

M-RING 24

SF6 INSULATED RING MAIN UNIT
METAL ENCLOSED (LSC2A)



according to

3B Energy can propose a huge number of Products related to Energy sector. We are active in the whole world of Power Transmission and Distribution. Medium Voltage switchgears, Medium Voltage switches, Low Voltage PC, Low Voltage MCCs with fix and withdrawable units, Transformers, Cabinets; 3B Energy can propose a wide range of Products for fulfilling any request and need.

3B Energy is very active and smart in assisting customers for finding Solutions related to Energy sector. We can support the customer during engineering phase of the plant, during purchasing steps, for the supply and after-sales services. 3B Energy is a real “turnkey” Solution provider; Package Substations, Transformer Substations, Mobile Cabinets; we can propose a complete solution set for letting the customer have one player only for his whole plant.

3B Energy can propose a complete and detailed list of Services which can cover each step of Engineering phase. Our technical staff is highly expert and professional and can support the customer starting from the base design of a single component till a complete apparatus for electrical application. We can design and project every component the customer may need: a single contact or a complete switching device, we can develop and engineer the technology for any product or application of Energy sector

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GENERAL

M-RING 24 series Ring Main Unit is an extensible, SF6 insulated switchgear, with rated voltage of 12&24 kV. All its HV live parts are contained in an air-tight gas tank, which is made from stainless steel of 3mm. The whole switching assembly is SF6 insulated, and free from any external influence, ensuring it great reliability of service and maintenance free. By plug-in type busbar extension, M-RING 24 series RMU can be of free combination and full modularization. The busbar extension has passed type test for power and thermal stability, and is fully insulated and shielded, exhibiting high reliability and safety.

M-RING 24 series Ring Main unit is suitable for all MV network up to 24 kV, all compact power stations, power distribution substations in all important industries, such as petrol-chemical industry, metallurgical and mining industries, and all transformer substations and wind power system.



Advanced facilities and process

1. With the laser cutting and punching machines imported from TRUMPF (Germany), the accuracy of re-location can be 0.02mm; the cutting deviation can be less than 0.05mm, which ensures that before welding the gaps between plates of gas tank are smaller than 0.1mm.



2. The three-dimension and five-axis laser welding system, also from TURMPF, with welding laser beam of φ 0.1mm and under protection of Helium gas, welds the stainless steel plates, the welding quality equals to bended steel plates, which ensure the gas tightness and uniformity of all gas tanks.



3. The fully automatic and integral helium leak detection system, made by SEILER Vakuumtechnik GmbH, through detecting of Helium leakage, brings gas leakage rate per year down to less than 0.02%, ensuring the life span of gas tank of over 30 years.



4. The ITP circuit breakers, ITP fuse holders, outgoing bushings, busbar bushing, and insulators as well as other epoxy resin insulated parts are also manufactured by fully-automatic and digitally controlled epoxy resin vacuum mixing/pressure gelatinizing system from Hedrich(Germany).

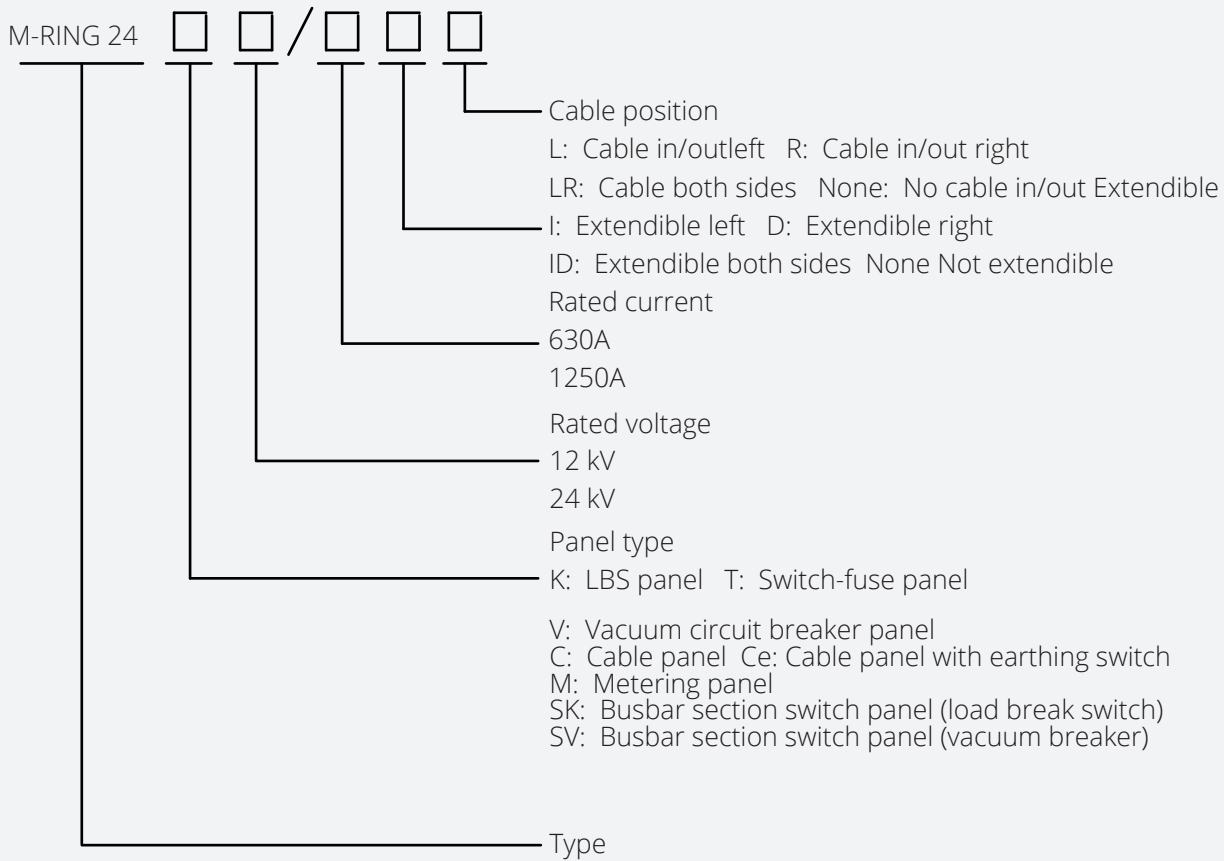


5. The busbar connector, cable connector, end-plug and other silicone rubber insulated parts are manufactured by fully-automatic and digitally controlled silicone rubber mixing/pressure gelatinizing system from VOGEL (Switzerland).



6. With the top-ranking partial discharge laboratory, Equipped with ICM compact from PD (Powev Diagnosis, Germany), which the system can guarantee the background noise level for all-condition of less than 0.3pC, and of the rated voltage up to 150kV, ensuring all components of our products highest quality available.

Definition of M-RING 24



Example:

1. M-RING 24-K-12/630DL means LBS panel, rated voltage: 12kV, rated current: 630A, extensible on right side, cable in/out on left side.
2. M-RING 24-KT-12/630IR means block version, combination of LBS unit and fuse-combined unit, rated voltage: 12kV, rated current: 630A, extensible on left side, cable in/out on right side.



M-RING 24

Relevant Standards

M-RING 24 series meets the following international standards and National standards:

- IEC60694:2002
- IEC62271—200:2003
- IEC60265-1:1997
- IEC62271-100:2001
- IEC62271-105: 2002
- IEC62271-102:2002

Service Condition

- | | |
|------------------------|---|
| 1, Ambient temperature | —40°C~+40°C |
| 2, Humidity | Max. daily average relative humidity 95% |
| 3, Altitude | 2000m (for above 2000m on demand) |
| 4, Special condition | While application in special condition, contact the manufacturer to find a customized solution.
While the application is in adverse environment, contact the manufacturer or supplier to find a proper solution, and/or application in the altitude exceeding 2000 m, specify definitely in order, we will supply a particular solution accordingly. |

Table 1: Technical Data for 12kV Ring Main Unit

Description	Unit	M-RING 24-K	M-RING 24-T	M-RING 24-V	M-RING 24-C
Rated voltage	kV	12	12	12	12
Power frequency	Phase to phase/earth	kV	42	42	42
withstand voltage (1min)	Between open contacts	kV	48	48	48
Impulse withstand voltage	Phase to phase/earth	kV	75, (95)*	75, (95)*	75, (95)*
	Between open contacts	kV	85, (110)*	85, (110)*	85, (110)*
Rated frequency	Hz	50, 60	50, 60	50, 60	50, 60
Rated current	A	630	①	630	630
Rated short circuit breaking current	kA		②	20, (25)*	
Rated short time withstan current	kA/s	20/3,(20/4, 25/1)*		20/3,(20/4, 25/3)*	20/3,(20/4, 25/1)*
Rated peak withstand current	kA	50, (63)*		50, (63)*	50, (63)*
Rated short circuit making current	kA	50, (63)*	②	50, (63)*	50, (63)*
Rated transfer current			1800		
Rated active load breaking current	A	630			630
Rated closed loop breaking current	A	630			630
5% rated active load breaking current	A	31.5			31.5
Rated operating sequence				O-0.3s-CO- 180s-CO	
Mechanical lifetime	Ops.	5000	5000	10000	5000
Electrical lifetime		E3		E2	E3
Thickness of stainless steel	mm		3.0		
SF6 rated pressure	kPa		30 (at 20 ②) 101.3kPa)		
Leakage rate per year			<0.02%		
Water treatment test		12kV 24 hours (at 30 kPa under water)			
Internal Arc Test			20kA 1s		
Protection Degree	Gas tank		IP 67		
	Fuse holder		IP 67		
	RMU		IP 4X		

Notes:

① Rated current of Switch-fuse panel depends on rating of fuse, and $\leq 125A$.

② Rated short-circuit breaking/making currents of Switch-fuse panel depend on rating of fuse.

* Values in brackets are for special requirement, please contact manufacturer or supplier for more information.

Table 1: Technical Data for 24kV Ring Main Unit

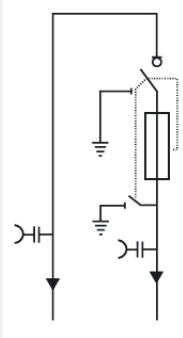
Description		Unit	M-RING 24-K	M-RING 24-T	M-RING 24-V	M-RING 24-C
Rated voltage		kV	24	24	24	24
Power frequency withstand voltage (1 min)	Phase to phase/earth	kV	50, (65)*	50, (65)*	50, (65)*	50, (65)*
	Between open contacts	kV	64, (79)*	64, (79)*	64, (79)*	64, (79)*
Impulse withstand voltage	Phase to phase/earth	kV	95, (72,5)*	95, (72,5)*	95, (72,5)*	95, (72,5)*
	Between open contacts	kV	110, (145)*	110, (145)*	110, (145)*	110, (145)*
Rated frequency		Hz	50, 60	50, 60	50, 60	50, 60
Rated current		A	630	①	630	630
Rated short circuit breaking current		kA		②	20	
Rated short time withstand current		kA/s	20/3,(20/4)*		20/3,(20/4)*	20/3,(20/4)*
Rated peak withstand current		kA	50		50	50
Rated short circuit making current		kA	50	②	50	50
Rated transfer current				1400		
Rated active load breaking current		A	630			630
Rated closed loop breaking current		A	630			630
5% rated active load breaking current		A	31.5			31.5
Rated operating sequence					O-0.3s-CO-180s-CO	
Mechanical lifetime		Ops.	5000	5000	10000	5000
Electrical lifetime			E3		E2	E3
Thickness of stainless steel		mm		3.0		
SF6 rated pressure		kPa		30 (at 20②), 101.3kPa)		
Leakage rate per year					<0.02%	
Water treatment test			24kV 24 hours (at 30 kPa under water)			
Internal Arc Test				20kA	1s	
Protection Degree	Gas tank				IP 67	
	Fuse holder				IP 67	
	RMU				IP 4X	

Notes:

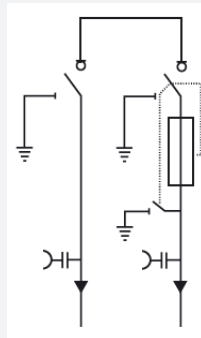
① Rated current of Switch-fuse panel depends on rating of fuse, and ≤100A.

② Rated short-circuit breaking/making current of Switch-fuse panel depends on rating of fuse.

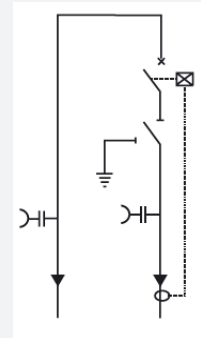
* Values in brackets are for special requirement, please contact manufacturer or supplier for more information. If 20KA/4s is required for rated short time withstand, please specify definitely when you are ordering.



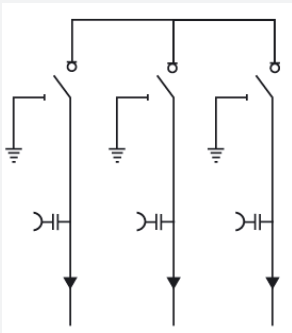
2 units CT (260kg) 700×765×1345mm



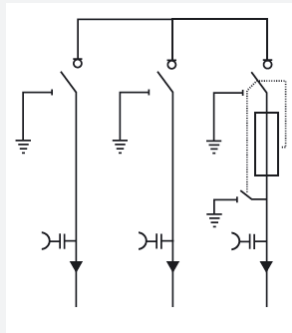
2 units KT (270kg) 700×765×1345mm



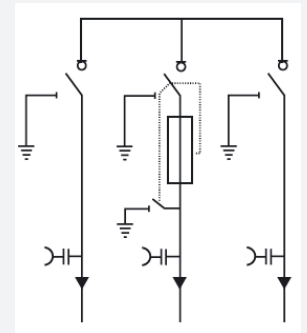
2 units CV (252kg) 700×765×1345mm



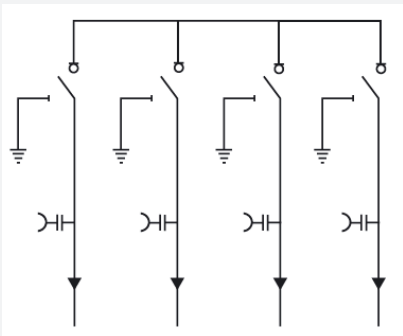
3 units KKK (300kg) 1020×765×1345mm



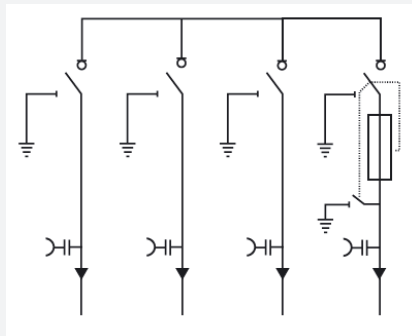
3 units KKT (320kg) 1020×765×1345mm



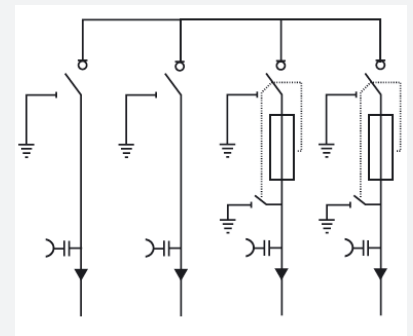
3 units KTK (320kg) 1020×765×1345mm



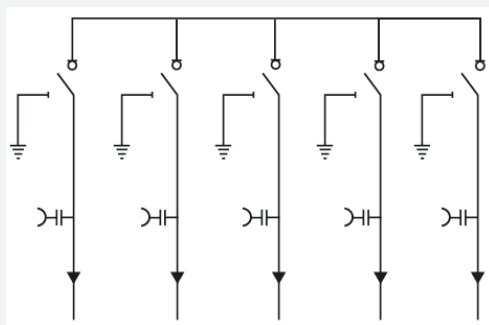
4 units KKKK (390kg) 1350×765×1345mm



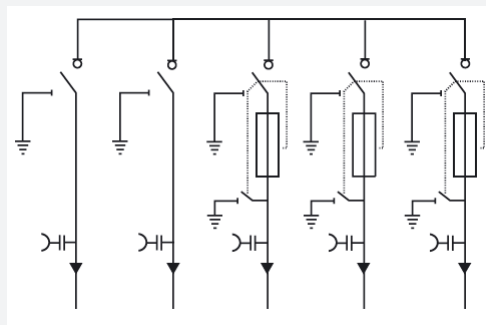
4 units KKKT (410kg) 1350×765×1345mm



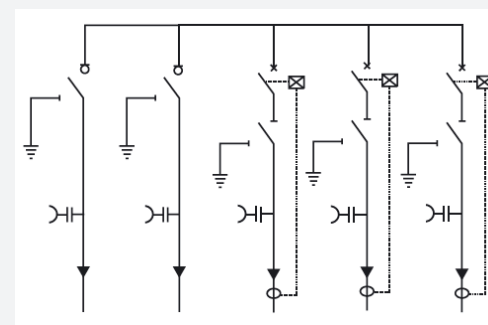
4 units KKTT (430kg) 1350×765×1345mm



5 units KKKKK (480kg) 1670×765×1345mm



5 units KKTTT (540kg) 1670×765×1345mm

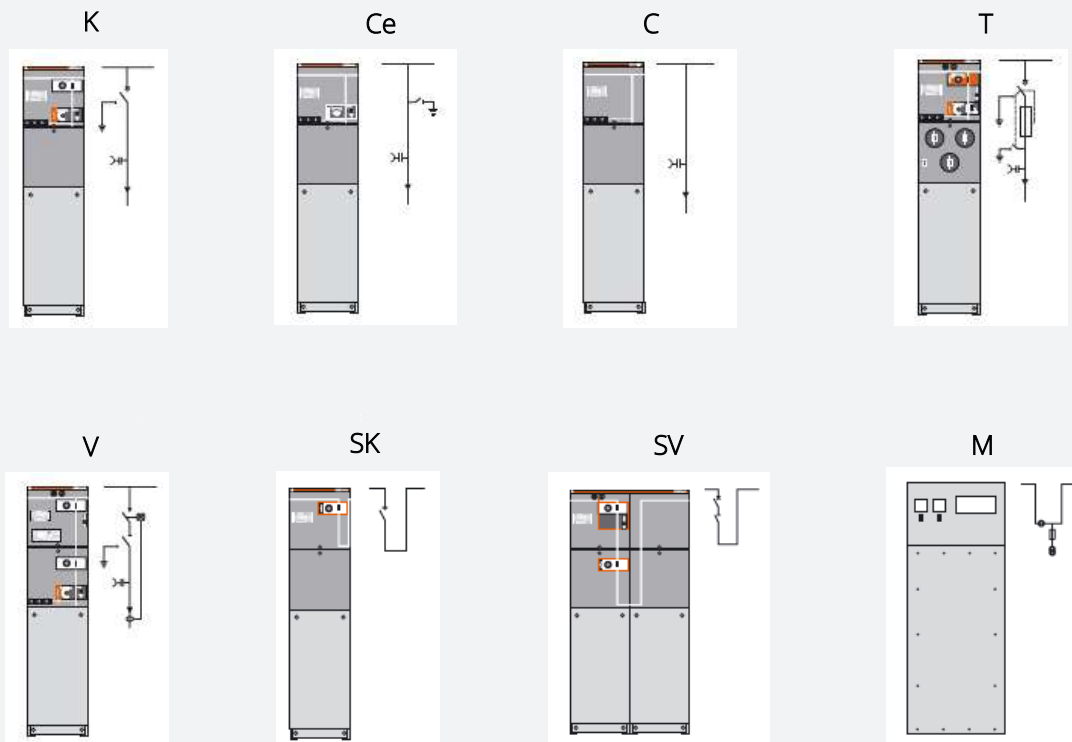


5 units KKVVV (509kg) 1670×765×1345mm

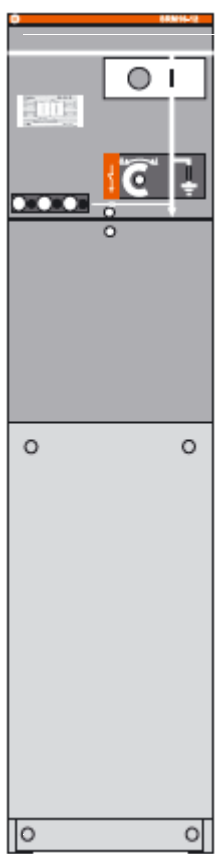
Single Units Dimensions

Type	Description	Width
K	Load break switch panel	325 mm
Ce	Cable connect panel with earth switch	325 mm
C	Cable connect panel without earth switch	325 mm
T	Load break switch and fuse combination panel	325 mm
V	Vacuum circuit-breaker panel	325 mm
SK	Busbar section switch panel (load break switch)	325 mm
SV	Busbar section breaker panel (vacuum breaker)	650 mm
M	Metering panel	750 mm

Front View of Single Cubicles



M-RING 24-K Load break switch panel

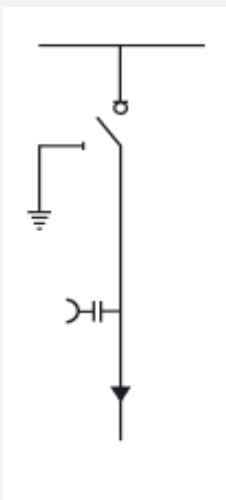


Standard features

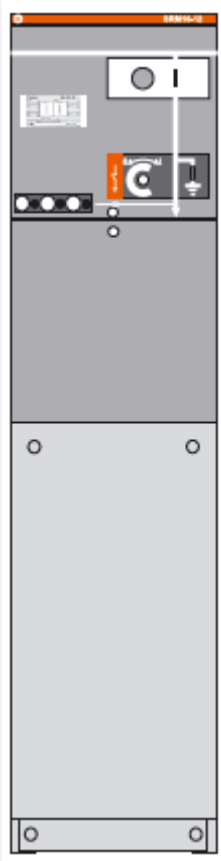
- Three position load break switch with disconnector and earthing switch
- Operating mechanism with two separate operating shafts for load break function and earthing function
- Switch position indication for load break switch and earthing switch
- Cable bushing horizontally in front, with integrated capacitor for voltage indication.
- SF6 pressure indicator (only one each SF6 tank).
- Busbars, 630A
- Earthing bar

Optional features

- Bushings for connection of external busbars
- Bushing for side extension
- Cable compartment front cover interlocked with earthing switch
- Motor operation for load break switch
- Low voltage compartment / top entry box
- Base frame (290 or 450mm)
- Auxiliary switches for load break switch position and earthing switch position
- Capacitive voltage indication systems, HR-module (Voltage Detecting System, VDS, acc. To IEC 61243-5) , or VPIS, acc. to IEC 61958 with integrated indicator lamps (LED)
- Indicator lamps for HR-module, 3-phase VIM-3
- Indicator lamp for HR-module, 1-phase VIM-1
- Short circuit indicators EMG EKL-4
- Smart Line Monitor CSM-SL3
- Ronis key interlock
- External current sensors (CT) for monitoring
- Cable compartment cover with window, with extra depth



M-RING 24-Ce Cable connect panel with earth switch

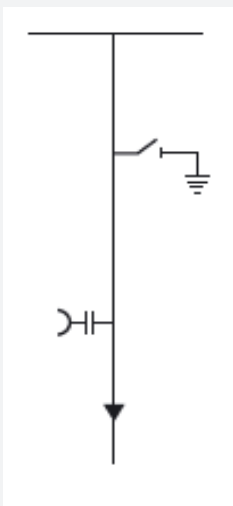


Standard features

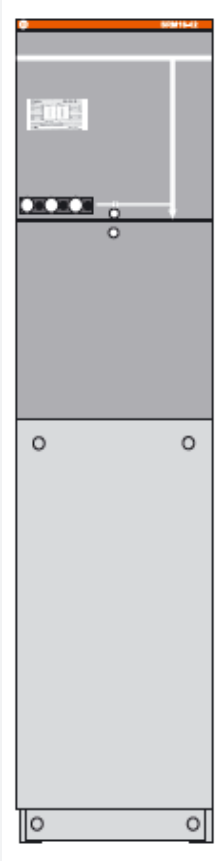
- Earthing switch
- Cable bushing horizontally in front, with integrated capacitor for voltage indication.
- SF6 pressure indicator (only one each SF6 tank).
- Busbars, 630A
- Earthing bar

Optional features

- Bushings for connection of external busbars
- Low voltage compartment / top entry box
- Base frame (290 or 450mm)
- Capacitive voltage indication systems, HR-module (Voltage Detecting System, VDS, acc. To IEC 61243-5) , or VPIS, acc. to IEC 61958 with integrated indicator lamps (LED)
- Indicator lamps for HR-module, 3-phase VIM-3
- Indicator lamp for HR-module, 1-phase VIM-1
- Short circuit indicators EMG EKL-4
- Smart Line Monitor CSM-SL3
- External current sensors (CT) for monitoring
- Cable compartment cover with window, with extra depth



M-RING 24-C Cable connect panel without earth switch

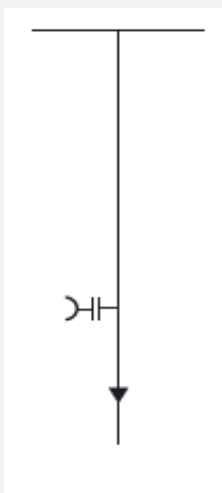


Standard features

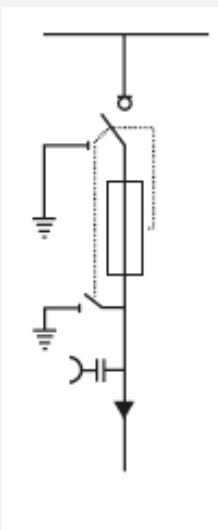
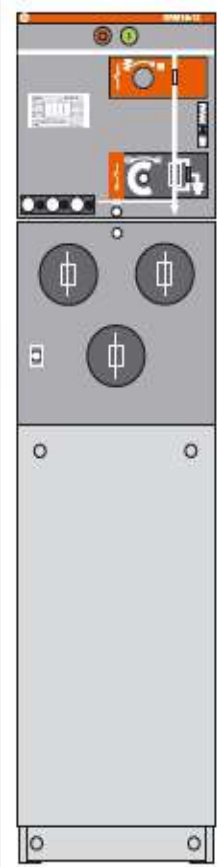
- Cable bushing horizontally in front, with integrated capacitor for voltage indication.
- SF6 pressure indicator (only one each SF6 tank).
- Busbars, 630A
- Earthing bar

Optional features

- Bushings for connection of external busbars
- Low voltage compartment / top entry box
- Base frame (290 or 450mm)
- Capacitive voltage indication systems, HR-module (Voltage Detecting System, VDS, acc. To IEC 61243-5) , or VPIS, acc. to IEC 61958 with integrated indicator lamps (LED)
- Indicator lamps for HR-module, 3-phase VIM-3
- Indicator lamp for HR-module, 1-phase VIM-1
- Short circuit indicators EMG EKL-4
- Smart Line Monitor CSM-SL3
- External current sensors (CT) for monitoring
- Cable compartment cover with window, with extra depth



M-RING24-T Load break switch and fuse combination panel



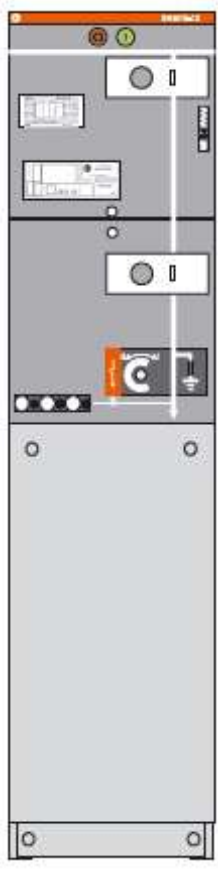
Standard features

- Three position load break switch with disconnect and earthing switch
- Operating mechanism with two separate operating shafts for load break function and earthing function
- Switch position indication for load break switch and earthing switch
- Cable bushing horizontally in front, with integrated capacitor for voltage indication.
- SF6 pressure indicator (only one each SF6 tank).
- Busbars, 630A
- Earthing bar

Optional features

- Bushings for connection of external busbars
- Bushing for side extension
- Cable compartment front cover interlocked with earthing switch
- Motor operation for load break switch
- Low voltage compartment / top entry box
- Base frame (290 or 450mm)
- Auxiliary switches for load break switch position and earthing switch position
- Capacitive voltage indication systems, HR-module (Voltage Detecting System, VDS, acc. To IEC 61243-5) , or VPIS, acc. to IEC 61958 with integrated indicator lamps (LED)
- Indicator lamps for HR-module, 3-phase VIM-3
- Indicator lamp for HR-module, 1-phase VIM-1
- Short circuit indicators EMG EKL-4
- Smart Line Monitor CSM-SL3
- Ronis key interlock
- External current sensors (CT) for monitoring
- Cable compartment cover with window, with extra depth

M-RING24-V Vacuum circuit breaker panel

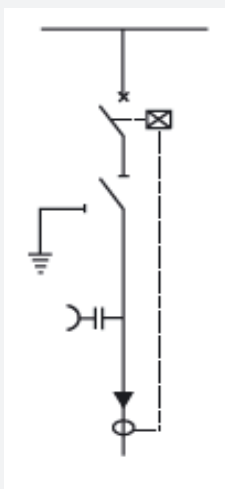


Standard features

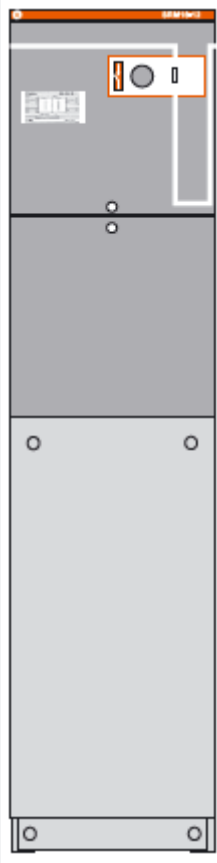
- 630A vacuum circuit-breaker
- Two position double spring mechanism for vacuum circuit-breaker.
- Three position disconnector / earthing switch downstream vacuum circuit-breaker
- Three position single spring mechanism for disconnector / earthing switch
- Interlocking between vacuum circuit-breaker and disconnector / earthing switch
- Switch position indication for vacuum circuit-breaker and disconnector / earthing switch
- Protection relay with ring core CTs on cable bushings
- Cable bushings horizontally in front
- SF6 pressure indicator (only one each SF6 tank).
- Busbars, 630A
- Earthing bar

Optional features

- Bushings for connection of external busbar on top of unit
- Cable compartment front cover interlocked with earthing switch
- Motor operation for vacuum circuit-breaker
- Low voltage compartment / top entry box
- Base frame (290 or 450mm)
- Auxiliary switches, vacuum circuit-breaker position, disconnector position and earthing switch position
- Trip coil open and close
- Advanced relays
- Ronis key interlock on disconnector / earthing switch



M-RING24-SK Busbar section switch panel (load break switch)

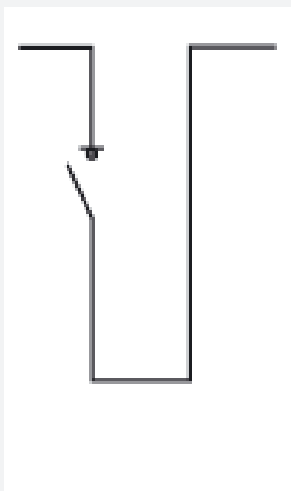


Standard features

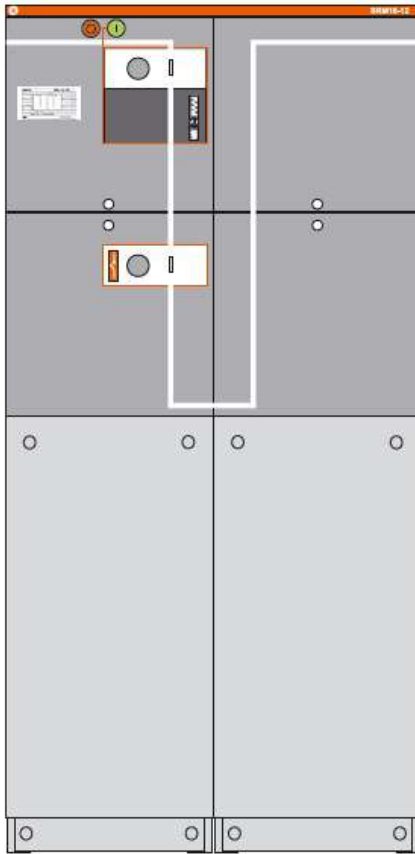
- Three positioning load break switch with disconnect and earthing switch
- Operating mechanism with two separate operating shafts for load break function and earthing function
- Switch position indication for load break switch and earthing switch
- SF6 pressure indicator (only one each SF6 tank).
- Busbars, 630A

Optional features

- Bushings for connection of external busbar
- Motor operation for load break switch
- Low voltage compartment / top entry box
- Base frame (290 or 450mm)
- Auxiliary switches, vacuum circuit-breaker position, disconnecter position and earthing switch position
- Ronis key interlock



M-RING24-SV Busbar section switch panel (vacuum breaker)

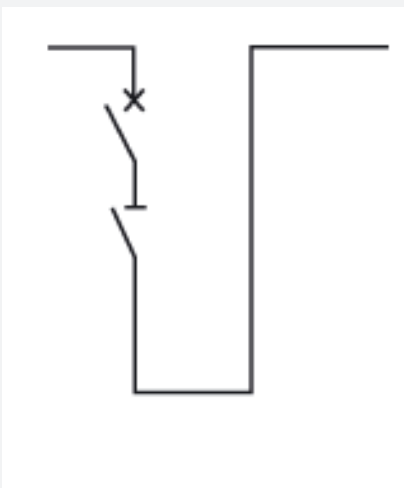


Standard features

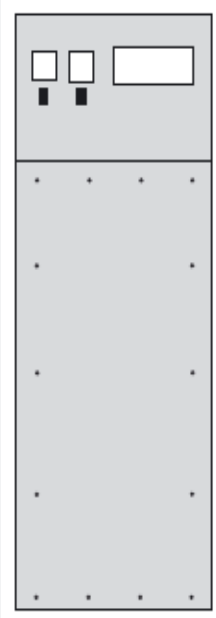
- 630A vacuum circuit-breaker
- Two position double spring mechanism for vacuum circuit-breaker.
- Three position disconnecter / earthing switch downstream vacuum circuit-breaker
- Three position single spring mechanism for disconnecter / earthing switch
- Interlocking between vacuum circuit-breaker and disconnecter / earthing switch
- Switch position indication for vacuum circuit-breaker and disconnecter / earthing switch
- SF6 pressure indicator (only one each SF6 tank).
- Busbars, 630A

Optional features

- Bushings for connection of external busbar
- Motor operation for vacuum circuit-breaker
- Low voltage compartment / top entry box
- Base frame (290 or 450mm)
- Auxiliary switches, vacuum circuit-breaker position, disconnecter position and earthing switch position
- Protection relay (metering module is required)
- Trip coil for relay trip
- Additional trip coil
- Ronis key interlock on disconnecter / earthing switch



M-RING24-M Metering

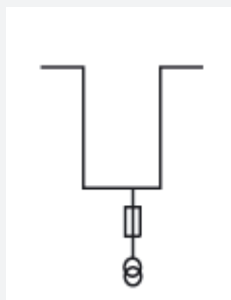
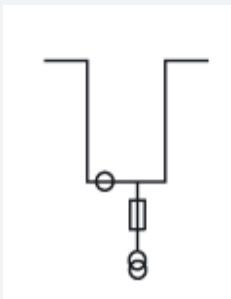


Standard features

- 2 pcs current transformers
- 2 pcs voltage transformers
- 6 pcs bushings interface C with connections and external busbars on left and right hand side
- 3 pcs bushings interface C only required if the M-module is left hand side or right hand side end module
- Internal layout with CTs and VTs on left hand side or right hand side dependent of power direction (has to be specified)
- Low voltage compartment

Optional features

- Additional meters
- Ronis key interlocking to prevent access to live parts
- Cable bottom entry for outgoing cable
- Base frame (290 or 450mm)



Transformer/circuit Protection

To select the rating of fuse link related to transformer, please refer to the form below:

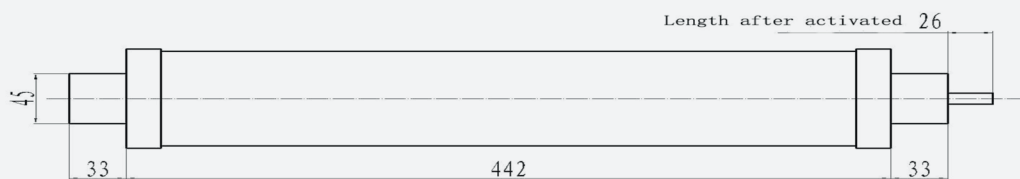
Fuse Specification

Rated Voltage:	Rated Capacity of transformer (kVA)												
	50	100	160	200	250	315	400	500	630	800	1000	1250	1600
6~7.2	16	25	32	40	50	63	100	100	100				
10~12	10	16	20	25	32	40	50	63	80	80	100	100	
13.8	6	10	16	20	25	32	32	50	50	50	63	80	
15~17.5	6	10	16	20	25	25	32	40	50	50	63	80	
20~24	6	10	10	16	16	20	25	32	40	40	40	50	80

Ambient temperature: -25°C~40°C

Standard: GB/T15166.2;

Fuse link length: 442mm





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