MV prefabricated equipment

SM6

QM, QMC, PM Cubicles

Fuse-Load Break Switch Combination Unit up to 24 kV

Introduction

QM, QMC & PM are part 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 24 kV.

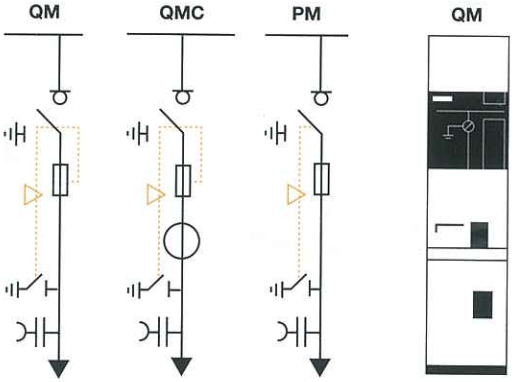
Application :

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 installed 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 us (kVp)	60	75	95	125
Rated current				
- load break switch (A)	400/630		400/630	
- busbar (A)	630		630	
- fuse (A)	**		**	
Short time withstand current				
- for rated current 400 A (kA/1s)	12.5		12.5	
- for rated current 630 A (kA/1s)	12.5		12.5	
	16		16	
	20		20	

** See fuse selection table

Schneider Electric

Load break switch or disconnector and earthing switch :

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 transformers (QMC)

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	750 mm
Depth	940 mm	940 mm
Height	1600 mm	1600 mm
LV compartment (h')	450 mm	450 mm
(option)		
Approximate weight	130 kg	230 kg
Cable connec. height	400 mm	340 mm

Standard Recommendation

IEC standard :
IEC 60694, 62271-200,
60265-1, 62271-105, 60255,
62271-100, 62271-102

NFC 13.100, 13.200, 64.130, 64.160

EDF specification :
HN 64-S-41, 64-S-43
SNI K-29-HB-01
K-30-HB-02

Colour :
White RAL 9002 Smooth
Grey RAL 7030 Smooth (option)

Cabling
Through trenches
Type of cables : single core

Current transformer for QMC unit :
transformer type ARM1/N1F & ARM2/NF2

- single primary winding
- single secondary winding for measurement or protection.

Internal arc withstand :

- standard: 12.5 kA 1 s, IAC: A-FL
- enhanced: 16 kA 1 s, IAC: A-FLR & IAC: A-FL in accordance with IEC 62271-200

Protection index :

- classes: PI (insulating partition)
- loss of service continuity classes: LSC2A
- units: IP3X
- Cubicle: IK08

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 cubicles 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 temperatures, consult us.

Cable entry or exit :

- through left or right side
- rear or front with condult
- top entry and bottom entry type (for top entry the depth of cubicle is added by 600 mm & the height is added by 400 mm)

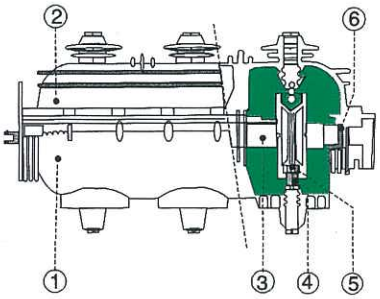
X section (sqmm)	bending radius (mm)	depth of trench (mm)
50	370	350
70	400	350
95	440	350

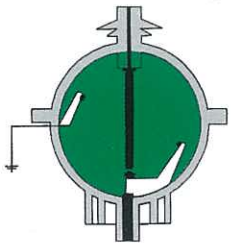
QMC must be installed with a 100 mm deep pan.
QM with ring CT's must be installed with an additional 150 mm deep pan and trench.

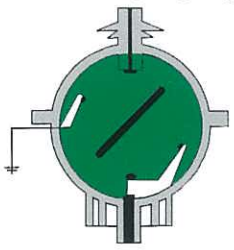
Auxiliary power supply :
for electrical operating mechanism (when applicable)
DC : 110V or AC : 220V 50Hz
24V 110V 50Hz
48V

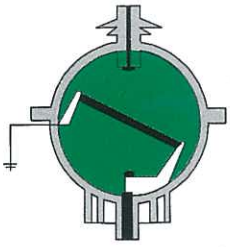
Short-time withstand current Ith (kA)

I1n (A)		10-20	20-40	25	50	100
Ith (kA)		5	12,5	2	4	8
t (s)		1s				
measurement	5A	7,5VA class 0,5		10VA class 0,5		
protection	5A	5VA 5P10				




Contacts closed


Contacts open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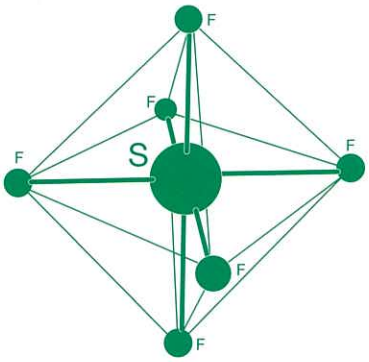


SM6 load break switches and earthing switches use sulphur hexafluoride gas (SF6) for insulation and breaking. The active parts are placed in an insulated enclosure in accordance with the definition of IEC 56 / Appendix EE (1987 edition) for sealed pressure system. These devices offer remarkable characteristics

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

Transformers Protection

Fuse rating for SM6 protection units such as the PM, QM and QMC depend among others 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 282.1 and DIN dimensions 43.625

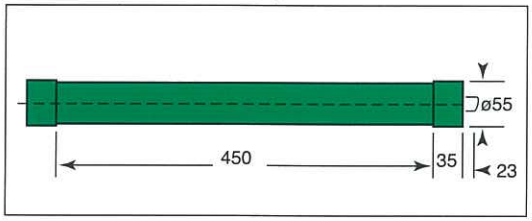
Example:
For the protection of a 400 kVA transformer at 10 kV, select either Solefuse fuses rated 43 A or Fusarc fuses rated 50 A.

rated voltage (kV)	rating (A)	L (mm)	Ø (mm)	weight (kg)
7.2	125	292	86	3.3
12	6.3 to 20	292	50.5	1.2
	25 to 40	292	57	1.5
	50 to 100	292	78.5	2.8
	125	442	86	4.6
24	6.3 to 20	442	50.5	1.6
	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

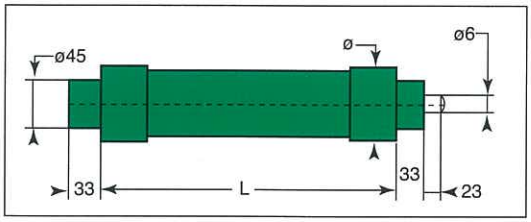
Fuse dimensions

Solefuse (UTE standard)



rated voltage (kV)	rating (A)	L (mm)	Ø (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°C < θ < 40°C).
Please consult us for overloads and operation over 40°C.

Type of fuse	Service voltage (kV)	Transformer rating (kVA) 25	50	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	Rated voltage (kV)
Solefuse (UTE NFC standards 13.100.64.210)																			
	5.5	6.3	16	31.5	31.5	63	63	63	63	63									7.2
	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				24
Solefuse (general case, UTE NFC standards 13.200)																			
	3.3	16	16	31.5	31.5	31.5	63	63	100	100									7.2
	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				12
	13.8	6.3	6.3	6.3	16	16	16	16	31.5	31.5	31.5	43	63	63	80				17.5
	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				24
	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)						7.2
	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)		12
	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)	17.5
	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)	24
	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 ratings 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 of 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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