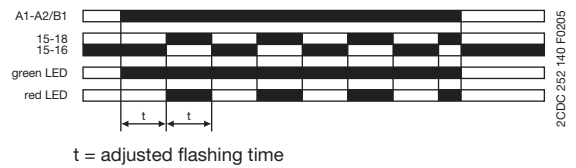


Flasher starting with OFF (Recycling equal times, OFF first) CT-EBE, CT-MFE

Applying control supply voltage, starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

Control input **A1-Y1** of the CT-MFE is disabled when this function is selected.

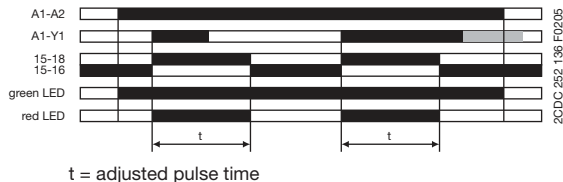


Pulse former (Single shot) CT-MFE

Closing the control input connected to terminals **A1-Y1**, with control supply voltage applied, energizes the output relay for the selected ON time. When the ON time is complete, the output relay de-energizes. Operating the control input switch **A1-Y1** during the time delay has no effect.

After the time delay is complete, it can be restarted by closing control input **A1-Y1**.

If control supply voltage is interrupted during timing, the output relay de-energizes and the ON time is reset.



Switching relay CT-IRE

The switching relay may be used to increase the number of available contacts or to reinforce contacts, or as a coupling/decoupling interface.

Applying control supply voltage, energizes the output relay. The output relay de-energizes if supply voltage is interrupted.



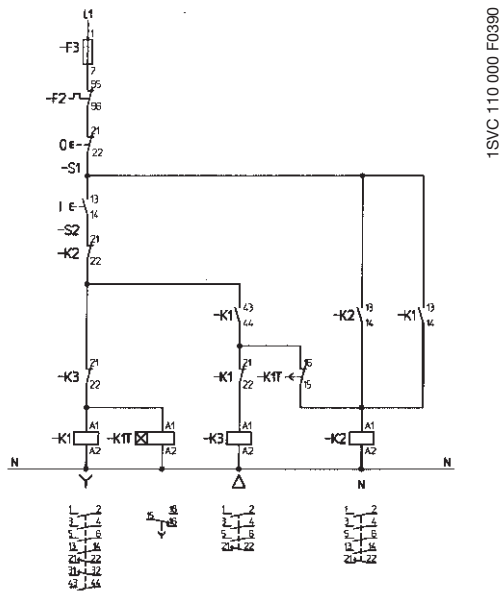
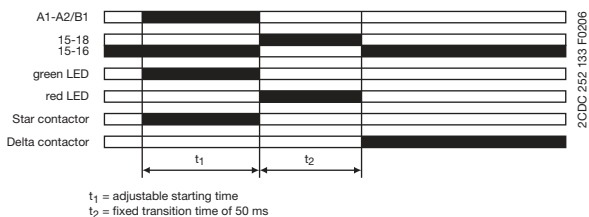
Electronic timers CT-E range Function diagrams

⚡ Star-delta change-over CT-YDE

Applying control supply voltage, energizes the star contactor (K1) and the line contactor (K2) and begins the set starting time.

When the starting time is complete, contact 15-16 de-energizes the star contactor (K1). Now, the fixed transition time starts.

When the transition time is complete, contact 15-16 energizes the delta contactor (K3).



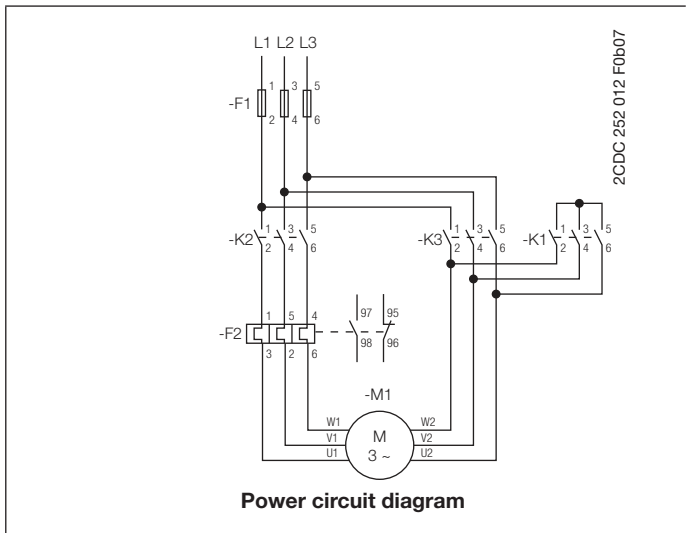
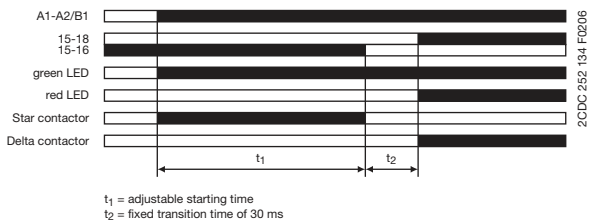
Control circuit diagram

⚡ Star-delta change-over CT-SDE

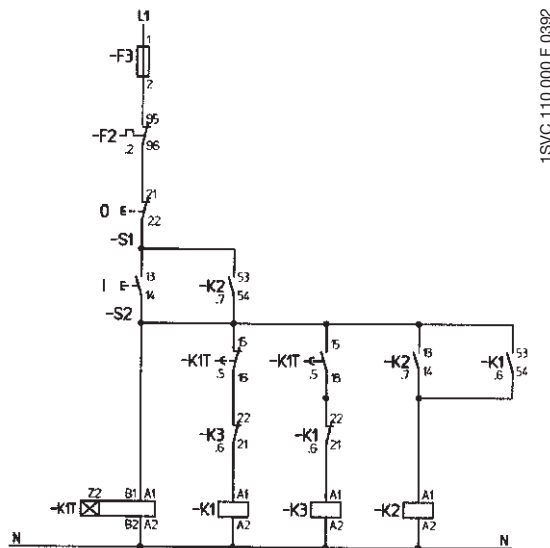
Applying control supply voltage, energizes the star contactor (K1) and the line contactor (K2) and begins the set starting time.

When the starting time is complete, contact 15-16 de-energizes the star contactor (K1). Now, the fixed transition time starts.

When the transition time is complete, contact 15-18 energizes the delta contactor (K3).



Power circuit diagram



Control circuit diagram

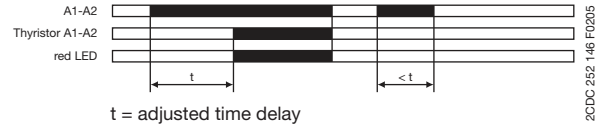
Electronic timers CT-E range Function diagrams

Multifunction timer CT-MKE

Functions and time ranges are programmed by simply plugging in external wire jumpers.

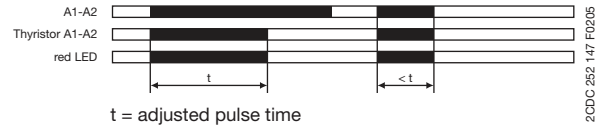
ON-delay (Delay on Make)

Without external connection. Timing begins when control supply voltage is applied to terminal **A1** and the load connected in series with **A2**. When the selected time delay is complete, the load connected to **A1-A2** energizes. If control supply voltage is interrupted, the load de-energizes and the time delay is reset. Interrupting control supply voltage before the time delay is complete, resets the time delay. The load does not energize.



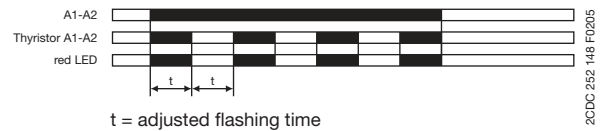
Impulse-ON (Interval)

External connection **X1-X4** required. The load energizes and timing starts when control supply voltage is applied to terminal **A1** and the load connected in series with **A2**. When the selected time delay is complete, the load de-energizes. Interrupting control supply voltage before the time delay is complete, de-energizes the load and resets the time delay.



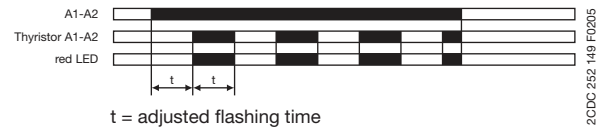
Flasher, starting with ON

External connection **X1-X4** and **X2-X4** required. When control supply voltage is applied to terminal **A1** and the load connected in series with **A2**, the load energizes and de-energizes with the selected ON & OFF times. The ON & OFF times are equal. The cycle starts with an ON time first (load energized). If control supply voltage is interrupted, the load de-energizes and the time delay is reset.



Flasher, starting with OFF

External connection **X2-X4** required. When control supply voltage is applied to terminal **A1** and the load connected in series with **A2**, the load energizes and de-energizes with the selected ON & OFF times. The ON & OFF times are equal. The cycle starts with an OFF time first (load de-energized). If control supply voltage is interrupted, the load de-energizes and the time delay is reset.



Programming the time ranges

X₃-X₄ jumpered: 0,1-10 s

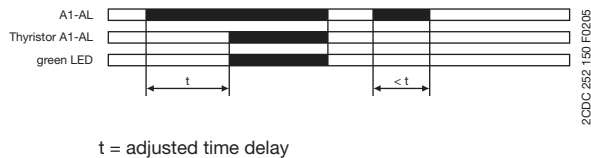
X₃-X₄ open: 3-300 s

ON-delay (Delay on make) CT-EKE

Timing begins when control supply voltage is applied to terminal **A1** and the load connected in series with **AL**. When the selected time delay is complete, the load energizes. The green LED glows as long as the load is energized.

If control supply voltage is interrupted, the load de-energizes and the time delay is reset.

Interrupting control supply voltage before the time delay is complete, resets the time delay. The load does not energize.



OFF-delay, with auxiliary voltage (Delay on break) CT-AKE

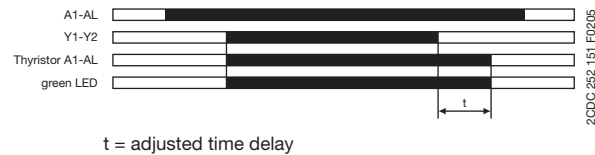
The OFF-delay function with auxiliary voltage requires continuous control supply voltage at terminal **A1** and the load connected in series with **AL**, for timing.

Timing is controlled by a control input, connected to terminals **Y2-A2**. When the control input closes, the load energizes. If the control input opens, the selected time delay starts (minimum control pulse length is 20 ms). The green LED glows as long as the load is energized.

When the selected time delay is complete, the load de-energizes.

If control input **Y2-A2** closes before the time delay is complete, the time delay is reset and the load remains energized. Timing starts again when the control input re-opens.

Interrupting control supply voltage resets the time delay and de-energizes the load.

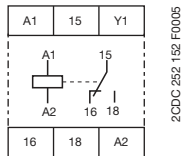


Notice:

CT...KE are solid-state timers with thyristor output for 2-wire applications. They are connected directly in series with the control coil of contactors or relays. Voltage should not be applied without a load connected, because there is no current limiting in the unit.

Electronic timers CT-E range Connection diagrams

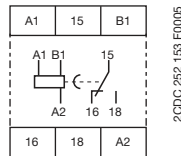
CT-MFE



A1-A2 Supply: 24-240 V AC/DC

A1-Y1 Control input
15-16/18 c/o contact

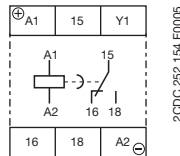
CT-ERE



A1-A2 Supply: 220-240 V AC or 110-130 V AC

A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

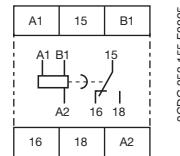
CT-AHE ¹⁾



A1(+)-A2(-) Supply: 24 V AC/DC or 110-240 V AC or 220-240 V AC

A1-Y1 Control input
15-16/18 c/o contact

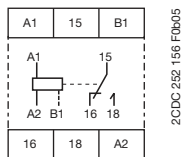
CT-ARE



A1-A2 Supply: 220-240 V AC or 110-130 V AC

A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

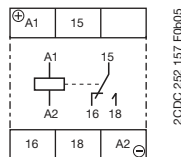
CT-VWE



A1-A2 Supply: 220-240 V AC or 110-130 V AC

A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

CT-AWE

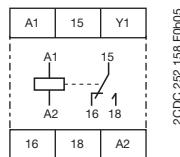


Device without aux. voltage

A1(+)-A2(-) Supply: 24 V AC/DC or 110-240 V AC or 220-240 V AC

15-16/18 c/o contact

CT-AWE ¹⁾

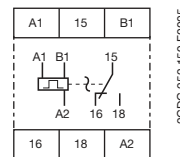


Device with aux. voltage

A1-A2 Supply: 24 V AC/DC or 110-240 V AC or 220-240 V AC

A1-Y1 Control input
15-16/18 c/o contact

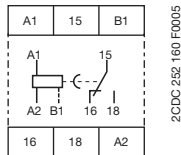
CT-EBE



A1-A2 Supply: 220-240 V AC or 110-130 V AC

A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

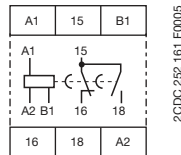
CT-YDE



A1-A2 Supply: 220-240 V AC or 110-130 V AC

A1-B1 Supply: 24 V AC/DC
15-16/18 c/o contact

CT-SDE

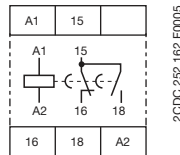


Device: 1SVR 550 217 R4100

A1-A2 Supply: 220-240 V AC
A1-B1 Supply: 24 V AC/DC

15-16/18 c/o contact

CT-SDE

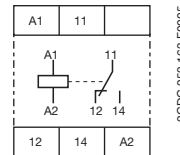


Devices: 1SVR 550 210 R4100, 1SVR 550 212 R4100

A1-A2 Supply: 110-130 V AC or 380-415 V AC

15-16/18 c/o contact

CT-IRE

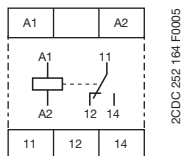


Supply terminals diagonally positioned

A1-A2 Supply: 24 V AC/DC or 220-240 V AC/DC

11-12/14 c/o contact

CT-IRE

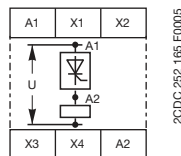


Supply terminals on one side of the device

A1-A2 Supply: 24 V AC/DC or 220-240 V AC/DC

11-12/14 c/o contact

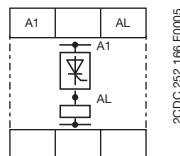
CT-MKE



A1-A2 Supply: 24-240 V AC/DC

A1-A2 Thyristor
X1-X4 Timing function adjustment
X2-X4 Timing function adjustment
X3-X4 Time range adjustment
(Details see function diagrams)

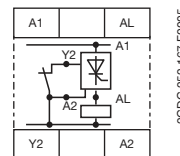
CT-EKE



A1-AL Supply: 24-240 V AC/DC

A1-AL Thyristor

CT-AKE



A1-AL Supply: 24-240 V AC

A1-AL Thyristor
Y2-A2 Control input



¹⁾ Wiring notes34

Electronic timers

CT-E range

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Type		CT-E (relays)	CT-E (solide-state)
Input circuit - Supply circuit			
Rated control supply voltage U_s	A1-A2, A1-AL	24-240 V AC/DC	
	A1-A2, A1-AL	24-240 V AC	
	A1-A2	110-130 V AC	-
	A1-A2	220-240 V AC	-
	A1-A2	380-415 V AC	-
	A1-B1	24 V AC/DC	-
Rated control supply voltage U_s tolerance		-15...+10 %	
Rated frequency	AC/DC versions	DC or 50/60 Hz	
	AC versions	50/60 Hz	
Current / power consumption	24-240 V AC/DC, 24-240 V AC	approx. 1.0-2.0 VA/W	
	110-130 V AC, 220-240 V AC	approx. 2.0 VA	-
	380-415 V AC	approx. 3.0 VA	-
	24 V AC/DC	approx. 1.0 VA/W	-
Current consumption while timing		-	≤ 2 mA (24-60 V AC/DC) ≤ 8 mA (60-240 V AC/DC)
Input circuit - Control circuit			
Kind of triggering		voltage-related triggering	-
Control input, Control function	A1-Y1	start timing external	-
Parallel load / polarized		no / yes ¹⁾	-
Minimum control pulse length		20 ms	-
Control voltage potential		see U_s	-
Timing circuit			
Time ranges	1 of 5 time ranges per singlefunction device	0.05-1 s 0.1-10 s 0.3-30 s 3-300 s 0.3-30 min	
	8 time ranges 0.05 s - 100 h (CT-MFE)	1.) 0.05-1 s 2.) 0.5-10 s 3.) 5-100 s 4.) 50-1000 s 5.) 0.5-10 min 6.) 5-100 min 7.) 0.5-10 h 8.) 5-100 h	-
	2 time ranges 0.1-300 s (CT-MKE)	-	1.) 0.1-10 s 2.) 3-300 s
Recovery time		<50 ms CT-ARE: <200 ms CT-AWE, CT-SDE: <400 ms CT-YDE: <500 ms	CT-MKE: <100 ms CT-AKE: <300 ms
Repeat accuracy within the rated control supply voltage tolerance		$\Delta t < 0.5\% / V$	
Repeat accuracy within the temperature range		$\Delta t < 0.1\% / \text{°C}$	
		CT-MFE: $\Delta t < 0.06\% / \text{°C}$	-
Star-delta transition time	CT-YDE / CT-SDE	50 ms / 30 ms	-
Minimum energizing time	CT-ARE	200 ms	-
Indication of operational states			
Control supply voltage	U: green LED	 : control supply voltage applied	
Relay status	R: red LED	 : output relay energized	
Output circuit			
Kind of output	15-16/18	relay, 1 c/o contact	-
	A1-A2, A1-AL	-	Thyristor
Contact material		AgCdO	-
Rated operational voltage U_e (VDE 0110, IEC 60947-1)		250 V	
Maximum switching voltage		250 V AC, 250 V DC	-
Rated operational current I_e (IEC 60947-5-1)	AC12 (resistive) at 230 V	4 A	-
	AC15 (inductive) at 230 V	3 A	-
	DC12 (resistive) at 24 V	4 A	-
	DC13 (inductive) at 24 V	2 A	-
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300	-
	max. rated operational voltage	300 V AC	-
	max. continuous thermal current at B 300	5 A	-
	max. making /breaking apparent power at B 300	3600/360 VA	-

¹⁾ CT-MFE: yes / no

Electronic timers

CT-E range

Technical data

1

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Type		CT-E (relays)	CT-E (solid-state)
Mechanical lifetime		30×10^6 switching cycles	-
Electrical lifetime	at AC12, 230 V, 4 A	0.1×10^6 switching cycles	-
Short circuit proof, maximum fuse rating	n/c contact	10 A fast-acting, CT-ARE: 5 A	-
	n/o contact	10 A fast-acting, CT-ARE: 5 A	-
Minimum load current		-	CT-MKE: 20 mA CT-EKE, CT-AKE: 10 mA
Maximum load current		-	CT-MKE: 0.8 A at $T_a = 20\text{ °C}$ CT-EKE, CT-AKE: 0.7 A
Load current reduction / Derating		-	10 mA/°C
Maximum surge current		-	CT-MKE: $\leq 20\text{ A}$ for $t \leq 20\text{ ms}$ CT-EKE, CT-AKE: $\leq 15\text{ A}$
Voltage drop in connected state		-	$\leq 3\text{ V}$
Cable length between solid-state timer and connected load at 50 Hz and a cable capacity of 100 pF/m :	at 24 V AC	-	220 m / 22 nF
	at 42 V AC	-	100 m / 10 nF
	at 60 V AC	-	65 m / 6.5 nF
	at 110 V AC	-	50 m / 5 nF
	at 240 V AC	-	22 m / 2.2 nF
General data			
Duty time		100 %	
Repeat accuracy (constant parameters)		$\Delta t < 1\text{ %}$	
Dimensions (W x H x D)		22.5 mm x 78.5 mm x 78 mm (0.886 inch x 3.09 inch x 3.07 inch)	
Weight		approx. 80 g (0.176 lb)	
Mounting		DIN rail (EN 60715)	
Mounting position		any	
Minimum distance to other units	horizontal / vertical	no / no	
Degree of protection	enclosure / terminals	IP50 / IP20	
Electrical connection			
Wire size	fine-strand	with wire end ferrule	$2 \times 0.75\text{-}1.5\text{ mm}^2$ (2 x 18-16 AWG)
		without wire end ferrule	$2 \times 1\text{-}1.5\text{ mm}^2$ (2 x 18-16 AWG)
	rigid		$2 \times 0.75\text{-}1.5\text{ mm}^2$ (2 x 18-16 AWG)
Tightening torque		10 mm (0.39 inch)	
Tightening torque		0.6-0.8 Nm	
Environmental data			
Ambient temperature range	operation / storage	$-20\text{...}+60\text{ °C}$ / $-40\text{...}+85\text{ °C}$	
Damp heat (IEC 68-2-30)		24 h cycles, 55 °C, 93 % rel., 96 h	
Operational reliability (IEC 68-2-6)		6 g	
Mechanical resistance (IEC 68-2-6)		10 g	
Isolation data			
Rated impulse withstand voltage U_{imp} between all isolated circuits (VDE 0110, IEC 664)		4 kV; 1.2/50 μs	
Pollution category (VDE 0110, IEC 664, IEC 255-5)		III/C	
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)		III/C	
Test voltage between all isolated circuits (type test)		2.5 kV, 50 Hz, 1 s	
Rated insulation voltage U_i between supply circuit, control circuit and output circuit (VDE 0110, IEC 60947-1)		300 V (supply up to 240 V)	
		500 V (supply up to 440 V)	
Standards			
Product standard		IEC 61812-1, EN 61812-1 + A11, DIN VDE 0435 Teil 2021	
Low Voltage Directive		2006/95/EC	
EMC Directive		2004/108/EC	

Electronic timers

CT-E range

Technical diagrams, Wiring notes, Dimensional drawing

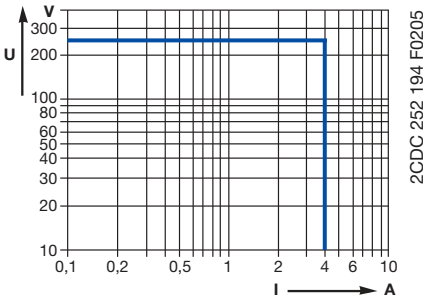
Data at $T_a = 25^\circ\text{C}$ and rated values, if nothing else indicated

Type	CT-E (relays)	CT-E (solid-state)
Electromagnetic compatibility		
Interference immunity		IEC/EN 61000-6-2
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)
powerful impulses (Surge)	IEC 1000-4-5, EN 61000-4-5	Level 4 (2 kV L-L)
HF line emission	IEC 1000-4-6, EN 61000-4-6	Level 3 (10 V)
Interference emission		IEC/EN 61000-6-4

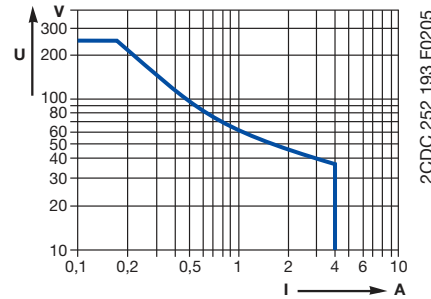
Technical diagrams

Load limit curves

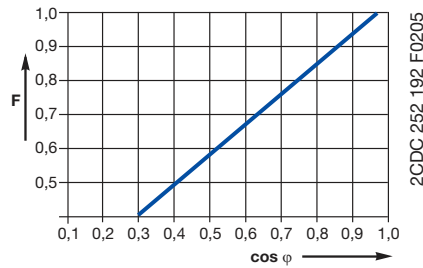
AC load (resistive)



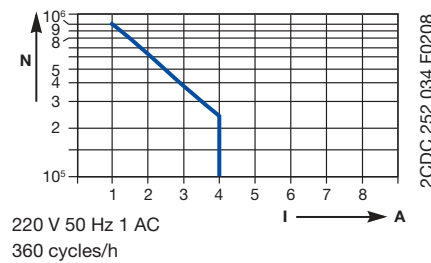
DC load (resistive)



Derating factor F for inductive AC load

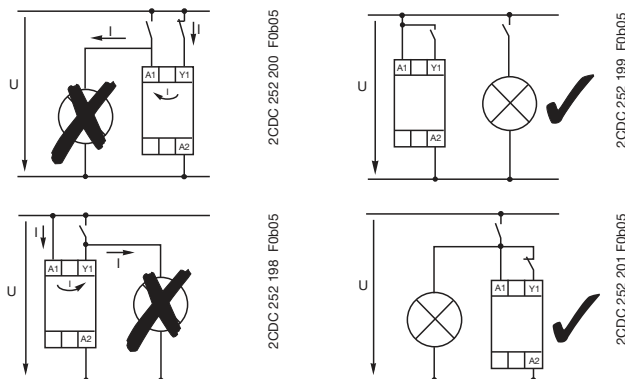


Contact lifetime



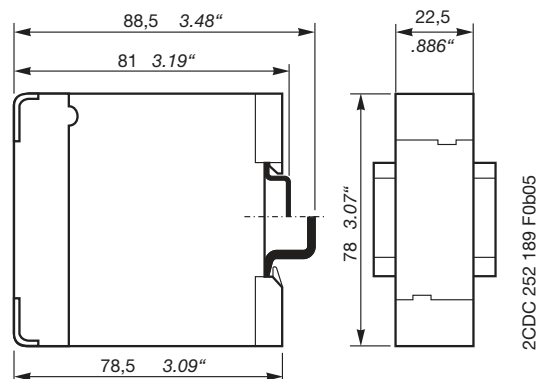
Wiring notes

for single-function devices with control contact (CT-AHE, CT-AWE with auxiliary voltage)



Dimensional drawing

Dimensions in mm





Electronic timers

CT-S range

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Electronic timers CT-S range Benefits and advantages

CT-S range - the high end timers

universal and economic



2CDC 255 057 F0006

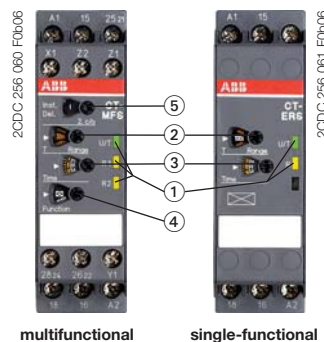
- Diversity:
 - 8 multifunction timers
 - 13 single-function timers
 - 8 switching relays
- Control supply voltages:
 - Multi range: 24-48 V DC, 24-240 V AC
 - Wide range: 24-240 V AC/DC
 - Single range: 380-440 V AC
- Devices with:
 - 1 or 2 c/o contacts
 - 2nd c/o contact can be selected as instantaneous contact ¹⁾
 - Remote potentiometer connection ¹⁾
 - Control input with volt-free or voltage related triggering e.g. to start timing, pause timing
- Sealable transparent cover for protection against unauthorized changes of time values
- Integrated marker label
- Approvals / Marks (partly pending)



¹⁾ selected devices

Operating controls

- ① LEDs for status indication
U/T / U - green LED:
 [] control supply voltage applied
 [] timing
 R / R1 / R2 - yellow LED:
 [] 1. / 2. output relay energized
- ② Time range adjustment
- ③ Fine adjustment of the time delay
- ④ Preselection of the timing function
- ⑤ Set the 2nd c/o contact as an instantaneous contact



2CDC 256 060 F0006

2CDC 256 061 F0006

Time range preselection and fine adjustment

Direct assignment of the preselected time range to the fine adjustment potentiometer scale by multicolor scales.



2CDC 253 062 F0006



2CDC 253 063 F0006

LEDs for status indication

All actual operational states are displayed by front-face LEDs, thus simplifying commissioning and troubleshooting.

Double-chamber cage connecting terminals

Double-chamber cage connecting terminals provide connection of wires up to 2 x 2.5 mm² (2 x 14 AWG), rigid or fine-strand, with or without wire end ferrules. Potential distribution does not require additional terminals.



2CDC 253 010 F0003



1SVC 110 000 F0507

Remote potentiometer connection

The CT-S range offers the possibility of connecting a remote potentiometer for the fine adjustment of the time delay. When an external potentiometer is connected, the internal, front-face potentiometer is disabled.

Integrated marker label

Integrated marker labels allow the product to be marked quickly and simply. No additional marker labels are required.



2CDC 253 064 F0006



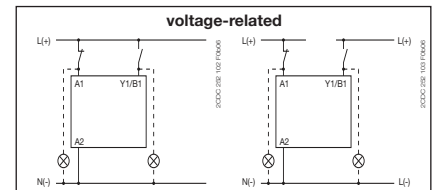
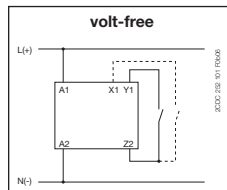
2CDC 253 065 F0006

Sealable transparent cover

Protection against unauthorized changes of time and threshold values. Available as an accessory.

Control input with volt-free or voltage-related triggering ¹⁾

The new CT-S range offers two types of devices: one with volt-free and one with voltage-related triggering. The control inputs of the devices with voltage-related triggering are capable of switching a parallel load and are not polarized. They can be powered either by the control supply voltage applied to A1 or by another voltage out of the rated control supply voltage range.



¹⁾ selected devices

Synonyms

used expression	alternative expression(s)	used expression	alternative expression(s)
1 c/o contact	SPDT	voltage-related	wet / non-floating
2 c/o contacts	DPDT	volt-free	dry / floating

Electronic timers

CT-S range

Ordering details

2CDC 251 049 F0b07



CT-MVS.21

2CDC 251 052 F0b07



CT-MXS.22

2CDC 251 053 F0b07



CT-MFS.21

2CDC 251 054 F0b07



CT-MBS.22

2CDC 251 055 F0b07



CT-WBS.22

Type	Rated control supply voltage	Control input	Remote potentiometer connection	2nd c/o cont. selectable as inst. contact	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
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Multifunction timers

CT-MVS: 11 functions ¹⁾, 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 3 LEDs

CT-MVS.21	24-240 V AC/DC	■	1x	•	1SVR 630 020 R0200	1		0.137 / 0.302
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CT-MVS: 11 functions ¹⁾, 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs

CT-MVS.22	24-48 V DC, 24-240 V AC	■			1SVR 630 020 R3300	1		0.131 / 0.289
CT-MVS.23	380-440 V AC	■			1SVR 630 021 R2300	1		0.135 / 0.298

CT-MVS: 10 functions ²⁾, 10 time ranges (0.05 s- 300 h), 1 c/o contact, 2 LEDs

CT-MVS.12	24-48 V DC, 24-240 V AC	■			1SVR 630 020 R3100	1		0.101 / 0.223
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CT-MXS: 5 functions ³⁾, 2 x 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs

CT-MXS.22	24-48 V DC, 24-240 V AC	■	2x		1SVR 630 030 R3300	1		0.131 / 0.289
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CT-MFS: 10 functions ⁴⁾, 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 3 LEDs

CT-MFS.21	24-240 V AC/DC	□/□	1x	•	1SVR 630 010 R0200	1		0.134 / 0.295
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CT-MBS: 10 functions ⁴⁾, 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 3 LEDs

CT-MBS.22	24-48 V DC, 24-240 V AC	□	1x	•	1SVR 630 010 R3200	1		0.129 / 0.284
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Impulse and flasher timer

CT-WBS: 7 functions ⁵⁾, 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs

CT-WBS.22	24-48 V DC, 24-240 V AC				1SVR 630 040 R3300	1		0.115 / 0.254
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■ Control input with voltage-related triggering

□ Control input with volt-free triggering

¹⁾ Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Symmetrical ON- and OFF-delay, Flasher starting with ON or OFF, Star-delta change-over with impulse, Pulse former, Accumulative ON-delay, ON/OFF-function

²⁾ Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Symmetrical ON- and OFF-delay, Flasher starting with ON or OFF, Pulse former, Accumulative ON-delay, ON/OFF-function

³⁾ Functions: Asymmetrical ON- and OFF-delay, Impulse-ON/OFF, Pulse generator starting with ON or OFF, Single pulse generator, ON/OFF-function

⁴⁾ Functions: ON-delay, OFF-delay with auxiliary voltage, Impulse-ON, Impulse-OFF with auxiliary voltage, Symmetrical ON- and OFF-delay, Flasher starting with ON, Flasher starting with OFF, Star-delta change-over with impulse, Pulse former, ON/OFF-function

⁵⁾ Functions: Flasher starting with ON, Flasher starting with OFF, Impulse-ON, ON-delay, fixed impulse with adjustable time delay, Adjustable impulse with fixed time delay, ON/OFF-function

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Electronic timers

CT-S range

Ordering details

1



Type	Rated control supply voltage	Control input	Remote potentiometer connection	2nd c/o cont. selectable as inst. contact	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
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ON-delay timers ☒

CT-ERS: 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs

CT-ERS.21	24-240 V AC/DC				1SVR 630 100 R0300	1		0.121 / 0.267
CT-ERS.22	24-48 V DC, 24-240 V AC				1SVR 630 100 R3300	1		0.113 / 0.249

CT-ERS: 10 time ranges (0.05 s- 300 h), 1 c/o contact, 2 LEDs

CT-ERS.12	24-48 V DC, 24-240 V AC				1SVR 630 100 R3100	1		0.097 / 0.214
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OFF-delay timers ■

CT-APS: 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs

CT-APS.21	24-240 V AC/DC	■			1SVR 630 180 R0300	1		0.136 / 0.306
CT-APS.22	24-48 V DC, 24-240 V AC	■			1SVR 630 180 R3300	1		0.128 / 0.282

CT-APS: 10 time ranges (0.05 s- 300 h), 1 c/o contact, 2 LEDs

CT-APS.12	24-48 V DC, 24-240 V AC	■			1SVR 630 180 R3100	1		0.101 / 0.223
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CT-AHS: 10 time ranges (0.05 s- 300 h), 2 c/o contacts, 2 LEDs

CT-AHS.22	24-48 V DC, 24-240 V AC	□			1SVR 630 110 R3300	1		0.125 / 0.276
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CT-ARS: without auxiliary voltage, 7 time ranges (0.05 s- 10 min), 1 c/o contact, 1 LED

CT-ARS.11	24-240 V AC/DC				1SVR 630 120 R3100	1		0.119 / 0.262
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CT-ARS: without auxiliary voltage, 7 time ranges (0.05 s- 10 min), 2 c/o contacts, 1 LED

CT-ARS.21	24-240 V AC/DC				1SVR 630 120 R3300	1		0.137 / 0.302
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CT-VBS: without auxiliary voltage, for DC contactor coils

CT-VBS.17	100-127 V AC				1SVR 430 261 R6000	1		0.123 / 0.271
CT-VBS.18	200-240 V AC				1SVR 430 261 R5000	1		0.118 / 0.260

Star-delta timers ▲

CT-SDS: 7 time ranges (0.05 s- 10 min), 50 ms transition time, 2 n/o contacts, 3 LEDs

CT-SDS.22	24-48 V DC, 24-240 V AC				1SVR 630 210 R3300	1		0.105 / 0.231
CT-SDS.23	380-440 V AC				1SVR 630 211 R2300	1		0.111 / 0.245

- Control input with voltage-related triggering
- Control input with volt-free triggering

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Electronic timers

CT-S range

Ordering details

2CDC 251 073 F0b07



CT-IRS.35

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
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Switching relays

CT-IRS: 1 c/o contact, 2 LEDs

CT-IRS.16	24 V AC/DC	1SVR 430 220 R9100	1		0.121 / 0.267
CT-IRS.14	110-240 V AC	1SVR 430 221 R7100	1		0.126 / 0.278

CT-IRS: 2 c/o contacts, 1 LED

CT-IRS.26	24 V AC/DC	1SVR 430 220 R9300	1		0.135 / 0.298
CT-IRS.24	110-240 V AC	1SVR 430 221 R7300	1		0.141 / 0.311

CT-IRS: 2 c/o contacts with gold-plated contacts, 1 LED

CT-IRS.26G	24 V AC/DC	1SVR 430 230 R9300	1		0.147 / 0.324
CT-IRS.24G	110-240 V AC	1SVR 430 231 R7300	1		0.150 / 0.331

CT-IRS: 3 c/o contacts, 1 LED

CT-IRS.36	24 V AC/DC	1SVR 430 220 R9400	1		0.159 / 0.351
CT-IRS.35	220-240 V AC	1SVR 430 221 R1400	1		0.161 / 0.355

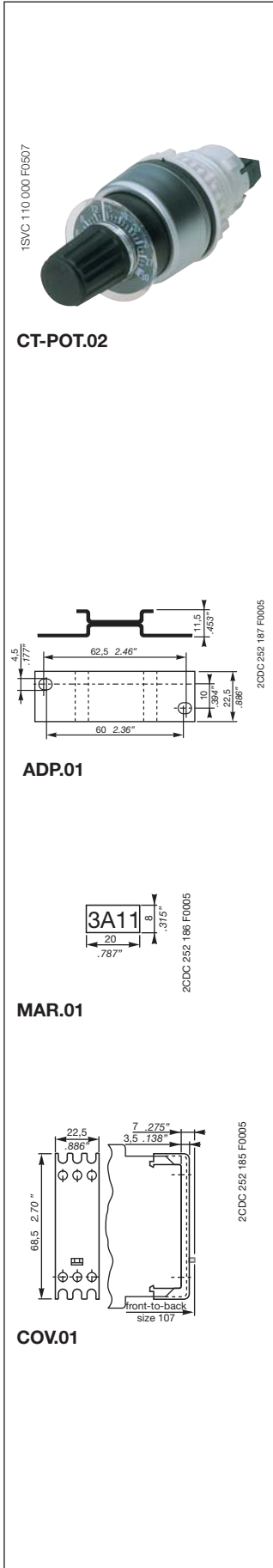
• Accessories	40	• Function diagrams	41	• Connection diagrams.....	50
• Technical data.....	53	• Technical diagrams	55	• Wiring notes / Dimensional drawing ...	56

Electronic timers

CT-S range

Ordering details - Accessories

1

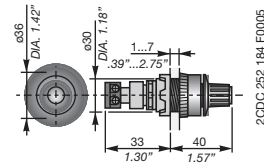


Accessories

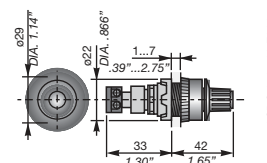
Remote potentiometer

50 kΩ ±20 % - 0.2 Ω with direct reading scale (graduated scale supplied)

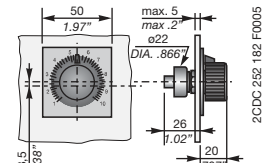
Type	Diameter in mm	Degree of protection	Order code	Pack.-unit pieces	Price 1 piece	Weight 1 piece g / oz
CT-POT.01	30.5	IP 65	1SVR 700 800 R1000	1		39.8/1.40
CT-POT.02	22.5	IP 65	1SVR 701 800 R1000	1		34.5/1.21
CT-POT.03	10.5	IP 40	1SVR 214 017 R0900	1		38.2/1.35



CT-POT.01



CT-POT.02



CT-POT.03

Adapter for screw mounting

Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
ADP.01	CT-S	22.5	1SVR 430 029 R0100	1		18.4/0.65

Marker label

Type	for type	for devices	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
MAR.01	CT-S	without DIP switches	1SVR 366 017 R0100	10		0.19/0.007
MAR.02	CT-S	with DIP switches	1SVR 430 043 R0000	10		0.13/0.005

Sealable transparent cover

Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
COV.01	CT-S	22.5	1SVR 430 005 R0100	1		5.2/0.18

Electronic timers

CT-S range

Function diagrams

Remarks

Legend

<input type="checkbox"/>	Control supply voltage not applied / Output contact open
<input checked="" type="checkbox"/>	Control supply voltage applied / Output contact closed
A1-Y1/B1	Control input with voltage-related triggering
Y1-Z2	Control input with volt-free triggering
X1-Z2	Control input with volt-free triggering

Remote potentiometer connection:

When an external potentiometer is connected to the remote potentiometer connection (terminals **Z1-Z2**, **Z3-Z2** respectively), the internal, front-face potentiometer is disabled and the time adjustment is made via the external potentiometer.

2nd c/o contact selectable as instantaneous contact:

When switch position Inst. "I" is selected, the functionality of the 2nd c/o contact changes to an instantaneous contact. It acts like the c/o contacts of a switching relay, i.e. applying or interrupting the control supply voltage energizes or de-energizes the c/o contact. The designation of the 2nd c/o contact changes from **25-26/28** to **21-22/24**, when selected as instantaneous contact.

Terminal designations on the device and in the diagrams:

The 1st c/o contact is always designated **15-16/18**.
 The 2nd c/o contact is designated **25-26/28**, if it responds to the time delay.
 If the 2nd c/o contact is selected as an instantaneous contact, the designation **25-26/28** is replaced by **21-22/24**.
 Control supply voltage is always applied to terminals **A1-A2**.

Function of the yellow LEDs:

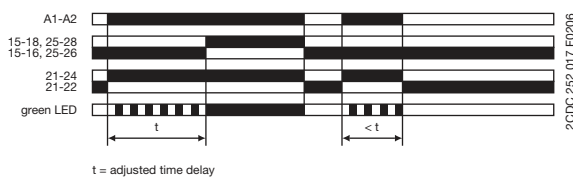
On devices without the function '2nd c/o contact selectable as instantaneous contact', the yellow LED **R** glows as soon as the output relay energizes and turns off when the output relay de-energizes.

Devices with the function '2nd c/o contact selectable as instantaneous contact' have two yellow LEDs, designated **R1** and **R2**. LED **R1** shows the status of the 1st c/o contact (**15-16/18**) and LED **R2** shows the status of the 2nd c/o contact (**25-26/28**, **21-22/24** resp.). LED **R1** or **R2** glow as soon as the corresponding output relay energizes and turns off when the corresponding output relay de-energizes.



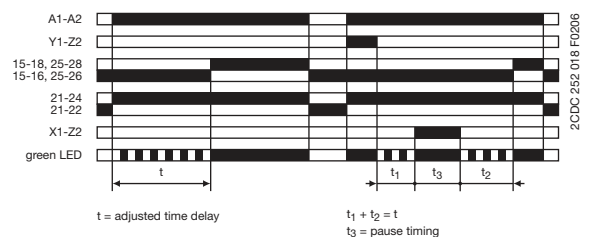
ON-delay (Delay on make) CT-MVS, CT-ERS, CT-WBS

This function requires continuous control supply voltage for timing. Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



ON-delay (Delay on make) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing. If control input **Y1-Z2** is open, timing begins when control supply voltage is applied. Or, if control supply voltage is already applied, opening control input **Y1-Z2** also starts timing. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady. If control input **Y1-Z2** closes before the time delay is complete, the time delay is reset and the output relay remains de-energized. Pause timing / Accumulative ON-delay (CT-MFS): Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** is re-opened. This can be repeated as often as required. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Electronic timers

CT-S range

Function diagrams



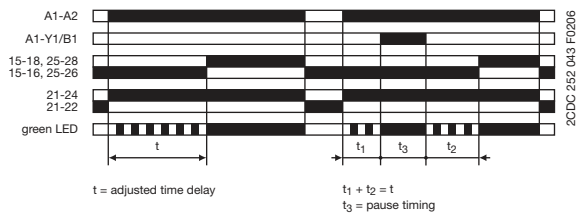
Accumulative ON-delay (Accumulative delay on make) CT-MVS

This function requires continuous control supply voltage for timing. Timing begins when control supply voltage is applied. The green LED flashes during timing. When the selected time delay is complete, the output relay energizes and the flashing green LED turns steady.

Timing can be paused by closing control input **A1-Y1/B1**. The elapsed time t_1 is stored and continues from this time value when **A1-Y1/B1** is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



OFF-delay with auxiliary voltage (Delay on break) CT-MFS, CT-MBS, CT-AHS

This function requires continuous control supply voltage for timing. If control input **Y1-Z2** is closed, the output relay energizes immediately. If control input **Y1-Z2** is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de-energizes and the flashing green LED turns steady.

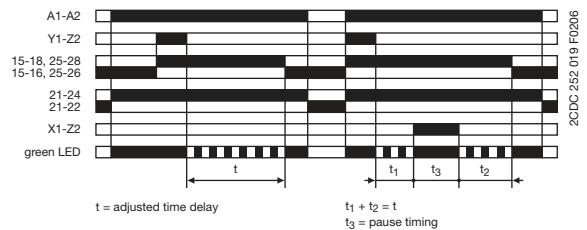
If control input **Y1-Z2** closes before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input **Y1-Z2** re-opens.

Pause timing / Accumulative OFF-delay (CT-MFS):

Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

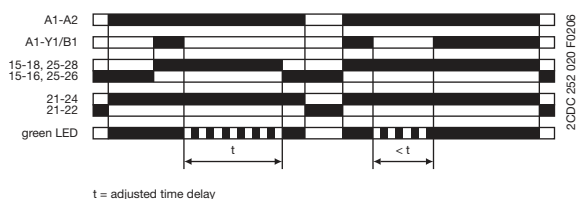


OFF-delay with auxiliary voltage (Delay on break) CT-MVS, CT-APS

This function requires continuous control supply voltage for timing. If control input **A1-Y1/B1** is closed, the output relay energizes immediately. If control input **A1-Y1/B1** is opened, the time delay starts. The green LED flashes during timing. When the selected time delay is complete, the output relay de-energizes and the flashing green LED turns steady.

If control input **A1-Y1/B1** recloses before the time delay is complete, the time delay is reset and the output relay does not change state. Timing starts again when control input **A1-Y1/B1** re-opens.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

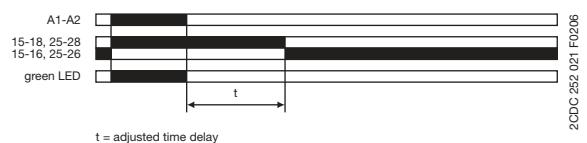


OFF-delay without auxiliary voltage (True delay on break) CT-ARS

The OFF-delay function without auxiliary voltage does not require continuous control supply voltage for timing. After a storage time of several months without any voltage, a formatting time of about 5 minutes is necessary.

Applying control supply voltage energizes the output relay immediately. Applied control supply voltage is displayed by the glowing green LED. If control supply voltage is interrupted, the OFF-delay starts and the LED turns off. When timing is complete, the output relay de-energizes.

For correct operation of the unit, it is necessary to complete the minimum energizing time. As soon as timing starts, the LED turns off.

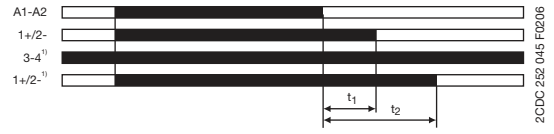


Electronic timers CT-S range Function diagrams

OFF-delay without auxiliary voltage for DC contactor coils CT-VBS

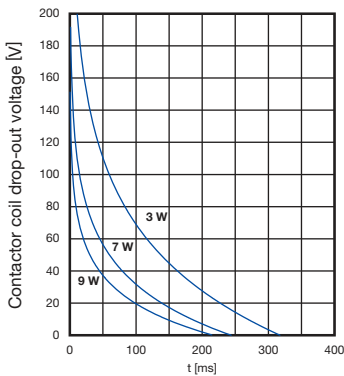
The DC contactor coil connected to the output is energized when control supply voltage is applied.

If control supply voltage is disconnected, the DC contactor coil remains energized for a short time delay. This time delay depends on the coil drop-out voltage and on the wattage of the contactor coil.

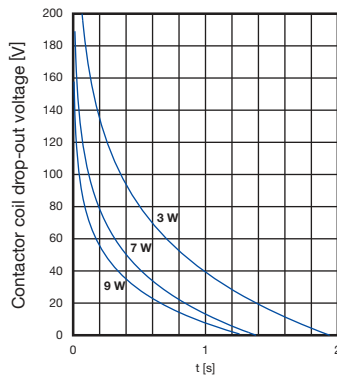


t₁ = OFF-delay (without jumper between terminals 3 and 4 ¹⁾)
t₂ = OFF-delay (with jumper between terminals 3 and 4 ¹⁾)
¹⁾ only for version 200-240 V AC

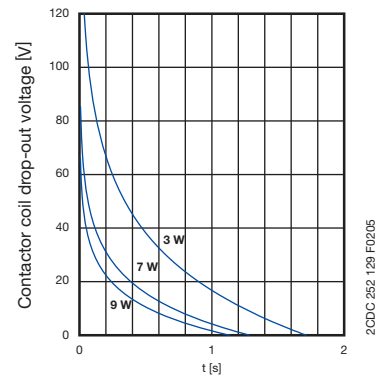
2CDC 252 045 F0206



Time delay guideline values
200-240 V AC version without jumper 3/4



Time delay guideline values
200-240 V AC version with jumper 3/4



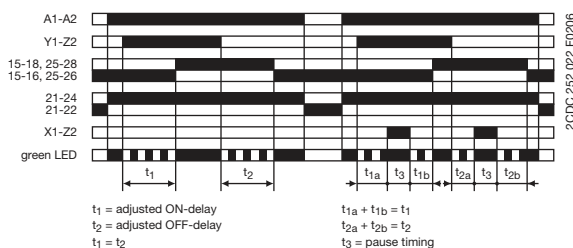
Time delay guideline values
110-127 V AC version

Symmetrical ON-delay and OFF-delay (Symmetrical delay on make and delay on break) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing. Closing control input **Y1-Z2** starts the ON-delay t_1 . When timing is complete, the output relay energizes. Opening control input **Y1-Z2** starts the OFF-delay t_2 . Both timing functions are displayed by the flashing green LED. When the OFF-delay t_2 is complete, the output relay de-energizes.

If control input **Y1-Z2** opens before the ON-delay t_1 is complete, the time delay is reset and the output relay remains de-energized. If control input **Y1-Z2** closes before the OFF-delay t_2 is complete, the time delay is reset and the output relay remains energized.

Pause timing / Accumulative, symmetrical ON-delay and OFF-delay (CT-MFS): Timing can be paused by closing control input **X1-Z2**. The elapsed time t_{1a} or t_{2a} is stored and continues from this time value when **X1-Z2** is re-opened. This can be repeated as often as required. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



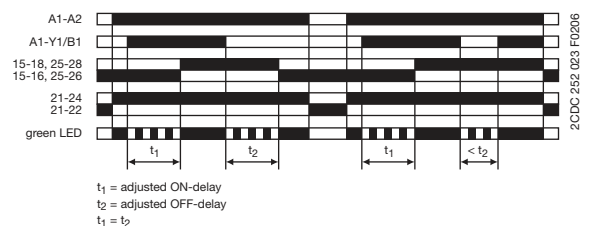
2CDC 252 022 F0206

Symmetrical ON-delay and OFF-delay (Symmetrical delay on make and delay on break) CT-MVS

This function requires continuous control supply voltage for timing. Closing control input **A1-Y1/B1** starts the ON-delay t_1 . When timing is complete, the output relay energizes. Opening control input **A1-Y1/B1** starts the OFF-delay t_2 . Both timing functions are displayed by the flashing green LED. When the OFF-delay t_2 is complete, the output relay de-energizes.

If control input **A1-Y1/B1** opens before the ON-delay t_1 is complete, the time delay is reset and the output relay remains de-energized. If control input **A1-Y1/B1** closes before the OFF-delay t_2 is complete, the time delay is reset and the output relay remains energized.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



2CDC 252 023 F0206

Electronic timers

CT-S range

Function diagrams

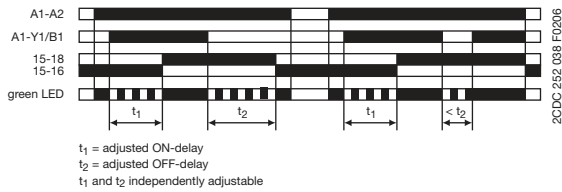
1

Asymmetrical ON-delay and OFF-delay (Asymmetrical delay on make and delay on break) CT-MXS

This function requires continuous control supply voltage for timing. Closing control input **A1-Y1/B1** starts the ON-delay t_1 . When timing is complete, the output relay energizes. Opening control input **A1-Y1/B1** starts the OFF-delay t_2 . When the OFF-delay is complete, the output relay de-energizes. Both timing functions are displayed by the flashing green LED. The ON-delay and OFF-delay are independently adjustable.

If control input **A1-Y1/B1** opens before the ON-delay is complete ($<t_1$), the time delay is reset and the output relay remains de-energized.

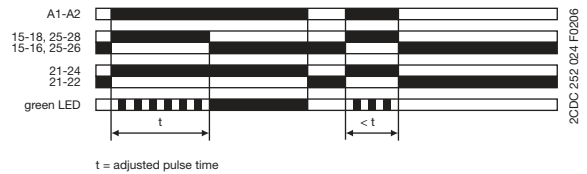
If control input **A1-Y1/B1** closes before the OFF-delay is complete ($<t_2$), the time delay is reset and the output relay remains energized. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Impulse-ON (Interval) CT-MVS, CT-WBS

This function requires continuous control supply voltage for timing. The output relay energizes immediately when control supply voltage is applied and de-energizes after the set pulse time is complete. The green LED flashes during timing. When the selected pulse time is complete, the flashing green LED turns steady.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Impulse-ON (Interval) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing. The output relay energizes immediately when control supply voltage is applied and de-energizes after the set pulse time is complete. If control input **Y1-Z2** is open, timing begins when control supply voltage is applied. Or, if control supply voltage is already applied, opening control input **Y1-Z2** starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

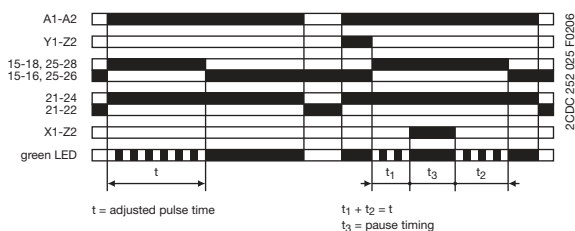
Closing control input **Y1-Z2**, before the pulse time is complete, de-energizes the output relay and resets the pulse time.

Pause timing / Accumulative impulse-ON (CT-MFS):

Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Impulse-OFF with auxiliary voltage (Trailing edge interval) CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing. If control supply voltage is applied, opening control input **Y1-Z2** energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

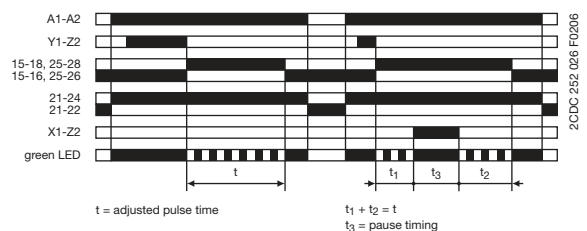
Closing control input **Y1-Z2**, before the pulse time is complete, de-energizes the output relay and resets the pulse time.

Pause timing / Accumulative impulse-OFF (CT-MFS):

Timing can be paused by closing control input **X1-Z2**. The elapsed time t_1 is stored and continues from this time value when **X1-Z2** is re-opened.

This can be repeated as often as required.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Electronic timers

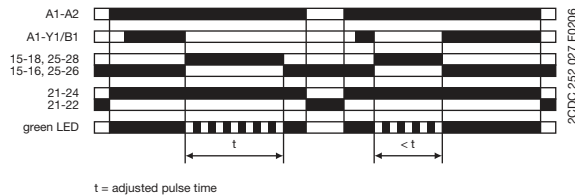
CT-S range

Function diagrams

Impulse-OFF with auxiliary voltage
(Trailing edge interval)
CT-MVS

This function requires continuous control supply voltage for timing. If control supply voltage is applied, opening control input **A1-Y1/B1** energizes the output relay immediately and starts timing. The green LED flashes during timing. When the selected pulse time is complete, the output relay de-energizes and the flashing green LED turns steady.

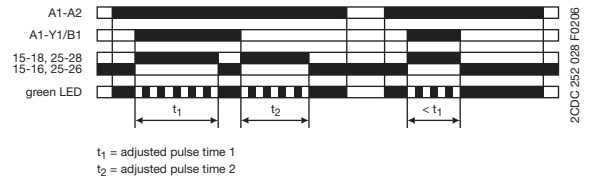
Closing control input **A1-Y1/B1**, before the pulse time is complete, de-energizes the output relay and resets the pulse time. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Impulse-ON and impulse-OFF
(Interval and trailing edge interval)
CT-MXS

This function requires continuous control supply voltage for timing. If control supply voltage is applied, closing control input **A1-Y1/B1** energizes the output relay immediately and starts the pulse time t_1 . The green LED flashes during timing. When t_1 is complete, the output relay de-energizes and the flashing green LED turns steady. Re-opening control input **A1-Y1/B1** energizes the output relay immediately and starts the pulse time t_2 . The green LED flashes during timing. When t_2 is complete, the output relay de-energizes and the flashing green LED turns steady. t_1 and t_2 are independently adjustable.

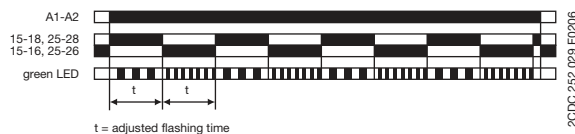
If control input **A1-Y1/B1** changes state before the pulse time is complete, the output relay de-energizes and the pulse time is reset. If control input **A1-Y1/B1** changes state again, the interrupted pulse time restarts. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Flasher, starting with the ON time
(Recycling equal times, ON first)
CT-WBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

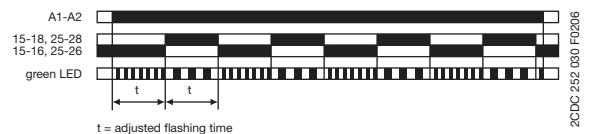
If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Flasher, starting with the OFF time
(Recycling equal times, OFF first)
CT-WBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.




Electronic timers

CT-S range

Function diagrams

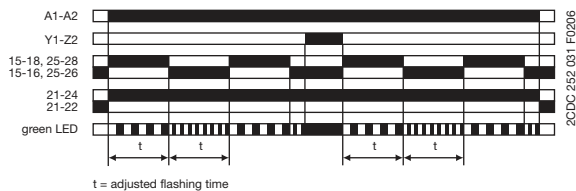
1

 **Flasher with reset, starting with the ON time**
(Recycling equal times with reset, ON first)
CT-MFS, CT-MBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The time delay can be reset by closing control input **Y1-Z2**. Opening control input **Y1-Z2** starts the timer pulsing again with symmetrical ON & OFF times.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

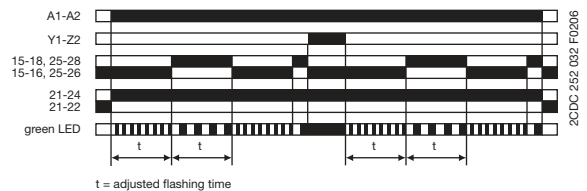



 **Flasher with reset, starting with the OFF time**
(Recycling equal times with reset, OFF first)
CT-MFS, CT-MBS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The time delay can be reset by closing control input **Y1-Z2**. Opening control input **Y1-Z2** starts the timer pulsing again with symmetrical ON & OFF times.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.

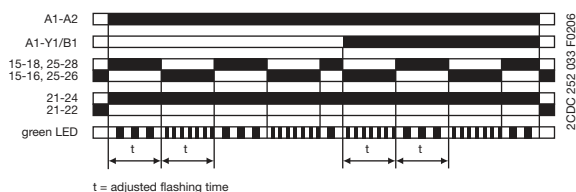


 **Flasher, starting with the ON or OFF time**
(Recycling equal times, ON or OFF first)
CT-MVS

Applying control supply voltage starts timing with symmetrical ON & OFF times. The cycle starts with an ON time first.

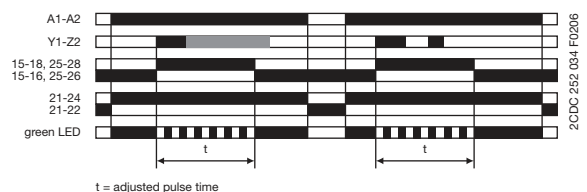
Closing control input **A1-Y1/B1**, with control supply voltage applied, starts the cycle with an OFF time first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



 **Pulse former**
(Single shot)
CT-MFS, CT-MBS

This function requires continuous control supply voltage for timing. Closing control input **Y1-Z2** energizes the output relay immediately and starts timing. Operating the control contact switch **Y1-Z2** during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input **Y1-Z2**. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Electronic timers

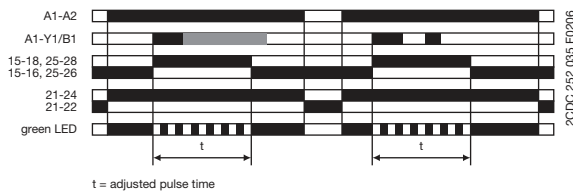
CT-S range

Function diagrams



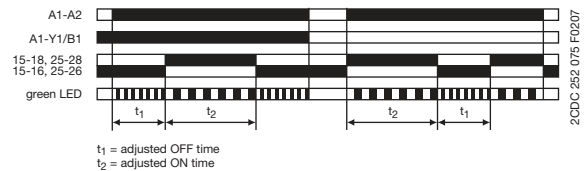
Pulse former (Single shot) CT-MVS

This function requires continuous control supply voltage for timing. Closing control input **A1-Y1/B1** energizes the output relay immediately and starts timing. Operating the control contact switch **A1-Y1/B1** during the time delay has no effect. The green LED flashes during timing. When the selected ON time is complete, the output relay de-energizes and the flashing green LED turns steady. After the ON time is complete, it can be restarted by closing control input **A1-Y1/B1**. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Pulse generator, starting with the ON or OFF time (Recycling unequal times, ON or OFF first) CT-MXS

This function requires continuous control supply voltage for timing. Applying control supply voltage, with open control input **A1-Y1/B1**, starts timing with an ON time t_2 first. Applying control supply voltage, with closed control input **A1-Y1/B1**, starts timing with an OFF time t_1 first. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time. The ON & OFF times are independently adjustable. If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



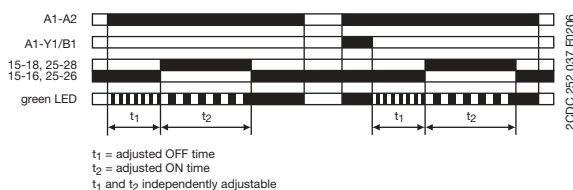
Single-pulse generator, starting with the OFF time (Delay on make with interval output) CT-MXS

This function requires continuous control supply voltage for timing. Applying control supply voltage, or, if control supply voltage is already applied, opening control input **A1-Y1/B1** energizes the output relay after the OFF time t_1 is complete. When the following ON time t_2 is complete, the output relay de-energizes. The ON & OFF times are displayed by the flashing green LED, which flashes twice as fast during the OFF time.

The ON & OFF times are independently adjustable.

Closing control input **A1-Y1/B1**, with control supply voltage applied, de-energizes the output relay and resets the time delay.

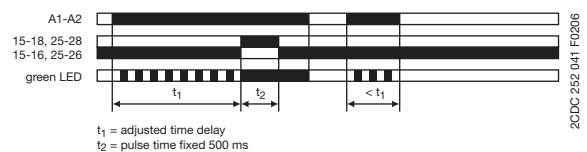
If control supply voltage is interrupted, the output relay de-energizes and the time delay is reset.



Fixed impulse with adjustable time delay (Delayed pulse output) CT-WBS

This function requires continuous control supply voltage for timing. The time delay t_1 starts when control supply voltage is applied. The green LED flashes during timing. When t_1 is complete, the output relay energizes for the fixed impulse time t_2 of 500 ms and the flashing green LED turns steady.

If control supply voltage is interrupted, the time delay is reset. The output relay does not change state.



Electronic timers

CT-S range

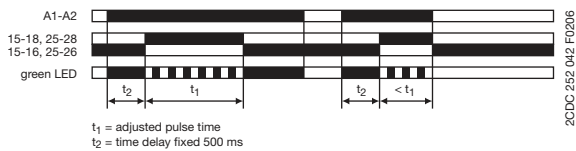
Function diagrams

1

Adjustable impulse with fixed time delay (Delayed Interval) CT-WBS

This function requires continuous control supply voltage for timing. Applying control supply voltage starts the fixed time delay t_2 of 500 ms. When t_2 is complete, the output relay energizes and the selected pulse time t_1 starts. The green LED flashes during timing. When t_1 is complete, the output relay de-energizes and the flashing green LED turns steady.

If control supply voltage is interrupted, the pulse time is reset. The output relay does not change state.



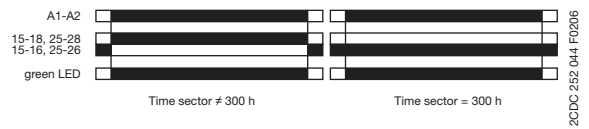
ON/OFF-Function CT-MFS, CT-MBS, CT-MVS, CT-MXS, CT-WBS

This function is used for test purposes during commissioning and troubleshooting.

If the selected max. value of the time range is smaller than 300 h (front-face potentiometer "Time sector" \neq 300 h), applying control supply voltage energizes the output relay immediately and the green LED glows. Interrupting control supply voltage, de-energizes the output relay.

If the selected max. value of the time range is 300 h (front-face potentiometer "Time sector" = 300 h) and control supply voltage is applied, the green LED glows, but the output relay does not energize.

Time settings and operating of the control inputs have no effect on the operation.



Switching relays CT-IRS

The switching relay may be used to increase the number of available contacts or to reinforce contacts, or as a coupling/decoupling interface.

Approx. 10 ms after applying control supply voltage to terminals **A1-A2**, the output relay energizes.

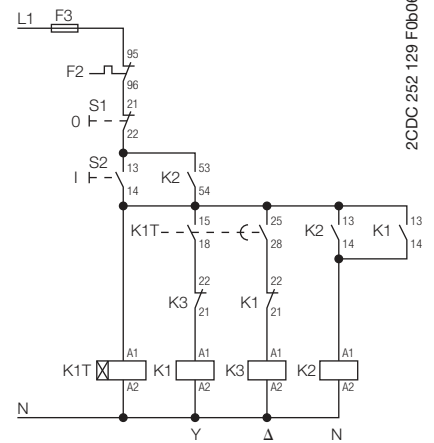
If control supply voltage is interrupted, the output relay de-energizes.



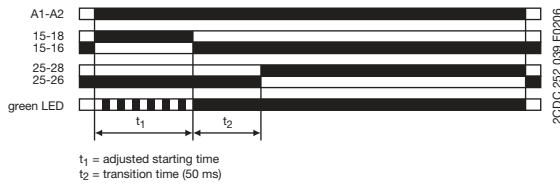
Electronic timers CT-S range Function diagrams

△1Π **Star-delta change-over with impulse function**
(Star-delta starting, interval/delay on make)
CT-MFS, CT-MBS, CT-MVS.2x

This function requires continuous control supply voltage for timing.
Applying control supply voltage to terminals **A1-A2**, energizes the star contactor connected to terminals **15-18** and begins the set starting time t_1 . The green LED flashes during timing. When the starting time is complete, the first c/o contact de-energizes the star contactor.
Now, the fixed transition time t_2 of 50 ms starts. When the transition time is complete, the second c/o contact energizes the delta contactor connected to terminals **25-28**. The delta contactor remains energized as long as control supply voltage is applied to the unit.

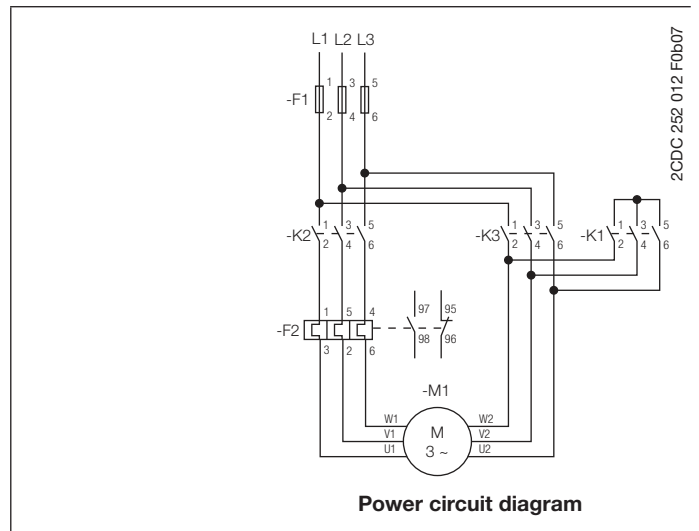


Control circuit diagram

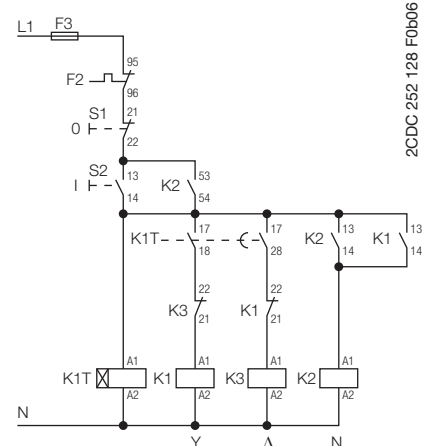
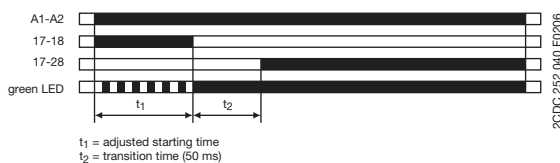


△ **Star-delta change-over**
(Star-delta starting)
CT-SDS

This function requires continuous control supply voltage for timing.
Applying control supply voltage to terminals **A1-A2**, energizes the star contactor connected to terminals **17-18** and begins the set starting time t_1 . The green LED flashes during timing. When the starting time is complete, the first output contact de-energizes the star contactor.
Now, the fixed transition time t_2 of 50 ms starts. When the transition time is complete, the second output contact energizes the delta contactor connected to terminals **17-28**. The delta contactor remains energized as long as control supply voltage is applied to the unit.



Power circuit diagram



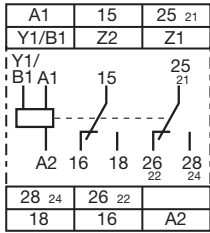
Control circuit diagram

Electronic timers

CT-S range

Connection diagrams

CT-MVS.21



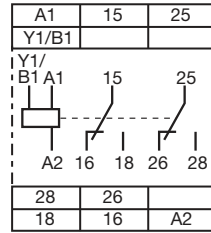
2CDC 252 002 F0b06

A1-A2 Supply:
24-240 V AC/DC

15-16/18 1. c/o contact
25-26/28 2. c/o contact
21-22/24 2. c/o contact as
instantaneous contact

A1-Y1/B1 Control input
Z1-Z2 Remote potentiometer
connection

CT-MVS.22



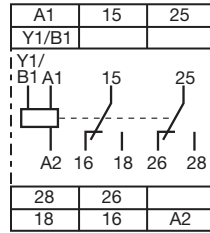
2CDC 252 003 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

15-16/18 1. c/o contact
25-26/28 2. c/o contact

A1-Y1/B1 Control input

CT-MVS.23



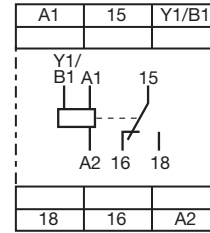
2CDC 252 003 F0b06

A1-A2 Supply:
380-440 V AC

15-16/18 1. c/o contact
25-26/28 2. c/o contact

A1-Y1/B1 Control input

CT-MVS.12



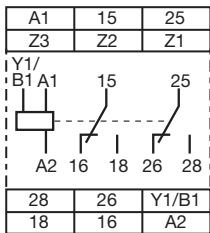
2CDC 252 004 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

15-16/18 1. c/o contact

A1-Y1/B1 Control input

CT-MXS.22



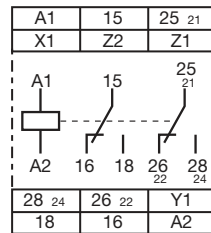
2CDC 252 005 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

15-16/18 1. c/o contact
25-26/28 2. c/o contact

A1-Y1/B1 Control input
Z1-Z2 Remote potentiometer
connection
Z3-Z2 Remote potentiometer
connection

CT-MFS.21



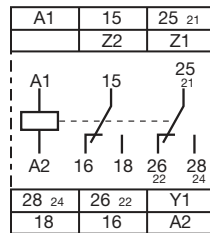
2CDC 252 006 F0b06

A1-A2 Supply:
24-240 V AC/DC

15-16/18 1. c/o contact
25-26/28 2. c/o contact
21-22/24 2. c/o contact as
instantaneous contact

Y1-Z2 Control input
X1-Z2 Control input
Z1-Z2 Remote potentiometer
connection

CT-MBS.22



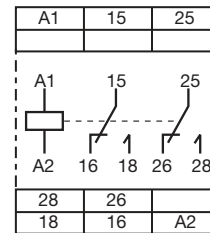
2CDC 252 007 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

15-16/18 1. c/o contact
25-26/28 2. c/o contact
21-22/24 2. c/o contact as
instantaneous contact

Y1-Z2 Control input
Z1-Z2 Remote potentiometer
connection

CT-WBS.22

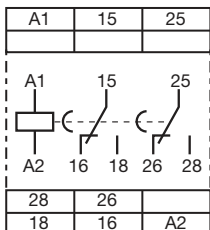


2CDC 252 008 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

15-16/18 1. c/o contact
25-26/28 2. c/o contact

CT-ERS.21

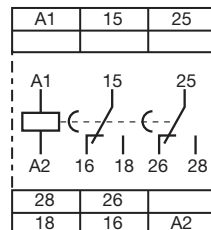


2CDC 252 009 F0b06

A1-A2 Supply:
24-240 V AC/DC

15-16/18 1. c/o contact
25-26/28 2. c/o contact

CT-ERS.22

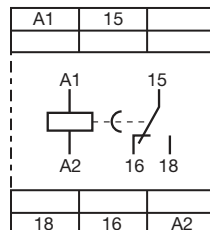


2CDC 252 009 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

15-16/18 1. c/o contact
25-26/28 2. c/o contact

CT-ERS.12



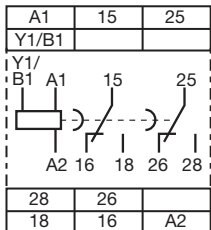
2CDC 252 010 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

15-16/18 1. c/o contact

Electronic timers CT-S range Connection diagrams

CT-APS.21



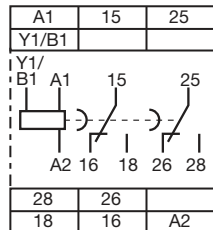
2CDC 252 011 F0b06

A1-A2 Supply:
24-240 V AC/DC

15-16/18 1. c/o contact
25-26/28 2. c/o contact

A1-Y1/B1 Control input

CT-APS.22



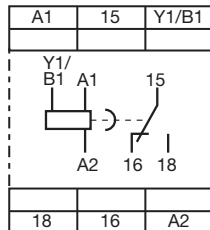
2CDC 252 011 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

15-16/18 1. c/o contact
25-26/28 2. c/o contact

A1-Y1/B1 Control input

CT-APS.12



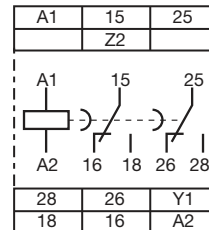
2CDC 252 012 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

15-16/18 1. c/o contact

A1-Y1/B1 Control input

CT-AHS.22



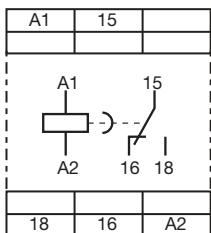
2CDC 252 013 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

15-16/18 1. c/o contact
25-26/28 2. c/o contact

Y1-Z2 Control input

CT-ARS.11

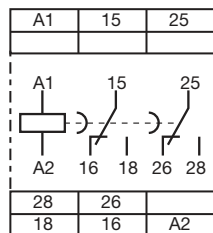


2CDC 252 014 F0b06

A1-A2 Supply:
24-240 V AC/DC

15-16/18 1. c/o contact

CT-ARS.21

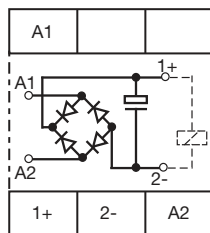


2CDC 252 015 F0b06

A1-A2 Supply:
24-240 V AC/DC

15-16/18 1. c/o contact
25-26/28 2. c/o contact

CT-VBS.17

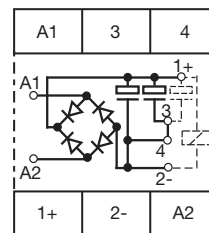


2CDC 252 107 F0b05

A1-A2 Supply:
110-127 V AC

1+ - 2- Contactor coil

CT-VBS.18

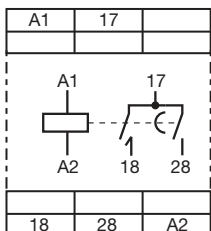


2CDC 252 108 F0b05

A1-A2 Supply:
200-240 V AC

1+ - 2- Contactor coil
3-4 Jumper for setting
the time delay
(see time delay diagram)

CT-SDS.22

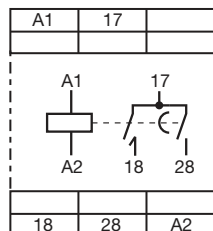


2CDC 252 016 F0b06

A1-A2 Supply:
24-48 V DC or
24-240 V AC

17-18 1. n/o contact
17-28 2. n/o contact

CT-SDS.23



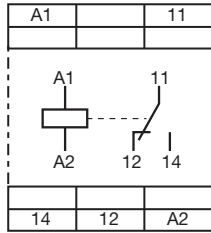
2CDC 252 016 F0b06

A1-A2 Supply:
380-440 V AC

17-18 1. n/o contact
17-28 2. n/o contact

Electronic timers CT-S range Connection diagrams

CT-IRS.16

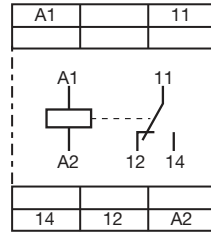


2CDC 252 123 F0b05

A1-A2 Supply:
24 AC/DC

11-12/14 1. c/o contact

CT-IRS.14

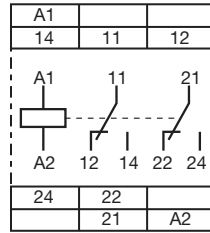


2CDC 252 123 F0b05

A1-A2 Supply:
110-240 V AC

11-12/14 1. c/o contact

CT-IRS.26

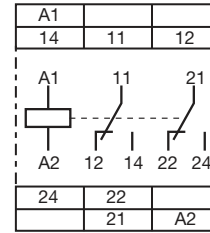


2CDC 252 124 F0b05

A1-A2 Supply:
24 AC/DC

11-12/14 1. c/o contact
21-22/24 2. c/o contact

CT-IRS.24

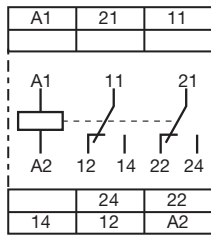


2CDC 252 124 F0b05

A1-A2 Supply:
110-240 V AC

11-12/14 1. c/o contact
21-22/24 2. c/o contact

CT-IRS.26G (gold-plated cont.)

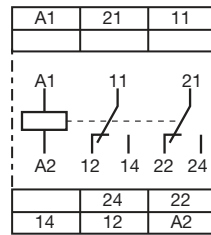


2CDC 252 125 F0b05

A1-A2 Supply:
24 AC/DC

11-12/14 1. c/o contact
21-22/24 2. c/o contact

CT-IRS.24G (gold-plated cont.)

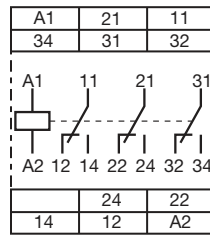


2CDC 252 125 F0b05

A1-A2 Supply:
110-240 V AC

11-12/14 1. c/o contact
21-22/24 2. c/o contact

CT-IRS.36

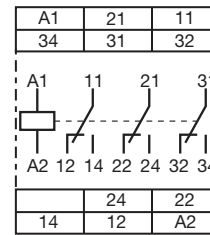


2CDC 252 035 F0b08

A1-A2 Supply:
24 V AC/DC

11-12/14 1. c/o contact
21-22/24 2. c/o contact
31-32/34 3. c/o contact

CT-IRS.35



2CDC 252 035 F0b08

A1-A2 Supply:
220-240 V AC

11-12/14 1. c/o contact
21-22/24 2. c/o contact
31-32/34 3. c/o contact

Electronic timers

CT-S range

Technical data

1

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Type	CT-S				
Input circuit - Supply circuit					
Rated control supply voltage U_s	CT-xxx.x1	24-240 V AC/DC			
	CT-xxx.x2	24-48 V DC, 24-240 V AC			
	CT-xxx.x3	380-440 V AC			
	CT-xxx.x4	110-240 V AC			
	CT-xxx.x5	220-240 V AC			
	CT-xxx.x6	24 V AC/DC			
	CT-xxx.x7	100-127 V AC			
	CT-xxx.x8	200-240 V DC			
Rated control supply voltage U_s tolerance	-15...+10 %				
Rated frequency	DC or 50/60 Hz				
Frequency range AC	47-63 Hz				
Typical current / power consumption	24 V DC	9-28 mA (depending on device, see data sheet)			
	230 V AC	11-60 mA (depending on device, see data sheet)			
	115 V AC	6-10 mA (depending on device, see data sheet)			
Power failure buffering time	min. 20 ms				
Input circuit - Control circuit					
Kind of triggering	CT-MVS, CT-MXS, CT-APS	voltage-related triggering			
Control input, Control function	A1-Y1/B1	CT-MVS, CT-MXS, CT-APS	start timing external		
Parallel load / polarized	yes / no				
Maximum cable length to the control input	50 m - 100 pF / m				
Minimum control pulse length	20 ms				
Control voltage potential	see rated control supply voltage				
Current consumption of the control input	24 V DC	1.2 mA			
	230 V AC	8 mA			
	400 V AC	6 mA			
Kind of triggering	CT-MFS, CT-MBS, CT-AHS	voltage-free triggering			
Control input, Control function	Y1-Z2	CT-MFS, CT-MBS, CT-AHS	start timing external		
	X1-Z2	CT-MFS	pause timing / accumulative functions		
Maximum switching current in the control circuit	1 mA				
Maximum cable length to the control input	50 m - 100 pF / m				
Minimum control pulse length	20 ms				
Non-load voltage at the control inputs	10-40 V DC				
Remote potentiometer					
Remote potentiometer connections, Resistance value	Z1-Z2	CT-MFS, CT-MBS, CT-MVS.21, CT-MXS	50 kΩ		
	Z3-Z2	CT-MXS	50 kΩ		
Maximum cable length to remote potentiometer	2 x 25 m, shielded with 100pF/m				
Shield connection	Z2				
Timing circuit					
Time ranges	10 time ranges 0.05 s - 300 h	1.) 0.05-1 s	2.) 0.15-3 s	3.) 0.5-10 s	
		4.) 1.5-30 s	5.) 5-100 s	6.) 15-300 s	
	7.) 1.5-30 min	8.) 15-300 min	9.) 1.5-30 h		
		10.) 15-300 h			
	7 time ranges 0.05 s - 10 min (CT-SDS, CT-ARS)	1.) 0.05-1 s	2.) 0.15-3 s	3.) 0.5-10 s	
		4.) 1.5-30 s	5.) 5-100 s	6.) 15-300 s	
Recovery time	24-240 V AC/DC	< 50 ms			
	24-48 V DC, 24-240 V AC	< 80 ms			
	380-440 V AC	< 60 ms			
Accuracy within the rated control supply voltage tolerance	$\Delta t < 0.004\% / V$				
Accuracy within the temperature range	$\Delta t < 0.03\% / \text{°C}$				
Star-delta transition time	CT-SDS, CT-MBS, CT-MFS, CT-MVS.2x	fixed 50 ms			
Star-delta transition time tolerance	CT-SDS, CT-MBS, CT-MFS, CT-MVS.2x	± 2 ms			
Minimum energizing time	CT-ARS	100 ms			
Formatting time ¹⁾	CT-ARS	5 min			







¹⁾ prior to first commissioning and after a six-month stop in operation

Electronic timers

CT-S range

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Indication of operational states		
Control supply voltage / timing	U/T: green LED	 : control supply voltage applied  : timing
Control supply voltage	U: green LED	 : control supply voltage applied
Relay state	R1: yellow LED R2: yellow LED R: yellow LED	 : output relay 1 energized  : output relay 2 energized  : output relay energized
Output circuit		
Kind of output	15-16/18	relay, 1 c/o contact
	15-16/18; 25-26/28	relay, 2 c/o contacts
	15-16/18; 25(21)-26(22)/28(24)	relay, 2 c/o contacts, 2nd c/o contact selectable as inst. contact
	17-18; 17-28	relay, 2 n/o contacts (CT-SDS)
Contact material		Cd-free, on request
Rated operational voltage U_a		250 V
Minimum switching voltage / minimum switching current		12 V / 10 mA (CT-IRS.2xG: 10 mV / 10 μ A)
Maximum switching voltage / maximum switching current		see load limit curves (CT-IRS.2xG: 10 V / 200 mA)
Rated operational current I_o (IEC/EN 60947-5-1)	AC12 (resistive) at 230 V	4 A
	AC15 (inductive) at 230 V	3 A
	DC12 (resistive) at 24 V	4 A
	DC13 (inductive) at 24 V	2 A
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B300
	max. rated operational voltage	300 V AC
	max. continuous thermal current at B 300	5 A
	max. making /breaking apparent power at B 300	3600/360 VA
Mechanical lifetime		30×10^6 switching cycles
Electrical lifetime	at AC12, 230 V, 4 A	0.1×10^6 switching cycles
Short circuit proof / maximum fuse rating (IEC/EN 60947-5-1)	n/c contact	6 A fast-acting
	n/o contact	10 A fast-acting
General data		
Duty time		100%
Repeat accuracy (constant parameters)		$\Delta t < \pm 0.2\%$
Dimensions (W x H x D)		22.5 mm x 78 mm x 100 mm (0.89 inch x 3.07 inch x 3.94 inch)
Weight		see ordering details
Mounting		DIN rail (EN 60715), snap mounting without any tool
Mounting position		any
Minimum distance to other units	horizontal / vertical	no/ no
Degree of protection	enclosure / terminals	IP50 / IP20
Electrical connection		
Wire size	fine-strand with(out) wire end ferrule	2 x 0.75-2.5 mm ² (2 x 18-14 AWG)
	rigid	2 x 0.5-4 mm ² (2 x 20-12 AWG)
Stripping length		7 mm (0.28 inch)
Tightening torque		0.6-0.8 Nm
Environmental data		
Ambient temperature range	operation / storage	-25...+60 °C / -40...+85 °C
Damp heat (cyclic) (IEC/EN 60068-2-30)		6 x 24 h cycle, 55 °C, 95 % RH
Vibration (sinusoidal) (IEC/EN 60068-2-6)		40 m/s ² , 20 cycles, 10...58/60...150 Hz
Shock (half-sine) (IEC/EN 60068-2-27)		100 m/s ² , 11 ms, 3 shocks, all directions
Isolation data		
Rated impulse withstand voltage U_{imp} between all isolated circuits (VDE 0110, IEC/EN 60664)		4 kV; 1.2/50 μ s
Pollution category (IEC/EN 60664, VDE 0110, UL 508)		3
Overvoltage category (IEC/EN 60664, VDE 0110, UL 508)		III
Rated insulation voltage U_i	input circuit / output circuit	500 V
	output circuit 1 / output circuit 2	300 V

Electronic timers CT-S range

Technical data, Technical diagrams

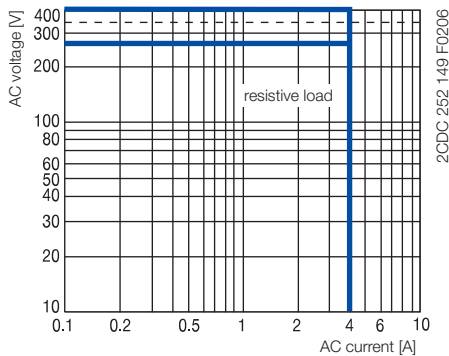
Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Isolation data		
Basic insulation (IEC/EN 61140)	input circuit / output circuit	500 V
Protective separation (VDE 0106 part 101 and part 101/A1; IEC/EN 61140)	input circuit / output circuit	250 V
Power-frequency withstand voltage test (test voltage, routine test) between all isolated circuits		2.0 kV, 50 Hz, 1 s
Standards		
Product standard		IEC 61812-1, EN 61812-1 + A11, DIN VDE 0435 part 2021
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
RoHS Directive		2002/95/EC
Electromagnetic compatibility		
Interference immunity		IEC/EN 61000-6-1, IEC/EN 61000-6-2
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 4 (2 kV A1-A2)
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)
Interference emission		IEC/EN 61000-6-3, IEC/EN 61000-6-4
electromagnetic field (HF radiation resistance)	IEC/CISPR 22, EN 55022	Class B
HF line emission	IEC/CISPR 22, EN 55022	Class B

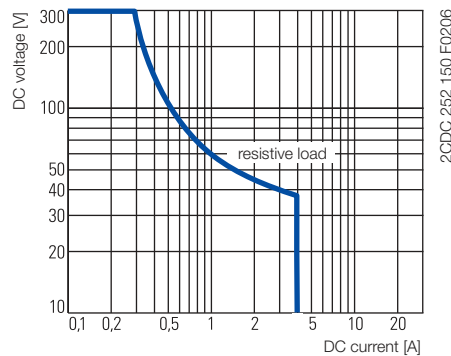
Technical diagrams

Load limit curves

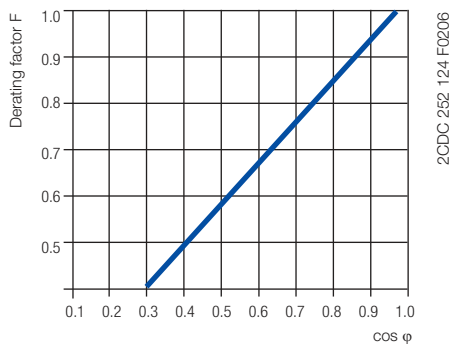
AC load (resistive)



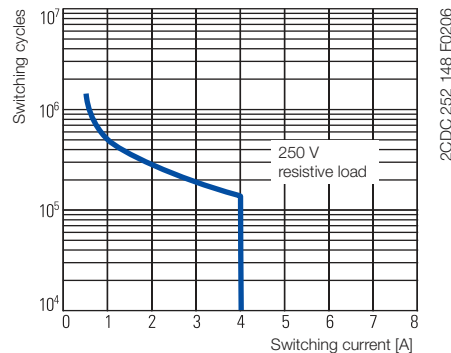
DC load (resistive)



Derating factor F
for inductive AC load



Contact lifetime



• Approvals 8

Electronic timers

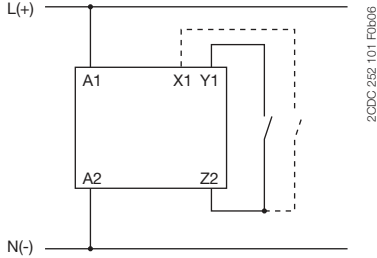
CT-S range

Wiring notes, Dimensional drawing

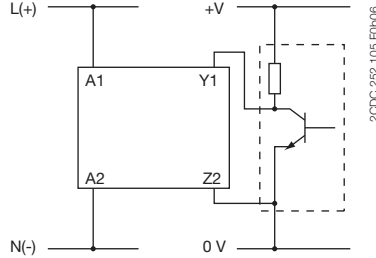
1

Wiring notes

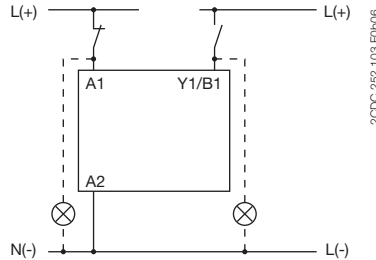
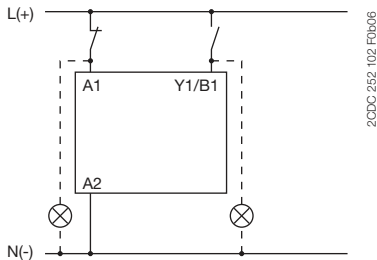
Control inputs (volt-free triggering)



Triggering of the control inputs (volt-free) with a proximity switch (3 wire)

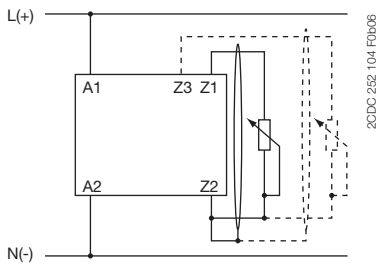


Control inputs (voltage-related triggering)



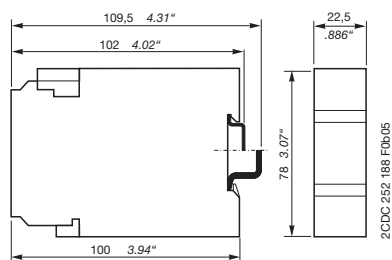
The control input **Y1/B1** is triggered with electric potential against **A2**. It is possible to use the control supply voltage from terminal **A1** or any other voltage within the rated control supply voltage range.

Remote potentiometer



Dimensional drawing

dimensions in mm





Measuring and monitoring relays

CM and C5xx range

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Measuring and monitoring relays

CM range

Benefits and advantages

2



2CDC 255 078 F0007

CM-E range: Economic



1SVR 550 851 F9400

Combination screws

Easy tightening and release of the connecting screws with pozidrive, pan- or crosshead screwdriver.



1SVC 110 000 F0506



Safety

The "real distance" is hidden. The clearance and the creepage distances of our products exceed international standards and substantially increase the safety of our products.

2CDC 253 011 F0003

- Only 22.5 mm wide enclosure
- Output contacts: 1 c/o contact or 1 n/o contact
- One supply voltage range
- One monitoring function
- Cost-efficient solution for OEM applications
- Preset monitoring ranges



Measuring and monitoring relays

CM range

Benefits and advantages

CM-S range: Universal and multifunctional



- Only 22.5 mm wide enclosure
- Output contacts: 1 or 2 c/o contacts
- One supply voltage range or supplied by measuring circuit
- Setting and operation via front-face operating controls
- Adjustment of threshold values and switching hysteresis via direct reading scale
- Integrated and snap-fitted front-face marker
- Sealable transparent cover (accessory)



2CDC 253 089 F0004

Direct reading scales

Direct adjustment of the threshold values of measuring and monitoring relays without any additional calculation provides accurate time delay adjustment.

LEDs for status indication

All actual operational states are indicated by front-face LEDs, thus simplifying commissioning and troubleshooting.



2CDC 253 014 F0003

Double-chamber cage connection terminals



2CDC 253 010 F0003

Double-chamber cage connection terminals provide connection of wires up to 2 x 2.5 mm² (2 x 14 AWG), rigid or fine-strand, with or without wire end ferrules. Potential distribution does not require additional terminals, thus saving time and money. Wiring is considerably simplified through integrated cable guides.

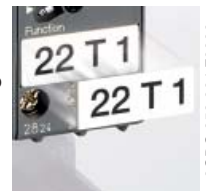
CM-N range: Multifunctional



- 45 mm wide enclosure
- Output contacts: 2 c/o contacts
- Continuous voltage range (24-240 V AC/DC) or single-supply
- Setting and operation via front-face operating controls
- Adjustment of threshold values and switching hysteresis via direct reading scale
- Adjustable time delays
- Integrated and snap-fitted front-face marker label
- Sealable transparent cover (accessory)

Integrated marker label

Integrated marker labels allow the product to be marked quickly and simply. No additional marking labels are required.



2CDC 253 064 F0006



2CDC 253 009 F0005

Sealable transparent covers

Protection against unauthorized changes of time and/or threshold values in sizes 22.5 and 45 mm wide (optionally available as an accessory).

Safety

The "real distance" is hidden. The clearance and the creepage distances of our products exceed international standards and substantially increase the safety of our products.



2CDC 253 011 F 0003

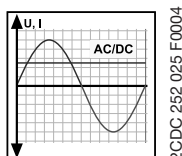
Measuring and monitoring relays

CM and C5xx range

Monitoring features and application ranges

Single-phase current and voltage monitoring

- Over- or undercurrent monitoring
CM-SRS and CM-SRS.M
- Over- and undercurrent monitoring
CM-SFS
- Over- or undervoltage monitoring
CM-ESS and CM-ESS.M
- Over- and undervoltage monitoring
CM-EFS



Current monitoring

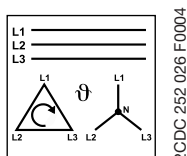
- Monitoring of motor current consumption
- Monitoring of lighting installations and heating circuits
- Monitoring of hoisting gear and transportation equipment overload
- Monitoring of locking devices, electromechanical brake gear and locked rotor

Voltage monitoring

- Speed monitoring of DC motors
- Monitoring of battery voltages and other supply networks
- Monitoring of upper and lower voltage threshold values

Three-phase monitoring

- Phase loss
CM-PBE
- Over- and undervoltage
CM-PVE
- Phase sequence and phase loss
CM-PFE and CM-PFS
- Phase sequence and phase loss, over- and undervoltage
CM-PSS.xx and CM-PVS.xx
- Phase sequence and phase loss, unbalance
CM-PAS.xx
- Phase sequence and phase loss, unbalance, over- and undervoltage
CM-MPS.xx and CM-MPN.xx

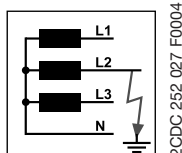


Three-phase voltage monitoring

- Voltage monitoring of mobile three-phase equipment
- Protection of personnel and installations against phase reversal
- Monitoring of the supply voltage to machines and installations
- Protection of equipment against damage caused by unstable supply voltage
- Switching to emergency or auxiliary supply
- Protection of motors against damage caused by unbalanced phase voltages and phase loss

Insulation monitoring

CM-IWN-AC for electrically isolated AC networks, and CM-IWN-DC for electrically isolated DC networks.

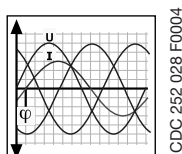


Insulation monitoring

- Monitoring of electrically isolated supply mains for insulation resistance failure
- Detection of initial faults
- Protection against ground faults

Motor load monitoring

CM-LWN monitors load states of single- and three-phase asynchronous motors.



Motor load monitoring

- Detection of V-belt breaking
- Motor protection against overload
- Monitoring of filters for clogging
- Protection of pumps against dry running
- Detection of high pressure in conduit systems
- Monitoring for dulling blades in sawing and cutting machines

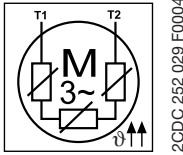
Measuring and monitoring relays

CM and C5xx range

Monitoring features and application ranges

Thermistor motor protection

CM-MSE, CM-MSS and CM-MSN provide full protection of motors with integrated PTC resistor sensors.

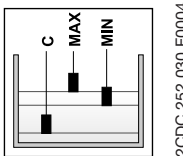


Thermistor motor protection

- Protection of motors against thermal overload, e. g. caused by insufficient cooling, heavy load starting conditions, undersized motors, etc.

Liquid level monitoring

CM-ENE, CM-ENS and CM-ENN for control and regulation of liquid levels and ratios of mixtures of conductive fluids.

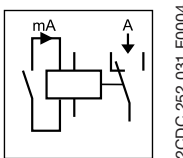


Liquid level monitoring and control

- Protection of pumps against dry running
- Protection against container overflow
- Control of liquid levels
- Detection of leaks
- Control of mixing ratios

Contact protection, sensor evaluation

The CM-KRN protects sensitive control contacts from excessive loads and can store switch positions. The CM-SIS supplies and evaluates NPN and PNP sensors.

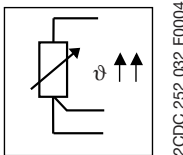


Contact protection / sensor evaluation

- Storage of the switching states of bouncing contacts
- Amplification of the switch state information of sensitive contacts
- Supply and evaluation of NPN or PNP sensors

Temperature monitoring

Acquisition, messaging and regulation of temperatures of solid, liquid and gaseous media in processes and machines via PT100, PT1000, KTY83, KTY 84 or NTC sensors with C510, C511, C512, C513.

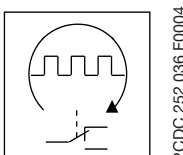


Temperature monitoring

- Motor and system protection
- Control cabinet temperature monitoring
- Frost monitoring
- Temperature limits for process variables, e.g. in the packing or electroplating industry
- Control of systems and machines like heating, air-conditioning and ventilation systems, solar collectors, heat pumps or hot water supply systems
- Monitoring of servomotors with KTY sensors
- Bearing and gear oil monitoring
- Coolant monitoring

Cycle monitoring

Cycle monitor with watchdog function CM-WDS.



Cycle monitoring

- External monitoring of the correct function of programmable logic controllers (plc) and industrial pcs (ipc)

Measuring and monitoring relays

CM and C5xx range

Approvals and marks

2

■ existing □ pending		Current and voltage monitoring, single-phase								Three-phase monitoring												
		CM-SRS.1x	CM-SRS.2x	CM-SRS.M	CM-SFS.2	CM-ESS.1x	CM-ESS.2x	CM-ESS.M	CM-EFS.2	CM-PBE	CM-PVE	CM-PFE	CM-PFS	CM-PSS.x1	CM-PVS.x1	CM-PAS.x1	CM-MPS.x1	CM-MPS.x3	CM-MPN.52	CM-MPN.62	CM-MPN.72	
Approvals																						
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	GL	□	□	□	□	□	□	□	□													
	GOST	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	CB scheme	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	CCC	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	RMRS	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Marks																						
	CE	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	C-Tick	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

■ existing □ pending		Insulation monitors for ungrounded supply mains					Motor load monitoring			Temperature monitoring				Contact protection, sensor interface							
		CM-IWN-AC	CM-IWN-DC	C558.01	C558.02	C558.03	CM-LWN			C510	C511	C512	C513	CM-KRN	CM-SIS						
Approvals																					
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■			■	■	■	■	■	■						
	GL	■	■				■							■	■						
	GOST	■	■				■							■	■						
	CB scheme	■	■				■														
	CCC	■	■				■														
	RMRS	■	■				■							■	■						
Marks																					
	CE	■	■	■	■	■	■			■	■	■	■	■	■						
	C-Tick	■	■				■								■						

■ existing □ pending		Cycle monitoring				Thermistor motor protection								Liquid level monitoring							
		CM-WDS				CM-MSE	CM-MSS (1)	CM-MSS (2)	CM-MSS (3)	CM-MSS (4)	CM-MSS (5)	CM-MSS (6)	CM-MSS (7)	CM-MSN	CM-ENE MIN	CM-ENE MAX	CM-ENS	CM-ENS UP/...	CM-ENN	CM-ENN UP/...	
Approvals																					
	UL 508, CAN/CSA C22.2 No.14	■				■	■	■	■	■	□	■	■	■	■	■	■	□	■	□	
	GL						■	■	■	■	■	■	■			■ ¹⁾		■			
	GOST					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
	II (2) G D, PTB 02 ATEX 3080																				
	CB scheme					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
	CCC					■	■	■	■	■	■	■	■	■	■	■	■	■	■		
	RMRS	■				■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Marks																					
	CE	■				■	■	■	■	■	■	■	■	■	■	■	■	■	■		
	C-Tick					■	■	■	■	■	■	■	■	■	■	■	■	■	■		

¹⁾ Versions with safety isolation without approval



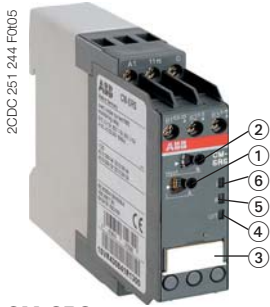
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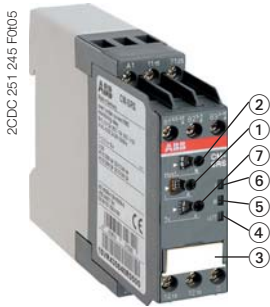
Current monitoring relays, single-phase AC/DC - CM-SRS.1 and CM-SRS.2

Ordering details

2



CM-SRS.1



CM-SRS.2

- ① Threshold value adjustment
- ② Hysteresis adjustment
- ③ DIP switches (see DIP switch functions)
- ④ U/T: green LED - control supply voltage, (timing)
- ⑤ R: yellow LED - relay status
- ⑥ I: red LED - over- / undercurrent
- ⑦ Adjustment of the tripping delay T_V

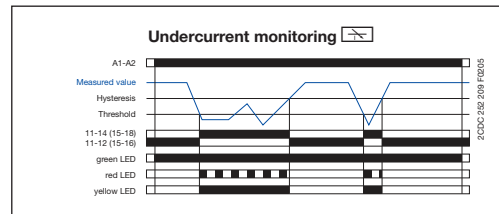
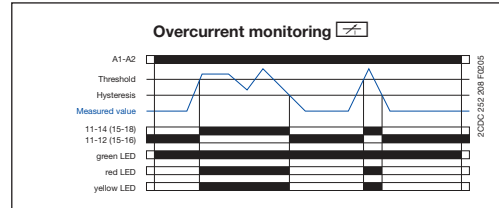
- Monitoring of DC- and AC-currents
- **CM-SRS.x1:** 3 mA - 1 A
- **CM-SRS.x2:** 0.3-15 A
- RMS measuring principle
- One device includes 3 measuring ranges
- Over- or undercurrent monitoring configurable
- Hysteresis adjustable from 3-30 %
- **CM-SRS.2:** Tripping delay T_V adjustable 0; 0.1-30 s
- 3 supply voltage versions
- **CM-SRS.1:** 1 c/o contact
- **CM-SRS.2:** 2 c/o contacts
- 22.5 mm width
- 3 LEDs for status indication

Depending on the configuration, the current monitoring relays **CM-SRS.1** and **CM-SRS.2** can be used for over- or undercurrent monitoring in single-phase AC and/or DC systems. The current to be monitored (measured value) is applied to terminals B1/B2/B3-C. The devices work according to the open-circuit principle.

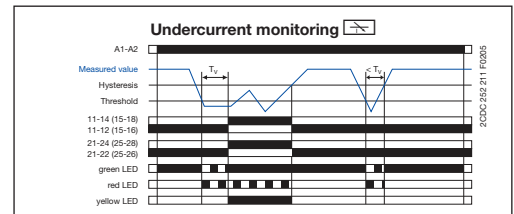
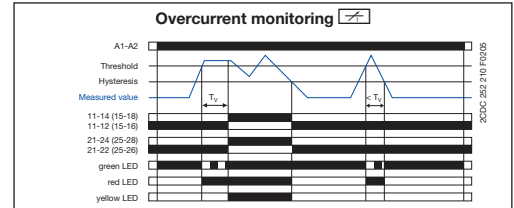
If the measured value exceeds resp. drops below the adjusted threshold value, the output relay(s) energize(s): on the CM-SRS.1 immediately, on the CM-SRS.2 after the set tripping delay T_V . If the measured value exceeds resp. drops below the threshold value plus resp. minus the adjusted hysteresis, the output relay(s) de-energize(s).

The hysteresis is adjustable within a range of 3-30 % of the threshold value.

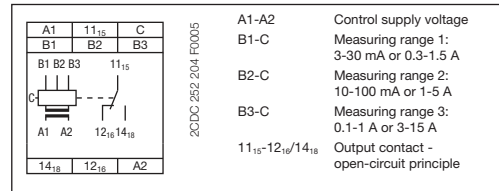
Function diagrams CM-SRS.1



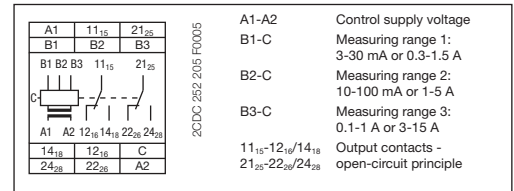
Function diagrams CM-SRS.2



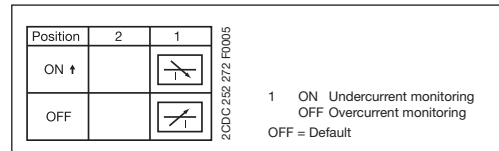
Connection diagram CM-SRS.1



Connection diagram CM-SRS.2



DIP switch functions CM-SRS.1, CM-SRS.2



Type	Control supply voltage 50/60 Hz	Tripping delay T_V	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
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Measuring ranges AC/DC: 3-30 mA; 10-100 mA; 0.1-1 A

CM-SRS.11	24-240 V AC/DC	without	1SVR 430 840 R0200	1		0.12 / 0.26
	110-130 V AC		1SVR 430 841 R0200	1		0.15 / 0.33
	220-240 V AC		1SVR 430 841 R1200	1		0.15 / 0.33

Measuring ranges AC/DC: 0.3-1.5 A; 1-5 A; 3-15 A

CM-SRS.12	24-240 V AC/DC	without	1SVR 430 840 R0300	1		0.12 / 0.26
	110-130 V AC		1SVR 430 841 R0300	1		0.15 / 0.33
	220-240 V AC		1SVR 430 841 R1300	1		0.15 / 0.33

Measuring ranges AC/DC: 3-30 mA; 10-100 mA; 0.1-1 A

CM-SRS.21	24-240 V AC/DC	adjustable 0 or 0.1-30 s	1SVR 430 840 R0400	1		0.12 / 0.26
	110-130 V AC		1SVR 430 841 R0400	1		0.15 / 0.33
	220-240 V AC		1SVR 430 841 R1400	1		0.15 / 0.33

Measuring ranges AC/DC: 0.3-1.5 A; 1-5 A; 3-15 A

CM-SRS.22	24-240 V AC/DC	adjustable 0 or 0.1-30 s	1SVR 430 840 R0500	1		0.12 / 0.26
	110-130 V AC		1SVR 430 841 R0500	1		0.15 / 0.33
	220-240 V AC		1SVR 430 841 R1500	1		0.15 / 0.33

• Approvals	62	• Technical data	70
• Technical diagrams	144	• Dimensional drawings	145
• Accessories	146	• Current transformers	147

Current monitoring relays, single-phase AC/DC, multifunctional - CM-SRS.M

Ordering details

2CDC 251 247 F005

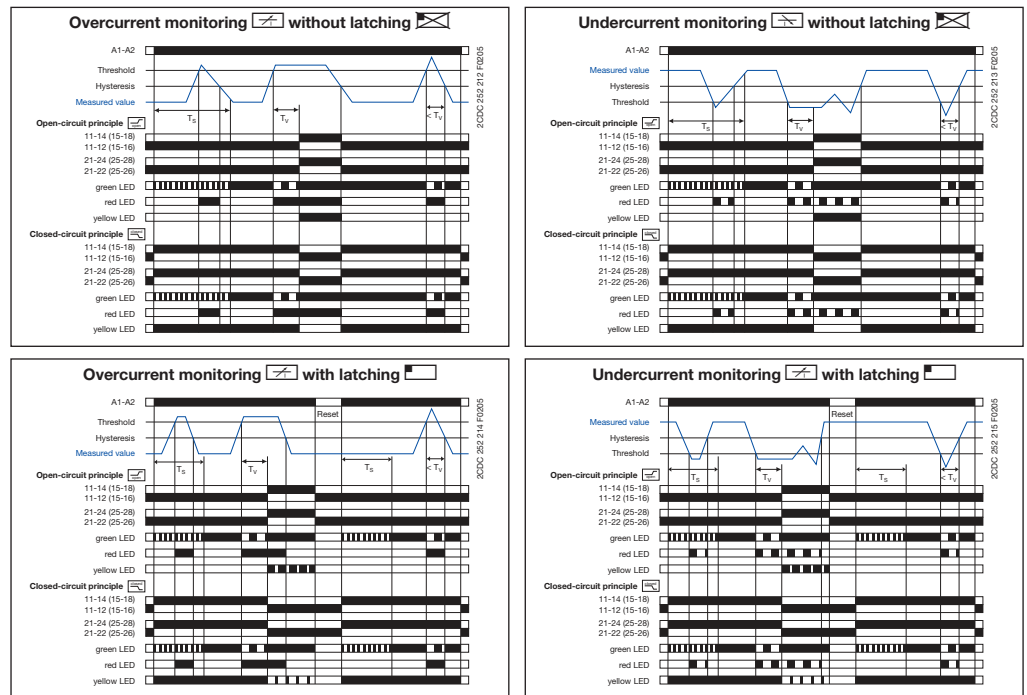


CM-SRS.M

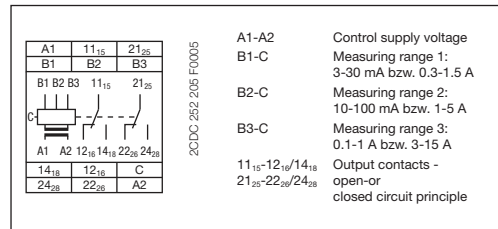
- ① Threshold value adjustment
- ② Hysteresis adjustment
- ③ Adjustment of the tripping delay T_V
- ④ Adjustment of the start-up delay T_S
- ⑤ DIP switches (see DIP switch functions)
- ⑥ U/T: green LED - control supply voltage, timing
- ⑦ R: yellow LED - relay status
- ⑧ I: red LED - over- / undercurrent

Depending on the configuration, the current monitoring relays **CM-SRS.M** can be used for over- or undercurrent monitoring in single-phase AC and/or DC systems. The current to be monitored (measured value) is applied to terminals B1/B2/B3-C. Open or closed-circuit principle are configurable. If the measured value exceeds resp. drops below the adjusted threshold value before the set start-up delay T_S is complete, the output relays do not change their actual state. If the measured value exceeds resp. drops below the adjusted threshold value when T_S is complete, the tripping delay T_V starts. If T_V is complete and the measured value is still exceeding resp. below the threshold value plus resp. minus the set hysteresis, the output relays energize / de-energize . If the measured value exceeds resp. drops below the threshold value minus resp. plus the set hysteresis and the latching function is not activated , the output relays de-energize / energize . With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset. The hysteresis is adjustable within a range of 3-30 % of the threshold value.

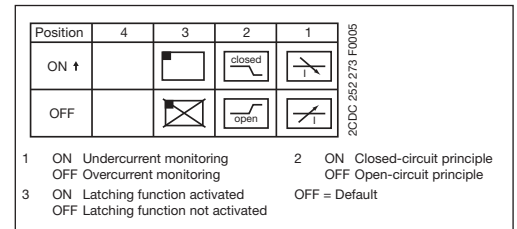
Function diagrams CM-SRS.M



Connection diagram CM-SRS.M



DIP switch functions CM-SRS.M



- Monitoring of DC- and AC-currents
- **CM-SRS.M1:** 3 mA - 1 A
- **CM-SRS.M2:** 0.3-15 A
- RMS measuring principle
- One device includes 3 measuring ranges
- Over- or undercurrent monitoring configurable
- Open- or closed circuit principle configurable
- Latching function configurable
- Hysteresis adjustable from 3-30 %
- Start-up delay T_S adjustable 0; 0.1-30 s
- Tripping delay T_V adjustable 0; 0.1-30 s
- 2 c/o contacts
- 22.5 mm width
- 3 LEDs for status indication

Type	Control supply voltage 50/60 Hz	Tripping delay T_V adjustable	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
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Measuring ranges AC/DC: 3-30 mA; 10-100 mA; 0,1-1 A

CM-SRS.M1	24-240 V AC/DC	0 or 0.1-30 s	1SVR 430 840 R0600	1		0.12 / 0.26
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Measuring ranges AC/DC: 0,3-1,5 A; 1-5 A; 3-15 A

CM-SRS.M2	24-240 V AC/DC	0 or 0.1-30 s	1SVR 430 840 R0700	1		0.12 / 0.26
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• Approvals	62	• Technical data	70
• Technical diagrams	144	• Dimensional drawings	145
• Accessories	146	• Current transformers	147

Current monitoring relay, single-phase AC/DC, window monitoring - CM-SFS.2

Ordering details

2



CM-SFS.2

- ① Threshold value adjustment >I for overcurrent
- ② Threshold value adjustment <I for undercurrent
- ③ Adjustment of the tripping delay T_V
- ④ Adjustment of the start-up delay T_S
- ⑤ DIP switches (see DIP switch functions)
- ⑥ U/T: green LED - control supply voltage, timing
- ⑦ R: yellow LED - relay status
- ⑧ I: red LED - over- / undercurrent

- Monitoring of DC- and AC-currents
- **CM-SFS.21:** 3 mA - 1 A
- **CM-SFS.22:** 0.3-15 A
- RMS measuring principle
- One device includes 3 measuring ranges
- Over- and undercurrent monitoring
- ON- or OFF-delay configurable
- Open- or closed circuit principle configurable
- Latching function configurable
- Thresholds for I_{min} and I_{max} adjustable
- Fixed hysteresis of 5 %
- Start-up delay T_S adjustable 0; 0.1-30 s
- Tripping delay T_V adjustable 0; 0.1-30 s
- 1x2 c/o contacts (common signal) or 2x1 c/o contact (separate signals for I_{min} and I_{max})
- 22.5 mm width
- 3 LEDs for status indication

The current window monitoring relays **CM-SFS.2** can be used for the simultaneous monitoring of over- (>I) and undercurrents (<I) in single-phase AC and/or DC systems. Depending on the configuration, one c/o contact each or both c/o contacts in parallel can be used for the over- and undercurrent monitoring. The current to be monitored (measured value) is applied to terminals B1/B2/B3-C. Open- or closed-circuit principle as well as an adjustable ON or OFF tripping delay are configurable.

ON-delayed current window monitoring with parallel switching c/o contacts

If the measured value exceeds resp. drops below the adjusted threshold value before the set start-up delay T_S is complete, the output relays do not change their actual state.

If the measured value exceeds resp. drops below the adjusted threshold value when T_S is complete, the tripping delay T_V starts, when is configured. If T_V is complete and the measured value is still exceeding resp. below the threshold value minus resp. plus the fixed hysteresis (5%), the output relays energize / de-energize .

If the measured value exceeds resp. drops below the threshold value plus resp. minus the hysteresis and the latching function is not activated , the output relays de-energize / energize . With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

OFF-delayed current window monitoring with parallel switching c/o contacts

If the measured value exceeds resp. drops below the adjusted threshold value when the set start-up delay T_S is complete, the output relays energize / de-energize , when is configured, and remain in this position during the set tripping delay T_V .

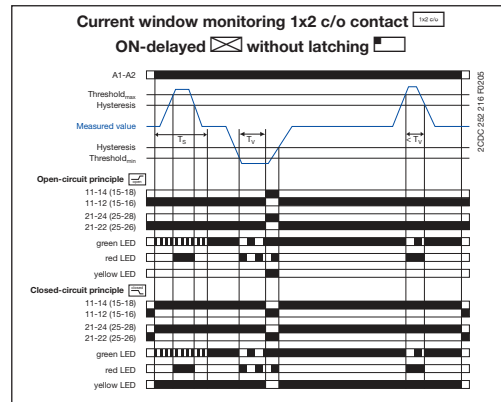
If the measured value exceeds resp. drops below the threshold value plus resp. minus the fixed hysteresis (5%) and the latching function is not activated , the tripping delay T_V starts.

After completion of T_V , the output relays de-energize / energize , provided that the latching function is not activated . With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

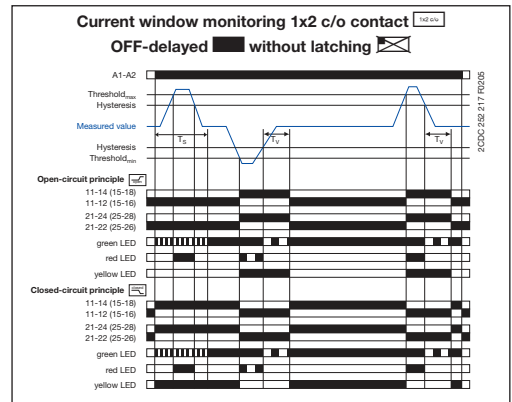
When is adjusted on the device, the functionality is equivalent to the one described above. There is only to consider that in this case, instead of both output relays, only one output relay each will be switched.

">I" = 11₁₅-12₁₆/14₁₈; "<I" = 21₂₅-22₂₆/24₂₈

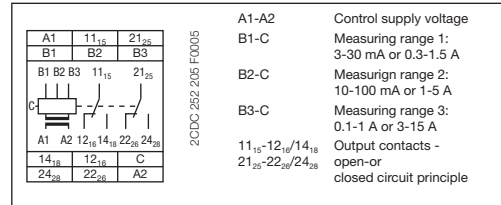
Function diagrams CM-SFS.2



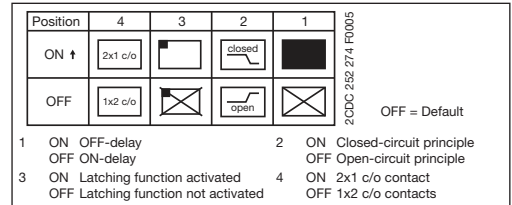
Further function diagrams see data sheet.



Connection diagram CM-SFS.2



DIP switch function CM-SFS.2



Type	Control supply voltage	Tripping delay	Order code	Pack.-unit	Price	Weight
	50/60 Hz	T_V adjustable		piece	1 piece	1 piece kg / lb

Measuring ranges AC/DC: 3-30 mA; 10-100 mA; 0.1-1 A

CM-SFS.21	24-240 V AC/DC	0 or 0.1-30 s	1SVR 430 760 R0400	1		0.12 / 0.26
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Measuring ranges AC/DC: 0.3-1.5 A; 1-5 A; 3-15 A

CM-SFS.22	24-240 V AC/DC	0 or 0.1-30 s	1SVR 430 760 R0500	1		0.12 / 0.26
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• Approvals	62	• Technical data	70
• Technical diagrams	144	• Dimensional drawings	145
• Accessories	146	• Current transformers	147

Voltage monitoring relays, single-phase AC/DC - CM-ESS.1 and CM-ESS.2

Ordering details



CM-ESS.1



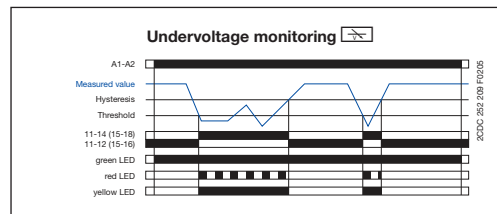
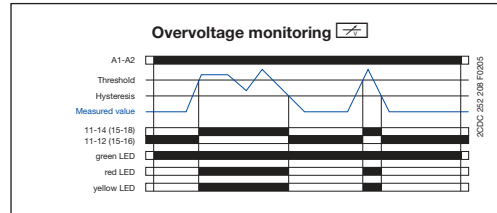
CM-ESS.2

- ① Threshold value adjustment
- ② Hysteresis adjustment
- ③ Adjustment of the measuring range
- ④ DIP switches (see DIP switch functions)
- ⑤ U/T: green LED - control supply voltage, timing
- ⑥ R: yellow LED - relay status
- ⑦ U: red LED - over- / undervoltage
- ⑧ Adjustment of the tripping delay T_V

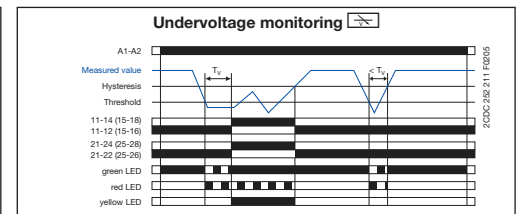
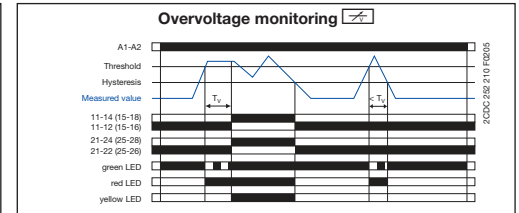
- Monitoring of DC- and AC-voltages from 3-600 V
- RMS measuring principle
- One device includes 4 measuring ranges: 3-30 V, 6-60 V, 30-300 V, 60-600 V
- Over- or undervoltage monitoring configurable
- Hysteresis adjustable from 3-30 %
- **CM-ESS.2:** Tripping delay T_V adjustable 0; 0.1-30 s
- 3 supply voltage versions
- **CM-ESS.1:** 1 c/o contact
- **CM-ESS.2:** 2 c/o contacts
- 22.5 mm width
- 3 LEDs for status indication

Depending on the configuration, the voltage monitoring relays **CM-ESS.1** and **CM-ESS.2** can be used for over- or undervoltage monitoring in single-phase AC and/or DC systems. The voltage to be monitored (measured value) is applied to terminals B-C. The devices work according the open-circuit principle. If the measured value exceeds resp. drops below the adjusted threshold value, the output relay(s) energize(s); on the CM-ESS.1 immediately, on the CM-ESS.2 after the set tripping delay T_V . If the measured value exceeds resp. drops below the threshold value plus resp. minus the adjusted hysteresis, the output relay(s) de-energize(s). The hysteresis is adjustable within a range of 3-30 % of the threshold value.

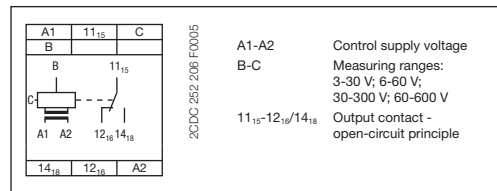
Function diagrams CM-ESS.1



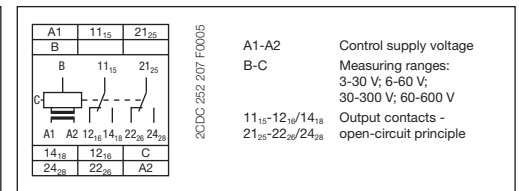
Function diagrams CM-ESS.2



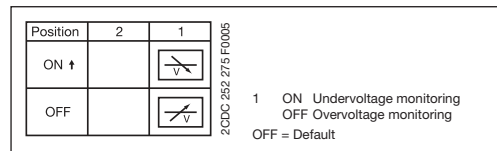
Connection diagram CM-ESS.1



Connection diagram CM-ESS.2



DIP switch functions CM-ESS.1, CM-ESS.2



Type	Control supply voltage	Tripping delay	Order code	Pack. unit	Price	Weight
	50/60 Hz	T_V		piece	1 piece	1 piece
						kg / lb

Measuring ranges AC/DC: 3-30 V; 6-60 V; 30-300 V; 60-600 V

CM-ESS.1	24-240 V AC/DC	without	1SVR 430 830 R0300	1		0.12 / 0.26
	110-130 V AC		1SVR 430 831 R0300	1		0.15 / 0.33
	220-240 V AC		1SVR 430 831 R1300	1		0.15 / 0.33
CM-ESS.2	24-240 V AC/DC	adjustable 0 or 0.1-30 s	1SVR 430 830 R0400	1		0.12 / 0.26
	110-130 V AC		1SVR 430 831 R0400	1		0.15 / 0.33
	220-240 V AC		1SVR 430 831 R1400	1		0.15 / 0.33

• Approvals	62	• Technical data	72
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• Accessories	146		

Voltage monitoring relay, single-phase AC/DC, multifunctional - CM-ESS.M

Ordering details

2



CM-ESS.M

- ① Threshold value adjustment
- ② Hysteresis adjustment
- ③ Adjustment of the tripping delay T_V
- ④ Adjustment of the measuring range
- ⑤ DIP switches (see DIP switch functions)
- ⑥ U/T: green LED - control supply voltage
- ⑦ R: yellow LED - relay status
- ⑧ U: red LED - over- / undervoltage

- Monitoring of DC- and AC-voltages from 3-600 V
- RMS measuring principle
- One device includes 4 measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
- Over- or undervoltage monitoring configurable
- Open- or closed circuit principle configurable
- Latching function configurable
- Hysteresis adjustable from 3-30 %
- Tripping delay T_V adjustable 0; 0.1-30 s
- 2 c/o contacts
- 22.5 mm width
- 3 LEDs for status indication

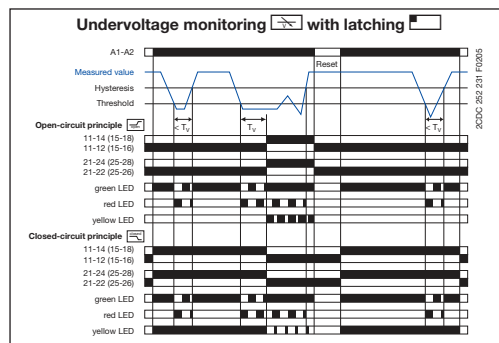
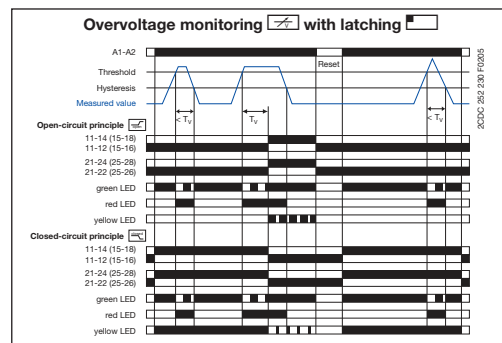
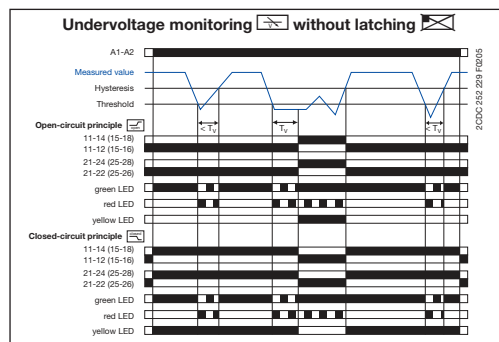
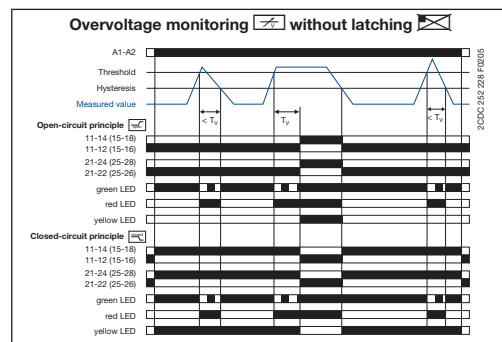
Depending on the configuration, the voltage monitoring relay **CM-ESS.M** can be used for over- or undervoltage monitoring in single-phase AC and/or DC systems. The voltage to be monitored (measured value) is applied to terminals B-C. Open or closed-circuit principle are selectable.

If the measured value exceeds resp. drops below the adjusted threshold value, the tripping delay T_V starts. If T_V is complete and the measured value is still exceeding resp. below the threshold value plus resp. minus the set hysteresis, the output relays energize / de-energize .

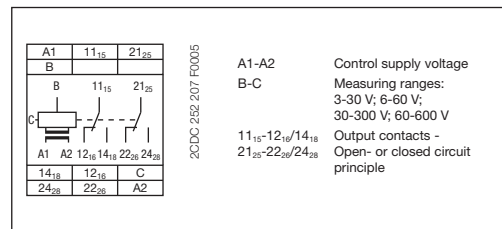
If the measured value exceeds resp. drops below the threshold value plus resp. minus the set hysteresis and the latching function is not activated , the output relays de-energize / energize . With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

The hysteresis is adjustable within a range of 3-30 % of the threshold value.

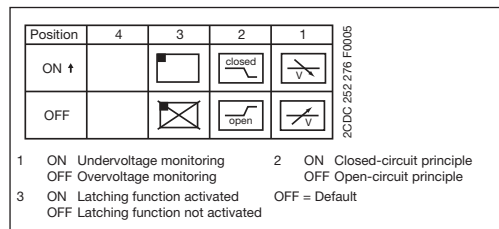
Function diagrams CM-ESS.M



Connection diagram CM-ESS.M



DIP switch functions CM-ESS.M



Type	Control supply voltage	Tripping delay	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
	50/60 Hz	T_V adjustable				

Measuring ranges AC/DC: 3-30 V; 6-60 V; 30-300 V; 60-600 V

CM-ESS.M	24-240 V AC/DC	0 or 0.1-30 s	1SVR 430 830 R0500	1		0.12 / 0.26
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• Accessories	146		

Voltage monitoring relay, single-phase AC/DC, window monitoring - CM-EFS.2

Ordering details

2CDC 251 F005



CM-EFS.2

- ① Threshold value adjustment >U for overvoltage
- ② Threshold value adjustment <U for undervoltage
- ③ Adjustment of the tripping delay T_V
- ④ Adjustment of the measuring range
- ⑤ DIP switches (see DIP switch functions)
- ⑥ U/T: green LED - control supply voltage, timing
- ⑦ R: yellow LED - relay status
- ⑧ U: red LED - over- / undervoltage

- Monitoring of DC- and AC-voltages from 3-600 V
- RMS measuring principle
- One device includes 4 measuring ranges: 3-30 V; 6-60 V; 30-300 V; 60-600 V
- Over- and undervoltage monitoring
- ON- or OFF-delay configurable
- Open- or closed circuit principle configurable
- Latching function configurable
- Thresholds for U_{min} and U_{max} adjustable
- Fixed hysteresis of 5 %
- Tripping delay T_V adjustable 0; 0.1-30 s
- 1x2 c/o contacts (common signal) or 2x1 c/o contact (separate signals for U_{min} and U_{max})
- 22.5 mm width
- 3 LEDs for status indication

The voltage window monitoring relay **CM-EFS.2** can be used for the simultaneous monitoring of over- (>U) and undervoltages (<U) in single-phase AC and/or DC systems. Depending on the configuration, one c/o contact each or both c/o contacts in parallel can be used for the over- and undervoltage monitoring. The voltage to be monitored (measured value) is applied to terminals B-C. Open- or closed-circuit principle as well as an adjustable ON or OFF tripping delay are configurable.

ON-delayed voltage window monitoring with parallel switching c/o contacts

If the measured value exceeds resp. drops below the adjusted threshold value, the tripping delay T_V starts, when is configured. If T_V is complete and the measured value is still exceeding resp. below the threshold value minus resp. plus the fixed hysteresis (5%), the output relays energize /de-energize .

If the measured value exceeds resp. drops below the threshold value plus resp. minus the hysteresis and the latching function is not activated , the output relays de-energize / energize . With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

OFF-delayed voltage window monitoring with parallel switching c/o contacts

If the measured value exceeds resp. drops below the adjusted threshold value, the output relays energize / de-energize , when is configured, and remain in this position during the set tripping delay T_V .

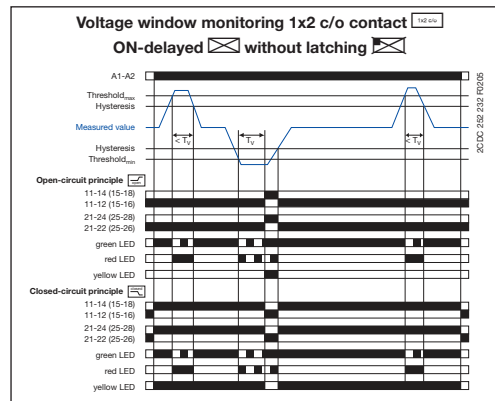
If the measured value exceeds resp. drops below the threshold value plus resp. minus the fixed hysteresis (5%) and the latching function is not activated , the tripping delay T_V starts.

After completion of T_V , the output relays de-energize / energize , provided that the latching function is not activated . With activated latching function the output relays remain energized and de-energize only, when the supply voltage is interrupted / the output relays remain de-energized and energize only, when the supply voltage is switched off and then again switched on = Reset.

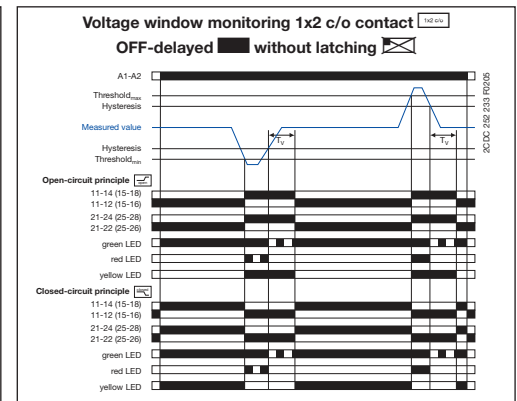
When is adjusted on the device, the functionality is equivalent to the one described above. There is only to consider that in this case, instead of both output relays, only one output relay each will be switched.

">U" = 11₁₅-12₁₆/14₁₈; "<U" = 21₂₅-22₂₆/24₂₈

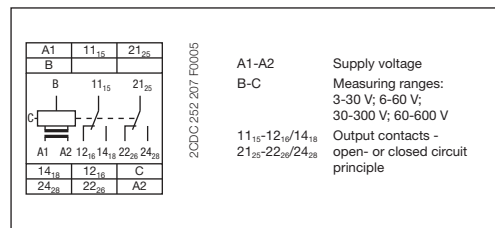
Function diagrams CM-EFS.2



Further function diagrams see data sheet.



Connection diagram CM-EFS.2



DIP switch functions CM-EFS.2

Position	4	3	2	1
ON ↑	<input type="checkbox"/> 2x1 c/o	<input type="checkbox"/>	<input type="checkbox"/> closed	<input type="checkbox"/>
OFF	<input type="checkbox"/> 1x2 c/o	<input type="checkbox"/>	<input type="checkbox"/> open	<input type="checkbox"/>

2CDC 252 274 F005 OFF = Default

1	ON OFF-delay	2	ON Closed-circuit principle
	OFF ON-delay		OFF Open-circuit principle
3	ON Latching function activated	4	ON 2x1 c/o contact
	OFF Latching function not activated		OFF 1x2 c/o contacts

Type	Control supply voltage	Tripping delay	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
	50/60 Hz	T_V adjustable				









Measuring ranges AC/DC: 3-30 V; 6-60 V; 30-300 V; 60-600 V

CM-EFS.2	24-240 V AC/DC	0 or 0.1-30 s	1SVR 430 750 R0400	1		0.12 / 0.26
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• Accessories	146		

Current monitoring relays, single-phase CM-SRS.1, CM-SRS.2, CM-SRS.M and CM-SFS.2

Technical data

Type	CM-SRS.1	CM-SRS.2	CM-SRS.M	CM-SFS.2			
Input circuit - Supply circuit	A1-A2						
Rated control supply voltage U_s	A1-A2	110-130 V AC					
	A1-A2	220-240 V AC					
	A1-A2	24-240 V AC/DC					
Rated control supply voltage U_s tolerance	-15...+10 %						
Rated frequency	AC versions	50/60 Hz					
	AC/DC versions	50/60 Hz or DC					
Current / power consumption	24 V DC	115 V AC	230 V AC				
	110-130 V AC	-	24 mA / 2.6 VA	-			
	220-240 V AC	-	-	12 mA / 2.6 VA			
	24-240 V AC/DC	30 mA / 0.75 W	17 mA / 1.9 VA	11 mA / 2.6 VA			
On-period	100 %						
Power failure buffering	20 ms						
Transient overvoltage protection	Varistors						
Input circuit - Measuring circuit	B1/B2/B3-C						
Monitoring function	over- or undercurrent monitoring configurable			over- and under- current monitoring			
Measuring method	RMS measuring principle						
Measuring inputs	Terminal connection	CM-SxS.x1		CM-SxS.x2			
	Measuring ranges AC/DC	B1-C	B2-C	B3-C	B1-C	B2-C	B3-C
	Input resistance	3-30 mA	10-100 mA	0.1-1 A	0.3-1.5 A	1-5 A	3-15 A ²⁾
	Pulse overload capacity $t < 1$ s	3.3 Ω	1 Ω	0.1 Ω	0.05 Ω	0.01 Ω	0.0025 Ω
	Continuous capacity	500 mA	1 A	10 A	15 A	50 A	100 A
	50 mA	150 mA	1.5 A	2 A	7 A	17 A	
Threshold value(s)	adjustable within the indicated measuring range						
Setting accuracy of threshold value	10 %						
Repeat accuracy (constant parameters)	± 0.07 % of full scale						
Hysteresis related to the threshold value	3-30 % adjustable			5 % fixed			
Measuring signal frequency range	DC / 15 Hz - 2 kHz						
Rated measuring signal frequency range	DC / 50-60 Hz						
Maximum response time	AC: 80 ms / DC: 120 ms						
Measuring error within the supply voltage tolerance	≤ 0.5 %						
Measuring error within the temperature range	≤ 0.06 % / $^{\circ}\text{C}$						
Timing circuit							
Start-up delay T_s	none		0 or 0.1-30 s adjustable				
Tripping delay T_v	none	0 or 0.1-30 s adjustable					
Repeat accuracy (constant parameters)	± 0.07 % of full scale						
Timing error within supply voltage tolerance	-	≤ 0.5 %					
Timing error within temperature range	-	≤ 0.06 % / $^{\circ}\text{C}$					
Indication of operational states							
Control supply voltage	U/T: green LED	 : control supply voltage applied,  : start-up delay T_s active,  : tripping delay T_v active					
Measured value	I: red LED	 : overcurrent,  : undercurrent					
Relay status	R: yellow LED	 : relay energized, no latching function  : relay energized, active latching function  : relay de-energized, active latching function					
Output circuits	11(15)-12(16)/14(18), 21(25)-22(26)/24(28) - Relays						
Kind of output	1 c/o contact	2 c/o contacts		1x2 c/o contacts or 2x1 c/o contact configurable			
Operating principle ¹⁾	open-circuit principle		open- or closed-circuit principle configurable				
Contact material	AgNi						
Rated voltage (VDE 0110, IEC 947-1)	250 V						
Minimum switching voltage / minimum switching current	24 V / 10 mA						
Maximum switching voltage / maximum switching current	250 V AC / 4 A AC						

Current monitoring relays, single-phase CM-SRS.1, CM-SRS.2, CM-SRS.M and CM-SFS.2

Technical data

2








Type		CM-SRS.1	CM-SRS.2	CM-SRS.M	CM-SFS.2
Rated operational current (IEC 60947-5-1)	AC12 (resistive) at 230 V		4 A		
	AC15 (inductive) at 230 V		3 A		
	DC12 (resistive) at 24 V		4 A		
	DC13 (inductive) at 24 V		2 A		
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300		
	max. rated operational voltage		300 V AC		
	max. continuous thermal current at B 300		5 A		
	max. making/breaking apparent power (Make/Break) at B 300		3600/360 VA		
Mechanical lifetime		30x10 ⁶ switching cycles			
Electrical lifetime (AC12, 230 V, 4 A)		0.1x10 ⁶ switching cycles			
Short-circuit capacity / maximum fuse rating	n/c contact	6 A fast-acting	10 A fast-acting		6 A fast-acting
	n/o contact		10 A fast-acting		
General data					
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inch)			
Mounting		DIN rail (EN 50022)			
Mounting position		any			
Degree of protection enclosure / terminals		IP50 / IP20			
Electrical connection					
Wire size	fine-strand with(out) wire end ferrule	2 x 0.75-2.5 mm ² (2 x 18-14 AWG)			
	rigid	2 x 0.5-4 mm ² (2 x 20-12 AWG)			
Stripping length		7 mm (0.28 inch)			
Tightening torque		0.6-0.8 Nm			
Environmental data					
Ambient temperature range operation / storage		-20...+60 °C / -40...+85 °C			
Damp heat (IEC 60068-2-30)		55 °C, 6 cycles			
Vibration (sinusoidal) (IEC/EN 60255-21-1)		Class 2			
Shock (IEC/EN 60255-21-2)		Class 2			
Isolation data					
Rated insulation voltage (VDE 0110, IEC 60947-1, IEC/EN 60255-5)	supply / measuring circuit / output	600 V			
	supply / output 1 / output 2	250 V			
Rated impulse withstand voltage U _{imp} (IEC/EN 60947-1, IEC/EN 60255-5)	supply / measuring circuit / output	6 kV 1.2/50 μs			
	supply / output 1 / output 2	4 kV 1.2/50 μs			
Pollution degree (VDE 0110, IEC 664, IEC/EN 60255-5)		3			
Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5)		III			
Standards					
Product standard		IEC/EN 60255-6			
Low Voltage Directive		2006/95/EC			
EMC Directive		2004/108/EC			
Electromagnetic compatibility					
Interference immunity		IEC/EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3			
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3			
fast transients (Burst)	IEC/EN 61000-4-4	Level 3			
powerful impulses (Surge)	IEC/EN 61000-4-9	Level 3			
HF line emission	IEC/EN 61000-4-6	Level 3			
Interference emission		IEC/EN 61000-6-3			
electromagnetic field (HF radiation resistance)	IEC/CISPR 22; EN 55022	Class B			
HF line emission	IEC/CISPR 22; EN 55022	Class B			

¹) Open-circuit principle: output relay energizes if the measured value exceeds \geq / falls below \leq the adjusted threshold value
 Closed-circuit principle: output relay de-energizes if measured value exceeds \geq / falls below \leq the adjusted threshold value
²) In case of measured currents > 10 A, lateral spacing has to be min. 10 mm

• Approvals 62

Voltage monitoring relays, single-phase CM-ESS.1, CM-ESS.2, CM-ESS.M and CM-EFS

Technical data

Type	CM-ESS.1	CM-ESS.2	CM-ESS.M	CM-EFS.2	
Input circuit - Supply circuit	A1-A2				
Rated control supply voltage U_s	A1-A2	110-130 V AC			
	A1-A2	220-240 V AC			
	A1-A2	24-240 V AC/DC			
Rated control supply voltage U_s tolerance	-15...+10 %				
Rated frequency	AC versions	50/60 Hz			
	AC/DC versions	50/60 Hz or DC			
Current / power consumption		24 V DC	115 V AC	230 V AC	
	110-130 V AC	-	24 mA / 2.6 VA	-	
	220-240 V AC	-	-	12 mA / 2.6 VA	
	24-240 V AC/DC	30 mA / 0.75 W	17 mA / 1.9 VA	11 mA / 2.6 VA	
On-period	100 %				
Power failure buffering	20 ms				
Transient overvoltage protection	Varistors				
Input circuit - Measuring circuit	B-C				
Monitoring function	over- or undervoltage monitoring configurable			over- and undervoltage monitoring	
Measuring method	RMS measuring principle				
Measuring inputs	Terminal connection	CM-ExS			
	Measuring range AC/DC	B-C	B-C	B-C	B-C
	Input resistance	3-30 V	6-60 V	30-300 V	60-600 V
	Pulse overload capacity $t < 1$ s	600 k Ω	600 k Ω	600 k Ω	600 k Ω
		800 V	800 V	800 V	800 V
Continuous capacity	660 V	660 V	660 V	660 V	
Threshold value(s)	adjustable within the indicated measuring range				
Setting accuracy of threshold value	10 %				
Repeat accuracy (constant parameters)	± 0.07 % of full scale				
Hysteresis related to the threshold value	3-30 % adjustable			5 % fixed	
Measuring signal frequency range	DC / 15 Hz - 2 kHz				
Rated measuring signal frequency range	DC / 50-60 Hz				
Maximum response time	AC: 80 ms / DC: 120 ms				
Measuring error within the supply voltage tolerance	≤ 0.5 %				
Measuring error within the temperature range	≤ 0.06 % / $^{\circ}\text{C}$				
Transient overvoltage protection	Varistors				
Timing circuit					
Delay time T_v	none	0 or 0.1-30 s adjustable			
Repeat accuracy (constant parameters)	± 0.07 % of full scale				
Timing error within supply voltage tolerance	-	≤ 0.5 %			
Timing error within temperature range	-	≤ 0.06 % / $^{\circ}\text{C}$			
Indication of operational states					
Control supply voltage	U/T: green LED	 : control supply voltage applied,  : tripping delay T_v active			
Measured value	U: red LED	 : overvoltage,  : undervoltage			
Relay status	R: yellow LED	 : relay energized, no latching function  : relay energized, active latching function  : relay de-energized, active latching function			
Output circuits	11(15)-12(16)/14(18), 21(25)-22(26)/24(28) - Relays				
Kind of output	1 c/o contact	2 c/o contacts		1x2 c/o contacts or 2x1 c/o contact configurable	
Operating principle ¹⁾	open-circuit principle		open- or closed-circuit principle configurable		
Contact material	AgNi				
Rated voltage (VDE 0110, IEC 947-1)	250 V				
Minimum switching voltage / minimum switching current	24 V / 10 mA				
Maximum switching voltage / maximum switching current	250 V AC / 4 A AC				

Voltage monitoring relays, single-phase CM-ESS.1, CM-ESS.2, CM-ESS.M and CM-EFS

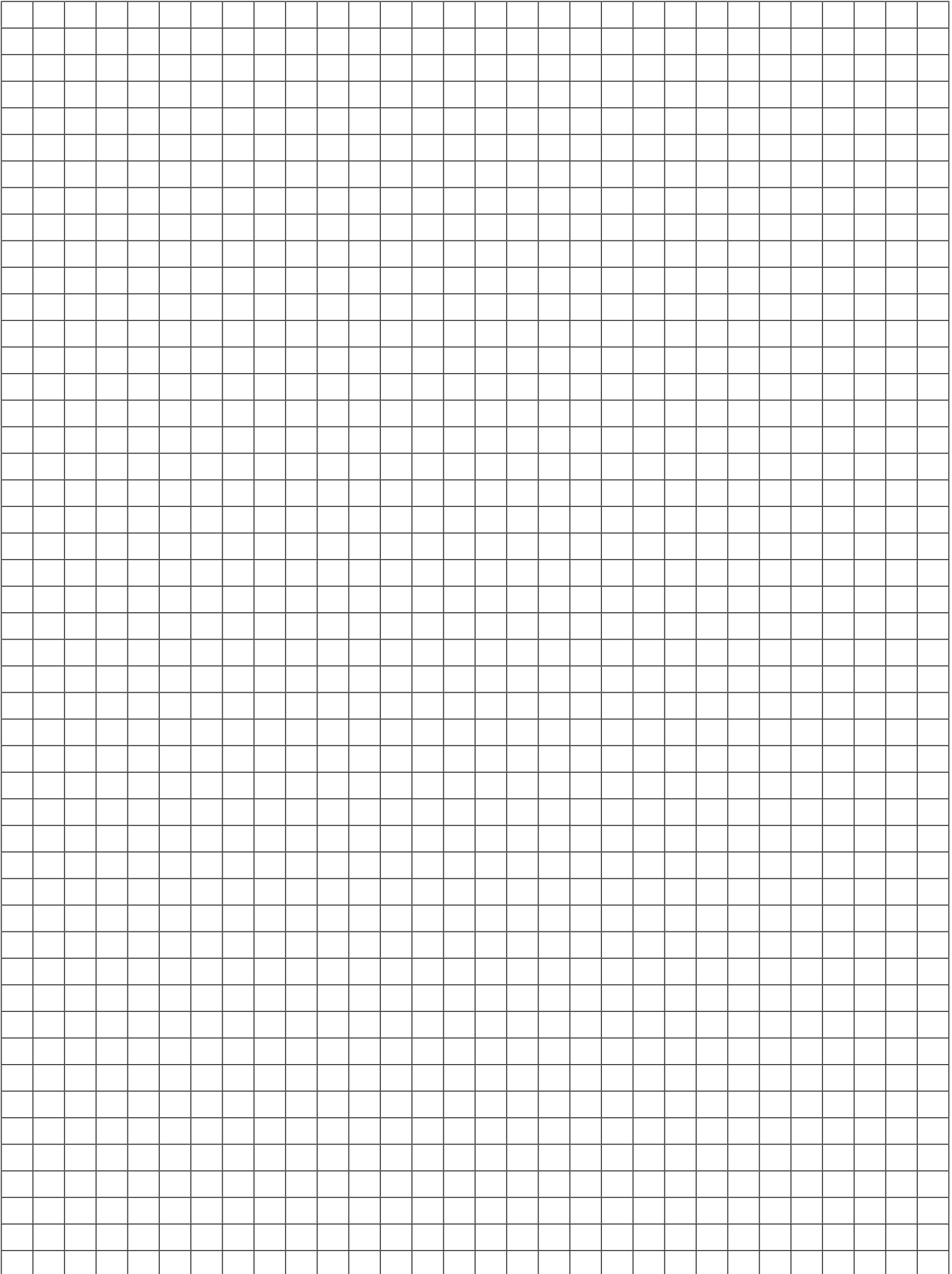
Technical data

Type		CM-ESS.1	CM-ESS.2	CM-ESS.M	CM-EFS.2
Rated operational current (IEC 60947-5-1)	AC12 (resistive) at 230 V		4 A		
	AC15 (inductive) at 230 V		3 A		
	DC12 (resistive) at 24 V		4 A		
	DC13 (inductive) at 24 V		2 A		
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300		
	max. rated operational voltage		300 V AC		
	max. continuous thermal current at B 300		5 A		
	max. making/breaking apparent power (Make/Break) at B 300		3600/360 VA		
Mechanical lifetime		30x10 ⁶ switching cycles			
Electrical lifetime (AC12, 230 V, 4 A)		0.1x10 ⁶ switching cycles			
Short-circuit capacity / maximum fuse rating	n/c contact	6 A fast-acting	10 A fast-acting		6 A fast-acting
	n/o contact		10 A fast-acting		
General data					
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inch)			
Mounting		DIN rail (EN 50022)			
Mounting position		any			
Degree of protection enclosure / terminals		IP50 / IP20			
Electrical connection					
Wire size	fine-strand with(out) wire end ferrule	2 x 0.75-2.5 mm ² (2 x 18-14 AWG)			
	rigid	2 x 0.5-4 mm ² (2 x 20-12 AWG)			
Stripping length		7 mm (0.28 inch)			
Tightening torque		0.6-0.8 Nm			
Environmental data					
Ambient temperature range operation / storage		-20...+60 °C / -40...+85 °C			
Damp heat (IEC 60068-2-30)		55 °C, 6 cycle			
Vibration (sinusoidal) (IEC/EN 60255-21-1)		Class 2			
Shock (IEC/EN 60255-21-2)		Class 2			
Isolation data					
Rated insulation voltage (VDE 0110, IEC 60947-1, IEC/EN 60255-5)	supply / measuring circuit / output	600 V			
	supply / output 1 / output 2	250 V			
Rated impulse withstand voltage U _{imp} (IEC/EN 60947-1, IEC/EN 60255-5)	supply / measuring circuit / output	6 kV 1.2/50 μs			
	supply / output 1 / output 2	4 kV 1.2/50 μs			
Pollution degree (VDE 0110, IEC 664, IEC/EN 60255-5)		3			
Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5)		III			
Standards					
Product standard		IEC/EN 60255-6			
Low Voltage Directive		2006/95/EC			
EMC Directive		2004/108/EC			
Electromagnetic compatibility					
Interference immunity		IEC/EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3			
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3			
fast transients (Burst)	IEC/EN 61000-4-4	Level 3			
powerful impulses (Surge)	IEC/EN 61000-4-9	Level 3			
HF line emission	IEC/EN 61000-4-6	Level 3			
Interference emission		IEC/EN 61000-6-3			
electromagnetic field (HF radiation resistance)	IEC/CISPR 22; EN 55022	Class B			
HF line emission	IEC/CISPR 22; EN 55022	Class B			

¹⁾ Open-circuit principle: output relay energizes if the measured value exceeds \geq / falls below \leq the adjusted threshold value
 Closed-circuit principle: output relay de-energizes if measured value exceeds \geq / falls below \leq the adjusted threshold value²⁾

Notes

2



**New
generation**

ABB Three-phase monitors

2

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Three-phase monitoring relays

Novelties




2





Modifications in comparison to the predecessor version

Improved handling / display



Adjustment of the type of tripping delay ¹⁾

Phase-out types	New generation
Sliding switch 	Rotary switch ¹⁾ DIP switches ¹⁾  

Adjustment of the time values

Phase-out types	New generation
Potentiometer with linear scale 	Potentiometer with logarithmic scale  The new potentiometer allows a very exact time adjustment in the lower time range. Furthermore the time delay can be switched off by turning to the left stop.

Status LEDs

Phase-out types	New generation
	 The order and color of the LEDs have been adapted.

¹⁾ depending on device

Expanded functionality

ABB's new generation of three-phase monitoring relays feature additional functions making the application field for the devices considerably larger.

Selectable phase sequence monitoring ¹⁾

The phase sequence monitoring can be switched off by means of a rotary switch or a DIP switch ¹⁾. This enables monitoring of three-phase mains where phase sequence is not relevant for the application, for example in case of motors with forward and reverse rotation, heating applications, etc.

Automatic phase sequence correction ¹⁾

The automatic phase sequence correction is activated by means of a DIP switch. With activated phase sequence correction, it is ensured that for any non-fixed or portable equipment, e.g. construction machinery, the correct phase sequence is always applied to the input terminals of the load. For details regarding the wiring, please see function description / diagrams.

Expanded type designation

The new type designation is descriptive and one-to-one.

Structure of the type designation

CM-__ x.y.z

x: width of enclosure


y: measuring / supply range

z: rated frequency /
operating principle of the output relays

Three-phase monitoring relays

Innovations

Selection and conversion table

 adjustable
 fix fixed value

	CM-PBE	CM-PBE	CM-PVE	CM-PVE	CM-PFE	CM-PFS	CM-PSS.31	CM-PSS.41	CM-PVS.31	CM-PVS.41	CM-PAS.31	CM-PAS.41	CM-MPS.11	CM-MPS.21	CM-MPS.31	CM-MPS.41	CM-MPS.23	CM-MPS.43	CM-MPN.52	CM-MPN.62	CM-MPN.72
Rated control supply voltage U_s																					
90-170 V AC													■								
160-300 V AC									■		■				■						
180-280 V AC														■							
185-265 V AC			■															■			
208-440 V AC					■																
200-500 V AC						■															
220-240 V AC	■																				
320-460 V AC				■																	
300-500 V AC										■		■				■		■			
350-580 V AC																			■		
380 V AC							■														
380-440 V AC		■																			
400 V AC								■													
450-720 V AC																				■	
530-820 V AC																					■
Rated frequency																					
50/60 Hz	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			■	■	■
50/60/400 Hz																		■	■		
Suitable for monitoring																					
Single-phase mains ¹⁾	■		■										■	■			■				
Three-phase mains	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Monitoring function																					
Phase failure	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Phase sequence					■	■	⊕	⊕	⊕	⊕	■	■	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
Automatic phase sequence correction																	⊕	⊕	⊕	⊕	⊕
Overvoltage			■	■			■	■	■	■			■	■	■	■	■	■	■	■	■
Undervoltage			■	■			■	■	■	■			■	■	■	■	■	■	■	■	■
Unbalance											■	■	■	■	■	■	■	■	■	■	■
Neutral ²⁾	■		■										■ ³⁾	■ ³⁾			■ ³⁾				
Thresholds																					
Thresholds	fix	fix	fix	fix	fix	fix	fix	fix	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
Timing function for tripping delay t_v / times																					
ON-delay						fix							⊕	⊕							
ON- and OFF-delay	fix	fix	fix	fix	fix																
ON- or OFF-delay (⊕)							⊕	⊕	⊕	⊕			⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
Output contacts																					
n/o contacts	1	1	1	1																	
c/o contacts					1	2	2	2	2	2	2	2	2	2	2	2	2 ⁴⁾	2 ⁴⁾	2 ⁴⁾	2 ⁴⁾	2 ⁴⁾
Indication of operational states																					
LED(s)	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Replacement for / conversion table																					
CM-PSS (1SVR 430 784 R2300)							■														
CM-PSS (1SVR 430 784 R3300)								■													
CM-PVS (1SVR 430 794 R1300)									■												
CM-PVS (1SVR 430 794 R3300)										■											
CM-PAS (1SVR 430 774 R1300)											■										
CM-PAS (1SVR 430 774 R3300)												■									
CM-MPS (1SVR 430 885 R1300)													■								
CM-MPS (1SVR 430 885 R3300)														■							
CM-MPS (1SVR 430 884 R1300)															■						
CM-MPS (1SVR 430 884 R3300)																■					

¹⁾ Devices with neutral monitoring are also suitable for monitoring single-phase mains, for example control circuits. For this, all three external conductors L1, L2 and L3 have to be jumpered and connected as one single conductor. If available, phase sequence monitoring has to be deactivated and the threshold value for phase unbalance has to be set to the maximum (25 %).

²⁾ The external conductor voltage towards the neutral conductor is measured.

³⁾ Interrupted neutral monitoring

⁴⁾ Operating mode 1x2 or 2x1 c/o (SPDT) contact can be selected. (2x1 c/o contact is only possible with over- and undervoltage monitoring and is compulsory for automatic phase sequence correction).

Three-phase monitoring relays

CM-PBE and CM-PVE

Ordering details

2



CM-PBE

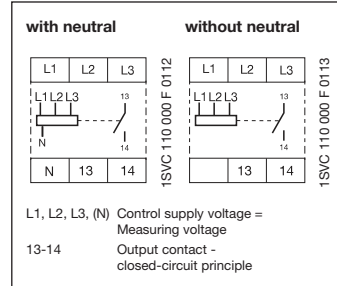
① R: yellow LED - relay status

The version with neutral monitoring is also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor.

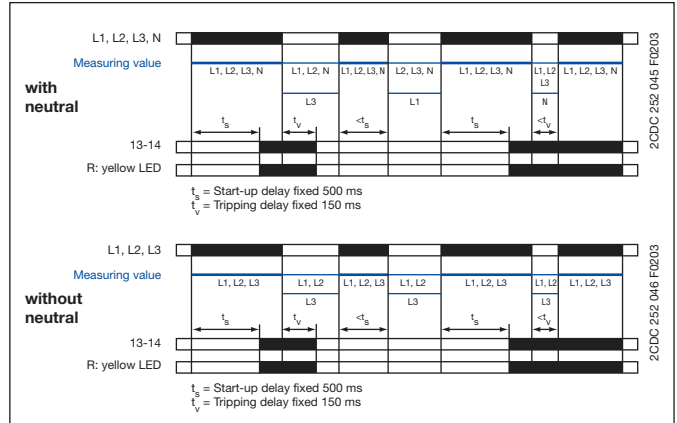
Single- and three-phase monitoring relays for phase failure detection

The **CM-PBE** is used to monitor supply voltages for phase failure ($U_{meas} < 60\% \times U_N$). If all phases (and the neutral) are present, the output relay energizes after the start-up delay t_s is complete. If a phase failure occurs, the tripping delay t_v starts. When timing is complete, the output relay de-energizes. As soon as the voltage returns to the tolerance range, timing of t_s starts. When timing is complete, the output relay re-energizes automatically. The yellow LED glows when the output relay is energized.

Connection diagrams



Function diagrams - Three-phase monitoring



Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
------	--------------------------------------------------	------------	------------------	---------------	------------------------

With neutral monitoring					
CM-PBE	3x380-440 V AC, 220-240 V AC	1SVR 550 881 R9400	1		0.08 / 0.17
Without neutral monitoring					
CM-PBE	3x380-440 V AC	1SVR 550 882 R9500	1		0.08 / 0.17



CM-PVE

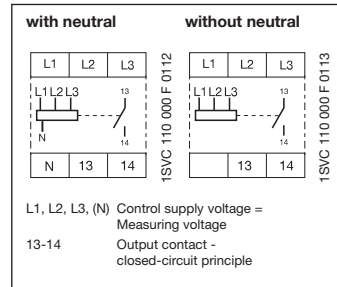
① R: yellow LED - relay status

The version with neutral monitoring is also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor.

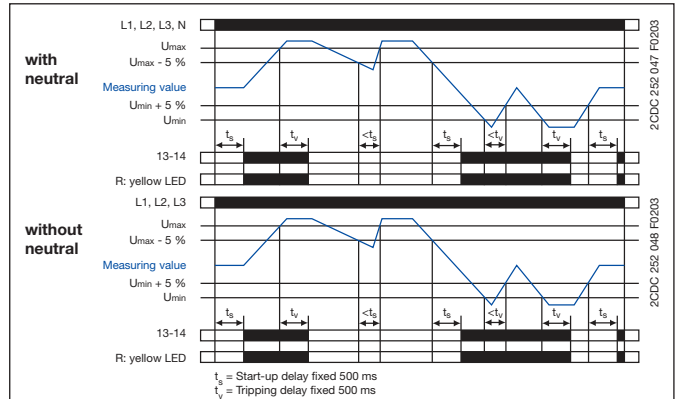
Single- and three-phase monitoring relays for over- / undervoltage and phase failure detection

The **CM-PVE** is used to monitor supply voltages for over- and undervoltage and phase failure. If all phases (and the neutral) are present with correct voltage, the output relay energizes after the start-up delay t_s is complete. If the voltage exceeds or falls below the fixed threshold value or if a phase failure occurs, the tripping delay t_v starts. When timing is complete, the output relay de-energizes. As soon as the voltage returns to the tolerance range, timing of t_s starts. When timing is complete, the output relay re-energizes automatically. The yellow LED glows when the output relay is energized.

Connection diagrams



Function diagrams - Three-phase monitoring



Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
------	--------------------------------------------------	------------	------------------	---------------	------------------------

With neutral monitoring					
CM-PVE	3x320-460 V AC, 185-265 V AC	1SVR 550 870 R9400	1		0.08 / 0.17
Without neutral monitoring					
CM-PVE	3x320-460 V AC	1SVR 550 871 R9500	1		0.08 / 0.17

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Three-phase monitoring relays

CM-PFE and CM-PFS

Ordering details



CM-PFE

- ① R: yellow LED - relay status

For applications where a reverse fed voltage > 60% is expected, we recommend to use our three-phase monitoring relays for unbalance CM-PAS.xx.



CM-PFS

- ① R: yellow LED - relay status
- ② Marker label

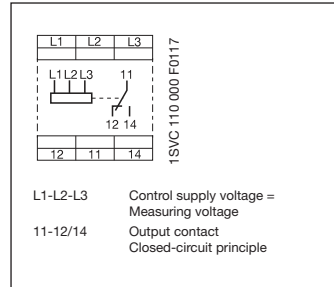
For applications where a reverse fed voltage > 60% is expected, we recommend to use our three-phase monitoring relays for unbalance CM-PAS.xx.

Three-phase monitoring relays for phase sequence monitoring and phase failure detection

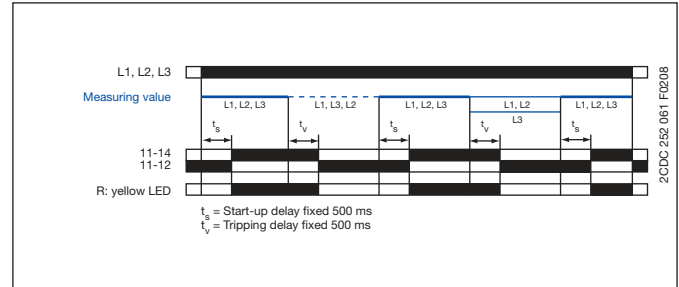
The **CM-PFE** is used to monitor three-phase mains for incorrect phase sequence and phase failure. If all phases are present with the correct phase sequence, the output relay energizes after the start-up delay t_s is complete. If a phase failure or a phase sequence error occurs, the tripping delay t_v starts. When timing is complete, the output relay de-energizes. The yellow LED glows when the output relay is energized.

In case of motors which continue running with only two phases, the CM-PFE detects phase failure if the reverse fed voltage is less than 60 % of the originally applied voltage.

Connection diagram



Function diagram



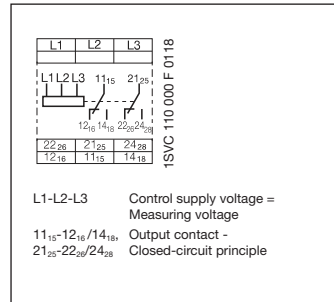
Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-PFE	3x208-440 V AC	1SVR 550 824 R9100	1		0.08 / 0.17

Three-phase monitoring relays for phase sequence monitoring and phase failure detection

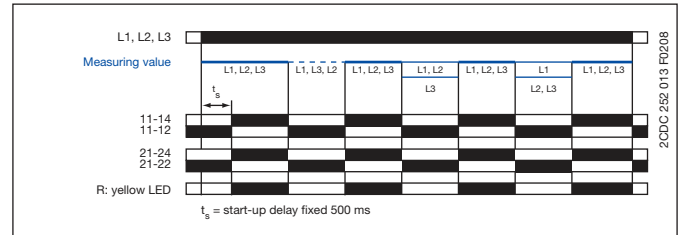
The **CM-PFS** is used to monitor three-phase mains for incorrect phase sequence and phase failure. If all phases are present with the correct phase sequence, the output relay energizes after the start-up delay t_s is complete. If a phase failure or a phase sequence error occurs, the output relay de-energizes instantaneous. The yellow LED glows when the output relay is energized.

In case of motors which continue running with only two phases, the CM-PFS detects phase failure if the reverse fed voltage is less than 60 % of the originally applied voltage.

Connection diagram



Function diagram



ATTENTION
If several CM-PFS units are placed side by side and the control supply voltage is higher than 415 V, spacing of at least 10 mm has to be kept between the individual units.

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-PFS	3x200-500 V AC	1SVR 430 824 R9300	1		0.15 / 0.33

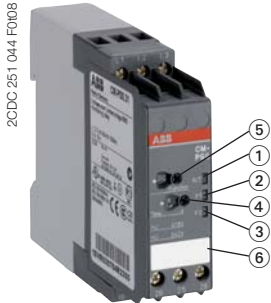
• Technical data.....86	• Dimensional drawing 145	• Accessories146
• Technical diagrams144		

New generation

Three-phase monitoring relays CM-PSS.x1 and CM-PVS.x1

Ordering details

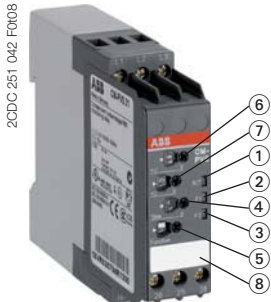
2



2CDC 251 044 F0b08

CM-PSS.x1

- 1 R/T: yellow LED - relay status, timing
- 2 F1: red LED - fault message
- 3 F2: red LED - fault message
- 4 Adjustment of the tripping delay t_v
- 5 Function selection (see rotary switch "Function")
- 6 Marker label



2CDC 251 042 F0b08

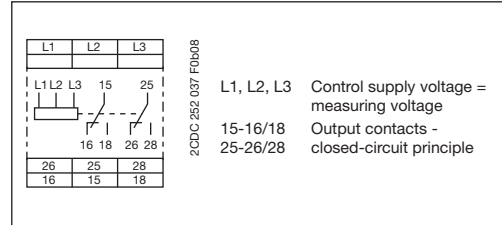
CM-PVS.x1

- 1 R/T: yellow LED - relay status, timing
- 2 F1: red LED - fault message
- 3 F2: red LED - fault message
- 4 Adjustment of the tripping delay t_v
- 5 Function selection (see rotary switch "Function")
- 6 Adjustment of the threshold value for overvoltage
- 7 Adjustment of the threshold value for undervoltage
- 8 Marker label

Three-phase monitoring relays for over- and undervoltage with fixed threshold values $\pm 10 \%$

The **CM-PSS.31** and the **CM-PSS.41** are monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage. The threshold values for over- and undervoltage are fixed.

Connection diagram



Rotary switch "Function"

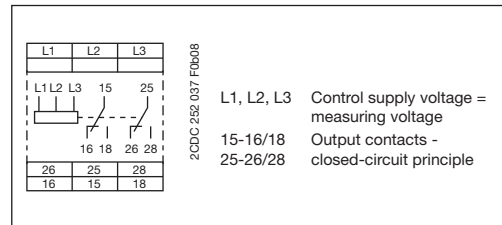
- ON-delay with phase sequence monitoring
- OFF-delay with phase sequence monitoring
- ON-delay without phase sequence monitoring
- OFF-delay without phase sequence monitoring

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-PSS.31	3x380 V AC	1SVR 630 784 R2300	1		0.13 / 0.29
CM-PSS.41	3x400 V AC	1SVR 630 784 R3300	1		0.13 / 0.29

Three-phase monitoring relays for over- and undervoltage with adjustable threshold values

The **CM-PVS.31** and the **CM-PVS.41** are monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage. The threshold values for over- and undervoltage are adjustable.

Connection diagram



Rotary switch "Function"

- ON-delay with phase sequence monitoring
- OFF-delay with phase sequence monitoring
- ON-delay without phase sequence monitoring
- OFF-delay without phase sequence monitoring

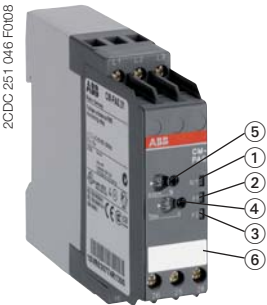
Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-PVS.31	3x160-300 V AC	1SVR 630 794 R1300	1		0.13 / 0.29
CM-PVS.41	3x300-500 V AC	1SVR 630 794 R3300	1		0.13 / 0.29

• Conversion table	77	• Function diagrams	83	• Technical data	88
• Technical diagrams	144	• Dimensional drawing	145	• Accessories	146

New generation

Three-phase monitoring relays CM-PAS.x1 and CM-MPS.x1

Ordering details



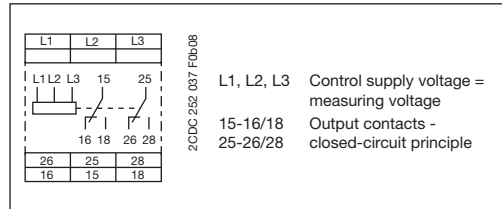
CM-PAS.x1

- ① R/T: yellow LED - relay status, timing
- ② F1: red LED - fault message
- ③ F2: red LED - fault message
- ④ Adjustment of the tripping delay t_v
- ⑤ Adjustment of the threshold value for phase unbalance
- ⑥ Marker label

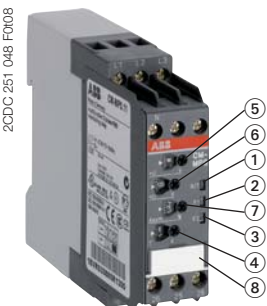
Three-phase monitoring relays for phase unbalance

The **CM-PAS.31** and the **CM-PAS.41** are monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure and phase unbalance. The threshold value for phase unbalance is adjustable.

Connection diagram



Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
CM-PAS.31	3x160-300 V AC	1SVR 630 774 R1300	1		0.13 / 0.29
CM-PAS.41	3x300-500 V AC	1SVR 630 774 R3300	1		0.13 / 0.29



CM-MPS.x1

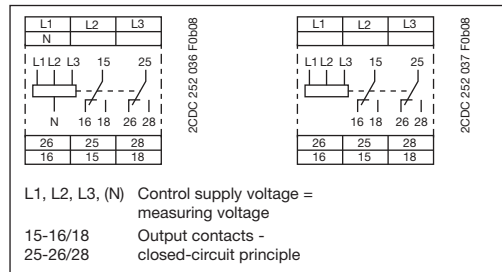
- ① R/T: yellow LED - relay status, timing
- ② F1: red LED - fault message
- ③ F2: red LED - fault message
- ④ Adjustment of the tripping delay t_v
- ⑤ Adjustment of the threshold value for overvoltage
- ⑥ Adjustment of the threshold value for undervoltage
- ⑦ Adjustment of the threshold value for phase unbalance
- ⑧ Function selection (see DIP switch functions) / Marker label

Multifunctional three-phase monitoring relays

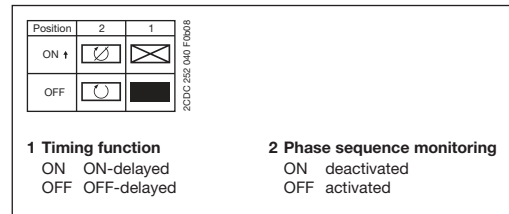
The **CM-MPS.x1** are multifunctional monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage and phase unbalance. CM-MPS.11 and CM-MPS.21 also monitor the neutral for interruption. The threshold values for over- and undervoltage and phase unbalance are adjustable.

i CM-MPS.11 and CM-MPS.21 are also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor. Phase sequence monitoring has to be deactivated and the threshold value for phase unbalance has to be set to the maximum (25 %).

Connection diagram



DIP switch functions



Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
With interrupted neutral monitoring					
CM-MPS.11	3x90-170 V AC	1SVR 630 885 R1300	1		0.13 / 0.29
CM-MPS.21	3x180-280 V AC	1SVR 630 885 R3300	1		0.13 / 0.29

Without interrupted neutral monitoring					
CM-MPS.31	3x160-300 V AC	1SVR 630 884 R1300	1		0.13 / 0.29
CM-MPS.41	3x300-500 V AC	1SVR 630 884 R4300	1		0.13 / 0.29

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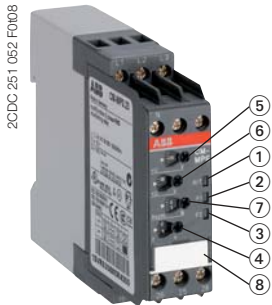


New generation

Three-phase monitoring relays CM-MPS.x3 and CM-MPN.x2

Ordering details

2



CM-MPS.x3

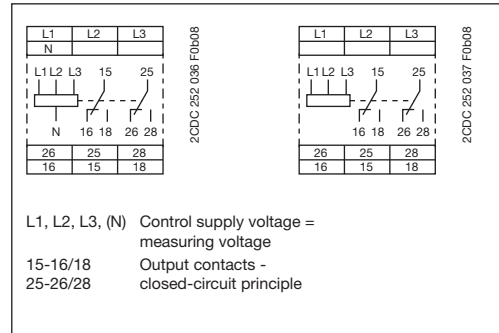
- ① R/T: yellow LED - relay status, timing
- ② F1: red LED - fault message
- ③ F2: red LED - fault message
- ④ Adjustment of the tripping delay t_v
- ⑤ Adjustment of the threshold value for overvoltage
- ⑥ Adjustment of the threshold value for undervoltage
- ⑦ Adjustment of the threshold value for phase unbalance
- ⑧ Function selection (see DIP switch functions) / Marker label

Multifunctional three-phase monitoring relays, automatic phase sequence correction and separate monitoring of over- and undervoltage (window monitoring) configurable

The **CM-MPS.x3** are multifunctional monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage and phase unbalance. CM-MPS.23 also monitors the neutral for interruption. The threshold values for over- and undervoltage and phase unbalance are adjustable.

i The devices can be used for mains with a frequency of 45-440 Hz. CM-MPS.23 is also suitable for monitoring single-phase mains. For this, all three external conductors (L1, L2, L3) have to be jumpered and connected as one single conductor. Phase sequence monitoring has to be deactivated and the threshold value for phase unbalance has to be set to the maximum (25 %).

Connection diagram



DIP switch functions

Position	4	3	2	1
ON +	(A)	2x1 c/o	(X)	(X)
OFF	(X)	1x2 c/o	(O)	(■)

1 Timing function
ON ON-delayed
OFF OFF-delayed

2 Phase sequence monitoring
ON deactivated
OFF activated

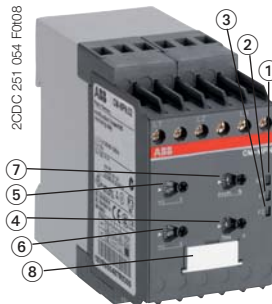
3 Operating principle of output
ON 2x1 c/o contact
OFF 1x2 c/o contacts

4 Phase sequence correction
ON activated
OFF deactivated

¹⁾ Output relay R1 is responsive to overvoltage, output relay R2 is responsive to undervoltage. In case of other faults, both output relays react synchronously.

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
------	--------------------------------------------------	------------	------------------	---------------	------------------------

With interrupted neutral monitoring					
CM-MPS.23	3x180-280 V AC	1SVR 630 885 R4300	1		0.13 / 0.29
Without interrupted neutral monitoring					
CM-MPS.43	3x300-500 V AC	1SVR 630 884 R4300	1		0.13 / 0.29



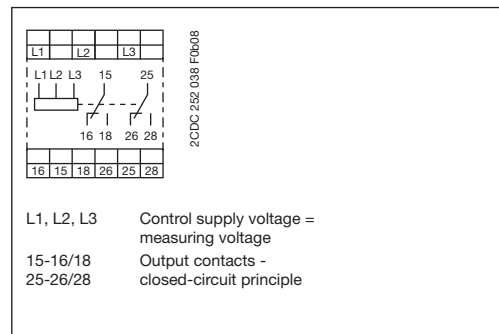
CM-MPN.x2

- ① R/T: yellow LED - relay status, timing
- ② F1: red LED - fault message
- ③ F2: red LED - fault message
- ④ Adjustment of the tripping delay t_v
- ⑤ Adjustment of the threshold value for overvoltage
- ⑥ Adjustment of the threshold value for undervoltage
- ⑦ Adjustment of the threshold value for phase unbalance
- ⑧ Function selection (see DIP switch functions) / Marker label

Multifunctional three-phase monitoring relays, automatic phase sequence correction and separate monitoring of over- and undervoltage (window monitoring) configurable

The **CM-MPN.52**, **CM-MPN.62** and **CM-MPN.72** are multifunctional monitoring relays for three-phase mains. They monitor the phase parameters phase sequence, phase failure, over- and undervoltage and phase unbalance. The threshold values for over- and undervoltage and phase unbalance are adjustable.

Connection diagram



DIP switch functions

Position	4	3	2	1
ON +	(A)	2x1 c/o	(X)	(X)
OFF	(X)	1x2 c/o	(O)	(■)

1 Timing function
ON ON-delayed
OFF OFF-delayed

2 Phase sequence monitoring
ON deactivated
OFF activated

3 Operating principle of output
ON 2x1 c/o contact
OFF 1x2 c/o contacts

4 Phase sequence correction
ON activated
OFF deactivated

¹⁾ Output relay R1 is responsive to overvoltage, output relay R2 is responsive to undervoltage. In case of other faults, both output relays react synchronously.

Type	Rated control supply voltage = measuring voltage	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
------	--------------------------------------------------	------------	------------------	---------------	------------------------

CM-MPN.52	3x350-580 V AC	1SVR 650 487 R8300	1		0.13 / 0.29
CM-MPN.62	3x450-720 V AC	1SVR 650 488 R8300	1		0.13 / 0.29
CM-MPN.72	3x530-820 V AC	1SVR 650 489 R8300	1		0.13 / 0.29

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New generation

Three-phase monitoring relays CM-PSS.xx, CM-PVS.xx, CM-PAS.xx and MPx.xx

Function description / -diagrams

Phase sequence and phase failure monitoring CM-PSS.xx, CM-PVS.xx, CM.PAS.xx, CM-MPS.xx, CM-MPN.xx

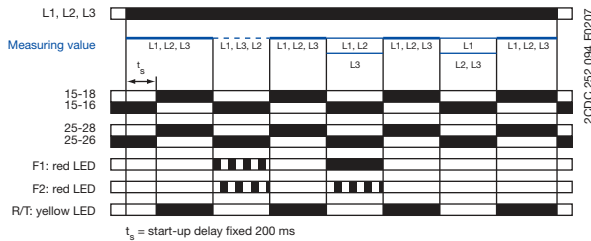
Applying control supply voltage begins the fixed start-up delay t_s . When t_s is complete and all phases are present with correct voltage, the output relays energize and the yellow LED R/T glows.

Phase sequence monitoring

If phase sequence monitoring is activated, the output relays de-energize as soon as a phase sequence error occurs. The fault is displayed by alternated flashing of the LEDs F1 and F2. The output relays re-energize automatically as soon as the phase sequence is correct again.

Phase failure monitoring

The output relays de-energize instantaneous if a phase failure occurs. The fault is indicated by lightning of LED F1 and flashing of LED F2. The output relays re-energize automatically as soon as the voltage returns to the tolerance range.



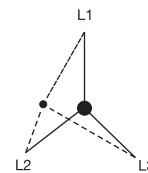
Interrupted neutral monitoring CM-MPS.11, CM-MPS.21, CM-MPS.23

The interruption of the neutral in the main to be monitored is detected by means of phase unbalance evaluation.

Determined by the system, in case of unloaded neutral, i.e. symmetrical load between all three phases, it may happen that an interruption of the neutral will not be detected.

If the star point is displaced by asymmetrical load in the three-phase main, an interrupted neutral will be detected.

Displacement of the star point



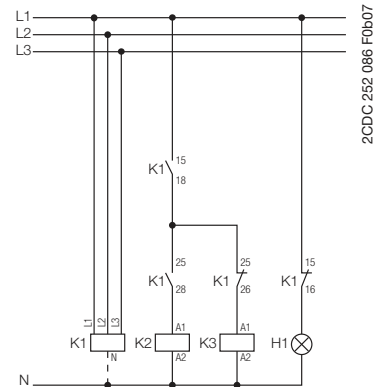
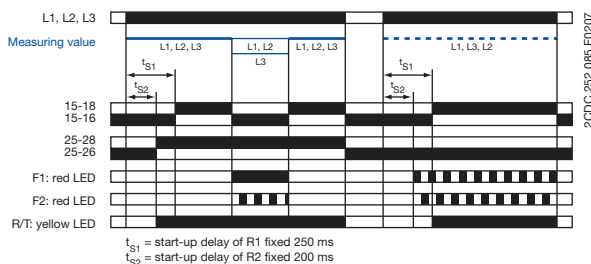
Automatic phase sequence correction CM-MPS.x3, CM-MPN.x2

This function can be selected only if phase sequence monitoring is activated and operating mode 2x1 c/o (SPDT) contact $\overline{no-ov}$ is selected.

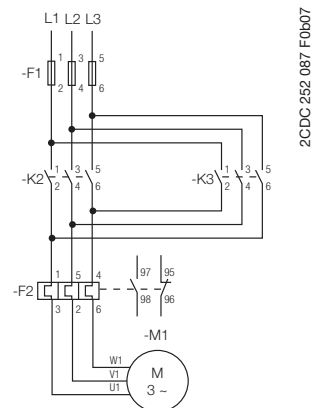
Applying control supply voltage begins the fixed start-up delay t_{s1} . When t_{s1} is complete and all phases are present with correct voltage, output relay R1 energizes. Output relay R2 energizes when the fixed start-up delay t_{s2} is complete and all phases are present with correct phase sequence. Output relay R2 remains de-energized if the phase sequence is incorrect.

If the voltage to be monitored exceeds or falls below the set threshold values for phase unbalance, over- or undervoltage or if a phase failure occurs, output relay R1 de-energizes and the LEDs F1 and F2 indicate the fault.

Output relay R2 is responsive only to a false phase sequence. In conjunction with a reversing contactor combination, this enables an automatic correction of the rotation direction. See circuit diagrams on the right.



Control circuit diagram (K1 = CM-MPS.xx or CM-MPN.xx)



Power circuit diagram

Over- and undervoltage monitoring 1x2 c/o

CM-PSS.xx¹⁾, CM-PVS.xx²⁾, CM-MPS.xx²⁾, CM-MPN.xx²⁾

Applying control supply voltage begins the fixed start-up delay t_s . When t_s is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize and the yellow LED R/T glows.

Type of tripping delay = ON-delay

If the voltage to be monitored exceeds or falls below the fixed¹⁾ or set²⁾ threshold value, the output relays de-energize after the set tripping delay t_v is complete. The LED R/T flashes during timing and turns off as soon as the output relays de-energize.

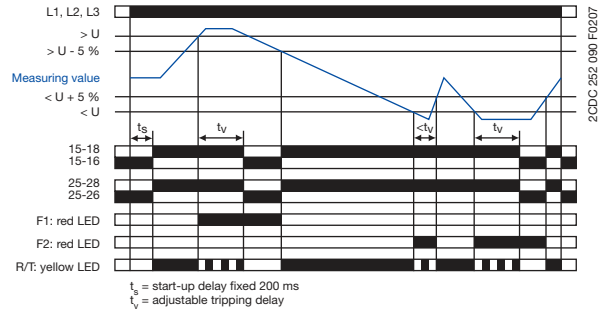
The output relays re-energize automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 % and the LED R/T glows.

Type of tripping delay = OFF-delay

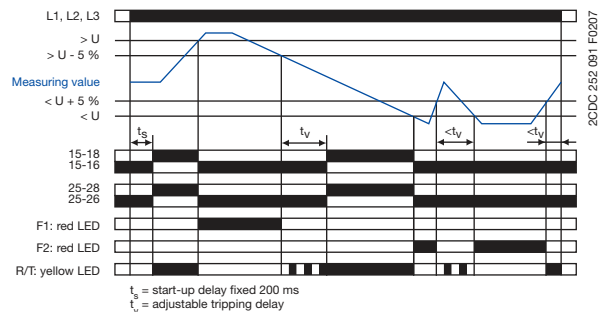
If the voltage to be monitored exceeds or falls below the fixed¹⁾ or set²⁾ threshold value, the output relays de-energize instantaneously and the LED R/T turns off.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %, the output relays re-energize automatically after the set tripping delay t_v is complete. The LED R/T flashes during timing and turns steady when timing is complete.

ON-delay 1x2 c/o contacts



OFF-delay 1x2 c/o contacts



Over- and undervoltage monitoring 2x1 c/o

CM-MPS.x3, CM-MPN.x2

Applying control supply voltage begins the fixed start-up delay t_s . When t_s is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize. The yellow LED R/T glows as long as at least one output relay is energized.

Type of tripping delay = ON-delay

If the voltage to be monitored exceeds or falls below the set threshold value, output relay R1 (overvoltage) or output relay R2 (undervoltage) de-energizes after the set tripping delay t_v is complete. The LED R/T flashes during timing.

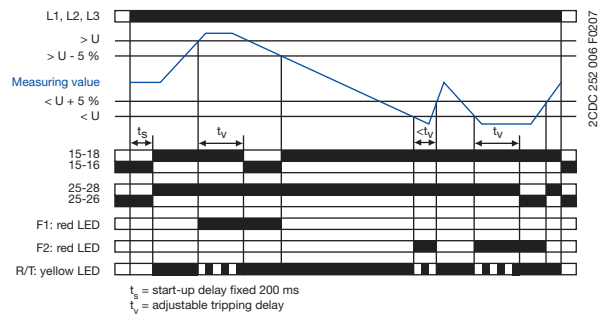
The corresponding output relay re-energizes automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %.

Type of tripping delay = OFF-delay

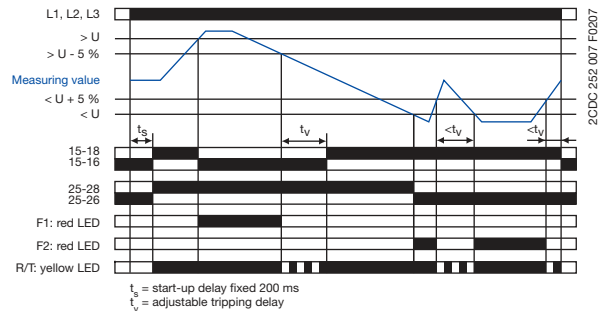
If the voltage to be monitored exceeds or falls below the set threshold value, output relay R1 (overvoltage) or output relay R2 (undervoltage) de-energizes instantaneously.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 5 %, the corresponding output relay re-energizes automatically after the set tripping delay t_v is complete. The LED R/T flashes during timing.

ON-delay 2x1 c/o contact



ON-delay 2x1 c/o contact



Phase unbalance monitoring

CM-PAS.xx, CM-MPS.xx, CM-MPN.xx

Applying control supply voltage begins the fixed start-up delay t_s . When t_s is complete and all phases are present with correct voltage and with correct phase sequence, the output relays energize and the yellow LED R/T glows.

Type of tripping delay = ON-delay

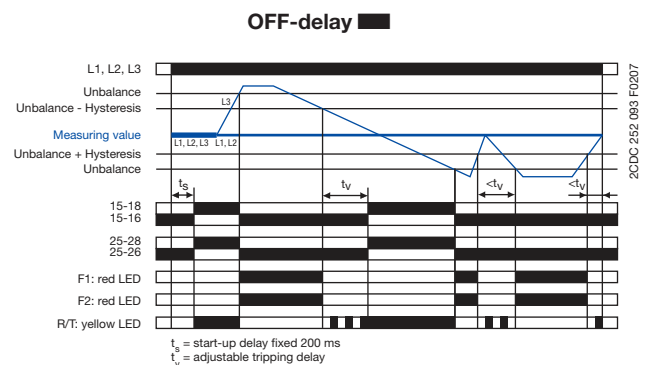
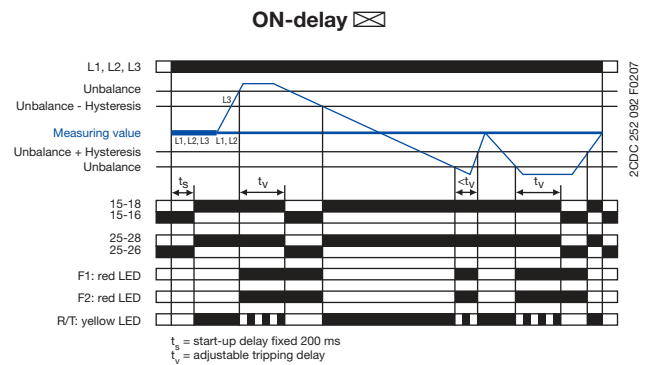
If the voltage to be monitored exceeds or falls below the set phase unbalance threshold value, the output relays de-energize after the set tripping delay t_v is complete. The LED R/T flashes during timing and turns off as soon as the output relays de-energize.

The output relays re-energize automatically as soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 20 % and the LED R/T glows.

Type of tripping delay = OFF-delay

If the voltage to be monitored exceeds or falls below the set phase unbalance threshold value, the output relays de-energize instantaneously and the LED R/T turns off.

As soon as the voltage returns to the tolerance range, taking into account a fixed hysteresis of 20 %, the output relays re-energize automatically after the set tripping delay t_v is complete. The LED R/T flashes during timing and turns steady when timing is complete.



LED functions

CM-PSS.xx, CM-PSV.xx, CM-PAS.xx, CM-MPS.xx, CM-MPN.xx

Function	R/T: yellow LED	F1: red LED	F2: red LED
Control supply voltage applied, output relay energized		-	-
Tripping delay t_v active		-	-
Phase failure	-		
Phase sequence	-		alternating
Overvoltage	-		-
Undervoltage	-	-	
Phase unbalance	-		
Interruption of the neutral	-		
Adjustment error ¹⁾			

¹⁾ Possible misadjustments of the front-face operating controls:

Overlapping of the threshold values: An overlapping of the threshold values is given, if the threshold value for overvoltage is set to a smaller value than the threshold value for undervoltage.

DIP switch 3 = OFF and DIP switch 4 = ON: Automatic phase sequence correction is activated and selected operating mode is 1x2 c/o contacts
DIP switch 2 and 4 = ON: Phase sequence detection is deactivated and the automatic phase sequence correction is activated

Type of tripping delay

CM-PSS.xx, CM-PSV.xx, CM-PAS.xx, CM-MPS.xx, CM-MPN.xx

The type of tripping delay ☒ / ■ can be adjusted via a rotary (CM-PxS.xx) or a DIP switch (CM-MPx.xx).

Switch position ON-delay ☒:

In case of a fault, the de-energizing of the output relays and the respective fault message are suppressed for the adjusted tripping delay t_v .

Switch position OFF-delay ■:

In case of a fault, the output relays de-energize instantaneously and a fault message is displayed and stored for the length of the adjusted tripping delay t_v . Thereby, also momentary undervoltage conditions are recognized.

Three-phase monitoring relays CM-PBE, CM-PVE, CM-PFE and CM-PFS

Technical data

Type	CM-PBE ¹⁾	CM-PBE	CM-PVE ¹⁾	CM-PVE	CM-PFE	CM-PFS
Supply circuit = measuring circuit	L1-L2-L3-N	L1-L2-L3	L1-L2-L3-N	L1-L2-L3	L1-L2-L3	
Rated control supply voltage U_S = measuring voltage	3x380-440 V AC, 220-240 V AC	3x380-440 V AC	3x320-460 V AC, 185-265 V AC	3x320-460 V AC	3x208-440 V AC	3x200-500 V AC
Power consumption						approx. 15 VA
Rated control supply voltage U_S tolerance	-15...+15 %		-15...+10 %		-10...+10 %	-15...+10 %
Rated frequency	50/60 Hz		50/60 Hz (-10...+10 %)			50/60 Hz
Duty time	100 %					
Measuring circuit	L1-L2-L3-N	L1-L2-L3	L1-L2-L3-N	L1-L2-L3	L1-L2-L3	
Monitoring functions						
phase failure	■	■	■	■	■	■
phase sequence	-	-	-	-	■	■
over- / undervoltage	-	-	■	■	-	-
neutral	■	-	■	-	-	-
Measuring ranges	3x380-440 V AC, 220-240 V AC	3x380-440 V AC	3x320-460 V AC, 185-265 V AC	3x320-460 V AC	3x208-440 V AC	3x200-500 V AC
Thresholds	U_{min}	$0.6 \times U_N$	fixed 185 V / 320 V	fixed 320 V	$0.6 \times U_N$	
	U_{max}		fixed 265 V / 460 V	fixed 460 V		
Hysteresis related to the threshold value	fixed 5 % (release value = $0.65 \times U_N$)		fixed 5 %			
Measuring voltage frequency	50/60 Hz (-10 %...+10 %)				50/60 Hz	
Response time	40 ms		80 ms		500 ms	
Measuring error within rated control supply voltage tolerance						≤ 0.5 %
Measuring error within temperature range						≤ 0.06 % / °C
Timing circuit						
Start-up delay t_s	fixed 500 ms (± 20 %)				fixed 500 ms	
Tripping t_v	fixed 150 ms (± 20 %)		at over-/undervoltage fixed 500 ms (± 20 %)		fixed 500 ms	-
Indication of operational states						
Relay status	R: yellow LED	┌───┐ Output relay energized				
Output circuits	13-14				11-12/14	11(15)-12(16)/14(18), 21(25)-22(26)/24(28)
Kind of output	1 n/o contact				1 c/o contact	2 c/o contacts
Operating principle ²⁾	closed-circuit principle					
Contact material	AgCdO					AgNi
Rated voltage (VDE 0110, IEC 60947-1)	250 V					
Minimum switching voltage / Minimum switching current	- / -					
Maximum switching voltage	250 V AC, 250 V DC					
Rated operational current (IEC 60947-5-1)	AC12 (resistive) 230 V		4 A			
	AC15 (inductive) 230 V		3 A			
	DC12 (resistive) 24 V		4 A			
	DC13 (inductive) 24 V		2 A			
Mechanical lifetime	30 x 10 ⁶ switching cycles					
Electrical lifetime (AC12, 230 V, 4 A)	0.1 x 10 ⁶ switching cycles					
Short-circuit proof, max. fuse rating	n/c contact		10 A fast-acting			4 A fast-acting
	n/o contact		10 A fast-acting			6 A fast-acting
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300			
	max. rated operational voltage		300 V AC			
	max. continuous thermal current at B 300		5 A			
	max. making/breaking apparent power at B 300		3600/360 VA			
General data						
Dimensions (W x H x D)	22.5 x 78 x 78.5 mm (0.89 x 3.07 x 3.09 inch)					22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inch)
Mounting position	any					
Degree of protection	enclosure / terminals		IP50 / IP20			
Mounting	DIN rail (EN 50022)					

Three-phase monitoring relays CM-PBE, CM-PVE, CM-PFE and CM-PFS

Technical data

Type	CM-PBE ¹⁾	CM-PBE	CM-PVE ¹⁾	CM-PVE	CM-PFE	CM-PFS
Electrical connection						
Wire size	fine-strand with wire end ferrule					2 x 0.75-2.5 mm ² (2 x 18-14 AWG)
	fine-strand without wire end ferrule					2 x 1-1.5 mm ² (2 x 18-16 AWG)
	rigid					2 x 0.75-1.5 mm ² (2 x 18-16 AWG)
Stripping length	10 mm (0.39 inch)					7 mm (0.28 inch)
Tightening torque	0.6-0.8 mm					
Environmental data						
Ambient temperature range	operation / storage -20...+60 °C / -40...+85 °C					
Environmental testing (IEC 68-2-30)	24 h cycle time, 55 °C, 93 % rel., 96 h					
Operational reliability (IEC 68-2-6)	6 g					4 g
Mechanical resistance (IEC 68-2-6)	10 g					6 g
Isolation data						
Rated insulation volt. between supply, measuring and output circuits (VDE 0110, IEC 60947-1)	400 V			500 V		
Rated impulse withstand voltage U _{imp} between all isolated circuits (VDE 0110, IEC 664)	4 kV / 1.2 - 50 µs					
Test voltage between all isolated circuits	2.5 kV, 50 Hz, 1 min.					
Pollution category (VDE 0110, IEC 664, IEC 255-5)	3					
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)	III					
Standards						
Product standard	IEC 255-6, EN 60255-6					
Low Voltage Directive	2006/95/EC					
EMC Directive	2004/108/EC					
Electromagnetic compatibility						
Interference emission	EN 61000-6-2					
electrostatic discharge (ESD)	IEC/EN 61000-4-2		Level 3 - 6 kV/ 8 kV			
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3		Level 3 - 10 V/m			
fast transients (Burst)	IEC/EN 61000-4-4		Level 3 - 2 kV / 5 kHz			
powerful impulses (Surge)	IEC 1000-4-5, EN 61000-4-5		Level 4 - 2 kV-L			
HF line emission	IEC 1000-4-6, EN 61000-4-6		Level 3 - 10 V			
Interference emission	EN 61000-6-4					

¹⁾ Device with neutral monitoring: The external conductor voltage towards the neutral conductor is measured.

²⁾ Closed-circuit principle: Output relay is de-energized if the measured value exceeds/drops below the adjusted threshold.

New generation

Three-phase monitoring relays CM-PSS.xx, CM-PVS.xx and CM-PAS.xx

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Type	CM-PSS.31	CM-PSS.41	CM-PVS.31	CM-PVS.41	CM-PAS.31	CM-PAS.41	
Input circuit = Measuring circuit							
L1, L2, L3							
Rated control supply voltage U_s = measuring voltage	3x380 V AC	3x400 V AC	3x160-300 V AC	3x300-500 V AC	3x160-300 V AC	3x300-500 V AC	
Rated control supply voltage U_s tolerance	-15...+10 %						
Rated frequency	50/60 Hz						
Frequency range	45-65 Hz						
Typical current / power consumption	25 mA / 18 VA (380 V AC)	25 mA / 18 VA (400 V AC)	25 mA / 10 VA (230 V AC)	25 mA / 18 VA (400 V AC)	25 mA / 10 VA (230 V AC)	25 mA / 18 VA (400 V AC)	
Measuring circuit							
L1, L2, L3							
Monitoring functions	Phase failure	■	■	■	■	■	
	Phase sequence	can be switched off				■	■
	Automatic phase sequence correction	-	-	-	-	-	-
	Over- / undervoltage	■	■	■	■	-	-
	Phase unbalance	-	-	-	-	■	■
Measuring range	Overvoltage	3x418 V AC	3x440 V AC	3x220-300 V AC	3x420-500 V AC	-	-
	Undervoltage	3x342 V AC	3x360 V AC	3x160-230 V AC	3x300-380 V AC	-	-
	Phase unbalance	-	-	-	-	2-25 % of average of phase voltages	
Thresholds	Overvoltage	fixed		adjust. within meas. range		-	-
	Undervoltage	fixed		adjust. within meas. range		-	-
	Phase unbalance (switch-off value)	-	-	-	-	adjust. within meas. range	
Hysteresis related to the threshold value	Over- / undervoltage	fixed 5 %				-	
	Phase unbalance	-	-	-	-	fixed 20 %	
Rated frequency of the measuring signal	50/60 Hz						
Frequency range of the measuring signal	45-65 Hz						
Maximum measuring cycle time	100 ms						
Measuring error within the rated control supply voltage tolerance	$\leq 0.5\%$						
Measuring error within the temperature range	$\leq 0.06\%$ / °C						
Measuring method	True RMS						
Timing circuit							
Start-up delay t_s	fixed 200 ms						
Tripping delay t_v	ON- or OFF-delay 0; 0.1-30 s adjustable				ON- delay 0; 0.1-30 s adjustable		
Timing error within the rated control supply voltage tolerance	$\leq 0.5\%$						
Timing error within the temperature range	$\leq 0.06\%$ / °C						
Indication of operational states	Details see function description / -diagrams						
Output circuits							
15-16/18, 25-26/28							
Kind of output	2x1 c/o contacts (Relays)						
Operating principle ¹⁾	closed-circuit principle						
Contact material	AgNi alloy, Cd free						
Rated voltage (VDE 0110, IEC 60947-1)	250 V						
Minimum switching power	24 V / 10 mA						
Maximum switching voltage	see load limit curve						
Rated operational current (IEC/EN 60947-5-1)	AC12 (resistive) 230 V	4 A					
	AC15 (inductive) 230 V	3 A					
	DC12 (resistive) 24 V	4 A					
	DC13 (inductive) 24 V	2 A					
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300					
	max. rated operational voltage	300 V AC					
	max. continuous thermal current at B 300	5 A					
	max. making/breaking apparent power at B 300	3600/360 VA					

**New
generation**

Three-phase monitoring relays CM-PSS.xx, CM-PVS.xx and CM-PAS.xx Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Type	CM-PSS.31	CM-PSS.41	CM-PVS.31	CM-PVS.41	CM-PAS.31	CM-PAS.41
Mechanical lifetime	30 x 10 ⁶ switching cycles					
Electrical lifetime (AC12, 230 V, 4 A)	0,1 x 10 ⁶ switching cycles					
Short-circuit proof, n/c contact	6 A fast-acting					
maximum fuse rating n/o contact	10 A fast-acting					
General data						
Duty time	100 %					
Repeat accuracy (constant parameters)	< ±0.2 %					
Dimensions (W x H x D)	22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inch)					
Weight	0.13 kg (0.29 lb)					
Mounting	DIN rail (EN 60715), snap-on mounting without any tool					
Mounting position	any					
Minimum distance to other units horizontal / vertical	none / none					
Degree of protection enclosure / terminals	IP50 / IP20					
Electrical connection						
Wire size fine-strand with(out) wire end ferrule	2 x 0.75-2.5 mm ² (2 x 18-14 AWG)					
rigid	2 x 0.5-4 mm ² (2 x 20-12 AWG)					
Stripping length	7 mm (0.28 inch)					
Tightening torque	0.6-0.8 Nm					
Environmental data						
Ambient temperature ranges operation / storage	-25...+60 °C / -40...+85 °C					
Damp heat (IEC 60068-2-30)	55 °C, 6 cycles					
Climatic category	3K3					
Vibration (sinusoidal) (IEC/EN 60255-21-1)	Class 2					
Shock (IEC/EN 60266-21-2)	Class 2					
Isolation data						
Rated insulation input circuit / output circuit	600 V					
voltage U_i output circuit 1 / output circuit 2	300 V					
Rated impulse withstand voltage U_{imp} input circuit (VDE 0110, IEC/EN 60664)	6 kV; 1.2/50 µs					
output circuit	4 kV; 1.2/50 µs					
Test voltage between all isolated circuits (type test)	2.5 kV, 50 Hz, 1 s					
Basis isolation input circuit / output circuit	600 V					
Protective separation (VDE 0160 part 101 and 101/A, IEC/EN 61140) input circuit / output circuit	-					
Pollution degree (VDE 0110, IEC/EN 60664, UL 508)	3					
Overvoltage category (VDE 0110, IEC 60664, UL 508)	III					
Standards						
Product standard	IEC/EN 60255-6, EN 50178					
Low Voltage Directive	2006/95/EG					
EMC directive	2004/108/EG					
RoHS directive	2002/95/EG					
Electromagnetic compatibility						
Interference immunity	EN 61000-6-1, EN 61000-6-2					
electrostatic discharge (ESD) IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)					
electromagnetic field (HF radiation resistance) IEC/EN 61000-4-3	Level 3 (10 V/m)					
fast transients (Burst) IEC/EN 61000-4-4	Level 3 (2 kV / 2 kHz)					
powerful impulses (Surge) IEC/EN 61000-4-5	Level 4 (2 kV L-L)					
HF line emission IEC/EN 61000-4-6	Level 3 (10 V)					
Resistance to harmonics EN 61000-4-13	Class 3					
Interference emission	EN 61000-6-3, EN 61000-6-4					
electromagn. field (HF radiation resistance) IEC/CISPR 22, EN 50022	Class B					
HF line emission IEC/CISPR 22, EN 50022	Class B					

¹⁾ Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

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**New
generation**

Three-phase monitoring relays CM-MPS.x1 Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Type		CM-MPS.11	CM-MPS.21	CM-MPS.31	CM-MPS.41	
Input circuit = Measuring circuit		L1, L2, L3, N			L1, L2, L3	
Rated control supply voltage $U_s =$ measuring voltage		3x90-170 V AC	3x180-280 V AC	3x160-300 V AC	3x300-500 V AC	
Rated control supply voltage U_s tolerance		-15...+10 %				
Rated frequency		50/60 Hz				
Frequency range		45-65 Hz				
Typical current / power consumption		25 mA / 10 VA (115 V AC)	25 mA / 18 VA (230 V AC)	25 mA / 10 VA (230 V AC)	25 mA / 18 VA (400 V AC)	
Measuring circuit		L1, L2, L3, N			L1, L2, L3	
Monitoring functions	Phase failure	■	■	■	■	
	Phase sequence	can be switched off				
	Automatic phase sequence correction	-	-	-	-	
	Over- / undervoltage	■	■	■	■	
	Phase unbalance	■	■	■	■	
	Interrupted neutral	■	■	-	-	
Measuring range	Overvoltage	3x120-170 V AC	3x240-280 V AC	3x220-300 V AC	3x420-500 V AC	
	Undervoltage	3x90-130 V AC	3x180-220 V AC	3x160-230 V AC	3x300-380 V AC	
	Phase unbalance	2-25 % of average of phase voltages				
Thresholds	Overvoltage	adjustable within measuring range				
	Undervoltage	adjustable within measuring range				
	Phase unbalance (switch-off value)	adjustable within measuring range				
Hysteresis related to the threshold value	Over- / undervoltage	fixed 5 %				
	Phase unbalance	fixed 20 %				
Rated frequency of the measuring signal		50/60 Hz				
Frequency range of the measuring signal		45-65 Hz				
Maximum measuring cycle time		100 ms				
Measuring error within the rated control supply voltage tolerance		$\leq 0.5\%$				
Measuring error within the temperature range		$\leq 0.06\%$ / °C				
Measuring method		True RMS				
Timing circuit						
Start-up delay t_s		fixed 200 ms				
Tripping delay t_v		ON- or OFF-delay 0; 0.1-30 s adjustable				
Timing error within the rated control supply voltage tolerance		$\leq 0.5\%$				
Timing error within the temperature range		$\leq 0.06\%$ / °C				
Indication of operational states		Details see function description / -diagrams				
Output circuits		15-16/18, 25-26/28				
Kind of output		1x2 c/o contacts (Relays)				
Operating principle ¹⁾		closed-circuit principle				
Contact material		AgNi alloy, Cd free				
Rated voltage (VDE 0110, IEC 60947-1)		250 V				
Minimum switching power		24 V / 10 mA				
Maximum switching voltage		see load limit curve				
Rated operational current (IEC/EN 60947-5-1)	AC12 (resistive) 230 V	4 A				
	AC15 (inductive) 230 V	3 A				
	DC12 (resistive) 24 V	4 A				
	DC13 (inductive) 24 V	2 A				
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300				
	max. rated operational voltage	300 V AC				
	max. continuous thermal current at B 300	5 A				
	max. making/breaking apparent power at B 300	3600/360 VA				

New generation

Three-phase monitoring relays

CM-MPS.x1

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Type	CM-MPS.11	CM-MPS.21	CM-MPS.31	CM-MPS.41
Mechanical lifetime	30 x 10 ⁶ switching cycles			
Electrical lifetime (AC12, 230 V, 4 A)	0,1 x 10 ⁶ switching cycles			
Short-circuit proof,	n/c contact		6 A fast-acting	
maximum fuse rating	n/o contact		10 A fast-acting	
General data				
Duty time	100 %			
Repeat accuracy (constant parameters)	< ±0.2 %			
Dimensions (W x H x D)	22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inch)			
Weight	0.14 kg (0.31 lb)		0.13 kg (0.29 lb)	
Mounting	DIN rail (EN 60715), snap-on mounting without any tool			
Mounting position	any			
Minimum distance to other units	horizontal / vertical		none / none	
Degree of protection	enclosure / terminals		IP50 / IP20	
Electrical connection				
Wire size	fine-strand with(out) wire end ferrule		2 x 0.75-2.5 mm ² (2 x 18-14 AWG)	
	rigid		2 x 0.5-4 mm ² (2 x 20-12 AWG)	
Stripping length	7 mm (0.28 inch)			
Tightening torque	0.6-0.8 Nm			
Environmental data				
Ambient temperature ranges	operation / storage		-25...+60 °C / -40...+85 °C	
Damp heat (IEC 60068-2-30)	55 °C, 6 cycles			
Climatic category	3K3			
Vibration (sinusoidal) (IEC/EN 60255-21-1)	Class 2			
Shock (IEC/EN 60266-21-2)	Class 2			
Isolation data				
Rated insulation voltage U_i	input circuit / output circuit		600 V	
	output circuit 1 / output circuit 2		300 V	
Rated impulse withstand voltage U_{imp} (VDE 0110, IEC/EN 60664)	input circuit		6 kV; 1.2/50 µs	
	output circuit		4 kV; 1.2/50 µs	
Test voltage between all isolated circuits (type test)	2.5 kV, 50 Hz, 1 s			
Basis isolation	input circuit / output circuit		600 V	
Protective separation (VDE 0160 part 101 and 101/A, IEC/EN 61140)	input circuit / output circuit		yes	-
Pollution degree (VDE 0110, IEC/EN 60664, UL 508)	3			
Overvoltage category (VDE 0110, IEC 60664, UL 508)	III			
Standards				
Product standard	IEC/EN 60255-6, EN 50178			
Low Voltage Directive	2006/95/EG			
EMC directive	2004/108/EG			
RoHS directive	2002/95/EG			
Electromagnetic compatibility				
Interference immunity	EN 61000-6-1, EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2		Level 3 (6 kV / 8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3		Level 3 (10 V/m)	
fast transients (Burst)	IEC/EN 61000-4-4		Level 3 (2 kV / 2 kHz)	
powerful impulses (Surge)	IEC/EN 61000-4-5		Level 4 (2 kV L-N)	Level 4 (2 kV L-L)
HF line emission	IEC/EN 61000-4-6		Level 3 (10 V)	
Resistance to harmonics	EN 61000-4-13		Class 3	
Interference emission	EN 61000-6-3, EN 61000-6-4			
electromagn. field (HF radiation resistance)	IEC/CISPR 22, EN 50022		Class B	
HF line emission	IEC/CISPR 22, EN 50022		Class B	

¹⁾ Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value



New generation

Three-phase monitoring relays CM-MPS.x3 and CM-MPN.x2

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

Type	CM-MPS.23	CM-MPS.43	CM-MPN.52	CM-MPN.62	CM-MPN.72
Input circuit = Measuring circuit	L1, L2, L3, N		L1, L2, L3		
Rated control supply voltage U_s = measuring voltage	3x180-280 V AC	3x300-500 V AC	3x350-580 V AC	3x450-720 V AC	3x530-820 V AC
Rated control supply voltage U_s tolerance	-15...+10 %				
Rated frequency	50/60/400 Hz		50/60 Hz		
Frequency range	45-440 Hz		45-65 Hz		
Typical current / power consumption	5 mA / 4 VA (230 V AC)	5 mA / 4 VA (400 V AC)	29 mA / 41 VA (480 V AC)	29 mA / 52 VA (600 V AC)	29 mA / 59 VA (690 V AC)
Measuring circuit	L1, L2, L3, N		L1, L2, L3		
Monitoring functions	Phase failure	■	■	■	■
	Phase sequence	can be switched off			
	Automatic phase sequence correction	configurable			
	Over- / undervoltage	■	■	■	■
	Phase unbalance	■	■	■	■
	Interrupted neutral	■	-	-	-
Measuring range	Overvoltage	3x240-280 V AC	3x420-500 V AC	3x480-580 V AC	3x600-720 V AC
	Undervoltage	3x180-220 V AC	3x300-380 V AC	3x350-460 V AC	3x450-570 V AC
	Phase unbalance	2-25 % of average of phase voltages			
Thresholds	Overvoltage	adjustable within measuring range			
	Undervoltage	adjustable within measuring range			
	Phase unbalance (switch-off value)	adjustable within measuring range			
Hysteresis related to the threshold value	Over- / undervoltage	fixed 5 %			
	Phase unbalance	fixed 20 %			
Rated frequency of the measuring signal	50/60/400 Hz		50/60 Hz		
Frequency range of the measuring signal	45-440 Hz		45-65 Hz		
Maximum measuring cycle time	100 ms				
Measuring error within the rated control supply voltage tolerance	≤ 0.5 %				
Measuring error within the temperature range	≤ 0.06 % / °C				
Measuring method	True RMS				
Timing circuit					
Start-up delay t_s and t_{s2}	fixed 200 ms				
Start-up delay t_{s1}	fixed 250 ms				
Tripping delay t_v	ON- or OFF-delay 0; 0.1-30 s adjustable			ON-delay 0; 0.1-30 s adjustable	
Timing error within the rated control supply voltage tolerance	≤ 0.5 %				
Timing error within the temperature range	≤ 0.06 % / °C				
Indication of operational states	Details see function description / -diagrams				
Output circuits	15-16/18, 25-26/28				
Kind of output	2x1 or 1x2 c/o contacts configurable (Relays)				
Operating principle ¹⁾	closed-circuit principle				
Contact material	AgNi alloy, Cd free				
Rated voltage (VDE 0110, IEC 60947-1)	250 V				
Minimum switching power	24 V / 10 mA				
Maximum switching voltage	see load limit curve				
Rated operational current (IEC/EN 60947-5-1)	AC12 (resistive) 230 V	4 A			
	AC15 (inductive) 230 V	3 A			
	DC12 (resistive) 24 V	4 A			
	DC13 (inductive) 24 V	2 A			
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300			
	max. rated operational voltage	300 V AC			
	max. continuous thermal current at B 300	5 A			
	max. making/breaking apparent power at B 300	3600/360 VA			

**New
generation**

Three-phase monitoring relays CM-MPS.x3 and CM-MPN.x2

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated

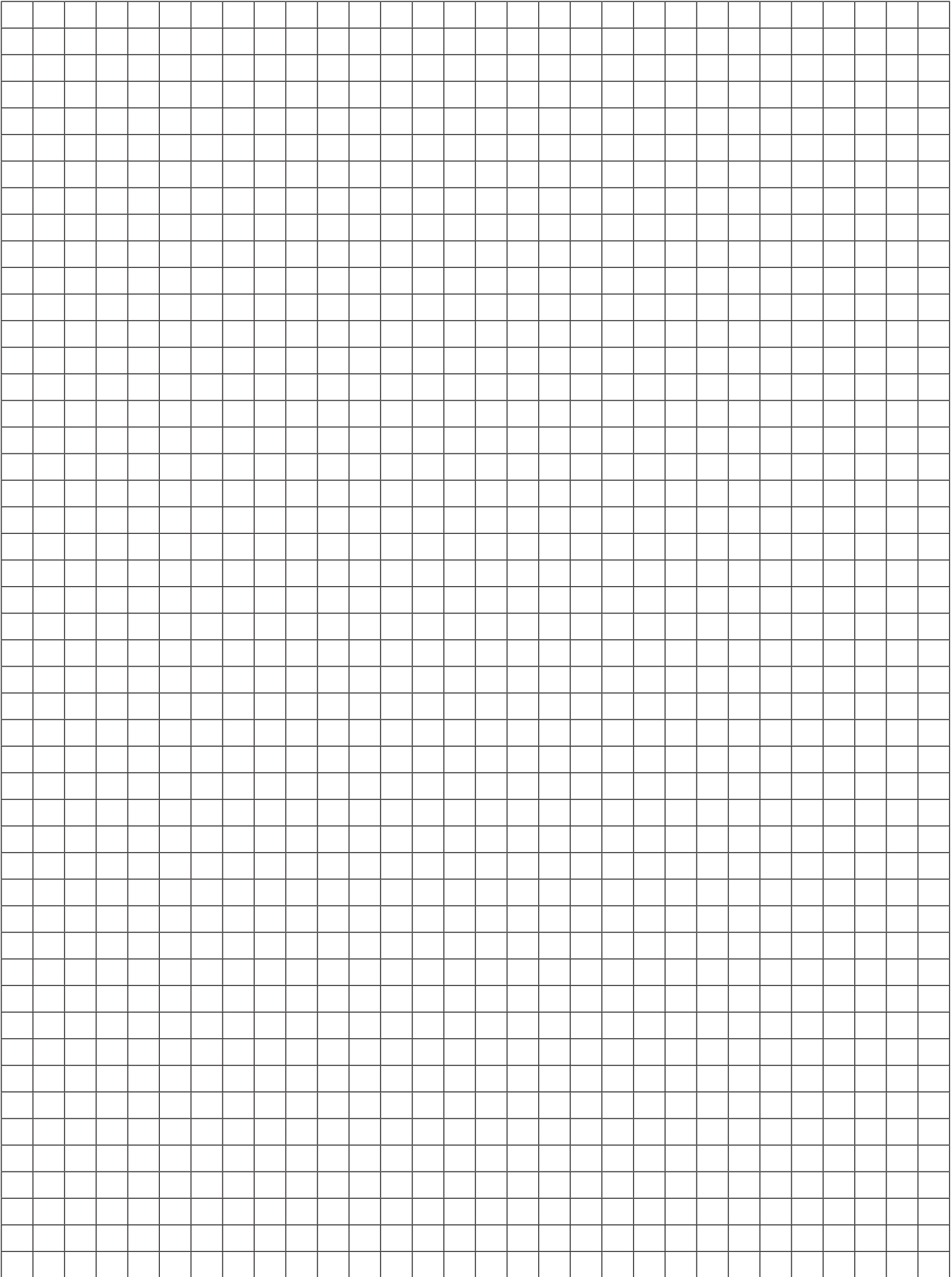
Type	CM-MPS.23	CM-MPS.43	CM-MPN.52	CM-MPN.62	CM-MPN.72
Mechanical lifetime	30 x 10 ⁶ switching cycles				
Electrical lifetime (AC12, 230 V, 4 A)	0,1 x 10 ⁶ switching cycles				
Short-circuit proof,	n/c contact		6 A fast-acting		
maximum fuse rating	n/o contact		10 A fast-acting		
General data					
Duty time	100 %				
Repeat accuracy (constant parameters)	< ±0.2 %				
Dimensions (W x H x D)	22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 inch)		45 x 78 x 100 mm (1.78 x 3.07 x 3.94 inch)		
Weight	0.14 kg (0.31 lb)	0.13 kg (0.29 lb)	0.22 kg (0.49 lb)		
Mounting	DIN rail (EN 60715), snap-on mounting without any tool				
Mounting position	any				
Minimum distance to other units	horizontal / vertical		none / none		
Degree of protection	enclosure / terminals		IP50 / IP20		
Electrical connection					
Wire size	fine-strand with(out) wire end ferrule		2 x 0.75-2.5 mm ² (2 x 18-14 AWG)		
	rigid		2 x 0.5-4 mm ² (2 x 20-12 AWG)		
Stripping length	7 mm (0.28 inch)				
Tightening torque	0.6-0.8 Nm				
Environmental data					
Ambient temperature ranges	operation / storage		-25...+60 °C / -40...+85 °C		
Damp heat (IEC 60068-2-30)	55 °C, 6 cycles				
Climatic category	3K3				
Vibration (sinusoidal) (IEC/EN 60255-21-1)	Class 2				
Shock (IEC/EN 60266-21-2)	Class 2				
Isolation data					
Rated insulation	input circuit / output circuit		600 V		1000 V
voltage U_i	output circuit 1 / output circuit 2		300 V		
Rated impulse withstand voltage U_{imp}	input circuit		6 kV; 1.2/50 µs		8 kV; 1.2/50 µs
(VDE 0110, IEC/EN 60664)	output circuit		4 kV; 1.2/50 µs		
Test voltage	isolated output circuits		2.5 kV, 50 Hz, 1 s		
(type test) between	input circuit and isolated output circuits		2.5 kV, 50 Hz, 1 s		4 kV, 50 Hz, 1 s
Basis isolation	input circuit / output circuit		600 V		1000 V
Protective separation (VDE 0160 part 101 and 101/A, IEC/EN 61140)	input circuit / output circuit		-		
Pollution degree (VDE 0110, IEC/EN 60664, UL 508)	3				
Overvoltage category (VDE 0110, IEC 60664, UL 508)	III				
Standards					
Product standard	IEC/EN 60255-6, EN 50178				
Low Voltage Directive	2006/95/EG				
EMC directive	2004/108/EG				
RoHS directive	2002/95/EG				
Electromagnetic compatibility					
Interference immunity	EN 61000-6-1, EN 61000-6-2				
electrostatic discharge (ESD)	IEC/EN 61000-4-2		Level 3 (6 kV / 8 kV)		
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3		Level 3 (10 V/m)		
fast transients (Burst)	IEC/EN 61000-4-4		Level 3 (2 kV / 2 kHz)		
powerful impulses (Surge)	IEC/EN 61000-4-5		Level 4 (2 kV L-N)	Level 4 (2 kV L-L)	
HF line emission	IEC/EN 61000-4-6		Level 3 (10 V)		
Resistance to harmonics	EN 61000-4-13		Class 3		
Interference emission	EN 61000-6-3, EN 61000-6-4				
electromagn. field (HF radiation resistance)	IEC/CISPR 22, EN 50022		Class B		
HF line emission	IEC/CISPR 22, EN 50022		Class B		

¹⁾ Closed-circuit principle: Output relay(s) de-energize(s) if measured value exceeds or falls below the adjusted threshold value

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Notes





Insulation monitors for ungrounded supply mains

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Insulation monitors for ungrounded supply mains

Insulation monitoring in IT systems

Overview, Application and connection examples

The IT system with additional equipotential bonding and insulation monitoring equipment

The IT system is supplied either by an isolation transformer or an independent voltage source, such as a battery or a generator.

In this system no active conductor is directly connected to earth potential. The advantage of this is that only a small fault current can flow in case of an insulation fault. This current is essentially caused by the system's leakage capacitance.

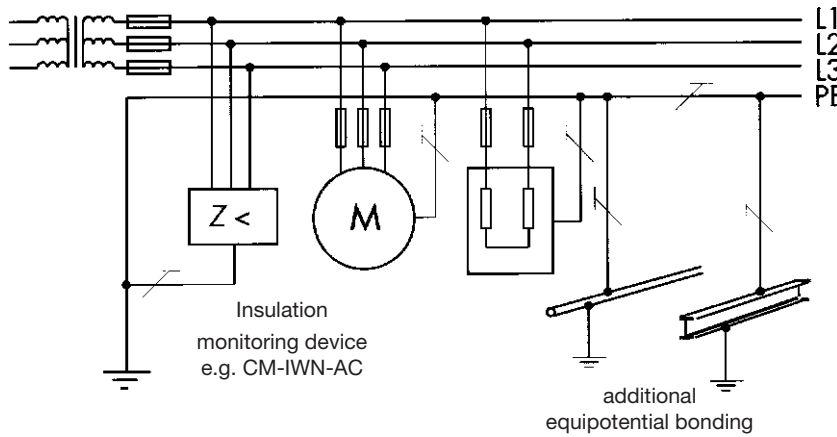
The system's fuse does not respond, thus maintaining the voltage supply and therefore operation even in case of a phase-to-earth fault.

The high reliability of an IT system is guaranteed thanks to continuous insulation monitoring.

The insulation monitoring device recognizes insulation faults as they develop, and immediately reports that the value has fallen below the minimum. This prevents operational interruptions caused by a second more severe insulation fault.

The following illustration shows the typical arrangement of an IT system.

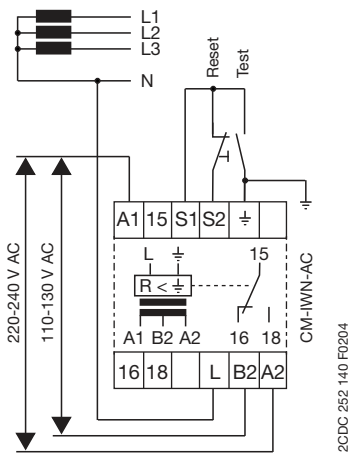
In IT-N systems the secondary side star point of the transformer is additionally used as neutral.



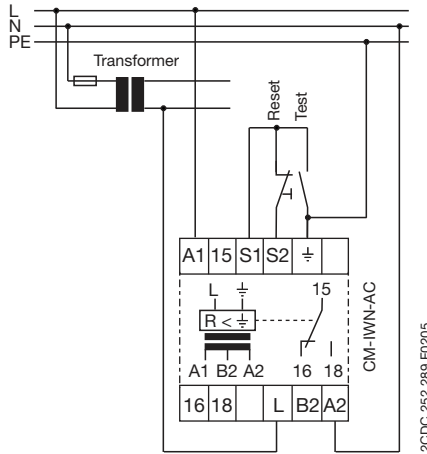
2CDC 252 028 F 0003

Application and connection examples for the CM-IWN AC in IT and IT-N systems

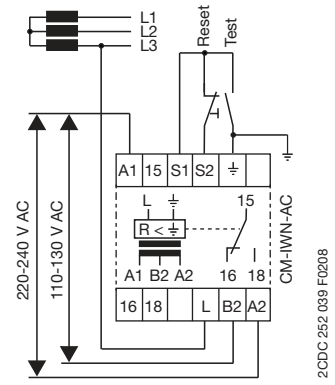
Three-phase IT-N system



Single-phase IT-N system



Three-phase IT system



Insulation monitors for ungrounded AC mains

CM-IWN-AC

Ordering details

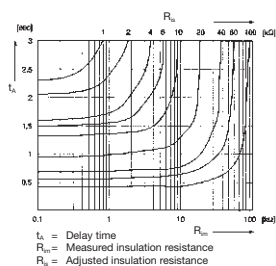


CM-IWN-AC

- ① Range selector switch
- ② Response threshold 1-110 kΩ
- ③ U: green LED - control supply voltage
- ④ F: red LED - relay status
- ⑤ Test button: "Test/Reset"
- ⑥ Marker label

- 2 measuring ranges from 1-110 kΩ
- Tripping storage
- Suitable for insulation monitoring of single- and three-phase ungrounded AC systems
- Functional test by means of front-face test button or via remote test button
- VDE 0413/T.2
- 1 c/o contact, open-circuit principle
- 2 LED for status indication

Tripping time



2CDC 252 109 F0004

The **CM-IWN-AC** is used to monitor the insulation resistance of single-phase or three-phase AC supply voltages. It is primarily used to monitor auxiliary circuits that are electrically isolated from ground. The CM-IWN-AC monitors the insulation resistance between ungrounded AC supply voltages and the protective earth conductors. A superimposed DC measuring voltage is used for measurement. The CM-IWN-AC is designed for insulation resistances to be monitored from 1 to 110 kΩ, divided into two ranges. The desired range is selected with a front-mounted switch.

The output relay is energized and the LED lights up as soon as the insulation resistance R_x falls below the threshold value. The relay is reset (de-energized) automatically if the measured insulation resistance exceeds 1.6 times the threshold value.

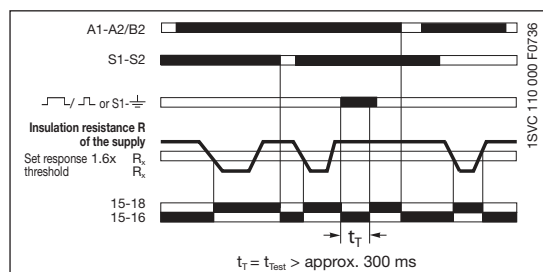
An earth-leakage fault can be simulated using the front-mounted "Test" button. A remote test button can be connected via the terminals S1- \perp . Tripping is caused by closing a n/o contact.

By jumpering the terminals S1-S2, fault tripping can be stored. Remote reset can be implemented by connecting a pushbutton to S1-S2. Pressing the button then resets storage of the tripped state.

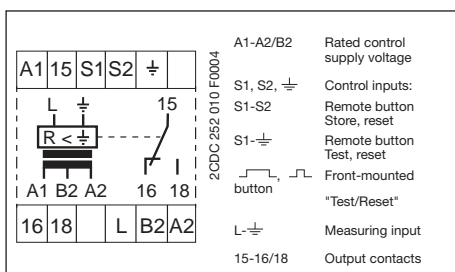
Attention!

The CM-IWN-AC is designed for AC supply voltages. Rectifiers, that are connected in series, should be electrically isolated from the measuring relay.

Function diagram CM-IWN-AC



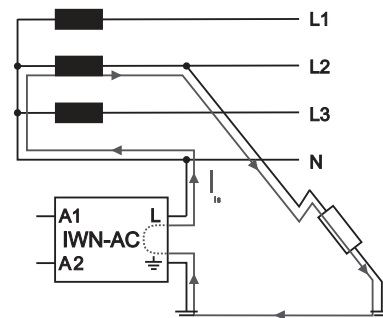
Connection diagram CM-IWN-AC



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-IWN-AC	24-240 V AC/DC	1SVR 450 075 R0000	1		0.30 / 0.66
	110-130 V, 220-240 V AC	1SVR 450 071 R0000	1		0.30 / 0.66

Operating principle

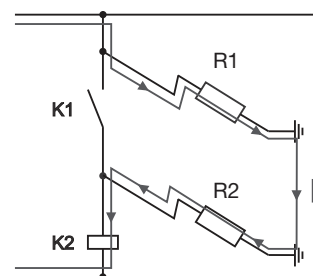
The control supply voltage is feeded via terminals A1-A2/ B2. This can be the voltage supplied from the system to be monitored. The CM-IWN superimposes DC-voltage on the system to be monitored via the terminals L and \perp (one phase or, if available, the neutral). In case of earth-leakage the resistance of the system against earth potential changes. The resulting earth-leakage current overcomes the insulation resistance ($< \infty$). If this earth-leakage current exceeds the adjusted response threshold, the output relay is energized with delay (see characteristic) and the red "fault" LED lights up.



1SVC 110 000 F0461

Fields of application

The insulation resistance monitor CM-IWN-AC is mainly used in industrial applications with electrically insulated AC systems for the measurement of an occurring first isolation fault. This can prevent the installation from incorrect operation caused by a possible second isolation fault. The resistances R1 and R2 correspond to two subsequent isolated faults (see drawing). In this case, the resistances are connected in series related to earth potential which would prevent contactor K2 from being de-energized (fault!) although auxiliary contact K1 is open. This incorrect operation may cause considerable faults within the installation.



1SVC 110 000 F0462

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Insulation monitor for ungrounded DC mains

CM-IWN-DC

Ordering details



CM-IWN-DC

- ① Selector switch
 open circuit principle
 closed circuit principle
- ② Response threshold
 1-110 kΩ
- ③ U: green LED -
 control supply voltage
- ④ L+: red LED -
 fault insulation resistance
- ⑤ L-: red LED -
 fault insulation resistance
- ⑥ Test button: "Test L+/Reset"
- ⑦ Test button: "Test L-"
- ⑧ Marker label

The **CM-IWN-DC** is designed for insulation resistance monitoring in ungrounded, pure DC supply systems with or without filtering. Due to its electrical isolation between the supply circuit and the measuring circuit, it can be supplied either by an external auxiliary voltage or by the supply voltage to be monitored. The CM-IWN-DC is mainly used to monitor DC auxiliary circuits that are electrically isolated from primary supply voltage circuits as well as installations powered by batteries.

Insulation resistance faults are evaluated separately for L+ or L- and displayed by LEDs. Due to its measuring principle, the CM-IWN-DC is not able to detect balanced earth-leakage faults.

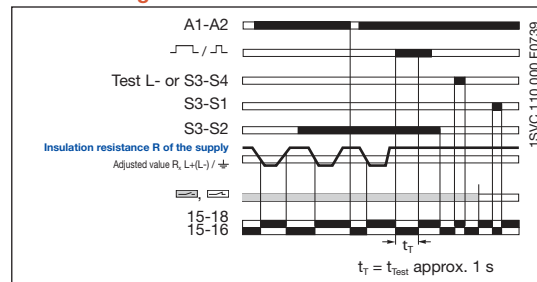
The response threshold is adjustable in a range from 10-110 kΩ. If the insulation resistance falls below the set response threshold, the relay is energized and the error LED lights up.

Front-face test button "Test L-": insulation fault can be simulated, pressing the test button = output relay will trip (energize, de-energize)

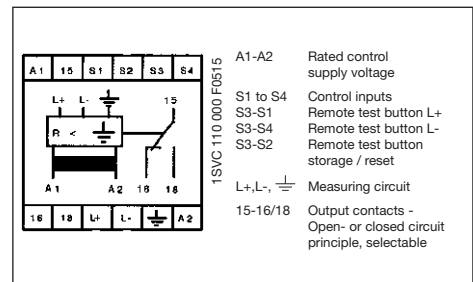
Front-face test button "Test \square /Reset \square L+": Pressed < 1 s = Test L+, Pressed > 1 s = Reset L+ and L-

Connection S2-S3: jumper = fault tripping is stored, button with n/o contact = remote reset, pressing the button resets storage of the tripped state

Function diagram CM-IWN-DC

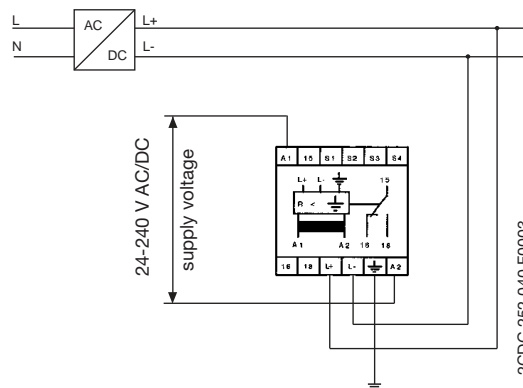


Connection diagram CM-IWN-DC



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-IWN-DC	24-240 V AC/DC	1SVR 450 065 R0000	1		0.30 / 0.66

Application and connection example



- Insulation resistance monitoring in ungrounded pure DC systems from 24-240 V DC
- Continuously adjustable measuring range 10-110 kΩ
- Front-face selector switch for open- or closed-circuit principle
- Front-face and external test-reset feature
- 1 c/o contact
- 3 LEDs for status indication

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Insulation monitors for ungrounded mixed AC/DC systems

C558.01

Ordering details

Enclosure width 45 mm



C558.01

Insulation monitoring device for AC IT systems with DC components and for DC IT systems

Modern control voltage systems frequently contain DC components and high system leakage capacitances due to interference suppression arrangements. These circumstances must be taken into account when selecting the insulation monitoring device.

The C558.01 guarantees reliable insulation monitoring of modern systems. Pure AC systems, pure DC systems as well as AC/DC systems can be monitored.

Fields of application

- Industrial control systems
- Automation systems
- Machine control systems
- Control systems in power plants and power supply companies
- Computer networks
- Mobile generators
- Elevator control systems
- Lighting systems

Measuring principle

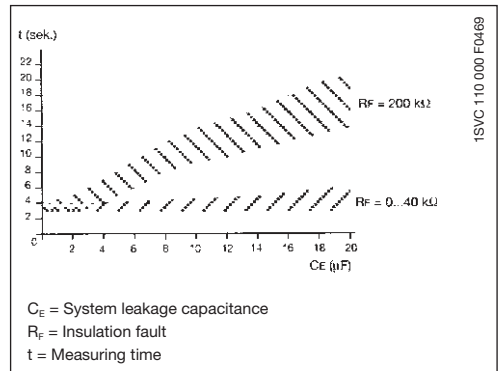
The C558.01 operates with a variant of a pulse measuring principle. This measuring principle ensures reliable monitoring of modern control voltage systems. The frequency range of the system to be monitored may extend from 15-400 Hz.

Standards

The C558.01 complies with the standards DIN 57413 T8 / VDE 0413 T8, IEC 61557-8, EN 61557-8 and ASTM F1669M-96.

When installing the device, the safety instructions supplied with the equipment have to be observed!

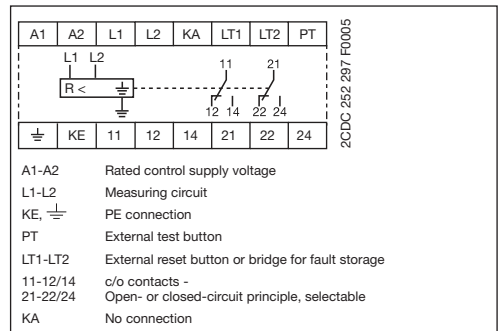
Measuring time



Fault Indications

Indication	Alarm LED		Alarm relay
	+	-	
AC fault	[Symbol]	[Symbol]	[Symbol]
DC fault L+	[Symbol]	[Symbol]	[Symbol]
DC fault L-	[Symbol]	[Symbol]	[Symbol]
Interruption ⊥/KE or L1/L2	[Symbol]	[Symbol]	[Symbol]

Connection diagram C558.01



Response values and measuring circuit

Type	Response value R_{an}	Response time ¹⁾	Meas. voltage	Meas. current	Internal-resistance ²⁾	Rated system voltage
C558.01	10-200 kΩ	5 s	13 V	0.1 mA	120/94 kΩ	DC 0-300 V and AC 15-400 Hz 0-300 V

¹⁾ Response times at 1 µF system leakage capacitance

²⁾ DC internal resistance / impedance

Type	Rated control supply voltage U_C	Order code	Pack unit pieces	Price 1 piece	Weight 1 piece kg / lb
C558.01	230 V AC	1SAR 470 020 R0005	1		0.40 / 0.88
C558.01	90-132 V AC	1SAR 470 020 R0004	1		0.40 / 0.88

- Insulation monitoring of AC, DC and AC/DC IT systems
- Voltage ranges up to 300 V AC and 300 V DC
- Automatic adaptation to the supply system conditions
- Connection monitoring
- Adjustable response threshold 10-200 kΩ
- Combined test and reset button
- Selection between open- and closed-circuit principle
- Fault storage selectable
- Sealable enclosure
- 2 c/o contacts
- 3 LEDs for status indication

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Insulation monitors for ungrounded AC systems

C558.02

Ordering details

Enclosure width 99 mm



C558.02

- Insulation monitoring of ungrounded single-phase and three-phase AC IT systems up to 793 V
- Adjustable threshold 1-200 kΩ
- Combined test and reset button
- Connection monitoring
- Selection between open- and closed-circuit principle
- Fault storage selectable
- Sealable enclosure
- Connection of external meter possible
- 2 c/o contacts
- LED bar graph indicator
- LEDs for status indication

Insulation monitor for AC IT systems

The standard power supply system is a pure AC system. It neither contains converters nor DC components. The leakage capacitance is relatively low, i.e. usually it is below 1 μF, sometimes slightly above this value.

The C558.02 can be used to monitor such systems with voltages of up to 793 V. The response threshold can be adjusted in a wide range, selectable from 1-20 kΩ or 10-200 kΩ.

Field of application

- Single-phase and three-phase AC systems without DC components
- Uncontrolled motor drives
- Building installation
- Simple machine drives
- Generating sets, mobile generators
- Power supply for public arenas
- Lighting systems
- Air ventilation and air conditioning systems

Measuring principle

Superimposed DC voltage with reversing stage.

Selecting the adjustment range

Changing the setting range from x 1 kΩ to x 10 kΩ, automatically changes the indication of the kΩ values on the LED bar graph indicator:

Range x 1 kΩ: Meter scale point x 1 kΩ.

Range x 10 kΩ: Meter scale point has to be multiplied by 10.

Response delay

Type	*) Response time in time range of 10-200 kΩ	*) Response time in the range of 1-20 kΩ	Max. system leakage capacitance
C558.02	< 1 s	< 3 s	20 μF

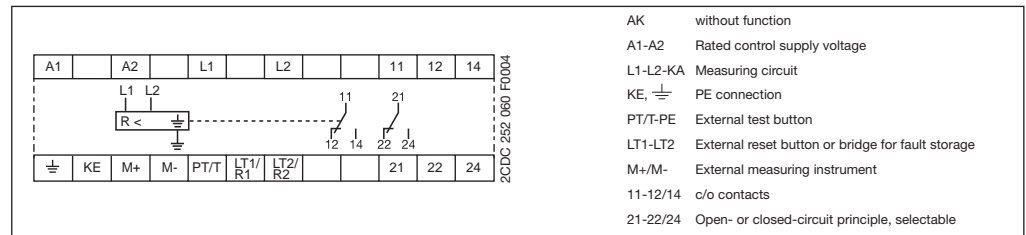
*) Response times acc. to IEC 61557-8 at $R_F = 0.5 \times R_{an}$ and 1 μF system leakage capacitance.

Standards

The C558.02 complies with the standards DIN 57413 Bl.2 / VDE 0413 T2, IEC 61557-8, EN 61557-8 and ASTM F1207-89.

When installing the device, the safety instructions supplied with the equipment have to be observed!

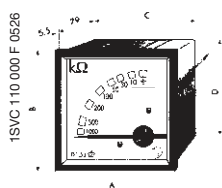
Connection diagram C558.02



Type	Rated control supply voltage U_C	Order code	Pack unit piece	Price 1 piece	Weight 1 piece kg / lb
C558.02	230 V AC	1SAR 471 020 R0005	1		0.35 / 0.77
C558.02	90-132 V AC	1SAR 471 020 R0004	1		0.35 / 0.77

Accessories (external kΩ meter)

C558.10		1SAR 477 000 R0100	1		0.20 / 0.44
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C558.10

• Technical data103 • Dimensional drawings145

Insulation monitors for ungrounded AC and DC systems

C558.03

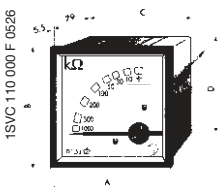
Ordering details

Enclosure width 99 mm



C558.03

- Insulation monitoring of AC, DC and AC/DC IT systems
- Connection monitoring
- Alarm or system fault indication selectable
- AMP measuring method (applied for EP)
- Automatic adaptation to the power system
- 2 continuously adjustable response thresholds 2-50 kΩ and 20-500 kΩ
- Combined test and reset button
- Selection between open- and closed-circuit principle
- Fault storage selectable
- Sealable enclosure acc. to VDE 0106 T 101
- Environmental conditions comply with EN 50155
- 2 x 1 c/o contact
- LED bar graph indicator
- LEDs for status indication



C558.10

Insulation monitor for AC and DC IT systems

The C558.03 monitors the insulation resistance of IT systems (ungrounded systems) with voltages of up to 690 V AC or 400 V DC. It can be universally used in AC, DC or mixed power systems. Measurement is not influenced by interference suppression measures and capacitances of up to 20µF to earth which are caused by long supply lines. The implemented AMP measuring method guarantees reliable insulation monitoring even in power systems with fixed frequency converters (output and input frequency are static).

Application in modern control voltage systems

- Industrial control systems
- Automation systems
- Machine control systems
- Control systems in power plants and power supply companies
- Computer networks
- Mobile generators
- Elevator control systems
- Lighting systems

Measuring principle

Superimposed DC voltage with reversing stage.

Fault indications

Indication	Alarm LED		Alarm relay
	+	-	
AC fault			
DC fault L+			
DC fault L-			
Interruption ≠/KE or L1/L2			

Standards

The C558.03 complies with the standards DIN 57413 Bl.2 / VDE 0413 T2, IEC 61557-8, EN 61557-8 and ASTM F1207-89.

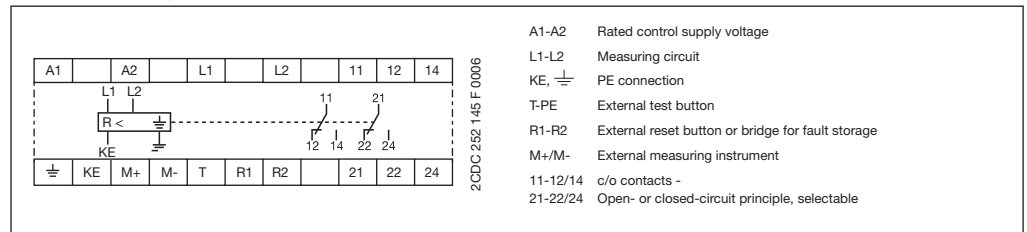
When installing the device, the safety instructions supplied with the equipment have to be observed!

Response delay

Type	*) Response time in the range of 2-6 kΩ	*) Response time in the range of 6-500 kΩ	Max. system leakage capacitance
C 558.03	< 8-35 s	< 8-12 s	50 µF

*) Response times acc. to IEC 61557-8 at $R_F = 0.5 \times R_{an}$ and 1 µF system leakage capacitance.

Connection diagram C558.03



Type	Rated control supply voltage U _c	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
C558.03	230 V AC	1SAR 472 020 R0005	1		0.40 / 0.88
C558.03	90-132 V AC	1SAR 472 020 R0004	1		0.40 / 0.88

Accessories (external kΩ meter)

C558.10	1SAR 477 000 R0100	1	0.20 / 0.44
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Insulation monitors for ungrounded supply mains CM-IWN-AC, CM-IWN-DC

Technical data

Type		CM-IWN-AC	CM-IWN-DC
Supply circuit			
Rated control supply voltage U_s - power consumption	A1-A2	24-240 V AC/DC - approx. 8 VA / 2 W	24-240 V AC/DC - approx. 8 VA / 2 W
	A1-B2	110-130 V AC - approx. 3 VA	
	A1-A2	220-240 V AC - approx. 3 VA	
Rated control supply voltage U_s tolerance		-15 %...+10 %	
Rated frequency	AC/DC versions	15-400 Hz or DC	
	AC versions	50-60 Hz	
Duty time		100 %	
Measuring circuit			
		L-PE	
Monitoring function	Insulation monitoring within electrically isolated	AC systems	DC systems
Measuring range, threshold value	min-max.	1-11 k Ω , 10-110 k Ω	10-110 k Ω
Internal resistance	min.	57 k Ω	-
AC internal resistance	min.	100 k Ω	-
DC internal resistance	min.	100 k Ω	-
Test resistance		820 Ω	-
Max. voltage at the measuring input	max.	415 V AC	300 V DC
Measuring DC voltage	max.	30 V DC	24-240 V DC
Cable length for reset-test button	max.	10 m	
Delay time		refer to ordering details page	<1 s if insulation <0.9 x response threshold
Indication of operational states			
Control supply voltage		U: green LED	
Insulation fault		F: red LED	L+: red LED, L-: red LED
Output circuits			
		15-16/18	
Kind of output		1 c/o contacts	
Operational principle ¹⁾		open-circuit principle	open- or closed circuit principle selectable
Contact material		AgCdO	
Rated voltage (VDE 0110, IEC 664-1, IEC 60947-1)		250 V	
Minimum switching voltage / minimum switching current		- / -	
Maximum switching voltage		400 V AC, 300 V DC	
Rated operational current (IEC 60947-5-1, EN 60947-5-1)	AC12 (resistive) 230 V	5 A	
	AC15 (inductive) 230 V	3 A	
	DC12 (resistive) 24 V	5 A	
	DC13 (inductive) 24 V	2 A	
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300	
	max. rated operational voltage	300 V AC	
	max. continuous thermal current at B 300	5 A	
	max. making/breaking apparent power at B 300	3600/360 VA	
Mechanical lifetime		30 x 10 ⁶ switching cycles	
Electrical lifetime	at AC12, 230 V, 4 A	0,1 x 10 ⁶ switching cycles	
Short circuit proof, max. fuse rating	n/c contact / n/o contact	4 A fast-acting / 6 A fast-acting	
General data			
Dimensions (W x H x D)		45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in)	
Weight		approx. 0,3 kg (0.66 lb)	
Mounting position		any	
Degree of protection	enclosure / terminals	IP50 / IP20	
Ambient temperature range	operation / storage	-25...+65 °C / -40...+85 °C	
Mounting		DIN rail (EN 50022)	
Electrical connection			
Wire size	fine-strand with wire end ferrule	2 x 2.5 mm ² (2 x14 AWG)	
Standards			
Product standards		IEC 255-6, EN 60255-6	
Low Voltage Directive		2006/95/EC	
EMC Directives		2004/108/EC, 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/67/EEC	
Electromagnetic compatibility		EN 61000-6-2, EN 61000-6-4	
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10(3)V/m)	
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2(1) kV / 5 kHz)	
powerful impulses (Surge)	IEC 1000-4-5, EN 61000-4-5	Level 3 (2(1) kV L-L)	
HF line emission	IEC 1000-4-6, EN 61000-4-6	Level 3 (10(3) V)	
Operational reliability (IEC 68-2-6)		5 g	
Mechanical resistance (IEC 68-2-6)		10 g	
Environmental testing (IEC 68-2-30)		24 h cycle time, 55 °C, 93 % rel., 96 h	
Isolation data			
Rating (HD 625.1 S1, VDE 0110, IEC 664-1, IEC 60255-5)		250 V	
Rated insulation voltage between supply, meas. and output circuits		4 kV / 1.2 - 50 μ s	
Rated impulse withstand voltage between all isolated circuits		2.5 kV, 50 Hz, 1 min.	
Test voltage between all isolated circuits		3	
Pollution category		III	
Overvoltage category		III	

¹⁾ Open-circuit principle: Output relay is energized if the measured value exceeds/drops below the adjusted threshold.
Closed-circuit principle: Output relay is de-energized if the measured value exceeds/drops below the adjusted threshold.

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Insulation monitors for ungrounded supply mains C558

Technical data

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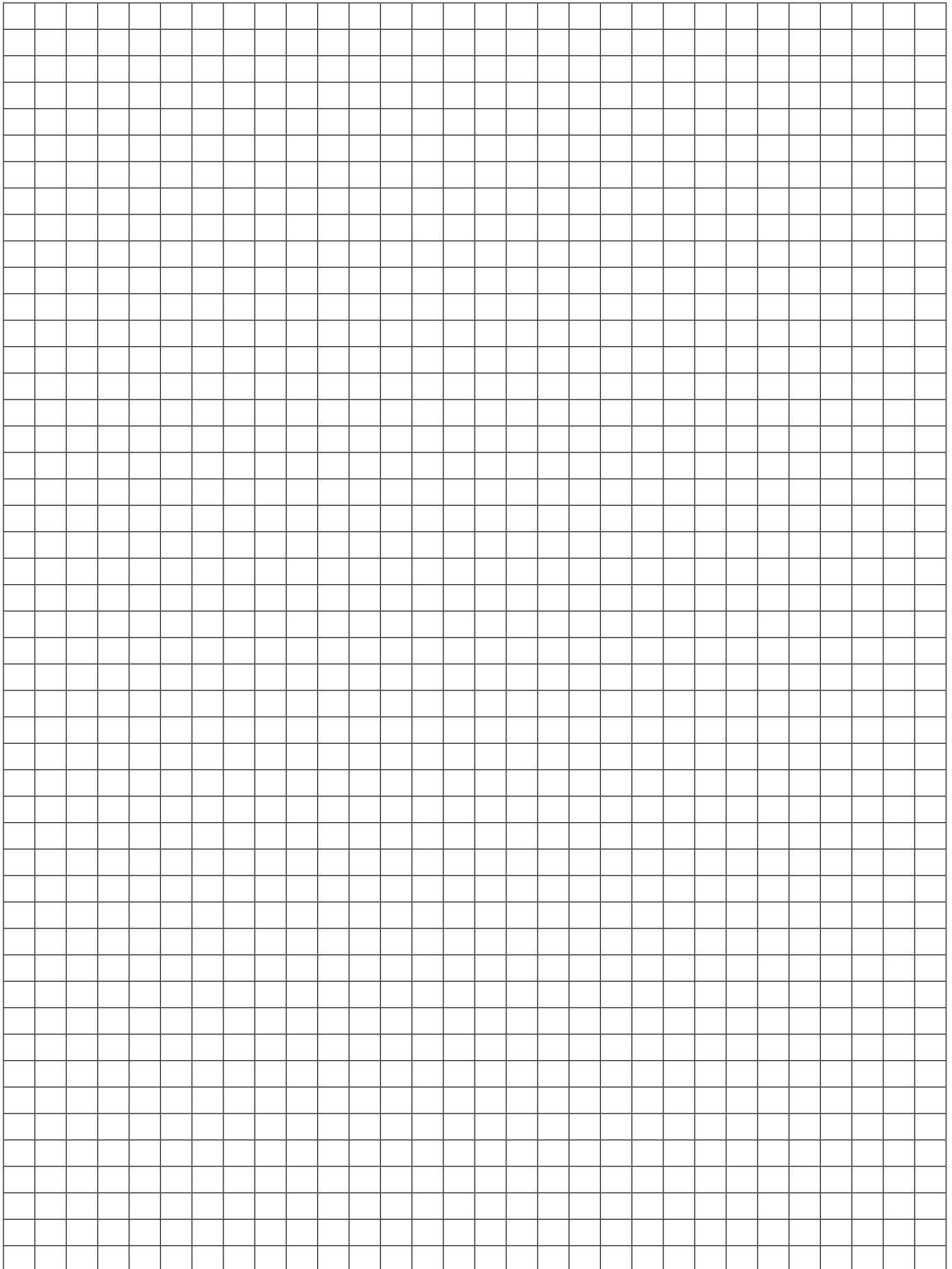
Type	C558.01	C558.02	C558.03
Supply circuit			
Rated control supply voltage U_s - power consumption	A1-A2	115 V AC - 3 VA	
	A1-A2	230 V AC - 3 VA	
Rated control supply voltage U_s tolerance		-20...+15 %	
Rated frequency		15-400 Hz	
Duty time		100 %	
Measuring circuit			
Monitoring function	Insulation monitoring within electrically isolated AC and DC supply systems		
Measuring range, threshold value	min-max.	10-200 k Ω	2-500 k Ω
AC internal resistance	min.	94 k Ω	180 k Ω
DC internal resistance	min.	120 k Ω	200 k Ω
Test resistance		-	
Insulation voltage (L-PE)	max.	290 V DC, 300 V AC	630 V
Measuring voltage / current	max.	13 V / 0.47 mA	20 V / 100 μ A
Cable length for reset-test button LT1-LT2	max.	-	
Delay time	max.	5 s	8-35 s
Indication of operational states			
Control supply voltage		ON: green LED	
Isolation fault (IEC 1557-8, EN 60557-8, ASTM F-25.10.11)		"+": red LED, "-": red LED	
Output circuits			
Kind of output		2 c/o contacts	2x1 c/o contacts
Operational principle ¹⁾		open- or closed-circuit principle selectable	
Contact material		-	
Rated voltage (VDE 0110, IEC 664-1, IEC 60947-1)		250 V AC / 300 V DC	
Minimum switching voltage / minimum switching current		- / -	
Maximum switching voltage		-	
Rated switching current (IEC 60947-5-1, EN 60947-5-1)	AC12 (resistive) 230 V AC15 (inductive) 230 V DC12 (resistive) 24 V DC13 (inductive) 24 V	5 A 2 A 5 A 0.2 A	
Mechanical lifetime		-	
Electrical lifetime	at AC12, 230 V, 4 A	1.2 x 10 ⁴ switching cycles	
Short circuit proof, max. fuse rating	n/c contact n/o contact	-	
General data			
Dimensions (W x H x D)	45 x 74 x 105 mm (1.77 x 2.91 x 4.13 in)	99 x 73 x 70 mm (3.9 x 2.87 x 2.76 in)	
Weight	approx. 0.35 kg (0.77 lb)	approx. 0.4 kg (0.88 lb)	approx. 0.35 kg (0.77 lb)
Mounting position		any	
Degree of protection	enclosure / terminals	IP 30 / IP 20	
Ambient temperature range	operation storage	-10...+55 °C -40...+70 °C	
Mounting		DIN rail (EN 50022)	
Electrical connection			
Wire size	fine-strand with wire end ferrule rigid	0.2-2.5 mm ² (24-14 AWG) 0.2-4 mm ² (24-12 AWG)	
Standards			
Product standard			
Low Voltage Directive		2006/95/EC	
EMC Directive		2004/108/EC	
Electromagnetic compatibility		EN 61000-6-2, EN 61000-6-4	
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10(3) V/m)	
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2(1) kV / 5 kHz)	
powerful impulses (Surge)	IEC 1000-4-5, EN 61000-4-5	Level 2	
HF line emission	IEC 1000-4-6, EN 61000-4-6	Level 3 (10(3) V)	
Vibration resistance (IEC 68-2-6)		10-150 Hz / 0.15 mm - 2 g	
Operational reliability (IEC 68-2-27, IEC 68-2-29)			
Environmental testing (IEC 68-2-30)			
Isolation data			
Rating (HD 625.1 S1, VDE 0110, IEC 664-1, IEC 60255-5)			
Rated insulation voltage between supply, meas. and output circuits	250 V	690 V	630 V
Rated impulse withstand voltage between all isolated circuits	4 kV / 1.2-50 μ s	6 kV / 1.2-50 μ s	
Test voltage between all isolated circuits	2 kV	3 kV	
Pollution category		3	
Overvoltage category		-	

¹⁾ Open-circuit principle: Output relay is energized if the measured value exceeds/drops below the adjusted threshold.
Closed-circuit principle: Output relay is de-energized if the measured value exceeds/drops below the adjusted threshold.

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Notes

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Motor load monitors

Fields of application

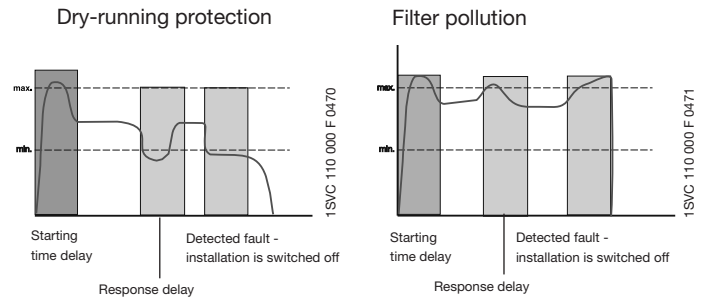
The motor load monitor monitors the load states of single-phase and three-phase asynchronous motors. The evaluation of the phase angle between current and voltage allows a very precise monitoring of the load states.

Compared with other conventional measuring principles (e.g. pressure transducers, current measurement), $\cos \varphi$ monitoring is a more precise and economical alternative. The motor is used as a sensor for its own load status.

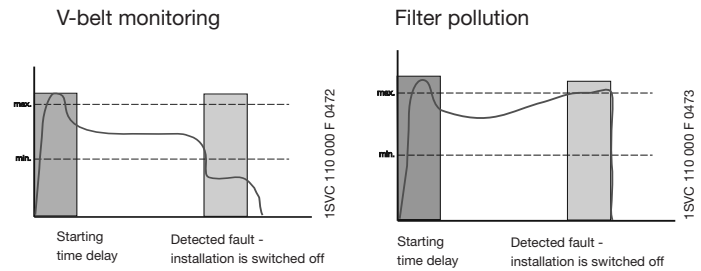
Main applications

- Pump monitoring
 - Dry-running protection (underload)
 - Closed valves (overload)
 - Pipe break (overload)
- Heating, air-conditioning, ventilation
 - Monitoring of filter pollution
 - V-belt breakage (underload)
 - Closed shutters/valves (overload)
 - Air ventilating volume
- Agitating machines
 - High consistency within the tank (overload)
 - Pollution of the tank (overload)
- Transport/Conveyance
 - Congested conveyor belts (overload)
 - Jamming of belts (overload)
 - Material accumulation in spiral conveyors (overload)
 - Lifting platforms
- Machine installation
 - Wear of tools, e.g. worn saw blades in circular saws, etc. (overload)
 - Tool breakage (underload)
 - V-belt drives (breakage underload)

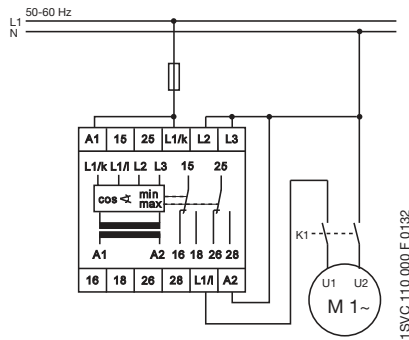
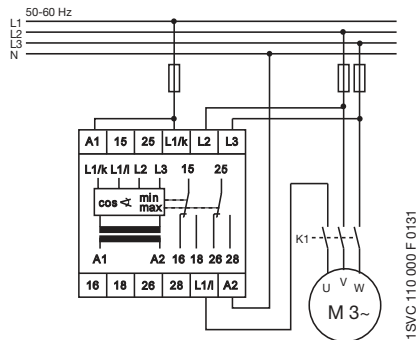
Pump control



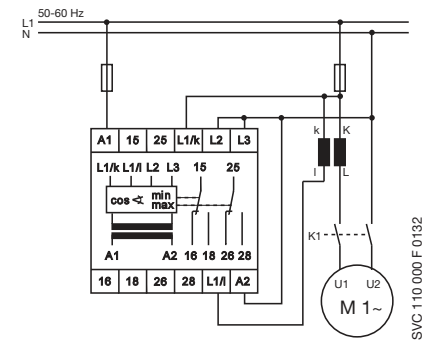
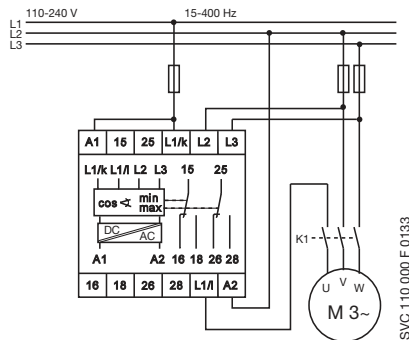
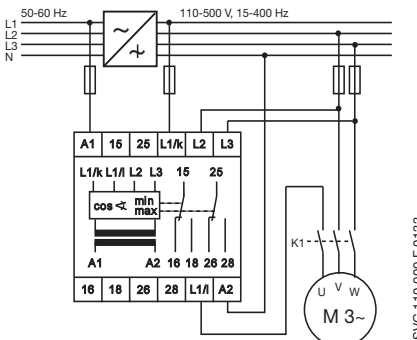
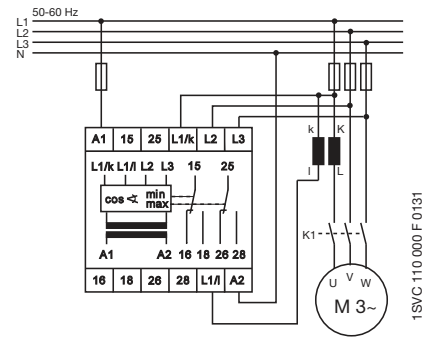
Ventilator monitoring



Wiring examples (for motor currents ≤ 20 A)



Wiring examples (for motor currents ≥ 20 A)

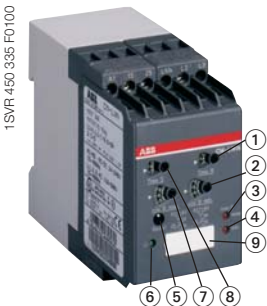


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Motor load monitors

CM-LWN

Ordering details



CM-LWN

- ① Response delay "Time R"
- ② Threshold for load limit "cos φ_{min} "
- ③ cos φ_{max} : red LED - cos φ_{max} exceeded
- ④ cos φ_{min} : red LED - below cos φ_{min}
- ⑤ Reset button
- ⑥ U: green LED - Control supply voltage
- ⑦ Threshold for load limit "cos φ_{max} "
- ⑧ Starting delay "Time S"
- ⑨ Marker label

- Load status monitoring for asynchronous motors
- Under- and overload monitoring cos φ_{min} and cos φ_{max} in one unit
- Adjustable starting delay 0.3-30 s
- Direct measurement of currents up to 20 A
- Adjustable response time delay 0.2-2 s
- Single-phase or three-phase monitoring
- 2 x 1 c/o contact, closed-circuit principle
- 3 LEDs for status indication

The **CM-LWN** module monitors the load status of inductive loads.

The primary application is the monitoring of single- or three-phase asynchronous motors (squirrel cage) under varying load conditions. The measuring principle is based on the evaluation of the phase shift (φ) between the voltage and the current in one phase.

The phase difference is nearly inversely proportional to the load. Therefore, cos φ , measured relatively from 0 to 1, measures the relationship of effective power to apparent power. A value towards 0 indicates low load and a value towards 1 indicates high load.

Threshold values can be set individually for cos φ_{max} and cos φ_{min} . If the set threshold value is reached, a LED lights up and the relay is de-energized.

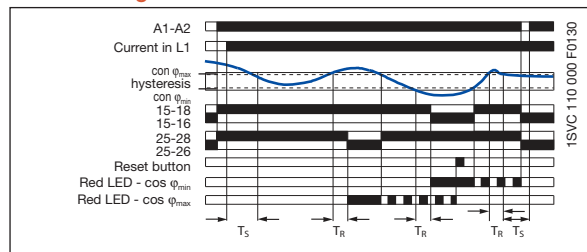
If cos φ returns to the acceptable limits (taking into account the hysteresis), the relay is reset to its original state and the LED flashes permanently to indicate the occurrence of the trip event. This message can be deleted using the reset button or by switching off the supply.

A time delay (Time S) of 0.3 to 30 s can be set for the starting phase of the motor. It is also possible to set a response delay time (Time R) of 0.2 to 2 s to suppress unwanted tripping due to unavoidable short load changes during normal operation.

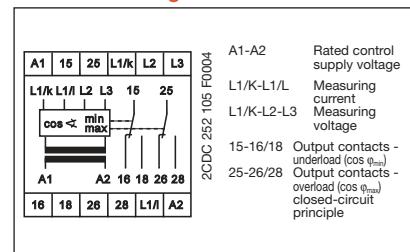
To guarantee correct operation of the response delay (Time R), the adjusted value for cos φ_{max} has to be higher than the value for cos φ_{min} plus the hysteresis. Consequently, the overload and underload indication must not be active at the same time.

Due to the internal electrical isolation of the supply circuit and the measuring circuit, it is also possible to use the device in systems with different supply voltages.

Function diagram CM-LWN



Connection diagram CM-LWN



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
------	------------------------------	------------	-------------------	---------------	------------------------

Current range: 0.5-5 A

CM-LWN	24-240 V AC/DC	1SVR 450 335 R0000	1		0.30 / 0.66
	110-130 V AC	1SVR 450 330 R0000	1		0.30 / 0.66
	220-240 V AC	1SVR 450 331 R0000	1		0.30 / 0.66
	380- 440 V AC	1SVR 450 332 R0000	1		0.30 / 0.66
	480-500 V AC	1SVR 450 334 R0000	1		0.30 / 0.66

Current range: 2-20 A

CM-LWN	24-240 V AC/DC	1SVR 450 335 R0100	1		0.30 / 0.66
	110-130 V AC	1SVR 450 330 R0100	1		0.30 / 0.66
	220-240 V AC	1SVR 450 331 R0100	1		0.30 / 0.66
	380-440 V AC	1SVR 450 332 R0100	1		0.30 / 0.66
	480-500 V AC	1SVR 450 334 R0100	1		0.30 / 0.66

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Motor load monitors

CM-LWN

Technical data

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Type	CM-LWN		
Input circuit - Supply circuit			
Rated control supply voltage U_s - power consumption	A1-A2	24-240 V AC/DC	approx. 8.4 VA/W
	A1-A2	110-130 V AC	approx. 3.6 VA
	A1-A2	220-240 V AC	approx. 3.6 VA
	A1-A2	380-440 V AC	approx. 3.6 VA
	A1-A2	480-500 V AC	approx. 3.6 VA
Rated control supply voltage U_s tolerance		-15 %...+10 %	
Rated frequency	AC versions	50-60 Hz	
	AC/DC versions	15-400 Hz or DC	
Duty time		100 %	
Measuring circuit			
Monitoring function		Motor load monitoring by $\cos \varphi$	
Voltage range	L1/K-L2-L3	110-500 V AC single-phase or three-phase	
Current range	L1/L-L1/K	0.5-5 A version	2-20 A version
Permissible overload of current input		25 A for 3 s	100 A for 3 s
Thresholds		$\cos \varphi_{\min}$ and $\cos \varphi_{\max}$ adjustable from 0 to 1	
Hysteresis (related to phase angle φ in °)		4°	
Frequency of measuring voltage		15-400 Hz	
Response time		300 ms	
Timing circuits			
Start-up time (Time S)		0.3-30 s, adjustable	
Response delay (Time R)		0.2-2 s, adjustable	
Timing error within rated control supply voltage tolerance		≤ 0,5 %	
Timing error within temperature range		≤ 0,06 % / °C	
Indication of operational states			
Control supply voltage		U: green LED	
below $\cos \varphi_{\min}$		$\cos \varphi_{\min}$: red LED	
$\cos \varphi_{\max}$ exceeded		$\cos \varphi_{\max}$: red LED	
Output circuits			
Kind of output		15-16/18, 25-26/28	
Operational principle ¹⁾		closed-circuit principle	
Contact material		AgCdO	
Rated voltage (VDE 0110, IEC 664-1, IEC 947-1)		250 V	
Max. switching voltage		400 V AC, 300 V DC	
Rated operational current (IEC 60947-5-1)	AC12 (resistive) 230 V	4 A	
	AC15 (inductive) 230 V	3 A	
	DC12 (resistive) 24 V	4 A	
	DC13 (inductive) 24 V	2 A	
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300	
	max. rated operational voltage	300 V AC	
	max. continuous thermal current at B 300	5 A	
	max. making/breaking apparent power at B 300	3600/360 VA	
Mechanical lifetime		30 x 10 ⁶ switching cycles	
Electrical lifetime	at AC12, 230 V, 4 A	0.1 x 10 ⁶ switching cycles	
Short circuit proof, max. fuse rating	n/c / n/o contact	10 A fast-acting / 10 A fast-acting	
General data			
Dimensions (W x H x D)		45 mm x 78 mm x 100 mm (1.77 inch x 3.07 inch x 3.94 inch)	
Mounting position		any	
Degree of protection	enclosure / terminals	IP50 / IP20	
Ambient temperature range	operation / storage	-25...+65 °C / -40...+85 °C	
Mounting		DIN rail (EN 50022)	
Electrical connection			
Wire size	fine-strand with wire end ferrule	2 x 2.5 mm ² (2 x 14 AWG)	
Standards			
Product standard		IEC 255-6, EN 60255-6	
Low Voltage Directive		2006/95/EC	
EMC Directive		2004/108/EC, 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/67/EEC	
Electromagnetic compatibility		EN 61000-6-2, EN 61000-6-4	
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)	
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)	
powerful impulses (Surge)	IEC 1000-4-5, EN 61000-4-5	Level 4 (2 kV L-L)	
HF line emission	IEC 1000-4-6, EN 61000-4-6	Level 3 (10 V)	
Operational reliability (IEC 68-2-6)		5 g	
Mechanical resistance (IEC 68-2-6)		10 g	
Environmental testing (IEC 68-2-30)		24 h cycle time, 55 °C, 93 % rel., 96 h	
Isolation data			
Rating (HD 625.1 S1, VDE 0110, IEC 664-1, IEC 60255-5)		250 V, 400 V, 500 V depending on the version	
Rated insulation voltage between supply-, measuring- and output circuit		4 kV / 1.2 - 50 μs	
Rated impulse withstand voltage between all isolated circuits		2,5 kV, 50 Hz, 1 min.	
Test voltage between all isolated circuits		3	
Pollution category		III	
Overvoltage category		III	

¹⁾ Open-circuit principle: Output relay is energized if the measured value exceeds/drops below the adjusted threshold.
 Closed-circuit principle: Output relay is de-energized if the measured value exceeds/drops below the adjusted threshold.



Thermistor motor protection relays

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Thermistor motor protection relays

CM-MSE, CM-MSS, CM-MSN

Benefits and advantages, Selection table

Operating principle and fields of application for thermistor motor protection relays

The CM range of thermistor motor protection relays are used to control motors equipped with PTC temperature sensors. The PTC temperature sensors are incorporated in the motor windings to measure the motor heating. This enables direct control and evaluation of the following operating conditions:

- heavy duty starting
- increased switching frequency
- single-phase operation
- high ambient temperature
- insufficient cooling
- break operation
- unbalance

The relay is independent of the rated motor current, the insulation class and the method of starting.

The PTC sensors are connected in series to the terminals T_a and T_b (or T_{a1} and T_{b1} without short-circuit detection). The number of possible PTC sensors per measuring circuit is limited by the sum of the individual PTC sensor resistances: $R_G = R_1 + R_2 + R_N \leq 1.5 \text{ k}\Omega$.

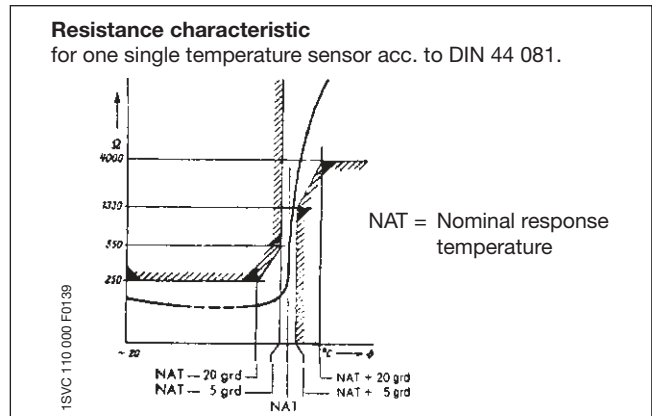
Under normal operating conditions the resistance is below the response threshold. If only one of the PTC resistors heats up excessively, the output relay de-energizes. If the autoreset function is configured, the output relay energizes automatically after cooling down.

Devices with manual (pushbutton on front-side) or remote reset configuration have to be controlled via the control input by the required signal.

Further applications:

Temperature monitoring of equipment with PTC sensors integrated, such as

- machine rolling bearings,
- hot-air ventilators,
- oil,
- air,
- heating installations, etc.



Selection table thermistor motor protection relays

Type	CM-MSE	CM-MSS (1)	CM-MSS (2)	CM-MSS (3)	CM-MSS (4)	CM-MSS (5)	CM-MSS (6)	CM-MSS (7)	CM-MSN
Function									
Measuring range									
Number of sensor circuits	1	1	1	1	1	1	2	3	6
Wire break monitoring	•	•	•	•	•	•	•	•	•
Short-circuit detection	-	-	-	• ¹⁾	•	•	•	•	•
Non-volatile fault storage	-	-	-	-	• ²⁾	• ²⁾	-	• ²⁾	• ²⁾
Operation/ Reset									
Auto reset	•	•	•	•	• ²⁾	• ²⁾	• ²⁾	• ²⁾	• ²⁾
Manual reset	-	-	•	•	•	•	•	•	•
Remote reset	-	-	•	•	•	•	•	•	•
Test button	-	-	-	•	•	•	•	•	•
Output contacts									
Operational principle	closed-circuit principle								
Number / type	1 c/o	1 n/o	2 c/o	2 c/o	1 n/o + 1 n/c	2 c/o	1 c/o per sensor circuit	1 n/o + 1 n/c accumulative evaluation	1 n/o + 1 n/c accumulative evaluation
Width of enclosure	22.5 mm								45 mm
Supply voltages and order codes									
24 V AC	1SVR550805R9300		1SVR430811R9300						
24 V AC/DC		1SVR430800R9100	1SVR430810R9300	1SVR430710R9300					
110-130 V AC	1SVR550800R9300		1SVR430811R0300	1SVR430711R0300					
220-240 V AC	1SVR550801R9300	1SVR430801R1100	1SVR430811R1300	1SVR430711R1300					
380-440 V AC				1SVR430711R2300					
24-240 V AC/DC					1SVR430720R0400	1SVR430720R0300	1SVR430710R0200	1SVR430720R0500	1SVR450025R0100

1) configurable via terminals

2) Auto reset without non-volatile fault storage configurable by permanent jumpering of connecting terminals S1-T2 or S1/X1-S2/X2

Thermistor motor protection relays

CM-MSE, CM-MSS

Ordering details

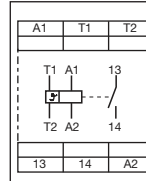
2CDC 251 012 F06/03



CM-MSE

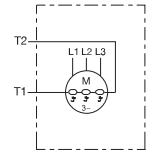
CM-MSE

- Auto reset
- Connection of several sensors (max. 6 sensors conn. in series)
- Monitoring of bimetals
- 1 n/o contact
- Excellent cost / performance ratio



1SVC 110 000 F0140

- A1-A2 Rated control supply voltage
- T1-T2 Sensor circuit
- 13-14 Output contact - Closed-circuit principle



1SVC 110 000 F0141

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSE	24 V AC	1SVR 550 805 R9300	1		0.11 / 0.24
	110-130 V AC	1SVR 550 800 R9300	1		0.11 / 0.24
	220-240 V AC	1SVR 550 801 R9300	1		0.11 / 0.24

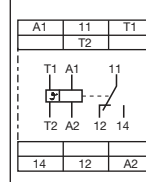
1SVR 430 801 F1100



CM-MSS (1)

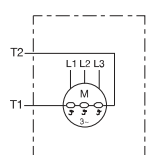
CM-MSS (1), 1 c/o contact

- Auto reset
- Connection of several sensors
- Monitoring of bimetals
- 1 c/o contact
- 2 LEDs for status indication



1SVC 110 000 F0142

- A1-A2 Rated control supply voltage
- T1-T2 Sensor circuit
- 11-12/14 Output contact - Closed-circuit principle



1SVC 110 000 F0141

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (1)	24 V AC/DC ¹⁾	1SVR 430 800 R9100	1		0.15 / 0.33
	220-240 V AC	1SVR 430 801 R1100	1		0.15 / 0.33

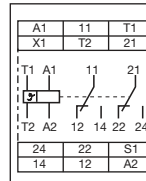
1SVR 430 811 F1300



CM-MSS (2)

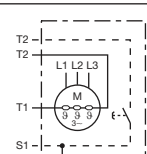
CM-MSS (2), 2 c/o contacts

- Fault storage can be switched off
- Auto reset configurable
- Reset button
- Remote reset
- Monitoring of bimetals
- 2 c/o contacts
- 2 LEDs for status indication



1SVC 110 000 F519

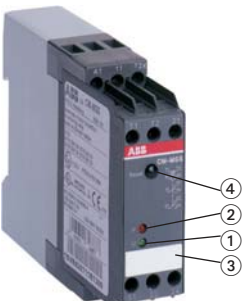
- A1-A2 Rated control supply voltage
- T1-T2 Sensor circuit
- S1-T2 Remote reset jumper = no storage
- X1-T2 Output contacts - Closed-circuit principle



2CDC 252 123 F06/07

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (2)	24 V AC/DC ¹⁾	1SVR 430 810 R9300	1		0.15 / 0.33
	24 V AC	1SVR 430 811 R9300	1		0.15 / 0.33
	110-130 V AC	1SVR 430 811 R0300	1		0.15 / 0.33
	220-240 V AC	1SVR 430 811 R1300	1		0.15 / 0.33

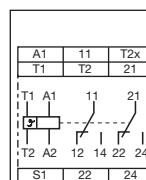
1SVR 430 711 F1300



CM-MSS (3)

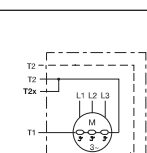
CM-MSS (3), 2 c/o contacts, short-circuit monitoring configurable

- Fault storage can be switched off
- Auto reset configurable
- Reset button
- Remote reset
- Monitoring of bimetals
- Short-circuit monitoring of the sensor circuit configurable
- 2 c/o contacts
- 2 LEDs for status indication



1SVC 110 000 F0143

- A1-A2 Rated control supply voltage
- S1-T2 remote reset jumper = without storage
- T1-T2x measuring circuit without short-circuit monitoring
- T1-T2 measuring circuit with short-circuit monitoring
- 11-12/14 Output contacts
- 21-22/24 Closed-circuit principle



1SVC 110 000 F0144

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (3)	24 V AC/DC ¹⁾	1SVR 430 710 R9300	1		0.15 / 0.33
	110-130 V AC	1SVR 430 711 R0300	1		0.15 / 0.33
	220-240 V AC	1SVR 430 711 R1300	1		0.15 / 0.33
	380-440 V AC	1SVR 430 711 R2300	1		0.15 / 0.33

¹⁾ not electrically isolated

• Accessories: PTC sensors114	• Technical data115
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	• Accessories146

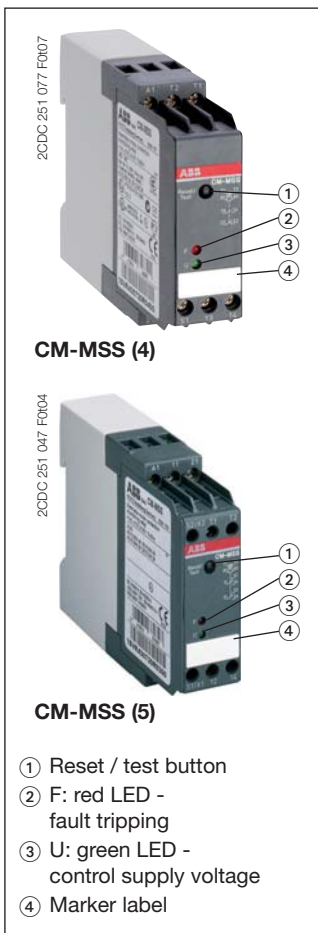
- ① F: red LED - fault tripping
- ② U: green LED - control supply voltage
- ③ Marker label
- ④ Reset button

Thermistor motor protection relays

CM-MSS

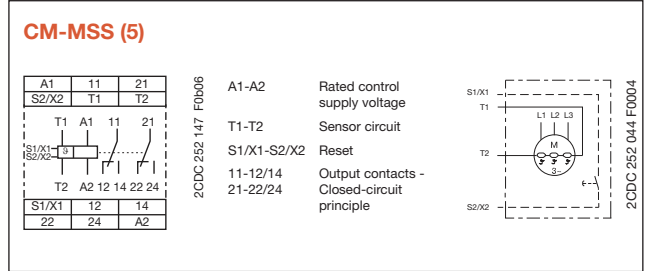
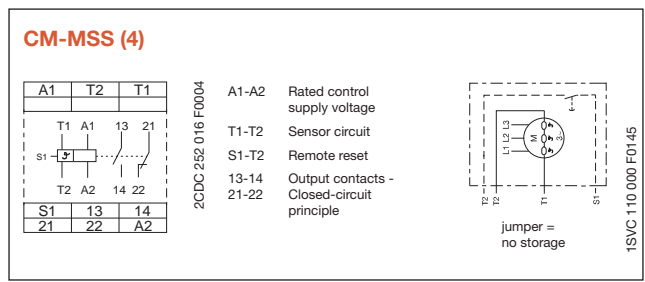
Ordering details

2

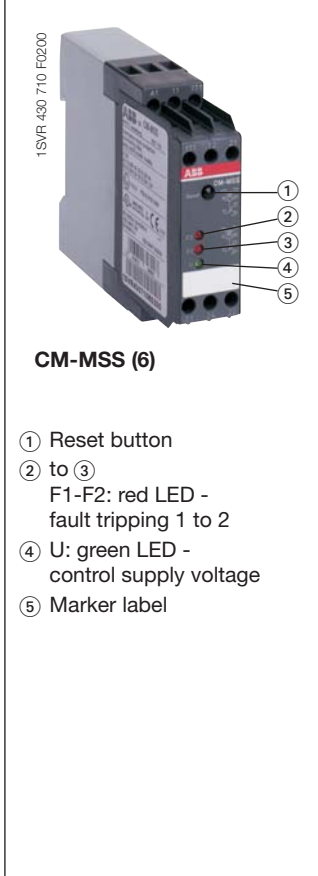


CM-MSS (4) + CM-MSS (5), 1-channel

- Short-circuit monitoring of the sensor circuit
- Wide supply voltage range: 24-240 V AC/DC
- Non-volatile fault storage selectable
- Reset and test button
- Remote reset
- Auto reset configurable
- Output contacts: 1 n/c and 1 n/o or 2 c/o contacts
- 2 LEDs for status indication

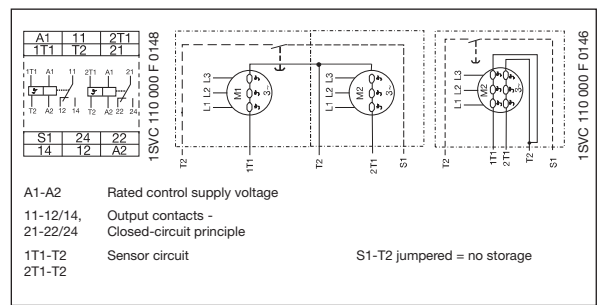


Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (4) 1-channel 1n/c, 1n/o	24-240 V AC/DC	1SVR 430 720 R0400	1		0.15 / 0.33
CM-MSS (5) 1-channel 2 c/o	24-240 V AC/DC	1SVR 430 720 R0300	1		0.15 / 0.33



CM-MSS (6), 2-channel, single evaluation

- Short-circuit monitoring for the sensor circuits
- Wide supply voltage range: 24-240 V AC/DC
- 2 separate sensor circuits for monitoring of two motors or one motor with 2 sensor circuits (prewarning and final switch off)
- Reset button
- Auto reset configurable
- Output contacts: 2 x 1 c/o contact
- 3 LEDs for status indication



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (6)	24-240 V AC/DC	1SVR 430 710 R0200	1		0.15 / 0.33

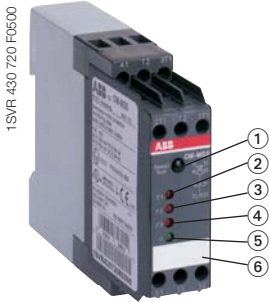
• Accessories: PTC sensors114	• Technical data115
• Technical diagrams144	• Dimensional drawings145
	• Accessories146



Thermistor motor protection relays

CM-MSS, CM-MSN

Ordering details

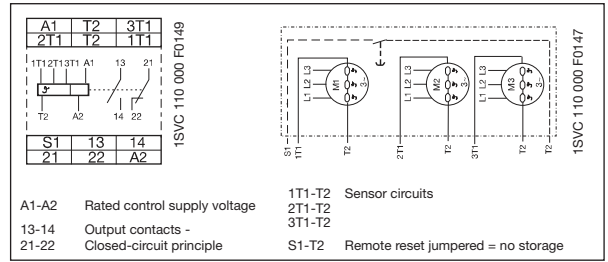


CM-MSS (7)

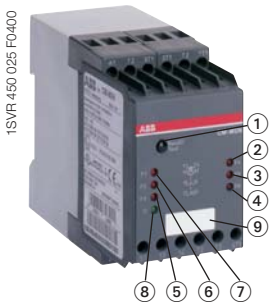
- ① Reset / test button
- ② to ④ F1-F3: red LED - fault tripping 1 to 3
- ⑤ U: green LED - control supply voltage
- ⑥ Marker label

CM-MSS (7), 3 sensor circuits, accumulative evaluation

- Short-circuit monitoring for the sensor circuits
- Wide supply voltage range 24-240 V AC/DC
- Non-volatile fault storage configurable
- Remote reset
- Auto reset configurable
- Reset and test button
- Output contacts: 1 n/c and 1 n/o contact
- 4 LEDs for status indication



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSS (7)	24-240 V AC/DC	1SVR 430 720 R0500	1		0.15 / 0.33

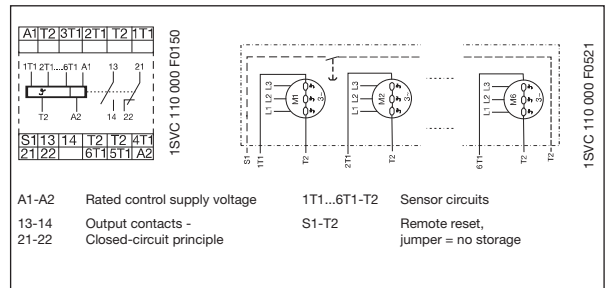


CM-MSN

- ① Reset / Test button
- ② to ⑦ F1-F6: red LED - fault tripping F1 to F6
- ⑧ U: green LED - control supply voltage
- ⑨ Marker label

CM-MSN, 6 sensor circuits, accumulative evaluation

- Short-circuit monitoring of the sensor circuit
- Wide supply voltage range: 24-240 V AC/DC
- Non-volatile fault storage configurable
- Remote reset
- Auto reset configurable
- Reset and test button
- Output contacts: 1 n/c, 1 n/o contact
- 7 LEDs for status indication



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-MSN	24-240 V AC/DC	1SVR 450 025 R0100	1		0.23 / 0.51

accumulative evaluation = if any input exceeds the threshold, the output relay will trip

• Accessories: PTC sensors114	• Technical data115
• Technical diagrams144	• Dimensional drawings145
	• Accessories146

Thermistor motor protection PTC temperature sensors C011

Ordering details, technical data

2

Temperature sensor characteristic

2CDC 252 068 F0208

1SVC 110 000 F0531

The PTC temperature sensors (temperature-dependent with positive temperature coefficient) are selected by the manufacturer of the motor depending on:

- the motor insulation class according to IEC/EN 60034-11,
- the special characteristics of the motor, such as the conductor cross-section of the windings, the permissible overload factor etc.
- special conditions prescribed by the user, such as the permissible ambient temperature, risks resulting from locked rotor, extent of permitted overload etc.

One temperature sensor must be embedded in each phase winding. For instance, in case of three-phase squirrel cage motors, three sensors are embedded in the stator windings. For pole-changing motors with one winding (Dahlander connection), 3 sensors are also sufficient. Pole-changing motors with two windings, however, require 6 sensors.

If an additional warning is required before the motor is switched off, separate sensors for a correspondingly lower temperature must be embedded in the winding. They have to be connected to a second control unit.

The sensors are suitable for embedding in motor windings with rated operating voltages of up to 600 V AC.

Conductor length: 500 mm per sensor.

A 14 V varistor can be connected in parallel to protect the sensors from overvoltage.

Due to their characteristics, the thermistor motor protection relays can also be used with PTC temperature sensors of other manufacturers which comply with DIN 44 081 and DIN 44 082.

Type	Rated response temperature T_{NF}	Color coding	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
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Temperature sensor C011, standard version acc. to DIN 44081

C011-70	70 °C	white-brown	GHC 011 0003 R0001	3		0.02/0.044
C011-80	80 °C	white-white	GHC 011 0003 R0002	3		0.02/0.044
C011-90	90 °C	green-green	GHC 011 0003 R0003	3		0.02/0.044
C011-100	100 °C	red-red	GHC 011 0003 R0004	3		0.02/0.044
C011-110	110 °C	brown-brown	GHC 011 0003 R0005	3		0.02/0.044
C011-120	120 °C	gray-gray	GHC 011 0003 R0006	3		0.02/0.044
C011-130	130 °C	blue-blue	GHC 011 0003 R0007	3		0.02/0.044
C011-140	140 °C	white-blue	GHC 011 0003 R0011	3		0.02/0.044
C011-150	150 °C	black-black	GHC 011 0003 R0008	3		0.02/0.044
C011-160	160 °C	blue-red	GHC 011 0003 R0009	3		0.02/0.044
C011-170	170 °C	white-green	GHC 011 0003 R0010	3		0.02/0.044

Triple temperature sensor C011-3

C011-3-150	150 °C	black-black	GHC 011 0033 R0008	1		0.05/0.11
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Technical data

Characteristic data	Sensor type C011
Cold-state resistance	50 -100 Ω at 25 °C
Warm-state resistance ± 5 up to 6 K of rated response temperature T_{NF}	10 000 Ω
Thermal time constant, sensor open ¹⁾	< 5 s
Permitted ambient temperature	+180 °C

Rated response temperature ± tolerance $T_{NF} \pm \Delta T_{NF}$	PTC resistance R from -20 °C to $T_{NF} - 20$ K	PTC resistance R at PTC temperatures of:		
		$T_{NF} - \Delta T_{NF}$ ($U_{PTC} \leq 2.5$ V)	$T_{NF} + \Delta T_{NF}$ ($U_{PTC} \leq 2.5$ V)	$T_{NF} + 15$ K ($U_{PTC} \leq 7.5$ V)
70 ± 5 °C	≤ 100 Ω	≤ 570 Ω	≥ 570 Ω	-
80 ± 5 °C		≤ 550 Ω	≥ 1330 Ω	≥ 4000 Ω
90 ± 5 °C				
100 ± 5 °C				
110 ± 5 °C				
120 ± 5 °C				
130 ± 5 °C				
140 ± 5 °C				
150 ± 5 °C				
160 ± 5 °C		≤ 570 Ω	≥ 570 Ω	-
170 ± 7 °C				

¹⁾ Not embedded in windings.

²⁾ For triple temperature sensor take values x 3.

Thermistor motor protection relays

CM-MSE, CM-MSS, CM-MSN

Technical data

Type		CM-MSE	CM-MSS	CM-MSN
Input circuit				
Rated control supply voltage U_s - power consumption	A1-A2		24 V AC	approx. 1.5 VA
	A1-A2		24 V AC/DC	approx. 1.1 VA / 0.6 W
	A1-A2		110-130 V AC	approx. 1.5 VA
	A1-A2		220-240 V AC	approx. 1.5 VA
	A1-A2		380-440 V AC	approx. 1.7 VA
Rated control supply voltage U_s tolerance			-15 % ... +10 %	
Rated frequency		AC: 50-60 Hz / 24-240 V AC/DC versions: 15-400 Hz		
Duty time		100 %		
Measuring circuit				
		T1-T2	T1-T2/T2x, 1T1...6T1-T2	1T1...6T1-T2
Monitoring function		temperature monitoring by means of PTC sensors		
Number of sensor circuits		1	1, 2 oder 3 (see order details)	6
Short-circuit monitoring		-	see ordering details	yes
Non-volatile fault storage		-	see ordering details	configurable
Test function		-	see ordering details	yes
Sensor circuit				
Temperature threshold (relay de-energizes)		2.7-3.7 k Ω	CM-MSS (1+2): 3050 \pm 550 Ω CM-MSS (3-7): 3.6 k Ω \pm 5 %	3.6 k Ω \pm 5 %
Temperature hysteresis (relay energizes)		1.7-2.3 k Ω	CM-MSS (1+2): 1900 \pm 400 Ω CM-MSS (3-7): 1.6 k Ω \pm 5 %	1.6 k Ω \pm 5 %
Short circuit threshold (relay de-energizes)			<20 Ω	
Short circuit hysteresis (relay energizes)			>40 Ω	
Maximum total resistance of sensors connected in series (cold state)			\leq 1.5 k Ω	
Maximum sensor cable length for short-circuit detection			2 x 100 m at 0.75 mm ² , 2 x 400 m at 2.5 mm ²	
Response time			<100 ms	
Control circuit for storage and hysteresis function				
Remote reset	S1-T2 or S1/X1-S2/X2	-	n/o contact	
Maximum no-load voltage		-	approx. 25 V, 24-240 V; AC/DC versions: 5.5 V	
Maximum cable length		-	\leq 50 m, 100-200 m if shielded	
Indication of operational states				
Control supply voltage	U: green LED	-	□: control supply voltage applied	
Fault indication	F: red LED	-	□: output relay de-energized	
Output circuits				
		13-14	11-12/14, 21-22/24, 13-14, 21-22	13-14, 21-22
Kind of output		1 n/o contact	CM-MSS (1): 1 c/o contact CM-MSS (2,3,5): 2 c/o contacts CM-MSS (4, 7): 1 n/o + 1 n/c CM-MSS (6): 2x1 c/o contact	1 n/o + 1 n/c contact
Operational principle		closed-circuit principle (output relay de-energizes if the measured value exceeds/drops below the adjusted threshold)		
Contact material		AgCdO	CM-MSS (1+2+6): AgCdO CM-MSS (3+4+5+7): AgNi	AgNi
Rated voltage (VDE 0110, IEC 664-1, IEC 60947-1)		250 V		
Maximum switching voltage		250 V		
Rated operational current (IEC 60947-5-1)	AC12 (resistive)	230 V	4 A	
	AC15 (inductive)	230 V	3 A	
	DC12 (resistive)	24 V	4 A	
	DC13 (inductive)	24 V	2 A (1.5 A - n/c contact ¹⁾)	
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300	
	max. rated operational voltage		300 V AC	
	max. continuous thermal current at B 300		5 A	
	max. making/breaking apparent power at B 300		3600/360 VA	
Mechanical lifetime		30 (10 ¹¹) x 10 ⁶ switching cycles		
Electrical lifetime (AC12, 230 V, 4 A)		0.1 x 10 ⁶ switching cycles		
Short circuit proof	n/c contact	10 A fast-acting	4 A (10 A ¹⁾ fast-acting	10 A fast-acting
maximum fuse rating	n/o contact	10 A fast-acting	6 A (10 A ¹⁾ fast-acting	10 A fast-acting
General data				
Dimensions (W x H x D)		22.5 x 78 x 78.5 mm (0.89 x 3.07 x 3.09 in)	22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)	45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in)
Weight		approx. 0.11 kg (0.24 lb)	approx. 0.15 kg (0.33 lb)	approx. 0.23 kg (0.51 lb)
Mounting position		any		
Degree of protection enclosure / terminals		IP50 / IP20		
Ambient temperature range	operation	-20...+60 °C		-25...+65 °C
	storage	-40...+85 °C		
Mounting		DIN rail (EN 50022)		

¹⁾ 1SVR 430 710 R 0200, 1SVR 430 8xx R xxxx

Thermistor motor protection relays

CM-MSE, CM-MSS, CM-MSN

Technical data

Type	CM-MSE	CM-MSS	CM-MSN
Electrical connection			
Wire size	fine strand with wire end ferrule	2 x 1.5 mm ² (2 x 16 AWG)	2 x 2.5 mm ² (2 x 14 AWG)
	fine strand without wire end ferrule	2 x 0.75-1.5 mm ² (2 x 18-16 AWG)	2 x 0.75-2.5 mm ² (2 x 18-14 AWG)
	rigid	2 x 1-1.5 mm ² (2 x 18-16 AWG)	2 x 0.75-2.5 mm ² (2 x 18-14 AWG)
Stripping length	2 x 0.75-1.5 mm ² (2 x 18-16 AWG)	2 x 0.5-4 mm ² (2 x 20-12 AWG)	
Tightening torque	10 mm (0.39 inch)		7 mm (0.28 inch)
Standards			
Product standard	IEC 255-6, EN 60255-6		
Low Voltage Directive	2006/95/EC		
EMC Directive	2004/108/EC, 91/263/EEC, 92/31/EEC, 93/68/EEC, 93/67/EEC		
Electromagnetic compatibility	EN 61000-6-2, EN 61000-6-4		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)	
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)	
powerful impulses (Surge)	IEC 1000-4-5, EN 61000-4-5	Level 3/4 (1/2 kV)	
HF line emission	IEC 1000-4-6, EN 61000-4-6	Level 3 (10 V)	
Operational reliability (IEC 68-2-6)	6 g	4 g	5 g
Resistance to vibration (IEC 68-2-6)	10 g	6 g	10 g
Environmental testing (IEC 68-2-30)	24 h cycle time, 55 °C, 93 % rel., 96 h		
Isolation data			
Rated voltage between supply, measuring and output circuit	250 V		
Rated impulse withstand voltage between all isolated circuits	4 kV / 1.2 - 50 µs		
Test voltage between all isolated circuits	2.5 kV, 50 Hz, 1 min.		
Pollution degree	3		
Overvoltage category	III		



Temperature monitors for PT100, PT1000, KTY83, KTY84 and NTC sensors

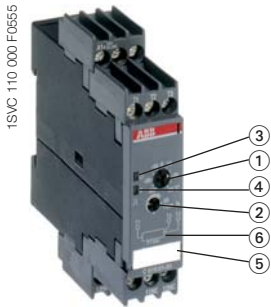
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Analog temperature monitoring relays C510 and C511

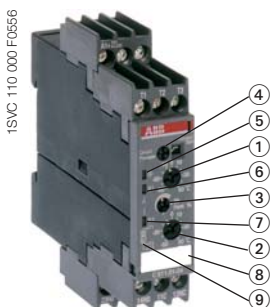
Ordering details

2



C510

- ① Threshold value adjustment
- ② Hysteresis adjustment
- ③ LED: control supply voltage
- ④ LED \varnothing : relay status
- ⑤ Marker label
- ⑥ Circuit diagram



C511

- ① Threshold value 1 (tripping) adjustment
- ② Threshold value 2 (warning) adjustment
- ③ Hysteresis adjustment for threshold value 1
- ④ Selection switch for open- or closed circuit principle
- ⑤ LED: control supply voltage
- ⑥ LED \varnothing 1: relay 1 energized
- ⑦ LED \varnothing 2: relay 2 energized
- ⑧ Marker label
- ⑨ Circuit diagram

Analog tripping devices - C510 and C511

- Sensor types: PT100
- Measuring principle for 2- and 3-wire sensors
- Electrical isolation between the sensors and the power supply (except for 24 V AC/DC devices)
- Separate design for the crossing of the upper or lower threshold
- Depending on the version, measurement ranges for -50...+50 °C / 0...+100 °C / 0...+200 °C
- no storage
- Adjustment precision $\pm 5\%$
- 22.5 mm enclosure with 12 terminals

C510

- 1 threshold adjustable via absolute scale in °C
- Hysteresis adjustable from 2-20 %
- 1 n/o and 1 n/c contact
- 2 LEDs for status indication
- Closed-circuit principle

Type	Rated control supply voltage	Order code	Measuring range	Pack.-unit piece	Price 1 piece	Weight 1 piece kg / lb
------	------------------------------	------------	-----------------	------------------	---------------	------------------------

Monitoring function: Overtemperature

C510.01-24	24 V AC/DC	1SAR 700 001 R0005	-50...+50 °C	1		0.15/0.33
C510.01-K	110/230 V AC	1SAR 700 001 R0006	-50...+50 °C	1		0.19/0.42
C510.02-24	24 V AC/DC	1SAR 700 002 R0005	0...+100 °C	1		0.15/0.33
C510.02-K	110/230 V AC	1SAR 700 002 R0006	0...+100 °C	1		0.19/0.42
C510.03-24	24 V AC/DC	1SAR 700 003 R0005	0...+200 °C	1		0.15/0.33
C510.03-K	110/230 V AC	1SAR 700 003 R0006	0...+200 °C	1		0.19/0.42

Monitoring function: Undertemperature

C510.11-24	24 V AC/DC	1SAR 700 004 R0005	-50...+50 °C	1		0.15/0.33
C510.11-K	110/230 V AC	1SAR 700 004 R0006	-50...+50 °C	1		0.19/0.42
C510.12-24	24 V AC/DC	1SAR 700 005 R0005	0...+100 °C	1		0.15/0.33
C510.12-K	110/230 V AC	1SAR 700 005 R0006	0...+100 °C	1		0.19/0.42
C510.13-24	24 V AC/DC	1SAR 700 006 R0005	0...+200 °C	1		0.15/0.33
C510.13-K	110/230 V AC	1SAR 700 006 R0006	0...+200 °C	1		0.19/0.42

C511

- 2 thresholds (warning and switch-off) adjustable via absolute scale in °C
- Hysteresis for threshold 1 adjustable from 2-20 %
- Hysteresis for threshold 2 fixed 5 %
- 1 n/o and 1 c/o
- 3 LEDs for status indication
- Open- or closed-circuit principle selectable

Type	Rated control supply voltage	Order code	Measuring range	Pack.-unit piece	Price 1 piece	Weight 1 piece kg / lb
------	------------------------------	------------	-----------------	------------------	---------------	------------------------

Monitoring function: Overtemperature

C511.01-24	24 V AC/DC	1SAR 700 011 R0005	-50...+50 °C	1		0.17/0.37
C511.01-W	24-240 V AC/DC	1SAR 700 011 R0010	-50...+50 °C	1		0.18/0.40
C511.02-24	24 V AC/DC	1SAR 700 012 R0005	0...+100 °C	1		0.17/0.37
C511.02-W	24-240 V AC/DC	1SAR 700 012 R0010	0...+100 °C	1		0.18/0.40
C511.03-24	24 V AC/DC	1SAR 700 013 R0005	0...+200 °C	1		0.17/0.37
C511.03-W	24-240 V AC/DC	1SAR 700 013 R0010	0...+200 °C	1		0.18/0.40

Monitoring function: Undertemperature

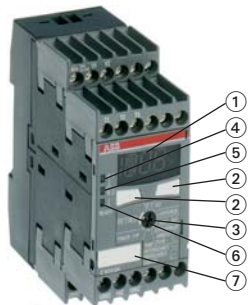
C511.11-24	24 V AC/DC	1SAR 700 014 R0005	-50...+50 °C	1		0.17/0.37
C511.11-W	24-240 V AC/DC	1SAR 700 014 R0010	-50...+50 °C	1		0.18/0.40
C511.12-24	24 V AC/DC	1SAR 700 015 R0005	0...+100 °C	1		0.17/0.37
C511.12-W	24-240 V AC/DC	1SAR 700 015 R0010	0...+100 °C	1		0.18/0.40
C511.13-24	24 V AC/DC	1SAR 700 016 R0005	0...+200 °C	1		0.17/0.37
C511.13-W	24-240 V AC/DC	1SAR 700 016 R0010	0...+200 °C	1		0.18/0.40

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Digital temperature monitoring relays C512 and C513

Ordering details

1SYVC 110 000 F0657



C512, C513

- ① Display
- ② Adjustment button
- ③ Menu selection switch
- ④ LED Ø1: Threshold value 1
- ⑤ LED Ø2: Threshold value 1
- ⑥ LED Ready: device in function
- ⑦ Marker label

Digital tripping devices - C512 und C513

- Adjustable sensor types: PT100, PT1000, KTY83, KTY84, NTC-B57227-K333-A1
- Measuring principle for 2-wire and 3-wire sensors
- Electrical isolation (except 24 V AC/DC devices)
- Adjustable over-, undertemperature monitoring or range monitoring function
- 2 thresholds
- Hysteresis for both thresholds (1-99 Kelvin)
- Adjustable time delay from 0-999 s affects to both thresholds
- Storage function selectable via external signal (Y1-Y2)
- Non-volatile storage of parameter settings
- 1 n/o (for wire-break and short-circuit detection) and 2 c/o
- Multifunctional digital display
- 3 LEDs for status indication
- Open- or closed-circuit principle selectable
- 45 mm wide enclosure with 24 terminals

C512

- Temperature monitor for 1 sensor circuit

Type	Rated control supply voltage	Order code	Measuring range	Pack.-unit piece	Price 1 piece	Weight 1 piece k g / lb
------	------------------------------	------------	-----------------	------------------	---------------	-------------------------

Monitoring function: Over- and undertemperature, range monitoring function

C512-24	24 V AC/DC	1SAR 700 100 R0005	-50...+500 °C *)	1		0.32/0.71
C512-W	24-240 V AC/DC	1SAR 700 100 R0010	-50...+500 °C *)	1		0.33/0.73

C513

- Temperature monitor for 1-3 sensor circuits
 - In the 3-sensor version the status of the single sensors is displayed if the temperature exceeds or falls below the threshold.
- This way it can be easily determined which one of the connected sensors has exceeded or dropped below either one or both threshold values.

Type	Rated control supply voltage	Order code	Measuring range	Pack.-unit piece	Price 1 piece	Weight 1 piece kg / lb
------	------------------------------	------------	-----------------	------------------	---------------	------------------------

Monitoring function: Over- and undertemperature, range monitoring function

C513-W	24-240 V AC/DC	1SAR 700 110 R0010	-50...+500 °C *)	1		0.34/0.75
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Accessories - Replaceable cover marking for digital devices

Type	use for	Order code	Language	Pack.-unit piece	Price 1 piece	Weight 1 piece kg / lb
------	---------	------------	----------	------------------	---------------	------------------------

C512-D	C512	1SAR 700 101 R0100	German	5		
C512-E	C512	1SAR 700 102 R0100	English	5		
C513-D	C513	1SAR 700 111 R0100	German	5		
C513-E	C513	1SAR 700 112 R0100	English	5		

*) The measuring range depends on the used sensor type:

- PT100: -50...+500 °C
 - PT1000: -50...+500 °C
 - NTC: +80...+160 °C
 - KTY83: -50...+175 °C
 - KTY84: -40...+300 °C
- (Typ Siemens Matsushita B57272-A333-A1 - 100 °C: 1,8 kΩ, 25 °C: 32,762 kΩ)

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Temperature monitoring relays

C51x range

Overview, functional description and diagrams

Overview

The C51x temperature monitoring relays can be used for temperature measurement in solid, liquid and gaseous media. The temperature is acquired by the sensor in the medium, evaluated by the device and monitored to determine whether it is within an operating range (range monitoring function) or has exceeded or fallen below a threshold.

Functional description

Analog tripping devices

Once the temperature has reached the set threshold, output relay K1 changes its switching state. In devices with 2 thresholds relay K2 reacts correspondingly if the second threshold is reached. No time delay can be set ($t = 0$).

The relays immediately return to their original switching state if the temperature reaches the set hysteresis value.

Once the temperature has reached the upper threshold of ν_1 , output relay K1 changes its switching state after the set time t .

The relay immediately returns to its original switching state if the temperature reaches the set hysteresis value.

K2 reacts correspondingly at the lower threshold value of ν_2 .

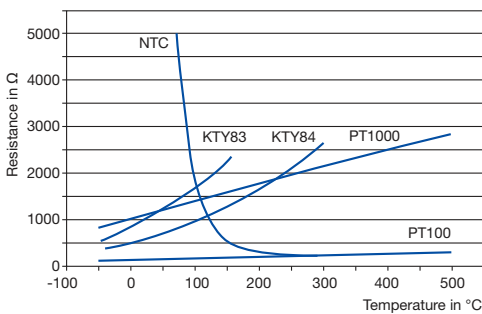
Once the temperature has reached the set threshold of ν_1 , output relay K1 changes its switching state after the set time t has elapsed. (K2 reacts in the same way at ν_2).

The relays return to their original state if the temperature drops below the set hysteresis value and the connection Y1-Y2 is interrupted for a short time.

Digital tripping devices

Once the temperature has reached the set threshold of ν_1 , output relay K1 changes its switching state after the set time delay t has elapsed (K2 reacts in the same way for ν_2).

Characteristic curves of resistance sensors



2CDC 252 076 F0207

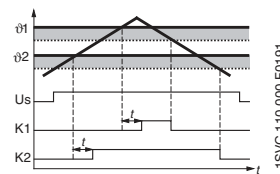
The family is composed of analog adjustable devices with one or two thresholds, and digital devices which are a good alternative especially in the low-end range.

The output relay switches on or off at the thresholds, depending on the configured functionality (open- or closed-circuit principle selectable).

Function diagrams

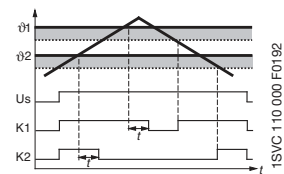
Overtemperature

Open-circuit principle



1SVC 110 000 F0191

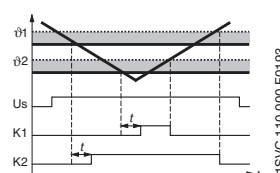
Closed-circuit principle



1SVC 110 000 F0192

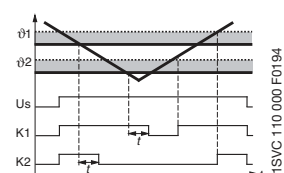
Undertemperature

Open-circuit principle



1SVC 110 000 F0193

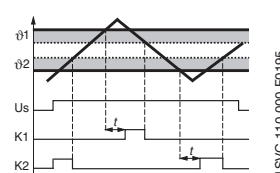
Closed-circuit principle



1SVC 110 000 F0194

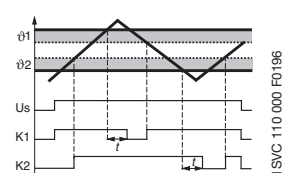
Range monitoring (only digital devices)

Open-circuit principle



1SVC 110 000 F0195

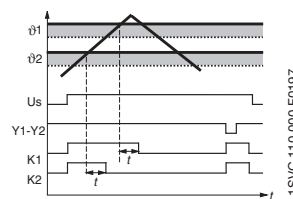
Closed-circuit principle



1SVC 110 000 F0196

Function principle with storage function

using overtemperature with closed-circuit principle as an example



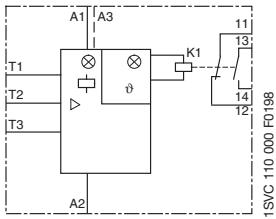
1SVC 110 000 F0197

— absolute limit
 ■ hysteresis
 hysteresis

Temperature monitoring relays C51x range

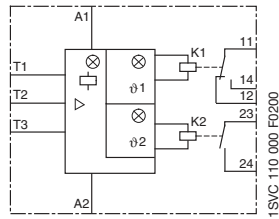
Connection diagrams, connection of resistance thermometer sensors

Connection diagrams



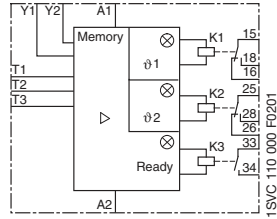
C510

A1/A3-A2 Rated control supply voltage
11-12 Output contacts
13-14
T1-T3 Sensor connection



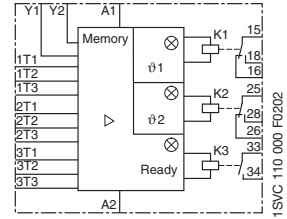
C511

A1-A2 Rated control supply voltage
11-12/14 Output contacts
23-24
T1-T3 Sensor connection



C512

A1-A2 Rated control supply voltage
15-16/18 Output contacts
25-26/28
33-34
T1-T3 Sensor connection
Y1-Y2 Connection for storage bridge



C513

A1-A2 Rated control supply voltage
15-16/18 Output contacts
25-26/28
33-34
1T1-1T3 Sensor connection 1
2T1-2T3 Sensor connection 2
3T1-3T3 Sensor connection 3
Y1-Y2 Connection for storage bridge

Connection of resistance thermometer sensors

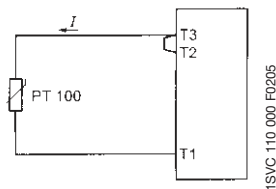
2-wire measurement

When using 2-wire temperature sensors the sensor resistance and the wire resistance are added together.

The resulting systematic errors must be taken into account when adjusting the tripping device.

A jumper must be connected between the terminals T2 and T3.

The following table can be used for PT100 sensors to determine the temperature errors caused by the line length.



ATTENTION!

When using resistance sensors with two-wire connection a bridge must be inserted between terminals T2 and T3.

Error caused by the line

The error resulting from the line resistance amounts to approx. 2.5 Kelvin/Ohm. If the resistance of the line is not known and it is not possible to measure it, the error caused by the line can be estimated using the following table.

Temperature error

(depending on the line length and conductor cross section for PT100 sensors at an ambient temperature of 20 °C, in K)

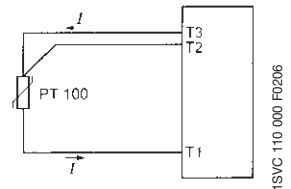
Line length in m	Wire size mm ²			
	0.50	0.75	1	1.5
0	0.0	0.0	0.0	0.0
10	1.8	1.2	0.9	0.6
25	4.5	3.0	2.3	1.5
50	9.0	6.0	4.5	3.0
75	13.6	9.0	6.8	4.5
100	18.1	12.1	9.0	6.0
200	36.3	24.2	18.1	12.1
500	91.6	60.8	45.5	30.2

3-wire measurement

To minimize the influence of the wire resistance, a three-wire connection is usually used.

By means of the additional wire two measuring circuits are created.

One of these two circuits is used for reference. This way, the tripping device can calculate and take into account the wire resistance automatically.



Temperature monitoring relays

C51x range

Technical data

Type		C510	C511	C512	C513
Input circuit					
Rated control supply voltage	A1-A2	24 V AC/DC			-
U _s	A1-A2	230 V AC	24-240 V AC/DC		
	A3-A2	110 V AC	-		
Power consumption	AC	< 4 VA		< 7 VA	
	DC	< 2 W		< 4 W	
Rated control supply voltage U _s tolerance		-15...+10 %			
Rated frequency	AC	50/60 Hz			
Sensor circuit					
Sensor type		PT100		PT100, PT1000, KTY83, KTY84, NTC	
Sensor current	PT100	typ. 1 mA			
	PT1000, KTY83, KTY84, NTC	-		typ. 0.2 mA	
Wire-break detection		no		yes (not for NTC)	
Short-circuit detection		no		yes	
3-wire connection		yes (2-wire connection of sensors with terminals T2 and T3 bridged)			
Measuring circuit					
Setting accuracy at T _s = 20 °C (T ₂₀)		typ. < ± 5 % of full-scale value		< ± 2 K ± 1 digit	
Maximum error within the temperature range		< 2 %		0.05 °C / °C deviation from T ₂₀	
Response time		-		500 ms	
Hysteresis settings	temperature 1	2-20 % of full-scale value		1-99 kelvin	
	temperature 2	-	5 % of full-scale value	1-99 kelvin	
Tripping delay		-		0-999 s	
Output circuit					
Kind of output		1 n/o + 1 n/c	1 c/o + 1 n/o	2 c/o + 1 n/o	2 c/o + 1 n/o
Rated operating current (IEC 60947-1-5)	AC12 (resistive) 230 V				
	AC15 (inductive) 230 V	3 A			
	DC12 (resistive) 24 V	1 A			
	DC13 (inductive) 24 V	0.1 A			
Mechanical lifetime		3 x 10 ⁶ switching cycles		30 x 10 ⁶ switching cycles	
Electrical lifetime (AC15 at 3 A)		0.1 x 10 ⁶ switching cycles			
Short-circuit proof, maximum fuse rating		4 A, operating class gL/gG			
General data					
Dimensions (W x H x D)		22.5 x 101.6 x 86 mm (0.89 x 4 x 3.39 in)		45 x 105.9 x 86 mm (1.77 x 4.17 x 3.39 in)	
Tightening torque		0.8-1.2 Nm			
Mounting position		any			
Degree of protection	enclosure / terminals	IP 40 / IP 20			
Ambient temperature range	operation	-25...+60 °C			
	storage	-40...+80 °C			
Mounting		DIN rail (EN 50022)			
Electrical connection					
Wire size	rigid	1 x 4 mm ² (1 x 12 AWG), 2 x 2.5 mm ² (2 x 14 AWG)			
	fine-strand with wire end ferrule	1 x 2.5 mm ² (1 x 14 AWG), 2 x 1.5 mm ² (2 x 16 AWG)			
Standards					
Environmental conditions		IEC 60721-3-3			
Low Voltage Directive		IEC 60947-5-1, VDE 0660			
Electromagnetic compatibility	Interference immunity	EN 61000-6-2			
	Interference emission	EN 61000-6-4			
Vibration resistance (IEC 68-2-6)		5-26 Hz / 0.75 mm			
Shock resistance (IEC 68-2-27)		15 g / 11 ms			
Isolation data					
Rated insulation voltage		300 V AC			
Pollution degree		3			

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Liquid level relays

CM-ENE MIN, CM-ENE MAX

Ordering details



CM-ENE MIN



CM-ENE MAX

① R: yellow LED - relay status

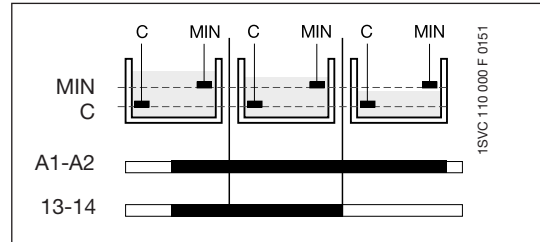
The liquid level relays CM-ENE MIN and CM-ENE MAX are used to monitor levels of conductive liquids, for example in pump control systems for dry-running or overflow monitoring.

The measuring principle is based on the occurring resistance change when moistening single-pole electrodes. The single-pole electrodes (see also section Accessories) are connected to the terminals C and MIN or MAX.

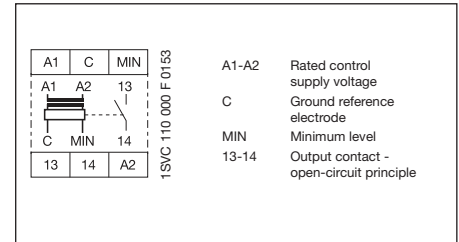
If the supply voltage is applied to A1-A2 and the electrodes are wet, the output relay of the CM-ENE MIN is energized and the output relay of the CM-ENE MAX is de-energized.

The output relay of the CM-ENE MIN de-energizes if the electrodes are no longer wet. The output relay of the CM-ENE MAX energizes if the electrodes are no longer wet.

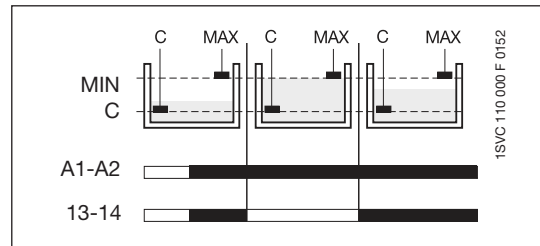
Function diagram CM-ENE MIN



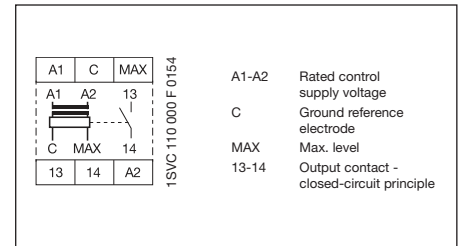
Connection diagram CM-ENE MIN



Function diagram CM-ENE MAX

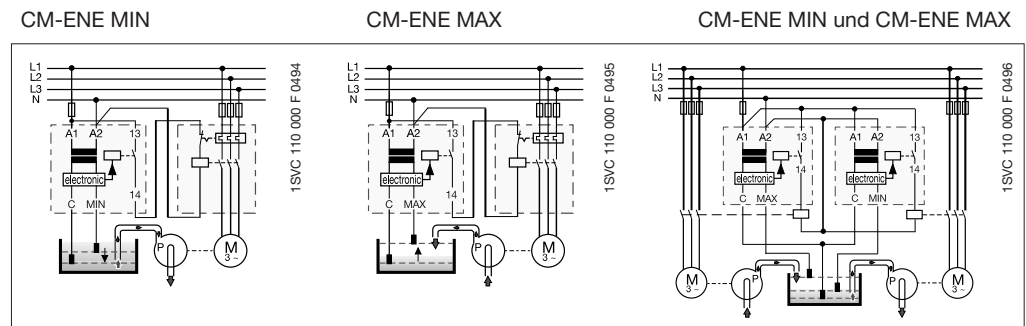


Connection diagram CM-ENE MAX



If a metal tank is used, the ground reference electrode C is not required. In this case the cable can be connected directly to the metal surface of the tank.

Application examples



- Monitoring of pump systems for dry running (ENE MIN) and overflow (ENE MAX)
- Connection of 2 electrodes possible at C and MIN/MAX
- 3 supply voltage versions
- Optimal price/performance ratio
- 1 n/o contact:
Open-circuit principle for CM-ENE MIN
- Closed-circuit principle for CM-ENE MAX
- LED for status indication

Suitable for	Not suitable for
spring water drinking water sea water sewage	chemically pure water fuel oils explosive areas (liquid gas)
acids, bases liquid fertilizers milk, beer, coffee non-concentrated alcohol ...	ethylene glycol concentrated alcohol paraffin lacquers ...

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-ENE MIN	24 V AC	1SVR 550 855 R9500	1		0.15 / 0.33
	110-130 V AC	1SVR 550 850 R9500	1		0.15 / 0.33
	220-240 V AC	1SVR 550 851 R9500	1		0.15 / 0.33
CM-ENE MAX	24 V AC	1SVR 550 855 R9400	1		0.15 / 0.33
	110-130 V AC	1SVR 550 850 R9400	1		0.15 / 0.33
	220-240 V AC	1SVR 550 851 R9400	1		0.15 / 0.33

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Liquid level relays

CM-ENS

Ordering details

1SVR 430 851 F 1100



CM-ENS

- ① "Sens." - sensitivity potentiometer for adjusting the response sensitivity
- ② R: yellow LED - relay status
- ③ U: green LED - control supply voltage
- ④ Marker label

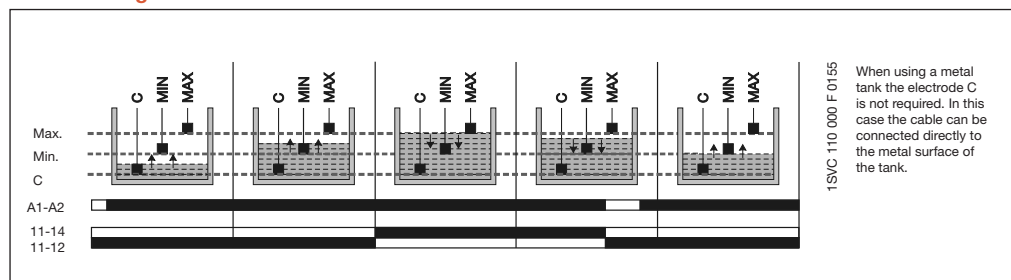
The CM-ENS monitors levels of conductive liquids and is used for example for liquid level control in pump systems. It can be used for filling or draining tanks for example.

It is also suitable for monitoring the conductivity of liquids. The measuring principle is based on the resistance change sensed by single-pole electrodes. After the supply voltage is applied to the terminals A1 and A2, the output relay is de-energized. The probes must be connected to C, MAX, MIN.

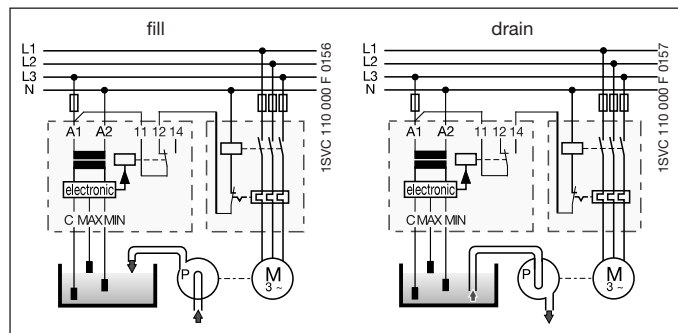
The output relay energizes if the liquid exceeds the maximum level (C and MAX wet) and de-energizes if the liquid level is below the minimum level (MAX and MIN dry).

Based on the measuring circuit there will be a response delay of approx. 250 ms at maximum sensitivity. Different levels in one tank can be controlled by up to 5 CM-ENS without interfering with each other.

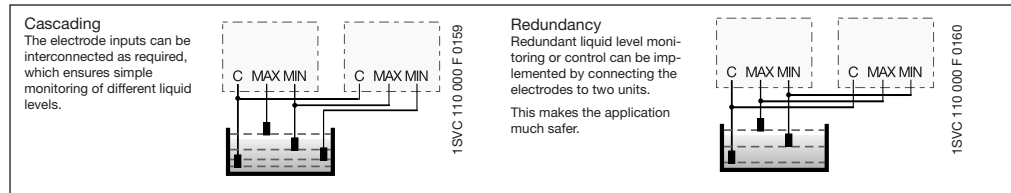
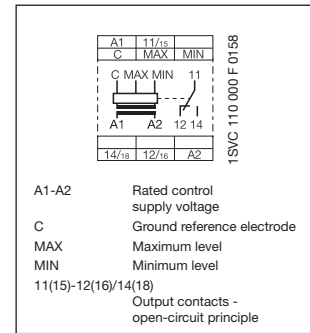
Function diagram CM-ENS



Application examples



Connection diagram CM-ENS



- Monitoring and control of liquid levels (when draining or filling liquids in tanks)
- Monitoring and control of mixture ratios (conductivity of liquids)
- Adjustable response sensitivity 5-100 kΩ
- 4 supply voltage versions 24 - 415 V AC
- Version with safe isolation acc. to VDE 0160
- Cascadable
- 1 c/o contact or 1 n/o and 1 n/c contact
- 2 LEDs for status indication

Suitable for

spring water
drinking water
sea water
sewage

acids, bases
liquid fertilizers
milk, beer, coffee
non-concentrated alcohol
...

Not suitable for

chemically pure water
fuel
oils
explosive areas (liquid gas)

ethylene glycol
concentrated alcohol
paraffin
lacquers
...

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-ENS	24 V AC	1SVR 430 851 R9100	1		0.15 / 0.33
	110-130 V AC	1SVR 430 851 R0100	1		0.15 / 0.33
	220-240 V AC	1SVR 430 851 R1100	1		0.15 / 0.33
	380-415 V AC	1SVR 430 851 R2100	1		0.15 / 0.33

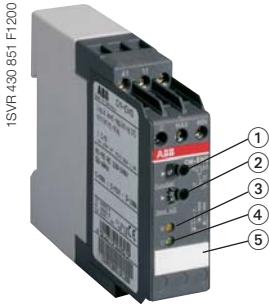
Version with safety isolation acc. to VDE 0160, 1 n/o, 1 n/c

CM-ENS	220-240 V AC	1SVR 430 851 R1300	1		0.15 / 0.33
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- Accessories 129 and 146
- Technical data 131
- Technical diagrams 144
- Dimensional drawings 145

Liquid level relays CM-ENS UP/DOWN

Ordering details



CM-ENS UP/DOWN

- ① "Func." - function selector switch:
"UP" - fill
"DOWN" - drain
- ② "Sens." - sensitivity potentiometer for adjusting the response sensitivity
- ③ R: yellow LED - relay status
- ④ U: green LED - control supply voltage
- ⑤ Marker label

The CM-ENS UP/DOWN monitors levels of conductive liquids and other media, and is used e.g. for liquid level control in pump systems.

The measuring principle is based on the resistance change sensed by single-pole electrodes.

The output relay functions fill (UP) or drain (DOWN) can be selected on a front-face selector switch.

If the "UP" function is selected, the output relay is energized until the MAX electrode becomes wet.

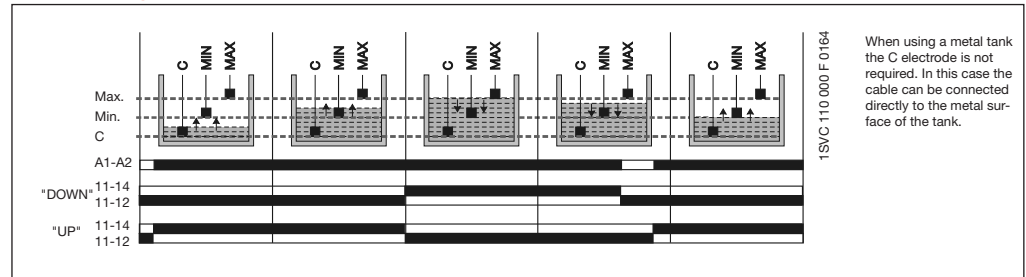
Then it is de-energized and not re-energized until the MIN electrode becomes dry.

If the "DOWN" function is selected, the output relay is energized as soon as the MAX electrode becomes wet.

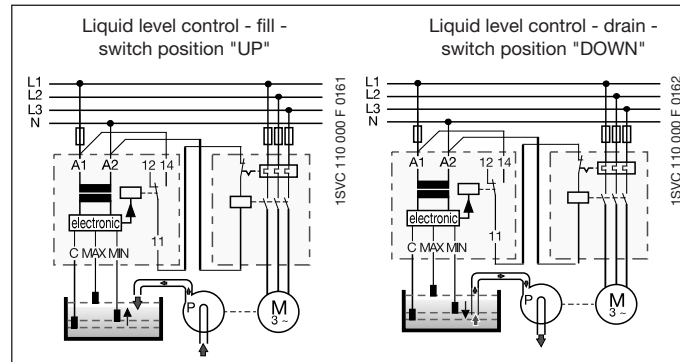
It remains energized until the liquid level has dropped below the MIN electrode.

The electrodes can be connected to more than one CM-ENS unit without interference.

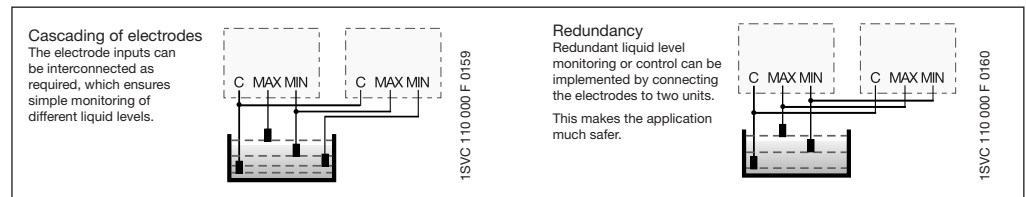
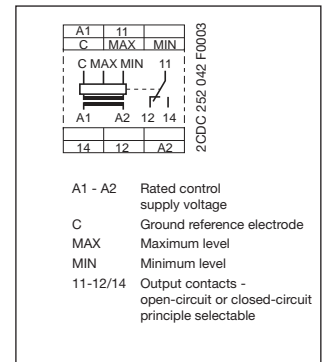
Function diagram CM-ENS UP/DOWN



Application examples



Connection diagram CM-ENS UP/DOWN



Suitable for		Not suitable for	
spring water	acids, bases	chemically pure water	ethylene glycol
drinking water	liquid fertilizers	fuel	concentrated alcohol
sea water	milk, beer, coffee	oils	paraffin
sewage	non-concentrated alcohol	explosive areas (liquid gas)	lacquers

- Monitoring and control of liquid levels
- Selectable function "fill" or "drain"
- Adjustable response sensitivity 5-100 kΩ
- Cascadable
- 1 c/o contact
- 2 LEDs for status indication

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-ENS UP/DOWN	24 V AC	1SVR 430 851 R9200	1		0.15/0.33
	110-130 V AC	1SVR 430 851 R0200	1		0.15/0.33
	220-240 V AC	1SVR 430 851 R1200	1		0.15/0.33

• Accessories 129 nd 146	• Technical data 131
• Technical diagrams 144	• Dimensional drawings 145

Liquid level relays

CM-ENN

Ordering details

1SVR 450 055 F0000



CM-ENN

- ① "Function" - time function selector switch:
 ON-delay
 OFF-delay
- ② "Sens.-sector" - measuring range selector switch
- ③ "Sens." - sensitivity potentiometer for adjusting the response sensitivity
- ④ "Time value" - fine adjustment of time delay
- ⑤ R: yellow LED - relay status
- ⑥ U: green LED - control supply voltage
- ⑦ Marker label

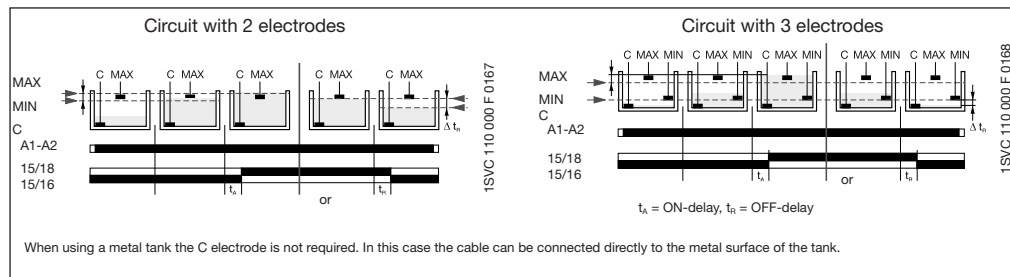
- Monitoring and control of liquid levels (when emptying or filling liquids in tanks)
- Monitoring and control of mixture ratios (conductivity of liquids)
- 3 response sensitivities from 250 Ω - 500 kΩ in one unit
- 5 supply voltage versions 24 V AC/DC - 415 V AC
- Selectable ON- or OFF-delay 0.1-10 s
- 2 c/o contacts
- 2 LEDs for status indication

The CM-ENN monitors levels of conductive liquids and is used for example for liquid level monitoring in pump control systems, for dry-running protection of submersible pumps or overflow monitoring of tanks. It is also suitable for conductivity monitoring of liquids.

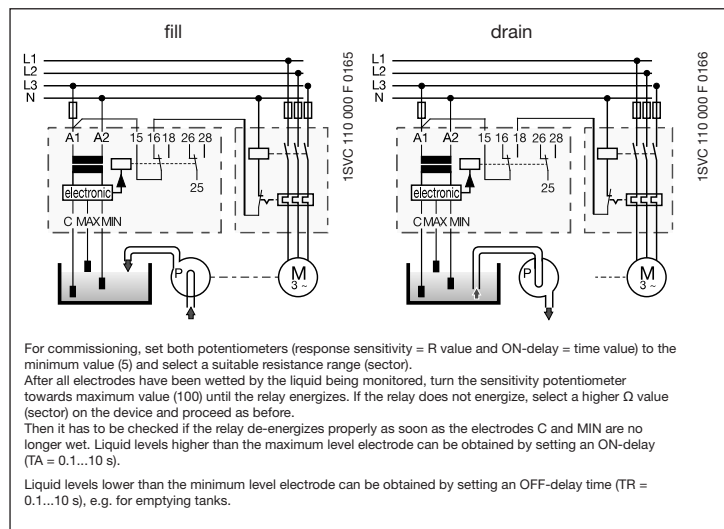
The measuring principle is based on the resistance change sensed by single-pole electrodes (wet or dry). Instead of electrodes, other sensors or transducers can also be used if their output quantities are different resistance values. The measuring, output and supply circuits are electrically isolated for potential separation and to prevent electrical interference.

Due to the integrated ON- or OFF-delay, it is possible to set up time-dependent liquid controls using only two electrodes (C, MAX). Different liquid levels in one tank can be controlled by up to 5 CM-ENN (AC version) without mutual interference.

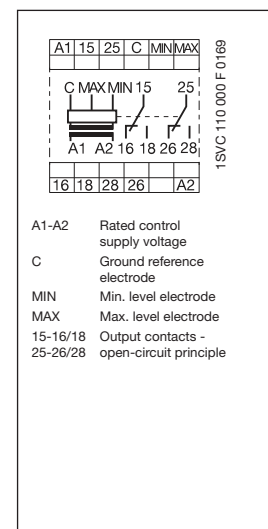
Function diagrams CM-ENN



Application examples



Connection diagram CM-ENN



Typ	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-ENN	24-240 V AC/DC	1SVR 450 055 R0000	1		0.30 / 0.66
	24 V AC	1SVR 450 059 R0000	1		0.30 / 0.66
	110-130 V AC	1SVR 450 050 R0000	1		0.30 / 0.66
	220-240 V AC	1SVR 450 051 R0000	1		0.30 / 0.66
	380-415 V AC	1SVR 450 052 R0000	1		0.30 / 0.66

Response sensitivity	Max. electrode current	Max. cable capacity	Max. cable length
250 Ω - 5 kΩ	8 mA	200 nF	1000 m
2.5-50 kΩ	2 mA	20 nF	100 m
25-500 kΩ	0.5 mA	4 nF	20 m

• Accessories 129 and 146	• Technical data 132
• Technical diagrams 144	• Dimensional drawings 145

Liquid level relays - Liquid level control with two alarm outputs - CM-ENN UP/DOWN

Ordering details

2



CM-ENN UP/DOWN

- ① "Func." - function selector switch:
"UP" - fill
"DOWN" - drain
- ② "Sens." - sensitivity potentiometer for adjusting the response sensitivity
- ③ R AL1: yellow LED - relay status AL1
- ④ R AL2: yellow LED - relay status AL2
- ⑤ R: MIN/MAX: yellow LED - relay status MIN/MAX
- ⑥ U: green LED - control supply voltage
- ⑦ Marker label

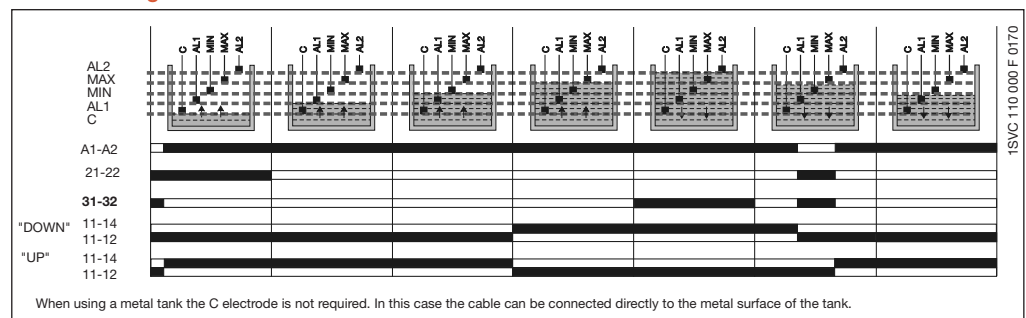
- Liquid level relay with 5 electrode inputs
- Level control with integrated overflow and dry-running protection
- Adjustable response sensitivity 5-100 kΩ
- Cascadable
- 1 c/o contact and 2 n/c contacts as alarm outputs
- 4 LEDs for status indication

The CM-ENN UP/DOWN monitors levels of conductive liquids and media and is used e.g. for liquid level control in pump systems. The measuring principle is based on the resistance change sensed by single-pole electrodes.

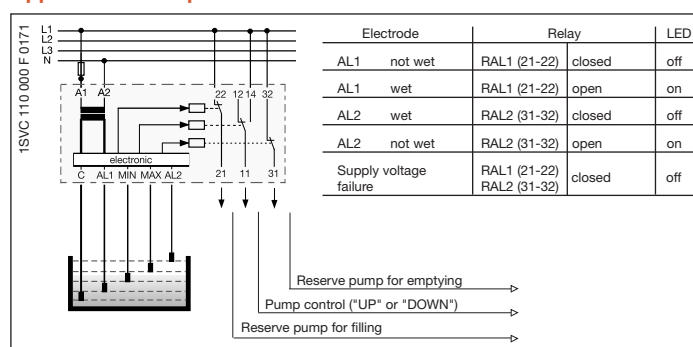
The function of the output relay 11-12/14 can be selected by a selector switch on the front of the unit to fill "UP" or drain "DOWN". If the "UP" function is selected, the output relay is energized until the MAX electrode becomes wet. Then it is de-energized and not re-energized until the MIN electrode becomes dry. If the "DOWN" function is selected, the output relay is energized as soon as the MAX electrode becomes wet. It remains energized until the liquid level has dropped below the MIN electrode.

The electrode inputs AL1 and AL2 energize/de-energize the corresponding output relays RAL1 (21-22) and RAL2 (31-32). AL1 opens if contact RAL1 (21-22) is wet. AL2 closes if contact RAL2 (31-32) is wet. This way, two additional alarm outputs for exceeding or dropping below the normal level can be implemented in addition to the filling levels MAX and MIN.

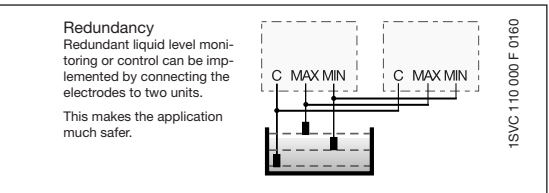
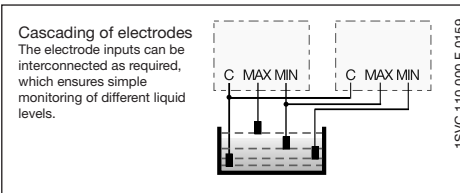
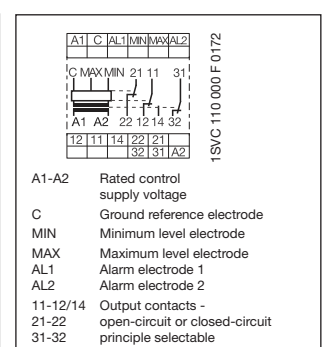
Function diagram CM-ENN UP/DOWN



Application example



Connection diagram CM-ENN UP/DOWN



Suitable for	Not suitable for
spring water drinking water sea water sewage	chemically pure water fuel oils explosive areas (liquid gas)
acids, bases liquid fertilizers milk, beer, coffee non-concentrated alcohol ...	ethylene glycol concentrated alcohol paraffin lacquers ...

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-ENN UP/DOWN	24 V AC	1SVR 450 059 R0100	1		0.15 / 0.33
	110-130 V AC	1SVR 450 050 R0100	1		0.15 / 0.33
	220-240 V AC	1SVR 450 051 R0100	1		0.15 / 0.33
	380-415 V AC	1SVR 450 052 R0100	1		0.15 / 0.33

• Accessories 129 and 146	• Technical data 132	• Technical diagrams 145
• Dimensional drawings 145		

Liquid level relays - Accessories

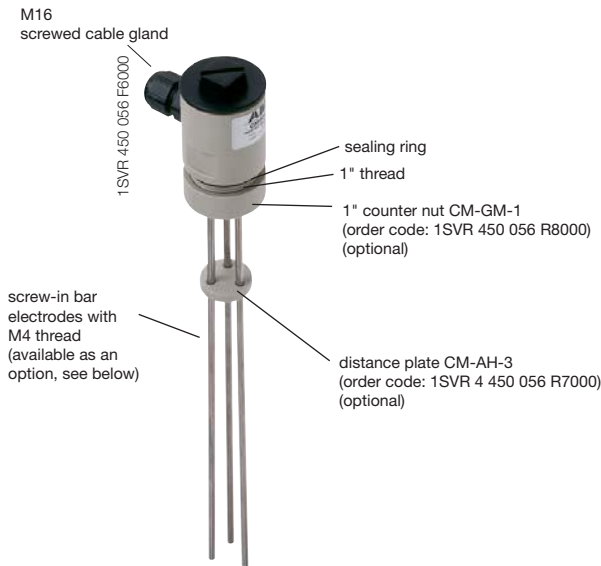
Electrodes

Ordering details, dimensional drawings

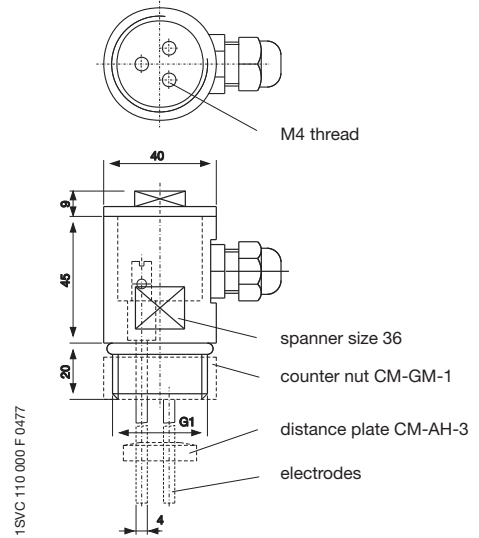
Compact support CM-KH-3 for 3 bar electrodes

Dimensions in mm

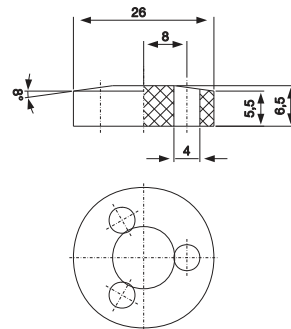
- Ideally suited for use with liquid level relays CM-ENS and CM-ENN
- Wire connection by screw terminals
- Pull relief by M16 screwed cable glands
- Temperature range up to 90 °C
- Food safe material (PPH)
- Screw-in electrodes (M4 thread)
- Distance plate (CM-AH-3) and locking nut (CM-GM-1) optionally available as an accessory



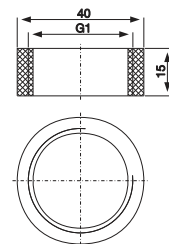
Compact support CM-KH-3



Distance plate CM-AH-3



Counter nut CM-GM-1

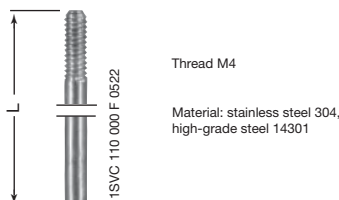


Technical data compact support

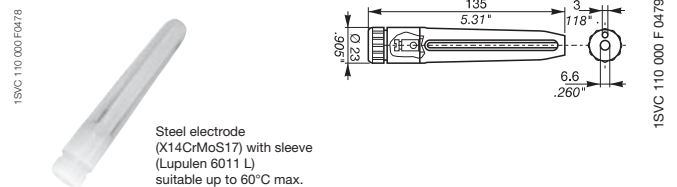
Type of mounting: G 1" thread
 Mounting position: any
 Enclosure material: PPH
 Sealing: NBR 70
 Temperature range: 90 °C max.
 Pressure: 10 bar max. (60 °C)

Type	Description	Order code	Pack. unit	Price 1 piece	Weight 1 piece kg / lb
CM-KH-3	Compact support for 3 bar electrodes	1SVR 450 056 R6000	1		0.06 / 0.132
CM-AH-3	Distance plate for 3 bar electrodes	1SVR 450 056 R7000	1		0.06 / 0.132
CM-GM-1	Counter nut for 1" thread	1SVR 450 056 R8000	1		0.06 / 0.132

Screw-in bar electrodes for compact support CM-KH-3



Suspension electrode CM-HE



During project engineering the compatibility of the electrode material with the medium to be supervised is to be examined!

Type	Length	Order code	Pack. unit	Price 1 piece	Weight 1 piece kg / lb
CM-SE-300	300 mm	1SVR 450 056 R0000	1		0.08 / 0.176
CM-SE-600	600 mm	1SVR 450 056 R0100	1		0.08 / 0.176
CM-SE-1000	1000 mm	1SVR 450 056 R0200	1		0.08 / 0.176
CM-HE	-	1SVR 402 902 R0000	1		0.08 / 0.176

Liquid level relays

CM-ENE MIN, CM-ENE MAX

Technical data

Type	CM-ENE MIN	CM-ENE MAX
Supply circuit		
Rated control supply voltage U_s - power consumption	A1-A2 A1-A2 A1-A2	24 V AC 110-130 V AC 220-240 V AC
Rated control supply voltage U_s tolerance		approx. 1.5 VA approx. 1.2 VA approx. 1.4 VA
Rated frequency		-15...+15 %
Duty time		50-60 Hz 100 %
Measuring circuit		
Monitoring function		MIN-C, MAX-C dry-running protection overflow protection
Response sensitivity		0-100 k Ω , not adjustable
Maximum electrode voltage		30 V AC
Maximum electrode current		1.5 mA
Electrode supply line	max. cable capacity max. cable length	3 nF 30 m
Timing circuit		
Time delay		-
Tripping delay		fixed approx. 200 ms
Indication of operational states		
Output relay energized		R: yellow LED
Output circuits		
Kind of output		13-14 1 n/o contact
Operational principle ¹⁾		open-circuit principle closed-circuit principle
Contact material		AgCdo
Rated voltage (VDE 0110, IEC 60947-1)		250 V
Minimum switching voltage / minimum switching current		- / -
Maximum switching voltage		250 V
Rated operational current (IEC 60947-5-1)	AC12 (resistive) 230 V AC15 (inductive) 230 V DC12 (resistive) 24 V DC13 (inductive) 24 V	4 A 3 A 4 A 2 A
AC rating (UL 508)	Utilization category (Control Circuit Rating Code) max. rated operational voltage max. continuous thermal current at B 300 max. making/breaking apparent power at B 300	B 300 300 V AC 5 A 3600/360 VA
Mechanical lifetime		30 x 10 ⁶ switching cycles
Electrical lifetime (AC12, 230 V, 4 A)		0.3 x 10 ⁶ switching cycles
Short-circuit proof, maximum fuse rating	n/c contact n/o contact	- 10 A fast-acting
General data		
Dimensions (W x H x D)		22.5 x 78 x 78.5 mm (0.89 x 3.07 x 3.09 in)
Mounting position		any
Degree of protection	enclosure / terminals	IP50 / IP20
Ambient temperature range	operation / storage	-20...+60 °C / -40...+85 °C
Mounting		DIN rail (EN 50022)
Electrical connection		
Wire size	fine-strand with wire-end ferrule fine-strand without wire-end ferrule rigid	2 x 0.75-1.5 mm ² (2 x 18-16 AWG) 2 x 1-1.5 mm ² (2 x 18-16 AWG) 2 x 0.75-1.5 mm ² (2 x 18-16 AWG)
Stripping length		10 mm (0.39 inch)
Tightening torque		0.6-0.8 Nm
Standards		
Product standard		IEC 255-6, EN 60255-6
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
Electromagnetic compatibility		EN 61000-6-2, EN 61000-6-4
electrostatic discharge (ESD)	acc. to IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)
electromagnetic field (HF radiation resistance)	acc. to IEC/EN 61000-4-3	Level 3 (10 V/m)
fast transients (Burst)	acc. to IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)
powerful impulses (Surge)	acc. to IEC 1000-4-5, EN 61000-4-5	Level 4 (2 kV L-L)
HF line emission	acc. to IEC 1000-4-6, EN 61000-4-6	Level 3 (10 V)
Resistance to vibration (IEC 68-2-6)		6 g
Mechanical resistance (IEC 68-2-6)		10 g
Isolation data		
Rat. insulation volt. betw. supply, meas. & output circuit (VDE 0110, IEC 60947)		250 V
Rated impulse withstand voltage between all isolated circuits (VDE 0110, IEC 664)		4 kV / 1.2-50 μ s
Test voltage between all isolated circuits		2.5 kV, 50 Hz, 1 min.
Pollution category (VDE 0110, IEC 664, IEC 255-5)		3 / C
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)		III / C
Environmental testing (IEC 68-2-30)		24 h cycle time, 55 °C, 93 % rel., 96 h

¹⁾ Open-circuit principle: Output relay energizes if the measured value exceeds/drops below the adjusted threshold.
Closed-circuit principle: Output relay de-energizes if the measured value exceeds/drops below the adjusted threshold.

Liquid level relays

CM-ENS, CM-ENS UP/DOWN

Technical data

Type		CM-ENS	CM-ENS UP/DOWN
Supply circuit			
Rated control supply voltage U_s - power consumption	A1-A2	24 V AC	24 V AC
	A1-A2	110-130 V AC approx. 1.5 VA	110-130 V AC approx. 4 VA
	A1-A2	220-240 V AC approx. 1.5 VA	220-240 V AC approx. 4 VA
	A1-A2	380-415 V AC approx. 1.5 VA	
Rated control supply voltage U_s tolerance		-15...+10 %	
Rated frequency		50-60 Hz	
Duty time		100 %	
Measuring circuit			
Monitoring function		MAX-MIN-C	
Response sensitivity		liquid level control	
Maximum electrode voltage		5-100 k Ω , adjustable	
Maximum electrode current		30 V AC	
Electrode supply line	max. cable capacity	1 mA	
	max. cable length	10 nF	
		100 m	
Timing circuit			
Time delay		-	
Tripping delay		approx. 250 ms	
Indication of operational states			
Control supply voltage		U: green LED	
Output relay energized		R MAX/MIN: yellow LED	
Alarm relay AL1		-	R AL1: yellow LED
Alarm relay AL2		-	R AL2: yellow LED
Output circuits			
		11-12/14, 21-22, 31-32	
Kind of output		1 c/o contact, 1 n/o + 1 n/c contact ²⁾	
Operational principle ¹⁾		open-circuit principle	open- and closed-circuit principle
Contact material		AgCdo	
Rated voltage (VDE 0110, IEC 60947-1)		250 V	
Minimum switching voltage / minimum switching current		- / -	
Maximum switching voltage		250 V	
Rated operational current (IEC 60947-5-1)	AC12 (resistive) 230 V	4 A	
	AC15 (inductive) 230 V	3 A	
	DC12 (resistive) 24 V	4 A	
	DC13 (inductive) 24 V	2 A	
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300	
	max. rated operational voltage	300 V AC	
	max. continuous thermal current at B 300	5 A	
	max. making/breaking apparent power at B 300	3600/360 VA	
Mechanical lifetime		30 x 10 ⁶ switching cycles	
Electrical lifetime (AC12, 230 V, 4 A)		0.3 x 10 ⁶ switching cycles	
Short-circuit proof, maximum fuse rating	n/c / n/o contact	10 A (4 A ²⁾ fast-act. / 10 A (6 A ²⁾ fast-act.	10 A fast-acting / 10 A fast-acting
General data			
Dimensions (W X H X D)		22.5 x 70 x 100 mm (0.89 x 3.07 x 3.94 in)	
Mounting position		any	
Degree of protection	enclosure / terminals	IP50 / IP20	
Ambient temperature range	operation / storage	-20...+60 °C / -40...+85 °C	
Mounting		DIN rail (EN50022)	
Electrical connection			
Wire size	fine-strand with wire end ferrule	2 x 2.5 mm ² (2 x 14 AWG)	
Standards			
Product standard		IEC 255-6, EN 60255-6	
Low Voltage Directive		2006/95/EG	
EMC Directive		2004/108/EG	
Electromagnetic compatibility		-	
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)	
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)	
powerful impulses (Surge)	IEC 1000-4-5, EN 61000-4-5	Level 4 (2 kV L-L)	
HF line emission	IEC 1000-4-6, EN 61000-4-6	Level 3 (10 V)	
Resistance to vibration (IEC 68-2-6)		4 g	
Mechanical resistance (IEC 68-2-6)		6 g	
Isolation data			
Rated insulation voltage between supply, measuring and output circuit (VDE 0110, IEC 60947)		250 V	
Rated impulse withstand voltage between all isolated circuits (VDE 0110, IEC 664)		4 kV / 1.2 - 50 μ s	
Test voltage between all isolated circuits		2.5 kV, 50 Hz, 1 min.	
Pollution category (VDE 0110, IEC 664, IEC 255-5)		3 / C	
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)		III / C	
Environmental testing (IEC 68-2-30)		24 h cycle time, 55 °C, 93 % rel., 96 h	

¹⁾ Open-circuit principle: Output relay energizes if the measured value exceeds/drops below the adjusted threshold.

²⁾ Closed-circuit principle: Output relay de-energizes if the measured value exceeds/drops below the adjusted threshold.

²⁾ 1SVR 430 851 R1300 (version with safe isolation)

• Approvals62



Liquid level relays

CM-ENN UP/DOWN, CM-ENN

Technical data

Type	CM-ENN UP/DOWN		CM-ENN	
Supply circuit				
Rated control supply voltage U_s - power consumption	A1-A2	24 V AC	24 V AC	
	A1-A2	110-130 V AC approx. 1.5 VA	110-130 V AC approx. 2.5 VA	
	A1-A2	220-240 V AC approx. 1.5 VA	220-240 V AC approx. 3 VA	
	A1-A2	380-415 V AC approx. 1.5 VA	380-415 V AC approx. 4 VA	
	A1-A2		24-240 V AC/DC approx. 2 VA/W	
Rated control supply voltage U_s tolerance			-15...+10 %	
Rated frequency		50-60 Hz	50-60 Hz oder DC	
Duty time			100 %	
Measuring circuit				
MAX-MIN-C				
Monitoring function			liquid level control	
Response sensitivity		adjustable 5-100 k Ω	adjustable 250 Ω - 5 k Ω	adjustable 2.5-50 k Ω 25-500 k Ω
Maximum electrode voltage		30 V AC	20 V AC	
Maximum electrode current		1 mA	8 mA	2 mA 0.5 mA
Electrode supply line	max. cable capacity	10 nF	200 nF	20 nF 4 nF
	max. cable length	100 m	1000 m	100 m 20 m
Timing circuit				
Time delay		-	0.1-10 s, adjustable, ON- or OFF-delay	
Tripping delay		approx. 250 ms	-	
Indication of operational states				
Control supply voltage			U: green LED	
Output relay energized		R MAX/MIN: yellow LED	R: yellow LED	
Output circuits				
Kind of output		11-12/14, 21-22, 31-32	15-16/18, 25-26/28	
Operational principle ¹⁾		1 c/o + 2 n/c contacts open-circuit principle	2 c/o contacts open- and closed-circuit principle	
Contact material			AgCdo	
Rated voltage (VDE 0110, IEC 60947-1)		250 V	400 V	
Minimum switching voltage / minimum switching current			- / -	
Maximum switching voltage		250 V	400 V	
Rated operational current (IEC 60947-5-1)	AC12 (resistive) 230 V	4 A	5 A	
	AC15 (inductive) 230 V		3 A	
	DC12 (resistive) 24 V	4 A	5 A	
	DC13 (inductive) 24 V	2 A	2.5 A	
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)		B 300	
	max. rated operational voltage		300 V AC	
	max. continuous thermal current at B 300		5 A	
	max. making/breaking apparent power at B 300		3600/360 VA	
Mechanical lifetime			30 x 10 ⁶ switching cycles	
Electrical lifetime (AC12, 230 V, 4 A)		0.3 x 10 ⁶ switching cycles	0.1 x 10 ⁶ switching cycles	
Short-circuit proof, maximum fuse rating	n/c / n/o contact		4 A fast-acting / 6 A fast-acting	
General data				
Dimensions (W X H X D)		45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in)		
Mounting position		any		
Degree of protection	enclosure / terminals	IP50 / IP20		
Ambient temperature range	operation / storage	-25...+65 °C / -40...+85 °C		
Mounting		DIN rail (EN50022)		
Electrical connection				
Wire size	fine-strand with wire end ferrule	2 x 2.5 mm ² (2 x 14 AWG)		
Standards				
Product standard		IEC 255-6, EN 60255-6		
Low Voltage Directive		2006/95/EG		
EMC Directive		2004/108/EG		
Electromagnetic compatibility		-		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8kV)		
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)		
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)		
powerful impulses (Surge)	IEC 1000-4-5, EN 61000-4-5	Level 4 (2 kV L-L)		
HF line emission	IEC 1000-4-6, EN 61000-4-6	Level 3 (10 V)		
Resistance to vibration (IEC 68-2-6)		5 g		
Mechanical resistance (IEC 68-2-6)		10 g		
Isolation data				
Rated insulation voltage between supply, measuring and output circuit (VDE 0110, IEC 60947)		250 V	500 V	
Rated impulse withstand voltage between all isolated circuits (VDE 0110, IEC 664)		4 kV / 1.2 - 50 μ s		
Test voltage between all isolated circuits		2.5 kV, 50 Hz, 1 min.		
Pollution category (VDE 0110, IEC 664, IEC 255-5)		3 / C		
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)		III / C		
Environmental testing (IEC 68-2-30)		24 h cycle time, 55 °C, 93 % rel., 96 h		

¹⁾ Open-circuit principle: Output relay energizes if the measured value exceeds/drops below the adjusted threshold.
Closed-circuit principle: Output relay de-energizes if the measured value exceeds/drops below the adjusted threshold.

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Contact protection relays

Sensor interface relay

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Contact protection relay CM-KRN

Ordering details

2



CM-KRN

- ① Time range selector switch
- ② Response (ON-)delay
- ③ U: green LED - control supply voltage
- ④ R: yellow LED - relay status
- ⑤ Marker label

- Protects and reduces load from sensitive control contacts
- Adjustable ON-delay 0.05-30 s
- Acts as two-position switch
- Stores switch positions
- Electrically isolated circuits
- 2 c/o contacts
- 2 LEDs for status indication

The CM-KRN protects sensitive control contacts from excessive load. It can be used with latching function or without. Bounce time of control contacts can be bypassed by the adjustable response delay time.

Use for contact protection

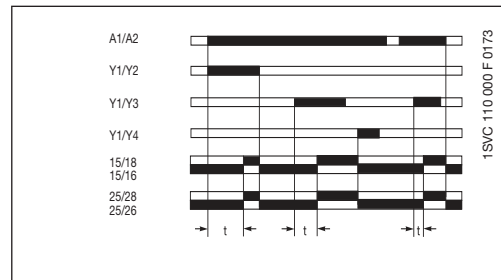
The contact to be protected is connected to terminals Y1 and Y2.

Use for contact protection with latching capacity

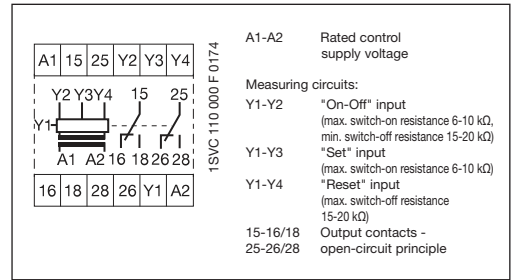
The output relay energizes after contact Y1-Y3 has been closed for at least 20 ms. It remains energized until contact Y1-Y4 closes. The switching positions are stored.

The relay is suitable for load reduction purposes for devices with minimum and maximum contacts. The CM-KRN can be operated via 3-wire proximity sensors for switching of higher power. The supply circuit, the control circuit and the output circuit are electrically isolated against each other.

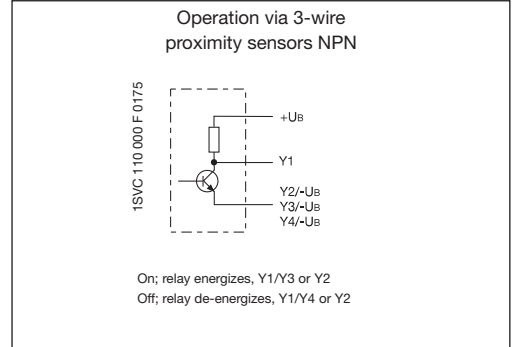
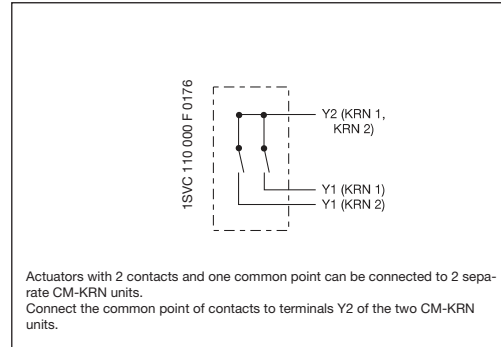
Function diagram CM-KRN



Connection diagram CM-KRN



Use, applications



Type	Rated control supply voltage 50-60 Hz	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
------	------------------------------------------	------------	-------------------	---------------	------------------------

with timing circuit 0.05-30 s

CM-KRN	24 V AC	1SVR 450 089 R0000	1		0.30 / 0.66
	110-130 V AC	1SVR 450 080 R0000	1		0.30 / 0.66
	220-240 V AC	1SVR 450 081 R0000	1		0.30 / 0.66
	380-415 V AC	1SVR 450 082 R0000	1		0.30 / 0.66

without timing circuit

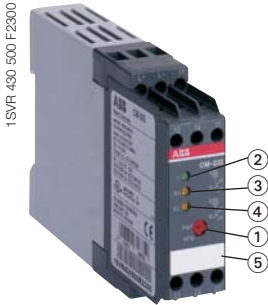
CM-KRN	24 V AC	1SVR 450 099 R0000	1		0.30 / 0.66
	110-130 V AC	1SVR 450 090 R0000	1		0.30 / 0.66
	220-240 V AC	1SVR 450 091 R0000	1		0.30 / 0.66
	24 V AC/DC ¹⁾	1SVR 450 099 R1000	1		0.30 / 0.66

¹⁾ not electrically isolated

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Sensor interface relay CM-SIS

Ordering details



CM-SIS

- ① Rotary switch for sensor type selection
- ② U: green LED - control supply voltage
- ③ R1: red LED - relay status R1
- ④ R2: red LED - relay status R2
- ⑤ Marker label

The CM-SIS is used to supply 2- or 3-wire NPN or PNP sensors with power and to evaluate their switching signals. Two sensors of the types NPN or PNP can be connected simultaneously. Selection is done via the front-face rotary switch.

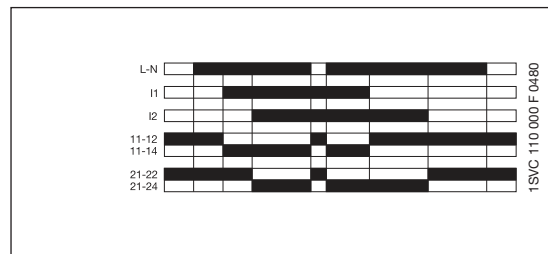
The CM-SIS (terminals L+, L-) supplies the connected sensors with voltage (24 V DC), the maximum power supply current is 0.5 A. The supply voltage and the sensor inputs are electrically isolated from the supply circuit. To ensure maximum safety when using these sensors, the principle of safe isolation has been included.

Each sensor input signal energizes the corresponding output relay without delay. The relay is energized as soon as a threshold current is exceeded at input I1 or I2. Sensor leakage currents of up to 8 mA don't affect the evaluation. The threshold value is about 9 mA. If the threshold value at input I1 or I2 is exceeded the corresponding relay R1 or R2 energizes and the corresponding LED lights up.

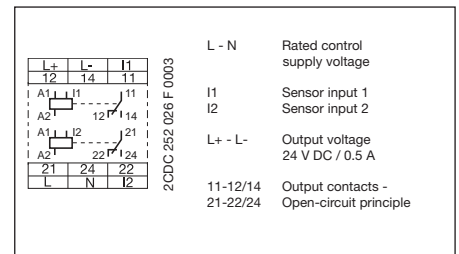
The wide-range supply voltage input of CM-SIS allows its application in nearly all supply systems.

The CM-SIS is also suitable for other applications, for example it is also possible to connect PTC or NTC resistors instead of PNP or NPN sensors or to operate the SIS directly by switching contacts.

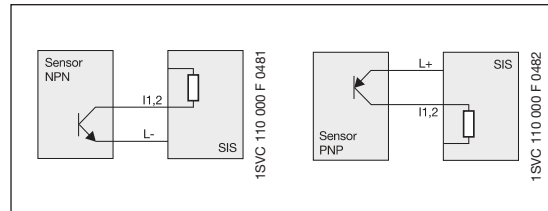
Function diagram CM-SIS



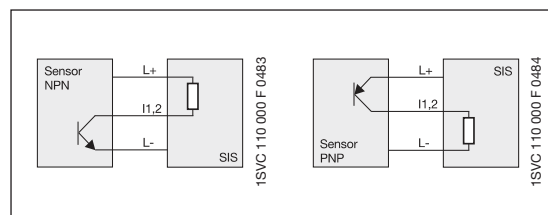
Connection diagram CM-SIS



Connection of 2-wire sensors



Connection of 3-wire sensors



- High efficiency
- Low heating
- Wide range of supply voltage
- Constant output voltage 24 V DC
- Safe isolation acc. to EN 50178 (VDE 0160)
- Short-circuit and overload proof
- Input protected by internal fuse
- 2 x 1 c/o contact
- 3 LEDs for status indication



Type	Rated control supply voltage 50-60 Hz	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-SIS	110-240 V AC / 105-260 V DC	1SVR 430 500 R2300	1		0.22 / 0.48

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Contact protection relay

CM-KRN

Technical data




Type	CM-KRN	
Supply circuit	A1-A2	
Rated control supply voltage U_s - power consumption	A1-A2	24 V AC - approx. 3.5 VA
	A1-A2	24 V AC/DC - approx. 3.5 VA
	A1-A2	110-130 V AC - approx. 3,5 VA
	A1-A2	220-240 V AC - approx. 3.5 VA
	A1-A2	380-415 V AC - approx. 3.5 VA
Rated control supply voltage U_s tolerance		-15...+10 %
Rated frequency		50-60 Hz
Duty time		100 %
Timing circuit		
ON-delay time		0.05-1 s, 1.5-30 s
OFF-delay time		max. 50 ms
Measuring circuit / contact circuit	Y1-Y2/Y3/Y4	
Measuring input	contact protection without latching	Y1-Y2
	contact protection with latching	Y1-Y3/Y4
Threshold	Y1-Y2/Y3	6-10 k Ω
Threshold-Hysteresis	Y1-Y2/Y4	15-20 k Ω
No-load voltage at the measuring input		\leq 10 V DC
Contact time for latching (CM-KRN without timing circuit)		min. 20 ms
Switching current at the measuring input		3 mA
Maximum applied voltage at the measuring input		\leq \pm 30 V (contact voltage)
Indication of operational states		
Control supply voltage	U: green LED	 : control supply voltage applied
Relay status	R: yellow LED	 : output relay energized
Output circuit	15-16/18, 25-26/28	
Kind of output		relay, 2 c/o contacts
Operating principle ¹⁾		open-circuit principle
Rated operating voltage (VDE 0110, IEC 60947-5-1)		400 V
Rated switching voltage		400 V AC
Rated operational current (IEC 60974-5-1)	AC12 (resistive) 230 V	5 A
	AC15 (inductive) 230 V	3 A
	DC12 (resistive) 24 V	5 A
	DC13 (inductive) 24 V	2.5 A
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300
	max. rated operational voltage	300 V AC
	max. continuous thermal current at B 300	5 A
	max. making/breaking apparent power at B 300	3600/360 VA
Mechanical lifetime		30 x 10 ⁶ switching cycles
Electrical lifetime (AC12, 230 V, 5 A)		0.1 x 10 ⁶ switching cycles
Short-circuit proof, maximum fuse rating	n/c / n/o contact	10 A fast-acting / 10 A fast-acting
General data		
Dimensions (W x H x D)		45 x 78 x 100 mm (1.77 x 3.07 x 3.94 in)
Mounting position		any
Degree of protection	enclosure / terminals	IP20 / IP50
Ambient temperature range	operation / storage	-25...+65 °C / -40...+85 °C
Mounting		DIN rail (EN 50022)
Electrical connection		
Wire size	fine-strand with wire end ferrule	2 x 2.5 mm ² (2 x 14 AWG)
Standards		
Product standard		IEC 255-6, EN 60255-6
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
Electromagnetic compatibility		
Interference immunity		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	6 kV / 8 kV
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m
fast transients (Burst)	IEC/EN 61000-4-4	2 kV / 5 kHz
powerful impulses (Surge)	IEC/EN 61000-4-5	2 kV symmetrical
HF line emission	IEC/EN 61000-4-6	10 V
Isolation data		
Rated insulation voltage (IEC 60947-1)		400 V
Rated impulse withstand voltage U_{imp} (IEC 644-6)		4 kV
Pollution category (IEC 255-5, IEC 664)		3
Overvoltage category (IEC 255-5, IEC 664)		III

¹⁾ Open-circuit principle: Output relay is energized if the measured value exceeds/drops below the adjusted threshold.

Sensor interface relay

CM-SIS

Technical data

Type	CM-SIS	
Input circuit		
Supply voltage	L-N	AC DC
		110-240 V AC (-15...+10 %)
		110-240 V (max. 105-260 V DC)
Frequency, AC supply		47-440 Hz
Supply voltage failure bridging time		10 ms min. at 100 % load
Current consumption		max. 0.35 A
		at 115 V AC 0.27 A
		at 230 V AC 0.14 A
Inrush current at 25°C (≤ 2 ms)		33 A
Internal input fuse		800 mA slow-acting
Measuring circuit		
		L+, L- / I1, I2
Sensor voltage	L+ L-	24 V DC ± 3%
Sensor current / power		max. 0.5 A / 12 W
Residual ripple		max. 100 mV _{pp}
Deviation with	load change statical	max. ± 0.5 %
	load change dynamical 10-90 %	max. .5 %
	change of the input voltage	max. ± 0.5 %
Short-circuit protection		overcurrent switch-off with automatic restart
Overload protection		excess temperature and overcurrent switch-off
Reset after thermal overload switch-off		automatic reset after cooling down
Sensor type connection possibilities	I1, I2	2- or 3-wire connection, NPN or PNP selectable by front-face switch
Input resistance		approx. 2.5 kΩ
Threshold value for relays R1, R2		$U_{emitter-collector} < 2,3 \text{ V}$ (I1, I2 > 8 mA)
Maximum switching frequency		approx. 20 Hz
Output circuit		
		11-12/14, 21-22/24
Kind of output		2 relays, 1 c/o contact each
Operating principle ¹⁾		open-circuit principle
Rated operating voltage		250 V
Maximum switching voltage		250 V AC
Rated operational current (IEC 60947-5-1)	AC12 (resistive) 230 V	4 A
	AC15 (inductive) 230 V	3 A
	DC12 (resistive) 24 V	4 A
	DC13 (inductive) 24 V	2 A
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300
	max. rated operational voltage	300 V AC
	max. continuous thermal current at B 300	5 A
	max. making/breaking apparent power at B 300	3600/360 VA
Mechanical lifetime		10 x 10 ⁶ switching cycles
Electrical lifetime		0.1 x 10 ⁶ switching cycles
Short-circuit proof, maximum fuse rating	n/c / n/o contact	6 A fast-acting / 10 A fast-acting
Indication of operational states		
Control supply voltage	U: green LED	 : control supply voltage applied
Relay status R1	R1: yellow LED	 : threshold value at input I1 exceeded
Relay status R2	R2: yellow LED	 : threshold value at input I2 exceeded
General data		
Efficiency at rated load		approx. 84 % (at 230 V AC)
Ambient temperature range	operation / storage	0...+55 °C / -25...+75 °C
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)
Mounting position		horizontally
Mounting		DIN rail
Minimum distance to other units		left-hand side 10 mm (0.39 in), vertical distance 50 mm (1.97 in)
Electrical connection		
Wire size		2 x 2,5 mm ² (2 x 14 AWG)
Standards		
Product standard		IEC 255-6, EN 60255-6
Electrical safety		IEC(EN) 60255-5, EN 50178 (VDE 0160), EN60950, UL 508, CSA 22.2
Galvanic isolation		safe isolation between L+,L-, I1,I2, and L,N,I1,I2,14,21,22,24



Sensor interface module

CM-SIS

Technical data

2

Type		CM-SIS
Electromagnetic compatibility		
Interference immunity		EN 61000-6-2
electrostatic discharge (ESD)	EN 61000-4-2	Level 3 (6 / 8 kV)
electromagnetic field (HF radiation resistance)	EN 61000-4-3	Level 3 (10 V/m)
fast transients (Burst)	EN 61000-4-4	Level 4 (4 kV)
powerful impulses (Surge)	EN 61000-4-5	Inst. class 3 (2 kV)
HF line emission	EN 61000-4-6	Level 3 (10 V)
Interference emission	EN 50081-2	radiated noise EN 55011, class B
Input current harmonics		no limitation
Isolation data		
Insulation testing		2.5 kV AC (routine test), 3 kV AC (type test)
Degree of pollution		2
Overvoltage category		II

¹⁾ Open-circuit principle: Output relay is energized if the measured value exceeds/drops below the adjusted threshold.



Cycle monitor with watchdog function

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Cycle monitoring relay with watchdog function CM-WDS

Ordering details

2



CM-WDS

- ① Setting the lower threshold value of cycle monitoring time
- ② F: red LED - cycle error
- ③ U: green LED - control supply voltage
- ④ Wiring diagram
- ⑤ Marker label

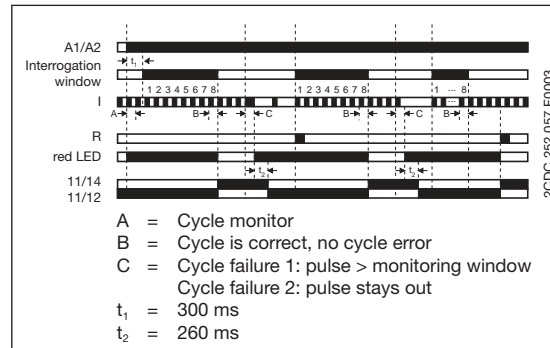
The cycle monitoring relay CM-WDS (watchdog) observes if a regularly intermittent pulse is applied to its pulse input "I". It is, for example, possible to connect the output of a programmable logic controller (plc), which is set and reset regularly (e. g. once each cycle). The connected cycle pulse must be generated by suitable programming of the plc/ipc. Now, the CM-WDS monitors if the cycle time of the plc/ipc program is smaller than the cycle monitoring time set by means of the front-face selector switch "time value (ms)".

The output relay 11-12/14 of the CM-WDS energizes and the red LED is switched off, if there are minimum 8 successive regular pulses on input "I". When the pulse signal stays out or is not regular, the output relay de-energizes and the red LED is illuminated.

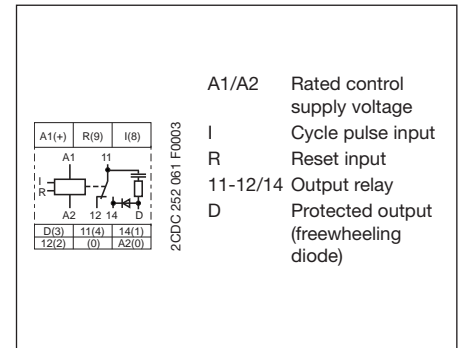
In case the monitoring time is too short or too long, this can be adjusted by a modified programming of the plc/ipcs or by modified setting of the monitoring time "time value (ms)".

A fault recognized and stored with the CM-WDS can be reset by an H-impulse (0-1-transition) on the reset input "R(9)", so that the cycle monitoring is again released. The reset impulse can be generated by means of a reset button or by suitable programming of the controller (plc/ipc).

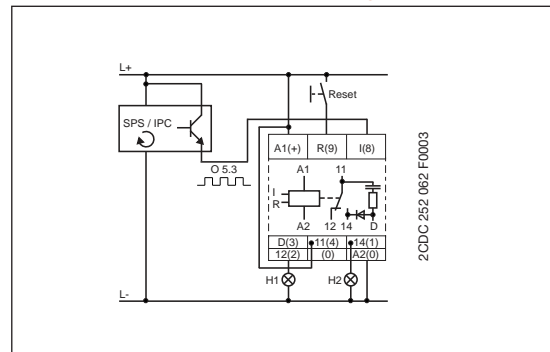
Funktion diagram CM-WDS



Connection diagram CM-WDS



Example of application - circuit diagram



Application

The CM-WDS is designed for the external monitoring of the correct function of programmable logic controllers (plc) and industrial pcs (ipc).

- Cycle monitor for monitoring the function of programmable logic controllers or industrial pcs
- 4 selectable cycle monitoring time ranges from 0.5 to 1000 ms
- 24 V DC supply
- 1 c/o contact
- 2 LEDs for status indication

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CM-WDS	24 V DC	1SVR 430 896 R0000	1		0.15 / 0.33

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Cycle monitoring relay with watchdog function

CM-WDS

Technical data

Type		CM-WDS
Input circuit		A1-A2
Rated control supply voltage U_s - power consumption	A1-A2	24 V DC - approx. 1 W
Tolerance of the rated control supply voltage U_s		-30 % - +30 %
Duty time		100 %
Measuring circuit		I
Monitoring function		cycle monitoring
Measuring voltage		24 V DC
Current consumption at the measuring input		approx. 5 mA
Setting range of cycle monitoring time		selectable: 0.5-150 ms, 0.5-260 ms, 0.5-500 ms, 0.5-1000 ms
Response time		approx. 0.5-1000 ms
Measuring error within the supply voltage tolerance		≤ 0.5 %
Measuring error within the temperature range		≤ 0.06 % / °C
Timing circuit		
ON-delay		approx. 2.2-10 s
Tripping delay		approx. 260 ms
Indication of operational states		
Control supply voltage		U: green LED
Output relay de-energized / cycle error		F: red LED
Output circuit		11-12/14
Kind of output		1 c/o
Operating principle ¹⁾		Closed-circuit principle
Contact material		AgCdo
Rated voltage (VDE 0110, IEC 60947-1)		250 V
Minimum switching voltage / Minimum switching current		
Maximum switching voltage		250 V AC, 250 V DC
Rated operational current (IEC 60947-5-1)	AC12 (resistive) 230 V	4 A
	AC15 (inductive) 230 V	3 A
	DC12 (resistive) 24 V	4 A
	DC13 (inductive) 24 V	2 A
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300
	max. rated operational voltage	300 V AC
	max. continuous thermal current at B 300	5 A
	max. making/breaking apparent power at B 300	3600/360 VA
Mechanical lifetime		10 x 10 ⁶ switching cycles
Electrical lifetime (AC12, 230 V, 4 A)		0.1 x 10 ⁶ switching cycles
Short-circuit proof, maximum fuse rating	n/c / n/o contacts	10 A fast-acting / 10 A fast-acting
General data		
Dimensions (W x H x D)		22.5 x 78 x 100 mm (0.89 x 3.07 x 3.94 in)
Mounting position		any
Degree of protection	enclosure / terminals	IP50 / IP20
Ambient temperature range	operation / storage	-20...+60 °C / -40...+85 °C
Mounting		DIN rail (EN 50022)
Electrical connection		
Wire size	fine-strand with wire end ferrule	2 x 2.5 mm ² (2 x 14 AWG)
Standards		
Product standard		IEC 255-6, EN 60255-6
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
Operational reliability (IEC 68-2-6)		4 g
Mechanical shock resistance (IEC 68-2-6)		6 g
Electromagnetic compatibility		
Interference immunity		EN 61000-6-2
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (6 kV / 8 kV)
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (2 kV / 5 kHz)
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 3 (2 kV L-L)
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)
Interference emission		EN 61000-6-4



Cycle monitoring relay with watchdog function

CM-WDS

Technical data

2

Isolation data	
Rated insulation voltage between supply-, control- and output circuit (VDE 0110, IEC 60947-1)	250 V
Rated impulse withstand between all isolated circuits (VDE 0110, IEC 664)	4 kV / 1.2-50 μs
Test voltage between all isolated circuits	2.5 kV, 50 Hz, 1 min
Pollution degree (VDE 0110, IEC 664, IEC 255-5)	3/C
Overvoltage category (VDE 0110, IEC 664, IEC 255-5)	III
Environmental tests (IEC 68-2-30)	24 h cycle, 55 °C, 93 % rel. 96 h

¹⁾ Closed-circuit principle: Output relay de-energizes if a cycle error occurs



General technical data, Accessories, Current transformers

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Measuring and monitoring relays

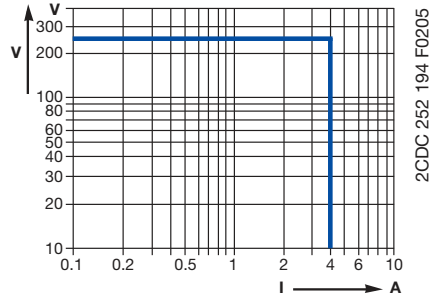
CM range

Technical diagrams

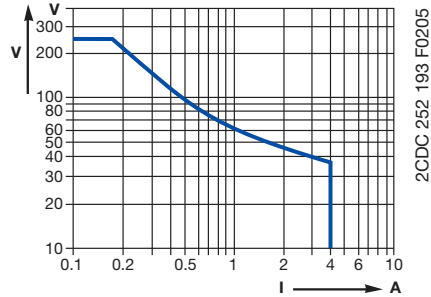
Load limit curves

CM-S (22.5 mm) and CM-E (22.5 mm) range

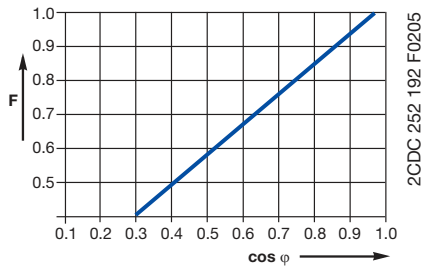
AC load (resistive)



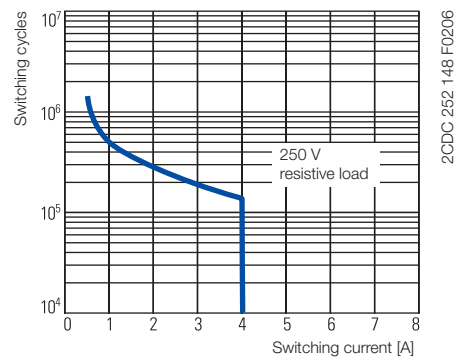
DC load (resistive)



Derating factor F for inductive AC load

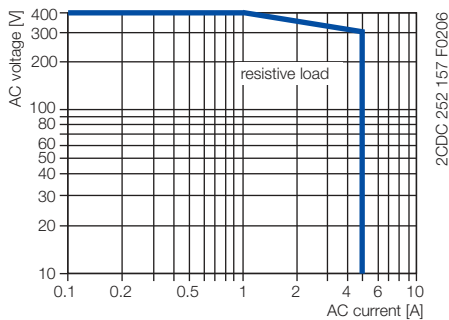


Contact lifetime

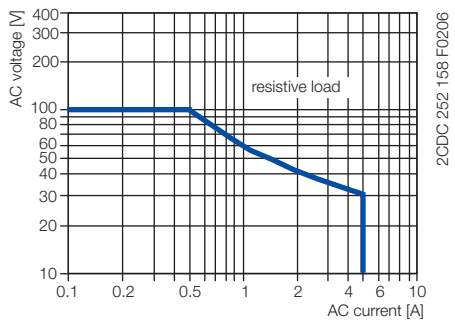


CM-N (45 mm) range

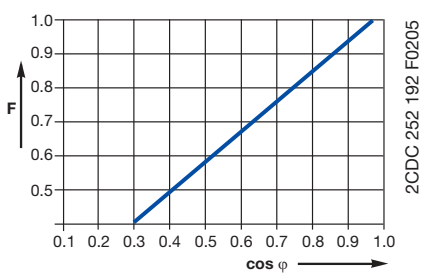
AC load (resistive)



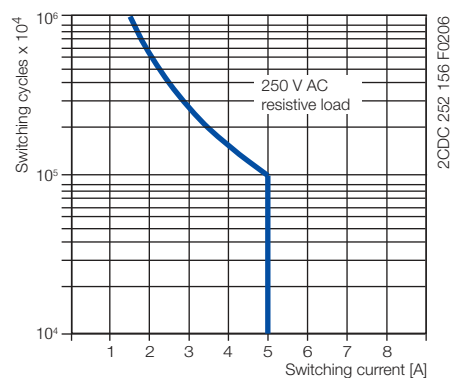
DC load (resistive)



Derating factor F for inductive AC load



Contact lifetime



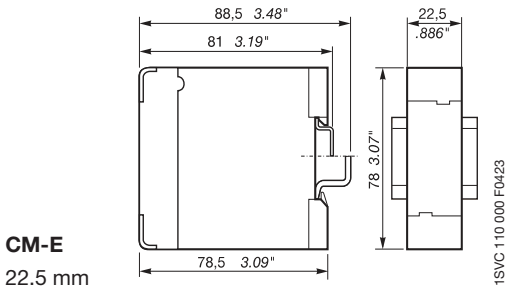
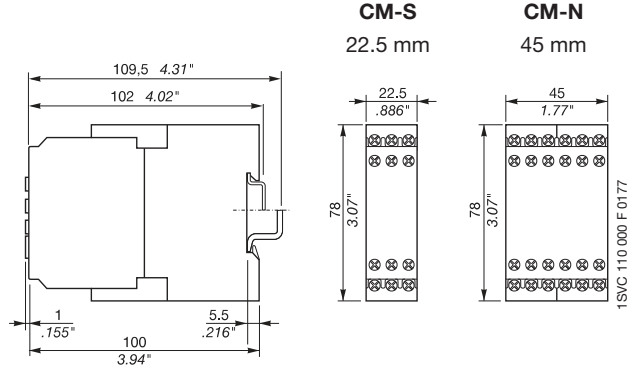
Measuring and monitoring relays CM and C51x Dimensional drawings

Dimensional drawings

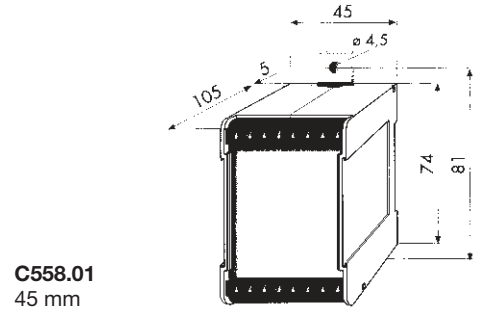
Dimensions in mm

Measuring and monitoring relays CM range

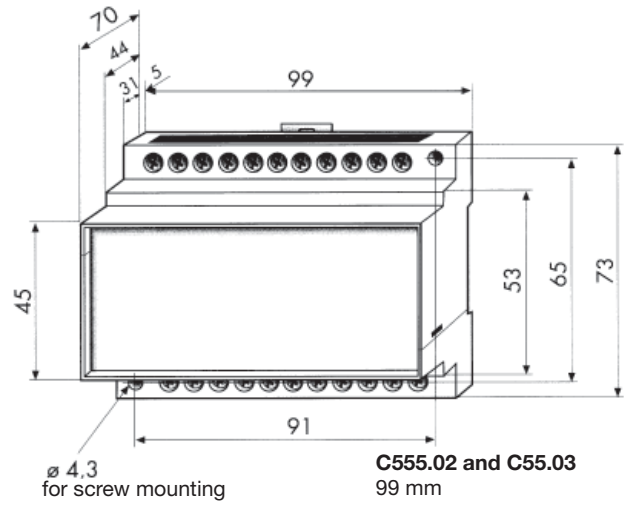
Insulation monitors for ungrounded supply mains C558.xx



CM-E
22.5 mm

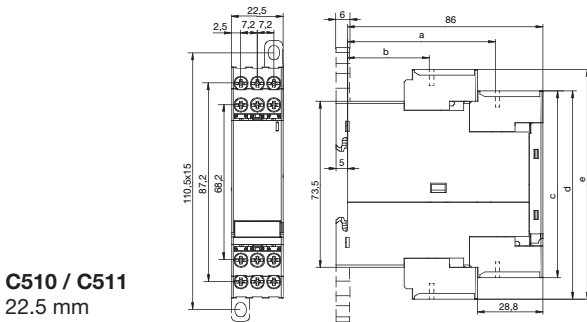


C558.01
45 mm



C555.02 and C555.03
99 mm

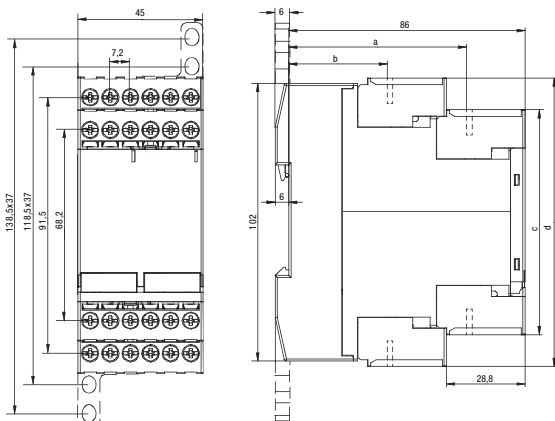
Temperature monitoring relays C51x range



C510 / C511
22.5 mm

	C510, C511
	0,8 ... 1,2 Nm 7 ... 10,3 lb-in
	1 x 0,5 ... 4,0 mm ² 2 x 0,5 ... 2,5 mm ²
	2 x 0,5 ... 1,5 mm ² 1 x 0,5 ... 2,5 mm ²
	—
AWG	2 x 20 ... 14

	a	b	c	d	e
C510, C511	65	36	82,6	92,2	101,6



C512/C513
45 mm

	C512 C513
	0,8 ... 1,2 Nm 7 ... 10,3 lb-in
	1 x 0,5 ... 4,0 mm ² 2 x 0,5 ... 2,5 mm ²
	2 x 0,5 ... 1,5 mm ² 1 x 0,5 ... 2,5 mm ²
	—
AWG	2 x 20 ... 14

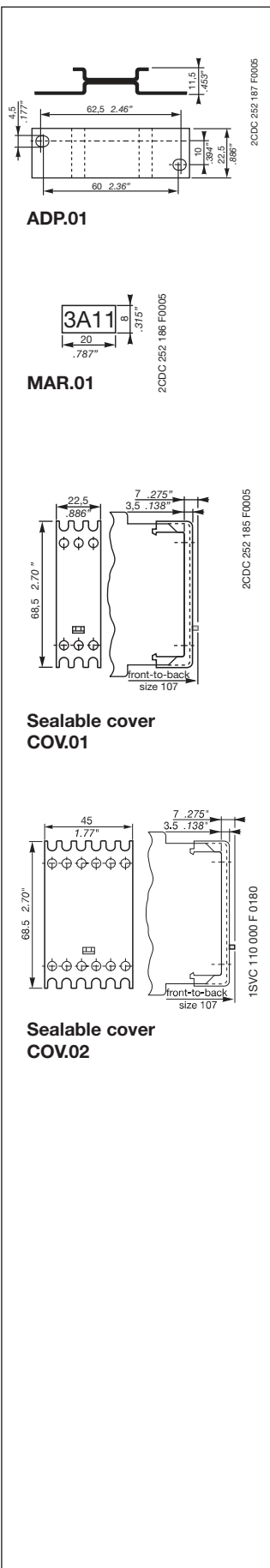
	a	b	c	d
C512, C513	65	36	82,6	105,9

Measuring and monitoring relays

Accessories for CM range

Ordering details

2



Accessories

Adapter for screw mounting

Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
ADP.01	CM-S	22.5	1SVR 430 029 R0100	1		18.4/0.65
ADP.02	CM-N	45.0	1SVR 440 029 R0100	1		36.7/1.30

Marker label

Type	for type	for devices	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
MAR.01	CM-S, CM-N	without DIP switches	1SVR 366 017 R0100	10		0.19/0.007
MAR.02	CM-S, CM-N	with DIP switches	1SVR 430 043 R0000	10		0.13/0.005

Sealable transparent cover

Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
COV.01	CM-S	22.5	1SVR 430 005 R0100	1		5.2/0.18
COV.02	CM-N	45.0	1SVR 440 005 R0100	1		7.7/0.27

Accessories for measuring and monitoring relays

Current transformers CM-CT

Ordering details

2CDC 251 002 F0005



CM-CT

2CDC 251 003 F0005



CM-CT with mounted accessories

2CDC 251 159 F0006



CM-CT-A mounted on DIN rail

Plug-in current transformers CM-CT

- Without primary conductor though with foot angle, insulating protective cap and bar fastening screws
- Primary / rated current from 50 A to 600 A
- Secondary current of 1 A or 5 A
- Class 1

Secondary current 1 A

Type	Rated / primary current	Burden / class	Order code	Pack. unit pieces	Price 1 piece
CM-CT 50/1	50 A	1 VA / 1	1SVR 450 116 R1000	1	
CM-CT 75/1	75 A	1.5 VA / 1	1SVR 450 116 R1100	1	
CM-CT 100/1	100 A	2.5 VA / 1	1SVR 450 116 R1200	1	
CM-CT 150/1	150 A	2.5 VA / 1	1SVR 450 116 R1300	1	
CM-CT 200/1	200 A	2.5 VA / 1	1SVR 450 116 R1400	1	
CM-CT 300/1	300 A	5 VA / 1	1SVR 450 117 R1100	1	
CM-CT 400/1	400 A	5 VA / 1	1SVR 450 117 R1200	1	
CM-CT 500/1	500 A	5 VA / 1	1SVR 450 117 R1300	1	
CM-CT 600/1	600 A	5 VA / 1	1SVR 450 117 R1400	1	

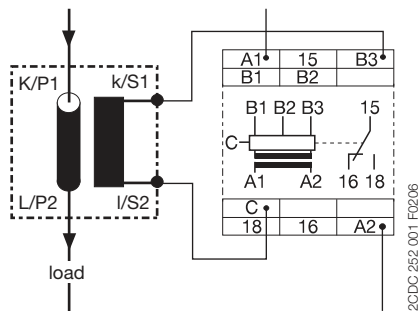
Secondary current 5 A

Type	Rated / primary current	Burden / class	Order code	Pack. unit pieces	Price 1 piece
CM-CT 50/5	50 A	1 VA / 1	1SVR 450 116 R5000	1	
CM-CT 75/5	75 A	1.5 VA / 1	1SVR 450 116 R5100	1	
CM-CT 100/5	100 A	2.5 VA / 1	1SVR 450 116 R5200	1	
CM-CT 150/5	150 A	2.5 VA / 1	1SVR 450 116 R5300	1	
CM-CT 200/5	200 A	5 VA / 1	1SVR 450 116 R5400	1	
CM-CT 300/5	300 A	5 VA / 1	1SVR 450 117 R5100	1	
CM-CT 400/5	400 A	5 VA / 1	1SVR 450 117 R5200	1	
CM-CT 500/5	500 A	5 VA / 1	1SVR 450 117 R5300	1	
CM-CT 600/5	600 A	5 VA / 1	1SVR 450 117 R5400	1	

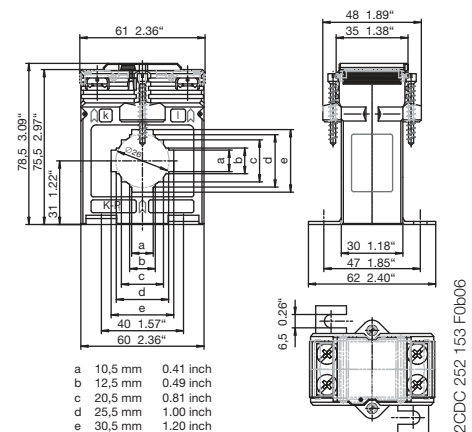
Accessories

Type	Description	Order code	Pack. unit pieces	Price 1 piece
CM-CT-A	Snap-on fastener for DIN rail mounting of CM-CT	1SVR 450 118 R1000	10	

Operating principle / circuit diagram



Dimensional drawing





Safety relays

C57x and C67xx range

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Safety relays

C57x range

Selection table, Approvals and marks



2CDC265 012 F0004

Type		C571	C573	C571-AC	C576	C577	C572	C574	C575	C579	C579-AC
Function	EMERGENCY STOP	■ ⁵⁾	■ ⁵⁾	■ ⁵⁾	■ ⁵⁾	■	■	■ ⁵⁾	-	-	-
	Safety gate monitoring	■	■	■	■	■ ⁶⁾	■	■ ⁶⁾	-	-	-
	Press control	-	-	-	-	-	-	-	■	-	-
	Cross circuit detection	-	-	■	■	■	■	■	■	-	-
Safety categorie acc. to EN 954-1 ¹⁾	B	■	■	■	■	■	■	■	■	■ ⁴⁾	■ ⁴⁾
	1	■	■	■	■	■	■	■	■	■ ⁴⁾	■ ⁴⁾
	2	■	■	■	■	■	■	■	■	■ ⁴⁾	■ ⁴⁾
	3	■	■	■	■	■	■	■	■	■ ⁴⁾	■ ⁴⁾
	4	■ ¹⁾	■ ¹⁾	■	■	■	■	■ ³⁾	■ ⁷⁾	■ ⁴⁾	■ ⁴⁾
Connection	single channel	■	■	■	-	-	■	■	-	-	-
	two channel	■	■	■	■	■	■	■	■	-	-
	Enabling circuits undelayed	2 n/o	3 n/o	2 n/o	2 n/o	2 n/o	3 n/o	2 n/o	2 n/o	4 n/o	4 n/o
	Enabling circuits delayed	-	-	-	-	-	-	2 n/o	-	-	-
	Signaling circuits	-	1 n/c	-	-	-	2 n/c	1 n/c	2 n/c	-	-
Start	automatic ⁸⁾	■	■	■	■	-	■	■, -	-	-	-
	monitored	-	-	-	-	■	■	-	-	-	-

■ existing
□ pending

Approvals											
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■	■	■	■	■
	Baumusterbescheinigung E 6794							■			
	Baumusterbescheinigung E 6795								■		
	BG Prüfzertifikat	■	■		□	□	■	■	■	■	■
Marks											
	CE	■	■	■	■	■	■	■	■	■	■
	C-Tick	■	■	■	■		■	■	■	■	■

¹⁾ Possible with additional external measures. The figures apply only if the cables and sensors are laid safely and protected mechanically. See also user manual and application manual.

²⁾ The maximum safety category acc. EN 954-1, which can be reached, depends essentially on the external wiring, the choice of the sensors and the position of the machine. The nominal regulations for the safety at machines have to be observed.

³⁾ Possible with undelayed enable contact.

⁴⁾ The safety category acc. to EN 954-1 corresponds to those of the basic unit.

⁵⁾ The ON-button is not monitored. Valid only for C574 devices with auto-start.

⁶⁾ With monitored ON-button possible. Valid only for C574 devices with monitored start.

⁷⁾ Acc. to EN 574, type III C.

⁸⁾ Automatic restarting (as per EN 60204-1) must be prevented by the higher-level control system in the event of EMERGENCY STOP.

Safety relays with solid-state outputs

C67xx range



Selection table, Approvals and marks



3

Type		C6700	C6701	C6702
Function	EMERGENCY-STOP	■	■	■
	Safety gate monitoring	■	■	■
	Press control	-	-	-
	Tread mats	-	■	■
	Electronic sensors	-	■	■
	Cascade input 24 V DC	-	1	1
	Cross short-circuit detection	■	■	■
Safety categorie acc. to EN 954-1	B	■	■	■
	1	■	■	■
	2	■	■	■
	3	■	■	■
	4	-	■	■
Connection	single channel	■	■	■
	two channel	■	■	■
	Enabling circuits Stop-Cat. 0	2 ¹⁾	2 ²⁾	1
	Enabling circuits Stop-Cat. 1	-	-	1 ³⁾
	Signaling circuits	-	⁴⁾	-
Start	automatic	■	■	■
	monitored	■	■	■

- existing
- pending

Approvals				
	UL 508, CAN/CSA C22.2 No.14	■	■	■
TÜV	TÜV	■	■	■
Marks				
CE	CE	■	■	■
	C-Tick	■	■	■

- ¹⁾ The outputs are only safe in connection with an external contactor.
- ²⁾ Can be used as electrical sensor input
- ³⁾ OFF-delay adjustable: 0.05-3 s or 0.5-30 s
- ⁴⁾ One safety circuit can be used as signaling circuit.

Safety relays

Safety for man and machine

Machinery directive, General information

Machinery Directive 98/37/EEC

The Machinery Directive 98/37/EEC is valid throughout Europe. This Directive obliges the machine manufacturer to guarantee, by attaching the CE mark, that all European Standards relevant to this machine type have been observed. The CE mark is attached by the manufacturer at his responsibility. No machine may be put into circulation or marketed without this CE mark.

What do I need to do to place a machine on the market in compliance with the directives?

The EU Machinery Directive stipulates that machinery should not present a risk (risk assessment in accordance with EN 1050 or EN ISO 14121-1).

Given that there is no such thing as zero risk in technology, the aim is to achieve an acceptable residual risk. If safety is dependent on control systems, these must be designed so that the probability of functional errors is sufficiently low. If this isn't possible, any errors that occur shall not lead to the loss of the safety function. To meet this requirement it makes sense to use harmonised standards that have been created in accordance with a mandate from the European Commission and are published in the Official Journal of the European Communities (presumption of conformity).

This is the only way to avoid spending extra time and effort demonstrating conformity in the event of a claim.

Standards for the safety of machinery

ISO 12100	"Safety of machinery - Basic concepts, general principles for design "
EN 60204-1	"Elektrische Ausrüstung von Maschinen"
EN 418	"Safety of machinery; emergency stop equipment"
EN 574	"Two-hand control devices"
EN 954-1 / EN ISO 13849-1	"Safety-related parts of control systems"
EN 1050 / EN ISO 14121	"Principles for risk assessment"
EN 1088	"Interlocking devices associated with guards"
IEC 61508	"Functional safety of electrical/ programmable electronic safety related system"
EN IEC 62061	Sector-specific standard under IEC 61508

Stop categories according to EN 60204

Standard EN 60204 demands that every machine must feature the stop function of category 0. Stop functions of categories 1 and/or 2 must be provided if necessary for technical safety and/or functional requirements of the machine. Category 0 and category 1 stops must be operable independent of the operating mode, and a category 0 stop must have priority.

There are three categories of stop functions:

Category 0:

Shut-down by immediate switch-off of the energy supply to the machine drives.

Category 1:

Controlled shut-down, where the energy supply to the machine drives is retained in order to achieve shut-down and where the energy supply is only interrupted after standstill has been reached.

Category 2:

A controlled shut-down where the energy supply to the machine drives is retained.

Further Information:

User manual

A user manual with a device description, connection diagrams and application information in several languages is enclosed with every safety switching device of C570 and C67xx range.

ZVEI brochure

The ZVEI has published a brochure "Safety of machinery" that contains a summary of the most important changes of the safety standards. The brochure can be ordered free of charge by using one of the following order codes:

English version: 2CDC 110 056 B0201

German version: 2CDC 110 056 B0101

Important notice

The products described here in are designed to be components of a customized machinery safety-oriented control system. A complete safety-oriented system may include safety sensors, evaluators, actuators and signaling components. It is the responsibility of each company to conduct its own evaluation of the effectiveness of the safety system by trained individuals.

ABB AG, its subsidiaries and affiliates (collectively "ABB") are not in a position to evaluate all of the characteristics of a given system or product or machine not designed by ABB.

ABB accepts no liability for any recommendation that may be implied or stated here in. The warranty contained in the contract of sale by ABB is the sole warranty of ABB. Any statements contained here in do not create new warranties or modify existing ones.

Safety relays

Safety for man and machine

EN 954-1

Classification of a machine into categories according to EN 954-1

Pursuant to the **Machinery Directive 98/37/EEC**, every machine must comply with the relevant directives and standards. Measures must be taken to keep the risk to persons below a tolerable extent.

This mandatory classification runs like a red thread from selection of the smallest limit switch through to the overall concept of the entire machine, always raising a permanent conflict between what is technically feasible and what is permitted on the basis of "pure theory".

In the first step, the project planner performs a risk evaluation according to **EN 1050 "Risk Assessment"**. This must take into account the machine's ambient conditions for instance. Then, any overall risk must be assessed. This risk assessment has to be conducted in a form that allows documentation of the procedure and the results achieved. The risks, dangers and possible technical measures to reduce risks and dangers must be stipulated in this risk assessment.

After stipulating the extent of the risk, the category on the basis of which the safety circuits are to be designed is determined with the aid of **EN 954-1 "Safety-Related Components of Controls"**.

The category determined this way defines the technical requirements applicable to the design of the safety equipment. There are five categories (B, 1, 2, 3 and 4), where B (standing for basic category) defines the lowest risk and thus also the minimum requirements applicable to the controller.

Thus: Depending on the application, not every technically feasible safety category is also permitted. For instance, in case of contactless protection devices (light barriers etc.) only categories 2 or 4 are permitted. In contrast, in case of tread mats, categories B to 4 can be used depending on risk assessment, provided that these categories can be reached at all owing to the design.

Why is today's EN 954-1 not sufficient for the future?

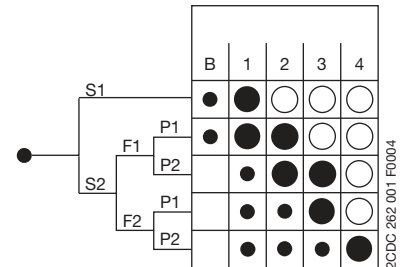
In the past, the safety-related parts of a machine's control system were designed in accordance with EN 954-1.

This was based on the calculated risk (formed into categories). The aim was to set an appropriate system behaviour ("control class") against a category (deterministic approach). Once electronics, and programmable electronics in particular, had made their mark on safety technology, safety could no longer be measured purely in terms of the simple category system found in EN 954-1. Furthermore, it was unable to provide information on probability of failure (probabilistic approach).

Help is now available from EN 62061 and EN ISO 13849-1, the successor standard to EN 954-1. The two standards EN 62061 and EN ISO 13849-1 are compared in the following.

Possible selection of categories according to EN 954-1

Starting point for the risk assessment of the safety-related component of the controller.



S- Serious injuries

- S1** Slight (and normally reversible) injuries.
- S2** Serious (normally irreversible) injuries, including death.

F- Frequency and/or duration of the risk exposure

- F1** Rare to frequent and/or short duration of exposure.
- F2** Frequent to sustained and/or longduration of exposure.

P- Options for risk avoidance

(generally referred to the speed and frequency at which the dangerous component moves and to the clearance from the dangerous component)

- P1** Possible under certain conditions.
- P2** Hardly possible.

B, 1, 2, 3 and 4: Categories for safety-related components of controls

- Preferred category.
- Possible category requiring additional measures.
- Disproportionately extensive measures by comparison with the risk.

Safety relays

Safety for man and machine

EN 62061 and EN ISO 13849-1

Scopes of standards EN 62061 and EN ISO 13849-1

EN 62061: "Functional safety of safety-related electrical, electronic and programmable electronic control systems"

This standard defines requirements and gives recommendations for the design, integration and validation of safety-related electrical, electronic and programmable electronic control systems (SRECS) for machinery.

It does not define requirements for the performance of non-electrical (e.g. hydraulic, pneumatic, electromechanical) safety-related control elements for machinery.

EN ISO 13849-1: "Safety-related parts of control systems, Part 1: General principles for design"

This standard may be applied to SRP/CS (safety-related parts of control systems) and all types of machinery, regardless of the type of technology and energy used (electrical, hydraulic, pneumatic, mechanical, etc.).

EN ISO 13849-1 also lists special requirements for SRP/CS with programmable electronic systems.

3

Brief overview of EN 62061

EN 62061 represents a sector-specific standard under IEC 61508. It describes the implementation of safety-related electrical and electronic control systems on machinery and examines the overall lifecycle from the concept phase through to decommissioning. Quantitative and qualitative examinations of the safety-related control functions form the basis.

The performance level is described through the **safety integrity level (SIL)**.

The safety functions identified from the risk analysis are divided into safety subfunctions; these safety subfunctions are then assigned to actual devices, called subsystems and subsystem elements. Both hardware and software are handled this way.

A safety-related control system is made up of several subsystems. The safety-related characteristics of these subsystems are described through parameters (SIL claim limit and PFH_D).

Safety-related parameters for subsystems:

- SIL_{CL}: SIL claim limit
- PFH_D: Probability of dangerous failure per hour
- T₁: Lifetime

These subsystems may in turn be made up of various interconnected subsystem elements (devices) with parameters to calculate the subsystem's corresponding PFH_D value.

Safety-related parameters for subsystem elements (devices):

- λ: Failure rate; for wearing elements: describe via the B₁₀ value
- SFF: Safe failure fraction

On electromechanical devices the failure rate is indicated by the manufacturer as a B₁₀ value, based on the number of cycles. The time-based failure rate and lifetime must be determined through the switching frequency for the respective application.

Internal parameters to be established during design / construction for a subsystem comprised of subsystem elements:

- T₂: Diagnostic test interval
- β: Susceptibility to common cause failure
- DC: Diagnostic coverage

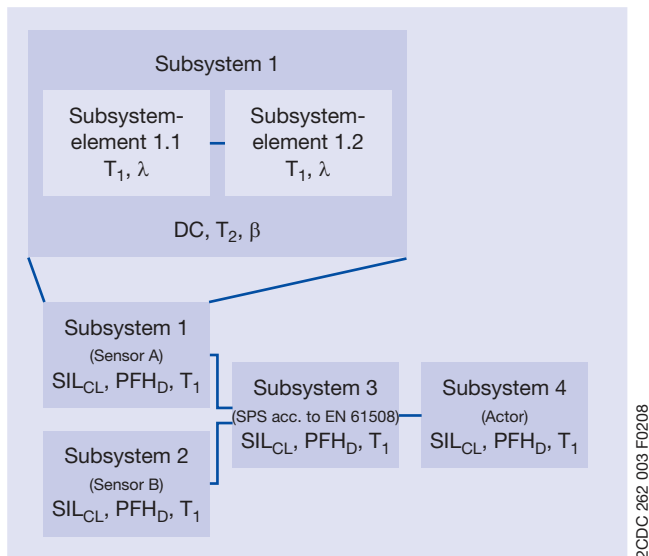
The PFH_D value of the safety-related control system is calculated by adding the subsystems' individual PFH_D values.

Users have the following options when designing a safety-related control system:

- Use devices and subsystems that already comply with EN 954-1 and IEC 61508 or EN 62061. The standard specifies how to incorporate qualified devices when implementing safety functions.
- Develop their own subsystems.
 - Programmable, electronic subsystems or complex subsystems: Apply IEC 61508.
 - Simple devices and subsystems: Apply EN 62061.

The standard represents a comprehensive system for the implementation of safety-related electrical, electronic and programmable electronic control systems. EN 62061 has been a harmonised standard since December 2005.

EN 954-1, or alternatively EN ISO 13849-1, should be applied for nonelectrical systems.



Safety relays

Safety for man and machine

EN ISO 13849-1, Scope of application

Brief overview of EN ISO 13849-1

EN ISO 13849-1 is based on the familiar categories from EN 954-1:1996. It examines complete safety functions, including all the components involved in their design. EN ISO 13849-1 goes beyond the qualitative approach of EN 954-1 to include a quantitative assessment of the safety functions. A **performance level (PL)** is used for this, building upon the categories.

Components/devices require the following safety parameters:

- Category (structural requirement)
- PL: Performance level
- $MTTF_d$: Mean time to dangerous failure
- B_{10d} : Number of cycles by which 10% of a random sample of wearing components have failed dangerously
- DC: Diagnostic coverage
- CCF: Common cause failure
- TM: Mission time

The standard describes how to calculate the performance level (PL) for safety-related parts of control systems, based on designated architectures, for the designated mission time TM.

EN ISO 13849-1 refers any deviations to IEC 61508. Where several safety-related parts are combined into one overall system, the standard describes how to calculate the PL that can be achieved.

For additional guidelines on validation EN ISO 13849-1 refers to Part 2, which was published at the end of 2003. This part provides information on fault considerations, maintenance, technical documentation and usage guidelines. The transition period from EN 954-1 to EN ISO 13849-1 is likely to end in October 2009. Until then, either standard may be applied.

The ABB safety switching devices comply with all requirements of EN 60204, part 1, and are approved by the German Employers' Liability Insurance Associations (BG) and/or TÜV (German Technical Inspection Authority).

Scope of application

Potential risks and hazards posed by a machine must be eliminated as fast as possible in the event of danger. For dangerous movements, the safe state is generally a standstill. All safety switching devices of C 570 range switch to de-energized state, i.e. standstill for drives, in the event of danger or fault.

Practical experience has shown that, in a few applications, it is necessary to also monitor the sensing elements (EMERGENCY STOP buttons, limit switches of the safety gates etc.).

A **two-channel** and/or **cross circuit safe** configuration is advisable in systems with a high level of contamination. In case of the two-channel control configuration, the contact part of the command unit has a **redundant** design. The supply leads can also be monitored for cross circuits.

In case of a fault, the system reverts to safe state after the safety contacts (**enabling circuits**) are opened. Enabling circuits are safety contacts which reliably switch off the hazardous drives or machines. (n/o contacts which reliably open in case of faults).

Depending on the device type, there are additional **signalling contacts** (n/c contacts which close in the event of a fault or semiconductor outputs). Of course, it is possible to also use enabling contacts as signaling contacts.

Unique and clear terminal identification permits simple, reliable and rapid wiring. The risk of a wiring fault is appreciably reduced.

■ EMERGENCY STOP

EMERGENCY STOP devices must have priority over all other functions. The energy supplied to the machine drives which may cause dangerous states must be switched off as fast as possible without further risks or dangers. Resetting the drives may not trigger a restart. The EMERGENCY STOP must act either as a stop of category 0 or as a stop of category 1.

According to EN 418 "EMERGENCY STOP equipment, functional aspects, principles for design" the resetting of the control device may only be possible as a result of an action by hand at the control device. Resetting the control device may not release a restart instruction. A restart of the machine may only be possible when all concerned operating elements have been reset individually and consciously by hand.

The basic devices of the C57x range of safety switching devices can be used for EMERGENCY STOP applications up to category 4 acc. to EN 954-1. Depending on external wiring and cable routing of the sensors, category 3 or 4 acc. to EN 954-1 or SIL 2/3 (Safety Integrated Level) acc. to IEC 61508 "Functional safety of electrical/programmable electronic safety related system" can be reached.

■ Safety gate monitoring

According to EN 1088, a distinction is made between interlocking guards and interlocking guards with guard locking. Here as well, the safety switching devices are used for EMERGENCY STOP applications. Controls up to category 4 to EN 954-1 or SIL 2/3 acc. to IEC 61508 are possible.

■ Presses and punches

Two-hand control is intended for devices on which the operator must use both hands simultaneously, thus protecting him against risks and dangers.

■ Safety tread mats

Safety relays

Safety for man and machine

Safety functions, device outputs

Safety functions

Auto-start

When the sensor circuit is closed the device is active.

If an ON-button is installed in the feedback circuit, a cross circuit of the feedback circuit is not monitored. Safety categories B, 1, 2, and 3 do not dictate a cross-circuit detection.

If a device with the function "auto-start" shall be used for safety categories 4 and EMERGENCY STOP, the user has to guarantee a fault exclusion in the ON-button circuit, e. g. by a safe laying of the ON-button line.

Monitored start

After a supply voltage failure or a safety-related switch-off, the device will be started only by actuation of the ON-button. Especially for presses type III C to DIN 574 is possible.

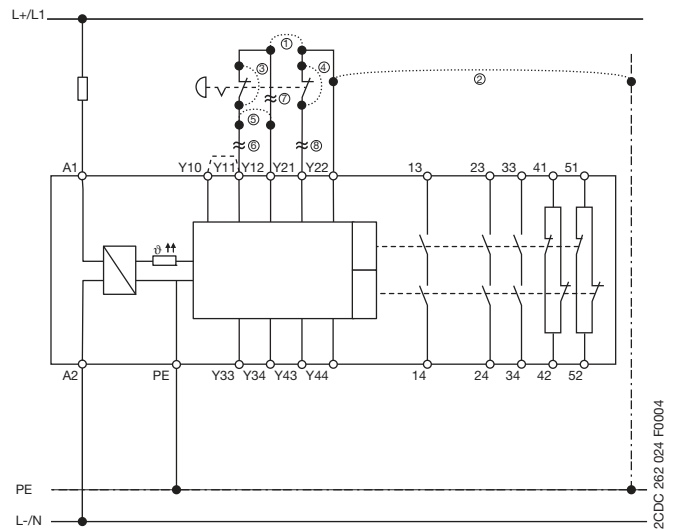
Safety category 4 to EN 954-1 is possible if the feed and the feed-back circuit are monitored for cross circuits.

After closing the sensor line the ON-button has to be actuated.

Cross circuit safety

Cross circuit safety denotes the ability of monitoring modules to detect faults (caused by pinched cable, earth-leakage, ect.) that can occur in the application being monitored and to prevent the release of the safety circuits until external faults have been removed.

On ABB Safety relays C57x and C67xx, which are designed to monitor EMERGENCY STOP, two-hand control units and safety gates, cross circuit safety is achieved by two channel (redundant) wiring of EMERGENCY STOP control devices (see diagram on the right). The two EMERGENCY STOP channels are operated at different voltages; thus the units will detect excessive current flow between the two points and disconnect the enabling circuits.



Type of fault

- ① + ⑤ Connection (cross circuit) between Y12 and Y21
 - ▶ The fault will be detected as a short-circuit (excessive current flow). The unit will disconnect the enabling circuits.
- ② Earthing of Y21
 - ▶ The fault will be detected as a short-circuit (excessive current flow). The unit will disconnect the enabling circuits.
- ③ + ④ Next operation of EMERGENCY STOP button will detect the fault as no voltage change will occur on Y12.
 - ▶ The unit will prevent restarting until the fault has been removed and the EMERGENCY STOP module reset.
- ⑥ - ⑧ Immediate detection of the line interruption (voltage change on Y12) and opening of the enabling circuits
 - ▶ The unit will prevent restarting until the fault has been removed and the EMERGENCY STOP module reset.
 - ▶ The units incorporate internal electrical short-circuit protection which will trip when a fault occurs (short-circuit, cross circuit, ...) and disconnect the enabling circuits.

After a fault has been removed, the safety relay will recognize this and again be ready for operation. Neither the unit nor any internal fuses will need to be exchanged.

Device outputs

Safety outputs

The safety-related function must be controlled via safe output contacts, the so-called safety outputs. Safety outputs are always normally open contacts and switch off without delay.

Signalling outputs

For the signalling outputs, normally open contacts and normally closed contacts which may not perform safety-related functions are used. Safety outputs also be used as signalling outputs.

Delayed safety outputs

Drives which have a long overtravel must be decelerated in the event of danger. For this purpose, the energy supply must be maintained for electrical braking (stop category 1 acc. to EN 60 204-1).

Contact expansion

If the safety outputs of the basic device do not suffice, positively driven contactors (e. g. B6, B7) may be used for contact expansion.

Safety relays C571 and C571-AC

Ordering details



C571

- Auto-start
- Supply voltage U_c at EMERGENCY STOP button or limit switch
- Feedback loop for monitoring of external contactors
- Safety outputs: 2 n/o contacts, positively guided
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4¹⁾

EMERGENCY STOP monitor and safety gate monitor C571 and C571-AC

Application

The safety relays C571 and C571-AC can be used in EMERGENCY STOP circuits according to EN 418 and in safety circuits according to VDE 0113 Part 1 (11.98) and/or EN 60 204-1 (11.98), e. g. with movable covers and guard doors. Depending on the external connections, safety categories B, 1, 2, 3 or 4¹⁾ according to DIN EN 954-1 are achievable.

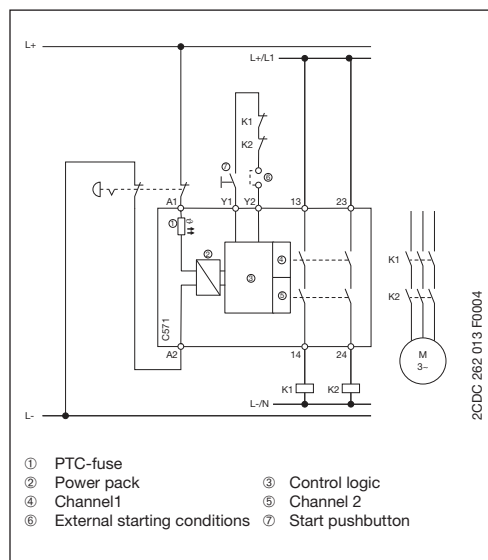
When the safety combination is used in "automatic start" mode, automatic restarting (according to EN 60 204-1, sections 9.2.5.4.2 and 10.8.3) must be prevented by the higher-level control system in the event of EMERGENCY STOP.

Functions

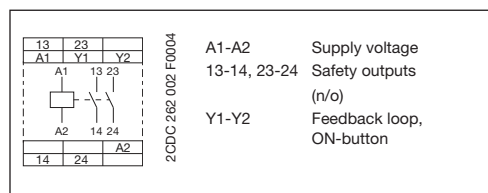
The safety relays C571 and C571-AC have two enabling (safe) circuits which are configured as n/o contacts. The number of enabling circuits can be increased by adding one or more C579 extension units. Three LEDs (Power, Channel 1, Channel 2) indicate the operating state and function.

When the EMERGENCY STOP button or the limit switch is unlocked and when the ON-button is pressed, the internal circuits of the safety relays and the external switch contactors are checked for proper functioning.

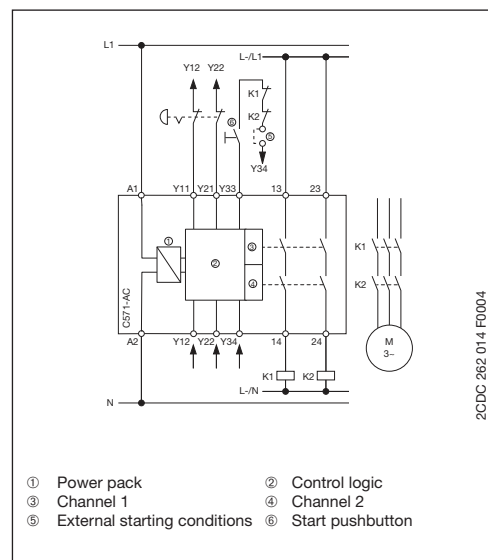
Block diagram C571



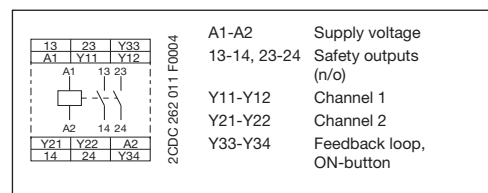
Connection diagram C571



Block diagram C571-AC



Connection diagram C571-AC



Type	Supply voltage U_c	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
C571	24 V DC	1SAR 501 020 R0003	1		0.26 / 0.57
C571	24 V AC/DC	1SAR 501 020 R0001	1		0.26 / 0.57
C571-AC	115 V AC	1SAR 501 020 R0004	1		0.29 / 0.64
C571-AC	230 V AC	1SAR 501 020 R0005	1		0.29 / 0.64

¹⁾ Possible in combination with additional external measures. Information given in brackets only apply if cables and sensors are installed safely and mechanically protected.

• Approvals	150	• Dimensional drawings	168
• Technical data	167		

Safety relays C573 Ordering details



C573

- Auto-start
- Supply voltage U_c at EMERGENCY STOP button or limit switch
- Single- or two-channel connection
- Feedback loop for monitoring of external contactors
- Safety outputs: 3 n/o contacts, positively guided
- Signalling contacts: 1 n/c contact, positively guided
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4¹⁾

EMERGENCY STOP monitor and safety gate monitor C573

Application

The safety relay C573 can be used in EMERGENCY STOP circuits according to EN 418 and in safety circuits according to VDE 0113 Part 1 (11.98) and/or EN 60 204-1 (11.98), e.g. with movable covers and guard doors. Depending on the external connections, safety categories B, 1, 2, 3 or 4¹⁾ according to DIN EN 954-1 are achievable.

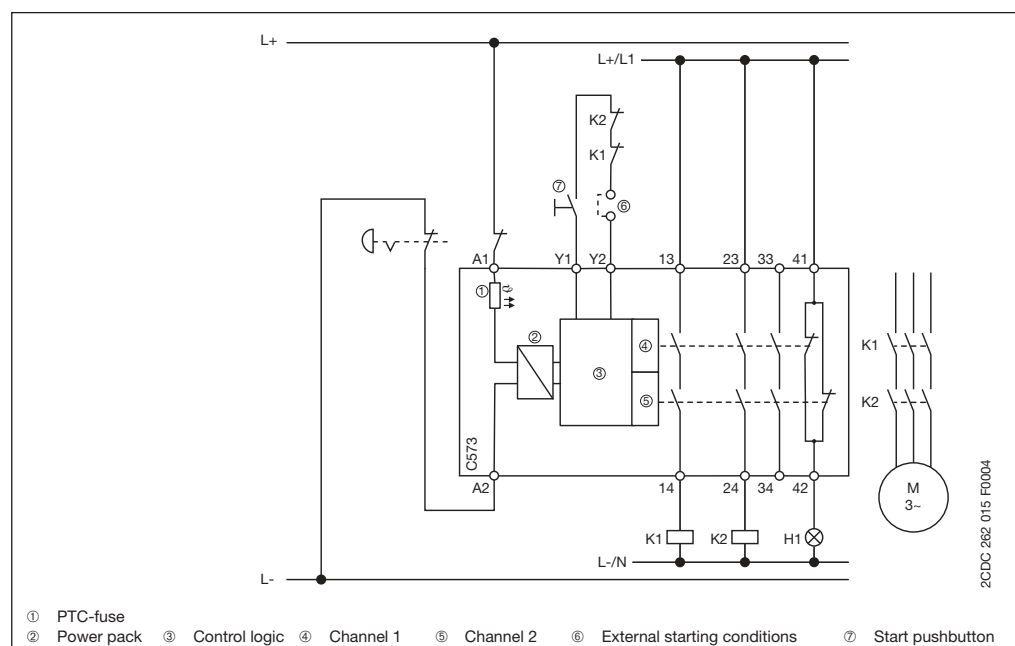
Functions

The safety relay C573 has three enabling circuits (safety outputs) which are configured as n/o contacts and a signal circuit configured as a n/c contact. The number of enabling circuits can be increased by adding one or more C579 extension units.

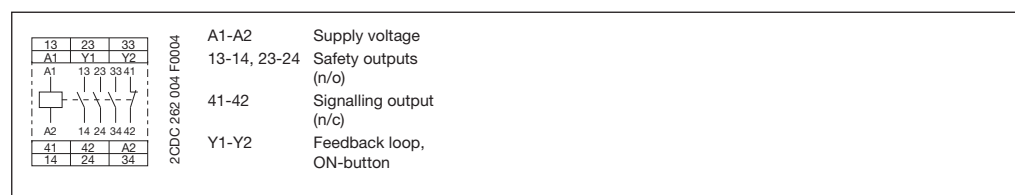
Three LEDs (Power, Channel 1, Channel 2) indicate the operating state and function.

When the EMERGENCY STOP button or the limit switch is unlocked and when the ON-button is pressed, the internal circuits of the safety relays and the external contactors are checked for proper functioning.

Block diagram C573



Connection diagram C573



Type	Supply voltage U_c	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
C573	24 V DC/AC	1SAR 501 031 R0001	1		0.28 / 0.62

¹⁾ Possible in combination with additional external measures. Information given in brackets only apply if cables and sensors are installed safely and mechanically protected.

• Approvals	150	• Dimensional drawings	168
• Technical data	167		

Safety relays C576 and C577

Ordering details



C576



C577

C576:

- Auto-Start

C577:

- Monitored Start

C567 and C577:

- Cross circuit detection at EMERGENCY STOP button or limit switch
- 24 V DC at the EMERGENCY STOP button
- Two-channel connection
- Feedback loop for monitoring of external contactors
- Safety outputs: 2 n/o contacts, positively guided
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4

EMERGENCY STOP monitor and safety gate monitor C576 and C577

Application

The safety relays C576 and C577 can be used in safety circuits according to VDE 0113 Part 1 (11.98) or EN 60 204-1 (11.98), e. g. with movable covers and safety gates, the C577 in EMERGENCY STOP circuits according to EN 418. Depending on external connections, safety categories B, 1, 2, 3 or 4 according to DIN EN 954-1 are achievable.

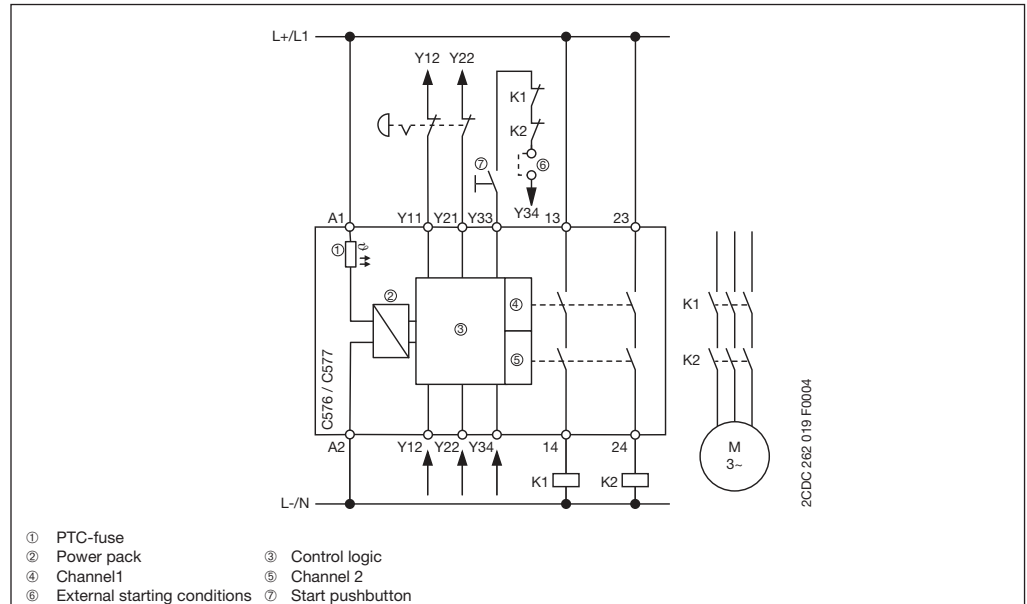
Functions

The safety relays C576 and C577 have two enabling circuits (safety outputs) configured as n/o contacts. The number of enabling circuits can be increased by adding one or more C579 extension units.

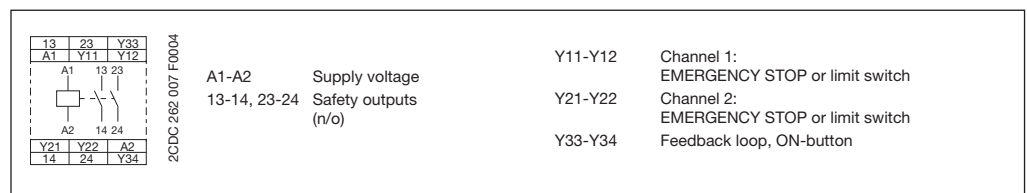
Three LEDs (Power, Channel 1, Channel 2) indicate operating state and function.

When the EMERGENCY STOP button or the limit switch is unlocked and when the ON-button is pressed, the internal circuit of the safety relay and the external contactors are checked for proper functioning. On the C577, the ON circuit Y33-Y34 is checked for short circuit. This means that a fault is detected when Y33-Y34 is closed before the EMERGENCY STOP button is closed.

Block diagram C576 and C577



Connection diagram C576 and C577



Type	Supply voltage U_c	Start	Order code	Pack unit piece	Price 1 piece	Weight 1 piece kg / lb
C576	24 V AC/DC	auto	1SAR 501 120 R0001	1		0.27 / 0.60
C577	24 V AC/DC	monitored	1SAR 501 220 R0001	1		0.28 / 0.62

• Approvals	150	• Dimensional drawings	168
• Technical data	167		

Safety relays

C572

Ordering details



C572

- Auto-start / monitored start
- 24 V DC at EMERGENCY STOP button or limit switch
- Cross circuit detection at EMERGENCY STOP button or limit switch
- Feedback loop for monitoring of external contactors
- Safety outputs: 3 n/o contacts, positively guided
- Signalling contacts: 2 n/c contacts, positively guided
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4

EMERGENCY STOP monitor and safety gate monitor C572

Application

The safety relay C572 can be used in EMERGENCY STOP circuits according to EN 418, in safety circuits according to VDE 0113 Part 1 (06.93) and/or EN 60 204-1 (12.97), e.g. with movable covers and safety gates. Depending on the external connection, safety categories B, 1, 2, 3 or 4 according to DIN EN 945-1 are achievable with this device.

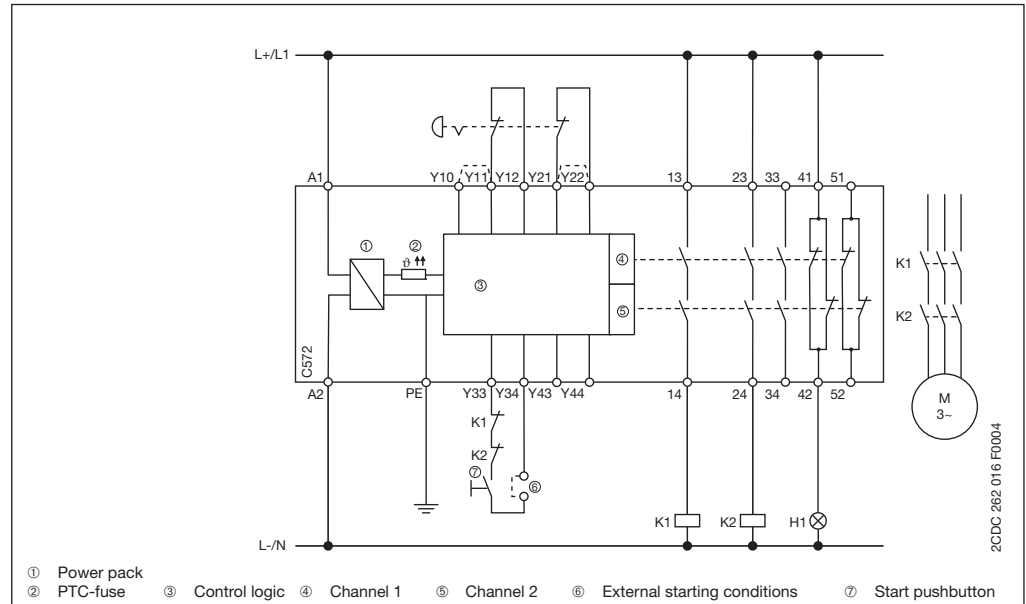
Functions

The safety relay C572 has three enabling circuits (safety outputs) which are configured as n/o contacts and two signal circuits configured as a n/c contact.

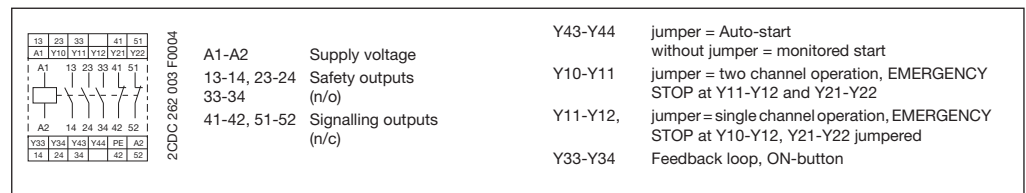
Three LEDs (Power, Channel 1, Channel 2) indicate operating state and function.

When the EMERGENCY STOP pushbutton or limit pushbutton is unlocked and the ON-button is pressed, the redundant safety relays, electronic circuitry and external contactors are tested for proper functioning. On the C572, the ON circuit Y33-Y34 is checked for short circuit. This means that a fault is detected when Y33-Y34 is closed before the EMERGENCY STOP button is closed.

Block diagram C572



Connection diagram C572



Type	Supply voltage U_c	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
C572	24 V DC	1SAR 501 032 R0003	1		0.42 / 0.93
	24 V AC	1SAR 501 032 R0002	1		0.42 / 0.93
	115 V AC	1SAR 501 032 R0004	1		0.52 / 1.15
	230 V AC	1SAR 501 032 R0005	1		0.52 / 1.15

- Approvals 150
- Technical data 167
- Dimensional drawings 168

Safety relays C574 Ordering details



C574

- Auto-start or monitored start (depending on device)
- Short circuit protection
- Single- or two-channel connection
- Feedback loop for monitoring of external contactors
- Off-delay T_v continuously adjustable
- Safety outputs: 2 n/o contacts (stop cat. 0), 2 n/o contacts (stop cat. 1), time delayed, pos. guided
- Signalling output: 1 n/c contact, positively guided
- 5 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4¹⁾

EMERGENCY STOP monitor and safety gate monitor with time delay C574

Application

The safety relay C574 can be used in EMERGENCY STOP devices according to EN 418, in safety circuits according to VDE 0113 Part 1 (06.93) and/or EN 60 204-1 (12.97), such as for monitoring safety gates, or in circuits with controlled stand-still requirement (STOP Category 1). Depending on the external circuitry, this device can be used to realize safety categories B, 1, 2, 3 or 4¹⁾ for undelayed enabling circuits according to DIN EN 954-1.

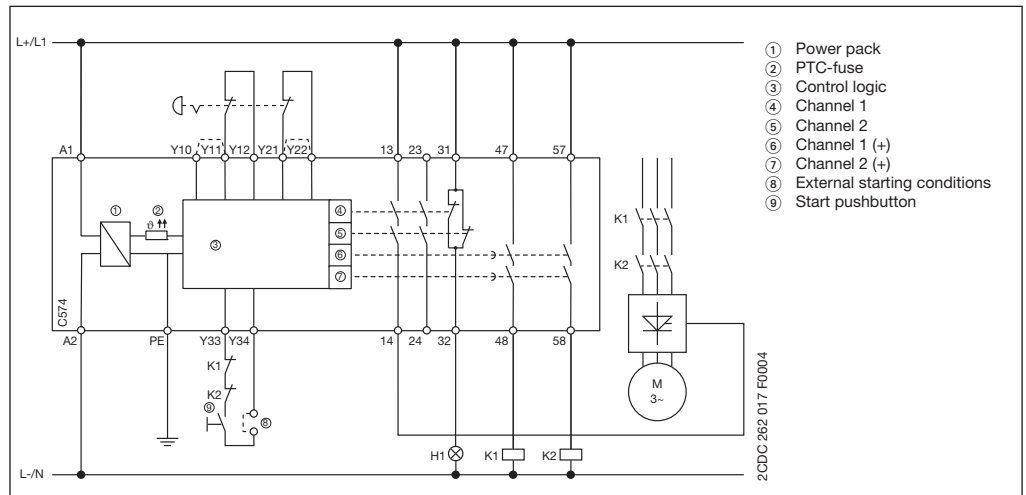
Functions

The C574 safety relay possesses two delayed and two undelayed enabling circuits (safety outputs) as n/o contacts and one undelayed signal output as n/c contact.

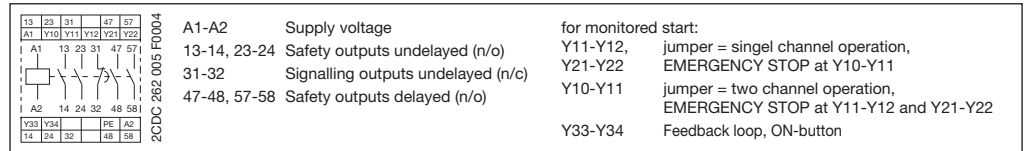
Five LEDs (Power, Channel 1, Channel 2, delayed channel 1, delayed channel 2) indicate the operating status and the functions.

The redundant safety relays, the electronics and the operated motor contactors are tested for proper functioning when the EMERGENCY STOP button or the limit switch button is unlatched, and when ON circuit Y33-Y34 is closed. On the C574 (monitored start), the ON circuit Y33-Y34 is checked for short circuit. This means that a fault is detected when Y33-Y34 is closed before the EMERGENCY STOP button is closed.

Block diagram C574



Connection diagram C574



Type	Supply voltage U_c	Off-delay T_v	Start	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
C574	24 V DC	0,5-30 s	monitored	1SAR 503 041 R0003	1		0.50 / 1.10
	24 V AC			1SAR 503 041 R0002	1		0.50 / 1.10
	115 V AC			1SAR 503 041 R0004	1		0.65 / 1.43
	230 V AC			1SAR 503 041 R0005	1		0.65 / 1.43
C574	24 V DC	0,5-30 s	auto	1SAR 503 141 R0003	1		0.50 / 1.10
	24 V AC			1SAR 503 141 R0002	1		0.50 / 1.10
	115 V AC			1SAR 503 141 R0004	1		0.65 / 1.43
	230 V AC			1SAR 503 141 R0005	1		0.65 / 1.43
C574	24 V DC	0,05-3 s	monitored	1SAR 533 241 R0003	1		0.50 / 1.10
	24 V AC			1SAR 533 241 R0002	1		0.50 / 1.10
	115 V AC			1SAR 533 241 R0004	1		0.65 / 1.43
	230 V AC			1SAR 533 241 R0005	1		0.65 / 1.43
C574	24 V DC	0,05-3 s	auto	1SAR 533 141 R0003	1		0.50 / 1.10
	24 V AC			1SAR 533 141 R0002	1		0.50 / 1.10
	115 V AC			1SAR 533 141 R0004	1		0.65 / 1.43
	230 V AC			1SAR 533 141 R0005	1		0.65 / 1.43

¹⁾ For undelayed enabling circuits only.

Safety relays C575 Ordering details



C575

- Two-Hand control acc. to EN 574 Type III C
- 24 V DC at the two-hand control switches
- Simultaneity monitoring: 0.5 s
- Cross circuit detection
- Feedback loop for monitoring of external contactors
- Safety outputs: 2 n/o contacts, positively guided
- Signaling contacts: 2 n/c contacts, positively guided
- 5 LEDs for status indication
- Safety category acc. to EN type III C: B4

TWO-HAND control C575

Application

C575 is suitable for installation in controls for presses: Hydraulic presses DIN EN 693, eccentric and related presses EN 692, screw presses EN 692.

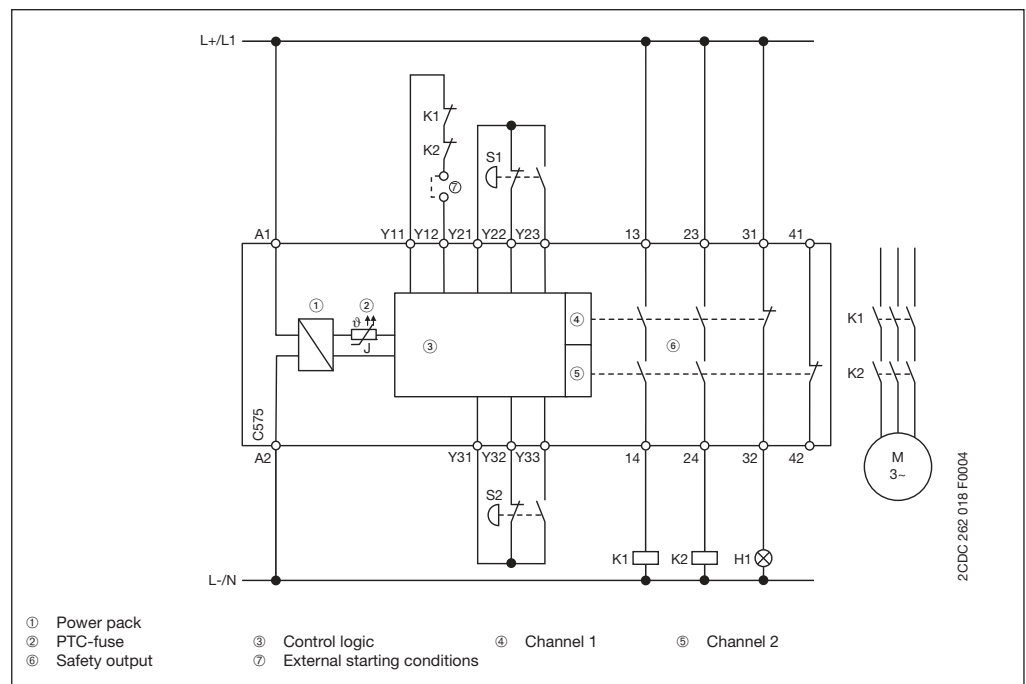
Functions

The two-hand control unit C575 possesses two enabling circuits (safety outputs) configured as n/o contacts and two signal outputs configured as n/c contacts.

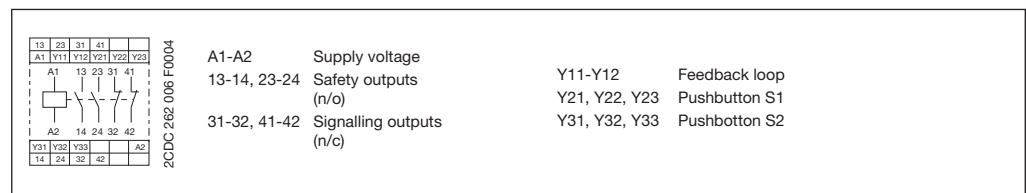
Five LEDs (Power, S1 ON, S1 OFF, S2 ON, S2 OFF) indicate the operating status and the functions.

The safety outputs are closed by simultaneous operation (< 0.5 s) of the pushbuttons S1 and S2. If one pushbutton is no longer pressed, the outputs open. They do not close again until both pushbuttons are no longer pressed and then simultaneously pressed again.

Block diagram C575



Connection diagram C575



Type	Supply voltage U_c	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
C575	24 V DC	1SAR 504 022 R0003	1		0.42 / 0.93
	24 V AC	1SAR 504 022 R0002	1		0.42 / 0.93
	115 V AC	1SAR 504 022 R0004	1		0.52 / 1.15
	230 V AC	1SAR 504 022 R0005	1		0.52 / 1.15

¹⁾ According to EN 574, Type III C

• Approvals	150	• Dimensional drawings	168
• Technical data	167		

Safety relays - Contact expansion

C579

Ordering details



C579

- 1 safety output contact of the basic device is required for connection to the extension unit.
- Safety outputs: 4 n/o contacts, positively guided
- 2 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4 depending on the external connection

Extension unit C579 for contact expansion

Applications

The C579 extension unit can be used in combination with all C57x basic units. It extends the number of enabling circuits. Depending on the external connection, safety categories B, 1, 2, 3 or 4 according to DIN EN 954-1 are achievable with this device.

Functions

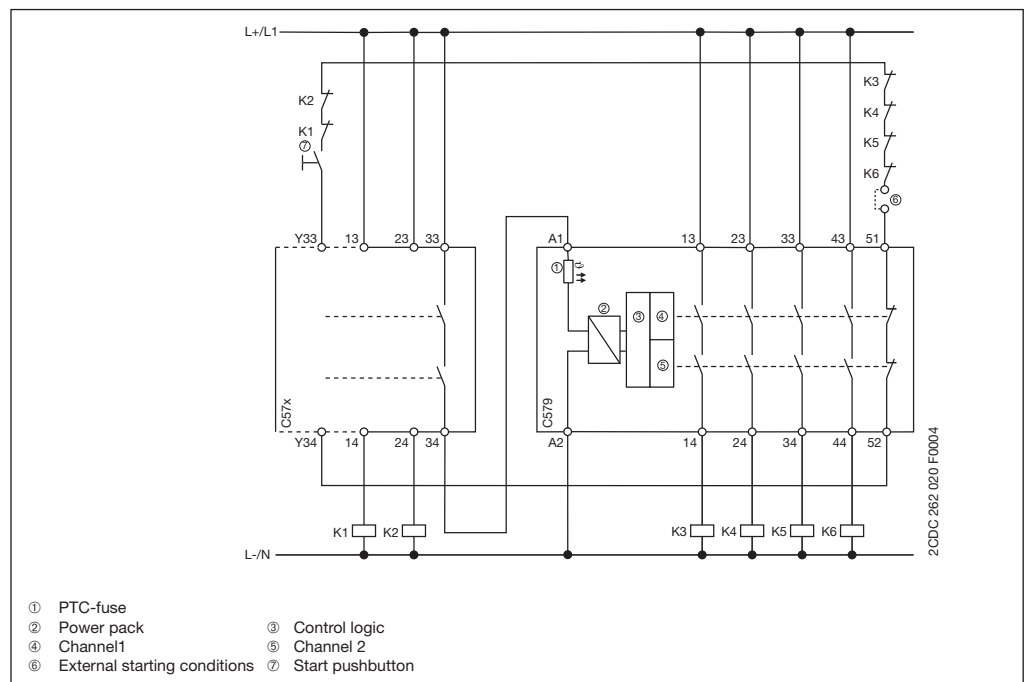
The C579 extension unit has four enabling circuits (safety circuits) configured as n/o circuits.

Two LEDs (channel 1, channel 2) indicate operating state and function.

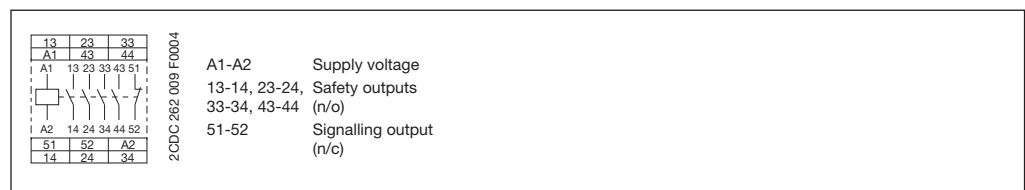
The device is controlled via one enabling circuit of the safety relays C57x.

When the EMERGENCY STOP pushbutton or the limit switch is unlocked and the ON-button is pressed, the internal circuit of the safety relay and the external contactors are checked for correct functioning.

Block diagram C579



Connection diagram C579



Type	Supply voltage U_c	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
C579	24 V AC/DC	1SAR 502 040 R0001	1		0.28 / 0.62
C579-AC	115 V AC	1SAR 502 040 R0004	1		0.31 / 0.68
C579-AC	230 V AC	1SAR 502 040 R0005	1		0.31 / 0.68

• Approvals	150	• Dimensional drawings	168
• Technical data	167		

Safety relay with solid-state output C6700

Ordering details



C6700

- Auto-start / monitored start
- Feedback loop for monitoring of external contactors
- Safety outputs:
2 solid-state components á 0,5 A
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3
- Safety integrity level acc. to IEC 61508: SIL 1, SIL 2

Electronic safety relay with solid-state output C6700

Applications

The C6700 safety combination can be used in EMERGENCY STOP circuits according to EN 418 and in safety circuits according to EN 60 204-1 (11.98), e. g. for moving covers and safety gates. Safety categories B, 1, 2 or 3 according to DIN EN 954-1 or SIL 1 or SIL 2 according to IEC 61508 can be achieved, depending on the external circuits.

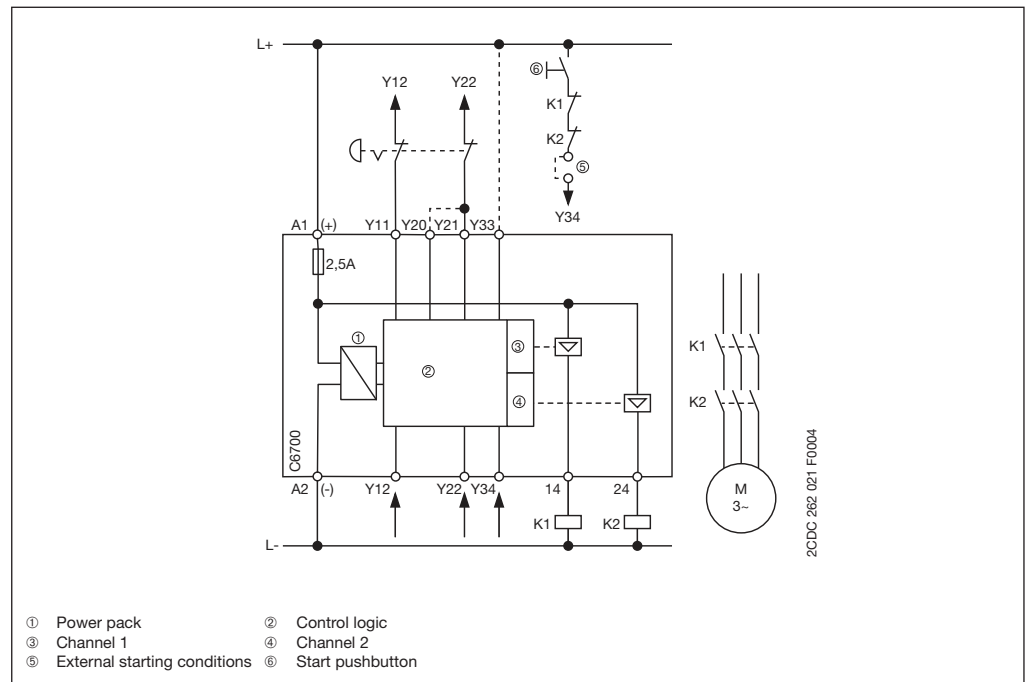
Functions

The C6700 safety relay has two solid-state outputs.

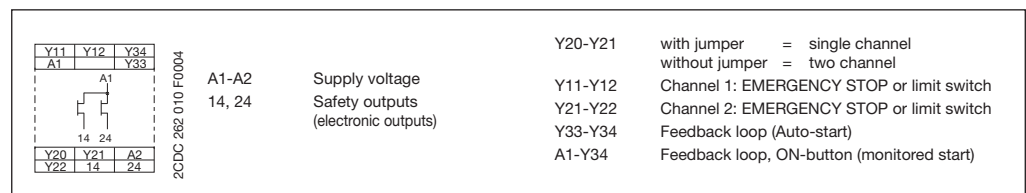
Three LEDs (Power, Run, Fail) indicate the operating state and the function.

During operation, all internal circuit elements are cyclically monitored for faults. Safety category 3 according to EN 954-1 is achieved only in combination with 2 external actuators with positively driven feedback contacts.

Block diagram C6700



Connection diagram C6700



Type	Supply voltage U_c	Release time after EMERG. STOP	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg /lb
C6700	24 V DC	< 30 ms	1SAR 510 120 R0003	1		0.18 / 0.40

• Approvals	151	• Dimensional drawing	170
• Technical data	169		

Safety relay with solid-state outputs C6701

Ordering details

2CDC 261 027 F0004



C6701

- Auto-start / monitored start
- Cross circuit detection configurable
- Feedback loop for monitoring of external contactors
- 2 solid-state components à 1,5 A
- Cascading input
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4
- Safety integrity level acc. to IEC 61508: SIL 1, SIL 2, SIL 3

Electronic safety relay with solid-state output C6701

Application

The C6701 safety relay can be used in EMERGENCY STOP circuits according to EN 418 and in safety circuits according to EN 60 204-1 (11.98), e.g. in movable guards and safety gates. Depending on the external circuit elements, safety categories B, 1, 2, 3 or 4 according to DIN EN 954-1 or SIL 1, SIL 2 or SIL 3 according to IEC 61508 can be achieved.

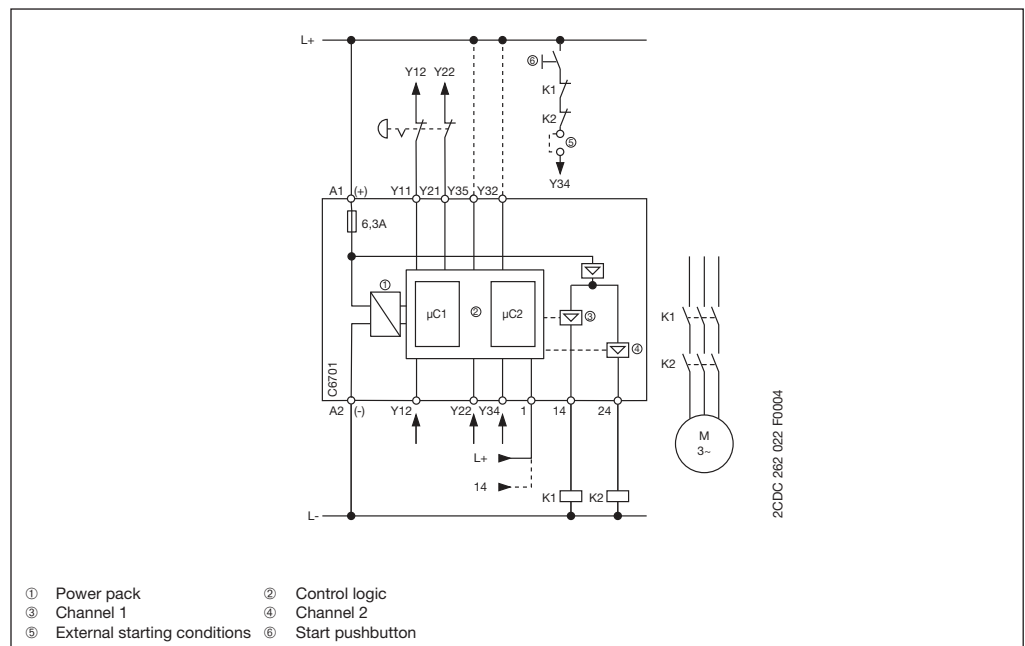
Functions

The C6701 safety relay has two reliable solid-state outputs.

Three LEDs (Power, Run, Fail) indicate the operating state and the function.

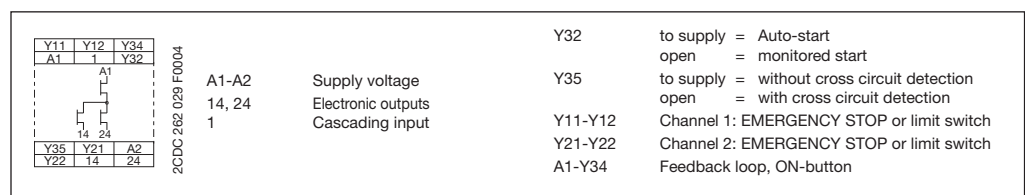
When the device is put into operation it runs through a self-test to test the correct functioning of the internal electronics. All internal circuit components are monitored for faults cyclically during operation. External actuators or loads can be switched via safe outputs 14 and 24.

Block diagram C6701



2CDC 262 022 F0004

Connection diagram C6701



Type	Supply voltage U_c	Release time after EMERG. STOP	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
C6701	24 V DC	30 ms min.	1SAR 511 320 R0003	1		0.17 / 0.37

- Approvals 151
- Technical data 169
- Dimensional drawing 170

Safety relays with solid-state outputs C6702

Ordering details



C6702

- Auto-start / monitored start
- Cross circuit detection configurable
- Feedback loop for monitoring of external contactors
- 2 Safety outputs à 1,5 A:
 - 1 solid-state component undelayed: stop category 0
 - 1 solid-state component delayed (delay time adjustable from 0,05-3 s or 0,5-30 s): stop category 1
- Cascading input
- 3 LEDs for status indication
- Safety category acc. to EN 954-1: B, 1, 2, 3, 4
- Safety integrity level acc. to IEC 61508: SIL 1, SIL 2, SIL 3

Electronic safety relays with solid-state output C6702

Application

The C6702 safety relays can be used in EMERGENCY STOP circuits according to EN 418 and in safety circuits according to EN 60 204-1 (11.98), e.g. in movable guards and safety gates. Depending on the external circuit elements, safety categories B, 1, 2, 3 or 4 according to DIN EN 954-1 or SIL 1, SIL 2 or SIL 3 according to IEC 61508 can be achieved.

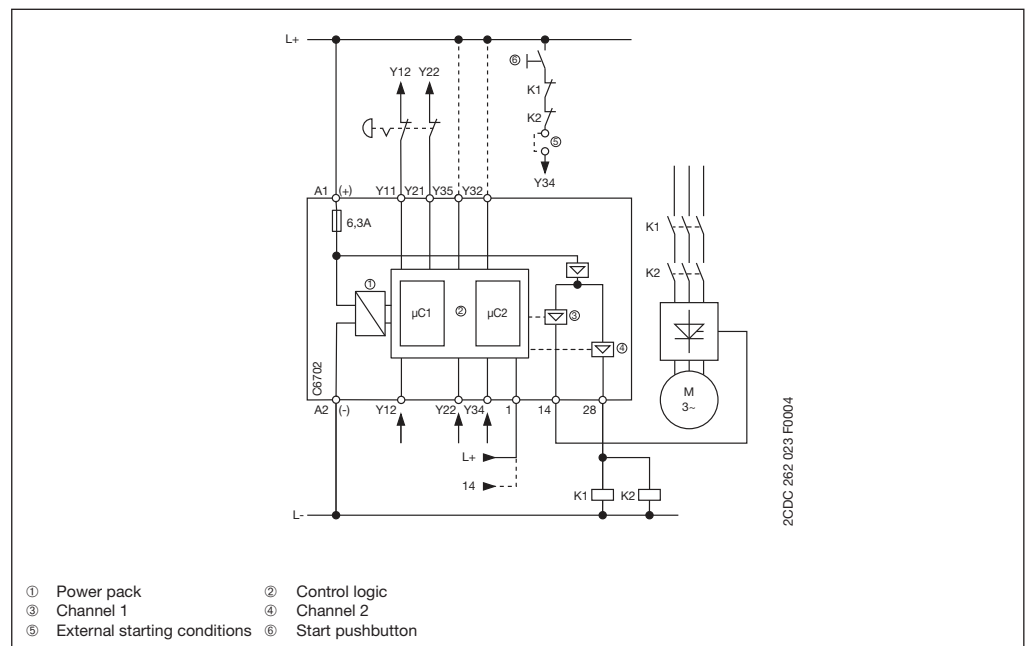
Functions

The C6702 solid-state safety relays have one safe solid-state output and one time-delayed safe solid-state output.

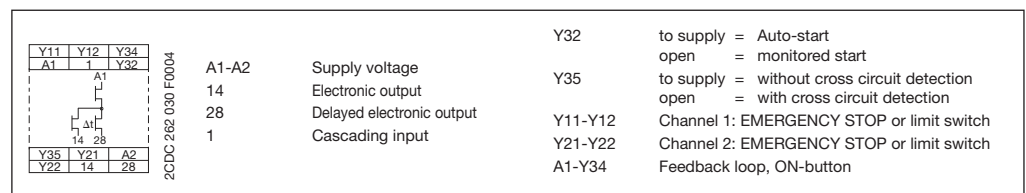
Three LEDs (Power, Run, Fail) indicate the operating state and the function.

When the device is put into operation it runs through a self-test to test the correct functioning of the internal electronics. All internal circuit components are monitored for faults cyclically during operation. External actuators or loads can be switched via safe outputs 14 and 28.

Block diagram C6702



Connection diagram C6702



Type	Supply voltage U _c	Release time after EMERG. STOP	Order code	Pack. unit piece	Price 1 piece	Weight 1 piece kg / lb
C6702	24 V DC	0.05-3 s	1SAR 543 320 R0003	1		0.17 / 0.37
C6702	24 V DC	0.5-30 s	1SAR 513 320 R0003	1		0.17 / 0.37

• Approvals	151	• Dimensional drawing	170
• Technical data	169		

Safety relays

C57x range

Technical data

Type	C571(-AC)	C573	C576	C577	C579(-AC)	C572	C574	C575	
Input circuit	A1-A2								
Supply voltage	see ordering details								
Supply voltage tolerance	AC	-15 % ... +10 %							
	DC	-15 % ... +20 %				-15 % ... +10 %			
Power consumption	1.5 W / VA					3 W / VA	4 W / VA	3 W / VA	
Duty time	100 %								
Mains buffering	60 ms	60 ms	30 ms	80 ms	35 ms	100 ms	30 ms	40 ms	
Time response - Control circuit									
Response time					≤ 30 ms ¹⁾			≤ 100 ms	
	monitored start	-	-	-	≤ 30 ms	-	≤ 25 ms	≤ 80 ms	-
	auto-start	≤ 200 ms ^{2),3)}	≤ 200 ms ²⁾	-	-	-	≤ 150 ms	≤ 80 ms	-
Release time								≤ 20 ms	
	at EMERGENCY STOP	≤ 200 ms	≤ 200 ms	≤ 80 ms	≤ 20 ms	-	≤ 25 ms	≤ 25 ms	-
	at power failure	≤ 200 ms	≤ 200 ms	≤ 100 ms	≤ 150 ms	≤ 25 ms ⁴⁾	≤ 350 ms	≤ 100 ms	-
Recovery time								≥ 250 ms	
	at EMERGENCY STOP	≥ 200 ms	≥ 200 ms	≥ 200 ms	≥ 400 ms	-	≥ 200 ms	after time lapse	-
	at power failure	≥ 200 ms	≥ 200 ms	≥ 200 ms	≥ 600 ms	≥ 100 ms	≥ 500 ms	≥ 1 s	-
Minimum control pulse length / time	EMERGENCY STOP	≥ 200 ms ³⁾	≥ 200 ms	≥ 25 ms	≥ 25 ms	-	≥ 25 ms	≥ 25 ms	-
	ON-button	≥ 150 ms ³⁾	≥ 150 ms	≥ 40 ms	≥ 25 ms	-	≥ 25 ms	≥ 25 ms	-
Simultaneity	unlimited							500 ms	
Output circuits									
Kind of output	2 n/o	3 n/o + 1 n/c	2 n/o	2 n/o	4 n/o	3 n/o + 2 n/c	4 n/o ⁸⁾ + 1 n/c	2 n/o + 2 n/c	
Contact material									
Rated switching current (IEC 60947-5-1)	AC15 1150 V	5 A				6 A	5 A / 2 A ⁵⁾	6 A	
	AC15 230 V	5 A				6 A	5 A / 2 A ⁵⁾	6 A	
	DC13 24 V	5 A				6 A	5 A / 2 A ⁵⁾	6 A	
Rated thermal current	5 A				6 A	5 A	6 A		
for 2-4 release circuits	at T _a = 70 °C	2 RC: 4 A	3 RC: 3.5 A	4 RC: 3 A	5 A	4 A	5 A		
	at T _a = 60 °C	2 RC: 4.5 A	3 RC: 4 A	4 RC: 3.5 A	6 A	5 A	6 A		
	at T _a = 50 °C	2 RC: 5 A	3 RC: 4.5 A	4 RC: 4 A	6 A	5 A	6 A		
Mechanical lifetime	1x10 ⁷ switching cycles								
Electrical lifetime	1x10 ⁵ switching cycles								
Operating frequency	1000/h at load with rated switching current								
Short-circuit proof I _K = 1 kA ⁶⁾ , max. fuse rating	6 A slow, 10 A fast ⁷⁾								
General data									
Dimensions (W x H x D)	22.5 x 102 x 120 mm (0.89 x 4.02 x 4.72 inch)					45 x 102 x 120 mm (1.77 x 4.02 x 4.72 inch)			
Mounting position	any								
Degree of protection enclosure / terminals	IP40 / IP20					IP20 / IP20			
Ambient temperature range	operation	-25...+60 °C							
	storage	-40...+80 °C							
Mounting	DIN rail (EN 50022)								

¹⁾ at 115 V AC, 230 V AC: max. 200 ms

²⁾ at 24 V AC: max. 300 ms

³⁾ at 115 V AC, 230 V AC: max. 300 ms

⁴⁾ at 115 V AC, 230 V AC: max. 80 ms

⁵⁾ undelayed / delayed release circuits

⁶⁾ other fuses on request

⁷⁾ signal circuit of C573 = 6 A

⁸⁾ 2 undelayed and 2 delayed n/o contacts

Safety relays

C57x range

Technical data (continued), dimensional drawings

Type	C571(-AC)	C573	C576	C577	C579	C572	C574	C575	
Electrical connection									
Wire size	rigid 2 x 2.5 mm ² / 1 x 4 mm ² (1 x 12 AWG / 2 x 14 AWG)								
	fine-strand with wire end ferrules 2 x 1.5 mm ² / 1 x 2.5 mm ² (2 x 16 AWG / 2 x 14 AWG)								
Standards									
Standards	EN 60204-1 (VDE 0113-1), EN 292, EN 954-1								
RoHs Directive	2002/95/EC								
Safety category	(EN 954-1)	4 ¹⁾	4 ¹⁾	4	4	as basic device	4	4 ²⁾	4
	(EN 574)	-	-	-	-	device	-	-	Type III C
Type-proof-test	10 a								
PFH	3 x 10 ⁻⁷ [1/h] ³⁾		3 x 10 ⁻⁸ [1/h] ³⁾		3 x 10 ⁻⁹ [1/h] ³⁾		3 x 10 ⁻⁸ [1/h] ³⁾		
Mechanical resistance (EN 60068)	8 g, 10 ms								
Isolation data									
Rated insulation voltage (VDE 0110, IEC 947-1)	300 V								
Rated impulse withstand voltage (VDE 0110, IEC 664)	4 kV								
Pollution degree (VDE 0110, IEC 664, IEC 255-5)	3								
Overvoltage category (VDE 0110)	III								

¹⁾ Possible with additional external measures. The figures apply only if the cables and sensors are laid safely and protected mechanically. See also user manual and application manual.

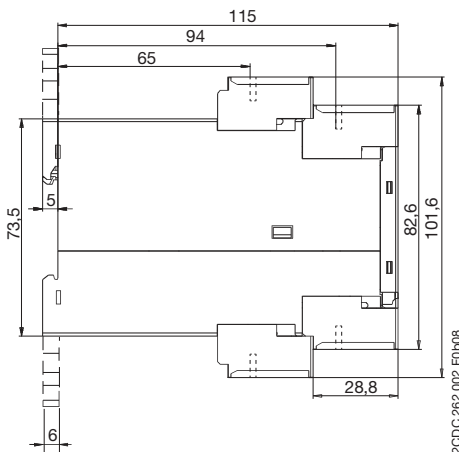
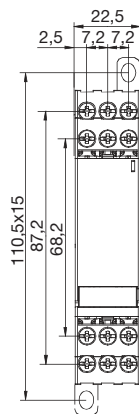
²⁾ Possible with undelayed enable contact.

³⁾ according to target of IEC 61508-1 Tab 3

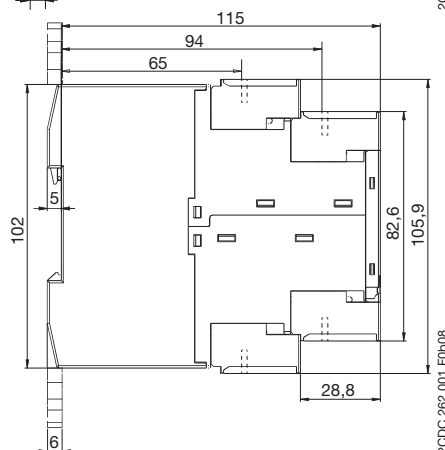
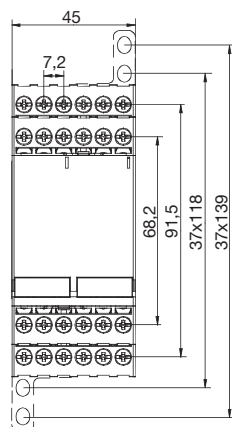
Dimensional drawings

Dimensions in mm

C571, C573,
C576, C577,
C579



C572, C574,
C575



Safety relays with solid-state outputs

C67xx range

Technical data

Type		C6700	C6701	C6702
Input circuit				
Supply voltage		24 V DC		
Supply voltage tolerance		-10 % ... +15 %		
Power consumption		1.5 W	1.3 W	1.3 W
Duty time		100 %		
Time response				
Response time	monitored start	125 ms	60 ms	60 ms
	auto-start	250 ms	60 ms	60 ms
Release time	at EMERG. STOP	30 ms	45 ms	45 ms ¹⁾ , adjustable 0.05-30 s ⁴⁾
	at power failure	25 ms	100 ms ²⁾	100 ms ²⁾
Recovery time	at EMERG. STOP	20 ms	400 ms	400 ms
	at power failure	0,02 s	max. 7 s	max. 7 s
Mains buffering		25 ms ³⁾	25 ms ^{2) 3)}	25 ms ^{2) 3)}
Minimum control pulse length / time	EMERGENCY STOP	20 ms	25 ms	30 ms
	ON-button	0.02 s	0.2-5 s	0.2-5 s
Simultaneity		unlimited		
Output circuits				
Kind of output		2 electrical		
Contact material		solid-state		
Rated switching current (IEC 60947-5-1)	AC15 1150 V	-	-	-
	AC15 230 V	-	-	-
	DC13 24 V	0.5 A	1.5 A	1.5 A
Mechanical lifetime				
Electrical lifetime		unlimited as switching electronically		
Operating frequency		3000/h at load with rated switching current		
Short-circuit proof, max. fuse rating		short-circuit proof, no fusing necessary		
General data				
Dimensions (W x H x D)		22.5 x 100 x 86 mm (0.89 x 3.94 x 3.39 inch)		
Mounting		any		
Degree of protection enclosure / terminals		IP40 / IP20		
Ambient temperature range	operation	-25...+60 °C		
	storage	-40...+80 °C		
Mounting		DIN rail (EN 50022)		
Electrical connection				
Wire size	rigid	2 x 2.5 mm ² / 1 x 4 mm ² (2 x 14 AWG / 1 x 12 AWG)		
	fine-strand with wire end ferrules	2 x 1.5 mm ² / 1 x 2.5 mm ² (2 x 16 AWG / 1 x 14 AWG)		

¹⁾ only for undelayed output

²⁾ When the casade input is supplied from A1, the maximum reaction time after an EMERGENCY STOP applies.

³⁾ No supply of the drivers, only internal supply bridging, SELV-/PELV power supply buffers.

⁴⁾ 1SAR 543 320 R0003: 0.05-3 s / 1SAR 513 320 R0003: 0.5-30 s

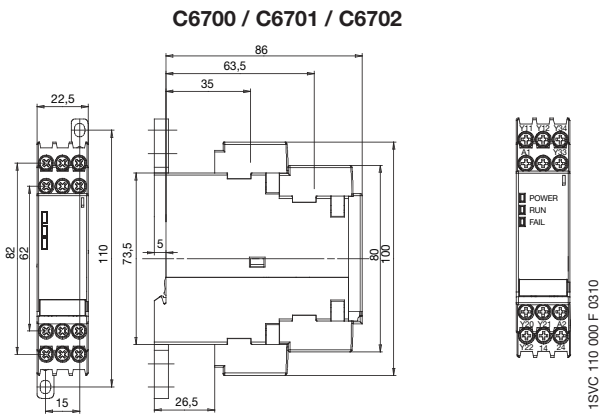
Safety relays with solid-state outputs C67xx range

Technical data (continued), dimensional drawing

Type	C6700	C6701	C6702
Standards			
Standards	EN 60204-1 (VDE 0113-1), EN 292, EN 954-1, IEC 61508, DIN EN 0116 ¹⁾		
Safety category (EN 954-1)	3	4	4
Safety integrity level (IEC 61508)	2	3	3
Type-proof-test	10 a		
PFD	$9,18 \times 10^{-4}$	$2,347 \times 10^{-6}$	
PFH	3×10^{-7} [1/h] ²⁾	$5,358 \times 10^{-11}$ [1/h] ²⁾	
Mechanical resistance (EN 60068)	8 g / 10 ms, 15 g / 5 ms		
Insulation data			
Rated insulation voltage (VDE 0110, IEC 947-1)	50 V		
Rated impulse withstand voltage (VDE 0110, IEC 664)	500 V		
Pollution degree (VDE 0110, IEC 664, IEC 255-5)			
Overvoltage category (VDE 0110)			

Dimensional drawing

Dimensions in mm



¹⁾ Electrical equipment of furnaces. VDE-Certificat for C6701 and C6702 available.

²⁾ according to target of IEC 61508-1 Tab 3



Primary switch mode power supplies

CP range

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Primary switch mode power supplies

CP range

Overview



2CDC 275 002 F0606

Special features of CP range primary switch power supplies

- **Primary switch mode power supplies**
 - High efficiency of approx. 90 %
 - Low power dissipation and low heating
 - Long lifetime
- **Wide range of AC or DC supply voltages**
 - World wide use also in high fluctuating networks and battery-powered plants
- **Constant or adjustable output voltage (depending on type)**
- **Use in very harsh industrial environments**
 - Reliable construction
 - According to EMC Directives EN 61000-6-2 (Interference immunity) and EN 61000-6-4 (Interference emission)
- **Open-circuit, overload and short-circuit proof**
- **Integrated input fuse**
- **Safety**
 - Closed construction
 - Touch-proof connecting terminals
 - Electrical isolation
- **Easy and fast mounting**
 - Mounting on DIN rail
- **LED(s) for status indication**
- **Example of application**
 - Supply of programmable logic controllers (PLC) e. g. AC31, AC500

Primary switch mode power supplies

CP range

Selection table

		CP-D						CP-E						CP-S			CP-C			
		0.42 A	0.83 A	1.3 A	2.1 A	2.5 A	4.2 A	0.625 A	0.75 A	1.25 A	2.5 A	3 A	5 A	10 A	20 A	5 A	10 A	20 A	5 A	10 A
Rated output current	5 V DC																			
	12 V DC		■		■															
	24 V DC	■		■		■	■		■	■	■		■	■	■	■	■	■	■	■
	48 V DC							■		■			■	■						
Rated output power / voltage	10 W	12 V DC		■																
		24 V DC	■																	
	15 W	5 V DC										■								
		24 V DC							■											
	18 W	12 V DC				■					■									
		24 V DC			■					■										
		48 V DC						■												
	60 W	24 V DC					■				■									
		48 V DC								■										
	100 W	24 V DC					■													
		48 V DC																		
	120 W	12 V DC												■						
		24 V DC											■		■			■		
	240 W	24 V DC												■		■			■	
48 V DC												■								
480 W	24 V DC												■			■			■	
	48 V DC												■							
Rated input voltage	100-240 V AC	■	■	■	■	■	■	■	■	■	■	■								
	115 / 230 V AC auto select												■ ¹⁾							
	115-230 V AC												■ ²⁾	■						
	110-240 V AC													■			■	■	■	
	110-120 V AC / 220-240 V AC														■	■				
Accessories	Redundancy unit						■	■	■	■	■	■	■	■	■	■	■	■	■	
	Control module													■	■	■	■	■	■	
	Messaging module																■	■	■	
Structure of the type designation	CP-x y/z.z CP: Power supply x: Product range y: Rated output voltage z: Rated output current																			

¹⁾ CP-E 12/10.0 and CP-E 24/10.0

²⁾ CP-E 48/10.0

Primary switch mode power supplies

CP range

Approvals and marks

		CP-D						
		CP-D 12/0.83	CP-D 12/2.1		CP-D 24/0.42	CP-D 24/1.3	CP-D 24/2.5	CP-D 24/4.2
■ existing □ pending								
Approvals								
	UL 508, CAN/CSA C22.2 No.14	■ ¹⁾	■ ¹⁾		■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾
	UL 1310, CAN/CSA C22.2 No.223 (Class 2 Power Supply)	■ ¹⁾	■ ¹⁾		■ ¹⁾	■ ¹⁾	■ ¹⁾	
	UL 60950, CAN/CSA C22.2 No.60950	■ ¹⁾	■ ¹⁾		■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾
	GOST	■	■		■	■	■	■
	CCC	■ ¹⁾	■ ¹⁾		■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾
Marks								
	CE	■	■		■	■	■	■
	C-Tick	□	□		□	□	□	□

		CP-E														
		CP-E 5/3.0	CP-E 12/2.5	CP-E 12/10.0	CP-E 24/0.75	CP-E 24/1.25	CP-E 24/2.5	CP-E 24/5.0	CP-E 24/10.0	CP-E 24/20.0	CP-E 48/0.62	CP-E 48/1.25	CP-E 48/5.0	CP-E 48/10.0		CP-RUD
■ existing □ pending																
Approvals																
	UL 508, CAN/CSA C22.2 No.14	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾		
	UL 1310, CAN/CSA C22.2 No.223 (Class 2 Power Supply)	■	■		■	■	■				■	■				
	ANSI/ISA-12.12 (Class I, Div. 2, hazardous locations)	■	■		■	■	■				■	■				
	UL 60950, CAN/CSA C22.2 No.60950	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾	■ ¹⁾		
	GOST	■	■	■	■	■	■	■	■	■	■	■	■	■		
	CCC	■ ¹⁾	■ ¹⁾		■ ¹⁾	■ ¹⁾	■ ¹⁾				■ ¹⁾	■ ¹⁾				
Marks																
	CE	■	■	■	■	■	■	■	■	■	■	■	■	■		■
	C-Tick	■	■	□	■	■	■	□	□	□	■	■	□	□		■

		CP-S			CP-C				CP-A					
		CP-S 24/5.0	CP-S 24/10.0	CP-S 24/20.0		CP-C 24/5.0	CP-C 24/10.0	CP-C 24/20.0		CP-C MM		CP-A RU	CP-A CM	
■ existing □ pending														
Approvals														
	UL 508, CAN/CSA C22.2 No.14	■ ¹⁾	■ ¹⁾	■ ¹⁾		■ ¹⁾	■ ¹⁾	■ ¹⁾		□			■ ¹⁾	
	UL 508, CAN/CSA C22.2 No.14												■ ¹⁾	
	UL 1604 (Class I, Div. 2, hazardous locations), CAN/CSA C22.2 No.213	■ ¹⁾	■ ¹⁾	■ ¹⁾		■ ¹⁾	■ ¹⁾	■ ¹⁾					■	□
	UL 60950, CAN/CSA C22.2 No.60950	■ ¹⁾	■ ¹⁾	■ ¹⁾		■ ¹⁾	■ ¹⁾	■ ¹⁾		□			■ ¹⁾	■ ¹⁾
	GOST	■	■	■		■	■	■		■			■	■
	CB scheme	■	■	■		■	■	■		□			■	■
	CCC	■ ¹⁾				■ ¹⁾	■ ¹⁾	■ ¹⁾		□				
Marks														
	CE	■	■	■		■	■	■		■			■	■
	C-Tick	■	■	■		■	■	■		■			■	□

¹⁾ Approvals refer to the rated input voltage U_{IN} .



Primary switch mode power supplies

CP-D range

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Primary switch mode power supplies

CP-D range

Benefits and advantages



2CDC 275 031 F0007

Width and structural form

With their width between 18 to 90 mm only, the CP-D range switch mode power supplies are ideally suited for installation in distribution panels.



2CDC 271 027 F0007

Wide range input

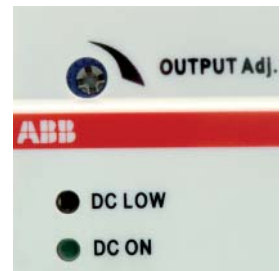
Optimised for world-wide applications: The CP-D power supplies can be supplied with 90-264 V AC or 120-370 V DC.



2CDC 276 033 F0007

Adjustable output voltage

The CP-D range types > 10 W feature a continuously adjustable output voltage. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by a long line length.



2CDC 276 032 F0007-a

- Output voltages 12 V, 24 V DC
- Adjustable output voltages (devices > 10 W)
- Output currents 0.42 A / 0.83 A / 1.3 A / 2.1 A / 2.5 A / 4.2 A
- Power range 10 W, 30 W, 60 W, 100 W
- Wide range input 100-240 V AC (90-264 V AC, 120-370 V DC)
- High efficiency of up to 89 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -25...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- U/I characteristic (fold-forward behaviour at overload – no switch-off)
- LEDs for status indication
- Light-grey enclosure in RAL 7035
- Approvals / Marks (depending on device, partly pending):



4

Primary switch mode power supplies

CP-D range

Ordering details



CP-D 12/0.83,
CP-D 24/0.42



CP-D 12/2.1
CP-D 24/1.3



CP-D 24/2.5



CP-D 24/4.2

Type	Rated input voltage	Rated output voltage / current	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CP-D 12/0.83	100-240 V AC	12 V DC / 0.83 A	1SVR 427 041 R1000	1		0.06 / 0.13
CP-D 12/2.1	100-240 V AC	12 V DC / 2.1 A	1SVR 427 043 R1200	1		0.19 / 0.41
CP-D 24/0.42	100-240 V AC	24 V DC / 0.42 A	1SVR 427 041 R0000	1		0.06 / 0.13
CP-D 24/1.3	100-240 V AC	24 V DC / 1.3 A	1SVR 427 043 R0100	1		0.19 / 0.41
CP-D 24/2.5	100-240 V AC	24 V DC / 2.5 A	1SVR 427 044 R0200	1		0.25 / 0.55
CP-D 24/4.2	100-240 V AC	24 V DC / 4.2 A	1SVR 427 045 R0400	1		0.32 / 0.71

• Approvals	174	• Technical diagrams	182	• Dimensional drawings	182
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Primary switch mode power supplies

CP-D range (12 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type		CP-D 12/0.83	CP-D 12/2.1
Input circuit - supply circuit		L, N	
Rated input voltage U_{IN}		100-240 V AC	
Input voltage range		90-264 V AC / 120-370 V DC	
Frequency range AC		47-63 Hz	
Typical input current / typical power consumption	at 110 V AC	200 mA / 12.68 W	502 mA / 31.14 W
	at 230 V AC	128.3 mA / 13.01 W	277 mA / 31.2 W
Inrush current	at 230 V AC	30 A (max. 3 ms)	50 A (max. 3 ms)
Power failure buffering		min. 30 ms	
Internal input fuse		1 A slow-acting / 250 V AC	2 A slow-acting / 250 V AC
Indication of operational states			
Output voltage	DC ON: green LED	┌: output voltage applied	
	DC LOW: red LED	└: output voltage too low	
Output circuit		+, -	++, --
Rated output voltage		12 V DC	
Tolerance of the output voltage		$\pm 1\%$	
Adjustment range of the output voltage		-	12-14 V DC
Rated output power		10 W	30 W
Rated output current I_r	$T_a \leq 60\text{ °C}$	0.83 A	2.1 A
Derating of the output current	$60\text{ °C} < T_a \leq 70\text{ °C}$	2.5 %/K	
Maximum load change statical deviation with change of input voltage within the input voltage range		1 %	
Control time		$< 1\text{ ms}$	
Starting time after applying the supply voltage	at I_r	1000 ms	
Response time	at rated load	typ. 1 ms	
Residual ripple and switching peaks	BW = 20 MHz	50 mV	
Parallel connection		no	
Series connection		yes, to increase voltage	
Resistance to reverse feed		18 V / 1 s	
Power factor correction (PFC)		no	
Output circuit - No-load, overload and short-circuit behaviour			
Output curve		U/I curve	
Short-circuit protection		continuous short-circuit stability	
Short-circuit behaviour		continuation with output power limitation	
Current limitation at short circuit		typ. 1.4 A	typ. 5.9 A
Overload protection		output power limitation	
No-load protection		continuous no-load stability	
Starting of capacitive loads		unlimited	
General data			
Efficiency		typ. 78 %	typ. 82 %
Duty time		100 %	
Dimensions (WxHxD)		18 x 91 x 57.5 mm [0.71 x 3.58 x 2.26 in]	53 x 91 x 57.5 mm [2.09 x 3.58 x 2.26 in]
Weight		0.06 kg (0.13 lb)	0.19 kg (0.41 lb)
Material of enclosure		plastic	
Mounting		DIN rail (EN 60715), snap-on mounting without any tool	
Mounting position		horizontal	
Minimum distance to other units	horizontal / vertical	25 mm / 25 mm (0.98 in / 0.98 in)	
Degree of protection	enclosure / terminals	IP20 / IP20	
Protection class		II	

Primary switch mode power supplies

CP-D range (12 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type		CP-D 12/0.83	CP-D 12/2.1
Electrical connection - Input circuit / Output circuit			
Wire size	fine-strand with wire end ferrule	0.2-2 mm ² (24-14 AWG)	
	fine-strand without wire end ferrule		
	rigid		
Stripping length		6 mm (0.24 in)	
Tightening torque		0.36-0.56 Nm	
Environmental data			
Ambient temperature range	operation	-25...+70 °C	
	rated load	-25...+60 °C	
	storage	-25...+85 °C	
Damp heat (cyclic) (IEC/EN 60068-2-30)		4 x 24 cycles, 40 °C, 95 % RH	
Vibration (sinusoidal) (IEC/EN 60068-2-6)		50 m/s ² , 10 Hz - 2 kHz	
Shock (half-sine) (IEC/EN 60068-2-27)		40 m/s ² , 22 ms	
Isolation data			
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC	
Pollution category		2	
Standards			
Product standard		EN 61204	
Low Voltage Directive		2006/95/EC	
EMC Directive		2004/108/EC	
Electrical safety		UL 508, UL 60950-1, EN 60950-1	
Protective low voltage		SELV (EN 60950-1)	
Electromagnetic compatibility			
Interference immunity		EN 61000-6-2	
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 4 (4 kV / 8 kV)	Level 4 (8 kV / 15 kV)
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)	
fast transients (Burst)	IEC/EN 61000-4-4	Level 4 (4 kV)	
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 3 (2 kV L-L)	
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)	
Interference emission		EN 61000-6-3	
electromagnetic field (HF radiation resistance)	IEC/CISPR 22, EN 55022	Class B	
HF line emission	IEC/CISPR 22, EN 55022	Class B	

Primary switch mode power supplies

CP-D range (24 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type	CP-D 24/0.42	CP-D 24/1.3	CP-D 24/2.5	CP-D 24/4.2
Input circuit - supply circuit	L, N			
Rated input voltage U_{IN}	100-240 V AC			
Input voltage range	90-264 V AC / 120-370 V DC			
Frequency range AC	47-63 Hz			
Typical input current / typical power consumption	at 110 V AC 184 mA / 11.62 W	600 mA / 37.92 W	1120 mA / 69.3 W	1800 mA / 117.3 W
	at 230 V AC 120.6 mA / 12 W	344 mA / 38.16 W	660 mA / 70.1 W	900 mA / 114.4 W
Inrush current	at 230 V AC 30 A (max. 3 ms)		50 A (max. 3 ms)	
Power failure buffering	min. 30 ms		min. 60 ms	
Internal input fuse	1 A slow-acting / 250 V AC	2 A slow-acting / 250 V AC		3.15 A slow-acting / 250 V AC
Indication of operational states				
Output voltage	DC ON: green LED	┌: output voltage applied		
	DC LOW: red LED	└: output voltage too low		
Output circuit	+, -	++, --		
Rated output voltage	24 V DC			
Tolerance of the output voltage	$\pm 1\%$			
Adjustment range of the output voltage	-	24-28 V DC		
Rated output power	10 W	30 W	60 W	100 W
Rated output current I_r	$T_a \leq 60\text{ °C}$			
	0.42 A	1.3 A	2.5 A	4.2 A
Derating of the output current	$60\text{ °C} < T_a \leq 70\text{ °C}$			
	2.5 %/K			
Maximum load change statical deviation with change of input voltage within the input voltage range	1 %			
Control time	$< 1\text{ ms}$			
Starting time after applying the supply voltage	at I_r 1000 ms			
Response time	at rated load typ. 1 ms			
Residual ripple and switching peaks	BW = 20 MHz 50 mV			
Parallel connection	no			
Series connection	yes, to increase voltage			
Resistance to reverse feed	35 V / 1 s			
Power factor correction (PFC)	no			
Output circuit - No-load, overload and short-circuit behaviour				
Output curve	U/I curve			
Short-circuit protection	continuous short circuit stability			
Short-circuit behaviour	continuation with output power limitation			
Current limitation at short circuit	typ. 0.78 A	typ. 4.2 A	typ. 6.05 A	typ. 11.5 A
Overload protection	output power limitation			
No-load protection	continuous no-load stability			
Starting of capacitive loads	unlimited			
General data				
Efficiency	typ. 80 %	typ. 83 %	typ. 86 %	typ. 89 %
Duty time	100 %			
Dimensions (WxHxD)	18 x 91 x 57.5 mm [0.71 x 3.58 x 2.26 in]	53 x 91 x 57.5 mm [2.09 x 3.58 x 2.26 in]	71 x 91 x 57.5 mm [2.80 x 3.58 x 2.26 in]	89.9 x 91 x 57.5 mm [3.54 x 3.58 x 2.26 in]
Weight	0.06 kg (0.13 lb)	0.19 kg (0.41 lb)	0.25 kg (0.55 lb)	0.32 kg / (0.72 lb)
Material of enclosure	plastic			
Mounting	DIN rail (EN 60715), snap-on mounting without any tool			
Mounting position	horizontal			
Minimum distance to other units	horizontal / vertical 25 mm / 25 mm (0.98 in / 0.98 in)			
Degree of protection	enclosure / terminals IP20 / IP20			
Protection class	II			

Primary switch mode power supplies

CP-D range (24 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type		CP-D 24/0.42	CP-D 24/1.3	CP-D 24/2.5	CP-D 24/4.2
Electrical connection - Input circuit / Output circuit					
Wire size	fine-strand with wire end ferrule	0.2-2 mm ² (24-14 AWG)			
	fine-strand without wire end ferrule				
	rigid				
Stripping length		6 mm (0.24 in)			
Tightening torque		0.36-0.56 Nm			
Environmental data					
Ambient temperature range	operation	-25...+70 °C			
	rated load	-25...+60 °C			
	storage	-25...+85 °C			
Damp heat (cyclic) (IEC/EN 60068-2-30)		4 x 24 cycles, 40 °C, 95 % RH			
Vibration (sinusoidal) (IEC/EN 60068-2-6)		50 m/s ² , 10 Hz - 2 kHz			
Shock (half-sine) (IEC/EN 60068-2-27)		40 m/s ² , 22 ms			
Isolation data					
Rated insulation voltage U_i	input circuit / output circuit	3 kV AC	3 kV AC	4 kV AC	3 kV AC
Pollution category		2			
Standards					
Product standard		EN 61204			
Low Voltage Directive		2006/95/EC			
EMC Directive		2004/108/EC			
Electrical safety		UL 508, UL 60950-1, EN 60950-1			
Protective low voltage		SELV (EN 60950-1)			
Electromagnetic compatibility					
Interference immunity		EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 4 (4 kV / 8 kV)	Level 4 (8 kV / 15 kV)		Level 4 (4 kV / 8 kV)
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)			
fast transients (Burst)	IEC/EN 61000-4-4	Level 4 (4 kV)			
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 3 (2 kV L-L)			
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)			
Interference emission		EN 61000-6-3			
electromagnetic field (HF radiation resistance)	IEC/CISPR 22, EN 55022	Class B			
HF line emission	IEC/CISPR 22, EN 55022	Class B			

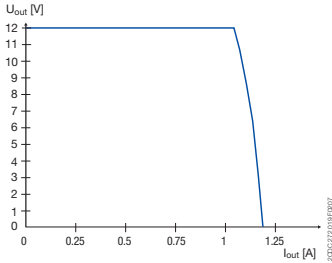
Primary switch mode power supplies

CP-D range

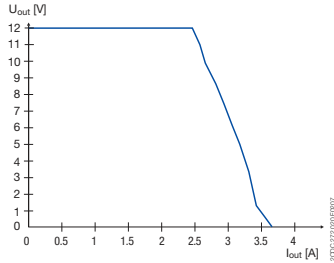
Technical diagrams, Dimensional drawings

Technical diagrams

Output curve at $T_a = 25^\circ\text{C}$

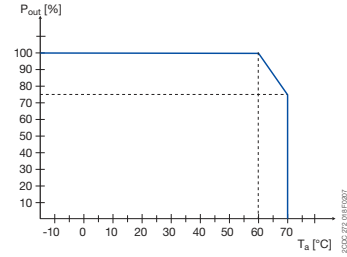


CP-D 12/0.83

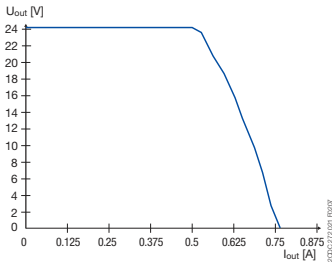


CP-D 12/2.1

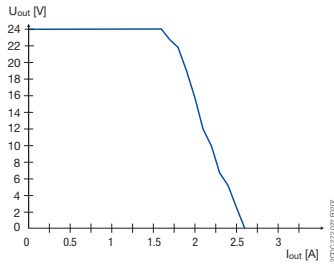
Temperature curve at rated output voltage



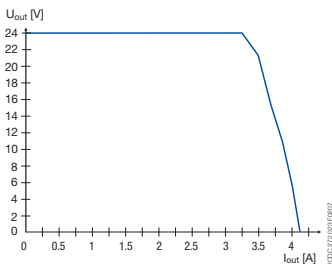
CP-D



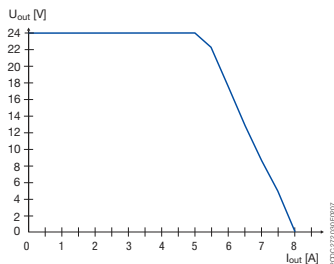
CP-D 24/0.42



CP-D 24/1.3



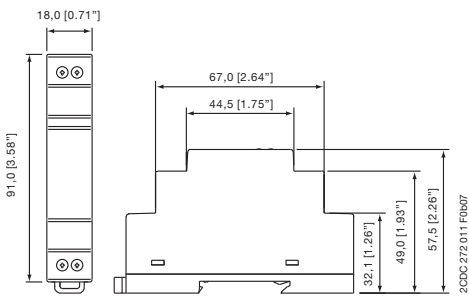
CP-D 24/2.5



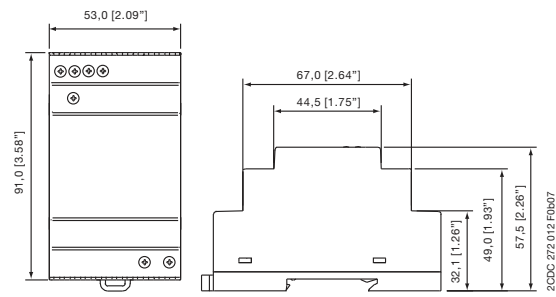
CP-D 24/4.2

Dimensional drawings

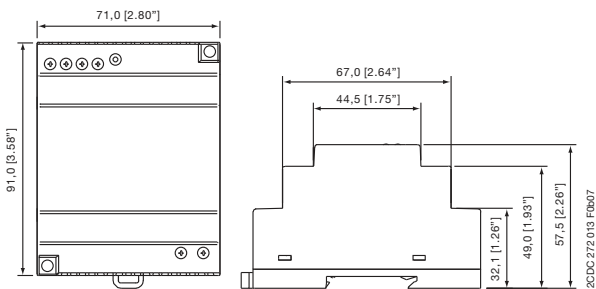
dimensions in mm



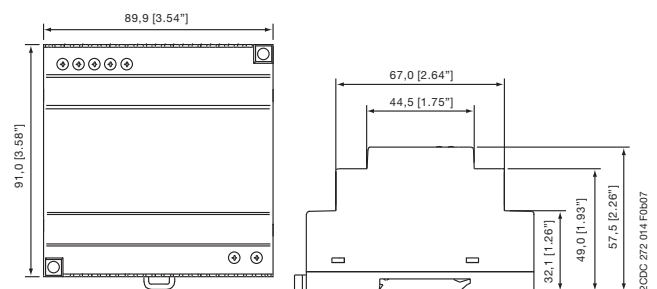
CP-D 12/0.83, CP-D 24/0.42



CP-D 12/2.1, CP-D 24/1.3



CP-D 24/2.5



CP-D 24/4.2



Primary switch mode power supplies

CP-E range

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Primary switch mode power supplies

CP-E range

Benefits and advantages



2CDC 275 004 F0006

Signalling output/contact

The CP-E range 24 V devices > 18 W offer an output/contact for monitoring of the output voltage and remote diagnosis.



2CDC 276 008 F0006

Wide range input

Optimised for world-wide applications: The CP-E power supplies can be supplied within a wide range of AC or DC voltage.



2CDC 276 009 F0006

Adjustable output voltage

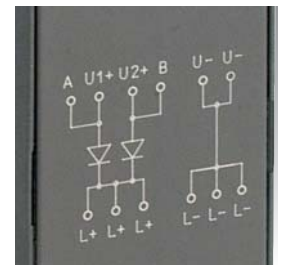
The CP-E range types feature a continuously adjustable output voltage. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by a long line length.



2CDC 276 008 F0006

Redundancy units

For decoupling of parallelized power supply units < 48 V. Thus, true redundancy can be achieved.



2CDC 271 006 F0003

4

- Output voltages 5 V, 12 V, 24 V, 48 V DC
- Adjustable output voltages
- Output currents 0.625 A / 0.75 A / 1.25 A / 2.5 A / 3 A / 5 A / 10 A / 20 A
- Power range 15 W, 18 W, 30 W, 60 W, 120 W, 240 W, 480 W
- Wide range input or auto select input
- High efficiency of up to 90 %
- Low power dissipation and low heating
- Free convection cooling (no forced cooling with ventilators)
- Ambient temperature range during operation -25...+70 °C
- Open-circuit, overload and short-circuit stable
- Integrated input fuse
- U/I characteristic curve on devices > 18 W (fold-forward behaviour at overload – no switch-off)
- Redundancy units offering true redundancy
- LED(s) for status indication
- Signalling output/contact for output voltage OK
 - Transistor on 24 V devices > 18 W and < 120 W
 - Relay on 24 V devices ≥ 120 W
- Approvals / Marks (depending on device, partly pending):



Primary switch mode power supplies

CP-E range

Ordering details



CP-E 5/3.0



CP-E 12/2.5



CP-E 24/0.75



CP-E 24/2.5



CP-E 48/0.62



CP-RUD

Type	Rated input voltage	Rated output voltage / current	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CP-E 5/3.0	100-240 V AC	5 V DC / 3 A	1SVR 427 033 R3000	1		0.15 / 0.33
CP-E 12/2.5	100-240 V AC	12 V DC / 2.5 A	1SVR 427 032 R1000	1		0.29 / 0.64
CP-E 12/10.0	115 / 230 V AC auto select	12 V DC / 10 A	1SVR 427 035 R1000	1		1.00 / 2.20
CP-E 24/0.75	100-240 V AC	24 V DC / 0.75 A	1SVR 427 030 R0000	1		0.15 / 0.33
CP-E 24/1.25	100-240 V AC	24 V DC / 1.25 A	1SVR 427 031 R0000	1		0.29 / 0.64
CP-E 24/2.5	100-240 V AC	24 V DC / 2.5 A	1SVR 427 032 R0000	1		0.36 / 0.79
CP-E 24/5.0	115 / 230 V AC auto select	24 V DC / 5 A	1SVR 427 034 R0000	1		1.00 / 2.20
CP-E 24/10.0	115 / 230 V AC auto select	24 V DC / 10 A	1SVR 427 035 R0000	1		1.36 / 3.01
CP-E 24/20.0	115-230 V AC	24 V DC / 20 A	1SVR 427 036 R0000	1		1.90 / 4.19
CP-E 48/0.62	100-240 V AC	48 V DC / 0.625 A	1SVR 427 030 R2000	1		0.29 / 0.64
CP-E 48/1.25	100-240 V AC	48 V DC / 1.25 A	1SVR 427 031 R2000	1		0.36 / 0.79
CP-E 48/5.0	115 / 230 V AC auto select	48 V DC / 5 A	1SVR 427 034 R2000	1		1.36 / 3.01
CP-E 48/10.0	115-230 V AC	48 V DC / 10 A	1SVR 427 035 R2000	1		1.90 / 4.19

Redundancy units for decoupling of two CP-E power supply units

Type	suitable for decoupling of CP-E power supply units	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
CP-RUD: 2 inputs each up to 2.5 A and 1 output up to 5 A					
CP-RUD	< 48 V and < 5 A	1SVR 423 418 R9000	1		0.15 / 0.33
CP-A RU: 2 inputs each up to 20 A and 1 output up to 40 A					
CP-A RU	< 48 V and ≥ 5 A	1SVR 427 071 R0000	1		0.89 / 1.96

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Primary switch mode power supplies

CP-E range (5 V DC and 12 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type		CP-E 5/3.0	CP-E 12/2.5	CP-E 12/10.0
Input circuit		L, N		
Rated input voltage U_{IN}		100-240 V AC		115 / 230 V AC auto select
Input voltage range		90-265 V AC / 120-370 V DC	85-264 V AC / 90-375 V DC	90-132 V AC, 186-264 V AC / 210-370 V DC
Frequency range AC		47-63 Hz		
Typical input current	at 115 V AC	297 mA	555 mA	2.8 A
	at 230 V AC	183.2 mA	328 mA	1.4 A
Typical power consumption		19.8 W	35.9 W	143 W
Inrush current	at 115 V AC	10 A (max. 3 ms)	20 A (max. 3 ms)	24 A (max. 5 ms)
	at 230 V AC	18 A (max. 3 ms)	40 A (max. 3 ms)	48 A (max. 5 ms)
Power failure buffering	at 115 V AC	min. 20 ms	min. 20 ms	min. 25 ms
	at 230 V AC	min. 75 ms	min. 30 ms	min. 30 ms
Internal input fuse		2 A slow-acting / 250 V AC		3.15 A slow-acting / 250 V AC
Indication of operational states				
Output voltage	green LED	OK: ┌───┐ └───┘ output voltage OK	OUTPUT OK: ┌───┐ └───┘ output voltage OK	OUTPUT OK: ┌───┐ └───┘ output voltage OK
	red LED	LOW: ┌───┐ └───┘ output voltage too low	-	OUTPUT LOW: ┌───┐ └───┘ output voltage too low
Output circuit		L+,L-	L+, L+, L-, L-	
Rated output voltage		5 V DC	12 V DC	
Tolerance of the output voltage		$\pm 1\%$		0...+1 %
Adjustment range of the output voltage		4.7-6 V DC	12-15 V DC	11.4-14.5 V DC
Rated output power		15 W	30 W	120 W
Rated output current I_o	$T_a \leq 60\text{ °C}$	3.0 A	2.5 A	10 A
Derating of the output current	$60\text{ °C} < T_a \leq 70\text{ °C}$	3 %/°C		
Signalling output for output voltage OK	DC OK	-	-	-
Maximum deviation with	load change statical	$\pm 2\%$	0.5 %	$\pm 1\%$ (single mode) $\pm 5\%$ (parallel mode)
	change of input voltage within the input voltage range	$\pm 1\%$	0.5 %	$\pm 0.5\%$
Control time		$< 2\text{ ms}$		
Starting time after applying the supply voltage	at I_o	max. 1 s		
Response time	at rated load	max. 150 ms		
Residual ripple and switching peaks	BW = 20 MHz	50 mV		
Parallel connection		yes, to enable redundancy		configurable, to increase power, up to 3 devices, reduction: (number of devices x I_o , x) x 0.9
Series connection		yes, to increase voltage		yes, to increase voltage, max. 2 devices
Resistance to reverse feed		approx. 9 V DC	approx. 18 V DC	approx. 22 V DC
Power factor correction (PFC)		no		yes
Output circuit - No-load, overload and short-circuit behaviour				
Output curve		Hiccup-mode	U/I curve	
Short-circuit protection		continuous short-circuit proof		
Short-circuit behaviour		Hiccup-mode	continuation with output power limitation	
Overload protection		output power limitation		
No-load protection		continuous no-load stability		
Starting of capacitive loads		not possible	unlimited	

Primary switch mode power supplies

CP-E range (5 V DC and 12 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type	CP-E 5/3.0	CP-E 12/2.5	CP-E 12/10.0
General data			
Efficiency	typ. 75 %	typ. 84 %	typ. 84 %
Duty time	100 %		
Dimensions (W x H x D)	23.9 x 88.5 x 115 mm [0.94 x 3.48 x 4.53 in]	43.5 x 88.5 x 115 mm [1.71 x 3.48 x 4.53 in]	63.2 x 123.6 x 123.6 mm [2.49 x 4.87 x 4.87 in]
Weight	0.15 kg (0.33 lb)	0.29 kg (0.64 lb)	1 kg (2.20 lb)
Material of enclosure	Plastic		Metall
Mounting	DIN rail (EN 60715), snap-on mounting without any tool		
Mounting position	horizontal		
Minimum distance to other units	horizontal / vertical 25 mm / 25 mm (0.98 in / 0.98 in)		
Degree of protection	enclosure / terminals IP20 / IP20		
Protection class	I		
Electrical connection - input circuit / output circuit			
Wire size	fine-strand with wire end ferrule		0.2-4 mm ² (24-11 AWG)
	fine-strand without wire end ferrule		0.2-2 mm ² (24-14 AWG)
	rigid		
Stripping length	6 mm (0.24 in)		8 mm (0.31 in)
Tightening torque	input / output 0.5-0.6 Nm		1 Nm / 0.6 Nm
Environmental data			
Ambient temperature range	operation		-25...+70 °C
	rated load		-25...+60 °C
	storage		-25...+85 °C
Damp heat (cyclic) (IEC/EN 60068-2-30)	4 x 24 cycles, 40 °C, 95 % RH		95 % without condensation
Vibration (sinusoidal) (IEC/EN 60068-2-6)	10 m/s ² , 10...500 Hz		
Shock (half-sine) (IEC/EN 60068-2-27)	40 m/s ² , 22 ms, all directions		
Isolation data			
Rated insulation voltage U_i	input circuit / output circuit		3 kV AC
Pollution degree	2		
Standards			
Product standard	EN 61204		
Low Voltage Directive	2006/95/EG		
EMC directive	2004/108/EG		
RoHS directive	2002/95/EG		
Electrical safety	EN 50178, EN 60950-1, UL 60950-1, UL 508		IEC/EN 60950-1
Protective low voltage	SELV (EN 60950)		SELV
Electromagnetic compatibility			
Interference immunity	IEC/EN 61000-6-2		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 4 (8 kV / 15 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)	
fast transients (Burst)	IEC/EN 61000-4-4	Level 4 (4 kV)	
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 4 (2 kV / 4 kV)	
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)	
Interference emission	IEC/EN 61000-6-3		
electromagnetic field (HF radiation resistance)	IEC/CISPR 22, EN 55022	Class B	
HF line emission	IEC/CISPR 22, EN 55022	Class B	

Primary switch mode power supplies

CP-E range (24 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type		CP-E 24/0.75	CP-E 24/1.25	CP-E 24/2.5
Input circuit		L, N		
Rated input voltage U_{IN}		100-240 V AC		
Input voltage range		90-265 V AC / 120-370 V DC	85-264 V AC / 90-375 V DC	
Frequency range AC		47-63 Hz		
Typical input current	at 115 V AC	321 mA	543 mA	1033 mA
	at 230 V AC	197.4 mA	326.6 mA	570 mA
Typical power consumption		22.8 W	36.7 W	69.2 W
Inrush current	at 115 V AC	10 A (max. 3 ms)	20 A (max. 3 ms)	30 A (max. 3 ms)
	at 230 V AC	18 A (max. 3 ms)	40 A (max. 3 ms)	60 A (max. 3 ms)
Power failure buffering	at 115 V AC	min. 20 ms	min. 20 ms	
	at 230 V AC	min. 75 ms	min. 30 ms	
Internal input fuse		2 A slow-acting / 250 V AC		
Indication of operational states				
Output voltage	green LED	OK: ┌───┐ └───┘ output voltage OK	OUTPUT OK: ┌───┐ └───┘ output voltage OK	
	red LED	LOW: ┌───┐ └───┘ output voltage too low	-	-
Output circuit		L+,L-	L+, L+, L-, L-	
Rated output voltage		24 V DC		
Tolerance of the output voltage		±1 %		
Adjustment range of the output voltage		21.6-28.8 V DC	24-28 V DC	
Rated output power		18 W	30 W	60 W
Rated output current I_o	$T_a \leq 60\text{ °C}$	0.75 A	1.25 A	2.5 A
Derating of the output current	$60\text{ °C} < T_a \leq 70\text{ °C}$	3 %/°C	2.5 %/°C	
Signalling output for output voltage OK	DC OK	-	Transistor	
Maximum deviation with	load change statical	±2 %	0.5 %	
	change of input voltage within the input voltage range	±1 %	0.5 %	
Control time		< 2 ms		
Starting time after applying the supply voltage	at I_o	max. 1 s		
Response time	at rated load	max. 150 ms		
Residual ripple and switching peaks	BW = 20 MHz	50 mV		
Parallel connection		yes, to enable redundancy		
Series connection		yes, to increase voltage		
Resistance to reverse feed		approx. 9 V DC	approx. 18 V DC	approx. 35 V DC
Power factor correction (PFC)		no		
Output circuit - No-load, overload and short-circuit behaviour				
Output curve		Hiccup-mode	U/I curve	
Short-circuit protection		continuous short-circuit proof		
Short-circuit behaviour		Hiccup-mode	continuation with output power limitation	
Overload protection		output power limitation		
No-load protection		continuous no-load stability		
Starting of capacitive loads		not possible	unlimited	

Primary switch mode power supplies

CP-E range (24 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated



Type	CP-E 24/0.75	CP-E 24/1.25	CP-E 24/2.5
General data			
Efficiency	typ. 77 %	typ. 86 %	typ. 89 %
Duty time	100 %		
Dimensions (W x H x D)	23.9 x 88.5 x 115 mm [0.94 x 3.48 x 4.53 in]	43.5 x 88.5 x 115 mm [1.71 x 3.48 x 4.53 in]	
Weight	0.15 kg (0.33 lb)	0.29 kg (0.64 lb)	0.36 kg (0.79 lb)
Material of enclosure	Plastic		
Mounting	DIN rail (EN 60715), snap-on mounting without any tool		
Mounting position	horizontal		
Minimum distance to other units	horizontal / vertical 25 mm / 25 mm (0.98 in / 0.98 in)		
Degree of protection	enclosure / terminals IP20 / IP20		
Protection class	I		
Electrical connection - input circuit / output circuit			
Wire size	fine-strand with wire end ferrule fine-strand without wire end ferrule rigid		
	0.2-2 mm ² (24-14 AWG)		
Stripping length	6 mm (0.24 in)		
Tightening torque	input / output 0.5-0.6 Nm		
Environmental data			
Ambient temperature range	operation rated load storage		
	-25...+70 °C -25...+60 °C -25...+85 °C		
Damp heat (cyclic) (IEC/EN 60068-2-30)	4 x 24 cycles, 40 °C, 95 % RH		
Vibration (sinusoidal) (IEC/EN 60068-2-6)	10 m/s ² , 10...500 Hz		
Shock (half-sine) (IEC/EN 60068-2-27)	40 m/s ² , 22 ms, all directions		
Isolation data			
Rated insulation voltage U_i	input circuit / output circuit 3 kV AC		
Pollution degree	2		
Standards			
Product standard	EN 61204		
Low Voltage Directive	2006/95/EG		
EMC directive	2004/108/EG		
RoHS directive	2002/95/EG		
Electrical safety	EN 50178, EN 60950-1, UL 60950-1, UL 508		
Protective low voltage	SELV (EN 60950)		
Electromagnetic compatibility			
Interference immunity	IEC/EN 61000-6-2		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 4 (8 kV / 15 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)	
fast transients (Burst)	IEC/EN 61000-4-4	Level 4 (4 kV)	
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 4 (2 kV / 4 kV)	
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)	
Interference emission	IEC/EN 61000-6-3		
electromagnetic field (HF radiation resistance)	IEC/CISPR 22, EN 55022	Class B	
HF line emission	IEC/CISPR 22, EN 55022	Class B	

Primary switch mode power supplies

CP-E range (24 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type		CP-E 24/5.0	CP-E 24/10.0	CP-E 24/20.0
Input circuit		L, N		
Rated input voltage U_{IN}		115 / 230 V AC auto select		115-230 V AC
Input voltage range		90-132 V AC, 186-264 V AC / 210-370 V DC	93-132 V AC, 186-264 V AC / 210-370 V DC	90-264 V AC, 120-370 V DC
Frequency range AC		47-63 Hz		
Typical input current	at 115 V AC	2.8 A	5.4 A	7 A
	at 230 V AC	1.4 A	2.2 A	3.5 A
Typical power consumption		140 W	270 W	539 W
Inrush current	at 115 V AC	24 A (max. 5 ms)	30 A (max. 5 ms)	25 A (max. 5 ms)
	at 230 V AC	48 A (max. 5 ms)	60 A (max. 5 ms)	50 A (max. 5 ms)
Power failure buffering	at 115 V AC	min. 25 ms		min. 30 ms
	at 230 V AC	min. 30 ms		
Internal input fuse		3.15 A slow-acting / 250 V AC	6.3 A slow-acting / 250 V AC	10 A slow-acting / 250 V AC
Indication of operational states				
Output voltage	green LED	OUTPUT OK:  output voltage OK		
	red LED	OUTPUT LOW:  output voltage too low		
Output circuit		L+, L+, L-, L-		
Rated output voltage		24 V DC		
Tolerance of the output voltage		0...+1 %		
Adjustment range of the output voltage		22.5-28.5 V DC		
Rated output power		120 W	240 W	480 W
Rated output current I_r	$T_a \leq 60\text{ °C}$	5 A	10 A	-
	$T_a \leq 55\text{ °C}$	-	-	20 A
Derating of the output current	$60\text{ °C} < T_a \leq 70\text{ °C}$	2.5 %/°C		
	$55\text{ °C} < T_a \leq 70\text{ °C}$	-	-	2.5 %/°C
Signalling contact for output voltage OK	13-14	Relay (max. 60 V DC, 0.3 A)		
Maximum deviation with	load change statical	±1 % (single mode) ±5 % (parallel mode)		±0.5 % (single mode) ±5 % (parallel mode)
	change of input voltage within the input voltage range	±0.5 %		
Control time		< 2 ms		
Starting time after applying the supply voltage	at I_r	max. 1 s		
Response time	at rated load	50 mV		
Residual ripple and switching peaks	BW = 20 MHz	100 mV		
Parallel connection		configurable, to increase power, up to 3 devices, reduction: (number of devices x I_r , x) x 0.9		
Series connection		yes, to increase voltage, max. 2 devices		
Resistance to reverse feed		approx. 35 V DC		
Power factor correction (PFC)		yes		
Output circuit - No-load, overload and short-circuit behaviour				
Output curve		U/I curve		
Short-circuit protection		continuous short-circuit proof		
Short-circuit behaviour		continuation with output power limitation		
Overload protection		output power limitation		
No-load protection		continuous no-load stability		
Starting of capacitive loads		unlimited		

Primary switch mode power supplies

CP-E range (24 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type	CP-E 24/5.0	CP-E 24/10.0	CP-E 24/20.0
General data			
Efficiency	typ. 86 %	typ. 89 %	typ. 89 %
Duty time	100 %		
Dimensions (W x H x D)	63.2 x 123.6 x 123.6 mm [2.49 x 4.87 x 4.87 in]	83 x 123.6 x 123.6 mm [3.27 x 4.87 x 4.87 in]	175 x 123.6 x 123.6 mm [6.89 x 4.87 x 4.87 in]
Weight	1 kg (2.20 lb)	1.36 kg (3.01 lb)	1.9 kg (4.19 lb)
Material of enclosure	Metall		
Mounting	DIN rail (EN 60715), snap-on mounting without any tool		
Mounting position	horizontal		
Minimum distance to other units	horizontal / vertical 25 mm / 25 mm (0.98 in / 0.98 in)		
Degree of protection	enclosure / terminals IP20 / IP20		
Protection class	I		
Electrical connection - input circuit / output circuit			
Wire size	fine-strand with wire end ferrule		0.2-4 mm ² (24-11 AWG)
	fine-strand without wire end ferrule		0.2-6 mm ² (24-10 AWG)
	rigid		
Stripping length	8 mm (0.31 in)		
Tightening torque	input / output		1 Nm / 0.6 Nm
Environmental data			
Ambient temperature range	operation		-25...+70 °C
	rated load		-25...+60 °C
	storage		-25...+85 °C
Damp heat (cyclic) (IEC/EN 60068-2-30)	95 % without condensation		
Vibration (sinusoidal) (IEC/EN 60068-2-6)			
Shock (half-sine) (IEC/EN 60068-2-27)			
Isolation data			
Rated insulation voltage U_i	input circuit / output circuit		3 kV AC
Pollution degree	2		
Standards			
Product standard			
Low Voltage Directive	2006/95/EG		
EMC directive	2004/108/EG		
RoHS directive	2002/95/EG		
Electrical safety	IEC/EN 60950-1		
Protective low voltage	SELV		
Electromagnetic compatibility			
Interference immunity	IEC/EN 61000-6-2		
electrostatic discharge (ESD)	IEC/EN 61000-4-2		
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3		
fast transients (Burst)	IEC/EN 61000-4-4		
powerful impulses (Surge)	IEC/EN 61000-4-5		
HF line emission	IEC/EN 61000-4-6		
Interference emission	IEC/EN 61000-6-3		
electromagnetic field (HF radiation resistance)	IEC/CISPR 22, EN 55022	Class B	
HF line emission	IEC/CISPR 22, EN 55022	Class B	

Primary switch mode power supplies

CP-E range (48 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type	CP-E 48/0.62	CP-E 48/1.25	CP-E 48/5.0	CP-E 48/10.0
Input circuit	L, N			
Rated input voltage U_{IN}	100-240 V AC		115 / 230 V AC auto select	115-230 V AC
Input voltage range	85-264 V AC / 90-375 V DC		93-132 V AC, 186-264 V AC / 210-370 V DC	90-264 V AC, 120-370 V DC
Frequency range AC	47-63 Hz			
Typical input current				
at 115 V AC	541 mA	1033 mA	5.4 A	7 A
at 230 V AC	320 mA	573 mA	2.2 A	3.5 A
Typical power consumption	35.7 W	69.0 W	267 W	528 W
Inrush current				
at 115 V AC	20 A (max. 3 ms)	30 A (max. 3 ms)	30 A (max. 5 ms)	25 A (max. 5 ms)
at 230 V AC	40 A (max. 3 ms)	60 A (max. 3 ms)	60 A (max. 5 ms)	50 A (max. 5 ms)
Power failure buffering				
at 115 V AC	min. 20 ms		min. 25 ms	min. 30 ms
at 230 V AC	min. 30 ms			
Internal input fuse	2 A slow-acting / 250 V AC		6.3 A slow-acting / 250 V AC	10 A slow-acting / 250 V AC
Indication of operational states				
Output voltage	green LED		OUTPUT OK: ┌───┐ └───┘ output voltage OK	
	red LED		OUTPUT LOW: ┌───┐ └───┘ output voltage too low	
	-	-		
Output circuit	L+, L+, L-, L-			
Rated output voltage	48 V DC			
Tolerance of the output voltage	$\pm 1\%$		$0...+1\%$	
Adjustment range of the output voltage	48-55 V DC		47-56 V DC	
Rated output power	30 W	60 W	240 W	480 W
Rated output current I_r				
$T_a \leq 60\text{ °C}$	0.625 A	1.25 A	5 A	-
$T_a \leq 55\text{ °C}$	-	-	-	10 A
Derating of the output current				
$60\text{ °C} < T_a \leq 70\text{ °C}$	2.5 %/°C			-
$55\text{ °C} < T_a \leq 70\text{ °C}$	-	-	-	2.5 %/°C
Signalling output for output voltage OK	DC OK		-	-
Maximum deviation with	load change statical			
	0.5 %		$\pm 1\%$ (single mode)	$\pm 0.5\%$ (single mode)
			$\pm 5\%$ (parallel mode)	$\pm 5\%$ (parallel mode)
	change of input voltage within the input voltage range		$\pm 0.5\%$	
Control time	$< 2\text{ ms}$			
Starting time after applying the supply voltage	at I_r		max. 1 s	
Response time	at rated load		max. 150 ms	
Residual ripple and switching peaks	BW = 20 MHz		50 mV	
Parallel connection	yes, to enable redundancy		configurable, to increase power, up to 3 devices, reduction: (number of devices x I_r , x) x 0.9	
Series connection	yes, to increase voltage		yes, to increase voltage, max. 2 devices	
Resistance to reverse feed	approx. 35 V DC			
Power factor correction (PFC)	no		yes	
Output circuit - No-load, overload and short-circuit behaviour				
Output curve	U/I curve			
Short-circuit protection	continuous short-circuit proof			
Short-circuit behaviour	continuation with output power limitation			
Overload protection	output power limitation			
No-load protection	continuous no-load stability			
Starting of capacitive loads	unlimited			

Primary switch mode power supplies

CP-E range (48 V DC)

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type	CP-E 48/0.62	CP-E 48/1.25	CP-E 48/5.0	CP-E 48/10.0
General data				
Efficiency	typ. 86 %	ty. 89 %	typ. 90 %	
Duty time	100 %			
Dimensions (W x H x D)	43.5 x 88.5 x 115 mm [1.71 x 3.48 x 4.53 in]		83 x 123.6 x 123.6 mm [3.27 x 4.87 x 4.87 in]	175 x 123.6 x 123.6 mm [6.89 x 4.87 x 4.87 in]
Weight	0.29 kg (0.64 lb)	0.36 kg (0.79 lb)	1.36 kg (3.01 lb)	1.9 kg (4.19 lb)
Material of enclosure	Plastic		Metall	
Mounting	DIN rail (EN 60715), snap-on mounting without any tool			
Mounting position	horizontal			
Minimum distance to other units	horizontal / vertical		25 mm / 25 mm (0.98 in / 0.98 in)	
Degree of protection	enclosure / terminals		IP/20 / IP20	
Protection class	I			
Electrical connection - input circuit / output circuit				
Wire size	fine-strand with wire end ferrule		0.2-4 mm ² (24-11 AWG)	
	fine-strand without wire end ferrule		0.2-6 mm ² (24-10 AWG)	
	rigid			
Stripping length	6 mm (0.24 in)		8 mm (0.31 in)	
Tightening torque	input / output		0.5-0.6 Nm / 1 Nm / 0.6 Nm	
Environmental data				
Ambient temperature range	operation		-25...+70 °C	
	rated load		-25...60 °C	-25...+55 °C
	storage		-25...+85 °C	
Damp heat (cyclic) (IEC/EN 60068-2-30)	4 x 24 Zyklen, 40 °C, 95 % RH		95 % without condensation	
Vibration (sinusoidal) (IEC/EN 60068-2-6)	10 m/s ² , 10...500 Hz			
Shock (half-sine) (IEC/EN 60068-2-27)	40 m/s ² , 22 ms, all directions			
Isolation data				
Rated insulation voltage U_i	input circuit / output circuit		3 kV AC	
Pollution degree	2			
Standards				
Product standard	EN 61204			
Low Voltage Directive	2006/95/EG			
EMC directive	2004/108/EG			
RoHS directive	2002/95/EG			
Electrical safety	EN 50178, EN 60950-1, UL 60950-1, UL508		IEC/EN 60950-1	
Protective low voltage	SELV (EN 60950)		SELV	
Electromagnetic compatibility				
Interference immunity	IEC/EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 4 (8 kV / 15 kV)		
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)		
fast transients (Burst)	IEC/EN 61000-4-4	Level 4 (4 kV)		
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 4 (2 kV / 4 kV)		
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)		
Interference emission	IEC/EN 61000-6-3			
electromagnetic field (HF radiation resistance)	IEC/CISPR 22, EN 55022	Class B		
HF line emission	IEC/CISPR 22, EN 55022	Class B		

Primary switch mode power supplies Redundancy units for CP-E range

Technical data

Data at $T_a = 25\text{ °C}$, if nothing else indicated

Type	CP-RUD	CP- A RU
Input circuit - Supply circuit	A: U1+/-U ; B: U2+/-U	(+/-, +/-)
Rated input voltage U_{IN}	24 V DC	
Input voltage range	5-35 V DC	10-40 V DC
Rated input current I_{IN} per channel	0.5-2.5 A	1-20 A
Maximum input current per channel	10 A for 300 s	30 A for 300 s
Transient overvoltage protection	no	yes
Output circuit	L+, L+, L+, L-, L-, L-	(+/-)
Rated output voltage U_{OUT}	24 V DC	
Voltage drop	typ. 0.6 V, max. 0.7 V	typ. 0.6 V, max. 0.9 V
Rated output current I_{OUT}	0.5-5 A	1-40 A
Peak output current	20 A for 150 s	60 A for 300 s
Resistance to reverse feed	< 35 V	< 40 V
General data		
Dimensions (W x H x D)	22.5 x 78 x 100 mm (0.89 x 3.07 x 4.02 in)	56.5 (60 ¹⁾) x 130 x 137 mm (2.22 (2.36 ¹⁾) x 5.12 x 5.39 in)
Weight	0.135 kg (0.30 lb)	0.89 kg (1.96 lb)
Minimum distance to other units	horizontal / vertical	10 mm / 50 mm (0.39 in / 1.97 in)
Degree of protection	enclosure / terminals	IP20 / IP20
Material of enclosure	enclosure shell / cover	plastic / plastic
Protection class		aluminium / zinc-coated sheet steel
Mounting		III ²⁾
Mounting position		DIN rail
Electrical connection - Input circuit / Output circuit		horizontal
Wire size	fine-strand with wire end ferrule	2.5-10 mm ² (14-8 AWG)
	fine-strand without wire end ferrule	0.5-10 mm ² (20-8 AWG)
	rigid	0.5-16 mm ² (20-6 AWG)
Stripping length	2 x 0.75-2.5 mm ² (2 x 18-14 AWG)	7 mm (0.28 in)
Tightening torque	2 x 0.5-4 mm ² (2 x 20-12 AWG)	12 mm (0.47 in)
Environmental data		
Ambient temperature range	operation	-20...+60 °C
	rated load	-20...+60 °C
	storage	-25...+60 °C (without derating)
Damp heat (IEC/EN 60068-2-3)		-40...+85 °C
Climatic category (IEC/EN 60721)		93 % at 40 °C, no condensation
Vibration (IEC/EN 60068-2-6)		3K3
Shock (IEC/EN 60068-2-27)		
Isolation data		
Insulation voltage	between input / output / enclosure	500 V AC (routine test)
Pollution degree (EN 50178)		2
Standards		
Product standard		IEC/EN 61204
Low Voltage Directive		2006/95/EG
EMC Directive		2004/108/EG
Electrical safety	EN 50178	EN 50178, EN 60950, UL 60950, UL 508
Electromagnetic compatibility		
Interference immunity		IEC/EN 61000-6-2
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge ±8 kV, contact discharge ±6 kV)
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV)
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 1 (±0.5 kV)
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)
Interference emission		IEC/EN 61000-6-3
electromagnetic field (HF radiation resistance)	IEC/CISPR 22 / EN 55022	Class B
HF line emission	IEC/CISPR 22 / EN 55022	Class B

¹⁾ incl. lateral screw

²⁾ This device is designed for connection to a safety extra-low voltage source. If no safety extra-low voltage is used at the input side, the lateral screw can be used for grounding of the enclosure (protection class I).

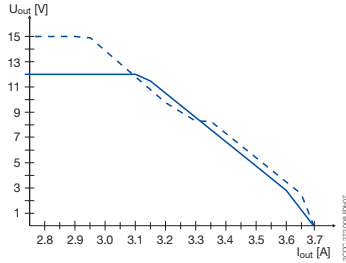
Primary switch mode power supplies

CP-E range

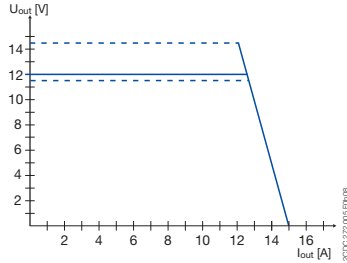
Technical diagrams, Wiring instructions

Technical diagrams

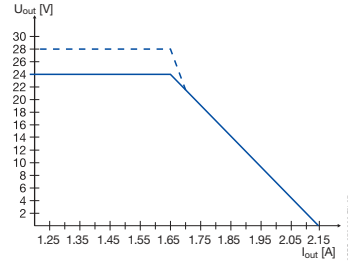
Output curve at $T_a = 25\text{ }^\circ\text{C}$



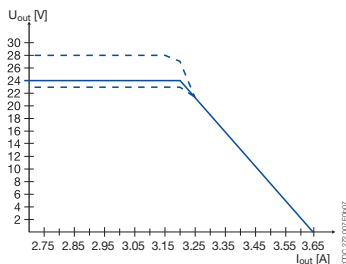
CP-E 12/2.5



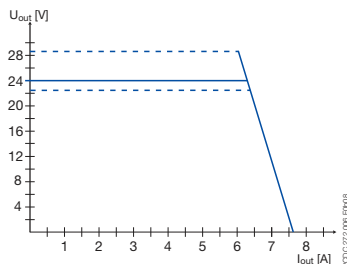
CP-E 12/10.0



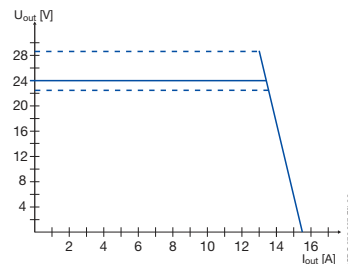
CP-E 24/1.25



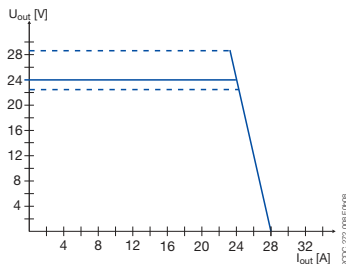
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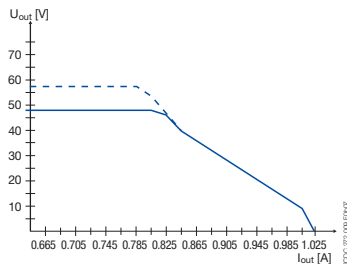
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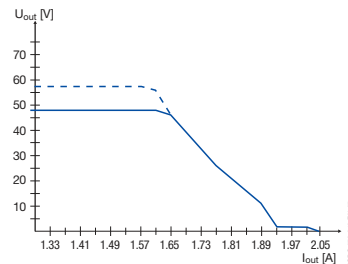
CP-E 24/10.0



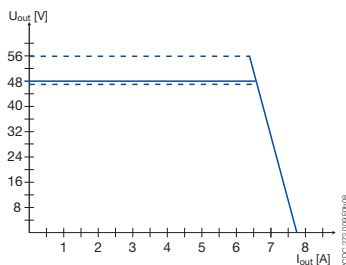
CP-E 24/20.0



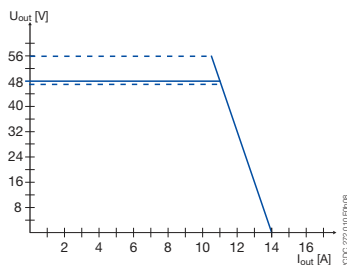
CP-E 48/0.62



CP-E 48/1.25

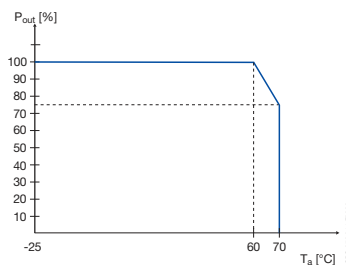


CP-E 48/5.0

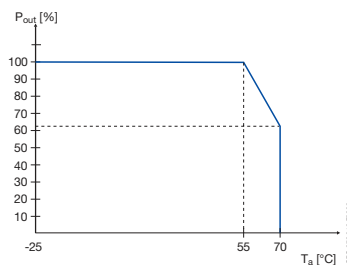


CP-E 48/10.0

Temperature curve at rated output voltage

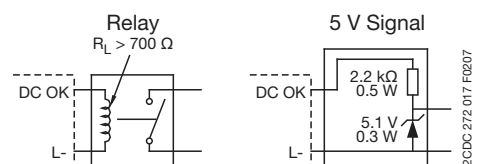


CP-E < 480 W



CP-E 480 W

Wiring instructions



CP-E 24/1.25, CP-E 24/2.5

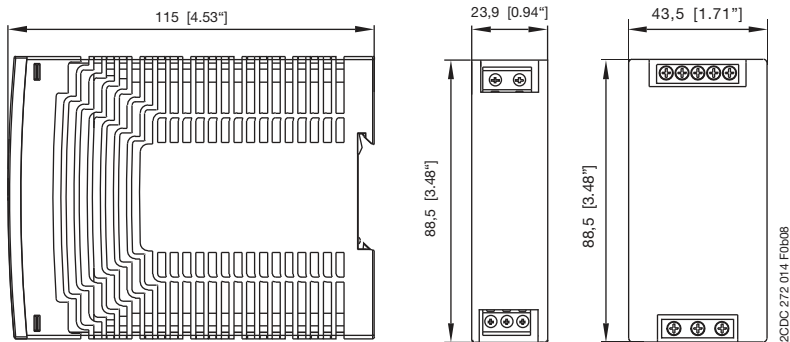
Primary switch mode power supplies

CP-E range

Dimensional drawings

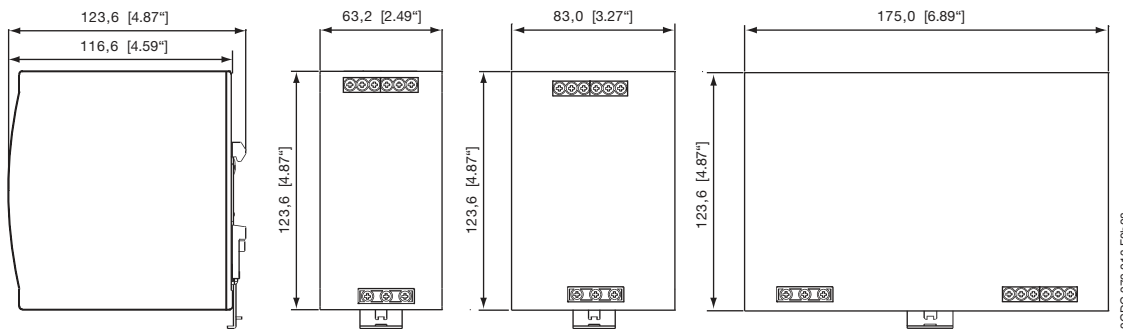
Dimensional drawings

dimensions in mm



**CP-E 5/3.0,
CP-E 24/0.75**

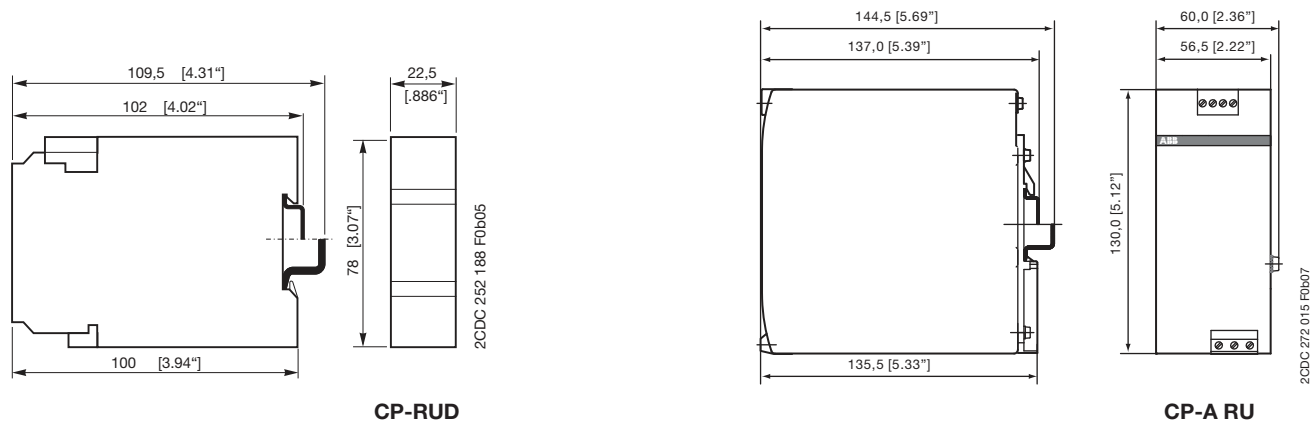
**CP-E 12/2.5,
CP-E 24/1.25,
CP-E 24/2.5,
CP-E 48/0.62,
CP-E 48/1.25**



**CP-E 12/10.0,
CP-E 24/5.0**

**CP-E 24/10.0,
CP-E 48/5.0**

**CP-E 24/20.0,
CP-E 48/10.0**



CP-RUD

CP-A RU

4



Primary switch mode power supplies

CP-S, CP-C, CP-A range

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Primary switch mode power supplies

CP-S, CP-C and CP-A range

Benefits and advantages



2CDC275 015 F0004

CP-S and CP-C range

- Output current 5 A, 10 A and 20 A
- Integrated power reserve of up to 50 %
- 5 A and 10 A devices with pluggable connecting terminals
- Approvals / marks (depending on device, partly pending)



CP-S range

- 10 A and 20 A device with front-face selector switch to adjust rated input voltage range: 110-120 V AC or 220-240 V AC
- Output voltage fixed at 24 V DC
- Parallel operation for redundancy

CP-C range

- Wide range input 110-240 V AC (85-264 V AC, 100-350 V DC)
- Output voltage adjustable in a range of 22-28 V DC
- Parallel operation for increased capacity and redundancy
- Power factor correction (PFC) acc. to EN 61000-3-2
- Function module pluggable onto the front side

Messaging module CP-C MM:

- LED for status indication
- Relay outputs "Input OK" and "Output OK"
- REMOTE ON/OFF function to switch on and off the power supply externally
- Output voltage monitoring is only possible in decoupled parallel operation

CP-A range

Redundancy unit CP-A RU

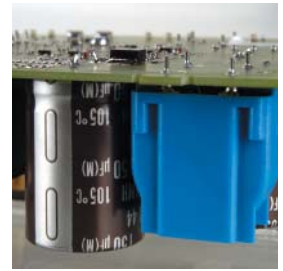
- Redundancy unit with 2 inputs / channels for decoupling of 2 CP-S or 2 CP-C power supplies
- up to 20 A per input / channel and output up to 40 A
- True redundancy by 100 % decoupling with 2 integrated diodes

Control module CP-A CM

- pluggable onto redundancy unit CP-A RU
- one relay output per monitored input / channel
- threshold values adjustable (14-28 V)
- indicates the presence of both input voltages (of the CP-A RU) via LEDs and energized output relays

Integrated power reserve

The new CP-S and CP-C range power supplies feature an integrated power reserve of up to 50 %. No oversized electricity supply is needed, especially under heavy load conditions.



2CDC 273 056 F0004

Pluggable connecting terminals

Extended flexibility in operation due to pluggable connecting terminals (this feature is not offered on all devices).



2CDC 273 057 F0004

Adjustable output voltage

The CP-C range types feature a continuously adjustable output voltage from 22 to 28 V. Thus, they can be optimally adapted to the application, e.g. compensating the voltage drop caused by long line length.



2CDC 273 046 F0004

Pluggable function modules

The CP-C range power supplies can be equipped with pluggable modules to add additional functions (e.g. messaging module). Thus, the power supplies can be ideally adapted to the relevant application.



2CDC 273 068 F0004

2CDC 271 003 F0005



CP-A RU + CP-A CM

Primary switch mode power supplies CP-S, CP-C and CP-A range

Ordering details

2CDC271.061.F0b04



CP-S 24/5.0

2CDC271.065.F0b04



CP-C 24/10.0

2CDC271.063.F0b04



CP-S 24/20.0

2CDC271.010.F0b06



CP-A RU

2CDC271.002.F0b05



CP-A CM

Type	Rated input voltage	Rated output voltage / current	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
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CP-S range

CP-S 24/5.0	110-240 V AC	24 V DC / 5 A	1SVR 427 014 R0000	1		0.96 / 2.11
CP-S 24/10.0	110-120 V AC / 220-240 V AC	24 V DC / 10 A	1SVR 427 015 R0100	1		1.07 / 2.35
CP-S 24/20.0	110-120 V AC / 220-240 V AC	24 V DC / 20 A	1SVR 427 016 R0100	1		2.83 / 6.23

CP-C range

CP-C 24/5.0	110-240 V AC	24 V DC / 5 A	1SVR 427 024 R0000	1		0.96 / 2.11
CP-C 24/10.0	110-240 V AC	24 V DC / 10 A	1SVR 427 025 R0000	1		1.34 / 2.95
CP-C 24/20.0	110-240 V AC	24 V DC / 20 A	1SVR 427 026 R0000	1		3.15 / 6.94

Type	Description	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
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Accessories for CP-C range

CP-C MM	Messaging module	1SVR 427 081 R0000	1		0.065 / 0.14
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Accessories for CP-S and C range

CP-A RU	Redundancy unit	1SVR 427 071 R0000	1		0.89 / 1.96
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CP-A CM	Control module	1SVR 427 075 R0000	1		0.063 / 0.14
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- Approvals174
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Primary switch mode power supplies

CP-S and CP-C range

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type		CP-C 24/5.0 CP-S 24/5.0	CP-C 24/10.0 CP-S 24/10.0	CP-C 24/20.0 CP-S 24/20.0
Input circuit - supply circuit		L, N		
Rated input voltage U_{IN}	CP-C	110-240 V AC		
	CP-S	110-240 V AC	switch position 115 110-120 V AC	
	CP-S		switch position 230 220-240 V AC	
Input voltage range	CP-C	85-264 V AC / 100-350 V DC ¹⁾		
	CP-S	85-264 V AC / 100-350 V DC ¹⁾	switch position 115 85-132 V AC	
	CP-S		switch position 230 184-264 V AC / 220-350 V DC ¹⁾	
Frequency range AC		47-63 Hz		
Current consumption		at 110-240 V AC	approx. 2.2-1.2 A	approx. 3.5-1.6 A
		at 110-120 V AC	-	approx. 4.2-4.0 A
		at 220-240 V AC	-	approx. 2.4-2.2 A
Power consumption			typ. 135 W	typ. 269 W
Inrush current / I^2t (cold start)	CP-C	< 23 A / approx. 0.9 A ² s	< 33 A / approx. 0.2 A ² s	
	CP-S		< 40 A / approx. 1.8 A ² s	
Power failure buffering at rated load	CP-C	min. 100 ms	min. 40 ms	
	CP-S		min. 50 ms	
Transient overvoltage protection		varistors		
Internal input fuse (apparatus protection, not accessible)		4 A (slow-acting)	6.3 A (slow-acting)	12 A (fast-acting)
Indication of operational states				
Output voltage	OUTPUT OK: green LED	L: output voltage OK		
Output circuit		L+, L+, L-, L- : short-circuit, no-load and overload proof		
Rated output voltage		24 V DC		
Tolerance of the output voltage	CP-C	$\pm 1\%$		
	CP-S	-1...+5 %		
Adjustment range of the output voltage	CP-C	22-28 V DC, default setting 24 V $\pm 0.5\%$		
	CP-S	fixed		
Rated output power		120 W	240 W	480 W
Rated output current		$T_a \leq 60\text{ °C}$ 5 A	10 A	20 A
Peak output current (power reserve)		$T_a \leq 40\text{ °C}$ typ. $\leq 7.25\text{ A}$	typ. $\leq 12.25\text{ A}$	typ. $\leq 22.5\text{ A}$
Derating		$60\text{ °C} < T_a \leq 70\text{ °C}$	2.5 % per Kelvin temperature increase	
Deviation with	CP-C	load change statical	typ. $< \pm 0.05\%$	
	CP-S	load change statical	typ. $< \pm 0.1\%$	
		load change dynamical 10-90 %	typ. $< \pm 3\%$	
		change of the input voltage of $\pm 10\%$	typ. $< \pm 0.05\%$	
Control time		typ. $< 1\text{ ms}$		
Starting time after applying supply voltage	CP-C	< 100 ms	< 5 ms	
	CP-S		< 10 ms	
Response time 10-90 %	CP-C	typ. $< 30\text{ ms}$	typ. $< 4\text{ ms}$	
	CP-S		typ. $< 5\text{ ms}$	
Residual ripple and switching peaks		20 MHz	typ. $< 50\text{ mV}_{PP}$	
Parallel connection		yes, up to 5 devices, to enable redundancy and to increase capacity, current not symmetrical (CP-S only redundancy)		
Series connection		yes, to increase voltage		
Resistance to reverse feed		approx. 35 V DC		
Power factor correction (PFC)	CP-C	yes		
	CP-S	no		
Output circuit - No-load, overload and short-circuit behaviour		see also U/I and I/T curves		
Output curve		U/I curve with power reserve		
Current limitation at short circuit		approx. 11 A	approx. 19 A	approx. 25 A
Short-circuit protection		continuous short-circuit stability		
Overload protection		thermal protection		
Starting of capacitive loads		unlimited		
General data				
Power dissipation		typ. $< 15\text{ W}$	typ. $< 29\text{ W}$	typ. $< 58\text{ W}$
Efficiency		typ. 89 %		
Discharge current for PE		$< 3.5\text{ mA}$		
MTBF	CP-C	500.000 h		
	CP-S	350.000 h		
Dimensions (W x H x D)		56.5 (60 ²⁾ x 130 x 137 mm [2.22 (2.36 ²⁾ x 5.12 x 5.39 in]	90 (93.5 ²⁾ x 130x 137 mm [3.54 (3.68 ²⁾ x 5.12 x 5.39 in]	200 (203.5 ²⁾ x 130 x 137 mm [7.87 (8.01 ²⁾ x 5.12 x 5.39 in]

Primary switch mode power supplies

CP-S and CP-C range

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Type		CP-C 24/5.0 CP-S 24/5.0	CP-C 24/10.0 CP-S 24/10.0	CP-C 24/20.0 CP-S 24/20.0
Weight	CP-C	approx. 0.96 kg (2.12 lb)	approx. 1.34 kg (2.95 lb)	approx. 3.15 kg (6.94 lb)
	CP-S		approx. 1.07 kg (2.36 lb)	approx. 2.83 kg (6.23 lb)
Minimum distance to other units	horizontal / vertical	10 mm / 80 mm (0.39 in / 3.15 in)		
Degree of protection	enclosure / terminals	IP20 / IP20		
Material of enclosure	enclosure shell / cover	aluminium / zinc-coated sheet steel		
Protection class (EN 61140)		I		
Mounting		DIN rail (EN 50022), snap-on mounting		
Mounting position		horizontal		
Electrical connection - Input circuit		3)	3)	-
Wire size	fine-strand with wire end ferrule	0.2-2.5 mm ² (24-14 AWG)		2.5-10 mm ² (14-8 AWG)
	fine-strand without wire end ferrule			0.5-10 mm ² (20-8 AWG)
	rigid			0.5-16 mm ² (20-6 AWG)
Stripping length		7 mm (0.28 in)	12 mm (0.47 in)	
Tightening torque		0.4 Nm		1.2-1.5 Nm
Electrical connection - Output circuit		3)	3)	-
Wire size	fine-strand with wire end ferrule	0.12-2.5 mm ² (26-14 AWG)		2.5-10 mm ² (14-8 AWG)
	fine-strand without wire end ferrule			0.5-10 mm ² (20-8 AWG)
	rigid			0.5-16 mm ² (20-6 AWG)
Stripping length		8 mm (0.31 in)	12 mm (0.47 in)	
Tightening torque		0.4 Nm		1.2-1.5 Nm
Environmental data				
Ambient temperature range	operation	-25...+70 °C		
	rated load	0...+60 °C (without derating)		
	storage	-40...+85 °C		
Damp heat (IEC/EN 60068-2-3)		93 % at +40 °C, no condensation		
Climatic category (IEC/EN 60721)		3K3		
Vibration (IEC/EN 60068-2-6)				
Shock (IEC/EN 60068-2-27)				
Isolation data				
Rated impulse withstand voltage U_{imp} (type test)	input / output	3 kV AC		
	input / PE	1.5 kV AC		
Power-frequency withstand voltage test (routine test)	input / output	1.2 kV AC		
	input / PE	1.2 kV AC		
	output / PE	350 V AC		
Pollution degree (EN 50178)		2		
Standards				
Product standard		IEC/EN 61204		
Low Voltage Directive		2006/95/EC		
EMC Directive		2004/108/EC		
Electrical safety		EN 50178, EN 60950, UL 60950, UL 508		
Protective low voltage		SELV (EN 60950)		
Electromagnetic compatibility				
Interference immunity		IEC/EN 61000-6-2		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 4 (8 kV / 15 kV)		
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)		
fast transients (Burst)	IEC/EN 61000-4-4	Level 4 (4 kV)		
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 4 (2 kV symmetrical, level 3 - 3 kV asymmetrical)		
HF line emission	IEC/EN 61000-4-6	Level 3 (10 V)		
Interference emission		IEC/EN 61000-6-3		
electromagnetic field (HF radiation resistance)	IEC/CISPR 22, EN 55022	Class B		
HF line emission	IEC/CISPR 22, EN 55022	Class B		

¹⁾ at $U > 264\text{ V}$ use additionally an appropriate external fuse

²⁾ with lateral screw

³⁾ pluggable connecting terminals, actuate only when power is off






Primary switch mode power supplies

Accessory for CP-C range

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Typ	CP-C MM		
Input circuit - Supply circuit			
Rated input voltage U_{IN}	powered by the input circuit of the power supply		
Input voltage range	70-264 V AC / 80-350 V DC		
Power consumption	2.5 VA / 1.5 W		
Input circuit - Control circuit			
Kind of triggering	volt-free triggering		
Control input, control function	Remote OFF	remote off	
Threshold "Switching-off power supply unit"	$R \leq 1\text{ k}\Omega$		
Threshold "Switching-on power supply unit"	$R \geq 10\text{ k}\Omega$		
Input current	typ. 1 mA (200 mA for 200 μ s)		
Maximum cable length to the control input	25 m - 100 pF/m		
Measuring circuit - INPUT			
Monitoring function	undervoltage monitoring of input voltage of the power supply unit		
Thresholds	85 V AC / 90 V DC		
Hysteresis, related to the threshold value	AC: typ. -8 % / DC -30 %		
Accuracy, tolerance	-5 % at AC and DC		
Maximum measuring cycle	typ. < 50 ms		
Measuring circuit - OUTPUT			
Monitoring function	undervoltage monitoring of output voltage of the power supply unit		
Thresholds	20 V DC		
Hysteresis, related to the threshold value	typ. 5 %		
Accuracy, tolerance	$\pm 1\%$		
Maximum measuring cycle	typ. < 10 ms		
Indication of operational states			
Remote off	REMOTE OFF: green LED	 : „REMOTE OFF“ input $R \leq 1\text{ k}\Omega$	
Status of power supply input	Input OK: green LED	 : relay „INPUT OK“ energized	
Status of power supply output	OUTPUT OK: green LED	 : relay „OUTPUT OK“ energized	
Output circuits			
11-12/14, 21-22/24			
Kind of output	relays, 2 x 1 c/o contacts		
Operating principle	closed-circuit principle		
Contact material	AgNi		
Rated voltage (VDE 0110, IEC/EN 60947-1)	250 V		
Minimum switching voltage / Minimum switching current	24 V / 10 mA		
Maximum switching voltage / Maximum switching current	250 V / 1 A		
Rated operating current I_o (IEC/EN 60947-1)	AC12 (resistive)	230 V	1 A
	AC15 (inductive)	230 V	1 A
	DC12 (resistive)	24 V	1 A
	DC13 (inductive)	24 V	1 A
Mechanical lifetime	30 x 10 ⁶ switching cycles		
Electrical lifetime	0.1 x 10 ⁶ switching cycles		
Short circuit proof, maximum fuse rating	n/c contact	2 A, gL	
	n/o contact	2 A, gL	
General data			
Duty time	100 %		
Dimensions (W x H x D, when mounted)	56.5 x 54 x 24 mm (2.22 x 2.13 x 0.94 in)		
Weight	0.065 kg (0.14 lb)		
Degree of protection	enclosure / terminals	IP20 / IP20	
Material of enclosure	UL 94 V0		
Protection class (EN 61140)	II		
Mounting	snap-on mounting, without any tool		
Mounting position	plugged onto the power supply unit		
Electrical connection			
Wire size	fine-strand with wire end ferrule		0.2-2.5 mm ² (24-14 AWG)
	fine-strand without wire end ferrule		
	rigid		0.2-4 mm ² (24-12 AWG)
Stripping length	7.5 mm (0.3 inch)		
Tightening torque	0.4-0.6 Nm		

Primary switch mode power supplies

Accessory for CP-C range

Technical data

Data at $T_a = 25\text{ °C}$, $U_{IN} = 230\text{ V AC}$ and rated values, if nothing else indicated

Typ		CP-C MM
Environmental data		
Ambient temperature range	operation	-25...+70 °C
	storage	-40...+85 °C
Damp heat (IEC/EN 60068-2-3)		93 % at +40 °C, no condensation
Climatic category (IEC/EN 60721)		3K3
Vibration (IEC/EN 60068-2-6)		
Shock (IEC/EN 60068-2-27)		
Isolation data		
Rated insulation voltage U_i (IEC/EN 60974-1, EN 50178, VDE 0160)		250 V
Protective separation (EN 50178, EN 60950) supply / measuring circuits / relay outputs		yes
Rated impulse withstand voltage U_{imp} between all isolated circuits (IEC 664, VDE 0110)		4 kV; 1.2/50 μ s
Test voltage between all circuits (type test)		2.5 kV AC
Pollution degree (EN 60950)		2
Overvoltage category (EN 60950)		II
Standards		
Product standard		IEC/EN 61204
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
Electrical safety		EN 50178, EN 60950, UL 60950, UL 508
Elektromagnetic compatibility		
Inference immunity		IEC/EN 61000-6-2
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 and 4 (6 kV / 8 kV)
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	Level 3 (10 V/m)
fast transients (Burst)	IEC/EN 61000-4-4	Level 4 and 2 (4 kV power input / 1 kV control input)
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 3 and 2 (4 kV symmetrical power input / 1 kV control input)
HF line emission	IEC/EN 61000-4-6	Level (10 V)
Interference emission		IEC/EN 61000-6-3
HF line emission	IEC/CISPR 22 / EN 55022	Class B
electromagnetic field (HF radiation resistance)	IEC/CISPR 22 / EN 55022	Class B

Primary switch mode power supplies

Accessory for CP-S and CP-C range: CP-A range

Technical data

Data at $T_a = 25\text{ °C}$, if nothing else indicated

Type		CP-A RU
Input circuit - Supply circuit		(+/-, +/-)
Rated input voltage U_{IN}		24 V DC
Input voltage range		10-40 V DC
Rated input current I_{IN} per channel		1-20 A
Maximum input current per channel		30 A for 300 s
Transient overvoltage protection		yes
Output circuit		(+/-)
Rated output voltage		24 V DC
Voltage drop		typ. 0.6 V, max. 0.9 V
Rated output current		1-40 A
Peak output current		60 A for 300 s
Resistance to reverse feed		< 40 V
General data		
Dimensions (W x H x D)		56.5 (60 ¹⁾ x 130 x 137 mm (2.22 (2.36 ¹⁾) x 5.12 x 5.39 in)
Weight		0.89 kg (1.96 lb)
Minimum distance to other units		horizontal / vertical 10 mm / 50 mm (0.39 in / 1.97 in)
Degree of protection		enclosure / terminals IP20 / IP20
Material of enclosure		enclosure shell / cover aluminium / zinc-coated sheet steel
Protection class		III ²⁾
Mounting		DIN rail
Mounting position		horizontal
Electrical connection - Input circuit / Output circuit		
Wire size		fine-strand with wire end ferrule 2.5-10 mm ² (14-8 AWG)
		fine-strand without wire end ferrule 0.5-10 mm ² (20-8 AWG)
		rigid 0.5-16 mm ² (20-6 AWG)
Stripping length		12 mm (0.47 in)
Tightening torque		1.2-1.5 Nm
Environmental data		
Ambient temperature range		operation -25...+70 °C
		rated load -25...+60 °C (without derating)
		storage -40...+85 °C
Damp heat (IEC/EN 60068-2-3)		93 % at 40 °C, no condensation
Climatic category (IEC/EN 60721)		3K3
Vibration (IEC/EN 60068-2-6)		
Shock (IEC/EN 60068-2-27)		
Isolation data		
Insulation voltage		between input / output / enclosure 500 V AC (routine test)
Pollution degree (EN 50178)		2
Standards		
Product standard		IEC/EN 61204
Low Voltage Directive		2006/95/EC
EMC Directive		2004/108/EC
Electrical safety		EN 50178, EN 60950, UL 60950, UL 508
Electromagnetic compatibility		
Interference immunity		IEC/EN 61000-6-2
electrostatic discharge (ESD)		IEC/EN 61000-4-2 Level 3 (air discharge ± 8 kV, contact discharge ± 6 kV)
electromagnetic field (HF radiation resistance)		IEC/EN 61000-4-3 Level 3 (10 V/m)
fast transients (Burst)		IEC/EN 61000-4-4 Level 3 (± 2 kV)
powerful impulses (Surge)		IEC/EN 61000-4-5 Level 1 (± 0.5 kV)
HF line emission		IEC/EN 61000-4-6 Level 3 (10 V)
Interference emission		IEC/EN 61000-6-3
electromagnetic field (HF radiation resistance)		IEC/CISPR 22 / EN 55022 Class B
HF line emission		IEC/CISPR 22 / EN 55022 Class B

¹⁾ incl. lateral screw

²⁾ This device is designed for connection to a safety extra-low voltage source. If no safety extra-low voltage is used at the input side, the lateral screw can be used for grounding of the enclosure (protection class I).

Primary switch mode power supplies

Accessory for CP-S and CP-C range: CP-A range

Technical data

Data at $T_a = 25\text{ °C}$, if noting else indicated

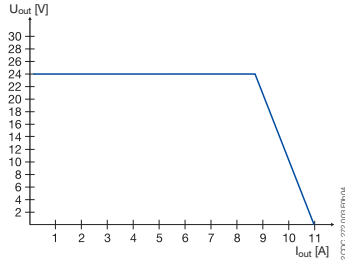
Type	CP-A CM		
Input circuit - Supply circuit			
Rated input voltage U_{IN}	24 V DC		
Input voltage range	13-30 V DC		
Power consumption	at 24 V DC	approx. 1 W	
Measuring circuit			
11-12/14, 21-22/24			
Monitoring function	undervoltage monitoring		
Measuring voltage	rated operational voltage		
Thresholds	14-28 V		
Hysteresis, related to the threshold value	3-5 % fixed		
Accuracy, tolerance	10 % of full-scale value		
Maximum measuring cycle	6 ms		
Indication of operational states			
Status of input 1	IN 1: green LED	L: voltage at input 1 > than threshold 1 = no faults present	
Status of input 2	IN 2: green LED	L: voltage at input 2 > than threshold 2 = no faults present	
Output status	OUT: green LED	L: $U_{OUT} > 3\text{ V}$ = no faults present	
Output circuit			
+, +, -			
Kind of output	relays, 2 x 1 c/o contact		
Contact material	AgNi		
Operating principle	closed-circuit principle		
Rated operational voltage U_o (IEC/EN 60947-1, VDE 0110)	250 V		
Minimum switching voltage / Minimum switching current	24 V / 10 mA		
Maximum switching voltage / Maximum switching current	250 V / 1 A		
Rated operational current I_o (IEC/EN 60947-5-1)	AC12 (resistive)	230 V	1 A
	AC15 (inductive)	230 V	1 A
	DC12 (resistive)	24 V	1 A
	DC13 (inductive)	24 V	1 A
Mechanical lifetime	30 x 10 ⁶ switching cycles		
Electrical lifetime	0.1 x 10 ⁶ switching cycles		
Short-circuit proof, maximum fuse rating	n/c contact	2 A, gL	
	n/o contact	2 A, gL	
General data			
Duty time	100 %		
Dimensions (W x H x D, when mounted)	56.5 x 54 x 24 mm (2.22 x 2.13 x 0.94 in)		
Weight	0.063 kg (0.14 lb)		
Degree of protection	enclosure / terminals	IP20 / IP20	
Material of enclosure	UL94V0		
Protection class	II		
Mounting	snap-on mounting, without any tool		
Mounting position	plugged onto the redundancy unit CP-A RU		
Electrical connection			
Wire size	fine-strand with wire end ferrule		0.2-2.5 mm ² (24-14 AWG)
	fine-strand without wire end ferrule		
	rigid		0.2-4 mm ² (24-12 AWG)
Stripping length	7.5 mm (0.3 in)		
Tightening torque	0.4-0.6 Nm		
Isolation data			
Rated insulation voltage U_i (IEC/EN 60947-1, EN 50178, VDE 0160)	250 V		
Rated impulse withstand voltage U_{imp} (type test) between all circuits (IEC 664, VDE 0110)	2.5 kV		
Power-frequency withstand voltage test (routine test) between all circuits	1.2 kV AC		
Protective separation (EN 50178) between input and output	yes		
Pollution degree	2		
Overvoltage category	II		
Environmental data			
Ambient temperature range	operation	-25...+70 °C	
	storage	-40...+85 °C	
Damp heat (IEC/EN 60068-2-3)	93 % at 40 °C, no condensation		
Climatic category (IEC/EN 60721)	3K3		
Vibration (IEC/EN 60068-2-6)			
Shock (IEC/EN 60068-2-27)			

Primary switch mode power supplies CP-S, CP-C and CP-A range

Technical diagrams, Dimensional drawings

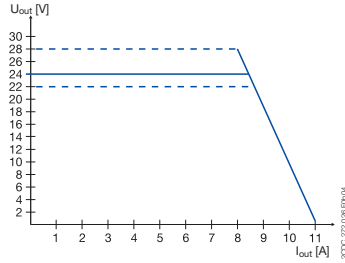
Technical diagrams

Output curve at 25 °C



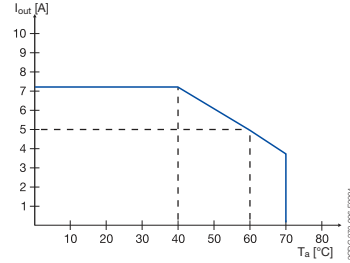
CP-S 24/5.0

Output curve at 25 °C

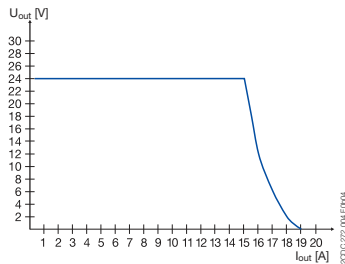


CP-C 24/5.0

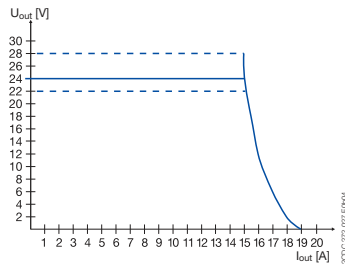
Temperature curve at U_{out} = 24 V DC



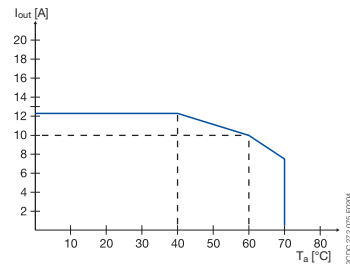
CP-S 24/5.0, CP-C 24/5.0



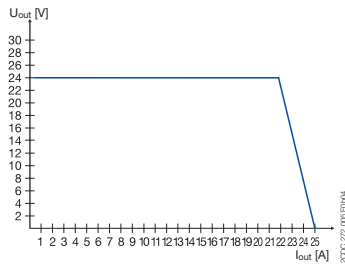
CP-S 24/10.0



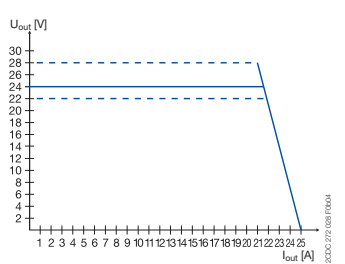
CP-C 24/10.0



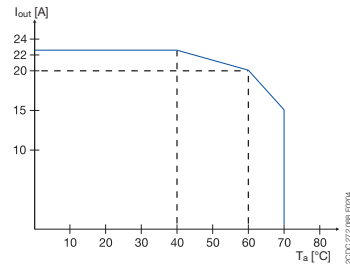
CP-S 24/10.0, CP-C 24/10.0



CP-S 24/20.0



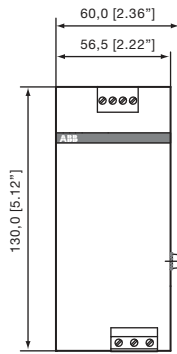
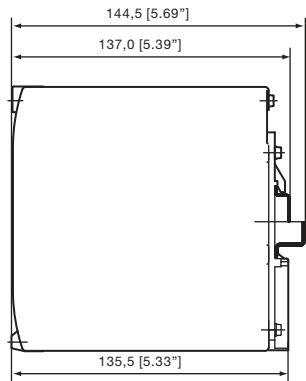
CP-C 24/20.0



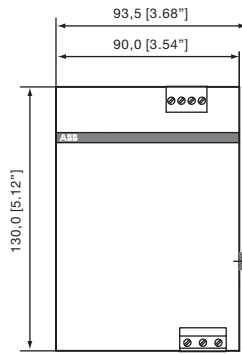
CP-S 24/20.0, CP-C 24/20.0

Dimensional drawings

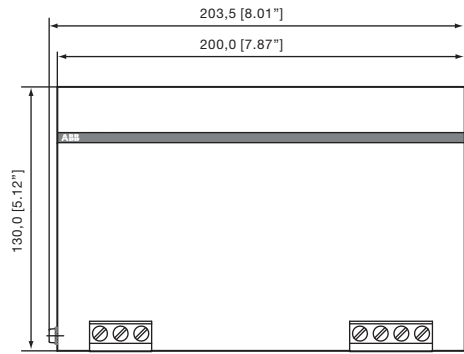
dimensions in mm



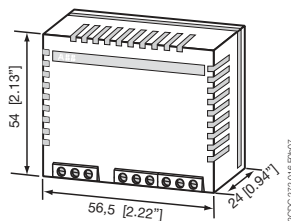
CP-S 24/5.0
CP-C 24/5.0
CP-A RU



CP-S 24/10.0
CP-C 24/10.0



CP-S 24/20.0
CP-C 24/20.0



CP-C MM
CP-A CM



Analog signal converters

CC range

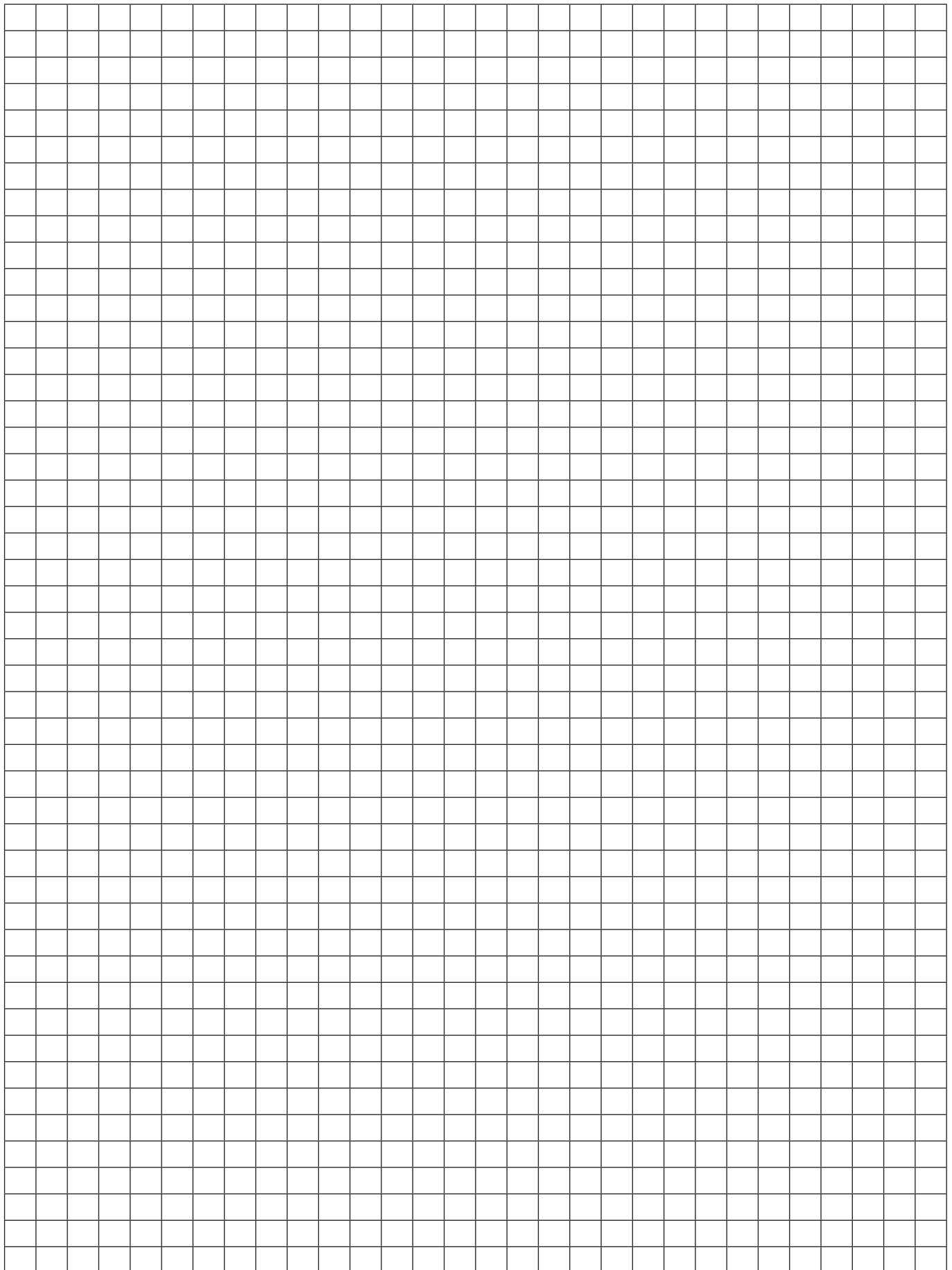
Serial data converters

ILPH range

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Analog signal converters

CC range

Benefits and advantages



2CDC283.016 F0b03

Product range for analog signal processing

CC-U range

- 8 different standard signal outputs on one device
- Input and output side universally configurable
- Also available with 2 threshold relay outputs
- Adjustment and operating elements on the front side
- Safe operation by electrical 3-way isolation
- Plug-in connecting terminals, unambiguously and clearly marked

Conversion, measurement and separation of

- standard signals
- signals of RTD sensors (PT10, PT100, PT1000)
- thermocouple signals
- RMS values of currents and voltages

Characteristics

- The required input and output ranges can be configured for all devices by means of directly accessible DIP switches positioned on the side.
- Due to the wide input range of the gain and offset stages all input signals between the minimum and the maximum input value can be universally converted to all common output signals.
- Devices for DC or AC (50/60 Hz) supply available.

CC-E range

- Universally configurable devices and single-function devices
- Adjustment and operating elements on the front side
- Safe operation by electrical 3-way isolation
- Unambiguous and clear connecting terminal markings

Conversion, measurement and separation of

- standard signals (0-5 V, 0-10 V, 0-20 mA, 4-20 mA)
- temperature signals of RTD sensors (PT 100)
- thermocouple signals (types J and K)
- current measurement signals (0-5 A, 0-20 A AC/DC)

Characteristics of single-function devices

- No adjustment or balancing necessary.

Characteristics of universal devices

- The required input and output ranges can be configured by means of directly accessible DIP switches positioned on the side
- Gain adjustment of $\pm 5\%$ by means of an adjustment potentiometer on the front-side
- Offset adjustment of $\pm 5\%$ by means of adjustment potentiometers on the front-side



2CDC283.016 F0b03

Analog signal converters

CC range

Application, Approvals and marks

Applications for analog signal processing and correct solution using CC-E and CC-U converters

Nearly every process includes a control system that receives data by means of analog signals and then evaluates the data and sets the respective parameters correspondingly.

When transmitting analog signals numerous problems may arise which can disturb or even block an ideal behavior of the process.

Below we have listed some processing problems together with the respective solutions to solve these problems:

Signal conversion

Sometimes the available signals cannot be processed by the controller or the actuator. In this case, signal converters are required to convert the input signal (or different input signals) to the desired output signal.

Signal amplification

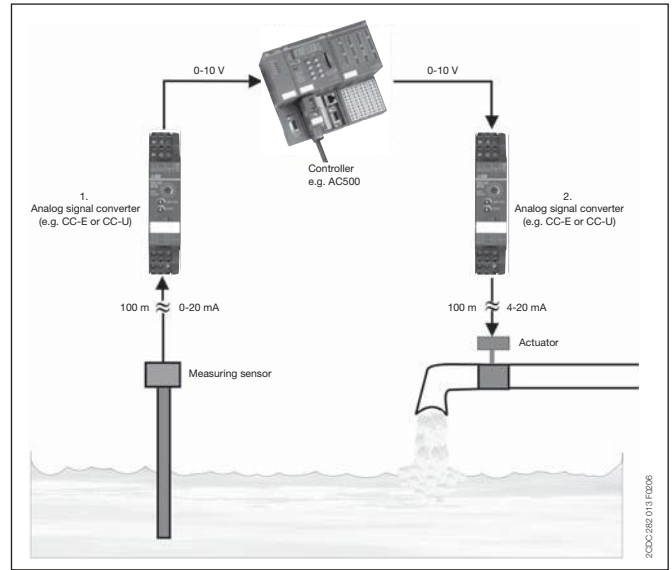
If long lines or high burdens have to be operated, it may be necessary to amplify the signal. CC analog signal converters require only low input power and provide high output power.

Thus, there are no restrictions for the converter's position on the line, i.e. it can be used

- for signal refreshing ① at the end of the line (low input power)
- or for signal amplification ② at the beginning of the line (high output power).

Signal filtering

Particularly on long lines or in rough industrial environments the signals are exposed to high electromagnetic interferences. The frequency of the coupled interference signals may be in the range of the common mains frequency (50 Hz) or even much higher (in case of frequency converters). According to the specific requirements, analog signal converters are available which provide reliable suppression of those interferences by means of an input low-pass filter.



Signal separation

■ Protection against overvoltage

The increased use of micro-electronics make controls much more sensitive against overvoltages, resulting from lightning discharges or switching processes. Suppression diodes are incorporated in the input of the CC analog signal converters which enable the converters to arrest overvoltages with low energy level (resulting from switching processes) by themselves. The products furthermore provide electrical isolation between input, output and supply circuit for protection of the controller connected to the output.

■ Protection against ground loops

If components are used which refer to ground, the measuring signals can be falsified by a so-called ground loop. In this case, certain parts of the signal are transmitted via earth and not via the analog transmission line, thus causing incorrect evaluation of the signal. The electrical isolation between the input and the output disconnects these ground loops and thus enables correct signal transmission.

- existing
- ▲ existing for some devices
- pending

		CC-E/STD	CC-E/I	CC-U/STD	CC-U/STDR	CC-E/RTD	CC-U/RTD	CC-U/RTDR	CC-E/TC	CC-U/TC	CC-U/TCR	CC-E/I	CC-E _{AC} /LPO	CC-U/I	CC-U/V
Approvals															
	UL 508, CAN/CSA C22.2 No.14	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	UL 1604 (Class I, Div 2, hazardous locations), CAN/CSA C22.2 No.213	▲		■		▲	■		▲	■		▲		■	■
	CB scheme				■			■			■				
	CCC				■			■			■				
Marks															
	CE	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	C-Tick	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Analog standard signal converters

CC-E/STD, CC-E x/x

Ordering details



CC-E/STD



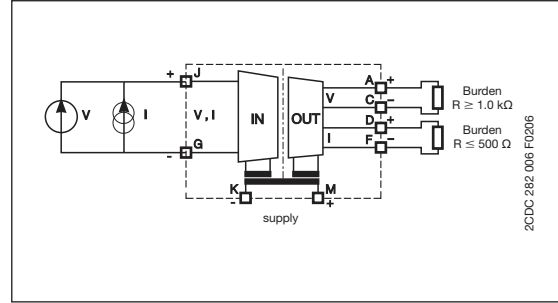
CC-E V/V

- ① U: green LED - supply voltage
- ② Gain adjustment
- ③ Offset adjustment
- ④ DIP switch for input and output configuration (only available on universal devices)

CC-E/STD analog signal converter with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/STD)
- 2x10 single-function devices
- "Plug and Work", no adjustment of single-function devices required

Wiring instruction



DIP switch settings (universal devices)

Input	Output	Switch							
		1	2	3	4	5	6	7	8
0...5 V	0...5 V								
	0...10 V								
	0...20 mA								
0...10 V	0...5 V								
	0...10 V								
	0...20 mA								
0...20 mA	0...5 V								
	0...10 V								
	0...20 mA								
4...20 mA	0...5 V								
	0...10 V								
	0...20 mA								

Legend:
 ON
 OFF

Type	Input signal	Output signal	Order code	Pack. unit piece	Price 1 piece
------	--------------	---------------	------------	------------------	---------------

Supply voltage: 24 V DC universal

CC-E/STD	0-5 V, 0-10 V 0-20 mA, 4-20 mA	0-5 V, 0-10 V 0-20 mA, 4-20 mA	1SVR 011 700 R0000 ¹⁾	1	
CC-E V/V		0-10 V	1SVR 011 710 R2100	1	
CC-E V/I	0-10 V	0-20 mA	1SVR 011 711 R1600	1	
CC-E V/I		4-20 mA	1SVR 011 712 R1700	1	
CC-E I/V		0-10 V	1SVR 011 713 R1000	1	
CC-E I/I	0-20 mA	0-20 mA	1SVR 011 714 R1100	1	
CC-E I/I		4-20 mA	1SVR 011 715 R1200	1	
CC-E I/V		0-10 V	1SVR 011 716 R1300	1	
CC-E I/I	4-20 mA	0-20 mA	1SVR 011 717 R1400	1	
CC-E I/I		4-20 mA	1SVR 011 718 R2500	1	
CC-E V/V	-10...+10 V	-10...+10 V	1SVR 011 719 R2600	1	

Supply voltage: 110-240 V AC universal

CC-E/STD	0-5 V, 0-10 V 0-20 mA, 4-20 mA	0-5 V, 0-10 V 0-20 mA, 4-20 mA	1SVR 011 705 R2100	1	
CC-E V/V		0-10 V	1SVR 011 720 R2300	1	
CC-E V/I	0-10 V	0-20 mA	1SVR 011 721 R1000	1	
CC-E V/I		4-20 mA	1SVR 011 722 R1100	1	
CC-E I/V		0-10 V	1SVR 011 723 R1200	1	
CC-E I/I	0-20 mA	0-20 mA	1SVR 011 724 R1300	1	
CC-E I/I		4-20 mA	1SVR 011 725 R1400	1	
CC-E I/V		0-10 V	1SVR 011 726 R1500	1	
CC-E I/I	4-20 mA	0-20 mA	1SVR 011 727 R1600	1	
CC-E I/I		4-20 mA	1SVR 011 728 R2700	1	
CC-E V/V	-10...+10 V	-10...+10 V	1SVR 011 729 R2000	1	

¹⁾ 1604 Class I, Div.2 (universal device)

Current/current isolator CC-E I/I-1 and CC-E I/I-2

Ordering details



CC-E I/I-1



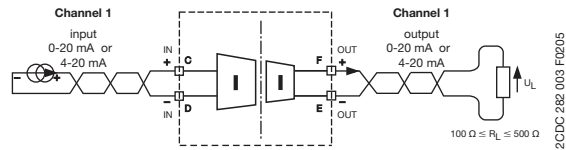
CC-E I/I-2

Loop-powered current/current isolator without external power supply for analog current signals of 0-20 mA and 4-20 mA

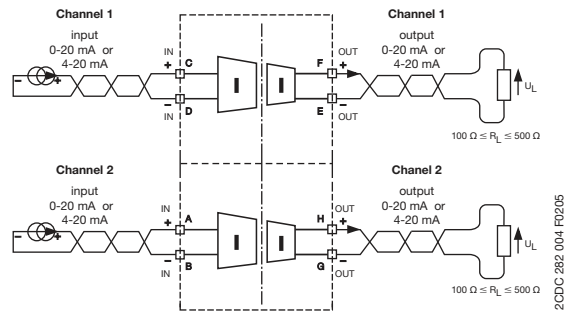
- Electrical isolation between input and output
- Very low internal voltage drop ≤ 2.5 V
- Available with one or two independent channels
- Width only 18 mm (1 and 2 channels)

Wiring instructions

CC-E I/I-1



CC-E I/I-2

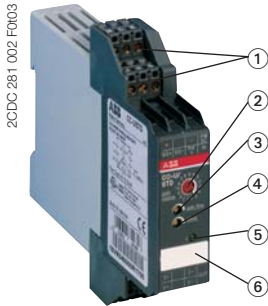


Type	Input signal	Output signal	Order code	Pack. unit piece	Price 1 piece
1 channel					
CC-E I/I-1	0-20 mA, 4-20 mA	0-20 mA, 4-20 mA	1SVR 010 200 R1600	1	
2 channel					
CC-E I/I-2	0-20 mA, 4-20 mA	0-20 mA, 4-20 mA	1SVR 010 201 R0300	1	

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Analog standard signal converter CC-U/STD

Ordering details



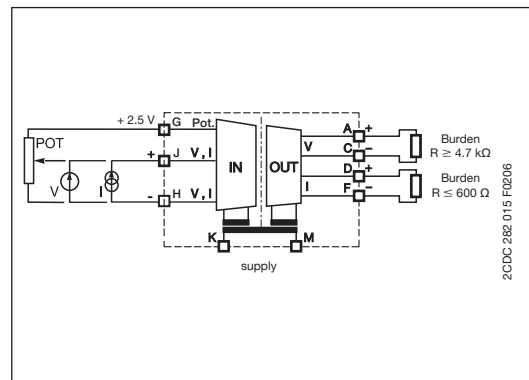
CC-U/STD

- ① Plug-in terminals
- ② Gain: Coarse adjustment
- ③ Gain: Fine adjustment
- ④ Offset adjustment
- ⑤ U: green LED - supply voltage
- ⑥ Marker label

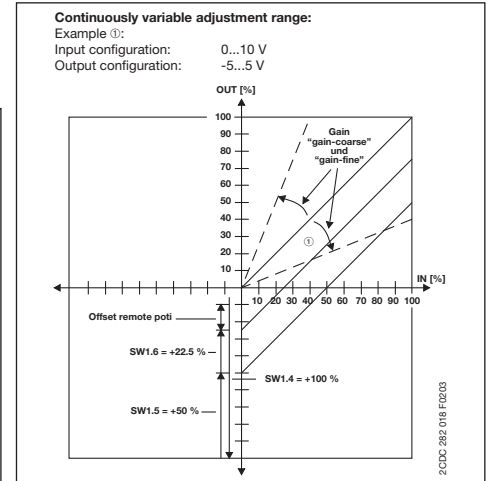
CC-U/STD universal signal converter with 3-way electrical isolation

- More than 120 configurations possible
- Configurable output signal response on input voltage signal interruption (low fail safe / high fail safe)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply
- Very fast signal transmission enables use in control systems

Wiring instruction



Adjustment range



DIP switch settings

Input	Switch 1								Gain	Coarse Type
	1	2	3	4	5	6	7	8		
Potentiometer									A...D	C
0...50 mV									A...D	C
0...100 mV									4...5	5
0...250 mV									0...1	1
0...500 mV									7...9	8
0...1 V									3...4	3
0...2.5 V									0	0
0...5 V									5...7	6
0...10 V									2	2
1...5 V									7...9	8
2...10 V									2...4	3
-10...+10 V									0	0
0...125 mV									3...4	3
0...8 V									3...4	3
-22.5...+22.5 mV									B...F	D
-11...+11 V									0	0
2.5...7.5 V									5...7	6
3.33...9.99 V									3...4	4
10...0 V									2	2
100...0 mV									4...5	5
0...1 mA									A...D	B
0...20 mA									2...4	3
4...20 mA									4...5	4
10...50 mA									0...1	1
20...4 mA									4...5	4
20...0 mA									4...2	3
-0.45...+0.45 mA									B...F	D
-55...+55 mA									4...6	5
High fail safe *)									-	-
Low fail safe *)									-	-
No fail safe *)									-	-

Output	Switch 2					
	1	2	3	4	5	6
0...5 V						
0...10 V						
1...5 V						
2...10 V						
-10...+10 V						
-5...+5 V						
-10...0 V						
-5...0 V						
0...6.66 V						
-10...+3.33 V						
-5...+1.66 V						
0...8 V						
0...4 V						
-10...-2 V						
-5...-1 V						
1.25...6.25 V						
-7.5...+2.5 V						
-3.75...+1.25 V						
1.66...8.33 V						
-6.66...+6.66 V						
-3.33...+3.33 V						
-8...0 V						
-4...0 V						
0...1 mA						
0...20 mA						
4...20 mA						
0...10 mA						
0...0.5 mA						
0...13.33 mA						
0...666 µA						
0...16 mA						
0...800 µA						
0...8 mA						
0...400 µA						
2.5...12.5 mA						
125...625 µA						
3.33...16.66 mA						
166...833 µA						
0.2...1 mA						
2...10 mA						
100...500 µA						

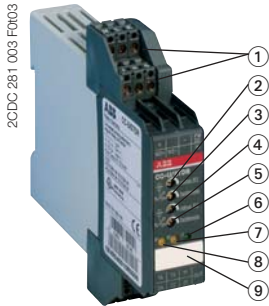
*) Detection of input voltage signal interruptions:
 If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).
 If "No fail safe" is configured, input signal interruptions are not detected.

Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/STD	24-48 V DC	1SVR 040 000 R1700	1	
	110-240 V AC	1SVR 040 001 R0400	1	

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Analog standard signal converter CC-U/STDR with relay output

Ordering details



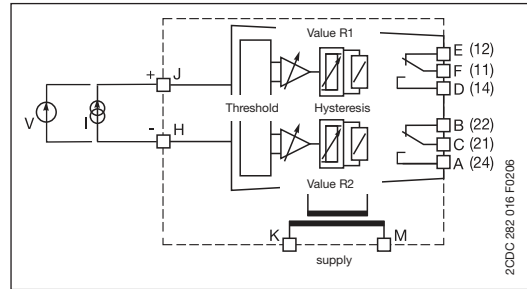
CC-U/STDR

- ① Plug-in connecting terminals
- ② Threshold value for R1
- ③ Hysteresis for R1
- ④ Threshold value for R2
- ⑤ Hysteresis for R2
- ⑥ U: green LED - supply voltage
- ⑦ R2: yellow LED - Relay 2 energized
- ⑧ R1: yellow LED - Relay 1 energized
- ⑨ Marker label

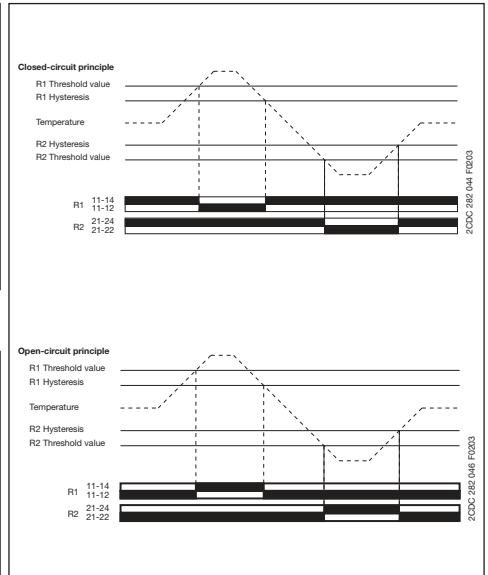
CC-U/STDR universal signal converter for standard signals, with 2 threshold relay outputs and with 3-way electrical isolation

- Standard signal converter with 7 setting ranges
- 2 threshold relay outputs with one c/o contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply

Wiring instruction



Function diagrams

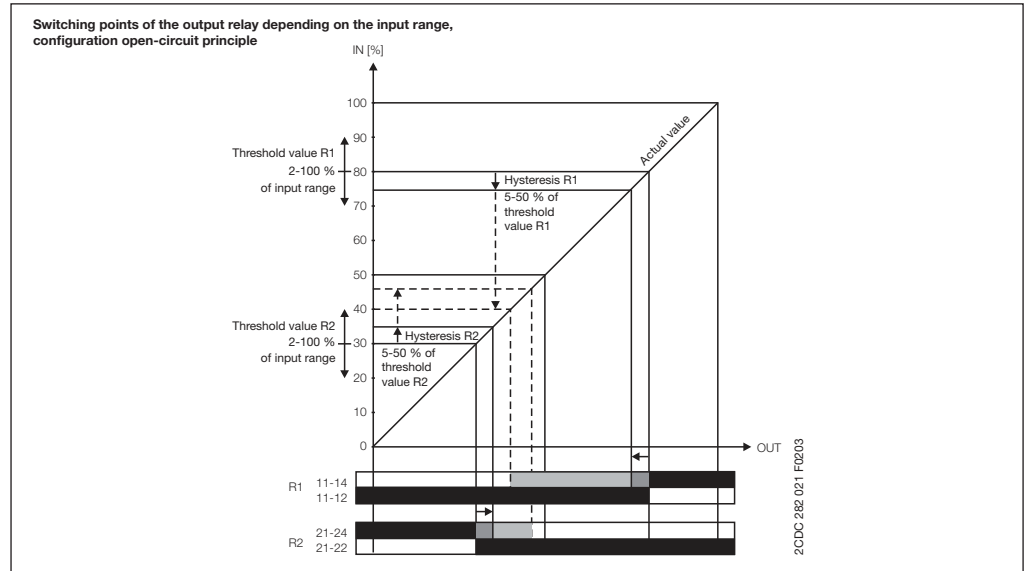


DIP switch settings

Input	Switch					
	1	2	3	4	5	6
0...0 V						
0...5 V						
0...1 V						
-10...+10 V						
1...5 V						
0...20 mA						
4...20 mA						
Output						
Closed-circuit principle						
Open-circuit principle						

Legend:
 ■ ON
 □ OFF
 ▒ no influence

Switching points

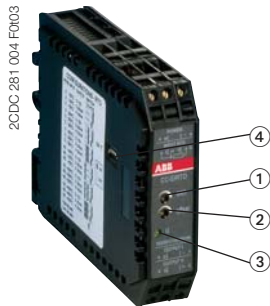


Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/STDR	24-48 V DC	1SVR 040 010 R0000	1	
	110-240 V AC	1SVR 040 011 R2500	1	

• Accessories	226	• Technical data	230
• Technical diagrams	233	• Dimensional drawings	233

Temperature signal converter for RTD sensors CC-E/RTD

Ordering details



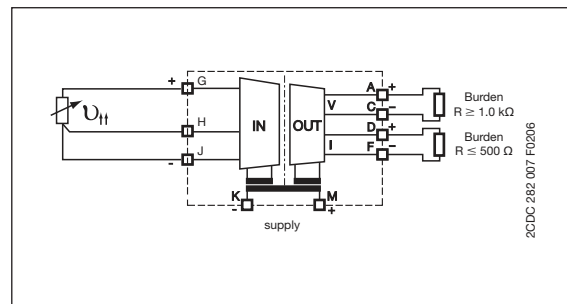
CC-E/RTD

- ① Gain adjustment
- ② Offset adjustment
- ③ U: green LED - supply voltage
- ④ DIP switch for input and output configuration (only available on universal devices)

CC-E/RTD temperature signal converter for RTD sensors, linearized with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/RTD)
- 2x12 single-function devices
- "Plug and Work", no adjustment of single-function devices required
- Temperature signal converter for PT100 sensors
- 2- or 3-wire connection

Wiring instruction



DIP switch settings (universal devices)

Input	Output	Switch					
		1	2	3	4	5	6
0...100 °C	0...10 V						■
	0-20 mA						■
	4-20 mA						■
0...300 °C	0-10 V						■
	0-20 mA						■
	4-20 mA						■
0...500 °C	0-10 V						■
	0-20 mA						■
	4-20 mA						■
-50...+50 °C	0-10 V						■
	0-20 mA						■
	4-20 mA						■
-50...+250 °C	0-10 V						■
	0-20 mA						■
	4-20 mA						■
-50...+450 °C	0-10 V						■
	0-20 mA						■
	4-20 mA						■
High fail safe						■	
Low fail safe						■	

Type	Input signal	Output signal	Order code	Pack. unit piece	Price 1 piece
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Supply voltage: 24 V DC universal

CC-E/RTD	refer to table	0-10 V, 0-20 mA, 4-20 mA	1SVR 011 701 R2500 ¹⁾	1	
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single-function

CC-E RTD/V	PT100	0-10 V	1SVR 011 730 R2500	1	
CC-E RTD/I	0...100 °C	0-20 mA	1SVR 011 731 R1200	1	
CC-E RTD/I		4-20 mA	1SVR 011 732 R1300	1	
CC-E RTD/V	PT100	0-10 V	1SVR 011 733 R1400	1	
CC-E RTD/I	-50...+50 °C	0-20 mA	1SVR 011 734 R1500	1	
CC-E RTD/I		4-20 mA	1SVR 011 735 R1600	1	
CC-E RTD/V	PT100	0-10 V	1SVR 011 736 R1700	1	
CC-E RTD/I	0...300 °C	0-20 mA	1SVR 011 737 R1000	1	
CC-E RTD/I		4-20 mA	1SVR 011 738 R2100	1	
CC-E RTD/V	PT100	0-10 V	1SVR 011 739 R2200	1	
CC-E RTD/I	-50...+250 °C	0-20 mA	1SVR 011 740 R0700	1	
CC-E RTD/I		4-20 mA	1SVR 011 741 R2400	1	

Supply voltage: 110-240 V AC universal

CC-E/RTD	refer to table	0-10 V, 0-20 mA, 4-20 mA	1SVR 011 706 R2200	1	
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single-function

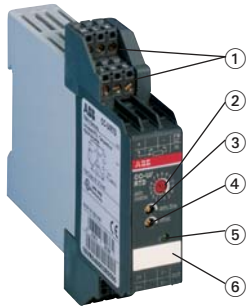
CC-E RTD/V	PT100	0-10 V	1SVR 011 788 R2400	1	
CC-E RTD/I	0...100 °C	0-20 mA	1SVR 011 789 R2500	1	
CC-E RTD/I		4-20 mA	1SVR 011 790 R2200	1	
CC-E RTD/V	PT100	0-10 V	1SVR 011 791 R1700	1	
CC-E RTD/I	-50...+50 °C	0-20 mA	1SVR 011 792 R1000	1	
CC-E RTD/I		4-20 mA	1SVR 011 793 R1100	1	
CC-E RTD/V	PT100	0-10 V	1SVR 011 794 R1200	1	
CC-E RTD/I	0...300 °C	0-20 mA	1SVR 011 795 R1300	1	
CC-E RTD/I		4-20 mA	1SVR 011 796 R1400	1	
CC-E RTD/V	PT100	0-10 V	1SVR 011 797 R1500	1	
CC-E RTD/I	-50...+250 °C	0-20 mA	1SVR 011 798 R2600	1	
CC-E RTD/I		4-20 mA	1SVR 011 799 R2700	1	

¹⁾ 1604 Class I, Div.2 (universal device)

Temperature signal converter for RTD sensors CC-U/RTD

Ordering details

2CDC 281 005 F003



CC-U/RTD

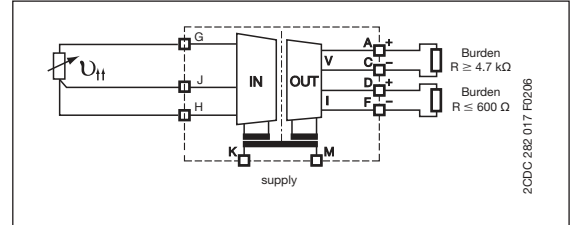
- ① Plug-in connecting terminals
- ② Gain: Coarse adjustment
- ③ Gain: Fine adjustment
- ④ Offset adjustment
- ⑤ U: green LED - supply voltage
- ⑥ Marker label

CC-U/RTD universal signal converter for PT10, PT100, PT1000 temperature sensors (acc. to IEC 751 and JIS C 1604¹⁾), linearized with 3-way electrical isolation

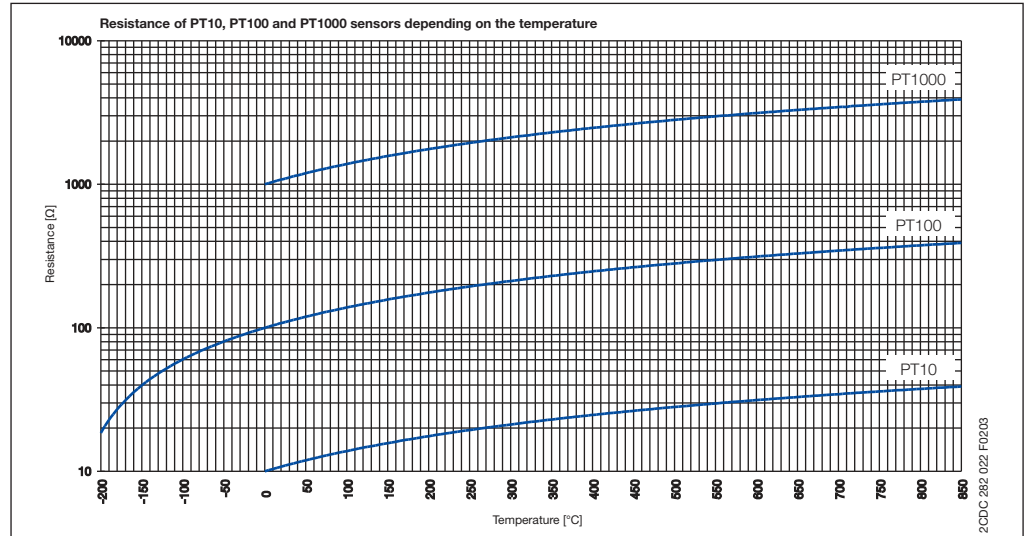
- Configurable output signal response on input signal interruption (low / high fail safe)
- Adjustment and operating elements on the front-side
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply
- 2- or 3-wire connection

¹⁾ Japanese standard

Wiring instruction



Characteristic curves



DIP switch settings

Type	Input Range	Switch 1						Switch 2						Gain Coarse
		1	2	3	4	5	6	1	2	3	4	5	6	
PT10	0...500 °C													F
	0...550 °C													E
	0...600 °C													D
	0...650 °C													C
	0...700 °C													B
	0...750 °C													A
PT100	0...800 °C													9
	0...850 °C													8
	0...90 °C													F
	0...80 °C													E
	0...70 °C													B
	0...80 °C													A
PT1000	0...90 °C													9
	0...100 °C													8
	0...200 °C													3
	0...300 °C													2
	0...400 °C													1
	0...500 °C													0
Low fail safe *)														-
High fail safe *)														-

Output	Switch 3					
	1	2	3	4	5	6
0...5 V						
0...10 V						
1...5 V						
2...10 V						
-10...+10 V						
-5...+5 V						
-10...0 V						
-5...0 V						
0...6.66 V						
-10...+3.33 V						
-5...+1.66 V						
0...8 V						
0...4 V						
-10...-2 V						
-5...-1 V						
1.25...6.25 V						
-7.5...+2.5 V						
-3.75...+1.25 V						
1.66...8.33 V						
-6.66...+6.66 V						
-3.33...+3.33 V						
-8...0 V						
-4...0 V						
0...1 mA						
0...20 mA						
4...20 mA						
0...10 mA						
0...0.5 mA						
0...13.33 mA						
0...666 µA						
0...16 mA						
0...800 µA						
0...8 mA						
0...400 µA						
2.5...12.5 mA						
125...625 µA						
3.33...16.66 mA						
166...833 µA						
0.2...1 mA						
2...10 mA						
100...500 µA						

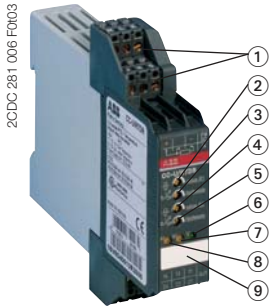
*) Detection of input signal interruptions:
If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).

Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/RTD	24-48 V DC	1SVR 040 002 R0500	1	
	110-240 V AC	1SVR 040 003 R0600	1	

• Accessories	226	• Dimensional drawings	233
• Technical data	229		

Temperature signal converter for RTD sensors CC-U/RTDR with relay output

Ordering details



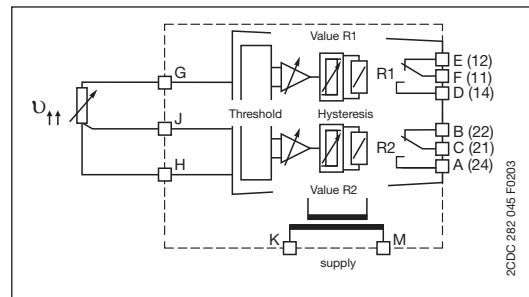
CC-U/RTDR

- ① Plug-in connecting terminals
- ② Threshold value for R1
- ③ Hysteresis for R1
- ④ Threshold value for R2
- ⑤ Hysteresis for R2
- ⑥ U: green LED - supply voltage
- ⑦ R2: yellow LED - Relay 2 energized
- ⑧ R1: yellow LED - Relay 1 energized
- ⑨ Marker label

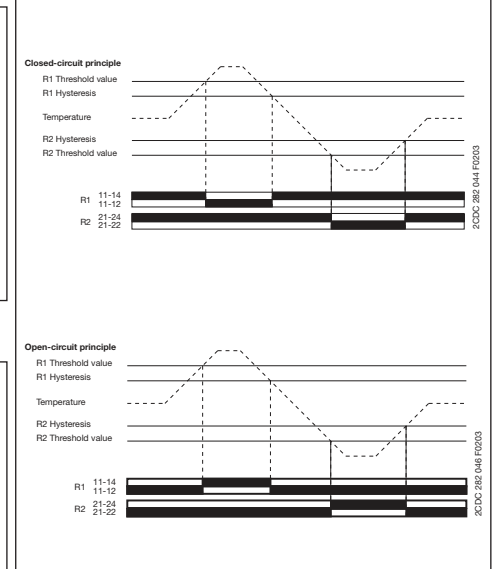
CC-U/RTDR universal signal converter for temperature and resistance signals, with 2 threshold relay outputs and 3-way electrical isolation

- Temperature signal converter for PT100 signals (5 ranges up to 800 °C) and variable resistances from 0-380 Ω
- 2 threshold relay outputs with one c/o contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply
- 2- or 3-wire connection

Wiring instruction



Function diagrams

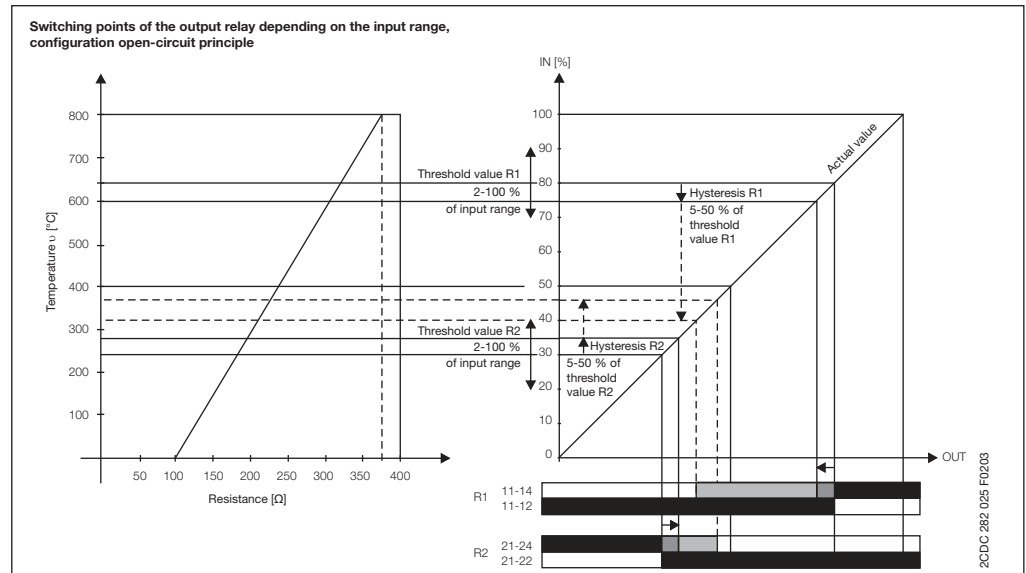


DIP switch settings

Input PT100	Switch					
	1	2	3	4	5	6
0...100 °C						
0...200 °C						
0...400 °C						
0...600 °C						
0...800 °C						
Output						
Closed-circuit principle						
Open-circuit principle						

Legend:
 ■ ON
 □ OFF
 ▨ no influence

Switching points



Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/RTDR	24-48 V DC	1SVR 040 012 R2600	1	
	110-240 V AC	1SVR 040 013 R2700	1	

• Accessories	226	• Technical data	230
• Technical diagrams	233	• Dimensional drawings	233

Temperature signal converter for thermocouples CC-E/TC

Ordering details

2CDC 281 007 F003



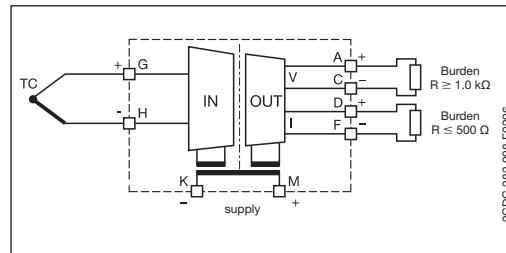
CC-E/TC

- ① Gain adjustment
- ② Offset adjustment
- ③ U: green LED - supply voltage
- ④ DIP switch for input and output configuration (only available on universal devices)

CC-E/TC analog signal converter for thermocouple signals of the types J and K with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/TC)
- 2x6 single-function devices
- "Plug and Work", no adjustment of single-function devices required

Wiring instruction



DIP switch settings (universal devices)

Input	Output	Switch					
		1	2	3	4	5	6
TC-J: 0...600 °C	0...10 V	■	■	■	■	■	■
	0...20 mA	■	■	■	■	■	■
	4...20 mA	■	■	■	■	■	■
TC-K: 0...1000 °C	0...10 V	■	■	■	■	■	■
	0...20 mA	■	■	■	■	■	■
	4...20 mA	■	■	■	■	■	■
High fail safe		■	■	■	■	■	■
Low fail safe		■	■	■	■	■	■

Legend:
 ■ ON
 □ OFF
 □ no influence

Type	Input signal	Output signal	Order code	Pack. unit piece	Price 1 piece
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Supply voltage: 24 V DC universal

CC-E/TC	thermocouple types J and K	0-10 V, 0-20 mA, 4-20 mA	1SVR 011 702 R2600¹⁾	1	
single-function					
CC-E TC/V	type J 0...600 °C	0-10 V	1SVR 011 750 R0100	1	
CC-E TC/I		0-20 mA	1SVR 011 751 R2600	1	
CC-E TC/I		4-20 mA	1SVR 011 752 R2700	1	
CC-E TC/V	type K 0...1000 °C	0-10 V	1SVR 011 753 R2000	1	
CC-E TC/I		0-20 mA	1SVR 011 754 R2100	1	
CC-E TC/I		4-20 mA	1SVR 011 755 R2200	1	

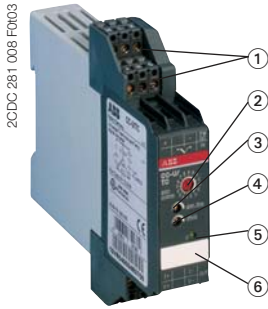
Supply voltage: 110-240 V AC universal

CC-E/TC	thermocouple types J and K	0-10 V, 0-20 mA, 4-20 mA	1SVR 011 707 R2300	1	
single-function					
CC-E TC/V	type J 0...600 °C	0-10 V	1SVR 011 760 R0300	1	
CC-E TC/I		0-20 mA	1SVR 011 761 R2000	1	
CC-E TC/I		4-20 mA	1SVR 011 762 R2100	1	
CC-E TC/V	type K 0...1000 °C	0-10 V	1SVR 011 763 R2200	1	
CC-E TC/I		0-20 mA	1SVR 011 764 R2300	1	
CC-E TC/I		4-20 mA	1SVR 011 765 R2400	1	

¹⁾ 1604 Class I, Div.2 (universal device)

Temperature signal converter for thermocouples CC-U/TC

Ordering details



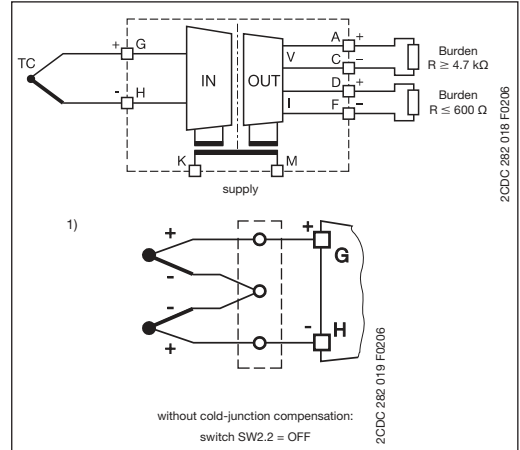
CC-U/TC

- ① Plug-in connecting terminals
- ② Gain: Coarse adjustment
- ③ Gain: Fine adjustment
- ④ Offset adjustment
- ⑤ U: green LED - supply voltage
- ⑥ Marker label

CC-U/TC universal signal converter for thermocouples with 3-way electrical isolation

- Temperature signal converter for thermocouples of the types K, J, T, S, E, N, R, B
- Continuously adjustable voltage signal input 0-10 mV and 0-50 mV
- Differential temperature meas. possible ¹⁾
- Configurable output signal response on input signal interruption (low fail safe / high fail safe)
- Adjustment and operating elements on the front-side
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

Wiring instruction



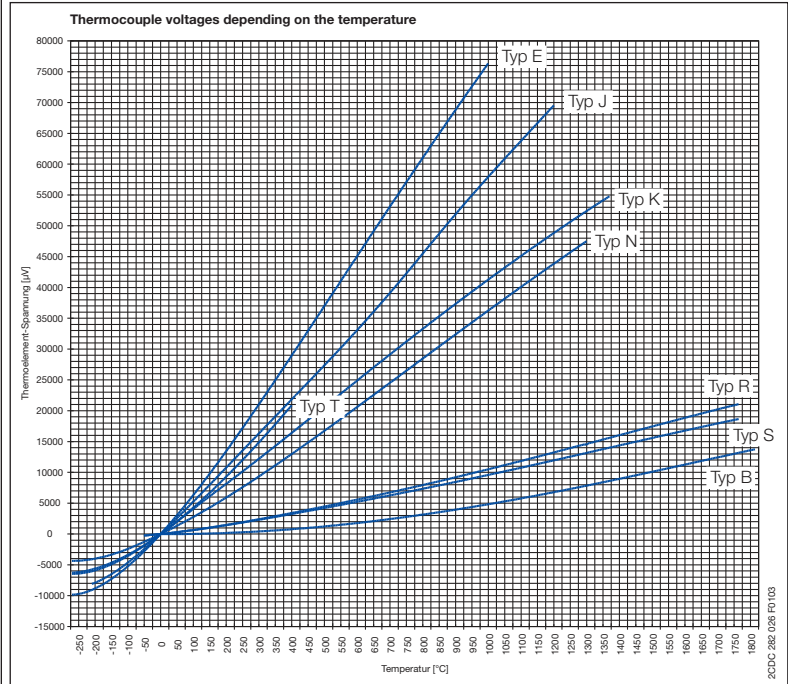
DIP switch settings

Output	Switch 3					
	1	2	3	4	5	6
0...5 V						
0...10 V						
1...5 V						
2...10 V						
-10...+10 V						
-5...+5 V						
-10...0 V						
-5...0 V						
0...6.66 V						
-10...+3.33 V						
-5...+1.66 V						
0...8 V						
0...4 V						
-10...-2 V						
-5...-1 V						
1.25...6.25 V						
-7.5...+2.5 V						
-3.75...+1.25 V						
1.66...8.33 V						
-6.66...+6.66 V						
-3.33...+3.33 V						
-8...0 V						
-4...0 V						
0...1 mA						
0...20 mA						
4...20 mA						
0...10 mA						
0...0.5 mA						
0...13.33 mA						
0...666 μA						
0...16 mA						
0...800 μA						
0...8 mA						
0...400 μA						
2.5...12.5 mA						
125...625 μA						
3.33...16.66 mA						
166...833 μA						
0.2...1 mA						
2...10 mA						
100...500 μA						

Input	Switch 1						Switch 2								
	1	2	3	4	5	6	1	2	3	4	5	6			
Type															
Range															
K															
J															
T															
S															
E															
N															
R															
B															
mV															
Low fail safe *)															
High fail safe *)															

¹⁾ Detection of input signal interruptions:
If the input signal circuit is interrupted, the output signal changes to the adjusted minimum value (low fail safe) or maximum value (high fail safe).

Characteristic curves



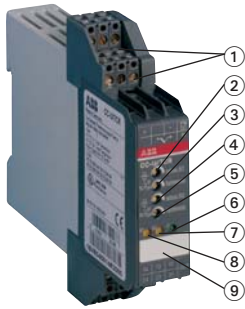
Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/TC	24-48 V DC	1SVR 040 004 R0700	1	
	110-240 V AC	1SVR 040 005 R0000	1	

- Accessories226
- Technical data229
- Dimensional drawings233

Temperature signal converter for thermocouples CC-U/TCR with relay output

Ordering details

2CDC 281 009 F0103



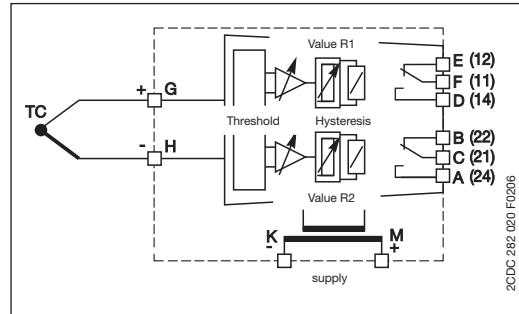
CC-U/TCR

- ① Plug-in connecting terminals
- ② Threshold value for R1
- ③ Hysteresis for R1
- ④ Threshold value for R2
- ⑤ Hysteresis for R2
- ⑥ U: green LED - supply voltage
- ⑦ R2: yellow LED - Relay 2 energized
- ⑧ R1: yellow LED - Relay 1 energized
- ⑨ Marker label

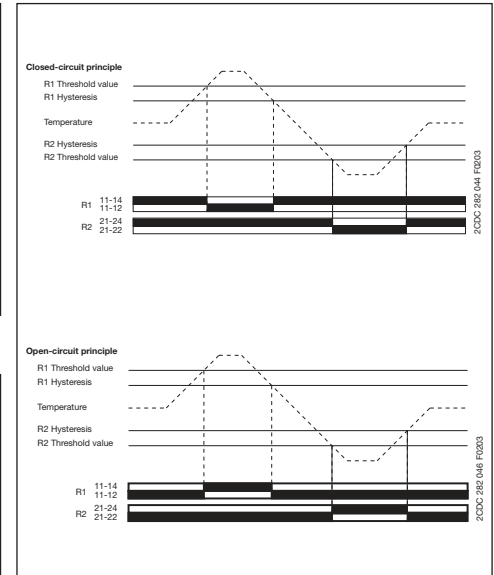
CC-U/TCR universal signal converter for thermocouples, with 2 threshold relay outputs and 3-way electrical isolation

- Temperature signal converter for thermocouples of the types K, J, T, S
- 2 threshold relay outputs with one change-over contact each (threshold and respective hysteresis can be adjusted independently from each other)
- Open-circuit or closed-circuit principle configurable by means of a DIP switch
- 2 yellow LEDs for clear status indication of the output relays
- Plug-in connecting terminals for inputs, outputs and supply

Wiring instruction



Function diagrams

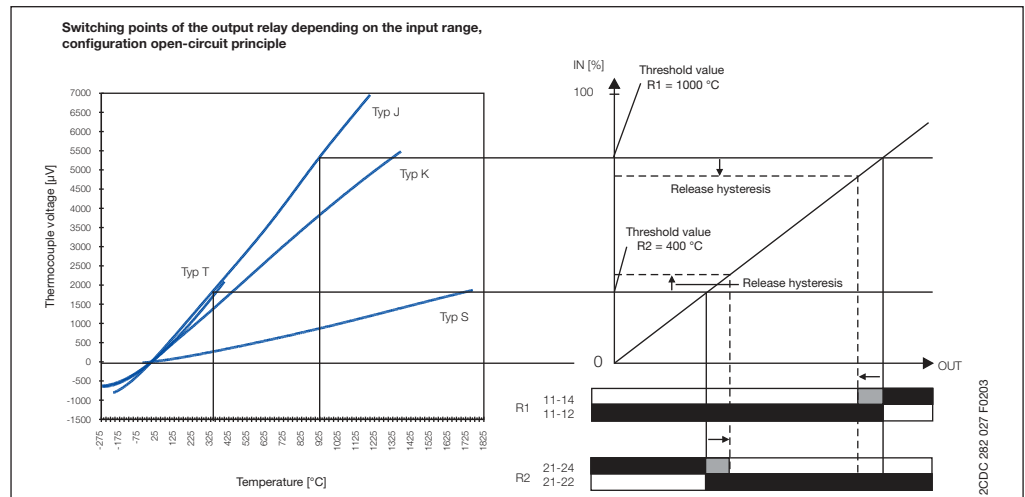


DIP switch settings

Type	Input Range	Switch					
		1	2	3	4	5	6
J	0...240 °C						
	0...480 °C						
K	0...1200 °C						
	0...250 °C						
T	0...500 °C						
	0...1350 °C						
S	-150...+120 °C						
	0...220 °C						
S	0...400 °C						
	0...210 °C						
S	0...380 °C						
	0...860 °C						
S	0...1550 °C						
	Output						
	Closed-circuit principle						
	Open-circuit principle						

Legend
 ■ ON
 □ OFF
 □ no influence

Switching points

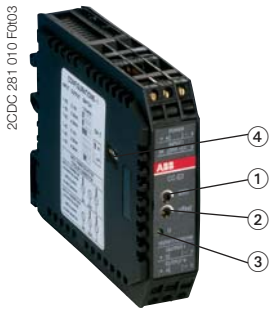


Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/TCR	24-48 V DC	1SVR 040 014 R2000	1	
	110-240 V AC	1SVR 040 015 R2100	1	

- Accessories 226
- Technical data 230
- Technical diagrams 233
- Dimensional drawings 233

Measuring converter for sinusoidal and DC currents CC-E/I

Ordering details



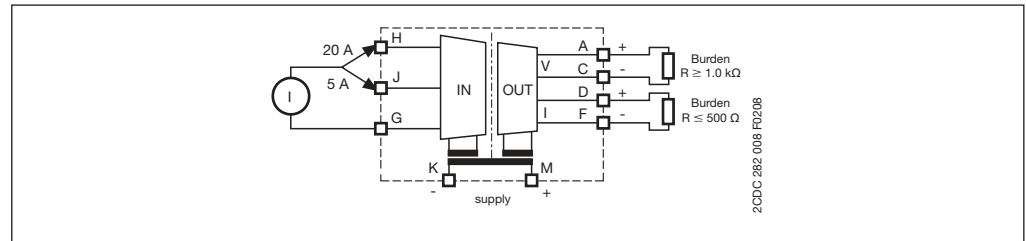
CC-E/I

- ① Gain adjustment
- ② Offset adjustment
- ③ U: green LED - supply voltage
- ④ DIP switch for input and output configuration (only available on universal devices)

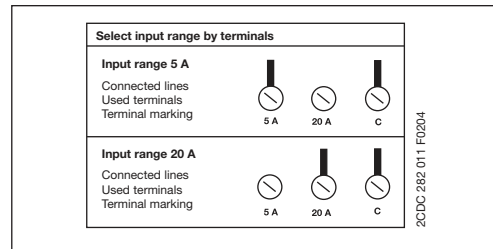
CC-E/I measuring converter for current signals 0-5 A, 0-20 A, AC/DC with 3-way electrical isolation

- 2 universally configurable devices (type CC-E/I)
- 2x6 single-function devices
- "Plug and Work", no adjustment of single-function devices required

Wiring instruction



Input range selection



DIP switch settings (universal devices)

Input	Output	Switch					
		1	2	3	4	5	6
I - DC	0...10 V	■					
I - AC							
I - DC	0...20 mA	■					
I - AC							
I - DC	4...20 mA	■	■	■	■	■	■
I - AC							

Legend: ■ ON, □ OFF

Type	Input signal	Output signal	Order code	Pack. unit pieces	Price 1 piece
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Supply voltage: 24 V DC universal

CC-E/I	0-5 A, 0-20 A, AC/DC	0-10 V, 0-20 mA, 4-20 mA	1SVR 011 703 R2700 ¹⁾	1	
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single-function

CC-E I _{AC} /V	0-5 A, 0-20 A, AC	0-10 V	1SVR 011 770 R0500	1	
CC-E I _{AC} /I		0-20 mA	1SVR 011 771 R2200	1	
CC-E I _{AC} /I		4-20 mA	1SVR 011 772 R2300	1	

CC-E I _{DC} /V	0-5 A, 0-20 A, DC	0-10 V	1SVR 011 773 R2400	1	
CC-E I _{DC} /I		0-20 mA	1SVR 011 774 R2500	1	
CC-E I _{DC} /I		4-20 mA	1SVR 011 775 R2600	1	

Supply voltage: 110-240 V AC universal

CC-E/I	0-5 A, 0-20 A, AC/DC	0-10 V, 0-20 mA, 4-20 mA	1SVR 011 708 R0400	1	
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single-function

CC-E I _{AC} /V	0-5 A, 0-20 A, AC	0-10 V	1SVR 011 780 R1100	1	
CC-E I _{AC} /I		0-20 mA	1SVR 011 781 R0600	1	
CC-E I _{AC} /I		4-20 mA	1SVR 011 782 R0700	1	

CC-E I _{DC} /V	0-5 A, 0-20 A, DC	0-10 V	1SVR 011 783 R0000	1	
CC-E I _{DC} /I		0-20 mA	1SVR 011 784 R0100	1	
CC-E I _{DC} /I		4-20 mA	1SVR 011 785 R1100	1	

¹⁾ UL 1604 Class I, Div.2 (universal device)

Measuring converter for sinusoidal currents

CC-E I_{AC}/ILPO

Ordering details

2CDC 281 018 F004



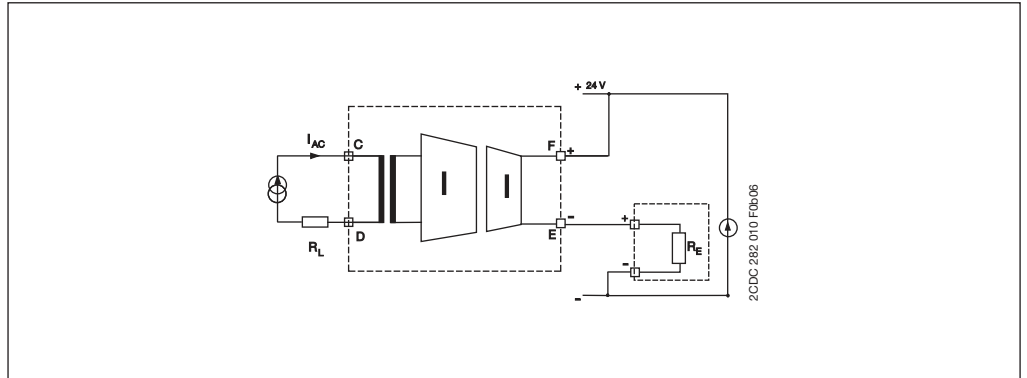
CC-E I_{AC}/ILPO

- ① Gain adjustment
- ② Offset adjustment
- ③ Selection of measuring range

CC-E I_{AC}/ILPO measuring converter without auxiliary power for sinusoidal currents
0-1 A, 0-5 A, output 4-20 mA

- Measuring converter for sinusoidal currents (0-1 A, 0-5 A)
- Measuring range selection by front-face sliding switch
- 4-20 mA output current in proportion to input current
- no additional power supply required

Wiring instruction

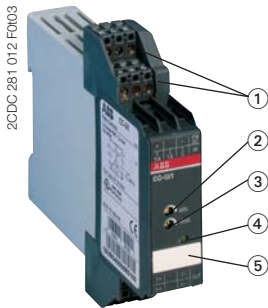


Type	Input signal	Order code	Pack. unit pieces	Price 1 piece
CC-E I _{AC} /ILPO	0-1 A, 0-5 A, AC	1SVR 010 203 R0500	1	

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Measuring converter for current RMS values CC-U/I

Ordering details



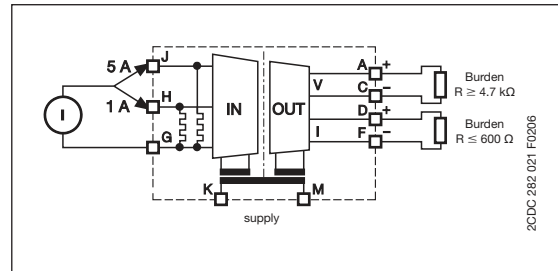
CC-U/I

- ① Plug-in connecting terminals
- ② Gain adjustment
- ③ Offset adjustment
- ④ U: green LED - supply voltage
- ⑤ Marker label

CC-U/I universal measuring converter for RMS values of 0-1 A and 0-5 A, with 3-way electrical isolation

- RMS converter for current signals up to 1 A and up to 5 A of any wave form (DC, DC with superimposed AC components, pure sinusoidal, triangular, phase-angle controlled, etc. in a measuring range of 0-600 Hz)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

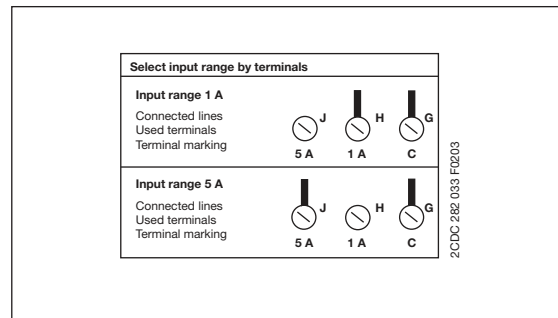
Wiring instruction



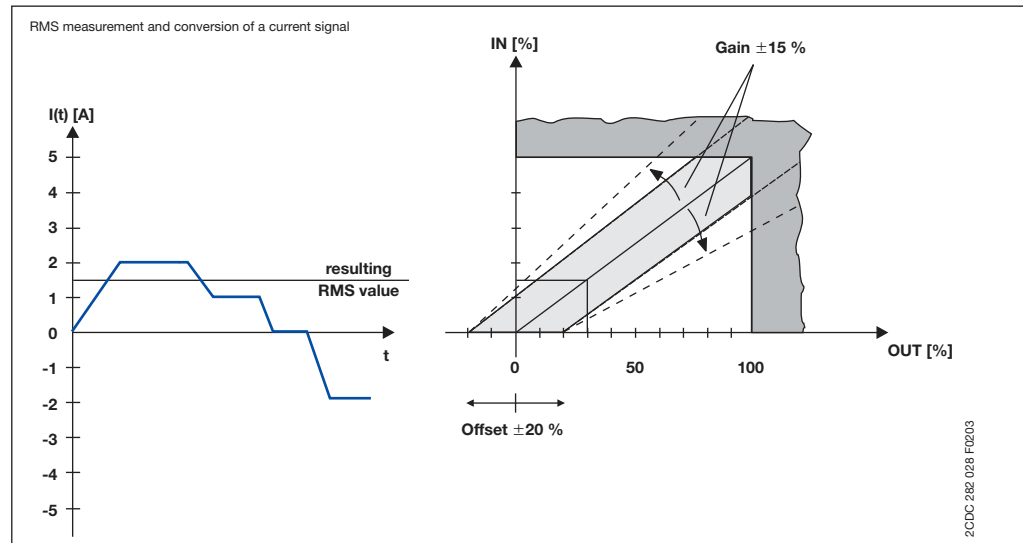
DIP switch settings

Output	Switch				
	1	2	3	4	5
0...5 V					
0...10 V					
1...5 V	■				
2...10 V	■				
-10...+3 V	■	■			
-10...0 V	■	■			
-5...0 V	■	■			
0...6.66 V	■	■			
-10...+3.33 V	■	■	■		
-5...+1.66 V	■	■	■		
0...8 V	■	■	■		
0...4 V	■	■	■		
-10...-2 V	■	■	■	■	
-5...-1 V	■	■	■	■	
1.25...6.25 V	■	■	■	■	
-7.5...+2.5 V	■	■	■	■	
-3.75...+1.25 V	■	■	■	■	
1.66...8.33 V	■	■	■	■	
-6.66...+6.66 V	■	■	■	■	
-3.33...+3.33 V	■	■	■	■	
-8...0 V	■	■	■	■	■
-4...0 V	■	■	■	■	■
0...1 mA	■	■	■	■	■
0...20 mA	■	■	■	■	■
4...20 mA	■	■	■	■	■
0...10 mA	■	■	■	■	■
0...0.5 mA	■	■	■	■	■
0...13.33 mA	■	■	■	■	■
0...666 μA	■	■	■	■	■
0...16 mA	■	■	■	■	■
0...800 μA	■	■	■	■	■
0...8 mA	■	■	■	■	■
0...400 μA	■	■	■	■	■
2.5...12.5 mA	■	■	■	■	■
125...625 μA	■	■	■	■	■
3.33...16.66 mA	■	■	■	■	■
166...833 μA	■	■	■	■	■
0.2...1 mA	■	■	■	■	■
2...10 mA	■	■	■	■	■
100...500 μA	■	■	■	■	■

Input range selection



Example of application



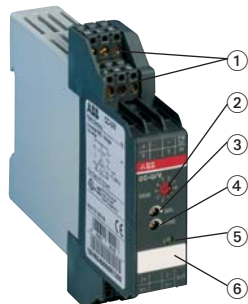
Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/I	24-48 V DC	1SVR 040 006 R0100	1	
	110-240 V AC	1SVR 040 007 R0200	1	

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Measuring converter for voltage RMS values CC-U/V

Ordering details

2CDC 281 013 F003



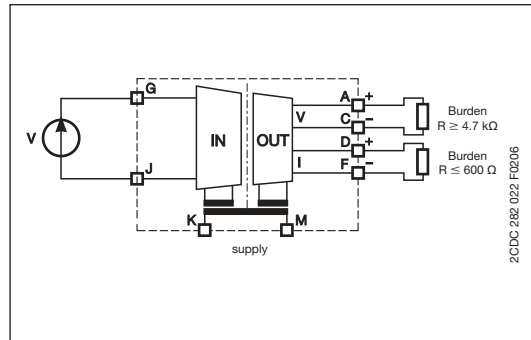
CC-U/V

- ① Plug-in connecting terminals
- ② Input voltage range selection
- ③ Gain adjustment
- ④ Offset adjustment
- ⑤ U: green LED - supply voltage
- ⑥ Marker label

CC-U/V universal measuring converter for RMS values of 0-600 V, with 3-way electrical isolation

- RMS converter for voltage signals up to 600 V of any wave form (DC, DC with superimposed AC components, pure sinusoidal, triangular, phase-angle controlled, etc. in a measuring range of 0-600 Hz)
- Adjustment and operating elements on the front
- Short-circuit proof signal outputs
- Plug-in connecting terminals for inputs, outputs and supply

Wiring instruction



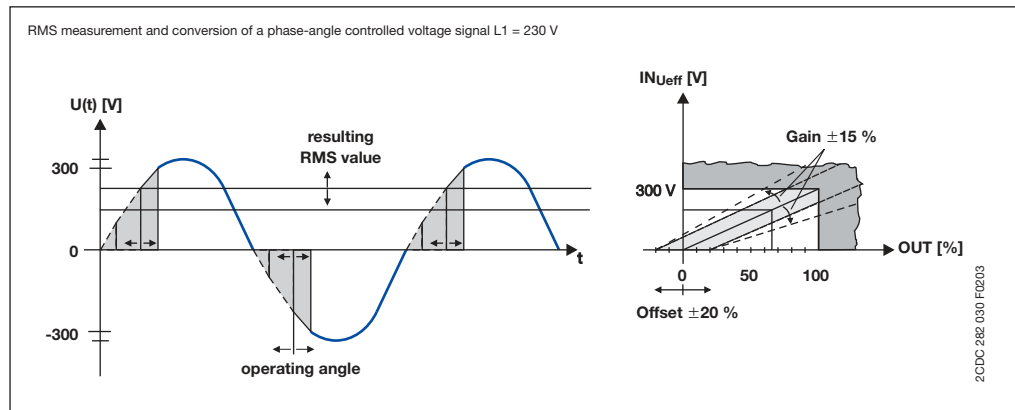
DIP switch settings

Output	Switch					
	1	2	3	4	5	6
0...5 V						
0...10 V						
1...5 V						
2...10 V						
-10...+10 V						
-5...+5 V						
-10...0 V						
-5...0 V						
0...6.66 V						
-10...+3.33 V						
-5...+1.66 V						
0...8 V						
0...4 V						
-10...-2 V						
-5...-1 V						
1.25...6.25 V						
-7.5...+2.5 V						
-3.75...+1.25 V						
1.66...8.33 V						
-6.66...+6.66 V						
-3.33...+3.33 V						
-8...0 V						
-4...0 V						
0...1 mA						
0...20 mA						
4...20 mA						
0...10 mA						
0...0.5 mA						
0...13.33 mA						
0...666 μA						
0...16 mA						
0...800 μA						
0...8 mA						
2.5...12.5 mA						
125...625 μA						
3.33...16.66 mA						
166...833 μA						
0.2...1 mA						
2...10 mA						
100...500 μA						

Input range selection

Selecting input range by front-face rotary switch	Switch position
0...100 V	1
0...150 V	2
0...250 V	3
0...300 V	4
0...400 V	5
0...450 V	6
0...550 V	7
0...600 V	8

Example of application



Type	Rated supply voltage	Order code	Pack. unit pieces	Price 1 piece
CC-U/V	24-48 V DC	1SVR 040 008 R1300	1	
	110-240 V AC	1SVR 040 009 R1400	1	

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Analog signal converters

Accessories for CC-U range

Ordering details

Accessories

Adapter for screw mounting

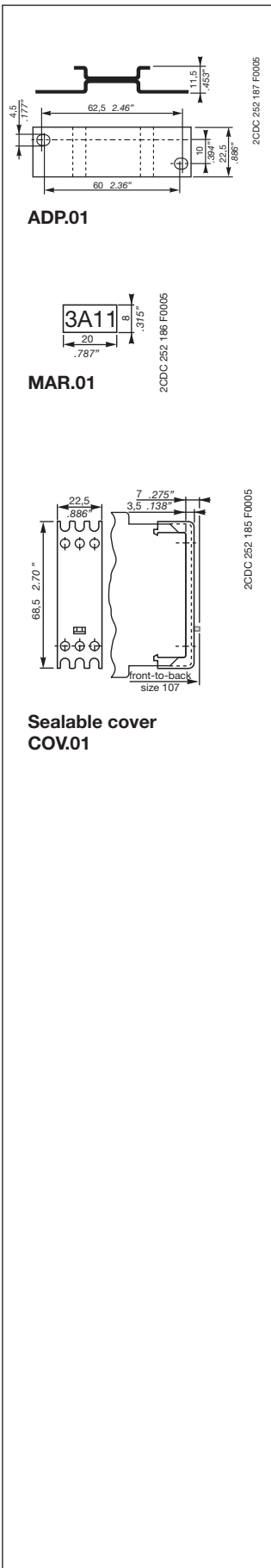
Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
ADP.01	CC-U	22.5	1SVR 430 029 R0100	1		18.4/0.65

Marker label

Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
MAR.01	CC-U		1SVR 366 017 R0100	10		0.19/0.007

Sealable transparent cover

Type	for type	Width in mm	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece g / oz
COV.01	CC-U	22.5	1SVR 430 005 R0100	1		5.2/0.18



5

Analog signal converters

CC-E/STD, CC-E x/x, CC-E/RTD, CC-E/TC

Technical data

Type		CC-E/STD		CC-E/RTD ³⁾	CC-E/TC
Input circuits - Analog inputs	J-G-H	Current	Voltage	Temperature sensors	Thermocouples (IEC 584-1 and 2)
Input signal		Standard signals		PT100	TC.K, TC.J
Rated input range		0...20 mA / 4...20 mA	0...5 V / 0...10 V / -10...+10 V	-50...+500 °C	TC.K: 0...1000 °C, TC.J: 0...600 °C
Limitation of input signals		+55 mA	± 11 V		
Influence of line resistance		-		< 0.01 %/Ω	< 0.5 % / 100 Ω
Gain adjustment range		± 5 % (universal devices)			
Offset adjustment range		± 5 % (universal devices)			
Input impedance		50 Ω	1 MΩ	-	-
Suppression at 50 Hz		-		-	> 35 dB
Common-mode rejection		-		100 dB	
Output circuits - Analog outputs	D-F, A-C	Current		Voltage	
Output signal		0-20 mA, 4-20 mA		0-5 V, 0-10 V	
Output burden		≤ 500 Ω		≥ 1.0 KΩ	
Accuracy ¹⁾		± 0.5 % of full-scale			
Residual ripple		< 0.5 %			
Response time		200 μs		10 ms	
Transmission frequency		2 kHz		80 Hz	2 Hz (up to -3 dB)
Reaction to input circuit interruption				Low fail safe: Output voltage > 15 % of measuring range ²⁾ Low fail safe: Output voltage < -0.6 V, output current = 0 mA	
Supply circuits	K-M	DC versions		AC versions	
Supply voltage		24 V DC		110-240 V AC - 50/60 Hz	
Supply voltage tolerance		-15...+15 %		-15...+10 %	
Power consumption		1.5 W typ.		1.5 VA typ.	
Indication of operational states					
Rated control supply voltage U _s		U: green LED			
General data					
Ambient temperature range	operation / storage	0...+60 °C / -20...+80 °C			
Temperature coefficient		± 500 ppm/°C			
Degree of protection (DIN 40050)		IP20			
Mounting position		ventilation slots on top and bottom			
Mounting		DIN rail, snap-on mounting			
Electrical connection					
Wire size	rigid	0.2-4 mm ² (24-12 AWG)			
	fine-strand with(out) wire end ferrule	0.2-2.5 mm ² (24-14 AWG)			
Stripping length		7 mm (0.28 inch)			
Tightening torque		0.5 Nm (4.4 lb.in)			
Electromagnetic compatibility					
Interference immunity		EN 61000-6-2			
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)			
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m			
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kHz)			
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV			
HF line emission	IEC/EN 61000-4-6	10 V			
Interference emission	EN 61000-6-4	Class B			
Isolation data					
Test voltage between all isolated circuits		2.5 kV AC			
Rated insulation voltage		-	-	-	-

¹⁾ includes: non-linearity, factory setting, drift of temperature, supply voltage and output load

²⁾ Only -/RTD and -/TC: Single-function devices respond with Low fail safe to input signal interruptions

³⁾ When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

Analog signal converter CC-E I/I-1, CC-E I/I-2

Technical data

Type	CC-E I/I	
Input circuits - Analog inputs		
Current		
Input current I_{IN}	0-20 mA, 4-20 mA	
Min. input current	< 100 μ A	
Max. input current	50 mA ¹⁾ ($V_{IN} < 18$ V)	
Input voltage U_{IN}	< 2.5 V + ($I_{IN} \times R_L$)	
Input voltage drop U_i	< 2.5 V (20 mA, $R_L = 0 \Omega$)	
Max. input voltage	18 V ¹⁾ ($I_{IN} < 50$ mA)	
Output circuits		
Output current I_{OUT}	0-20 mA, 4-20 mA	
Output load R_L	0-500 Ω	
Output voltage U_{OUT}	$I_{OUT} \times R_L$	
Residual ripple	< 20 mV _{pp} (500 Ω , 20 mA)	
Response time (0-100 %)	< 15 ms (0-500 Ω , 20 mA), < 5 ms (500 Ω , 20 mA, 25 °C)	
Accuracy	≤ 0.1 % of full-scale (20 mA)	
Load influence (0-500 Ω)	$\leq \pm 0.05$ % / 100 Ω , ≤ -0.1 % / 100 Ω (25 °C)	
General data		
Width of the enclosure	18 mm	
Weight	1 channel	approx. 0.037 kg (0.082 lb)
	2 channel	approx. 0.044 kg (0.097 lb)
Mounting position	any	
Degree of protection	enclosure / terminals	IP20 / IP20
Ambient temperature range	operation / storage	-25...+60 °C / -40...+85 °C
Temperature coefficient	< ± 50 ppm / °C	
Mounting	DIN rail (EN 50022)	
Electrical connection		
Wire size	rigid	0.2-4 mm ² (24-12 AWG)
	fine-strand with(out) wire end ferrule	0.2-2.5 mm ² (24-14 AWG)
Stripping length	7 mm (0,28 inch)	
Tightening torque	0.5 Nm (4.4 lb.in)	
Standards		
Product standard	EN 50178	
Low Voltage Directive	2006/95/EC	
EMC Directive	2004/108/EC	
Electromagnetic compatibility		
Interference immunity	EN 61000-6-2	
electrostatic discharge (ESD)	EN 61000-4-2	Level 3 (± 6 kV / ± 8 kV)
electromagnetic field (HF radiation resistance)	EN 61000-4-3	10 V/m
fast transients (Burst)	EN 61000-4-4	Level 3 (± 2 kV / 5 kH)
powerful impulses (Surge)	EN 61000-4-5	± 2 kV / ± 1 kV
HF line emission	EN 61000-4-6	10 V
magnetisches Feld	EN 61000-4-8	30 A/m
Interference emission	EN 61000-6-4	
Radiated noise	EN 55011	Class B
Operational reliability (EN 68-2-6)	4 g	
Mechanical resistance (EN 68-2-6)	10 g	
Environmental testing (IEC 68-2-30 Db)	24 h cycle, 55 °C, 93 % rel., 96 h	
Isolation data		
Insulation voltage input / output	500 V _{eff} / 50 Hz	
Insulation voltage between channels	5 kV _{eff} / 50 Hz (device with 2 channels)	
Pollution category	2	
Overvoltage category	II	

¹⁾ The input parameters have to be limited to the indicated maximum values.

• Approvals211

Analog signal converters CC-U/STD, CC-U/RTD, CC-U/TC

Technical data

Type	CC-U/STD			CC-U/RTD ³⁾	CC-U/TC
Input circuits - Analog inputs	J-G-H				
	Current	Voltage	Potentiometer	Temperature sensors	Thermocouples (IEC 584-1 and 2)
Input signal	0-20 mA 4-20 mA 10-50 mA 0-1 mA	0-100 mV 0-1 V 0-5 V 1-5 V 0-10 V 2-10 V ± 10 V	470 Ω - 1 MΩ ²⁾	PT10, PT100, PT1000 (IEL 751 and JICC 1604)	TC.K TC.J TC.T TC.S TC.E TC.N TC.R TC.B
Limitation of input signals	± 55 mA	± 11 V		-	-
Rated input range	-	-	-	Max. temperature adjustable: 6-60 °C for PT1000 50-500 °C for PT100 500-850 °C for PT10	refer to temperature specs. of individual thermocouples
Influence of line resistance	-	-	-	0.015 °C/Ω	< 0.01 % / 100 Ω
Gain adjustment range (universal devices)	0.9- 110 mA	45 mV - 22 V	-	see DIP switch settings	
Offset adjustment range (universal devices)	-137.5...+62.5 %			± 5 %	± 10 %
Input impedance	for different ranges			-	-
without detection of input signal interruption	51 Ω	6 MΩ	3 GΩ	-	-
with detection of input signal interruption	51 Ω	3.5 MΩ	9.5 GΩ	-	-
Suppression at 50 Hz	-	-	-	-	> 40 dB
Common-mode rejection	-	-	-	120 dB	105 dB
Output circuits - Analog outputs	D-F, A-C			Current	Voltage
Output signal				0-20 mA, 4-20 mA	0-5 V, 1-5 V, 0-10 V, 2-10 V, ± 10 V
Output burden				≤ 600 Ω	≥ 4.7 KΩ
Accuracy ¹⁾	±0.1 % of full-scale			±0.2 % of full-scale	±0.1 % of full-scale
Residual ripple	-			< 0.15 %	-
Response time	200 μs			10 ms	200 ms
Transmission frequency	1 kHz			80 Hz	2 Hz (to -3 dB)
Supply circuits	K-M				
Rated supply voltage				24-48 V DC	110-240 V AC
Supply voltage range				24-48 V DC / 24 V AC	110-240 V AC / 100-300 V DC
Supply voltage tolerance				DC: -15...+15 %	AC: -15...+10 %
Rated frequency				0 Hz or 50/60 Hz	
Power consumption				2 W at 24 V DC	4.5 VA at 230 V AC
Indication of operational states					
Supply voltage	U: green LED				
General data					
Ambient temperature range	operation / storage			-20...+60 °C / -40...+80 °C	
Temperature coefficient	±150 ppm/°C			±250 ppm/°C	±200 ppm/°C at min. offset ±400 ppm/°C at max. offset
Mounting position	any				
Mounting	DIN rail, snap-on mounting / screw mounting with adapter				
Electrical connection					
Wire size	rigid			plug-connector with screw terminals 0.2-2.5 mm ² (24-12 AWG)	
	fine-strand with(out) wire end ferrule			plug-connector with screw terminals 0.2-2.5 mm ² (24-12 AWG)	
Stripping length	7 mm (0.28 inch)				
Tightening torque	0.4 Nm (3.5 lb.in)				
Electromagnetic compatibility					
Interference immunity	EN 61000-6-2				
electrostatic discharge (ESD)	IEC/EN 61000-4-2			Level 3 (±6 kV / ±8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3			10 V/m	
fast transients (Burst)	IEC/EN 61000-4-4			Level 3 (±2 kV / 5 kHz)	
powerful impulses (Surge)	IEC/EN 61000-4-5			±2 kV / ±1 kV	
HF line emission	IEC/EN 61000-4-6			10 V	
Interference emission	EN 61000-6-4			Class B	
Isolation data					
Isolation test (between all isolated circuits)	1.5 kV				
Test voltage (between all isolated circuits)	1.5 kV / 50 Hz				

¹⁾ includes: non-linearity, factory setting, drift of temperature, supply voltage and output load

²⁾ Detection of an input signal break (fail safe) and resistance > 10 kΩ results in a linearity of ±0,2 %.

³⁾ When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

• Approvals211

Analog signal converters with relay output CC-U/STDR, CC-U/RTDR, CC-U/TCR

Technical data

Type	CC-U/STDR		CC-U/RTDR ¹⁾	CC-U/TCR
Input circuits - Analog inputs	J-H	Current	Voltage	Temperature sensors
Measuring signal / input range		0-20 mA 4-20 mA	0-1 V / 1-5 V 0-10 / ±10 V	PT100
Input resistance		approx. 50 Ω	approx. 1,5 MΩ	
Adjustable threshold		2-100 % of selected input range		
Adjustable hysteresis		5-50 % of threshold		
Repeat accuracy (constant parameters)		±0.5 % of full-scale		
Output circuits - Relay outputs	E-D-F, B-C-A	Relay, 2 c/o contacts		
Rated switching voltage		250 V AC		
Rated switching current	AC12 (resistive) 230 V	4 A		
	AC15 (inductive) 230 V	3 A		
	DC12 (resistive) 24 V	4 A		
	DC13 (inductive) 24 V	2 A		
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	B 300		
	max. rated operational voltage	300 V AC		
	max. continuous thermal current at B 300	5 A		
	max. making/breaking apparent power at B 300	3600/360 VA		
Minimum switching voltage		12 V		
Minimum switching current / power		10 mA / 0.6 VA (W)		
Response time		10 ms		
Mechanical lifetime		30 x 10 ⁶ switching cycles		
Electrical lifetime	at AC12, 230 V, 4 A	0.1 Mio. switching cycles		
Supply circuits	K-M			
Rated supply voltage		24-48 V DC	110-240 V AC	
Supply voltage range		24-48 V DC / 24 V AC	110-240 V AC / 100-300 V DC	
Supply voltage tolerance		DC: -15...+15 %	AC: -15...+10 %	
Rated frequency		0 Hz or 50/60 Hz		
Power consumption		2 W at 24 V DC	4.5 VA at 230 V AC	
Indication of operational states				
Supply voltage		U: green LED		
1st / 2nd output relay energized		R1: yellow LED / R2: yellow LED		
General data				
Ambient temperature range	operation / storage	-20...+60 °C / -40...+80 °C		
Temperature coefficient		±300 ppm/°C		
Mounting position		any		
Mounting		DIN rail (EN 50 022), snap-on mounting / screw mounting with adapter		
Electrical connection				
Wire size	rigid	plug-connector with screw terminals 0.2-2.5 mm ² (24-12 AWG)		
	fine-strand with(out) wire end ferrule	plug-connector with screw terminals 0.2-2.5 mm ² (24-12 AWG)		
Stripping length		7 mm (0.28 inch)		
Tightening torque		0.4 Nm (3.5 ib.in)		
Electromagnetic compatibility				
Interference immunity		EN 61000-6-2		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)		
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m		
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kHz)		
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV		
HF line emission	IEC/EN 61000-4-6	10 V		
Interference emission	EN 61000-6-4	Class B		
Isolation data				
Insulation voltage (between all isolated circuits)		2.5 kV		
Test voltage (between all isolated circuits)		2.5 kV		

¹⁾ When connecting a 2-wire sensor, the terminals J and H have to be jumpered.

• Approvals211

Analog signal converters

CC-E/I, CC-E I_{AC}/ILPO

Technical data

Type	CC-E/I		CC-E I _{AC} /ILPO
	J-G-H		C-D
Input circuits - Analog inputs	AC current	DC current	2 meas. ranges selectable
Rated input range	0-5 A / 0-20 A	0-5 A / 0-20 A	0-1 A / 0-5 A / sinusoidal
Measuring frequency			50/60 Hz
Overload capacity of inputs	input range 1 input range 2	10 x I _{Nom} (50 A) for max. 1 s 10 x I _{Nom} (200 A) for max. 1 s	10 x I _{Nom} (50 A) for max. 2 s 10 x I _{Nom} (200 A) for max. 2 s
Gain adjustment range	±5 % (universal devices)		-
Offset adjustment range	±5 % (universal devices)		-
Input impedance / resistance	5A : 65 mΩ	20 A : 2.5 mΩ	5 mΩ
Output circuits - Analog outputs	D-F Current	A-C Voltage	F-E passive current output in proportion to input current
Output signal	0-20 mA / 4-20 mA	0-10 V	4-20 mA
Output burden / load	≤ 500 Ω	≥ 1.0 Ω	12 V DC: 150 Ω, 24 V DC: 750 Ω 30 V DC: 1050 Ω
Accuracy ¹⁾	± 2 % of full-scale		
Offset adjustment range	±5 % (universal device)		± 5 %
Gain adjustment range	±5 % (universal device)		± 20 %
Residual ripple	< 0.5 %		
Response time	0.5 s		0.6 s
Transmission frequency	DC or 50/60 Hz		AC: 50/60 Hz
Reaction to input circuit interruption	Low fail safe: output voltage < 200 mA, output current < 400 μA		-
Supply circuits	K-M	DC versions	AC versions
Supply voltage		24 V DC	110-240 V AC 50/60 Hz
Supply voltage tolerance		-15...+15 %	-15...+10 %
Power consumption		typ 1.5 W	typ 1.5 VA
			-
Indication of operational states			
Supply voltage		U: green LED	-
General data			
Ambient temperature range	operation / storage	0...+60 °C / -20...+80 °C	-20...+60 °C / -40...+80 °C
Temperature coefficient		± 500 ppm/°C	300 ppm/°C
Degree of protection (DIN 40050)		IP20	
Mounting position		ventilation slots on top and bottom	
Mounting		DIN rail, snap-on mounting	
Electrical connection			
Wire size	rigid	0.2-4 mm ² (24-12 AWG)	
	fine-strand with(out) wire end ferrule	0.2-2.5 mm ² (24-14 AWG)	
Stripping length		7 mm (0.28 inch)	
Tightening torque		0.5 Nm (4.4 lb.in)	
Electromagnetic compatibility			
Interference immunity		EN 61000-6-2	
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m	
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kHz)	
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV	
HF line emission	IEC/EN 61000-4-6	10 V	
Interference emission	EN 61000-6-4	Class B	
Isolation data			
Test voltage (between all isolated circuits)		2.5 kV AC	
Rated insulation voltage		-	250 V AC

¹⁾ includes: non-linearity, factory setting, drift of temperature, supply voltage and output load

Analog signal converters

CC-U/I, CC-U/V

Technical data

Type		CC-U/I	CC-U/V
Input circuits - Analog inputs	J-G-H	any current signals, RMS measurement	any voltage signals, RMS measurement
Rated input range		0-1 A 0-5 A	0-100 V, 0-200 V 0-300 V, 0-400 V 0-500 V, 0-600 V
Measuring frequency		0-600 Hz	
Overload capacity of inputs	input range 1	$10 \times I_{Nom}$ (10 A) for max. 2 s	-
	input range 2	$10 \times I_{Nom}$ (50 A) for max. 2 s	-
Gain adjustment range		±15 %	
Offset adjustment range		±20 %	
Input impedance / resistance		1A: 60 mΩ, 5 A: 12 mΩ	> 800 kΩ
Output circuits - Analog outputs	D-F, A-C	Current	Voltage
Output signal		0-20 mA, 4-20 mA	0-5 V, 1-5 V, 0-10 V, 2-10 V, ± 10 V
Output load		≤ 600 Ω	≥ 4.7 kΩ
Accuracy ¹⁾		±0.5 % of full-scale	
Temperature coefficient		±250 ppm/°C max.	±300 ppm/°C max.
Residual ripple		< 0.15 %	
Response time		150 ms	
Supply circuits	K-M		
Rated supply voltage		24-48 V DC	110-240 V AC
Supply voltage range		24-48 V DC, 24 V AC	110-240 V AC, 100-300 V DC
Supply voltage tolerance		DC: -15...+15 %	AC: -15...+10 %
Rated frequency		0 Hz or 50/60 Hz	
Power consumption		2 W at 24 V DC	4.5 VA at 230 V AC
Indication of operational states			
Supply voltage		U: green LED	
General data			
Ambient temperature range	operation / storage	-20...+60 °C / -40...+80 °C	
Mounting position		any	
Mounting		DIN rail (EN 50022), snap-on mounting / screw mounting with adapter	
Electrical connection			
Wire size	rigid	plug-connector with screw terminals 0.2-2.5 mm ² (24-12 AWG)	
	fine-strand with(out) wire end ferrule	plug-connector with screw terminals 0.2-2.5 mm ² (24-12 AWG)	
Stripping length		7 mm (0.28 inch)	
Tightening torque		0.4 Nm (3.5 lb.in)	
Standards			
Product standard			
Low Voltage Directive			
EMC Directive			
RoHS Directive			
Electromagnetic compatibility			
Interference immunity		EN 61000-6-2	
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (±6 kV / ±8 kV)	
electromagnetic field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m	
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (±2 kV / 5 kHz)	
powerful impulses (Surge)	IEC/EN 61000-4-5	±2 kV / ±1 kV	
HF line emission	IEC/EN 61000-4-6	10 V	
Interference emission	EN 61000-6-4	Class B	
Isolation data			
Insulation voltage (between all isolated circuits)		1.5 kV	
Test voltage (between all isolated circuits)		1.5 kV / 50 Hz	

¹⁾ includes: non-linearity, factory setting, drift of temperature, supply voltage and output load

Analog signal converters

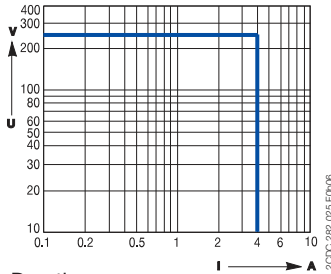
CC-E, CC-U

Technical diagr., Connection diagr., Dimensional drawings

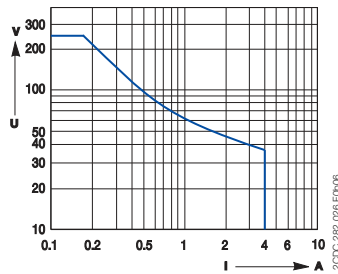
Technical diagrams

Load limit curves CC-U/xxR

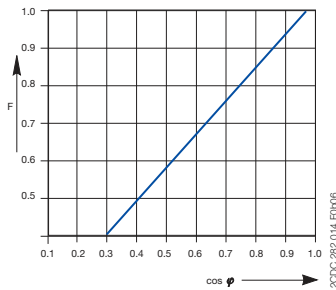
Resistive AC load



Resistive DC load

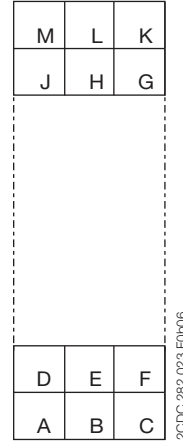


Derating curve



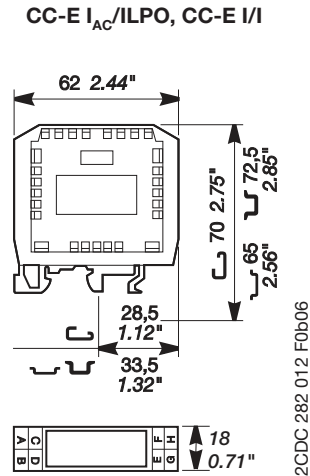
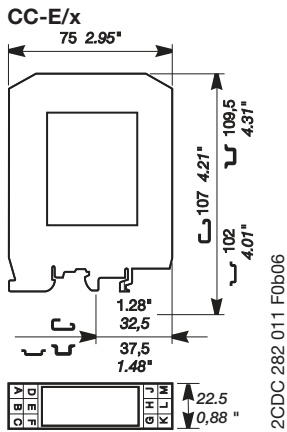
Connection diagram CC-U/x

Width 22.5 mm (0.89 in)

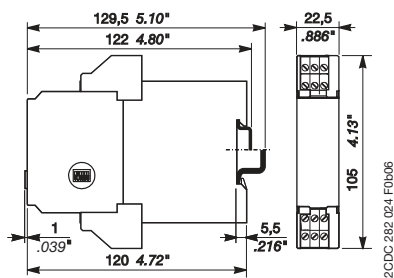


Dimensional drawings

Dimensions in mm



CC-U/x, CC-U/xR





Serial data converters

ILPH range

Content

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Serial data converters ILPH range Uses

In the field of industrial data transmission, various processes of data transmission and interfaces are used today. Already existing systems need to be updated or connected to new devices for continuity of process. When new communication functions are not build-in, ABB propose a range of converters to be able to use from the standard RS232 or RS485, to the Ethernet open products or the Optical Fiber.

Ethernet communication is now one of the main features need in open communication, ABB propose the e-ILPH to connect the serial devices to the web world.

Uses

Adaptation

The use of converters allows the connection of two devices using different interfaces.
To add new equipment to existing installations.

Galvanic Isolation

To protect sensitive equipment it is sometimes necessary to use converters which allow galvanic isolation.

To cross a disturbed environment

Some interfaces are more sensitive to noise. Electrically, it is preferable, in some cases, to change the interface or support.

Type of connection	Immunity to noise
RS232	Low
RS422	High
RS485	High
CL	High
OF	Very high
Ethernet	High

Multipoint connections

Some equipments are only designed to communicate in RS232 point to point connection. To communicate with several devices it is then necessary to use converters RS232 to RS422, RS485, CL or OF to reach multipoint mode.

Type of connection	Connection
RS232	Point to point
RS422	12 points
RS485	32 points
CL	5-6 points
OF	32 points
Ethernet	Point to point or multipoint

Increase in the transmission and amplification distances of the signals

Every connection has its own limits, to increase the communication distances you only have to change the type of link (converter) or amplify the signal (Repeater) using an ILPH.

Type of connection	Max. distances *
RS232	15m
RS422	1.2km
RS485	1.2km
CL	300-500m
OF	4km
Ethernet	100 m with CAT5 cable

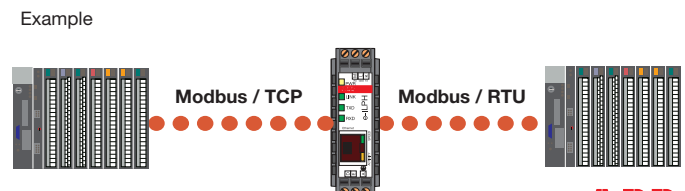
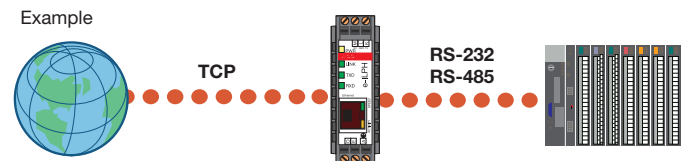
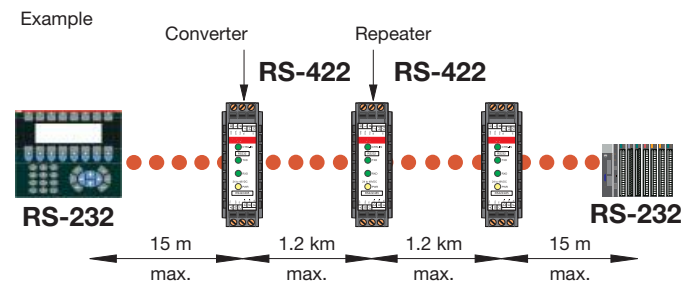
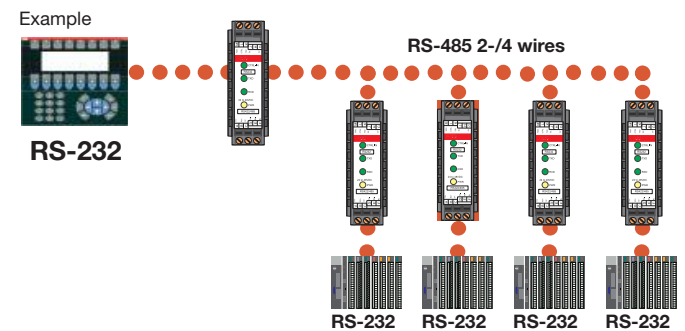
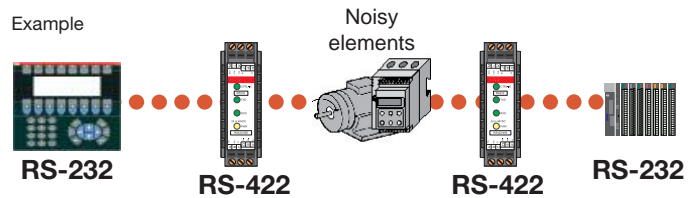
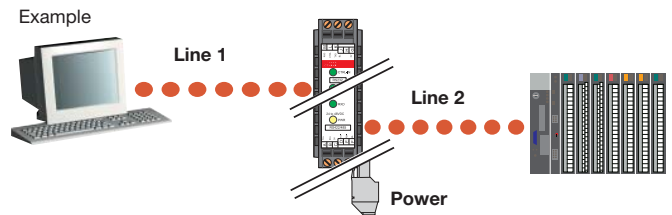
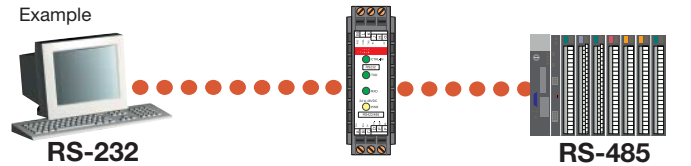
* Depending on transmission speed.

"World Wide" communication

Communication is more and more used with Ethernet support. The interests are to have a distant access, to use an already existing network and to upload information and data on a supervisor or a computer. The conversions from serial to Ethernet protocol are used to connect local network to Ethernet.

Protocol conversion

Modbus is one of the main protocols used in the industrial networks. The creation of Modbus/TCP allows an adapted access to the Ethernet network. So, the conversion between these 2 protocols is necessary.



Serial data converters

ILPH range

Product overview

	RS232	RS422 / RS485	CL	OF-S	OF-P	Ethernet	24 V DC	24-48 V DC	110-240 V AC	24-42 V AC/DC	10-34 VDC, 10-24 VAC	Insulation *	Part numbers
RS232	●						●					In-Ps-Out	1SNA 684 234 R2000
	●							●				In-Ps-Out	1SNA 684 244 R0200
		●					●					Wi	1SNA 684 231 R2500
		●					●					In-Out	1SNA 684 233 R2700
		●						●				In-Ps-Out	1SNA 684 333 R2300
		●							●			In-Ps-Out	1SNA 684 334 R2400
			●				●					In-Out	1SNA 684 202 R0100
				●						●		In-Ps-Out	1SNA 684 236 R2200
				●						●		In-Ps-Out	1SNA 684 237 R2300
					●					●		In-Ps-Out	1SNA 684 238 R0400
					●					●		In-Ps-Out	1SNA 684 239 R0500
RS422 / RS485		●				●						In-Out	1SNA 684 212 R2200
			●			●						In-Out	1SNA 684 232 R2600
RS485				●					●			In-Ps-Out	1SNA 684 246 R0400
				●					●			In-Ps-Out	1SNA 684 247 R0500
					●				●			In-Ps-Out	1SNA 684 248 R1600
					●				●			In-Ps-Out	1SNA 684 249 R1700
RS232 / RS485					●					●	In-Ps-Out	1SNA 684 252 R0200	

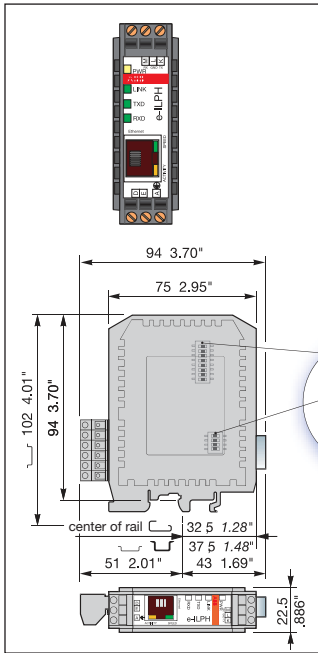
* In=Input, Ps=Power supply, Out=Output, Wi=Without insulation

- **RS 232 - EIA-232 / V.24 / V.28**
Point-to-point connection
Max. 15 m transmission distance
Rate up to 19.2 kbit/s
Full-duplex
- **RS 422 - EIA-422 / V.11**
Point-to-point connection
(1 Transmitter - 10 Receivers)
Differential voltage transmission
Full-duplex
Up to 1200 m/ 10Mbit/s
Good EMC characteristics
- **Current loop(TTY)**
Point-to-point / multi-point connection
Active or passive current loop
Full-duplex
Up to 1200 m/19.2 kBit/s
Good EMC characteristics
- **RS 485 - ISO/IEC/EIA-485**
Multi-point connection up to 32 units
Differential voltage transmission
Half-duplex on 1 pair
Full-duplex on 2 pairs
Up to 1200 m / 10Mbit/s
Good EMC characteristics
- **Optical fiber interface**
Point-to-point connection
Full-duplex
From 40m up to 4km transmission distance
according to optical fiber material (plastic / glass)
and wavelength used up to 10 Mbit/s
Excellent EMC characteristics
- **Ethernet Interface**
Point to point connexion or multipoint connection.
Up to 100m using CAT5 cable without Hub or Switch
10/100 Mbit/s
Good EMC characteristics

Serial data converters

ILPH range

Ordering details, technical data



ILPH RS 232 - 485 / Ethernet

Isolated RS232 or/and RS485 to Ethernet converter

- Triple galvanic isolation
- RS232 on SUBD 9 points or screw connectors
- RS485 on removable screw connectors
- Ethernet 10/100 Mbit/s, RJ45 connector
- Power supply 10-34 VDC et 10-24 VAC
- Possible to have a redundant 10-34 VDC power supply
- Economic with low consumption
- Up to 100m with CAT5 cable without Hub or Switch
- Good EMC characteristics
- Up to 2 Modbus@TCP Masters

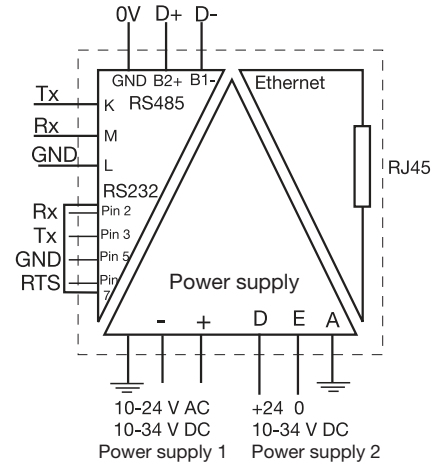
Available modes:

- Modbus@TCP to Modbus@ RTU conversion
- Transparent Client or Server mode
- SMTP mode (Mail send)

Standards: TPC/IP, TELNET, DHCP, FTP

Specifics functions in Modbus@ protocol:

- Concentrator (Asynchronous mode) up to 1200 words
- AC31 programming
- Modbus@ Easy Net mode : this mode could be used to exchange data without a Modbus@/TCP master. The data are logged in a table and could be distributed to one or all the others e-ILPH participants on Ethernet.

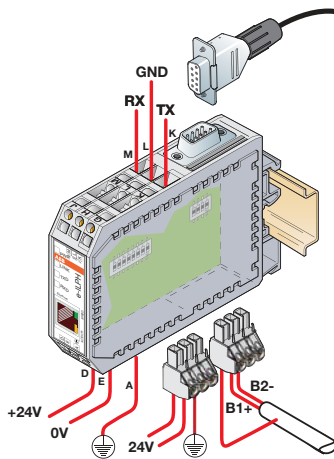


Description	Type	Order P/N	Packaging	Weight kg
Serial data converter e-ILPH	ILPH RS 232-RS 485 / Ethernet	1SNA 684 252 R0200	1	0,12

Technical data

Power supply 1	
Voltage	10...34 V DC, 10...24 V AC
Voltage tolerance	-10%, +10%
Consumption	2 W max
Connections	coding screw removable connector 0 to 2,5 mm ² (22-14 AWG)
Power supply 2	
Voltage	10...34 V DC
Voltage tolerance	-10%, +10%
Consumption	2 W max
Connections	screw connector (AWG 20)
Serial link 1 : RS 232	
Overvoltage protection	EIA RS 232 integrated
Baud rate / Transmission distance	max. 115,2 kbits/s / max. 15 m
Connections	2,5 mm ² screw connector (AWG 20) or male SubD 9 points
Serial link 2 : RS 485	
Overvoltage protection	EIA RS 485 integrated
Line polarization	integrated
End line resistance	integrated
Baud rate / Transmission distance	max. 115,2 kbits/s / max. 1200 m
Connections	coding screw removable connector 0 to 2,5 mm ² (22-14 AWG)
Ethernet link	
Overvoltage protection	integrated
Baud rate / Transmission distance	10-100 Mbits/s / max. 100 m without Hub or Switch with CAT5 cable
Connections	RJ45 connector
Traffic indication	
Voltage	1 yellow LED
Status of signal	3 green LED (Rx,D, Tx,D, LINK), 2 amber or green LED (Speed, Activity)
EMC behavior	
Electrostatic discharge	EN 61000-4-2
Radiated electromagnetic field	EN 61000-4-3
Burst	EN 61000-4-4
Surge	EN 61000-4-5
Electromagnetic compatibility	EN 55022
Other characteristics	
Galvanic isolation between serial link / power supply / Ethernet link	750 VDC / 1500 VAC
Configuration of the operating mode	using internal switches or/and software (TELNET or HYPERTERMINAL)
Operating temperature	0°C ... +60°C
Storage temperature	-20°C ... +70°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2,5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (W x D x H)	94 x 22,5 x 100 mm
Weight	120 g

SubD9 connector
pin 2 = RX
pin 3 = TX
pin 5 = GND
pin 7 = RTS

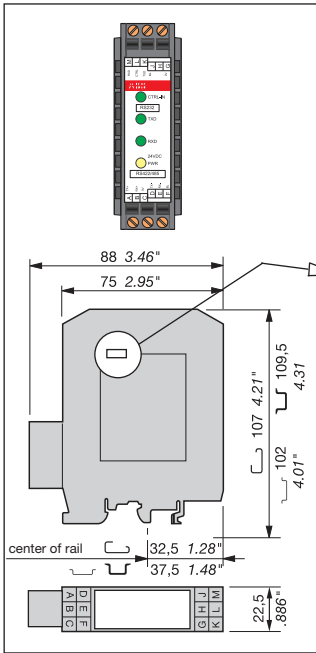




Serial data converters

ILPH range

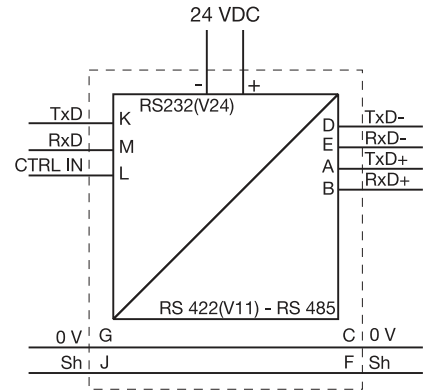
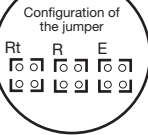
Ordering details, technical data



ILPH RS 232 / RS 422 - 485

RS 232 to RS 422-485 serial link without isolation

- Economic version without isolation
- Baudrate up to 38,4 kbit/s
- Transmission distance up to 1200 m
- RS 485 1 or 2 pair handling
- Usable in "noisy" environments
- 24 V DC power supply
- CE mark



Description	Type	Order P/N	Packaging	Weight kg
Serial link interface without galvanic isolation	ILPH RS 232 / RS 422-485	1SNA 684 231 R2500	1	0,1

RS 485 LINK ON ONE PAIR

R	E	Configuration	Function
		R ON/OFF	Transmitter inactive / Receiver active
		R ON/OFF	Transmitter active / Receiver inactive

RS 422 LINK ON TWO PAIRS

R	E	Configuration	Function
		R ON	Transmitter inactive / Receiver active
		E ON	Transmitter active / Receiver inactive

The Receiver and the Transmitter are activated alternately (never at the same time) depending on the status of the CTRL IN signal.

POLARIZATION OF THE RS 422 - RS 485 LINE

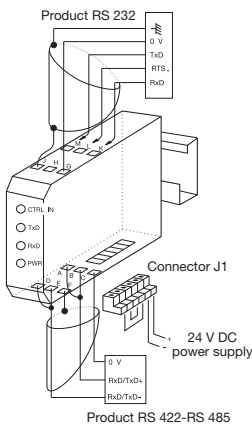
The line must always be polarized. The ILPH is used to polarize the reception channel :
 Connection by 1 wire P+ (J1.1) with 5V (J1.4)
 Connection by 1 wire P- (J1.2) with 0V (J1.3)

ADAPTING THE RS 422 - RS 485 LINE

The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus. The ILPH is used to adapt the reception channel by setting the jumper Rt correctly :

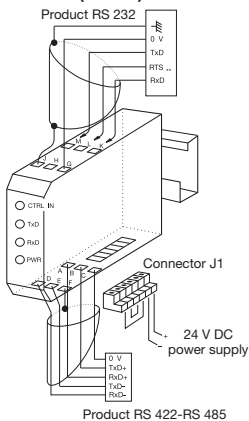
Rt	* Line adaptation, Rt = 120 Ω (general case)
Rt	* Line adaptation, Rt = 220 Ω
Rt	* No line adaptation, Rt = ∞

RS 422 - RS 485 SERIAL LINK (2 wires)



***CAUTION :**
When the RTS Signal is not activated, M terminal (RxD ILPH) has to be connected to L terminal (CTRL IN).

RS 422 - RS 485 SERIAL LINK (4 wires)



**** CAUTION :**
To be connected to 2 wired RS 485 only (not possible for 4 wired RS 422).
When the RTS Signal is not activated, M terminal (RxD ILPH) has to be connected to L terminal (CTRL IN).

CTRL IN STATUS	ACTION ON RS 485
0 logic (+3V ≤ U ≤ +25V)	Transmitter active / Receiver inactive
1 logic (-25V ≤ U ≤ -3V)	Transmitter inactive / Receiver active
High impedance	Transmitter inactive / Receiver active

NOTE : For RS 232 products running the RTS (REQUEST TO SEND) signal, connect RTS to CTRL IN. Otherwise, connect M (RxD ILPH) to L (CTRL IN).

RS 485 LINK ON 2 PAIRS

R	E	Configuration	Function
		R ON	Transmitter inactive / Receiver active
		E ON/OFF	Transmitter active / Receiver inactive

Receiver permanently active
Transmitter controlled by the signal CTRL IN (see table for Transmitter operation as a function of CTRL IN)

Technical data

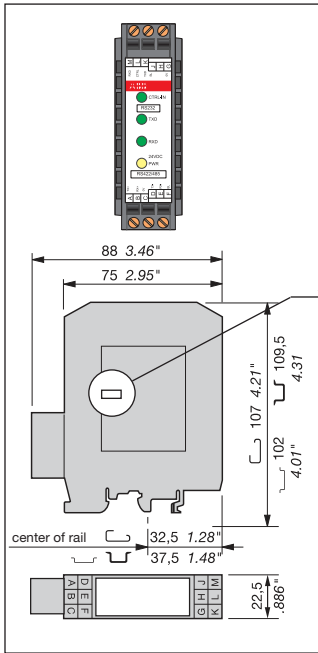
Power supply	polarized
Voltage	24 V DC
Voltage tolerance	8,5...28 V DC
Supply current	100 mA max
Connections	removable screw connectors (AWG 20)
RS 232-1 serial link	EIA RS 232 C / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1,2/50 μs)
Baud rate / Transmission distance	max. 38,4 kbits/s / max. 1200 m
Connections	2,5 mm ² screw connectors (AWG 20)
RS 422-485-2 serial link	EIA RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1,2/50 μs)
Baud rate / Transmission distance	max. 38,4 kbits / max. 1200 m
Connections	2,5 mm ² screw connectors (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	2 green LED (RxD, TxD)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 310 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between input / power supply / output	no
Configuration of the operating mode	using internal jumper
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2,5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22,5 x 100 mm
Weight	100 g



Serial data converters

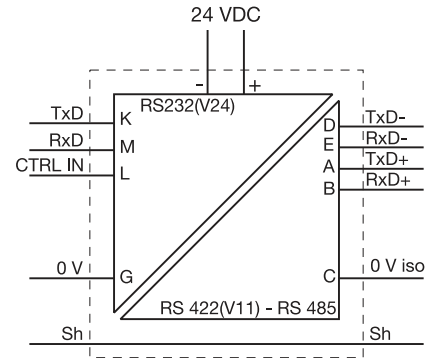
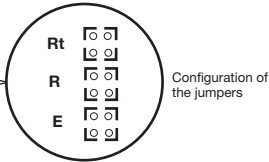
ILPH range

Ordering details, technical data



ILPH RS 232 / RS 422 - 485

- Galvanic isolated converter for RS 232 to RS 422-485 serial links.
- Galvanic isolation between input/output and output/power supply
- Baudrate up to 38,4 kbit/s
- Transmission distance up to 1200 m
- RS 485 1 or 2 pair handling
- Usable in "noisy" environments
- 24 V DC power supply
- CE mark



Description	Type	Order P/N	Packaging	Weight kg
Serial link interface with galvanic isolation	ILPH RS 232 / RS 422-485	1SNA 684 233 R2700	1	0,1

RS 485 LINK ON ONE PAIR

- R ON/OFF Jumper R in position R ON/OFF
- E ON/OFF Jumper E in position E ON/OFF

The Transmitter and the Receiver are activated alternately (never at the same time) depending on the status of the CTRL IN signal.

CTRL IN STATUS	ACTION ON RS 485
0 logic (+3V ≤ U ≤ +25V)	Transmitter active / Receiver inactive
1 logic (-25V ≤ U ≤ -3V)	Transmitter inactive / Receiver active
High impedance	Transmitter inactive / Receiver active

RS 422 LINK ON TWO PAIRS

- R ON Jumper R in position R ON
- E ON Jumper E in position E ON

The Transmitter and Receiver are both permanently active.

POLARIZATION OF THE RS 422 - RS 485 LINE

The line must always be polarized. The ILPH is used to polarize the reception channel :
 Connection by 1 wire P+ (J1.1) with 5V (J1.4)
 Connection by 1 wire P- (J1.2) with 0V (J1.3)

ADAPTING THE RS 422 - RS 485 LINE

The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus. The ILPH is used to adapt the reception channel by setting the jumper Rt correctly :

- Rt * Line adaptation, Rt = 120 Ω (general case)
- Rt * Line adaptation, Rt = 220 Ω
- Rt * No line adaptation, Rt = ∞

CAUTION : For RS 232 products running the RTS (REQUEST TO SEND) signal, connect RTS to CTRL IN. Otherwise, connect M (RxD ILPH) to L (CTRL IN).

RS 485 LINK ON 2 PAIRS

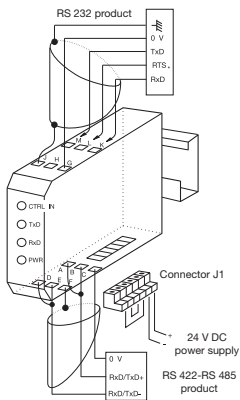
- R ON Jumper R in position R ON
- E ON/OFF Jumper E in position E ON/OFF

Receiver permanently active
 Transmitter controlled by the signal CTRL IN (see table for Transmitter operation as a function of CTRL IN)

Technical data

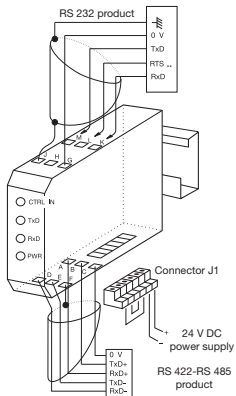
Power supply	polarized
Voltage	24 V DC
Voltage tolerance	8,5...28 V DC
Supply current	100 mA max
Connections	Removable screw connectors (Omniconnect)
RS 232-1 serial link	EIA RS 232 C / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1,2/50µs)
Baud rate / Transmission distance	max. 38,4 kbits/s / max. 15 m
Connections	2,5 mm ² screw connectors (AWG 20)
RS 422-RS485-2 serial link	EIA RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1,2/50 µs)
Baud rate / Transmission distance	max. 38,4 kbits / max. 1200 m
Connections	2,5 mm ² screw connectors (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	3 green LED (RxD, TxD and CTRL-IN)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 310 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between RS 232/RS 422-485 and RS 422-485/power supply	500 V DC
Configuration of the operating mode	using internal jumper
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2,5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22,5 x 100 mm
Weight	100 g

RS 422 - RS 485 2 WIRE SERIAL LINKS



* CAUTION :
 If the RTS signal is not generated, connect M (RxD ILPH) to L (CTRL IN).

RS 422 - RS 485 4 WIRE SERIAL LINKS

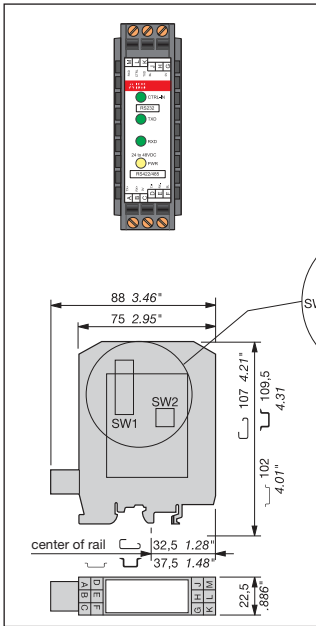


** CAUTION :
 Only to be connected for RS 485 two pairs (of no use for RS 422 two pairs). If the RTS signal is not generated, connect M (RxD ILPH) to L (CTRL IN).

Serial data converters

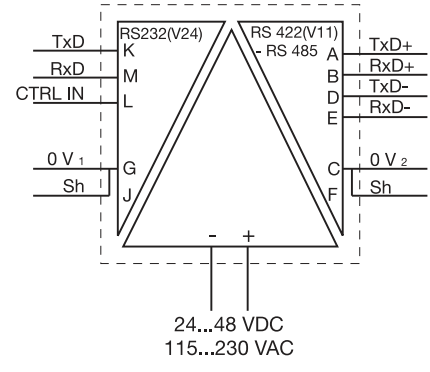
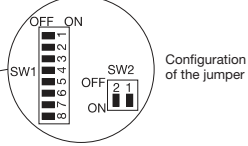
ILPH range

Ordering details, technical data



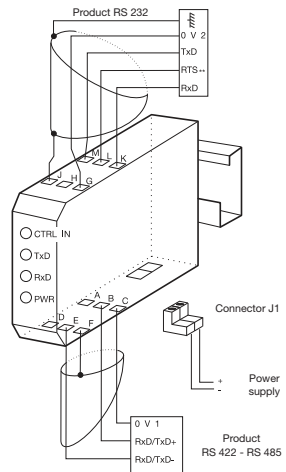
ILPH RS 232 / RS 422 - 485

- 3 way galvanic isolated converter for RS 232 to RS 422-485 serial links.
- 3 way galvanic isolation between power supply and input/output
- RS 485 switch on 2 or 4 wires
- Baudrate up to 38,4 kbit/s
- Transmission distance up to 1200 m
- RS 485 1 or 2 pair handling
- Usable in "noisy" environments
- 24...48 V DC and 115...230 V AC power supply
- CE marking



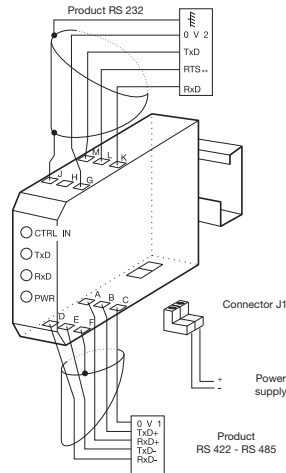
Description	Type	Order P/N	Packaging	Weight kg
Serial link interface	ILPH RS 232 / RS 422-485			
3 way galvanic isolation	24...48 V DC power supply	1SNA 684 333 R2300	1	0,1
	115...230 V AC power supply	1SNA 684 334 R2400	1	0,1

RS 422 - RS 485 2 WIRE SERIAL LINK



***CAUTION :**
When the RTS signal is not generated, set SW2-1 in position ON.

RS 422 - RS 485 4 WIRE SERIAL LINKS



****CAUTION :**
Only to be connected for RS 485 two pairs (of no use for RS 422 two pairs). If the RTS signal is not generated, set SW2-1 in position ON.

RS 485 LINK ON ONE PAIR

Set SW1-1, SW1-3, SW1-6, SW1-7 and SW1-8 to position ON. The receiver and the transmitter are activated alternately (never at the same time), depending on the status of the CTRL IN signal.

CTRL IN STATUS	Action on RS 485
0 Logic (3V ≤ U ≤ +25V)	Transmitter active / Receiver inactive
1 Logic (-25V ≤ U ≤ -3V)	Transmitter inactive / Receiver active
High impedance	Transmitter inactive / Receiver active

CAUTION : For RS 232 products running the RTS signal (REQUEST TO SEND), connect RTS to CTRL IN. Otherwise, set SW2-1 to position ON.

RS 485 LINK ON TWO PAIRS

Set SW1-1, SW1-3, SW1-7 in position OFF. Set SW1-6, SW1-8 in position ON. The receiver is permanently active. The transmitter is controlled by the signal CTRL IN (see table for transmitter operation as a function of CTRL IN).

RS 422 LINK ON TWO PAIRS

Set SW1-1, SW1-3, SW1-7 and SW1-8 in position OFF. Set SW1-6 in position ON. Transmitter and receiver are both permanently active.

POLARIZATION OF THE RS 422 - RS 485 LINE

The line must always be polarized. The ILPH is used to polarize the reception channel : Set SW1-4 and SW1-5 in position ON.

ADAPTING THE RS 422 - RS 485 LINE

The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus.

The ILPH is used to adapt the reception channel by setting the jumper SW1-2 correctly :

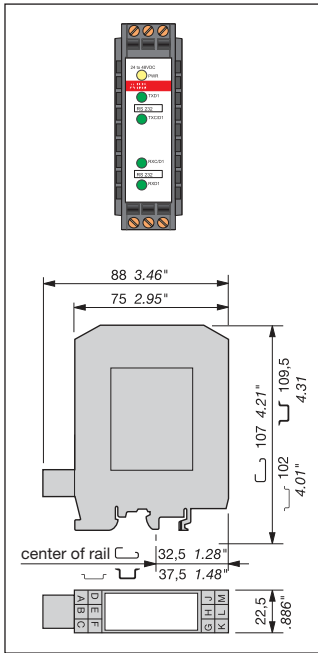
- SW1-2 in position ON ⇒ line adaptation, Rt = 120 Ω (standard)
- SW1-2 in position OFF ⇒ no line adaptation, Rt = ∞

Power supply	Polarization for DC model	
Voltage	24...48 V DC	115...230 V AC (50/60 Hz)
Voltage tolerance	-15% ... +20%	-15% ... +15%
Supply current	24 V DC < 110 mA, 48 V DC < 55 mA, 115 V AC < 40 mA, 230 V DC < 26 mA	
Supply power	≈ 3 W	≈ 3 VA
Connections	Removable screw connector (Omniconnect)	
RS 232-1 serial link	EA / TIA RS 232 new revision / CCITT V24 V28	
Overvoltage protection	integrated (transil 8 kV 1,2/50 μs)	
Baud rate / Transmission distance	max. 38,4 kbits/s / max. 15 m / 2500 pF	
Connections	2,5 mm ² screw (AWG 20)	
RS 422/485-2 serial link	EIA RS 485 and EIA RS 422 CCITT V11	
Overvoltage protection	integrated (transil 8 kV 1,2/50 μs)	
Baud rate / Transmission distance	max. 38,4 kbits / max. 1200 m	
Connections	2,5 mm ² screw (AWG 20)	
Traffic indication		
Voltage	1 yellow LED	
Status of signal	3 green LED (Rx/D, Tx/D and CTRL-IN)	
EMC behavior		
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV	
Radiated electromagnetic field	EN 61000-4-3 level 310 V/m	
Burst	EN 61000-4-4 level 3 1 kV	
Electromagnetic compatibility	EN 55022 class B	
Other characteristics		
Galvanic isolation between RS 232 / Power supply / RS 422-RS 485	1,5 kV	
Configuration of the operating mode	using internal jumper	
Operating temperature	0°C ... +50°C	
Storage temperature	-25°C ... +80°C	
Mounting	any required	
DIN rail fixing (EN 50002)	snap-on mounting	
Wire size	2,5 mm ² / stranded with ferrule, 4 mm ² solid	
Dimensions (WxDxH)	88 x 22,5 x 100 mm	
Weight	100 g	

Serial data converters

ILPH range

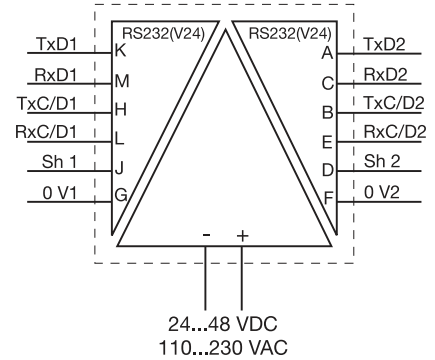
Ordering details, technical data



ILPH RS 232 / RS 232

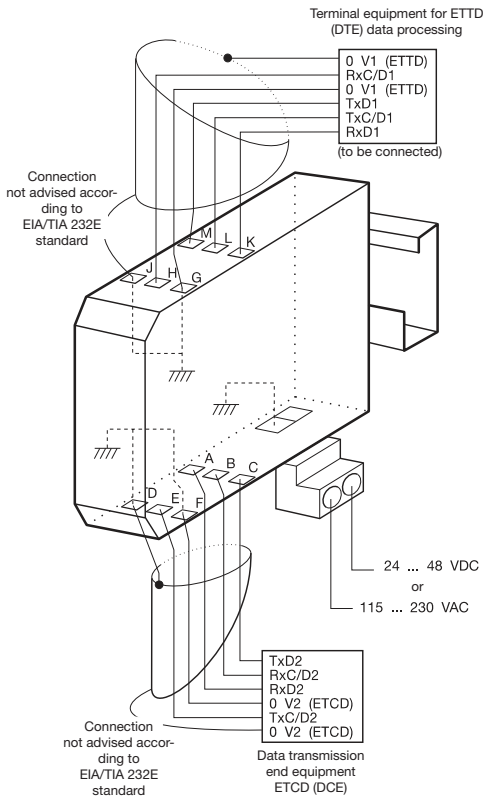
3 way galvanic isolator between RS 232 serial interface and another RS 232 serial interface.

- Ensures triple insulation between the 2 serial interfaces and between each and power supply
- Baudrate up to 19,2 kbit/s (up to 64 kbit/s depending on cable)
- Transmission distance up to 15 m
- Can be used in "noisy" environments
- Power supply from 24...48 V DC and 115...230 V AC
- CE marking



Description	Type	Order P/N	Packaging	Weight kg
Serial link interface	ILPH RS 232 / RS 232			
3 way galvanic isolation	24...48 V DC power supply	1SNA 684 234 R2000	1	0,1
	115...230 V DC power supply	1SNA 684 244 R0200	1	0,1

5

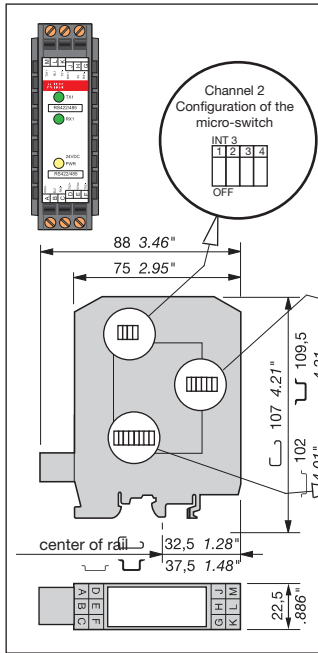


Technical data

Power supply	DC model polarized
Voltage	24...48 V DC 115...230 V AC (50/60Hz)
Voltage tolerance	-15%...+20% -15%...+15%
Supply current	24 V DC<155 mA; 48 V DC<77 mA; 110 V AC<40 mA; 230 V DC<26 mA
Supply power	≈ 3,15 W ≈ 3,15 VA
Connections	Removable screw connector (Omniconnect)
RS 232-1 interface	EIA / TIA RS 232 new revision / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1,2/50 μs)
Transmission capacity /	
Transmission distance	max. 19,2 kbits/s / max. 15 m / 2500 pF
Connections	2,5 mm ² screw (AWG 20)
RS 232-2 interface	EIA / TIA RS 232 new revision / CCITT V24 V28
Overvoltage protection	integrated (transil 8 kV 1,2/50μs)
Transmission capacity /	
Transmission distance	max. 19,2 kbits/s / max. 15 m
Connections	2,5 mm ² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	4 green LED (RxD, RxC/D, Tx/D, Tx/C/D)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between input / power supply / output	1,5 kV
Configuration of the operating mode	No
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2,5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22,5 x 100 mm
Weight	100 g

Serial data converters ILPH range

Ordering details, technical data



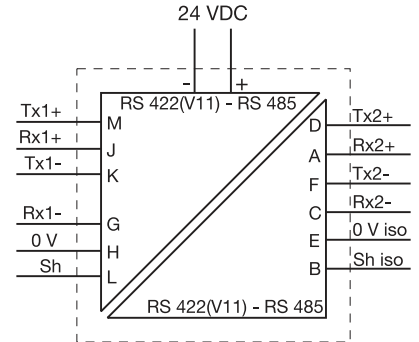
ILPH RS 422 - 485 / RS 422 - 485

Galvanic isolated connection between an RS 422-485 (1 or 2 pairs) and an RS 422 485 (1 or 2 pairs) serial link. It amplifies the signal beyond the 1200 m limit distance of the RS 422-485 and only needs a minimum of 1,5 character delay time to switch off the RS 485 drivers.

- Galvanic isolation between power supply/output and input/output
- Baudrate up to 500 kbit/s (up to 200 m)
- Transmission distance up to 1200m at 38,4 kbit/s
- Usable in "noisy" environments
- 2/4 wires automatic handling
- 24 V DC power supply
- CE mark

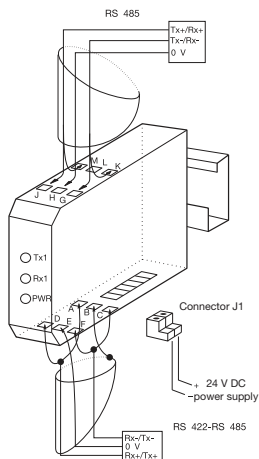
BAUD RATE	INT 1	INT 2	INT 3	INT 4
FULL DUPLEX	0 0 0 0	0 0 0 0	X X X 1	X X X 1 0 1
500 Kb/s	1 1 1 1	1 1 1 1	X X X 0	X X X 0 0 0
187,5 Kb/s	1 1 1 1	1 1 1 0	X X X 0	X X X 0 0 0
93,75 Kb/s	1 1 1 1	1 1 0 0	X X X 0	X X X 0 0 0
38,4 Kb/s	1 1 1 1	1 0 0 0	X X X 0	X X X 0 0 0
19,2 Kb/s	1 1 1 1	0 0 0 0	X X X 0	X X X 0 0 0
9,6 Kb/s	1 1 1 0	0 0 0 0	X X X 0	X X X 0 0 0
4,8 Kb/s	1 1 0 0	0 0 0 0	X X X 0	X X X 0 0 0
2,4 Kb/s	1 0 0 0	0 0 0 0	X X X 0	X X X 0 0 0
1,2 Kb/s	0 0 0 0	0 0 0 0	X X X 0	X X X 0 0 0

N_U = not used 1 = contact closed
X = zero 0 = contact open (aus) (off)



Description	Type	Order P/N	Packaging	Weight kg
Serial link interface with galvanic isolation	ILPH RS 422 - 485 / RS 422 - 485 24 V DC power supply	1SNA 684 212 R2200	1	0,1

RS 422 - RS 485 2 wire serial link



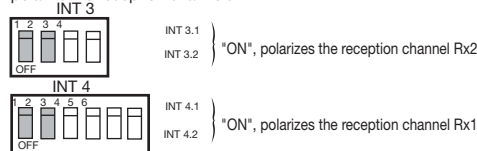
RS 422 - RS 485 DRIVERS CONTROL

The RS 422 - RS 485 Drivers Control (transmitters and receivers) makes the ILPH easy to use. The control of the 2 channels is completely automatic ; you only have to configure the baud rate needed.

The minimum turn off delay is about 1,5 character/time from 27 µs to 10 ms depending on the baud rate selected.

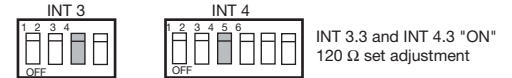
POLARIZATION OF THE RS 422 - RS 485 CONNECTIONS

The connections must always be polarized. The ILPH is used to polarize the reception channels :



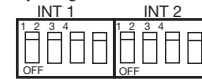
ADAPTING THE RS 422 - RS 485 CONNECTIONS

The connections must always be adjusted to the level of the reception channel of each subscriber forming the end of the bus. The ILPH is used to adjust the reception channel by setting the micro-switch INT 3.3 and INT 4.3.



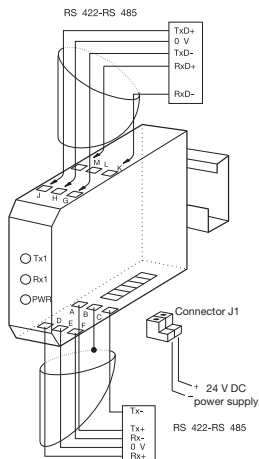
BAUD RATE

By using the 8 micro-switches inside the box.



Permits to define up to 8 transmission speeds and to select the Full Duplex operation mode (RS 422 / RS 422) in addition with the INT 3.4 INT 4.4 and INT 4.5 micro switches.

RS 422 - RS 485 4 wire serial link



Technical data

Power supply	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/-15%
Supply current	120 mA max.
Connections	Removable screw connector (Omniconnect)
RS 422-485-1 interface	EIA / RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1,2/50 µs)
RS 485 data switching	Time switching / Time delay transmission/reception 27 µs ...10 ms
Baudrate / Transmission distance	from 1,2 to 500 kbits/s / max. 1200 m up to 38,4 kbit/s
Connections	2,5 mm ² screw (AWG 20)
RS 422-485-2 interface	EIA / RS 485 and EIA RS 422 / CCITT V11
Overvoltage protection	integrated (transil 8 kV 1,2/50 µs)
RS 485 data switching	Time switching / Time delay transmission/reception 27 µs ...10 ms
Baudrate / Transmission distance	from 1,2 to 500 kbits/s / max. 1200 m up to 38,4 kbit/s
Connections	2,5 mm ² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	2 green LED (RxD, TxD,)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between input / power supply / output	500 V DC
Configuration of the operating mode	using internal DIP switches
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2,5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22,5 x 100 mm
Weight	100 g

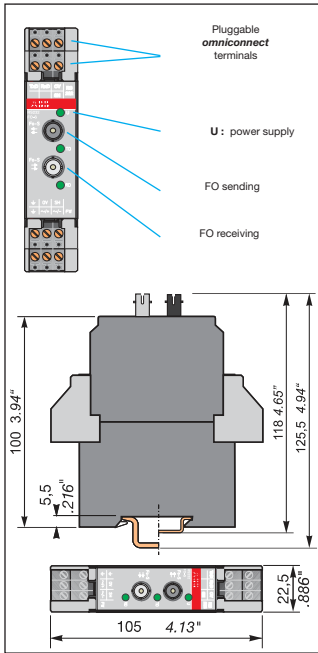
Caution :

The transmission channels of both RS 422 - RS 485 serial link interfaces always have to be independently polarized.

Serial data converters

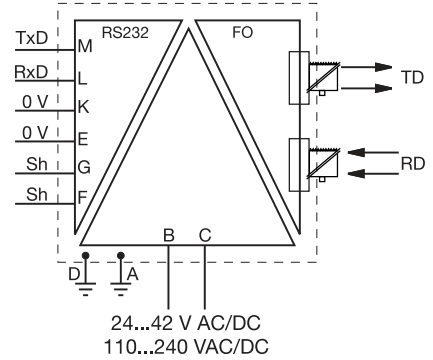
ILPH range

Ordering details, technical data



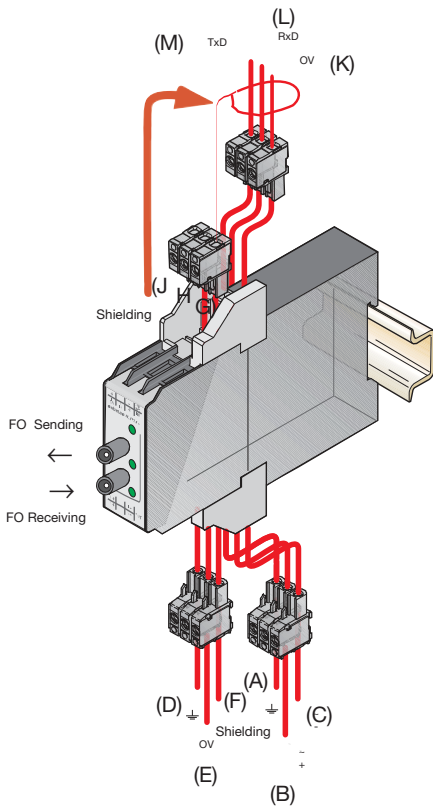
ILPH RS 232 / FO

- 3 way galvanic isolated Converter for RS 232 to optical fiber serial link glass (S) or plastic (P).
- 3 way galvanic isolation between power supply and input/output
- Baud rate up to 115,2 kbit/s
- Available for glass or plastic fiber
- Transmission distance up to 4 km
- Usable in "very noisy" environments
- 20...42 V AC/DC and 110...240 V AC/DC power supply
- CE marked



Description	Type	Order P/N	Packaging	Weight kg
Serial link interface 3 way galvanic isolation	ILPH RS 232 / FO-S			
	24...42 V AC/DC Power supply	1 SNA 684 236 R2200	1	0,15
	110...240 V AC/DC Power supply	1 SNA 684 237 R2300	1	0,15
Serial link interface 3 way galvanic isolation	ILPH RS 232 / FO-P			
	24...42 V AC/DC Power supply	1 SNA 684 238 R0400	1	0,15
	110...240 V AC/DC Power supply	1 SNA 684 239 R0500	1	0,15

RS 232 / FO



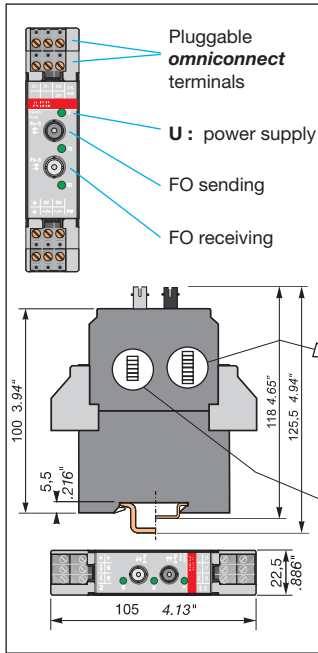
Technical data

Power supplies		
Supply voltage	24...42 V AC/DC (50/60 Hz)	110...240 V AC/DC (50/60 Hz)
Voltage tolerance	-15% ... +10%	-15% ... +10%
Connections	Omniconnect pluggable connector	
RS 232 Interface 1	CCITT V.24/DIN 66020- CCITT V.28 DIN 66259-EIA 232 E	
Protection	Integrated (transil 8 kV 1.2/50µs)	
Max. speed / Max. distance	Max. 115.2 kbits/s / max. 15 m / 2500 pF	
Connections	Omniconnect pluggable connector	
Fiber optic interface 2	DIN VDE 0888-1	
Type of fiber / Connections	Multimode fiber Glass : ST connector Plastic : FSMA screw connector	
Wavelength	Glass : 820 nm Plastic : 655 nm	
Max. transmission power	Glass : 50/125 µm : -14.4 db/m Glass : 62.5/125 µm : -14 db/m Plastic : 980/1000 µm : -8 db/m	
Max. reception power	Glass : -28 db/m Plastic : -20 db/m	
Max. speed / Max. distance	Max. 115.2 kbits/s Glass : 50/125 µm : 3 km Glass : 62.5/125 µm : 4 km Plastic : 980/1000 µm : 40 m	
Status indication	1 green LED / 2 green LEDs (RxD, TxD)	
EMC behavior		
Electrostatic discharge	EN 61000-4-2 Level 3 6/8 kV	
Radiated electromagnetic field	EN 61000-4-3 Level 3 10 V/m	
Burst	EN 61000-4-4 Level 3 1 kV	
Electromagnetic compatibility	EN 55022 Class B	
Other characteristics		
Galvanic isolation input / power supply / output	2.5 kV	
Operating temperature	-20°C ... +60°C	
Storage temperature	-40°C ... +85°C	
Mounting	Onto DIN Rail (EN 50002)	
Connections	14 AWG (2.5 mm ²) fine stranded / 12 AWG (4 mm ²) rigid	
Dimensions (WxDxH)	105 x 22.5 x 112 mm / 4.13 x 0.89 x 4.41"	
Weight	150 g / 0.33 lb	

Serial data converters

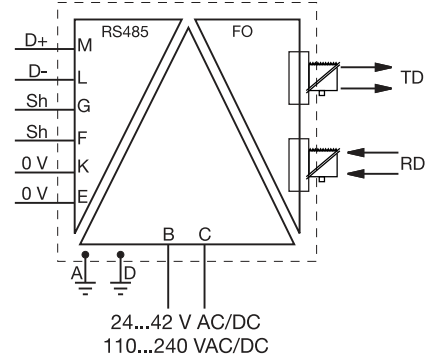
ILPH range

Ordering details, technical data



ILPH RS 485 / FO

- 3 way galvanic isolated converter for RS 485 (1 pair) to optical fiber serial link glass (S) or plastic (P).
- 3 way galvanic isolation between power supply and input/output
- Baud rate up to 1.5 Mbit/s
- Available for glass fiber or plastic fiber
- Transmission distance up to 4 km
- Usable in "very noisy" environments
- 20...42 V AC/DC and 110...240 V AC/DC power supply
- CE marked



Baud rate :
SW1 DIP switch configuration

Baudrate bit/s	SW 1							
	1	2	3	4	5	6	7	8
1500000								
500000								
375000								
187500								
136000								
115200								
93750								
75000								
57600								
38400								
19200								
9600								
4800								
300								

Legend	
<input checked="" type="checkbox"/>	on
<input type="checkbox"/>	off

End-of-line resistor, polarization
SW2 DIP switch configuration

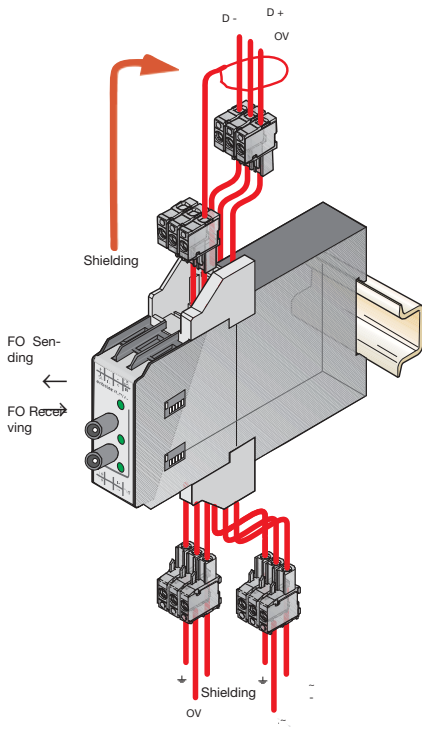
Polarization	SW 2					
	1	2	3	4	5	6
EOL 60 ohm						
EOL 120 ohm						
EOL 180 ohm						
EOL 240 ohm						
EOL indefinite						

Description	Type	Order P/N	Packaging	Weight
				kg
Serial link interface 3 way galvanic isolation	ILPH RS 485 / FO-S			
	24...42V AC/DC Power supply	1SNA 684 246 R0400	1	0,15
	110...240 V AC/DC Power supply	1SNA 684 247 R0500	1	0,15
Serial link interface 3 way galvanic isolation	ILPH RS 485 / FO-P			
	24...42V AC/DC Power supply	1SNA 684 248 R1600	1	0,15
	110...240 V AC/DC Power supply	1SNA 684 249 R1700	1	0,15

Technical data

Power supplies	
Supply voltage	24...42 V AC/DC (50/60 Hz) 110...240 V AC/DC (50/60 Hz)
Voltage tolerance	-15% ... +10% -15% ... +10%
Connections	Omniconnect pluggable connector
RS 485 interface 1	ISO / IEC 8482 / DIN 66 259-4; EIA 485
Protection	Integrated (8 kV 1.2/50µs)
Max. speed / max. distance	Max. 1.5 Mbits/s / max. 1200 m (38.4 kbit/s)
Connections	Omniconnect Pluggable connector
Optic fiber interface 2	DIN VDE 0888-1
Type of fiber / Connections	Multimode fiber Glass : ST connector Plastic : FSMA screw connector
Wavelength	Glass : 820 nm Plastic : 655 nm
Max. transmission power	Glass : 50/125 µm : -14.4 db/m Glass : 62.5/125 µm : -14 db/m Plastic 980/1000 µm : -8 db/m
Max. reception power	Glass : -28 db/m Plastic : -20 db/m
Max. speed	Max. 1.5 Mbit/s
Max. distance	Glass : 50/125 µm : 3 km Glass : 62.5/125 µm : 4 km Plastic 980/1000 µm : 40 m
Status indication	
Power supply / Data exchange	1 green LED / 2 green LEDs (Rx/D, Tx/D)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 Level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 Level 3 10 V/m
Burst	EN 61000-4-4 Level 3 1 kV
Electromagnetic compatibility	EN 55022 Class B
Other characteristics	
Galvanic isolation input / power supply / output	2.5 kV
Function configuration	With DIP-Switches
Operating temperature	-20°C ... +60°C
Storage temperature	-40°C ... +85°C
Mounting	Onto DIN Rail
Connections	14 AWG (2,5mm²) / fine stranded, 12 AWG (4 mm²) rigid
Dimensions (WxDxH)	105 x 22.5 x 112 mm / 4.13 x 0.89 x 4.41"
Weight	150 g / 0.33lb

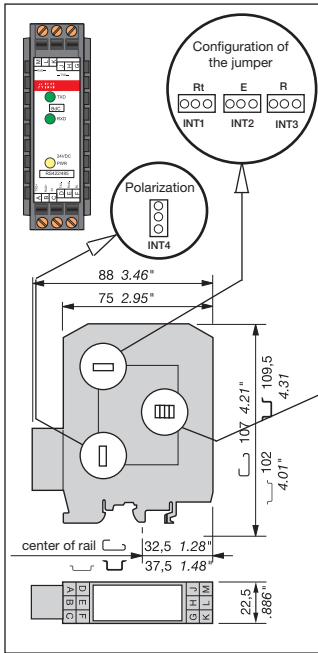
RS 485 / FO



Serial data converters

ILPH range

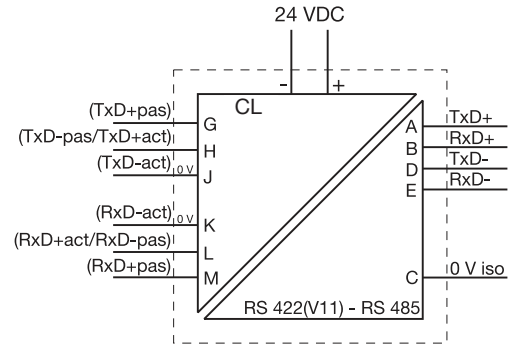
Ordering details, technical data



ILPH CL / RS 422 - 485

Galvanic isolated converter for current loop to RS 422-485 (1 or 2 pairs) serial link.

- Galvanic isolation between power supply/current loop and RS 422-485/current loop
- Active/passive 0...20 mA / 4...20 mA selectable
- Positive or negative logic selectable
- Baudrate up to 38,4 kbit/s (up to 2400 m)
- Transmission distance up to 2400 m (1200 m RS 485 and 1200 m current loop)
- Usable in "noisy" environments
- 24 V DC power supply
- CE marking



Description	Type	Order P/N	Packaging	Weight kg
Serial link interface with galvanic isolation	ILPH BdC / RS 422 - 485 24 V DC power supply	1 SNA 684 232 R2600	1	0,1

LINE AMPLIFIER CONFIGURATION

Configuration of amplifiers of the RS 422 - RS 485 (Receiver, Transmitter) line provides greater flexibility of use. The various configurations can be selected using the 2 jumpers (R INT2, E INT1) located inside the box.

POLARIZATION OF THE RS 422 - RS 485 LINE

The line must always be polarized. The ILPH is used to polarize the reception channel :
 Connection by 1 wire P+ (J1.1) with 5 Viso (J1.4)
 Connection by 1 wire P- (J1.2) with 0 Viso (J1.3)

ADAPTING THE RS 422 - RS 485 LINE

The line must always be adapted to the level of the reception channel of each subscriber forming the end of the bus. The ILPH is used to adapt the reception channel by setting the jumper Rt correctly :

- Rt INT1 * Line adaptation, Rt = 120 Ω (Standard)
- Rt INT1 * No line adaptation, Rt = ∞

RS 485 LINK ON ONE PAIR

- R INT2 R ON/OFF Jumper R in position R ON/OFF
- E INT3 E ON/OFF Jumper E in position E ON/OFF

The Receiver and the Transmitter are activated alternately (never at the same time) depending on the status of the Current Loop Reception signal.

RS 485 LINK ON TWO PAIRS

- R INT2 R ON Jumper R in position R ON
- E INT3 E ON/OFF Jumper E in position E ON/OFF

Receiver permanently active. Transmitter controlled by the Current Loop Reception signal.

RS 422 LINK ON TWO PAIRS

- R INT2 R ON R ON Jumper R in position R ON
- E INT3 E ON E ON Jumper E in position E ON

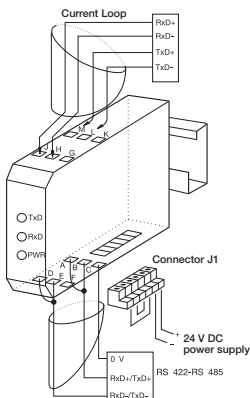
The Receiver and the Transmitter are both permanently active.

RS 422 - RS 485 2 wire serial link

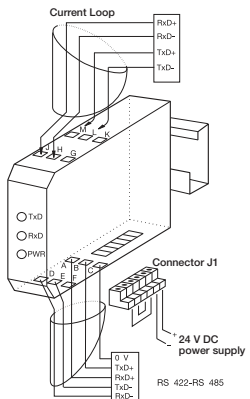
CONNECTIONS

Example of connection with a CL (current Loop) product, Transmission (TxD) in active mode and Reception (RxD) in passive mode. Then, the ILPH must be configured and connected Reception (RxD) in passive mode and Transmission (TxD) in active mode.

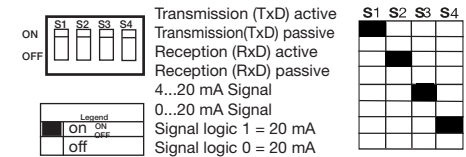
Note : For any other configuration, see schematic diagram or front sticker of the product.



RS 422 - RS 485 4 wire serial link



Note : The TxD channel of the RS 422 - RS 485 link must be polarized independently too.



POLARIZATION

The polarization can be configured using the INT4 jumper.

- INT4 Protection ON
- INT4 Protection OFF, used if power supply at minimum value (21,6 V).

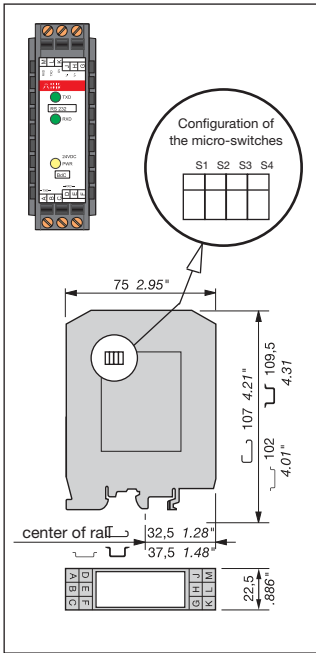
Technical data

Power supply	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/-10%
Supply current	120 mA max.
Connections	Removable screw connector (Omniconnect)
CL interface (Current Loop 1)	active/passive 0...20 mA / 4...20 mA, mode is settable
Logic level	0 = 20 mA or 1 = 20 mA, settable
Baud rate / Transmission distance	max. 38,4 kbit/s / max. 1200 m
Connections	2,5 mm ² screw (AWG 20)
RS 422/485-2 serial link	EIA RS 485 and EIA RS 422 / CCITT V 11
Overvoltage protection	integrated (transil 8 kV 1,2/50 μs)
Baud rate / Transmission distance	max. 38,4 kbit/s / max. 1200 m
Connections	2,5 mm ² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	2 green LED (RxD, TxD)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between input/output and power supply / output	depending on Current Loop (active/passive) 500 V DC (active) / 2000 V DC (passive)
RS 422-485 power supply	500 V DC
Configuration of the operating mode	using internal DIP switches
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2,5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22,5 x 100 mm
Weight	100 g

Serial data converters

ILPH range

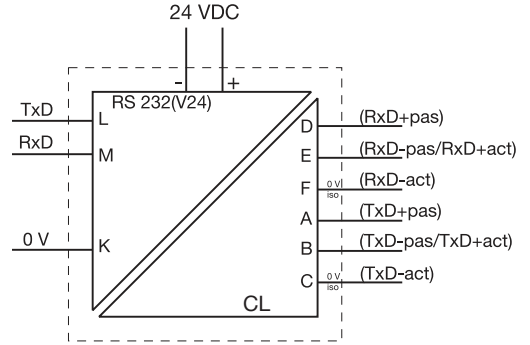
Ordering details, technical data



ILPH RS 232 / CL

Galvanic isolated Converter for RS 232 to current loop serial link.

- Galvanic isolation between power supply/current loop and RS 232/current loop
- Active/Passive 0...20 mA / 4...20 mA selectable
- Positive or negative logic selectable
- Baudrate up to 38,4 kbit/s
- Transmission distance up to 1200 m
- Usable in "noisy" environments
- 24 V DC power supply
- CE marking



Description	Type	Order P/N	Packaging	Weight kg
Serial link interface with galvanic isolation	ILPH RS 232 / BdC 24 V DC power supply	1SNA 684 202 R0100	1	0,1

CONFIGURATION

The various configurations can be selected using the 4 micro-switches located inside the box.

OPERATING MODE ACTIVE OR PASSIVE

The Current Loop's Transmission and Reception can be independently in active or passive mode.

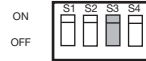
Select operating mode using **S1** and **S2**.



- S1** Transmission (TxD) ON = Active / OFF = Passive
- S2** Reception (RxD) ON = Active / OFF = Passive

SIGNAL LEVEL

Select signal level 4-20 mA or 0-20 mA. This selection is made using micro-switch S3



S3 ON = 4-20 mA / OFF = 0-20 mA

Caution :

It is not possible to select a 4-20 mA signal when the Reception is in active mode.

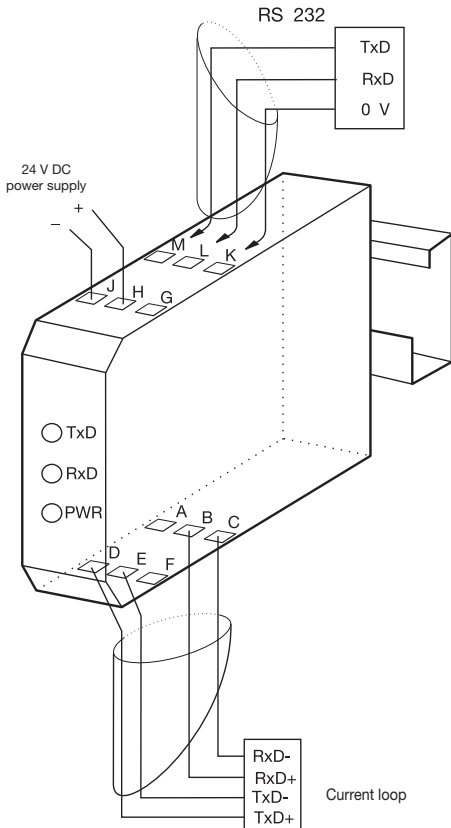
LOGIC LEVEL

Configuration : Positive logic (0 Logic = 20 mA) or negative logic (1 Logic = 20 mA)

using micro-switch S4



S4 ON = (1 = 20 mA) / OFF = (0 = 20 mA)



CONNECTIONS

Example of connection with a CL (Current Loop) product, Transmission (TxD) in active mode and Reception (RxD) in passive mode. Then, the ILPH must be configured and connected Reception (RxD) in passive mode and Transmission (TxD) in active mode.

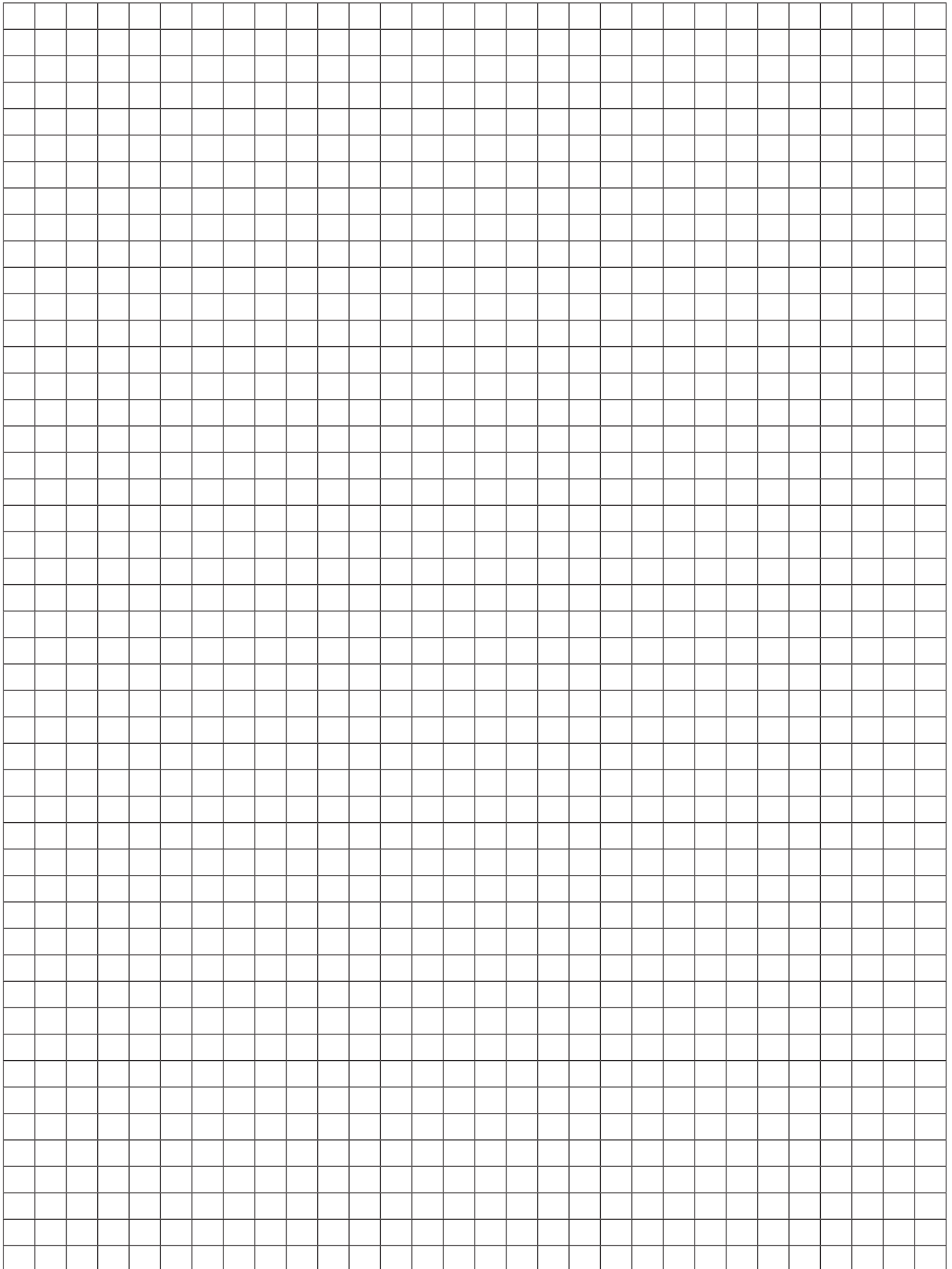
CAUTION : For any other configuration, see schematic diagram or front sticker of the product.

Technical data

Power supply	DC model polarized
Voltage	24 V DC
Voltage tolerance	+/-10%
Supply current	120 mA max.
Connections	Removable screw connector (Omnicontact)
RS 232-1 serial link	EIA RS 232 C / CCITT V 24 V 28
Overvoltage protection	integrated (transil 8 kV 1,2/50 µs)
Baud rate / Transmission distance	max. 38,4 kbit/s / max. 15 m
Connections	2,5 mm ² screw (AWG 20)
BdC serial link (current loop) 2	active/passive 0...20 mA / 4...20 mA mode settable
Logic level	0=20 mA or 1=20 mA settable
Baud rate / Transmission distance	max. 38,4 kbit/s / max. 1200 m
Connections	2,5 mm ² screw (AWG 20)
Traffic indication	
Voltage	1 yellow LED
Status of signal	2 green LED (RxD, TxD)
EMC behavior	
Electrostatic discharge	EN 61000-4-2 level 3 6/8 kV
Radiated electromagnetic field	EN 61000-4-3 level 3 10 V/m
Burst	EN 61000-4-4 level 3 1 kV
Electromagnetic compatibility	EN 55022 class B
Other characteristics	
Galvanic isolation between	depending on current loop (active/passive)
Current loop / RS 232	500 V DC (active) / 2000 V DC (passive)
Current loop / power supply	500 V DC (active) / 2000 V DC (passive)
Configuration of the operating mode	using internal DIP switches
Operating temperature	0°C ... +50°C
Storage temperature	-25°C ... +80°C
Mounting	any required
DIN rail fixing (EN 50002)	snap-on mounting
Wire size	2,5 mm ² / stranded with ferrule, 4 mm ² solid
Dimensions (WxDxH)	88 x 22,5 x 100 mm
Weight	100 g

Notes

5





Pluggable interface relays

CR-P, CR-M and CR-U range

Interface relays and optocoupler

R500, R900, R910, R1800, R600 range

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Pluggable interface relays

CR-P, CR-M and CR-U range

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Pluggable interface relays CR-P, CR-M and CR-U range

Benefits and advantages



2CDC 295 007 F0605

Pluggable pcb relays CR-P

- 9 different coil voltages
 - DC versions: 12 V, 24 V, 48 V, 110 V
 - AC versions: 24 V, 48 V, 110 V, 120 V, 230 V
- Output contacts:
 - 1 c/o contact (16 A) or
 - 2 c/o contacts (8 A) optionally equipped with gold contacts
- Logical or standard sockets
- Cadmium-free contact material
- Width on socket: 15,5 mm
- Pluggable function modules
 - Reverse polarity protection/ Free wheeling diode
 - LED indication
 - RC elements
 - Overvoltage protection
 - Time modules

Pluggable miniature relays CR-M

- 12 different coil voltages
 - DC versions: 12 V, 24 V, 48 V, 60 V, 110 V, 125 V, 220 V
 - AC versions: 24 V, 48 V, 110 V, 120 V, 230 V
- Output contacts
 - 2 c/o contacts (12 A) or
 - 3 c/o contacts (10 A) or
 - 4 c/o contacts (6 A) optionally equipped with gold contacts, LED and free wheeling diode
- Integrated test button for manual actuation and locking of the output contacts (blue = DC, orange = AC) that can be removed if necessary
- With or without integrated LED
- Logical or standard sockets
- Cadmium-free contact material
- Width on socket: 27 mm
- Pluggable function modules
 - Reverse polarity protection/ Free wheeling diode
 - LED indication
 - RC elements
 - Overvoltage protection
 - Time modules

Pluggable universal relays CR-U

- 10 different coil voltages
 - DC versions: 12 V, 24 V, 48 V, 110 V, 220 V
 - AC versions: 24 V, 48 V, 110 V, 120 V, 230 V
- Output contacts
 - 2 c/o contacts (10 A) or
 - 3 c/o contacts (10 A)
- Integrated test button for manual actuation and locking of the output contacts (blue = DC, orange = AC) that can be removed if necessary
- With or without integrated LED
- Cadmium-free contact material
- Width on socket: 38 mm
- Pluggable function modules
 - Reverse polarity protection/ Free wheeling diode
 - LED indication
 - RC elements
 - Overvoltage protection
 - Multifunction time module

Pluggable interface relays CR-P, CR-M and CR-U range Approvals and marks

Kinds of sockets

Standard sockets - Position of connecting terminals:

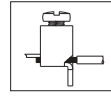
Coil connection (A1-A2) on lower socket side,
contact connections (n/o and n/c contacts)
on the lower and upper socket side.

Logical sockets - Position of connecting terminals:

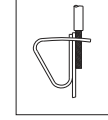
Coil connection (A1-A2) on lower socket side,
all contact connections (common contacts,
n/o and n/c contacts) on upper socket side.

Details see connection diagrams

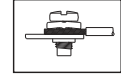
Kind of connecting terminals



Screw type



Spring type



Fork type

Approvals and marks

		Relays			Sockets							Modules	
		CR-P	CR-M	CR-U	CR-PLS CR-PSS	CR-PLC	CR-M..L. CR-M..SS	CR-M..SF	CR-U..S CR-U..E	CR-U..SM	CR-P/M	CR-U	
■ existing □ pending													
Approvals													
	UL 508	■	■ ¹⁾	■	■	■	■	■	■	■			
	CAN/CSA C22.2 No. 14	■	■ ²⁾	■							■ ⁶⁾	■ ⁷⁾	
	CAN/CSA C22.2 No. 14	■	■ ³⁾	■	■		■	■	■				
	VDE	■	■ ⁴⁾	■									
	GOST	■	■	■	■	■	■	■	■	■	■	■	■
	Lloyds Register		■ ⁵⁾	■									
	CCC	■	■	■									
	RMRS	■	■	■	■	■	■	■	■	■			
Marks													
	CE	■	■	■	■		■	■	■	■	■	■	■

¹⁾ except 60 V DC and 125 V DC devices with gold contacts

²⁾ except devices with gold contacts

³⁾ except 60 V DC and 125 V DC devices

⁴⁾ except 125 V DC devices

⁵⁾ only devices with 4 c/o contacts

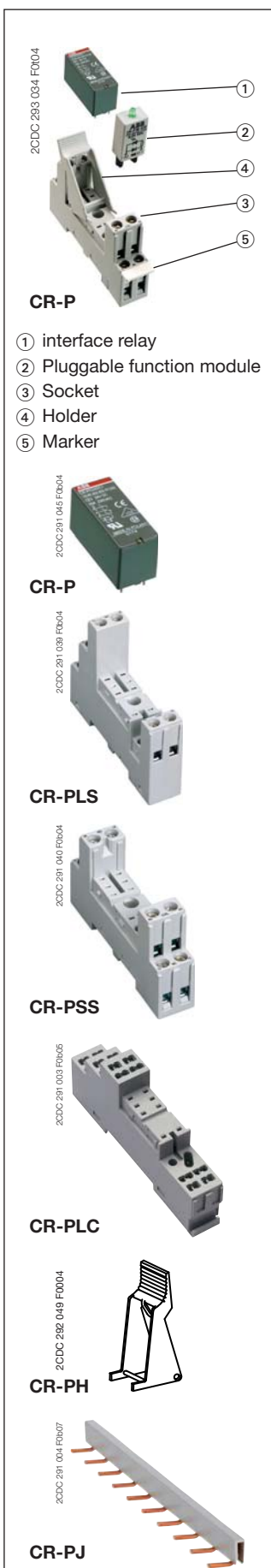
⁶⁾ except CR-P/M 42B, CR-P/M 42BV, CR-P/M 42C, CR-P/M 42CV, CR-P/M 52D, CR-P/M 62E, CR-P/M 62EV, CR-P/M 62D, CR-P/M 62DV, CR-P/M T...

⁷⁾ except CR-U 41B, CR-U 41BV, CR-U 41C, CR-U 41CV, CR-U 51D, CR-U 61CV, CR-U 61E, CR-U 61EV, CR-U 61D, CR-U 61DV, CR-U 91C, CR-U T

Pluggable interface relays CR-P

Pcb relays

Ordering details



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece
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Interface relays

1 c/o contact: 250 V, 16 A

CR-P012DC1	12 V DC	1SVR 405 600 R4000	10	
CR-P024DC1	24 V DC	1SVR 405 600 R1000	10	
CR-P048DC1	48 V DC	1SVR 405 600 R6000	10	
CR-P110DC1	110 V DC	1SVR 405 600 R8000	10	
CR-P024AC1	24 V AC	1SVR 405 600 R0000	10	
CR-P048AC1	48 V AC	1SVR 405 600 R5000	10	
CR-P110AC1	110 V AC	1SVR 405 600 R7000	10	
CR-P120AC1	120 V AC	1SVR 405 600 R2000	10	
CR-P230AC1	230 V AC	1SVR 405 600 R3000	10	

2 c/o contacts: 250 V, 8 A

CR-P012DC2	12 V DC	1SVR 405 601 R4000	10	
CR-P024DC2	24 V DC	1SVR 405 601 R1000	10	
CR-P048DC2	48 V DC	1SVR 405 601 R6000	10	
CR-P110DC2	110 V DC	1SVR 405 601 R8000	10	
CR-P024AC2	24 V AC	1SVR 405 601 R0000	10	
CR-P048AC2	48 V AC	1SVR 405 601 R5000	10	
CR-P110AC2	110 V AC	1SVR 405 601 R7000	10	
CR-P120AC2	120 V AC	1SVR 405 601 R2000	10	
CR-P230AC2	230 V AC	1SVR 405 601 R3000	10	

Interface relays with gold contacts

2 c/o gold contacts: 250 V, 8 A

CR-P024DC2G	24 V DC	1SVR 405 606 R1000	10	
CR-P024AC2G	24 V AC	1SVR 405 606 R0000	10	
CR-P110AC2G	110 V AC	1SVR 405 606 R7000	10	
CR-P230AC2G	230 V AC	1SVR 405 606 R3000	10	

Accessories - Sockets

Type	Version	Connection terminals	Order code	Pack. unit pieces	Price 1 piece
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Sockets

CR-PLS	Logical socket with safety isolation	screw	1SVR 405 650 R0000	10	
CR-PLSx	Logical socket ¹⁾	screw	1SVR 405 650 R0100	10	
CR-PLC	Logical socket ¹⁾	spring connection	1SVR 405 650 R0200	10	
CR-PSS	Standard socket	screw	1SVR 405 650 R1000	10	

Socket accessories

CR-PH	Plastic Holder		1SVR 405 659 R0000	10	
CR-PJ	Jumper bar for sockets with screw connection		1SVR 405 658 R5000	10	

¹⁾ can be used with time modules CR-P/M T...
Bold printed products = stocked products

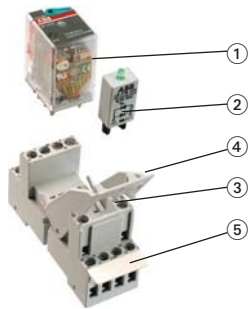
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Pluggable interface relays CR-M

Miniature relays

Ordering details

2CDC 293 035 F0004



CR-M

- ① Interface relay
- ② Pluggable function module
- ③ Socket
- ④ Holder
- ⑤ Marker

2CDC 291 046 F0004



CR-M

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece
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Interface relays without LED

2 c/o contacts: 250 V, 12 A

CR-M012DC2	12 V DC	1SVR 405 611 R4000	10	
CR-M024DC2	24 V DC	1SVR 405 611 R1000	10	
CR-M048DC2	48 V DC	1SVR 405 611 R6000	10	
CR-M060DC2	60 V DC	1SVR 405 611 R4200	10	
CR-M110DC2	110 V DC	1SVR 405 611 R8000	10	
CR-M125DC2	125 V DC	1SVR 405 611 R8200	10	
CR-M220DC2	220 V DC	1SVR 405 611 R9000	10	
CR-M024AC2	24 V AC	1SVR 405 611 R0000	10	
CR-M048AC2	48 V AC	1SVR 405 611 R5000	10	
CR-M110AC2	110 V AC	1SVR 405 611 R7000	10	
CR-M120AC2	120 V AC	1SVR 405 611 R2000	10	
CR-M230AC2	230 V AC	1SVR 405 611 R3000	10	

3 c/o contacts: 250 V, 10 A

CR-M012DC3	12 V DC	1SVR 405 612 R4000	10	
CR-M024DC3	24 V DC	1SVR 405 612 R1000	10	
CR-M048DC3	48 V DC	1SVR 405 612 R6000	10	
CR-M060DC3	60 V DC	1SVR 405 612 R4200	10	
CR-M110DC3	110 V DC	1SVR 405 612 R8000	10	
CR-M125DC3	125 V DC	1SVR 405 612 R8200	10	
CR-M220DC3	220 V DC	1SVR 405 612 R9000	10	
CR-M024AC3	24 V AC	1SVR 405 612 R0000	10	
CR-M048AC3	48 V AC	1SVR 405 612 R5000	10	
CR-M110AC3	110 V AC	1SVR 405 612 R7000	10	
CR-M120AC3	120 V AC	1SVR 405 612 R2000	10	
CR-M230AC3	230 V AC	1SVR 405 612 R3000	10	

4 c/o contacts: 250 V, 6 A

CR-M012DC4	12 V DC	1SVR 405 613 R4000	10	
CR-M024DC4	24 V DC	1SVR 405 613 R1000	10	
CR-M048DC4	48 V DC	1SVR 405 613 R6000	10	
CR-M060DC4	60 V DC	1SVR 405 613 R4200	10	
CR-M110DC4	110 V DC	1SVR 405 613 R8000	10	
CR-M125DC4	125 V DC	1SVR 405 613 R8200	10	
CR-M220DC4	220 V DC	1SVR 405 613 R9000	10	
CR-M024AC4	24 V AC	1SVR 405 613 R0000	10	
CR-M048AC4	48 V AC	1SVR 405 613 R5000	10	
CR-M110AC4	110 V AC	1SVR 405 613 R7000	10	
CR-M120AC4	120 V AC	1SVR 405 613 R2000	10	
CR-M230AC4	230 V AC	1SVR 405 613 R3000	10	

Bold printed products = stocked products

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Pluggable interface relays CR-M

Miniature relays

Ordering details (continued)

2CDC 291 046 F0004

CR-M



Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece
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Interface relays with LED

2 c/o contacts: 250 V, 12 A

CR-M012DC2L	12 V DC	1SVR 405 611 R4100	10	
CR-M024DC2L	24 V DC	1SVR 405 611 R1100	10	
CR-M048DC2L	48 V DC	1SVR 405 611 R6100	10	
CR-M060DC2L	60 V DC	1SVR 405 611 R4300	10	
CR-M110DC2L	110 V DC	1SVR 405 611 R8100	10	
CR-M125DC2L	125 V DC	1SVR 405 611 R8300	10	
CR-M220DC2L	220 V DC	1SVR 405 611 R9100	10	
CR-M024AC2L	24 V AC	1SVR 405 611 R0100	10	
CR-M048AC2L	48 V AC	1SVR 405 611 R5100	10	
CR-M110AC2L	110 V AC	1SVR 405 611 R7100	10	
CR-M120AC2L	120 V AC	1SVR 405 611 R2100	10	
CR-M230AC2L	230 V AC	1SVR 405 611 R3100	10	

3 c/o contacts: 250 V, 10 A

CR-M012DC3L	12 V DC	1SVR 405 612 R4100	10	
CR-M024DC3L	24 V DC	1SVR 405 612 R1100	10	
CR-M048DC3L	48 V DC	1SVR 405 612 R6100	10	
CR-M060DC3L	60 V DC	1SVR 405 612 R4300	10	
CR-M110DC3L	110 V DC	1SVR 405 612 R8100	10	
CR-M125DC3L	125 V DC	1SVR 405 612 R8300	10	
CR-M220DC3L	220 V DC	1SVR 405 612 R9100	10	
CR-M024AC3L	24 V AC	1SVR 405 612 R0100	10	
CR-M048AC3L	48 V AC	1SVR 405 612 R5100	10	
CR-M110AC3L	110 V AC	1SVR 405 612 R7100	10	
CR-M120AC3L	120 V AC	1SVR 405 612 R2100	10	
CR-M230AC3L	230 V AC	1SVR 405 612 R3100	10	

4 c/o contacts: 250 V, 6 A

CR-M012DC4L	12 V DC	1SVR 405 613 R4100	10	
CR-M024DC4L	24 V DC	1SVR 405 613 R1100	10	
CR-M048DC4L	48 V DC	1SVR 405 613 R6100	10	
CR-M060DC4L	60 V DC	1SVR 405 613 R4300	10	
CR-M110DC4L	110 V DC	1SVR 405 613 R8100	10	
CR-M125DC4L	125 V DC	1SVR 405 613 R8300	10	
CR-M220DC4L	220 V DC	1SVR 405 613 R9100	10	
CR-M024AC4L	24 V AC	1SVR 405 613 R0100	10	
CR-M048AC4L	48 V AC	1SVR 405 613 R5100	10	
CR-M110AC4L	110 V AC	1SVR 405 613 R7100	10	
CR-M120AC4L	120 V AC	1SVR 405 613 R2100	10	
CR-M230AC4L	230 V AC	1SVR 405 613 R3100	10	

Interface relays with LED and free-wheeling diode

4 c/o contacts: 250 V, 6 A

CR-M024DC4LD	24 V DC	1SVR 405 614 R1100	10	
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Bold printed products = stocked products

• Pluggable function modules258 • Technical data261 • Dimensional drawings265

Pluggable interface relays CR-M

Miniature relays

Ordering details (continued)

2CDC 291 046 F0004



CR-M

2CDC 291 041 F0004



CR-M4SS

2CDC 291 042 F0004



CR-M4LS

2CDC 291 004 F0005



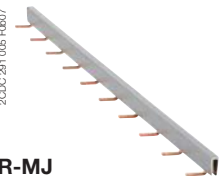
CR-M4LC

2CDC 292 072 F0004



CR-MH

2CDC 291 005 F0007



CR-MJ

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece
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Interface relays with gold contacts

4 c/o contacts: 250 V, 6 A

CR-M024DC4G	24 V DC	1SVR 405 618 R1000	10	
CR-M024AC4G	24 V AC	1SVR 405 618 R0000	10	
CR-M110AC4G	110 V AC	1SVR 405 618 R7000	10	
CR-M230AC4G	230 V AC	1SVR 405 618 R3000	10	

Interface relays with gold contacts and LED

4 c/o contacts: 250 V, 6 A

CR-M012DC4LG	12 V DC	1SVR 405 618 R4100	10	
CR-M024DC4LG	24 V DC	1SVR 405 618 R1100	10	
CR-M048DC4LG	48 V DC	1SVR 405 618 R6100	10	
CR-M060DC4LG	60 V DC	1SVR 405 618 R4300	10	
CR-M110DC4LG	110 V DC	1SVR 405 618 R8100	10	
CR-M125DC4LG	125 V DC	1SVR 405 618 R8300	10	
CR-M220DC4LG	220 V DC	1SVR 405 618 R9100	10	
CR-M024AC4LG	24 V AC	1SVR 405 618 R0100	10	
CR-M048AC4LG	48 V AC	1SVR 405 618 R5100	10	
CR-M110AC4LG	110 V AC	1SVR 405 618 R7100	10	
CR-M120AC4LG	120 V AC	1SVR 405 618 R2100	10	
CR-M230AC4LG	230 V AC	1SVR 405 618 R3100	10	

Interface relays with gold contacts, LED and free-wheeling diode

4 c/o contacts: 250 V, 6 A

CR-M012DC4LDG	12 V DC	1SVR 405 618 R4400	10	
CR-M024DC4LDG	24 V DC	1SVR 405 618 R1400	10	

Accessories - Sockets

Type	Version	Connection terminals	Order code	Pack. unit pieces	Price 1 piece
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Sockets

CR-M2LS	Logical socket ¹⁾ for 2 c/o	screw	1SVR 405 651 R1100	10	
CR-M3LS	Logical socket ¹⁾ for 3 c/o		1SVR 405 651 R2100	10	
CR-M4LS	Logical socket ¹⁾ for 2/4 c/o		1SVR 405 651 R3100	10	
CR-M2LC	Logical socket ¹⁾ for 2 c/o	spring connection	1SVR 405 651 R1200	10	
CR-M4LC	Logical socket ¹⁾ for 4 c/o		1SVR 405 651 R3200	10	
CR-M2SS	Standard socket for 2 c/o	screw	1SVR 405 651 R1000	10	
CR-M3SS	Standard socket for 3 c/o		1SVR 405 651 R2000	10	
CR-M4SS	Standard socket for 2/4 c/o		1SVR 405 651 R3000	10	
CR-M2SF	Standard socket for 2 c/o	fork type	1SVR 405 651 R1300	10	
CR-M4SF	Standard socket for 2/4 c/o		1SVR 405 651 R3300	10	

Socket accessories

CR-MH	Plastic holder	1SVR 405 659 R1000	10	
CR-MH1	Metal holder	1SVR 405 659 R1100	10	
CR-MJ	Jumper bar for sockets with screw connection	1SVR 405 658 R6000	10	

¹⁾ can be used with time modules CR-P/M T...

Bold printed products = stocked products

• Pluggable function modules258 • Technical data261 • Dimensional drawings265

Pluggable interface relays CR-P, CR-M - Accessories

Pluggable function modules

Ordering details, Connection diagrams

2CDC 291 037 F0b04



CR-P/M ..

Type	Rated control supply voltage	Version	Order code	Pack. unit pieces	Price 1 piece
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Diode - Reverse polarity protection/free wheeling diode

CR-P/M 22	6-230 V DC	A1+, A2-	1SVR 405 651 R0000	10	
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Diode and LED - Reverse polarity protection/free wheeling diode

CR-P/M 42	6-24 V DC	red, A1+, A2-	1SVR 405 652 R0000	10	
CR-P/M 42V	6-24 V DC	green, A1+, A2-	1SVR 405 652 R1000	10	
CR-P/M 42B	24-60 V DC	red, A1+, A2-	1SVR 405 652 R4000	10	
CR-P/M 42BV	24-60 V DC	green, A1+, A2-	1SVR 405 652 R4100	10	
CR-P/M 42C	110-230 V DC	red, A1+, A2-	1SVR 405 652 R9000	10	
CR-P/M 42CV	110-230 V DC	green, A1+, A2-	1SVR 405 652 R9100	10	

RC element - Spark quenching

CR-P/M 52B	6-24 V AC		1SVR 405 653 R0000	10	
CR-P/M 52D	24-60 V AC		1SVR 405 653 R4000	10	
CR-P/M 52C	110-230 V AC		1SVR 405 653 R1000	10	

Diode and LED

CR-P/M 62	6-24 V AC/DC	red, for DC A1+, A2-	1SVR 405 654 R0000	10	
CR-P/M 62V	6-24 V AC/DC	green, for DC A1+, A2-	1SVR 405 654 R1000	10	
CR-P/M 62E	24-60 V AC/DC	red, for DC A1+, A2-	1SVR 405 654 R4000	10	
CR-P/M 62EV	24-60 V AC/DC	green, for DC A1+, A2-	1SVR 405 654 R4100	10	
CR-P/M 92	110-230 V AC/DC	red, for DC A1+, A2-	1SVR 405 654 R0100	10	
CR-P/M 92V	110-230 V AC/DC	green, for DC A1+, A2-	1SVR 405 654 R1100	10	

Varistor and LED - Overvoltage protection

CR-P/M 62C	6-24 V AC/DC	red, for DC A1+, A2-	1SVR 405 655 R0000	10	
CR-P/M 62CV	6-24 V AC/DC	green, for DC A1+, A2-	1SVR 405 655 R1000	10	
CR-P/M 62D	24-60 V AC/DC	red, for DC A1+, A2-	1SVR 405 655 R4000	10	
CR-P/M 62DV	24-60 V AC/DC	green, for DC A1+, A2-	1SVR 405 655 R4100	10	
CR-P/M 92C	110-230 V AC/DC	red, for DC A1+, A2-	1SVR 405 655 R0100	10	
CR-P/M 92CV	110-230 V AC/DC	green, for DC A1+, A2-	1SVR 405 655 R1100	10	

Varistor - Overvoltage protection

CR-P/M 72	24 V AC		1SVR 405 656 R0000	10	
CR-P/M 72A	115 V AC		1SVR 405 656 R1000	10	
CR-P/M 82	230 V AC		1SVR 405 656 R2000	10	

Time modules

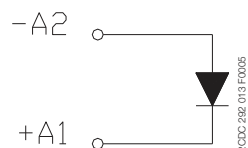
CR-P/M T1	12-24 V AC/DC	ON-delay	1SVR 405 657 R0000	10	
CR-P/M T2	12-24 V AC/DC	Impulse-ON	1SVR 405 657 R0100	10	

2CDC 291 002 F0b07

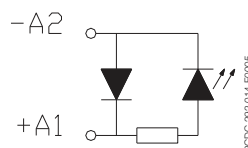


CR-P/M T..

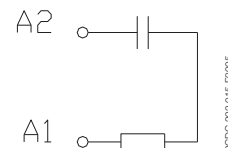
Connection diagrams



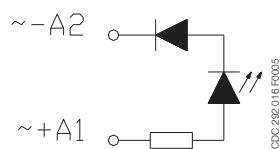
CR-P/M 22



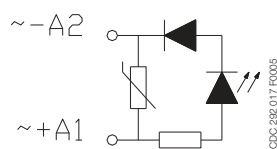
CR-P/M 42,
CR-P/M 42C,
CR-P/M 42BV,
CR-P/M 42B,
CR-P/M 42V,
CR-P/M 42CV



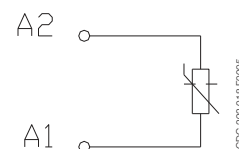
CR-P/M 52B,
CR-P/M 52D,
CR-P/M 52C



CR-P/M 62,
CR-P/M 92,
CR-P/M 62EV,
CR-P/M 62E,
CR-P/M 62V,
CR-P/M 92V



CR-P/M 62C,
CR-P/M 92C,
CR-P/M 62DV,
CR-P/M 62D,
CR-P/M 62CV,
CR-P/M 92CV



CR-P/M 72,
CR-P/M 72A,
CR-P/M 82

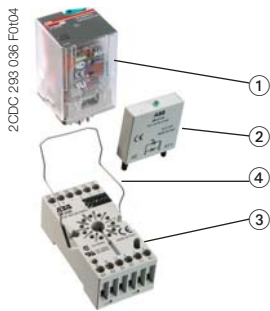
All CR-P/M modules - except time modules CR-P/M T... - can be plugged onto all CR-P or CR-M sockets. The time modules CR-P/M T... can be plugged onto the following sockets only: CR-PLSx, CR-PLC and CR-M2LS, CR-M3LS, CR-M4LS, CR-M2LC, CR-M4LC.

Bold printed products = stocked products

Pluggable interface relays CR-U

Universal relays

Ordering details



CR-U

- ① Interface relay
- ② Pluggable function module
- ③ Socket
- ④ Holder



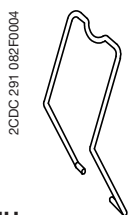
CR-U



CR-U3S



CR-U3E



CR-UH

Type	Rated control supply voltage	Order code	Pack. unit pieces	Price 1 piece
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Interface relays without LED: 2 c/o contacts: 250 V, 10 A

CR-U012DC2	12 V DC	1SVR 405 621 R4000	10	
CR-U024DC2	24 V DC	1SVR 405 621 R1000	10	
CR-U048DC2	48 V DC	1SVR 405 621 R6000	10	
CR-U110DC2	110 V DC	1SVR 405 621 R8000	10	
CR-U220DC2	220 V DC	1SVR 405 621 R9000	10	
CR-U024AC2	24 V AC	1SVR 405 621 R0000	10	
CR-U048AC2	48 V AC	1SVR 405 621 R5000	10	
CR-U110AC2	110 V AC	1SVR 405 621 R7000	10	
CR-U120AC2	120 V AC	1SVR 405 621 R2000	10	
CR-U230AC2	230 V AC	1SVR 405 621 R3000	10	

Interface relays without LED: 3 c/o contacts: 250 V, 10 A

CR-U012DC3	12 V DC	1SVR 405 622 R4000	10	
CR-U024DC3	24 V DC	1SVR 405 622 R1000	10	
CR-U048DC3	48 V DC	1SVR 405 622 R6000	10	
CR-U110DC3	110 V DC	1SVR 405 622 R8000	10	
CR-U220DC3	220 V DC	1SVR 405 622 R9000	10	
CR-U024AC3	24 V AC	1SVR 405 622 R0000	10	
CR-U048AC3	48 V AC	1SVR 405 622 R5000	10	
CR-U110AC3	110 V AC	1SVR 405 622 R7000	10	
CR-U120AC3	120 V AC	1SVR 405 622 R2000	10	
CR-U230AC3	230 V AC	1SVR 405 622 R3000	10	

Interface relays with LED: 2 c/o contacts: 250 V, 10 A

CR-U012DC2L	12 V DC	1SVR 405 621 R4100	10	
CR-U024DC2L	24 V DC	1SVR 405 621 R1100	10	
CR-U048DC2L	48 V DC	1SVR 405 621 R6100	10	
CR-U110DC2L	110 V DC	1SVR 405 621 R8100	10	
CR-U220DC2L	220 V DC	1SVR 405 621 R9100	10	
CR-U024AC2L	24 V AC	1SVR 405 621 R0100	10	
CR-U048AC2L	48 V AC	1SVR 405 621 R5100	10	
CR-U110AC2L	110 V AC	1SVR 405 621 R7100	10	
CR-U120AC2L	120 V AC	1SVR 405 621 R2100	10	
CR-U230AC2L	230 V AC	1SVR 405 621 R3100	10	

Interface relays with LED: 3 c/o contacts: 250 V, 10 A

CR-U012DC3L	12 V DC	1SVR 405 622 R4100	10	
CR-U024DC3L	24 V DC	1SVR 405 622 R1100	10	
CR-U048DC3L	48 V DC	1SVR 405 622 R6100	10	
CR-U110DC3L	110 V DC	1SVR 405 622 R8100	10	
CR-U220DC3L	220 V DC	1SVR 405 622 R9100	10	
CR-U024AC3L	24 V AC	1SVR 405 622 R0100	10	
CR-U048AC3L	48 V AC	1SVR 405 622 R5100	10	
CR-U110AC3L	110 V AC	1SVR 405 622 R7100	10	
CR-U120AC3L	120 V AC	1SVR 405 622 R2100	10	
CR-U230AC3L	230 V AC	1SVR 405 622 R3100	10	

Accessories - Sockets

Type	Version	Order code	Pack. unit pieces	Price 1 piece
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Sockets

CR-U2S	Socket for 2 c/o and module	1SVR 405 670 R0000	10	
CR-U3S	Socket for 3 c/o and module	1SVR 405 660 R0000	10	
CR-U3E	Socket for 2 c/o	1SVR 405 660 R0100	10	
CR-U2SM	Socket small for 2 c/o	1SVR 405 670 R1100	10	
CR-U3SM	Socket small for 3 c/o	1SVR 405 660 R1100	10	

Sockelzubehör

CR-UH	Holder for CR-U socket	1SVR 405 669 R0000	10	
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Bold printed products = stocked products

• Pluggable function modules260 • Technical data261 • Dimensional drawings265

Pluggable interface relays CR-U - Accessories

Pluggable function modules

Ordering details, Connection diagrams

2CDC 291 038 F004



CR-U ..

Type	Rated control supply voltage	Version	Order code	Pack. unit pieces	Price 1 piece
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Diode - Reverse polarity protection/free wheeling diode

CR-U 21	6-230 V DC	A1+, A2-	1SVR 405 661 R0000	10	
CR-U 41	6-24 V DC	red, A1+, A2-	1SVR 405 662 R0000	10	
CR-U 41V	6-24 V DC	green, A1+, A2-	1SVR 405 662 R1000	10	
CR-U 41B	24-60 V DC	red, A1+, A2-	1SVR 405 662 R4000	10	
CR-U 41BV	24-60 V DC	green, A1+, A2-	1SVR 405 662 R4100	10	
CR-U 41C	110-230 V DC	red, A1+, A2-	1SVR 405 662 R9000	10	
CR-U 41CV	110-230 V DC	green, A1+, A2-	1SVR 405 662 R9100	10	

RC element - Spark quenching

CR-U 51B	6-24 V AC		1SVR 405 663 R0000	10	
CR-U 51D	24-60 V AC		1SVR 405 663 R4000	10	
CR-U 51C	110-230 V AC		1SVR 405 663 R1000	10	

Diode and LED

CR-U 61	6-24 V AC/DC	red, for DC: A1+, A2-	1SVR 405 664 R0000	10	
CR-U 61V	6-24 V AC/DC	green, for DC: A1+, A2-	1SVR 405 664 R1000	10	
CR-U 61E	24-60 V AC/DC	red, for DC: A1+, A2-	1SVR 405 664 R4000	10	
CR-U 61EV	24-60 V AC/DC	green, for DC: A1+, A2-	1SVR 405 664 R4100	10	
CR-U 91	110-230 V AC/DC	red, for DC: A1+, A2-	1SVR 405 664 R0100	10	
CR-U 91V	110-230 V AC/DC	green, for DC: A1+, A2-	1SVR 405 664 R1100	10	

Varistor and LED - Overvoltage protection

CR-U 61C	6-24 V AC/DC	red, for DC: A1+, A2-	1SVR 405 665 R0000	10	
CR-U 61CV	6-24 V AC/DC	green, for DC: A1+, A2-	1SVR 405 665 R1000	10	
CR-U 61D	24-60 V AC/DC	red, for DC: A1+, A2-	1SVR 405 665 R4000	10	
CR-U 61DV	24-60 V AC/DC	green, for DC: A1+, A2-	1SVR 405 665 R4100	10	
CR-U 91C	110-230 V AC/DC	red, for DC: A1+, A2-	1SVR 405 665 R0100	10	
CR-U 91CV	110-230 V AC/DC	green, for DC: A1+, A2-	1SVR 405 665 R1100	10	

Varistor - Overvoltage protection

CR-U 71	24 V AC		1SVR 405 666 R0000	10	
CR-U 71A	115 V AC		1SVR 405 666 R1000	10	
CR-U 81	230 V AC		1SVR 405 666 R2000	10	

Multifunction time module

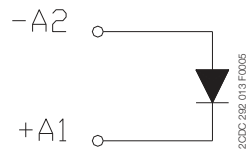
CR-U T	24-240 V AC/DC	pluggable onto CR-U2S and CR-U3S	1SVR 405 667 R0000	10	
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2CDC 291 032 F005

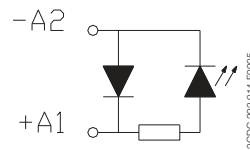


CR-U T

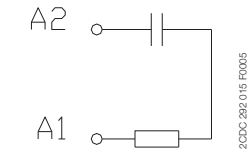
Connection diagrams



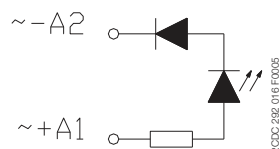
CR-U 21



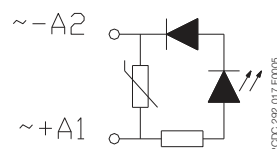
CR-U 41, CR-U 41B, CR-U 41C, CR-U 41V, CR-U 41BV, CR-U 41CV



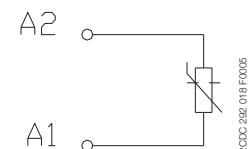
CR-U 51B, CR-U 51C CR-U 51D,



CR-U 61, CR-U 61E, CR-U 91, CR-U 61V, CR-U 61EV, CR-U 91V



CR-U 61C, CR-U 61D, CR-U 91C, CR-U 61CV, CR-U 61DV CR-U 91CV



CR-U 71, CR-U 81 CR-U 71A,

All CR-U modules can be plugged onto sockets CR-U2S and CR-U3S.
Bold printed products = stocked products

Pluggable interface relays CR-P, CR-M and CR-U

Pcb-, miniature- and universal relays

Technical data

Input circuit - coil data

CR-P range



	Rated control supply voltage U_s	Rated frequency	Make voltage (at 20 °C)	Maximum voltage (at 55 °C)	Break voltage	Rated power	Coil resistance (at 20 °C)	Tolerance of coil resistance
DC coils	12 V DC	-	8.4 V DC	30.6 V DC	$\geq 0.1 U_s$	0.4-0.48 W	360 Ω	$\pm 10\%$
	24 V DC	-	16.8 V DC	61.2 V DC	$\geq 0.1 U_s$	0.4-0.48 W	1440 Ω	$\pm 10\%$
	48 V DC	-	33.6 V DC	122.4 V DC	$\geq 0.1 U_s$	0.4-0.48 W	5700 Ω	$\pm 10\%$
	110 V DC	-	77 V DC	280 V DC	$\geq 0.1 U_s$	0.4-0.48 W	25200 Ω	$\pm 10\%$
AC coils	24 V AC	50 / 60 Hz	19.2 V AC	28.8 V AC	$\geq 0.15 U_s$	0.75 VA	400 Ω	$\pm 10\%$
	48 V AC	50 / 60 Hz	38.4 V AC	57.6 V AC	$\geq 0.15 U_s$	0.75 VA	1550 Ω	$\pm 10\%$
	110 V AC	50 / 60 Hz	88 V AC	132 V AC	$\geq 0.15 U_s$	0.75 VA	8900 Ω	$\pm 10\%$
	120 V AC	50 / 60 Hz	96 V AC	144 V AC	$\geq 0.15 U_s$	0.75 VA	10200 Ω	$\pm 10\%$
	230 V AC	50 / 60 Hz	184 V AC	276 V AC	$\geq 0.15 U_s$	0.75 VA	38500 Ω	$\pm 10\%$

CR-M range



	Rated control supply voltage U_s	Rated frequency	Make voltage (at 20 °C)	Maximum voltage (at 55 °C)	Break voltage	Rated power	Coil resistance (at 20 °C)	Tolerance of coil resistance
DC coils	12 V DC	-	9.6 V DC	13.2 V DC	$\geq 0.1 U_s$	0.9 W	160 Ω	$\pm 10\%$
	24 V DC	-	19.2 DC	26.4 V DC	$\geq 0.1 U_s$	0.9 W	640 Ω	$\pm 10\%$
	48 V DC	-	38.4 V DC	52.8 V DC	$\geq 0.1 U_s$	0.9 W	2600 Ω	$\pm 10\%$
	60 V DC	-	48.0 V DC	66.0 V DC	$\geq 0.1 U_s$	0.9 W	4000 Ω	$\pm 10\%$
	110 V DC	-	88 V DC	121 V DC	$\geq 0.1 U_s$	0.9 W	13600 Ω	$\pm 10\%$
	125 V DC	-	100 V DC	137,5 V DC	$\geq 0.1 U_s$	0.9 W	16000 Ω	$\pm 10\%$
	220 V DC	-	176 V DC	242 V DC	$\geq 0.1 U_s$	0.9 W	54000 Ω	$\pm 10\%$
AC coils	24 V AC	50 / 60 Hz	19.2 V AC	26.4 V AC	$\geq 0.2 U_s$	1.6 VA	158 Ω	$\pm 10\%$
	48 V AC	50 / 60 Hz	38.4 V AC	52.8 V AC	$\geq 0.2 U_s$	1.6 VA	640 Ω	$\pm 10\%$
	110 V AC	50 / 60 Hz	88 V AC	121 V AC	$\geq 0.2 U_s$	1.6 VA	3450 Ω	$\pm 10\%$
	120 V AC	50 / 60 Hz	96 V AC	132 V AC	$\geq 0.2 U_s$	1.6 VA	3770 Ω	$\pm 10\%$
	230 V AC	50 / 60 Hz	184 V AC	253 V AC	$\geq 0.2 U_s$	1.6 VA	16100 Ω	$\pm 10\%$

CR-U range



	Rated control supply voltage U_s	Rated frequency	Make voltage (at 20 °C)	Maximum voltage (at 55 °C)	Break voltage	Rated power	Coil resistance (at 20 °C)	Tolerance of coil resistance
DC coils	12 V DC	-	9.6 V DC	13.2 V DC	$\geq 0.1 U_s$	1.5 W	110 Ω	$\pm 10\%$
	24 V DC	-	19.2 DC	26.4 V DC	$\geq 0.1 U_s$	1.5 W	430 Ω	$\pm 10\%$
	48 V DC	-	38.4 V DC	52.8 V DC	$\geq 0.1 U_s$	1.5 W	1750 Ω	$\pm 10\%$
	110 V DC	-	88 V DC	121 V DC	$\geq 0.1 U_s$	1.5 W	9200 Ω	$\pm 10\%$
	220 V DC	-	176 V DC	242 V DC	$\geq 0.1 U_s$	1.5 W	37000 Ω	$\pm 10\%$
AC coils	24 V AC	50 / 60 Hz	19.2 V AC	26.4 V AC	$\geq 0.15 U_s$	2.8 VA (50 Hz) 2.5 VA (60 Hz)	75 Ω	$\pm 10\%$
	48 V AC	50 / 60 Hz	38.4 V AC	52.8 V AC	$\geq 0.15 U_s$	2.8 VA (50 Hz) 2.5 VA (60 Hz)	305 Ω	$\pm 10\%$
	110 V AC	50 / 60 Hz	88 V AC	121 V AC	$\geq 0.15 U_s$	2.8 VA (50 Hz) 2.5 VA (60 Hz)	1700 Ω	$\pm 10\%$
	120 V AC	50 / 60 Hz	96 V AC	132 V AC	$\geq 0.15 U_s$	2.8 VA (50 Hz) 2.5 VA (60 Hz)	1910 Ω	$\pm 10\%$
	230 V AC	50 / 60 Hz	184 V AC	253 V AC	$\geq 0.15 U_s$	2.8 VA (50 Hz) 2.5 VA (60 Hz)	7080 Ω	$\pm 10\%$

Pluggable interface relays CR-P, CR-M and CR-U

Pcb-, miniature- and universal relays

Technical data (continued)

Type	CR-P...1	CR-P...2	CR-M...2	CR-M...3	CR-M...4	CR-U...2	CR-U...3	
Output circuit(s)	11-12/14	11-12/14 21-22/24	11-12/14 21-22/24	11-12/14 21-22/24 31-32/34	11-12/14 21-22/24 31-32/34 41-42/44	11-12/14 31-32/34	11-12/14 21-22/24 31-32/34	
Kind of output	Relay, 1 c/o	Relay, 2 c/o	Relay, 2 c/o	Relay, 3 c/o	Relay, 4 c/o	Relay, 2 c/o	Relay, 3 c/o	
Contact material	AgNi	AgNi AgNi/Au 5 µm	AgNi	AgNi	AgNi AgNi/Au 5 µm	AgNi		
Rated operational voltage U_g (VDE 0110, IEC 60947-1)	250 V							
Minimum switching voltage	5 V							
Maximum switching voltage	DC 300 V DC		250 V DC					
	AC 400 V AC		250 V AC					
Minimum switching current	5 mA (AgNi), 2 mA (AgNi/Au)							
Rated free air thermal current I_{th}	16 A	8 A	12 A	10 A	6 A	10 A		
Rated operational current (IEC 60947-5-1)	AC12 (resistive) 230 V	16 A	8 A	12 A	10 A	6 A	10 A	
	AC15 (inductive) 230 V	1.5 A	1 A	1.5 A	1.5 A	1 A	1.5 A	
	DC12 (resistive) 24 V	16 A	8 A	12 A	10 A	6 A	10 A	
	DC13 (inductive) 24 V	2 A	2 A	8 A	8 A	6 A	2 A	
AC rating (UL 508)	Utilization category (Control Circuit Rating Code)	-		-			-	B 300
	max. rated operational voltage	-		-			-	300 V AC
	max. continuous thermal current at B 300	-		-			-	5 A
	max. making / breaking apparent power at B 300	-		-			-	3600/360 VA
	Utilization category General Purpose (single phase)	-		-			10 A, 250 V AC	10 A, 250 V AC
	Utilization category (Resistive)	16 A, 250 V AC	8 A, 250 V AC	10 A, 250 V AC 12 A, 150 V AC	6 A, 250 V AC 10 A, 150 V AC	6 A, 250 V AC 10 A, 150 V AC	10 A, 250 V AC	-
Minimum switching power	0.3 W (AgNi), 0.1 W (AgNi/Au)						0.3 W	
Maximum switching power AC-1	4000 VA	2000 VA	3000 VA	2500 VA	1500 VA	2500 VA		
Contact resistance	≤ 100 mΩ			≤ 100 mΩ				
Maximum switching capacity	rated load AC-1	600 switching cycles/h		1200 switching cycles/h				
	without load	72000 switching cycles/h		18000 switching cycles/h		12000 switching cycles/h		
Mechanical lifetime	> 3 x 10 ⁷ switching cycles		> 2 x 10 ⁷ switching cycles					
Electrical lifetime AC1 (resistive)	> 10 ⁵ switching cycles (16 A, 250 V) (8 A, 250 V)		> 10 ⁵ switching cycles (12 A, 250 V) (10 A, 250 V) (6 A, 250 V)			> 10 ⁵ switching cycles (10 A, 250 V)		
	cos φ	see reduction factor F						
Response time	typ. 7 ms		typ. 13 ms (DC), 10 ms (AC)			typ. 18 ms (DC), 12 ms (AC)		
Release time	typ. 3 ms		typ. 3 ms (DC), 8 ms (AC)			typ. 7 ms (DC), 10 ms (AC)		
Isolation data								
Rated insulation voltage	400 V AC		250 V AC					
Insulation class	C250 / B400		C250 / B250			C250		
Rated impulse withstand voltage U_{imp}	between coil and contacts	5 kV AC		2.5 kV AC				
	between open contacts	1 kV AC		1.5 kV AC				
	between c/o contacts	2.5 kV AC		2.5 kV AC	2 kV AC	2 kV AC		
Clearance distance between coil and contacts	≥ 10 mm		≥ 2.5 mm	≥ 1.6 mm	≥ 3 mm			
Creepage distance between coil and contacts	≥ 10 mm		≥ 4 mm	≥ 3.2 mm	≥ 4.2 mm			
Overvoltage category	III		III	II	III			
Pollution degree	3		3	2	3			

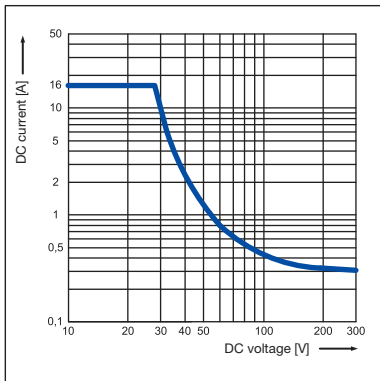
Pluggable interface relays CR-P, CR-M and CR-U Pcb-, miniature- and universal relays

Technical data (continued), Technical diagrams

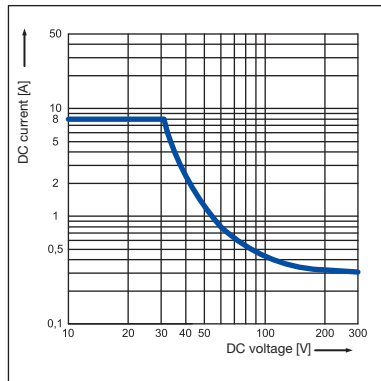
Type	CR-P...1	CR-P...2	CR-M...2	CR-M...3	CR-M...4	CR-U...2	CR-U...3
General data							
Dimensions (W x H x D) when mounted	12.7 x 29 x 15.7 mm		21.2 x 27.5 x 35.6 mm			35 x 35 x 54.4 mm	
Weight	14 g (0.031 lb)		35 g (0.077 lb)			83 g (0.18 lb)	
Mounting	on socket (see accessories)						
Mounting position	any						
Degree of protection	IP 67			IP 40			
Electrical connection							
Connection	by socket						
Environmental data							
Ambient temperature range	operation DC	-40 ... +85 °C			-40 ... +70 °C		
	operation AC	-40 ... +70 °C			-40 ... +55 °C		
	storage	-40 ... +85 °C					
Vibration resistance 10-150 Hz	n/o contact	10 g		5 g		5 g	
	n/c contact	10 g	5 g	5 g		5 g	
Shock resistance	n/o contact	30 g	20 g	10 g		10 g	
	n/c contact	30 g	20 g	5 g		10 g	
Standards							
Product standard	EN 61810-1, EN 60255-23 IEC 60664-1			EN 60810-1, EN 60255-23 IEC 61810-7		EN 60255-1-00	
Low Voltage Directive	73/23/EEC						

Load limit curves - Maximum switching power at resistive DC load

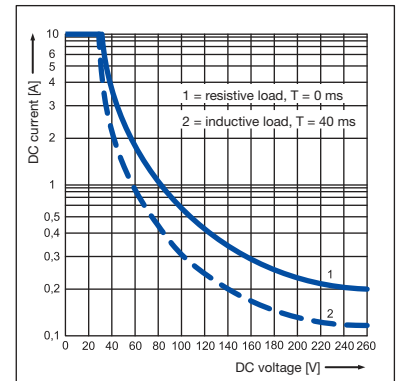
CR-P with 1 c/o contact



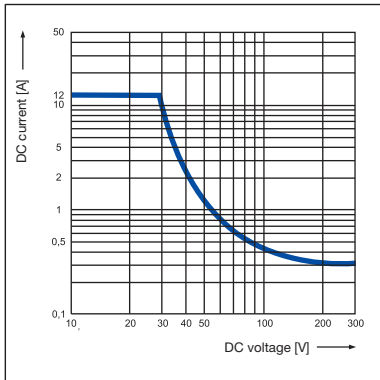
CR-P with 2 c/o contacts



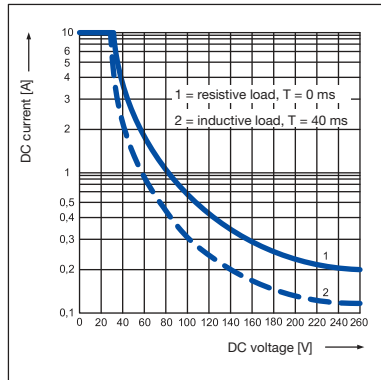
CR-U with 2 and 3 c/o contacts



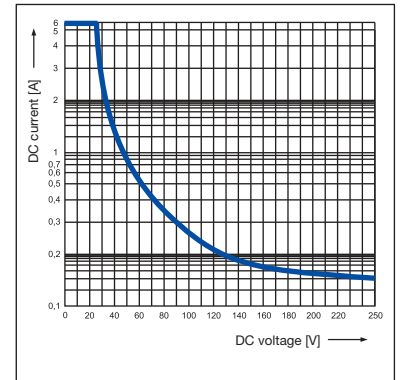
CR-M with 2 c/o contacts



CR-M with 3 c/o contacts



CR-M with 4 c/o contacts



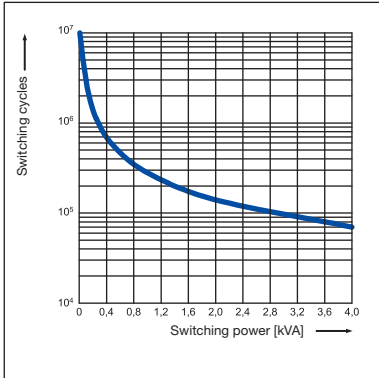
Pluggable interface relays CR-P, CR-M and CR-U

Pcb-, miniature- and universal relays

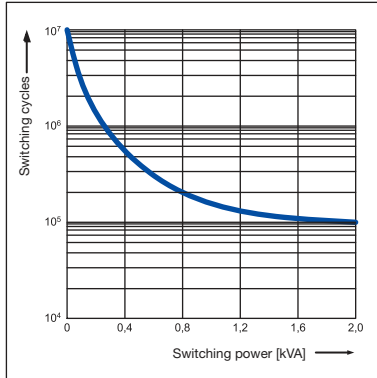
Technical diagrams

Load limit curves - Electrical lifetime at resistive AC load

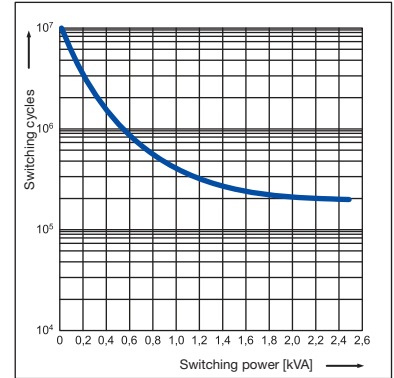
CR-P with 1 c/o contact



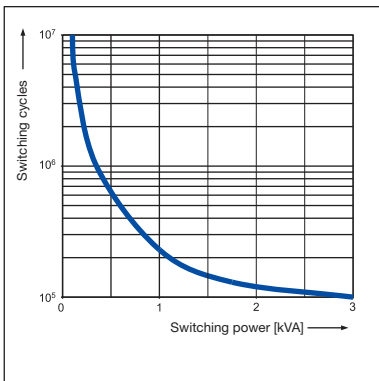
CR-P with 2 c/o contacts



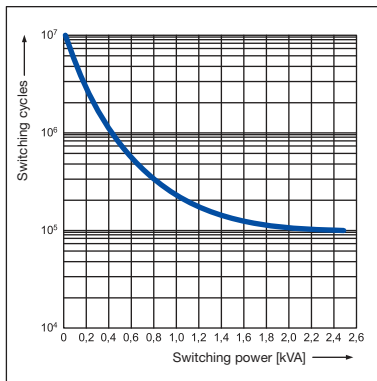
CR-U with 2 and 3 c/o contacts



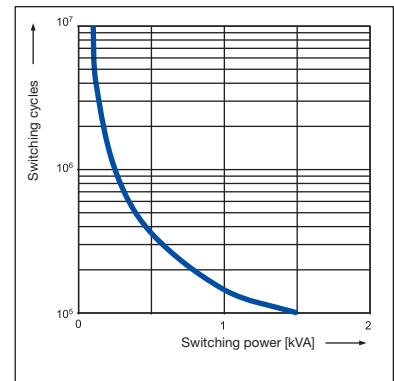
CR-M with 2 c/o contacts



CR-M with 3 c/o contacts



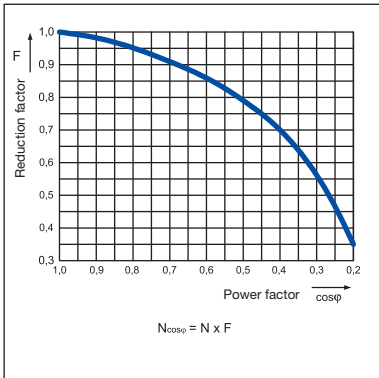
CR-M with 4 c/o contacts



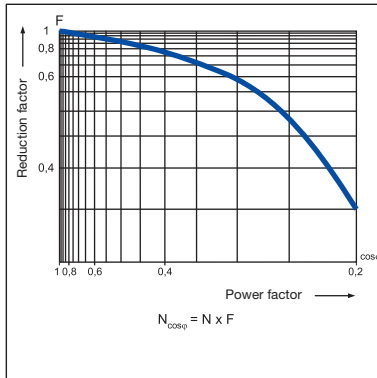
6

Reduction factor F at inductive AC load

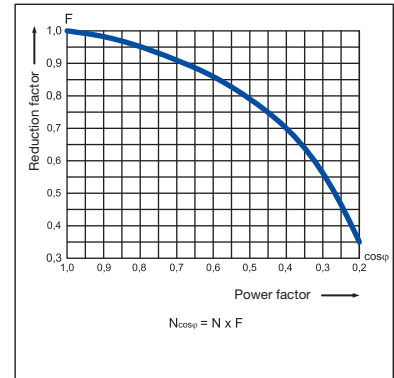
CR-P



CR-M



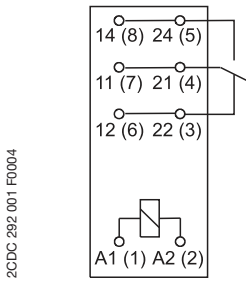
CR-U



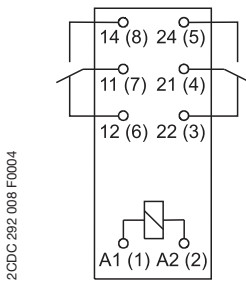
Pluggable interface relays CR-P, CR-M and CR-U Pcb-, miniature- and universal relays

Connection diagrams, dimensional drawings

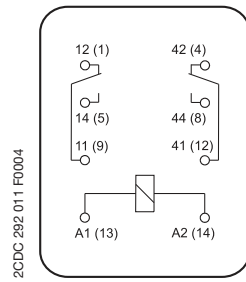
Connection diagrams



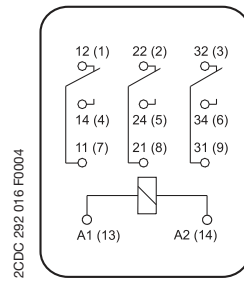
CR-P with 1 c/o contact



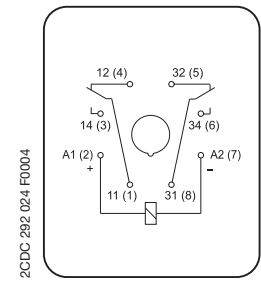
CR-P with 2 c/o contacts



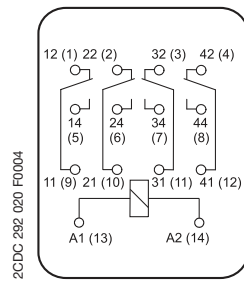
CR-M with 2 c/o contacts



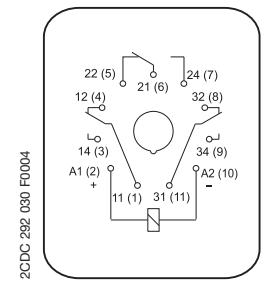
CR-M with 3 c/o contacts



CR-U with 2 c/o contacts

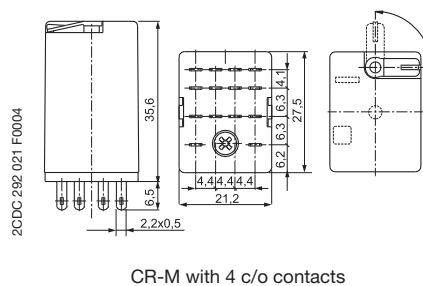
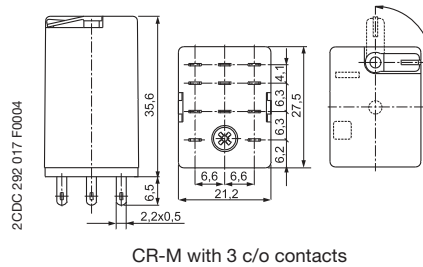
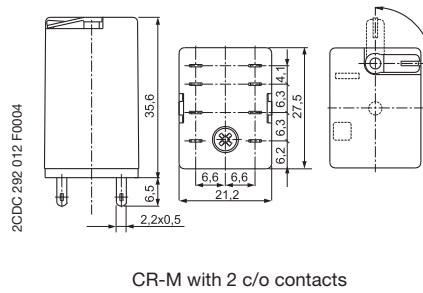
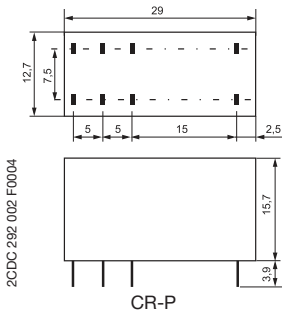


CR-M with 4 c/o contacts

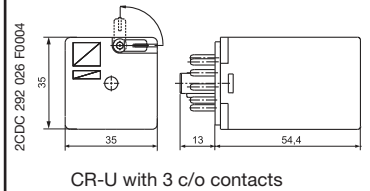
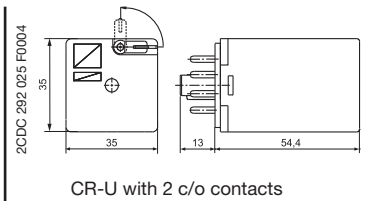


CR-U with 3 c/o contacts

Dimensional drawings



Dimensions in mm



Pluggable interface relays CR-P, CR-M and CR-U

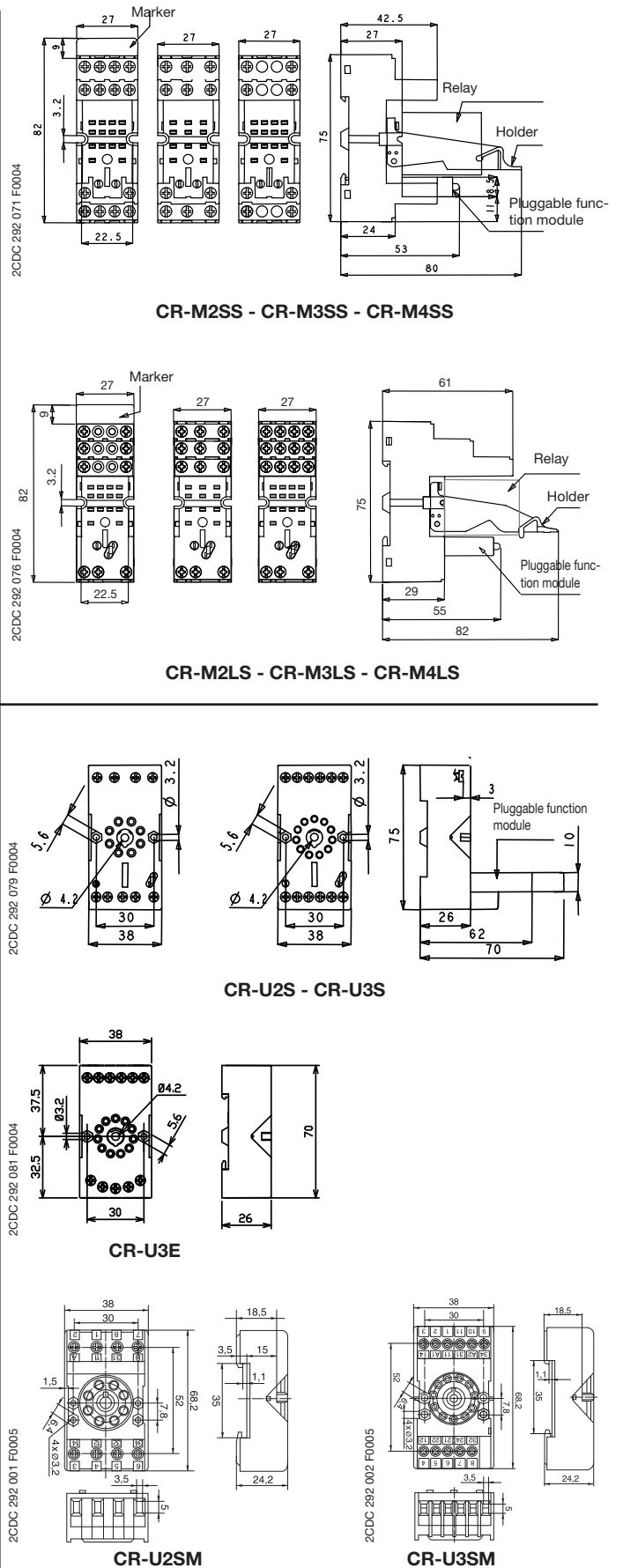
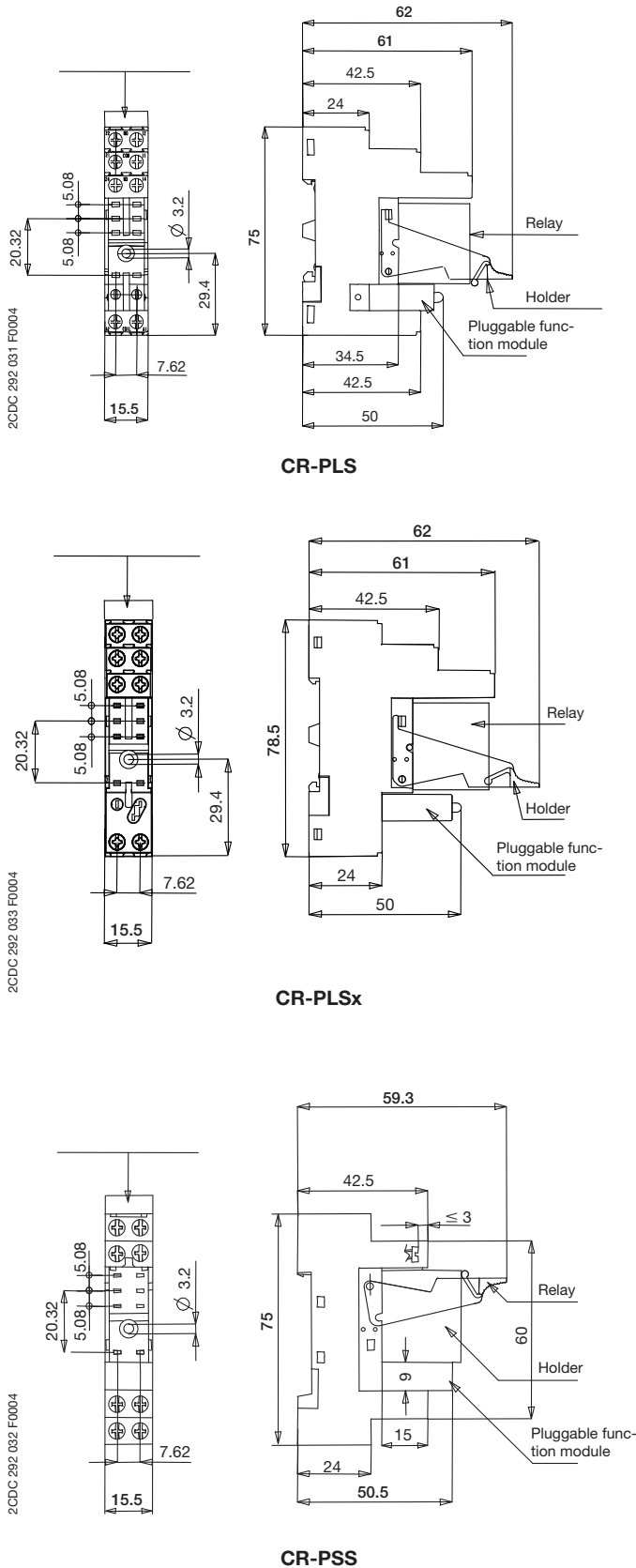
Pcb-, miniature- and universal relays

Dimensional drawings

Dimensional drawings

Dimensions in mm

Sockets for screw connection



6

Pluggable interface relays CR-P, CR-M and CR-U

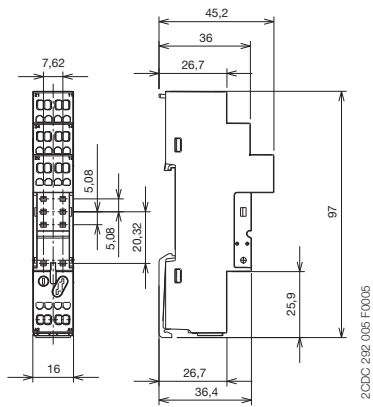
Pcb-, miniature- and universal relays

Dimensional drawings

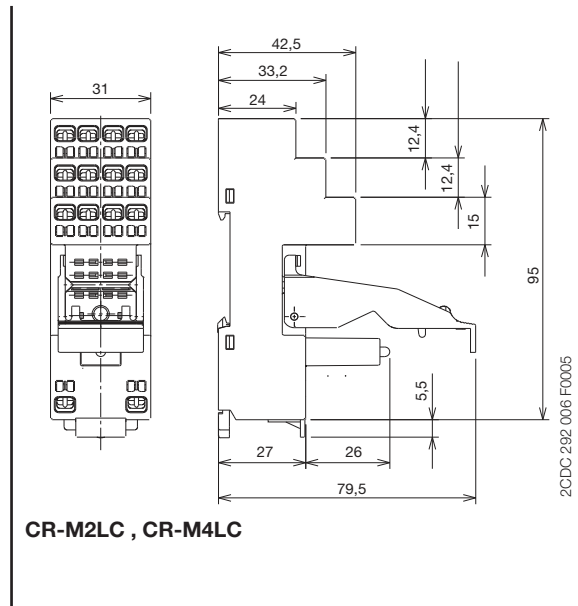
Dimensional drawings

Dimensions in mm

Sockets for spring connection

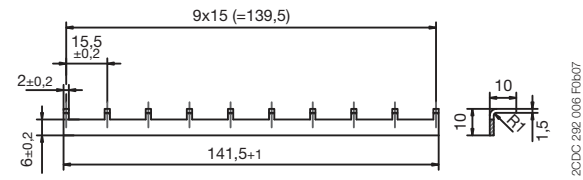


CR-PLC

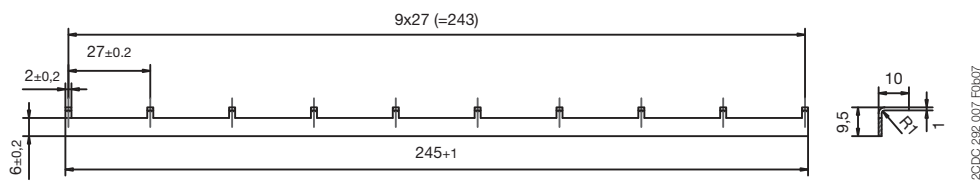


CR-M2LC , CR-M4LC

Jumper

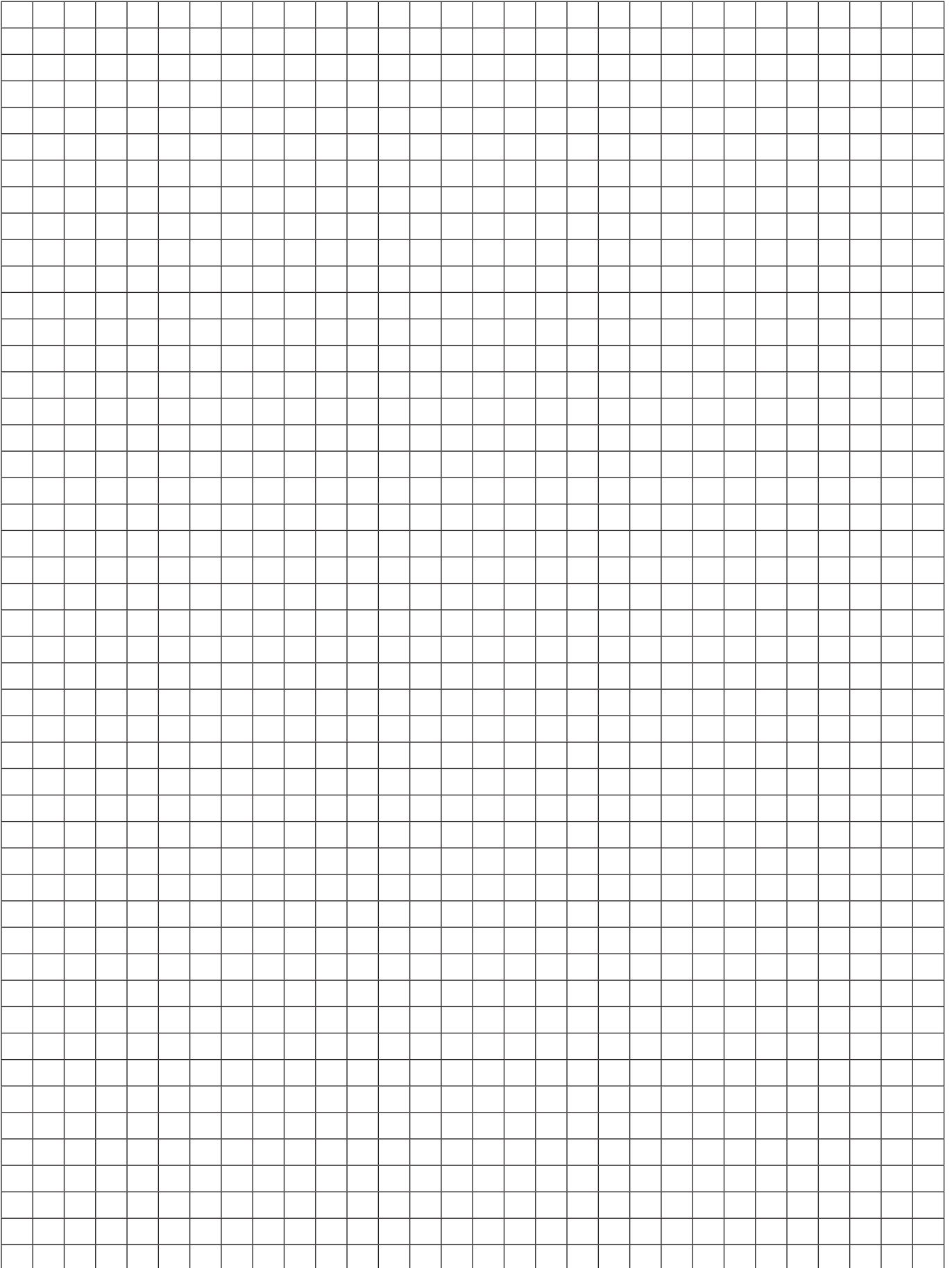


CR-PJ



CR-MJ

Notes



6

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STANDARD RANGE R600

COMFORT

EASY MARKING

Box function with markers type RC610
Wire connection with markers type RC65
Electrical schematic of the block on the side of the block

Type RC610



Type RC65

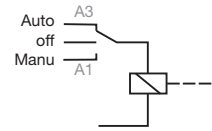
MANUAL OR AUTOMATIC FUNCTIONNING

Micro-Switch allowing forcing of the coil input to 0 or 1 for interventions in equipments.

Two possibilities:

With a visible switch located on front side. (Fig. 1)

With a secure switch (Fig. 2) after acces hatch opening (Fig. 3)



(Fig. 1)



(Fig. 3)

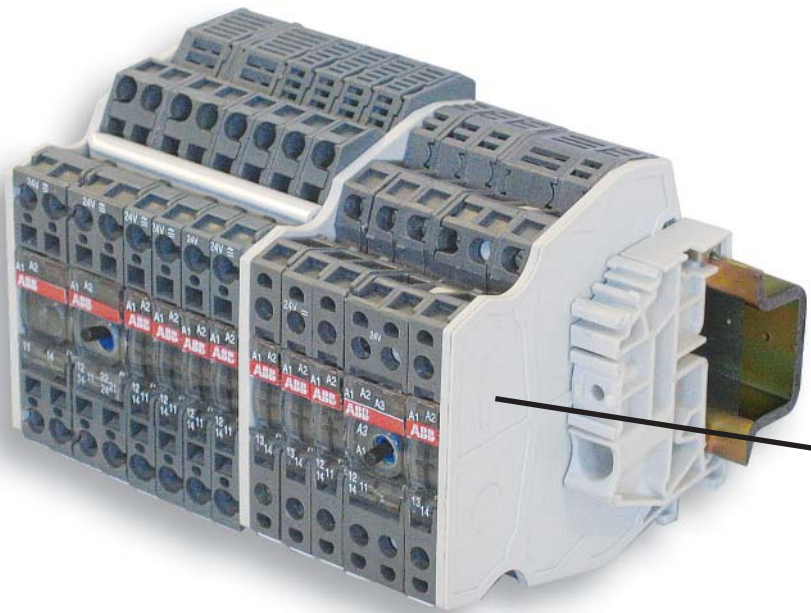


(Fig. 2)



FUNCTIONNING STATUS

Functionning display through a green Led.



6

JUMPER BAR

Same jumper bar for «Screw clamp» or «Spring clamp» technologies. Independent of wire clamp and snap on held in place. Use of end sections is required to preserve IP20 protection.



DISTRIBUTION BLOCK

«Screw clamp» or «Spring clamp» technologies. With protection connected to the rail.

For polarity distribution on demand : coils and/ or contacts.



MESUREMENTS - TESTS

Holes for holding DIA. 2 mm test plugs of the measurement apparatus in position.



EASY WIRING

DIA. 3,5 mm screwdriver self-gripped into spring



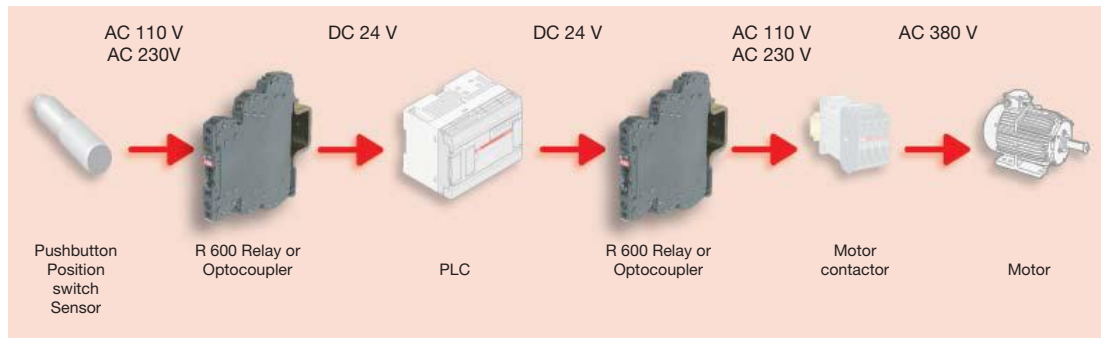
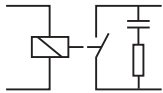


ABB PROVIDES A FULL SOLUTION FROM SENSOR TO MOTOR

SAVING

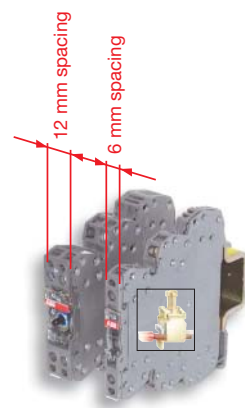
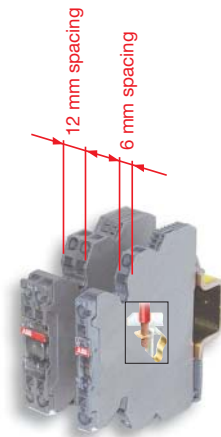
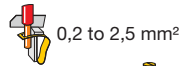
CONTACT LIFE INCREASED



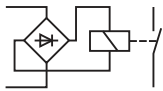
Contact protection through RC circuit

DIMENSIONS

Compact block in «spring clamp» or «screw clamp» versions with 6 mm and 12 mm spacings.



ONLY ONE PART NUMBER AC/DC



SAFETY

6

SEPARATION AND IDENTIFICATION OF SEVERAL VOLTAGES

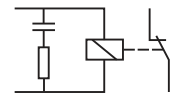
Separator end sections.

IP20 PROTECTION

NO DISTURBANCE PRODUCTION

Choice of high quality electronic components to reduce leakage currents (< 50 µA).

IMMUNITY



Leakage current protection

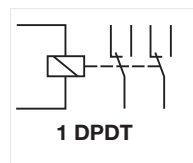
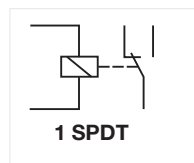
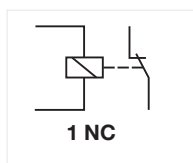
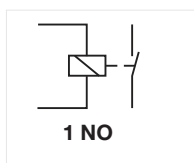
ACCORDANCE TO STANDARDS :



LRS



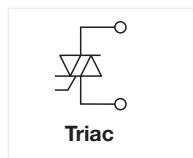
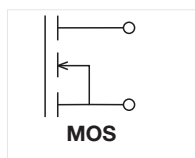
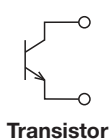
PERFORMANCES



ADAPTABILITY TO ANY APPLICATION TYPE

THE PLUS IN OUR PERFORMANCES

- Triac output 400 VAC (50 Hz / 60 Hz)
- Relay output 12 A in 12 mm spacing
- 100 part numbers
- Screw clamp or spring clamp connections



Relays and optocouplers

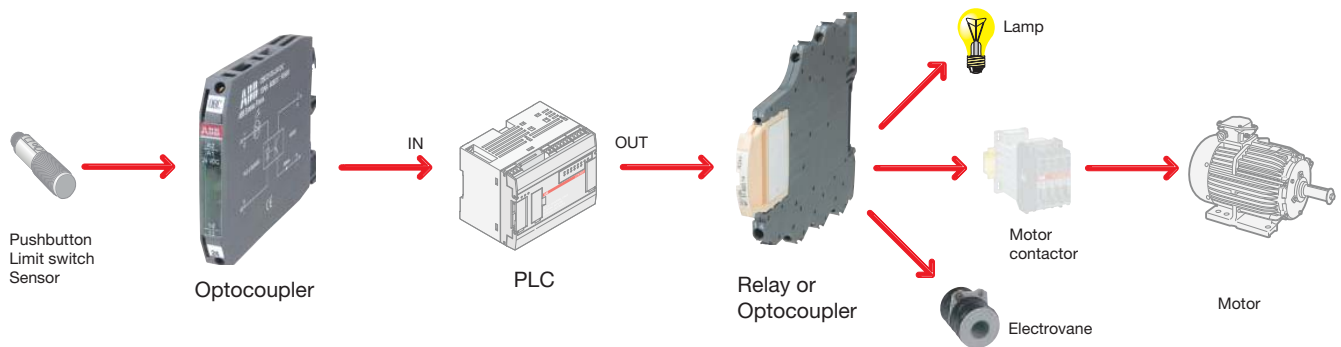
Applications

In today's automation systems, PLCs are the core of industry. They link sensors and actuators to the process, which are connected to the PLC via conventional wires.

However these PLCs are not completely isolated from the industrial environment, hence over voltage picks and transient currents can affect their operating functions. And additionally, their application field is often limited to 24 VDC / 100 mA.

So, with the aim to adapt application voltage and/or current and provide as well the right galvanic isolation to the PLC, it is recommended to install per I/O the right interface providing both voltage-current level adaptation and isolation protection.

This interfacing is possible thanks to ABB's relays and optocouplers ranges, which offer wide adaptation in both voltage (from 5 to 400 V) and current (from 10-7 to 16 A) as well as high isolation between input and output from 2 to 4 KV.



Technical data

R600 series

Standard range in screw clamp or spring clamp versions

- Spacing : 6 mm
- Wire size : 2.5 mm² (4 mm² solid wire)
- Contact type : 1 NO, 1 NC, 1 SPDT, 1 DPDT from 1 mA to 8 A / 250 V
- Transistor : 100 mA
MOS : 1 A to 5 A
Triac : 1 A to 2 A



R500 series

It is our range offering pluggable functions

- Spacing : 5.08 mm (the smallest in the market)
- Wire size : 2.5 mm² (4 mm² solid)
- Contact type : 1 SPDT from 10 mA to 6 A / 250 V
- Transistor : 30 mA to 100 mA
MOS : 1 A to 2 A
Triac : 1 A



R910 series

It is a relay inside a terminal block

- Spacing : 9 mm
- High wiring capacity 4 mm²
- Contact type : 1 NO from 10 mA to 5 A / 250 V
- Good isolation 3 kV



R900 series

The fastest optocoupler in the market

- Spacing : 9 to 15 mm
- Wire size : 2.5 mm² (4 mm² solid)
- Contact type : 1 SPDT or 1 DPDT contacts from 1 mA to 6 A / 250 V
- Transistor : 100 mA to 5 A
MOS : 5 A
Triac : 1 A to 5 A



R1800 series

It is the range dedicated to special applications

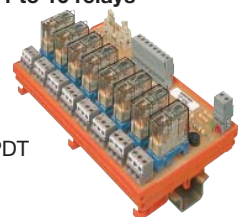
- Spacing : 18 to 23 mm
- Wire size : 2.5 mm² (4 mm² solid)
- Contact type : 1 NO, 1 NC, 1 NO + 1 NC, 4 NO, 1 SPDT, 1 DPDT from 10⁻⁷ A to 8 A / 250 V
- Transistor : 25 mA to 1 A



R20000 series

It is our PCB mounted range of modules 1 to 16 relays



- Spacing : 12,7 to 325 mm
- Wire size : 2.5 mm²
- Contact type : 1 NO, 1 NC, 1 SPDT, 1 DPDT from 1 mA to 16 A / 250 V
- MOS : 3 A
Triac : 3 A



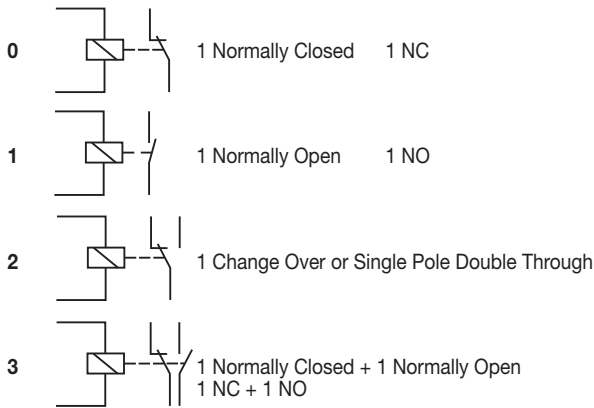
Relays and optocouplers

Coding principle

Construction of description type

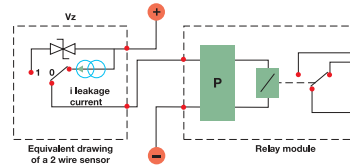
SERIES	CODE	NB OF RELAYS	CONTACT TYPE	NB OF CONTACTS PER RELAY	PARTICULARITIES			
R 600  R 900 R 1800	<table border="1"><tr><td>R</td><td>B</td></tr></table>	R	B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
R	B							
R 600  R 20000	<table border="1"><tr><td>R</td><td>B</td><td>R</td></tr></table>	R	B	R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R	B	R						
R 500	<table border="1"><tr><td>R</td><td>M</td></tr></table>	R	M	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
R	M							
R 910	<table border="1"><tr><td>D</td><td>2,5/5</td><td>R</td></tr></table>	D	2,5/5	R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D	2,5/5	R						
	<table border="1"><tr><td>M</td><td>4/9</td><td>R</td></tr></table>	M	4/9	R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	4/9	R						
			0 1 2 3		None A B C N P R V I			

Description of contact types

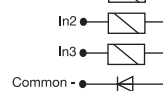


Particularities description

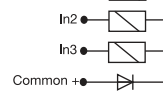
None Input voltage DC
A Input voltage AC/DC
B Input voltage AC
C 2 wire sensor compatibility



N In1 In2 In3 Common - Commons of coils connected to negative



P In1 In2 In3 Common + Commons of coils connected to positive



R RC circuit protection :
- Input protection against leakage current

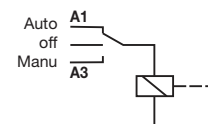


- Increases relay contacts life






V Relay protection against overvoltage peaks

I Switch to force the coil for maintenance and/or installation purposes



Color coding for relays

Color	Current level in contacts	Switching current	Switching voltage	Switching load power
 green	Very low level	10 ⁻⁷ to 5 A	10 ⁻³ to 250 V	10 ⁻¹⁰ to 2000 VA 10 ⁻¹⁰ to 200 W
 grey	Low level	1 mA to 8 A	5 to 250 V	0,05 to 1500 VA 0,05 to 192 W
 blue	High level	10 mA to 16 A	12 to 380 V	0,6 to 4000 VA 0,6 to 240 W

Relays and optocouplers

Selection guide for relay modules

How to use this selection guide

1 Choose the coil voltage AC or DC

Input type	Rated voltage
DC input	5 VDC
	12 VDC

2 Choose the contact type together with the current needed for your application

Contact type	Connection type	Nb of relays	Current in contacts
1 SPDT	screw	1	10mA-6A
1 SPDT	screw	1	1mA-6A
1 SPDT	spring	1	10mA-6A

3 Verify the connection type, the number of relays and the spacing

Connection type	Nb of relays	Current in contacts	Spacing (mm)
screw	1	10mA-6A	6
screw	1	1mA-6A	6

4 Go to see the indicated page for more technical data
or
Use the part number to place an order

Part number	Page
1SNA 645 034 R2300	16
1SNA 645 036 R2500	17



Screw connection



Spring connection

Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page	
DC input	5 VDC	1 SPDT	screw	1	10mA-6A	6	R600			RB 121-5VDC	1SNA 645 034 R2300	282	
		1 SPDT	screw	1	1mA-6A	6	R600			RB 121-5VDC	1SNA 645 036 R2500	283	
		1 SPDT	spring	1	10mA-6A	6	R600			RBR 121-5VDC	1SNA 645 534 R2500	282	
		1 SPDT	spring	1	1mA-6A	6	R600			RBR 121-5VDC	1SNA 645 536 R2700	283	
		1 SPDT	screw	1	1mA-2A	18	R1800		TTL	EBO 1R-5VDC	1SNA 010 131 R1400	293	
	12 VDC	1 NO	screw	1	10mA-5A	9	R910			R	M 4/9.R111L-12VDC	1SNA 607 051 R0700	287
		1 NO	screw	1	10mA-5A	9	R910			R	M 4/9.R111L-12VDC	1SNA 607 001 R0600	287
		1 NO	screw	1	10mA-5A	9	R910			R	M 4/9.R111L-12VDC	1SNA 607 029 R0100	287
		1 NO	screw	1	10 mA-5A	12,7	R20000				RM 111-12VDC	1SNA 020 035 R1100	299
		1 SPDT	screw	1	10mA-6A	6	R600				RB 121-12VDC	1SNA 645 035 R2400	282
		1 SPDT	screw	1	1mA-6A	6	R600				RB 121-12VDC	1SNA 645 037 R2600	283
		1 SPDT	spring	1	10mA-6A	6	R600				RBR 121-12VDC	1SNA 645 535 R2600	282
		1 SPDT	spring	1	1 mA-6A	6	R600				RBR 121-12VDC	1SNA 645 537 R2000	283
		1 SPDT	screw	1	10mA-8A	18	R1800				RB 121-12VDC	1SNA 610 125 R2400	290
		1 SPDT	screw	1	1mA-6A	11,5	R900				RB 121-12VDC	1SNA 630 001 R0000	296
		1 DPDT	screw	1	0,1µA-4A	18	R1800				RB 122-12VDC	1SNA 010 174 R0700	295

Notes :

P Pluggable relays
R Leakage current protection

I External switch to force the coil
Is Internal switch to force the coil

V Overvoltage protection with varistor
C Static sensor compatible

Negative Coil common in negative
Positive Coil common in positive
TTL TTL compatible

High runners in bold characters
Marine Certifications : @ GL, LRS

Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page	
DC input	24 VDC	1 NO	screw	1	10mA-6A	12	R600		R	RB 101AR-24VAC/DC	1SNA 645 019 R0400	281	
		1 NO	spring	1	10mA-6A	12	R600		R	RBR 101AR-24VAC/DC	1SNA 645 519 R0600	281	
		1 NO	screw	1	10mA-8A	12,7	R20000			RM 101-24VDC	1SNA 020 239 R0200	299	
		1 NC	screw	1	10mA-5A	9	R910			M 4/9.R111L-24VDC	1SNA 607 052 R0000	287	
		1 NC	screw	1	10mA-5A	9	R910		R	M 4/9.R111L-24VDC	1SNA 607 002 R0700	287	
		1 NC	screw	1	10mA-5A	9	R910		R	M 4/9.R111L-24VDC	1SNA 607 030 R0600	287	
		1 NC	screw	1	10mA-6A	6	R600			RB 111A-24VAC/DC	1SNA 645 014 R2700	281	
		1 NC	screw	1	10mA-6A	6	R600		Is	RB 111AI-24VAC/DC	1SNA 645 063 R0000	281	
		1 NC	screw	1	10 mA-6A	12	R600		R	RB 111AR-24VAC/DC	1SNA 645 018 R0300	281	
		1 NC	spring	1	10mA-6A	6	R600			RBR 111A-24VAC/DC	1SNA 645 514 R2100	281	
		1 NC	spring	1	10mA-6A	6	R600		Is	RBR 111AI-24VAC/DC	1SNA 645 563 R0200	281	
		1 NC	spring	1	10mA-6A	12	R600		R	RBR 111AR-24VAC/DC	1SNA 645 518 R0500	281	
		1 NC	screw	1	10mA-8A	12,7	R20000			RM 111-24VDC	1SNA 020 032 R1600	299	
		4 NC	screw	1	0,1µA-5A	18	R1800			RB 114A-24VAC/DC	1SNA 010 126 R1700	289	
		1NC+1NO	screw	1	10mA-5A	18	R1800			C, V	RB 131CV-24VDC	1SNA 010 181 R1700	288
		1NC+1NO	screw	1	1µA-5A	18	R1800			C, V	RB 131CV-24VDC	1SNA 010 151 R2000	288
		1NC+1NO	screw	1	1µA-8A	18	R1800				RB 131-24VDC	1SNA 010 055 R2300	289
		1NC+1NO	screw	1	1µA-8A	18	R1800				RB 310-24VDC bistable	1SNA 010 063 R2300	289
		1NC, 1NC	screw	2	1µA-5A	18	R1800				RB 211-24VDC	1SNA 010 014 R1200	289
		1 SPDT	screw	1	10mA-6A	6	R600				RB 121-24VDC	1SNA 645 064 R0100	282
		1 SPDT	screw	1	1 mA-6A	6	R600				RB 121-24VDC	1SNA 645 065 R0200	283
		1 SPDT	screw	1	10mA-6A	6	R600				RB 121A-24VAC/DC	1SNA 645 001 R0300	282
		1 SPDT	screw	1	1 mA-6A	6	R600				RB 121A-24VAC/DC	1SNA 645 005 R0700	283
		1 SPDT	screw	1	10mA-6A	5,08	R500			P	D 2,5/5-R121-24VDC	1SNA 607 217 R0200	286
		1 SPDT	screw	1	10mA-6A	5,08	R500			P	D 2,5/5-R121L-24VDC	1SNA 607 201 R1300	286
		1 SPDT	screw	1	10mA-6A	5,08	R500			P	D 2,5/5-R121L-24VAC/DC	1SNA 607 231 R0000	286
		1 SPDT	screw	1	10mA-6A	12	R600			I	RB 121AI-24VAC/DC	1SNA 645 032 R2100	284
		1 SPDT	screw	1	10mA-6A	12	R600			Is	RB 121AI-24VAC/DC	1SNA 645 009 R1300	284
		1 SPDT	screw	1	1mA-6A	12	R600			I	RB 121AI-24VAC/DC	1SNA 645 033 R2200	284
		1 SPDT	screw	1	1mA-6A	12	R600			Is	RB 121AI-24VAC/DC	1SNA 645 010 R0700	284
		1 SPDT	spring	1	10mA-6A	6	R600				RBR 121-24VDC	1SNA 645 564 R0300	282
		1 SPDT	spring	1	1 mA-6A	6	R600				RBR 121-24VDC	1SNA 645 565 R0400	283
		1 SPDT	spring	1	10mA-6A	6	R600				RBR 121A-24VAC/DC	1SNA 645 501 R0500	282
		1 SPDT	spring	1	1mA-6A	6	R600				RBR 121A-24VAC/DC	1SNA 645 505 R0100	283
		1 SPDT	spring	1	10mA-6A	12	R600			I	RBR 121AI-24VAC/DC	1SNA 645 532 R2300	284
		1 SPDT	spring	1	10mA-6A	12	R600			Is	RBR 121AI-24VAC/DC	1SNA 645 509 R1500	284
		1 SPDT	spring	1	1mA-6A	12	R600			I	RBR 121AI-24VAC/DC	1SNA 645 533 R2400	284
		1 SPDT	spring	1	1mA-6A	12	R600			Is	RBR 121AI-24VAC/DC	1SNA 645 510 R0100	284
		1 SPDT	screw	1	10mA-8A	18	R1800				RB 121A-24VAC/DC	1SNA 610 004 R0700	290
		1 SPDT	screw	1	5mA-3A	18	R1800			C, V	RB 121CV-24VAC/DC orange	1SNA 010 184 R1200	292
		1 SPDT	screw	1	1µA-5A	18	R1800			C, V	RB 121CV-24VAC/DC orange	1SNA 010 154 R2300	292
		1 SPDT	screw	1	1mA-6A	11,5	R900				RB 121A-24VAC/DC	1SNA 630 002 R0100	296
		1 SPDT	screw	1	1mA-6A	11,5	R900			I	RB 121AI-24VAC/DC	1SNA 630 007 R0600	297
		1 SPDT	screw	1	10mA-10A	17,8	R20000				RM 121A-24VAC/DC	1SNA 020 042 R2000	300
		1 SPDT	screw	1	10mA-16A	22,5	R20000				RM 121-24VDC	1SNA 020 046 R2400	300
		1 SPDT	screw	4	10mA-16A	89	R20000				RM 421A-24VAC/DC	1SNA 020 054 R2400	301
		1 SPDT	screw	8	10mA-16A	165	R20000				RM 821A-24VAC/DC	1SNA 020 070 R0000	301
		1 SPDT	screw	16	10mA-16A	325	R20000				RM 1621A-24VAC/DC	1SNA 020 086 R1500	301
		1 SPDT	screw	4	1mA-8A	63,5	R20000			Negative	RM 421N-24VDC	1SNA 020 604 R0100	302
		1 SPDT	screw	8	1mA-8A	132	R20000			Negative	RM 821N-24VDC	1SNA 020 112 R1300	302
1 SPDT	screw	16	1mA-8A	252	R20000			Negative	RM 1621N-24VDC	1SNA 020 113 R1400	302		

Notes :

P Pluggable relays
R Leakage current protection

I External switch to force the coil
Is Internal switch to force the coil

V Overvoltage protection with varistor
C Static sensor compatible

Negative Coil common in negative
Positive Coil common in positive
TTL TTL compatible

High runners in bold characters
Marine Certifications :



Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page	
DC input	24 VDC	1 SPDT	screw	4	1mA-8A	63,5	R20000		Positive	RM 421P-24VDC	1SNA 020 605 R0200	302	
		1 SPDT	screw	8	1mA-8A	132	R20000		Positive	RM 821P-24VDC	1SNA 020 114 R1500	302	
		1 SPDT	screw	16	1mA-8A	252	R20000		Positive	RM 1621P-24VDC	1SNA 020 115 R1600	302	
		1 DPDT	screw	1	1mA-8A	12	R600		V	RB 122A-24VAC/DC	1SNA 645 012 R2500	285	
		1 DPDT	spring	1	1mA-8A	12	R600		V	RBR 122A-24VAC/DC	1SNA 645 512 R2700	285	
		1 DPDT	screw	1	10mA-5A	18	R1800		V	RBR 122AV-24VAC/DC	1SNA 610 121 R2000	294	
		1 DPDT	screw	1	0,1µA-5A	18	R1800		V	RB 122-24VDC	1SNA 610 059 R1500	294	
		1 DPDT	screw	1	100mA-7A	15	R900		V	RB 122-24VDC	1SNA 630 019 R0100	298	
		1 DPDT	screw	1	10µA-3A	11,5	R900		V	RB 122A-24VAC/DC	1SNA 630 011 R2100	298	
		1 DPDT	screw	1	10mA-5A	23	R20000			RM 122A-24VAC/DC	1SNA 020 106 R2600	303	
		1 DPDT	screw	1	10mA-5A	23	R20000			RM 122-24VDC	1SNA 020 139 R2600	303	
		1 DPDT	screw	4	10mA-5A	76	R20000		Negative	RM 422N-24VDC	1SNA 020 144 R2300	304	
		1 DPDT	screw	4	10mA-5A	76	R20000		Positive	RM 422P-24VDC	1SNA 020 146 R2500	304	
		1 DPDT	screw	4	100mA-4A	76	R20000		Negative	RM 422N-24VDC	1SNA 020 672 R0400	305	
		1 DPDT	screw	4	100mA-4A	76	R20000		Positive	RM 422P-24VDC	1SNA 020 673 R0500	305	
		1 DPDT	screw	8	100mA-4A	159	R20000		Negative	RM 822N-24VDC	1SNA 020 149 R0000	305	
		1 DPDT	screw	8	100mA-4A	159	R20000		Positive	RM 822P-24VDC	1SNA 020 492 R1100	305	
	1 DPDT	screw	16	100mA-4A	300	R20000		Negative	RM 1622N-24VDC	1SNA 020 151 R2200	305		
	1 DPDT	screw	16	100mA-4A	300	R20000		Positive	RM 1622P-24VDC	1SNA 020 493 R1200	305		
	48 VDC	1 NO	screw	1	10mA-6A	6	R600				RB 111A-48-60VAC/DC	1SNA 645 015 R2000	281
		1 NO	spring	1	10mA-6A	6	R600				RBR 111A-48-60VAC/DC	1SNA 645 515 R2200	281
		1 NO	screw	1	10mA-8A	12,7	R20000				RM 111-48VDC	1SNA 020 033 R1700	299
		4 NO	screw	1	0,1µA-5A	18	R1800				RB 114A-48VAC/DC	1SNA 010 127 R1000	289
		1NO+1NC	screw	1	10mA-5A	18	R1800			C, V	RB 131CV-48VDC	1SNA 010 182 R1000	288
		1NO+1NC	screw	1	1µA-5A	18	R1800			V	RB 131CV-48VDC	1SNA 010 152 R2100	288
		1NO+1NC	screw	1	1µA-8A	18	R1800				RB 310-48VDC Bistable	1SNA 010 064 R2400	289
		1 SPDT	screw	1	10mA-6A	6	R600				RB 121A-48-60VAC/DC	1SNA 645 002 R0400	282
		1 SPDT	screw	1	1mA-6A	6	R600				RB 121A-48-60VAC/DC	1SNA 645 006 R0000	283
		1 SPDT	spring	1	10mA-6A	6	R600				RBR 121A-48-60VAC/DC	1SNA 645 502 R0600	282
		1 SPDT	spring	1	1mA-6A	6	R600				RBR 121A-48-60VAC/DC	1SNA 645 506 R0200	283
		1 SPDT	screw	1	10mA-6A	5,08	R500			P	D 2,5/5-R121L-48VAC/DC	1SNA 607 232 R0100	286
		1 SPDT	screw	1	10mA-8A	18	R1800			V	RB 121AV-48VAC/DC	1SNA 610 006 R0100	290
		1 SPDT	screw	1	5mA-3A	18	R1800			C, V	RB 121CV-48VDC orange	1SNA 010 185 R1300	292
		1 SPDT	screw	1	1µA-5A	18	R1800			C, V	RB 121CV-48VDC orange	1SNA 010 155 R2400	292
		1 SPDT	screw	1	1mA-5A	11,5	R900				RB 121A-48VAC/DC	1SNA 630 003 R0200	296
1 SPDT		screw	1	10mA-10A	17,8	R20000				RM 121A-48VAC/DC	1SNA 020 043 R2100	300	
1 SPDT		screw	4	10mA-10A	89	R20000				RM 421A-48VAC/DC	1SNA 020 051 R2100	301	
1 SPDT		screw	8	10mA-10A	165	R20000				RM 821A-48VAC/DC	1SNA 020 067 R2100	301	
1 SPDT		screw	16	10mA-10A	325	R20000				RM 1621A-48VAC/DC	1SNA 020 083 R1200	301	
1 DPDT		screw	1	1mA-8A	12	R600				RB 122A-48-60VAC/DC	1SNA 645 040 R1500	285	
1 DPDT		spring	1	1mA-8A	12	R600				RBR 122A-48-60VAC/DC	1SNA 645 540 R1700	285	
1 DPDT		screw	1	10mA-5A	18	R1800			V	RB 122AV-48VAC/DC	1SNA 610 122 R2100	294	
1 DPDT		screw	1	0,1µA-5A	18	R1800			V	RB 122-48VDC	1SNA 610 060 R1200	294	
1 DPDT		screw	1	10mA-5A	23	R20000				RM 122A-48VAC/DC	1SNA 020 107 R2700	303	
1 DPDT	screw	4	10mA-5A	76	R20000			Negative	RM 422N-48VDC	1SNA 020 145 R2400	304		
1 DPDT	screw	4	10mA-5A	76	R20000			Positive	RM 422P-48VDC	1SNA 020 147 R2600	304		
60 VDC	1 NO	screw	1	10mA-6A	6	R600				RB 111A-48-60VAC/DC	1SNA 645 015 R2000	281	
	1 NO	spring	1	10mA-6A	6	R600				RBR 111A-48-60VAC/DC	1SNA 645 515 R2200	281	
	1 SPDT	screw	1	10mA-4A	6	R600				RB 121A-48-60VAC/DC	1SNA 645 002 R0400	282	

Notes :
P Pluggable relays
R Leakage current protection
I External switch to force the coil
Is Internal switch to force the coil
V Overvoltage protection with varistor
C Static sensor compatible
Negative Coil common in negative
Positive Coil common in positive
TTL TTL compatible

High runners in bold characters
 Marine Certifications : GL, LRS

Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
DC input	60 VDC	1 SPDT	screw	1	1mA-6A	6	R600	(pending) LRS		RB 121A-48-60VAC/DC	1SNA 645 006 R0000	283
		1 SPDT	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 121A-48-60VAC/DC	1SNA 645 502 R0600	282
		1 SPDT	spring	1	1mA-6A	6	R600	(pending) LRS		RBR 121A-48-60VAC/DC	1SNA 645 506 R0200	283
		1 DPDT	screw	1	1mA-8A	12	R600	(pending) LRS		RB 122A-48-60VAC/DC	1SNA 645 040 R1500	285
		1 DPDT	spring	1	1mA-8A	12	R600	(pending) LRS		RBR 122A-48-60VAC/DC	1SNA 645 540 R1700	285
	110-115 VDC	1 NO	screw	1	10mA-6A	6	R600	(pending) LRS		RB 111A-115VAC/DC	1SNA 645 016 R2100	281
		1 NO	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 111A-115VAC/DC	1SNA 645 516 R2300	281
		1 NO	screw	1	10mA-8A	12,7	R20000			RM 111-110VDC	1SNA 020 034 R1000	299
		1 NO	screw	1	10mA-8A	12,7	R20000			RM 111A-110VAC/DC	1SNA 020 323 R2600	299
		1 SPDT	screw	1	10mA-6A	6	R600	(pending) LRS		RB 121A-115VAC/DC	1SNA 645 003 R0500	282
		1 SPDT	screw	1	1mA-6A	6	R600	(pending) LRS		RB 121A-115VAC/DC	1SNA 645 007 R0100	283
		1 SPDT	screw	1	10mA-6A	12	R600	(pending) LRS	R	RB 121AR-115VAC/DC	1SNA 645 046 R0700	284
		1 SPDT	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 121A-115VAC/DC	1SNA 645 503 R0700	282
		1 SPDT	spring	1	1mA-6A	6	R600	(pending) LRS		RBR 121A-115VAC/DC	1SNA 645 507 R0300	283
		1 SPDT	spring	1	10mA-6A	12	R600	(pending) LRS	R	RBR 121AR-115VAC/DC	1SNA 645 546 R0100	284
		1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-230VAC/DC	1SNA 610 132 R2300	290
		1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-135VAC/DC	1SNA 010 226 R2300	291
		1 SPDT	screw	1	10mA-8A	18	R1800		R	RB 121AR1-110VAC/DC	1SNA 010 158 R0700	291
		1 SPDT	screw	1	10mA-8A	18	R1800		R	RB 121AR2-110VAC/DC	1SNA 010 168 R0100	291
		1 SPDT	screw	1	100mA-8A	17,8	R20000			RM 121A-115VAC/DC	1SNA 020 044 R2200	300
		1 SPDT	screw	4	10mA-10A	89	R20000			RM 421A-110VAC/DC	1SNA 020 052 R2200	301
		1 SPDT	screw	8	10mA-10A	165	R20000			RM 821A-110VAC/DC	1SNA 020 068 R0200	301
		1 SPDT	screw	16	10mA-10A	325	R20000			RM 1621A-110VAC/DC	1SNA 020 084 R1300	301
		1 DPDT	screw	1	1mA-8A	12	R600	(pending) LRS		RB 122A-115VAC/DC	1SNA 645 041 R0200	285
		1 DPDT	spring	1	1mA-8A	12	R600	(pending) LRS		RBR 122A-115VAC/DC	1SNA 645 541 R0400	285
		1 DPDT	screw	1	10mA-5A	23	R1800		R	RB 122AR-110VAC/DC	1SNA 610 011 R2600	294
		1 DPDT	screw	1	10mA-5A	23	R20000			RM 122A-115VAC/DC	1SNA 020 141 R2000	303
		1 DPDT	screw	8	100mA-4A	159	R20000			RM 822A-110VAC/DC	1SNA 020 150 R0500	305
		1 DPDT	screw	16	100mA-4A	300	R20000			RM 1622A-110VAC/DC	1SNA 020 152 R2300	305
		135 VDC	1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-135VAC/DC	1SNA 010 226 R2300
	1 DPDT		screw	1	10mA-3A	18	R1800		R	RB 122AR-135VAC/DC	1SNA 010 228 R0500	295
	230 VDC	1 NO	screw	1	10mA-6A	6	R600	(pending) LRS		RB 111A-230VAC/DC	1SNA 645 017 R2200	281
		1 NO	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 111A-230VAC/DC	1SNA 645 517 R2400	281
		1 SPDT	screw	1	10mA-6A	6	R600	(pending) LRS		RB 121A-230VAC/DC	1SNA 645 004 R0400	282
		1 SPDT	screw	1	1mA-6A	6	R600	(pending) LRS		RB 121A-230VAC/DC	1SNA 645 008 R1200	283
		1 SPDT	screw	1	10mA-6A	12	R600	(pending) LRS	R	RB 121AR-230VAC/DC	1SNA 645 011 R2400	284
		1 SPDT	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 121A-230VAC/DC	1SNA 645 504 R0000	282
		1 SPDT	spring	1	1mA-6A	6	R600	(pending) LRS		RBR 121A-230VAC/DC	1SNA 645 508 R1400	283
		1 SPDT	spring	1	10mA-6A	12	R600	(pending) LRS	R	RBR 121AR-230VAC/DC	1SNA 645 511 R2600	284
		1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-230VAC/DC	1SNA 610 132 R2300	290
		1 SPDT	screw	1	100mA-8A	17,8	R20000			RB 121A-230VAC/DC	1SNA 020 045 R2300	300
		1 SPDT	screw	4	10mA-10A	89	R20000			RM 421A-220VAC/DC	1SNA 020 053 R2300	301
1 SPDT		screw	8	10mA-10A	165	R20000			RM 821A-220VAC/DC	1SNA 020 069 R0300	301	
1 SPDT		screw	16	10mA-10A	325	R20000			RM 1621A-220VAC/DC	1SNA 020 085 R1400	301	
1 DPDT		screw	1	1mA-8A	12	R600	(pending) LRS		RB 122A-230VAC/DC	1SNA 645 013 R2600	285	
1 DPDT		spring	1	1mA-8A	12	R600	(pending) LRS		RBR 122A-230VAC/DC	1SNA 645 513 R2000	285	
1 DPDT	screw	1	10mA-5A	23	R1800		V, R	RB 122AV-230VAC/DC	1SNA 610 123 R2200	294		
1 DPDT	screw	1	10mA-5A	23	R20000			RM 122A-230VAC/DC	1SNA 020 142 R2100	303		
60-230 VDC	1 SPDT	screw	1	10mA-6A	12	R600	(pending) LRS		RB 121 A 60-230VAC/DC	1SNA 645 020 R0100	284	
	1 SPDT	spring	1	10mA-6A	12	R600	(pending) LRS		RBR 121 A 60-230VAC/DC	1SNA 645 520 R0300	284	

Notes :

P Pluggable relays
R Leakage current protection

I External switch to force the coil
Is Internal switch to force the coil

V Overvoltage protection with varistor
C Static sensor compatible

Negative Positive TTL Coil common in negative
Coil common in positive
TTL compatible



High runners in bold characters
Marine Certifications :

Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
AC input	24 VAC	1 NC	screw	1	10mA-6A	12	R600	(pending) LRS	R	RB 101AR-24VAC/DC	1SNA 645 019 R0400	281
		1 NC	spring	1	10mA-6A	12	R600	(pending) LRS	R	RBR 101AR-24VAC/DC	1SNA 645 519 R0600	281
		1 NO	screw	1	10mA-6A	6	R600	(pending) LRS	Is	RB 111A-24VAC/DC	1SNA 645 014 R2700	281
		1 NO	screw	1	10mA-6A	6	R600	(pending) LRS		RB 111AI-24VAC/DC	1SNA 645 063 R0000	281
		1 NO	screw	1	10mA-6A	12	R600	(pending) LRS	R	RB 111AR-24VAC/DC	1SNA 645 018 R0300	281
		1 NO	spring	1	10mA-6A	6	R600	(pending) LRS	Is	RBR 111A-24VAC/DC	1SNA 645 514 R2100	281
		1 NO	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 111AI-24VAC/DC	1SNA 645 563 R0200	281
		1 NO	spring	1	10mA-6A	12	R600	(pending) LRS	R	RBR 111AR-24VAC/DC	1SNA 645 518 R0500	281
		4 NO	screw	1	0,1µA-5A	18	R1800			RB 114A-24VAC/DC	1SNA 010 126 R1700	289
		1 SPDT	screw	1	10mA-6A	6	R600	(pending) LRS		RB 121A-24VAC/DC	1SNA 645 001 R0300	282
		1 SPDT	screw	1	1mA-6A	6	R600	(pending) LRS		RB 121A-24VAC/DC	1SNA 645 005 R0700	283
		1 SPDT	screw	1	10mA-6A	5,08	R600		P	D 2,5/5-R121L-24VAC/DC	1SNA 607 231 R0000	286
		1 SPDT	screw	1	10mA-6A	12	R600	(pending) LRS	I	RB 121AI-24VAC/DC	1SNA 645 032 R2100	284
		1 SPDT	screw	1	10mA-6A	12	R600	(pending) LRS	Is	RB 121AI-24VAC/DC	1SNA 645 009 R1300	284
		1 SPDT	screw	1	1mA-6A	12	R600	(pending) LRS	I	RB 121AI-24VAC/DC	1SNA 645 033 R2200	284
		1 SPDT	screw	1	1mA-6A	12	R600	(pending) LRS	Is	RB 121AI-24VAC/DC	1SNA 645 010 R0700	284
		1 SPDT	spring	1	10mA-6A	6	R600	(pending) LRS		RBR 121A-24VAC/DC	1SNA 645 501 R0500	282
		1 SPDT	spring	1	1mA-6A	6	R600	(pending) LRS		RBR 121A-24VAC/DC	1SNA 645 505 R0100	283
		1 SPDT	spring	1	10mA-6A	12	R600	(pending) LRS	I	RBR 121AI-24VAC/DC	1SNA 645 532 R2300	284
		1 SPDT	spring	1	10mA-6A	12	R600	(pending) LRS	Is	RBR 121AI-24VAC/DC	1SNA 645 509 R1500	284
	1 SPDT	spring	1	1mA-6A	12	R600	(pending) LRS	I	RBR 121AI-24VAC/DC	1SNA 645 533 R2400	284	
	1 SPDT	spring	1	1mA-6A	12	R600	(pending) LRS	Is	RBR 121AI-24VAC/DC	1SNA 645 510 R0100	284	
	1 SPDT	screw	1	10mA-8A	18	R1800	(pending) LRS		RB 121A-24VAC/DC	1SNA 610 004 R0700	290	
	1 SPDT	screw	1	1mA-6A	11,5	R900	(pending) LRS		RB 121A-24VAC/DC	1SNA 630 002 R0100	296	
	1 SPDT	screw	1	1mA-6A	11,5	R900	(pending) LRS	I	RB 121AI-24VAC/DC	1SNA 630 007 R0600	297	
	1 SPDT	screw	1	10mA-10A	17,8	R20000	(pending) LRS		RM 121A-24VAC/DC	1SNA 020 042 R2000	300	
	1 SPDT	screw	4	10mA-16A	89	R20000	(pending) LRS		RM 421A-24VAC/DC	1SNA 020 054 R2400	301	
	1 SPDT	screw	8	10mA-16A	165	R20000	(pending) LRS		RM 821A-24VAC/DC	1SNA 020 070 R0000	301	
	1 SPDT	screw	16	10mA-16A	325	R20000	(pending) LRS		RM 1621A-24VAC/DC	1SNA 020 086 R1500	301	
	1 DPDT	screw	1	1mA-8A	12	R600	(pending) LRS		RB 122A-24VAC/DC	1SNA 645 012 R2500	285	
	1 DPDT	spring	1	1mA-8A	12	R600	(pending) LRS		RBR 122A-24VAC/DC	1SNA 645 512 R2700	285	
	1 DPDT	screw	1	10mA-5A	18	R1800	(pending) LRS	V	RBR 122AV-24VAC/DC	1SNA 610 121 R2000	294	
	1 DPDT	screw	1	10µA-3A	11,5	R900			RB 122A-24VAC/DC	1SNA 630 011 R2100	298	
	1 DPDT	screw	1	10mA-5A	23	R20000	(pending) LRS		RM 122A-24VAC/DC	1SNA 020 106 R2600	303	
	48 VAC	1 NO	screw	1	10mA-6A	6	R600	(pending) LRS		RB 111A-48-60VAC/DC	1SNA 645 015 R2000	281
spring			1	10mA-6A	6	R600	(pending) LRS	RBR 111A-48-60VAC/DC		1SNA 645 515 R2200	281	
4 NO		screw	1	0,1µA-5A	18	R1800			RB 114A-48VAC/DC	1SNA 010 127 R1000	289	
1 SPDT		screw	1	10mA-6A	6	R600	(pending) LRS	P	RB 121A-48-60VAC/DC	1SNA 645 002 R0400	282	
1 SPDT		screw	1	1mA-6A	6	R600	(pending) LRS		RB 121A-48-60VAC/DC	1SNA 645 006 R0000	283	
1 SPDT		screw	1	10mA-6A	5,08	R500	(pending)		D 2,5/5-R121L-48VAC/DC	1SNA 607 232 R0100	286	
1 SPDT		spring	1	10mA-6A	6	R600	(pending) LRS		RBR 121A-48-60VAC/DC	1SNA 645 502 R0600	282	
1 SPDT		spring	1	1mA-6A	6	R600	(pending) LRS	V	RBR 121A-48-60VAC/DC	1SNA 645 506 R0200	283	
1 SPDT		screw	1	10mA-8A	18	R1800	(pending) LRS		RB 121AV-48VAC/DC	1SNA 610 006 R0100	290	
1 SPDT		screw	1	1mA-6A	11,5	R900			RB 121A-48VAC/DC	1SNA 630 003 R0200	296	
1 SPDT		screw	1	10mA-10A	17,8	R20000			RM 121A-48VAC/DC	1SNA 020 043 R2100	300	
1 SPDT		screw	4	10mA-10A	89	R20000			RM 421A-48VAC/DC	1SNA 020 051 R2100	301	
1 SPDT		screw	8	10mA-10A	165	R20000			RM 821A-48VAC/DC	1SNA 020 067 R2100	301	
1 SPDT		screw	16	10mA-10A	325	R20000			RM 1621A-48VAC/DC	1SNA 020 083 R1200	301	
1 DPDT		screw	1	1mA-8A	12	R600	(pending) LRS		RB 122A-48-60VAC/DC	1SNA 645 040 R1500	285	

Notes :
P Pluggable relays
R Leakage current protection
I External switch to force the coil
Is Internal switch to force the coil
V Overvoltage protection with varistor
C Static sensor compatible
Negative Positive TTL Coil common in negative
Coil common in positive
TTL compatible
High runners in bold characters
Marine Certifications :

Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
AC input	48 VAC	1 DPDT	spring	1	1mA-8A	12	R600			RBR 122A-48-60VAC/DC	1SNA 645 540 R1700	285
		1 DPDT	screw	1	10mA-5A	18	R1800		V	RB 122AV-48VAC/DC	1SNA 610 122 R2100	294
		1 DPDT	screw	1	10mA-5A	23	R20000			RM 122A-48VAC/DC	1SNA 020 107 R2700	303
	60 VAC	1 NO	screw	1	10mA-6A	6	R600	(pending)		RB 111A-48-60VAC/DC	1SNA 645 015 R2000	281
		1 NO	spring	1	10mA-6A	6	R600	(pending)		RBR 111A-48-60VAC/DC	1SNA 645 515 R2200	281
		1 SPDT	screw	1	10mA-6A	6	R600	(pending)		RB 121A-48-60VAC/DC	1SNA 645 002 R0400	282
		1 SPDT	screw	1	1mA-6A	6	R600	(pending)		RB 121A-48-60VAC/DC	1SNA 645 006 R0000	283
		1 SPDT	spring	1	10mA-6A	6	R600	(pending)		RBR 121A-48-60VAC/DC	1SNA 645 502 R0600	282
		1 SPDT	spring	1	1mA-6A	6	R600	(pending)		RBR 121A-48-60VAC/DC	1SNA 645 506 R0200	283
		1 DPDT	screw	1	1mA-8A	12	R600	(pending)		RB 122A-48-60VAC/DC	1SNA 645 040 R1500	285
		1 DPDT	spring	1	1mA-8A	12	R600	(pending)		RBR 122A-48-60VAC/DC	1SNA 645 540 R1700	285
	110-115 VAC	1 NO	screw	1	10mA-6A	6	R600	(pending)		RB 111A-115VAC/DC	1SNA 645 016 R2100	281
		1 NO	spring	1	10mA-6A	6	R600	(pending)		RBR 111A-115VAC/DC	1SNA 645 516 R2300	281
		1 NO	screw	1	10mA-6A	12,7	R20000			RM 111A-110VAC/DC	1SNA 020 323 R2600	299
		1NO+1NC	screw	1	10mA-5A	18	R1800		C, V, R	RB 131BCVR-110VAC/DC	1SNA 010 183 R1100	288
		1NO+1NC	screw	1	1µA-5A	18	R1800		C, V, R	RB 131BCVR-110VAC	1SNA 010 153 R2200	288
		1 SPDT	screw	1	10mA-6A	6	R600	(pending)		RB 121A-115VAC/DC	1SNA 645 003 R0500	282
		1 SPDT	screw	1	1mA-6A	6	R600	(pending)		RB 121A-115VAC/DC	1SNA 645 007 R0100	283
		1 SPDT	screw	1	10mA-6A	12	R600	(pending)	R	RB 121AR-115VAC/DC	1SNA 645 046 R0700	284
		1 SPDT	screw	1	10mA-6A	5,08	R500	(pending)	P	D 2,5/5-R121L-110VAC	1SNA 607 264 R1100	286
		1 SPDT	spring	1	10mA-6A	6	R600	(pending)		RBR 121A-115VAC/DC	1SNA 645 503 R0700	282
		1 SPDT	spring	1	1mA-6A	6	R600	(pending)		RBR 121A-115VAC/DC	1SNA 645 507 R0300	283
		1 SPDT	spring	1	10mA-6A	12	R600	(pending)	R	RBR 121AR-115VAC/DC	1SNA 645 546 R0100	284
		1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-135VAC/DC	1SNA 010 226 R2300	291
		1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-230VAC/DC	1SNA 610 132 R2300	290
		1 SPDT	screw	1	10mA-8A	18	R1800		R	RB 121AR1-110VAC/DC	1SNA 010 158 R0700	291
		1 SPDT	screw	1	10mA-8A	18	R1800		R	RB 121AR2-110VAC/DC	1SNA 010 168 R0100	291
		1 SPDT	screw	1	5mA-3A	18	R1800		C, V, R	RB 121BCVR-110VAC orange	1SNA 010 186 R1400	292
		1 SPDT	screw	1	1µA-5A	18	R1800		C, V, R	RB 121BCVR-110VAC orange	1SNA 010 156 R2500	292
		1 SPDT	screw	1	1mA-5A	11,5	R900			RB 121A-110VAC 50 Hz	1SNA 630 004 R0300	297
		1 SPDT	screw	1	1mA-5A	11,5	R900			RB 121A-115VAC 60 Hz	1SNA 630 005 R0400	297
	1 SPDT	screw	1	100mA-8A	17,8	R20000			RM 121A-115VAC/DC	1SNA 020 044 R2200	300	
	1 SPDT	screw	4	10mA-10A	89	R20000			RM 421A-110VAC/DC	1SNA 020 052 R2200	301	
	1 SPDT	screw	8	10mA-10A	165	R20000			RM 821A-110VAC/DC	1SNA 020 068 R0200	301	
	1 SPDT	screw	16	10mA-10A	325	R20000			RM 1621A-110VAC/DC	1SNA 020 084 R1300	301	
	1 DPDT	screw	1	1mA-8A	12	R600	(pending)		RB 122A-115VAC/DC	1SNA 645 041 R0200	285	
	1 DPDT	spring	1	1mA-8A	12	R600	(pending)		RBR 122A-115VAC/DC	1SNA 645 541 R0400	285	
	1 DPDT	screw	1	10mA-5A	23	R1800		R	RB 122AR-110VAC/DC	1SNA 610 011 R2500	294	
	1 DPDT	screw	1	10mA-3A	18	R1800		R	RB 122AR-135VAC/DC	1SNA 010 228 R0500	295	
	1 DPDT	screw	1	0,1µA-5A	23	R1800		V, R	RB 122BR-110VAC	1SNA 610 115 R2200	294	
1 DPDT	screw	1	100mA-7A	15	R900		V	RB 122A-110VAC 50 Hz	1SNA 630 021 R2300	298		
1 DPDT	screw	1	100mA-7A	15	R900		V	RB 122A-115VAC 60 Hz	1SNA 630 022 R2400	298		
1 DPDT	screw	1	10mA-5A	23	R20000			RM 122A-115VAC/DC	1SNA 020 141 R2000	303		
1 DPDT	screw	8	100mA-4A	159	R20000			RM 822A-110VAC/DC	1SNA 020 150 R0500	305		
1 DPDT	screw	16	100mA-4A	300	R20000			RM 1622A-110VAC/DC	1SNA 020 152 R2300	305		

Notes :

P Pluggable relays
R Leakage current protection

I External switch to force the coil
Is Internal switch to force the coil

V Overvoltage protection with varistor
C Static sensor compatible

Negative Positive
TTL TTL compatible

High runners in bold characters
Marine Certifications :



Input type	Rated voltage	Contact type	Connection type	Nb of relays	Current in contacts	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
AC input	135 VAC	1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-135VAC/DC	1SNA 010 226 R2300	291
		1 DPDT	screw	1	10mA-3A	18	R1800		R	RB 122AR-135VAC/DC	1SNA 010 228 R0500	295
	230 VAC	1 NO	screw	1	10mA-6A	6	R600	(pending)		RB 111A-230VAC/DC	1SNA 645 017 R2200	281
			spring	1	10mA-6A	6	R600	(pending)		RBR 111A-230VAC/DC	1SNA 645 517 R2400	281
		1 SPDT	screw	1	10mA-6A	6	R600	(pending)		RB 121A-230VAC/DC	1SNA 645 004 R0400	282
		1 SPDT	screw	1	1mA-6A	6	R600	(pending)		RB 121A-230VAC/DC	1SNA 645 008 R1200	283
		1 SPDT	screw	1	10mA-6A	12	R600	(pending)	R	RB 121AR-230VAC/DC	1SNA 645 011 R2400	284
		1 SPDT	screw	1	10mA-6A	5,08	R500	(pending)	P	D 2,5/5-R121L-230VAC/DC	1SNA 607 265 R1200	286
		1 SPDT	spring	1	10mA-6A	6	R600	(pending)		RBR 121A-230VAC/DC	1SNA 645 504 R0000	282
		1 SPDT	spring	1	1mA-6A	6	R600	(pending)		RBR 121A-230VAC/DC	1SNA 645 508 R1400	283
		1 SPDT	spring	1	10mA-6A	12	R600	(pending)	R	RBR 121AR-230VAC/DC	1SNA 645 511 R2600	284
		1 SPDT	screw	1	10mA-8A	18	R1800			RB 121A-110-230VAC/DC	1SNA 610 132 R2300	290
		1 SPDT	screw	1	1mA-5A	11,5	R900			RB 121A-230VAC	1SNA 630 006 R0500	297
		1 SPDT	screw	1	100mA-8A	17,8	R20000			RM 121A-230VAC/DC	1SNA 020 045 R2300	300
		1 SPDT	screw	4	10mA-10A	89	R20000			RM 421A-220VAC/DC	1SNA 020 053 R2300	301
		1 SPDT	screw	8	10mA-10A	165	R20000			RM 821A-220VAC/DC	1SNA 020 069 R0300	301
		1 SPDT	screw	16	10mA-10A	325	R20000			RM 1621A-220VAC/DC	1SNA 020 085 R1400	301
		1 DPDT	screw	1	1mA-8A	12	R600	(pending)		RB 122A-230VAC/DC	1SNA 645 013 R2600	285
		1 DPDT	spring	1	1mA-8A	12	R600	(pending)		RBR 122A-230VAC/DC	1SNA 645 513 R2000	285
		1 DPDT	screw	1	0,1µA-5A	23	R1800			RB 122BR-230VAC	1SNA 610 089 R0400	294
		1 DPDT	screw	1	10mA-5A	23	R1800			RBR 122AV-230VAC/DC	1SNA 610 123 R2200	294
		1 DPDT	screw	1	10mA-5A	23	R20000			RM 122A-230VAC/DC	1SNA 020 142 R2100	303
	60-230 VAC	1 SPDT	screw	1	10mA-6A	12	R600	(pending)		RB 121 A 60-230VAC/DC	1SNA 645 020 R0100	284
			spring	1	10mA-6A	12	R600	(pending)		RBR 121 A 60-230VAC/DC	1SNA 645 520 R0300	284

Notes :

- P Pluggable relays
- R Leakage current protection

- I External switch to force the coil
- Is Internal switch to force the coil

- V Overvoltage protection with varistor
- C Static sensor compatible

- Negative Coil common in negative
- Positive Coil common in positive
- TTL TTL compatible

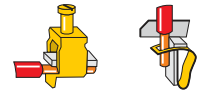
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 Marine Certifications : , LRS



Relays and optocouplers

Relay Interfaces

R600 relay modules



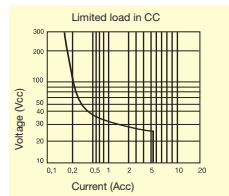
DIN 3

Relay : 1NO or 1NC high level contact 10 mA to 6 A - 6 mm .236" or 12 mm .472" spacing

Characteristics

Relay characteristics	RB 111 A					RB 111 AI	RB 111 AR	RB 101 AR
	24 VAC/DC	48 VAC/DC	60 VAC/DC	115 VAC/DC	230 VAC/DC	24 VAC/DC	24 VAC/DC	24 VAC/DC
COIL								
Rated voltage +20%, -15% on DC ; +10%, -10% on AC								
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	0,24 W	0,34 W	0,54 W	0,46 W	0,8 W	0,24 W	0,24 W	0,24 W
Rated current	10 mA	7 mA	9 mA	4 mA	3,5 mA	10 mA	10 mA	10 mA
Drop-out voltage at 20°C	4,5 V	8 V	8 V	17 V	27 V	4,5 V	4,5 V	4,5 V
Status device	green LED							
CONTACT								
Type	1 NO					1 NO + RC		1 NC + RC
Voltage switching range min./max.	12 V / 250 V AC							
Current switching range min./max.	10 mA / 6 A							
Load switching range	0,6 VA / 1500 VA (ohmic load)							
AC1 min. / max.	0,6 W / 140 W							
DC1 min. / max.								
Number of on-load operations	10 ⁵ on AC15							
Number of off-load operations	10 ⁷							
Operating speed	F 5 ms	5 ms	5 ms	6 ms	7 ms	5 ms	5 ms	5 ms
	O 8 ms	8 ms	8 ms	15 ms	15 ms	8 ms	8 ms	8 ms
Bounce	1,2 ms					1,2 ms		1,2 ms
Insulation coil / contact	4000 V RMS							
Resistance to shock coil / contact	4000 V RMS							
Insulation contact / contact	1000 V RMS							
Ambient temperature	-40°C to +80°C							
operating	-20°C to +70°C (1)							
Other characteristics	Screw clamp				Spring clamp			
Body material	grey				UL 94 V0			
Wire	Solid wire				0,2 - 2,5 mm ² / 24 - 12 AWG			
size	Stranded wire				0,22 - 2,5 mm ² / 24 - 12 AWG			
Rated wire size	2,5 mm ² / 12 AWG				2,5 mm ² / 12 AWG			
Wire stripping length	9 mm .354"				9 mm .354"			
Recommended screwdriver	3,5 mm .137"				3,5 mm .137"			
Protection	IP20 NEMA1				IP20 NEMA1			
Recommended torque	0,4 - 0,6 Nm 3,5 - 5,3 lb.in				0,4 - 0,6 Nm 3,5 - 5,3 lb.in			
Approvals								

(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.



	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

Order codes

Description	Type	Order P/N	Packaging	Weight kg
Relay module 1 NO high level 6 mm spacing	RB 111 A-24VAC/DC	1SNA 645 014 R2700	10	0,02
Relay module 1 NO high level 6 mm spacing	RB 111 A-48-60VAC/DC	1SNA 645 015 R2000	10	0,02
Relay module 1 NO high level 6 mm spacing	RB 111 A-115VAC/DC	1SNA 645 016 R2100	10	0,02
Relay module 1 NO high level 6 mm spacing	RB 111 A-230VAC/DC	1SNA 645 017 R2200	10	0,02
Relay mod. 1 NO high level w/safety switch 6 mm spacing	RB 111 AI-24VAC/DC	1SNA 645 063 R0000	10	0,02
Relay mod. 1 NO high level w/contact protection 12 mm spacing	RB 111 AR-24VAC/DC	1SNA 645 018 R0300	5	0,03
Relay mod. 1 NC high level w/contact protection 12 mm spacing	RB 101 AR-24VAC/DC	1SNA 645 019 R0400	5	0,03
Relay module 1 NO high level 6 mm spacing	RBR 111 A-24VAC/DC	1SNA 645 514 R2100	10	0,02
Relay module 1 NO high level 6 mm spacing	RBR 111 A-48-60VAC/DC	1SNA 645 515 R2200	10	0,02
Relay module 1 NO high level 6 mm spacing	RBR 111 A-115VAC/DC	1SNA 645 516 R2300	10	0,02
Relay module 1 NO high level 6 mm spacing	RBR 111 A-230VAC/DC	1SNA 645 517 R2400	10	0,02
Relay mod. 1 NO high level w/safety switch 6 mm spacing	RBR 111 AI-24VAC/DC	1SNA 645 563 R0200	10	0,02
Relay mod. 1 NO high level w/contact protection 12 mm spacing	RBR 111 AR-24VAC/DC	1SNA 645 518 R0500	5	0,03
Relay mod. 1 NC high level w/contact protection 12 mm spacing	RBR 101 AR-24VAC/DC	1SNA 645 519 R0600	5	0,03

Accessories

End section	BADH V0	1SNA 116 900 R2700	50
	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Separator end section	SC 612	1SNA 290 474 R0200	10
Divisible shunt 10 poles	BJ 612-10	1SNA 290 488 R0100	10
Divisible shunt 70 poles	BJ 612-70	1SNA 290 489 R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA 645 031 R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA 645 531 R2200	5
Test plug DIA. 2 mm	FC2	1SNA 007 865 R2600	10
Marking method	RC65 RC610	see marking	

Screw clamp module

70 2.76"

67,5 2.66"

75 2.95"

center of rail 35 1.38"

Spring clamp module

75 2.95"

67,5 2.66"

75 2.95"

center of rail 37,5 1.48"

RB...111 A - 24 V AC/DC

RB...111 AI

RB...111 AR

RB...101 AR

BADH

BADL

BJ...

SC612

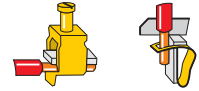
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FC2

Relays and optocouplers

Relay Interfaces

R600 relay modules



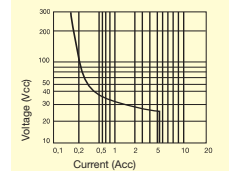
DIN 3

Relay : 1 SPDT high level contact 10 mA to 6 A - 6 mm .236" spacing

Characteristics

Relay characteristics COIL	RB 121			RB 121A				
	5 V DC	12 V DC	24 V DC	24 VAC/DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	230 V AC/DC
Rated voltage +20%, -15% on DC ; +10%, -10% on AC	5 V DC	12 V DC	24 V DC	24 VAC/DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	±10% on AC +10% -15% on DC 230 V AC/DC
Frequency				50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	0,2 W	0,2 W	0,28 W	0,24 W	0,33 W	0,54 W	0,46 W	0,8 W
Rated current	40 mA	16 mA	12 mA	10 mA	7 mA	9 mA	4 mA	3,5 mA
Drop-out voltage at 20°C	1,2 V	2,2 V	1,2 V	4,5 V	8 V	8 V	17 V	27 V
Status device	green LED							
CONTACT								
Type	1 SPDT							
Voltage switching range min./max.	12 V / 250 V AC							
Current switching range min./max.	10 mA / 6 A							
Load switching range	0,6 VA / 1500 VA (ohmic load)							
AC1 min. / max.	0,6 W / 140 W							
DC1 min. / max.								
Number of on-load operations	10 ⁵ on AC15							
Number of off-load operations	10 ⁷							
Operating speed	F 5 ms	5 ms	5 ms	5 ms	5 ms	5 ms	6 ms	7 ms
	O 8 ms	8 ms	8 ms	8 ms	8 ms	8 ms	15 ms	16 ms
Bounce	1,2 ms							
Insulation coil / contact	4000 V RMS							
Resistance to shock coil / contact	4000 V RMS							
Insulation contact / contact	1000 V RMS							
Ambient temperature storage	-40°C to +80°C							
operating	-20°C to +70°C (1)							
Other characteristics								
Body material	grey			Screw clamp			Spring clamp	
Wire	Solid wire			UL 94 V0			UL 94 V0	
size	Stranded wire			0,2 - 4 mm ² / 24 - 12 AWG			0,2 - 2,5 mm ² / 24 - 12 AWG	
Rated wire size				0,22 - 2,5 mm ² / 24 - 12 AWG			0,22 - 2,5 mm ² / 24 - 12 AWG	
Wire stripping length				2,5 mm ² / 12 AWG			2,5 mm ² / 12 AWG	
Recommended screwdriver				9 mm .354"			9 mm .354"	
Protection				3,5 mm .137"			3,5 mm .137"	
Recommended torque				IP20 NEMA1			IP20 NEMA1	
Approvals				0,4 - 0,6 Nm 3.5 - 5.3 lb.in			0,4 - 0,6 Nm 3.5 - 5.3 lb.in	
Reference standards				cULus (pending for 12 V DC), (pending), LRS, CE				

(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.



	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

Order codes

Description	Type	Order P/N	Packaging	Weight
			kg	kg
Relay module 1 SPDT high level	RB 121-5VDC	1SNA 645 034 R2300	10	0,02
Relay module 1 SPDT high level	RB 121-12VDC	1SNA 645 069 R0000	10	0,02
Relay module 1 SPDT high level	RB 121-24VDC	1SNA 645 064 R0100	10	0,02
Relay module 1 SPDT high level	RB 121 A-24VAC/DC	1SNA 645 001 R0300	10	0,02
Relay module 1 SPDT high level	RB 121 A-48-60VAC/DC	1SNA 645 002 R0400	10	0,02
Relay module 1 SPDT high level	RB 121 A-115VAC/DC	1SNA 645 003 R0500	10	0,02
Relay module 1 SPDT high level	RB 121 A-230VAC/DC	1SNA 645 004 R0400	10	0,02
Relay module 1 SPDT high level	RBR 121-5VDC	1SNA 645 534 R2500	10	0,02
Relay module 1 SPDT high level	RBR 121-12VDC	1SNA 645 569 R0000	10	0,02
Relay module 1 SPDT high level	RBR 121-24VDC	1SNA 645 564 R0300	10	0,02
Relay module 1 SPDT high level	RBR 121 A-24VAC/DC	1SNA 645 501 R0500	10	0,02
Relay module 1 SPDT high level	RBR 121 A-48-60VAC/DC	1SNA 645 502 R0600	10	0,02
Relay module 1 SPDT high level	RBR 121 A-115VAC/DC	1SNA 645 503 R0700	10	0,02
Relay module 1 SPDT high level	RBR 121 A-230VAC/DC	1SNA 645 504 R0000	10	0,02

Accessories

End section	BADH V0	1SNA 116 900 R2700	50
	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Separator end section	SC 612	1SNA 290 474 R0200	10
Divisible shunt 10 poles	BJ 612-10	1SNA 290 488 R0100	10
Divisible shunt 70 poles	BJ 612-70	1SNA 290 489 R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA 645 031 R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA 645 531 R2200	5
Test plug DIA. 2 mm	FC2	1SNA 007 865 R2600	10
Marking method	RC65 RC610	see marking	

Screw clamp module

70 2.76"

67,5 2,66"

75 2,95"

center of rail 35 1,38"

Spring clamp module

75 2,95"

67,5 2,66"

75 2,95"

center of rail 37,5 1,48"

RB...121 - 5 V DC

RB...121 - 12-24 V DC

RB...121 A - 24 V AC/DC

RB...121 A 48-60-115-230 V AC/DC

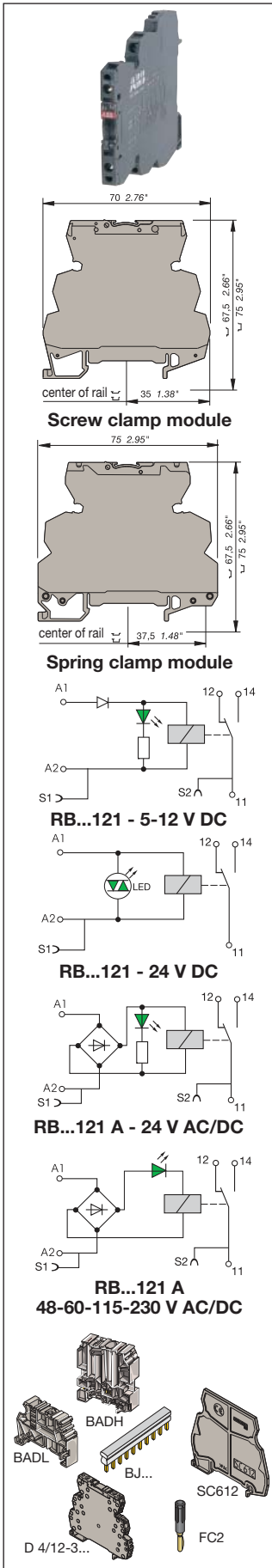
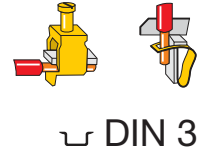
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6

Relays and optocouplers

Relay Interfaces

R600 relay modules

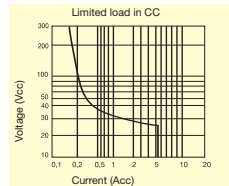


Relay : 1 SPDT low level contact 1 mA upto 6 A - 6 mm .236" spacing

Characteristics

Relay characteristics COIL	RB 121			RB 121 A				
	5 V DC	12 V DC	24 V DC	24 VAC/DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	±10% on AC +10% -15% on DC
Rated voltage +20%, -15% on DC ; +10%, -10% on AC								
Frequency				50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	0,2 W	0,2 W	0,28 W	0,24 W	0,33 W	0,54 W	0,46 W	0,8 W
Rated current	40 mA	16 mA	12 mA	10 mA	7 mA	9 mA	4 mA	3,5 mA
Drop-out voltage at 20°C	1,2 V	2,2 V	1,2 V	4,5 V	8 V	8 V	17 V	27 V
Status device	green LED							
CONTACT								
Type	1 SPDT							
Voltage switching range min./max.	5 V / 250 V AC							
Current switching range min./max.	1 mA / 6 A							
Load switching range	0,05 VA / 1500 VA (ohmic load) 0,05 W / 140 W							
Number of on-load operations	10 ⁵ on AC15							
Number of off-load operations	10 ⁷							
Operating speed	F 5 ms	5 ms	5 ms	5 ms	5 ms	5 ms	6 ms	7 ms
	O 8 ms	8 ms	8 ms	8 ms	8 ms	8 ms	15 ms	16 ms
Bounce	1,2 ms							
Insulation coil / contact	4000 V RMS							
Resistance to shock coil / contact	4000 V RMS							
Insulation contact / contact	1000 V RMS							
Ambient temperature storage	-40°C to +80°C							
operating	-20°C to +70°C (1)							
Other characteristics								
Body material	Screw clamp			Spring clamp				
	UL 94 V0			UL 94 V0				
Wire	Solid wire			0,2 - 2,5 mm ² / 24 - 12 AWG				
size	Stranded wire			0,22 - 2,5 mm ² / 24 - 12 AWG				
Rated wire size	2,5 mm ² / 12 AWG			2,5 mm ² / 12 AWG				
Wire stripping length	9 mm .354"			9 mm .354"				
Recommended screwdriver	3,5 mm .137"			3,5 mm .137"				
Protection	IP20 NEMA1			IP20 NEMA1				
Recommended torque	0,4 - 0,6 Nm 3,5 - 5,3 lb.in			0,4 - 0,6 Nm 3,5 - 5,3 lb.in				
Approvals								

Reference standards CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.



	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

Order codes

Description	Type	Order P/N	Packaging	Weight
Relay module 1 SPDT low level	RB 121-5VDC	1SNA 645 036 R2500	10	0,02
Relay module 1 SPDT low level	RB 121-12VDC	1SNA 645 037 R2600	10	0,02
Relay module 1 SPDT low level	RB 121-24VDC	1SNA 645 065 R0200	10	0,02
Relay module 1 SPDT low level	RB 121 A-24VAC/DC	1SNA 645 005 R0700	10	0,02
Relay module 1 SPDT low level	RB 121 A-48-60VAC/DC	1SNA 645 006 R0000	10	0,02
Relay module 1 SPDT low level	RB 121 A-115VAC/DC	1SNA 645 007 R0100	10	0,02
Relay module 1 SPDT low level	RB 121 A-230VAC/DC	1SNA 645 008 R1200	10	0,02
Relay module 1 SPDT low level	RBR 121-5VDC	1SNA 645 536 R2700	10	0,02
Relay module 1 SPDT low level	RBR 121-12VDC	1SNA 645 537 R2000	10	0,02
Relay module 1 SPDT low level	RBR 121-24VDC	1SNA 645 565 R0400	10	0,02
Relay module 1 SPDT low level	RBR 121 A-24VAC/DC	1SNA 645 505 R0100	10	0,02
Relay module 1 SPDT low level	RBR 121 A-48-60VAC/DC	1SNA 645 506 R0200	10	0,02
Relay module 1 SPDT low level	RBR 121 A-115VAC/DC	1SNA 645 507 R0300	10	0,02
Relay module 1 SPDT low level	RBR 121 A-230VAC/DC	1SNA 645 508 R1400	10	0,02

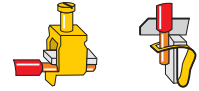
Accessories

End section	BADH V0	1SNA 116 900 R2700	50
	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Separator end section	SC 612	1SNA 290 474 R0200	10
Divisible shunt 10 poles	BJ 612-10	1SNA 290 488 R0100	10
Divisible shunt 70 poles	BJ 612-70	1SNA 290 489 R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA 645 031 R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA 645 531 R2200	5
Test plug DIA. 2 mm	FC2	1SNA 007 865 R2600	10
Marking method	RC65 RC610	see marking	

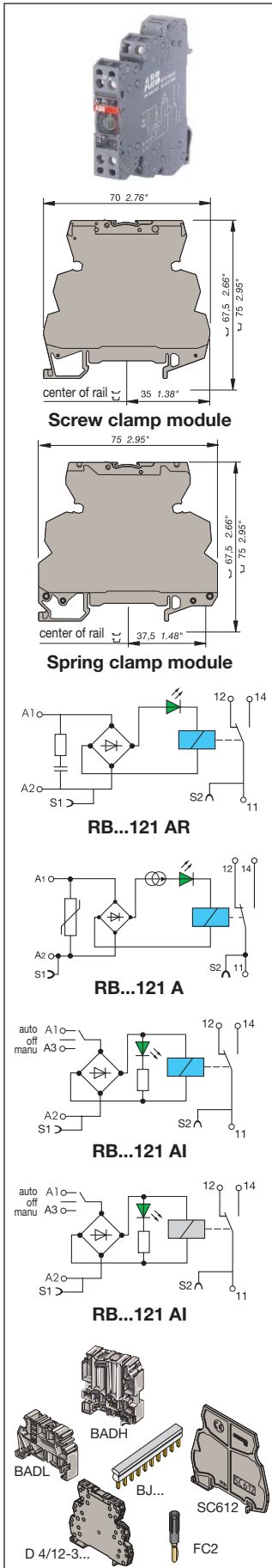
Relays and optocouplers

Relay Interfaces

R600 relay modules



DIN 3

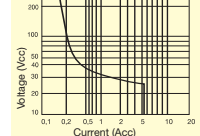


- Relay : 1 SPDT high level with switch or large coil voltage range or with leakage current protection - 12 mm .472" spacing
- Relay : 1 SPDT low level with switch - 12 mm .472" spacing

Characteristics

Relay characteristics	RB...121 AR		RB...121 AI		RB...121 AI		RB...121 A
COIL							
Rated voltage +20%, -15% on DC ; +10%, -10% on AC	115 V AC/DC	±10% on AC +10% -15% on DC 230 V AC/DC	24 VAC/DC	24 VAC/DC	24 VAC/DC	24 VAC/DC	60 to 253 VAC/DC
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	2 W	2,8 W	0,24 W	0,24 W	0,24 W	0,24 W	1 W
Rated current	18 mA	12 mA	10 mA	10 mA	10 mA	10 mA	4 mA max.
Drop-out voltage at 20°C	17 V	27 V	4,5 V	4,5 V	4,5 V	4,5 V	15 V
Permissible leakage current	1,6 mA	1 mA					
Status device	green LED		green LED		green LED		green LED
CONTACT							
Type	1 SPDT		1 SPDT		1 SPDT		1 SPDT
Voltage switching range min./max.	12 V / 250 V		12 V / 250 V		12 V / 250 V		12 V / 250 V
Current switching range min./max.	10 mA / 6 A		10 mA / 6 A		10 mA / 6 A		10 mA / 6 A
Load switching range	AC1 min. / max. DC1 min. / max.		0,6 VA / 1500 VA (ohmic load) 0,6 W / 140 W		0,05 VA/1500 VA (ohmic load) 0,05 W / 140 W		0,6 VA/1500 VA (ohmic load) 0,6 W / 140 W
Number of on-load operations	10 ⁵ on AC15		10 ⁵ on AC15		10 ⁵ on AC15		10 ⁵ on AC15
Number of off-load operations	10 ⁷		10 ⁷		10 ⁷		10 ⁷
Operating speed	F 6 ms O 15 ms	7 ms 16 ms	5 ms 8 ms	5 ms 8 ms	5 ms 8 ms	5 ms 8 ms	7 ms 20 ms
Bounce							
Insulation coil / contact	4000 V RMS						
Resistance to shock coil / contact	4000 V RMS						
Insulation contact / contact	1000 V RMS						
Ambient temperature storage	-40°C to +80°C						
operating	-20°C to +70°C (1)						
Other characteristics	Screw clamp		Screw clamp				Spring clamp
Body material	grey		UL 94 V0				UL 94 V0
Wire	Solid wire		0,2 - 4 mm ² / 24 - 12 AWG		0,2 - 2,5 mm ² / 24 - 12 AWG		0,2 - 2,5 mm ² / 24 - 12 AWG
size	Stranded wire		0,22 - 2,5 mm ² / 24 - 12 AWG		0,22 - 2,5 mm ² / 24 - 12 AWG		0,22 - 2,5 mm ² / 24 - 12 AWG
Rated wire size			2,5 mm ² / 12 AWG		2,5 mm ² / 12 AWG		2,5 mm ² / 12 AWG
Wire stripping length			9 mm .354"		9 mm .354"		9 mm .354"
Recommended screwdriver			3,5 mm .137"		3,5 mm .137"		3,5 mm .137"
Protection			IP20 NEMA1		IP20 NEMA1		IP20 NEMA1
Recommended torque			0,4 - 0,6 Nm 3.5 - 5.3 lb.in		0,4 - 0,6 Nm 3.5 - 5.3 lb.in		0,4 - 0,6 Nm 3.5 - 5.3 lb.in
Approvals							

Reference standards CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.



(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.

	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

Order codes

Description	Type	Order P/N	Packaging	Weight kg
■ Relay mod. 1SPDT high level w/leakage current protec.		RB 121 AR-115VAC/DC	1 SNA 645 046 R0700	5 0,03
■ Relay mod. 1SPDT high level w/leakage current protec.		RB 121 AR-230VAC/DC	1 SNA 645 011 R2400	5 0,03
■ Relay mod. 1SPDT high level w/large coil voltage range		RB 121 A 60-230VAC/DC	1 SNA 645 020 R0100	5 0,03
■ Relay mod. 1SPDT high level with switch		RB 121 AI-24VAC/DC	1 SNA 645 032 R2100	5 0,03
■ Relay mod. 1SPDT high level with safety switch		RB 121 AI-24VAC/DC	1 SNA 645 009 R1300	5 0,03
■ Relay module 1SPDT low level with switch		RB 121 AI-24VAC/DC	1 SNA 645 033 R2200	5 0,03
■ Relay module 1SPDT low level with safety switch		RB 121 AI-24VAC/DC	1 SNA 645 010 R0700	5 0,03
■ Relay mod. 1SPDT high level w/leakage current protec.		RBR 121 AR-115VAC/DC	1 SNA 645 546 R0100	5 0,03
■ Relay mod. 1SPDT high level w/leakage current protec.		RBR 121 AR-230VAC/DC	1 SNA 645 511 R2600	5 0,03
■ Relay mod. 1SPDT high level w/large coil voltage range		RBR 121 A 60-230VAC/DC	1 SNA 645 520 R0300	5 0,03
■ Relay mod. 1SPDT high level with switch		RBR 121 AI-24VAC/DC	1 SNA 645 532 R2300	5 0,03
■ Relay mod. 1SPDT high level with safety switch		RBR 121 AI-24VAC/DC	1 SNA 645 509 R1500	5 0,03
■ Relay module 1SPDT low level with switch		RBR 121 AI-24VAC/DC	1 SNA 645 533 R2400	5 0,03
■ Relay module 1SPDT low level with safety switch		RBR 121 AI-24VAC/DC	1 SNA 645 510 R0100	5 0,03

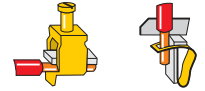
Accessories

End section	BADH V0	1 SNA 116 900 R2700	50
	BADL V0	1 SNA 399 903 R0200	50
	BAM2 V0	1 SNA 399 967 R0100	50
Separator end section	SC 612	1 SNA 290 474 R0200	10
Divisible shunt 10 poles	BJ 612-10	1 SNA 290 488 R0100	10
Divisible shunt 70 poles	BJ 612-70	1 SNA 290 489 R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1 SNA 645 031 R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1 SNA 645 531 R2200	5
Test plug DIA. 2 mm	FC2	1 SNA 007 865 R2600	10
Marking method	RC65 RC610	see marking	

Relays and optocouplers

Relay Interfaces

R600 relay modules



DIN 3

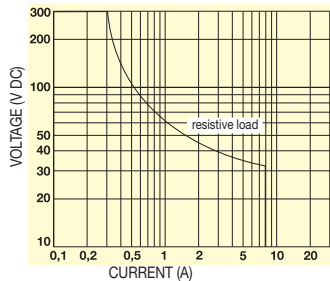
Relay : 1 DPDT low level contact 1 mA to 8 A - 12 mm .472" spacing

Characteristics

Relay characteristics	RB...122A				
COIL					
Rated voltage +20%, -15% on DC ; +10%, -10% on AC	24 VAC/DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	±10% on AC +10% -15% on DC 230 V AC/DC
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	0,48 W	0,62 W	0,96 W	0,58 W	1,15 W
Rated current	20 mA	13 mA	16 mA	5 mA	5 mA
Drop-out voltage at 20°C	5,4 V	8,8 V	8,8 V	20 V	10 V
Status device	green LED				
CONTACT					
Type	1 DPDT				
Voltage switching range min./max.	5 V / 250 V DC - 250 V AC				
Current switching range min./max.	1 mA / 8 A		1 mA / 5 A		
Load switching range					
AC1 min. / max.	5 mVA / 1500 VA				
DC1 min. / max.	5 mW / 192 W				
Number of on-load operations	10 ⁶				
Number of off-load operations	2 x 10 ⁷				
Operating speed	F 6 ms	10 ms	10 ms	6 ms	6 ms
	O 10 ms	14 ms	14 ms	15 ms	15 ms
Bounce	1 ms				
Insulation coil / contact	3500 V RMS				
Resistance to shock coil / contact	3500 V RMS				
Insulation contact / contact	3500 V RMS (between 2 contacts)				
Ambient temperature storage	-40°C to +80°C				
operating	-20°C to +70°C (1)				
Other characteristics	Screw clamp		Spring clamp		
Body material	grey		grey		
Wire	Solid wire		Solid wire		
size	Stranded wire		Stranded wire		
Rated wire size	2,5 mm ² / 12 AWG		2,5 mm ² / 12 AWG		
Wire stripping length	9 mm .354"		9 mm .354"		
Recommended screwdriver	3,5 mm .137"		3,5 mm .137"		
Protection	IP20 NEMA1		IP20 NEMA1		
Recommended torque	0,4 - 0,6 Nm 3.5 - 5.3 lb.in		0,4 - 0,6 Nm 3.5 - 5.3 lb.in		
Approvals					
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.				

(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.

Max. DC load breaking capacity

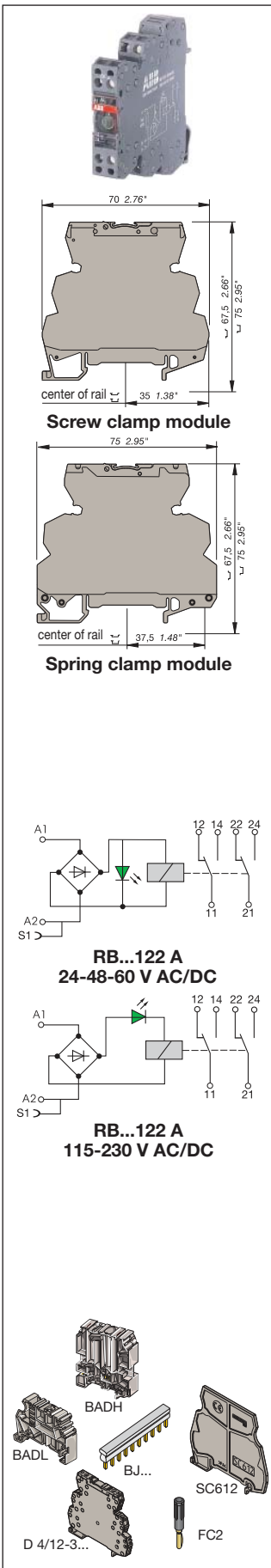


Order codes

Description	Type	Order P/N	Packaging	Weight
Relay module 1 DPDT low level	RB 122 A-24VAC/DC	1SNA 645 012 R2500	5	0,03 kg
Relay module 1 DPDT low level	RB 122 A-48-60VAC/DC	1SNA 645 040 R1500	5	0,03 kg
Relay module 1 DPDT low level	RB 122 A-115VAC/DC	1SNA 645 041 R0200	5	0,03 kg
Relay module 1 DPDT low level	RB 122 A-230VAC/DC	1SNA 645 013 R2600	5	0,03 kg
Relay module 1 DPDT low level	RBR 122 A-24VAC/DC	1SNA 645 512 R2700	5	0,03 kg
Relay module 1 DPDT low level	RBR 122 A-48-60VAC/DC	1SNA 645 540 R1700	5	0,03 kg
Relay module 1 DPDT low level	RBR 122 A-115VAC/DC	1SNA 645 541 R0400	5	0,03 kg
Relay module 1 DPDT low level	RBR 122 A-230VAC/DC	1SNA 645 513 R2000	5	0,03 kg

Accessories

End section	BADH V0	1SNA 116 900 R2700	50
	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Separator end section	SC 612	1SNA 290 474 R0200	10
Divisible shunt 10 poles	BJ 612-10	1SNA 290 488 R0100	10
Divisible shunt 70 poles	BJ 612-70	1SNA 290 489 R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA 645 031 R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA 645 531 R2200	5
Test plug DIA. 2 mm	FC2	1SNA 007 865 R2600	10
Marking method	RC65 RC610	see marking	



Relays and optocouplers

Relay Interfaces

R500 pluggable relay modules



DIN 3

Pluggable relay : 1 SPDT high level contact 10 mA to 6 A - 5.08 mm .200" spacing

Characteristics

Relay characteristics	D 2,5/5-R121		D 2,5/5-R121L		D 2,5/5-R121AL			D 2,5/5-R121BL	
COIL									
Rated voltage $+20\%$, -15% DC, $\pm 15\%$ AC	24 V DC	24 V DC	24 V AC	24 V DC	48 V AC	48 V DC	110 V AC	230 V AC	
Frequency			50 / 60 Hz		50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Power	0.17 W	0.3 W	0.35 VA	0.35 W	0.44 VA	0.47 W	1.08 VA	2.13 VA	
Rated current	7 mA	12 mA	12.4 mA	10 mA	7.6 mA	6.8 mA	8.4 mA	8 mA	
Drop-out voltage at 20°C	2.4 V	2.4 V	4.8 V	4.8 V	10 V	10 V	25 V	45 V	
Status device	green LED								

CONTACT

Type	1 SPDT								
Voltage switching range min./max.	12 V / 250 V AC								
Current switching range min./max.	10 mA / 6 A								
Load switching range									
AC1 min. / max.	0.6 VA / 1500 VA (ohmic load)								
DC1 min. / DC13 max.	0.6 W / 140 W								
Number of on-load operations	10^5 in AC15								
Number of off-load operations	10×10^5								
Pull-in time (delay time)	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms	
Drop-out time (delay time)	8 ms	8 ms	15 ms	15 ms	15 ms	15 ms	15 ms	15 ms	
Bounce time	1.5 ms								
Insulation coil / contacts	4000 V RMS								
Breakdown voltage coil / contacts	4000 V RMS								
Insulation contacts/contacts	1000 V RMS								
Storage ambient temperature	- 40°C to + 80°C								
Operating ambient temperature	See derating curves								

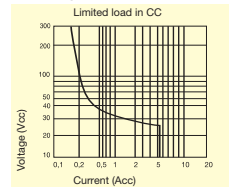
Other characteristics

Body material	grey	UL 94 V0
Wire	Solid wire	0.2-4 mm ² / 24-12 AWG
size	Stranded wire	0.22-2.5 mm ² / 24-12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		10 mm .394"
Recommended screwdriver		3.5 mm .137"
Protection		IP 20 NEMA 1
Recommended torque		0.4-0.6 Nm 3.5-5.3 lb.in
Approvals		

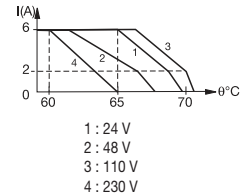
Reference standards

CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Derating curves



	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A



D 2,5/5-R121

D 2,5/5-R121...L

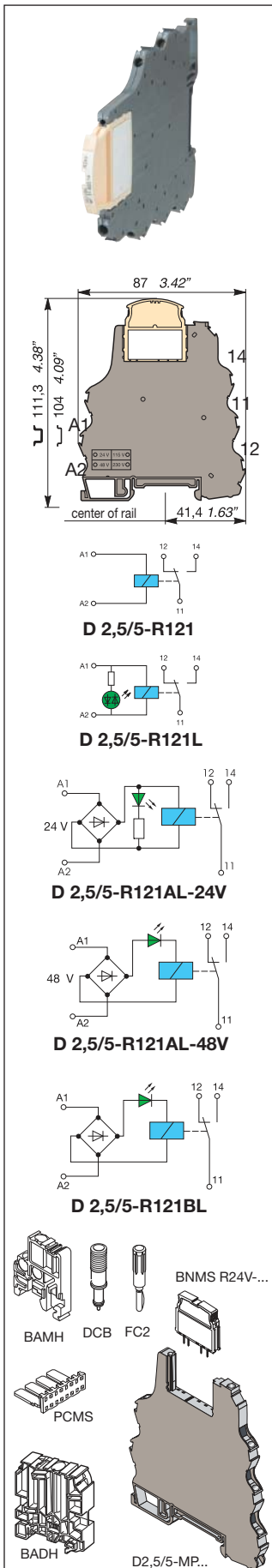
Order codes

Description	Type	Order P/N	Packaging	Weight kg
Relay module 1 SPDT high level	D 2,5/5-R121-24VDC	1SNA 607 217 R0200	10	0.032
Relay module with LED 1 SPDT high level	D 2,5/5-R121L-24VDC	1SNA 607 201 R1300	10	0.032
Relay module with LED 1 SPDT high level	D 2,5/5-R121AL-24VAC/DC	1SNA 607 231 R0000	10	0.04
Relay module with LED 1 SPDT high level	D 2,5/5-R121AL-48VAC/DC	1SNA 607 232 R0100	10	0.04
Relay module with LED 1 SPDT high level	D 2,5/5-R121BL-110VAC	1SNA 607 264 R1100	10	0.04
Relay module with LED 1 SPDT high level	D 2,5/5-R121BL-230VAC	1SNA 607 265 R1200	10	0.04

Accessories

High end stop	BAMH 9,1 mm	1SNA 114 836 R0000	50	
	BAMH V0 9,1 mm	1SNA 194 836 R0100	50	
	BADH 12 mm	1SNA 116 900 R2700	50	
Comb type jumper bar 2 to 22 poles Jumper bar 10 poles grey		consult us		
	PCMS V0	1SNA 205 523 R2200	8	
Relay / Opto base	D 2,5/5-MP	1SNA 607 224 R0100	10	0.028
Relay / Opto base with LED 24 VDC	D 2,5/5-MP-24VDC	1SNA 607 222 R0700	10	0.028
Relay / Opto base with LED 24 VAC/DC	D 2,5/5-MP-24VAC/DC	1SNA 607 260 R2100	10	0.036
Relay / Opto base with LED 48 VAC/DC	D 2,5/5-MP-48VAC/DC	1SNA 607 261 R1600	10	0.036
Relay / Opto base with LED 110 VAC	D 2,5/5-MP-110VAC	1SNA 607 266 R1300	10	0.036
Relay / Opto base with LED 230 VAC	D 2,5/5-MP-230VAC	1SNA 607 267 R1400	10	0.036
Plug relay 24 V 1 SPDT 10 mA to 6 A	BNMS R24V-1	1SNA 031 820 R1400	4	
Plug relay 24 V 1 SPDT 1 mA to 6 A	BNMS R24V-2	1SNA 031 847 R1300	4	
Test device	blue DCB (1)	1SNA 105 028 R2100	10	
Test plug	DIA. 2 mm FC2	1SNA 007 865 R2600	10	
Marking method	RC55	see marking		

(1) Only on top decks.



Relays and optocouplers

Relay Interfaces

R910 relay modules



DIN 1-3

Relay : 1 NO high level contacts 10 mA to 5 A - 9 mm .354" spacing

Characteristics

Relay characteristics	M 4/9.R111		M 4/9.R111L		M 4/9.R111L	
COIL						
Rated voltage +20%, -20% on DC	12 V	24 V	12 V	24 V	12 V	24 V
Frequency						
Power	0.3 W	0.3 W	0.6 W	0.8 W	0.25 W	0.31 W
Rated current	24 mA	14 mA	52 mA	33 mA	21 mA	13 mA
Drop-out voltage at 20°C	1.2 V DC	2.4 V DC	1.2 V	2.4 V	1.2 V	2.4 V
Allowable leakage current	2 mA	1 mA	4 mA	3 mA	1.5 mA	0.7 mA
Status device			lamp		green LED	

CONTACT

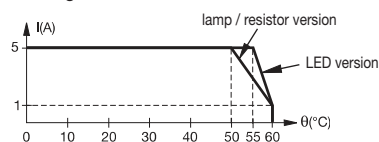
Type	1 NO					
Voltage switching range min./max.	12 V / 150 V DC - 250 V AC					
Current switching range	10 mA / 5 A					
Load switching range						
AC1 min. / max.	0.6 VA / 1250 VA					
DC1 min. / max.	0.6 W / 150 W					
Number of on-load operations	1 x 10 ⁶					
Number of off-load operations	2 x 10 ⁷					
Pull-in time (delay time)	5 ms					
Drop-out time (delay time)	6 ms		7 ms		6 ms	
Bounce time	4 ms					
Insulation coil / contacts	3000 V RMS				2500 V RMS	
Breakdown voltage with 1.2/50µ wave	4000 V RMS					
Insulation contacts/contacts	750 V RMS					
Storage ambient temperature	-40°C to +80°C					
Operating ambient temperature	See derating curve hereunder					

Other characteristics

Body material	grey	UL 94 V0
Wire	Solid wire	0.2-4 mm ² / 22-12 AWG
size	Stranded wire	0.22-2.5 mm ² / 22-12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		9 mm .354"
Recommended screwdriver		3.5 mm .137"
Protection		IP 20 NEMA 1
Recommended torque		0.4-0.6 Nm 3.5-5.3 lb.in
Approvals		

Reference standards CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Derating curve



M 4/9.R111...

Order codes

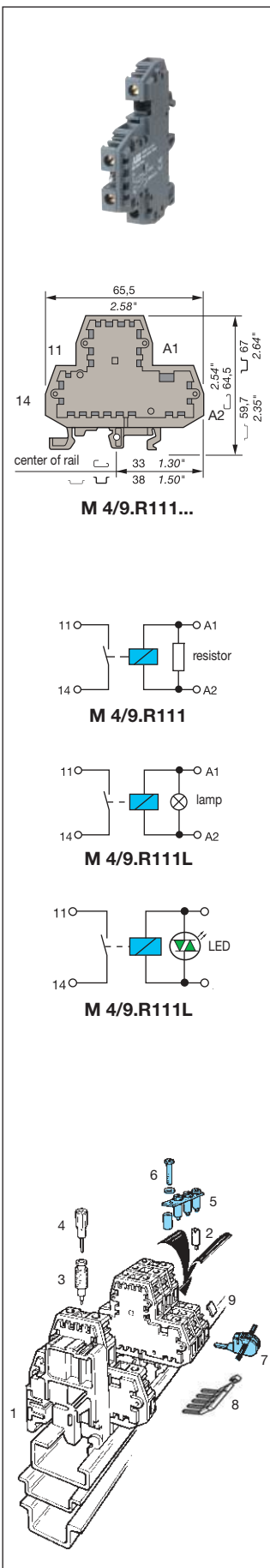
Description	Type	Order P/N	Packaging	Weight kg
Relay module 1 NO high level	M 4/9.R111-12VDC	1SNA 607 029 R0100	10	0.02
Relay module 1 NO high level	M 4/9.R111-24VDC	1SNA 607 030 R0600	10	0.02
Relay module with lamp 1NO high level protected against leakage current	M 4/9.R111L-12VDC	1SNA 607 001 R0600	10	0.02
Relay module with lamp 1NO high level protected against leakage current	M 4/9.R111L-24VDC	1SNA 607 002 R0700	10	0.02
Relay module with LED 1 NO high level	M 4/9.R111L-12VDC	1SNA 607 051 R0700	10	0.02
Relay module with LED 1 NO high level	M 4/9.R111L-24VDC	1SNA 607 052 R0000	10	0.02

Accessories

1 High end stop (all rails)	BAMH	9,1 mm	1SNA 114 836 R0000	50
2 Test socket	DIA. 2 mm	AL2 (1)	1SNA 163 070 R0000	50
	DIA. 3 mm	AL3 (1)	1SNA 163 261 R0000	50
3 Test device	grey	□ DCG	1SNA 163 218 R0500	10
4 Test plug		FC2	1SNA 007 865 R2600	10
5 Jumper bar	8 poles	BJS9 (1)(2)	1SNA 177 583 R1200	25
	not assembled 16 poles	BJS9 (1)(2)	1SNA 177 584 R1300	25
6 Sub-assembly for jumper bar		EV6D (1)(2)	1SNA 168 400 R1600	20
	(screw + jumper + post)			
7 IDC jumper		AD2,5	1SNA 114 205 R2000	50
8 Comb type jumper bar		PC9	1SNA 210 160 R1200	10
9 Marking method		RC65 and RC610	see marking	

(1) These accessories can be used on the lower connection only.

(2) Use of these accessories requires the user to cut out the precut partition.



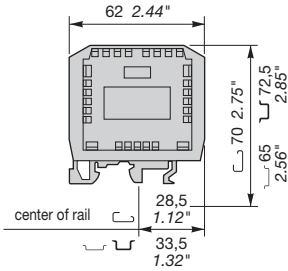
Relays and optocouplers

Relay Interfaces

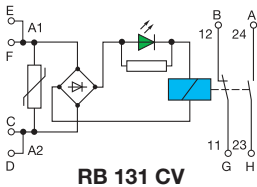
R1800 relay modules



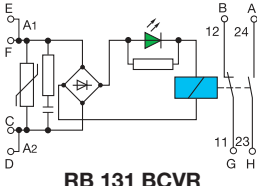
DIN 1-3



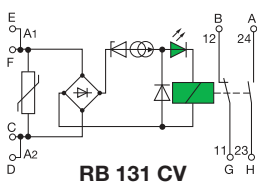
Relay blocks R1800



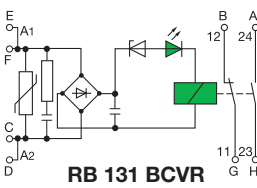
RB 131 CV



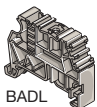
RB 131 BCVR



RB 131 CV



RB 131 BCVR



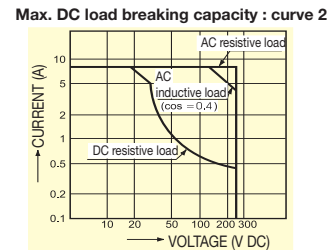
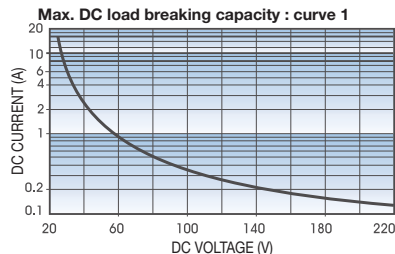
- Relay : 1 NO and 1 NC high level contacts 10 mA up to 5 A - 18 mm .709" spacing
- Relay : 1 NO and 1 NC very low level contacts 10⁻⁶ mA up to 5 A - 18 mm .709" spacing

Characteristics

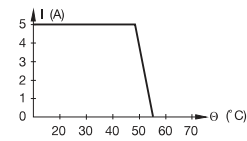
Relay characteristics	RB 131 CV		RB 131 BCVR		RB 131 CV		RB 131 BCVR	
	COIL		CONTACT		COIL		CONTACT	
Rated voltage +20%, -15% on DC +10%, -15% on AC	24 V DC	48 V DC	110 V AC	24 V DC	48 V DC	110 V AC	24 V DC	48 V DC
Frequency	50/60 Hz		50/60 Hz		50/60 Hz		50/60 Hz	
Power	0.6 W	0.7 W	1.9 VA	0.8 W	1.2 W	4.4 VA	0.8 W	1.2 W
Rated current	25 mA	14 mA	17 mA	34 mA	24 mA	40 mA	34 mA	24 mA
Drop-out voltage at 20°C	2.4 V DC	4.8 V DC	11 V AC	5 V DC	12 V DC	20 V AC	5 V DC	12 V DC
Permissible leakage current	1 mA	2 mA	2 mA	1 mA	2.2 mA		1 mA	2.2 mA
Status device	green Led				green Led			
Type	1 NO + 1 NC				1 NO + 1 NC			
Voltage switching range min./max.	12 V / 250 V				10 ³ V / 250 V			
Current switching range min./max.	10 mA / 5 A				10 ⁻⁶ mA / 5 A			
Load switching range	AC1 min. / max. DC1 min. / max.				10 ⁻⁶ VA / 1250 VA			
Number of on-load operations	2 x 10 ⁵ resistive				2 x 10 ⁵ resistive			
Number of off-load operations	2 x 10 ⁷				10 ⁷			
Operating speed	7 ms				8 ms			
Bounce	10 ms				4 ms			
Insulation coil / contact	4 ms				1 ms			
Resistance to shock coil / contact	2500 V RMS							
Insulation contact / contact	≥ 1000 V RMS							
Ambient temperature storage	-40°C à +80°C							
operating	see derating curves							

Other characteristics

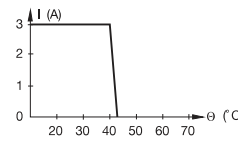
Body material	grey	UL 94 V2
Wire	Solid wire	0 - 4 mm ² / 20 - 12 AWG
size	Stranded wire	0 - 2.5 mm ² / 20 - 12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		7 mm .276"
Recommended screwdriver		3.5 mm .137"
Protection		IP20 NEMA1
Recommended torque		0.4 - 0.6 Nm 3.5 - 5.3 lb.in
Approvals		CE
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6	



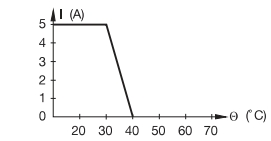
Derating curves



RB 131 CV
RB 131 BCVR



RB 131 CV
Very low level



RB 131 BCVR
Very low level

Order codes

Description	Type	Order P/N	Packaging Weight kg
Relay module 1 NO + 1 NC high level	RB 131 CV 24 V DC	1SNA 010 181 R1700	1
Relay module 1 NO + 1 NC high level	RB 131 CV 48 V DC	1SNA 010 182 R1000	1
Relay module 1 NO + 1 NC high level	RB 131 BCVR 110 V AC	1SNA 010 183 R1100	1
Relay module 1 NO + 1 NC very low level	RB 131 CV 24 V DC	1SNA 010 151 R2000	1
Relay module 1 NO + 1 NC very low level	RB 131 CV 48 V DC	1SNA 010 152 R2100	1
Relay module 1 NO + 1 NC very low level	RB 131 BCVR 110 V AC	1SNA 010 153 R2200	1

Accessories

End section	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	

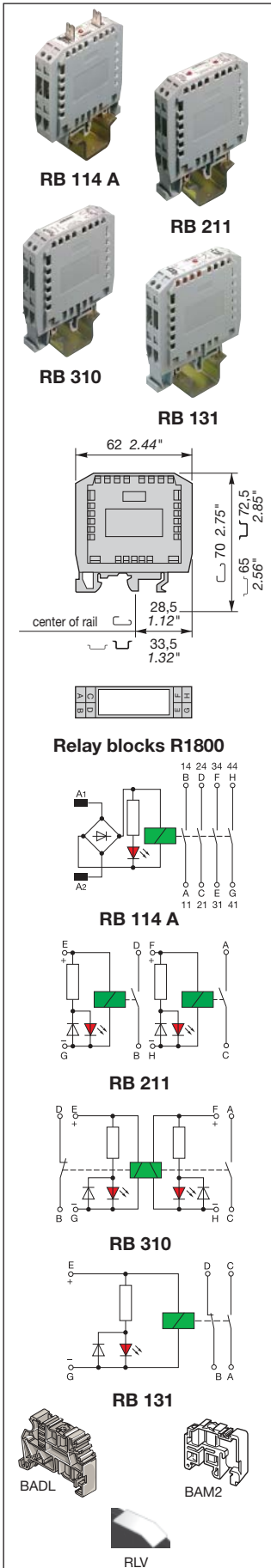
Relays and optocouplers

Relay Interfaces

R1800 relay modules



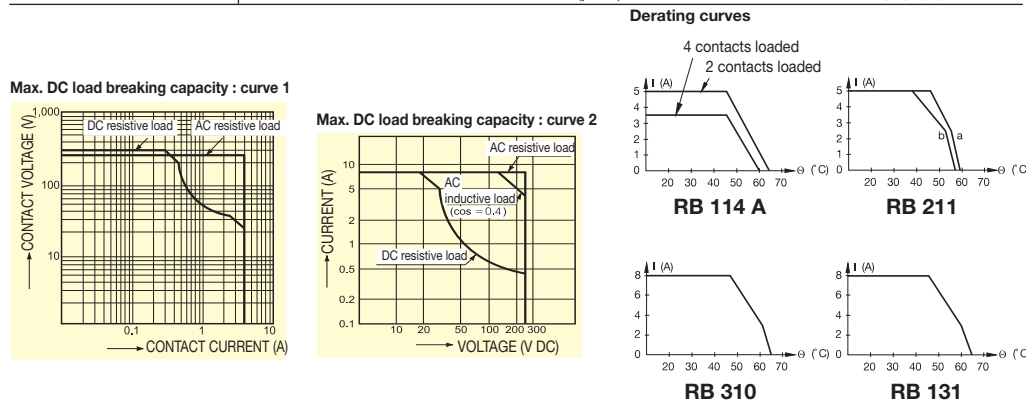
DIN 1-3



- Relay : 4 NO very low level contacts 10⁻⁷ A to 4 A - 18 mm .709" spacing
- 2 relays : 1 NO very low level contacts 10⁻⁶ A to 5 A - 18 mm .709" spacing
- Latching relay : very low level contacts 10⁻⁶ A to 8 A - 18 mm .709" spacing
- Relay : 1 NO and 1 NC very low level contacts 10⁻⁶ A to 8 A - 18 mm .709" spacing

Characteristics

Relay characteristics	RB 114 A	RB 211	RB 310	RB 131
COIL				
Rated voltage +20%, -15% on DC +10%, -15% on AC	24 V AC/DC	48 V AC/DC	24 V DC	24 V DC
Frequency	50/60 Hz	50/60 Hz		
Power	0.6 W / 0.7 VA	0.8 W / 0.9 VA	2 x 0.36 W	0.36 W
Rated current	26 mA	17 mA	15 mA	15 mA
Drop-out voltage at 20°C	2.7 V AC/DC	4 V AC/DC	2.4 V DC	
Permissible leakage current				2.4 V DC
Status device	Red Led	Red Led	Red Led	
CONTACT				
Type	4 NO	1 NO + 1 NO	1 NO + 1NC	
Voltage switching range min./max.	10 ⁻³ V / 250 V	10 ⁻³ V / 250 V	10 ⁻³ V / 250 V	
Current switching range min./max.	10 ⁻⁷ A / 4 A	10 ⁻⁶ A / 5 A	10 ⁻⁶ A / 8 A	
Load switching range				
AC1 min. / max.	10 ⁻¹⁰ VA / 1000 VA	10 ⁻⁶ VA / 1250 VA	10 ⁻⁶ VA / 2000 VA	
DC1 min. / max.	10 ⁻¹⁰ W / see curve 1 hereunder	10 ⁻⁶ W / see curve 2	10 ⁻⁶ W / see curve 2 hereunder	
Number of on-load operations	2 x 10 ⁵ resistive	2 x 10 ⁵ resistive	2 x 10 ⁵ resistive	
Number of off-load operations	10 ⁸	10 ⁷	10 ⁷	
Operating speed	F 8 ms O 3 ms	8 ms 4 ms	8 ms 4 ms	
Bounce	0.5 ms	1 ms	1 ms	
Insulation coil / contact	1500 V RMS	2500 V RMS	2500 V RMS	
Resistance to shock coil / contact				
Insulation contact / contact	750 V RMS	1500 V RMS	1500 V RMS	
Ambient temperature storage operating		-40°C to +80°C see derating curves		
Other characteristics				
Body material	grey		UL 94 V2	
Wire	Solid wire	0 - 4 mm ² / 20 - 12 AWG		
size	Stranded wire	0 - 2.5 mm ² / 20 - 12 AWG		
Rated wire size		2.5 mm ² / 12 AWG		
Wire stripping length		7 mm .276"		
Recommended screwdriver		3.5 mm .137"		
Protection		IP20 NEMA1		
Recommended torque		0.4 - 0.6 Nm 3.5 - 5.3 lb.in		
Approvals	CE	CE	CE	CE
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6			



Order codes

Description	Type	Order P/N	Packaging Weight kg
Relay module 4 NO very low level	RB 114 A	24 V AC/DC 1SNA 010 126 R1700	1
Relay module 4 NO very low level	RB 114 A	48 V AC/DC 1SNA 010 127 R1000	1
2 relay module 1 NO very low level	RB 211	24 V DC 1SNA 010 014 R1200	1
Latching relay module very low level	RB 310	24 V DC 1SNA 010 063 R2300	1
Latching relay module very low level	RB 310	48 V DC 1SNA 010 064 R2400	1
Relay module 1 NO + 1 NC very low level	RB 131	24 V DC 1SNA 010 055 R2300	1

Accessories

End section	Accessories	Order P/N	Weight kg
BADL V0		1SNA 399 903 R0200	50
BAM2 V0		1SNA 399 967 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	

Relays and optocouplers

Relay Interfaces

R1800 relay modules



DIN 1-3

Relay : 1 SPDT high level contacts 10 mA to 8 A - 18 mm .709" spacing

Characteristics

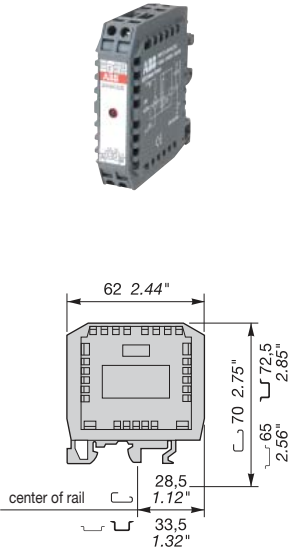
Relay characteristics	RB 121	RB 121 A	RB 121 AV	RB 121 A	
COIL					
Rated voltage +15%, -10% on DC ±15% on AC	12 V DC	24 V AC/DC	48 V AC/DC	110 V AC/DC	220 V AC/DC
Frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	0.5 W	0.7 W	0.96 W	0.5 W	1.1 VA
Rated current	41 mA	29 mA	20 mA	4.3 mA	5 mA
Drop-out voltage at 20°C	3.2 V DC	5 V AC/DC	5.6 V AC/DC	14.5 V AC/DC	25.2 V AC
Permissible leakage current					
Status device	red LED		green LED	red LED	

CONTACT

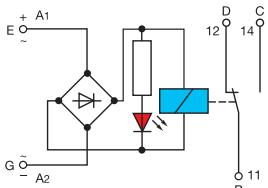
Type	1 SPDT
Voltage switching range min./max.	12 V / 380 V
Current switching range min./max.	10 mA / 8 A
Load switching range	
AC1 min. / max.	0.6 VA / 2000 VA
DC1 min. / max.	0.6 W / see curve below
Number of on-load operations	2×10^5
Number of off-load operations	2×10^7
Operating speed	
F	7 ms
O	6 ms
Bounce	2 ms
Insulation coil / contact	2500 V RMS
Resistance to shock coil / contact	4000 V RMS
Insulation contact / contact	1000 V RMS
Ambient temperature storage	-40°C to +80°C
operating	see derating curves

Other characteristics

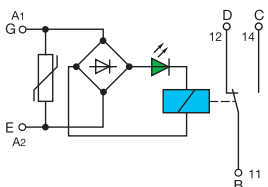
Body material	grey	UL 94 V0
Wire	Solid wire	0.2 - 4 mm ² / 22 - 12 AWG
size	Stranded wire	0.22 - 2.5 mm ² / 22 - 12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		7 mm .276"
Recommended screwdriver		3.5 mm .137"
Protection		IP20 NEMA1
Recommended torque		0.4 - 0.6 Nm 3.5 - 5.3 lb.in
Approvals		
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	



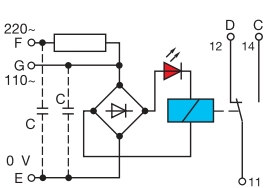
Relay blocks R1800



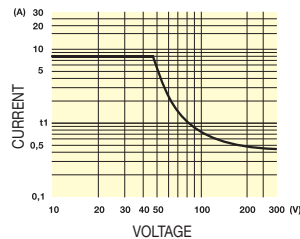
RB 121 12 VDC RB 121 A 24 VAC/DC



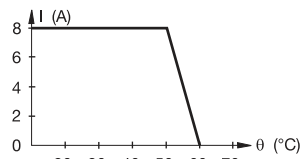
RB 121 AV 48 VAC/DC



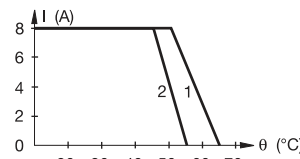
RB 121 A 110-220 VAC/DC



Derating curves



RB 121 12 VDC RB 121 A 24 VAC/DC RB 121 AV 48 VAC/DC



RB 121 A 110-220 VAC/DC

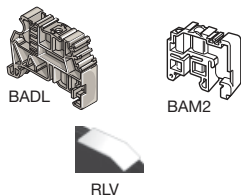
1 : 110 V AC/DC block
2 : 220 V AC block

Order codes

Description	Type	Order P/N	Packaging	Weight
Relay block 1 SPDT high level	RB 121-12VDC	1SNA 610 125 R2400	1	0.05
Relay block 1 SPDT high level	RB 121A-24VAC/DC	1SNA 610 004 R0700	1	0.05
Relay block 1 SPDT high level	RB 121AV-48VAC/DC	1SNA 610 006 R0100	1	0.05
Relay block 1 SPDT high level	RB 121A-110-220VAC/DC	1SNA 610 132 R2300	1	0.05

Accessories

End section	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	



Relays and optocouplers

Relay Interfaces

R1800 relay modules



DIN 1-3

Relay : 1 SPDT high level contacts 10 mA to 8 A - 18 mm .709" spacing

Characteristics

Relay characteristics	RB 121 A		RB 121 AR1		RB 121 AR2	
COIL						
Rated voltage +20%, -15% on DC +10%, -15% on AC	110 V AC/DC	135 V AC/DC	110 V DC	110 V AC	110 V DC	110 V AC
Frequency	50/60 Hz	50/60 Hz		50/60 Hz		50/60 Hz
Power	0.5 W	0.6 W	0.5 W	4.4 VA	0.5 W	1 VA
Rated current	4.3 mA	4.4 mA	4.5 mA	40 mA	4.5 mA	9 mA
Drop-out voltage at 20°C	11 V AC/DC	13.5 V DC	19 V DC	20 V AC	19 V DC	20 V AC
Permissible leakage current						
Status device	green LED		red LED			

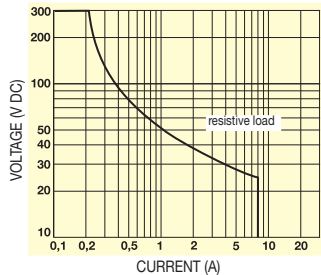
CONTACT

Type	1 SPDT				1 SPDT	
Voltage switching range min./max.	12 V / 250 V				12 V / 380 V	
Current switching range min./max.	10 mA / 8 A				10 mA / 8 A	
Load switching range						
AC1 min. / max.	0.6 VA / 2000 VA				0.6 VA / 2000 VA	
DC min. / max.	0.6 W / see curve				0.6 W / 90 W	
Number of on-load operations	2 x 10 ⁶ ohmic				2 x 10 ⁶ ohmic	
Number of off-load operations	2 x 10 ⁷				2 x 10 ⁷	
Operating speed	F	7 ms	O	7 ms	3 ms	2 ms
Bounce						
Insulation coil / contact	2500 V RMS				2500 V RMS	
Resistance to shock coil / contact						
Insulation contact / contact	1500 V RMS				1000 V RMS	
Ambient temperature storage operating			-40°C to +80°C		see derating curves	

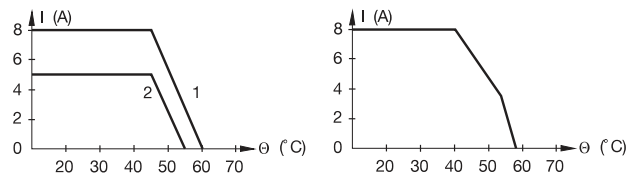
Other characteristics

Body material	orange or grey	UL 94 V2	grey	UL 94 V2	orange
Wire size	Solid wire	0 - 4 mm ² / 20 - 12 AWG			
Stranded wire	0 - 2.5 mm ² / 20 - 12 AWG				
Rated wire size	2.5 mm ² / 12 AWG				
Wire stripping length	7 mm .276"				
Recommended screwdriver	3.5 mm .137"				
Protection	IP20 NEMA1				
Recommended torque	0.4 - 0.6 Nm 3.5 - 5.3 lb.in				
Approvals	CE		UL CE		CE
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6				

Max. DC load breaking capacity



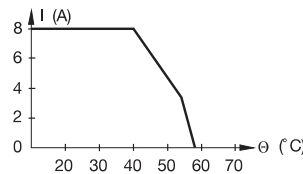
Derating curves



RB 121 A

1: 110 V AC/DC block
2: 135 V AC/DC block

RB 121 AR1



RB 121 AR2

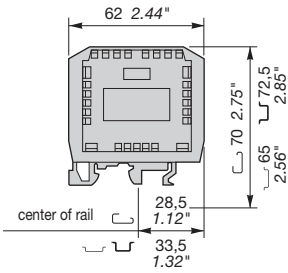
Order codes

Description	Type	Order P/N	Packaging Weight kg
Relay module 1 SPDT high level 18 mm spacing	RB 121 A 110-135 V AC/DC	1SNA 010 226 R2300	1
Relay module 1 SPDT* high level 18 mm spacing	RB 121 AR1 110 V AC/DC	1SNA 010 158 R0700	1
Relay module 1 SPDT* high level 18 mm spacing	RB 121 AR2 110 V AC/DC	1SNA 010 168 R0100	1

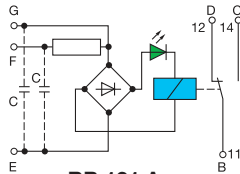
* with leakage current protection ; orange

Accessories

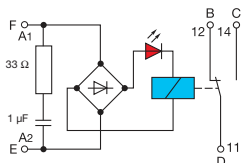
End section	BADL V0 BAM2 V0	1SNA 399 903 R0200 1SNA 399 967 R0100	50 50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	



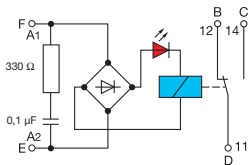
Relay blocks R1800



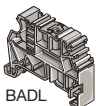
RB 121 A



RB 121 AR1



RB 121 AR2



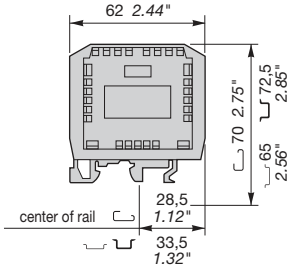
Relays and optocouplers

Relay Interfaces

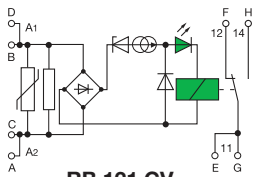
R1800 relay modules



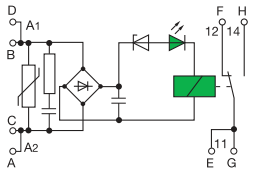
DIN 1-3



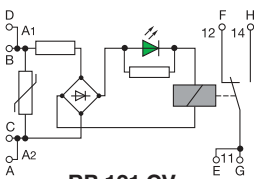
Relay blocks R1800



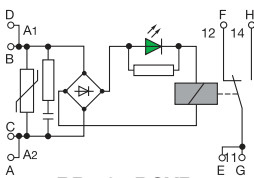
RB 121 CV



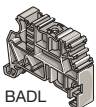
RB 121 BCVR



RB 121 CV



RB 121 BCVR

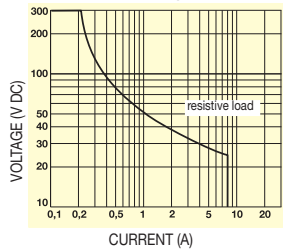


- Relay : 1 SPDT very low level contacts 10⁻⁶ A to 5 A - 18 mm .709" spacing
- Relay : 1 SPDT low level contacts 5 mA to 6 A - 18 mm .709" spacing

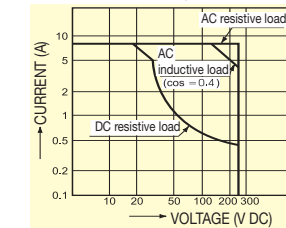
Characteristics

Relay characteristics	RB 121 CV	RB 121 BCVR	RB 121 CV	RB 121 BCVR
COIL				
Rated voltage +20%, -15% on DC +10%, -15% on AC	13.2 to 26.4 V DC	32.4 to 52.8 V DC	82 to 121 V AC	24 V DC 48 V DC 110 V AC
Frequency			50/60 Hz	50/60 Hz
Power	0.8 W	1.2 W	4.4 VA	0.85 W 1 W 3.9 VA
Rated current	34 mA	24 mA	40 mA	35 mA 20 mA 35 mA
Drop-out voltage at 20°C	5 V DC	12 V DC	20 V AC	2.4 V DC 4.8 V DC 11 V AC
Permissible leakage current	1 mA		2.2 mA	3.5 mA 2 mA
Status device	green LED			
CONTACT				
Type	1 SPDT		1 SPDT	
Voltage switching range min./max.	10 ⁻³ V / 250 V		12 V / 250 V	
Current switching range min./max.	10 ⁻⁶ A / 5 A		5 mA / 3 A 5 mA / 6 A	
Load switching range				
AC1 min. / max.	10 ⁻⁶ VA / 1250 VA		60 mVA / 750 VA 60 mVA / 1500 VA	
DC1 min. / max.	10 ⁻⁸ W / see curve 2 hereunder		60 mW / see curve 1 hereunder	
Number of on-load operations	2 x 10 ⁵ ohmic		2 x 10 ⁶ ohmic	
Number of off-load operations	10 ⁷		2 x 10 ⁷	
Operating speed	8 ms 4 ms		7 ms 10 ms	
Bounce	1 ms		4 ms	
Insulation coil / contact	2500 V RMS			
Resistance to shock coil / contact	≥ 1000 V RMS			
Insulation contact / contact	≥ 1000 V RMS			
Ambient temperature storage	-40°C à +80°C			
operating	see derating curves			
Other characteristics				
Body material	orange		UL 94 V2	
Wire	Solid wire		0 - 4 mm ² / 20 - 12 AWG	
Wire size	Stranded wire		0 - 2.5 mm ² / 20 - 12 AWG	
Rated wire size			2.5 mm ² / 12 AWG	
Wire stripping length			7 mm .276"	
Recommended screwdriver			3.5 mm .137"	
Protection			IP20 NEMA1	
Recommended torque			0.4 - 0.6 Nm 3.5 - 5.3 lb.in	
Approvals	CE			
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6			

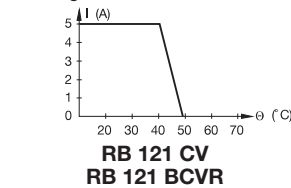
Max. DC load breaking capacity : curve 1



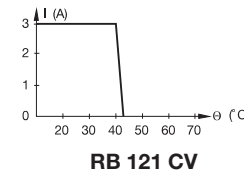
Max. DC load breaking capacity : curve 2



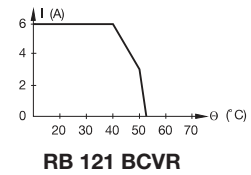
Derating curves



RB 121 CV
RB 121 BCVR



RB 121 CV



RB 121 BCVR

Order codes

Description	Type	Order P/N	Packaging Weight kg
■ Relay module 1 SPDT very low level	RB 121 CV 24 V DC	1SNA 010 154 R2300	1
■ Relay module 1 SPDT very low level	RB 121 CV 48 V DC	1SNA 010 155 R2400	1
■ Relay module 1 SPDT very low level	RB 121 BCVR 110 V AC	1SNA 010 156 R2500	1
■ Relay module 1 SPDT low level	RB 121 CV 24 V DC	1SNA 010 184 R1200	1
■ Relay module 1 SPDT low level	RB 121 CV 48 V DC	1SNA 010 185 R1300	1
■ Relay module 1 SPDT low level	RB 121 BCVR 110 V AC	1SNA 010 186 R1400	1

Accessories

End section	BADL V0 BAM2 V0	1SNA 399 903 R0200 1SNA 399 967 R0100	50 50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	

Relays and optocouplers

Relay Interfaces

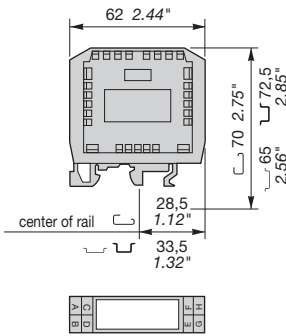
R1800 relay modules



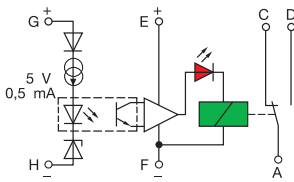
DIN 1-3



EBO 1R



Relay blocks R1800

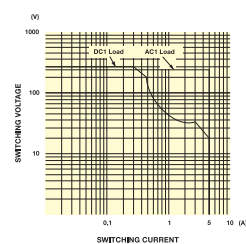


EBO 1R

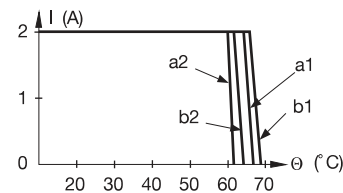
Relay : 1 SPDT with TTL compatible control - 18 mm .709" spacing

Characteristics

Relay characteristics	EBO 1R	
	Input GH	Power supply EF
COIL/INPUT		
Rated voltage +20%, -15% on DC +10%, -15% on AC	5 V DC	24 V to 30 V DC
Frequency		
Power	2.5 mW	0.83 W
Rated current	0.5 mA	25 mA
Drop-out point	2 V DC	17 V DC
Drop-out voltage at 20°C	2.1 V	7 V
Insulation input / power supply	2000 V RMS	
Status device	red LED	
CONTACT		
Type	1 SPDT	
Voltage switching range min./max.	125 V AC / 150 V DC	
Current switching range min./max.	2 A	
Load switching range		
AC1 min. / max.	50 VA / 30 W	
DC1 min. / max.	10 ⁵ VA / see curve hereunder	
Load min.	10 ⁵ W	
Number of on-load operations	10 ⁶	
Number of off-load operations	2 x 10 ⁷	
Operating speed	F	30 ms
	O	11 ms
Bounce	0.2 ms	
Insulation coil / contact	1400 V RMS	
Resistance to shock coil / contact	2 kV	
Ambient temperature storage	-40°C to +80°C	
operating	see derating curve	
Other characteristics		
Body material	grey	
Wire	UL 94 V2	
size	0 - 4 mm ² / 20 - 12 AWG	
Stranded wire	0 - 2.5 mm ² / 20 - 12 AWG	
Rated wire size	2.5 mm ² / 12 AWG	
Wire stripping length	7 mm .276"	
Recommended screwdriver	3.5 mm .137"	
Protection	IP20 NEMA1	
Recommended torque	0.4 - 0.6 Nm 3.5 - 5.3 lb.in	
Approvals	CE	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6	



Derating curve

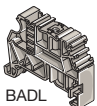


- a1. horizontal at 24 V
- a2. horizontal at 30 V
- b1. vertical at 24 V
- b2. vertical at 30 V

EBO 1R

Order codes

Description	Type	Order P/N	Packaging Weight kg
Relay module 1 SPDT	EBO 1R 5 V DC	1SNA 010 131 R1400	1



BADL



BAM2



RLV

Accessories

End section	BADL V0 BAM2 V0	1SNA 399 903 R0200 1SNA 399 967 R0100	50 50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	

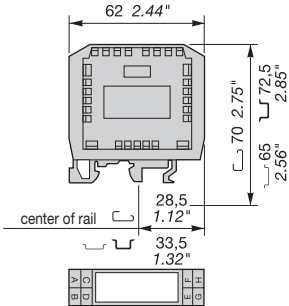
Relays and optocouplers

Relay Interfaces

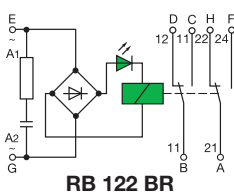
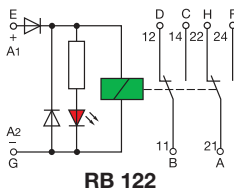
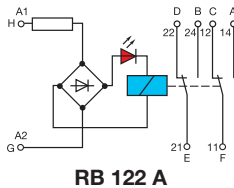
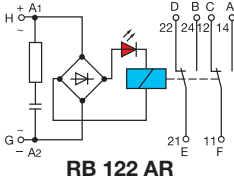
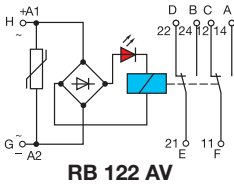
R1800 relay modules



DIN 1-3



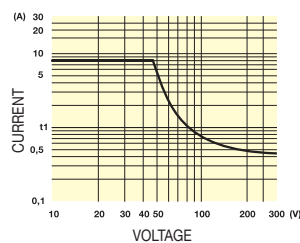
Relay blocks R1800



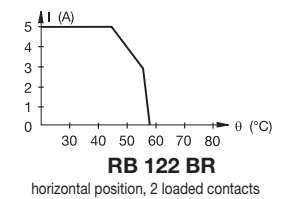
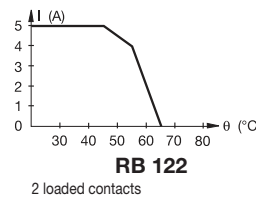
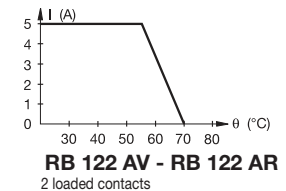
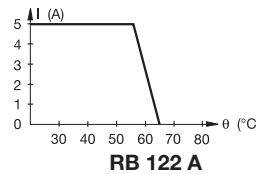
- Relay : 1 DPDT high level contacts 10 mA to 5 A - 18 mm .709" or 23 mm .906" spacing
- Relay : 1 DPDT very low level contacts 10⁻⁷ A to 5 A - 18 mm .709" or 23 mm .906" spacing

Characteristics

Relay characteristics	RB 122 AV	RB 122 AR	RB 122 A	RB 122	RB 122 BR
COIL					
Rated voltage +15%, -10% on DC ±15% on AC	24 VAC/DC	48 VAC/DC	110 VAC/DC	220 VAC/DC	24 V DC
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power	0.7 W	0.7 W	0.7 W - 1.8 VA	1.2 W	0.31 W
Rated current	26 mA	14 mA	16 mA	5.5 mA	13 mA
Drop-out voltage at 20°C	2.4 V AC/DC	4.8 V AC/DC	11 V AC/DC	22 V AC/DC	2.4 V DC
Permissible leakage current			1.6 mA		
Status device			red LED		green LED
CONTACT					
Type	1 DPDT				
Voltage switching range min./max.	12 V / 250 V	10 ⁻³ V / 250 V	12 V / 250 V	10 ⁻³ V / 250 V	
Current switching range min./max.	10 mA / 5 A			10 ⁻⁷ A / 5 A	
Load switching range	0.6 VA / 1250 VA			10 ⁻¹⁰ VA / 1000 VA	
AC1 min. / max. DC1 min. / max.	0.6 W / see curve hereunder			10 ⁻¹⁰ W / see curve hereunder	
Number of on-load operations	2 x 10 ⁸			5A/100W - 5A/1kVA : 10 ⁵	
Number of off-load operations	2 x 10 ⁷			2 x 10 ⁸	
Operating speed	F	7 ms	4 ms	8 ms	3 ms
Bounce	O	3 ms	0.5 ms	0.5 ms	0.5 ms
Insulation coil / contact	2000 V RMS			1500 V RMS	
Resistance to shock coil / contact	4000 V RMS			4000 V RMS	
Insulation contact / contact	1500 V RMS			2000 V RMS	
Ambient temperature storage operating	-40°C to +80°C see derating curves				
Other characteristics	UL 94 V0				
Body material	grey				
Wire	Solid wire				
Wire size	0.22 - 2.5 mm ² / 22 - 12 AWG				
Rated wire size	2.5 mm ² / 12 AWG				
Wire stripping length	7 mm .276"				
Recommended screwdriver	3.5 mm .137"				
Protection	IP20 NEMA1				
Recommended torque	0.4 - 0.6 Nm 3.5 - 5.3 lb.in				
Approvals	cULus for RB 122AR-110VAC/DC, RB 122-24VDC, RB 122BR-110VAC and RB122AV-24VAC/DC, CE				
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.				



Derating curves



Order codes

Description	Type	Order P/N	Packaging	Weight
Relay module 1 DPDT high level 18 mm sp.	RB 122AV-24VAC/DC	1SNA 610 121 R2000	1	0.05
Relay module 1 DPDT high level 18 mm sp.	RB 122AV-48VAC/DC	1SNA 610 122 R2100	1	0.05
Relay module 1 DPDT high level 18 mm sp.	RB 122AR-110VAC/DC	1SNA 610 011 R2500	1	0.05
Relay module 1 DPDT high level 18 mm sp.	RB 122A-220VAC/DC	1SNA 610 123 R2200	1	0.05
Relay module 1 DPDT very low level 18 mm sp.	RB 122-24VDC	1SNA 610 059 R1500	1	0.05
Relay module 1 DPDT very low level 18 mm sp.	RB 122-48VDC	1SNA 610 060 R1200	1	0.05
Relay module 1 DPDT very low level 23 mm sp.	RB 122BR-110VAC	1SNA 610 115 R2200	1	0.05
Relay module 1 DPDT very low level 23 mm sp.	RB 122BR-220VAC	1SNA 610 089 R0400	1	0.05

Accessories

End section	Type	Order P/N	Packaging	Weight
BADL V0	BADL V0	1SNA 399 903 R0200	50	
BAM2 V0	BAM2 V0	1SNA 399 967 R0100	50	
Lengthwise marker	RLV	1SNA 103 849 R0300	100	
Marker	RC55	see markers		

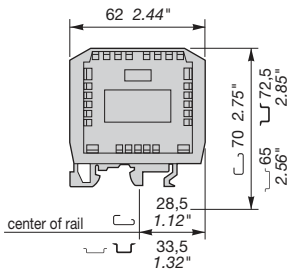
Relays and optocouplers

Relay Interfaces

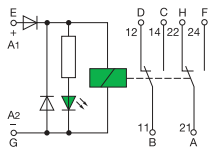
R1800 relay modules



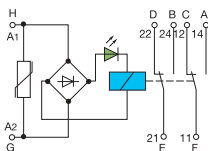
DIN 1-3



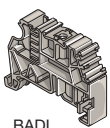
Relay blocks R1800



RB 122



RB 122 A



BADL



BAM2



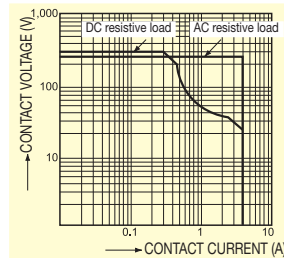
RLV

- Relay : 1 DPDT very low level contacts 10⁻⁷ A to 4 A - 18 mm .709" spacing
- Relay : 1 DPDT high level contacts 10 mA to 3 A - 18 mm .709" spacing

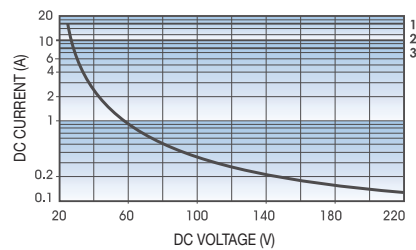
Characteristics

Relay characteristics	RB 122	RB 122 A
COIL		
Rated voltage +20%, -15% on DC +10%, -15% on AC	12 V DC	135 V AC/DC
Frequency		50/60 Hz
Power	0.26 W	0.8 W
Rated current	22 mA	5.8 mA
Drop-out voltage	2 V DC	13.5 V AC/DC
Drop-in voltage at 20°C		
Permissible leakage current		
Status device	green LED	green LED
CONTACT		
Type	1 DPDT	1 DPDT
Voltage switching range min./max.	10 ⁻³ V / 250 V	12 V / 250 V
Current switching range min./max.	10 ⁻⁷ A / 4 A	10 mA / 3 A
Load switching range		
AC1 min. / max.	10 ⁻¹⁰ VA / 1000 VA	0.6 VA / 750 VA
DC1 min. / max.	10 ⁻¹⁰ W / see curve 1 hereunder	see curve 2 hereunder
Number of on-load operations	2 x 10 ⁵ resistive	2 x 10 ⁵ resistive
Number of off-load operations	10 ⁹	2 x 10 ⁷
Operating speed		
F	8 ms	7 ms
O	7.5 ms	4 ms
Bounce	0.21 ms	3 ms
Insulation coil / contact	1500 V RMS	2000 V RMS
Resistance to shock coil / contact		
Insulation contact / contact	1500 V RMS	2000 V RMS
Ambient temperature storage	-40°C to +80°C	
operating	see derating curves	
Other characteristics		
Body material	grey	UL 94 V2
Wire	Solid wire	0 - 4 mm ² / 20 - 12 AWG
size	Stranded wire	0 - 2.5 mm ² / 20 - 12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		7 mm .276"
Recommended screwdriver		3.5 mm .137"
Protection	IP20 NEMA1	
Recommended torque	0.4 - 0.6 Nm 3.5 - 5.3 lb.in	
Approvals	CE	CE, UL, ENEC
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6	

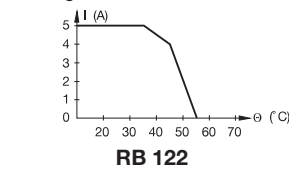
Max. DC load breaking capacity : curve 1



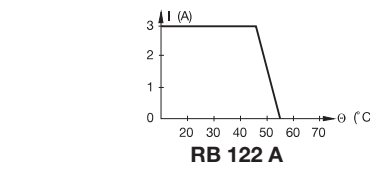
Max. DC load breaking capacity : curve 2



Derating curves



RB 122



RB 122 A

Order codes

Description	Type	Order P/N	Packaging Weight kg
■ Relay module 1 DPDT very low level	RB 122	12 V DC 1SNA 010 174 R0700	1
■ Relay module 1 DPDT high level	RB 122 A	135 V AC/DC 1SNA 010 228 R0500	1

Accessories

End section	BADL V0 BAM2 V0	1SNA 399 903 R0200 1SNA 399 967 R0100	50 50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	

Relays and optocouplers

Relay Interfaces

R900 relay modules

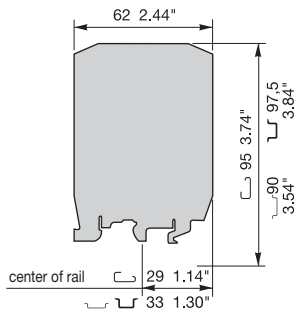


DIN 1-3

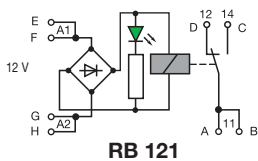
Relay : 1 SPDT low level contacts 1 mA to 6 A - 11.5 mm .453" spacing

Characteristics

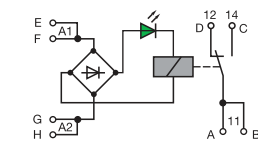
Relay characteristics	RB 121 - 12 V	RB 121 A - 24 V		RB 121 A - 48 V	
COIL					
Rated voltage +20%, -15% on DC, ±15% on AC	12 V DC	24 V AC	24 V DC	48 V AC	48 V DC
Frequency		50 / 60 Hz		50 / 60 Hz	
Power	0.5 W	0.52 VA	0.44 W	0.62 VA	0.48 W
Rated current	42 mA	22 mA	18 mA	13 mA	10 mA
Drop-out voltage at 20°C	2.8 V	4.6 V	4.6 V	5.8 V	5.8 V
Permissible leakage current	3.5 mA	2.2 mA	1.8 mA	1 mA	1 mA
Status device	green LED				
CONTACT					
Type	1 SPDT				
Voltage switching range min./max.	5 V / 150 V DC - 250 V AC				
Current switching range min./max.	1 mA / 6 A				
Load switching range					
AC1 min. / max.	5 mVA / 1500 VA				
DC1 min. / max.	5 mW / 192 W				
Number of on-load operations	1 x 10 ⁵				
Number of off-load operations	5 x 10 ⁶				
Operating speed	5 ms				
Bounce	1 ms				
Insulation coil / contact	3500 V RMS				
Resistance to shock coil / contact	4000 V RMS				
Insulation contact / contact	1000 V RMS				
Ambient temperature storage	-40°C to +80°C				
operating	See derating curve				
Other characteristics					
Body material	grey				
Wire	Solid wire				
size	0.5 - 4 mm ² / 20 - 12 AWG				
Stranded wire	0.5 - 2.5 mm ² / 20 - 12 AWG				
Rated wire size	2.5 mm ² / 12 AWG				
Wire stripping length	7 mm .276"				
Recommended screwdriver	3.5 mm .137"				
Protection	IP20 NEMA1				
Recommended torque	0.4 - 0.6 Nm 3.5 - 5.3 lb.in				
Approvals	cULus for RB 121A-24VAC/DC, CE				
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.				



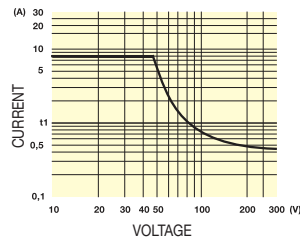
Relay blocks R900



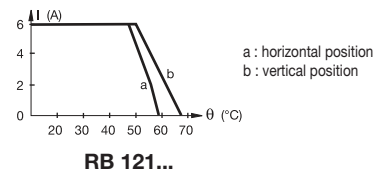
RB 121



RB 121 A



Derating curve

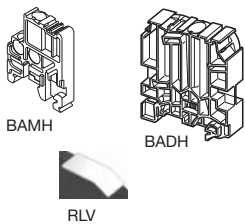


Order codes

Description	Type	Order P/N	Packaging Weight kg
Relay module 1 SPDT low level	RB 121-12VDC	1SNA 630 001 R0000	1 0.04
Relay module 1 SPDT low level	RB 121A-24VAC/DC	1SNA 630 002 R0100	1 0.04
Relay module 1 SPDT low level	RB 121A-48VAC/DC	1SNA 630 003 R0200	1 0.04

Accessories

High end section	BADH	1SNA 116 900 R2700	50
	BAMH	1SNA 114 836 R0000	50
	BAMH V0	1SNA 194 836 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marking method	RC55	see marking	



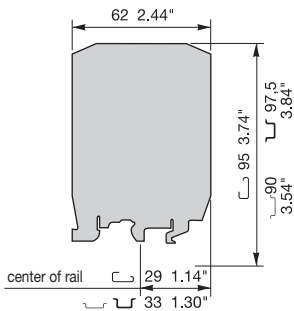
Relays and optocouplers

Relay Interfaces

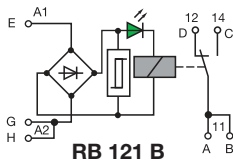
R900 relay modules



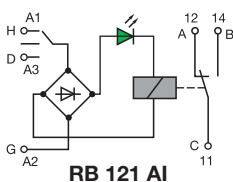
DIN 1-3



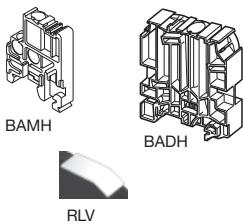
Relay blocks R900



RB 121 B



RB 121 AI



- Relay : 1 SPDT low level contacts 1 mA to 5 A - 11.5 mm .453" spacing
- Relay : 1 SPDT with switch low level contacts 1 mA to 5 A - 11.5 mm .453" spacing

Characteristics

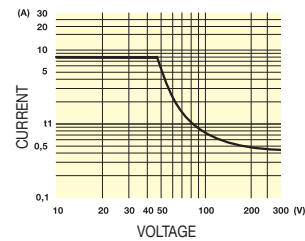
Relay characteristics	RB 121 B			RB 121 AI	
	110 V AC	115 V AC	230 V AC	24 V AC ±10%	24 V DC ±10%
COIL					
Rated voltage +20%, -15% on DC, ±15% on AC	110 V AC	115 V AC	230 V AC	24 V AC ±10%	24 V DC ±10%
Frequency	50 Hz	60 Hz	50 Hz	50 / 60 Hz	
Power	1.5 VA	1.6 VA	3.22 VA	0.53 VA	0.44 W
Rated current	14 mA	14 mA	14 mA	22 mA	18 mA
Drop-out voltage at 20°C	30 V AC	30 V AC	60 V AC	5.5 V	4.6 V
Permissible leakage current	2 mA max.	2 mA max.	3.6 mA max.	2.2 mA	1.8 mA
Status device	green LED				

CONTACT

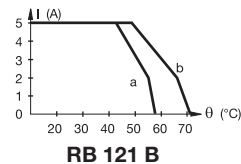
Type	1 SPDT				
Voltage switching range min./max.	5 V / 150 V DC - 250 V AC				
Current switching range min./max.	1 mA / 5 A		1 mA / 6 A		
Load switching range					
AC1 min. / max.	5 mVA / 1250 VA		5 mVA / 1500 VA		
DC1 min. / max.	5 mW / 192 W				
Number of on-load operations	1 x 10 ⁵				
Number of off-load operations	5 x 10 ⁶				
Operating speed	F 10 ms		O 5 ms		
Bounce	1 ms				
Insulation coil / contact	3000 V RMS				
Resistance to shock coil / contact	4000 V RMS				
Insulation contact / contact	1000 V RMS				
Ambient temperature storage	-40°C to +80°C				
operating	see derating curves				

Other characteristics

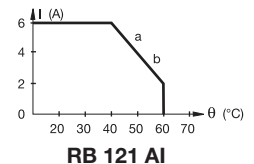
Body material	grey	UL 94 V0
Wire	Solid wire	0.5 - 4 mm ² / 20 - 12 AWG
size	Stranded wire	0.5 - 2.5 mm ² / 20 - 12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		7 mm .276"
Recommended screwdriver		3.5 mm .137"
Protection		IP20 NEMA1
Recommended torque		0.4 - 0.6 Nm 3.5 - 5.3 lb.in
Approvals	us for RB 121B-115VAC and RB 121AI-24VAC/DC,	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	



Derating curves



a : horizontal position
b : vertical position



Order codes

Description	Type	Order P/N	Packaging	Weight
<input type="checkbox"/> Relay module 1 SPDT low level	RB 121B-110VAC	1SNA 630 004 R0300	1	0.05
<input type="checkbox"/> Relay module 1 SPDT low level	RB 121B-115VAC	1SNA 630 005 R0400	1	0.05
<input type="checkbox"/> Relay module 1 SPDT low level	RB 121B-230VAC	1SNA 630 006 R0500	1	0.05
<input type="checkbox"/> Relay module 1 SPDT with switch low level	RB 121AI-24VAC/DC	1SNA 630 007 R0600	1	0.05

Accessories

High end section	BADH	1SNA 116 900 R2700	50
	BAMH	1SNA 114 836 R0000	50
	BAMH V0	1SNA 194 836 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marking method	RC55	see marking	

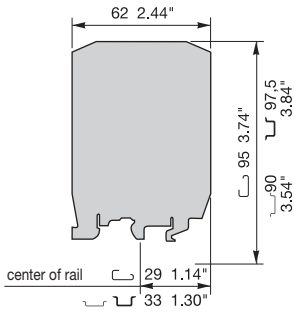
Relays and optocouplers

Relay Interfaces

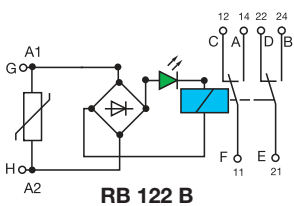
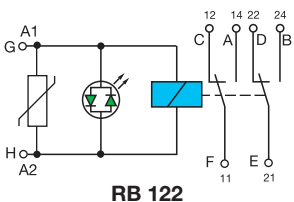
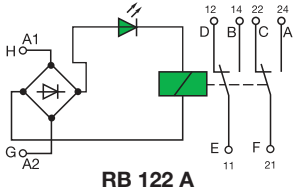
R900 relay modules



DIN 1-3



Relay blocks R900



- Relay : 1 DPDT very low level contacts 10⁻⁵ A to 3 A - 11.5 mm .453" spacing
- Relay : 1 DPDT high level contacts 100 mA to 7 A - 15 mm .591" spacing

Characteristics

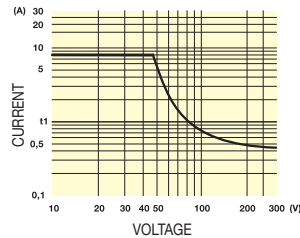
Relay characteristics	RB 122 A	RB 122	RB 122 B		
COIL					
Rated voltage +15%, -10% on DC ±15% on AC	24 V AC	24 V DC	24 V DC	110 V AC	115 V AC
Frequency	50 / 60 Hz			50 Hz	60 Hz
Power	0.4 VA	0.35 W	0.48 W	3.6 VA	4 VA
Rated current	16.8 mA	14.4 mA	20 mA	33 mA	35 mA
Drop-out voltage at 20°C	9.2 V	6.5 V	2.4 V DC	11 V AC	11.5 V AC
Permissible leakage current	2 mA max.	2 mA max.	1.5 mA	2 mA	2.6 mA
Status device	green LED				

CONTACT

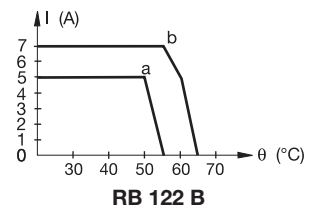
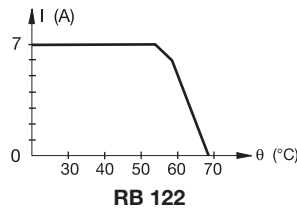
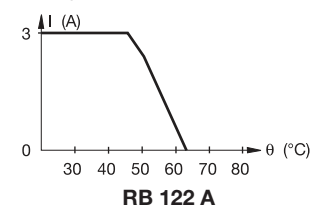
CONTACT	1 DPDT			
Type	1 DPDT			
Voltage switching range min./max.	10 ⁵ V / 250 V AC		12 V / 250 V	
Current switching range min./max.	10 ⁻⁵ A / 3 A	100 mA / 7 A	100 mA / 7 A	100 mA / 7 A
Load switching range				
AC1 min. / max.	10 ⁻¹⁰ VA / 250 VA	1.2 VA / 1750 VA	1.2 VA / 1750 VA	1.2 VA / 1750 VA
DC1 min. / max.	10 ⁻¹⁰ W / 90 W	1.2 W / see curve hereunder		
Number of on-load operations	1.8 x 10 ⁶ (2 A / 60 W)			
Number of off-load operations	10 ⁸	30 x 10 ⁶		
Operating speed	F 6 ms	8 ms		6 ms
	O 11 ms	15 ms		12 ms
Bounce	1 ms		2 ms	
Insulation coil / contact	1500 V RMS	2500 V RMS		
Resistance to shock coil / contact	4000 V RMS			
Insulation contact / contact	1000 V RMS			
Ambient temperature storage operating	-40°C to +80°C			
	see derating curves			

Other characteristics

Body material	grey	UL 94 V0
Wire	Solid wire	0.5 - 4 mm ² / 20 - 12 AWG
size	Stranded wire	0.5 - 2.5 mm ² / 20 - 12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		7 mm .276"
Recommended screwdriver		3.5 mm .137"
Protection		IP20 NEMA1
Recommended torque		0.4 - 0.6 Nm 3.5 - 5.3 lb.in
Approvals	CE	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	



Derating curves



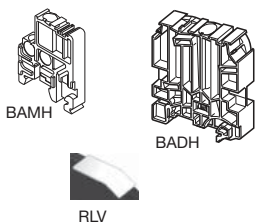
a : 110 V AC/50 Hz block
b : 115 V AC/60 Hz block

Order codes

Description	Type	Order P/N	Packaging	Weight
■ Relay module 1 DPDT very low level 11.5 mm sp.	RB 122A-24VAC/DC	1SNA 630 011 R2100	1	0.05
■ Relay module 1 DPDT high level 15 mm sp.	RB 122-24VDC	1SNA 630 019 F0100	1	0.05
■ Relay module 1 DPDT high level 15 mm sp.	RB 122B-110VAC/50Hz	1SNA 630 021 F2300	1	0.06
■ Relay module 1 DPDT high level 15 mm sp.	RB 122B-115VAC/60Hz	1SNA 630 022 F2400	1	0.06

Accessories

High end section	BADH	1SNA 116 900 R2700	50
	BAMH	1SNA 114 836 F0000	50
	BAMH V0	1SNA 194 836 F0100	50
Lengthwise marker	RLV	1SNA 103 849 F0300	100
Marking method	RC55		see marking



Relays and optocouplers

Relay Interfaces

R20000 relay modules



DIN 1-3

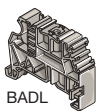
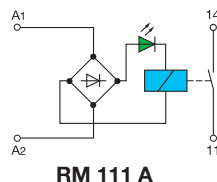
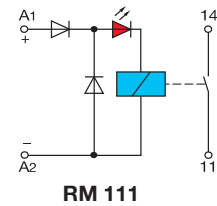
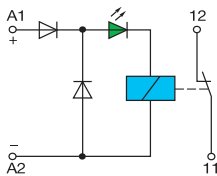
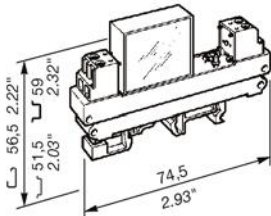
Relay modules R20000



RM 101



RM 111...

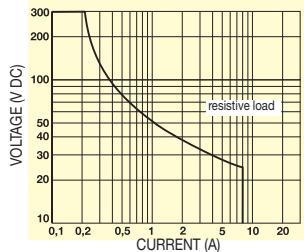


- Relay : 1 NC high level contact 10 mA to 8 A - 12,7 mm .500" spacing
- Relay : 1 NO high level contact 10 mA to 8 A - 12,7 mm .500" spacing

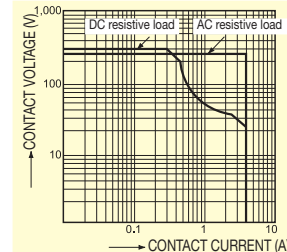
Characteristics

Relay characteristics	RM 101	RM 111			RM 111 A
COIL					
Rated voltage +20%, -15% on DC +10%, -15% on AC	24 V DC	12 V DC	24 V DC	48 V DC	110 V DC
Frequency					110 V AC/DC
Power	0.5 W	0.5 W	0.5 W	0.5 W	0.5 W
Rated current	20 mA	40 mA	20 mA	10 mA	4.3 mA
Drop-out voltage at 20°C	4.2 V DC	1.2 V DC	4.2 V DC	7.8 V DC	17.1 V DC
Permissible leakage current					14 V AC/DC
Status device	green LED	green LED	red LED		green LED
CONTACT					
Type	1 NC	1 NO			1 NO
Voltage switching range min./max.	12 V / 250 V	12 V / 250 V			12 V / 250 V
Current switching range min./max.	10 mA / 8 A	10 mA / 5 A			10 mA / 8 A
Load switching range					
AC1 min. / max.	0.6 VA / 2000 VA	0.6VA/1250VA		0.6 VA / 2000 VA	
DC1 min. / max.	0.6 W/see curve 1 hereunder	0.6 W/see curve 2 hereunder		0.6 W/see curve 1 hereunder	
Number of on-load operations	2 x 10 ⁶ resistive			2 x 10 ⁶ resistive	
Number of off-load operations		10 x 10 ⁶			2 x 10 ⁷
Operating speed	F	4 ms	10 ms	4 ms	
	O	6 ms	5 ms	6 ms	
Bounce		2 ms	2 ms	2 ms	
Insulation coil / contact	2000 V RMS	2000 V RMS		2000 V RMS	
Resistance to shock coil / contact	1.2 / 50 μs - 5 kV / 500 Ω	1.2/50μs-4kV/500 Ω		1.2 / 50 μs - 5 kV / 500 Ω	
Insulation contact / contact					
Ambient temperature		-40°C to +80°C			
storage		see derating curves			
operating					
Other characteristics					
Body material	orange	UL 94 V2			
Wire	Solid wire	0 - 2.5 mm ² / 20 - 14 AWG			
size	Stranded wire	0 - 2.5 mm ² / 20 - 14 AWG			
Rated wire size		2.5 mm ² / 12 AWG			
Wire stripping length		6 mm .236"			
Recommended screwdriver		3.5 mm .137"			
Protection		IP20 NEMA1			
Recommended torque		0.4 - 0.6 Nm 3.5 - 5.3 lb.in			
Approvals					
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6				

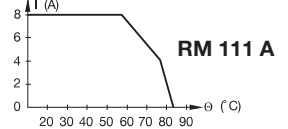
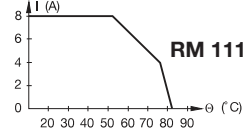
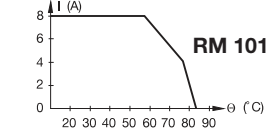
Max. DC load breaking capacity : curve 1



Max. DC load breaking capacity : curve 2



Derating curves



Order codes

Description	Type	Order P/N	Packaging Weight kg
Relay module 1 NC high level	RM 101	24 V DC 1SNA 020 239 R0200	1
Relay module 1 NO high level	RM 111	12 V DC 1SNA 020 035 R1100	1
Relay module 1 NO high level	RM 111	24 V DC 1SNA 020 032 R1600	1
Relay module 1 NO high level	RM 111	48 V DC 1SNA 020 033 R1700	1
Relay module 1 NO high level	RM 111	110 V DC 1SNA 020 034 R1000	1
Relay module 1 NO high level	RM 111 A	110 V AC/DC 1SNA 020 323 R2600	1

Accessories

End section	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Pivoting marker-holder : quantity 20	PEF	1SNA 020 568 R0400	1
Marker	RC55	see markers	

Relays and optocouplers

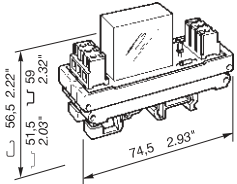
Relay Interfaces

R20000 relay modules

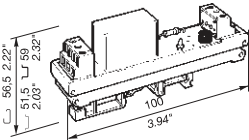


DIN 1-3

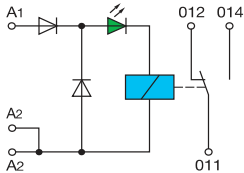
Relay modules R20000



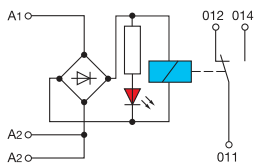
RM 121 24 V DC
RM 121 A 115 V AC/DC
RM 121 A 220 V AC/DC



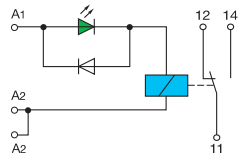
RM 121 A 24 V DC



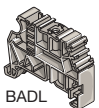
RM 121 24 V DC



RM 121 A 24 V AC/DC
RM 121 A 48 V AC/DC



RM 121 A 115 V AC/DC
RM 121 A 220 V AC/DC

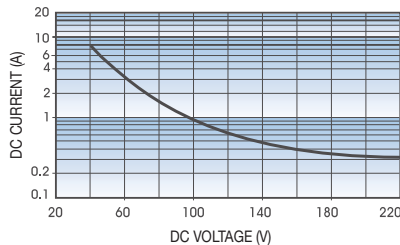


Relay : 1 SPDT high level contact 10 mA 6 A - 17,8 mm .701" or 22,5 mm .886" spacing

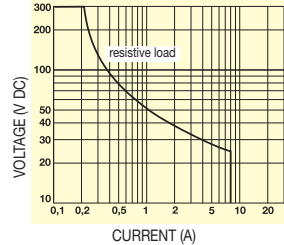
Characteristics

Relay characteristics	RM 121	RM 121 A	RM 121 A
COIL			
Rated voltage +20%, -15% on DC +10%, -15% on AC	24 V DC	24 V AC/DC 48 V AC/DC	115 V AC/DC 220 V AC/DC
Frequency		50/60 Hz	50/60 Hz
Power	0.65 W	0.7 W 0.9 W	1.3 VA 0.9 VA
Rated current	26 mA	30 mA 18 mA	10.8 mA 4.3 mA
Drop-out voltage at 20°C	4 V DC	3.6 V AC/DC 7.2 V AC/DC	30 V AC/DC 66 V AC/DC
Permissible leakage current		2 mA	
Status device	green LED	red LED	green LED
CONTACT			
Type	1 SPDT	1 SPDT	1 SPDT
Voltage switching range min./max.	12 V / 250 V	12 V / 250 V	12 V / 250 V
Current switching range min./max.	10 mA / 16 A	10 mA / 10 A	100 mA / 8 A
Load switching range			
AC1 min. / max.	0.6 VA / 4000 VA	0.6 VA / 2500 VA	0.6 VA / 2000 VA
DC1 min. / max.	0.6 W / see curve 1 hereunder	0.6 W / see curve 1 hereunder	0.6 W / see curve 2 hereunder
Number of on-load operations	2 x 10 ⁵ resistive	2 x 10 ⁵ resistive	2 x 10 ⁵
Number of off-load operations	2 x 10 ⁷	2 x 10 ⁷	3 x 10 ⁷
Operating speed	F 7 ms O 8 ms	7 ms 4 ms	10 ms 15 ms
Bounce	3 ms	3 ms	4 ms
Insulation coil / contact	4 000 V RMS	4 000 V RMS	2 500 V RMS
Resistance to shock coil / contact	1.2 / 50 μs - 5 kV / 500 Ω	1.2 / 50 μs - 5 kV / 500 Ω	1.2 / 50 μs - 5 kV / 500 Ω
Insulation contact / contact			1000 V RMS
Ambient temperature		-40°C to +80°C	
storage		see derating curves	
operating			
Other characteristics			
Body material	orange	UL 94 V2	
Wire	Solid wire	0 - 2.5 mm ² / 20 - 14 AWG	
size	Stranded wire	0 - 2.5 mm ² / 20 - 14 AWG	
Rated wire size		2.5 mm ² / 12 AWG	
Wire stripping length		6 mm .236"	
Recommended screwdriver		3.5 mm .137"	
Protection		IP20 NEMA1	
Recommended torque		0.4 - 0.6 Nm 3.5 - 5.3 lb.in	
Approvals		CE	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6		

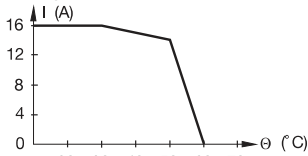
Max. DC load breaking capacity : curve 1



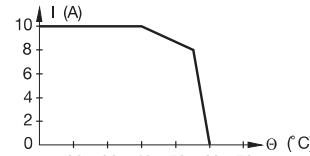
Max. DC load breaking capacity : curve 2



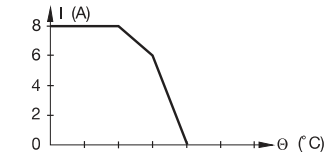
Derating curves



RM 121 24 V DC



RM 121 A 24 - 48 V AC/DC



RM 121 A 115 - 220 V AC/DC

Order codes

Description	Type	Order P/N	Packaging Weight kg
Relay module 1 SPDT high level 22.5 mm sp.	RM 121 24 V DC	1SNA 020 046 R2400	1
Relay module 1 SPDT high level 17.8 mm sp.	RM 121 A 24 V AC/DC	1SNA 020 042 R2000	1
Relay module 1 SPDT high level 17.8 mm sp.	RM 121 A 48 V AC/DC	1SNA 020 043 R2100	1
Relay module 1 SPDT high level 17.8 mm sp.	RM 121 A 115 V AC/DC	1SNA 020 044 R2200	1
Relay module 1 SPDT high level 17.8 mm sp.	RM 121 A 220 V AC/DC	1SNA 020 045 R2300	1

Accessories

End section	Accessories	Order P/N	Weight kg
BADL V0		1SNA 399 903 R0200	50
BAM2 V0		1SNA 399 967 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Pivoting marker-holder : quantity 20	PEF	1SNA 020 568 R0400	1
Marker	RC55	see markers	

Relays and optocouplers

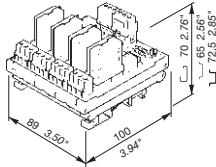
Relay Interfaces

4, 8 and 16 relay modules R20000



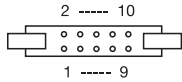
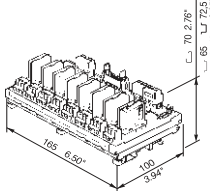
DIN 1-3

Relay modules R20000



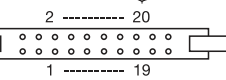
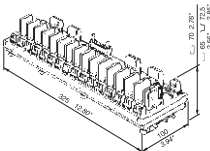
RM 421 A

Inputs : connection using pluggable connectors



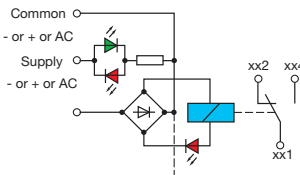
RM 821 A

10 point socket with extractors
Inputs : 24 and 48 V module connection using HE 10/10 connector mounted in parallel with pluggable connectors.
110 et 220 V module connection using pluggable connectors only.



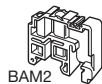
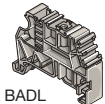
RM 1621 A

20 point socket with extractors
Inputs : 24 and 48 V module connection using HE 10/20 connector mounted in parallel with pluggable connectors.
110 et 220 V module connection using pluggable connectors only.



RM 421 A - RM 821 A - RM 1621 A

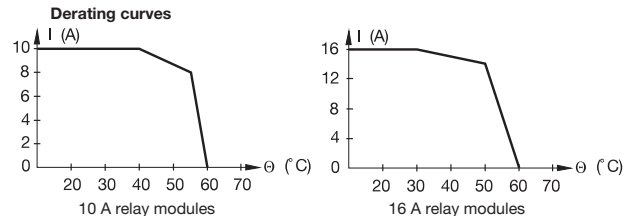
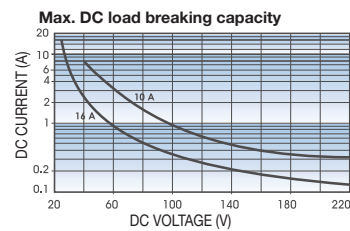
- Red diode R lighted when + on common
- Green diode V lighted when - on common
- Red diode R, green diode V both lighted when alternative



- 4 relays : 1 SPDT high level contact from 10 mA to 16 A - 89 mm 3.50" spacing
- 8 relays : 1 SPDT high level contact from 10 mA to 16 A - 165 mm 6.50" spacing
- 16 relays : 1 SPDT high level contact from 10 mA to 16 A - 325 mm 12.80" spacing

Characteristics

Relay characteristics	RM 421 A	RM 821 A	RM 1621 A
Modules equipped with relays	16 Amps	10 Amps	
COIL			
Rated voltage +20%, -15% on DC +10%, -15% on AC	24 V AC/DC	48 V AC/DC	110 V AC/DC 220 V AC/DC
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Power	1.32 W	1.32 W	1.32 W
Rated current	50 AC/56 DC	24 AC/28 DC	11 AC/12 DC 6 AC/65 DC
Drop-out voltage at 20°C	6 AC/5.4 DC	8.7 AC/7.8 DC	15.5 AC/14 DC 27.8 AC/25 DC
Permissible leakage current			
Status device	see description on left column		
CONTACT			
Type	1 SPDT	1 SPDT	
Voltage switching range min./max.		12 V / 250 V AC	
Current switching range min./max.	10 mA / 16 A	10 mA / 10 A	
Load switching range			
AC1 min. / max. DC1 min. / max.	0.6 VA / 4000 VA 0.6 W / see curve hereunder	0.6 VA / 2500 VA 0.6 W / see curve hereunder	
Number of on-load operations	2 x 10 ⁶ resistive	2 x 10 ⁶ resistive	
Number of off-load operations	2 x 10 ⁷	2 x 10 ⁷	
Operating speed	F 5 ms O 5 ms	5 ms 5 ms	
Bounce	4 ms	4 ms	
Insulation coil / contact	4 000 V RMS	4 000 V RMS	
Resistance to shock coil / contact	1.2 / 50 µs - 5 000 V / 500 Ω	1.2 / 50 µs - 5 000 V / 500 Ω	
Insulation contact / contact	2 500 V RMS	2 500 V RMS	
Ambient temperature storage operating	-40°C to +80°C see derating curves		
Other characteristics			
Body material	UL 94 V2		
Wire Solid wire	0 - 2.5 mm ² / 20 - 14 AWG		
size Stranded wire	0 - 2.5 mm ² / 20 - 14 AWG		
Rated wire size	2.5 mm ² / 12 AWG		
Wire stripping length	6 mm .236"		
Recommended screwdriver	3.5 mm .137"		
Protection	IP20 NEMA1		
Recommended torque	0.4 - 0.6 Nm 3.5 - 5.3 lb.in		
Approvals	CE (RM 421 A 24 and 110 V AC/DC - RM 821 A 24 and 110 V AC/DC - RM 1621 A 24 and 110 V AC/DC)		
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6		



Order codes

Description	Type		Order P/N	Packaging	Weight kg
Pluggable 4 relay module 1SPDT high level 16A	RM 421 A	24 V AC/DC	1SNA 020 054 R2400	1	1
Pluggable 4 relay module 1SPDT high level 10A	RM 421 A	48 V AC/DC	1SNA 020 051 R2100	1	1
Pluggable 4 relay module 1SPDT high level 10A	RM 421 A	110 V AC/DC	1SNA 020 052 R2200	1	1
Pluggable 4 relay module 1SPDT high level 10A	RM 421 A	220 V AC/DC	1SNA 020 053 R2300	1	1
Pluggable 8 relay module 1SPDT high level 16A	RM 821 A	24 V AC/DC	1SNA 020 070 R0000	1	1
Pluggable 8 relay module 1SPDT high level 10A	RM 821 A	48 V AC/DC	1SNA 020 067 R2100	1	1
Pluggable 8 relay module 1SPDT high level 10A	RM 821 A	110 V AC/DC	1SNA 020 068 R0200	1	1
Pluggable 8 relay module 1SPDT high level 10A	RM 821 A	220 V AC/DC	1SNA 020 069 R0300	1	1
Pluggable 16 relay module 1SPDT high level 16A	RM 1621 A	24 V AC/DC	1SNA 020 086 R1500	1	1
Pluggable 16 relay module 1SPDT high level 10A	RM 1621 A	48 V AC/DC	1SNA 020 083 R1200	1	1
Pluggable 16 relay module 1SPDT high level 10A	RM 1621 A	110 V AC/DC	1SNA 020 084 R1300	1	1
Pluggable 16 relay module 1SPDT high level 10A	RM 1621 A	220 V AC/DC	1SNA 020 085 R1400	1	1

Accessories

End section				
12 V relay for 24 V 16 A modules 24 V relay for 48 V 10 A modules 60 V relay for 110 V 10 A modules 110 V relay for 220 V 10 A modules	BADL V0	1SNA 399 903 R0200		50
	BAM2 V0	1SNA 399 967 R0100		50
Lengthwise marker		1SNA 175 105 R2100		10
		1SNA 175 007 R2200		10
		1SNA 175 089 R2400		10
		1SNA 175 086 R1100		10
Pivoting marker-holder : quantity 20	PEF	1SNA 020 568 R0400		1
Marker	RC55		see markers	

Relays and optocouplers

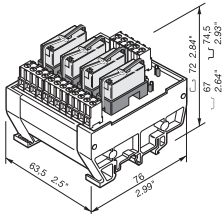
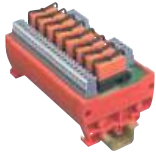
Relay Interfaces

4, 8 and 16 relay modules R20000

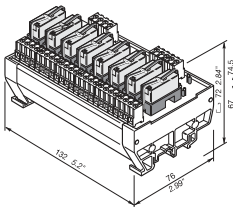


DIN 1-3

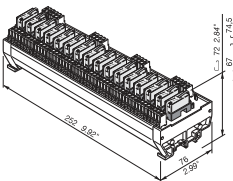
Relay modules R20000



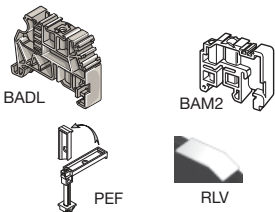
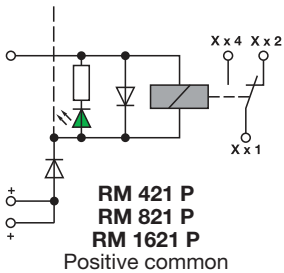
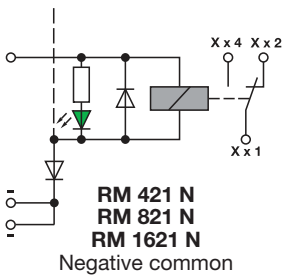
RM 421...



RM 821...



RM 1621...

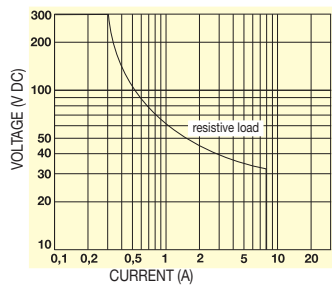


- 4 relays : 1 SPDT low level contact 1 mA to 8 A N or P version - 63,5 mm 2.5" spacing
- 8 relays : 1 SPDT low level contact 1 mA to 8 A N or P version - 132 mm 5.2" spacing
- 16 relays : 1 SPDT low level contact 1 mA to 8 A N or P version - 252 mm 10.0" spacing

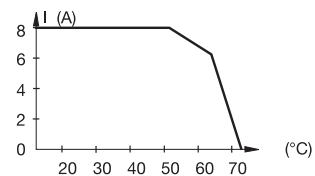
Characteristics

Relay characteristics	RM 421 N	RM 421 P	RM 821 N	RM 821 P	RM 1621 N	RM 1621 P
COIL						
Rated voltage +20%, -15% on DC +10%, -15% on AC				24 V DC		
Frequency						
Power				0.36 W		
Rated current				15 mA		
Drop-out voltage at 20°C				2.4 V		
Permissible leakage current						
Status device				green LED		
CONTACT						
Type				1 SPDT		
Voltage switching range min./max.				5 V / 250 V		
Current switching range min./max.				1 mA / 8 A		
Load switching range				5 mW / 2 000 VA		
AC1 min. / max.				5 mW / see curve hereunder		
DC1 min. / max.						
Number of on-load operations				10 ⁶ resistive		
Number of off-load operations				30 x 10 ⁶		
Operating speed	F					7 ms
	O					3 ms
Bounce				1 ms		
Insulation coil / contact				5 000 V RMS		
Resistance to shock coil / contact						
Insulation contact / contact				2 500 V RMS		
Ambient temperature storage				-40°C to +80°C		
operating				see derating curves		
Other characteristics						
Body material	orange		UL 94 V2			
Wire	Solid wire		0 - 2.5 mm ² / 20 - 14 AWG			
size	Stranded wire		0 - 2.5 mm ² / 20 - 14 AWG			
Rated wire size			2.5 mm ² / 12 AWG			
Wire stripping length			6 mm .236"			
Recommended screwdriver			3.5 mm .137"			
Protection			IP20 NEMA1			
Recommended torque			0.4 - 0.6 Nm 3.5 - 5.3 lb.in			
Approvals			CE			
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6					

Max. DC load breaking capacity



Derating curves



RM 421 N - RM 421 P
RM 821 N - RM 821 P
RM 1621 N - RM 1621 P

Order codes

Description	Type	Order P/N	Packaging Weight kg
4 relay module 1 SPDT pluggable low level(1)	RM 421 N	24 V DC 1SNA 020 604 R0100	1
4 relay module 1 SPDT pluggable low level(2)	RM 421 P	24 V DC 1SNA 020 605 R0200	1
8 relay module 1 SPDT pluggable low level(1)	RM 821 N	24 V DC 1SNA 020 112 R1300	1
8 relay module 1 SPDT pluggable low level(2)	RM 821 P	24 V DC 1SNA 020 114 R1500	1
16 relay module 1 SPDT pluggable low level(1)	RM 1621 N	24 V DC 1SNA 020 113 R1400	1
16 relay module 1 SPDT pluggable low level(2)	RM 1621 P	24 V DC 1SNA 020 115 R1600	1

(1) Negative common - (2) Positive common

Accessories

End section	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Schrack 24 V relay		1SNA 179 208 R2400	10
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Pivoting marker-holder : quantity 20	PEF	1SNA 020 568 R0400	1
Marker	RC55	see markers	

Relays and optocouplers

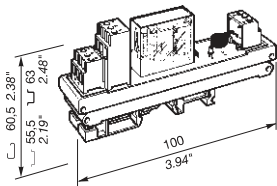
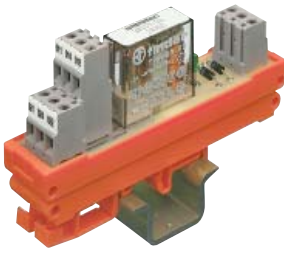
Relay Interfaces

Relay modules R20000

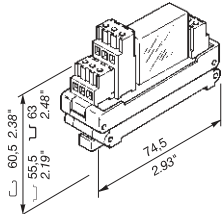


DIN 1-3

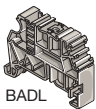
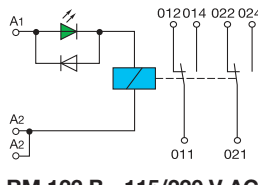
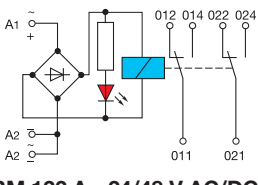
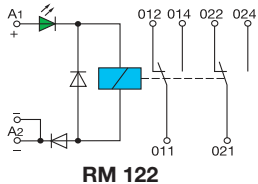
Relay modules R20000



RM 122 A - 24/48 V AC/DC
RM 122 - 24 V DC



RM 122 B - 115/220 V AC



Relay : 1 DPDT high level contact from 10 mA to 8 A - 23 mm .906" spacing

Characteristics

Relay characteristics	RM 122	RM 122 A	RM 122 B
COIL			
Rated voltage +20%, -15% on DC +10%, -15% on AC	24 V DC	24 V AC/DC	115 V AC 220 V AC
Frequency		50/60 Hz	50 Hz 50 Hz
Power	0.6 W	0.7 W	0.9 W 1.3 VA
Rated current	25 mA	30 mA	11 mA 4.3 mA
Drop-out voltage at 20°C	5.6 V DC	3.6 V AC/DC	30 V AC 66 V AC
Permissible leakage current			
Status device	green LED	red LED	green LED

CONTACT

Type	1 DPDT		
Voltage switching range min./max.	12 V / 250 V		
Current switching range min./max.	10 mA / 5 A	10 mA / 5 A	10 mA / 8 A
Load switching range			
AC1 min. / max.	0.6 VA / 1250 VA	0.6 VA / 1250 VA	0.6 VA / 2000 VA
DC1 min. / max.	0.6 W / see curve 1	0.6 W / see curve 1	0.6 W / see curve 2
Number of on-load operations	2 x 10 ⁵ resistive	2 x 10 ⁵ resistive	2 x 10 ⁵ resistive
Number of off-load operations	10 ⁷	10 ⁷	3 x 10 ⁷
Operating speed	F 7 ms	F 7 ms	F 10 ms
	O 4 ms	O 4 ms	O 15 ms
Bounce	3 ms	3 ms	4 ms
Insulation coil / contact	4000 V RMS	4000 V RMS	3000 V RMS
Resistance to shock coil / contact	1500 V RMS	2000 V RMS	1000 V RMS
Insulation contact / contact			
Ambient temperature storage	-40°C to +80°C		
operating	see derating curves		

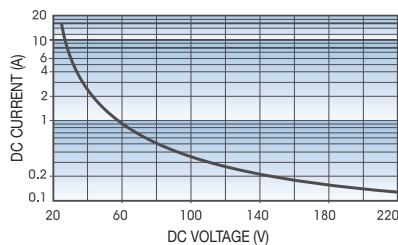
Other characteristics

Body material	orange	UL 94 V2
Wire	Solid wire	0 - 4 mm ² / 20 - 12 AWG
size	Stranded wire	0 - 2.5 mm ² / 20 - 12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		7 mm .276"
Recommended screwdriver		3.5 mm .137"
Protection		IP20 NEMA1
Recommended torque		0.4 - 0.6 Nm 3.5 - 5.3 lb.in
Approvals		CE

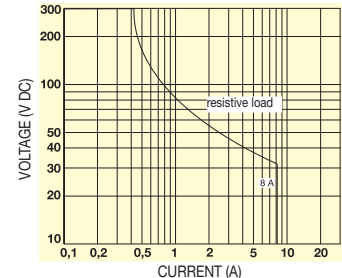
Reference standards

CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6

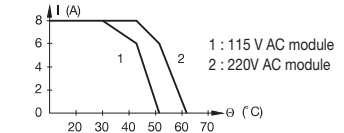
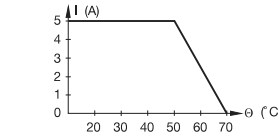
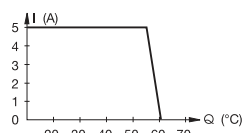
Max. DC load breaking capacity : curve 1



Max. DC load breaking capacity : curve 2



Derating curves



Order codes

Description	Type	Order P/N	Packaging Weight kg	
Relay module 1 DPDT high level	RM 122	24 V DC	1SNA 020 139 R2600	1
Relay module 1 DPDT high level	RM 122 A	24 V AC/DC	1SNA 020 106 R2600	1
Relay module 1 DPDT high level	RM 122 A	48 V AC/DC	1SNA 020 107 R2700	1
Relay module 1 DPDT high level	RM 122 B	115 V AC	1SNA 020 141 R2000	1
Relay module 1 DPDT high level	RM 122 B	220 V AC	1SNA 020 142 R2100	1

Accessories

End section	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	

Relays and optocouplers

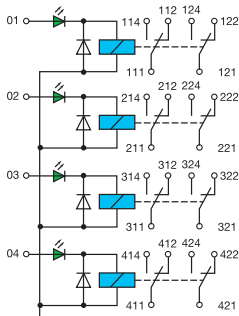
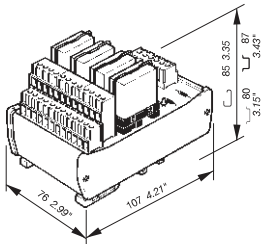
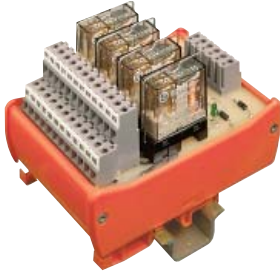
Relay Interfaces

4 relay modules R20000

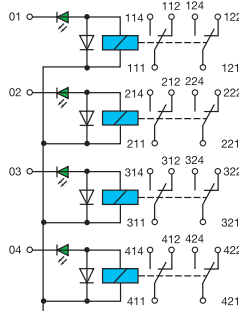


DIN 1-3

Relay modules R20000



RM 422 N



RM 422 P



BADL



BAM2



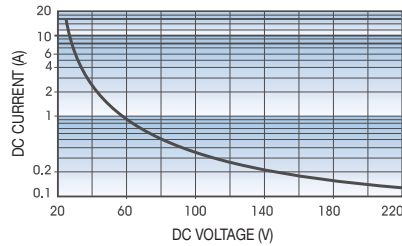
RLV

4 relays : 1 DPDT high level contact from 10 mA to 5 A N or P version - 76 mm 3" spacing

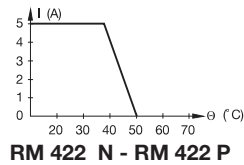
Characteristics

Relay characteristics	RM 422 N - RM 422 P	
	RM 422 N	RM 422 P
COIL		
Rated voltage +20%, -15% on DC +10%, -15% on AC	24 V DC	48 V DC
Frequency		
Power	0.6 W	0.6 W
Rated current	24 mA	13 mA
Drop-out voltage at 20°C	5.6 V DC	8 V DC
Permissible leakage current		
Status device	green LED	
CONTACT		
Type	1 DPDT	
Voltage switching range min./max.	12 V / 250 V	
Current switching range min./max.	10 mA / 5 A	
Load switching range		
AC1 min. / max.	0.6 VA / 1250 VA	
DC1 min. / max.	0.6 W / see curve	
Number of on-load operations	10 ⁵	
Number of off-load operations	2 x 10 ⁷	
Operating speed	7 ms	
	4 ms	
Bounce	3 ms	
Insulation coil / contact	4000 V RMS	
Resistance to shock coil / contact	1500 V RMS	
Insulation contact / contact		
Ambient temperature storage	-40°C to +80°C	
operating	see derating curves	
Other characteristics		
Body material	orange	
Wire	UL 94 V2	
size	Solid wire	
Rated wire size	0 - 4 mm ² / 20 - 12 AWG	
Wire stripping length	0 - 2.5 mm ² / 20 - 12 AWG	
Recommended screwdriver	2.5 mm ² / 12 AWG	
Protection	7 mm .276"	
Recommended torque	3.5 mm .137"	
Approvals	IP20 NEMA1	
	0.4 - 0.6 Nm 3.5 - 5.3 lb.in	
	CE	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6	

Max. DC load breaking capacity



Derating curves



Order codes

Description	Type	Order P/N	Packaging Weight kg
4 relay module 1 DPDT high level negative common	RM 422 N	24 V DC	1 SNA 020 144 R2300
4 relay module 1 DPDT high level positive common	RM 422 P	24 V DC	1 SNA 020 146 R2500
4 relay module 1 DPDT high level negative common	RM 422 N	48 V DC	1 SNA 020 145 R2400
4 relay module 1 DPDT high level positive common	RM 422 P	48 V DC	1 SNA 020 147 R2600

Accessories

End section	BADL V0	1 SNA 399 903 R0200	50
	BAM2 V0	1 SNA 399 967 R0100	50
24 V relay for 24 V module		1 SNA 174 855 R2700	10
48 V relay for 48 V module		1 SNA 174 856 R2000	10
Lengthwise marker	RLV	1 SNA 103 849 R0300	100
Marker	RC55	see markers	

Relays and optocouplers

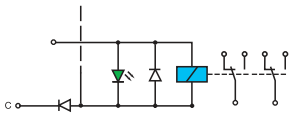
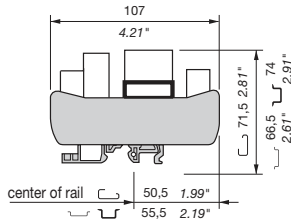
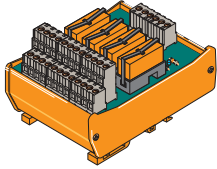
Relay Interfaces

4, 8 and 16 relay modules R20000

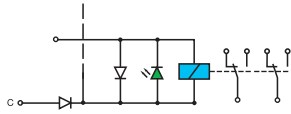


DIN 1-3

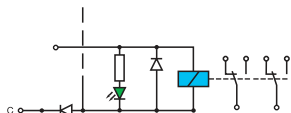
Relay modules R20000



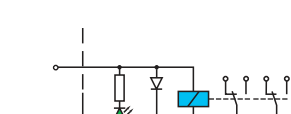
RM 422 N
Negative common



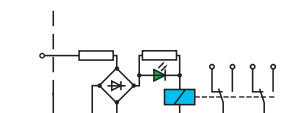
RM 422 P
Positive common



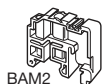
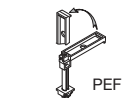
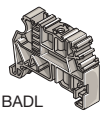
RM 822 N
RM 1622 N
Negative common



RM 822 P
RM 1622 P
Positive common



RM 822 A
RM 1622 A



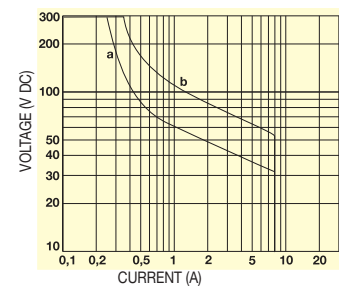
- 4 relays : 1 DPDT high level contact from 100 mA to 4 A - 76 mm 2.99" spacing
- 8 relays : 1 DPDT high level contact from 100 mA to 4 A - 159 mm 6.26" spacing
- 16 relays : 1 DPDT high level contact from 100 mA to 4 A - 300 mm 11.81" spacing

Characteristics

Relay characteristics	RM 422 N	RM 422 P	RM 822 N	RM 822 P	RM 1622 N	RM 1622 P	RM 822 A	RM 1622 A
COIL								
Rated voltage +20%, -15% on DC +10%, -15% on AC	24 V DC				110 V AC/DC			
Frequency					50/60 Hz			
Power	0.5 W				0.77 W			
Rated current	21 mA				7 mA			
Drop-out voltage at 20°C	2.4 V DC				15 V			
Permissible leakage current								
Status device	green LED							
CONTACT								
Type	2 DPDT							
Voltage switching range min./max.	12 V / 250 V AC							
Current switching range min./max.	100 mA / 4 A							
Load switching range	1.2 VA / 1 000 VA							
AC1 min. / max.	12 W / see curve hereunder							
DC1 min. / max.								
Number of on-load operations	2 x 10 ⁶							
Number of off-load operations	30 x 10 ⁶							
Operating speed	F	9 ms			7 ms (DC) / 12 ms (AC)			
	O	12 ms			12 ms			
Bounce	2 ms							
Insulation coil / contact	3.5 kV							
Resistance to shock coil / contact	10 kV							
Insulation contact / contact	2 kV							
Ambient temperature storage operating	-40°C to +80°C see derating curves							
Other characteristics								
Body material	orange							
Wire	UL 94 V2							
Wire size	Solid wire 0 - 2.5 mm ² / 20 - 14 AWG							
size	Stranded wire 0 - 2.5 mm ² / 20 - 14 AWG							
Rated wire size	2.5 mm ² / 12 AWG							
Wire stripping length	6 mm .236"							
Recommended screwdriver	3.5 mm .137"							
Protection	IP20 NEMA1							
Recommended torque	0.4 - 0.6 Nm 3.5 - 5.3 lb.in							
Approvals	CE							

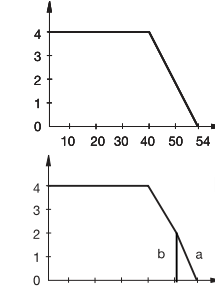
Reference standards CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6

Max. DC load breaking capacity



a : 1 contact
b : 2 serial contacts
2 pole resistive load

Derating curves



RM 422 N
RM 422 P

RM 822 N - RM 1622 N
RM 822 P - RM 1622 P
RM 822 A - RM 1622 A

a : 24 V DC
b : 110 V AC/DC

Order codes

Description	Type		Order P/N	Packaging Weight kg
4 relay module 1 DPDT pluggable high level(1)	RM 422 N	24 V DC	1SNA 020 672 R0400	1
4 relay module 1 DPDT pluggable high level(2)	RM 422 P	24 V DC	1SNA 020 673 R0500	1
8 relay module 1 DPDT pluggable high level(1)	RM 822 N	24 V DC	1SNA 020 149 R0000	1
8 relay module 1 DPDT pluggable high level(2)	RM 822 P	24 V DC	1SNA 020 492 R1100	1
8 relay module 1 DPDT pluggable high level	RM 822 A	110 V AC/DC	1SNA 020 150 R0500	1
16 relay module 1 DPDT pluggable high level(1)	RM 1622 N	24 V DC	1SNA 020 151 R2200	1
16 relay module 1 DPDT pluggable high level(2)	RM 1622 P	24 V DC	1SNA 020 493 R1200	1
16 relay module 1 DPDT pluggable high level	RM 1622 A	110 V AC/DC	1SNA 020 152 R2300	1

(1) Negative common - (2) Positive common

Accessories

End section		Order P/N	Packaging Weight kg
BADL V0		1SNA 399 903 R0200	50
BAM2 V0		1SNA 399 967 R0100	50
Schrack 24 V relay for 24 V module		1SNA 210 021 R2600	10
Schrack 60 V relay for 110 V module		1SNA 210 022 R2700	10
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Pivoting marker-holder : quantity 20	PEF	1SNA 020 568 R0400	1
Marker	RC55	see markers	

Contents

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Optocoupler interfaces	
R600 pluggable optocoupler blocks	313
R500 pluggable optocoupler blocks	317
R900 optocoupler blocks	323
R1800 optocoupler blocks	329
R20000 optocoupler modules	332
R11000 relay-optocoupler blocks	333

Relays and optocouplers

Optocouplers

Coding principle

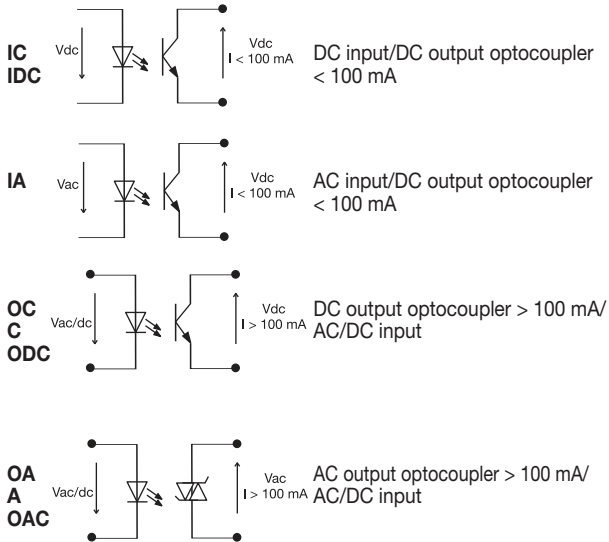
Construction of description type

SERIES	CODE	CONNECTION TYPE	FUNCTION TYPE	MAX. OUTPUT CURRENT (mA)	PARTICULARITIES	INPUT VOLTAGE
R600	O B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
R500	D 2,5/5 O B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
R900	O B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
R1800	E B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
R20000	O M 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

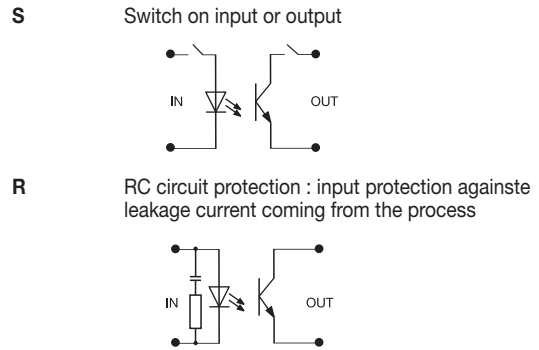
None : screw
 R : spring

IC
 IA
 OC
 OA
 C
 A
 IDC
 ODC
 OAC

Function type description :



Particularities description :



Relays and optocouplers

Optocouplers

Selection guide for optocoupler modules

How to use this selection guide

1 Choose the input voltage of the optocoupler

Input type	Output type	Rated voltage
DC input	DC output	5 V
		12 V
		15 V

2 Choose the AC or DC output voltage of the optocoupler and the current needed

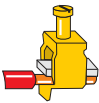
Output type	Rated voltage	Contact type	Input voltage range	Min. output voltage	Output current
DC output	5 V	screw	4,25 to 14,4V	58VDC	100mA
		spring	4,25 to 14,4V	58VDC	100mA
		screw	4,5 to 5,5V	58VDC	30mA
DC output	12 V	screw	4,25 to 14,4V	58VDC	100mA
		spring	4,25 to 14,4V	58VDC	100mA
		screw	10,2 to 28,8V	60VDC	100mA
DC output	15 V	screw	9,6 to 13,2V	53VDC	50mA
		screw	10 to 32V	5V TTL	25mA
		screw	10 to 32V	24V HLL	25mA
DC output	15 V	screw	12 to 16,5V	53VDC	50mA
		screw	12 to 16,5V	53VDC	50mA

3 Verify the connection type, the input voltage range and the spacing

Contact type	Input voltage range	Max. output voltage	Output current	Spacing (mm)
screw	4,25 to 14,4V	58VDC	100mA	6
spring	4,25 to 14,4V	58VDC	100mA	6
screw	4,5 to 5,5V	58VDC	30mA	5,08

4 Go to see the indicated page for more technical data or Use the part number to place an order

Part number	Page
1SNA 645 047 R0000	46
1SNA 645 547 R0200	46
1SNA 607 274 R1300	50



Screw connection



Spring connection

Input type	Output type	Rated voltage	Contact type	Input voltage range	Max. output voltage	Output current	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
Input optocoupler - Output DC voltage, current < 100 mA													
DC input	DC output	5 V	screw	4,25 to 14,4V	58VDC	100mA	6	R600	(pending)	H	OBIC 0100 5-12VDC	1SNA 645 047 R0000	313
			spring	4,25 to 14,4V	58VDC	100mA	6	R600	(pending)	H	OBRIC 0100 5-12VDC	1SNA 645 547 R0200	313
			screw	4,5 to 5,5V	58VDC	30mA	5,08	R500	(pending)	P	D2,5/5-OBIC-0030 5VDC	1SNA 607 274 R1300	317
			screw	4 to 5,5V	53VDC	50mA	18	R1800		VH	EBO3-DC	1SNA 610 230 R1100	329
			screw	4,25 to 14,4V	58VDC	100mA	6	R600	(pending)	H	OBIC 0100 5-12VDC	1SNA 645 047 R0000	313
			spring	4,25 to 14,4V	58VDC	100mA	6	R600	(pending)	H	OBRIC 0100 5-12VDC	1SNA 645 547 R0200	313
		12 V	screw	10,2 to 28,8V	60VDC	100mA	9	R900		VH	OBC 0100-24VDC	1SNA 608 017 R0600	323
			screw	9,6 to 13,2V	53VDC	50mA	18	R1800		VH	EBO3-DC	1SNA 610 230 R1100	329
			screw	10 to 32V	5V TTL	25mA	18	R1800		TTL	EB IDC 5	1SNA 010 031 R1300	331
			screw	10 to 32V	24V HLL	25mA	18	R1800		HLL	EB IDC 24	1SNA 010 033 R1500	331
			screw	12 to 16,5V	53VDC	50mA	18	R1800		VH	EBO3-DC	1SNA 610 230 R1100	329
			24 V	screw	20,4 to 28,8V	58VDC	100mA	6	R600	(pending)	H	OBIC 0100 24VDC	1SNA 645 021 R2600
		spring		20,4 to 28,8V	58VDC	100mA	6	R600	(pending)	H	OBRIC 0100 24VDC	1SNA 645 521 R2000	313
		screw		19,2 to 27,6V	58VDC	30mA	5,08	R500	(pending)	P	D2,5/5-OBIC-0030-24VDC	1SNA 607 210 R1700	317
		screw		10,2 to 28,8V	60VDC	100mA	9	R900		VH	OBC 0100-24VDC	1SNA 608 017 R0600	323
		screw		19,2 to 26,4V	53VDC	50mA	18	R1800		VH	EBO3-DC	1SNA 610 230 R1100	329
		screw		16 to 27,6V	58VDC	100mA	18	R1800			EBO1-24VAC/DC	1SNA 610 022 R2000	330
		screw	10 to 32V	5V TTL	25mA	18	R1800		TTL	EB IDC 5	1SNA 010 031 R1300	331	
screw	10 to 32V	24V HLL	25mA	18	R1800		HLL	EB IDC 24	1SNA 010 033 R1500	331			

Note :
P Pluggable optocouplers
S Switch on input or output

H Max. operating frequency 1000 to 2000 Hz
HLL HLL compatible

VH Max. operating frequency 5000 to 9000 Hz
R Leakage current protection
TTL TTL compatible

High runners in bold characters
 Marine certifications :



Input type	Output type	Rated voltage	Contact type	Input voltage range	Max. output voltage	Output current	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page	
Input optocoupler - Output DC voltage, current < 100 mA														
DC input	DC output	48 V	screw	40,8 to 72V	58VDC	100mA	6	R600			OBIC 0100 48-60VAC/DC	1SNA 645 049 R1200	313	
			spring	40,8 to 72V	58VDC	100mA	6	R600			OBRIC 0100 48-60VAC/DC	1SNA 645 549 R1400	313	
			screw	38,4 to 55,2V	58VDC	30mA	5,08	R500			D2,5/5-OBIC-0030-48VDC	1SNA 607 211 R0400	317	
			screw	40,8 to 57,6V	60VDC	100mA	9	R900			OBC 0100-48VDC	1SNA 608 021 R0200	323	
			screw	38,4 to 52,8V	53VDC	50mA	18	R1800			EBO3-DC	1SNA 610 230 R1100	329	
			screw	29 to 58V	58VDC	100mA	18	R1800			EBO1-48VAC/DC	1SNA 010 048 R0400	330	
		115 V 90 V	screw	40,8 to 72V	58VDC	100mA	6	R600			OBIC 0100 48-60VAC/DC	1SNA 645 049 R1200	313	
			spring	40,8 to 72V	58VDC	100mA	6	R600			OBRIC 0100 48-60VAC/DC	1SNA 645 549 R1400	313	
			screw	97,8 to 276V	58VDC	100mA	6	R600			OBIC 0100 115-230VAC/DC	1SNA 645 022 R2700	313	
			spring	97,8 to 276V	58VDC	100mA	6	R600			OBRIC 0100 115-230VAC/DC	1SNA 645 522 R2100	313	
			125 V	screw	93,5 to 140V	58VDC	30mA	5,08	R500			D2,5/5-OBIC-0030-125VDC	1SNA 607 275 R1400	317
				screw	100 to 143,8V	58VDC	100mA	9	R900			OBC 0100-110VAC/125VDC	1SNA 008 048 R1700	324
		screw		100 to 143,8V	58VDC	100mA	9	R900			OBC 0100-125VDC	1SNA 008 049 R1000	324	
		screw		106 to 150V	58VDC	100mA	9	R900			OBC 0100S-125VDC	1SNA 008 004 R0400	324	
127 V	screw	97,8 to 140V	58VDC	100mA	18	R1800			EBO1-127VAC/DC	1SNA 610 108 R1400	330			
	screw	150 to 253V	58VDC	100mA	18	R1800			EBO1-220VAC/DC	1SNA 610 023 R2100	330			
230 V 220 V	screw	97,8 to 276V	58VDC	100mA	6	R600			OBIC 0100 115-230VAC/DC	1SNA 645 022 R2700	313			
	spring	97,8 to 276V	58VDC	100mA	6	R600			OBRIC 0100 115-230VAC/DC	1SNA 645 522 R2100	313			
	24 V	screw	20,4 to 26,4V	58VDC	30mA	5,08	R500			D2,5/5-OBIA-0030-24VAC	1SNA 607 212 R0500	318		
		screw	12 to 27,6V	58VDC	100mA	18	R1800			EBO1-24VAC/DC	1SNA 610 022 R2000	330		
	48 V	screw	43,2 to 66V	58VDC	100mA	6	R600			OBIC 0100 48-60VAC/DC	1SNA 645 049 R1200	313		
		spring	43,2 to 66V	58VDC	100mA	6	R600			OBRIC 0100 48-60VAC/DC	1SNA 645 549 R1400	313		
screw		40,8 to 52,8V	58VDC	30mA	5,08	R500			D2,5/5-OBIA-0030-48VAC	1SNA 607 213 R0600	318			
screw		20 to 58V	58VDC	100mA	18	R1800			EBO1-48VAC/DC	1SNA 010 048 R0400	330			
60 V	screw	43,2 to 66V	58VDC	100mA	6	R600			OBIC 0100 48-60VAC/DC	1SNA 645 049 R1200	313			
	spring	43,2 to 66V	58VDC	100mA	6	R600			OBRIC 0100 48-60VAC/DC	1SNA 645 549 R1400	313			
110 V	screw	93,5 to 152,4V	60VDC	100mA	9	R900			OBC 0100-110VAC	1SNA 608 024 R0500	323			
	screw	93,5 to 152,4V	58VDC	100mA	9	R900			OBC 0100R-110VAC	1SNA 008 076 R0300	325			
	screw	88 to 126,5V	58VDC	100mA	9	R900			OBC 0100-110VAC/125VDC	1SNA 008 048 R1700	324			
115 V	screw	103,5 to 253V	58VDC	100mA	6	R600			OBIC 0100 115-230VAC/DC	1SNA 645 022 R2700	313			
	spring	103,5 to 253V	58VDC	100mA	6	R600			OBRIC 0100 115-230VAC/DC	1SNA 645 522 R2100	313			
	screw	98 to 126,5V	58VDC	30mA	5,08	R500			D2,5/5-OBIA-0030-115VAC	1SNA 607 214 R0700	318			
127 V	screw	88 to 140V	58VDC	100mA	18	R1800			EBO1-127VAC/DC	1SNA 610 108 R1400	330			
	230 V	screw	130 to 253V	58VDC	100mA	18	R1800			EBO1-220VAC/DC	1SNA 610 023 R2100	330		
		screw	103,5 to 253V	58VDC	100mA	6	R600			OBIC 0100 115-230VAC/DC	1SNA 645 022 R2700	313		
	spring	103,5 to 253V	58VDC	100mA	6	R600			OBRIC 0100 115-230VAC/DC	1SNA 645 522 R2100	313			
	screw	195,5 to 253V	58VDC	30mA	5,08	R500			D2,5/5-OBIA-0030-230VAC	1SNA 607 215 R0000	318			
	screw	184 to 264,5V	60VDC	100mA	9	R900			OBC 0100-230VAC	1SNA 608 027 R0000	323			
screw	195 to 253V	58VDC	100mA	9	R900			OBC 0100R-230VAC	1SNA 008 077 R0400	325				
Output optocoupler - Output DC voltage, current > 100 mA														
DC input	DC output	5 V	screw	4,25 to 14,4V	58VDC	2A	6	R600		H	OBOC 1000-5-12VDC	1SNA 645 050 R1700	314	
			spring	4,25 to 14,4V	58VDC	2A	6	R600		H	OBROC 1000-5-12VDC	1SNA 645 550 R1100	314	
			screw	4,5 to 5,5V	58VDC	100mA	5,08	R500		P	D2,5/5-OBOC-0100-5VDC	1SNA 607 203 R1500	319	
			screw	4,5 to 5,5V	58VDC	1A	5,08	R500		P, H	D2,5/5-OBOC-1000-5VDC	1SNA 607 206 R1000	320	
			screw	4,5 to 5,5V	30VDC	2A	5,08	R500		P, H	D2,5/5-OBOC-2000-5VDC	1SNA 607 208 R2200	321	
			screw	4,5 to 5,5V	60VDC	1A	9	R900		VH	OBC 1000-5VDC	1SNA 608 014 R2200	326	
		12 V	screw	4,25 to 14,4V	58VDC	2A	6	R600		H	OBOC 1000-5-12VDC	1SNA 645 050 R1700	314	
			spring	4,25 to 14,4V	58VDC	2A	6	R600		H	OBROC 1000-5-12VDC	1SNA 645 550 R1100	314	
			screw	10,2 to 28,8V	60VDC	1A	9	R900		VH	OBC 1000-24VDC	1SNA 608 018 R1700	326	
			24 V	screw	20,4 to 28,8V	58VDC	2A	6	R600		H	OBOC 1000-24VDC	1SNA 645 051 R0400	314
				screw	20,4 to 28,8V	58VDC	2A	6	R600		H	OBOC 1500-24VAC/DC	1SNA 645 025 R2200	314
				screw	20,4 to 28,8V	58VDC	5A	6	R600		H	OBOC 5000-24VDC	1SNA 645 024 R2100	315
		spring		20,4 to 28,8V	58VDC	2A	6	R600		H	OBROC 1000-24VDC	1SNA 645 551 R0600	314	
		spring		20,4 to 28,8V	58VDC	2A	6	R600		H	OBROC 1500-24VAC/DC	1SNA 645 525 R2400	314	
		spring		20,4 to 28,8V	58VDC	5A	6	R600		H	OBROC 5000-24VDC	1SNA 645 524 R2300	315	
		24 V	screw	20,4 to 28,8V	58VDC	100mA	5,08	R500			D2,5/5-OBOC-0100-24VDC	1SNA 607 204 R1600	319	
			screw	20,4 to 28,8V	58VDC	1A	5,08	R500		H	D2,5/5-OBOC-1000-24VDC	1SNA 607 207 R1100	320	
			screw	20,4 to 28,8V	58VDC	1A	5,08	R500		P	D2,5/5-OBOC-1000-24VAC/DC	1SNA 607 250 R2700	320	
			screw	20,4 to 28,8V	30VDC	2A	5,08	R500		P, H	D2,5/5-OBOC-2000-24VDC	1SNA 607 209 R2300	321	
			screw	20,4 to 28,8V	30VDC	2A	5,08	R500		P	D2,5/5-OBOC-2000-24VAC/DC	1SNA 607 255 R1000	321	
			screw	10,2 to 28,8V	60VDC	1A	9	R900		VH	OBC 1000-24VDC	1SNA 608 018 R1700	326	
			screw	19,2 to 28,8V	58VDC	5A	9	R900			ORC 111-24VDC	1SNA 608 068 R2100	328	

Note :
P Pluggable optocouplers
S Switch on input or output
H Max. operating frequency 1000 to 2000 Hz
HLL HLL compatible
VH Max. operating frequency 5000 to 9000 Hz
R Leakage current protection
TTL TTL compatible

High runners in bold characters
Marine certifications : GL, LRS

Input type	Output type	Rated voltage	Contact type	Input voltage range	Max. output voltage	Output current	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page			
Output optocoupler - Output DC voltage, current > 100 mA																
DC input	DC output	24 V	screw	19,2 to 28,8V	60VDC	1A	18	R1800		HLL	EB ODC 24	1SNA 010 039 R2300	331			
			screw	9,6 to 30V	60VDC	3A	12,7	R20000			OM1C3-24VAC/DC	1SNA 020 361 R0400	332			
		48 V	screw	40,8 to 72V	58VDC	2A	6	R600				OBOC 1000-48-60VAC/DC	1SNA 645 053 R0600	314		
			spring	40,8 to 72V	58VDC	2A	6	R600				OBROC 1000-48-60VAC/DC	1SNA 645 553 R0000	314		
			screw	40,8 to 57,6V	58VDC	100mA	5,08	R500			P	D2,5/5-OBOC-0100-48VDC	1SNA 607 205 R1700	319		
			screw	40,8 to 57,6V	58VDC	1A	5,08	R500			P	D2,5/5-OBOC-1000-48VAC/DC	1SNA 607 251 R1400	320		
			screw	40,8 to 57,6V	30VDC	2A	5,08	R500			P	D2,5/5-OBOC-2000-48VAC/DC	1SNA 607 256 R1100	321		
			screw	40,8 to 57,6V	60VDC	1A	9	R900			VH	OBC 1000-48VDC	1SNA 608 022 R0300	326		
		60 V	screw	40,8 to 72V	58VDC	2A	6	R600				OBOC 1000-48-60VAC/DC	1SNA 645 053 R0600	314		
			spring	40,8 to 72V	58VDC	2A	6	R600				OBROC 1000-48-60VAC/DC	1SNA 645 553 R0000	314		
		115 V	screw	97,8 to 138V	58VDC	2A	6	R600				OBOC 1000-115VAC/DC	1SNA 645 054 R0700	314		
			screw	97,8 to 138V	58VDC	5A	6	R600				OBOC 5000-115VAC/DC	1SNA 645 058 R1300	315		
			spring	97,8 to 138V	58VDC	2A	6	R600				OBROC 1000-115VAC/DC	1SNA 645 554 R0100	314		
			spring	97,8 to 138V	58VDC	5A	6	R600				OBROC 5000-115VAC/DC	1SNA 645 558 R1500	315		
		230 V	screw	195 to 276V	58VDC	2A	6	R600				OBOC 1000-230VAC/DC	1SNA 645 026 R2300	314		
			screw	195 to 276V	58VDC	5A	6	R600				OBOC 5000-230VAC/DC	1SNA 645 059 R1400	315		
			spring	195 to 276V	58VDC	2A	6	R600				OBROC 1000-230VAC/DC	1SNA 645 526 R2500	314		
			spring	195 to 276V	58VDC	5A	6	R600				OBROC 5000-230VAC/DC	1SNA 645 559 R1600	315		
		AC input	DC output	24 V	screw	21,6 to 26,4V	58VDC	2A	6	R600				OBOC 1500-24VAC/DC	1SNA 645 025 R2200	314
					spring	21,6 to 26,4V	58VDC	2A	6	R600				OBROC 1500-24VAC/DC	1SNA 645 525 R2400	314
					screw	21,6 to 26,4V	58VDC	1A	5,08	R500			P	D2,5/5-OBOC-1000-24VAC/DC	1SNA 607 250 R2700	320
					screw	21,6 to 26,4V	30VDC	2A	5,08	R500			P	D2,5/5-OBOC-2000-24VAC/DC	1SNA 607 255 R1000	321
				48 V	screw	9,6 to 30V	60VDC	3A	12,7	R20000				OM1C3-24VAC/DC	1SNA 020 361 R0400	332
					screw	43,2 to 66V	58VDC	2A	6	R600				OBOC 1000-48-60VAC/DC	1SNA 645 053 R0600	314
spring	43,2 to 66V				58VDC	2A	6	R600				OBROC 1000-48-60VAC/DC	1SNA 645 553 R0000	314		
screw	43,2 to 66V				58VDC	1A	5,08	R500			P	D2,5/5-OBOC-1000-48VAC/DC	1SNA 607 251 R1400	320		
60 V	screw			43,2 to 66V	30VDC	2A	5,08	R500			P	D2,5/5-OBOC-2000-48VAC/DC	1SNA 607 256 R1100	321		
	spring			43,2 to 66V	58VDC	2A	6	R600				OBOC 1000-48-60VAC/DC	1SNA 645 053 R0600	314		
110 V	screw			43,2 to 66V	58VDC	2A	6	R600				OBROC 1000-48-60VAC/DC	1SNA 645 553 R0000	314		
	spring			43,2 to 66V	58VDC	2A	6	R600				OBROC 1000-48-60VAC/DC	1SNA 645 553 R0000	314		
115 V	screw			99 to 121V	58VDC	1A	5,08	R500			P	D2,5/5-OBOC-1000-110VAC	1SNA 607 270 R2300	320		
	screw			99 to 121V	58VDC	2A	5,08	R500			P	D2,5/5-OBOC-2000-110VAC	1SNA 607 272 R1100	321		
	screw			93,5 to 152,4V	60VDC	1A	9	R900				OBC 1000-110VAC	1SNA 608 025 R0600	326		
	spring			103,5 to 126,5V	58VDC	2A	6	R600				OBOC 1000-115VAC/DC	1SNA 645 054 R0700	314		
115 V	screw			103,5 to 126,5V	58VDC	5A	6	R600				OBOC 5000-115VAC/DC	1SNA 645 058 R1300	315		
	spring			103,5 to 126,5V	58VDC	2A	6	R600				OBROC 1000-115VAC/DC	1SNA 645 554 R0100	314		
	spring			103,5 to 126,5V	58VDC	5A	6	R600				OBROC 5000-115VAC/DC	1SNA 645 558 R1500	315		
	spring			103,5 to 126,5V	58VDC	5A	6	R600				OBROC 5000-115VAC/DC	1SNA 645 558 R1500	315		
230 V	screw			207 to 253V	58VDC	2A	6	R600				OBOC 1000-230VAC/DC	1SNA 645 026 R2300	314		
	screw			207 to 253V	58VDC	5A	6	R600				OBOC 5000-230VAC/DC	1SNA 645 059 R1400	315		
	spring			207 to 253V	58VDC	2A	6	R600				OBROC 1000-230VAC/DC	1SNA 645 526 R2500	314		
	spring			207 to 253V	58VDC	5A	6	R600				OBROC 5000-230VAC/DC	1SNA 645 559 R1600	315		
	screw	207 to 253V	58VDC	1A	5,08	R500			P	D2,5/5-OBOC-1000-230VAC	1SNA 607 271 R1000	320				
	screw	207 to 253V	58VDC	2A	5,08	R500			P	D2,5/5-OBOC-2000-230VAC	1SNA 607 273 R1200	321				
screw	195 to 264,5V	60VDC	1A	9	R900				OBC 1000-230VAC	1SNA 608 028 R1100	326					
Output optocoupler - Output AC voltage, current > 1 A																
DC input	AC output	5 V	screw	4,5 to 5,5V	253VAC	1A	9	R900				OBA 1000-5VDC	1SNA 608 015 R0400	327		
			screw	4,5 to 6V	280VAC	1A	18	R1800			TTL	EB OAC 5	1SNA 010 034 R1600	331		
		12 V	screw	10,2 to 28,8V	253VAC	1A	9	R900				OBA 1000-24VDC	1SNA 608 019 R1000	327		
			screw	20,4 to 28,8V	400VAC	1A	6	R600				OBOA 1000-24VDC	1SNA 645 027 R2400	316		
		24 V	screw	20,4 to 28,8V	230VAC	2A	12	R600				OBOA 2000-24VDC	1SNA 645 029 R0600	316		
			spring	20,4 to 28,8V	400VAC	1A	6	R600				OBROA 1000-24VDC	1SNA 645 527 R2600	316		
			spring	20,4 to 28,8V	230VAC	2A	12	R600				OBROA 2000-24VDC	1SNA 645 529 R0000	316		
			screw	20,4 to 28,8V	253VAC	1A	5,08	R500			P	D2,5/5-OBOA-1000-24VDC	1SNA 607 238 R1700	322		
			screw	20,4 to 28,8V	253VAC	1A	5,08	R500			P	D2,5/5-OBOA-1000-24VAC/DC	1SNA 607 240 R2500	322		
			screw	10,2 to 28,8V	253VAC	1A	9	R900				OBA 1000-24VDC	1SNA 608 019 R1000	327		
			screw	19,2 to 28,8V	135VAC	5A	9	R900				ORA 111-24VDC	1SNA 608 069 R2200	328		
			screw	19,2 to 28,8V	280VAC	1A	18	R1800				EB OAC 24	1SNA 010 036 R1000	331		
			screw	9,6 to 30V	280VAC	3A	12,7	R20000				OM1A3-24VAC/DC	1SNA 020 365 R0000	332		
			48 V	screw	40,8 to 72V	400VAC	1A	6	R600				OBOA 1000-48-60VAC/DC	1SNA 645 061 R0600	316	
		spring		40,8 to 72V	400VAC	1A	6	R600				OBROA 1000-48-60VAC/DC	1SNA 645 561 R0000	316		
		screw		40,8 to 57,6V	253VAC	1A	5,08	R500			P	D2,5/5-OBOA-1000-48VAC/DC	1SNA 607 241 R1200	322		
		screw		40,8 to 57,6V	253VAC	1A	9	R900				OBA 1000-48VDC	1SNA 608 023 R0400	327		
		60 V	screw	40,8 to 72V	400VAC	1A	6	R600				OBOA 1000-48-60VAC/DC	1SNA 645 061 R0600	316		
			spring	40,8 to 72V	400VAC	1A	6	R600				OBROA 1000-48-60VAC/DC	1SNA 645 561 R0000	316		
		115 V	screw	97,8 to 138V	400VAC	1A	6	R600				OBOA 1000-115VAC/DC	1SNA 645 062 R0700	316		
			spring	97,8 to 138V	400VAC	1A	6	R600				OBROA 1000-115VAC/DC	1SNA 645 562 R0100	316		

Note :
P Pluggable optocouplers
S Switch on input or output

H Max. operating frequency 1000 to 2000 Hz
HLL HLL compatible

VH Max. operating frequency 5000 to 9000 Hz
R Leakage current protection
TTL TTL compatible

High runners in bold characters
Marine certifications :



Input type	Output type	Rated voltage	Contact type	Input voltage range	Max. output voltage	Output current	Spacing (mm)	Series	Available approvals	Particularities	Product type	Part number	Page
Output optocoupler - Output AC voltage, current > 1 A													
DC	AC	230 V	screw	195 to 276V	400VAC	1A	6	R600	(pending) LRS		OBOA 1000-230VAC/DC	1SNA 645 028 R0500	316
			spring	195 to 276V	400VAC	1A	6	R600	(pending) LRS		OBROA 1000-230VAC/DC	1SNA 645 528 R0700	316
AC input	AC output	24 V	screw	21,6 to 26,4V	253VAC	1A	5,08	R500	(pending)	P	D2,5/5-OBOA-1000-24VAC/DC	1SNA 607 240 R2500	322
			spring	9,6 to 30V	280VAC	3A	12,7	R20000	(pending)		OM1A3-24VAC/DC	1SNA 020 365 R0000	332
		48 V	screw	43,2 to 66V	400VAC	1A	6	R600	(pending) LRS		OBOA 1000-48-60VAC/DC	1SNA 645 061 R0600	316
			spring	43,2 to 66V	400VAC	1A	6	R600	(pending) LRS		OBROA 1000-48-60VAC/DC	1SNA 645 561 R0000	316
			spring	43,2 to 53V	253VAC	1A	5,08	R500	(pending)	P	D2,5/5-OBOA-1000-48VAC/DC	1SNA 607 241 R1200	322
		60 V	screw	43,2 to 66V	400VAC	1A	6	R600	(pending) LRS		OBOA 1000-48-60VAC/DC	1SNA 645 061 R0600	316
			spring	43,2 to 66V	400VAC	1A	6	R600	(pending) LRS		OBROA 1000-48-60VAC/DC	1SNA 645 561 R0000	316
		110 V	screw	99 to 121V	253VAC	1A	5,08	R500	(pending)	P	D2,5/5-OBOA-1000-110VAC	1SNA 607 268 R2500	322
			screw	93,5 to 152,4V	253VAC	1A	9	R900			OBA 1000-110VAC	1SNA 608 026 R0700	327
			screw	103,5 to 128,5V	400VAC	1A	6	R600	(pending) LRS		OBOA 1000-115VAC/DC	1SNA 645 062 R0700	316
			spring	103,5 to 128,5V	400VAC	1A	6	R600	(pending) LRS		OBROA 1000-115VAC/DC	1SNA 645 562 R0100	316
		230 V	screw	207 to 253V	400VAC	1A	6	R600	(pending) LRS		OBOA 1000-230VAC/DC	1SNA 645 028 R0500	316
			spring	207 to 253V	400VAC	1A	6	R600	(pending) LRS		OBROA 1000-230VAC/DC	1SNA 645 528 R0700	316
			spring	207 to 253V	253VAC	1A	5,08	R500	(pending)	P	D2,5/5-OBOA-1000-230VAC	1SNA 607 269 R2600	322

6

P Pluggable optocouplers
S Switch on input or output

H Max. operating frequency 1000 to 2000 Hz
HLL HLL compatible

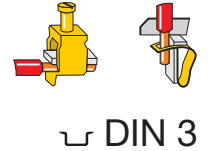
VH Max. operating frequency 5000 to 9000 Hz
R Leakage current protection
TTL TTL compatible

High runners in bold characters
Marine certifications : @ GL, LRS

Relays and optocouplers

Optocouplers

R600

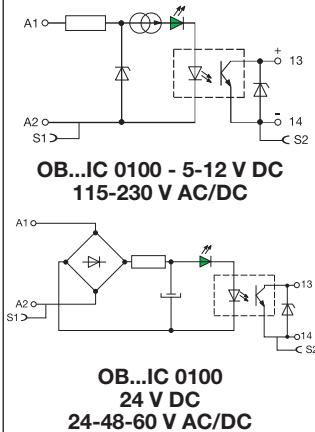
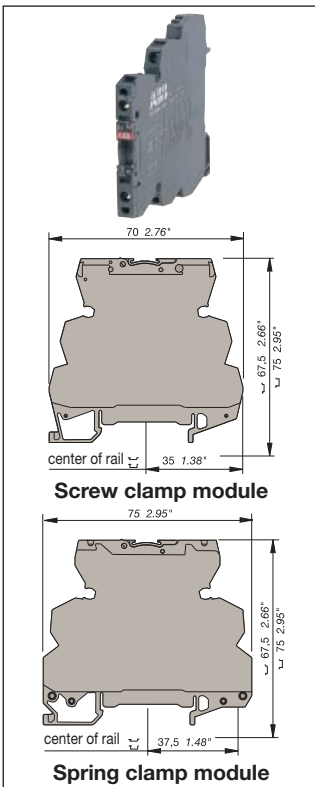


Optocoupler : 5 to 58 V DC output / 100 mA - 6 mm .236" spacing

Characteristics

Opto. characteristics	OB...IC 0100							
	5 V DC - 12 V DC		24 V DC	48 V AC/DC 50 / 60 Hz	60 V AC/DC 50 / 60 Hz	115 V AC/DC 50 / 60 Hz	230 V AC/DC 50 / 60 Hz	230 V AC/DC 50 / 60 Hz
INPUT								
Input voltage +20% -15% on DC, +10% -10% on AC	5 V DC - 12 V DC		24 V DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	230 V AC/DC	230 V AC/DC
Frequency				50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Input current AC/DC	5 mA	9 mA	4 mA	4 mA	5 mA	7 mA / 16mA	11.5 mA/25 mA	11.5 mA/25 mA
Pull-in voltage at Is=100%	4 V	4 V	15 V	25 V	25 V	60 VAC/70 VDC	60 VAC/70 VDC	60 VAC/70 VDC
Switching time C / O	10 µs / 500 µs		10 µs / 500 µs	5 ms / 20 ms		5 ms / 15 ms		
Operating frequency	1000 Hz		1000 Hz	20 Hz		20 Hz		
Permissible leakage current								
OUTPUT	0,9 mA		1 mA	0,9 mA		1,6 mA		
Output voltage	4,5 to 58 VDC							
Output current min.	1 mA							
Output current max.	100 mA							
Output leakage current at Umax.	< 50 µA							
Residual voltage at I max and U rated	1 V							
	typical							
	max.							
Frequency on inductive load	1,3 V							
Isolation Input / Output	2500 V RMS							
TEMPERATURE								
Ambient temperature storage	-40°C to +80°C							
operating	-20°C to +70°C (1)							
Other characteristics	Screw clamp				Spring clamp			
Body material	grey				grey			
Wire size	Solid wire				UL 94 V0			
Stranded wire	0,2 - 4 mm ² / 24 - 12 AWG				UL 94 V0			
Rated wire size	0,22 - 2,5 mm ² / 24 - 12 AWG				0,2 - 2,5 mm ² / 24 - 12 AWG			
Wire stripping length	2,5 mm ² / 12 AWG				0,22 - 2,5 mm ² / 24 - 12 AWG			
Recommended screwdriver	9 mm .354"				2,5 mm ² / 12 AWG			
Protection	3,5 mm .137"				9 mm .354"			
Recommended torque	IP20 NEMA1				3,5 mm .137"			
	0,4 - 0,6 Nm 3.5 - 5.3 lb.in				IP20 NEMA1			
	0,4 - 0,6 Nm 3.5 - 5.3 lb.in				0,4 - 0,6 Nm 3.5 - 5.3 lb.in			
Approvals	c us, (pending), , LRS,							
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.							

(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.



Order codes

Description	Type	Order P/N	Packaging	Weight
			kg	kg
Optocoupler module 100 mA/DC	OBIC 0100-5-12VDC	1SNA 645 047 R0000	10	0,02
Optocoupler module 100 mA/DC	OBIC 0100-24VDC	1SNA 645 021 R2600	10	0,02
Optocoupler module 100 mA/DC	OBIC 0100-48-60VAC/DC	1SNA 645 049 R1200	10	0,02
Optocoupler module 100 mA/DC	OBIC 0100-115-230VAC/DC	1SNA 645 022 R2700	10	0,02
Optocoupler module 100 mA/DC	OBRIC 0100-5-12VDC	1SNA 645 547 R0200	10	0,02
Optocoupler module 100 mA/DC	OBRIC 0100-24VDC	1SNA 645 521 R2000	10	0,02
Optocoupler module 100 mA/DC	OBRIC 0100-48-60VAC/DC	1SNA 645 549 R1400	10	0,02
Optocoupler module 100 mA/DC	OBRIC 0100-115-230VAC/DC	1SNA 645 522 R2100	10	0,02

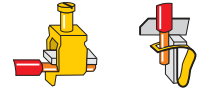
Accessories

End section	BADH V0	1SNA 116 900 R2700	50
	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Separator end section	SC 612	1SNA 290 474 R0200	10
Divisible shunt 10 poles	BJ 612-10	1SNA 290 488 R0100	10
	BJ 612-70	1SNA 290 489 R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1SNA 645 031 R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1SNA 645 531 R2200	5
Test plug DIA. 2 mm	FC2	1SNA 007 865 R2600	10
Marking method	RC65 RC610	see marking	

Relays and optocouplers

Optocouplers

R600



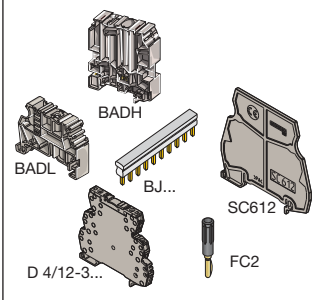
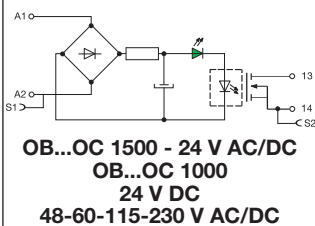
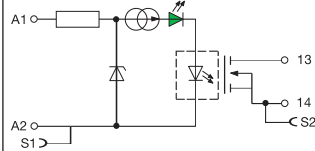
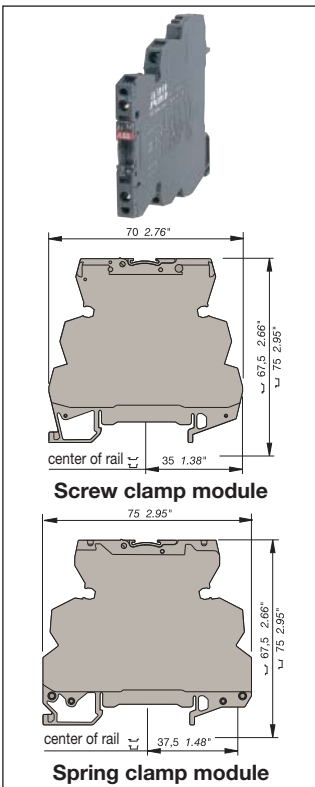
DIN 3

Optocoupler : 5 to 58 V DC output / 2 A - 6 mm .236" spacing

Characteristics

Opto. characteristics	OB...OC 1000		OB...OC 1500	OB...OC 1000				
	INPUT		INPUT	INPUT	INPUT	INPUT	INPUT	
Input voltage +20% -15% on DC, +10% -10% on AC	5 V DC - 12 V DC		24 V DC	24 V AC/DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	230 V AC/DC
Frequency	5 mA 9 mA		5,4 mA	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Input current	4 V		12 V	6,3 mA	4 mA	5,1 mA	4,2 mA	4 mA
Pull-in voltage at Is=100%	15 µs / 250 µs		30 µs/400 µs	1 ms/7 ms	5 ms/20 ms	5 ms/20 ms	500 µs/10 ms	1 ms / 15 ms
Switching time C / O	2000 Hz		1000 Hz	60 Hz	20 Hz	20 Hz	50 Hz	35 Hz
Operating frequency	1 mA		0,8 mA	0,9 mA	1 mA	1 mA	0,3 mA	0,3 mA
Permissible leakage current								
OUTPUT								
Output voltage								4,5 to 58 VDC
Output current min.								1 mA
Output current max.								2 A
Output leakage current at Umax.								< 50 µA
Residual voltage at I max and U rated								0,1 V typical max.
Frequency on inductive load								0,5 V
Isolation Input / Output								2500 V RMS
TEMPERATURE								
Ambient temperature storage								-40°C to +80°C
operating								-20°C to +70°C (1)
Other characteristics								
Body material	grey							
Wire size	Solid wire		0,2 - 4 mm ² / 24 - 12 AWG					0,2 - 2,5 mm ² / 24 - 12 AWG
Stranded wire			0,22 - 2,5 mm ² / 24 - 12 AWG					0,22 - 2,5 mm ² / 24 - 12 AWG
Rated wire size			2,5 mm ² / 12 AWG					2,5 mm ² / 12 AWG
Wire stripping length			9 mm .354"					9 mm .354"
Recommended screwdriver			3,5 mm .137"					3,5 mm .137"
Protection			IP20 NEMA1					IP20 NEMA1
Recommended torque			0,4 - 0,6 Nm 3.5 - 5.3 lb.in					0,4 - 0,6 Nm 3.5 - 5.3 lb.in
Approvals								UL, CE, LRS, etc.
Reference standards								CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.



Order codes

Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 2 A/DC	OBOC 1000-5-12VDC	1 SNA 645 050 R1700	10	0,02
Optocoupler module 2 A/DC	OBOC 1000-24VDC	1 SNA 645 051 R0400	10	0,02
Optocoupler module 2 A/DC	OBOC 1500-24VAC/DC	1 SNA 645 025 R2200	10	0,02
Optocoupler module 2 A/DC	OBOC 1000-48-60VAC/DC	1 SNA 645 053 R0600	10	0,02
Optocoupler module 2 A/DC	OBOC 1000-115VAC/DC	1 SNA 645 054 R0700	10	0,02
Optocoupler module 2 A/DC	OBOC 1000-230VAC/DC	1 SNA 645 026 R2300	10	0,02
Optocoupler module 2 A/DC	OBROC 1000-5-12VDC	1 SNA 645 550 R1100	10	0,02
Optocoupler module 2 A/DC	OBROC 1000-24VDC	1 SNA 645 551 R0600	10	0,02
Optocoupler module 2 A/DC	OBROC 1500-24VAC/DC	1 SNA 645 525 R2400	10	0,02
Optocoupler module 2 A/DC	OBROC 1000-48-60VAC/DC	1 SNA 645 553 R0000	10	0,02
Optocoupler module 2 A/DC	OBROC 1000-115VAC/DC	1 SNA 645 554 R0100	10	0,02
Optocoupler module 2 A/DC	OBROC 1000-230VAC/DC	1 SNA 645 526 R2500	10	0,02

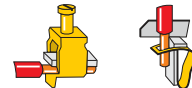
Accessories

End section	BADH V0	1 SNA 116 900 R2700	50
	BADL V0	1 SNA 399 903 R0200	50
	BAM2 V0	1 SNA 399 967 R0100	50
Separator end section	SC 612	1 SNA 290 474 R0200	10
Divisible shunt 10 poles	BJ 612-10	1 SNA 290 488 R0100	10
	BJ 612-70	1 SNA 290 489 R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1 SNA 645 031 R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1 SNA 645 531 R2200	5
Test plug DIA. 2 mm	FC2	1 SNA 007 865 R2600	10
Marking method	RC65 RC610	see marking	

Relays and optocouplers

Optocouplers

R600



DIN 3

Optocoupler : 5 to 58 V DC output / 5 A - 6 mm .236" spacing

Characteristics

Opto. characteristics	OB...OC 5000			
INPUT				
Input voltage +20% -15% on DC, +10% -10% on AC	24 V DC			115 V AC/DC 50 / 60 Hz 230 V AC/DC 50 / 60 Hz
Frequency				4,2 mA 4 mA
Input current	5,4 mA			50 V 80 V
Pull-in voltage at Is=100%	12 V			500 µs/10 ms 1 ms / 15 ms
Switching time C / O	30 µs/400 µs			50 Hz 35 Hz
Operating frequency	1000 Hz			0,3 mA 0,3 mA
Permissible leakage current	0,8 mA			

OUTPUT

Output voltage	4,5 to 58 VDC			
Output current min.	1 mA			
Output current max.	5 A			
Output leakage current at Umax.	< 50 µA			
Residual voltage at I max and U rated	typical 0,1 V max. 0,5 V			
Frequency on inductive load				
Isolation Input / Output	2500 V RMS			

TEMPERATURE

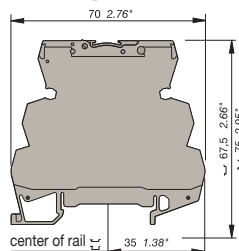
Ambient temperature storage	-40°C to +80°C			
operating	-20°C to +70°C (1)			

Other characteristics

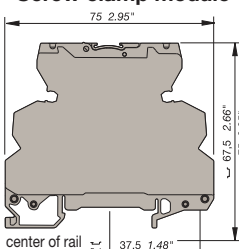
	Screw clamp	Spring clamp
Body material	grey UL 94 V0	grey UL 94 V0
Wire size	Solid wire 0,2 - 4 mm ² / 24 - 12 AWG	0,2 - 2,5 mm ² / 24 - 12 AWG
Stranded wire	0,22 - 2,5 mm ² / 24 - 12 AWG	0,22 - 2,5 mm ² / 24 - 12 AWG
Rated wire size	2,5 mm ² / 12 AWG	2,5 mm ² / 12 AWG
Wire stripping length	9 mm .354"	9 mm .354"
Recommended screwdriver	3,5 mm .137"	3,5 mm .137"
Protection	IP20 NEMA1	IP20 NEMA1
Recommended torque	0,4 - 0,6 Nm 3,5 - 5,3 lb.in	0,4 - 0,6 Nm 3,5 - 5,3 lb.in

Approvals	UL, CE (pending), LRS, CE			
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.			

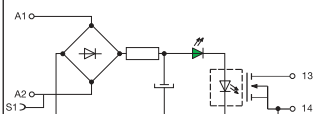
(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.



Screw clamp module



Spring clamp module



OB...OC 5000
24 V DC
24-48-60-115-230 V AC/DC

Order codes

Description	Type	Order P/N	Packaging	Weight
Optocoupler module 5 A/DC	OBOC 5000-24VDC	1 SNA 645 024 R2100	10	0,02
Optocoupler module 5 A/DC	OBOC 5000-115VAC/DC	1 SNA 645 058 R1300	10	0,02
Optocoupler module 5 A/DC	OBOC 5000-230VAC/DC	1 SNA 645 059 R1400	10	0,02
Optocoupler module 5 A/DC	OBROC 5000-24VDC	1 SNA 645 524 R2300	10	0,02
Optocoupler module 5 A/DC	OBROC 5000-115VAC/DC	1 SNA 645 558 R1500	10	0,02
Optocoupler module 5 A/DC	OBROC 5000-230VAC/DC	1 SNA 645 559 R1600	10	0,02

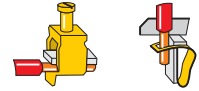
Accessories

End section	BADH V0	1 SNA 116 900 R2700	50
	BADL V0	1 SNA 399 903 R0200	50
	BAM2 V0	1 SNA 399 967 R0100	50
Separator end section	SC 612	1 SNA 290 474 R0200	10
Divisible shunt 10 poles	BJ 612-10	1 SNA 290 488 R0100	10
	BJ 612-70	1 SNA 290 489 R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1 SNA 645 031 R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1 SNA 645 531 R2200	5
Test plug DIA. 2 mm	FC2	1 SNA 007 865 R2600	10
Marking method	RC65 RC610	see marking	

Relays and optocouplers

Optocouplers

R600



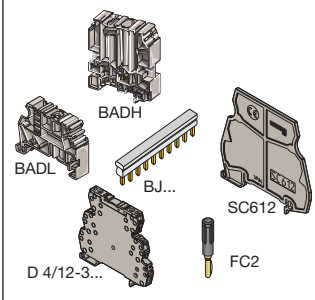
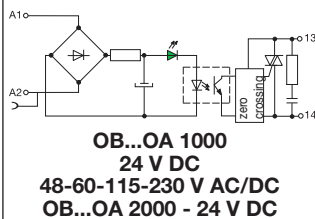
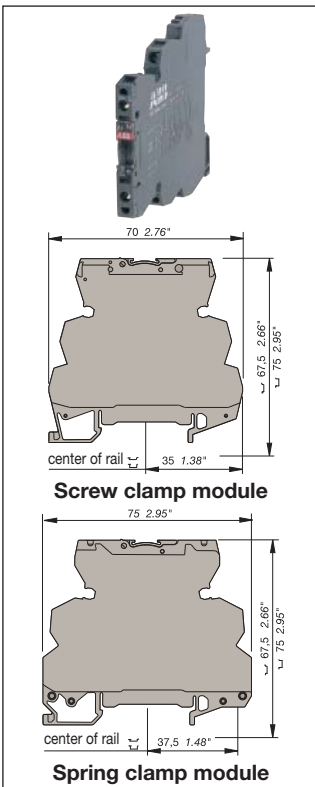
DIN 3

Optocoupler : 24 to 400 V AC output / 2 A max. - 6 or 12 mm spacing

Characteristics

Opto. characteristics	OB...OA 1000						OB...OA 2000
	INPUT	24 V DC	48 V AC/DC	60 V AC/DC	115 V AC/DC	230 V AC/DC	24 V DC
Input voltage +20% -15% on DC, +10% -10% on AC		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz		
Frequency		4,3 mA	5,5 mA	4,15 mA	4,6 mA	3,6 mA	
Input current	3,6 mA						
Pull-in voltage at Is=100%	14 V	15 V	18 V	60 V	135 V	14 V	
Switching time C / O	150 µs/1ms	3 ms / 30 ms		2,2 ms/18 ms	2,5 ms/25 ms	150 µs/1 ms	
Operating frequency	500 Hz	20 Hz	25 Hz	20 Hz	500 Hz	500 Hz	
Permissible leakage current	1 mA	1 mA		1 mA	1 mA	1 mA	
OUTPUT	24 to 400 V AC						
Output voltage	50 / 60 Hz						
Frequency	25 mA						
Output current min.	1 A						
Output current max.	2 A						
Output leakage current at Umax.	< 0,5 mA						
Residual voltage at I max and U rated	typical 1 V						
	max. 1,6 V						
Frequency on inductive load	2500 V RMS						
Isolation Input / Output							
TEMPERATURE	- 40°C to + 80°C						
Ambient temperature storage	-20°C to +70°C (1)						
operating							
Other characteristics	Screw clamp			Spring clamp			
Body material	grey UL 94 V0			grey UL 94 V0			
Wire	Solid wire 0,2 - 4 mm ² / 24 - 12 AWG			Solid wire 0,2 - 2,5 mm ² / 24 - 12 AWG			
size	Stranded wire 0,22 - 2,5 mm ² / 24 - 12 AWG			Stranded wire 0,22 - 2,5 mm ² / 24 - 12 AWG			
Rated wire size	2,5 mm ² / 12 AWG			2,5 mm ² / 12 AWG			
Wire stripping length	9 mm .354"			9 mm .354"			
Recommended screwdriver	3,5 mm .137"			3,5 mm .137"			
Protection	IP20 NEMA1			IP20 NEMA1			
Recommended torque	0,4 - 0,6 Nm 3,5 - 5,3 lb.in			0,4 - 0,6 Nm 3,5 - 5,3 lb.in			
Approvals							
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.						

(1) Over 55°C, blocks have to be mounted on horizontal rail with 10 mm spacing between each block. For vertical rail mounting use temperature is 15°C less decreased.



Order codes

Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 1 A/AC 6 mm spac.	OBOA 1000-24VDC	1 SNA 645 027 R2400	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBOA 1000-48-60VAC/DC	1 SNA 645 061 R0600	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBOA 1000-115VAC/DC	1 SNA 645 062 R0700	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBOA 1000-230VAC/DC	1 SNA 645 028 R0500	10	0,03
Optocoupler module 2 A/AC 12 mm spac.	OBOA 2000-24VDC	1 SNA 645 029 R0600	5	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBROA 1000-24VDC	1 SNA 645 527 R2600	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBROA 1000-48-60VAC/DC	1 SNA 645 561 R0000	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBROA 1000-115VAC/DC	1 SNA 645 562 R0100	10	0,03
Optocoupler module 1 A/AC 6 mm spac.	OBROA 1000-230VAC/DC	1 SNA 645 528 R0700	10	0,03
Optocoupler module 2 A/AC 12 mm spac.	OBROA 2000-24VDC	1 SNA 645 529 R0000	5	0,03

Accessories

End section	BADH V0	1 SNA 116 900 R2700	50
	BADL V0	1 SNA 399 903 R0200	50
	BAM2 V0	1 SNA 399 967 R0100	50
Separator end section	SC 612	1 SNA 290 474 R0200	10
Divisible shunt 10 poles	BJ 612-10	1 SNA 290 488 R0100	10
	BJ 612-70	1 SNA 290 489 R0200	10
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1 SNA 645 031 R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1 SNA 645 531 R2200	5
Test plug DIA. 2 mm	FC2	1 SNA 007 865 R2600	10
Marking method	RC65 RC610	see marking	

Relays and optocouplers

Pluggable optocoupler modules

R500

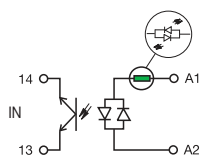
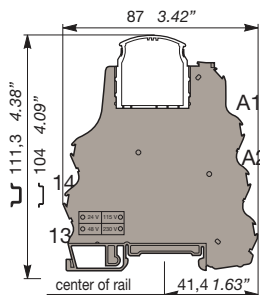


DIN 3

Pluggable optocoupler : 5 to 58 V DC output / 30 mA - 5.08 mm .200" spacing

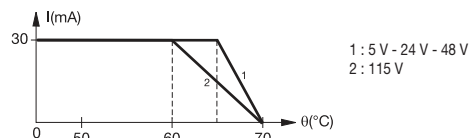
Characteristics

Opto. characteristics	D 2,5/5-OBIC-0030			
INPUT				
Input voltage	4.5 V to 5.5 VDC	19.2 V to 27.6 V DC	38.4 V to 55.2 V DC	93.5 V to 140 V DC
Frequency				
Input current	6 mA	5 mA	4.1 mA	3 mA
Pull-in voltage at Is=100%	3.5 V	12 V	21 V	50 V
Switching time C / O	20 μs / 1.3 ms	20 μs / 1.3 ms	20 μs / 1.3 ms	20 μs / 1.3 ms
Operating frequency	400 Hz	400 Hz	400 Hz	400 Hz
Permissible leakage current		1 mA	0.8 mA	
OUTPUT				
Output voltage	4.5 V to 58 V DC			
Output current min.	0.5 mA			
Output current max.	30 mA			
Output leakage current at Umax.	< 50 μA			
Residual voltage at I max and U rated				
typical	2.3 V DC			
max.	2.7 VDC			
Frequency on inductive load	2500 V RMS			
Isolation Input / Output				
TEMPERATURE				
Ambient temperature	storage	- 40°C to + 80°C		
	operating	See derating curve		
Other characteristics				
Body material	grey			
Wire	UL 94 V0			
Solid wire	0.2-4 mm ² / 24-12 AWG			
Stranded wire	0.22-2.5 mm ² / 24-12 AWG			
Rated wire size	2.5 mm ² / 12 AWG			
Wire stripping length	10 mm .394"			
Recommended screwdriver	3.5 .137"			
Protection	IP 20 NEMA 1			
Recommended torque	0.4-0.6 Nm 3.5-5.3 lb.in			
Approvals	c us pending,			
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.			



D 2,5/5-OBIC-0030

Derating curve



D 2,5/5-OBIC-0030

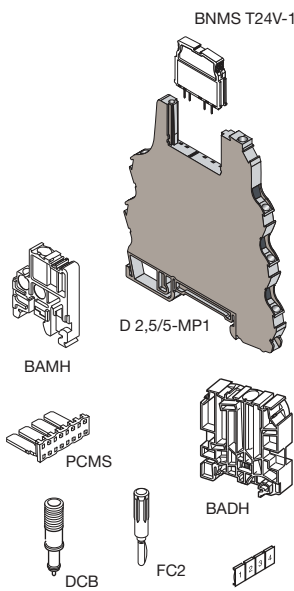
Order codes

Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 30 mA/DC	D 2,5/5-OBIC-0030-5VDC	1SNA 607 274 R1300	1	0.032
Optocoupler module 30 mA/DC	D 2,5/5-OBIC-0030-24VDC	1SNA 607 210 R1700	1	0.032
Optocoupler module 30 mA/DC	D 2,5/5-OBIC-0030-48VDC	1SNA 607 211 R0400	1	0.032
Optocoupler module 30 mA/DC	D 2,5/5-OBIC-0030-125VDC	1SNA 607 275 R1400	1	0.032

Accessories

High end stop	BAMH 9,1 mm	1SNA 114 836 R0000	50	
	BAMH V0 9,1 mm	1SNA 194 836 R0100	50	
	BADH 12 mm	1SNA 116 900 R2700	50	
Comb type jumper bar 2 to 22 poles		consult us		
Jumper bar 10 poles grey	PCMS V0	1SNA 205 523 R2200	8	
Input opto base	D 2,5/5-MP1	1SNA 607 223 R0000	10 0.028	
Plug OBIC 5 V	white □	BNMS T5V-1	1SNA 031 831 R0300	4
Plug OBIC 24 V	white □	BNMS T24V-1	1SNA 031 800 R2100	4
Plug OBIC 48 V	white □	BNMS T48V-1	1SNA 031 801 R1600	4
Plug OBIC 125 V	white □	BNMS T125V-1	1SNA 031 845 R1100	4
Test device	blue ■	DCB (1)	1SNA 105 028 R2100	10
Test plug	DIA. 2 mm	FC2	1SNA 007 865 R2600	10
Marking method	RC55	see marking		

(1) Only on top decks.



Relays and optocouplers

Pluggable optocoupler modules

R500

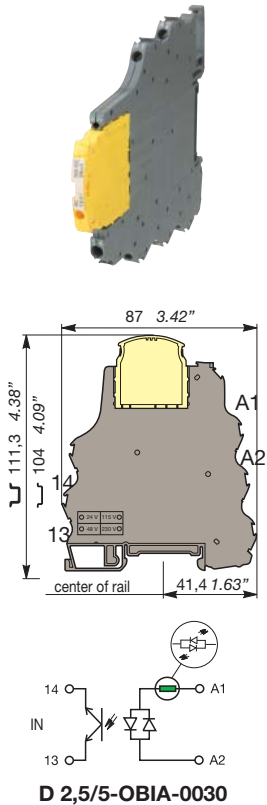


DIN 3

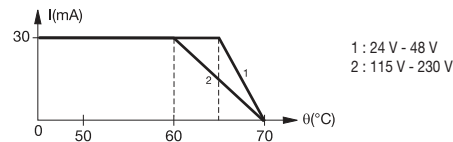
Pluggable optocoupler : 5 to 58 V DC output / 30 mA - 5.08 mm .200" spacing

Characteristics

Opto. characteristics	D 2,5/5-OBIA-0030			
INPUT				
Input voltage	20.4 V to 26.4 V AC	40.8 V to 52.8 V AC	98 V to 126.5 V AC	195.5 V to 253 V AC
Frequency			50 / 60 Hz	50 Hz
Input current	8.5 mA	4.5 mA	8 mA	7 mA
Pull-in voltage at Is=100%	13 V	22 V	50 V	95 V
Switching time C / O	6 ms / 10 ms	6 ms / 10 ms	6 ms / 10 ms	6 ms / 10 ms
Operating frequency	30 Hz	30 Hz	30 Hz	30 Hz
Permissible leakage current	1 mA	1 mA	2 mA	2 mA
OUTPUT	4.5 V to 58 V DC			
Output voltage				
Output current min.	0.5 mA			
Output current max.	30 mA			
Output leakage current at Umax.	< 50 µA			
Residual voltage at I max and U rated	2.3 V DC			
typical				
max.	2.7 VDC			
Frequency on inductive load	2500 V RMS			
Isolation Input / Output				
TEMPERATURE	- 40°C to + 80°C			
Ambient temperature	See derating curve			
storage				
operating				
Other characteristics	UL 94 V0			
Body material	grey			
Wire	Solid wire			
size	Stranded wire			
Rated wire size	0.2-4 mm ² / 24-12 AWG			
Wire stripping length	0.22-2.5 mm ² / 24-12 AWG			
Recommended screwdriver	2.5 mm ² / 12 AWG			
Protection	10 mm .394"			
Recommended torque	3.5 .137"			
Approvals	IP 20 NEMA 1			
	0.4-0.6 Nm 3.5-5.3 lb.in			
	UL US pending, CE			
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.			



Derating curve



D 2,5/5-OBIA-0030

Order codes

Description	Type	Order P/N	Packaging	Weight
Optocoupler module 30 mA/DC	D 2,5/5-OBIA-0030-24VAC	1 SNA 607 212 R0500	1	0.032 kg
Optocoupler module 30 mA/DC	D 2,5/5-OBIA-0030-48VAC	1 SNA 607 213 R0600	1	0.032 kg
Optocoupler module 30 mA/DC	D 2,5/5-OBIA-0030-115VAC	1 SNA 607 214 R0700	1	0.032 kg
Optocoupler module 30 mA/DC	D 2,5/5-OBIA-0030-230VAC	1 SNA 607 215 R0000	1	0.032 kg

Accessories

High end stop	BAMH 9,1 mm	1 SNA 114 836 R0000	50
	BAMH V0 9,1 mm	1 SNA 194 836 R0100	50
	BADH 12 mm	1 SNA 116 900 R2700	50
Comb type jumper bar 2 to 22 poles		consult us	
Jumper bar 10 poles grey	PCMS V0	1 SNA 205 523 R2200	8
Input opto base	D 2,5/5-MP1	1 SNA 607 223 R0000	10 0.028
Plug OBIA 24 V	yellow BNMS T24V-1	1 SNA 031 802 R1700	4
Plug OBIA 48 V	yellow BNMS T48V-1	1 SNA 031 803 R1000	4
Plug OBIA 115 V	yellow BNMS T115V-1	1 SNA 031 804 R1100	4
Plug OBIA 230 V	yellow BNMS T230V-1	1 SNA 031 805 R1200	4
Test device	blue DCB (1)	1 SNA 105 028 R2100	10
Test plug	DIA. 2 mm FC2	1 SNA 007 865 R2600	10
Marking method	RC55	see marking	

(1) Only on top decks.

6

Relays and optocouplers

Pluggable optocoupler modules

R500

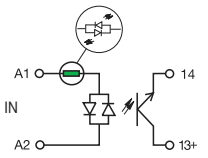
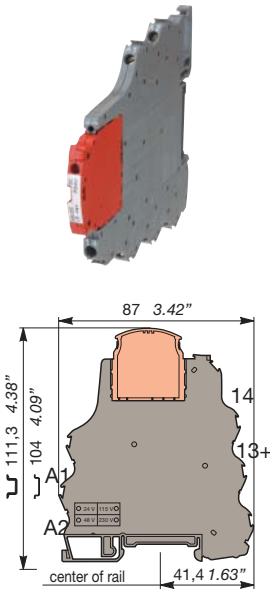


DIN 3

Pluggable optocoupler : 5 to 58 V DC output / 100 mA - 5.08 mm .200" spacing

Characteristics

Opto. characteristics	D 2,5/5-OBOC-0100 5 V DC / 24 V DC		D 2,5/5-OBOC-0100 48 V DC
INPUT			
Input voltage	4.5 V to 5.5 V DC	20.4 V to 28.8 V DC	40.8 V to 57.6 V DC
Frequency			
Input current	8.5 mA	4.8 mA	3.9 mA
Pull-in voltage at Is=100%	2.9 V DC	16 V DC	26 V DC
Switching time C / O	20 µs / 1.3 ms	20 µs / 1.3 ms	20 µs / 1.3 ms
Operating frequency	400 Hz	400 Hz	400 Hz
Permissible leakage current	1 mA	1 mA	1 mA
OUTPUT			
Output voltage	4.5 to 58 V DC		
Output current min.	1 mA		
Output current max.	100 mA		
Output leakage current at Umax.	< 50 µA		
Residual voltage at I max and U rated	1 V DC		
typical	1.3 V DC		
max.	See Note 1		
Frequency on inductive load	2500 V RMS		
Isolation Input / Output			
TEMPERATURE			
Ambient temperature storage	- 40°C to + 80°C		
operating	See derating curves		
Other characteristics			
Body material	grey		
Wire	UL 94 V0		
Wire size	Solid wire 0.2-4 mm ² / 24-12 AWG		
Stranded wire	0.22-2.5 mm ² / 24-12 AWG		
Rated wire size	2.5 mm ² / 12 AWG		
Wire stripping length	10 mm .394"		
Recommended screwdriver	3.5 mm .137"		
Protection	IP 20 NEMA 1		
Recommended torque	0.4-0.6 Nm 3.5-5.3 lb.in		
Approvals	c us pending,		
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.		



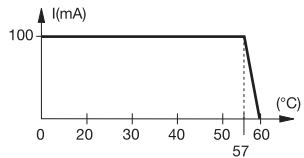
D 2,5/5-OBOC-0100

Note 1 :

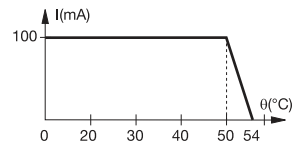
$F_{max} = (1 - 0,007 \times U_s) / (L \times I_s^2)$
 or
 $F_{max} = (1 - 0,007 \times U_s) / (P \times \frac{L}{R})$

Us = Output voltage
 Is = Output current
 L = Inductance of load
 P = Power of load
 R = Resistance of load

Derating curves



D 2,5/5-OBOC-0100 5 V DC / 24 V DC



D 2,5/5-OBOC-0100 48 V DC

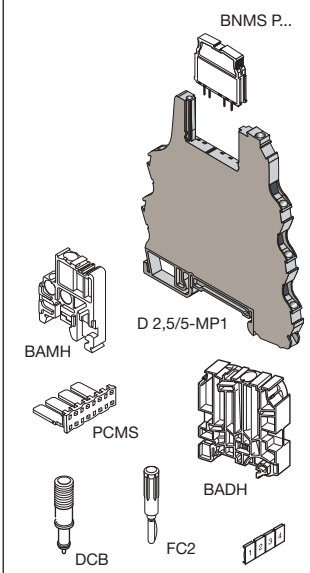
Order codes

Description	Type	Order P/N	Packaging	Weight
Optocoupler module 100 mA/DC	D 2,5/5-OBOC-0100-5VDC	1SNA 607 203 R1500	1	0.032 kg
Optocoupler module 100 mA/DC	D 2,5/5-OBOC-0100-24VDC	1SNA 607 204 R1600	1	0.032 kg
Optocoupler module 100 mA/DC	D 2,5/5-OBOC-0100-48VDC	1SNA 607 205 R1700	1	0.032 kg

Accessories

High end stop	BAMH 9,1 mm	1SNA 114 836 R0000	50
	BAMH V0 9,1 mm	1SNA 194 836 R0100	50
	BADH 12 mm	1SNA 116 900 R2700	50
Comb type jumper bar 2 to 22 poles	Jumper bar 10 poles grey	PCMS V0	consult us
		1SNA 205 523 R2200	8
Relay / Opto base	D 2,5/5-MP	1SNA 607 224 R0100	10 0.028
Plug for OBOC 5 V DC	red ■	BNMS P5V-3	4
Plug for OBOC 24 V DC	red ■	BNMS P24V-3	4
Plug for OBOC 48 V DC	red ■	BNMS P48V-3	4
Test device	blue ■	DCB (1)	10
Test plug	DIA. 2 mm	FC2	10
Marking method	RC55	see marking	

(1) Only on top decks.



Relays and optocouplers

Pluggable optocoupler modules

R500

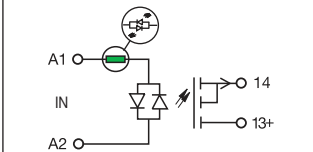
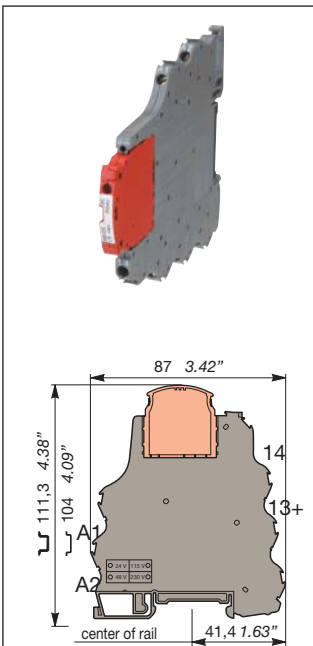


DIN 3

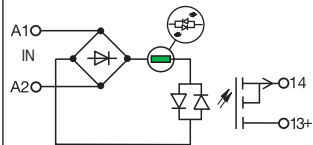
Pluggable optocoupler : 5 to 58 V DC output / 1 A - 5.08 mm .200" spacing

Characteristics

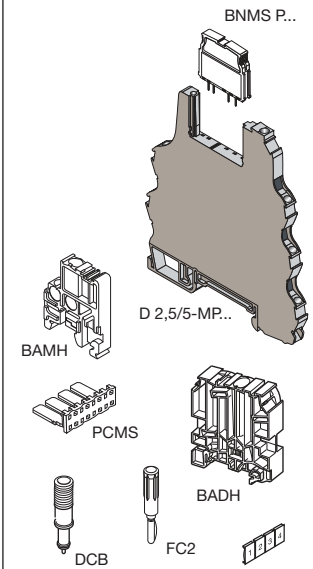
Opto. characteristics	D 2,5/5-OBOC-1000 5/24 VDC		D 2,5/5-OBOC-1000 24/48 VAC/DC				D2,5/5-OBOC-1000-110/230VAC	
	5 VDC	24 VDC	24 VAC	24 VDC	48 VAC	48 VDC	110 VAC	230 VAC
INPUT								
Input voltage	4.5 to 5.5 VDC	20.4 to 28.8 VDC	24 ± 10%	20.4 to 28.8 VDC	48 ± 10%	40.8 to 57.6 VDC	110 ± 10%	230 ± 10%
Frequency			50 / 60 Hz		50 / 60 Hz		50 / 60 Hz	50 / 60 Hz
Input current	12.3 mA	6.7 mA	10.5 mA	8 mA	6.8 mA	5.8 mA	8.5 mA	7.5 mA
Pull-in voltage at Is=100%	3.5 V DC	10 V DC						
Switching time C / O	20/250 µs	50/350 µs	15/13 ms	5/13 ms	15/15 ms	6/25 ms	15/15 ms	15/15 ms
Operating frequency	2000 Hz	1500 Hz	20 Hz	20 Hz	20 Hz	20 Hz	20 Hz	20 Hz
Permissible leakage current								
OUTPUT								
Output voltage	4.5 to 58 VDC		4.5 to 58 VDC					
Output current min.	1 mA		1 mA					
Output current max.	1 A		1 A					
Output leakage current at Umax.	< 50 µA		< 50 µA					
Residual voltage at I max and U rated	typical 0.1 V		0.1 V					
	max. 0.5 V		0.5 V					
Frequency on inductive load	See Note 1							
Isolation Input / Output	2500 V RMS							
TEMPERATURE								
Ambient temperature storage	-40°C to +80°C							
operating	See derating curve							
Other characteristics								
Body material	grey		UL 94 V0					
Wire	Solid wire		0.2-4 mm² / 24-12 AWG					
size	Stranded wire		0.22-2.5 mm² / 24-12 AWG					
Rated wire size	2.5 mm² / 12 AWG							
Wire stripping length	10 mm .394"							
Recommended screwdriver	3.5 mm .137"							
Protection	IP 20 NEMA 1							
Recommended torque	0.4-0.6 Nm 3.5-5.3 lb.in							
Approvals								
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.							



D 2,5/5-OBOC-1000 5/24 VDC



D 2,5/5-OBOC-1000 24/48 VAC/DC 110/230 VAC



Note 1 :

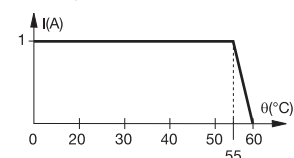
$$F_{max} = (1 - 0,007 \times U_s) / (L \times I_s^2)$$

or

$$F_{max} = (1 - 0,007 \times U_s) / (P \times \frac{L}{R})$$

Us = Output voltage
 Is = Output current
 L = Inductance of load
 P = Power of load
 R = Resistance of load

Derating curve



Order codes

Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-5VDC	1SNA 607 206 R1000	1	0.032
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-24VDC	1SNA 607 207 R1100	1	0.032
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-24VAC/DC	1SNA 607 250 R2700	1	0.04
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-48VAC/DC	1SNA 607 251 R1400	1	0.04
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-110VAC	1SNA 607 270 R2300	1	0.04
Optocoupler module 1 A/DC	D 2,5/5-OBOC-1000-230VAC	1SNA 607 271 R1000	1	0.04

Accessories

High end stop	BAMH 9,1 mm	1SNA 114 836 R0000	50
	BAMH V0 9,1 mm	1SNA 194 836 R0100	50
	BADH 12 mm	1SNA 116 900 R2700	50
Comb type jumper bar 2 to 22 poles		consult us	
Jumper bar 10 poles grey	PCMS V0	1SNA 205 523 R2200	8
Relay / Opto base	D 2,5/5-MP	1SNA 607 224 R0100	10 0.028
Relay / Opto base with LED 24 VAC/VDC	D 2,5/5-MP-24VAC/DC	1SNA 607 260 R2100	10 0.036
Relay / Opto base with LED 48 VAC/VDC	D 2,5/5-MP-48VAC/DC	1SNA 607 261 R1600	10 0.036
Relay / Opto base with LED 110 VAC	D 2,5/5-MP-110VAC	1SNA 607 266 R1300	10 0.036
Relay / Opto base with LED 230 VAC	D 2,5/5-MP-230VAC	1SNA 607 267 R1400	10 0.036
Plug (2)	red ■	BNMS P5V-2 5 V/1 A	4
Plug (3)	red ■	BNMS P24V-2 24 V/1 A	4
Test device	blue ■	DCB (1)	10
Test plug	DIA. 2 mm	FC2	10
Marking method	RC55	see marking	

(1) Only on top decks.
 (2) For D 2,5/5-OBOC-2000 5 V DC only.
 (3) For all D 2,5/5-OBOC-2000 except 5 V DC model.

Relays and optocouplers

Pluggable optocoupler modules

R500



DIN 3

Pluggable optocoupler : 5 to 30 V DC output / 2 A - 5.08 mm .200" spacing

Characteristics

Opto. characteristics	D 2,5/5-OBOC-2000 5/24 VDC		D 2,5/5-OBOC-2000 24/48 VAC/DC				D 2,5/5-OBOC-2000 110/230VAC	
	5 VDC	24 VDC	24 VAC	24 VDC	48 VAC	48 VDC	110 VAC	230 VAC
INPUT								
Input voltage	4.5 to 5.5 VDC	20.4 to 28.8 VDC	24 ±10%	20.4 to 28.8 VDC	48 ±10%	40.8 to 57.6 VDC	110 ±10%	230 ±10%
Frequency			50 / 60 Hz		50 / 60 Hz		50 / 60 Hz	50 / 60 Hz
Input current	12.3 mA	6.7 mA	10.5 mA	8 mA	6.8 mA	5.8 mA	8.5 mA	7.5 mA
Pull-in voltage at Is=100%	3.5 V DC	10 V DC						
Switching time C / O	20/250 µs	50/350 µs	15/13 ms	5/13 ms	15/15 ms	6/25 ms	15/15 ms	15/15 ms
Operating frequency	2000 Hz	1500 Hz	20 Hz	20 Hz	20 Hz	20 Hz	20 Hz	20 Hz
Permissible leakage current								
OUTPUT								
Output voltage	4.5 to 30 VDC		4.5 to 30 VDC					
Output current min.	1 mA		1 mA					
Output current max.	2 A		2 A					
Output leakage current at Umax.	< 50 µA		< 50 µA					
Residual voltage at I max and U rated	typical 0.1 V		typical 0.1 V					
	max. 0.5 V		max. 0.5 V					
Frequency on inductive load	See Note 1							
Isolation Input / Output	2500 V RMS							
TEMPERATURE								
Ambient temperature storage	-40°C to +80°C							
operating	See derating curve							
Other characteristics								
Body material	grey							
Wire	Solid wire							
size	Stranded wire							
Rated wire size	0.22-2.5 mm ² / 24-12 AWG							
Wire stripping length	2.5 mm ² / 12 AWG							
Recommended screwdriver	10 mm .394"							
Protection	3.5 mm .137"							
Recommended torque	IP 20 NEMA 1							
Approvals	0.4-0.6 Nm 3.5-5.3 lb.in							
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.							

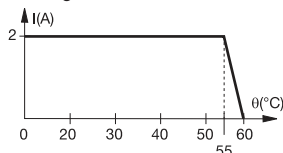
Note 1 :

$$F_{max} = (1 - 0,012 \times U_s) / (L \times I_s^2)$$

$$F_{max} = (1 - 0,012 \times U_s) / (P \times \frac{L}{R})$$

Us = Output voltage
Is = Output current
L = Inductance of load
P = Power of load
R = Resistance of load

Derating curve



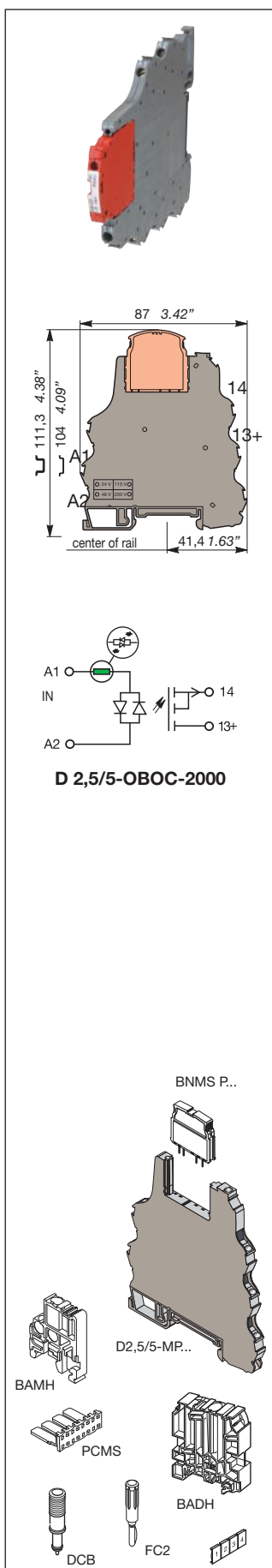
Order codes

Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-5VDC	1SNA 607 208 R2200	1	0.032
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-24VDC	1SNA 607 209 R2300	1	0.032
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-24VAC/DC	1SNA 607 255 R1000	1	0.04
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-48VAC/DC	1SNA 607 256 R1100	1	0.04
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-110VAC	1SNA 607 272 R1100	1	0.04
Optocoupler module 2 A/DC	D 2,5/5-OBOC-2000-230VAC	1SNA 607 273 R1200	1	0.04

Accessories

High end stop	BAMH 9,1 mm	1SNA 114 836 R0000	50
	BAMH V0 9,1 mm	1SNA 194 836 R0100	50
	BADH 12 mm	1SNA 116 900 R2700	50
Comb type jumper bar 2 to 22 poles		consult us	
Jumper bar 10 poles grey	PCMS V0	1SNA 205 523 R2200	8
Relay / Opto base	D 2,5/5-MP	1SNA 607 224 R0100	10 0.028
Relay / Opto base with LED 24 VAC/VDC	D 2,5/5-MP-24VAC/DC	1SNA 607 260 R2100	10 0.036
Relay / Opto base with LED 48 VAC/VDC	D 2,5/5-MP-48VAC/DC	1SNA 607 261 R1600	10 0.036
Relay / Opto base with LED 110 VAC	D 2,5/5-MP-110VAC	1SNA 607 266 R1300	10 0.036
Relay / Opto base with LED 230 VAC	D 2,5/5-MP-230VAC	1SNA 607 267 R1400	10 0.036
Plug (2)	red ■ BNMS P5V-1 5 V/2 A	1SNA 031 814 R0200	4
Plug (3)	red ■ BNMS P24V-1 24 V/2 A	1SNA 031 815 R0300	4
Test device	blue ■ DCB (1)	1SNA 105 028 R2100	10
Test plug	DIA. 2 mm FC2	1SNA 007 865 R2600	10
Marking method	RC55	see marking	

- (1) Only on top decks.
- (2) For D 2,5/5-OBOC-2000 5 V DC only.
- (3) For all D 2,5/5-OBOC-2000 except 5 V DC model.



Relays and optocouplers

Pluggable optocoupler modules

R500



DIN 3

Pluggable optocoupler : 24 to 253 V AC output / 1 A - 5.08 mm .200" spacing

Characteristics

Opto. characteristics	D 2,5/5-... 24 VDC		D 2,5/5-OBOA-1000 24 VAC/DC-48 VAC/DC			D 2,5/5-OBOA-1000 110 VAC-230 VAC	
	24 VDC	24 VAC	24 VDC	48 VAC	48 VDC	110 VAC	230 VAC
INPUT							
Input voltage	20.4 to 28.8 VDC	24 ±10%	20.6 to 28.8 VDC	48 ±10%	40.8 to 57.6 VDC	110 ±10%	230 ±10%
Frequency		50 / 60 Hz		50 / 60 Hz		50 / 60 Hz	50 / 60 Hz
Input current	4 mA	10 mA	7 mA	6 mA	5 mA	8 mA	7.5 mA
Pull-in voltage at Is=100%							
Switching time C / O	10/20 ms	20/20 ms	10/20 ms	20/20 ms	10/20 ms	20/20 ms	20/20 ms
Operating frequency	15 Hz	15 Hz	15 Hz	15 Hz	15 Hz	15 Hz	15 Hz
Permissible leakage current							

OUTPUT

Output voltage	24 to 253 VAC - 50 / 60 Hz
Output current min.	25 mA
Output current max.	1 A
Output leakage current at U _{max} .	< 0.5 mA
Residual voltage at I _{max} and U _{rated}	typical 1 V max. 1.6 V
Frequency on inductive load	See Note 1
Isolation Input / Output	2500 V RMS

TEMPERATURE

Ambient temperature	storage operating	-40 to +80°C See derating curve
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Other characteristics

Body material	grey	UL 94 V0
Wire	Solid wire	0.2-4 mm ² / 24-12 AWG
size	Stranded wire	0.22-2.5 mm ² / 24-12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		10 mm .394"
Recommended screwdriver		3.5 mm .137"
Protection		IP 20 NEMA 1
Recommended torque		0.4-0.6 Nm 3.5-5.3 lb.in
Approvals		us pending, CE
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	

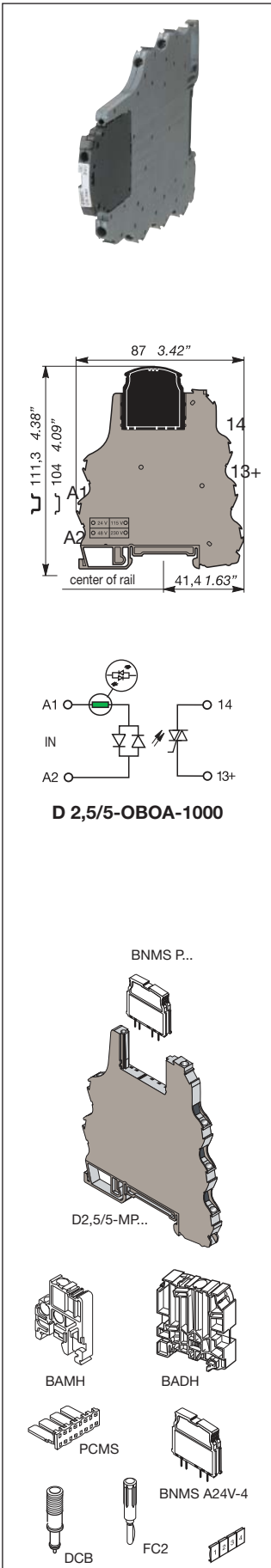
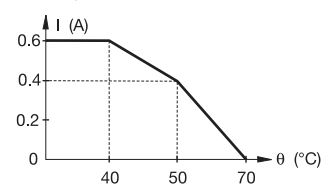
Note 1 :

$$F_{max} = (1 - 0,012 \times U_s) / (L \times I_s^2)$$

$$F_{max} = (1 - 0,012 \times U_s) / (P \times \frac{L}{R})$$

Us = Output voltage
 Is = Output current
 L = Inductance of load
 P = Power of load
 R = Resistance of load

Derating curve



D 2,5/5-OBOA-1000

Order codes

Description	Type	Order P/N	Packaging	Weight kg
Optocoupler module 1 A/AC	D 2,5/5-OBOA-1000-24VDC	1SNA 607 238 R1700	1	0.032
Optocoupler module 1 A/AC	D 2,5/5-OBOA-1000-24VAC/DC	1SNA 607 240 R2500	1	0.04
Optocoupler module 1 A/AC	D 2,5/5-OBOA-1000-48VAC/DC	1SNA 607 241 R1200	1	0.04
Optocoupler module 1 A/AC	D 2,5/5-OBOA-1000-110VAC	1SNA 607 268 R2500	1	0.04
Optocoupler module 1 A/AC	D 2,5/5-OBOA-1000-230VAC	1SNA 607 269 R2600	1	0.04

Accessories

High end stop	BAMH	9,1 mm	1SNA 114 836 R0000	50	
	BAMH V0	9,1 mm	1SNA 194 836 R0100	50	
	BADH	12 mm	1SNA 116 900 R2700	50	
Comb type jumper bar 2 to 22 poles			consult us		
Jumper bar 10 poles	grey	□	PCMS V0	1SNA 205 523 R2200	8
Relay / Opto base		D 2,5/5-MP	1SNA 607 224 R0100	10	0.028
Relay / Opto base with LED 24 VAC/VDC		D 2,5/5-MP-24VAC/DC	1SNA 607 260 R2100	10	0.036
Relay / Opto base with LED 48 VAC/VDC		D 2,5/5-MP-48VAC/DC	1SNA 607 261 R1600	10	0.036
Relay / Opto base with LED 110 VAC		D 2,5/5-MP-110VAC	1SNA 607 266 R1300	10	0.036
Relay / Opto base with LED 230 VAC		D 2,5/5-MP-230VAC	1SNA 607 267 R1400	10	0.036
Plug	black	■	BNMS A24V-4 250 V/1 A	1SNA 031 839 R1300	4
Test device	blue	□	DCB (1)	1SNA 105 028 R2100	10
Test plug	DIA. 2 mm		FC2	1SNA 007 865 R2600	10
Marking method		RC55		see marking	

(1) Only on top decks.

Relays and optocouplers

Optocouplers

R900



DIN 3

Optocoupler : 5 to 60 V DC / 100 mA high switching output - 9 mm .354" spacing

Characteristics

Opto. characteristics	OBC 0100 - 24 V DC	OBC 0100 - 48 V DC	OBC 0100 - 110 V AC	OBC 0100 - 230 V AC
INPUT				
Input voltage	10.2 V to 28.8 V DC	40.8 V to 57.6 V DC	93.5 V AC to 152.4 V AC	230 V AC +15%, -20%
Frequency			50 / 60 Hz	50 Hz
Input current	7 mA to 12 V / 10 mA to 24 V	5 mA	8 mA	8 mA
Pull-in voltage at Is=100%	10.2 V DC	40.8 V DC	93.5 V AC	184 V AC
Switching time C / O	20 μs / 50 μs	20 μs / 50 μs	5 ms/5 ms	5 ms/5 ms
Operating frequency	7000 Hz	7000 Hz	50 Hz	50 Hz
Permissible leakage current				

OUTPUT

Output voltage	4.5 to 60 V DC
Output current min.	1 mA
Output current max.	100 mA
Output leakage current at Umax.	< 50 μA
Residual voltage at I max and U rated	1 V
typical	
max.	1.3 V
Frequency on inductive load	
Isolation Input / Output	3000 V RMS

TEMPERATURE

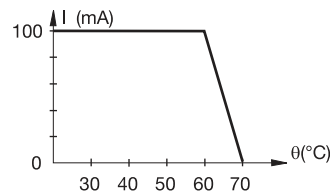
Ambient temperature storage	- 40°C to + 80°C
operating	See derating curve

Other characteristics

Body material	grey	UL 94 V0
Wire	Solid wire	0.5-4 mm ² / 20-12 AWG
size	Stranded wire	0.5-2.5 mm ² / 20-12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		7 mm .276"
Recommended screwdriver		3.5 .137"
Protection		IP 20 NEMA 1
Recommended torque		0.4-0.6 Nm 3.5-5.3 lb.in

Approvals	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Derating curve



OBC 0100

Order codes

Description	Type	Order P/N	Packaging	Weight
			kg	
Optocoupler module 100 mA/DC	OBC 0100-24VDC	1SNA 608 017 R0600	1	0.04
Optocoupler module 100 mA/DC	OBC 0100-48VDC	1SNA 608 021 R0200	1	0.04
Optocoupler module 100 mA/DC	OBC 0100-110VAC	1SNA 608 024 R0500	1	0.04
Optocoupler module 100 mA/DC	OBC 0100-230VAC	1SNA 608 027 R0000	1	0.04

Accessories

High end stop	BAMH 9,1 mm	1SNA 114 836 R0000	50
	BAMH V0 9,1 mm	1SNA 194 836 R0100	50
	BADH 12 mm	1SNA 116 900 R2700	50
Comb type jumper bar 10 poles	PC9 15 A	1SNA 210 160 R1200	10
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marking method	RC55	see marking	

OBC 0100 - 24 V DC

OBC 0100 - 48 V DC

OBC 0100 - 110-230 V

Relays and optocouplers

Optocouplers

R900



DIN 3

Optocoupler : 5 to 57,6 V DC / 100 mA output - 9 mm .354" spacing

Characteristics

Opto. characteristics	OBC 0100 - 110 V AC / 125 V DC	OBC 0100 - 125 V DC	OBC 0100 S - 125 V DC
INPUT			
Input voltage	88 to 126 V AC	100 to 143.8 V DC	100 to 143.8 V DC
Frequency	50 Hz		
Input current	3.5 mA	4.5 mA	4.5 mA
Pull-in voltage at Is=100%		40 V DC	40 V DC
Switching time C / O	15 / 35 ms	15 / 45 ms	5 μs / 50 μs
Operating frequency	10 Hz	10 Hz	9000 Hz
Permissible leakage current			

OUTPUT

Output voltage max.	5 to 57.6 V DC
Output current min.	1 mA
Output current max.	100 mA
Output leakage current at Umax.	< 50 μA
Residual voltage at I max and U rated	typical max. 1 V
Frequency on inductive load	3000 V RMS
Isolation Input / Output	

TEMPERATURE

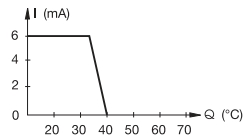
Ambient temperature	storage	- 40°C to + 80°C
	operating	see derating curves

Other characteristics

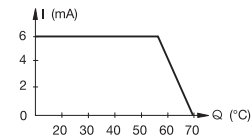
Body material	black	UL 94 V2
Wire	Solid wire	0.5-4 mm ² / 20-12 AWG
size	Stranded wire	0.5-2.5 mm ² / 20-12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		7 mm .276"
Recommended screwdriver		3.5 .137"
Protection		IP 20 NEMA 1
Recommended torque		0.4-0.6 Nm 3.5-5.3 lb.in
Approvals		CE

Reference standards CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6

Derating curves



OBC 0100



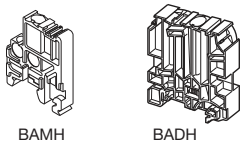
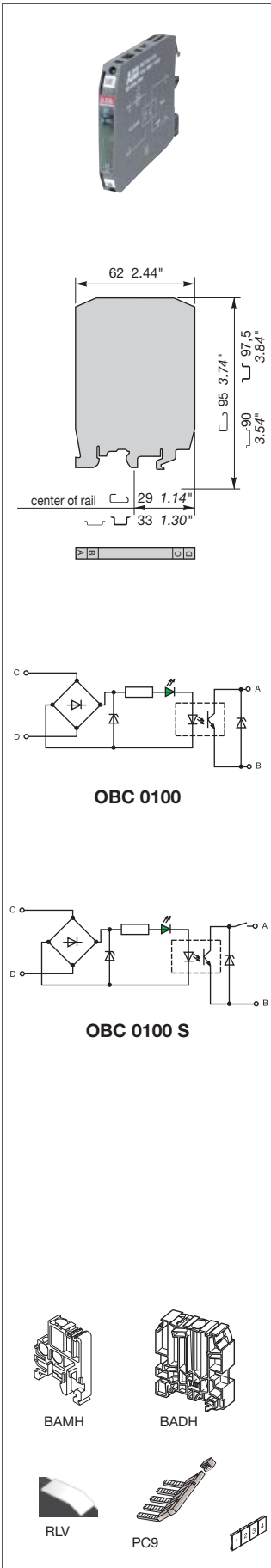
OBC 0100 S

Order codes

Description	Type	Order P/N	Packaging Weight kg
Optocoupler module 100 mA/DC	OBC 0100 110 VAC/125 VDC	1SNA 008 048 R1700	1
Optocoupler module 100 mA/DC	OBC 0100 125 V DC	1SNA 008 049 R1000	1
Optocoupler module with switch 100 mA/DC	OBC 0100 S 125 V DC	1SNA 008 004 R0400	1

Accessories

High end stop	BAMH 9,1 mm	1SNA 114 836 R0000	50
	BAMH V0 9,1 mm	1SNA 194 836 R0100	50
	BADH 12 mm	1SNA 116 900 R2700	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Comb-type jumper bar 10 poles	PC9 15 A	1SNA 210 160 R1200	10
Marker	RC55	see markers	



Relays and optocouplers

Optocouplers

R900


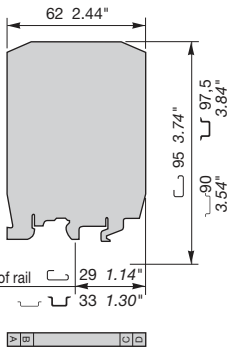


DIN 3

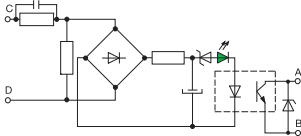
Optocoupler : 5 to 57,6 V DC / 100 mA output with leakage current protection - 9 mm .354" spacing

Characteristics

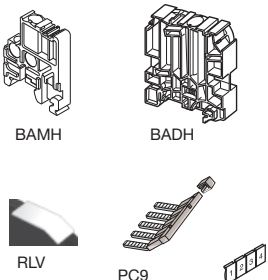
Opto. characteristics	OBC 0100 R		
	INPUT	93.5 V AC to 152.4 V AC 50 Hz	93.5 V AC to 127 V AC 60 Hz
Input voltage			
Frequency			
Input current	12 mA		15 mA
Pull-in voltage at Is=100%	93.5 V		195.5 V
Switching time C / O	10 / 25 ms		10 / 25 ms
Operating frequency	15 Hz		15 Hz
Permissible leakage current	5 mA		5 mA
OUTPUT			
Output voltage max.	4.5 to 57,6 V DC		
Output current min.	1 mA		
Output current max.	100 mA		
Output leakage current at Umax.	< 50 µA		
Residual voltage at I max and U rated	1 V		
typical	1 V		
max.	1.3 V		
Frequency on inductive load	3000 V RMS		
Isolation Input / Output	3000 V RMS		
TEMPERATURE			
Ambient temperature	- 40°C to + 80°C		
storage	- 40°C to + 80°C		
operating	see derating curve		
Other characteristics			
Body material	black		
Wire	UL 94 V2		
size	Solid wire 0.5-4 mm ² / 20-12 AWG		
Stranded wire	0.5-2.5 mm ² / 20-12 AWG		
Rated wire size	2.5 mm ² / 12 AWG		
Wire stripping length	7 mm .276"		
Recommended screwdriver	3.5 .137"		
Protection	IP 20 NEMA 1		
Recommended torque	0.4-0.6 Nm 3.5-5.3 lb.in		
Approvals			
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6		

62 2.44"
95 3.74"
97.5 3.84"
90 3.54"
center of rail 29 1.14"
33 1.30"

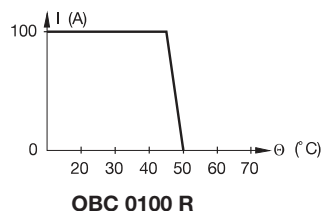


OBC 0100 R



BAMH BADH
RLV PC9

Derating curve



Order codes

Description	Type	Order P/N	Packaging	Weight kg
Optocoupler mod. w. leakage current protection 100 mA/DC	OBC 0100 R 110 V AC	1SNA 008 076 R0300	1	
Optocoupler mod. wi. leakage current protection 100 mA/DC	OBC 0100 R 230 V AC	1SNA 008 077 R0400	1	

Accessories

High end stop	BAMH 9,1 mm	1SNA 114 836 R0000	50
	BAMH V0 9,1 mm	1SNA 194 836 R0100	50
	BADH 12 mm	1SNA 116 900 R2700	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Comb-type jumper bar 10 poles	PC9 15 A	1SNA 210 160 R1200	10
Marker	RC55	see markers	

Relays and optocouplers

Optocouplers

R900



DIN 3

Optocoupler : 5 to 60 V DC / 1 A high switching output - 9 mm .354" spacing

Characteristics

Opto. characteristics	OBC 1000 - 5 V DC	OBC 1000 - 24 V DC	OBC 1000 - 48 V DC	OBC 1000 - 110 V AC	OBC 1000 - 230 V AC
INPUT					
Input voltage	4.5 to 5.5 V DC	10.2 V DC to 28.8 V DC	40.5 to 57.6 V DC	93.5 V AC to 152.4 V AC	195 to 264.5 V AC
Frequency				50 / 60 Hz	50 Hz
Input current	6.5 mA	6.5mA to 12V/9.5mA at 24V	4.5 mA	8 mA	7 mA
Pull-in voltage at Is=100%	4.5 V DC	10.2 V AC	40.8 V DC	93.5 V AC	184 V DC
Switching time C / O	20 μs / 50 μs	20 μs / 50 μs	20 μs / 50 μs	2 ms / 5 ms	1 ms / 5 ms
Operating frequency	7000 Hz	7000 Hz	7000 Hz	80 Hz	80 Hz
Permissible leakage current					

OUTPUT

Output voltage	5 to 60 V DC
Output current min.	1 mA
Output current max.	1 A
Output leakage current at U _{max} .	< 50 μA
Residual voltage at I _{max} and U _{rated}	1 V
typical	
max.	1.3 V
Frequency on inductive load	3000 V RMS
Isolation Input / Output	

TEMPERATURE

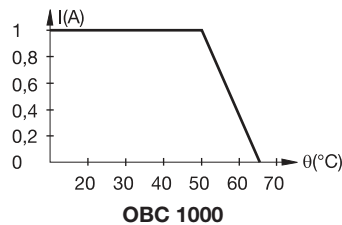
Ambient temperature	storage	- 40°C to + 80°C
	operating	See derating curve

Other characteristics

Body material	grey	UL 94 V0
Wire	Solid wire	0.5-4 mm ² / 20-12 AWG
size	Stranded wire	0.5-2.5 mm ² / 20-12 AWG
Rated wire size		2.5 mm ² / 12 AWG
Wire stripping length		7 mm .276"
Recommended screwdriver		3.5 .137"
Protection		IP 20 NEMA 1
Recommended torque		0.4-0.6 Nm 3.5-5.3 lb.in

Approvals	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.

Derating curve



Order codes

Description	Type	Order P/N	Packaging	Weight
Optocoupler module 1 A/DC	OBC 1000-5VDC	1SNA 608 014 R2200	1	0.04
Optocoupler module 1 A/DC	OBC 1000-24VDC	1SNA 608 018 R1700	1	0.04
Optocoupler module 1 A/DC	OBC 1000-48VDC	1SNA 608 022 R0300	1	0.04
Optocoupler module 1 A/DC	OBC 1000-110VAC	1SNA 608 025 R0600	1	0.04
Optocoupler module 1 A/DC	OBC 1000-230VAC	1SNA 608 028 R1100	1	0.04

Accessories

High end stop	BAMH 9,1 mm	1SNA 114 836 R0000	50
	BAMH V0 9,1 mm	1SNA 194 836 R0100	50
	BADH 12 mm	1SNA 116 900 R2700	50
Comb type jumper bar 10 poles	PC9 15 A	1SNA 210 160 R1200	10
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marking method	RC55	see marking	

OBC 1000 - 24 V

OBC 1000 - 5-48 V

OBC 1000 - 110-230 V

BAMH

BADH

RLV

PC9

6

Relays and optocouplers

Optocouplers

R900



DIN 3

Optocoupler : 24 to 253 V AC / 1 A output - 9 mm .354" spacing

Characteristics

Opto. characteristics	OBA 1000 - 5 V DC	OBA 1000 - 24 V DC	OBA 1000 - 48 V DC	OBA 1000 - 110 V AC
INPUT				
Input voltage	4.5 to 5.5 V DC	10.2 V DC to 28.8 V DC	40.8 to 57.6 V DC	93.5 V AC to 152.4 V AC
Frequency				50 / 60 Hz
Input current	10 mA	8 mA to 12 mA	7 mA	7 mA to 10 mA
Pull-in voltage at Is=100%	4.5 V DC	10.2 V DC	40.8 V DC	93.5 V AC
Switching time C / O	10 ms / 10 ms	10 ms / 10 ms	10 ms / 10 ms	10 ms / 10 ms
Operating frequency	25 Hz	25 Hz	25 Hz	25 Hz
Permissible leakage current		1.5 mA		2.5 mA

OUTPUT

Output voltage	24 to 253 V AC - 50 / 60 Hz			
Output current min.	25 mA			
Output current max.	1 A			
Output leakage current at Umax.	< 0.5 mA			
Residual voltage at I max and U rated	1 V			
typical				
max.	1.6 V			
Frequency on inductive load	3000 V RMS			
Isolation Input / Output				

TEMPERATURE

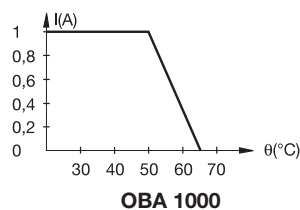
Ambient temperature	- 40°C to + 80°C			
storage				
operating	See derating curves			

Other characteristics

Body material	grey			
Wire	Solid wire			
size	Stranded wire			
Rated wire size	2.5 mm ² / 12 AWG			
Wire stripping length	7 mm .276"			
Recommended screwdriver	3.5 .137"			
Protection	IP 20 NEMA 1			
Recommended torque	0.4-0.6 Nm 3.5-5.3 lb.in			

Approvals				
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.			

Derating curve



Order codes

Description	Type	Order P/N	Packaging	Weight
Optocoupler module 1 A/AC	OBA 1000-5VDC	1SNA 608 015 R0400	1	0.05
Optocoupler module 1 A/AC	OBA 1000-24VDC	1SNA 608 019 R1000	1	0.05
Optocoupler module 1 A/AC	OBA 1000-48VDC	1SNA 608 023 R0400	1	0.05
Optocoupler module 1 A/AC	OBA 1000-110VAC	1SNA 608 026 R0700	1	0.05

Accessories

High end stop	BAMH	9,1 mm	1SNA 114 836 R0000	50
	BAMH V0	9,1 mm	1SNA 194 836 R0100	50
	BADH	12 mm	1SNA 116 900 R2700	50
Comb type jumper bar 10 poles	PC9	15 A	1SNA 210 160 R1200	10
Lengthwise marker	RLV		1SNA 103 849 R0300	100
Marking method	RC55		see marking	

center of rail 29 1.14"

33 1.30"

62 2.44"

95 3.74"

3.54"

0.975"

3.84"

OBA 1000 - 5 - 48 V DC

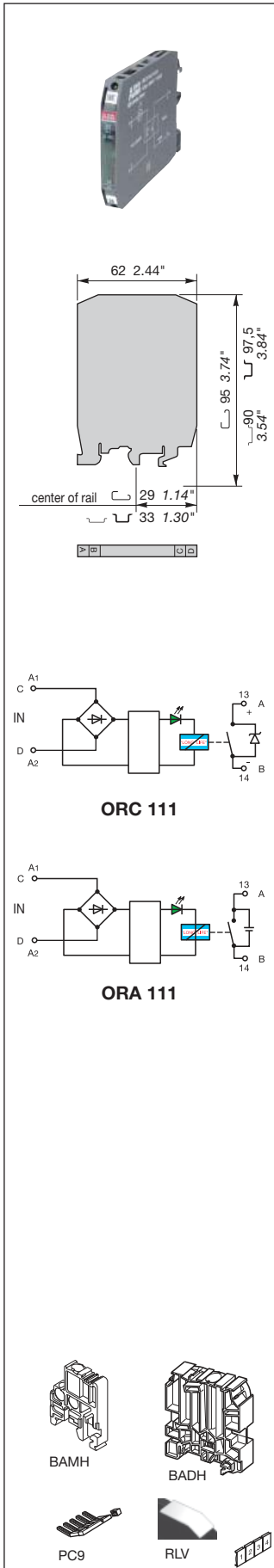
OBA 1000 - 24 V DC

OBA 1000 - 110 V AC

Relays and optocouplers "Long Life" Optocouplers R900



DIN 1-3



Optocoupler : 10 to 57.6 V DC / 5 A output - 9 mm .354" spacing
Optocoupler : 20 to 135 V AC / 5 A output - 9 mm .354" spacing

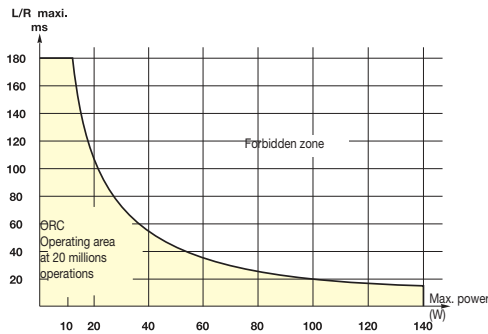
Characteristics

Opto. characteristics	ORC 111 24 V DC	ORA 111 24 V DC
INPUT		
Rated voltage $\pm 20\%$ on DC	24 V DC	24 V DC
Power	0.65 W	0.6 W
Rated current	26 mA	20 mA
Drop-out voltage at 20°C	4 V	5 V
Drop-in voltage at 20°C		
Permissible leakage current		
Status device	green LED	
OUTPUT		
Type	1 NO	
Voltage switching range min./max.	10 V DC / 57,6 V DC	20 V AC / 135 V AC
Current switching range min./max.	100 mA / 5 A	
Load switching range		
AC1 min. / max.	2 VA / 675 VA	
DC1 min. / max.	2 VA / 675 VA	
Number of on-load operations	20 x 10 ⁶ (see curves)	
Number of off-load operations	20 x 10 ⁶	
Operating speed		
F	80 μ s	10 ms
O	20 ms	30 ms
Bounce		
Insulation input / output	3000 V RMS	
Resistance to shock input / output	5000 V RMS	
Inductive load max.	see curves	
Ambient temperature storage operating	-40°C to +80°C see derating curves	
Other characteristics		
Body material	grey	
Wire	UL 94 V0	
Wire size	0.5-4 mm ² / 20-12 AWG	
Stranded wire	0.5-2.5 mm ² / 20-12 AWG	
Rated wire size	2.5 mm ² / 12 AWG	
Wire stripping length	7 mm / .276"	
Recommended screwdriver	3.5 mm / .137"	
Protection	IP 20 / NEMA 1	
Recommended torque	0.4-0.6 Nm / 3.5-5.3 lb.in	
Approvals		
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.	

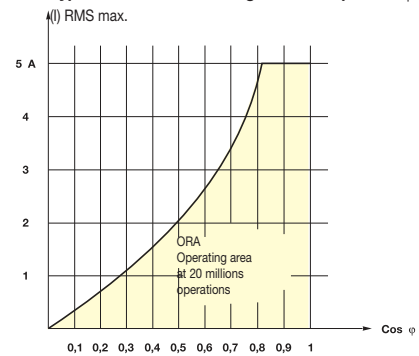
ORC 111

ORA 111

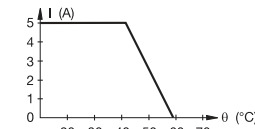
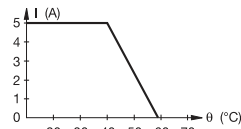
ORC type - Maximum switching power at 24V DC as per L/R



ORA type - Maximum switching current as per cos ϕ



Derating curves



ORC 111

ORA 111

Order codes

Description	Type	Order P/N	Packaging	Weight kg
Long Life optocoupler module 5 A/DC	ORC 111-24VDC	1SNA 608 068 R2100	1	0.03
Long Life optocoupler module 5 A/AC	ORA 111-24VDC	1SNA 608 069 R2200	1	0.04

Accessories

High end section	Type	Order P/N	Packaging	Weight kg
BADH	BADH	1SNA 116 900 R2700		50
BAMH	BAMH	1SNA 114 836 R0000		50
BAMH V0	BAMH V0	1SNA 194 836 R0100		50
Comb-type jumper bar	PC9	1SNA 210 160 R1200		10
Lengthwise marker	RLV	1SNA 103 849 R0300		100
Marking method	RC55	see marking		

Relays and optocouplers

Optocouplers

R1800



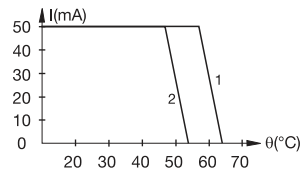
DIN 3

Optocoupler : 5 to 53 V DC / 50 mA output - 18 mm .709" spacing

Characteristics

Opto. characteristics	EBO3 DC				
	INPUT	4 to 5.5 V DC	9.6 to 13.2 V DC	12 to 16.5 V DC	19.2 to 26.4 V DC
Input voltage	4 to 5.5 V DC	9.6 to 13.2 V DC	12 to 16.5 V DC	19.2 to 26.4 V DC	38.4 to 52.8 V DC
Frequency					
Input current			11 mA		
Pull-in voltage at Is=100%	4 V	9.6 V	12 V	19.2 V	38.4 V
Switching time C / O	20 μs / 80 μs				
Operating frequency	5000 Hz				
Permissible leakage current					
OUTPUT					
Output voltage	4.5 to 53 V DC				
Output current min.	0.5 mA				
Output current max.	50 mA				
Output leakage current at Umax.	< 50 μA				
Residual voltage at I max and U rated					
typical	1 V				
max.	1.3 V				
Frequency on inductive load					
Isolation Input / Output	2500 V RMS				
TEMPERATURE					
Ambient temperature storage	- 40°C to + 80°C				
operating	See derating curves				
Other characteristics					
Body material	grey				
Wire	Solid wire				
size	0.2-4 mm ² / 22-12 AWG				
Stranded wire	0.22-2.5 mm ² / 22-12 AWG				
Rated wire size	2.5 mm ² / 12 AWG				
Wire stripping length	7 mm .276"				
Recommended screwdriver	3.5 .137"				
Protection	IP 20 NEMA 1				
Recommended torque	0.4-0.6 Nm				
Approvals	CE				
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.				

Derating curves



EBO3 DC

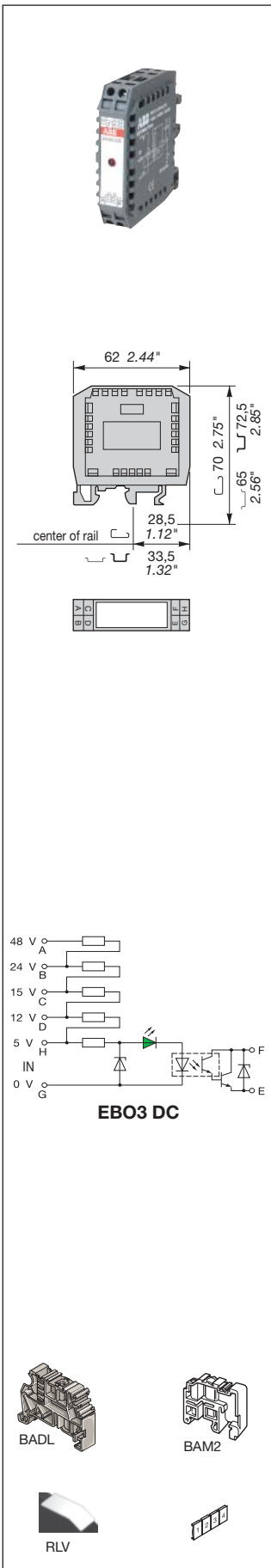
- 1 : 5 to 24 V DC model
- 2 : 48 V DC model

Order codes

Description	Type	Order P/N	Packaging	Weight
Optocoupler module 50 mA / DC	EBO3 DC	1SNA 610 230 R1100	1	0.03 kg

Accessories

End section	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	



Relays and optocouplers

Optocouplers

R1800



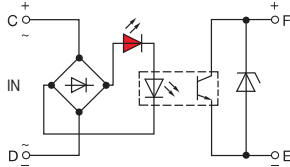
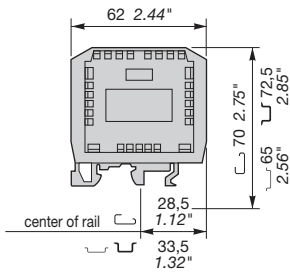
DIN 3



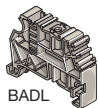
EBO1 24 - 127/230 V AC/DC



EBO1 48 V AC/DC



EBO1...



BADL



BAM2



RLV



Optocoupler : 5 to 58 V DC / 100 mA output - 18 mm .709" spacing
Optocoupler : 5 to 58 V DC / 50 mA output - 18 mm .709" spacing

Characteristics

Opto. characteristics	EBO1 - 24 V AC/DC		EBO1 - 48 V AC/DC		EBO1 - 127-220 V AC/DC			
	INPUT	OUTPUT	INPUT	OUTPUT	INPUT	OUTPUT	INPUT	OUTPUT
Input voltage	12 to 27.6 V AC	16 to 27.6 V DC	20 to 58 V AC	29 to 58 V DC	88 to 140 V AC	97.8 to 140 V DC	130 to 253 V AC	150 to 253 V DC
Frequency	50/60 Hz		50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Input current	10 mA	8 mA	5 mA	5 mA	6 mA	6 mA	5 mA	5 mA
Pull-in voltage at Is=100%	12 V AC	16 V DC			88 V AC	88 V AC	128 V AC	128 V AC
Switching time C / O	10 ms / 7 ms		10 ms / 7 ms		25 ms / 10 ms			
Operating frequency	30 Hz		30 Hz		15 Hz			
Permissible leakage current								

OUTPUT

Output voltage	4.5 to 58 V DC
Output current min.	1 mA
Output current max.	100 mA
Output leakage current at Umax.	< 50 µA
Residual voltage at I max and U rated	1 V
typical	
max.	1.3 V
Frequency on inductive load	
Isolation Input / Output	2500 V RMS

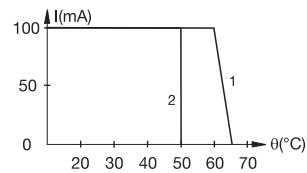
TEMPERATURE

Ambient temperature storage	- 40°C to + 80°C
operating	See derating curves

Other characteristics

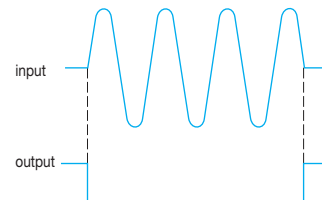
Body material	grey	UL 94 V0	UL 94 V2	UL 94 V0
Wire	Solid wire	0.2-4 mm ² / 22-12 AWG		
size	Stranded wire	0.22-2.5 mm ² / 22-12 AWG		
Rated wire size		2.5 mm ² / 12 AWG		
Wire stripping length		7 mm .276"		
Recommended screwdriver		3.5 .137"		
Protection		IP 20 NEMA 1		
Recommended torque		0.4-0.6 Nm		
Approvals		CE		
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (in relevant parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6.			

Derating curves



EBO1 24 - 127/230 V AC/DC

1 : 24 V AC/DC model
2 : 127-230 V AC/DC model



Order codes

Description	Type	Order P/N	Packaging	Weight
Optocoupler module 100 mA/DC	EBO1-24VAC/DC	1SNA 610 022 R2000	1	0.03
Optocoupler module 100 mA/DC	EBO1-48VAC/DC	1SNA 010 048 R0400	1	0.03
Optocoupler module 50 mA/DC	EBO1-127VAC/DC	1SNA 610 108 R1400	1	0.03
Optocoupler module 50 mA/DC	EBO1-220VAC/DC	1SNA 610 023 R2100	1	0.03

Accessories

End section	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	

Relays and optocouplers

Optocouplers

R1800

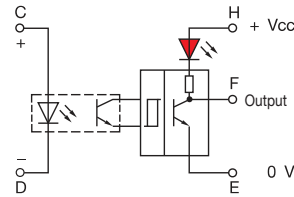
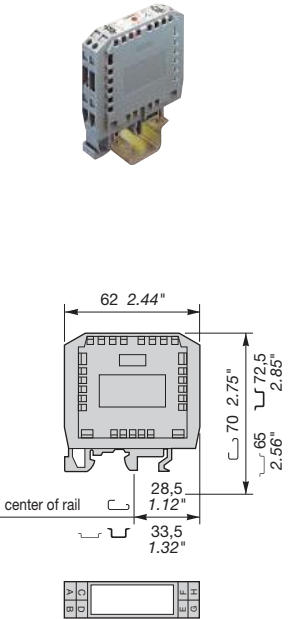


DIN 3

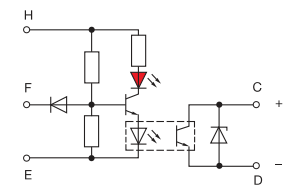
Optocoupler : 5 to 60 V DC / 1 A output - 18 mm .709" spacing
 Optocoupler : 5 to 280 V AC / 1 A output - 18 mm .709" spacing

Characteristics

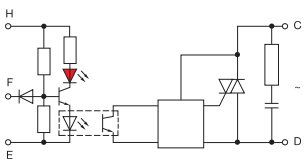
Opto. characteristics	EB IDC		EB ODC		EB OAC	
	TTL	HLL	TTL	HLL	TTL	HLL
INPUT						
Input voltage	10 to 32 V DC					
Voltage HE			4.5 to 6 V DC	19.2 to 28.8 V DC	4.5 to 6 V DC	19.2 to 28.8 V DC
Frequency						
Input current	32 mA at 32 V					
Current HE			11 mA	14 mA	28 mA	12 mA
Non-functioning current	1.5 mA					
FE current in mode 3					- 1.5 mA	- 0.7 mA
Switching time C / O	5 ms		≤ 250 μs		10 ms	
Operating frequency	< 100 Hz		< 200 Hz		< 50 Hz	
Power requirement	60 mW	430 mW	55 mW	340 mW	140 mW	290 mW
OUTPUT						
Logic voltage supply HE	5 V DC ± 1 V	24 V DC ± 6 V				
Logic current supply HE	12 mA	18 mA				
Output voltage	5 V DC TTL	24 V DC HLL	12 to 60 V DC		24 to 280 V AC	
Min. output current			50 mA		25 mA RMS	
Max. output current	25 mA		1 A derating 20 mA / °C		1 A derating 20 mA / °C	
Output leakage current at U _{max}	100 μA		3 mA at 60 V		4 mA max.	
Residual voltage	0.4 V at 25 mA		2.6 V max. at 1 A		± 1.4 V	
Peak current			4 A / 1 s		30 A / 20 ms	
Isolation Input / Output	2500 V RMS		2500 V RMS		2500 V RMS	
TEMPERATURE						
Ambient temperature	storage	- 40°C à + 80°C				
	operating	see derating curve				
Other characteristics						
Body material	grey		UL 94 V2			
Wire	Solid wire		0 - 4 mm ² / 20-12 AWG			
size	Stranded wire		0 - 2.5 mm ² / 20-12 AWG			
Rated wire size			2.5 mm ² / 12 AWG			
Wire stripping length			7 mm .276"			
Recommended screwdriver			3.5 .137"			
Protection			IP 20 NEMA 1			
Recommended torque			0.4 - 0.6 Nm 3.5 - 5.3 lb.in			
Approvals			CE			
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6					



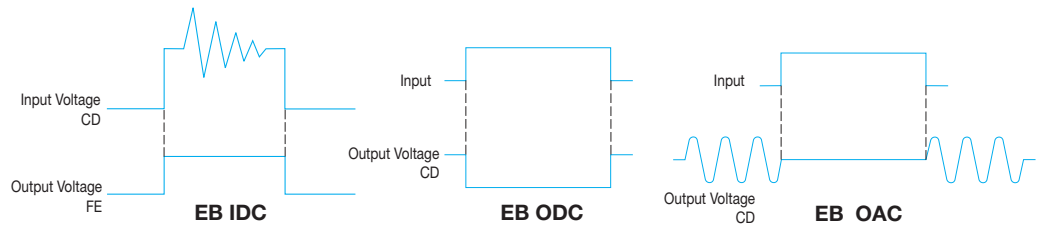
EB IDC



EB ODC



EB OAC

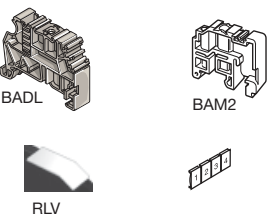


Order codes

Description	Type	Order P/N	Packaging Weight kg
Optocoupler module 25 mA / HLL	EB IDC 5	1SNA 010 031 R1300	1
Optocoupler module 25 mA / HLL	EB IDC 24	1SNA 010 033 R1500	1
Optocoupler module input TTL 1 A / DC	EB ODC 5	1SNA 010 037 R1100	1
Optocoupler module input TTL 1 A / DC	EB ODC 24	1SNA 010 039 R2300	1
Optocoupler module input TTL 1 A / AC	EB OAC 5	1SNA 010 034 R1600	1
Optocoupler module input TTL 1 A / AC	EB OAC 24	1SNA 010 036 R1000	1

Accessories

End section	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	



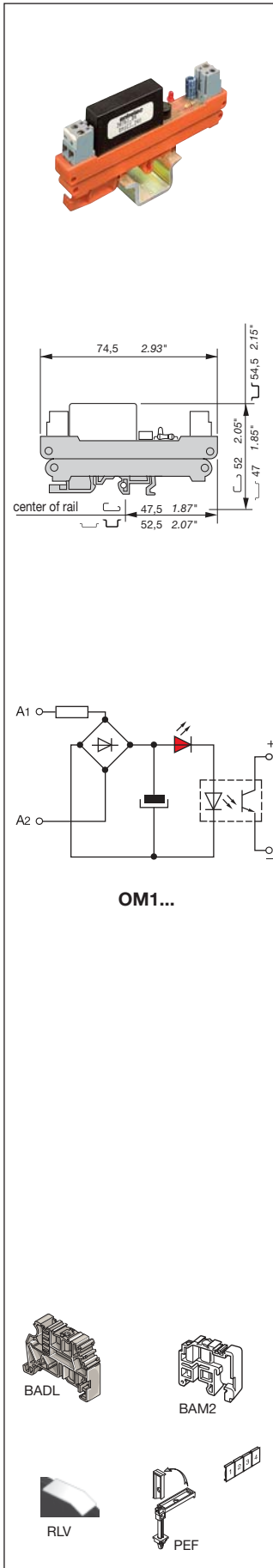
Relays and optocouplers

Optocoupler modules

R20000



DIN 3

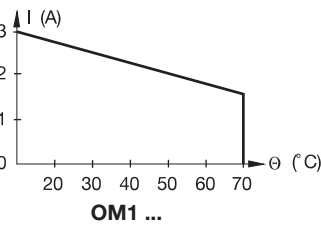


Optocoupler : 3 to 60 V DC / 3 A output - 12.7 mm .500" spacing
 Optocoupler : 24 to 280 V AC / 3 A output - 12.7 mm .500" spacing

Characteristics

Opto. characteristics	OM1 C3	OM1 A3
INPUT		
Input voltage	9.6 to 30 V AC/DC	
Frequency	< 50/60 Hz	
Input current	11 mA	
Pull-in voltage at Is=100%	4.8 V	
Switching time C / O	< 20 μs / < 600 μs	
Operating frequency	800 Hz	
Permissible leakage current		
OUTPUT		
Output voltage	3 to 60 V DC	24 to 280 V AC
Output current min.	25 mA	
Output current max.	3 A	
Output leakage current at Umax.	0.3 mA	
Residual voltage at I max and U rated	1.6 V	
Frequency on inductive load	2500 V RMS	
Isolation Input / Output	2500 V RMS	
TEMPERATURE		
Ambient temperature storage	- 40°C to + 80°C	
operating	see derating curve	
Other characteristics		
Body material	orange	
Wire size	UL 94 V2	
size	0 - 2.5 mm ² / 20-14 AWG	
Stranded wire	0 - 2.5 mm ² / 20-14 AWG	
Rated wire size	2.5 mm ² / 12 AWG	
Wire stripping length	6 mm .236"	
Recommended screwdriver	3.5 .137"	
Protection	IP 20 NEMA 1	
Recommended torque	0.4 - 0.6 Nm 3.5 - 5.3 lb.in	
Approvals	CE	
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6	

Derating curve

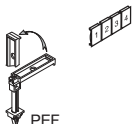
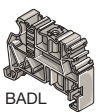


Order codes

Description	Type	Order P/N	Packaging Weight kg
Optocoupler module 3 A/DC	OM1 C3	24 V AC/DC 1SNA 020 361 R0400	1
Optocoupler module 3 A/AC	OM1 A3	24 V AC/DC 1SNA 020 365 R0000	1

Accessories

End section	BADL V0	1SNA 399 903 R0200	50
	BAM2 V0	1SNA 399 967 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marker	RC55	see markers	



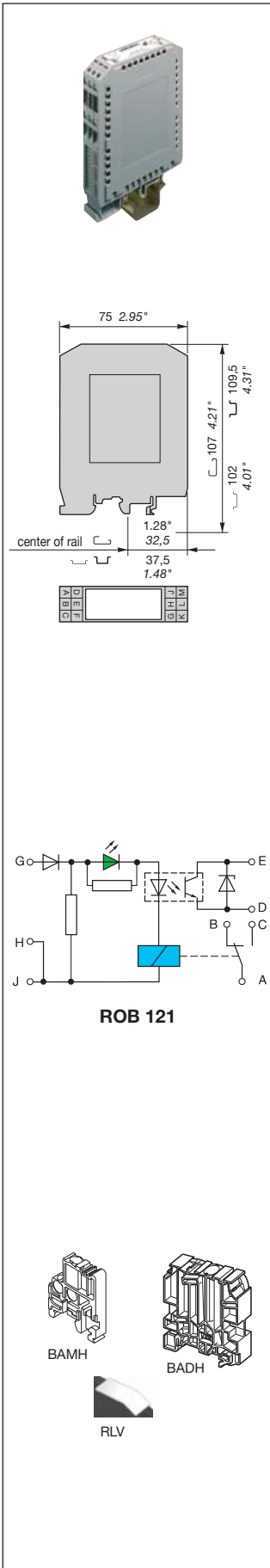
Relays and optocouplers

Relay + Optocoupler modules

R11000



DIN 1-3

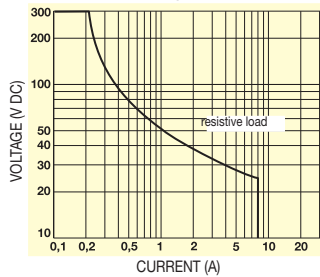


Relay + optocoupler : relay 1 SPDT and optocoupler 4.5 to 58 V DC / 30 mA output - 22.5 mm .886" spacing

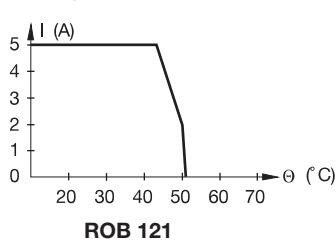
Characteristics

Relay-opto characteristics	ROB 121
INPUT	
Rated voltage +20%, -15% on DC ±15% on AC	24 V DC
Power	0.96 W
Rated current	40 mA
Drop-out voltage	15 V
Permissible leakage current	2.9 mA
OPTOCOUPLER OUTPUT	
Output voltage	4.5 to 58 V DC
Output current max.	30 mA
Output current min.	
Residual voltage at I max and U rated	typical 0.6 V
Operating speed	50 µs / 1.5 ms
Isolation input / output	2500 V RMS
RELAY OUTPUT	
Type	1 SPDT
Voltage switching range min./max.	12 V / 250 V
Current switching range min./max.	5 A
Number of on-load operations	2 x 10 ⁵
Number of off-load operations	3 x 10 ⁷
Operating speed	F 5 ms O 3 ms
Bounce	2 ms
Insulation coil / contact	3500 V RMS
Opto output / relay contact isolation	3500 V RMS
Ambient temperature storage	-40°C to +80°C
operating	see derating curve
Other characteristics	
Body material	grey UL 94 V2
Wire	Solid wire 0 - 4 mm ² / 20 - 12 AWG
size	Stranded wire 0 - 2.5 mm ² / 20 - 12 AWG
Rated wire size	2.5 mm ² / 12 AWG
Wire stripping length	7 mm .276"
Recommended screwdriver	3.5 mm .137"
Protection	IP20 NEMA1
Recommended torque	0.4 - 0.6 Nm 3.5 - 5.3 lb.in
Approvals	CE
Reference standards	CEI 947-7-1 / CEI 947-1 / CEI 1131-2 (parts) / CEI 60664-1 / CEM : IRC 1000-4-2, 3, 4, 5, 6

Max. DC load breaking capacity

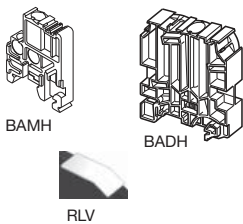


Derating curve



Order codes

Description	Type	Order P/N	Packaging	Weight kg
Relay 1 SPDT - opto. 30 mA/DC module	ROB 121	24 V DC	1SNA 011 093 R0700	1



Accessories

High end section	BADH	1SNA 116 900 R2700	50
	BAMH	1SNA 114 836 R0000	50
	BAMH V0	1SNA 194 836 R0100	50
Lengthwise marker	RLV	1SNA 103 849 R0300	100
Marking method	RC55	see markers	



Component holder terminal blocks Plugs

Contents

R500 series component holder terminal blocks	336
Input optocoupler plugs	337
Transistor or MOS output optocoupler plugs.....	338
MOS or Triac output optocoupler plugs.....	339
Relay or analog plugs, fuse and strap plugs.....	340

Terminal blocks component holder

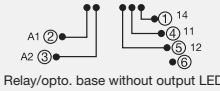
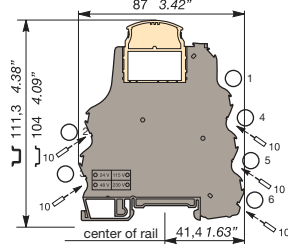
Base for pluggable plug
R500 Series

DIN 3

End stop		th. 9 mm	BADL	V0	1SNA 399 903 R0200
End stop		th. 9,1 mm	BAM	V2	1SNA 103 002 R2600
End stop		th. 9,1 mm	BAM V0	V0	1SNA 199 306 R0300
Rail		35 x 7,5 x 1	PR3.Z2		1SNA 174 300 R1700
Rail		35 x 15 x 2,3	PR4		1SNA 168 500 R1200
Rail		35 x 15 x 1,5	PR5		1SNA 168 700 R2200

D 2,5/5-MP

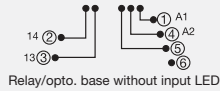
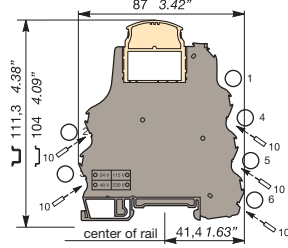
Spacing 5,08 mm (.200")



Relay/opto. base without output LED

D 2,5/5-MP1

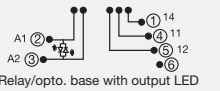
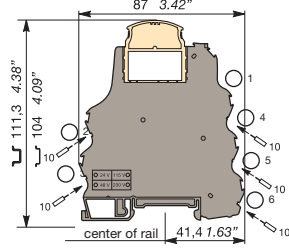
Spacing 5,08 mm (.200")



Relay/opto. base without input LED

D 2,5/5-MP...

Spacing 5,08 mm (.200")



Relay/opto. base with output LED

Observations

Terminal blocks are delivered without plugs.

Max. working temperature
version without LED : 100°C
version with LED : 85°C
Contact resistance : < 5 mΩ

Type	Part numbers	Type	Part numbers	Type	Part numbers
Grey V0	Order plugs separately	Grey V0	Order plugs separately	Grey V0	Order plugs separately
D 2,5/5-MP	1SNA 607 224 R0100	D 2,5/5-MP1	1SNA 607 223 R0000	D 2,5/5-MP-24VDC	1SNA 607 222 R0700
				D 2,5/5-MP-24VAC/DC	1SNA 607 260 R2100
				D 2,5/5-MP-48VAC/DC	1SNA 607 261 R1600
				D 2,5/5-MP-110VAC	1SNA 607 266 R1300
				D 2,5/5-MP-230VAC	1SNA 607 267 R1400

Characteristics

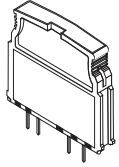
			IEC	UL/CSA pending	IEC	UL/CSA pending	IEC	UL/CSA pending
Wire size	Compression clamp	Solid wire	0,2-4 mm ²	24-12 AWG	0,2-4 mm ²	24-12 AWG	0,2-4 mm ²	24-12 AWG
		Stranded wire	0,22-2,5 mm ²	24-12 AWG	0,22-2,5 mm ²	24-12 AWG	0,22-2,5 mm ²	24-12 AWG
Voltage	Rated		320 V	300 V	320 V	300 V	320 V	300 V
	Pulse		4 kV		4 kV		4 kV	
Current	Rated		6 A	6 A	6 A	6 A	6 A	6 A
	Pollution degree		3		3		3	
Wire size	Rated / Gauge		2,5 mm ²	12 AWG	2,5 mm ²	12 AWG	2,5 mm ²	12 AWG
Wire stripping length			10 mm / .394"		10 mm / .394"		10 mm / .394"	
Recommended screwdriver			3,5 mm / .137"		3,5 mm / .137"		3,5 mm / .137"	
Recommended torque			0,4-0,6 Nm / 3,5-5,3 lb.in		0,4-0,6 Nm / 3,5-5,3 lb.in		0,4-0,6 Nm / 3,5-5,3 lb.in	
Protection			IP 20 / NEMA1		IP 20 / NEMA1		IP 20 / NEMA1	

Accessories

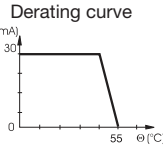
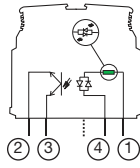
	Type	Part numbers	Type	Part numbers	Type	Part numbers
1 Test device	DCB (1) blue	1SNA 105 028 R2100	DCB (1) blue	1SNA 105 028 R2100	DCB (1) blue	1SNA 105 028 R2100
2 Test plug	FC2 DIA. 2	1SNA 007 865 R2600	FC2 DIA. 2	1SNA 007 865 R2600	FC2 DIA. 2	1SNA 007 865 R2600
3 Relay plug 1 SPDT 10mA/6 A	BNMS R24V-1 beige	1SNA 031 820 R1400			BNMS R24V-1 beige	1SNA 031 820 R1400
1 SPDT 1mA/6 A	BNMS R24V-2 beige	1SNA 031 847 R1300			BNMS R24V-2 beige	1SNA 031 847 R1300
4 Input optocoupler plug 5 V DC			BNMS T5V-1 white	1SNA 031 831 R0300		
24 V DC			BNMS T24V-1 white	1SNA 031 848 R2400		
24 V DC			BNMS T24V-2 white	1SNA 031 800 R2100		
48 V DC			BNMS T48V-1 white	1SNA 031 801 R1600		
125 V DC			BNMS T125V-1 white	1SNA 031 845 R1100		
24 V AC			BNMS T24V-1 yellow	1SNA 031 802 R1700		
48 V AC			BNMS T48V-1 yellow	1SNA 031 803 R1000		
115 V AC			BNMS T115V-1 yellow	1SNA 031 804 R1100		
230 V AC			BNMS T230V-1 yellow	1SNA 031 805 R1200		
5 Output optocoupler 24 V DC/100 mA	BNMS N24V-3 red	1SNA 031 807 R1400			BNMS N24V-3 red	1SNA 031 807 R1400
24 V DC/100 mA	BNMS P24V-3 red	1SNA 031 810 R1200			BNMS P24V-3 red	1SNA 031 810 R1200
24 V DC/2 A	BNMS N24V-1 red	1SNA 031 813 R0100			BNMS N24V-1 red	1SNA 031 813 R0100
24 V DC/2 A	BNMS P24V-1 red	1SNA 031 815 R0300			BNMS P24V-1 red	1SNA 031 815 R0300
24 V DC/1 A	BNMS N24V-2 red	1SNA 031 817 R0500			BNMS N24V-2 red	1SNA 031 817 R0500
24 V DC/1 A	BNMS P24V-2 red	1SNA 031 819 R1700			BNMS P24V-2 red	1SNA 031 819 R1700
24 V DC/1 A	BNMS A24V-4 black	1SNA 031 839 R1300			BNMS A24V-4 black	1SNA 031 839 R1300
5 Output optocoupler 5 V DC/100 mA	BNMS N5V-3 red	1SNA 031 806 R1300				
5 V DC/100 mA	BNMS P5V-3 red	1SNA 031 809 R2600				
48 V DC/100 mA	BNMS N48V-3 red	1SNA 031 808 R2500				
48 V DC/100 mA	BNMS P48V-3 red	1SNA 031 811 R0700				
5 V DC/2 A	BNMS N5V-1 red	1SNA 031 812 R0000				
5 V DC/2 A	BNMS P5V-1 red	1SNA 031 814 R0200				
5 V DC/1 A	BNMS N5V-2 red	1SNA 031 816 R0400				
5 V DC/1 A	BNMS P5V-2 red	1SNA 031 818 R1600				
7 Fuse plug	BNMS F125mA-1 grey	1SNA 031 821 R0100	BNMS F125mA-1 grey	1SNA 031 821 R0100	BNMS F125mA-1 grey	1SNA 031 821 R0100
125 V/125 mA	BNMS F500mA-1 grey	1SNA 031 838 R1200	BNMS F500mA-1 grey	1SNA 031 838 R1200	BNMS F500mA-1 grey	1SNA 031 838 R1200
125 V/500 mA	BNMS F2A-1 grey	1SNA 031 822 R0200	BNMS F2A-1 grey	1SNA 031 822 R0200	BNMS F2A-1 grey	1SNA 031 822 R0200
125 V/2 A	BNMS F5A-1 grey	1SNA 031 823 R0300	BNMS F5A-1 grey	1SNA 031 823 R0300	BNMS F5A-1 grey	1SNA 031 823 R0300
125 V/5 A	BNMS F125mA-2 grey	1SNA 031 824 R0400	BNMS F125mA-2 grey	1SNA 031 824 R0400	BNMS F125mA-2 grey	1SNA 031 824 R0400
250 V/125 mA	BNMS F2A-2 grey	1SNA 031 825 R0500	BNMS F2A-2 grey	1SNA 031 825 R0500	BNMS F2A-2 grey	1SNA 031 825 R0500
250 V/2 A	BNMS F5A-2 grey	1SNA 031 826 R0600	BNMS F5A-2 grey	1SNA 031 826 R0600	BNMS F5A-2 grey	1SNA 031 826 R0600
250 V/5 A	BNMS F125mA-3 grey	1SNA 031 827 R0700			BNMS F125mA-3 grey	1SNA 031 827 R0700
125 V/125 mA	BNMS F125mA-4 grey	1SNA 031 828 R1000			BNMS F125mA-4 grey	1SNA 031 828 R1000
250 V/125 mA	BNMS F2A-7 grey	1SNA 031 849 R2500	BNMS F2A-7 grey	1SNA 031 849 R2500		
125 V/2 A	BNMS ST1 grey	1SNA 031 829 R1100	BNMS ST1 grey	1SNA 031 829 R1100	BNMS ST1 grey	1SNA 031 829 R1100
	BNMS ST2 grey	1SNA 031 830 R1600	BNMS ST2 grey	1SNA 031 830 R1600		
8 Strap plug	BNMS CAI/U-500 grey	1SNA 031 832 R0400				
	BNMS CAI/U-500 grey	1SNA 031 832 R0400				
	BNMS CAI/U-250 grey	1SNA 031 833 R0500				
	BNMS CAI/U-250	1SNA 031 833 R0500				
9 Converter plug	PCMS V0 (2) RC 55	1SNA 205 523 R2200	PCMS V0 (2) RC 55	1SNA 205 523 R2200	PCMS V0 (2) RC 55	1SNA 205 523 R2200
0-20 mA/0-10 V						
4-20 mA/2-10 V						
0-20 mA/0-5 V						
4-20 mA/1-5 V						
10 Comb type jumper bar						
10 poles						
R See section on marking						

(1) Solely on the top stage. (2) Comb type jumper bar from 2 to 22 poles, see accessories.

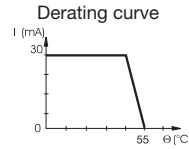
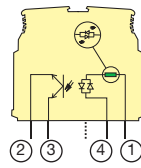
Input optocoupler plugs



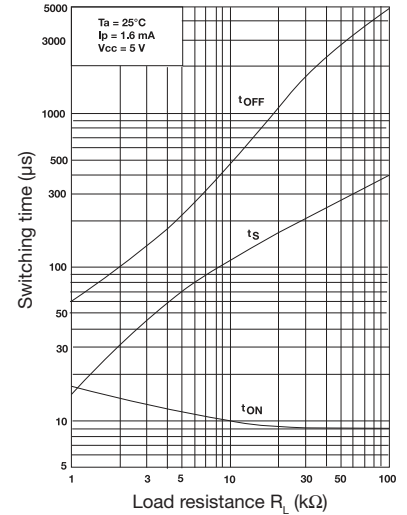
DC plugs



AC plugs



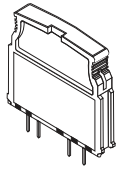
Switching time R_L curve 1 for 24 V DC plugs only



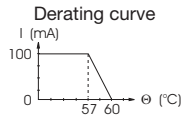
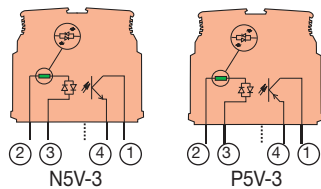
Part number	5 V DC		24 V DC		48 V DC		125 V DC	
	Type	P/N	Type	P/N	Type	P/N	Type	P/N
	BNMS T5V-1	1SNA 031 831 R0300	BNMS T24V-1	1SNA 031 800 R2100	BNMS T48V-1	1SNA 031 801 R1600	BNMS T125V-1	1SNA 031 845 R1100
			BNMS T24V-2	1SNA 031 848 R2400				
Characteristics								
INPUT			BNMS T24V-1	BNMS T24V-2				
Voltage	4,5 V to 5,5 V DC		19,2 V to 27,6 V DC		38,4 V to 55,2 V DC		93,5 V to 140 V DC	
Max. current	6 mA		5 mA		4,1 mA		3 mA	
Typical triggering threshold at $I_s = 100\%$	3,5 V		12 V DC		21 V DC		50 V DC	
Switching time	C/O	20 µs / 1,3 ms	20 µs / 1,3 ms	10 µs / see curve 1	20 µs / 1,3 ms		20 µs / 1,3 ms	
Leakage current			1 mA		0,8 mA			
OUTPUT								
Max. voltage. / Max. current	58 V / 30 mA		58 V / 30 mA	58 V / 5 mA	58 V / 30 mA		58 V / 30 mA	
Residual voltage max. I and rated U standard	2,3 V DC		2,3 V DC	0,3 V DC	2,3 V DC		2,3 V DC	
max.	2,7 V DC		2,7 V DC	0,5 V DC	2,7 V DC		2,7 V DC	
Compatibility								
Input / Output isolation	2,5 kV		2,5 kV		2,5 kV		2,5 kV	
TEMPERATURE								
Storage	- 30°C to + 80°C		- 30°C to + 80°C		- 30°C to + 80°C		- 30°C to + 80°C	
Operating	- 20°C to + 55°C		- 20°C to + 55°C		- 20°C to + 55°C		- 20°C to + 55°C	
Part number	24 V AC		48 V AC		115 V AC		230 V AC	
	Type	P/N	Type	P/N	Type	P/N	Type	P/N
	BNMS T24V-1	1SNA 031 802 R1700	BNMS T48V-1	1SNA 031 803 R1000	BNMS T115V-1	1SNA 031 804 R1100	BNMS T230V-1	1SNA 031 805 R1200
Charateristics								
INPUT								
Voltage	20,4 V to 26,4 V AC		40,8 V to 52,8 V AC		98 V to 126,5 V AC		195,5 V to 253 V AC	
Max. current	8,5 mA		4,5 mA		8 mA		7 mA	
Typical triggering threshold at $I_s = 100\%$	13 V AC		22 V AC		50 V AC		95 V AC	
Switching time	C/O	6 ms / 10 ms	6 ms / 10 ms		6 ms / 10 ms		6 ms / 10 ms	
Leakage current	1 mA		1 mA		2 mA		2 mA	
OUPUT								
Max. voltage / Max. current	58 V / 30 mA		58 V / 30 mA		58 V / 30 mA		58 V / 30 mA	
Residual voltage max. I and rated U standard	2,3 V DC		2,3 V		2,3 V		2,3 V	
max.	2,7 V DC		2,7 V		2,7 V		2,7 V	
Input / Output isolation	2,5 kV		2,5 kV		2,5 kV		2,5 kV	
TEMPERATURE								
Storage	- 30°C to + 80°C		- 30°C to + 80°C		- 30°C to + 80°C		- 30°C to + 80°C	
Operating	- 20°C to + 55°C		- 20°C to + 55°C		- 20°C to + 55°C		- 20°C to + 55°C	

Transistor output optocoupler plugs

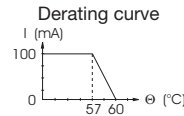
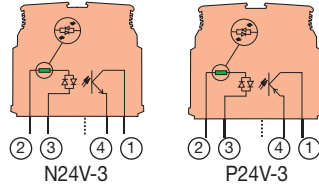
CE



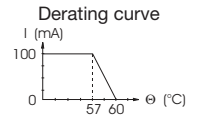
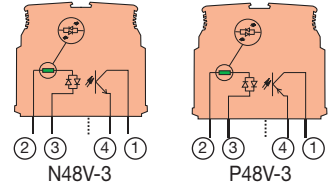
100 mA output optocoupler 5 V DC



100 mA output optocoupler 24 V DC



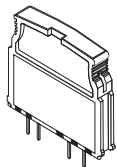
100 mA output optocoupler 48 V DC



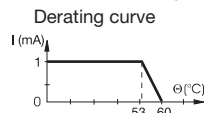
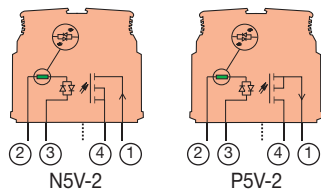
Part numbers	Type	P/N	Type	P/N	Type	P/N
	BNMS N5V-3	1SNA 031 806 R1300	BNMS N24V-3	1SNA 031 807 R1400	BNMS N48V-3	1SNA 031 808 R2500
	BNMS P5V-3	1SNA 031 809 R2600	BNMS P24V-3	1SNA 031 810 R1200	BNMS P48V-3	1SNA 031 811 R0700
Characteristics						
INPUT						
Voltage	4,5 V to 5,5 V DC		20,4 V to 28,8 V DC		40,8 V to 57,6 V DC	
Max. current	8,5 mA		4,8 mA		3,9 mA	
Typical triggering threshold at $I_s = 100\%$	2,9 V DC		16 V DC		26 V DC	
Switching time C/O	20 μ s / 1,3 ms		20 μ s / 1,3 ms		20 μ s / 1,3 ms	
Leakage current	1 mA		1 mA		1 mA	
OUTPUT						
Max. voltage / Max. current	58 V / 100 mA		58 V / 100 mA		58 V / 100 mA	
Residual voltage max. I and rated U						
standard U	1 V DC		1 V DC		1 V DC	
max.	1,3 V DC		1,3 V DC		1,3 V DC	
Frequency on inductive load	See Note 1		See Note 1		See Note 1	
Input / Output isolation	2,5 kV		2,5 kV		2,5 kV	
TEMPERATURE						
Storage	- 30°C to + 80°C		- 30°C to + 80°C		- 30°C to + 80°C	
Operating	- 20°C to + 60°C		- 20°C to + 60°C		- 20°C to + 60°C	

MOS output optocoupler plugs

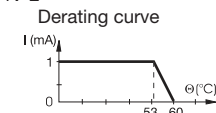
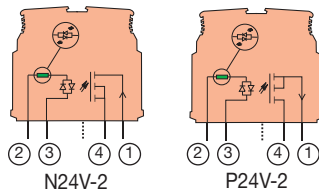
CE



1 A output optocoupler 5 V DC



1 A output optocoupler 24 V DC



Note 1 :

$$F_{max} = (1 - 0,007 \times U_s) / (L \times I_s^2)$$

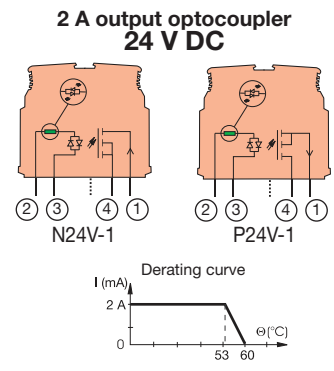
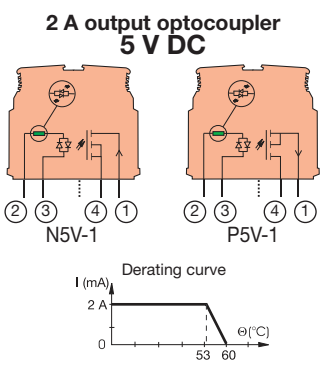
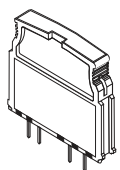
or

$$F_{max} = (1 - 0,007 \times U_s) / (P \times \frac{L}{R})$$

U_s = Output voltage supply
 I_s = Output current
 L = Inductive load
 P = Load power
 R = Load resistance

Part numbers	Type	P/N	Type	P/N
	BNMS N5V-2	1SNA 031 816 R0400	BNMS N24V-2	1SNA 031 817 R0500
	BNMS P5V-2	1SNA 031 818 R1600	BNMS P24V-2	1SNA 031 819 R1700
Characteristics				
INPUT				
Voltage	4,5 V to 5,5 V DC		20,4 V to 28,8 V DC	
Max. current	12,5 mA		6,7 mA	
Typical triggering threshold at $I_s=100\%$	3,5 V DC		10 V DC	
Switching time C/O	20 μ s / 250 μ s		50 μ s / 350 μ s	
Leakage current	1 mA		1 mA	
OUTPUT				
Max. voltage / Max. current	58 V / See graphs		58 V / See graphs	
Residual voltage max. I and rated U				
standard U	1 V DC		1 V DC	
max.	1,3 V DC		1,3 V DC	
Frequency on inductive load	See Note 1		See Note 1	
Input / Output isolation	2,5 kV		2,5 kV	
TEMPERATURE				
Storage	- 30°C to + 80°C		- 30°C to + 80°C	
Operating	- 20°C to + 60°C		- 20°C to + 60°C	

MOS output optocoupler plug



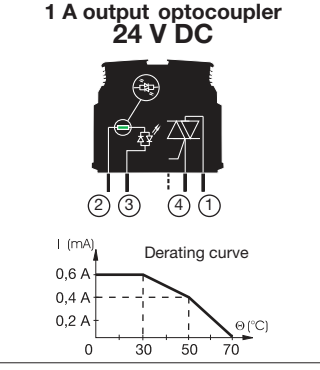
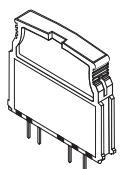
Note 2 :
 $F_{max} = (1 - 0,012 \times U_s) / (L \times I_s^2)$
 or
 $F_{max} = (1 - 0,012 \times U_s) / (P \times \frac{L}{R})$

U_s = Output voltage supply
 I_s = Output current
 L = Inductive load
 P = Load power
 R = Load resistance

Part numbers	Type	P/N	Type	P/N
	BNMS N5V-1	1SNA 031 812 R0000	BNMS N24V-1	1SNA 031 813 F0100
	BNMS P5V-1	1SNA 031 814 R0200	BNMS P24V-1	1SNA 031 815 F0300

Characteristics			
INPUT			
Voltage		4,5 V to 5,5 V DC	20,4 V to 28,8 V DC
Max. current		12,5 mA	6,7 mA
Typical triggering threshold		3,5 V DC	10 V DC
Switching time	C/O	20 μs / 250 μs	50 μs / 350 μs
Leakage current		1 mA	1 mA
OUTPUT			
Max. voltage / Max. current		30 V DC / See graphs	30 V / See graphs
Residual voltage max. I and rated U			
standard U		1 V DC	1 V DC
max.		1,3 V DC	1,3 V DC
Frequency on inductive load		See Note 2	See Note 2
Input / Output isolation		2,5 kV	2,5 kV
TEMPERATURE			
Storage		- 30°C to + 80°C	- 30°C to + 80°C
Operating		- 20°C to + 60°C	- 20°C to + 60°C

Triac output optocoupler plug

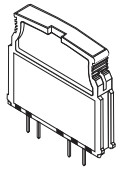


Part numbers	Type	P/N
	BNMS A24V-4	1SNA 031 839 R1300

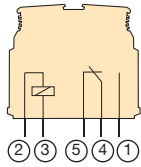
Characteristics			
INPUT			
Voltage		20,4 V to 28,8 V DC	
Max. current		3,8 mA	
Typical triggering threshold		10 V DC	
Switching time	C/O	9,5 ms / 12 ms	
Leakage current			
OUTPUT			
Max. voltage / Max. current		24 V to 253 V AC / See derating curve	
Residual voltage max. I and rated U			
standard U		1 V AC	
max.		1,3 V AC	
Input / Output isolation		2,5 kV	
TEMPERATURE			
Storage		- 30°C to + 80°C	
Operating		- 20°C to + 70°C	

Relay plugs

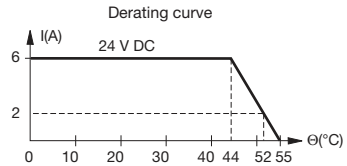
CE



1 SPDT relay



R24V-1

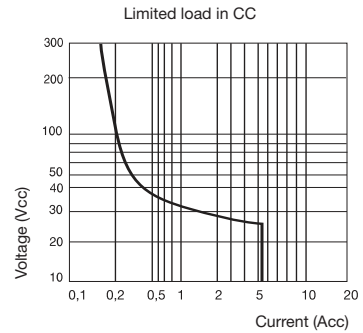


Part numbers

Type	P/N
BNMS R24V-1	1SNA 031 820 R1400
BNMS R24V-2	1SNA 031 847 R1300

Characteristics

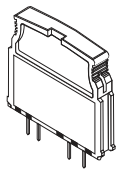
	BNMS R24V-1	BNMS R24V-2
COIL		
Voltage	20,4 V to 28,8 V DC	
Current max.	7 mA	
Trip voltage	1,2 V	
CONTACT		
Type	1 SPDT	
Voltage mini. / max.	12 V / 250 V	5 V / 250 V
Switching current mini. / max.	10 mA / 6 A	1 mA / 6 A
Switching current	AC1 mini. / max. DC1 mini. / max.	0,05 VA/1500 VA (resistance) 0,05 W / 140 W
Number of operations on load	10 ⁵ operations for AC15	
Number of operations off load	10x10 ⁶ operations	
Operating speed	C/O 6 ms / 8 ms	
Bounce	1,5 ms	
Isolation	Coil / Contact	4 kV
Resistance to shock waves	Coil / Contact	4 kV
Isolation	Contact / Contact	1 kV
TEMPERATURE		
Storage	- 40°C to + 80°C	
Operating	- 20°C to + 55°C	



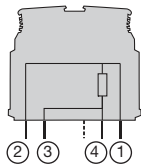
	DC12	AC12	DC13	AC15
24 V	6 A	6 A	1 A	3 A
110/120 V	0,3 A	6 A	0,2 A	3 A
220/230 V	0,2 A	6 A	0,1 A	3 A

Analogical plugs

CE

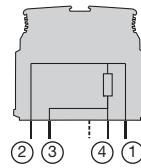


Current / Voltage Converter



Plug with 250 Ω accuracy resistance for analogical signals.

Current / Voltage Converter



Plug with 500 Ω accuracy resistance for analogical signals.

Part numbers

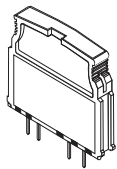
Type	P/N	Type	P/N
BNMS CA I/U-250	1SNA 031 832 R0400	BNMS CA I/U-500	1SNA 031 833 R0500

Characteristics

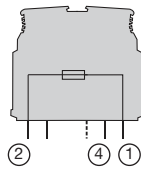
	250 Ω	500 Ω
Resistance	250 Ω	500 Ω
Power	0,35 W	0,35 W
Accuracy	0,1 %	0,1 %
Stability	25 ppm	25 ppm

Fuse and strap plugs

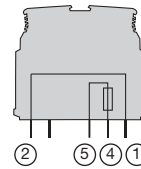
CE



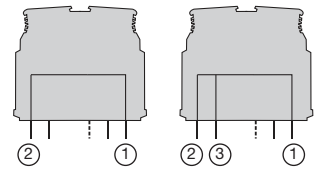
Output fuse plug



Input fuse plug



Strap plug



Part numbers

Type	P/N	Type	P/N	Type	P/N
BNMS F125mA-1	125 V / 125 mA 1SNA 031 821 R0100	BNMS F125mA-3	125 V / 125 mA 1SNA 031 827 R0700	BNMS ST1	1SNA 031 829 R1100
BNMS F500mA-1	125 V / 500 mA 1SNA 031 838 R1200	BNMS F125mA-4	250 V / 125 mA 1SNA 031 828 R1000	BNMS ST2	1SNA 031 830 R1600
BNMS F2A-1	125 V / 2 A 1SNA 031 822 R0200				
BNMS F5A-1	125 V / 5 A 1SNA 031 823 R0300				
BNMS F125mA-2	250 V / 125 mA 1SNA 031 824 R0400				
BNMS F2A-2	250 V / 2 A 1SNA 031 825 R0500				
BNMS F5A-2	250 V / 5 A 1SNA 031 826 R0600				

Contents

Accessories..... 342

Marking 344

Relays and optocouplers Accessories

End stops

The end stops are mounted at the extremity of the terminal board assembly, giving additional support to the terminal blocks as markers. For various types of marking, refer to the marker section.

Description	Type	Order P/N	Packaging Weight kg
End stop DIN 3			
grey V0	BADL 9 mm	1 SNA 399 903 R0200	50
End stop with screws DIN 3			
grey V0	BAM2 V0 10 mm	1 SNA 399 967 R0100	50
grey V2	BAM2 10 mm	1 SNA 206 351 R1600	50
beige V0	BAM2 V0 10 mm	1 SNA 296 351 R0000	50
High end stop with screws DIN 1 and DIN 3			
grey	BAMH 9,1 mm	1 SNA 114 836 R0000	50
beige V0	BAMH V0 9,1 mm	1 SNA 194 836 R0100	50
High end stop with screws DIN 3			
grey	BADH 12 mm	1 SNA 116 900 R2700	50

Mounting rails

Symmetrical zinc bichromate plated steel prepunched rail	PR30 2 m	1 SNA 173 220 R0500	1
Symmetrical zinc bichromate plated steel rail	PR3.Z2 2 m	1 SNA 174 300 R1700	1
White, symmetrical passivated galvanized steel rail	PR3.G2 2 m	1 SNA 164 800 R0300	1
Symmetrical zinc bichromate plated steel rail	PR5 2 m	1 SNA 168 700 R2200	1
Symmetrical zinc bichromate plated steel rail	PR4 2 m	1 SNA 168 500 R1200	1

Test devices

Test plug DIA. 2 mm	FC2	1 SNA 007 865 R2600	10
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Assembled jumper bar

This accessory permits electrical connection between 2 to 70 blocks with 6 mm spacing placed side by side. It can be used with screw clamp or spring clamp blocks with 6 mm or 12 mm spacing. Interconnection of blocks not placed side by side is possible if teeth of the jumper bar have been cut in front of the blocks not to be connected. These teeth can be removed using pliers.

Use of separator end sections before and after the jumper bar is required to preserve IP20 protection of the assembly.

Assembled jumper bar 10 poles - 24 A	BJ612-10	1 SNA 290 488 R0100	10
Assembled jumper bar 70 poles - 24 A	BJ612-70	1 SNA 290 489 R0200	10

Separator end section

Directly mounted on the rail beside the block, it permits to identify and make electrical insulation of product groups using jumper bars. Dimensions are the same as screw clamp blocks : width 70 mm and height on rail 67,5 mm with 2 mm spacing.

Separator end section	SC612	1 SNA 290 474 R0200	10
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Distribution module

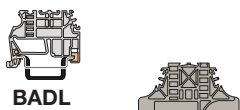
This terminal block with BJ612-... jumper bars permits 2 polarities distribution (*PCL side and process side*) thanks to two separate circuits, each of them including :

- one 4 mm² input,
- two 2,5 mm² outputs
- one double output for jumper bar BJ612-...

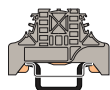
It permits also the connection of ground to the rail though a 4 mm² input.

Rated voltage : 250 VAC-DC
 Rated current : 32 A (4 mm²) - 16 A (2,5 mm²)
 Recommended torque : 0,4 - 0,6 Nm

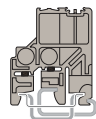
Screw clamp distribution block sp. 12 mm	D4/12-3-3	1 SNA 645 031 R2000	5
Spring clamp distribution block sp. 12 mm	D4/12-3R-3R	1 SNA 645 531 R2200	5



BADL



BAM2



BAMH



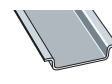
BADH



PR30



PR3.Z2



PR3.G2



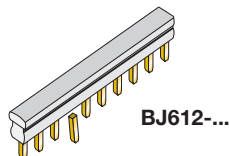
PR5



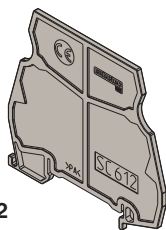
PR4



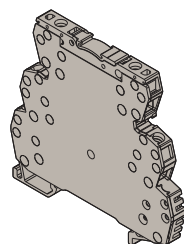
FC2



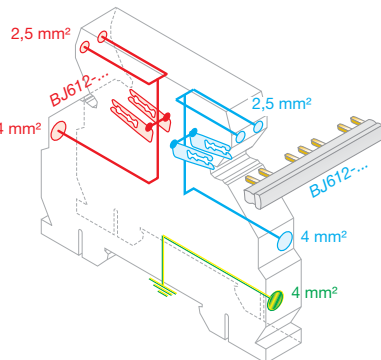
BJ612-...



SC612



D4/12-3...

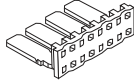


Accessories

PCMS

Comb-type jumper

This accessory permits the electrical connection of 2 to 22 blocks.



No. of poles	Grey UL94V0	Red UL94V0	Blue UL94V0	Green/Yellow UL94V0
2	1SNA 205 491 R2300	1SNA 205 492 R2400	1SNA 205 493 R2500	1SNA 205 494 R2600
3	1SNA 205 495 R2700	1SNA 205 496 R2800	1SNA 205 497 R2900	1SNA 205 498 R3000
4	1SNA 205 499 R0300	1SNA 205 500 R1000	1SNA 205 501 R0500	1SNA 205 502 R0600
5	1SNA 205 503 R0700	1SNA 205 504 R0800	1SNA 205 505 R0900	1SNA 205 506 R1000
6	1SNA 205 507 R0300	1SNA 205 508 R1400	1SNA 205 509 R1500	1SNA 205 510 R0100
7	1SNA 205 511 R2600	1SNA 205 512 R2700	1SNA 205 513 R2800	1SNA 205 514 R2100
8	1SNA 205 515 R2200	1SNA 205 516 R2300	1SNA 205 517 R2400	1SNA 205 518 R0500
9	1SNA 205 519 R0600	1SNA 205 520 R0300	1SNA 205 521 R2000	1SNA 205 522 R2100
10	1SNA 205 523 R2200	1SNA 205 524 R2300	1SNA 205 525 R2400	1SNA 205 526 R2500
11	1SNA 205 527 R2600	1SNA 205 528 R0700	1SNA 205 529 R0000	1SNA 205 530 R0500
12	1SNA 205 531 R2200	1SNA 205 532 R2300	1SNA 205 533 R2400	1SNA 205 534 R2500
13	1SNA 205 535 R2600	1SNA 205 536 R2700	1SNA 205 537 R2000	1SNA 205 538 R0100
14	1SNA 205 539 R0200	1SNA 205 540 R1700	1SNA 205 541 R0400	1SNA 205 542 R0500
15	1SNA 205 543 R0600	1SNA 205 544 R0700	1SNA 205 545 R0000	1SNA 205 546 R0100
16	1SNA 205 547 R0200	1SNA 205 548 R1300	1SNA 205 549 R1400	1SNA 205 550 R1100
17	1SNA 205 551 R0600	1SNA 205 552 R0700	1SNA 205 553 R0000	1SNA 205 554 R0100
18	1SNA 205 555 R0200	1SNA 205 556 R0300	1SNA 205 557 R0400	1SNA 205 558 R1500
19	1SNA 205 559 R1600	1SNA 205 560 R1300	1SNA 205 561 R0000	1SNA 205 562 R0100
20	1SNA 205 563 R0200	1SNA 205 564 R0300	1SNA 205 565 R0400	1SNA 205 566 R0500
21	1SNA 205 567 R0600	1SNA 205 568 R1700	1SNA 205 569 R1000	1SNA 205 570 R1500
22	1SNA 205 571 R0200	1SNA 205 572 R0300	1SNA 205 573 R0400	1SNA 205 574 R0500

PEF

Identification label holders

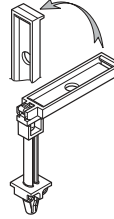
Designed to hold RPEV label (see opposite).

PEF * 1SNA 020 568 R0400

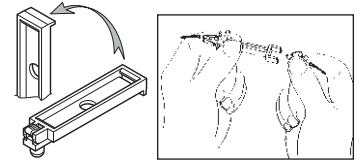
* Delivered with labels.

The label holders are removable and the labels can be changed easily.

● For mounting on PCB in a 3,7 mm diameter hole.



● For mounting on a PCB block in a 2 mm diameter hole (no support leg).



RPEV

Label for PEF 29 x 6 mm

Sheets of 99 pre-cut labels

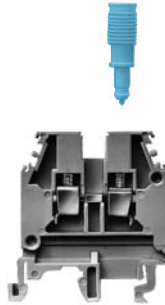


✓ Blank **RPEV** 1SNA 173 178 R0700

DC

Test device on screw head

This patented device is mounted on the round screwdriver opening. It is used for troubleshooting, measuring and control for monitoring and repairing an installation, on blocks without a test socket. For this, the device receives an FC2 test plug.



The DC's are differentiated by their colour :

blue for MA 2,5/5 blocks

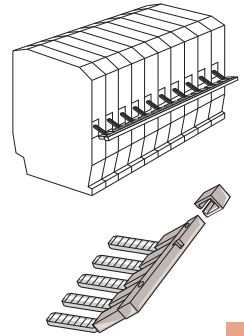
DCB 1SNA 105 028 R2100

PC

Comb-type jumper bar

PC **EIP**

This accessory can be used only on the terminal blocks with at least one compression clamp connection. It permits the electrical connection of 2 to 10 blocks. Interconnection of non-consecutive blocks is possible by removing the teeth opposite the blocks which must not be connected. The comb-type jumper bars can be cut using pliers (or a saw) : in this case, the use of an insulating tip EIP is recommended. The comb is placed in the compression clamp before tightening the screws, above the eventual conductor.



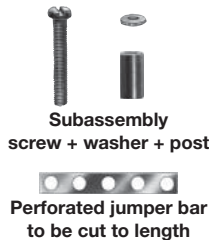
To be mounted on blocks series R900 and R910 :

Insulating tip for comb **EIP** 1SNA 113 550 R2400
Comb-type jumper bar **PC9** 15 A 10 poles 1SNA 210 160 R1200

BJ Jumper bar

BJS Jumper bar not assembled

To connect terminal blocks, place the metal tube into the top center hole on each terminal block to be connected. The metal tube contacts the terminal block's internal connector bar. The perforated bar is cut to length and placed flat along the center opening of the series of terminal blocks. The screw is inserted into the perforated bar's hole which is located directly above the blocks being connected. The screw goes through the threaded metal tube and is screwed into the terminal block's internal connector bar. This completes the electrical connection to the perforated bar and connects the block.



To be mounted on blocks series R910 :

Screw + washer + post **EV6D** 1SNA 168 400 R1600
Perforated jumper bar **BJS9** 32 A 8 poles 1SNA 177 583 R1200
BJS9 32 A 16 poles 1SNA 177 584 R1300

RL Lengthwise marker

RLV Lengthwise marker
Width 9 mm .354"

Large area for writing.
To be snapped onto the top of blocks.

Blank marker for writing : **RLV** 1SNA 103 849 R0300



IDC jumper

(insulation displacement jumper)

Characteristics

Wire size	IEC NFC VDE		CSA
	Rigid	2,5 mm ²	14 AWG
mm ² / AWG	Flexible	2,5 mm ²	14 AWG
Voltage	V	600	600
Current	A	26	15
Rated wire size	mm ² / AWG	2,5 mm ²	14 AWG
Working temperature	°C	-55°C → +110°C	
Protection		IP20 / NEMA1	

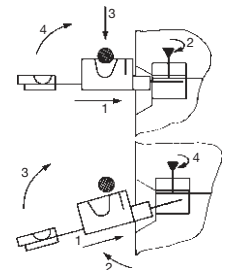
Quick-jump lets you interconnect screw clamp terminals of different sizes, levels and all manufacturers quickly and safely. Its insulation displacement technology makes it easy to use, fast, economical and does not require a special tool. Use as a jumper between relays, switches and other electronic components. ABB Quick-jump will fit any screw clamp type terminal block, from 6 mm .238" spacing and larger.

How to use : connecting Quick-jump to your terminal

- 1 - Insert ABB Quick-jump into your terminal screw clamp.
- 2 - Tighten the terminal screw.
- 3 - Guide jumper wire through the V-shaped opening in the Quick-jump.
- 4 - Secure the wire by closing the Quick-jump lever with any flat nose pliers.

Adding a shunt in an installation :

- 1 - Insert ABB Quick-jump into your terminal screw clamp.
- 2 - Guide the terminal screw clamp into contact with the wire.
- 3 - Secure the wire by closing the Quick-jump lever with any flat nose pliers.
- 4 - Tighten the terminal screw.



Insulation displacement jumper **AD 2,5** 1SNA 114 205 R2000

Relays and optocouplers Accessories Marking

Marking for Interface Modules

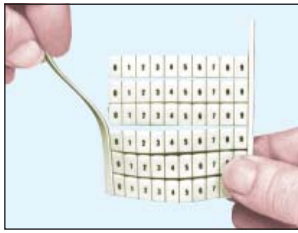
Selection table

Markers for modules :	RC610	RC55	RC65
R500	⊘	●	⊘
R600	●	POSSIBLE	●
R900	⊘	●	⊘
R910	●	POSSIBLE	●
R1800	⊘	●	⊘

Possible mounting : **POSSIBLE**

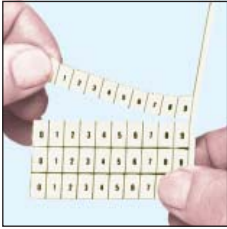
Recommended mounting : ●

Impossible mounting : ⊘



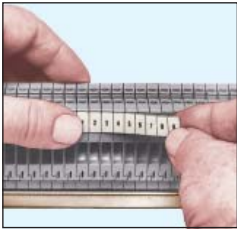
1

Remove one of the side bands of the card.



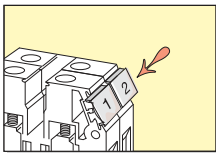
2

Separate the chosen strip from the rest of the card.

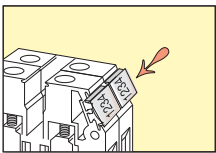


3

Press the first marker in place, hold it and slide your thumb on the rest of the strip.



Horizontal marking



Vertical marking



Refillable box of 100 cards of 18 RC markers

Marking for terminal blocks

Standard RC marker cards

Marker sizes	(x) = Nb of cards in 5 mm spacing kit			(x) = Nb of cards in 6 mm spacing kit		
	RC55	RC65	RC610	RC55	RC65	RC610
Blank cards	1SNA 230 000 R1200	1SNA 232 000 R0300	1SNA 233 000 R0100			
Horizontal marking						
10 strips from 1 to 10	1SNA 230 002 R0000 (5)	1SNA 232 002 R2630 (5)	1SNA 233 002 R2700 (25)			
10 strips from 11 to 20	1SNA 230 003 R0100 (2)	1SNA 232 003 R2700 (2)	1SNA 233 003 R2000 (10)			
10 strips from 21 to 30	1SNA 230 004 R0200	1SNA 232 004 R2000	1SNA 233 004 R2100 (6)			
10 strips from 31 to 40	1SNA 230 005 R0300	1SNA 232 005 R2100	1SNA 233 005 R2200 (4)			
10 strips from 41 to 50	1SNA 230 006 R0400	1SNA 232 006 R2200	1SNA 233 006 R2300 (3)			
10 strips from 51 to 60	1SNA 230 007 R0500	1SNA 232 007 R2300	1SNA 233 007 R2400 (2)			
10 strips from 61 to 70	1SNA 230 008 R1600	1SNA 232 008 R0400	1SNA 233 008 R0500 (2)			
From 1 to 100	1SNA 230 030 R0700 (2)	1SNA 232 030 R2530 (2)	1SNA 233 030 R2600 (15)			
From 101 to 200	1SNA 230 031 R2400	1SNA 232 031 R1200	1SNA 233 031 R1300 (2)			
20 times L1-L2-L3-N-PE	1SNA 230 131 R2500	1SNA 232 131 R1300	1SNA 233 131 R1400 (2)			
Vertical marking						
10 strips from 1 to 10	1SNA 230 041 R0600	1SNA 232 041 R2400	1SNA 233 041 R2500 (5)			
10 strips from 11 to 20	1SNA 230 042 R0700	1SNA 232 042 R2500	1SNA 233 042 R2600 (3)			
10 strips from 21 to 30	1SNA 230 043 R0000	1SNA 232 043 R2600	1SNA 233 043 R2700 (2)			
10 strips from 31 to 40	1SNA 230 044 R0100	1SNA 232 044 R2700	1SNA 233 044 R2000 (2)			
From 1 to 100	1SNA 230 060 R1500	1SNA 232 060 R0300	1SNA 233 060 R0400 (8)			

Marking kit RC 5 mm spacing or 6 mm spacing

Box with 100 cards with 18 various part numbers (see table next page)

Description	Type	Order P/N	Packaging Weight kg
Box with 100 cards RC 5 mm spacing		1SNA 400 085 R2700	1
Refill for box RC 5 mm		1SNA 400 145 R0700	1
Box with 100 cards RC 6 mm spacing		1SNA 400 084 R2600	1
Refill for box RC 6 mm		1SNA 400 144 R0600	1

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Panel heaters

Benefits and advantages, heat demand calculation



Why do I need a panel heater?

Whenever the ambient temperature around the control panel exceeds the temperature inside the control panel, condensation may occur inside the control panel. Humidity may be deposited as condensation water on the devices and terminals in the control panel, leading to malfunction and short circuits.

A simple solution is heating the inside of the control panel. This ensures that the temperature inside the control panel is always a little bit higher than the outside temperature, thus avoiding condensation.

To ensure that this does not happen to your control panel or subsidiary distribution box in the winter, we recommend using panel heaters to protect your equipment from frost damages and to ensure the trouble-free functioning of your systems.

ABB's panel heaters are characterized by their flat structural form that enables positive fastening at the control panel wall without disturbing other devices. A mounting clip also enables DIN rail mounting. Each panel heater includes overheating protection.

Fields of application

- Anti-condensation
Avoidance of water condensation inside the control panel (eg. in carpark ticket machines)
- Anti-frost
Avoidance of undercooling of systems and control panels inside of free-standing distributors or mobile equipment.

Features

- Flat structural form: only 3 mm thick
- Power stages: 20 W, 40 W, 100 W, 200 W, 250 W, 300 W
- Voltages: 110 V or 230 V, 50/60 Hz
- Plate temperature fixed at +70 °C or +80 °C or adjustable from +30 °C to +150 °C
- Long lifetime through low surface temperature (70 °C or 80 °C)
- Even heat distribution on the whole heating surface
- Good resistance against chemicals
- Isolation out of silicone rubber, continuous 180 °C, puncture-proof until 12 kV/mm
- Bracket: anodized aluminium
- Connecting line: 0.5 m silicone rubber, 2 x 0.75 mm²
- The heating elements are tested in accordance to VDE 720, CEE publication 11
- Lowest ambient temperature -40 °C
- Fastening: Snap on 35 mm top hat rail according DIN EN 50022, optionally fastening with M 4 screws or by bonding
- Separate thermostat for exact temperature control

Heat demand calculation

The calculation of the heat demand (watt) and the selection of the appropriate heating plate depends on different factors such as:

- size of the control panel
- material of the control panel
- place of installation
- relative humidity
- power dissipation (self-heating) of the chassis-mounted units
- ventilation of the control panel

To aid installation, we have established the guideline values on the right.

case content in litres	Location		outdoors
	indoors heated	indoors unheated	
up to 20	10 W	20 W	40 W
30	20 W	33 W	55 W
50	30 W	55 W	90 W
75	30 W	75 W	130 W
100	55 W	90 W	150 W
120	55 W	90 W	150 W
160	55 W	130 W	180 W
240	90 W	180 W	235 W
300	90 W	180 W	275 W
420	90 W	180 W	310 W
500	90 W	240 W	360 W
600	90 W	280 W	415 W
800	130 W	280 W	630 W
1000	130 W	280 W	810 W
1200	150 W	360 W	1300 W

Panel heaters

Ordering details

2CDC 311 001 F0005



Heating element 20 W

2CDC 311 005 F0005



Mounting clips

2CDC 311 012 F0005



Heating plate 250 W

2CDC 311 010 F0005



Heating plate 100 W adjustable

2CDC 311 006 F0005



Thermostat

Type	Heating power	Rated operational voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg / lb
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Heating elements for screw mounting, optionally DIN rail mounting with mounting clips

Plate temperature max. 80 °C, cable length 0.5 m

20W-230V-HE	20 W	230 V AC	GHV6 000 020 V0006	1		0.10/0.22
40W-230V-HE	40 W	230 V AC	GHV6 000 040 V0006	1		0.25/0.55

Plate temperature max. 70 °C, cable length 0.5 m

100W-230V-HE	100 W	230 V AC	GHV6 000 100 V0006	1		0.30/0.66
200W-230V-HE	200 W	230 V AC	GHV6 000 200 V0006	1		0.50/1.10
300W-230V-HE	300 W	230 V AC	GHV6 000 300 V0006	1		0.50/1.10

Mounting clips for heating elements

to snap on DIN rail

20-100W-MC	20-100 W	-	GHV6 000 000 V0001	1		0.01/0.22
200-300W-MC	200-300 W	-	GHV6 000 000 V0002	1		0.02/0.44

Heating plates with mounting clip for DIN rail mounting

Plate temperature 70 °C fixed, cable length 0.5 m

40W-110V-HP	40 W	110 V AC	GHV6 010 040 V0004	1		0.13/0.29
40W-230V-HP	40 W	230 V AC	GHV6 010 040 V0006	1		0.13/0.29
100W-110V-HP	100 W	110 V AC	GHV6 010 100 V0004	1		0.37/0.80
100W-230V-HP	100 W	230 V AC	GHV6 010 100 V0006	1		0.37/0.80
250W-110V-HP	250 W	110 V AC	GHV6 010 250 V0004	1		0.58/1.28
250W-230V-HP	250 W	230 V AC	GHV6 010 250 V0006	1		0.54/1.19

Plate temperature 70 °C fixed, cable length 3 m

40W-230V-HP-E	40 W	230 V AC	GHV6 010 040 V0007	1		0.13/0.29
100W-230V-HP-E	100 W	230 V AC	GHV6 010 100 V0007	1		0.37/0.80

Plate temperature adjustable from 30 to 150 °C

100W-230V-HP-ADJ	100 W	230 V AC	GHV6 017 100 V0006	1		0.39/0.85
250W-230V-HP-ADJ	250 W	230 V AC	GHV6 017 250 V0006	1		0.54/1.19

Thermostat

Temperature adjustable from 10 to 60 °C

Thermostat	-	230 V AC	GHV6 011 060 V0001	1		0.25/0.55
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Panel heaters

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if noting else indicated.

Type		20W-230V-HE	40W-230V-HE	100W-230V-HE	200W-230V-HE	300W-230V-HE
Input circuit - supply circuit						
Rated operational voltage		230 V AC				
Operational voltage range		210-240 V AC/DC				
Rated frequency		50/60 Hz				
Frequency range		DC; 47-63 Hz				
Typical current / power consumption	230 V AC	87 mA / 20 VA	170 mA / 40 VA	439 mA / 100 VA	870 mA / 200 VA	1300 mA / 300 VA
	110 V AC	-	-	-	-	-
Typical inrush current		87 mA	170 mA	430 mA	870 mA	1300 mA
Output circuit						
Heating element		silicone heating element				
Bracket of the heating element		anodized aluminium				
Isolation of the heating element		silicone				
Maximum heating power		20 W	40 W	100 W	200 W	300 W
Maximum plate temperature		80 °C		70 °C		
Plate temperature adjustable		no				
Power density		0.17 W/cm ²	0.13 W/cm ²	0.33 W/cm ²		0.5 W/cm ²
General data						
Duty time		100 %				
Mounting		screw, bond, DIN rail (optional)				
Degree of protection		IP53				
Electrical connection						
Connecting line out of silicone rubber		2x0.75 mm ² (2x18 AWG)				
Length of connecting line		0.5 m				
Environmental data						
Ambient temperature range	operation	-40...+20 °C		-40...+40 °C		
	storage	-60...+100 °C				
	transport	-60...+100 °C				
Standards						
Product standard		DIN EN 60355-1				
Low Voltage Directive		2006/95/EC				

Panel heaters

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if noting else indicated.

Type	40W-110V-HP	40W-230V-HP	40W-230V-HP-E	100W-110V-HP	100W-230V-HP	100W-230V-HP-E	250W-110V-HP	250W-230V-HP	100W-230V-HP-ADJ	250W-230V-HP-ADJ
Input circuit - supply circuit										
Rated operational voltage	110 V AC	230 V AC		110 V AC	230 V AC		110 V AC	230 V AC		
Rated voltage range	105-115 V AC	210-240 V AC		105-115 V AC	210-240 V AC		105-115 V AC	210-240 V AC		
Rated frequency	50/60 Hz									
Frequency range	47-63 Hz									
Typical current / power consumption	230 V AC	-	170 mA / 40 VA	-	430 mA / 100 VA	-	1086 mA / 250 VA	430 mA / 100 VA	1086 mA / 250 VA	
	110 V AC	360 mA / 40 VA	-	910 mA / 100 VA	-	2270 mA / 250 VA	-			
Typical inrush current	360 mA	170 mA	910 mA	430 mA	2270 mA	1086 mA	430 mA	1086 mA		
Output circuit										
Heating element	silicone heating element									
Bracket of the heating element	anodized aluminium									
Isolation of the heating element	silicone									
Maximum heating power	40 W		100 W			250 W		100 W	250 W	
Maximum plate temperature	70 °C								150 °C	
Plate temperature adjustable	no								yes, +30...+150 °C	
Power density	0.33 W/cm ²					0.42 W/cm ²		0.33 W/cm ²	0.42 W/cm ²	
General data										
Duty time	100 %									
Mounting	screw, bond, DIN rail									
Degree of protection	IP53									
Electrical connection										
Connecting line out of silicone rubber	2x0.75 mm ² (2x18 AWG)									
Length of connecting line	0.5 m									
Environmental data										
Ambient temperature range	operation	-40...+40 °C								
	storage	-60...+100 °C								
	transport	-60...+100 °C								
Standards										
Product standard	DIN EN 60335-1									
Low Voltage Directive	2006/95/EC									

Panel heaters

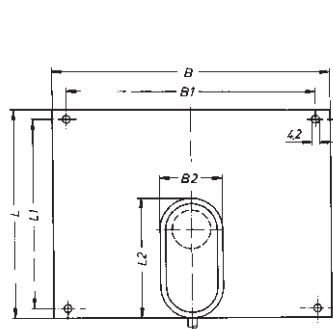
Dimensional drawings

Table of dimension

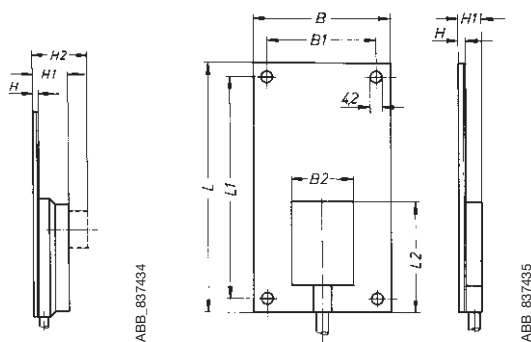
in mm

Type	L	L1	L2	B	B1	B2	H	H1	H2	Drawing no.
Heating elements for screw mounting, optionally DIN rail mounting with mounting clips										
20W-230V-HE	150	134	65	80	64	32	2.5	10	-	2
40W-230V-HE	150	130	65	200	180	45	2.5	10	-	1
100W-230V-HE	150	130	65	200	180	45	2.5	10	-	1
200W-230V-HE	300	280	95	200	180	45	2.5	10	-	2
300W-230V-HE	300	280	95	200	180	45	2.5	10	-	2
Heating plates, temperature fixed, with mounting clip for DIN rail mounting										
40W-110V-HP 40W-230V-HP 40W-230V-HP-E	150	134	65	80	64	32	2.5	10	-	2
100W-110V-HP 100W-230V-HP 100W-230V-HP-E	150	130	65	200	180	45	2.5	10	-	1
250W-110V-HP 250W-230V-HP	300	280	85	200	180	45	2.5	10	-	2
Heating plates, temperature adjustable from 30 to 150 °C, with mounting clip for DIN rail mounting										
100W-230V-HP-ADJ	150	130	65	200	180	45	2.5	10	50	1
250W-230V-HP-ADJ	300	280	85	200	180	45	2.5	10	50	2

Dimensions



Dimensional drawing 1



Dimensional drawing 2



Logic relays and Display system

CL range

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Logic relays, display system CL range

System overview



2CDC315039 F0106

Concept

CL range logic relays are suitable for small and medium-sized control tasks and are able to substitute logic wiring in a quick and simple manner.

They can be used for applications in control as well as for timing functions, e. g.

- in buildings, lighting systems, air-conditioning systems, general control functions,
- in small machines and systems or
- as stand-alone control module for small applications.

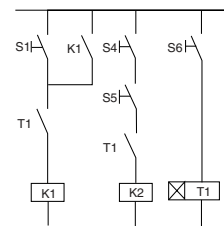
Steps to the application of CL range

- CL range can be used easily, rapidly and comfortably without any time-consuming planning and programming.
- The user can discover the advantages and the benefit of these logic relays in no time at all.
- CL range provides for the control statements according to a simple circuit diagram.
- Setup, storage, simulation and documentation are performed using the compact and user-friendly CL-SOFT software (CL-LAS.PS002).

Software characteristics (CL-SOFT)

- display on a PC monitor according to IEC, ANSI
- different languages to choose from
- easy installation on all Microsoft Windows™ operating systems

Logic links instead of wiring



1SVC110000 F 0554

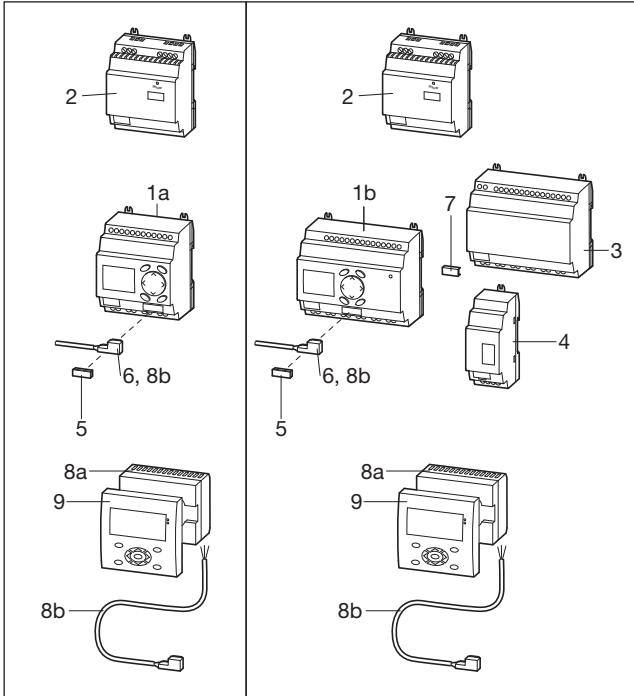
Documentation (download from the internet)

Logic relay manual	1SVC 440 795 M0100
Remote display manual	1SVC 440 795 M2100
Display system manual	1SVC 440 795 M1100

Logic relays, display system CL range System overview

System overview

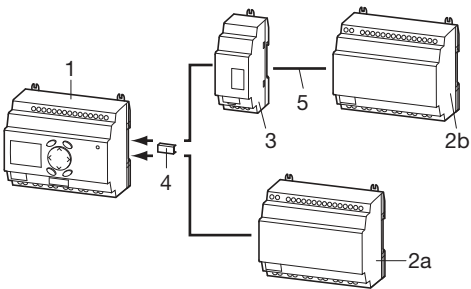
Logic relays



2CDC 312 001 F0b08

- 1a Logic relay CL-LS..
- 1b Expandable logic relay CL-LM..
- 2 Power supply CP-D...
- 3 I/O expansion CL-LER.., CL-LET.. for logic relays CL-LM..
- 4 Coupler unit CL-LEC.. for remote expansion of logic relays CL-LM..
- 5 Memory module CL-LAS.MD003 for logic relays CL-LS.., CL-LM..
- 6 Connecting cable CL-LAS.TK001, CL-LAS.TK002 to connect PC
- 7 CL-LINK plug CL-LAS.TK011 to connect expansion to logic relays CL-LM..
- 8a Remote display connection module CL-LDC.S..
- 8b Connecting cable CL-LAD.TK007 to connect a remote displays to a logic relay
- 9 Display module CL-LDD..

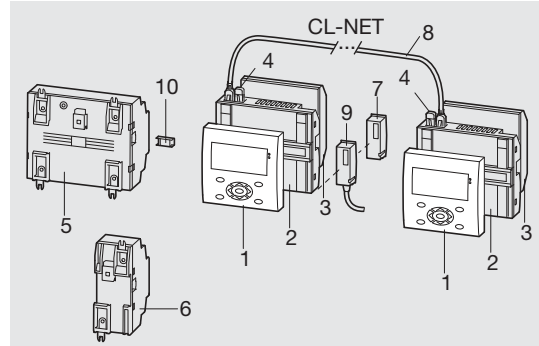
Expansion of logic relays



2CDC 312 037 F0b07

- 1 Logic relay CL-LM..
- 2 I/O expansion CL-LER.., CL-LET..
 - 2a local expansion
 - 2b remote expansion
- 3 Coupler unit CL-LEC.. for remote expansion of logic relays CL-LM..
- 4 CL-LINK plug CL-LAS.TK011 for expansion of logic relays CL-LM..
- 5 up to 30 m

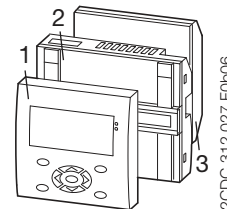
Display system → Compact HMI logic relay



2CDC 312 025 F0b06

- 1 Display module CL-LDD..
 - 2 Display base module CL-LDC.LN..
 - 3 Display I/O module CL-LDR.., CL-LDT..
 - 4 Termination resistor CL-LAD.TK009
 - 5 I/O expansion CL-LER.., CL-LET..
 - 6 Coupler unit CL-LEC.. for remote expansion
 - 7 Memory module CL-LAD.MD004 for display base module
 - 8 Connecting cable CL-LAD.TK002, CL-LAD.TK003, CL-LAD.TK004
 - 9 Connecting cable CL-LAD.TK001, CL-LAD.TK011 to connect PC
 - 10 CL-LINK plug CL-LAS.TK011 for expansion of logic relays CL-LM..
- e.g. door of switchgear cabinet

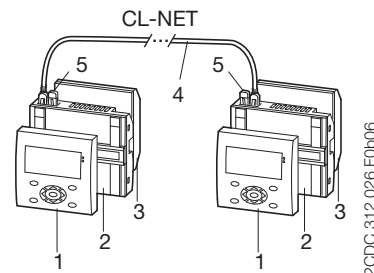
Stand alone with I/O module



2CDC 312 027 F0b06

- 1 Display CL-LDD..
- 2 Remote display connection module CL-LDC.S.. incl. connecting cable
- 3 Display base module CL-LDC.L..

Communication via CL-NET



2CDC 312 026 F0b06

- 1 Display CL-LDD..
- 2 Display base module CL-LDC.LN.. for CL-NET
- 3 Display I/O module CL-LDR.., CL-LDT..
- 4 Connecting cable CL-LAD.TK002, CL-LAD.TK003, CL-LAD.TK004
- 5 Termination resistor CL-LAD.TK009

Logic relays, display system CL range

System overview, Approvals and marks

Technical Data overview

Logic relays

- 8 or 12 digital inputs
- 4 or 6 digital relay outputs
- optionally with 4 or 8 transistor outputs
- 128 rungs
- 3 contacts as n/o or n/c contacts in series plus 1 coil per rung
- optionally with 2 or 4 analog inputs (not 100-240 V AC version)
- power flow display for checking the circuit diagram (devices with display)
- expansions for local or remote level
- enclosure color RAL 7035
- DIN rail mounting

Display system

- useable as compact HMI logic relay
- fully graphic, backlit display module
- 12 digital inputs
- 4 digital relay outputs
- optionally with 4 transistor outputs
- 256 rungs
- 4 contacts as n/o or n/c contacts in series plus 1 coil per rung
- optionally with 4 analog inputs (not 100-240 V AC version)
- networking-compatible via CL-NET
- front panel mounting
- expansion for local

Remote display

- Remote display up to a distance of 5 m
- Illustration of text and status displays
- Remote adjustment via keypad
- Front panel mounting

Software

- 16 timing relays 0.01-99:59 h
- 16 counting relays for up-, down counting
- 8 weekly timer, 8 annual timers
- 16 analog value comparators
- 16 freely editable display texts
- 32 markers or auxiliary relays

		Logic relays				Expansions			Display system				Accessories	
		CL-LSR	CL-LST	CL-LMR	CL-LMT	CL-LER	CL-LET	CL-LEC	CL-LDD	CL-LDC	CL-LDR	CL-LDT	CL-LAS	CL-LAD
Approvals														
UL	■	■	■	■	■	■	■	■	■	■	■	■	■ ¹⁾	■ ²⁾
CAN/CSA C22.2 No.14	■	■	■	■	■	■	■	■	■	■	■	■	■ ¹⁾	■ ²⁾
CAN/CSA C22.2 No.213 (hazardous locations)	■	■	■	■	■	■	■	■	■	■	■	■	■ ¹⁾	■ ²⁾
GL	■	■	■	■	■				■	■ ³⁾	■ ⁴⁾	■		
GOST	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Lloyds Register	■	■	■	■	■				■	■ ³⁾	■ ⁴⁾	■		
Marks														
CE	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C-Tick	□	□	□	□	□	□	□	□	□	□	□	□	□	□

¹⁾ not for: CL-LAS-PS002, CL-LAS.TD001, CL-LAS.FD001, CL-LAS.TK002, CL-LAS.TK011

²⁾ not for: CL-LAD.TK006, CL-LAD.TK011, CL-LAD.FD002

³⁾ not for: CL-LDC.SDC2, CL-LDC.SAC2, CL-LDC.LAC2, CL-LDC.LNAC2

⁴⁾ not for: CL-LDR.16AC2

Logic relays

CL-LSR., CL-LST., CL-LMR., CL-LMT..

Ordering details



CL-LSR



CL-LST



CL-LMR



CL-LMT

Type	Rated operational voltage	Display + Keypad	Timer	expandable	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Logic relays

CL-LSR: 8 inputs, 4 relay outputs

CL-LSR.C12AC1	24 V AC	■	■		1SVR 440 712 R0300	1		0.20/0.44
CL-LSR.CX12AC1	24 V AC		■		1SVR 440 712 R0200	1		0.20/0.44
CL-LSR.12AC2	100-240 V AC	■			1SVR 440 713 R0100	1		0.20/0.44
CL-LSR.C12AC2	100-240 V AC	■	■		1SVR 440 713 R0300	1		0.20/0.44
CL-LSR.CX12AC2	100-240 V AC		■		1SVR 440 713 R0200	1		0.20/0.44
CL-LSR.C12DC1	12 V DC	■	■		1SVR 440 710 R0300	1		0.20/0.44
CL-LSR.CX12DC1	12 V DC		■		1SVR 440 710 R0200	1		0.20/0.44
CL-LSR.12DC2	24 V DC	■			1SVR 440 711 R0100	1		0.20/0.44
CL-LSR.C12DC2	24 V DC	■	■		1SVR 440 711 R0300	1		0.20/0.44
CL-LSR.CX12DC2	24 V DC		■		1SVR 440 711 R0200	1		0.20/0.44

CL-LST: 8 inputs, 4 transistor outputs

CL-LST.C12DC2	24 V DC	■	■		1SVR 440 711 R1300	1		0.20/0.44
CL-LST.CX12DC2	24 V DC		■		1SVR 440 711 R1200	1		0.20/0.44

Expandable logic relays

CL-LMR: 12 inputs, 6 relay outputs

CL-LMR.C18AC1	24 V AC	■	■	■	1SVR 440 722 R0300	1		0.36/0.79
CL-LMR.CX18AC1	24 V AC		■	■	1SVR 440 722 R0200	1		0.36/0.79
CL-LMR.C18AC2	100-240 V AC	■	■	■	1SVR 440 723 R0300	1		0.36/0.79
CL-LMR.CX18AC2	100-240 V AC		■	■	1SVR 440 723 R0200	1		0.36/0.79
CL-LMR.C18DC1	12 V DC	■	■	■	1SVR 440 720 R0300	1		0.36/0.79
CL-LMR.CX18DC1	12 V DC		■	■	1SVR 440 720 R0200	1		0.36/0.79
CL-LMR.C18DC2	24 V DC	■	■	■	1SVR 440 721 R0300	1		0.36/0.79
CL-LMR.CX18DC2	24 V DC		■	■	1SVR 440 721 R0200	1		0.36/0.79

CL-LMT: 12 inputs, 8 transistor outputs

CL-LMT.C20DC2	24 V DC	■	■	■	1SVR 440 721 R1300	1		0.36/0.79
CL-LMT.CX20DC2	24 V DC		■	■	1SVR 440 721 R1200	1		0.36/0.79

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Logic relays Accessories - CL-LE., CL-LD.. Ordering details

2CDC 311 037 F0606



CL-LER

2CDC 311 038 F0606



CL-LEC

2CDC 311 028 F0606



CL-LDD.K

2CDC 311 017 F0607



CL-LDC.S..

Type	Rated operational voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Expansions

CL-LER: 2 relay outputs

CL-LER.20	-	1SVR 440 709 R5000	1		0.07/0.15
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CL-LER: 12 inputs, 6 relay outputs

CL-LER.18AC2	100-240 V AC	1SVR 440 723 R0000	1		0.26/0.57
CL-LER.18DC2	24 V DC	1SVR 440 721 R0000	1		0.22/0.49

CL-LET: 12 inputs, 8 transistor outputs

CL-LET.20DC2	24 V DC	1SVR 440 721 R1000	1		0.21/0.46
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Coupler unit

CL-LEC: Coupler unit for remote expansion with a distance of up to 30 m

CL-LEC.CI000	-	1SVR 440 709 R0000	1		0.07/0.15
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Type	Rated operational voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Display modules

CL-LDD: Graphic display 132 x 64 pixel

CL-LDD.XK	-	1SVR 440 839 R4500	1		0.14/0.30
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CL-LDD: Graphic display 132 x 64 pixel, with keypad

CL-LDD.K	-	1SVR 440 839 R4400	1		0.13/0.29
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Remote display connection modules

CL-LDC: Module to displace the display from the logic relay, incl. connecting cable CL-LAD.TK007, 5 m, length adaptable

CL-LDC.SDC2	24 V DC	1SVR 440 841 R0000	1		0.16/0.36
CL-LDC.SAC2	100-240 V AC	1SVR 440 843 R0000	1		0.16/0.36

• Approvals	356	• Dimensional drawings	376
• Technical data	365		

Logic relays Accessories - CL-LA..

Ordering details

2CDC 311 012 F0607



CL-LAS.PS002

2CDC 311 013 F0607



CL-LAS.MD003

2CDC 311 014 F0607



CL-LAS.TK001

2CDC 311 031 F0607



CL-LAS.TK011

2CDC 271 027 F0607



CP-D 24/1.3

Type	Description	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Software for CL range (CL-SOFT)

CL-LAS: Software for programming and control of CL range devices

CL-LAS.PS002	Installation CD-ROM for Microsoft Windows™	1SVR 440 799 R8000	1		0.10/0.21
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Memory module

CL-LAS: Memory module for logic relays

CL-LAS.MD003	Memory size: 32 kB	1SVR 440 799 R7000	1		0.02/0.04
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Connecting cables

CL-LAS: Cable with serial interface to connect PC and logic relay

CL-LAS.TK001	Length: 2 m	1SVR 440 799 R6000	1		0.10/0.22
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CL-LAS: Cable with USB interface to connect PC and logic relay

CL-LAS.TK002	Length:	1SVR 440 799 R6100	1		
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CL-LAD: Cable for point-to-point connection of remote-display connection module and logic relay, length adaptable

CL-LAD.TK007	Length: 5 m	1SVR 440 899 R6600	1		0.20/0.44
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Fixing brackets

CL-LAS: Fixing brackets for screw mounting of logic relay, expansion, display base module

CL-LAS.FD001	content: 9 fixing brackets	1SVR 440 799 R5000	1		0.01/0.01
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Connecting plug

CL-LAS: Spare plug (CL-LINK) for connection of logic relay to expansion

CL-LAS.TK011	CL-LINK	1SVR 440 799 R5100	1		0.10/0.22
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Type	Rated input voltage	Rated output voltage / current	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Simulator

CL-LAS: Input-/ output simulator with wall power supply, fits to CL-LSR and CL-LST

CL-LAS.TD001	100-240 V AC	24 V DC	1SVR 440 793 R0000	1		0.19/0.43
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Power supplies

CP-D: Primary switch mode power supplies

CP-D 24/0.42 ¹⁾	100-240 V AC	24 V DC / 0.42 A	1SVR 427 041 R0000	1		0.06/0.13
CP-D 24/1.3 ²⁾	100-240 V AC	24 V DC / 1.3 A	1SVR 427 043 R0100	1		0.19/0.41

¹⁾ replaces CL-LAS.SD001, technical data see chapter "Primary switch mode power supplies"

²⁾ replaces CL-LAS.SD002, technical data see chapter "Primary switch mode power supplies"

- Approvals356
- Dimensional drawings376

Display system

CL-LD..

Ordering details

2CDC 311 028 F0006



CL-LDD.K

2CDC 311 031 F0006



CL-LDC.LN..

2CDC 311 032 F0006



CL-LDR

Type	Rated operational voltage	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Display modules

CL-LDD: Graphic display 132 x 64 pixel

CL-LDD.XK	-	1SVR 440 839 R4500	1		0.14/0.30
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CL-LDD: Graphic display 132 x 64 pixel, with keypad

CL-LDD.K	-	1SVR 440 839 R4400	1		0.13/0.29
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Display base modules

CL-LDC: CPU / power supply

CL-LDC.LDC2	24 V DC	1SVR 440 821 R0000	1		0.16/0.36
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CL-LDC.LAC2	100-240 V AC	1SVR 440 823 R0000	1		0.16/0.36
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CL-LDC: CPU / power supply, networking-compatible (CL-NET)

CL-LDC.LNDC2	24 V DC	1SVR 440 821 R1000	1		0.17/0.38
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CL-LDC.LNAC2	100-240 V AC	1SVR 440 823 R1000	1		0.17/0.38
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Display I/O modules

CL-LDR: 12 inputs, 4 relay outputs

CL-LDR.16AC2	100-240 V AC	1SVR 440 853 R0000	1		0.17/0.38
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CL-LDR.16DC2	24 V DC	1SVR 440 851 R0000	1		0.17/0.38
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CL-LDR: 12 inputs, 4 relay outputs, 1 analog output

CL-LDR.17DC2	24 V DC	1SVR 440 851 R2000	1		0.17/0.38
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CL-LDT: 12 inputs, 4 transistor outputs

CL-LDT.16DC2	24 V DC	1SVR 440 851 R1000	1		0.14/0.30
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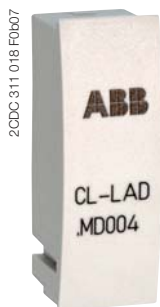
CL-LDT: 12 inputs, 4 transistor outputs, 1 analog output

CL-LDT.17DC2	24 V DC	1SVR 440 851 R3000	1		0.14/0.30
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Display system Accessories - CL-LAD..

Ordering details



CL-LAD.MD004



CL-LAD.TK001



CL-LAD.TK002



CL-LAD.TK009

Type	Description	Order code	Pack. unit pieces	Price 1 piece	Weight 1 piece kg/lb
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Memory module

CL-LAD: Memory module for display base modules

CL-LAD.MD004	Memory size: 256 kB	1SVR 440 899 R7000	1		0,02/0.03
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Connecting cables

CL-LAD: Cable with serial interface to connect PC and display base module

CL-LAD.TK001	Length: 2 m	1SVR 440 899 R6000	1		0.11/0.23
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CL-LAD: Cable with USB interface to connect PC and display base module

CL-LAD.TK011	Length:	1SVR 440 899 R6700	1		
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CL-LAD: Network cable (CL-NET) to connect 2 display base modules

CL-LAD.TK002	Length: 0.3 m	1SVR 440 899 R6100	1		0.05/0.12
CL-LAD.TK003	Length: 0.8 m	1SVR 440 899 R6200	1		0.07/0.14
CL-LAD.TK004	Length: 1.5 m	1SVR 440 899 R6300	1		0.08/0.18

CL-LAD: Cable for point-to-point connection of remote display connection modules and display base module, length adaptable

CL-LAD.TK005	Length: 5 m	1SVR 440 899 R6400	1		0.20/0.44
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CL-LAD: Cable for point-to-point connection of 2 display base modules, length adaptable

CL-LAD.TK006	Length: 5 m	1SVR 440 899 R6500	1		0.12/0.26
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Termination resistor

CL-LAD: Termination resistor

CL-LAD.TK009	content: 2 pieces	1SVR 440 899 R6900	1		0.01/0.02
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Protective covers

CL-LAD: Protective cover, transparent, for harsh environmental conditions and application in the food industry

CL-LAD.FD001	-	1SVR 440 899 R1000	1		0.03/0.07
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CL-LAD: Protective cover, transparent and sealable

CL-LAD.FD011	-	1SVR 440 899 R2000	1		0.03/0.07
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Assembly tool

CL-LAD: Tool for mounting of display modules

CL-LAD.FD002	-	1SVR 440 899 R3000	1		
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• Approvals356

Logic relays

CL-LS., CL-LM., CL-LER., CL-LET.

Technical data / Input circuit - supply circuit

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type	CL-LSR.C...12DC1	CL-LSR....12DC2 CL-LST.C...12DC2	CL-LSR.C...12AC1	CL-LSR...12AC2
Input circuit - supply circuit				
Rated operational voltage U_o	12 V DC	24 V DC	24 V AC	100-240 V AC
Rated operational voltage tolerance	-15...+30 %	-15...+20 %	-15...+10 %	
Operational voltage range	10.2-15.6 V DC	20.4-28.8 V DC	20.4-26.4 V AC	85-264 V AC
Rated frequency	0 Hz		50/60 Hz	
Rated frequency tolerance	-		±5 %	
Residual ripple	≤ 5 %		-	
Input current	at 12 V DC	typ. 140 mA	-	-
	at 24 V DC	-	typ. 80 mA	-
	at 24 V AC	-	-	-
	at 115/120 V AC (60 Hz)	-	typ. 200 mA	-
	at 230/240 V AC (50 Hz)	-	-	typ. 40 mA
Power failure buffering (IEC/EN 61131-2)	10 ms		20 ms	
Power dissipation	at 12 V DC	typ. 2 W	-	-
	at 24 V DC	-	typ. 2 W	-
	at 24 V AC	-	-	-
	at 115/120 V AC	-	typ. 5 VA	-
	at 230/240 V AC	-	-	typ. 5 VA

Type	CL-LMR.C...18DC1	CL-LMR.C...18DC2 CL-LMT.C...20DC2	CL-LMR.C...18AC1	CL-LMR.C...18AC2
Input circuit - supply circuit				
Rated operational voltage U_o	12 V DC	24 V DC	24 V AC	100-240 V AC
Rated operational voltage tolerance	-15...+30 %	-15...+20 %	-15...+10 %	
Operational voltage range	10.2-15.6 V DC	20.4-28.8 V DC	20.4-26.4 V AC	85-264 V AC
Rated frequency	0 Hz		50/60 Hz	
Rated frequency tolerance	-		±5 %	
Residual ripple	≤ 5 %		-	
Input current	at 12 V DC	typ. 200 mA	-	-
	at 24 V DC	-	typ. 140 mA	-
	at 24 V AC	-	-	-
	at 115/120 V AC (60 Hz)	-	typ. 300 mA	-
	at 230/240 V AC (50 Hz)	-	-	typ. 70 mA
Power failure buffering (IEC/EN 61131-2)	10 ms		20 ms	
Power dissipation	at 12 V DC	typ. 3.5 W	-	-
	at 24 V DC	-	typ. 3.5 W	-
	at 24 V AC	-	-	-
	at 115/120 V AC	-	typ. 7 VA	-
	at 230/240 V AC	-	-	typ. 10 VA

Type	CL-LER.18DC2 CL-LET.20DC2	CL-LER.18AC2		
Input circuit - supply circuit				
Rated operational voltage U_o	24 V DC	100-240 V AC		
Rated operational voltage tolerance	-15...+20 %	-15...+10 %		
Operational voltage range	20.4-28.8 V DC	85-264 V AC		
Rated frequency	0 Hz	50/60 Hz		
Rated frequency tolerance	-	±5 %		
Residual ripple	≤ 5 %	-		
Input current	at 24 V DC	typ. 140 mA	-	
	at 115/120 V AC (60 Hz)	-	typ. 70 mA	
	at 230/240 V AC (50 Hz)	-	typ. 35 mA	
Power failure buffering (IEC/EN 61131-2)	10 ms	20 ms		
Power dissipation	at 24 V DC	typ. 3.4 W	-	
	at 115/120 V AC	-	typ. 10 VA	
	at 230/240 V AC	-	typ. 10 VA	

Logic relays CL-LSR., CL-LST..

Technical data / Input circuit - inputs

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type	CL-LSR.C...12DC1	CL-LSR....12DC2 CL-LST.C...12DC2	CL-LSR.C...12AC1	CL-LSR.C...12AC2
Input circuit - Digital inputs	12 V DC	24 V DC	24 V AC	115 / 230 V AC
Number	8			
Inputs can be used as analog inputs	2 (I7, I8)			-
Indication of operational states	LCD-Display (if existing)			
Electrical isolation	no			
from voltage supply	no			
between digital inputs	no			
from the outputs	yes			
Rated operational voltage U_e	12 V DC	24 V DC	24 V AC	
U_e on „0“ signal	4 V DC (I1-I8)	< 5 V DC (I1-I8)	0-6 V AC (sinusoidal)	0-40 V AC (sinusoidal)
U_e on „1“ signal	8 V DC (I1-I8)	> 15 V DC (I1-I6), > 8 V DC (I7, I8)	> 9,5 V DC, 14-26,4 V AC (sinusoidal) (I1-I6), > 7 V AC (sinusoidal) (I7,I8)	79-264 V AC (sinusoidal)
Rated frequency	-		50-60 Hz	
Input current on „1“ signal	3.3 mA (at 12 V DC, I1-I6), 1.1 mA (at 12 V DC, I7, I8)	3.3 mA (at 24 V DC, I6-I7), 2.2 mA (at 24 V DC, I7, I8)	4 mA (at 24 V AC, 50 Hz, I1-I6), 2 mA (at 24 V AC, 50 Hz, I7,I8), 2 mA (at 24 V DC, I7, I8)	6x0.25 mA (at 115 V AC, 60 Hz, I1-I6), 6x0.5 mA (at 230 V AC, 50 Hz, I1-I6) 2x4 mA (at 115 V AC, 60 Hz, I7, I8), 2x6 mA (at 230 V AC, 50 Hz, I7, I8)
Time delay from „0“ to „1“	debounce ON	20 ms		80 ms (at 50 Hz), 66 ^{2/3} ms (at 60 Hz)
	debounce OFF	typ. 0.3 ms (I1-I6), typ. 0.35 ms (I7, I8)	typ. 0,25 ms (I1-I8)	20 ms (at 50 Hz), 16 ^{2/3} ms (at 60 Hz)
Time delay from „1“ to „0“	debounce ON	20 ms		80 ms (at 50 Hz, I1-I6), 66 ^{2/3} ms (at 60 Hz, I1-I6) 160 ms (at 50 Hz, I7, I8), 150 ms (at 60 Hz, I7, I8)
	debounce OFF	typ. 0.3 ms (I1-I6), typ. 0.15 ms (I7, I8)	-	20 ms (at 50 Hz, I1-I6), 16 ^{2/3} ms (at 60 Hz, I1-I6) 100 ms (at 50 Hz, I7, I8), 100 ms (at 60 Hz, I7, I8)
Cable length (unshielded)	100 m		-	-
Maximum cable length per input	-		40 m	40 m (I1-I6), 100 m (I7, I8)
Frequency counter	Number	2 (I3, I4)		-
	counting frequency	< 1 kHz		-
	pulse shape	square-wave		-
	pulse / pause ratio	1:1		-
Rapid counter inputs	Number	2 (I1, I2)		-
	counting frequency	< 1 kHz		-
	pulse shape	square-wave		-
	pulse / pause ratio	1:1		-
Cable length (shielded)	< 20 m		-	-
Input circuit - Analog inputs				
Number	2 (I7, I8)			-
Electrical isolation	no			
from voltage supply	no			
from the digital inputs	no			
from the outputs	yes			
from PC interface, memory module, CL-NET, CL-LINK	no			
Input type	DC voltage			-
Signal range	0-10 V DC			-
Resolution	analog	0.01 V		-
	digital	0.01 V; 10 Bit (value 1-1023)		-
Input impedance	11.2 kΩ			-
Accuracy of the actual value	two CL devices	±3 %		-
	within one device	±2 %, ±0.12 V		-
Conversion time analog/digital	Input delay ON	20 ms		-
	Input delay OFF	each cycle		-
Input current	< 1 mA			-
Cable length (shielded)	< 30 m			-

Logic relays CL-LMR..., CL-LMT.. Technical data / Input circuit - inputs

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type	CL-LMR.C...18DC1	CL-LMR.C...18DC2 CL-LMT.C...20DC2	CL-LMR.C...18AC1	CL-LMR.C...18AC2
Input circuit - Digital inputs	12 V DC	24 V DC	24 V AC	115 / 230 V AC
Number	12			
Inputs can be used as analog inputs	4 (I7, I8, I11, I12)			-
Indication of operational states	LCD-Display (if existing)			
Electrical isolation	no			
from voltage supply	no			
between digital inputs	no			
from the outputs	yes			
from PC interface, memory module, CL-NET, CL-LINK	no			yes
Rated operational voltage U_e	12 V DC	24 V DC	24 V AC	
U_e on „0“ signal	4 V DC (I1-I12)	< 5 V DC (I1-I12, R1-R12)	0-6 V AC (sinusoidal)	0-40 V AC (sinusoidal)
U_e on „1“ signal	8 V DC (I1-I12)	> 15 V DC (I1-I6, I9, I10) > 8 V DC (I7, I8, I11, I12)	> 9.5 V DC, 14-26.4 V AC (sinusoidal) (I1-I6, I9, I10) > 7 V AC (sinusoidal) (I7, I8, I11, I12)	79-264 V AC (sinusoidal)
Rated frequency	-		50-60 Hz	
Input current on „1“ signal	3.3 mA (at 12 V DC, I1-I6, I9-I12), 1.1 mA (at 12 V DC, I7, I8),	3.3 mA (at 24 V DC, I1-I6, I9, I10), 2.2 mA (at 24 V DC, I7, I8, I11, I12)	4 mA (at 24 V AC, 50 Hz, I1-I6, I9, I10), 2 mA (at 24 V AC, 50 Hz, I7, I8, I11, I12), 2 mA (at 24 V DC, I7, I8, I11, I12)	6x0.25 mA (at 115 V AC, 60 Hz, I1-I6), 6x0.5 mA (at 230 V AC, 50 Hz, I1-I6) 2x4 mA (at 115 V AC, 60 Hz, I7, I8), 2x6 mA (at 230 V AC, 50 Hz, I7, I8), 4x0.25 mA (at 115 V AC, 60 Hz, I9-I12), 4x0.5 mA (at 230 V AC, 50 Hz, I9-I12)
Time delay from „0“ to „1“	debounce ON	20 ms		80 ms (at 50 Hz), 66 ² / ₃ ms (at 60 Hz)
	debounce OFF	typ. 0.3 ms (I1-I6, I9, I10), typ. 0.35 ms (I7, I8, I11, I12)	typ. 0.25 ms	20 ms (at 50 Hz), 16 ² / ₃ ms (at 60 Hz)
Time delay from „1“ to „0“	debounce ON	20 ms		80 ms (at 50 Hz), 66 ² / ₃ ms (at 60 Hz)
	debounce OFF	typ. 0.4 ms (I1-I6, I9, I10), typ. 0.35 ms (I7, I8, I11, I12)	-	20 ms (at 50 Hz), 16 ² / ₃ ms (at 60 Hz)
Cable length (unshielded)	100 m			
Maximum cable length per input			max. 40 m, typ. 40 m (I9, I10)	typ. 40 m (I1-I6, I9-I12), typ. 100 m (I7, I8)
Frequency counter	number	2 (I3, I4)		-
	counting frequency	< 1 kHz		-
	pulse shape	square-wave		-
	pulse / pause ratio	1:1		-
Rapid counter inputs	number	2 (I1, I2)		-
	counting frequency	< 1 kHz		-
	pulse shape	square-wave		-
	pulse / pause ratio	1:1		-
Cable length (shielded)	< 20 m			
Input circuit - Analog inputs				
Number	4 (I7, I8, I11, I12)			-
Electrical isolation	no			
from voltage supply	no			
from the digital inputs	no			
from the outputs	yes			
from PC interface, memory module, CL-NET, CL-LINK	no			
Input type	DC voltage			
Signal range	0-10 V DC			
Resolution	analog	0.01 V		
	digital	0.01 V; 10 Bit (value 1-1023)		
Input impedance	11.2 k Ω			
Accuracy of the actual value	two CL devices	$\pm 3\%$		
	within one device	$\pm 2\%$, $\pm 0.12\text{ V}$		
Conversion time analog/digital	Input delay ON	20 ms		
	Input delay OFF	each cycle		
Input current	< 1 mA			
Cable length (shielded)	< 30 m			

Logic relays CL-LER., CL-LET..

Technical data / Input circuit - inputs

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type	CL-LER.18DC2 CL-LET.20DC2	CL-LER.18AC2
Input circuit - Digital inputs	24 V DC	115 / 230 V AC
Number		12
Inputs can be used as analog inputs		-
Indication of operational states		-
Electrical isolation		
from voltage supply		no
between digital inputs		no
from the outputs		yes
from PC interface, memory module, CL-NET, CL-LINK		no
Rated operational voltage U_o	24 V DC	
U_o on „0“ signal	< 5 V DC (I1-I12, R1-R12)	0-40 V AC (sinusoidal)
U_o on „1“ signal	-	79-264 V AC (sinusoidal)
Rated frequency	-	50-60 Hz
Input current on „1“ signal	3.3 mA (at 24 V DC, R1-R12)	12x0.25 mA (at 115 V AC, 60 Hz, R1-R12), 12x0.5 mA (at 230 V AC, 50 Hz, R1-R12)
Time delay from „0“ to „1“		
debounce ON	20 ms	80 ms (at 50 Hz, I1-I12, R1-R12), 66 ² / ₃ ms (at 60 Hz, I1-I12, R1-R12)
debounce OFF	typ. 0.25 ms (R1-R12)	20 ms (at 50 Hz, I1-I12, R1-R12), 16 ² / ₃ ms (at 60 Hz, I1-I12, R1-R12)
Time delay from „1“ to „0“		
debounce ON	20 ms	80 ms (at 50 Hz, I1-I12, R1-R12), 66 ² / ₃ ms (at 60 Hz, I1-I12, R1-R12)
debounce OFF	-	20 ms (at 50 Hz, I1-I12, R1-R12), 16 ² / ₃ ms (at 60 Hz, I1-I12, R1-R12)
Cable length (unshielded)	100 m	-
Maximum cable length per input	-	typ. 40 m (I1-I6, I9-I12, R1-R12), typ. 100 m (I7, I8)

Logic relays

CL-LSR., CL-LMR., CL-LER..

Technical data / Output circuit - Relay outputs

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type		CL-LSR...	CL-LMR... CL-LER...	CL-LER.20
Output circuit - Relay outputs				
Number		4	6	2
Outputs in groups of		1		2
Parallel switching of outputs to increase capacity		not permissible		
Fusing of the output relay		circuit-breaker B16 or fuse 8 A (slow-acting)		
Electrical isolation	from voltage supply		yes	
	from the inputs		yes	
	from PC interface, memory module, CL-NET, CL-LINK		no	
	protective separation		300 V AC	
	basic isolation		600 V AC	
Mechanical lifetime		10x10 ⁶ switching cycles		
Rung	conventional thermal current (10 A UL)		8 A	
	recommended for load 12 V AC/DC		> 500 mA	
	short-circuit proof $\cos \varphi = 1$; characteristic B16 at 600 A		16 A	
	short-circuit proof $\cos \varphi = 0,5$ up to 0,7; characteristic B16 at 900 A		16 A	
	Rated impulse withstand voltage U_{im} contact-coil		6 kV	
	Rated operational voltage U_e		250 V AC	
Rated insulation voltage U_i			250 V AC	
Protective separation (EN 50178)	between coil and contact		300 V AC	
	between two contacts		300V AC	
Making capacity	AC15, 250 V AC, 3 A (600 ops./h)		300.000 switching cycles	
	DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops./h)		200.000 switching cycles	
Breaking capacity	AC15, 250 V AC, 3 A (600 ops./h)		300.000 switching cycles	
	DC13, L/R ≤ 150 ms, 24 V DC, 1 A (500 ops./h)		200.000 switching cycles	
Incandescent lamp load	1000 W at 230/240 V AC		25.000 switching cycles	
	500 W at 115/120 V AC		25.000 switching cycles	
Fluorescent lamp load	10 x 58 W at 230/240 V AC with electrical control gear		25.000 switching cycles	
	10 x 58 W at 230/240 V AC uncompensated		25.000 switching cycles	
	1 x 58 W at 230/240 V AC conventional compensated		25.000 switching cycles	
Switching frequency	mechanical operations		10x10 ⁶	
	switching frequency		10 Hz	
	resistive load / lamp load		2 Hz	
	inductive load		0.5 Hz	
UL/CSA				
Continuous current at 240 V			10 A AC	
Continuous current at 24 V			8 A DC	
AC	Utilization category (Control Circuit Rating Codes)		B 300 Light Pilot Duty	
	max. rated operational voltage		300 V AC	
	max. continuous thermal current $\cos \varphi = 1$ at B 300		5 A	
	max. making / breaking apparent power (Make/Break) $\cos \varphi \neq 1$ at B 300		3600/360 VA	
DC	Utilization category (Control Circuit Rating Codes)		R 300 Light Pilot Duty	
	max. rated operational voltage		300 V DC	
	max. continuous thermal current at R 300		1 A	
	max. making / breaking apparent power (Make/Break) at R 300		28/28 VA	

Logic relays

CL-LST., CL-LMT., CL-LET..

Technical data / Output circuit - Transistor outputs

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type	CL-LST...	CL-LMT...	CL-LET...
Output circuit - Transistor outputs			
Number	4	8	
Rated operational voltage U_o	24 V DC		
Operational voltage range	20.4-28.8 V DC		
Residual ripple	$\leq 5\%$		
Supply current	on „0“ signal	typ. 9 mA / max. 16 mA	typ. 18 mA / max. 32 mA
	on „1“ signal	typ. 12 mA / max. 22 mA	typ. 24 mA / max. 44 mA
Reverse voltage protection	yes (Attention: If supply voltage is reversed, applying voltage at the outputs, causes a short circuit.)		
Electrical isolation	from voltage supply	yes	
	from the inputs	yes	
	from PC interface, memory module, CL-NET, CL-LINK	-	
Rated operational current I_o on „1“ signal DC	max. 0.5 A		
Lamp load without R_v	5 W		
Residual current on „0“ signal per channel	$< 0.1\text{ mA}$		
Max. output voltage	on „0“ signal at external load $< 10\text{ M}\Omega$	2.5 V	
	on „1“ signal at $I_o = 0.5\text{ A}$	$U = U_o - 1\text{ V}$	
Short-circuit protection	yes, thermal (analysis results from diagnosis input I16, I15; R15, R16)		
Short-circuit tripping current for $R_a \leq 10\text{ m}\Omega$	$0.7\text{ A} \leq I_o \leq 2\text{ A}$ per output		
Total short-circuit current	8 A	16 A	
Peak short-circuit current	16 A	32 A	
Thermal tripping	yes		
Max. switching frequency with constant resistive load $R_L < 100\text{ k}\Omega$ (depending on active channels and their load)	40.000 switching cycles/h		
Parallel connection of outputs	with resistive load, inductive load with external suppressor, combination within one group	group 1: Q1-Q4	group 1: Q1-Q4, group 2: Q5-Q8
	number of outputs	max. 4	
	max. total current	2 A (Attention! Outputs must be actuated simultaneously and for the same length of time.)	
Indication of operational states of the outputs	LCD-Display (if existing)		
Inductive load ¹⁾ without external suppressor			
$T_{0.95} = 1\text{ ms}$, $R = 48\ \Omega$, $L = 16\text{ mH}$	utilization factor	0.25 g	
	duty time	100 %	
	max. switching frequency $f = 0,5\text{ Hz}$ (max. duty time = 50 %)	1500 switching cycles	
DC13, $T_{0.95} = 72\text{ ms}$, $R = 48\ \Omega$, $L = 1.15\text{ H}$	utilization factor	0.25 g	
	duty time	100 %	
	max. switching frequency $f = 0,5\text{ Hz}$ (max. duty time = 50 %)	1500 switching cycles	
$T_{0.95} = 15\text{ ms}$, $R = 48\ \Omega$, $L = 0.24\text{ H}$	utilization factor	0.25 g	
	duty time	100 %	
	max. switching frequency $f = 0,5\text{ Hz}$ (max. duty time = 50 %)	1500 switching cycles	
Inductive load ¹⁾ with external suppressor			
	demand factor	1 g	
	duty time	100 %	
	max. switching frequency max. duty time	depends on suppressor	

¹⁾ For inductive loading, without external suppression of the transistor outputs, the following applies:
 $T_{0.95}$ = time in ms, until 95 % of the steady-state current is achieved. $T_{0.95} = 3 \times T_{0.65} = 3 \times L/R$.

Data transfer rate in the CL-NET network: bus lengths of 40 m and over only attainable with cables with additional cross-section and connection adapter.

Logic relays

CL-LS., CL-LM., CL-LE..

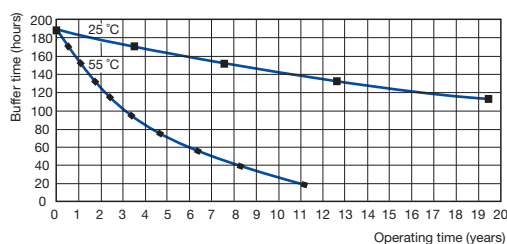
Technical data / General data, ...

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type		CL-LSR..., CL-LST...	CL-LMR... CL-LMT.. CL-LET., CL-LER.18..	CL-LER.20 CL-LEC.CI000
General data				
Dimensions (W x H x D)		71.5 mm x 90 mm x 58 mm (2.81 inch x 3.54 inch x 2.28 inch)	107.5 mm x 90 mm x 58 mm (4.23 inch x 3.54 inch x 2.28 inch)	35.5 mm x 90 mm x 58 mm (1.40 inch x 3.54 inch x 2.28 inch)
Weight		0.2 kg (0.44 lb)	0.3 kg (0.66 lb)	0.07 kg (0.15 lb)
Mounting		DIN rail (IEC/EN 60715), 35 mm or screw mounting with fixing brackets CL-LAS.FD001 (accessories)		
Mounting position		horizontal / vertical		
Electrical connection				
Wire size	rigid	0.2-4 mm ² (22-12 AWG)		
	fine-strand with wire end ferrule	0.2-2.5 mm ² (22-12 AWG)		
Max. tightening torque		0.6 Nm		
Environmental data				
Ambient temperature range	operation	-25...+55 °C, cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2		
	storage	-40...+70 °C		
LCD-Display (clearly legible)		0...+55 °C		
Condensation		avoid condensation with suitable methods		
Humidity, no condensation (IEC/EN 60068-2-30)		5-95 %		
Air pressure (operation)		795-1080 hPa		
Degree of protection (IEC/EN 60529)		IP20		
Vibration (IEC/EN 60068-2-6)		10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)		
Shock resistance (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)		18 Shocks		
Drop (IEC/EN 60068-2-31) height of fall		50 mm		
Free fall, packaged (IEC/EN 60068-2-32)		1 m		
Insulation data				
Overvoltage category		II		
Pollution degree (DIN EN 60947)		2		
Rating of air and creepage distances		EN 50178, UL 508, CSA C22.2, No. 142		
Insulation resistance		EN 50178		
Standards				
Standards and directives		EN 55011, EN 55022, IEC/EN 61000-4, IEC 60068-2-6, IEC 60068-2-27		
Electromagnetic compatibility				
Interference immunity				
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)		
electromag. field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m		
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal lines 2 kV)		
powerful impulses (Surge)	IEC/EN 61000-4-5	supply cable symmetrical (AC) 2 kV, Level 2 (supply cable symmetrical (DC) 0.5 kV)		
HF line emission	IEC/EN 61000-4-6	10 V		
Interference suppression (EN 55011, EN 55022)		class B		
Real time clock				
Back-up time		see diagram		-
Accuracy		typ. ± 5 (± 0.5 h/year)		-
Repeat accuracy of the time relay				
Accuracy (from value)		± 1		-
Resolution	range „S“	10 ms		-
	range „M:S“	1 s		-
	range „H:M“	1 min		-
Retention behaviour				
Write cycles of retention memory (minimum)		1.000.000 (10 ⁶)		-

Technical diagram

Back-up time of the real time clock



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Display system

Displays - CL-LDD..

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type	CL-LDD...	
Input circuit - Supply circuit		
Power failure buffering (IEC/EN 61131-2)		10 ms
General data		
Dimensions (W x H x D)		with keypad: 86.5 x 86.5 x 21.5 mm (3.41 x 3.41 x 0.85 inch) without keypad: 86.5 x 86.5 x 20 mm (3.41 x 3.41 x 0.79 inch)
Weight		0.13 kg (0.29 lb)
Mounting		2 x 22.5 mm, with 2 retainers screwed
Mounting position		horizontal / vertical
Environmental data		
Ambient temperature range	operation	-25...+55 °C (cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2)
	storage	-40...+70 °C
LCD-Display (clearly legible)		-5...+50 °C, -10...0 °C (with backlit / continuous operation)
Condensation		avoid condensation with suitable methods
Humidity, no condensation (IEC/EN 60068-2-30)		5-95 %
Air pressure (operation)		795-1080 hPa
Degree of protection (IEC/EN 60529)		IP65
Vibration (IEC/EN 60068-2-6)		10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)
Shock resistance (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)		18 Shocks
Drop (IEC/EN 60068-2-31) height of fall		50 mm
Free fall, packaged (IEC/EN 60068-2-32)		1 m
Insulation data		
Pollution degree (DIN EN 60947)		3
Rating of air and creepage distances		EN 50178, UL 508, CSA 22.2, No 142
Insulation resistance		EN 50178
Standards		
Standards and directives		EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, IEC 60068-2-6, IEC 60068-2-27
Electromagnetic compatibility		
Interference immunity		
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)
electromag. field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal lines 2 kV)
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 3 (supply cable symmetrical 2 kV, CL-LDC.L...AC2) Level 2 (0.5 kV supply cable symmetrical, CL-LDC.L...AC2)
HF line emission	IEC/EN 61000-4-6	10 V
Interference suppression (EN 55011, EN 55022)		class B

Logic relay, display system

Remote disp. con. / Display base mod. CL-LDC..

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type	CL-LDC.SDC2	CL-LDC.SAC2	CL-LDC.LDC2	CL-LCD.LAC2	CL-LDC.LNDC2	CL-LDC.LNAC2
Input circuit - Supply circuit						
Rated operational voltage U_g	24 V DC	100-240 V AC	24 V DC	100-240 V AC	24 V DC	100-240 V AC
Rated operational voltage tolerance	-15...+20 %	-15...+10 %	-15...+20 %	-15...+10 %	-15...+20 %	-15...+10 %
Operational voltage range	20.4-28.8 V DC	85-264 V AC	20.4-28.8 V DC	85-264 V AC	20.4-28.8 V DC	85-264 V AC
Frequency	0 Hz	50/60 Hz	0 Hz	50/60 Hz	0 Hz	50/60 Hz
Frequency tolerance	-	± 5 %	-	± 5 %	-	± 5 %
Residual ripple	≤ 5 %	-	≤ 5 %	-	≤ 5 %	-
Input current	at 24 V DC	typ. 185 mA	-	typ. 200 mA	-	typ. 200 mA
	at 115/120 V AC (60 Hz)	-	typ. 90 mA	-	typ. 90 mA	-
	at 230/240 V AC (50 Hz)	-	typ. 60 mA	-	typ. 60 mA	-
Power failure buffering (IEC/EN 61131-2)	10 ms					
Power dissipation	at 24 V DC	1.5 W	-	3.4 W	-	3.4 W
	at 115/120 V AC	-	typ. 11 VA	-	typ. 11 VA	-
	at 230/240 V AC	-	typ. 15 VA	-	typ. 15 VA	-
Network - point-to-point connection						
Number of stations	1		-			
Data transfer rate	CL-LS..., CL-LM...	9,6 kBaud		-		
	CL-LDD	19,2 kBaud		-		
Distance	max. 5 m		-			
Electrical isolation	to voltage supply	yes		-		
	to connected device	yes		-		
Termination system	spring-type terminal		-			
Network - CL-NET						
Number of stations	max. 1		-		max. 8	
Data transfer rate	6 m	-		1000 kBit/s		
	25 m	-		500 kBit/s		
	40 m	-		250 kBit/s		
	125 m	-		125 kBit/s		
	300 m	-		50 kBit/s		
	700 m	-		20 kBit/s		
	1000 m	-		10 kBit/s		
Electrical isolation	to voltage supply	-		yes		
	to inputs	-		yes		
	to outputs	-		yes		
	to PC interface, memory module, CL-NET, CL-LINK	-		yes		
Bus terminator (first and last station)	-		yes			
Termination system	-		RJ45, 8 pole			
General data						
Dimensions (W x H x D)	75 x 58 x 36.2 mm (2.95 x 2.28 x 1.43 inch)		107.5 x 90 x 30 mm (4.23 x 3.54 x 1.18 inch)			
Weight	0.164 kg (0.36 lb)		0.145 kg (0.32 lb)			
Mounting	plugged onto CL-LDD		plugged onto CL-LDD or on DIN rail (IEC/EN 60715)			
Mounting position						
Electrical connection - Supply circuit						
Wire size	fine-strand with wire end ferrule		0.2 mm ² / 2.5 mm ² (24-12 AWG)			
	rigid		0.2 mm ² / 4 mm ² (24-12 AWG)			
Electrical connection - Data cable						
Wire size	fine-strand with wire end ferrule		0.08 mm ² / 1.5 mm ² (28-12 AWG)		0.2 mm ² / 2.5 mm ² (24-12 AWG)	
	rigid		0.08 mm ² / 2.5 mm ² (28-12 AWG)		0.2 mm ² / 4 mm ² (24-12 AWG)	
Environmental data						
Ambient temperature range	operation		-25...+55 °C (cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2)			
	storage		-40...+70 °C			
Condensation	avoid condensation with suitable methods					
Humidity, no condensation (IEC/EN 60068-2-30)	5-95 %					
Air pressure (operation)	795-1080 hPa					
Degree of protection (IEC/EN 60529)	IP20					
Vibration (IEC/EN 60068-2-6)	10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)					

Logic relay, display system

Remote disp. con. / Display base mod. CL-LDC..

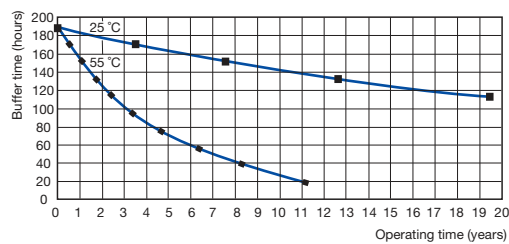
Technical data (continued)

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type	CL-LDC.SDC2	CL-LDC.SAC2	CL-LDC.LDC2	CL-LCD.LAC2	CL-LDC.LNDC2	CL-LDC.LNAC2
Shock (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)	18 Shocks					
Drop (IEC/EN 60068-2-31) height of fall	50 mm					
Free fall, packaged (IEC/EN 60068-2-32)	1 m					
Insulation data						
Degree of protection (DIN EN 60947)	2					
Rating of air and creepage distances	EN 50178, UL 508, CSA 22.2, No 142					
Isolation resistance	EN 50178					
Standards						
Standards and directives	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, IEC 60068-2-6, IEC 60068-2-27					
Electromagnetical compatibility						
Interference immunity						
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)				
electromag. field (HF radiation resistance)	IEC/EN 61000-4-3	10 V/m				
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal lines 2 kV)				
powerful impulses (Surge)	IEC/EN 61000-4-5	Level 3 (supply cable symmetrical 2 kV, CL-LDC.L...AC2)				
		Level 2 (1 kV supply cable symmetrical)	Level 2 (0.5 kV supply cable symmetrical, CL-LDC.L...AC2)			
HF line emission	IEC/EN 61000-4-6	10 V				
Interference suppression (EN 55011, EN 55022)	class B					
Real time clock						
Back-up time	-	see diagram				
Accuracy	-	typ. ± 5 s/day ($\pm 0,5$ h/year)				
Repeat accuracy of the time relay						
Accuracy (from value)	-	$\pm 0.02\%$				
Resolution	range „S“	-	5 ms			
	range „M:S“	-	1 s			
	range „H:M“	-	1 min			
Retention behaviour						
Write cycles of retention memory (minimum)	-	10^{10} (read/ write cycles)				

Technical diagram

Back-up time of the real time clock



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Display system

Display I/O-modules - CL-LDR., CL-LDT..

Technical data

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type		CL-LD...16DC2	CL-LD...17DC2	CL-LDR.16AC2
Input circuit - Digital inputs		24 V DC		115/230 V
Number		12		
Inputs can be used as analog inputs		4 (I7, I8, I11, I12)		-
Indication of operational states		-		LCD-Display (if existing)
Electrical isolation	from supply voltage	no		
	from digital inputs	no		
	from the outputs	yes		
	from PC interface, memory module, CL-NET, CL-LINK	yes		
Rated operational voltage U_o		24 V DC		-
	U_o on „0“ signal	< 5 V DC (I1-I6, I9, I10), < 8 V DC (I7, I8, I11, I12)		0-40 V AC (sinusoidal)
	U_o on „1“ signal	> 15 V DC (I1-I6, I9, I10), > 8 V DC (I7, I8, I11, I12)		79-264 V AC (sinusoidal)
Rated frequency		0 Hz		50-60 Hz
Input current on „1“ signal		3.3 mA (at 24 V DC, I1-I6, I9, I10), 2.2 mA (at 24 V DC, I7, I8, I11, I12)		12x0.2 mA (at 115 V AC, 60 Hz, I1-I12), 12x0.5 mA (at 230 V AC, 50 Hz, I1-I12)
Time delay from „0“ to „1“	debounce ON	20 ms		10 ms (at 50 Hz), 100 ms (at 60 Hz)
	debounce OFF	typ. 0.1 ms (I1-I4), typ. 0.25 ms (I5-I12)		10 ms (at 50 Hz), 100 ms (at 60 Hz)
Time delay from „1“ to „0“	debounce ON	20 ms		10 ms (at 50 Hz), 100 ms (at 60 Hz)
	debounce OFF	typ. 0.1 ms (I1-I4), typ. 0.4 ms (I5, I6, I9, I10), typ. 0.2 ms (I7, I8, I11, I12)		10 ms (at 50 Hz), 100 ms (at 60 Hz)
Cable length (unshielded)		100 m		-
Maximum cable length per input		-		typ. 60 m
Frequency counter	number	4 (I1, I2, I3, I4)		-
	counting frequency	< 3 kHz		-
	pulse shape	square-wave		-
	pulse / pause ratio	1:1		-
Incremental counter	number	2 (I1 + I2, I3 + I4)		-
	counting frequency	< 3 kHz		-
	pulse shape	square-wave		-
	signal offset	90°		-
	pulse / pause ratio	1:1		-
Rapid counter inputs	number	4 (I1, I2, I3, I4)		-
	counting frequency	< 3 kHz		-
	pulse shape	square-wave		-
	pulse / pause ratio	1:1		-
Cable length (shielded)		< 20 m		-
Input circuit - Analog inputs				
Number		4 (I7, I8, I11, I12)		-
Electrical isolation	to voltage supply	no		
	to digital inputs	no		
	to outputs	yes		
	to PC interface, memory modul, CL-NET, CL-LINK	yes		
Input type		DC voltage		-
Signal range		0-10 V DC		-
Resolution	analog	0.01 V		-
	digital	0.01 V; 10 Bit (value 0-1023)		-
Input impedance		11.2 kΩ		-
Accuracy of the actual value	two CL-LD... devices	± 3 %		-
	within one device	± 2 %		-
Conversion time analog/digital		each cycle		-
Input current		< 1 mA		-
Cable length (shielded)		< 30 m		-

Display system

Display I/O-modules - CL-LDR., CL-LDT..

Technical data (continued)

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type		CL-LD...16DC2	CL-LD...17DC2	CL-LDR.16AC2
Output circuit - Analog outputs				
Number		-	1	-
Electrical separation	from voltage supply	-	no	-
	from the digital inputs	-	no	-
	from the digital outputs	-	yes	-
	from PC interface, memory module, CL-NET, CL-LINK	-	yes	-
Output type		-	DC voltage	-
Signal range		-	0-10 V DC	-
Max. output current		-	0.01 A	-
Burden resistance		-	1 k Ω	-
Overload and short-circuit protection		-	yes	-
Resolution	analog	-	0.01 V DC	-
	digital	-	10 Bit, (value: 0-1023)	-
Setting time		-	100 ms	-
Accuracy	-25...+55 °C	-	2 %	-
	25 °C	-	1 %	-
Conversion time		-	each CPU cycle	-
General data				
Dimensions (W x H x D)		CL-LDR: 89 x 90 x 44 mm (3.5 x 3.54 x 1.73 inch) CL-LDT (build-in): 89 x 90 x 25 mm (3.5 x 3.54 x 0.98 inch)		89 x 90 x 44 mm (3.5 x 3.54 x 1.73 inch)
Weight		CL-LDR: 0.15 kg (0.33 lb) / CL-LDT: 0.14 kg (0.31 lb)		0.15 kg (0.33 lb)
Mounting		snap-on power supply unit		
Mounting position		horizontal / vertical		
Electrical connection				
Wire size	fine-strand with wire end ferrule	0.2 mm ² / 2.5 mm ² (24-12 AWG)		
	rigid	0.2 mm ² / 4 mm ² (24-12 AWG)		
Electrical connection - Data cable				
Wire size	fine-strand with wire end ferrule	0.08 mm ² / 1.5 mm ² (28-12 AWG)		
	rigid	0.08 mm ² / 2.5 mm ² (28-12 AWG)		
Environmental data				
Ambient temperature range	operation	-25...+55 °C (cold acc. to IEC 60068-2-1, heat acc. to IEC 60068-2-2)		
	storage	-40...+70 °C		
Condensation		avoid condensation with suitable methods		
Humidity, no condensation (IEC/EN 60068-2-30)		5-95 %		
Atmospheric pressure (operation)		795-1080 hPa		
Degree of protection (IEC/EN 60529)		IP20		
Vibration (IEC/EN 60068-2-6)		10-57 Hz (constant amplitude 0.15 mm), 57-150 Hz (constant acceleration 2 g)		
Shock (half-sine 15 g / 11 ms) (IEC/EN 60068-2-27)		18 Shocks		
Drop (IEC/EN 60068-2-31) height of fall		50 mm		
Free fall, packaged (IEC/EN 60068-2-32)		1 m		
Insulation data				
Pollution degree		2		
Rating of air and creepage distances		EN 50178, UL 508, CSA C22.2, No. 142		
Isolation resistance		EN 50178		
Standards				
Standards and directives		EN 61000-6-1/-2/-3/-4, IEC/EN 61000-4, IEC 60068-2-6, IEC 60068-2-27		
Electromagnetic compatibility				
electrostatic discharge (ESD)	IEC/EN 61000-4-2	Level 3 (air discharge 8 kV, contact discharge 6 kV)		
electromag. field (HF radiation res.)	IEC/EN 61000-4-3	10 V/m		
fast transients (Burst)	IEC/EN 61000-4-4	Level 3 (supply cable 2 kV, signal cable 2 kV)		
powerful impulses (Surge)	IEC/EN 61000-4-5	2 kV (supply cable symmetrical), Level 2 (0.5 kV supply cable symmetrical)		
HF line emission	IEC/EN 61000-4-6	10 V		
Interference suppression (EN 55011, EN 55022)		class B		

Display system

Display I/O-modules - CL-LDR..

Technical data / Output circuit - Relay outputs

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type		CL-LDR...
Output circuit - Relay outputs		
Number		4
Outputs in groups of		-
Parallel switching of outputs to increase capacity		not permissible
Fusing of the output relay		circuit-breaker B16 or fuse 8 A (slow-acting)
Electrical isolation	from voltage supply	yes
	from the inputs	yes
	from PC interface, memory module, CL-NET, CL-LINK	yes
	protective separation	300 V AC
	Basic isolation	600 V AC
Mechanical lifetime		10×10^6 switching cycles
Rung	conventional thermal current (10 A UL)	8 A
	recommended load 12 V AC/DC	> 500 mA
	short-circuit proof $\cos \varphi = 1$; characteristic B16 at 600 A	16 A
	short-circuit proof $\cos \varphi = 0.5$ up to 0.7; characteristic B16 at 900 A	16 A
	Rated impulse withstand voltage U_{imp} contact-coil	6 kV
	Rated operational voltage U_o	250 V AC
Rated insulation voltage U_i		250 V AC
Protective separation (EN 50178)	between coil and contact	300 V AC
	between two contacts	300V AC
Making capacity	AC15, 250 V AC, 3 A (600 ops./h)	300.000 switching cycles
	DC13, L/R \leq 150 ms, 24 V DC, 1 A (500 ops./h)	200.000 switching cycles
Breaking capacity	AC15, 250 V AC, 3 A (600 ops./h)	300.000 switching cycles
	DC13, L/R \leq 150 ms, 24 V DC, 1 A (500 ops./h)	200.000 switching cycles
Incandescent lamp load	1000 W at 230/240 V AC	25.000 switching cycles
	500 W at 115/120 V AC	25.000 switching cycles
Fluorescent lamp load	10 x 58 W at 230/240 V AC with electrical control gear	25.000 switching cycles
	10 x 58 W at 230/240 V AC uncompensated	25.000 switching cycles
	1 x 58 W at 230/240 V AC conventional compensated	25.000 switching cycles
Switching frequency	mechanical operations	10×10^6
	switching frequency	10 Hz
	resistive load / lamp load	2 Hz
	inductive load	0.5 Hz
UL/CSA		
Continuous current at 240 V		10 A AC
Continuous current at 24 V		8 A DC
AC	Utilization category (Control Circuit Rating Codes)	B 300 Light Pilot Duty
	max. rated operational voltage	300 V AC
	max. continuous thermal current $\cos \varphi = 1$ at B 300	5 A
	max. making / breaking apparent power (Make/Break) $\cos \varphi \neq 1$ at B 300	3600/360 VA
DC	Utilization category (Control Circuit Rating Codes)	R 300 Light Pilot Duty
	max. rated operational voltage	300 V DC
	max. continuous thermal current at R 300	1 A
	max. making / breaking apparent power (Make/Break) at R 300	28/28 VA

Display system

Display I/O-modules - CL-LDT..

Technical data / Output circuit - Transistor outputs

Data at $T_a = 25\text{ °C}$ and rated values, if nothing else indicated.

Type	CL-LDT...	
Output circuit - Transistor outputs		
Number	4	
Rated operational voltage U_o	24 V DC	
Operational voltage range	20.4-28.8 V DC	
Residual ripple	-	
Supply current	on „0“ signal on „1“ signal	typ. 18 mA / max. 32 mA typ. 24 mA / max. 44 mA
Reverse voltage protection	yes (Attention: If supply voltage is reversed, applying voltage at the outputs, causes a short circuit.)	
Electrical isolation	from voltage supply from the inputs from PC interface, memory module, CL-NET, CL-LINK	yes yes yes
Rated operational current I_o on „1“ signal DC	max. 0.5 A	
Lamp load without R_v	5 W (Q1-Q4)	
Residual current on „0“ signal per channel	< 0.1 mA	
Max. output voltage	on „0“ signal at external load < 10 M Ω on „1“ signal at $I_o = 0.5\text{ A}$	2.5 V $U = U_o - 1\text{ V}$
Short-circuit protection	thermal (Q1-Q4), (analysis results from diagnosis input I16)	
Short-circuit tripping current for $R_s \leq 10\text{ m}\Omega$	$0.7\text{ A} \leq I_o \leq 2\text{ A}$ per output	
Total short-circuit current	8 A	
Peak short-circuit current	16 A	
Thermal tripping	yes	
Max. switching frequency with constant resistive load $R_L < 100\text{ k}\Omega$ (depending on active channels and their load)	40.000 switching cycles/h	
Parallel connection of outputs	with resistive load, inductive load with external suppressor, combination within one group	group 1: Q1-Q4
	number of outputs	max. 4
	max. total current	2 A (Attention! Outputs must be actuated simultaneously and for the same length of time.)
Indication of operational states of the outputs	LCD-Display (if existing)	
Inductive load ¹⁾ without external suppressor		
$T_{0.95} = 1\text{ ms}$, $R = 48\ \Omega$, $L = 16\text{ mH}$	utilization factor	0.25 g
	duty time	100 %
	max. switching frequency $f = 0,5\text{ Hz}$ (max. duty time = 50 %)	1500 switching cycles
DC13, $T_{0.95} = 72\text{ ms}$, $R = 48\ \Omega$, $L = 1.15\text{ H}$	utilization factor	0.25 g
	duty time	100 %
	max. switching frequency $f = 0,5\text{ Hz}$ (max. duty time = 50 %)	1500 switching cycles
$T_{0.95} = 15\text{ ms}$, $R = 48\ \Omega$, $L = 0.24\text{ H}$	utilization factor	0.25 g
	duty time	100 %
	max. switching frequency $f = 0,5\text{ Hz}$ (max. duty time = 50 %)	1500 switching cycles
Inductive load ¹⁾ with external suppressor		
	demand factor	1 g
	duty time	100 %
	max. switching frequency max. duty time	depends on suppressor

¹⁾ For inductive loading, without external suppression of the transistor outputs, the following applies:

$T_{0.95}$ = time in ms, until 95 % of the steady-state current is achieved. $T_{0.95} \cdot 3 \times T_{0.65} = 3 \times L/R$.

Data transfer rate in the CL-NET network: bus lengths of 40 m and over only attainable with cables with additional cross-section and connection adapter.

Logic relays, display system

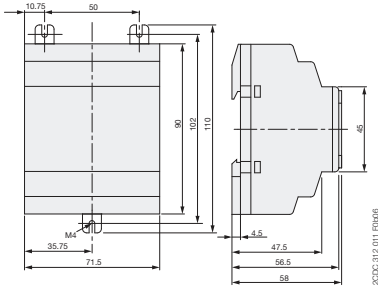
CL range

Dimensional drawings

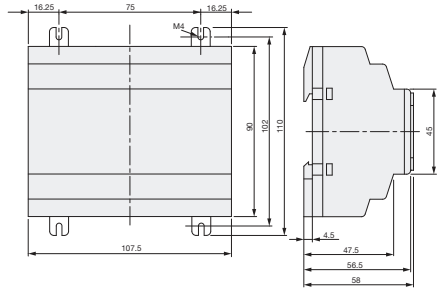
Dimensional drawings

dimensions in mm

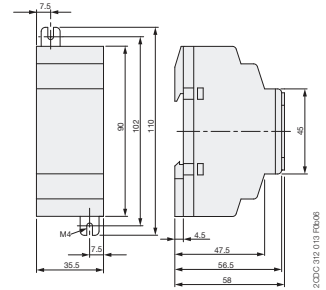
CL-LSR, CL-LST



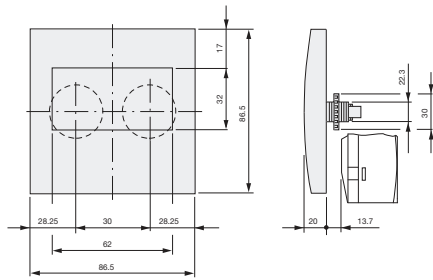
CL-LMR, CL-LMT



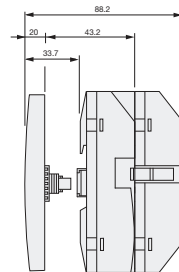
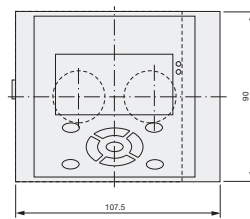
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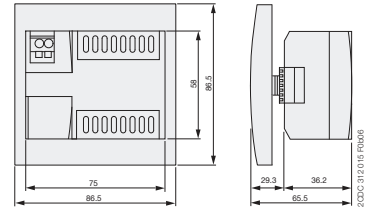
CL-LDD



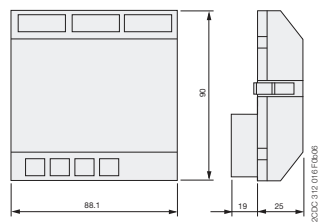
**CL-LDD.K + CL-LDC.L.. +
(CL-LDR or CL-LDT)**



CL-LDC.S..



CL-LDR, CL-LDT



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1SVR 550 120 R1100	CT-ARE	23	1SVR 630 774 R1300	CM-PAS.31	81			
1SVR 550 120 R4100	CT-ARE	23	1SVR 630 774 R3300	CM-PAS.41	81			
1SVR 550 127 R1100	CT-ARE	23	1SVR 630 784 R2300	CM-PSS.31	80			
1SVR 550 127 R4100	CT-ARE	23	1SVR 630 784 R3300	CM-PSS.41	80			
1SVR 550 130 R1100	CT-VWE	24	1SVR 630 794 R1300	CM-PVS.31	80			
1SVR 550 130 R2100	CT-VWE	24	1SVR 630 794 R3300	CM-PVS.41	80			
1SVR 550 130 R4100	CT-VWE	24	1SVR 630 884 R1300	CM-MPS.31	81			
1SVR 550 137 R1100	CT-VWE	24	1SVR 630 884 R3300	CM-MPS.41	81			
1SVR 550 137 R2100	CT-VWE	24	1SVR 630 884 R4300	CM-MPS.43	82			
1SVR 550 137 R4100	CT-VWE	24	1SVR 630 885 R1300	CM-MPS.11	81			
1SVR 550 140 R1100	CT-AWE	24	1SVR 630 885 R3300	CM-MPS.21	81			
1SVR 550 140 R2100	CT-AWE	24	1SVR 630 885 R4300	CM-MPS.23	82			
1SVR 550 140 R4100	CT-AWE	24	1SVR 650 487 R8300	CM-MPN.52	82			
1SVR 550 141 R1100	CT-AWE	24	1SVR 650 488 R8300	CM-MPN.62	82			
1SVR 550 141 R2100	CT-AWE	24	1SVR 650 489 R8300	CM-MPN.72	82			
1SVR 550 141 R4100	CT-AWE	24	1SVR 700 800 R1000	CT-POT.01	40			
1SVR 550 148 R1100	CT-AWE	24	1SVR 701 800 R1000	CT-POT.02	40			
1SVR 550 148 R2100	CT-AWE	24						
1SVR 550 148 R4100	CT-AWE	24	GHC...					
1SVR 550 150 R3100	CT-AWE	24	GHC 011 0003 R0001	C 011-70	114			
1SVR 550 151 R3100	CT-AWE	24	GHC 011 0003 R0002	C 011-80	114			
1SVR 550 158 R3100	CT-AWE	24	GHC 011 0003 R0003	C 011-90	114			
1SVR 550 160 R1100	CT-EBE	24	GHC 011 0003 R0004	C 011-100	114			
1SVR 550 167 R1100	CT-EBE	24	GHC 011 0003 R0005	C 011-110	114			
1SVR 550 200 R1100	CT-YDE	24	GHC 011 0003 R0006	C 011-120	114			
1SVR 550 200 R2100	CT-YDE	24	GHC 011 0003 R0007	C 011-130	114			
1SVR 550 200 R4100	CT-YDE	24	GHC 011 0003 R0008	C 011-150	114			
1SVR 550 207 R1100	CT-YDE	24	GHC 011 0003 R0009	C 011-160	114			
1SVR 550 207 R2100	CT-YDE	24	GHC 011 0003 R0010	C 011-170	114			



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