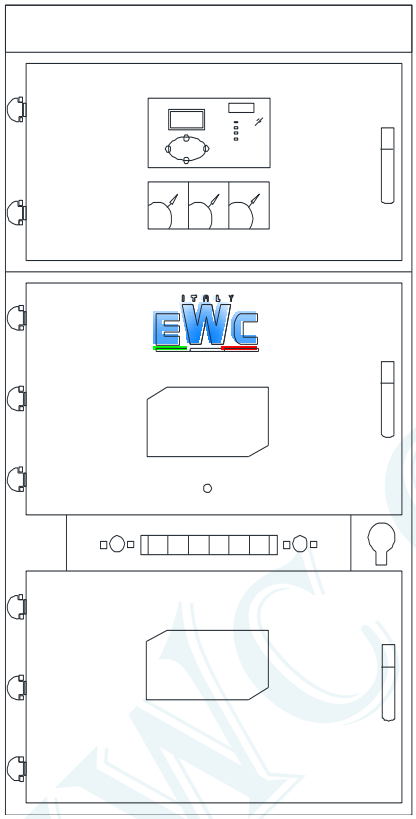
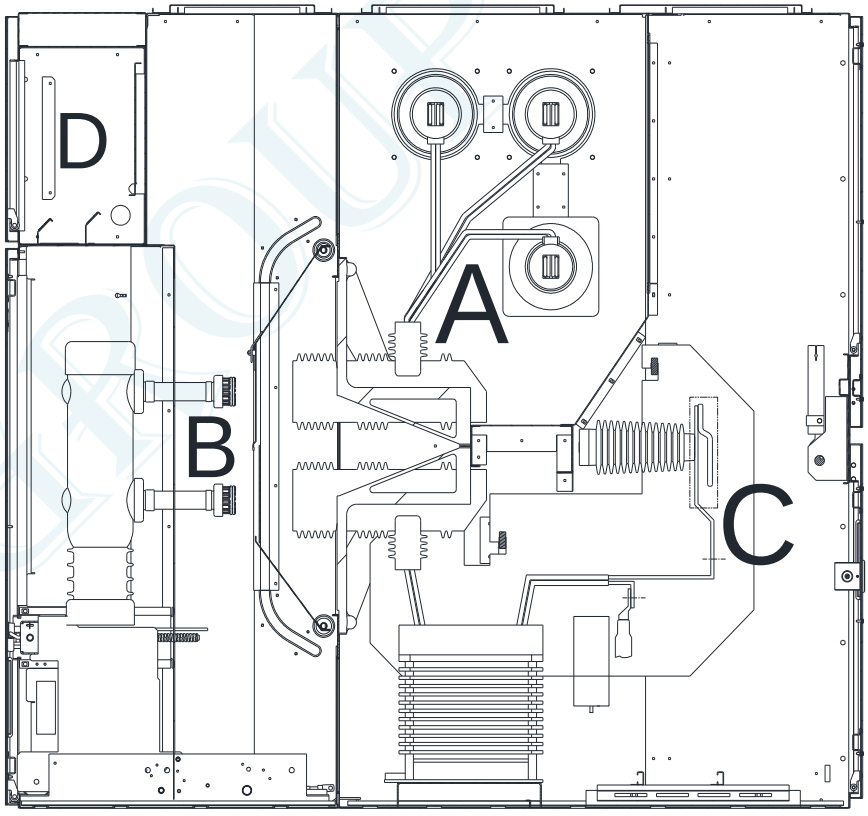
MCSG–36kV / 630-3150A

Air-insulated Metal-clad Withdrawable Switchgear





METAL CLAD

EWC GROUP srl – (25082) Botticino – via G. Pastore, 36 (BS)- Email: thaer@ewcgroup.it
Website: www.ewcgroup.it - Mobile: +39 392 678 5050 / Tel.&Fax: +39 030 2692486.

INDEX

1. Summary

1.1 General

Air-insulated metal-clad withdrawable switchgear (hereinafter as switchgear) is a kind of MV switchgear.
It is designed as a withdrawable module type panel, and the withdrawable part is fitted with withdrawable vacuum and Sf6 circuit breaker manufactured by ABB, SIEMENS, SCHNEIDER. It can also be fitted with isolation truck, PT truck, fuses truck. It is applicable to three phase AC 50/60 Hz power system, and mainly used for the transmission and distribution of electrical power and control, protection, monitoring of the circuit. With standards and Specifications below:

IEC60694	The common technical requirements of high voltage switchgear and controlgear
IEC62271-200	A.C. metal enclosed switchgear and controlgear at the rated voltage of 1kV~52k V
IEC62271-100	High voltage switchgear and controlgear-Part 100:High voltage A.C. circuit breaker

1.2 Service Conditions:

1.2.1 Normal Operating Conditions

A. Ambient temperature: -15℃~+40℃
B. Altitude: Not exceed 1000m above sea level
C. Ambient humidity: Daily average RH ≤ 95%; Monthly average RH ≤ 90%
D. Earthquake intensity: ≤ Degree 8
E. Ambient air is not obviously contaminated by corrosive or flammable gas or steam.
F. Neither heavy pollution nor frequently strenuous vibration is occurred. Under harsh condition the strict design shall meet the requirement of class Ⅰ.
G. The voltage of the secondary electromagnetism interference induced in the system shall no more than 1.6kV.

1.2.2 Special Operating Conditions

According to IEC60694, the manufacturer and user may agree on special service conditions which deviate from the normal service conditions. To prevent the condensation phenomena, the heater is necessary for switchgear and needs to be put into service when the switchgear is in readiness and service conditons. The heat dissipation problem of switchgear can be sloved by ventilation facilities.

2. Technical Parameters

Switchgear Technical Parameters

Item		Unit	Parameters	
Rated Voltage		kV	36 [1]	40.5 [1]
Rated Insulation Level	1 min Power Frequency Withstand Voltage	kV	95	
	Lightning Impulse Withstand Voltage	kV	185	
Rated Frequency		Hz	50/60	
Rated Current		A	630, 1250, 1600, 2000, 2500, 3150	
Rated Short Circuit Breaking Current [2]		kA	25, 31.5, 40[4]	
Rated Short-time Withstand Current(4s) [2]		kA	25, 31.5, 40[4]	
Rated Peak Withstand Current		kA	63, 80, 100	
Rated Short Circuit Making Current(Peak)		kA	63, 80, 100	
Auxiliary Control Circuit Rated Voltage [3]		Cycle	DC110, DC220, AC220	

[1] 36kV is accordance with IEC.
[2] Current transformer should be considered singly.
[3] Other voltage is available on request.
[4] 40kA x 3s.

3. Switchgear Structure, Overall Dimension and Equipment Installed

3.1 Basic Structure

The basic structure of MCSG-36/ 630-3150A Switchgear comprises the panel itself, and the movable, withdrawable part with circuit breaker, fuse or other facilities. According to the electrical function inside the panel, it consists of four compartment , that is, busbar compartment A, circuit breaker compartment B, cable compartment C and low voltage compartment D.

The whole panel is constructed by bolting up the double folded steel plates manufactured through cold rolling process and CNC machining equipment.

The withdrawable parts of the switchgear panels can be fitted with VCB, PT, surge arrester, fuse, isolated truck and so on.

The indicator which is used to monitor the situation of primary circuit can be mounted in switchgear. This device is composed by two parts: high voltage sensor and indicator. Sensor is mounted on the high voltage compartments for monitoring while the indicator is mounted on the relay plate.

The affect of inner fault arcing of switchgear is taken into consideration during MCSG-36/ 630-3150A being desiged and the arcing test has been done according to the stipulations of IEC62271-200 , which can ensure the safety of operator and equipment.

The dimensions and weight of switchgear are as following:

Height H (mm)	2400
Width W (mm)*	1200
	2600
Depth D (mm)	1800
Weight (Kg)	850-1850

*The width of the substation transformer panel depends on its capacity.

3.2 Enclosure and Partitions

The enclosure and internal partitions of the switchgear consist of high quality aluminium-clad zink plate.
The switchgear has degrees of protection IP4X for the enclosure and IP2X for the partitions.
The front door and rear door of the switchgear are throughly disposed to prevent corrosion, and then painted with a special process which make it had a particular resistance to impact s and corrosion.
The circuit breaker compartment, busbar compartment and cable compartment are fitted with pressure relief plates. These plates open upward if internal fault arc result in overpressure. This method of construction prevents them from danger and ensure operators in a safe condition all the time.

3.3 Compartment

3.3.1 Circuit Breaker Compartment

The circuit breaker compartment is fitted with the necessary guide rails to accommodate the withdrawable part, which can be moved between the service position and the test/disconnected position.
If the withdrawable part is moved from the service position into the test/disconnected position, the fixed contacts located in the connection block in busbar compartment C and cable compartment D are automatically covered by metal plates which will be interlocked mechanically or can be locked by a padlock when the withdrawable part is moved away. In the test/disconnected position, the withdrawable part is still completely inside the panel with the door closed. The switching operations (including manual operation) are carried out with the doors closed.

3.3.2 Withdrawable Part

The manually moved withdrawable part consists of a robust sheet steel structure on which the circuit breaker poles are mounted and the breaker mechanism with relevant components is installed.
Contact arms with spring-loaded contact systems are fitted to the circuit-breaker poles. These create the electrical connection to the switchgear when the withdrawable part is inserted into the service position. Detailed information on the vacuum circuit breaker can be found in the corresponding instruction manual.
The signalling, protection and control wiring between the switchgear and the withdrawable part is coupled by a multiple pin control wiring plug.
As soon as withdrawable part has been slid into the switchgear and its interlock yoke has engaged in the test / disconnected position, it is positively connected to the switchgear panel. At the same time, it is earthed by earthing contacts and earthing rail.
The position of withdrawable part can be checked on the electrical position indicator or through the sight glass in the door at any time. The stored-energy spring mechanism of the circuit breaker including controls and indicators is accessible at the front of the withdrawable part. Apart from the version with a fitted circuit breaker, withdrawable parts with other equipment such as voltage transformer, are available.

3.3.3 Busbar Compartment

Busbars are laid in sections from panel to panel, and are held in place by the tee-off conductors and by busbar bushings. The conductor material used is tubing with a D-shaped cross section, in either single or double configuration depending on the current rating. The connection to the flat tee-off conductor s is made without any special connecting clamps. The busbars and tee-off conductors are covered with shrink-on sleeves. The bolt connections in the busbar system are normally covered by insulating covers. In conjunction with bushings, panel by panel partitioning is realised.
The main busbar can be fitted with either single and double form or aluminium rectangle type according to the clients requirements.

3.3.4 Cable Compartment

Current transformers and an earthing switch (with manual operating mechanisms) are located here. Installation of surge arrestor is possible. Multiple parallel power cables can also be available without difficulty. The cable sealing ends can be fitted in particularly favourable conditions. A removable plate for cable glands is located in the cable entry area.
Installation of voltage transformers at cable side of the panel is in preparation and will have influence on the depth of the panel.
The earthing switch is designed with a making capacity of 62.5 kA (design for 80 kA in preparation).

3.3.5 Low Voltage Compartment

The low voltage compartment, together with its front door , accommodates the secondary equipment of the switchgear panel required for the particular application.

The control wiring in the switchgear panel area is led through generously dimensioned and metal covered ducts. The left hand duct is reserved for the incoming and outgoing control wires, and the internal wiring in the panel is located on the right hand side.

At the top of the left hand duct, an entry for control cables is reserved with the free-cut rubber sealing which will keep the protection class IP4X for the whole encloser of the switchgear panel.

3.4 Interlocks/Protection Against Maloperation

A series of interlocks are provided to prevent fundamentally hazardous situations and maloperation, thus protecting both personnel and the switchgear itself. The interlocks which are normally individually effective are as follows:

3.4.1 The withdrawable circuit breaker can only be moved from the test/disconnected position into the service position (and back) with the circuit breaker open and the earthing switch open (Mechanical interlock).

3.4.2 The circuit breaker can only be closed when the withdrawable circuit breaker is precisely in the defined test position or service position (Mechanical interlock).

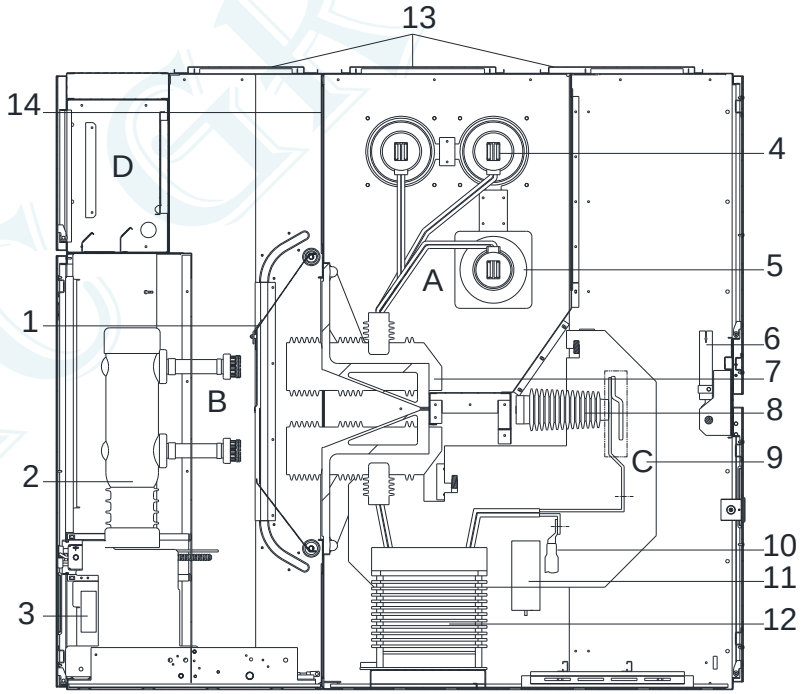
3.4.3 The circuit breaker can only be opened manually in the service or test position when no control voltage is applied, and can not be closed (Electromechanical interlock).

3.4.4 The circuit breaker can be only closed when withdrawable circuit breaker is in the test/disconnected position or removable position (Mechanical interlock).

3.4.5 Earthing switch can only be closed when the withdrawable circuit breaker is in the test/disconnected position or the removed position (Mechanical interlock).

3.4.6 The withdrawable circuit breaker cannot be moved from the test/disconnected position into the service position when the earthing switch is closed (Mechanical interlock).

3.4.7 The secondary control plug of circuit breaker is locked when withdrawable circuit breaker is in the service position.



A. Busbar Compartment	**B.** Circuit Breaker Compartment	**C.** Cable Compartment	**D.** Low Voltage Compartment

1. Shutter	6. Earthing Switch	11. Baffle Heater
2. Circuit Breaker	7. Spout	12. Current Transformer
3. Secondary Plug	8. Supportor(Fitted with Indicator)	13. Pressure Relief Plate
4. Main Busbar	9. Insulated Separate Plate	14. Partition
5. Busbar Bushing	10. Electrical Cable	

4. Major Electrical Components of Primary Circuit

All the electrical components be fitted in the MCSG-36/630-3150 type switchgear are manufactured by EWC GROUP srl. By this way , it can guarrant the consistancy of technical characteristic of this type of switchgear, matching well, then ensure the type switchgear to be the advanced technical, stable characteristic, reliable distribution equipment.
here below is the abstract of primary circuit main electrical components be fitted in switchgear:

4.1 Vacuum Circuit Breaker

Vacuum circuit breaker is one of the main electrical components in the switchgear, the products are according to the requirements of international and national standard.
Vacuum circuit breaker can be operated frequently and multiple break the short circuit current in the scope of service current. It is suited to reclosed operation and has an extreme high operation reliability.
Circuit breaker can service safely, relibly when it be used in the scope of allowed technical specification under the normal service condition, and only needs a little maintenance as sweeping and lubricate.
The operating mechanism which matches Vacuum circuit breaker is charging spring operating mechanism.
This charging spring operating mechanism has a compact structure, stable characteristic and it also operates three phase interrupter. The charging spring has two charging ways: manual and electrical.
The basic functions of operating mechanism can satisfy all clients requirements, and it has the perfect, reliable electrical and mechanical auxiliary elements.

4.2 Surge Arrester

MCSG-36/630-3150 type switchgear can be fitted with zincoxide surge arresters having the characteristic of advanced technology and reliable characteristic. It has a perfect nonlinear characteristic. When it been applied continual service voltage, the leakage current is less than 1mA. It immediately present s conduction state when the over voltage appears.
Surge arrester can bear:

Rated discharge current (Peak): 10 kA
Impulse current (Peak) : 100 kA
Long-period wave (Peak): 550 A, 2000 S
Thermal capacity: 3.4 kJ/kV Uc

Arrester has many advantages: low protection residual voltage, big absorbed energy, far protection distance. The enclosure of arrester be capsulated by silastic, has many characterstic: antiaging, stable data, free maintenance etc.

4.3 Earthing Switch

The earthing switch used in switchgear is fitted manual operating mechanism, and have the ability of making short circuit .
Earthing switch contains indicator of opening and closing position. The Operating mechanism is operated manually, but also can use electro motor in the special conditions. Mechanical interlock mechanism can be installed on the rod of operating mechanism, interlocking with circuit breaker truck, or the interlock electromagnet can be installed, then implement the electrical interlock.
Earthing switch contains auxiliary contact, and it can supply the signal for opening and closing state of earthing switch.

EK6 Earthing Switch Technical Parameters

N°.	ITEM	UNIT	PARAMETERS
1	Rated Voltage	kV	36
2	Center Distance Between Phases	kV	280
3	Rated Short Time Withstand Current	kA/s	31.5/40
4	Rated Short Circuit Making Capacity (peak)	kA	80
5	Power Voltage Of Interlock Electromagnet	V	DC48, 110,220; AC110,220

4.4 Current Transformer and Voltage Transformer

The current transformer and voltage transformer are both purchased from the companies which are well-known in power systems we can ensure they are consistent with the technical characteristic of switchgear, and satisfy requirements of different clients.

The short time withstand current and peak withstand current of current transformer should be acknowledged according to the variable ratio value of current when ordering the goods.

Current Transformer Technical Parameters

N°.	ITEM	UNIT	PARAMETERS
1	Rated Voltage	kV	35
2	Power Frequency Withstand Voltage	kV	95
3	Lighten Impulse Withstan d Voltage (Peak)	kV	185
4	Rated Primary Current	A	50-3150
5	Rated Secondary Current	A	1, 5
6	Precision Degree		0.2,0.5,1.0,3.0,5P10,5P20,10P10,10P20
7	Rated Capacity	VA	10-30
8	Rated Short Time Withstand Current(4s)	kA	25, 31.5 [1)]
9	Rated Peak Withstand Current	kA	63, 80 [1)]

[1)] The rated peak and short time withstand current of current transformer should be acknowledged according to the variable ratio values of current when ordering the goods.

Voltage Transformer Technical Parameters

N°.	ITEM	UNIT	PARAMETERS
1	Rated Primary Voltage	kV	35/ √3 35
2	Power Frequency Withstand Voltage	kV	95
3	Lighten Impulse Withstand Voltage(Peak)	kV	185
4	Rated Secondary Current	A	100 100/ √3 100/3
5	Precision Degree		0.2,0.5,1.0,3.0
6	Rated Capacity	kA	20-100

5. Major Electrical Components of Secondary Circuit

5.1 Measuring Meter

The collocation of the measuring meter is according to the requirements of clients, and satisfy the requirements of IEC measuring meter guide rules. EWC GROUP srl adopts the imported meter, includes indicate meter, electric energy counter meter and transducer, also can adopt national meters as the requirements of clients.

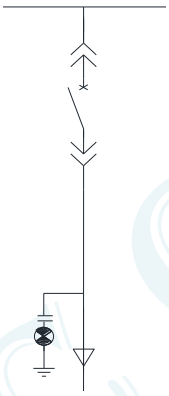
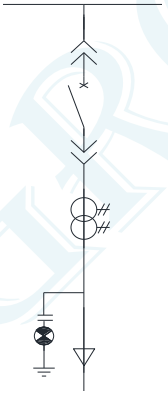
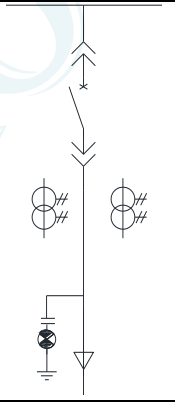
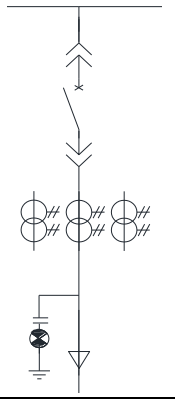
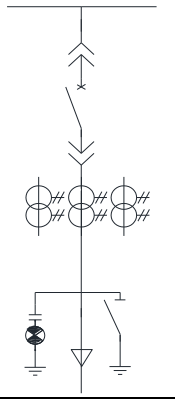
5.2 Operating Switch

MCSG-36/630-3150 switchgear i s fitted with kinds of imported operating switches, which have top class quality and Performance.

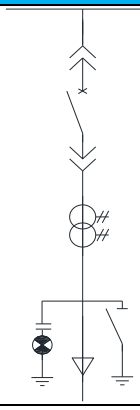
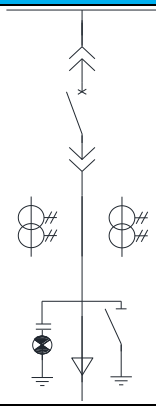
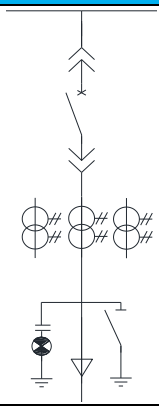
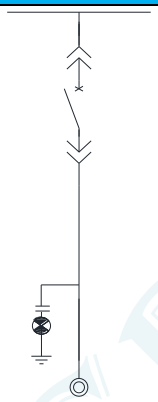
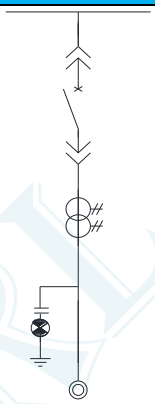
5.3 Position Indicator

MCSG-36/630-3150 switchgear is fitted with the world famous MCB as the protection of operating power.
MCSG-36/630-3150 switchgear is fitted with the secondary terminals with top class quality and performance.
MCSG-36/630-3150 switchgear is fitted with the auxiliary switches and secondary connectors which are well known in power systems. They have many advantages: simple structure, perfect characteristic, reliable service.

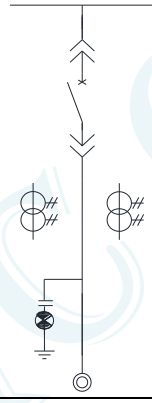
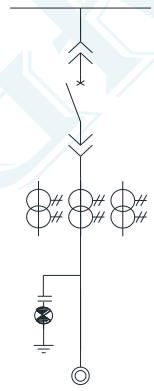
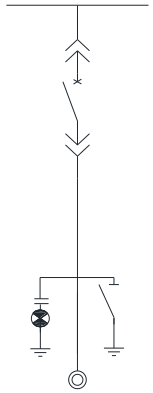
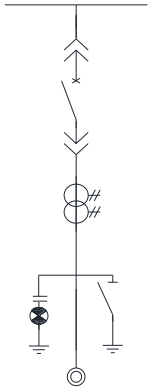
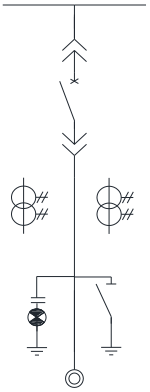
6. Primary Circuit Diagram

Scheme No.	001	002	003	004	005
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker	**1**	**1**	**1**	**1**	**1**
Current Transformer		**1**	**2**	**3**	
Voltage Transformer					
High Voltage Fuse					
Earthing Switch					**1**
Surge Arrestor					
Application	Cable Incoming (Outgoing)				

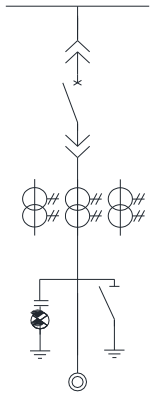
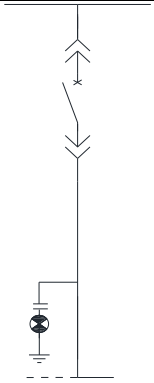
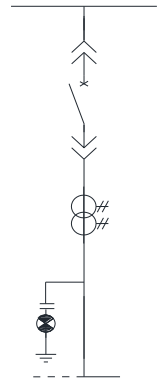
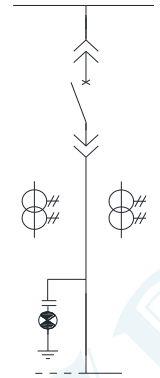
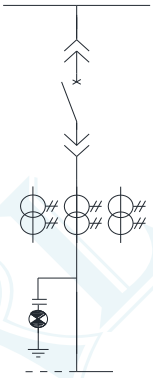
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	006	007	008	009	010
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker	**1**	**1**	**1**	**1**	**1**
Current Transformer	**1**	**2**	**3**		**1**
Voltage Transformer					
High Voltage Fuse					
Earthing Switch	**1**	**1**	**1**		
Surge Arrestor					
Application	Cable Incoming (Outgoing)			Overhead Incoming(Outgoing)	

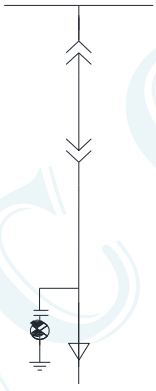
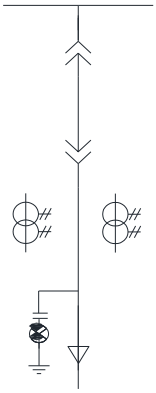
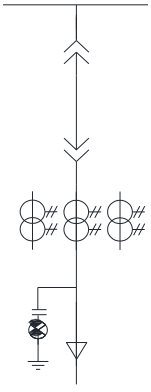
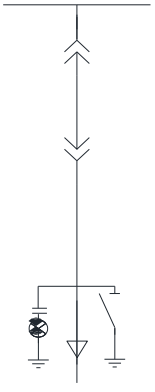
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	011	012	013	014	015
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker	**1**	**1**	**1**	**1**	**1**
Current Transformer	**2**	**3**		**1**	**2**
Voltage Transformer					
High Voltage Fuse					
Earthing Switch			**1**	**1**	**1**
Surge Arrestor					
Application	Overhead Incoming (Outgoing)				

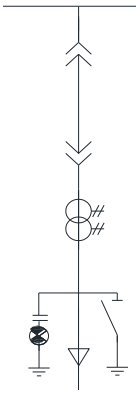
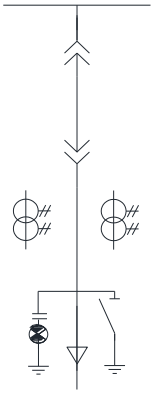
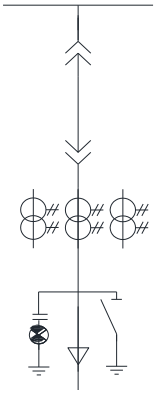
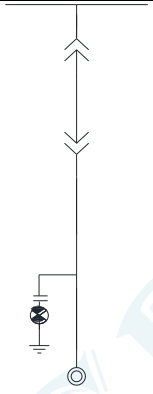
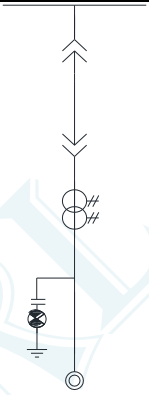
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	016	017	018	019	020
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker	**1**	**1**	**1**	**1**	**1**
Current Transformer	**3**		**1**	**2**	**3**
Voltage Transformer					
High Voltage Fuse					
Earthing Switch	**1**				
Surge Arrestor					
Application	Overhead Incoming (Outgoing)	Busbar-tie			

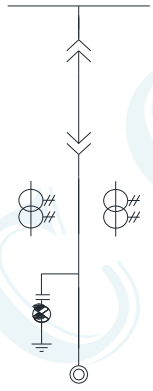
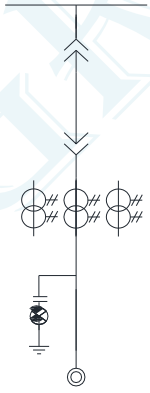
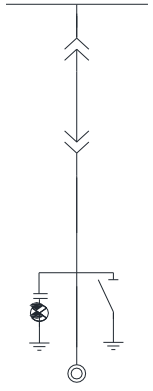
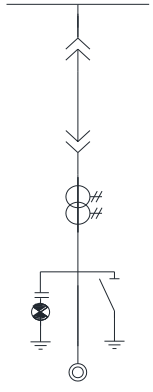
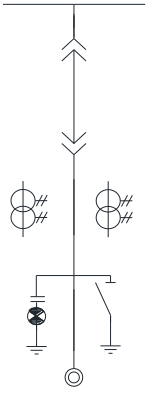
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	021	022	023	024	025
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer		**1**	**2**	**3**	
Voltage Transformer					
High Voltage Fuse					
Earthing Switch					**1**
Surge Arrestor					
Application	Cable Incoming (Outgoing)				

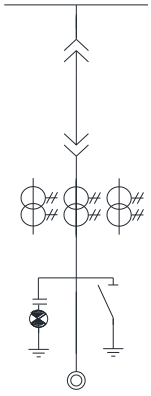
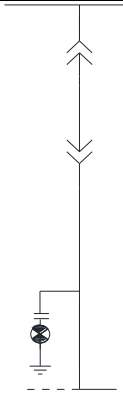
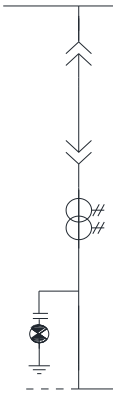
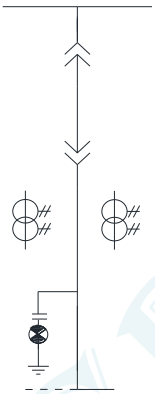
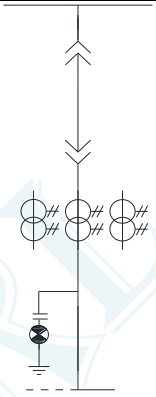
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	026	027	028	029	030
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer	**1**	**2**	**3**		**1**
Voltage Transformer					
High Voltage Fuse					
Earthing Switch	**1**	**1**	**1**		
Surge Arrestor					
Application	Cable Incoming (Outgoing)			Overhead Incoming(Outgoing)	

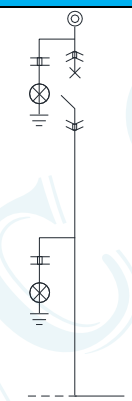
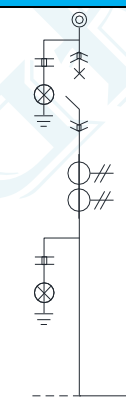
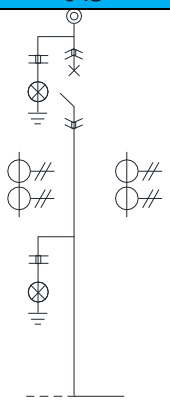
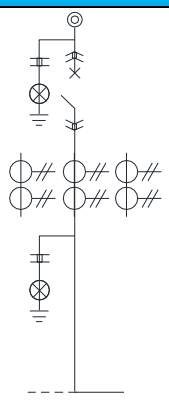
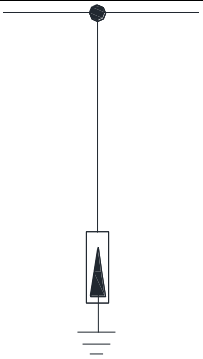
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	031	032	033	034	035
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer	**2**	**3**		**1**	**2**
Voltage Transformer					
High Voltage Fuse					
Earthing Switch			**1**	**1**	**1**
Surge Arrestor					
Application	Cable Incoming (Outgoing)				

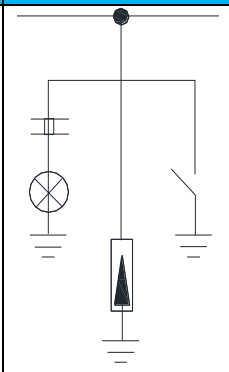
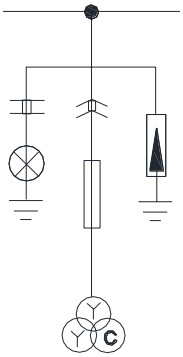
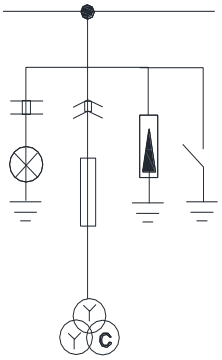
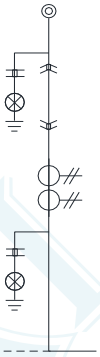
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	036	037	038	039	040
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer	**3**		**1**	**2**	**3**
Voltage Transformer					
High Voltage Fuse					
Earthing Switch	**1**				
Surge Arrestor					
Application	Overhead Incoming (Outgoing)	Isolator+Busbar-tie			

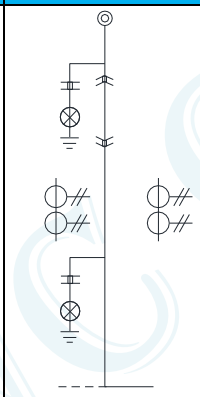
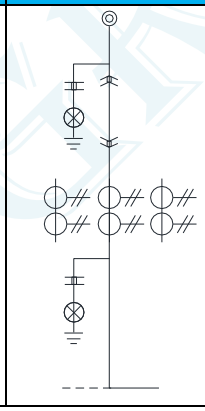
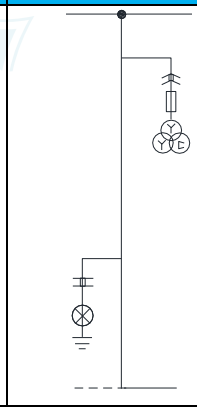
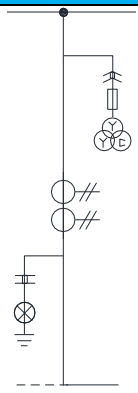
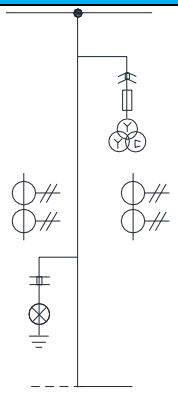
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	041	042	043	044	045
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker	**1**	**1**	**1**	**1**	
Current Transformer		**1**	**2**	**3**	
Voltage Transformer					
High Voltage Fuse					
Earthing Switch					
Surge Arrestor					**3**
Application	Overhead Incoming (Outgoing), Busbar-tie				Arrester

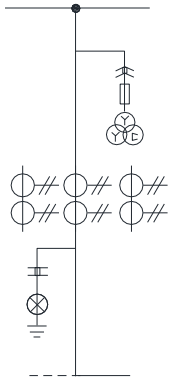
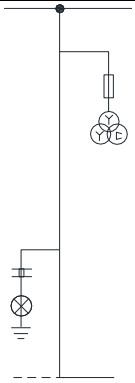
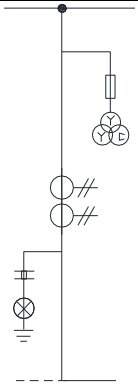
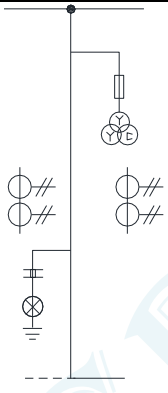
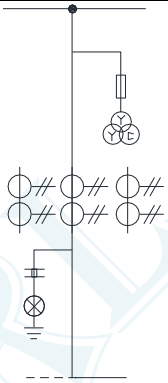
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	046	047	048	049	050
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer					**1**
Voltage Transformer		**3**	**3**		
High Voltage Fuse		**3**	**3**		
Earthing Switch	**1**		**1**		
Surge Arrestor	**3**	**3**	**3**		
Application	Arrester	Transformer, Arrester		Overhead Incoming (Outgoing), Busbar-tie	

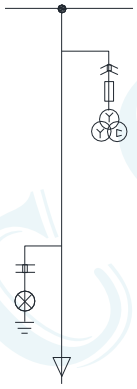
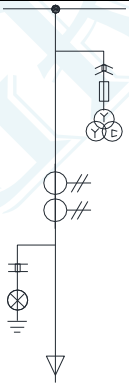
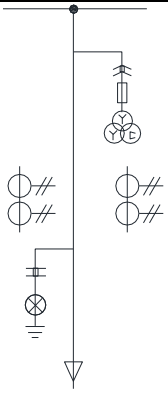
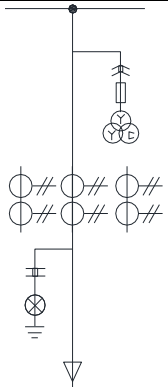
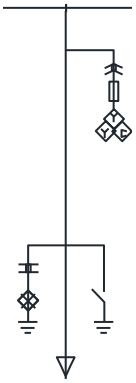
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	051	052	053	054	055
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer	**2**	**3**		**1**	**2**
Voltage Transformer			**3**	**3**	**3**
High Voltage Fuse			**3**	**3**	**3**
Earthing Switch					
Surge Arrestor					
Application	Overhead Incoming (Outgoing), Busbar-tie		Liaison Transformer + Busbar-tie		

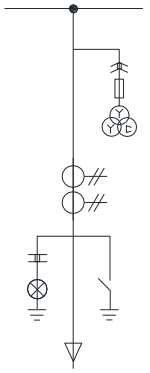
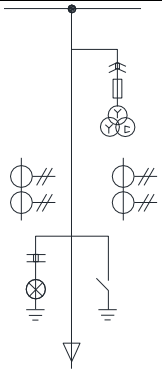
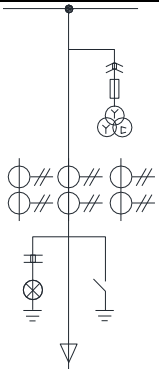
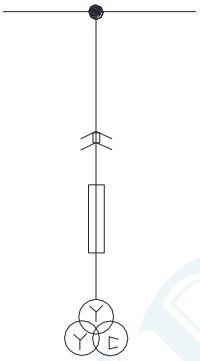
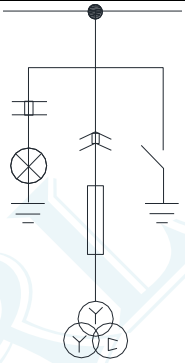
Notice: The scheme of cable or overlead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	056	057	058	059	060
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer	**3**		**1**	**2**	**3**
Voltage Transformer	**3**	**3**	**3**	**3**	**3**
High Voltage Fuse	**3**	**3**	**3**	**3**	**3**
Earthing Switch					
Surge Arrestor					
Application	Liaison Transformer + Busbar-tie				

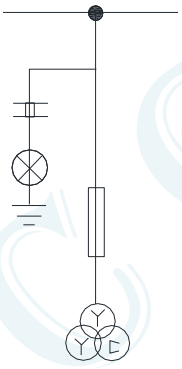
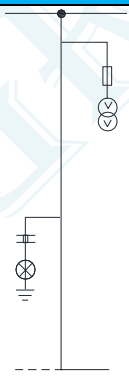
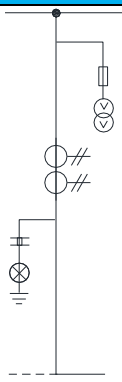
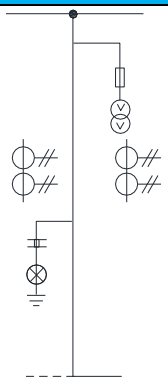
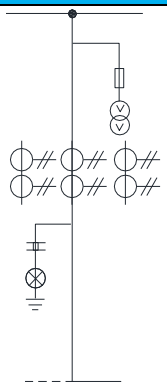
Notice: The scheme of cable or overlead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	061	062	063	064	065
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer		**1**	**2**	**3**	
Voltage Transformer	**3**	**3**	**3**	**3**	**3**
High Voltage Fuse	**3**	**3**	**3**	**3**	**3**
Earthing Switch					**1**
Surge Arrestor					
Application	Cable Incoming(Outgoing)+Transformer				

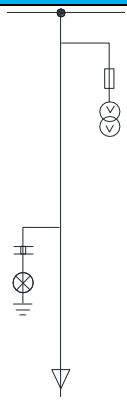
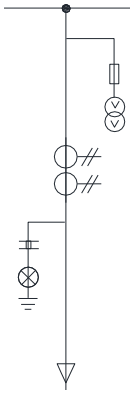
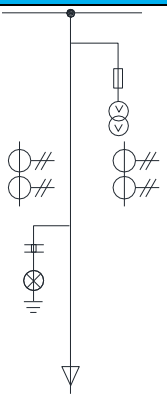
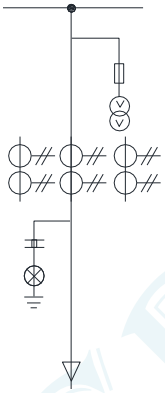
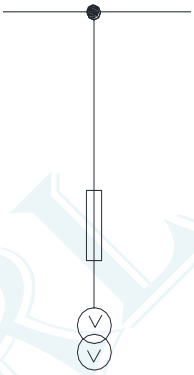
Notice: The scheme of cable or overlead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	066	067	068	069	070
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer	**1**	**2**	**3**		
Voltage Transformer	**3**	**3**	**3**	**3**	**3**
High Voltage Fuse	**3**	**3**	**3**	**3**	**3**
Earthing Switch	**1**	**1**	**1**		**1**
Surge Arrestor					
Application	Cable Incoming(Outgoing)+Transformer			Transformer	

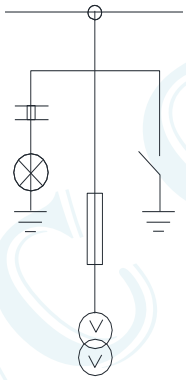
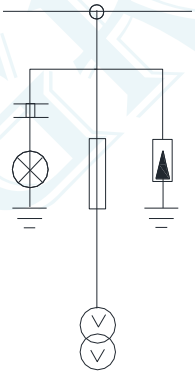
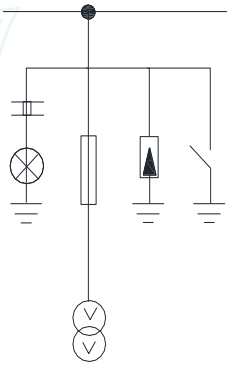
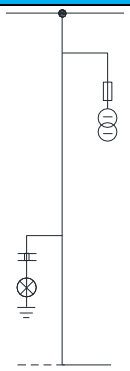
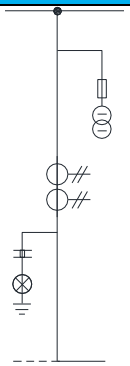
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	071	072	073	074	075
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer			**1**	**2**	**3**
Voltage Transformer	**3**	**2**	**2**	**2**	**2**
High Voltage Fuse	**3**	**3**	**3**	**3**	**3**
Earthing Switch					
Surge Arrestor					
Application	Transformer	Liaison, Metering + Busbar-tie			

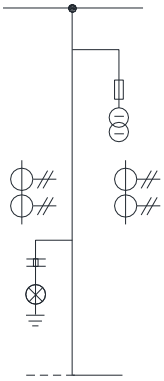
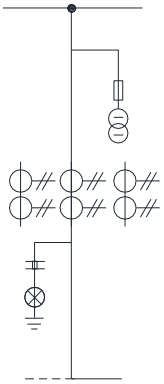
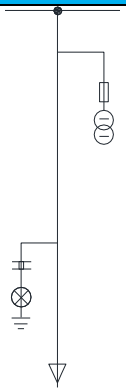
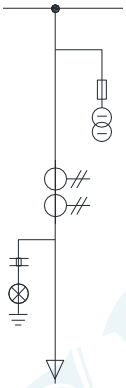
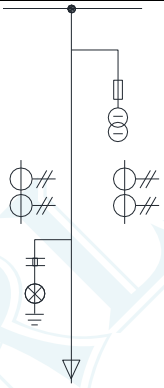
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	076	077	078	079	080
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer		**1**	**2**	**3**	
Voltage Transformer	**2**	**2**	**2**	**2**	**2**
High Voltage Fuse	**3**	**3**	**3**	**3**	**3**
Earthing Switch					
Surge Arrestor					
Application	Cable Incoming (Outgoing) + Metering				Transformer

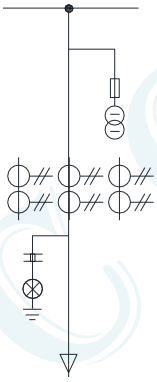
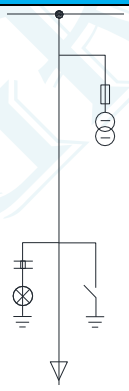
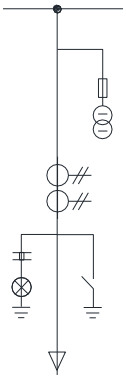
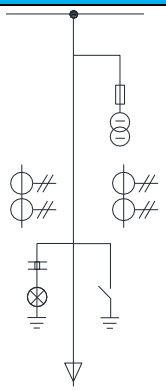
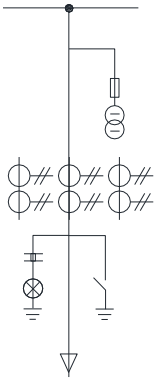
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	081	082	083	084	085
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer					
Voltage Transformer	**2**	**2**	**2**	**1**	**1**
High Voltage Fuse	**3**	**3**	**3**	**2**	**2**
Earthing Switch	**1**		**1**		
Surge Arrestor		**3**	**3**		
Application	Transformer, Arrester			Liaison,Transformer	

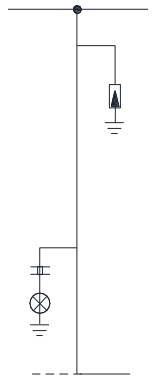
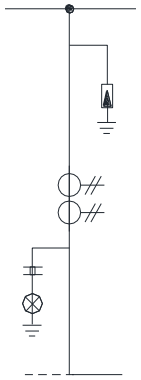
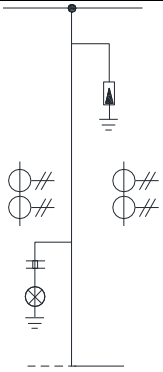
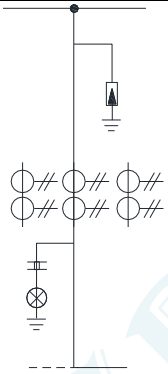
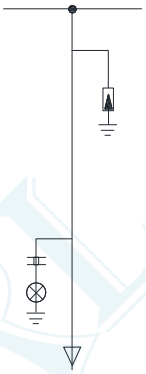
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	086	087	088	089	090
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer	**2**	**3**		**1**	**2**
Voltage Transformer	**1**	**1**	**1**	**1**	**1**
High Voltage Fuse	**2**	**2**	**2**	**2**	**2**
Earthing Switch					
Surge Arrestor					
Application	Liaison,Transformer		Cable Incoming(Outgoing),Transformer		

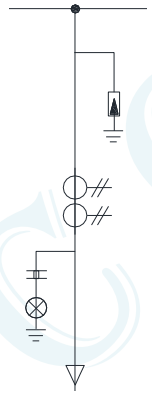
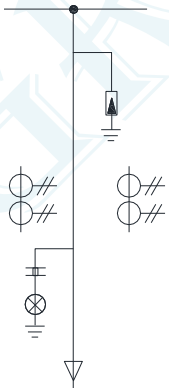
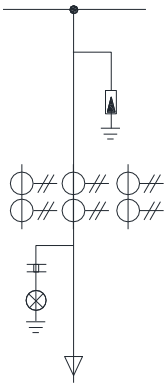
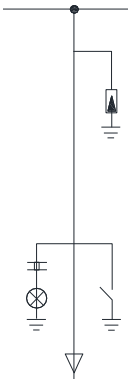
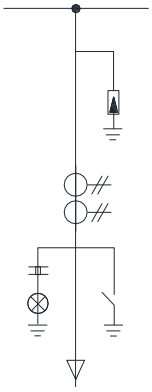
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	091	092	093	094	095
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer	**3**		**1**	**2**	**3**
Voltage Transformer	**1**	**1**	**1**	**1**	**1**
High Voltage Fuse	**2**	**2**	**2**	**2**	**2**
Earthing Switch		**1**	**1**	**1**	**1**
Surge Arrestor					
Application	Cable Incoming (Outgoing),Transformer				

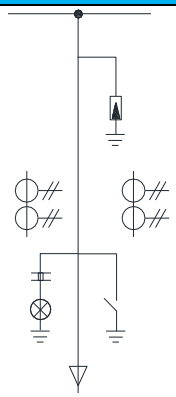
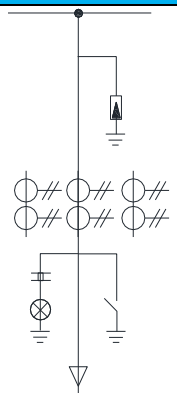
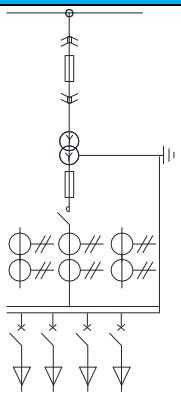
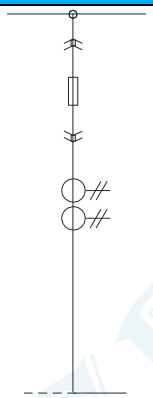
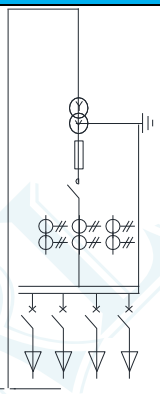
Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	096	097	098	099	100
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer		**1**	**2**	**2**	
Voltage Transformer					
High Voltage Fuse					
Earthing Switch					
Surge Arrestor	**3**	**3**	**3**	**3**	**3**
Application	Busbar-tie + Arrester				

Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	101	102	103	104	105
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer	**1**	**2**	**3**		**1**
Voltage Transformer					
High Voltage Fuse					
Earthing Switch				**1**	**1**
Surge Arrestor	**3**	**3**	**3**	**3**	**3**
Application	Cable Incoming (Outgoing) ,Thunder-arresting + Arrester				

Notice: The scheme of cable or overhead incoming(outgoing) can both be installed zinc Oxide arrester.

Scheme No.	106	107	108	109	110
Primary Circuit Diagram					
Rated Current (A)	**630~3150**				
Vacuum Circuit Breaker					
Current Transformer	**2**	**3**		**1**	
Voltage Transformer					
High Voltage Fuse			**3**	**3**	**3**
Earthing Switch	**1**	**1**			
Surge Arrestor	**3**	**3**			
Application	Cable Incoming (Outgoing)		Trarsformer		

Notice:
1.Scheme No. 108, the panel dimension of up to 50kVA transformer: 1600mm(W)x3200mm(D)x2400mm(H).
2.Scheme No. 109, 110, these two panels only can be used as a end panel of up to 50kVA transformer: 1400mm(W)x2600mm(D)x2400mm(H).

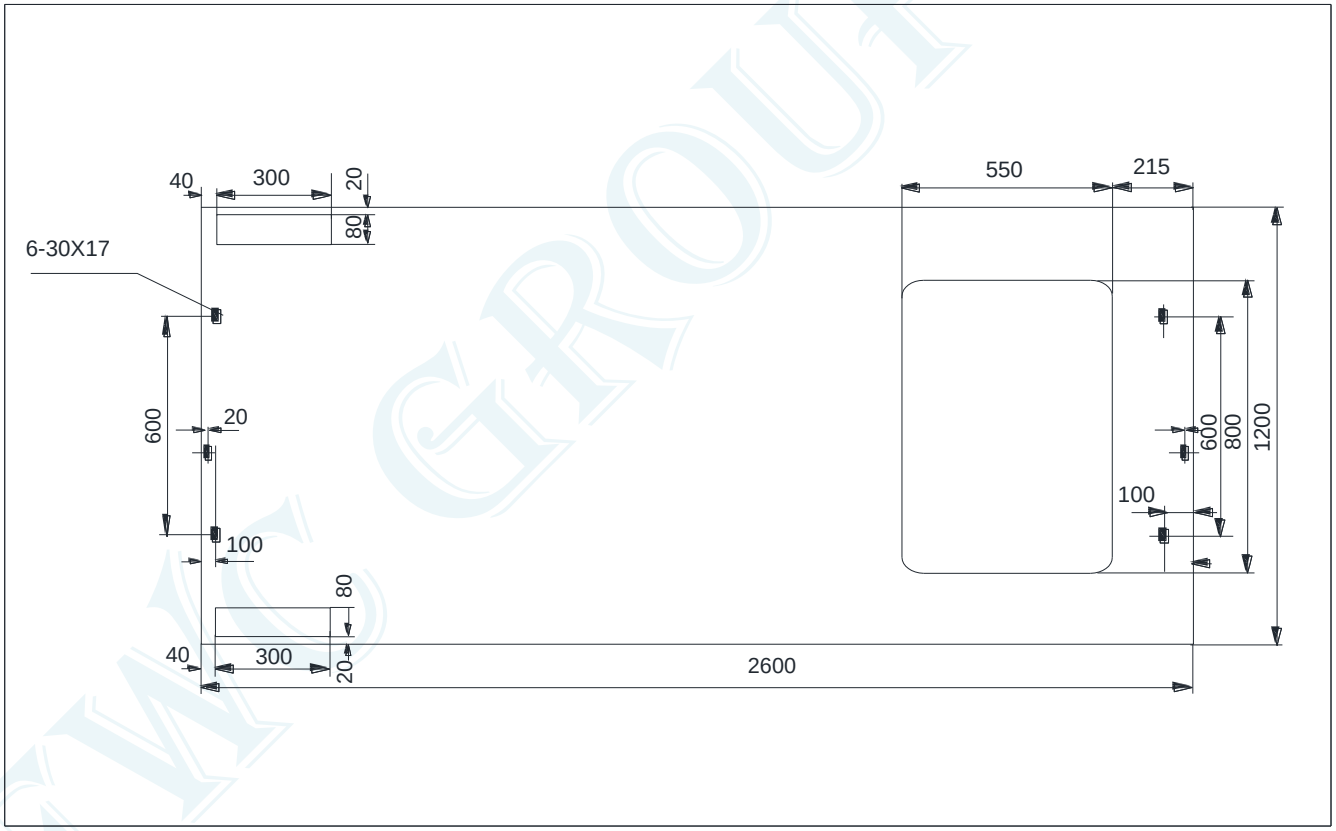
7. Installation and Arrangement of Switchgear

In the interests of an optimum installation sequence and the assurance of a high quality standard, site installation of the switchgear should only be carried out by specially trained skilled personnel, or at least supervised and monitored by responsible persons.

7.1 General Site Requirements

(Figure 7/1)
On commencement of installation at site, the switch room must be completely finished, provided with lighting and site electricity supply, lockable, dry and with facilities for ventilation. All the necessary preparations such as wall openings, ducts, etc., for laying of the power and control cables up to the switchgear must already be completed.

Figure 7/1 Open Pore Dimension of Switchgear Bottom Board



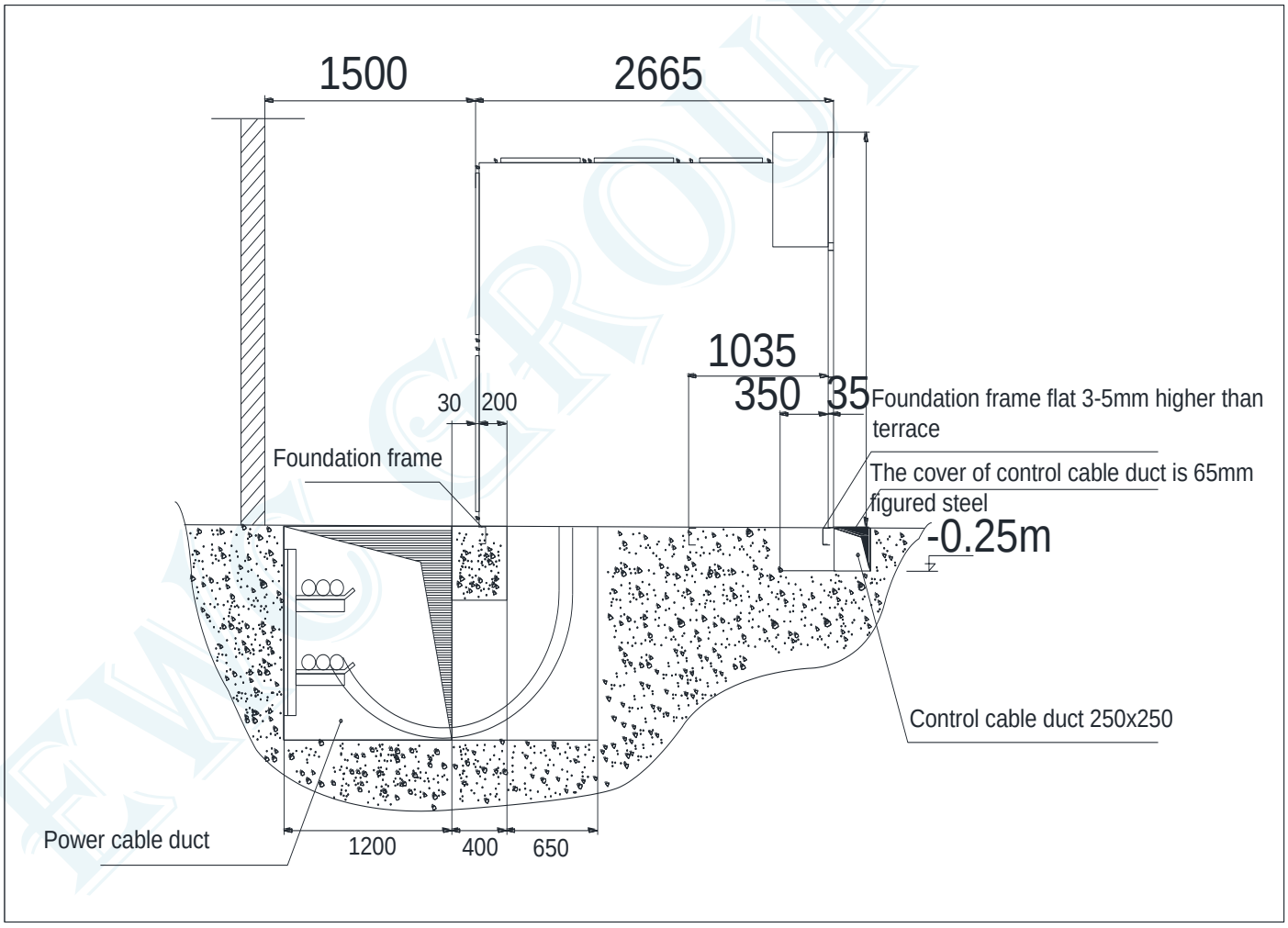
7.2 Foundation Frame on A Concrete Floor

Frame installation(Figure 7/2)

In order to guarantee the level degree on the basic frame, the basic frame welds part should be welding scheduled to join and click , and fix up the basic frame on concrete terrace accurately according to the installation arrangement of the electricity distribution room. the earth connection of the basic frame must use the zincplated flat-rolled steel which cross-section must not be smaller than 30X4 mm. Each basic frame should have less than two earthing connections.

Use the level meter to adjust surface degree of level of the whole basic frame carefully, and guarantee its correct height, the top surface of the basic frame should be 2 mm higher than completed electricity distribution room ground level ground, so that the switchgear is easily installed and adjusted. The flatness allowance is ± 1 mm/m, the frame material straight line degree allowance is ± 1 mm/m, but the deviation in the total length of the frame should not be greater than 2 mm. When the floor topping is applied, carefully back fill the foundation frame, leaving no gaps. The foundation frame must not be subjected to any injurious impacts or pressures, particularly during the installation phase. If these conditions are not fulfilled, problems during assembly of the switchgear and possibly with movement of the withdrawable parts and opening and closing of the doors can not be ruled out.

Figure 7/2 T ypical Section View of Distribution Room(Cable Be Used to Connect)



8. Operation and Maintenance

8.1 Cautions During Operation of Switchgear

8.1.1 Operation Procedures

Operator must operate the switchgear in accordance with the related operating procedures and this technical document. Any optional operating must be avoided and in case of trouble, any rough and forced operation without careful analysis must be avoided and otherwise equipment damage and person injury might resulte.

8.1.1.1 Operation of Circuit Breaker Panel Without Earthing Switch

A). Mount withdrawable circuit breaker into the panel:

Before moving the withdrawable circuit breaker into the compartment, it is necessary to check the withdrawable circuit breaker whether in a good condition, whether any part or sundries are left inside the mechanism box and compartment. Put the withdrawable circuit breaker on the transfer truck and lock it well. Push the transfer truck up to the front of the switchgear and lift it to a proper height. Insert the front positioning lock plate of the transfer truck into the slot of the compartment partition and lock the transfer truck and the compartment body together.

Open the locking hook of the withdrawable circuit breaker and push it into the compartment smoothly and steadily and lock it well. After the locking of withdrawable circuit breaker and compartment body is confirmed, unlock and disconnect the transfer truck from the compartment body and move it away.

B). Operation of the withdrawable circuit breaker inside the compartment:

After the withdrawable circuit breaker is moved inside the compartment by transfer truck and the withdrawable circuit breaker is in disconnected/testing position, first insert the secondary plug of the auxiliary circuit to put withdrawable circuit breaker into ready operating status. With power connected, the testing position indicator on the low voltage compartment will light, and at that time, an electrical operating test could be made without connection of the main circuit. For further operation, it must close all compartment doors, insert the keys to lock the doors and confirm the circuit breaker at its opening condition (refer to clause D as below).

Then insert the hand crank into the operating hole of the middle panel to turn it clockwise till the crank is obstructed obviously and hear a clear switchover sound of the auxiliary switch. In the meantime, the service position indicator on the low voltage compartment will light and then remove the hand crank. At this time, the main circuit is connected with power and the withdrawable circuit breaker is at its service position, operator can open or close the withdrawable circuit breaker via control circuit. To withdraw the withdrawable circuit breaker from its service position, it should first confirm the withdrawable circuit breaker at its opening state (Refer to point d below), insert withdrawable the circuit breaker hand crank and turn the hand crank anticlockwise till the crank is obstructed obviously and hear a clear switchover sound of the auxiliary switch. At that time, the withdrawable circuit breaker returns back its testing position, the main circuit is open completely and the shutters are closed.

C). Take the withdrawable circuit breaker out of the compartment:

In order to take the withdrawable circuit breaker out of the compartment, first it should confirm the withdrawable circuit breaker in testing position, then unplug the secondary plug of the auxiliary circuit, and lock the moving plug onto the withdrawable circuit breaker frame. Push the transfer truck up to the front of the panel(as same as mounting the withdrawable circuit breaker into the compartment), unlock the truck and pull the withdrawable circuit breaker out of the compartment. After the withdrawable circuit breaker has been moved to the transfer truck completely and it is confirmed the withdrawable circuit breaker has been locked with the transfer truck, unlock the transfer truck from the compartment, move the transfer truck backwards away appropriately from the compartment and lower it down and stop. If the transfer truck shall move a long distance, it must pay more attention to prevent it from accident in transportation.

D). Confirmation of open or close state of the circuit breaker inside the compartment:

A judgment be made according to the open and close indication plate on the withdrawable circuit breaker and open and close indicative lamps on the low voltage compartment. If a green opening indicative plate is shown on the circuit breaker when operator observes through the viewing window on the panel, it could judge that the circuit breaker is at opening state. At that time, if the secondary plug of the auxiliary circuit is connected with power, the opening indicative lamp on the low voltage compartment will light.

8.1.1.2 *Operation of Withdrawable Circuit Breaker Panel With Earthing Switch*

The operation procedures to move the withdrawable circuit breaker in and out of the compartment are as same as that for withdrawable circuit breaker without earthing switch. However, it should pay more attention during withdrawable circuit breaker operation inside the compartment and during operating the earthing switch as follows:

A. Operation of the withdrawable circuit breaker inside the compartment

To move the withdrawable circuit breaker into its service position, in addition to the operation requirements as described in 8.1.1.1, it must confirm the earthing switch in its opening condition otherwise no further operation can be done.

B. Operation of earthing switch ON and OFF

To turn on the earthing switch, first confirm the withdrawable circuit breaker has been moved backwards to its disconnected/testing position and take out the forward moving hand crank. Then push down the bending slab at the earthing switch operation hole, insert the earthing switch operating handle to turn it clockwise 90° to turn on the earthing switch. If the handle turns further anticlockwise 90°, it will turn off the earthing switch.

8.1.1.3 *Operation of Isolation Truck*

The isolation truck is unable to connect or disconnect load current, therefore, to push or pull the truck with load is not allowed. In operation of isolation truck inside the compartment, first it must ensure related circuit breaker truck open (see clause D of 8.1.1.1) and after the circuit breaker truck is open, it should unlock the electrical interlock between the auxiliary contact changeover and isolation truck. Only at that time, it is possible to operate the isolation truck with the specific operation procedures as same as that for withdrawable circuit breaker.

8.1.2 Cautions in Use of Interlock

8.1.2.1 There are mechanical interlocks and electrical interlocks in switchgear to ensure panel and operators in a safe condition all the time such as prevent the withdrawable circuit breaker to be pulled out or pushed in with load, prevent the circuit breaker to be incorrectly opened or closed, prevent the circuit breaker to be closed when the earthing switch is closed, prevent anybody accidentally to access into the compartment, and prevent the earthing switch to be closed in alive. However, operators must not ignore the requirement of the operating procedures. The combination of management rules and technical measures is necessary to give full play of the interlock device functions to prevent maloperation and accident.

8.1.2.2 The lock and unlock of the interlock function on this switchgear could be realized in the course of normal operation without additional operating procedures. If it is found the operation is obstructed (e.g. increasing operating obstruction), it should first check for maloperation. Never attempt to operate the equipment with extra force to damage the equipment or result a maloperation.

8.1.2.3 An emergent unlocking is allowed in any special urgent case (such as the interlock between the compartment bottom plate and earthing switch). However, it must be careful to use the emergent unlocking and frequent use of emergent unlocking should be avoided. Also necessary safeguard measures are required in use of emergent unlocking and after the urgent case is finished, the original interlock must be recovered immediately.

8.2 Cautions During Maintenance of Switchgear

In addition to the related maintenance procedures, the serviceman should pay more attention on following recommendations:

8.2.1 Check the condition of withdrawable circuit breaker in accordance with the installation and operation instructions of vacuum circuit breaker.

8.2.2 Check the operating mechanism and interlocks of withdrawable circuit breaker to meet the requirement in the instruction.

8.2.3 Check main circuit the condition, remove old grease on the fixed contact, check whether contacts are damaged, check spring for distortion, and check coating for oxidation under high temperature. Slove the problem immediately if any abnormal condition is found.

8.2.4 Check whether auxiliary circuit contact is in any abnormal condition and repair it if necessary.

8.2.5 Check whether the earthing circuit is earthed continuity such as earthing contacts, main earthing electrode and wiring between compartments.

8.2.6 Check whether fasteners are loose and retighten them if necessary.

9. Transportation and Storage

During Transportation and Storage of The Switchgear, It Should Pay Attention on Followings:

A. Toppling over, upside down and strenuous vibration must be prohibited and always keep the switchgear far from fire.

B. Protect the switchgear from raining and moisture.

C. Without permission, never attempt to disassemble the electrical apparatus and parts.

10. Documentation Completed with Switchgear

A. Product quality certificate

B. Packing list

C. Product routine test report

D. Product operation instructions

E. Secondary circuit diagram

F. Special tools and transfer truck (One transfer truck is equipped for every 5 sets of switchgear if the contract number of switchgear is less than 10 sets while an extra transfer truck is provided every additional 10 sets of switchgear if the total number of switchgear is more than 10 sets.)

CONTACT US

EWC GROUP srl
(ITALY – BOTTICINO)
Via Giulio Pastore, 36
(25082) Botticino (BS) - Italy
Tel.&Fax: +39 0302692486
Mobile: +39 3398887519
Email: thaer@ewcgroup.it
Website: www.ewcgroup.it