

Power Management



PM CONTROL EQUIPMENT PVT. LTD.

A powerful network of experts at your service



LEGRAND
PREMIUM
PANEL ■ ■
BUILDER
PARTNER

Our Company

Our business activities

PM Control Equipment Pvt. Ltd., an ISO 9001 : 2008 organization, is a leading manufacturer of custom-built low and medium voltage switchgear and control gear panels since two decades in India. The company is committed to excellence, reliability and perfection. Our rich experience in this field, state-of-the art technology, stringent quality control measures at every stage of production and offering products at competitive rates in the committed timeline have been the hallmark of our success. PM Control Equipment earnestly and continuously strives to achieve excellence in its operations by firmly following the quality policy of constantly striving to satisfy its customers by anticipating and exceeding their expectations. Continuous improvement, teamwork, commitment to integrity and excellence are the guiding values that we adhere to.

Started as a small design office, manufacturing custom-built L.T. switchgear panels in the year 2001, under the leadership of Mr. Sengupta, a highly qualified engineer from one of the reputed institutes of India, PM Control Equipment is today one of the leading panel builders in Kolkata that has highly professional and skilled set of enthusiastic and dedicated team of more than 80 people who provide complete support in the developmental cycle of making a panel right from Designing, manufacturing, Testing, Commissioning & Installation.





By developing excellent products, PM Control Equipment Pvt. Ltd. has carved out a niche for itself in the domestic market. All the products are manufactured with utmost precision to ensure 100 % customer satisfaction. Quality of products bears the identity of the company and they are the reflections of the expertise that the company possesses. Keeping pace with the needs of the customers, the company continuously improves its products & maintains its distinguished position.

The extensive range of panels that we specialize in:

Power Control Centre, Motor Control Centre, Power Distribution Boards, Control desks, Auto power factor correction products, Control relay panels, PLC panels, Soft starter panels, MV VCB Control panels, LT & HT bus ducts, Control panels up to 132 kV

While designing a new product, the aspects of safety, flexibility, reliability, service convenience, adaptability, environmental impact and aesthetic appeal are taken into consideration before commencing the production.



Our premises

The workshops

PM Control Equipment, a reliable name in the field of control panel boards, fabrication and other panel boards manufacturing technologies, is a well-equipped organization with advance manufacturing facilities and modern machinery. The company specializes in manufacturing electric panels for applications in oil and petroleum industry, thermal and hydel power plants, textile industry, chemical industries and tea gardens.

PM Control Equipment has 3 manufacturing units, two in Kolkata spread across an area of 24,000 sq.ft. and a large set-up in Vadodara spread across an area of 60,000 sq.ft. All 3 manufacturing units are equipped with state-of-the art machinery imported from Japan. We have the best machinery for computer aided design and manufacturing facilities from renowned industrial houses like Amada, Japan.

The fabrication facility at PM Control Equipment serves as a test-bed leading to the development, demonstration, integration and qualification of advanced fabrication technologies. World's renowned CNC Turret & Press Brake machine of Amada, Japan is used for utmost precision. It is a fully bolted construction process having internal partition with galvanized CRCA sheets that are directly sourced from Tata Steel.





Personally involved in designing an optimum solution, Mr. Sengupta leads a technically skilled team of around 6 people that forms the design cell. They design innovative and economical panels in such a manner that it satisfies the demands of today's business, utilizes optimum floor space and is flexible enough to meet the requirements of the varying customers from different industries. The finalized design then gets executed as it gets fabricated in parts and goes on one of the 4 assembly lines that follow a lean process. The completely assembled panels then get powder coated to make them completely dust and rust proof. Once the panels are ready, they are put through all stringent routine tests like High Voltage Di-electric Strength, High Voltage Megger Test etc. to eliminate any error margins.

All the products of the company are manufactured as per the international quality standards and can compete with their international counterparts. The company ensures that the products are monitored at each stage of production, to ensure that only the best products leave the factory. The company's electric panels are high in looks, performance and durability.



XL³ the range which can adapt to any requirement

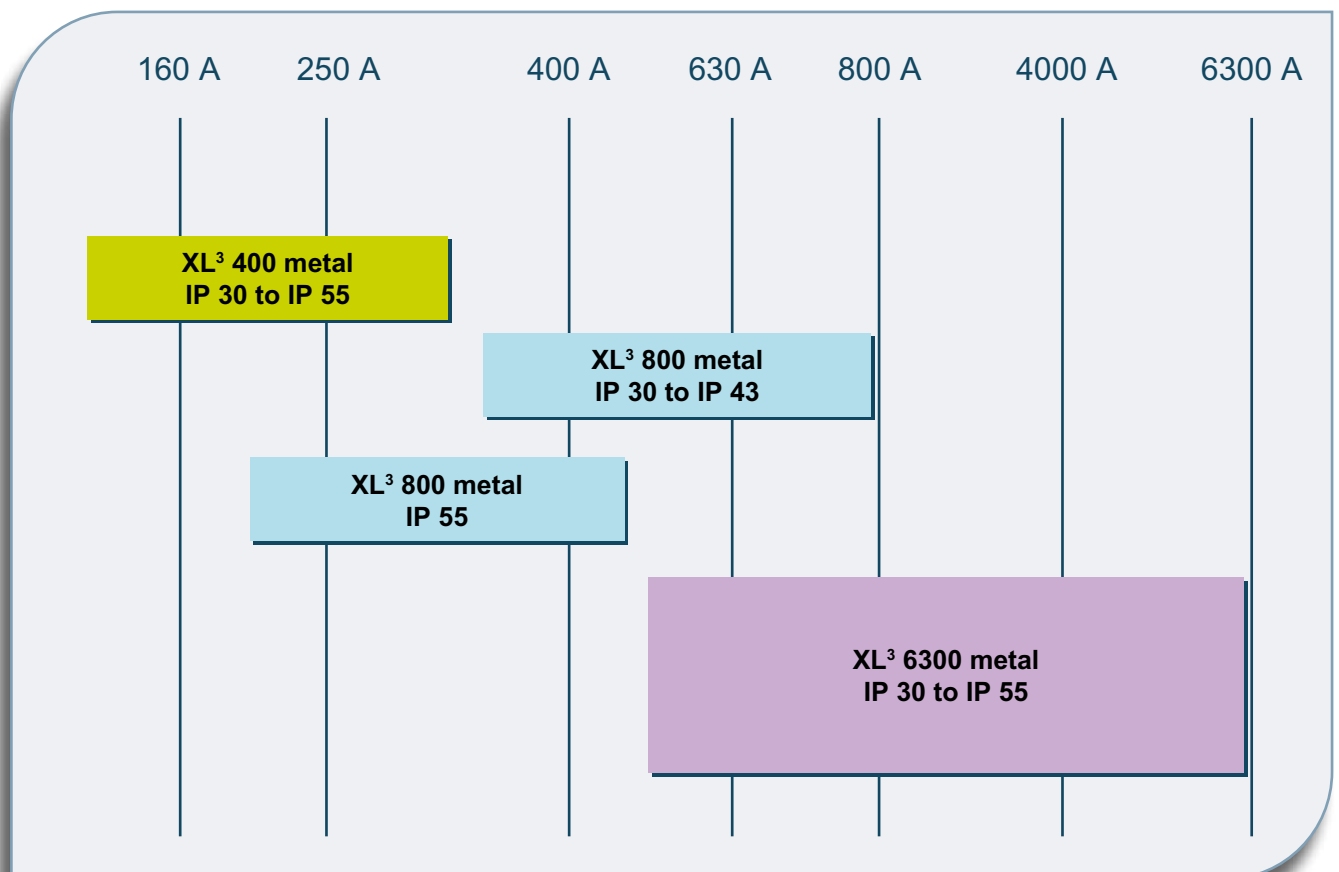
XL³ enclosures which can adapt to any requirement

Enclosures

Our workshops manufacture and equip XL³ enclosures for applications up to 6300 A. The strength of the XL³ enclosures combined with the additional features of the Legrand protection devices range guarantee an optimum solution for your sites, whether they are residential, commercial or industrial.

As an approved Legrand XL³ enclosure manufacturer we can guarantee high-quality enclosures and can provide you with our expertise in order for you to make the most suitable choice to meet the needs of all of your sites.

We can supply XL³ enclosures that are ready to be installed and are pre-fitted according to your requirements in order to best meet current time-saving requirements whilst still complying with quality demands.





XL³ enclosures allow us to use and implement all the devices that are essential for the proper operation of your installation:

- for guaranteed protection: DMX³ ACBs, DPX³ & DPX MCCBs, Lexic DIN-rail mounting circuit-breakers...
- for optimum distribution: isolating supports for Busbars, Modular Distribution Blocks, Capacitors...

Our complete solutions guarantee the reliability and protection of an installation.



XL³ the range which can adapt to any requirement

The XL³ range from Legrand

Our products

Thanks to the XL³ range we can provide you with a solution adapted to meet your site power distribution needs by offering a range of cabinets and enclosures up to 6300 A.

Each enclosure model of the XL³ range offers a large selection of sizes, versions and equipment.

XL³ 400

For sites up to 400 A

Metallic distribution cabinets and enclosures, IP 30 to IP 55, 24 module capacity per row.

- Reduced depth for optimum space saving
- Easy and reliable equipment installation thanks to the functional uprights integrated at the back of the cabinet
- Optimum use of wiring space:
the cable sleeves can take DPX³ & DPX moulded case circuit breakers
- Possibility of joining (between 2 enclosures or between the enclosures and the cable sleeves) for greater wiring capacity
- Perfect finish and protection index IP 40 to IP 55 thanks to the metallic or glass doors

XL³ 800

For sites up to 800 A

Metallic distribution cabinets and enclosures, IP 30 to IP 55, 24 or 36 module capacity per row.

- Easy and reliable equipment installation thanks to the functional uprights integrated at the back of the enclosure
- Optimum use of wiring space:
the cable sleeves can take DPX³ & DPX moulded case circuit breakers



XL³ 800

For sites up to 800 A (*continued*)

Enclosures with 36 module capacity per row can integrate an internal cable sleeve (by moving to 24 modules per row)

- Possibility of joining (between 2 enclosures or between the enclosures and the cable ducts) for greater wiring capacity
- Perfect finish and protection index IP 40 to IP 43 thanks to the metallic or glass doors
- All versions can be fitted with set of busbars at the side or at the back of the enclosure

XL³ 6300

For sites up to 6300 A

Configurable metal distribution enclosures, IP 30, IP 43 & IP 55 (with door and waterproof seal).

- Can take all Legrand protection equipment up to 6300 A and multiple distribution solutions
- Numerous configurations capable of meeting highly diverse requirements: the enclosures are available in 3 heights, 4 widths and 3 depths
- Reliable assembly using the functional uprights and fixing accessories for protection devices
- Remarkable strength thanks to the specially designed structural elements for maximum stability
- Perfect finish: metal or glass doors

Our professionalism combined with Legrand's know-how

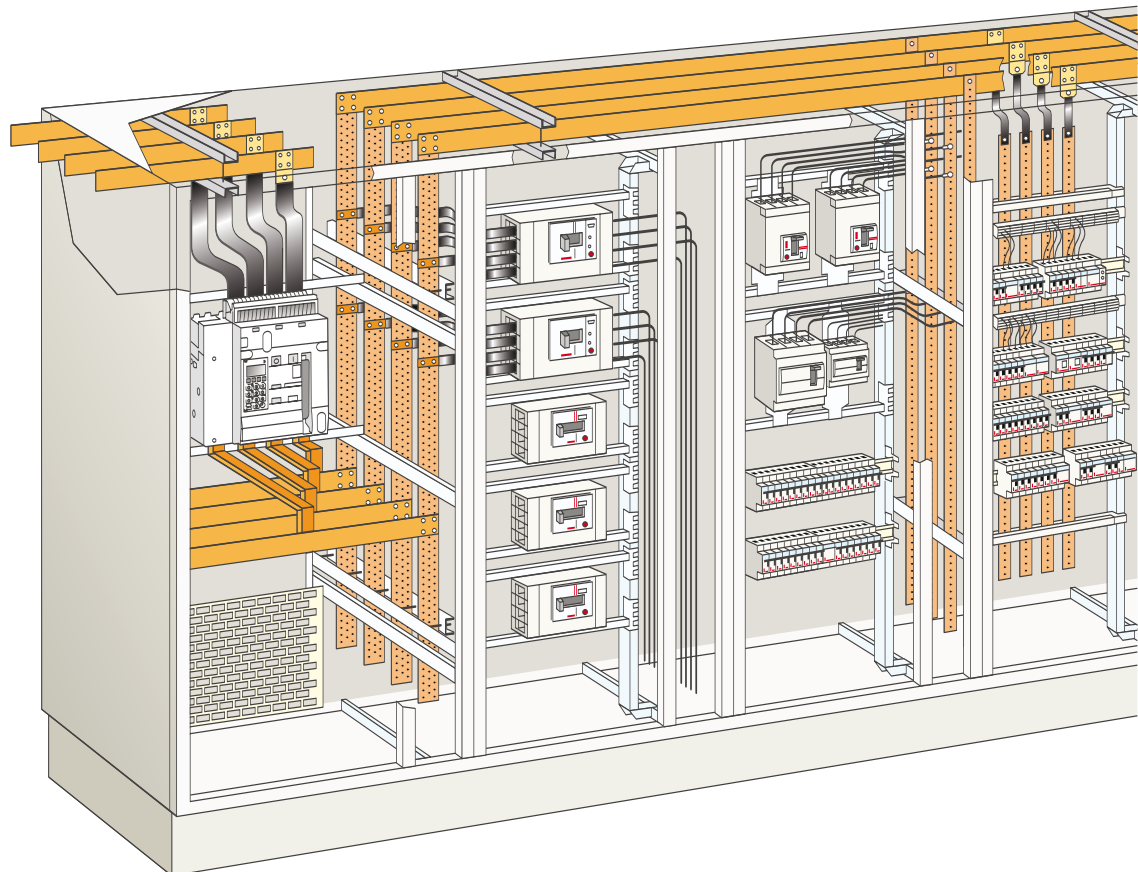
Efficiency and safety with a global leader

Complete offer

As a licensed Legrand XL³ enclosure manufacturer we can provide the entire XL³ range from 400 to 6300 A.

Our enclosures are supplied fitted with Lexic DIN-rail mounting circuit breakers, DPX³ & DPX moulded case circuit breakers, DMX³ air circuit breakers, Alpican & Alpivar² capacitors, a complete range of distribution blocks and busbar supports up to 6300 A.

This complete system for power installations gives us a great deal of flexibility in your panel room.





Project

As a Legrand approved Panel Builder we rely on the continuous support of the specialised Legrand sales and technical teams who are in contact with the professionals in the field: design offices, site engineers and investors to offer our systems in the most wide-ranging projects:

- Hotels
- Office buildings
- Shopping centres
- Hospitals
- Institutions
- Sports complexes
- Industrial buildings

The partnership with Legrand allows us to offer you the best technical solutions for the most ambitious projects. We are at your side throughout the process, from design to technical execution and right through to acceptance of installations.

We can also support you during the diagnostics, maintenance and development phases of the installation.



Our professionalism combined with Legrand's know-how (continued)

Product and enclosure manufacturing training

Training

In order to guarantee the know-how equivalent to that possessed by Legrand manufacturing teams, we were directly trained by Legrand experts, which made us the approved manufacturers of XL³.





➔ Being a Legrand approved XL³ enclosure manufacturer, proof of our high performance levels

Audit

Reputation and quality of technical solutions are key differentiating factors.

The audit is an important phase of our commitment to each other. It is used to check whether our structure and our professional approach are in line with Legrand's quality criteria. The evaluation of the entire process (from the design offices through to the delivery of panels) gives us a clear picture of where our strengths and weaknesses lie.

Each year the Legrand experts check our assembly lines in order to ensure that our know-how continues to meet the brand's quality demands.

We can then concentrate our efforts on points that need to be improved in order to become more efficient and more professional by the day.

For us the audit is after all how we set the standard for our performance in relation to other Premium panel builder and XL³ enclosure manufacturer colleagues throughout the world.

The following points are reviewed during the Legrand audit.

- ✓ **Company:** profile, activity area, know-how, reputation,
- ✓ **Design office:** file management, quality of offerings, quality of drawings, descriptions and quotations.
- ✓ **Workshop:** production process, equipment, quality of assembly and wiring
- ✓ **Stock:** organisation, stock and logistics management
- ✓ **Quality:** inspection procedures, treatment of nonconformities, individual testing of panels, packaging

➤ The safety guaranteed by the certification of fitted XL³ enclosures

➤ The principles

The standard

The certification of enclosures is defined by international standard IEC 61439-1 & 2. This formulates the definitions, operating conditions, structural provisions, technical characteristics and the tests for low-voltage wiring accessory assemblies.

This approach draws on three obligations:

- The construction of assemblies of representative configurations using products that have themselves been tested and comply with their own specific standards, these are the type tests carried out based on our enclosures with Legrand equipment.
- Compliance with the selection and installation rules of these products in accordance with the procedures defined by the standards and regulations.
- The carrying out of individual tests (insulation, continuity of the exposed conductive parts) and a final inspection, all recorded in a simplified individual report (see example in the appendix).

The compliance

Total compliance with this process can then be certified by a declaration of conformity (see example in the appendix) and the assembly can be marked accordingly.

Compliance with standard IEC 61439 also enables the CE mark to be affixed, if required.

➤ The 11 tests for certification of the fitted enclosures

The 11 tests

The 11 tests described in more depth are an additional guarantee of the operation of the fitted enclosure in safe conditions, as well as of the safety of individuals and of the equipment installed downstream of the panel. This is the case for the entire period of service of the electrical panel.



The 8 type tests

Legrand is committed to carrying out the 8 type tests

The type tests defined by standard IEC 61439-1 & 2 are carried out officially by neutral organisations on representative assemblies of the usual wiring and device configurations.

These assemblies are called “Standard assemblies”.

They involve the following check (for the certificates see page 13):

1. Temperature rise limits;
2. Dielectric properties
3. Short-circuit resistance
4. Effectiveness of the protective circuit
5. Clearances and creepage distances
6. Mechanical operation
7. Degree of protection (IP)
8. Strength of materials and parts (lift, IK, ...)

The enclosures fitted with Legrand circuit breakers are manufactured and tested in accordance with the standard.

3 individual tests

We carry out the 3 individual tests

Standard IEC 61439-1 & 2 requires final checks on all wired assemblies. These checks certify that the essential characteristics linked to safety (insulation, protective circuits, etc.) are fully complied with.

The 3 individual tests defined by standard IEC 61439-1 & 2 include (see page 23 for more details):

1. an assembly inspection that includes the wiring, with a check of the markings and labelling and of any potential electrical tests;
2. an insulation check by dielectric test or through measurement of the insulation resistance;
3. a check of the protection measures for the continuity of the protective circuit.

▶ The safety guaranteed by the certification of fitted XL³ enclosures (continued)

▶ The 8 type tests in detail

Test 1

Temperature rise limits

Temperature rise test on assemblies

This test checks that assemblies operate correctly under maximum operating conditions (current, number of devices, volume of enclosure).

It allows to define the heat balance elements for an average temperature rise in the air in assemblies of less than 30°C and a temperature rise in the terminals less than 70°C.

Temperature rise test on busbars

The various currents given for all the bar and distribution systems have been checked under the most severe conditions, according to the degree of ventilation of the enclosure (IP < 30 and IP > 30), so that the temperature rise of the bars does not exceed 65°C.

Test 2

Dielectric properties

The dielectric tests check the insulation performance levels for the maximum operating voltage. They are carried out at the industrial frequency of 50 Hz and in the form of voltage waves simulating a lightning strike.

Test 3

Short-circuit resistance

The tests carried out guarantee, in relation to thermal and electro dynamic stresses, the resistance of the busbars and their supports, the breaking devices and protection devices (DMX³/DPX³/DPX/Lexic), and the enclosures.

Test 4

Effectiveness of the protective circuit

The continuity of the protective circuit is a decisive factor for safety. It is checked:

- on the one hand in accordance with standard IEC 61439-1 at a test current of 25 A between the terminal connecting the protective conductors and all the exposed conductive parts and
 - also in accordance with an additional Legrand test, at a high fault current capable of occurring in the event that a conductor becomes accidentally detached.



The protective circuits (conductors, terminals or collector bars) are sized and tested to withstand the maximum short-circuit thermal stress that could occur according to the current at the supply end of the assembly.

Test 5

Clearances and creepage distances

The measurement procedures for the clearances and creepage distances are accurately covered in appendix F issued from standard IEC 61439-1 issued from standard CEI 60664-1. The clearances and distances are measured between live parts with different polarities, and also between live parts and the exposed conductive parts.

When Legrand devices and equipment are installed in accordance with the specified conditions, the clearances and distances are observed for the insulation voltages of these devices. Experience has shown that the greatest risk is in the wiring. Connections, bundles of conductors and busbars must be meticulously checked. Unsuitable connectors, bolted connections, joints and metal supports can reduce the initially planned insulation values.

Test 6

Mechanical operation check

In accordance with the provisions of the standard, tests are carried out on parts and devices that are not subject to any specific requirements. Correct mechanical operation is checked by 50 operating cycles on draw-out racks and faceplate fixings.

Test 7

Check of the degree of protection (IP)

The IP defines the ability to protect people and to prevent entry of solid objects (first number) and liquids (second number). The additional letter indicates the protection against access to hazardous parts. Legrand offers a solution that is perfectly suited to all environments.

Test 8

Strength of materials and parts

Assemblies shall be constructed of materials capable of withstanding the mechanical, electrical, thermal and environmental stresses that are likely to be encountered in specified service conditions. So test are made to check the protection against corrosion, the thermal stability, the mechanical strength, the lifting provision, the resistance to ultraviolet and the insulation of materials to heat and fire.

Legrand certificates



Approval



Audit certificate



➔ Lovag certificates



ACAE
CONFERENZA PER LA CERTIFICAZIONE
NELLE ATTIVITÀ DI ATTIVITÀ ELETTRICHE
Via Tito Livio, 8 - 24122 - BERGAMO (Italy)
Tel. +39035717047 Fax +39035754952 e-mail: accaeb@acae.it



Certificate of Conformity

LOVAG-Certificate No. IT 12.019
Page 1 of 2

Apparatus
Three phases distribution board - Low voltage switchgear 415V (U_n, U_c) - 500V (U_i) - 85V (U_{max}) - 70KA (I_{cs}) - 30-60kr - 3130 A(L₁) - 65KA (L₂)

Designation
XL3 4000

Manufacturer or responsible vendor
Legrand SNC - 128 Av. de Mouchal-de-Latry-de-Tassigny-47045 Limoges Cedex (France)
Tested for: Legrand SNC
Tested by: ACAE Laboratory I80

The apparatus, constructed in accordance with the description mentioned in the Test Report listed on this Certificate has been subjected to the series of proving tests in accordance with IEC 61439-2 Ed.1.0 (2009-01).

30.3 Degree of protection
30.4 Clearances and creepage distances
30.2 Testing of the protective circuit
30.9 Dielectric properties
30.10.2.3.3 Temperature rise
30.11 Short circuit withstand strength
30.13 Mechanical operation

The results are shown in the Test Report in accordance to LOVAG. The values obtained and the general performance are considered to comply with the above Standard(s) and to justify the characteristics assigned by the manufacturer as stated below.

IP40 - 415V (U_n, U_c) - 500V (U_i) - 3150A (I_{cs}) - 70KA (L₁) - 65KA (L₂)

Responsible Certification Body: ACAE
Mauro Marchi



Authorized signature
Date: 2012.04.04



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Example of declaration of compliance

Declaration of compliance

Company:

Address:

Addressee:

Document no.:

Date:

Assembly no.:

Date:

Standard IEC 61439-1

Standard IEC 61439-2

The declarant certifies through this document that the assembly of low-voltage electrical wiring accessories derived from the series (EDS) set out above has been built in compliance with standard IEC 61439-1/ IEC 61439-2.

Installation has been completed in accordance with the recommendations of the manufacturer of the components used.

The following product ranges were used:

- DPX³ & DPX and DMX³ power circuit breakers complying with standard IEC 60947-2
- Lexic secondary circuit breakers complying with standard IS/IEC 60898
- distribution blocks and busbar supports

in reference to the tests completed following IEC 61439-1:

- check of the temperature rise limits
- check of dielectric properties
- check of short-circuit resistance
- check of protective circuit efficiency
- check of the clearances and creepage distances
- mechanical operation check
- check of the degree of protection
- check of the strenght of material and parts including :
 - check of rust resistance
 - check of thermal stability
 - check of mechanical strenght
 - check of lift provision,...

The individual tests form the subject of individual inspection report no. including, in compliance with the standard:

- Visual inspection of the assembly
- Check of the insulation
- Check of the continuity of the protective circuit

The declarant:

Signature:



➔ List of individual tests

1. Visual inspection	Completed	Not applicable
● Wiring check	<input type="checkbox"/>	<input type="checkbox"/>
● Compliance with the diagram	<input type="checkbox"/>	<input type="checkbox"/>
● Wiring accessories check	<input type="checkbox"/>	<input type="checkbox"/>
● Compliance with the specified wiring accessories	<input type="checkbox"/>	<input type="checkbox"/>
● Busbar check	<input type="checkbox"/>	<input type="checkbox"/>
● Check of the effective connection of the exposed conductive parts	<input type="checkbox"/>	<input type="checkbox"/>
● Check of the measurements associated with category II	<input type="checkbox"/>	<input type="checkbox"/>
● Electrical operation (power)	<input type="checkbox"/>	<input type="checkbox"/>
● Electrical operation (control)	<input type="checkbox"/>	<input type="checkbox"/>
● Check of the measuring devices	<input type="checkbox"/>	<input type="checkbox"/>
● Tests of residual current devices	<input type="checkbox"/>	<input type="checkbox"/>
● Mechanical operation check	<input type="checkbox"/>	<input type="checkbox"/>
● Compliance of the locking with specifications	<input type="checkbox"/>	<input type="checkbox"/>
● Check of the tightening torques	<input type="checkbox"/>	<input type="checkbox"/>
● Compliance of the handling devices	<input type="checkbox"/>	<input type="checkbox"/>
● Verification for the preservation of the degree of protection	<input type="checkbox"/>	<input type="checkbox"/>
2. Check of the insulation		
● Dielectric test: voltage...	<input type="checkbox"/>	<input type="checkbox"/>
● Insulation resistance below 500 V minimum value measured:	<input type="checkbox"/>	<input type="checkbox"/>
3. Check for the continuity of the protective circuit		
● Continuity measurement below 25 A	<input type="checkbox"/>	<input type="checkbox"/>
● Check with signal controller	<input type="checkbox"/>	<input type="checkbox"/>
4. Final check		
● Nameplate present	<input type="checkbox"/>	<input type="checkbox"/>
● Documentation present	<input type="checkbox"/>	<input type="checkbox"/>

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www.powermanagement.co.in

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Village-Asoj
Vadodara Halol Express Highway
Taluka-Waghodia
Dist- Vadodara, Pin-391 510