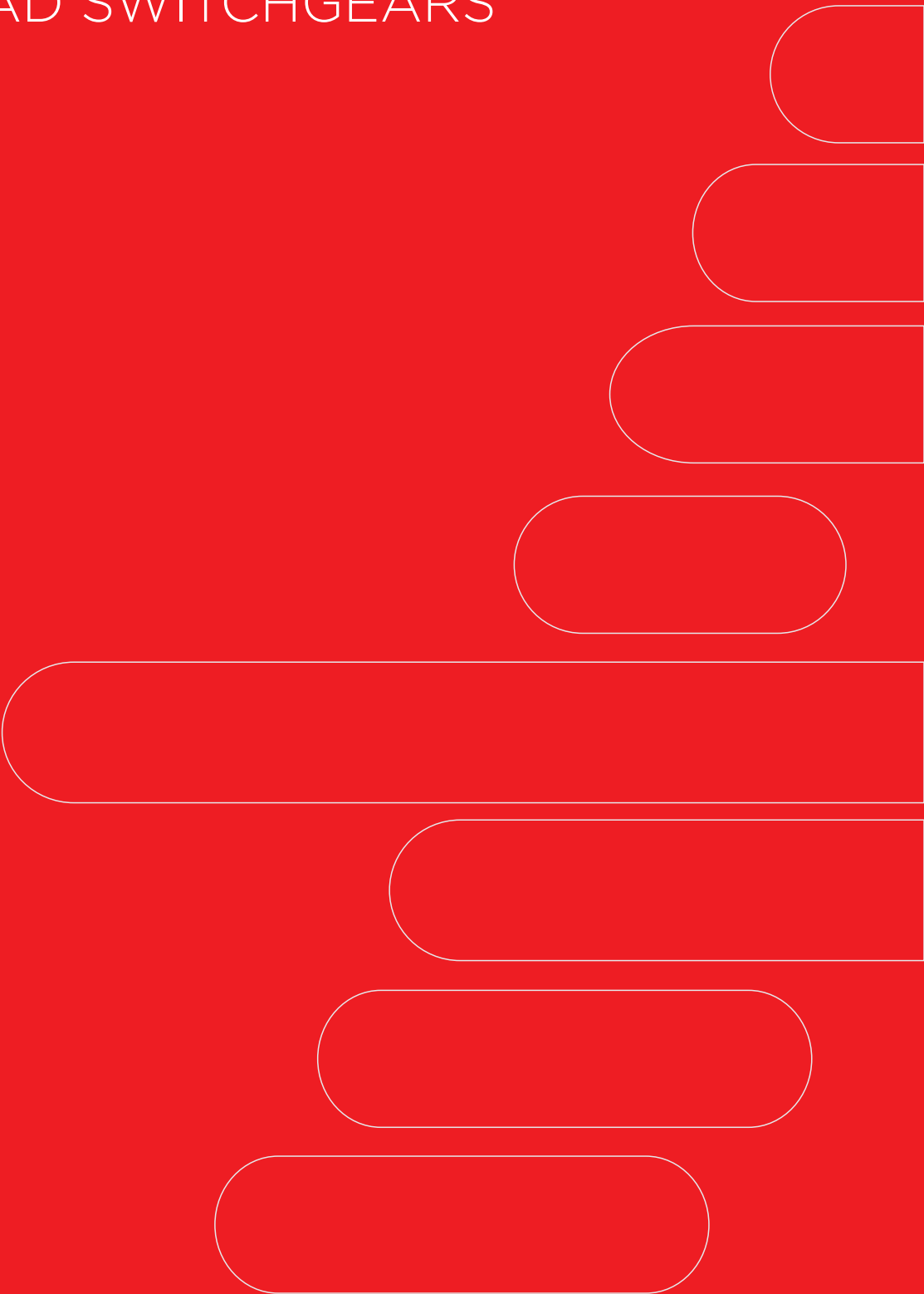




# MCLSERIES

AIR INSULATED  
METAL CLAD SWITCHGEARS



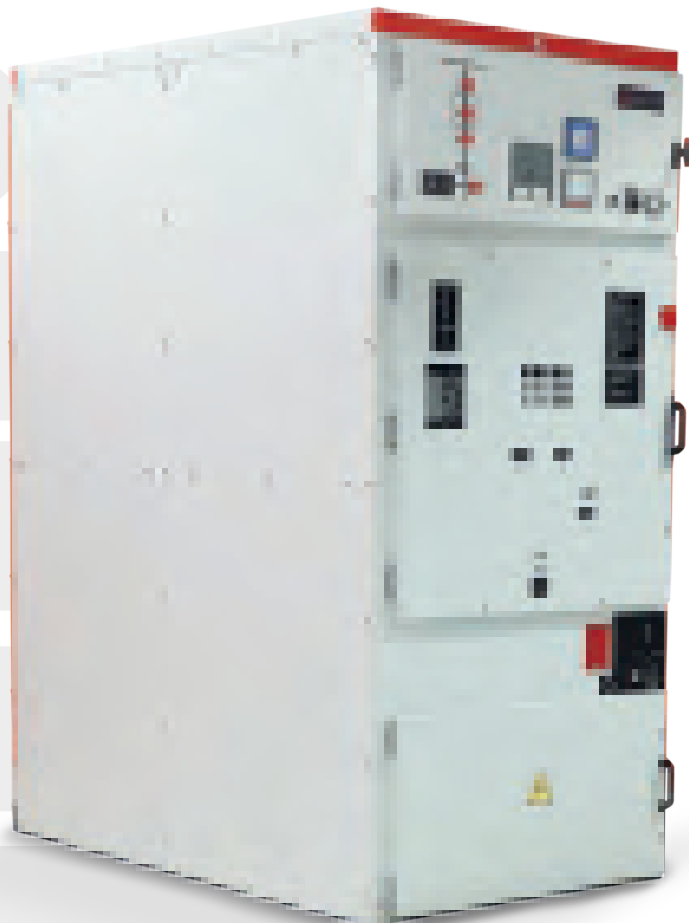
## GENERAL

ASTOR branded Air Insulated Metal Clad MCL Series Switchgears are designed according to IEC 62271-200 standard for using up to 40.5kV. It always fulfill the needs with flexible designs which are suitable for the projects. It is ideal for safe use in facilities where have got with different climatic and geographical conditions and which cannot endurance power interruption.

MCL Series Metal Clad Switchgears are produced to be used in places where the maximum service continuity is desired. Metal Clad Switchgear is designed for indoor applications. Generally metal clad switchgear is used to distribute electric power in a variety of demanding applications such as in power plants, utility substations, cement and petrochemical factories, in mines, airports, railway, shopping mall and suitable to provide control and protection for transformers, capacitors and motors.

These type of switchgears, which are produced resistant to high current and short circuit current rates, are also resistant to tough environmental conditions.

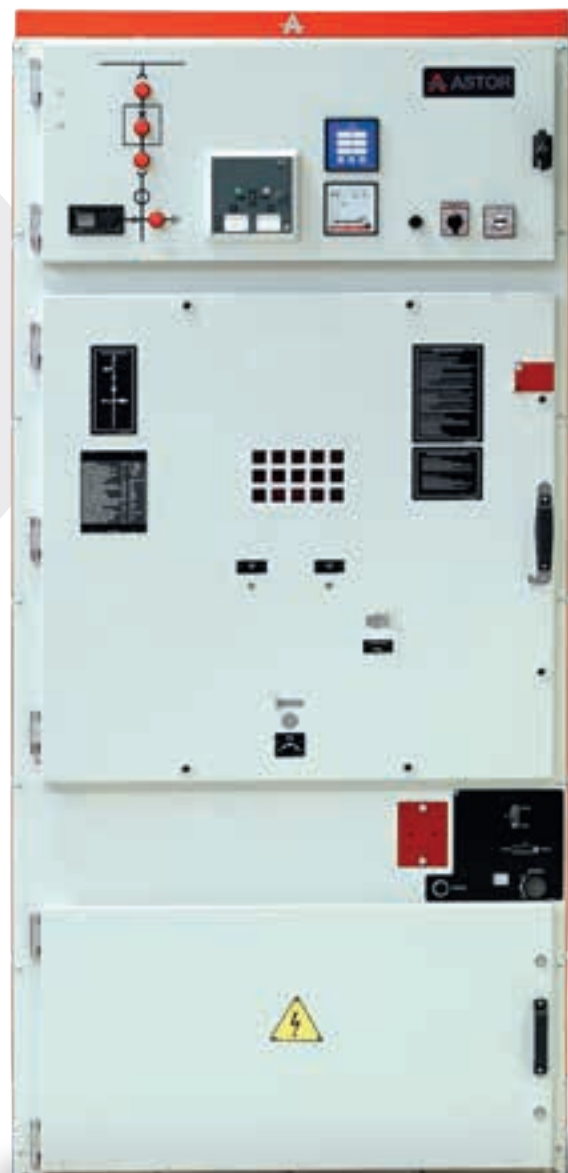
During a fault or maintenance, because of circuit breakers are easily replaceable each other, power outages are eliminated as soon as possible.



## ASTOR MCL Series Metal Clad Switchgears gives you the advantages of

- Continuity of service for your networks
- Optimized investment throughout the life of your installation
- The possibility of incorporating your medium voltage switchboard in a remote monitoring and control system.
- Provides safe cutting with vacuum circuit breaker.
- Resistance to high current and short circuit (31,5kA /3 second)
- It guarantees a high level of protection of people; when an accessible compartment is open, the other compartments and/or functional units may remain energised.
- All divisions are separated by means of grounded metal and they are fully insulated systems.
- Easily replaceable withdrawable type switching devices between the panels.
- Maintenance, reparation and on-site installation can be done from front or back side of the switchgear.
- Since the switchgear is highly modular type, this make simple selection of components required by any application.

All the installation, operation and maintenance operations can be carried out from the front of the unit.



## MCL Series Metal Clad Switchgear

### Description;

ASTOR brand Air Insulated Metal Clad Switchgears are designed by Turkish engineers and manufactured in ASTOR factory with high quality materials and workmanship.

Galvanized steel sheet is used due to its high resistance to environmental conditions and its recyclable properties.

Due to their superior switching systems, ASTOR brand Metal Clad Switchgear do not allow operational errors. Thanks to our design flexibility, Astor can easily answer to requests of customers.

The functional units of the switchgear are guaranteed arc proof in accordance with the IEC 62271-200 Standards.



MCL Series Metal Clad Switchgears are made up of several interconnected functional units.

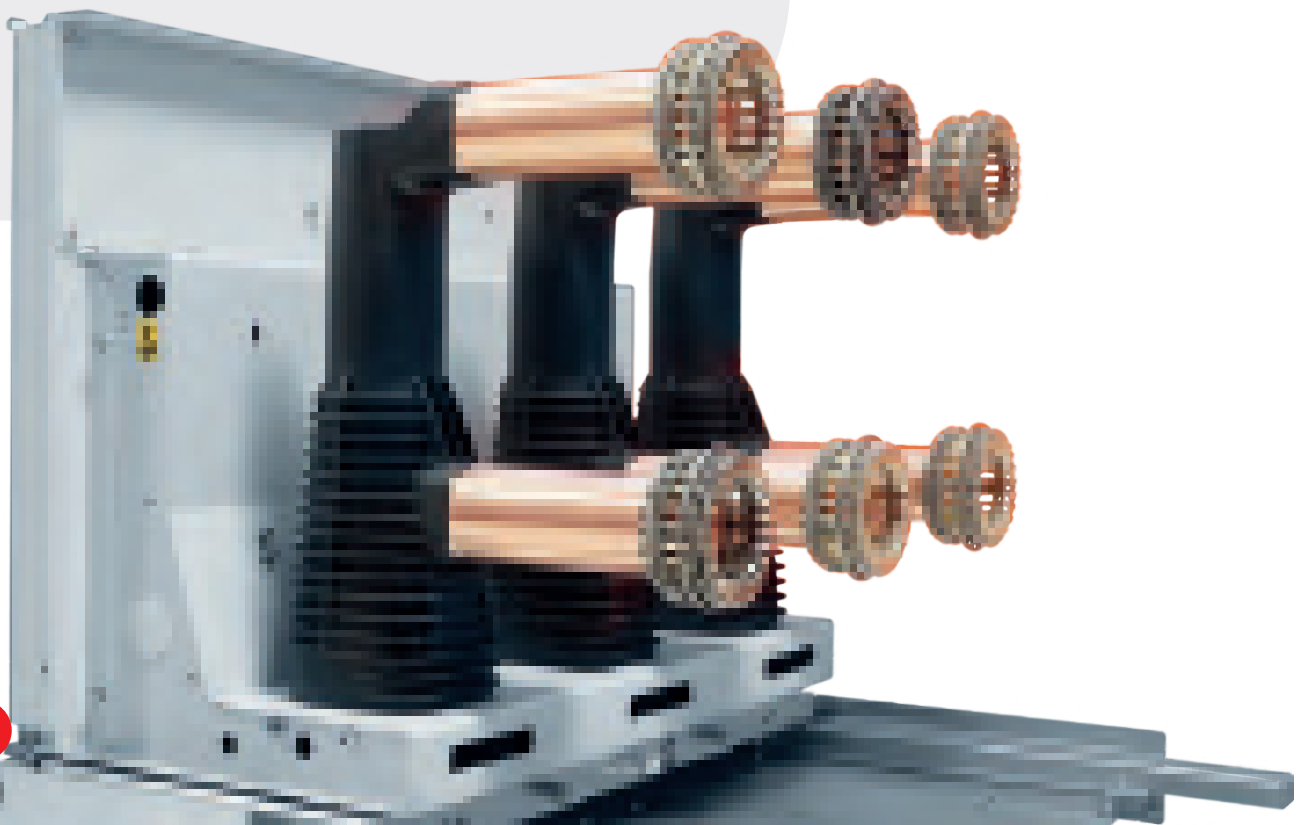
The power connections are made between the functional units within a switchboard via a single busbar.

The electrical continuity of all of the metal frames is provided by the connection of each functional unit's earthing busbar to the main earthing circuit of switchgear.

Low voltage wiring trays are provided in the switchboard above the low voltage control cabinets.

Low voltage cables can enter the switchboard through the top or bottom of each functional unit.

The switchgear and the earthing switches are operated from the front with the door closed.

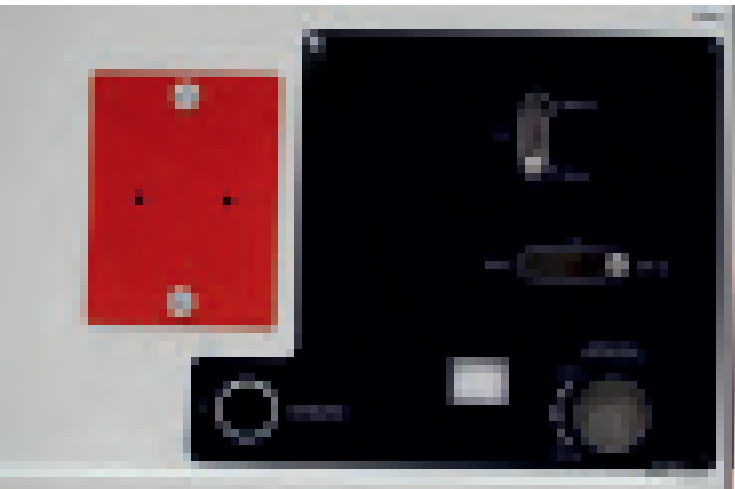


## Safety

Switchgear is equipped with all the interlocks and needed accessories to guarantee the highest level of safety and reliability for both installation and personnel.

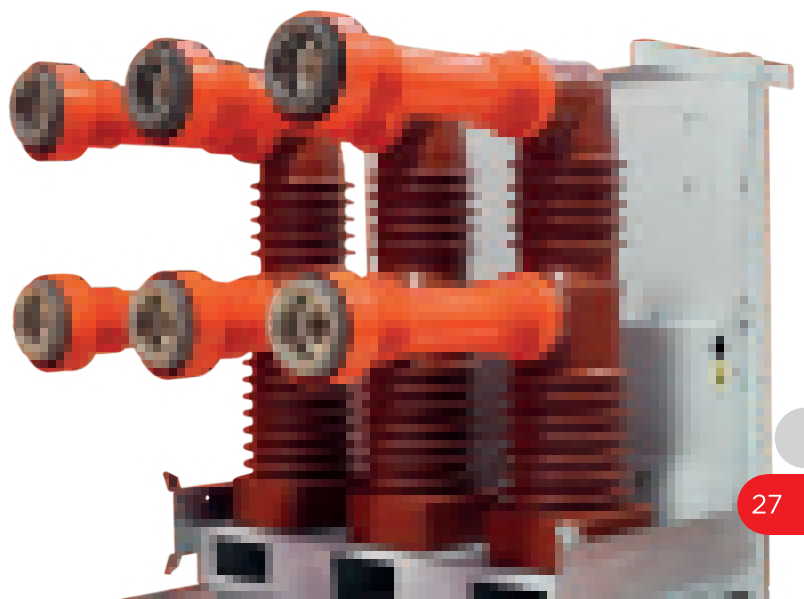
### Locking System

- Locking conditions comply with IEC 62271-102 standards.
- The earthing cannot be closed until the circuit breaker is put in the test position.
- Circuit Breaker door can be opened only when breaker is in test position.



- Circuit breaker can be moved with the open and earthing switch open position.
- If it is desired to retract while the breaker is in service position, the mechanism moves the breaker to the open position.
- Behind of switchgear there is the status of the earthing switch and the indicator which Show there is energy in system or not.
- It has mechanical key locking.
- There is main busbar-to-earth disconnector locking.

- All manoeuvres can be made when the panel door is properly closed.
- Possibility of wrong manoeuvre is prevented by means of mechanical and electrical interlocks.



## Compartments

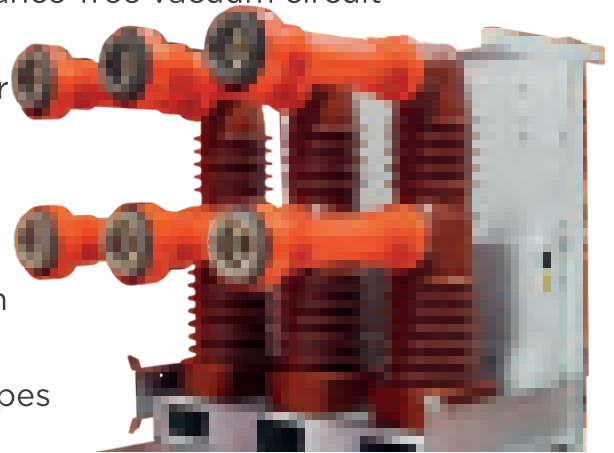
ASTOR MCL series metal clad switchgear is with a metal enclosure, suitable for indoor installations. Metal partitions segregate the compartments from each other and the live parts are air-insulated. Each Metal Clad Switchgear unit consists of three power compartments: circuit-breaker, busbars and cables;

### 1) Circuit Breaker Compartment

- In the all products are used reliable and maintenance-free vacuum circuit breaker.
- Switching operations can make when the MV door is closed.
- Pressure relief is to upwards.
- Electrostatic powder coating is used.
- Invulnerable doors protect the operator when occurrence internal arc.

Cutter Compartment is suitable for the following other types of panels;

- Vacuum circuit breaker
- Disconnecter
- Voltage Transformer Truck



### 2) Main Busbar Compartment

- The busbar compartment contains the main busbar system connected to the upper isolating contacts of the circuit-breaker by means of branch connections.
- Contains busbar array with nominal current up to rating 2500 A.
- Busbars are fixed on the epoxy support insulators.
- Pressure relief is to upwards.
- The main busbars are made of electrolytic copper.
- The busbars is insulated with original design insulated materials.



### 3) Cable Compartment

The cable compartment contains the branch system for connection of the power cables to the lower contacts of the circuit-breaker.

Earthing switch, current transformers install in this section and for some types can include voltage transformers and surge arresters.

There is a earthing busbar.

Pressure relief is to upwards.

Electrical and mechanical interlocks prevent to access while system in energy.

It has an earthing switch with short circuit closing capacity according to IEC 62271-102 standard.

### Earthing Switch

Cable compartment can be fitted with an earthing switch for cable earthing.

The same device can also be used to earth the busbar system (measurements and bus-tie units). It can also be installed directly on the main busbar system in a dedicated compartment .

The earthing switch has short-circuit making capacity.

Control of the earthing switch is from the front of the switchgear with manual operation, and optionally, can also be motor operated.

The position of the earthing switch can be seen from the front of the switchgear by means of a mechanical coupled indicator.

### Standarts;

The metal clad switchgear and main apparatus contained in it comply with the Standards as below:

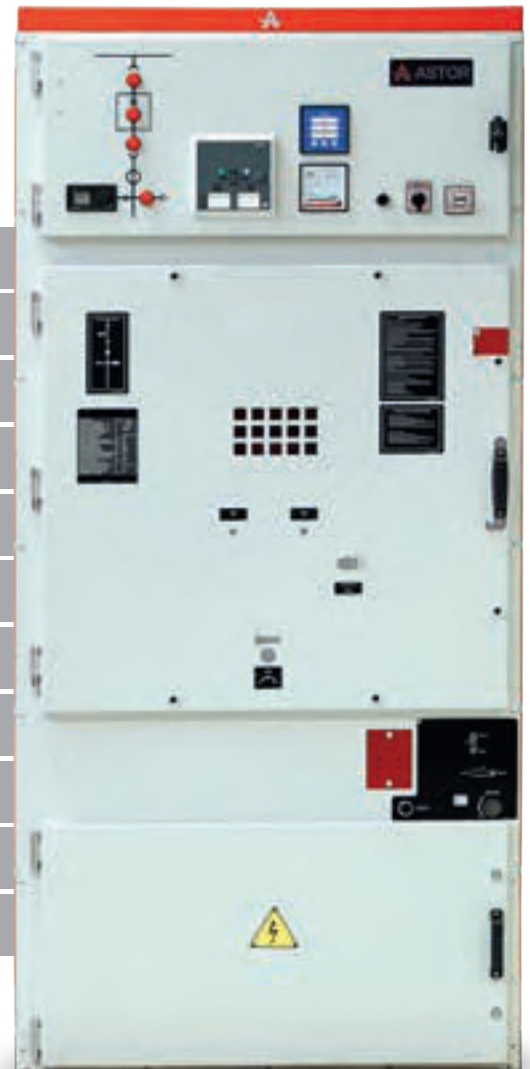
- IEC 62271-200 for the switchgear
- IEC 62271-1 for general purposes
- IEC 62271-102 for the earthing switch
- IEC 62271-100 for the circuit-breakers
- IEC 60071-2 for the insulation coordination
- IEC 62271-106 for the contactors
- IEC 60265-1 for the switch-disconnectors
- IEC 60529 for degree of protections



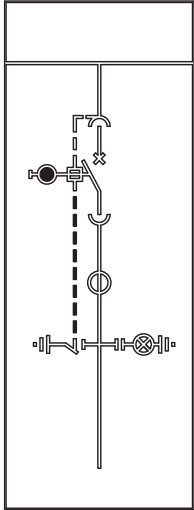
# MCL12 SERIES

## Technical Specification

Type	MCL 12
Rated Voltage(kV)	12
Rated Busbar Current (A)	UP TO 2500
Rated Feeder Current (A)	UP TO 2500
Rated Lightning Imp.Withstand Volt.(kV)	75
Rated Short Time Withstand Current(kA)	31.5 / 1sec
Rated peak Withstand Current(kA-peak)	62,5-80
Loss Of Service Continuity	LSC2B
IP Protection Of Enclosure	IP4X
Partitioning Class	PM
Arc Test Current(kA)	31.5 / 1sec



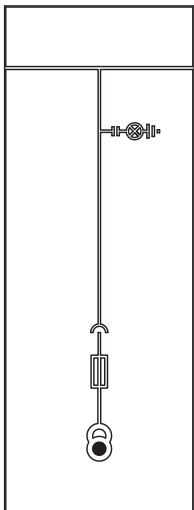
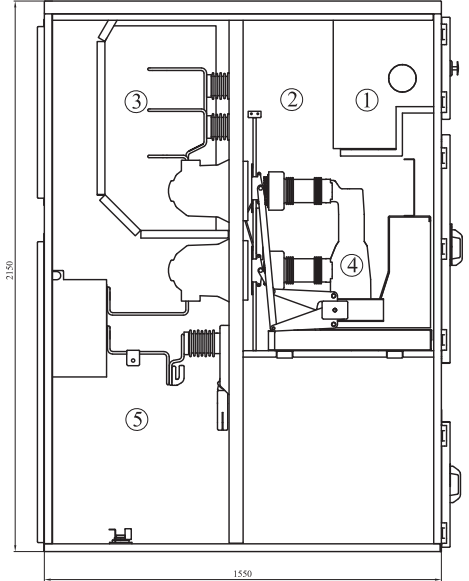
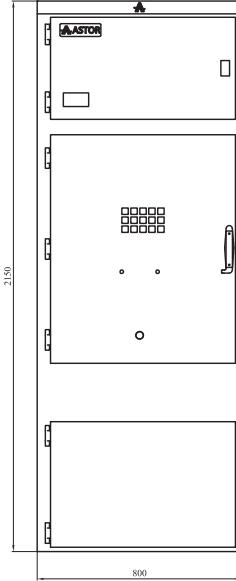
## CUBICLE TYPES



### MCL12-02

Incoming / Outgoing Switchgear

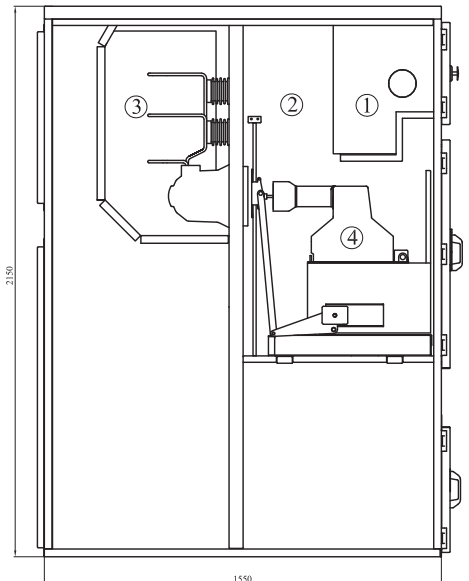
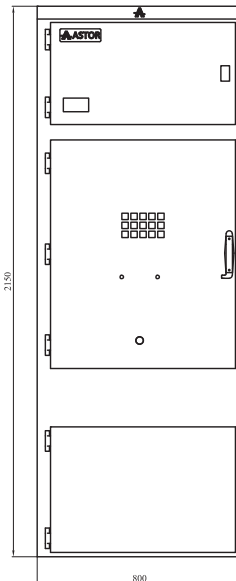
Un (kV)	12
Width (mm)	800-1000
Length (mm)	1550
Height (mm)	2150

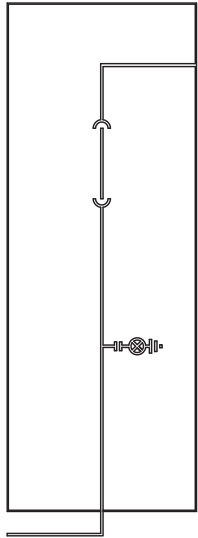


### MCL12-15

Voltage Measurement Switchgear

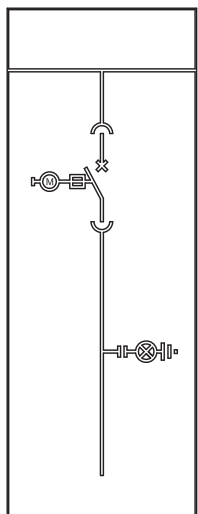
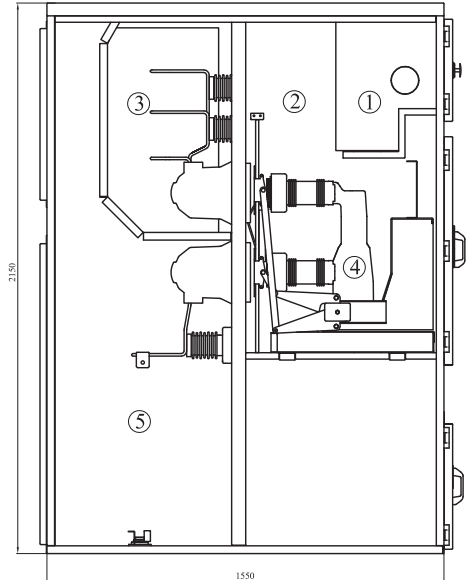
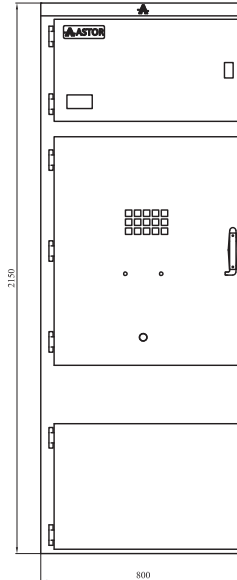
Un (kV)	12
Width (mm)	800
Length (mm)	1550
Height (mm)	2150





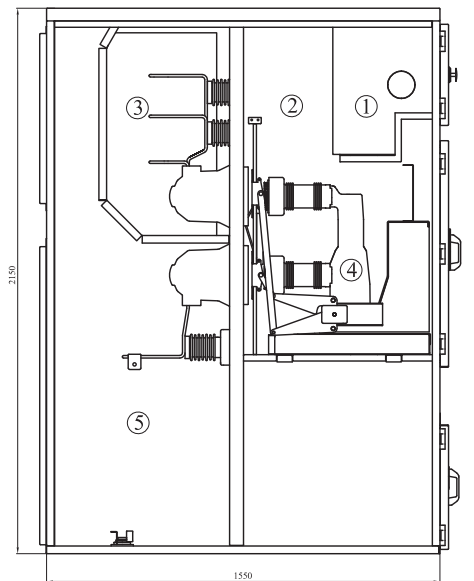
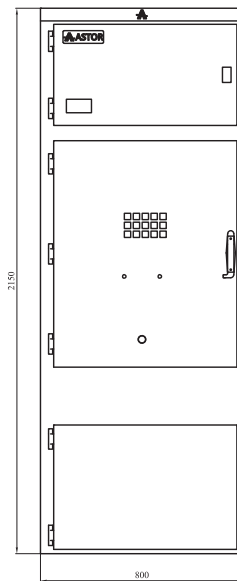
**MCL12-17**  
Bus Riser Switchgear

Un (kV)	12
Width (mm)	800-1000
Length (mm)	1550
Height (mm)	2150



**MCL12-32**  
Coupling Switchgear

Un (kV)	12
Width (mm)	800-1000
Length (mm)	1550
Height (mm)	2150



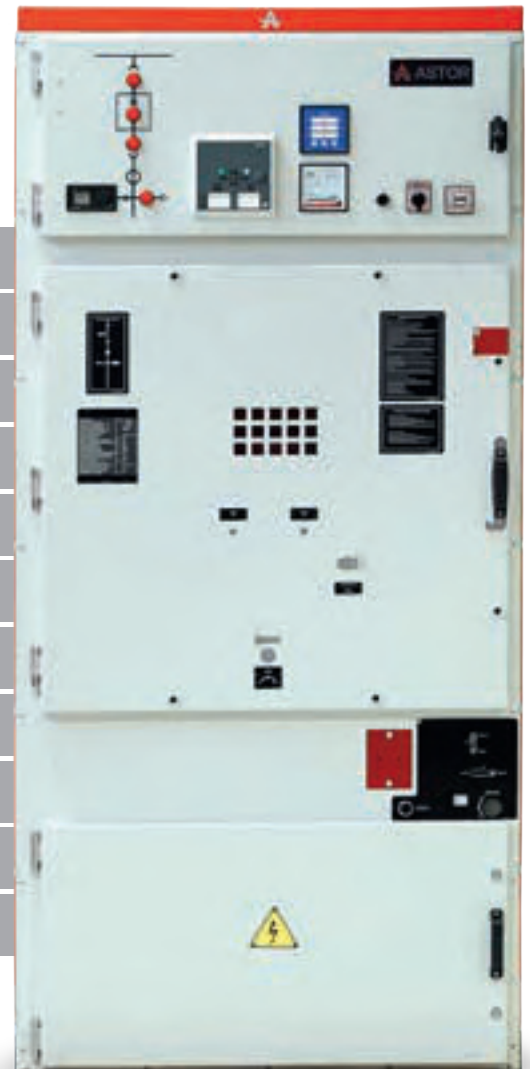
# MCL12 SERIES



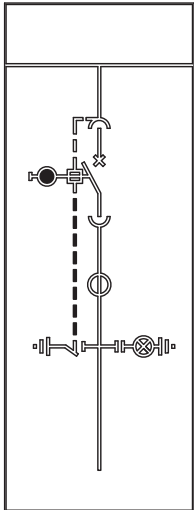
# MCL24 SERIES

## Technical Specification

Type	MCL 24
Rated Voltage(kV)	24
Rated Busbar Current (A)	UP TO 2500
Rated Feeder Current (A)	UP TO 2500
Rated Lightning Imp.Withstand Volt.(kV)	125
Rated Short Time Withstand Current(kA)	31.5 / 1 sec
Rated peak Withstand Current(kA-peak)	62,5-80
Loss Of Service Continuity	LSC2B
IP Protection Of Enclosure	IP4X
Partitioning Class	PM
Arc Test Current(kA)	31.5 / 1 sec



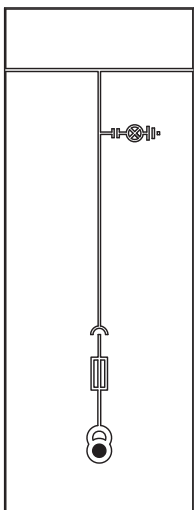
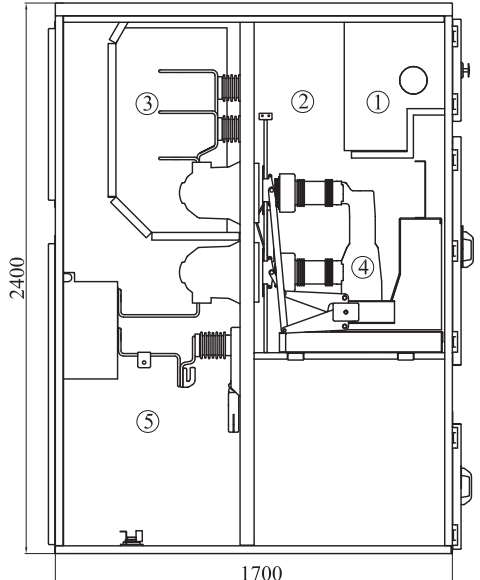
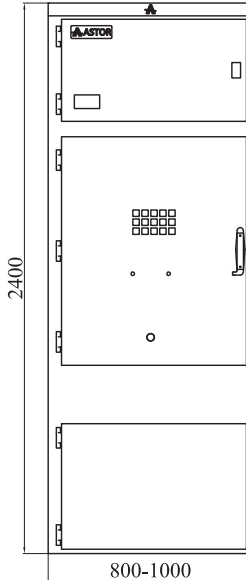
## CUBICLE TYPES



### MCL24-02

Incoming / Outgoing Switchgear

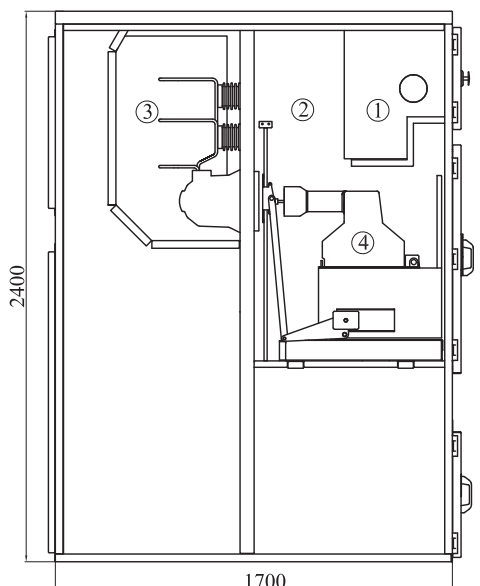
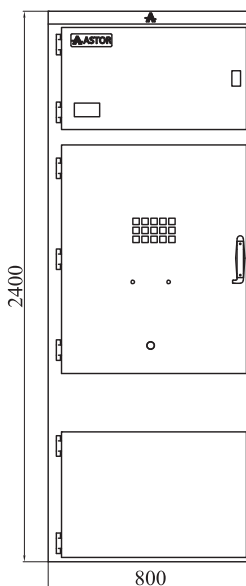
Un (kV)	24
Width (mm)	800-1000
Length (mm)	1700
Height (mm)	2400

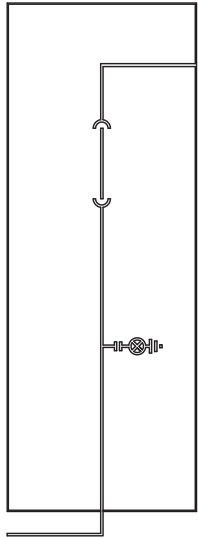


### MCL24-15

Voltage Measurement Switchgear

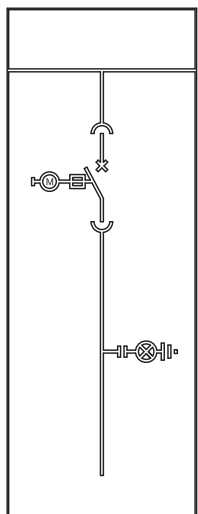
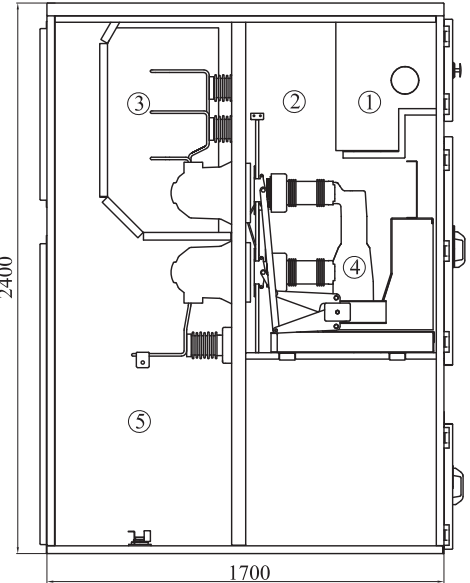
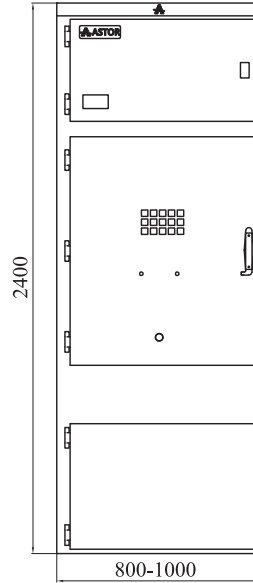
Un (kV)	24
Width (mm)	800
Length (mm)	1700
Height (mm)	2400





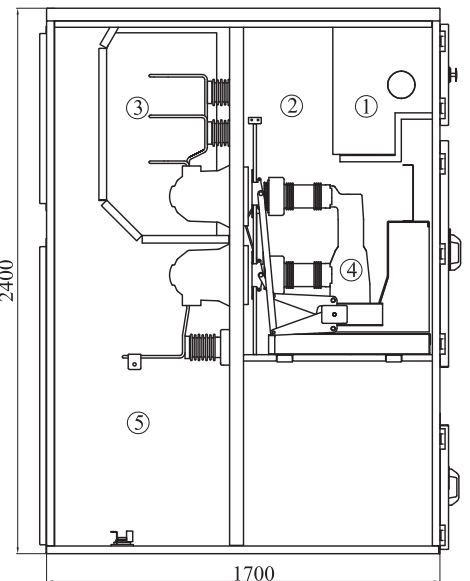
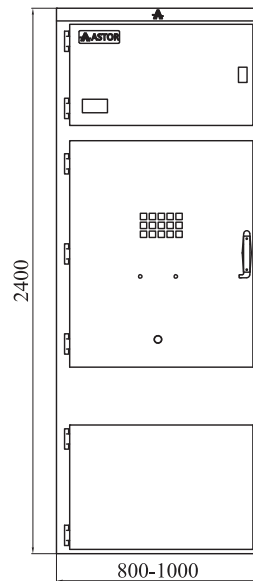
**MCL24-17**  
Bus Riser Switchgear

Un (kV)	24
Width (mm)	800-1000
Length (mm)	1700
Height (mm)	2400



**MCL24-32**  
Coupling Switchgear

Un (kV)	24
Width (mm)	800-1000
Length (mm)	1700
Height (mm)	2400



# MCL24 SERIES





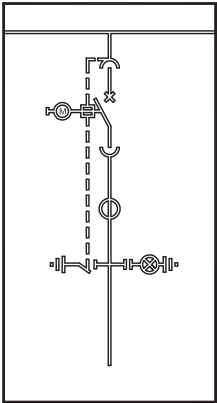
# MCL40 SERIES

## Technical Specification

Type	MCL 40
Rated Voltage(kV)	40.5
Rated Busbar Current (A)	UP TO 2500
Rated Feeder Current (A)	UP TO 2500
Rated Lightning Imp.Withstand Volt.(kV)	185
Rated Short Time Withstand Current(kA)	31.5 / 1 sec
Rated peak Withstand Current(kA-peak)	62,5-80
Loss Of Service Continuity	LSC2B
IP Protection Of Enclosure	IP4X
Partitioning Class	PM
Arc Test Current(kA)	31.5 / 1 sec



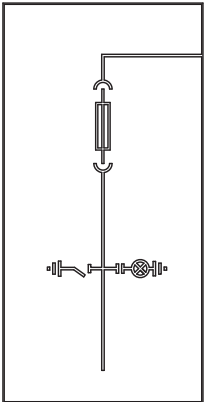
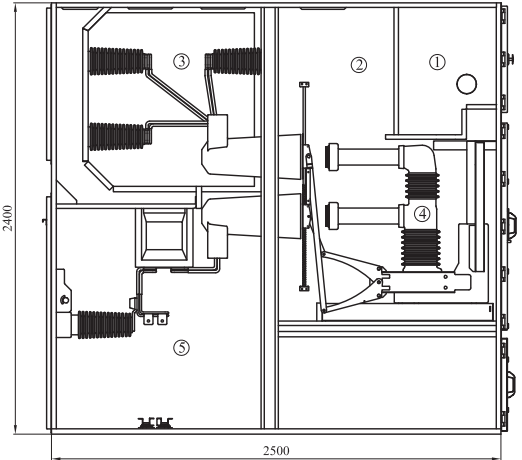
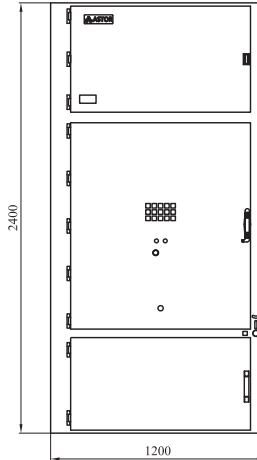
## CUBICLE TYPES



### MCL40-02

Incoming / Outgoing Switchgear

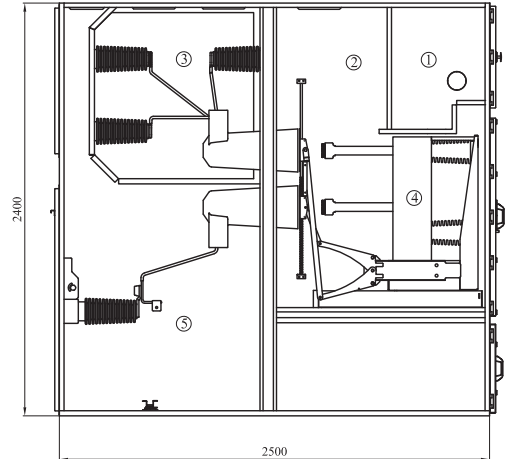
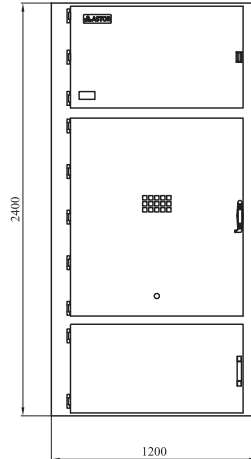
Un (kV)	40.5
Width (mm)	1200
Length (mm)	2500
Height (mm)	2400

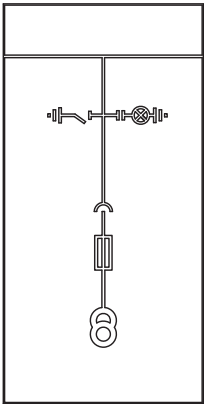


### MCL40-14

Transformer Protection Switchgear

Un (kV)	40.5
Width (mm)	1200
Length (mm)	2500
Height (mm)	2400

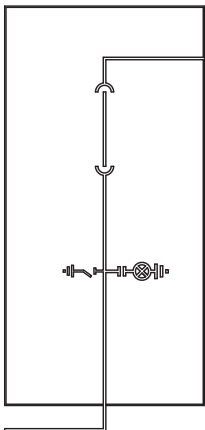
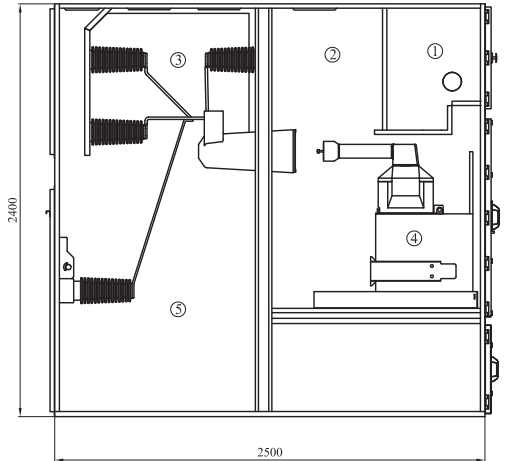
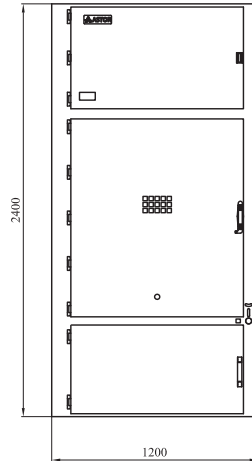




### MCL40-15

Voltage Measurement Switchgear

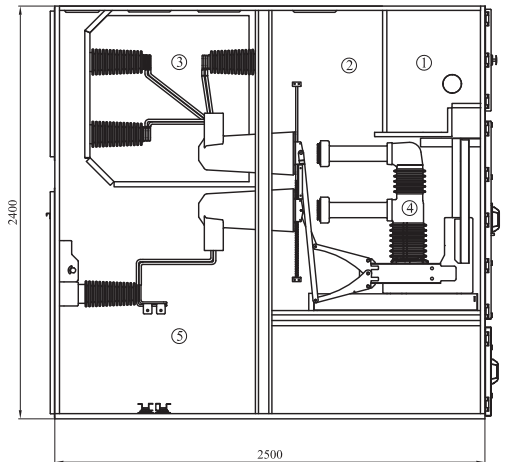
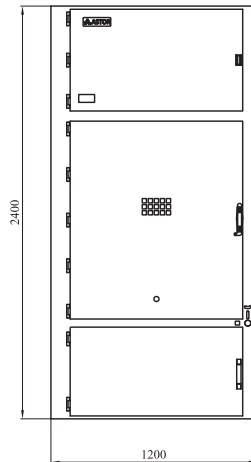
Un (kV)	40.5
Width (mm)	1200
Length (mm)	2500
Height (mm)	2400

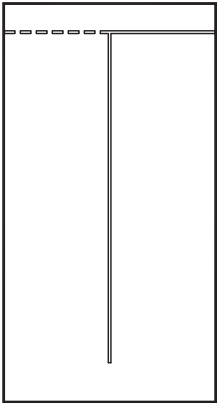


### MCL40-17

Bus Riser With Disconnect Switchgear

Un (kV)	40.5
Width (mm)	1200
Length (mm)	2500
Height (mm)	2400

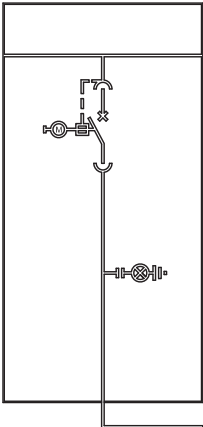
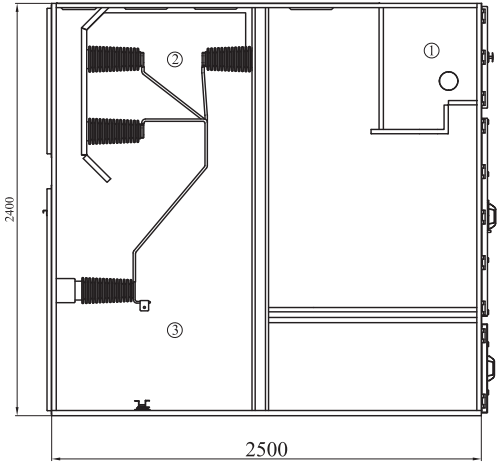
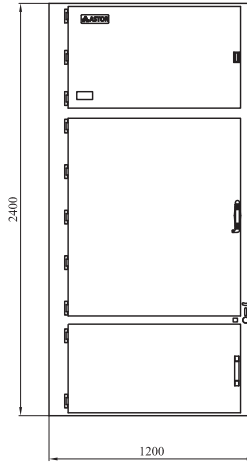




## MCL40-18

Bus Riser Switchgear

Un (kV)	40.5
Width (mm)	1200
Length (mm)	2500
Height (mm)	2400



## MCL40-32

Coupling Switchgear

Un (kV)	40.5
Width (mm)	1200
Length (mm)	2500
Height (mm)	2400

