LOW VOLTAGE
SWITCHGEAR

COMPREHENSIVE SOLUTIONS FROM DESIGN TO DELIVERY

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LOW VOLTAGE SOLUTION

TECHNO'S systems are suitable for applications in all fields concerning the generation, distribution and use of electrical energy, e. g., they can be used as: PCC, MCC. MDB, SDB, DB etc.

- In utility companies
- In power plants
- In oil refineries
- On off-shore drilling platforms
- On ships
- In production facilities
- In buildings for other than dwelling purposes.
- In pharmaceutical company
- In steel factory
- In cement & real estate company
- In small, medium and large industries

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SYSTEM OVERVIEW

The Modular/Metal enclosed Low-Voltage Switchgear System has proven its worth for many years worldwide. At the same time, it constitutes a safe investment for the future due to its continuous further development. The high flexibility of the system results from a frame-work construction with maintenance-free bolted connections which can be equipped as required with standardized components and can be perfectly adapted to each application. The consistent application of the modular/metal enclosed principle both in electrical and mechanical design permits optional selection of the structural design, interior arrangement and degree of protection according to the operating and environmental conditions. The design and material used for the system largely prevent the occurrence of any electrical faults and provide for arc quenching within a short time. The system complies with the requirements laid down in IEC 61439.

- Compact, space-saving design
- Economic energy distribution in the cubicles
- Comprehensive range of standardized types
- Earthquake-, vibration- and shock-proof design possible
- Easy assembly without any special tools
- Easy conversion and retrofit
- Any customization is possible as per client's special requirements.

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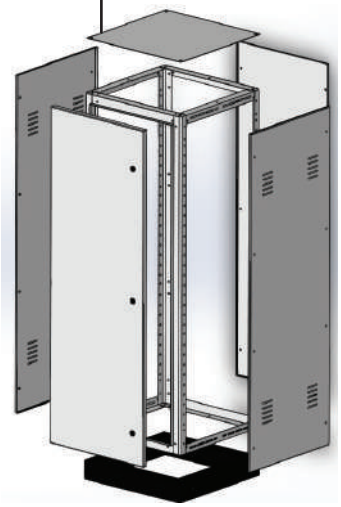
TECHNICAL FEATURES

• Rated current	: Up to 6300A [CB] & common busbar up to 22000A
• Degree of Protection	: IP 3X, IP4X & for special requirement IP54
• Rated frequency	: 50-60 Hz
• Rated service voltage [Ue]	: 690V
• Rated insulation voltage [Ui]	: 1000V
• Rated short time current	: Up to 100KA [1S], 50KA [3S]
• Standard	: IEC 61439-1-2
• Form of segregation	: From Form 1 to Form 4b
• Installation	: Indoor, Outdoor
• Mounting type	: Floor, Wall Mounted
• Circuit breaker protection	: LI, LSI, LSIG & others as per customer requirements
• BMS compatibility	: Can be provided through potential free auxiliary contacts & RS ports where necessary.
• Busbar	: 99.99% electrolytic CU busbar and aluminum busbar if customer demands

Constructive elements

- Uprights & crosspieces/frame
- Panel base
- Top/bottom cover
- Side/rear cover
- Front door



Dimensions of the structure

	Dimensions [mm]
Height [With 100mm Base]	1800, 2000or any customized height
Width	400, 600, 800, 1000, 1200 or any customized width
Depth	400, 600, 800, 1000, 1200, 1400, 1600 or any customized depth

Dimensions of the cable/busbar chamber

	Dimensions [mm]
Width	250, 300, 350, 400 or any customized width
Depth	400, 600, 800, 1000, 1200, 1400, 1600 or any customized depth

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STANDARDS

EEL is designed to comply with the requirements of the international standard IEC 61439-1-2 and any other referenced IEC publication.

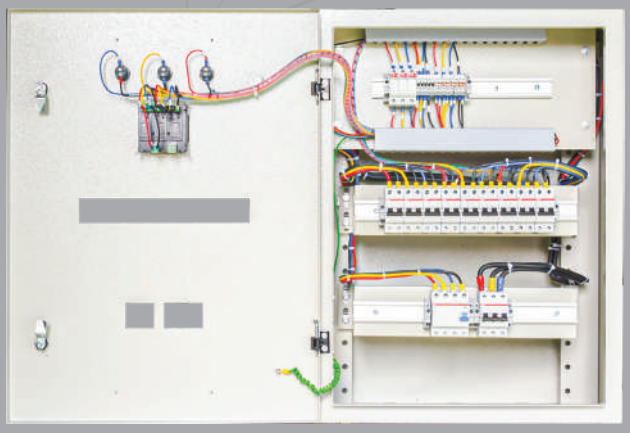
Operating conditions

EEL switchgear is suitable for installation in closed locations for electrical equipment and other operating facilities in compliance with the switchgear degree of protection.

IP3X-cubicles have ventilation grill. IP3X is only used for the cubicle while all individual distribution units are at least IP4X. IP4X-cubicles are protected from contact by means of a fine mesh grill fitted to the ventilation openings. IP54-cubicle is without any ventilation openings and with all doors and top plates sealed.

Corrosion resistance

The corrosion protection is obtained by 7 steps chemical treatment before painting. All visible panels such as doors, end panels, rear panels, etc., are powder coated to enhance weather protection and the appearance of the switchgear as well.
All painted panels are protected by a 70-80 µm thick layer of paint powder.
Non-painted panels and basic elements are manufactured from 1.6/2/2.5 mm Aluzink® which is a corrosion resistant sheet steel.



Mechanical design

The cubicles are made up of mechanical parts joined together by screws/wielding. The switchgear cubicle has a modular/-metal enclosed system for the installation of circuit breaker kits, busbar unit, Incoming/Outgoing cable unit, measuring instrument unit and cover plates.
Only the sides at the left and right ends of a row of cubicles or the side panels on each side of a single cubicle need to be fitted with end panels.
The cubicles are delivered complete with engraved legend plate for cubicle identification at the cubicle top and identification plate on the cubicle bottom accordance with IEC Standard.
EEL is designed to comply with the requirements of the international standard IEC 61439-1-2 and any other referenced IEC publication.

Measuring instruments

We are using metering instruments from renowned brand having sizes of 96 x 96, 48 x 48 mm depending on the height of the distribution unit. The voltmeters are used with selector switch for measuring between phases and between phases and neutral. A 3-pole MCB is included for the protection of the voltmeters. The voltmeter is delivered for ranges 0–250 V, 0–500 V and 0–600 V for analogue and digital can be provided based on customer demand, in this case the range is programmable to any ranges. Our conventional practice is to provide three ammeters for monitoring phase wise instantaneous current which are fed through suitable current transformers. Here, we also have the options of both analogue and digital ammeters as per customer demands. Also, we provide multifunction meter/power analyzer with or without RS communication port.

Protective circuit continuity

Cubicle components which are painted before assembly, are fixed in place with self-tapping screws which destroy the painted surface in the thread area and so ensure good electrical contact.

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Busbar system

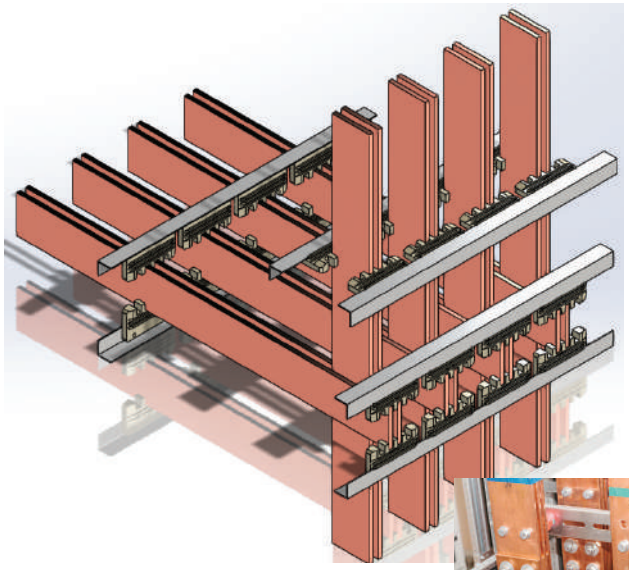
TECHNO LV panel has the capacity of main busbar system up to 22000A which can be installed in the busbar chamber both horizontally and vertically. Busbar system is installed by means of metal crosspieces [stainless steel for 4000A or above], insulated busbar holder depending on the busbar thickness and tie rods to close the system.

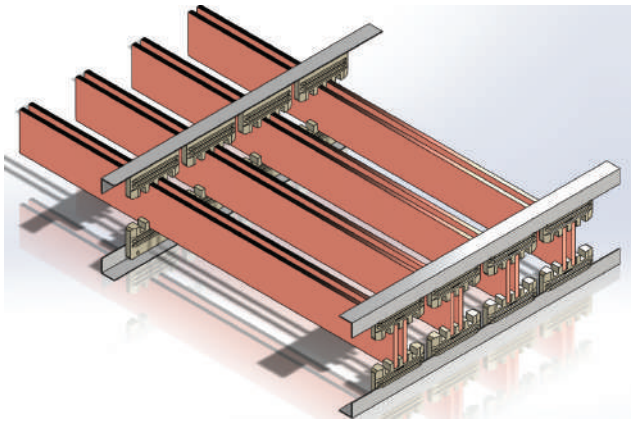
Horizontal busbars

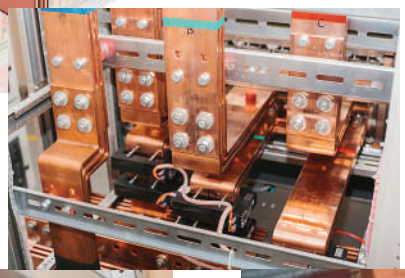
The horizontal busbars are situated, at the top or at the bottom or middle position. The busbars in adjacent cubicles are interconnected at site after the cubicles have been fixed to the foundation. This arrangement facilitates easy extension of an already existing switchgear.

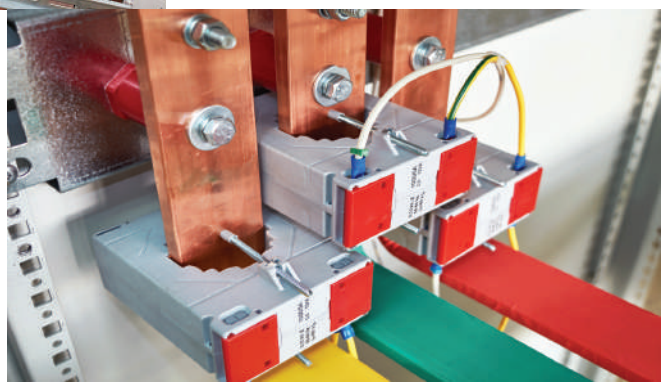
Vertical busbars

The vertical busbars are protected to degree of protection IP20. The functional units are connected to the busbars with busbar/cables. The vertical busbar system are available with 3 or 4 poles.









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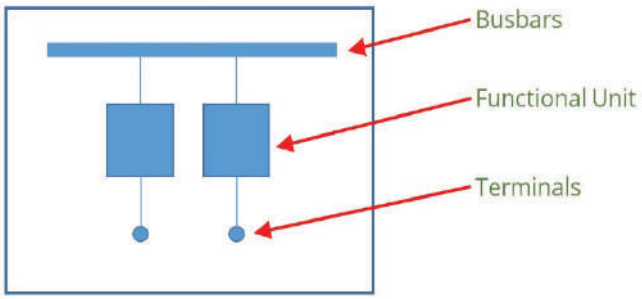
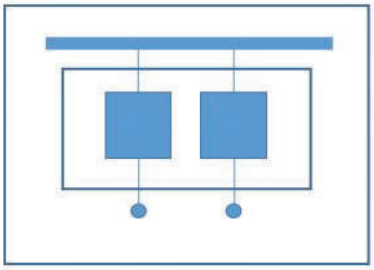
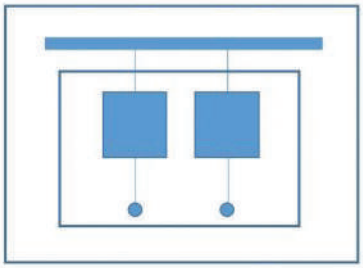
SEGREGATIONS



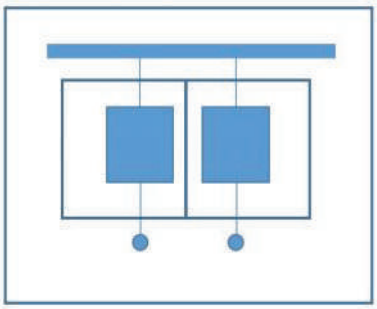
Form-1



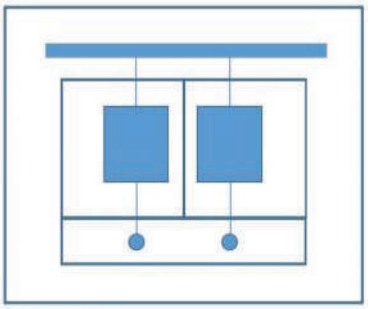
Form-2a



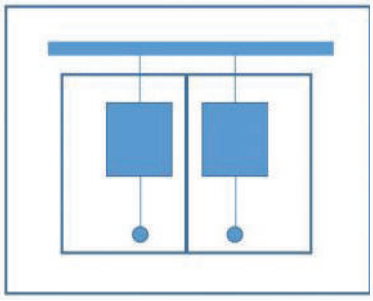
Form-2b



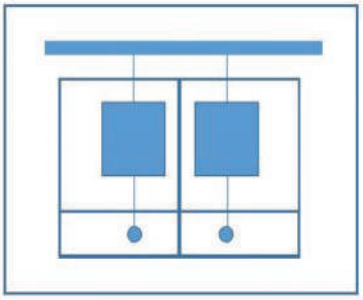
Form-3a



Form-3b



Form-4a



Form-4b

Form of segregations are ensured with IEC 61439-2 standard. The basic segregation starts with Form 1 and passes to Form 4b by adding numbers of accessories in sequence depending on the required form of segregation. They are labeled labelled as Form 1, Form 2, Form 3 and Form 4. Forms 2, 3 and 4 are further broken down into Form 2a, 2b, 3a, 3b, 4a and 4b.

Each form relates to the internal separation of the busbars, functional units and terminals, each being defined as:

Busbar- low impedance conductor to which several electric circuits can be connected

Funtional unit- part of the assembly comprising the electrical and mechanical elements that contribute to the fulfilment of the same function

Incoming unit- functional unit which feeds energy into the assembly

Outgoing unit- functional unit supplying energy to the outgoing circuits

Terminals- part of the assembly which provide for connection of incoming and outgoing cable and busbar

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MOTOR CONTROL CENTER

Electric motors might be used in commercial or industrial applications and that needs to be controlled from a central location. EEL manufacture wide range of motor control center (MCC) with a combination of different components such as:

- Motor protection circuit breaker/ MMS(manual motor starter)
- Motor application contactor
- Overload relay with different trip class.

Technical features

TECHNO motor control center is designed in accordance with IEC type 1 & 2 coordination for different starter configuration for example-

- DOL starter
- H- DOL starter
- R- DOL Starter
- Star-delta starter
- VSD
- Soft starter

All the apparatus are from different renowned supplier like ABB, Schneider, Fuji, LS etc. Besides major moto protection components, other components associated with the motor such as push buttons/indications lamp/selector switch are also used. In terms of controlling the motors we can provide features like remote-local operation, Auto-manual operation, BMS/SCADA/PLC/DCS inter facing etc. Energypac motor control center is designed with modular/compartmentalized features, ample space for cable termination through top/bottom of the panel, adequate ventilation. We also take care of any customized demands of clients.

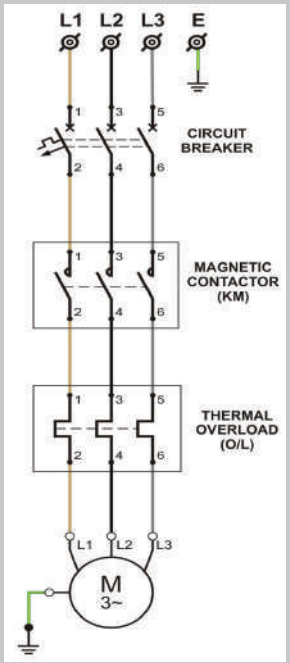

Figure: Line diagram DOL

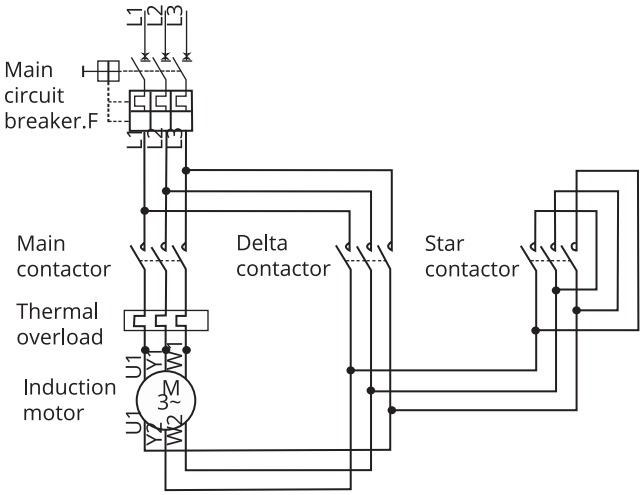

Figure: Line diagram star delta

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