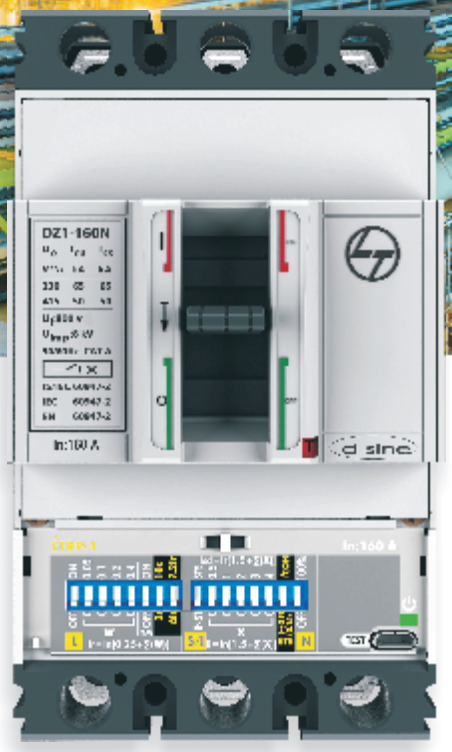
L&T Electrical & Automation

d sine-DZ1 | Moulded Case Circuit Breakers

User Centric Innovation



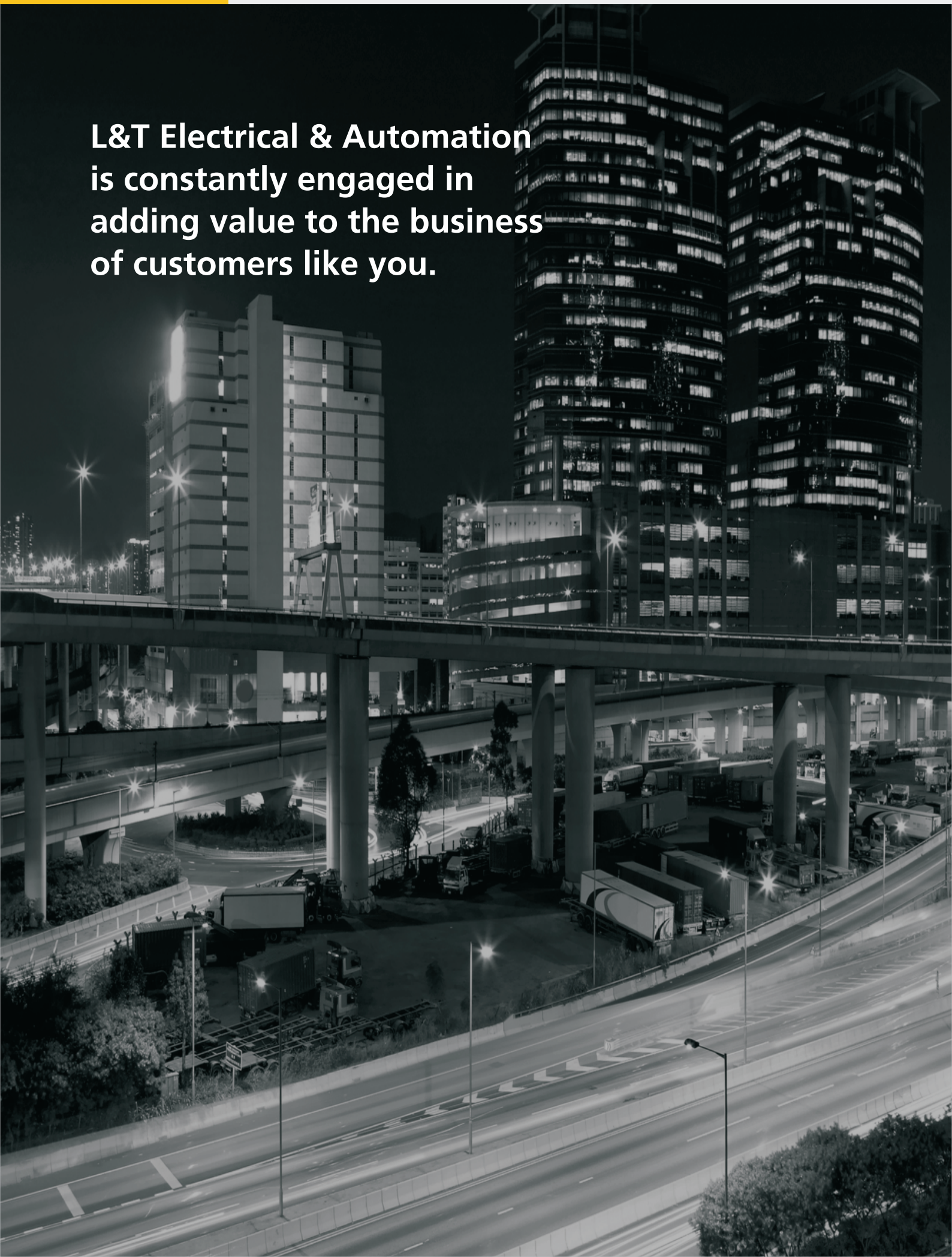
A technology idea often forms the foundation of innovation in a product and the success of its outcome is determined by the users' experience. Talking to customers and taking their feedback gives an assurance that the innovation would meet the expected and even aspired results. The dsine DZ range is an outcome of users' feedback that has been recorded, analysed and incorporated in its design and development journey.

About
L&T Electrical & Automation

L&T Electrical & Automation (E&A) is a market leader for electrical distribution, monitoring and control solutions in the low voltage category.

Popular among customers as L&T Switchgear, E&A offers a wide range of low and medium voltage switchgear, motor starters, electrical systems, industrial automation, building electrical solutions, energy management solutions, electrical modernization solutions and metering solutions. It products and solutions cater to key sectors of economy like industries, utilities, infrastructure, building and agriculture.

E&A's manufacturing operations at Navi Mumbai, Ahmednagar, Vadodara, Coimbatore and Mysuru in India adhere to global practices of excellence and receive support from well-equipped in-house design and development centres as well as tooling facilities that contribute to precision in manufacturing.


L&T Electrical & Automation
is constantly engaged in
adding value to the business
of customers like you.

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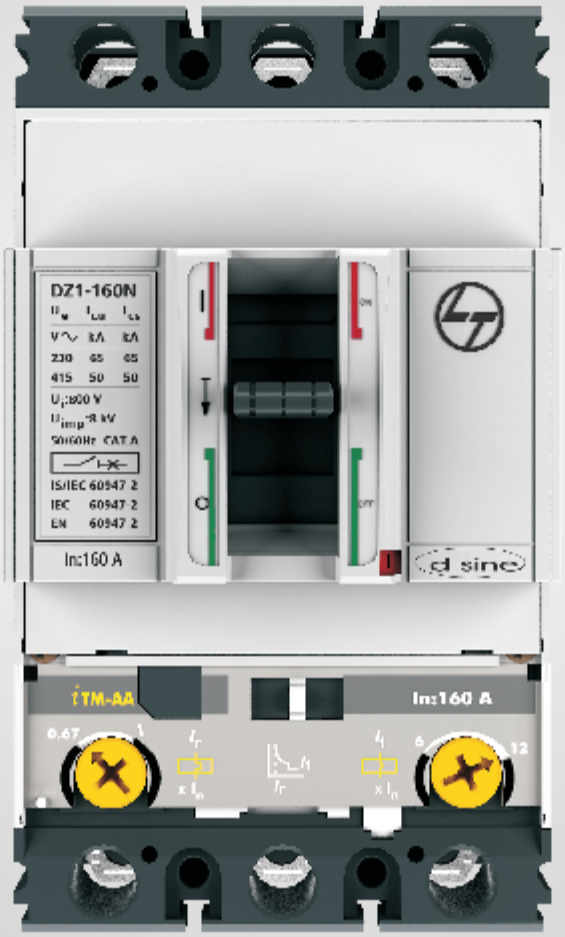


User Centric Innovation

The dsine DZ range is designed to meet the requirements of today's evolving electrical systems in modern installations. Protection units in thermal magnetic as well as microprocessor versions offer comprehensive protection for all needs.

Range features:

- Rated Current : 16 A to 160 A
- Available in 3 Pole & 4 Pole
- Protection using both thermal magnetic & microprocessor based release
- Various types of terminations
- Switch disconnector and motor backup versions
- No load line bias
- Ambient temperature compensation upto 55°C *
- Ics=100% of Icu
- Suitable for isolation
- Wide range of internal and external accessories
- Conforms to IS 60947-2, IEC 60947-2 and EN 60947-2

DZ1		
Protection Release	**Ratings (A)**	**Breaking Capacity (kA) Ics= 100% of Icu**
Microprocessor	25, 40, 63, 100, 160	36, 50
Thermal Magnetic	16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160	
Only Magnetic	16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160	

* No Deration upto 55 °C

Protection Release features

- Wide range of protections using thermal magnetic and microprocessor based trip unit
- Long time (overload) setting starts from 0.25In for *i*TRP-1 release and 0.67In for thermal magnetic release
- Transparent release cover

Thermal Magnetic Release:

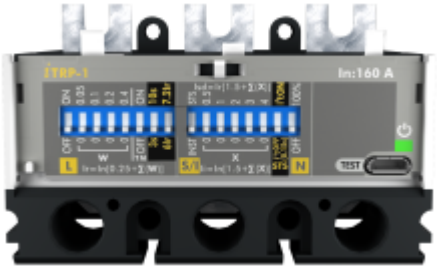
- Adjustable overload setting
- Adjustable short circuit setting*
- True RMS sensing

*i*TM - AA	
LI	
Rated Current (A)	16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 160
Frame	DZ1
OverLoad (Phase)	
Current Setting Ir (Ir = x In)	0.67 to 1 x In
Instantaneous	
Current Setting Ii (Ii = x In)	6 to 12 x In*

* 16 A to 50 A : Fixed Magnetic 375 A

Microprocessor Releases:
i TRP-1

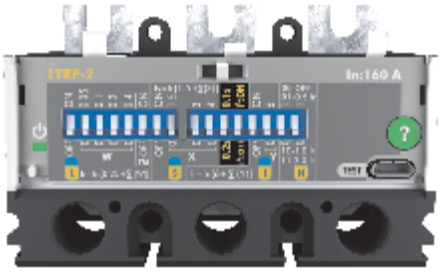
- Wide range of overload setting starting from 0.25In
- Adjustable Trip class
- Neutral overload protection
- Short circuit setting with delay or Instantaneous option
- Adjustable Instantaneous Setting
- Thermal Memory with option of Defeat
- Provision for release testing



***i*TRP-1**	
LS/I	
Rated Current (A)	25, 40, 63, 100, 160
Frame	DZ1
OverLoad (Phase)	
Current Setting Ir (Ir = x In)	0.25 to 1 x In (in step of 0.05)
Time delay, tr (Inverse)	10s at 6Ir, 3s at 6Ir , 10s at 7.2 Ir, 3s at 7.2Ir
Protection Mode	ON/OFF
Thermal Memory	ON/OFF
OverLoad (Neutral)	
Current Setting In (In = x Ir)	OFF / 1.0 x Ir
Time delay, tr (Inverse)	As per Overload Curve Setting
Protection Mode	ON/OFF
Short Circuit	
Current Setting Is (Is = x Ir)	1.5 to 12 x Ir (in step of 0.5)
Time delay, ts	As per I^2t curve /150 msec
I^2t	ON/OFF
or Instantaneous	
Current Setting Ii (Ii = x In)	1.5 to 12 x In (in step of 0.5)

Microprocessor Releases:
i TRP-2

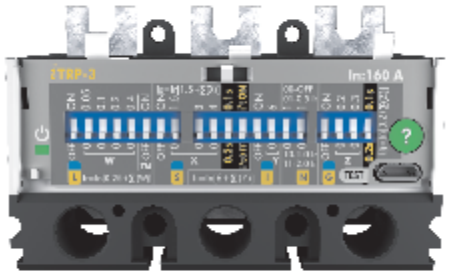
- Wide range of overload settings from 0.25In
- Adjustable neutral overload protection
- Short circuit setting with delay
- Adjustable instantaneous setting
- Thermal memory defeat
- Provision for release testing
- Individual fault indication LEDs



i TRP-2	
LSIN	
Rated Current (A)	25, 40, 63, 100,160
Frame	DZ1
OverLoad (Phase)	
Current Setting Ir (Ir = x In)	0.25 to 1 x In (in step of 0.05)
Time delay, tr (Inverse)	10s at 6Ir
Protection Mode	ON/OFF
Thermal Memory	Enable/Disable
OverLoad (Neutral)	
Current Setting In (In = x Ir)	OFF / 0.5/ 1.0/ 2.0 x Ir
Time delay, tr (Inverse)	As per Overload Curve Setting
Protection Mode	On/OFF
Short Circuit	
Current Setting Isd (Isd = x Ir)	1.5, 3, 4.5, 5.5, 6, 7, 8.5, 10 x Ir
Time delay, ts	100ms/200ms
I2T	ON/OFF
Protection Mode	ON/OFF
Instantaneous	
Current Setting Ii (Ii = x In)	6 & 12 In
Protection Mode	ON/OFF

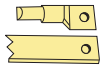
Microprocessor Releases:
i TRP-3

- Wide range of overload settings from 0.25In
- Adjustable neutral overload protection
- Short circuit setting with delay
- Adjustable instantaneous setting
- Thermal memory defeat
- Provision for release testing
- Individual fault indication LEDs
- Inbuilt earth fault protection

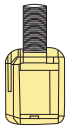


***i*TRP-3**	
LSING	
Rated Current (A)	25, 40, 63, 100, 160
Frame	DZ1
OverLoad (Phase)	
Current Setting Ir (Ir = x In)	0.25 to 1 x In (in step of 0.05)
Time delay, tr (Inverse)	10s at 6Ir
Protection Mode	ON/OFF
Thermal Memory	Enable/ Disable
OverLoad (Neutral)	
Current Setting In (In = x Ir)	OFF / 0.5/ 1.0/ 2.0 x Ir
Time delay, tr (Inverse)	As per Overload Curve Setting
Protection Mode	ON/OFF
Short Circuit	
Current Setting Isd (Isd = x Ir)	1.5, 3, 4.5, 5.5, 6, 7, 8.5, 10 x Ir
Time delay, ts	100ms/200ms
I2T	ON/OFF
Protection Mode	ON/OFF
Instantaneous	
Current Setting Ii (Ii = x In)	6 & 12 In
Protection Mode	ON/OFF
Earth Fault	
Current Setting Ig (Ig = x In)	0.2, 0.4, 0.5, 0.7 x In
Time delay, Tg	100ms/200ms
Protection Mode	ON/OFF

Termination

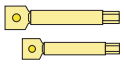


DIRECT TERMINAL		
	Cable	2.5 mm to 25 mm^2
	Link	(11 to 16)mm wide x (2 to 5)mm thick
	Tightening Torque	max 6N-m at MCCB termination

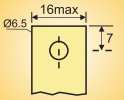


BOX CLAMP #		
	Flexible	2.5 mm to 70 mm^2
	Rigid	2.5 mm to 95 mm^2
	Tightening Torque	max 6N-m at MCCB termination

SPREADER #		
	Cable	25mm^2 to 95mm^2
	Link	(16 to 25)+mm wide x (3 to 6)mm thick
	Tightening Torque	max 6N-m at MCCB termination



REAR TERMINAL #		
	Cable	95mm^2
	Link	(16 to 25)mm wide x (2 to 4)mm thick
	Tightening Torque	max 6N-m at MCCB termination



Basic Breaker is suitable for DIRECT termination.
For all other types of termination
+ LINK / LUG width(W): 25 < W < 30mm

Plug-in Version

MCCBs with plug-in module are used in applications which demand higher levels of service continuity such as hospitals, process industries, automobile industry, etc. where immediate replacement is required. In such cases, MCCB with plug-in base can be safely removed from the system without removing the power connections or terminations and replaced with new MCCB.

Once MCCB is removed from the plug-in base, it offers complete isolation from the supply and maintains the safety of personnel working on down-stream feeders.

Features:

- Inbuilt safety interlock that prevents plugging in/out of MCCB when it is in ON condition
- Suitable for all types of terminations i.e. direct, spreader links, box clamps and rear terminals
- True position indication of MCCB - service or isolate
- Provision for both base mounting or 35 mm rail mounting
- Ingress Protection (IP):
  - IP20 – MCCB plugged out condition
  - IP40 – MCCB plugged in condition

Technical Datasheet

Frame			DZ1-160	
Type			D	N
Current Range In (A)			16-160	
Release			TM(VTVM)/Microprocessor *	
Poles			3P/4P	
Impulse Withstand Voltage Uimp (kV)			8	
Rated Operational Voltage Ue (V AC) (MAX) @ 50 / 60 Hz			415	
Rated Operational Voltage Ue (V DC) (MAX)			500	
Rated Insulation Voltage Ui (V AC)			800	
Utilization Category			A	
Standard			IS 60947-2, IEC 60947-2, EN 60947-2	
Rated Short Circuit Breaking Capacity	Icu(kA)	220 / 230 V AC 50 / 60 Hz	45	65
		400 / 415 V AC 50 / 60 Hz	36	50
	Ics as % of Icu	220 / 230 V AC 50 / 60 Hz	100%	
		400 / 415 V AC 50 / 60 Hz		
Making Capacity (kA) @ 415 V AC			75.6	105
Life	Mechanical		30000	
	Electrical @ 415 V AC		10000	
Operating Frequency (Hz)			50/60	
Opening Time			< 10 msec	
Fingerproof Terminals			YES	
Suitable for Isolation			YES	
IP Class			IP20/IP40[$] and IP54 with Extended ROM	
Pollution Degree			III	
Load-Line Bias			NO	
Ambient Temperature			- 5 °C to 55 °C	
Storage Temperature			- 15 °C to 70 °C	
Mounting Positions in Vertical Plane			Vertical and 90° in both directions	
Dimensions (H x W x D) (mm)	3 Pole		130 x 75 x 60	
	4 Pole		130 x 100 x 60	
Weight (kg) 3P/4P			0.9/1.1	
Accessories	Internal	Auxiliary Contact 1 C/O	01 no. Aux	
		Trip Alarm Contact 1 C/O	01 no. TAC	
		Shunt Release	01 no. Shunt or 01 no. UV	
		Under Voltage Release		
	External	Rotary Operating Mechanism(Direct/Extended)	✓	
		Mechanical Interlock Kit	✓	
		Spreader Terminals	✓	
		Rear Terminals[#]	✓	
		Box-Clamp[#]	✓	
		Plug-in[#]	✓	

*VTVM - Variable Thermal Variable Magnetic
*16 A to 50 A : Fixed Magnetic 375A
$ IP20 : At the Terminals, IP40: At Front Face
# For details contact nearest branch office

Altitude Correction Factors

Altitude does not significantly affect circuit breaker characteristics upto 2000 m.
Above this altitude, it is necessary to take into account the decrease in the dielectric strength and cooling capacity of air.

The following tables give the altitude correction factors for various circuit breaker characteristics :

Altitude Correction Factors		
Altitude	Rated Continuous Current (In)	Rated Voltage (Ue)
(m)	x (In)	x (Ue)
2000 & below	1.00	1.00
2500	0.99	0.95
3900	0.95	0.80

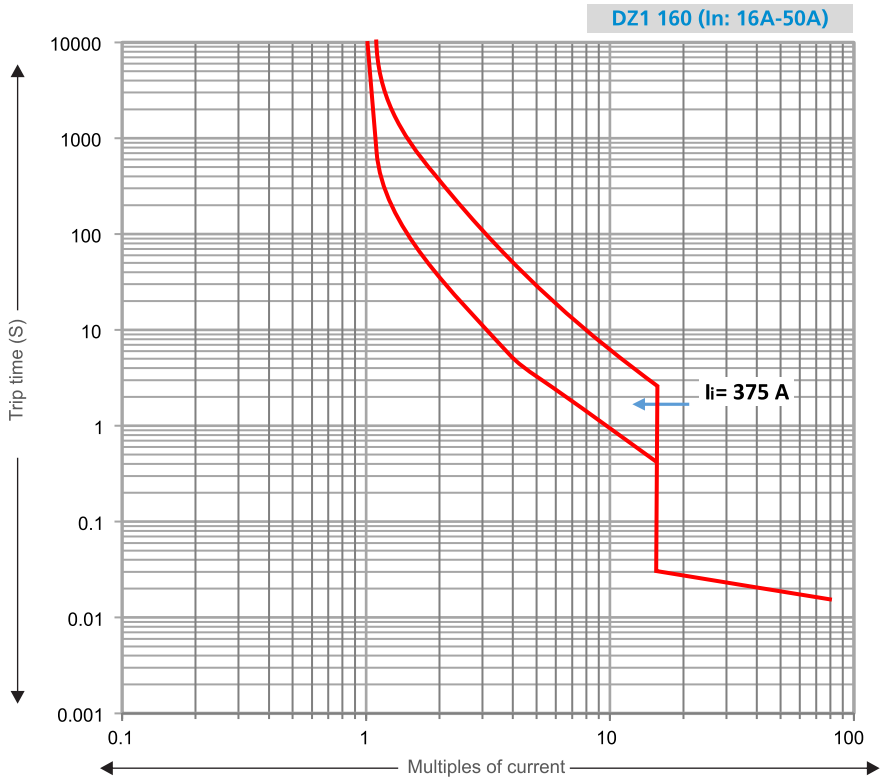
Altitude Correction Factors		
Altitude	Rated Insulation Voltage (Ui)	Rated Impulse Voltage (Uimp)
(m)	(V)	(kV)
2000 & below	800	8.0
2500	664	6.7
3900	560	5.6

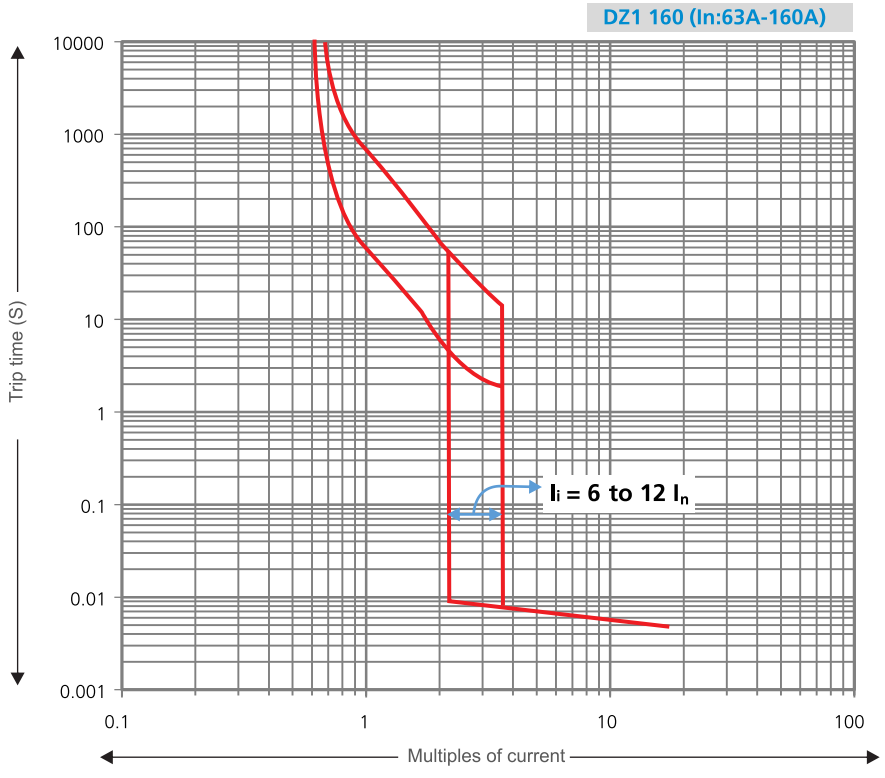
Characteristic Curves

Trip Curves

Thermal Magnetic Release

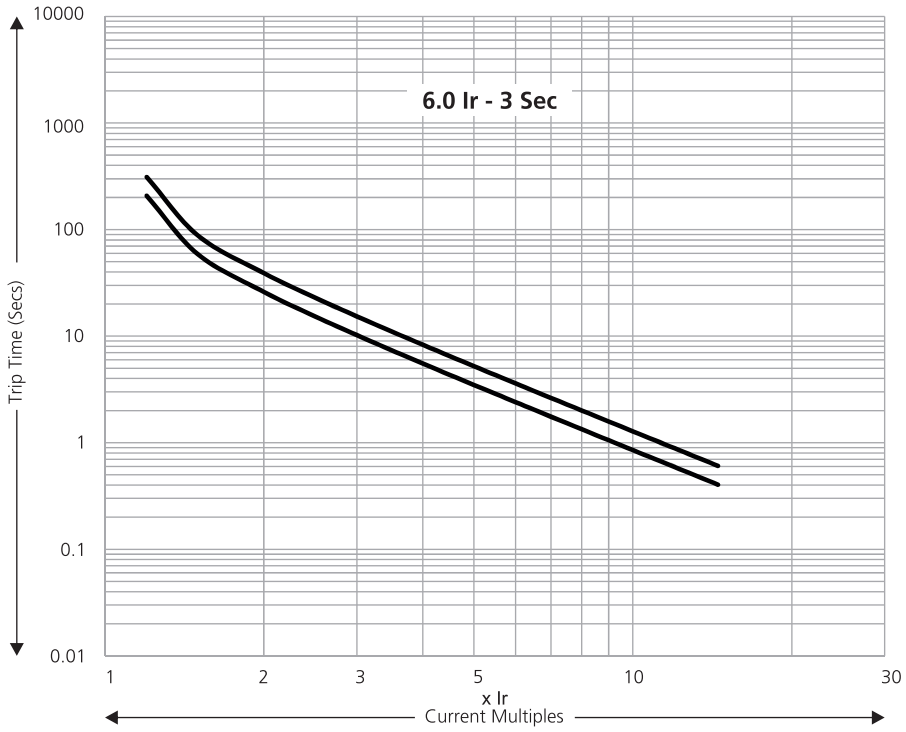
*i*TMAF @12In



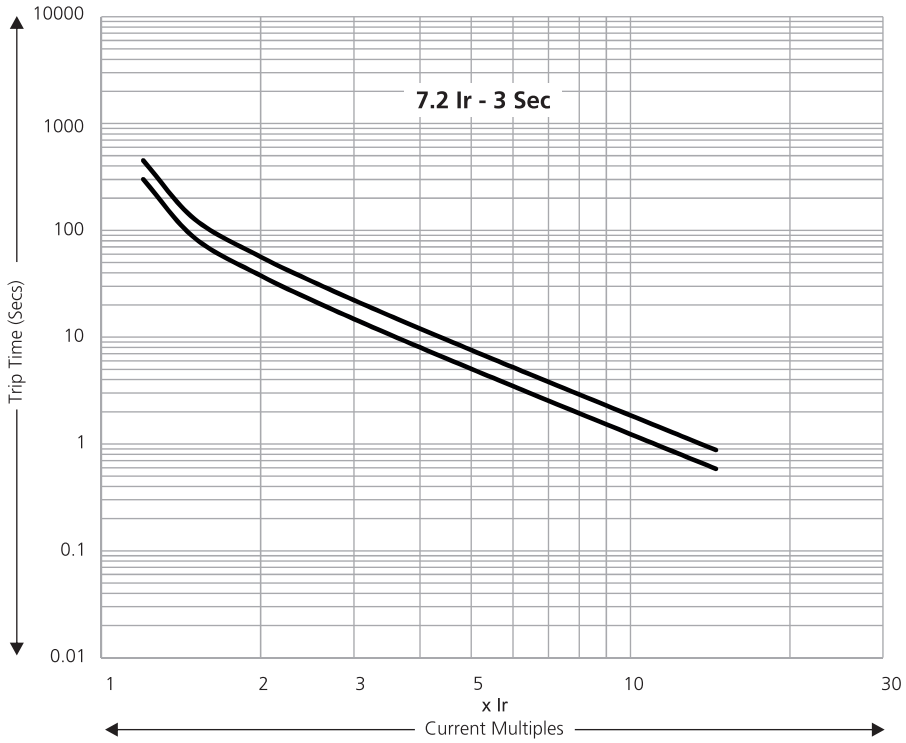


Microprocessor Release (*i*TRP)

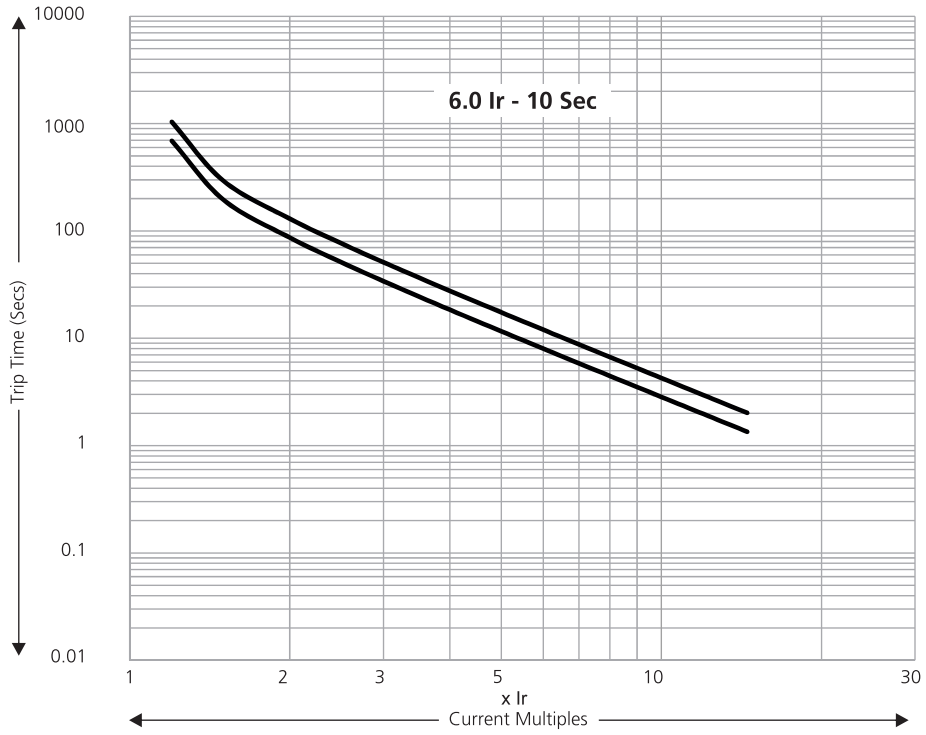
Overload 6Ir @ 3s



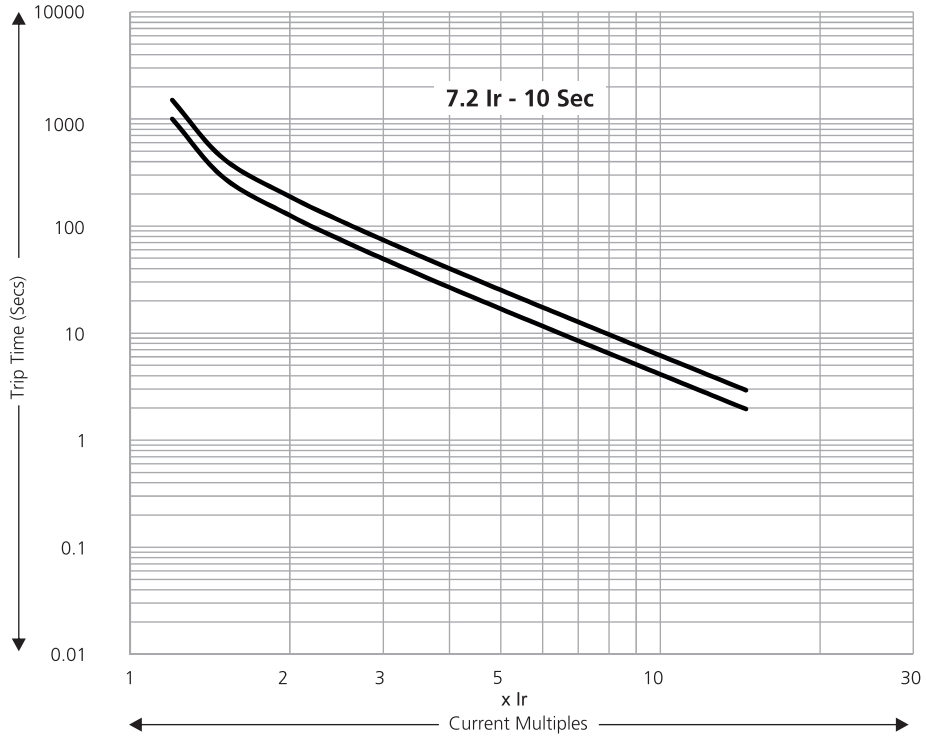
Overload 7.2Ir @ 3s



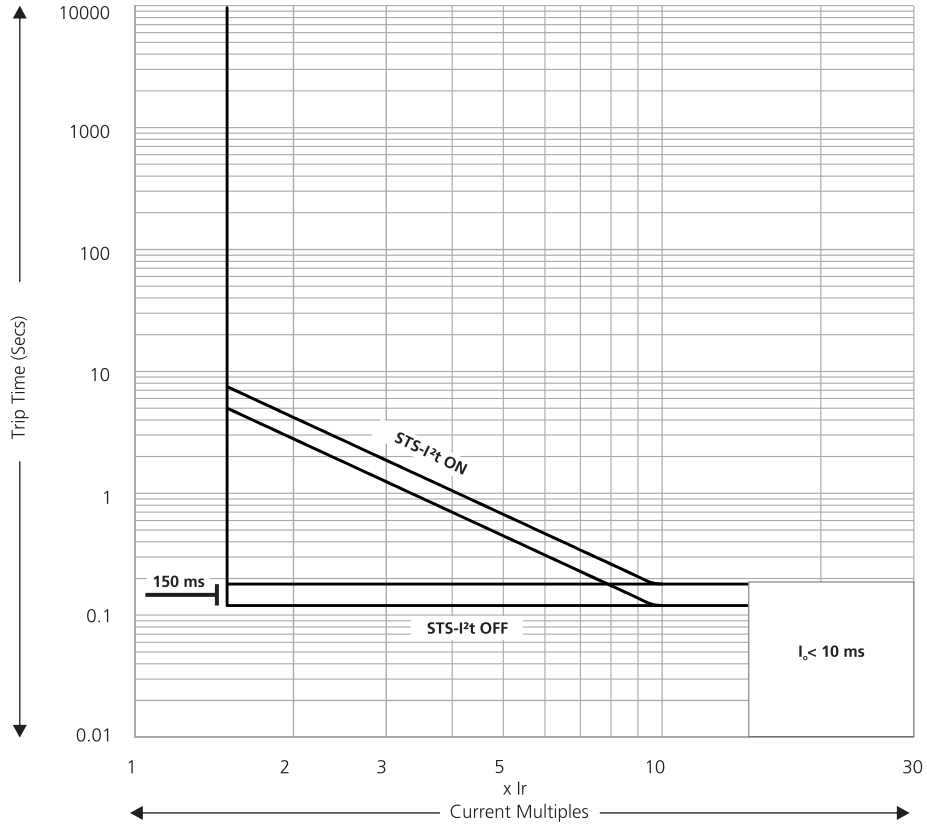
Overload 6Ir @ 10s



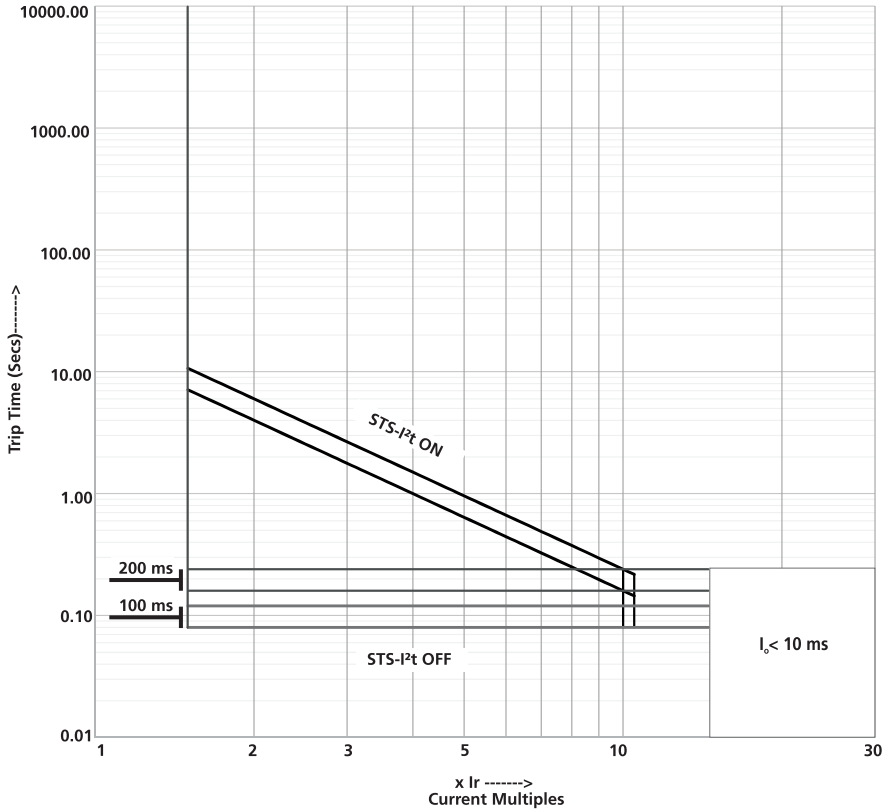
Overload 7.2Ir @ 10s



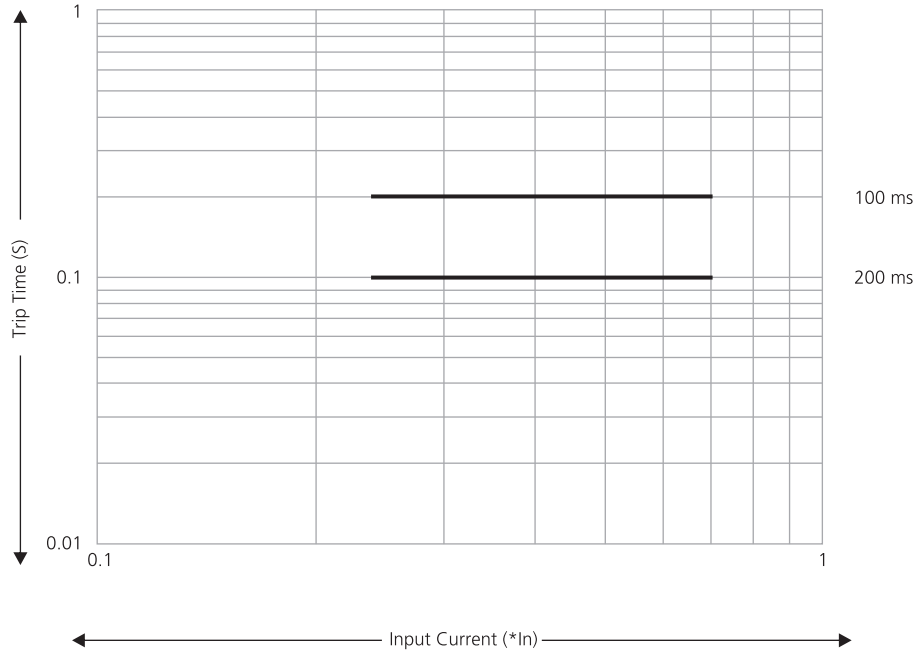
Short-Circuit & Instantaneous - *i* TRP-1



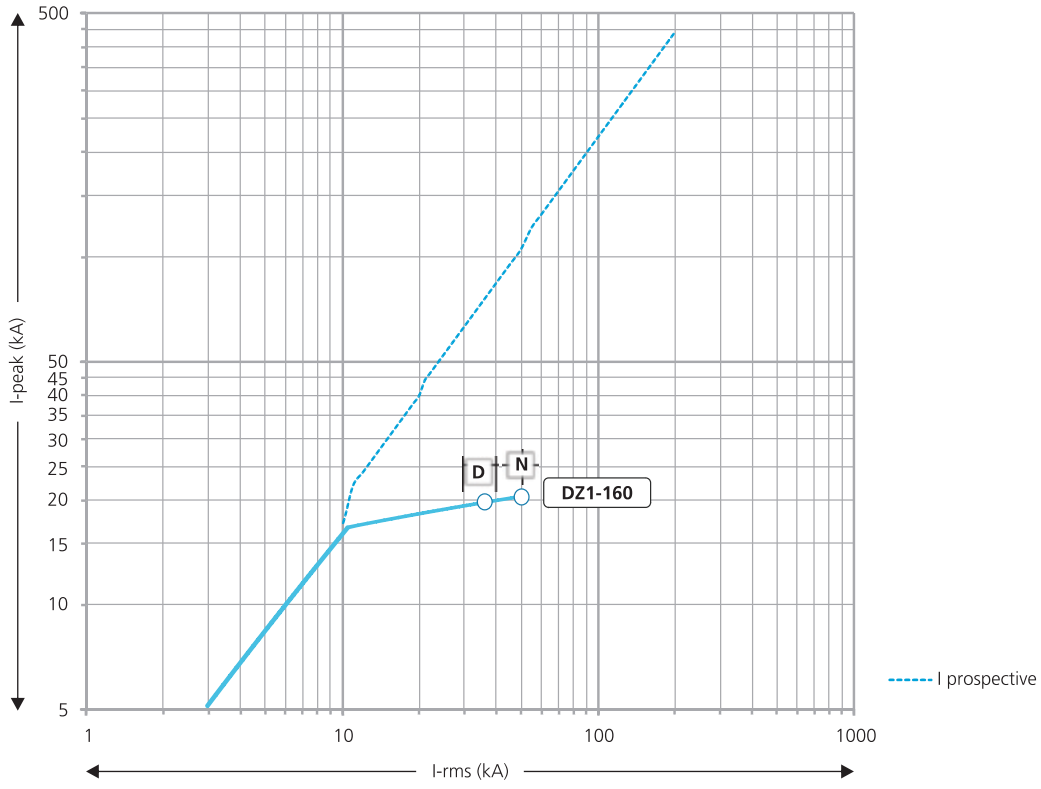
Short-Circuit & Instantaneous - *i* TRP-2 / *i* TRP-3



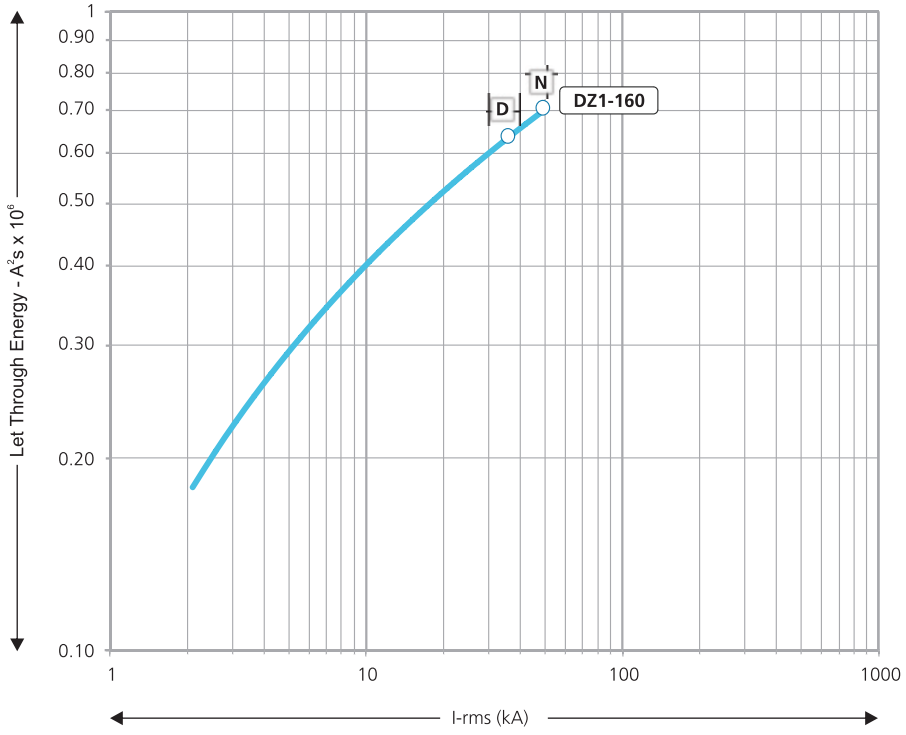
Earth Fault - *i* TRP-3



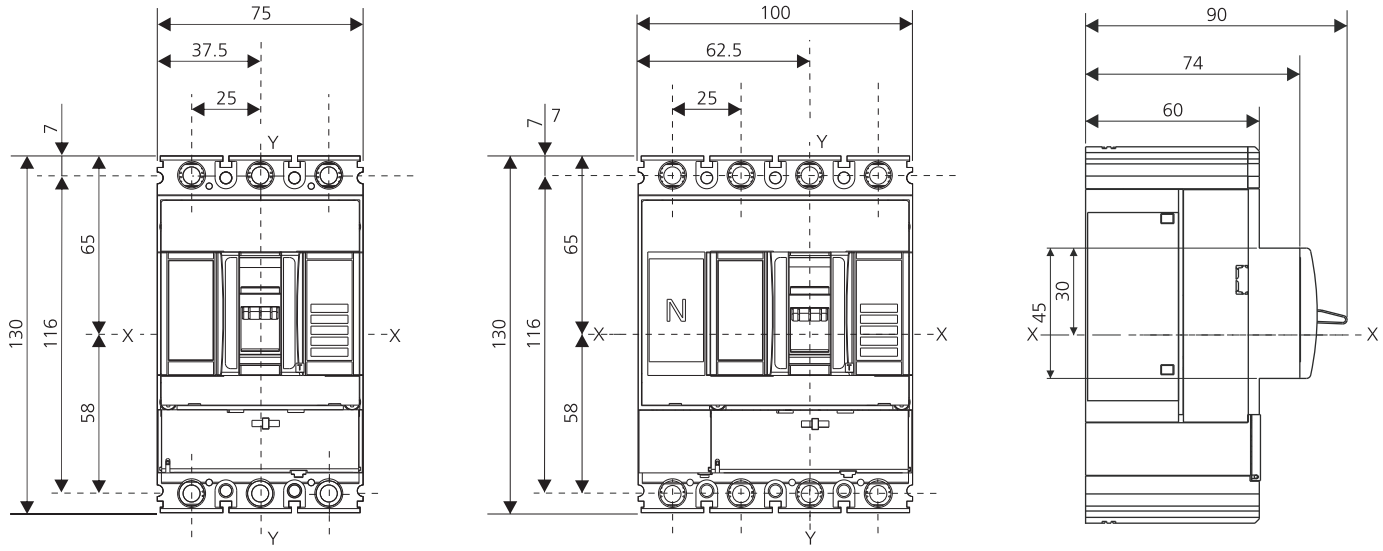
Current-Limiting Curve for d sine - DZ1 @ 415V



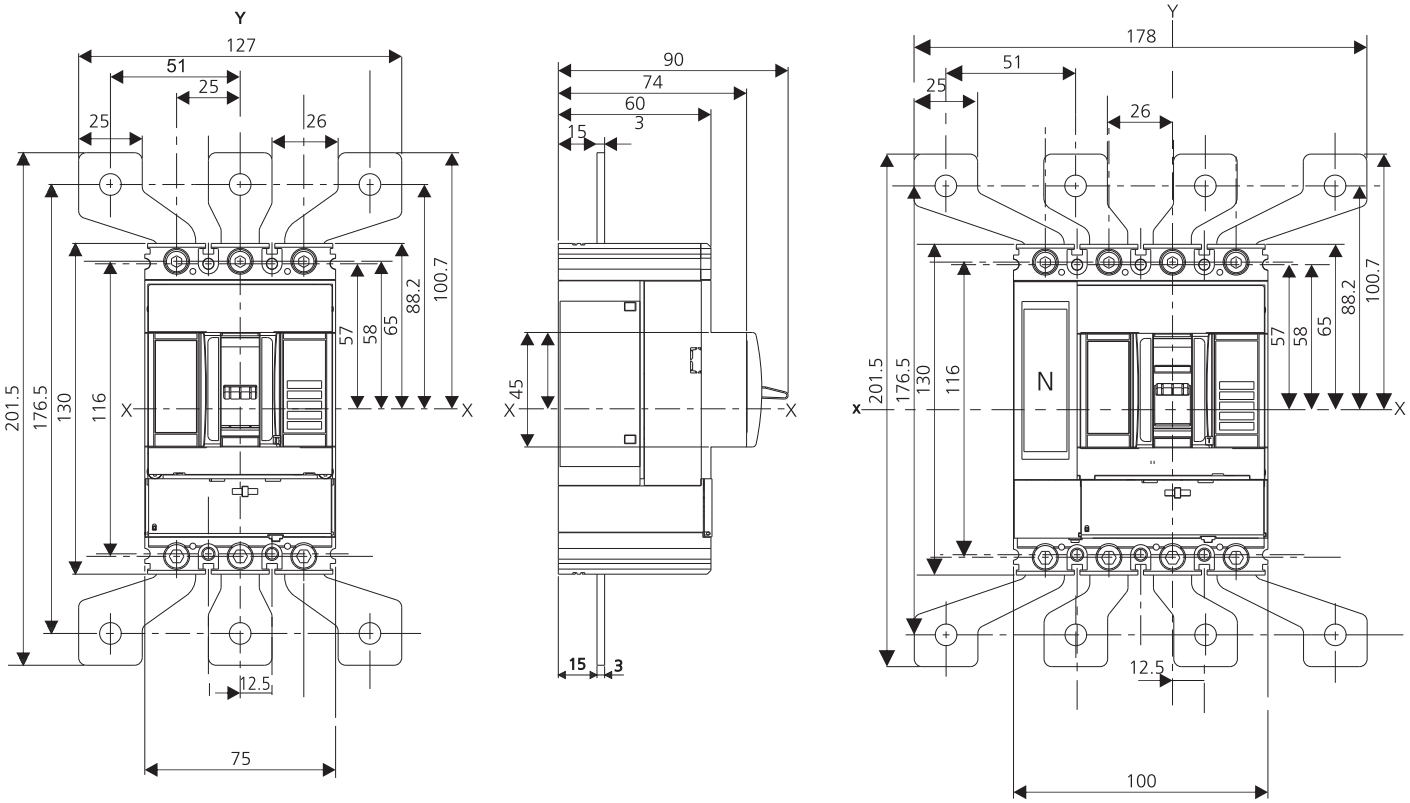
Energy-Limiting Curve for d sine - DZ1 @ 415V



Overall Dimensions

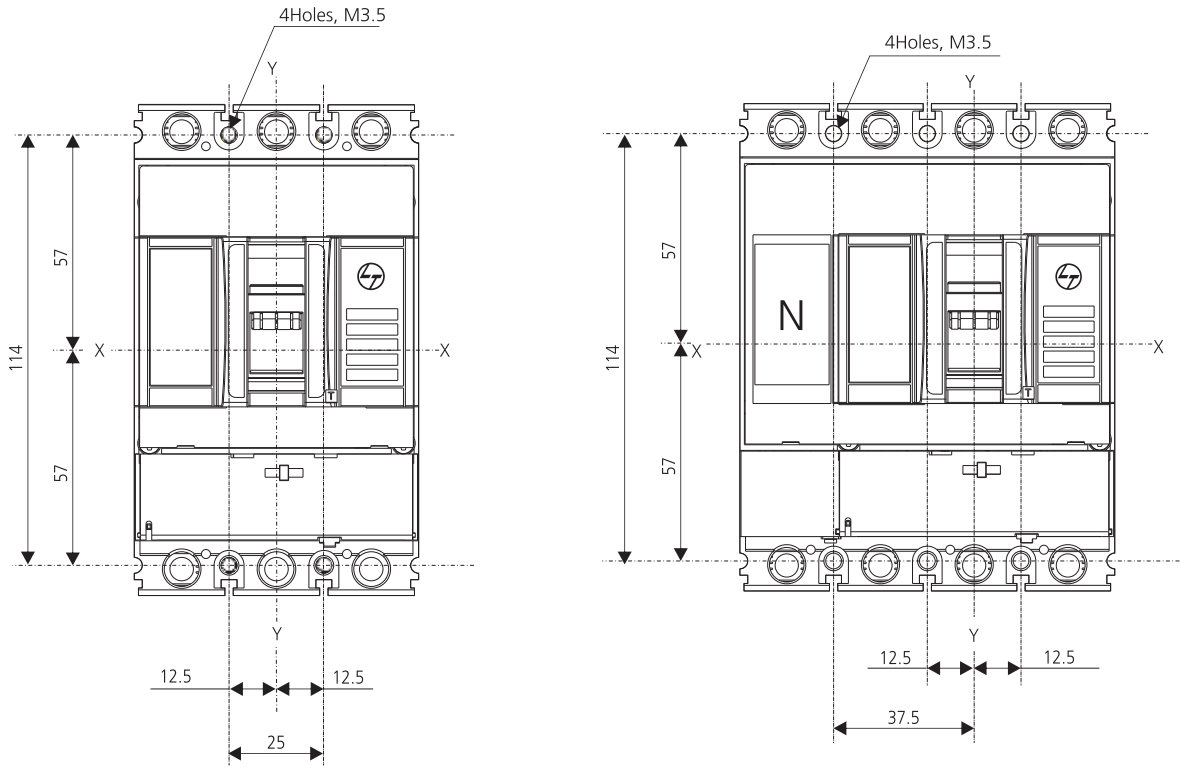


Overall Dimensions with Spreader Links

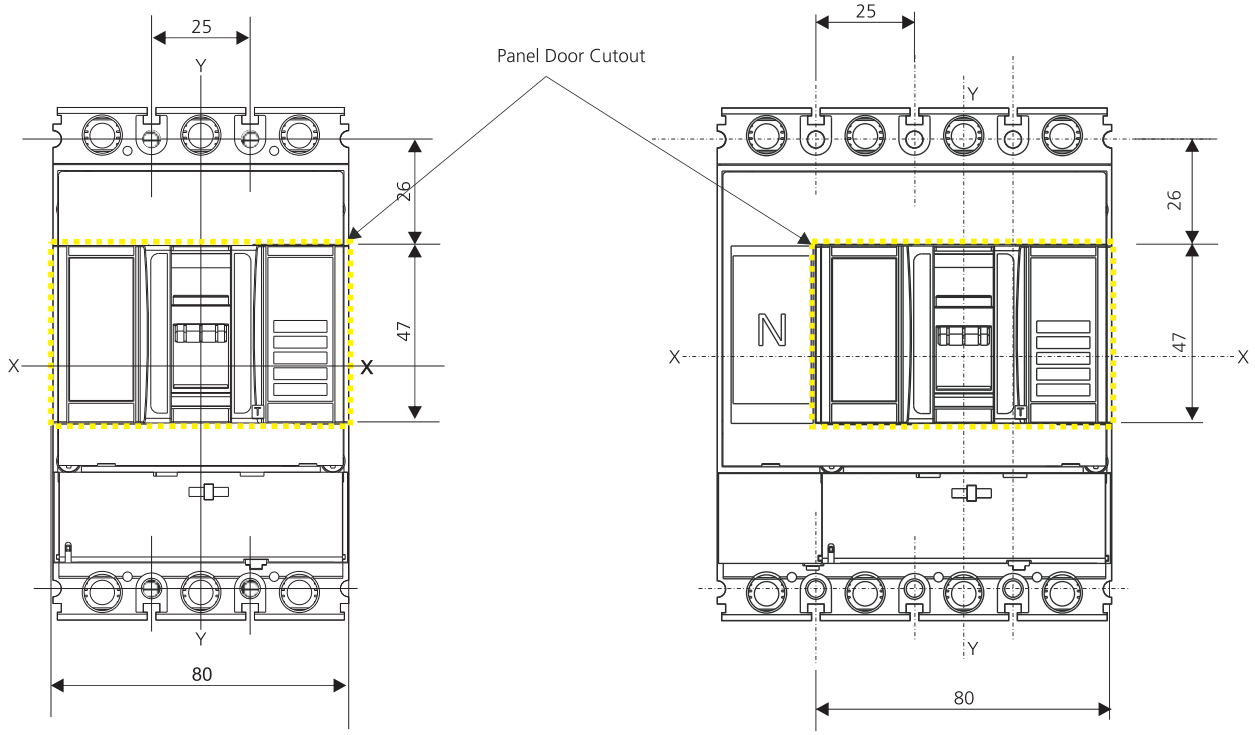


All dimensions are in mm

Mounting Dimensions



Panel Cutout

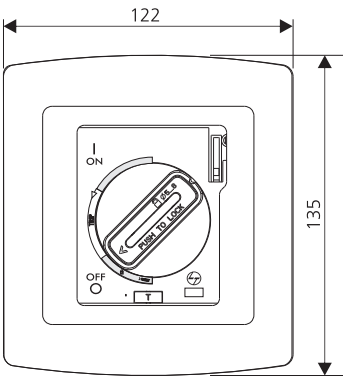


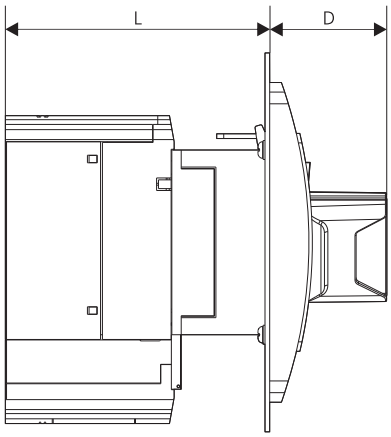
All dimensions are in mm

Accessories Dimensions

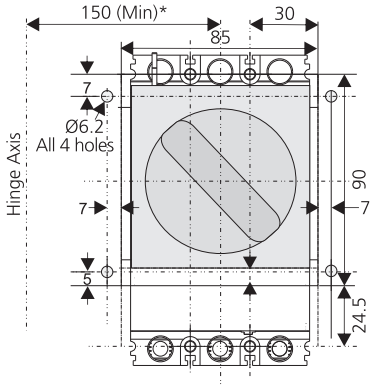
Direct ROM

Dimension with Bezel & MCCB





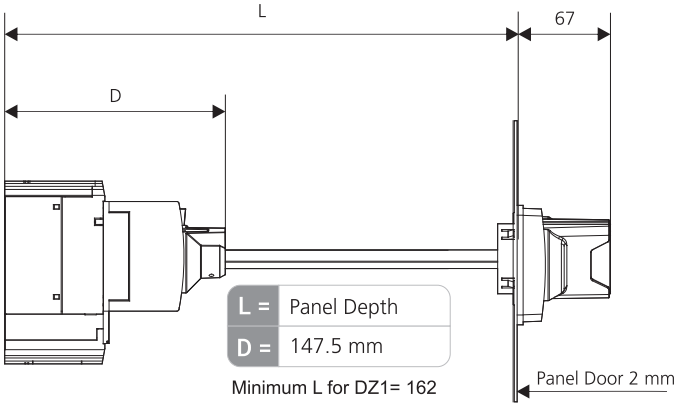
Panel Door Cut-out Dimensions



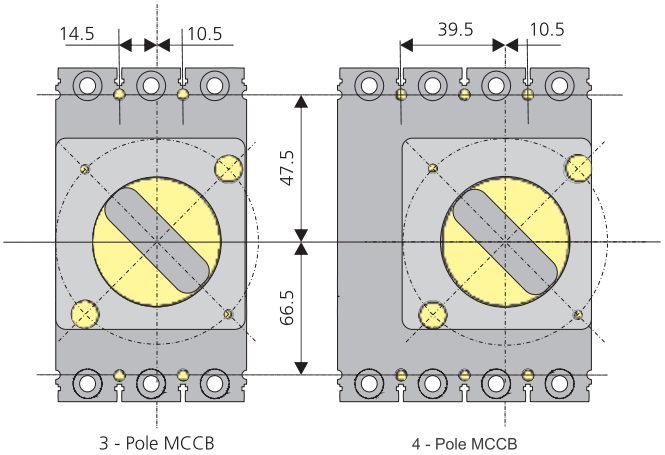
* Minimum hinge radius for Horizontal / Vertical MCCB installation

Frame	L	D
DZ 1	100.5	50

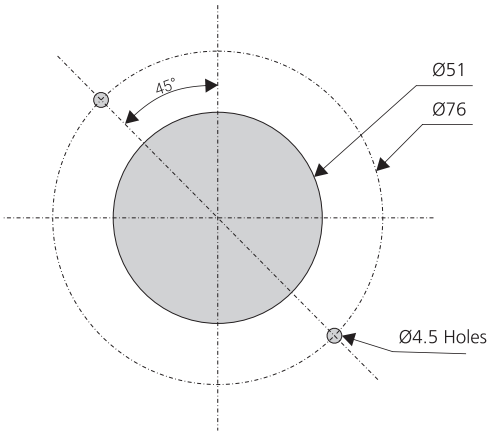
Extended ROM



Vertical & Horizontal References with Respect to MCCB Mounting



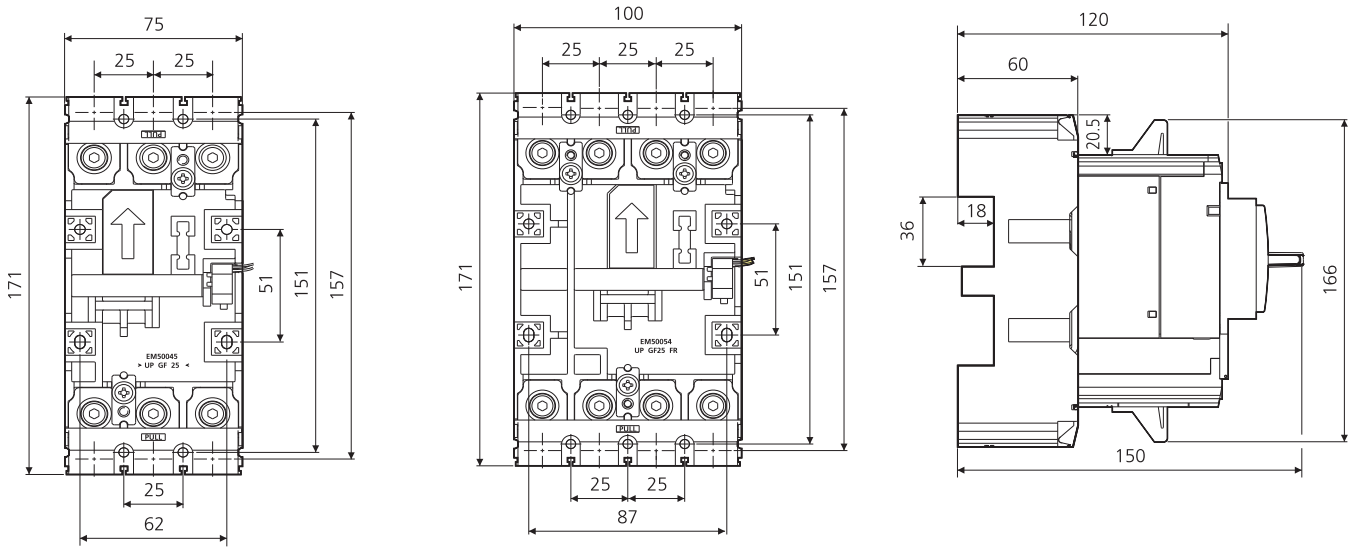
Panel Cut-out Details as Viewed from the Front



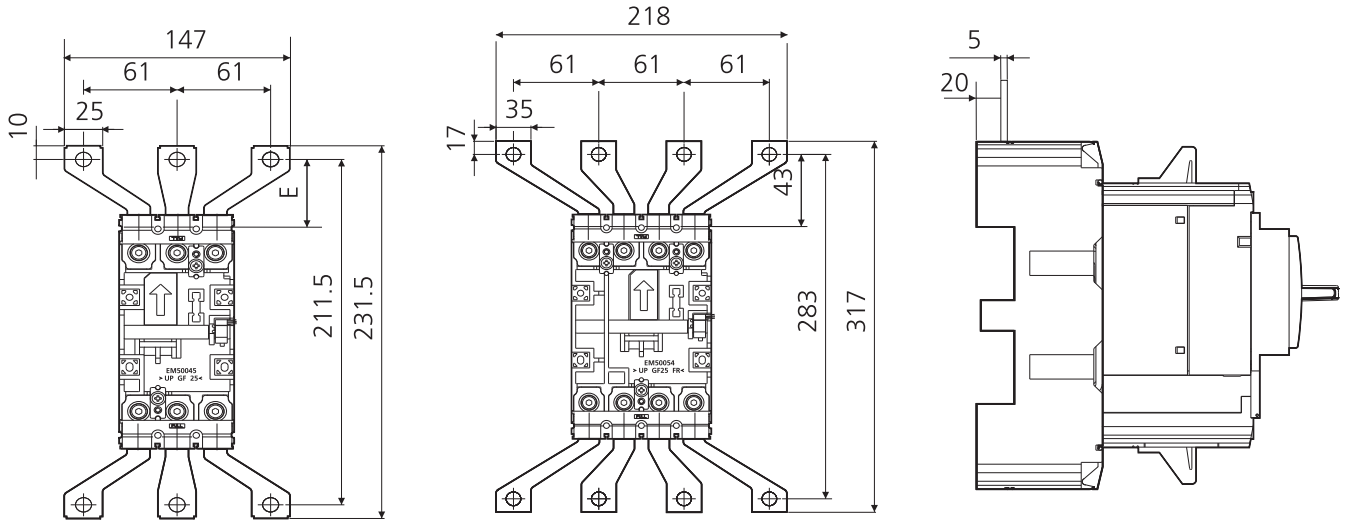
All dimensions are in mm

Plug-in type MCCBs

Overall Dimension



Spreader Dimension



Type 2 Co-ordination Chart

Motor feeders are generally of two types- Fuse and Fuseless based on the type of short circuit protection device used. Fuse systems incorporate fuse whereas fuseless systems either make use of MCCB or MPCB. The MCCBs are available for various current ratings and kA levels depending on application. This offers you the flexibility of making the most apt selection as per your application. We have DZ1-M MCCBs which cater to motor back up application.

Selection Chart: Fuseless Protection for DOL Starter Feeders: IE2

Type '2' co-ordination, Iq=50 kA at 415V, 3Ø, 50 Hz as per IS/IEC 60947-4-1 standard

Sr. No.	Motor Ratings: 3Ø, 415V, 50 Hz			Contactor Type	Overload Relay			MCCB	
	hp	kW	FLC, In (A)		Type	Range (A)		Type	Rating (A)
1	50	37	68	MO 80	RTO-3	60	78	DZ1-160N (FM)	100
2	60	45	81	MO 95	RTO-3	75	110	DZ1-160N (FM)	100
3	75	55	94	MO 140	RTO-4	72	108	DZ1-160N (FM)	125
4	100	75	130	MO 250	RTO-4	105	156	DZ1-160N (FM)	160

Selection Chart: Fuseless Protection for DOL Starter Feeders: IE3

Type '2' co-ordination, Iq=50 kA at 415V, 3Ø, 50 Hz as per IS/IEC 60947-4-1 standard

Sr. No.	Motor Ratings: 3Ø, 415V, 50 Hz			Contactor Type	Overload Relay			MCCB	
	hp	kW	FLC, In (A)		Type	Range (A)		Type	Rating (A)
1	50	37	68	MO 80	RTO-3	60	78	DZ1-160N (FM)	100
2	60	45	81	MO 140	RTO-4	72	108	DZ1-160N (FM)	125
	75	55	94	MO 185	RTO-4	72	108	DZ1-160N (FM)	160

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