PIX RoF 12kV, Upto 3150A, Upto 40kA

Medium Voltage Switchgears

Life Is On Schneider Electric

What is a PIX RoF ?

A high performance and a high quality Air Insulated Switchgear with a floor rolling Vacuum Circuit Breaker up to 12kV, 40kA and 3150A

- Standards compliance IEC 62271-200 / 62271-100
- Aluzinc Structure of panel
- Robust Structure to withstand Upto 40kA/1 Internal Arc
- Vacuum Interrupters from Schneider Electric
- Global Range Manufactured in Baroda, India
- Lead time12-16 weeks Ex-works Baroda

PIX – Certification

- PIX is developed and tested according to IEC 62271-200
- HVX is developed and tested according to IEC 62271-100
- Classification according IEC 62271-200
- Partition class : PM
- Loss in service continuity cat. : LSC2B
- Internal arc classification : IAC AFLR 40 kA 1s

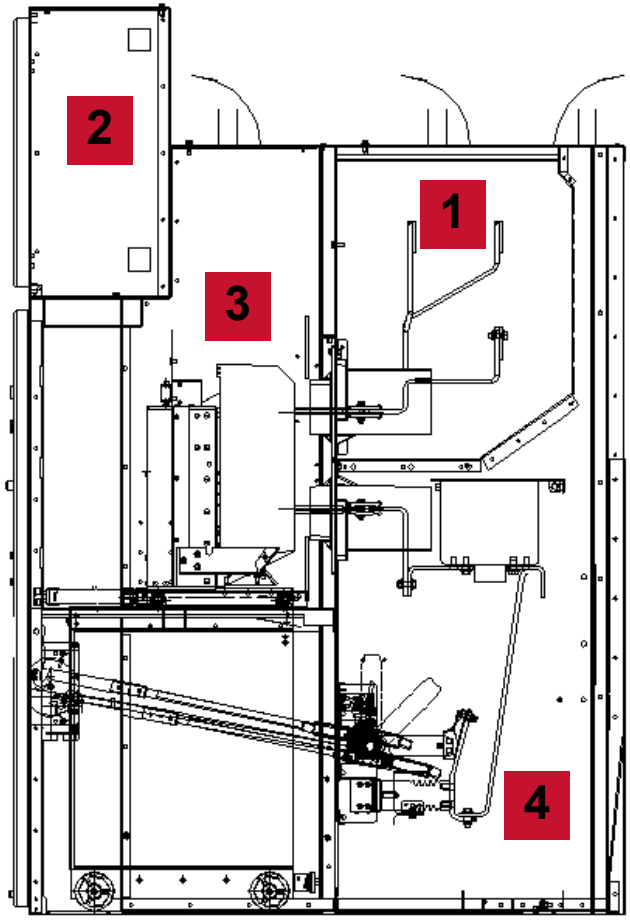
PIX comply with the latest IEC

PIX – Technical Data

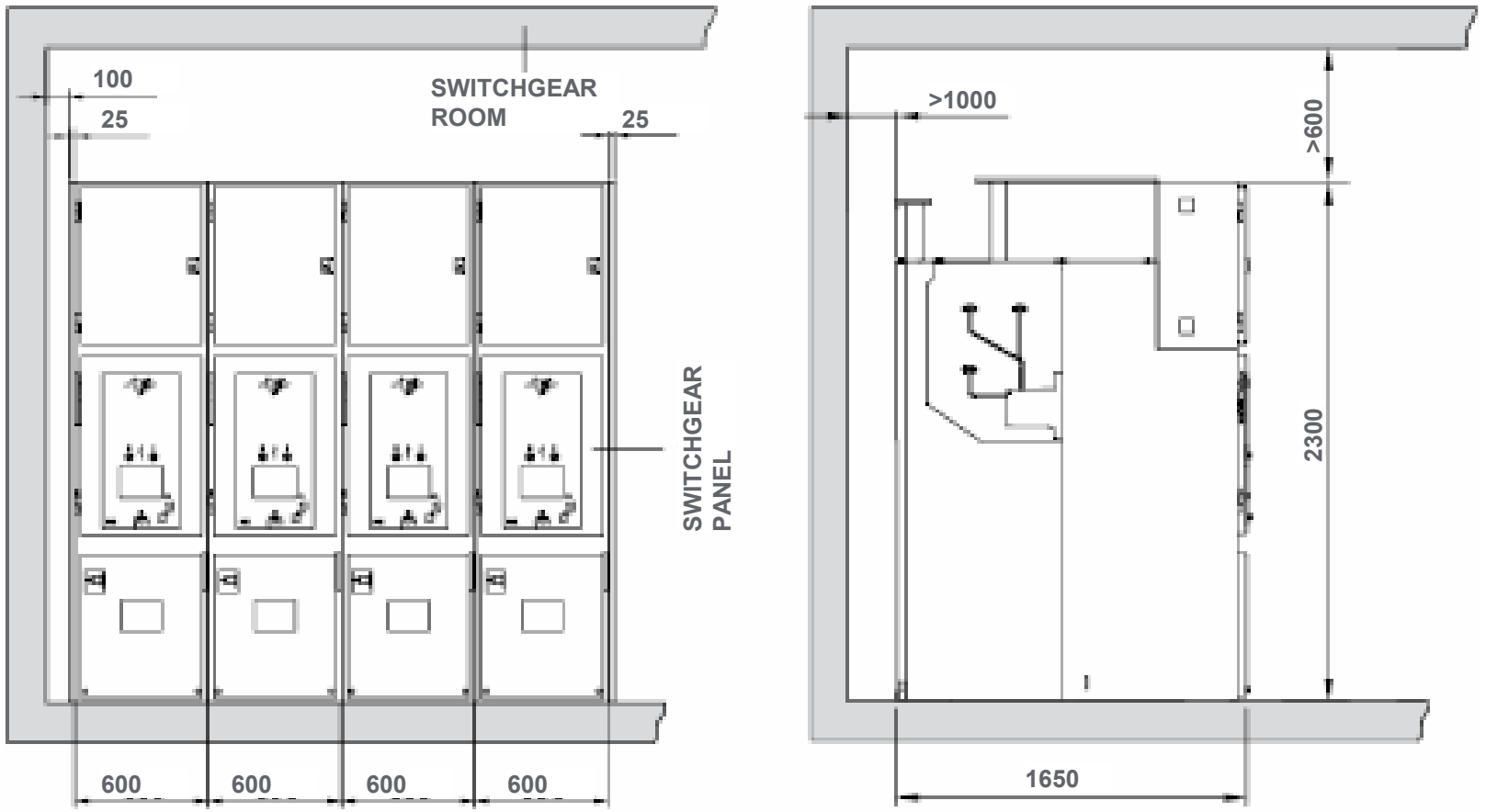
Rated voltage	**kV**	**12**
Rated frequency withstand voltage	**kV**	**28/38**
Rated impulse withstand voltage (BIL)	**kV**	**75/95**
Rated frequency	**Hz**	**50/60**
Rated current	**up to A**	**3150**
Rated peak current	**kA**	**100**
Rated short time current (1s - 3s)	**kA**	**up to 40**
Internal arc fault (1s)	**kA**	**40**
Degree of protection	**IP**	**4X**

PIX – Compartment description

- 1 Busbar compartment
- 2 Low-voltage cabinet
- 3 Withdrawable circuit breaker module with HVX
- 4 Cable compartment

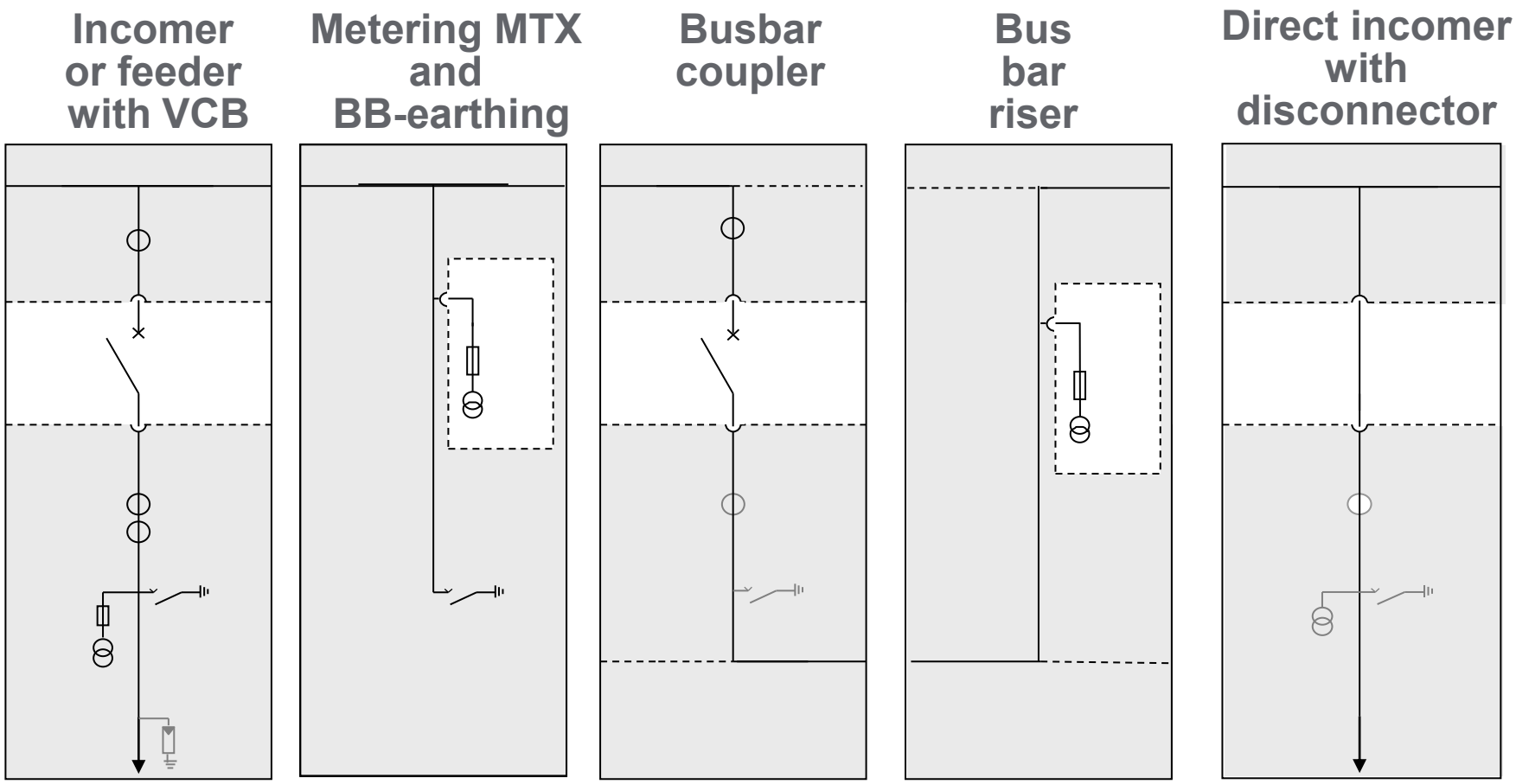


PIX – Functional unit



* Extended depth for specific options as 2 cable CT's/ phase, Busbar CT and Bus Ducts
* 2300mm height is with 735mm high LV cabinet
* 800mm wide for continuous current rating 2000A and 2500A
* 1000mm wide for continuous current rating 3150A

PIX – Main Cubicle Types



PIX Operations– Front Door and LV connector

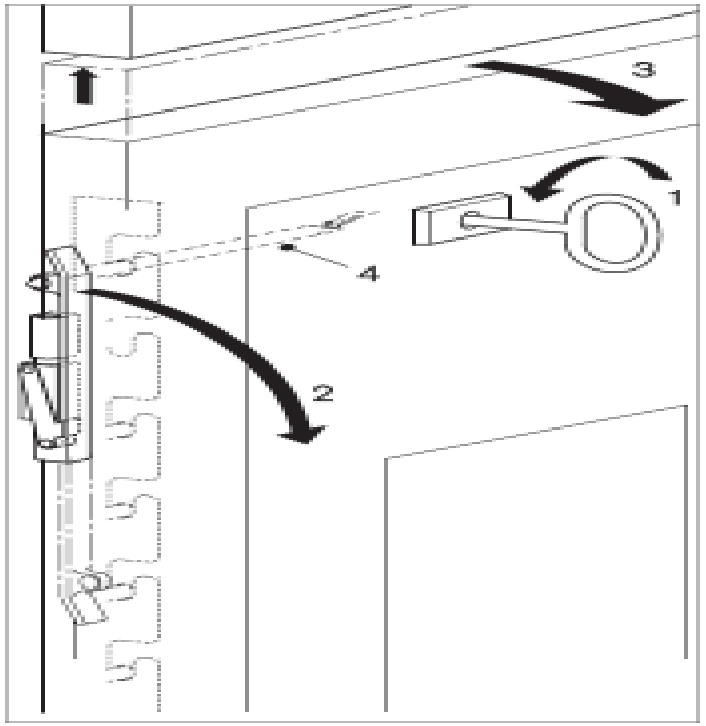


Fig. 10
(Open front door)

1 Lock with double-bit key
2 Lever to unlock the front door
3 The front door can be opened laterally
4 Opening for manual unlocking in case of optional truck- / front door interlock

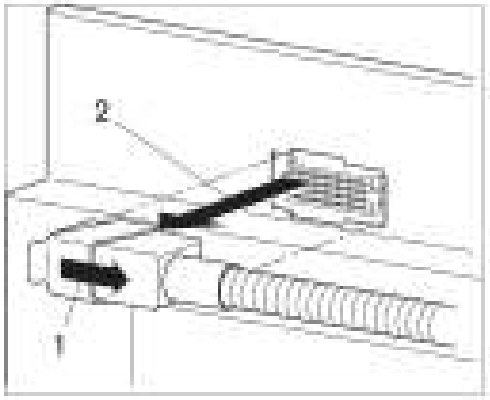


Fig. 11
1 Unlock low-voltage connector
2 Remove low-voltage connector

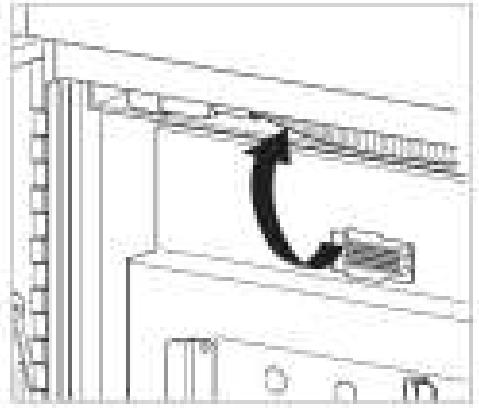
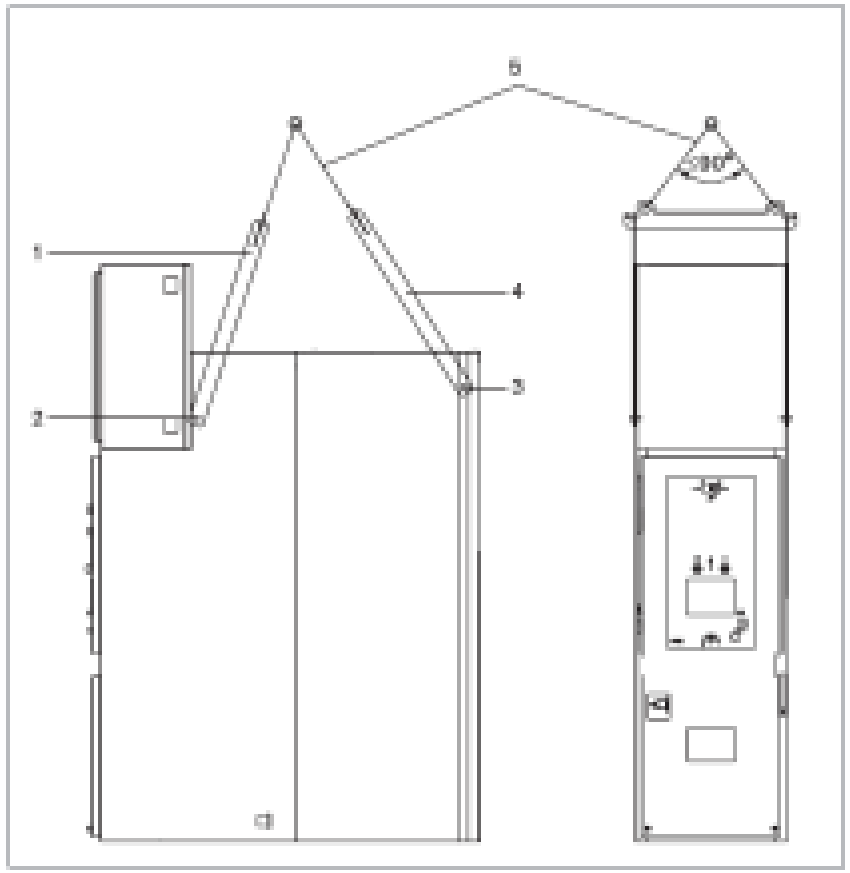


Fig. 11
Place low-voltage connector in tray above the truck

PIX Lifting Arrangement



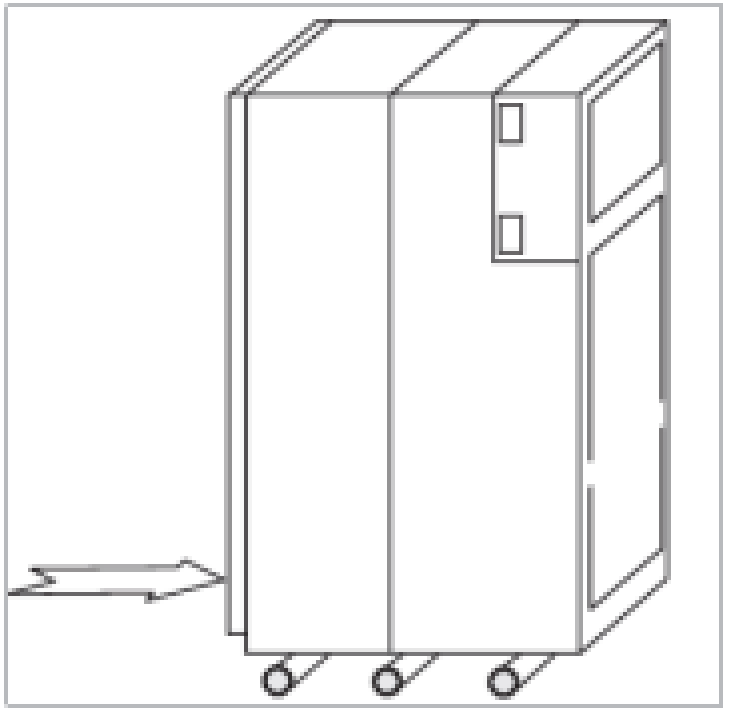


Fig. 23
Transport on rollers

PIX – Earth Bus Connection and Cable connection

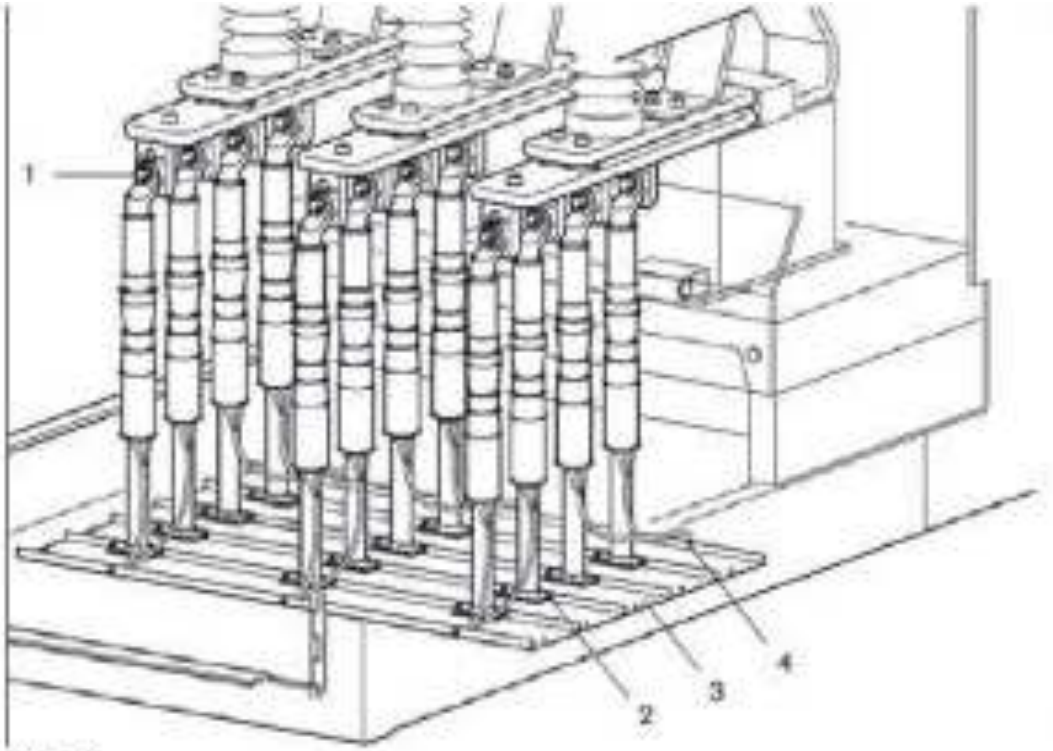
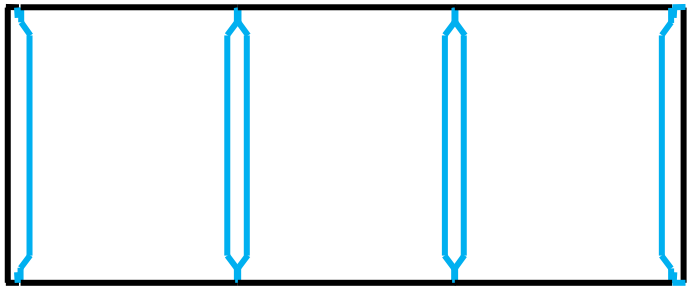


Fig. 31
High-voltage connection
1 Cable connection on the panel
2 Cable holding with the compressible type glands.
3 Compressible glands mounted on the plain gland plate,
4 Connection of the ground wires to the panel

Fig. 25
Connecting point of switchgear earth bus to building earth

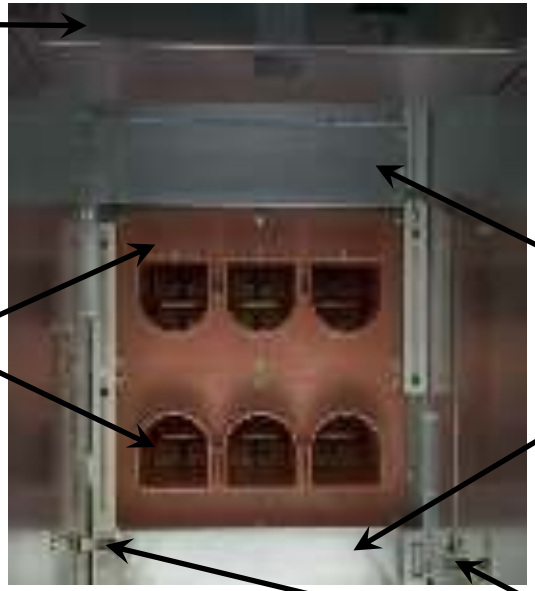
PIX – Maximum Safety

- Robust construction
  - High-pressure resistant front doors with interlocking flanges on all sides - ‘lifting door’
  - Combined sheet-metal folding / joining / riveting technique using painted sheet-metal plates
  - Metal shutters on fixed contacts
  - 2 partition walls between cubicles (metal – air - metal) and at the switchboard ends ensure high availability.



PIX – The Cubicle Breaker Compartment

Pocket for storing secondary plug



To prevent damage to other compartments in the event of internal arc. current transfer contacts are through seal off bushing

Shutters are metallic & earthed to avoid any floating potential

Shutter movement guided only through the movement of circuit breaker

PIX – The Cubicle Breaker Compartment

- Independent shutters

PIX – The Cubicle Breaker Compartment

- **Special front door design tested for Internal Arc Fault withstand.**
  - **No tie down bolts or other manual means used to secure the door.**
  - **A single movement operates all required latching in simultaneous mode.**
  - **No special tools required to latch the breaker compartment door**

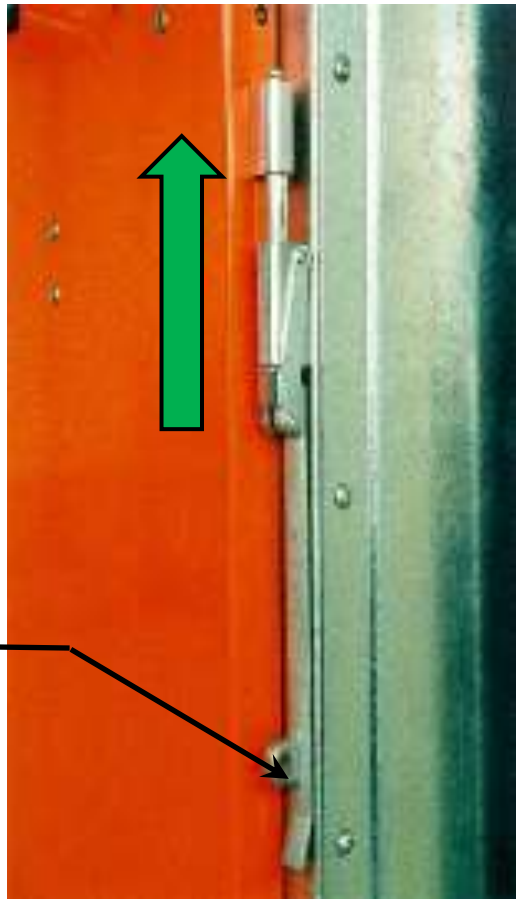
Multi point hinged locking arrangement provided on each side

PIX – The Cubicle Breaker Compartment

Safety: Lifting Doors

Door closed and locked

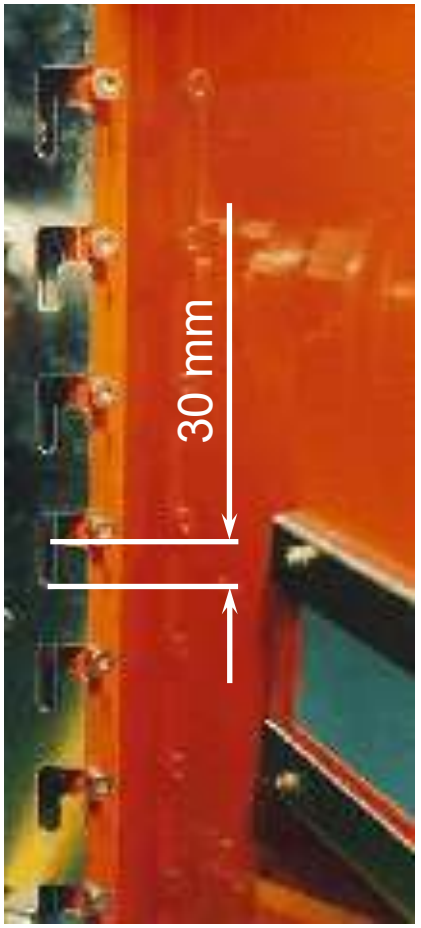
Door unlocked and lifted



PIX – The Cubicle Breaker Compartment

Safety: Lifting Doors

- **With multiple locking system in doors and blinds**
- **Upto 40 closing points**



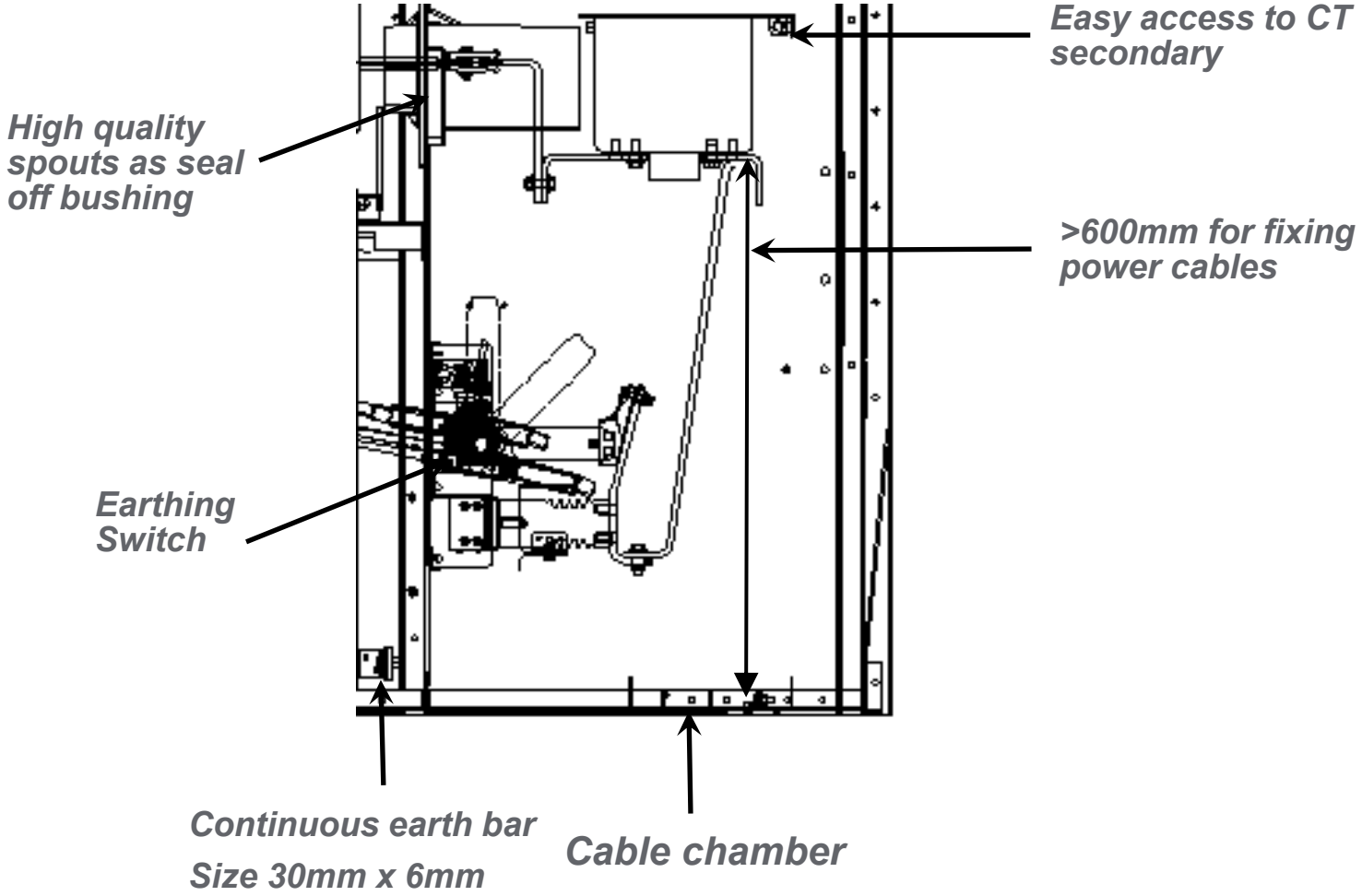
PIX – The Busbar Compartment

12 kV busbar

17,5 kV busbar

Additional heat shrink insulation

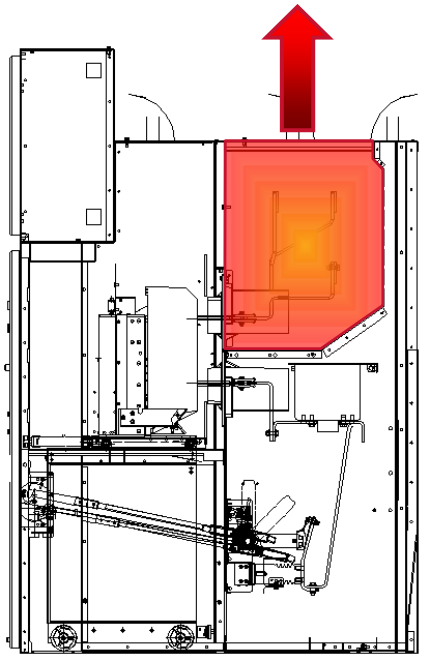
PIX – The Cable Compartment



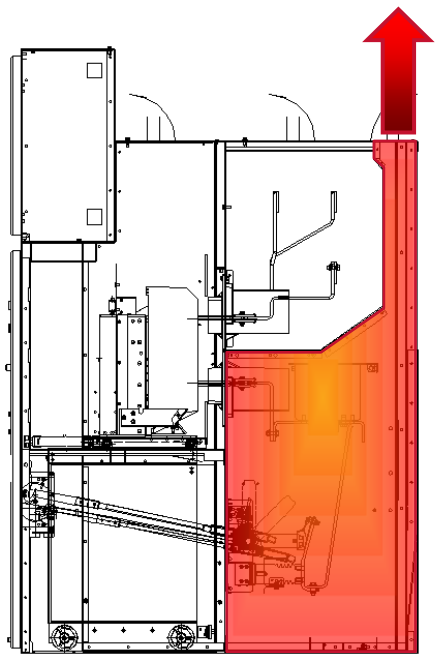
PIX – Maximum Operator Safety

Pressure relief of compartments

Circuit breaker



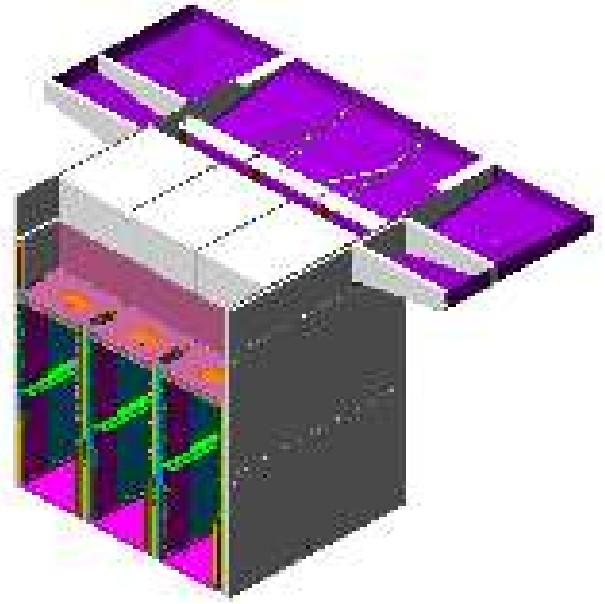
Busbar



Cable connection

AFLR Arc fault configuration

- Cubicle Setup for IAC Test
  - Deflectors are added in the rear and part of the sides only
  - CB & cable compartment are successful without side deflectors
  - Side deflectors used to clear bus bar compartment test



AFLR with gas duct

- Cubicle Setup for IAC Test
  - Test successful in the first attempt.
  - Proving the robustness of the cubicle itself
  - Proving a consistent withstand of the arc

PIX – Easy and Safe Operation

- Safe operation
  - Easy, safe and robust door locking mechanism
  - All mechanical operation can be done from front with doors closed
  - Mechanical indication for all switching positions
  - High operator safety - completely integrated interlocking system

PIX – Easy and Safe Operation

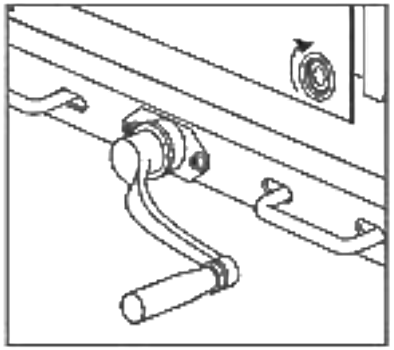
- **Mechanical operation of C.B. with closed front door as manual emergency operation**

All mechanical operating procedures performed from the front – with all doors securely closed !

PIX – Easy and Safe Operation

- **Optimized rack-in mechanism**
  - **No need for long handle to rack-in the circuit breaker**

CB in Test Position



Ergonomic handle for CB racking

CB in Service Position

PIX – Easy and Safe Operation

- **Interlocked plug-in auxiliary connections**
  - **Fixing of the LV- connector to the C.B. by locking mechanism**
  - **Storage compartment for LV plug / harness**
  - **Auxiliary plug is interlocked with the C.B. racking system.**
    - **C.B. cannot be racked from test to service position with LV plug disconnected.**
    - **When C.B. is in service position, LV plug cannot be disconnected**

HVX – Vacuum Circuit Breaker

- **Technical data**
  - 3 in 1 pole design of breaker brings consistency for the parameters & eliminates the variations.
  - Compact design

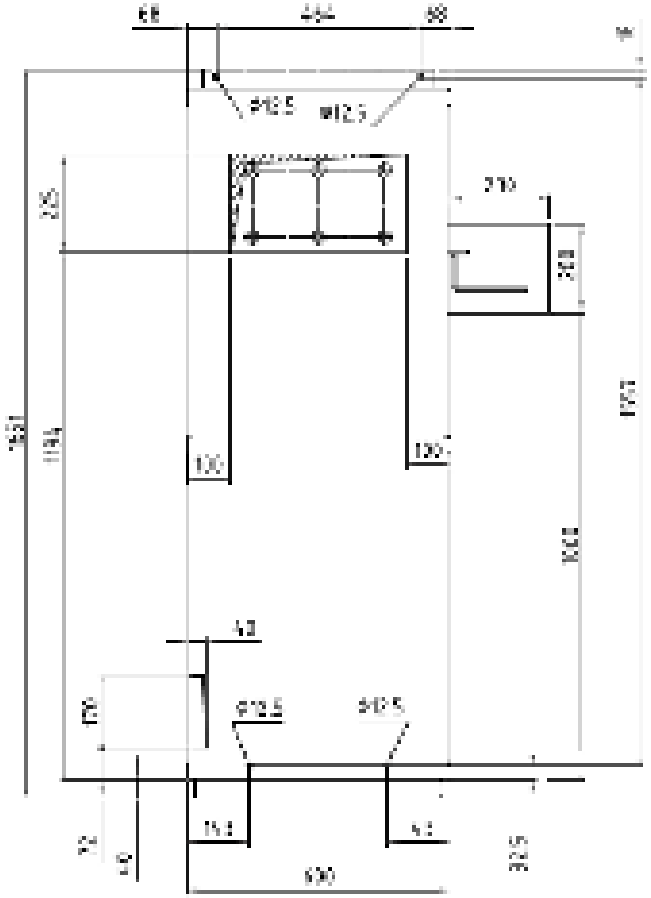
    (12/17.5kV / up to 40kA / up to 3150A)
  - Copper or aluminum arms
  - Proven Mechanism FK2 type, 3 shafts operated
  - 3 independent transmission levers included in the housing
  - Racking mechanism included in the frame
  - Range of VG : VG2i, VG2, VG3i, VG3, VG4
  - All test performed according new IEC 62271-100

HVX – Vacuum Circuit Breaker

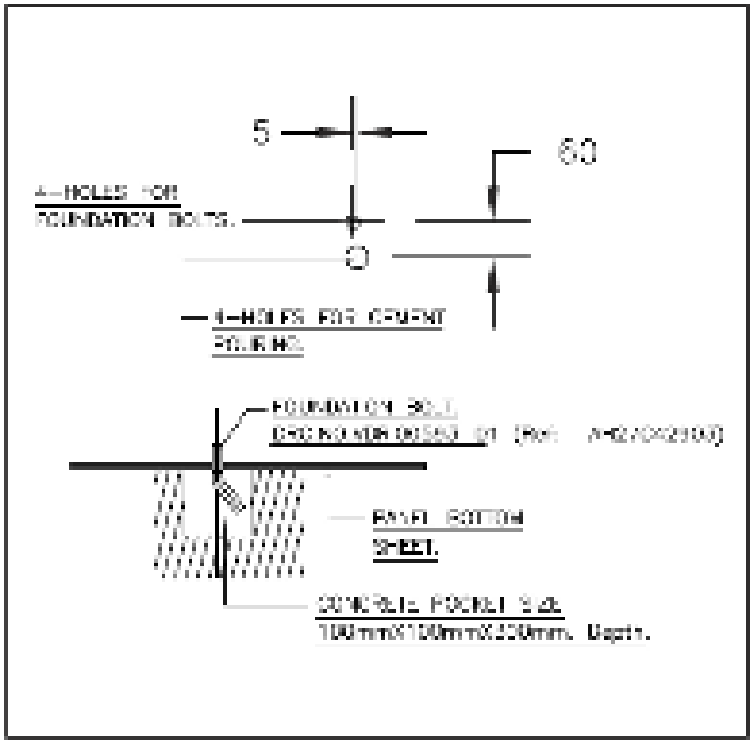
- **Ergonomic design principal**
  - **Simple general arrangements**
  - **Easy user guidance through a functional arrangement of the mechanical operation and signal parts.**
  - **Clear difference of the mechanical and electrical parts inside the gear drive**
  - **Secondary connection with 24/64-pole plug-in (at the top)**

PIX – Grounding and Foundation Details

Grounding and Foundation details



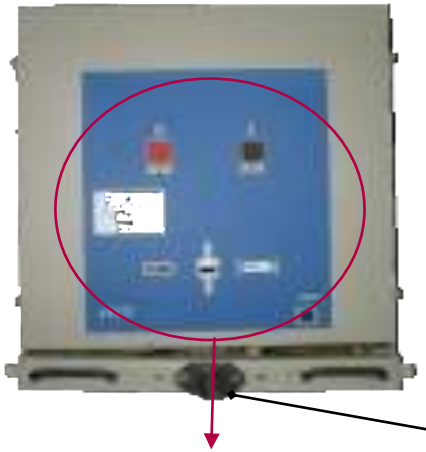
Standard ground plan for PIX panel

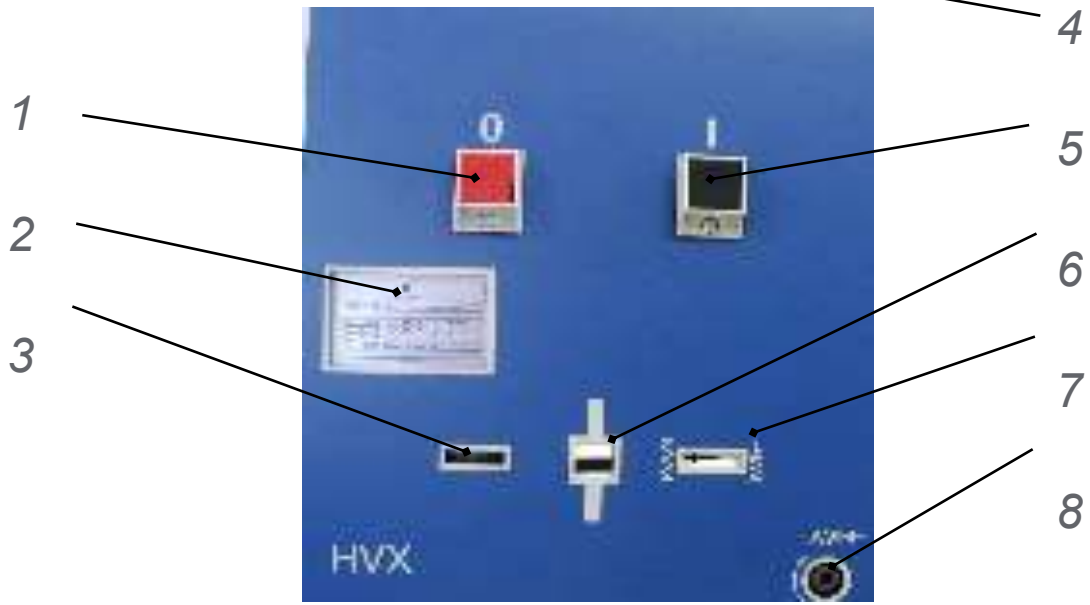


Standard foundation drawing for PIX

Panels are design for erection directly on the floor, separate base frames are not provided. However structural 'C' Channels can be included to mount panels over tranches on request

HVX - Vacuum Circuit Breaker





1) Trip button
2) Name plate
3) Counter
4) Hand crank opening
6) Close button
7) Switch position indicator
8) Energy storage indicator

HVX – Vacuum Circuit Breaker

- **Very high mechanical stability and stress free design of the pole structure**
  - **Common reference for drive shaft on pole housing for consistency for the parameters & eliminates the variations.**
  - **Force free mounting of the vacuum bottle.**
  - **No heat problems within the pole structure - free air circulation**
  - **No critical hot spots within the pole structure**

Operational Benefits

Maximum Safety

Reliable and Easy Operation

User-friendly and Easy Access

Safety

Safety

- Operator is safe in the event of internal arc - All operation with door closed
- Internal arc withstand as per new IEC for up to 1 second.
- Total safety to the operator working at the cable side - rear cable cover cannot be opened unless breaker is tripped & bought to test position.
- Circuit side voltage transformer has a chamber for itself & hence can be withdrawn independent of breaker.

Reliability

Reliability

- Time proven mechanism & interrupter technology.
- 3 in 1 pole design of breaker brings consistency for the parameters & eliminates the variations.
- Basic design of breaker suitable up to 17.5kV.
- Air clearance in the busbar chamber with no sleeving
- All tests performance according to the latest IEC 62271-200
  - Partition class : PM
  - Loss in service continuity cat : LSC2B
  - Internal arc classification : IAC AFLR 40kA 1s

User Friendly

User friendly

- Very compact cubicle & light weight breaker for easy maneuverability for easy erection & commissioning.
- Simple & user friendly racking & interlocking systems.
- Viewing window for cable & breaker chambers.
- Head room in cable compartment > 600mm for fixing power cables
- CT mounting provides easy access to the secondary terminal & makes replacement much easier if & when required.

PIX – RoF : Highlights

1. Separate Bus PT Panel
2. Manual Spring Charging, Closing, Tripping at Closed Door condition
3. Earth Switch for Circuit side & Earthing Truck for Bus side
4. Front operated Circuit Earth Switch
5. Seismic Zone – V
6. Internal Arc 40KA for 1Sec.

References

Few References for PIX

Customer	Country	*Qty*	Year
Export references			
KPLC Kenya	*Kenya*	72	2012
EDD (Arab Shipbuilding & Repair Yard)	*Bahrain*	50	2012
Petronas	*Iraq*	26	2012
India references			
Reliance Industries Limited	*India*	2000	2014
Tata Power	*India*	28	2013
Godrej a/c Hiranandani	*India*	28	2016
Jindal Steel & Power	*India*	16	2015
Thyssenkrupp Industries	*India*	34	2015
Alstom India a/c Tehri Hydro	*India*	26	2014
Isolux a/c DMRC	*India*	18	2014
NDPL	*India*	13	2014
VSP, Vizag	*India*	280	2017
JSW	*India*	40	2017
JSPL	*India*	72	2012
Usha Martin	*India*	64	2012
BMM Ispat	*India*	52	2012