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MEDIUM VOLTAGE DISTRIBUTION SYSTEMS & ENERGY AUTOMATION

- COMPACT SUBSTATIONS

- *METAL COMPACT SUBSTATIONS*
- *CONCRETE COMPACT SUBSTATIONS*
- *UNDERGROUND COMPACT SUBSTATIONS*
- *PREFABRICATED COMPACT SUBSTATIONS*
- *MOBILE COMPACT SUBSTATIONS*

- MEDIUM VOLTAGE SWITCHGEAR

- *METAL CLAD SWITCHGEAR*
- *AIR INSULATED MODULAR METAL SWITCHGEAR*
- *SF6 GAS INSULATED RING MAIN UNITS(RMU)*

- MEDIUM VOLTAGE SWITCHGEAR ACCESSORIES

- MEDIUM VOLTAGE DISCONNECTOR

- *OUTDOOR TYPE SWITCH DISCONNECTOR*
- *INDOOR TYPE SWITCH DISCONNECTOR*
- *MEDIUM VOLTAGE FUSES for INDOOR&OUTDOOR DISCONNECTOR*

COMPACT SUBSTATION

GENERAL INFORMATION

The substation is a compact enclosure consisting of medium voltage switchgear, a transformer, and a low voltage switchboard located in three separate compartments which are segregated from each other using partitions in order to ensure personnel safety. Accessibility to operate or maintain the equipment is through lockable doors provided for each compartment to maximize security. The assembly of the complete substation is factory-ready to minimize site installation time and cost. **Compact substations are used for energy transformation in secondary distribution network from medium voltage to low voltage or the opposite situation.**

TYPES of COMPACT SUBSTATIONS

- **Metal Compact Substation**
- **Concrete Compact Substation**
- **Underground Compact Substation**
- **Mobile Compact Substation**
- **Prefabricated Compact Substation**

APPLICATION

General Application Areas

- Transformer Centers
- Distribution Lines
- Industrial Areas
- Wind Power Plants
- Hospitals
- Power Generation Plants
- Petroleum, Chemicals, Iron and Steel Enterprises

Special Application Areas

- Water Pump Stations
- GSM Lines
- Generator Cabins
- Compensation Plants

ADVANTAGES

- **Reduced work and maintenance costs**
- **Quick and easy assembly**
- **Long lasting**
- **The structure is compatible with the environment(Different colour options)**
- **High safety**
- **Resistant to climatic conditions**

Metal Compact Substations

Metal Compact Substations is transformer and distribution centers made of galvanized and painted sheet in desired dimensions for various application results. Metal Compact Substations (transformer centers) that can be used provide medium voltage - low voltage (MV / LV) distribution center solution solutions for electricity distribution administrations.

Concrete Compact Substations

Concrete Transformer Substations are compact, environmentally friendly, aesthetic, and reliable centers designed to isolate medium voltage switchgear, transformers, and low voltage panels from harsh environmental conditions. Concrete Transformer Substations are produced in different colours and sizes in accordance with customer requirements. These substations are used, in general, in the secondary distribution systems at 12 kV, 24 kV and 36 kV voltage levels for equipment such as Air and Gas Insulated Switchgear, Distribution Transformers, and LV Panels which has granted its documentations and reliability from internationally accredited laboratories.

Underground Compact Substations

Compact underground substations offer a special solution for facilities and metropolitan areas that have a lack of space. Designed to be used in general distribution networks with operating voltages up to 36 kV, underground transformer substations include compact and modular RMUs, low voltage (LV) panel and distribution transformer.

Prefabricated Compact Substations

The prefabricated compact substation is one kind of compact complete set of distribution equipment which designed combining medium voltage switchgear, low voltage switchgear, distribution transformer, energy metering devices and reactive power compensation devices into one or several boxes according to a Customer's Certain Wiring Scheme (SLD). It is suitable for three-phase AC systems with a rated voltage of 10KV - 36KV for line and distribution of electrical energy. Prefabricated compact substations are suitable for residential quarters, urban public utilities and construction power supplies etc., users can select compact transformers according to different conditions of use and load levels. The protection degree reached IP55, so it could be installed outdoor by occupying the small area.

Mobile Compact Substations

Mobil compact substation is the most recent high and medium voltage switchgear solution, which combines current technologies and equipment. The main feature of this substation is mobility. It is composed of generating equipment, low and medium voltage solutions all integrated and incorporated into a container specifically prepared for this purpose. Full exterior customization is also possible in accordance with the customer's specifications and image. Mobile substations are formed by mounting all the switchgear devices that must be in a substation on a trailer of sufficient size. These trailers are transported by a vehicle of suitable capacity.


DANGER
HIGH VOLTAGE

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MEDIUM VOLTAGE SWITCHGEAR

Content of Medium Voltage Switchgear

- **METAL CLAD SWITCHGEAR**
  - * **Air Insulated Metal Clad MV Switchgear**
    - * Withdrawable Air Insulated Metal Clad Switchgear
    - * Truck Type Air Insulated Metal Clad Switchgear
  - * **Gas Insulated Metal Clad MV Switchgear**
    - * Fixed Type Vacuum or SF6 Gas Insulated Circuit Breaker Metal Clad Switchgear

- **AIR INSULATED MODULAR METAL SWITCHGEAR**
  - * **SF6 Gas Insulated Circuit Breakers**
  - * **Vacuum Insulated Circuit Breakers**

- **SF6 GAS INSULATED RING MAIN UNITS(RMU)**
  - * **Compact Type (Non-Extensible) RMU**
  - * **Modular Type (Extensible Type) RMU**

METAL CLAD
MEDIUM VOLTAGE SWITCHGEAR

GENERAL INFORMATION

Metal Clad MV Switchgears can produce up to 36kV. They are especially designed for branch substations and power plants and equipped with the switching device mounted on a truck and metal cladded. Metal Clad Switchgears are presented with metallic unit compartments as well as a separate metal cladded compartment each for the vacuum circuit breaker truck, the bus-bars system, the cable compartment.

TECHNICAL DATA

Rated Voltage (kV): Up to 36kV

Rated Main Bus Current (A): Up to 3150A

Rated Main Feeder Current (A): Up to 3150A

Short Time Rated Withstand Current: 31.5 - 3sec

Product Standard: IEC 62271-200

**** Metal Clad Switchgears can product with SF6 Gas Insulated or Vacuum Insulated Circuit Breakers according to the customer's request.**

***** Metal Clad Switchgears can product with Truck Type or Withdrawable Type according to the customer's request.**

APPLICATION

- **Power Plants**
- **Switching Stations**
- **Organized Industrial Zones**
- **Food, Paper and Textile Factories**
- **Hospitals**
- **Water Treatment plants**
- **Shopping Malls**
- **Water Pump Stations**

ADVANTAGES

- **Safe switching through sound and secure locking**
- **Superior ease to operate**
- **High strength in electric and mechanics**
- **Allows to expand due to the modular design**
- **Easy to install**
- **Easy transportation and storage**
- **Maximum security**
- **Easy to use**

Air Insulated Metal Clad MV Switchgear

Air Insulated Metal Clad Switchgears provide a high level of security against false mechanical and electrical locking and false manoeuvres.
Air Insulated Metal Clad Switchgears save space with reduced dimensions. Sections are separated from each other by metal partitions.
Front, side and rear access is possible.
Air Insulated Metal Clad Switchgears provide a high level of personnel and operational safety and operation and maintenance services.

Gas Insulated Metal Clad MV Switchgear

Gas insulated switchgear is a medium voltage metal-clad gas insulated switchgear which applicated in outdoor and indoor 3 phase AC secondary power distribution system in utility and substations.
Metal-clad switchgear is one of three common types of metal-enclosed switchgear.

AIR INSULATED MODULAR TYPE (EXTENSIBLE TYPE) MEDIUM VOLTAGE SWITCHGEAR

GENERAL INFORMATION

Air Insulated Modular Type Medium Voltage Switchgear: A switchgear assembly completely enclosed on all sides and top with sheet metal (except for ventilating openings and inspection windows) containing primary power circuit switching or interrupting devices, or both, with buses and connections. This switchgear offers high personal and operating safety, optimal availability, secure engineering easy operation and high efficiency with low life cycle costs. Units are Modular Extensible Air insulated metal enclosed switchgear, designed for supplying sustainable energy, protecting electrical equipment in secondary distribution networks.

TECHNICAL DATA

Rated Voltage (kV): Up to 36kV

Rated Main Bus Current (A): Up to 1250A

Rated Main Feeder Current (A): Up to 1250A

Short Time Rated Withstand Current: 25kA - 1sec

Product Standard: IEC 62271-200

** **Air Insulated Modular Type Medium Voltage Switchgear can product with SF6 Gas Insulated or Vacuum Insulated Circuit Breakers according to the customer's request.**

APPLICATION

- **Medium Voltage Distribution Systems**
- **Power Plant (SPP,HPP,REPP,GPP)**
- **Infrastructure and Construction Sector**
- **Industrial plan**

ADVANTAGES

- **Easy installation and convenience for both sides due to modular design.**
- **The possibility of faulty opening / closing is eliminated by means of mechanical interlocks.**
- **The cubicles type cubicles are suitable for equipping equipment for remote monitoring and control.**
- **Reliable Switching in SF6 Gas**
- **Ease of Transport and Storage**
- **Different Feeder Combinations According to Customer's Request**

SF6 GAS INSULATED RING MAIN UNITS(RMU)



GENERAL INFORMATION

In an electrical power distribution system, a ring main unit (RMU) is a factory-assembled, metal-enclosed set of switchgear used at the load connection points of a ring-type distribution network. It includes in one unit two switches that can connect the load to either or both main conductors, and a fusible switch or circuit breaker and switch that feed a distribution transformer. The metal-enclosed unit connects to the transformer either through a bus throat of standardized dimensions, or else through cables and is usually installed outdoors.

TECHNICAL DATA

Rated Voltage (kV): Up to 38.5kV*
Rated Main Bus Current (A): Up to 2500A
Rated Main Feeder Current (A): Up to 2500A
Short Time Rated Withstand Current: 25kA - 1sec
Product Standard: IEC 62271-200
*** 38.5kV Power Range can product according to the customers request.**
**** SF6 Gas Insulated Ring Main Units can product with SF6 Gas Insulated or Vacuum Insulated Circuit Breakers according to the customer's request.**

APPLICATION

- **Public Distribution**
- **Infrastructures**
- **Industrial (Small Industries etc.)**
- **Wind Power Plants**
- **Solar Power Plants**
- **Compact Secondary Substations**
- **Hotels, Office Buildings, Residential Housing Complex, Shopping Centers, Business Centers, Hospitals, Airports etc.**

ADVANTAGES

- **Less Maintenance**
- **High Safety**
- **Feature-Rich Compact Designs**
- **Less Space Occupy**
- **Smart Capabilities**

Compact(Non-Extensible) Type RMU

Compact models are standardized packages, built by taking the most common configurations used in worldwide applications into consideration. These units with very compact dimensions combine all medium voltage functional system units like disconnector switches, load break switches and circuit breakers to enable supply, connection and protection of line feeders and transformers on a network.

Modular(Extensible)Type RMU

Extensible models offer more flexibility to the customer, giving the opportunity to add new panels to the package as their facility requires in time. These units with very compact dimensions combine all medium voltage functional system units like disconnector switches, load break switches and circuit breakers to enable supply, connection and protection of line feeders and transformers on a network.


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MEDIUM VOLTAGE SWITCHGEAR ACCESSORIES

Content of
Medium Voltage Accessories

- MEDIUM VOLTAGE SWITCHGEAR ACCESORIES

* **SF6 Gas Insulated Circuit Breakers**
* **Vacuum Insulated Circuit Breakers**
* **SF6 Gas Insulated Load Break Switches** (Earth Blade)
* **SF6 Gas Separators** (Earth Blade)
* **Air Insulated Rotary Separators**
* **Earthing Disconnectors**
* **Cable Terminations**
  (Heat Shrinkable Straight Type,Elbow Type, T Type)

- MEDIUM VOLTAGE DISCONNECTORS

- Outdoor Type Switch Disconnectors

* Fuse Type Switch Disconnector with Earthing
* Fuse Type Switch Disconnector without Earthing
* Switch Disconnector with Earthing
* Switch Disconnector without Earthing

- Indoor Type Switch Disconnectors

* Fuse Type Switch Disconnector with Earthing
* Fuse Type Switch Disconnector without Earthing
* Switch Disconnector with Earthing
* Switch Disconnector without Earthing

- Medium Voltage Fuse for Indoor&Outdoor Disconnector

MEDIUM VOLTAGE SWITCHGEAR ACCESSORIES

SF6 Circuit Breaker

SF6 Circuit Breaker are one of the equipment of medium voltage air insulated switchgears. Circuit breaker mechanism is filled with SF6 gas which is 5 times heavier than the air and has 3 times higher breakdown strength. There is a wide range of application field due to the properties of SF6 Gas. SF6 Circuit Breaker's type test are completed in accordance with IEC 62271-100 standard, manufactured at 36kV rated voltage. SF6 Circuit Breaker are also widely used due to being cost effective solutions.

Vacuum Circuit Breaker

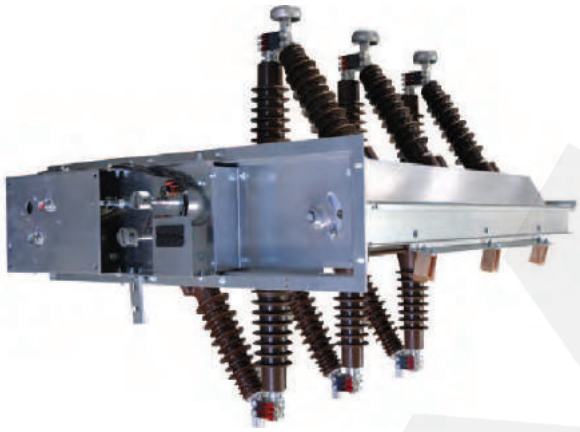
Vacuum Circuit Breakers, which are the most advanced technology developed for arc extinguishing, are also one of the most important electrical switching equipment. Vacuum Circuit Breaker manufactured at 36kV rated voltage is produced in accordance with IEC 62271-100 standard and type test report are completed successfully.
Vacuum Circuit Breakers provide that arc fault extinguish with highly secure structure in metal-clad air insulated indoor switchgears.

SF6 Gas Insulated Load Break Switches (Earth Blade)

SF6 gas insulated load break switch (LBS) for overhead lines operating at a voltage up to 38kV. It meets the demand for oil-less and maintenance free operation with SF6 gas, related parts and devices installed inside its hermetically sealed stainless steel tank. It can be manually operated or motorized for sectionalizing, automation and remote control to suit your power line requirements.

Gas Separator

SF6 gas insulated separators that conform with IEC 60295-1 and 62271-102 standards are used in our cells. Rated current of SF6 gas insulated separators is up to 1250 A and short circuit resistance current is up to 25 kA. Separators have the ability to I/O without loads and are 3 polar 3 position (open-closed-grounding rod). Ground separator is within the load separator chamber.



Air Insulated Rotary Separators

Air Insulated Rotary Separators are used throughout electrical switchgear and controls for industry, buildings, machinery, and equipment. The high-performance, robust and compact switchgear is available in many standard ranges and customized configurations. An almost unlimited range of switching functions is possible.

Earthing Disconnector

Earthing Disconnectors can be suitable for Railway Electrification, Transmission & Distribution and Power Generation applications for indoor and outdoor use.

Cable Terminations

Electrical cable terminations feature cold shrink technology, which is engineered for easy installation and long-term performance in the field. Cold shrink terminations offer a reliable sealing solution for medium and high voltage applications and are simple to install even in confined work areas; helping you save time and money.
Heat shrink cable terminations are suitable for Indoor and Outdoor connection of MV HV Power Cables – to clarify indoor terminations include cables terminated into substation switchgear and transformers and air insulated type cable boxes. Where cable terminations are connected to overhead line equipment and mounted pole-top an outdoor cable termination with rain sheds should be used.

OUTDOOR TYPE SWITCH DISCONNECTORS

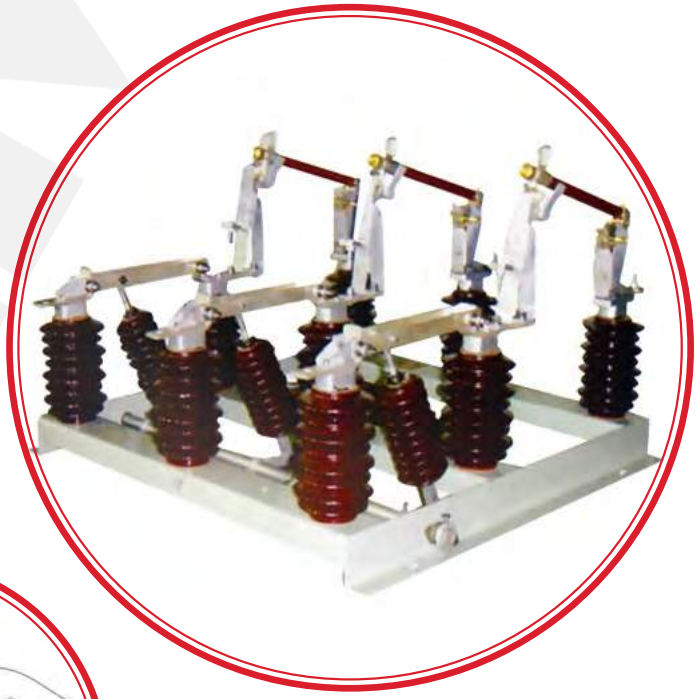


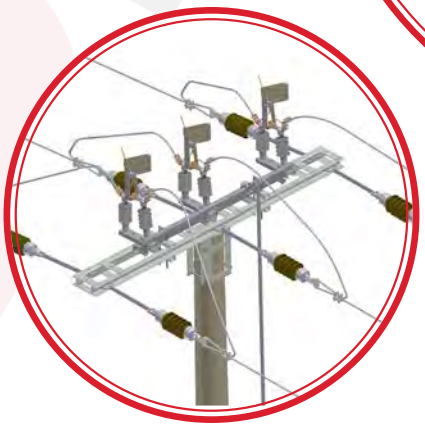

GENERAL INFORMATION

Medium voltage outdoor disconnectors are manufactured by using high quality materials and provide a safe area to work. For the best volition of main and earthing shafts; the shaft bearings are produced of brass. Using brass also prevents moulding. Shafts, frames, joints, control mechanism, pipe tongs and shaft couplings of the disconnectors are hot-dip galvanized. Other hardware materials of the product are zinc and cadmium plated. 20mm/kV porcelain insulators are used for the disconnectors. All copper terminals and surface of copper handles that touch the terminals are electro-silver plated. Double coil springs are used in order to ensure that copper handles touch terminals properly.

TYPES

- **Fuse Type Switch Disconnector with Earthing**
- **Fuse Type Switch Disconnector without Earthing**
- **Switch Disconnector with Earthing**
- **Switch Disconnector without Earthing**





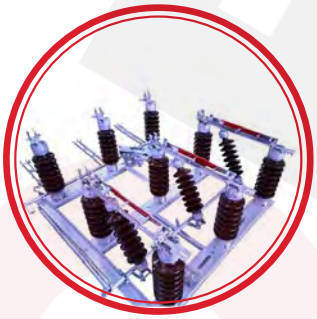
INDOOR TYPE SWITCH DISCONNECTORS

GENERAL INFORMATION

Medium voltage indoor disconnectors are manufactured by using high quality materials and provide a safe area to work. For the best volition of main and earthing shafts; the shaft bearings are produced of brass. Using brass also prevents molding. Shafts, frames, joints, control mechanism, pipetongs and shaft couplings of the disconnectors are hot-dip galvanized. Other hardware materials of the product are zinc and cadmium plated. All copper terminals and surface of copper handles that touch the terminals are electro-silver plated. Double coil springs are used in order to ensure that copper handles touch terminals properly.

TYPES

- **Fuse Type Switch Disconnector with Earthing**
- **Fuse Type Switch Disconnector without Earthing**
- **Switch Disconnector with Earthing**
- **Switch Disconnector without Earthing**



MEDIUM VOLTAGE FUSE FOR INDOOR&OUTDOOR DISCONNECTOR

GENERAL INFORMATION

The main function of current-limiting fuses is to protect electrical apparatus, such as distribution transformers, motors, and capacitor banks against overload currents. Fuses can operate as sole devices or can be combined with air/SF6 insulated switch disconnectors. The choice depends on each application's requirements and specific network conditions. One of the most critical factors for optimum protection is proper fuse selection. This can be done based on theoretical calculations but in many cases, the practical knowledge obtained from actual test results could make it easier and even more reliable. Current limiting fuses have been designed to ensure safe operation in the open air and for limited heat dissipation in installations such as gas-insulated switchgear.

APPLICATIONS

Medium Voltage Fuses are used to protect transformers, capacitor banks, cable and overhead lines against short circuits. They protect switchgear from thermal and electromagnetic effects of heavy short circuit currents by limiting the peak current values (cut off characteristic) and interrupting the currents in several milliseconds.

ADVANTAGES

- **It is the cheapest form of protection, and it does need any maintenance.**
- **Its operation is completely automatic and requires less time as compared to circuit breakers.**
- **The smaller sizes of fuse elements impose a current limiting effect under short-circuit conditions.**
- **Its inverse time-current characteristic enables its use for overload protection.**