



# MODULAR SWITCHGEARS

A Sustainable  
Future...



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## About Us

Our company designs, offers solutions, sells and markets electrical and mechanical products such as Medium Voltage Switching Products, Medium Voltage Substations (Transformer Module), Mobile Substations, Current Transformers, Medium Voltage Fuse Disconnectors with its experience and high quality understanding.

We offer complete turnkey installation services for the generation of electrical energy from renewable energy sources. For the most suitable energy system solution; we offer engineering, feasibility, project design, implementation, commissioning and maintenance and repair activities.

## Our Vision

**'Light up the world, add value to the future.'**

To provide the world's best products and services with a passion for innovation and optimal operation in line with the vision of becoming the company of the future in the field of electric power generation from renewable energy sources, transmission and distribution of electric energy in the world.

As a company, we will welcome challenges and opportunities.

## Our Mission

To inspire the industry and the world with innovative products and designs that adhere to national and international standards, customer-oriented, add value to all stakeholders, sensitive to energy efficiency and carbon emissions.

# Air Insulated Modular Switchgears

Metal enclosed modular switchgears are medium voltage switchgears designed for use in MV distribution systems, compact power center type substations and industrial plants, designed for use in internal spaces, used for reliable distribution of electricity, manufactured in accordance with IEC standards. Metal enclosed modular switchgears are manufactured from 12 kV to 36 kV. All functional units that may be required in a switchgear center can be easily installed side by side.

## Metal Enclosed Modular Switchgear Sections

Air Insulated Modular cell types consist of 3 main sections. These sections are secured by switching and mechanical interlocks, and the transitions to ensure continuity. They are isolated from other sections.



### A) Busbar Connection Section:

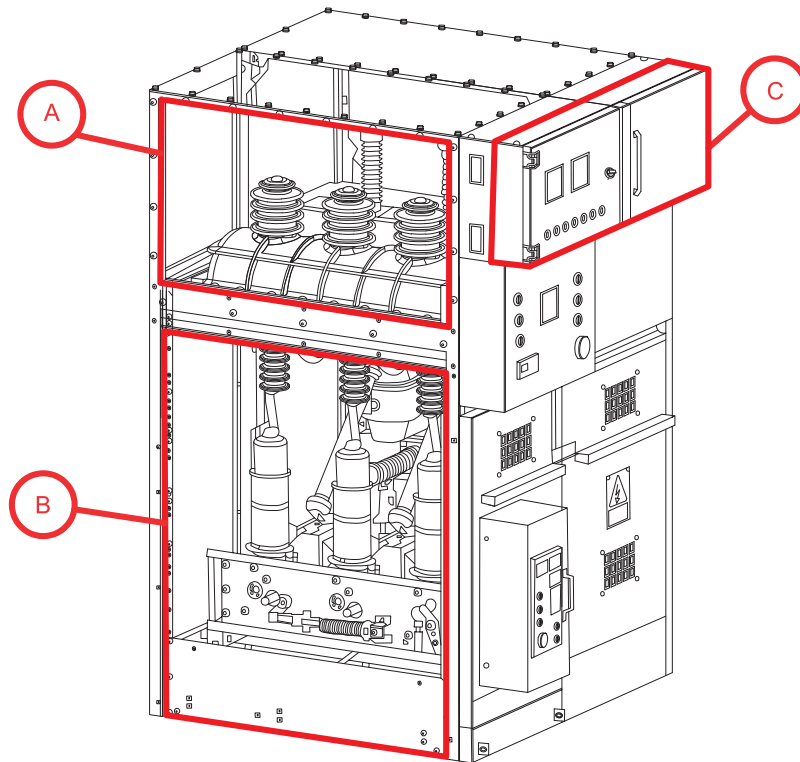
This section is where the main busbar is located and the main busbar connection is made. This section contains electrolytic coppers, insulators and bushings. Busbars can be aluminum or copper. The breaker may vary according to the rated current value. Access to this section requires special instructions and safety precautions.

### B) Cable Connection and Switching Section:

This is the section where medium voltage cables are connected. Earthing separator, breaker, support insulator, capacitive insulator, current transformer, voltage transformer, MV fuse, earthing busbar are located in this section. For safe access to this section, the earthing disconnector must be closed in the earth position.

### C) LV section:

This section contains terminal blocks, LV fuses, thermostats, measuring instruments and protection relays. While the cell (busbars and cable) is energized, operations can be performed in the LV panel



## Relevant Standards

IEC 62271	High Voltage Switchgear and Controlgear - Common Features
IEC 62271-200	High Voltage Switching and Control Scheme (up to 52kV AC)
IEC 62271-100	Alternating Current Circuit Breakers
IEC 62271-102	Alternating Current Disconnectors and Earthing Switches
IEC 62271-105	Alternating Current Switch Fuse Components
IEC 61869-2	Current Transformers
IEC 61869-3	Voltage Transformers
IEC 60273	Support Insulators
IEC 60051	Electrical Dimensions Instruments
IEC 60255	Secondary Protection Relays
IEC 61243-1	Voltage Determination Systems

## Areas of Use

MMH series metal enclosed switchgears are highly preferred products in medium voltage electricity distribution networks. Easy installation, expandable structure, diversity in product types make it preferred in many branches of the industry. Project-specific solutions, flexible design and production structure are also among the reasons that affect this preference. It is one of the most preferred products in electricity distribution systems with its safe use and maintenance-free structure. It is preferred in places where people live mostly. Main areas of use;



## Areas of Use

- Wind turbines
- Solar Power Plants
- Hydroelectric Power Plants
- Shopping Centers
- Airports
- Hospitals
- Schools
- Large residences
- Sites
- Industrial Plants
- Hotels



## Technical Features

TYPE	(MMH)		
Rated Voltage	12 kV	24 kV	36 kV
Rated Network Frequency Withstand Voltage (1 min)	28 kV	50 kV	70 kV
In Separation Range (Between contacts in open position)	32 kV	60 kV	80 kV
Rated Lightning Impact Resistance Voltage	75 kV	125 kV	170 kV
In Separation Range (between contacts in open position)	85 kV	145 kV	195 kV
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Rated Current	630-1250 A	630-1250 A	630-1250 A
Rated Short Circuit Current (1sec) (3sec)	16-20-25 kA	16-20-25 kA	16-20-25 kA
Rated Short Circuit Closing Current	40-50-62,5 kA-peak	40-50-62,5 kA-peak	40-50-62,5 kA-peak
Internal Arc Class	AFL	AFL	AFL
Loss Of Service Continuity	LSC2A-PI	LSC2A-PI	LSC2A-PI
Protection Class	IP3X	IP3X	IP3X

### MMH: Air Insulated Switchgear Product Types

PRODUCT CODE	PRODUCT NAME
MMH-001	Input Output Switchgear with Load Separator
MMH-002	Fused Switchgear with Load Breakers
MMH-003	Voltage Measurement Internal Requirement Switchgear
MMH-004	Input Output Switchgear with Disconnecter
MMH-005	Busbar Coupling Switchgear with Separator
MMH-006	Input Output Switchgear with Separator
MMH-007	Cable Entry Connection Cell
MMH-008	Current Voltage Measurement Switchgear with Load Separator
MMH-009	Busbar Upgrade Switchgear
MMH-010	Busbar Splitter Switchgear with Load Break
MMH-012	Current Voltage Measurement Switchgear with Disconnecter
MMH-013	Cable Bonding Switchgear with Earth Separator

# SF6 Gas Insulated Modular Switchgears

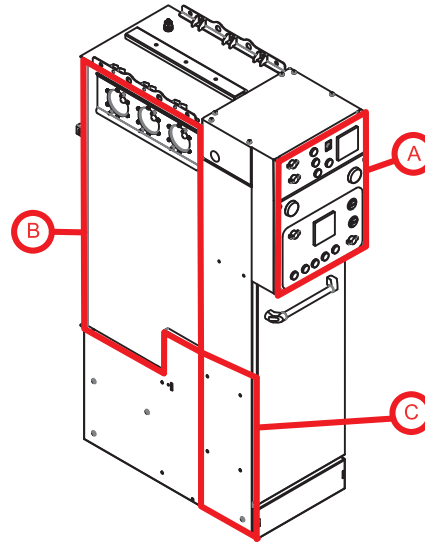
MSF series, SF6 gas insulated medium voltage modular switchgears (RMU) are the switchgears used in today's advanced MV distribution systems with increased functional features and minimized dimensions. SF6 gas insulated medium voltage modular switchgears (RMU) are manufactured from 24 kV to 36 kV. RMUs minimize total usage costs with ease of installation, remote control feature, high security, expansion possibility. Provided that the mechanism is installed in advance, it offers a unique solution to the user with its remote on-off feature even if there is no motor. RMUs, which are generally used in MV distribution systems in sheet metal or concrete power centers, offer rational solutions to the user by their compact dimensions and increased safety features.

SF6 gas insulated modular switchgears (RMU) consist of 3 parts;

## A) Mechanism and LV Control Panel

## B) SF6 Compartment

## C) Cable Box Compartment



## Relevant Standards

IEC 62271	High Voltage Switchgear and Controlgear - Common Features
IEC 62271-200	High Voltage Switching and Control Scheme (up to 52kV AC)
IEC 62271-100	Alternating Current Circuit Breakers
IEC 62271-102	Alternating Current Disconnectors and Earthing Switches
IEC 62271-105	Alternating Current Switch Fuse Components
IEC 61869-2	Current Transformers
IEC 61869-3	Voltage Transformers
IEC 60273	Support Insulators
IEC 60051	Electrical Dimensions Instruments
IEC 60255	Secondary Protection Relays
IEC 61243-1	Voltage Determination Systems



# Technical Features

TYPE	SF6 GAS INSULATED MODULAR SWITCHGEAR (MSF)								
		MODULE L	MODULE F	MODULE C	MODULE M	UNIT LFF-3		UNIT LLC-3	
Rated Voltage		24 kV- 36 kV	24 kV- 36 kV	24 kV- 36 kV	24 kV- 36 kV	24 kV- 36 kV		24 kV- 36 kV	
Rated Lightning Impact Resistance Voltage		630 A	200 A	630 A	630 A (ATR Cell)	200/630 A		630 A	
Short Term Withstand Current	24 kV	21 kA/3 sec	-	21 kA/3 sec	16 kA/1 sec	21 kA/3 sec		21 kA/3 sec	
	36 kV	16 kA/1-3 sec	-	16 kA/1-3 sec	16 kA/1 sec	16 kA/1-3 sec		16 kA/1-3 sec	
Short Circuit Opening Current						L	F	L	C
	24 kV	-	20 kA	21 kA	-	-	20 kA	-	21 kA
	36 kV	-	16 kA	16 kA	-	16 kA		16 kA	
Short Circuit Closing Current	24 kV	52,5 kA	50 kA	52,5 kA	-	L	F	L	C
						52,5 kA	50 kA	52,5 kA	52,5 kA
	36 kV	40 kA	40 kA	40 kA	-	L	F	L	C
						40 kA	40 kA	40 kA	40 kA
Power Frequency Withstand Voltage (1 min.)	24 kV	50-60 kV							
	36 kV	70-80 kV							
Lightning Impulse Voltage (kV Peak)	24 kV	125-145 kV							
	36 kV	170-195 kV							
Protection Class		IP3X	IP3X	IP3X	IP3X	IP3X	IP3X	IP3X	IP3X

## MSF: SF6 Gas Insulated Modular Switchgears Product Types

PRODUCT CODE	PRODUCT NAME
MSF-001	C Module SF6 gas insulated input-output switchgear with vacuum breaker
MSF-002	F Module SF6 gas insulated transformer protection switchgear with disconnector and fuse
MSF-003	L Module SF6 gas insulated input-output switchgear with load separator
MSF-004	M Module air-insulated measuring unit
MSF-005	LLC 3 Unit SF6 gas insulated compact switchgear with vacuum breaker
MSF-006	LLF 3 Unit SF6 gas insulated fused compact unit

## Areas of Use

MSF series SF6 gas insulated switchgears (RMU) are highly preferred products in medium voltage electricity distribution networks. Easy installation, expandable structure, diversity in product types make them preferred in many branches of the industry. Project-specific solutions, flexible design and production structure are also among the reasons affecting this preference. It is one of the most preferred products in electricity distribution systems with its safe use and maintenance-free structure. It is preferred in places where people live mostly.

# Metal Clad Switchgears

Metal clad switchgears are designed for applications where challenging environmental conditions and high electrical and mechanical durability are required. Metal clad switchgears are manufactured up to 40.5 kV. Cutting procedure is done with SF6 gas or vacuum cutters. Separation is achieved by removing the trolley cutter. Operator safety is maximized with electrical and mechanical interlocks. Metal Clad cell consists of 4 sections;

## A) Low Voltage Compartment

It is the section located at the top of the cell where all kinds of protection relays, control elements and measuring instruments can be produced. Control and monitoring materials are designed at an easy-to-control height. All protection and control operations related to switching can be performed from this panel. Connections of transition cables between panels are easily made.

## B) Busbar Section

It is the section where the conductors that provide energy transmission between the cells and can withstand high current and short circuit powers and the epoxy resin support insulators and sleeve insulators that fix these conductors to the body are located. Access to the busbar section can be made from the top or, if desired, by removing the front sheet metal without removing the sleeve and metal curtains from the breaker section. In the busbar transition between the cells, the expansion of the cell in both directions is easily done on site by using busbar joining apparatus.

## C) Cutter Section

Medium voltage switching elements (SF6 gas or vacuum breakers) and their carrier, the drawer type trolley, is the section with metal curtains separating the busbar and breaker sections. Breakers used in switchgears with the same technical values can be interchanged quickly and simply for energy continuity. A curtain system has been designed that opens the front of the sleeves so as not to force the movement of the breaker trolley in the service position and closes safely when it is taken to the test position. The breaker trolley is always in contact with the main earth of the cell with the spring-loaded earth busbar. The status information of the breaker is carried to the low voltage panel with the socket plug system.

## D) Cable Compartment

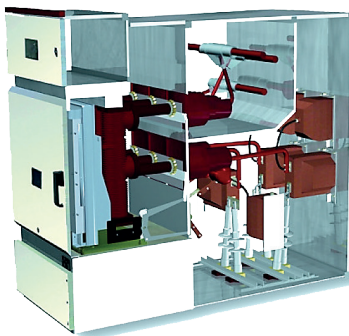
It is the section where switchgear materials such as different types of current, voltage transformers, epoxy sleeve insulators, earth knife, surge arrester, capacitive insulator that provide passage with the breaker section. The change of measurement transformers is done quickly and easily. Cables are fixed on the base of the cell with recorders. The cable compartment is designed to be accessible from the front and back, taking into account the dimensions of the building and user convenience, if the necessary mechanical and electrical interlocks are made.

## Relevant Standards

IEC 62271	High Voltage Switchgear and Controlgear - Common Features
IEC 62271-200	High Voltage Switching and Control Scheme (up to 52kV AC)
IEC 62271-100	Alternating Current Circuit Breakers
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IEC 62271-105	Alternating Current Switch Fuse Components
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IEC 60273	Support Insulators
IEC 60051	Electrical Dimensions Instruments
IEC 60255	Secondary Protection Relays
IEC 61243-1	Voltage Determination Systems

## Areas of Use

- HV/MV Transformer Centers
- Railways, Airports, Ports
- Schools
- Hospitals
- Iron and Steel Industry
- Power Plants
- Industrial Zones
- Shopping Centers
- Pump Stations
- Cement and Petrochemical Plants
- Mining Operations



# Technical Features

TYPE	(MCL)		
Rated Voltage	12 kV	24 kV	40,5 kV
Rated Network Frequency Withstand Voltage (1 min)	28 kV	50 kV	95 kV
Rated Peak Withstand Current	62,5-80 kA	62,5-80 kA	62,5-80 kA
Rated Lightning Impact Resistance Voltage	75 kV	125 kV	185 kV
Rated Current	1250-2500 A	1250-2500 A	1250-2500 A
Rated Short Circuit Current	31,5 kA	31,5 kA	31,5 kA
Arc Test Current	31,5 kA	31,5 kA	31,5 kA
Partitioning Class	PM	PM	PM
Protection Class	IP4X	IP4X	IP4X

## MCL: Metal Clad Switchgears Product Types

PRODUCT CODE	PRODUCT NAME
MCL-001	Current and Voltage Measurement Switchgear
MCL-002	Busbar Grounding Switchgear
MCL-003	Voltage Measurement Switchgear
MCL-004	Voltage Measurement and Busbar Grounding Switchgear
MCL-005	Busbar Coupling Switchgear with Breaker Current Transformer
MCL-006	Current Transformer Input Output Switchgear with Breaker
MCL-007	Current and Voltage Transformer Input-Output Switchgear with Breaker
MCL-008	Fused Output Switchgear











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