

MV prefabricated equipment

SM6

QM, QMC, PM Cubicles

Fuse-Load Break Switch Combination Unit up to 24 kV

Introduction

QM, QMC & PM are parts of SM6 product range. This SM6 range is made up of modular units and used for the MV section of MV/LV substation in secondary distribution system up to 24kV.

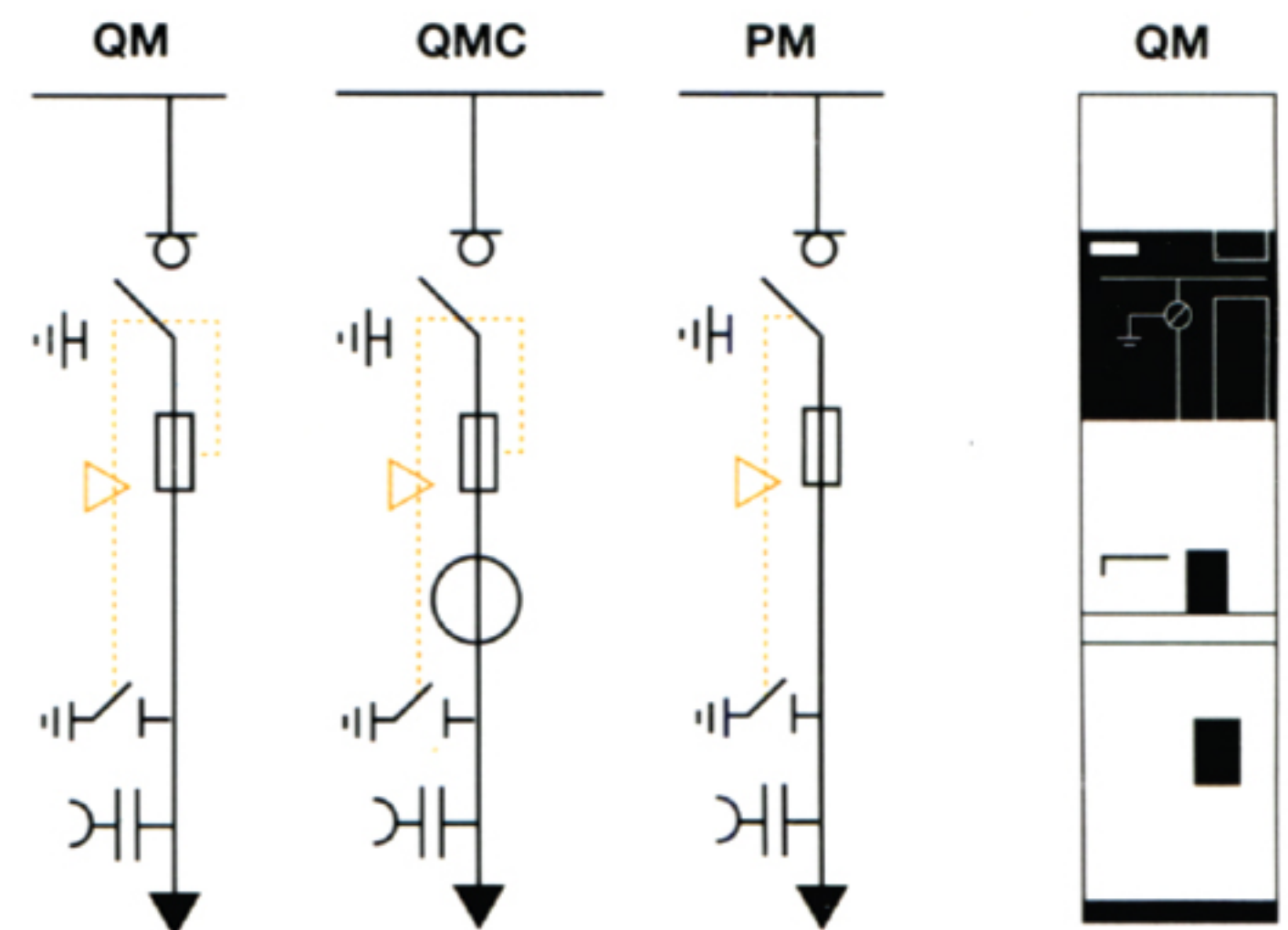
Application :

QM is a fuse load break switch combination unit with striker fuses mechanism (a blown fuse causes the switch to open). It can be used for transformer protection, cable protection, etc.

QMC is similar to QM but equipped with three CT's for metering or protection purposes.

PM is a fuse load break switch unit without striker fuses mechanism.

This QM, QMC, OR PM is normally together in the system with other parts of SM6 product range such as IM, IMC, CM, DM1, DM2, etc. in accordance with the design of a distribution system.

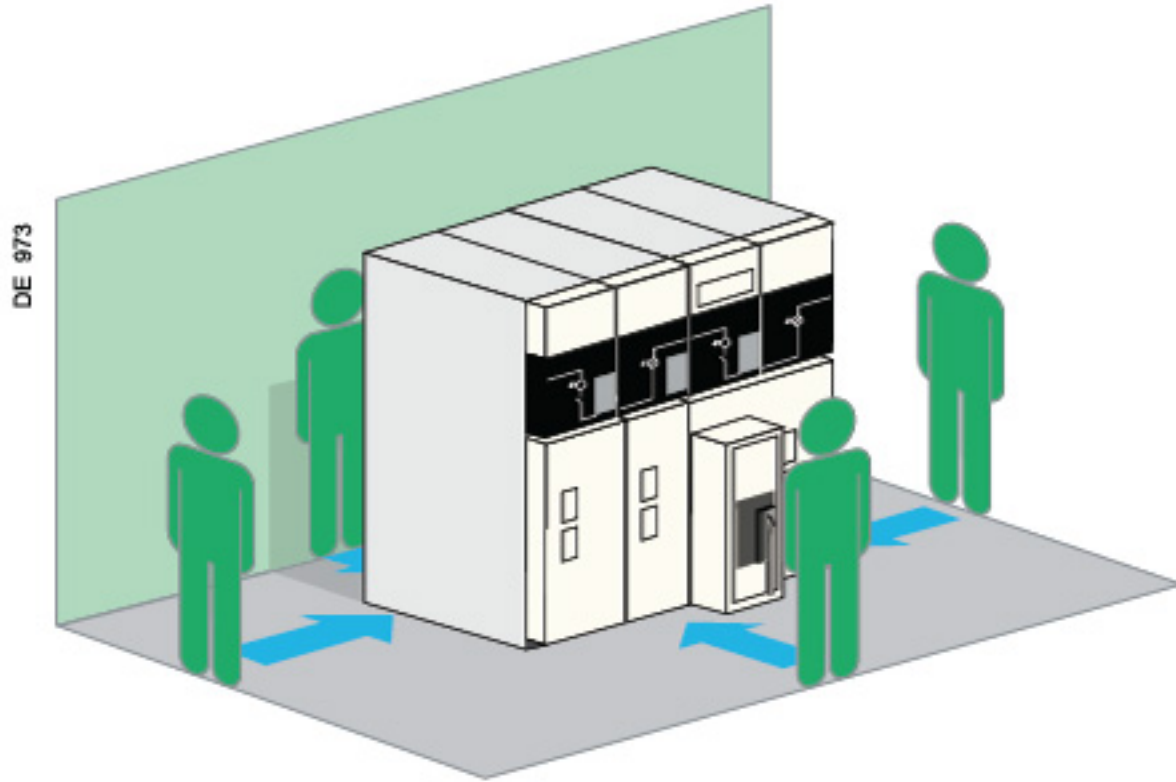


Characteristic :

Rated maximum Voltage (kV)	12		24	
Rated voltage (kVrms)	7.2	12	17.5	24
Rated insulation level				
- 50Hz for 1 min (kVrms)	20	28	38	50
- impulse 1.2/50 μ S (kVrms)	60	75	95	125
Rated current				
- load break switch (A)	400/630		400/630	
- busbar (A)	630		630	
Short time withstand current				
- for rated current 400 A (kA/1s)	12.5/14.5		12.5/14.5	
- for rated current 630 A (kA/1s)	12.5/14.5		12.5/14.5	
	16		16	
	20		20	

** See fuse selection table

Load break switch or disconnecter and earthing switch :



Example of installation of an SM6-24 switchboard installed in the middle of a room downwards exhaust 16 kA 1 s, IAC: A-FLR. 4-sides internal arc protection

Internal arc withstand :

(in accordance with IEC 82271-200):

- SM6-24
- 12.6 kA 1s, IAC A-FLR & IAC A-FL
- 16 kA 1s, IAC:A-FLR & IAC:A-FL (Standard)
- 20 kA 1s, IAC:A-FLR & IAC:A-FL

Protection index :

- Classes: PI (insulating partition)
- Loss of service continuity classes: LSC2A (LSC1 for metering functions)
- Units in switchboard IP3X
- Between compartments: IP2X for SM-24
- Cubicle: Ik08 for SM6-24

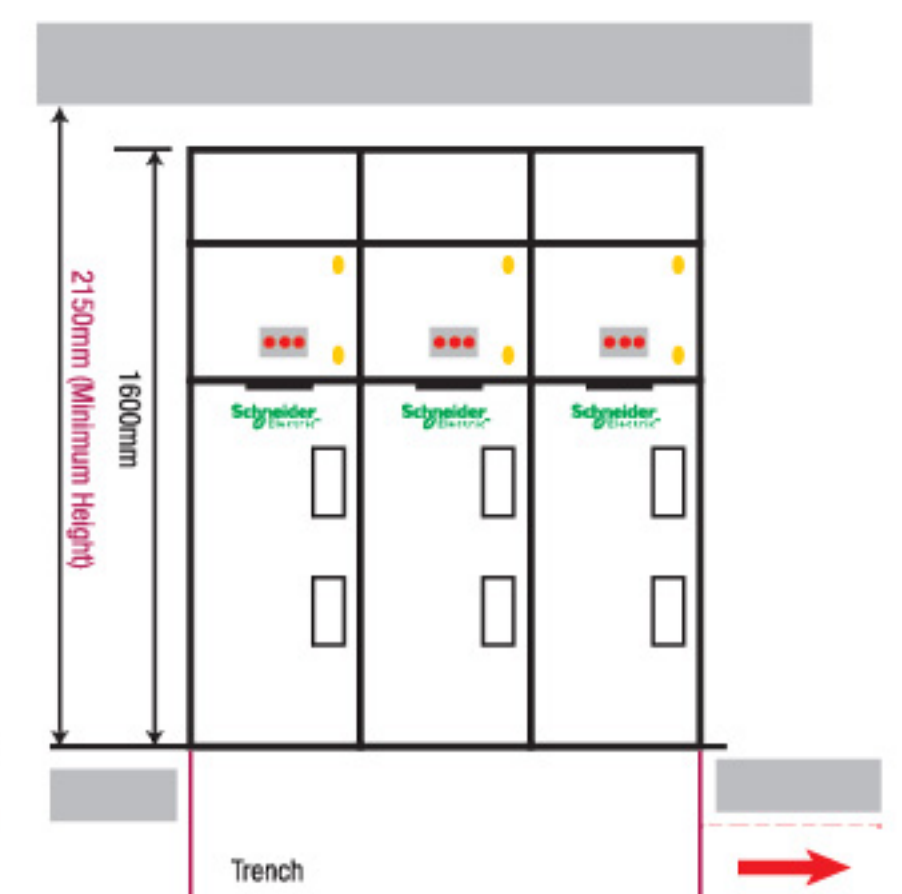
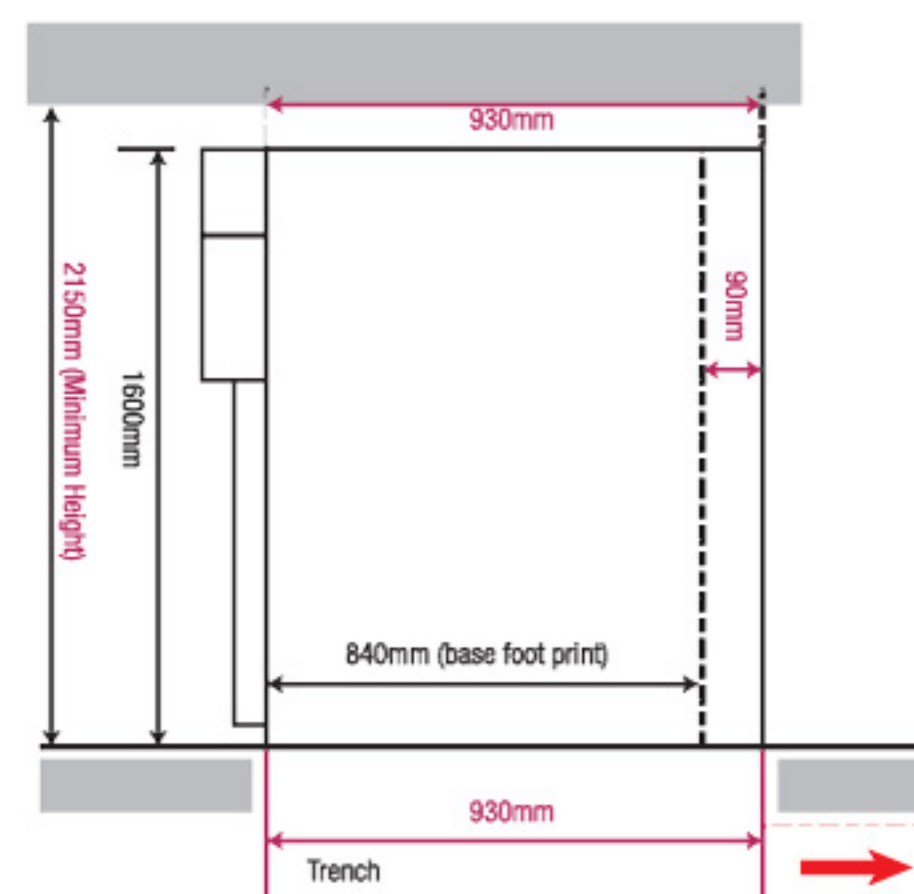
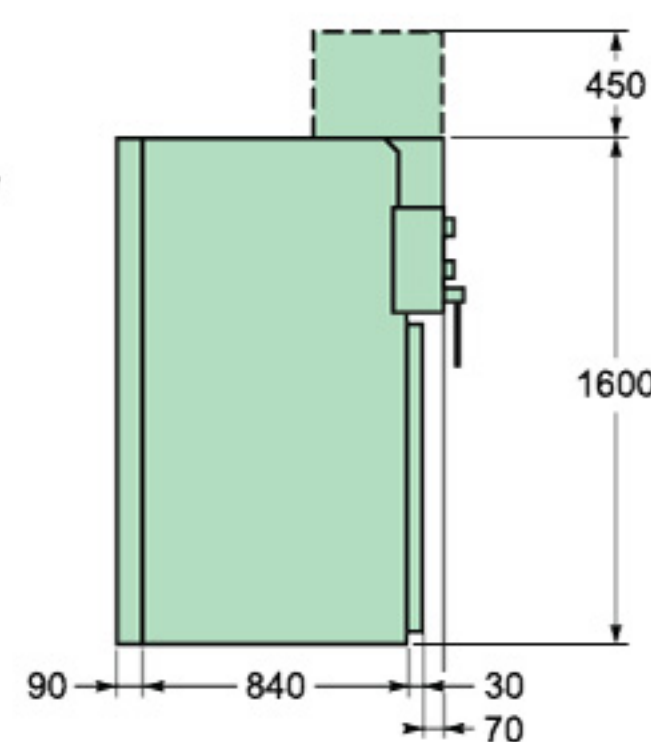
Electro-magnetic compatibility :

- relays: 4 kV withstand capacity, as per recommendation IEC 60801.4
- compartments:
 - electrical field:
 - 40 dB attenuation at 100 Mhz
 - 20 dB attenuation at 200 MHz
 - magnetic field: 20 dB attenuation below 30 Mhz.

Temperatures :

The cubicle must be stored and installed in a dry area free from dust and with limited temperature variations.

- for stocking: from -40°C to +70°C,
- for working: from -5°C to +40°C,
- other temperature, consult us.
 - 40 dB attenuation at 100 Mhz
 - 20 dB attenuation at 200 MHz
- magnetic field: 20 dB attenuation below 30 Mhz.



Side View

Front View

16 kA/1s as IAC : A - FLR (bottom exhaust gas)

Basic Equipment :

- SF6 functional load break switch and earthing switch.
- Three phase busbar 630 A.
- CI1 operating mechanism (QM & QMC).
- CIT operating mechanism (PM).
- Three fuses (PM).
- Three striker fuses (QM & QMC).
- Mechanical indication for blown fuses (QM & QMC).
- Voltage indicators.
- Downstream earthing switch.
- Heater 50 W, 220 V.
- Three current transformer (QMC).

Standard Recommendation :

- IEC standards : 62271-200, 52271-1, 62271-103, 62271-105, 60255, 62271-100, 62271-102, 61859-2, 61869-3, 60044-8, 62271-206, 62271-304
- UTE standard for 24kV NFC 13.100, NFC13.200, NFC64.130, NFC 64.160
- EDF spesification for 24kV HN64-S-41, HN64-S-43

Colour :

RAL 9003

Cabling

Through trenches
Type of cable : single core

Optional Accessories :

- Motor operating mechanism.
 - Auxiliary contacts.
 - Large LV compartment on top of the cubicle, h = 450mm.
 - key type interlocks.
 - Indication contact for blown fuses.
 - Shunt trip or undervoltage release.
 - Ring CT's + Ampere meter (QM)
- *other requirements please consult us.

Over all dimension	QM, PM	QMC
Width	500 mm	625 mm
Depth	1030 mm	1030 mm
Height	1600 mm	1600 mm
LV Compartment (h')	450 mm	450 mm
Approximate weight	140 kg	190 kg
Cable connec. height	400 mm	400 mm

Cable entry or exit :

- Through left or right side.
- Rear or front with conduit.
- Top entry and bottom entry type (for top entry the depth of cubicle is added by 600 mm and the height is added by 400 mm).

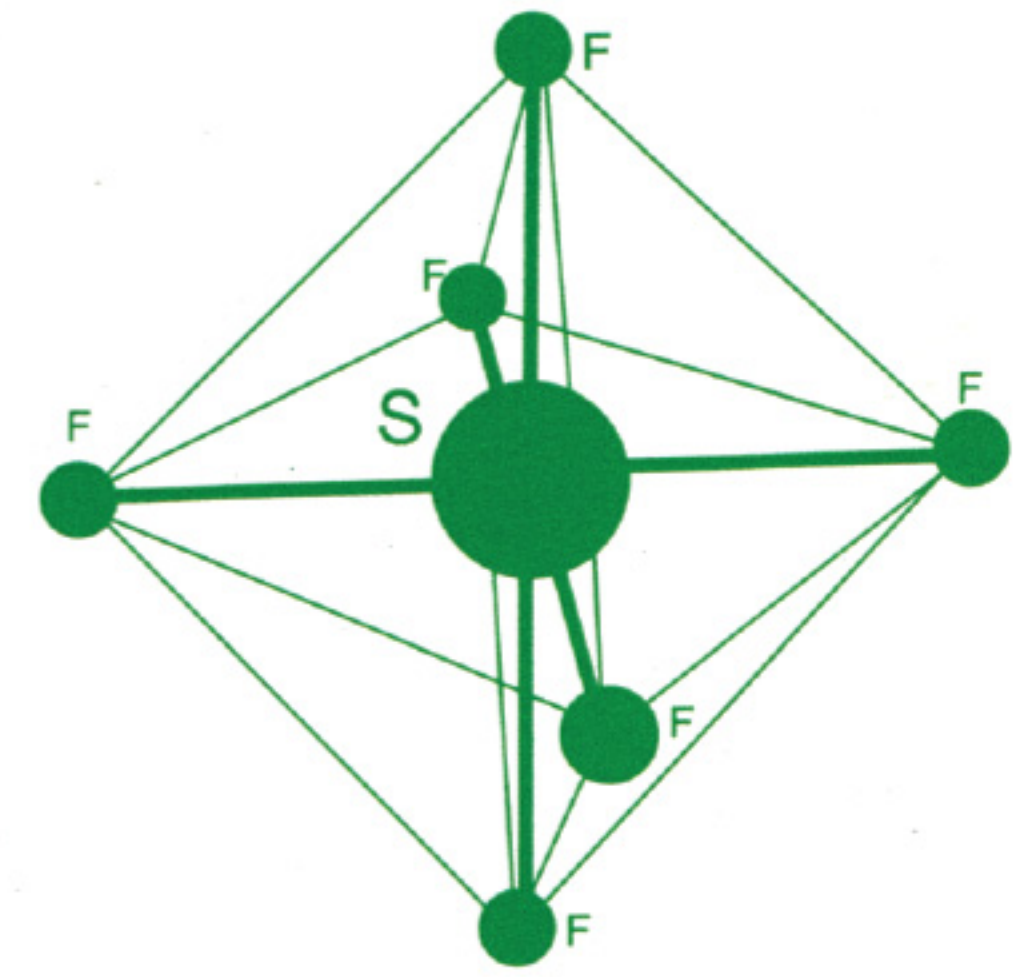
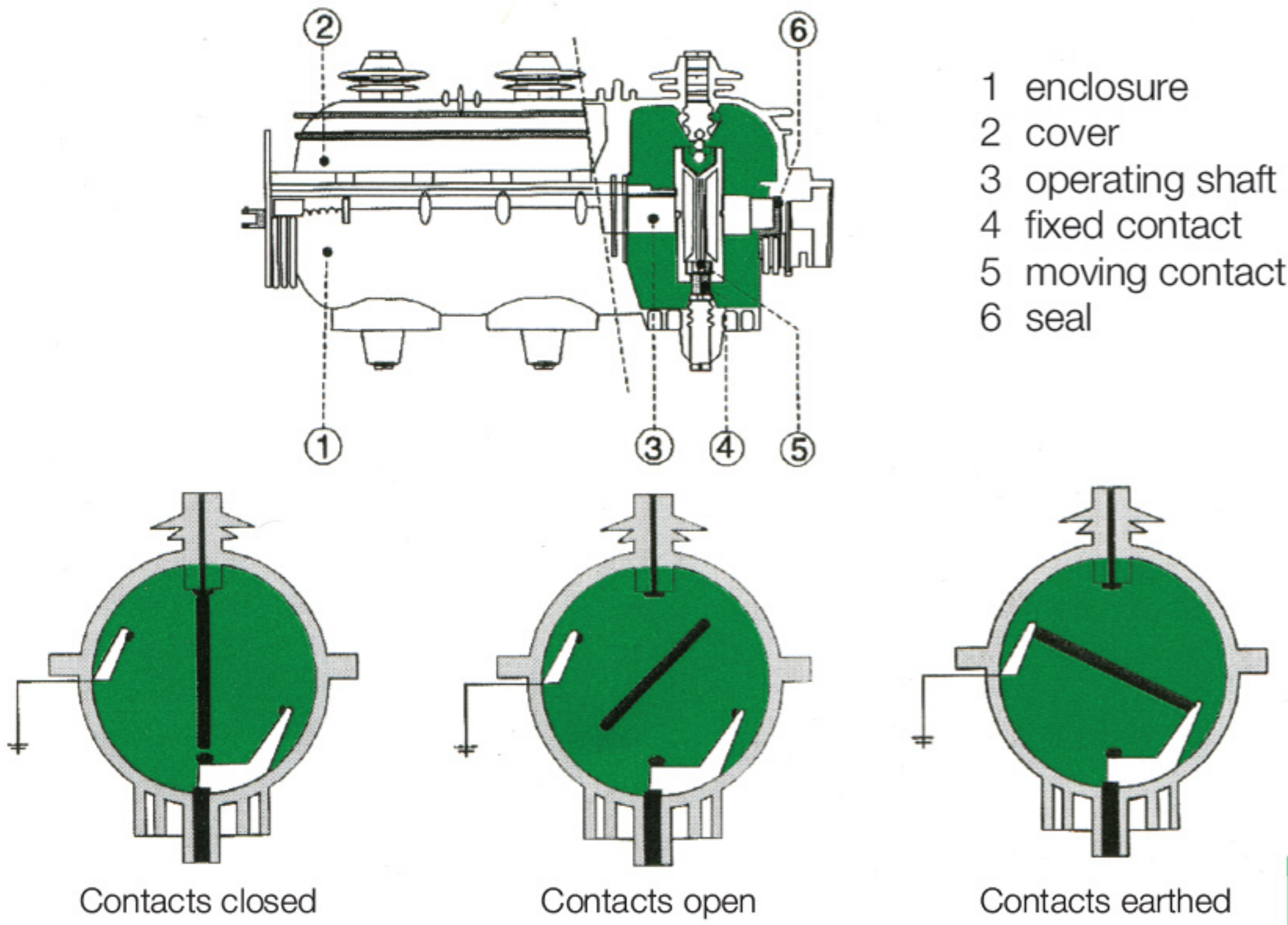
QMC must be installed with a 100mm deep pan.

QM with ring CT's must be installed with an additional 150 mm deep pan and trench.

Auxiliary power supply :

for electrical operating mechanism (when applicable)

DC : 110V or AC : 220V 50Hz
24V 110V 50Hz
48V



Transformers Protection

Fuse rating for SM6 protection units such as the PM, QM and QMC depend among others of the following criteria :

- service voltage
- transformer rating
- fuse technology (manufacturer).

Different types of fuses with medium loaded striker may be installed :

- Solefuse fuses as per standard UTE NCF 64.210
- Fusarc CF fuses as per IEC recommendation 282.1 and DIN dimensions 43.625

Example:

For the protection of a 400 kVA transformer at 10 kV, select either Solefuse fuses rated 43 A or Fusarc fuses rated 50 A.

SM6 load break switches and earthing switches use sulphur hexafluoride gas (SF6) for insulation and breaking. The active parts are placed in insulated enclosure in accordance with the definition of IEC 56 / Appendix EE (1987 edition) for sealed pressure system. These devices offer remarkable characteristic :

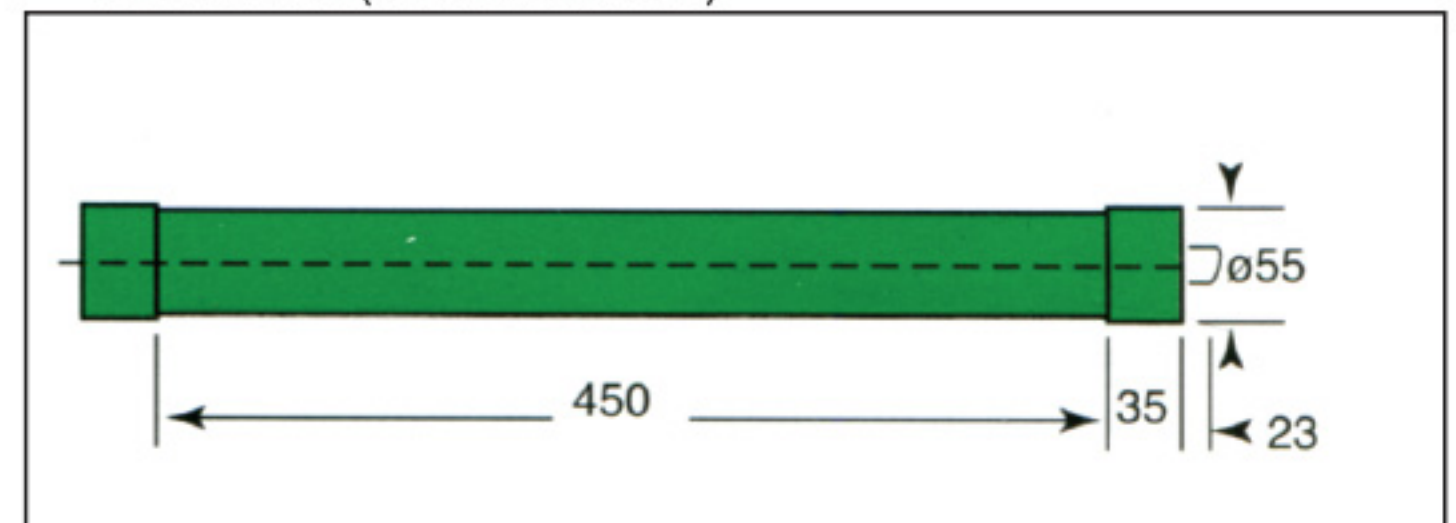
- long life service
- maintenance – free active parts
- high electrical endurance
- over – voltage levels very low
- safety operation

Rated voltage (kV)	Rating (A)	L (mm)	∅ (mm)	Weight (kg)
7.2	125	292	86	3.3
	6.3 to 20	292	50.5	1.2
12	25 to 40	292	57	1.5
	50 to 100	292	78.5	2.8
	125	442	86	4.6
	6.3 to 20	442	50.5	1.6
24	25 to 40	442	57	2.2
	50 to 63	442	78.5	4.1
	80 to 100	442	86	5.3

Please consult us on installation of fuses from other manufacturer

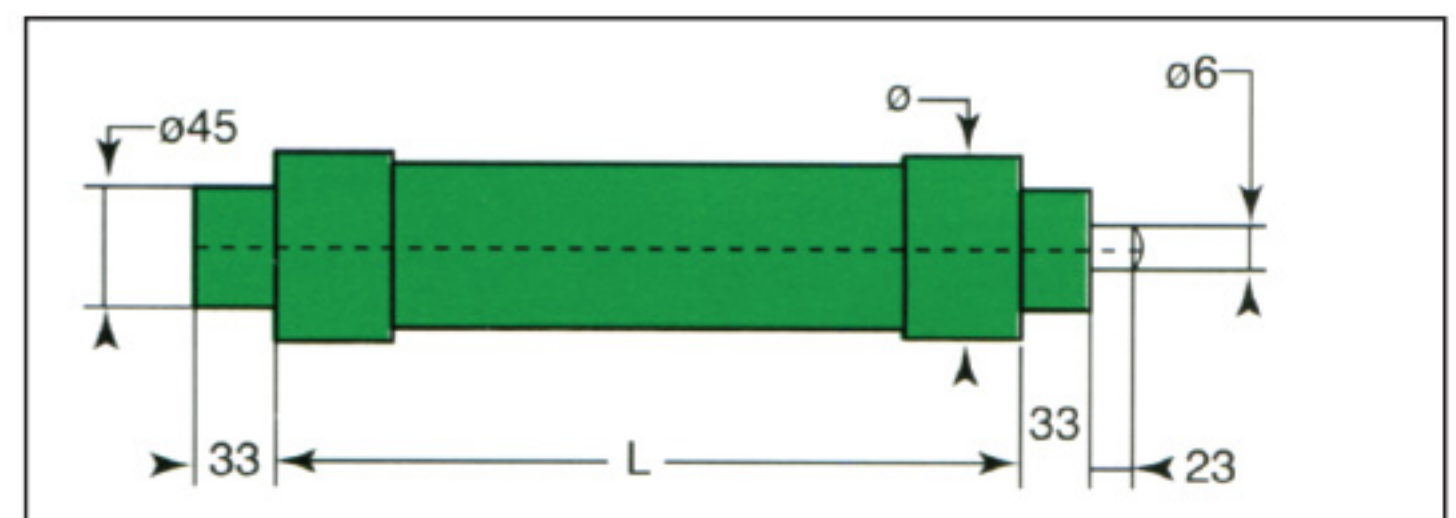
Fuse dimensions

Solefuse (UTE standard)



Rated voltage (kV)	Rating (A)	L (mm)	∅ (mm)	Weight (kg)
7.2	6.3 to 125	450	55	2
12	100			
17.5	80			
24	6.3 to 63			

Fusarc CF (DIN standard)



Fuse Selection Table

Selection table (rating in A, no overload, $-5^{\circ}\text{C} < \theta < 40^{\circ}\text{C}$).
Please consult us for overloads and operation over 40°C .

Type of fuse	Service voltage (kV)	Transformer rating (kVA)																	Rated voltage (kV)	
		25	50	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500		
Solefuse	(UTE NFC standards 13.100.64.210)																			7.2
	5.5	6.3	1.6	31.5	31.5	63	63	63	63	63										
	10	6.3	6.3	16	16	31.5	31.5	31.5	63	63	63	63								
	15	6.3	6.3	16	16	16	16	16	43	43	43	43	43	63						
	20	6.3	6.3	6.3	6.3	16	16	16	16	43	43	43	43	43	63					
Solefuse	(General case, UTE NFC standards 13.200)																			7.2
	3.3	16	16	31.5	31.5	31.5	63	63	100	100										
	5.5	6.3	16	16	31.5	31.5	63	63	63	80	80	100	125							
	6.6	6.3	16	16	16	31.5	31.5	43	43	63	80	100	125	125						
	10	6.3	6.3	16	16	16	31.5	31.5	31.5	43	43	63	80	80	100					
	13.8	6.3	6.3	6.3	16	16	16	16	31.5	31.5	31.5	43	63	63	80					
	15	6.3	6.3	16	16	16	16	16	31.5	31.5	31.5	43	43	63	80					
	20	6.3	6.3	6.3	6.3	16	16	16	16	31.5	31.5	31.5	43	43	63					
	22	6.3	6.3	6.3	6.3	16	16	16	16	16	31.5	31.5	31.5	43	63	63				
	Fusarc CF and SIBA⁽¹⁾	(General case for QM, QMB and QMC cubicle according to IEC 62271-105)																		
3.3		16	25	40	50	50	80	80	100	125	125	160 ⁽¹⁾	200 ⁽¹⁾							
5		10	16	31.5	40	40	50	63	80	80	125	125	160 ⁽¹⁾							
5.5		10	16	31.5	31.5	40	50	50	63	80	100	125	125	160 ⁽¹⁾	160 ⁽¹⁾					
6		10	16	25	31.5	40	50	50	63	80	80	125	125	160 ⁽¹⁾	160 ⁽¹⁾					
6.6		10	16	25	31.5	40	50	50	63	80	80	100	125	125	160 ⁽¹⁾					
10		6.3	10	16	20	25	31.5	40	50	50	63	80	80	100	100	125 ⁽¹⁾	200 ⁽¹⁾			
11		6.3	10	16	20	25	25	31.5	40	50	50	63	80	100	100	125 ⁽¹⁾	160 ⁽¹⁾			
13.8		6.3	10	16	16	20	25	31.5	31.5	40	50	50	63	80	80	100 ⁽¹⁾	125 ⁽¹⁾	125 ⁽¹⁾		
15		6.3	10	10	16	16	20	25	31.5	40	50	50	63	80	80	100 ⁽¹⁾	125 ⁽¹⁾	125 ⁽¹⁾		
20		6.3	6.3	10	10	16	16	25	25	31.5	40	40	50	50	63	80	100 ⁽¹⁾	125 ⁽¹⁾		
22		6.3	6.3	10	10	10	16	20	25	25	31.5	40	40	50	50	80	80	100 ⁽¹⁾		

(1) = SIBA fuses

Fuse rating for SM6-24 protection units such as PM, QM, QMB and QMC depend, among other things, on the following criteria:

- service voltage
- transformer rating
- fuse technology (manufacturer)

Different types of fuses with medium loaded striker may be installed:

- Solefuse fuses as per standard UTE NCF 64.210
- Fusarc CF Fuses as per IEC recommendation 60.282.1 and DIN dimensions 43.625

For fuse-switch combination unit type QM, QMB, QMC, refer only to the selection table and reference list of fuses.

For all other type fuses, consult us.

Example: for the protection of a 400 kVA transformer at 10 kV, select either Solefuse fuses rated 43 A or Fusarc CF fuses rated 50 A.

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