Xiamen Minghan Electric Co., Ltd.

ADD: Minghan Industrial Park, No. 9 Hongxi Road,
Xiamen Torch Hi-tech Industrial Development Zone
(Xiang'an), 361101, Fujian, China
Tel: +86-592-5774389
Fax: +86-592-5774489
Http: //www.minghan.com.cn
Email: intertrade@minghan.com.cn

GIR SF_6 Gas Insulation Ring Main Units

Instruction Manual

Xiamen Minghan Electric Co., Ltd.

Contents

Compact secondary substation

Small-scale factory

Wind power plant

Hotel, shopping mall, office building, commercial center etc.

Light-duty mining equipment, tunnel & subway

1 General

The GIR series ring main module is a kind of expandable SF_6 gas-insulated, metal-enclosed switchgear of 12/24kV. All live parts and switches of the primary high voltage are completely enclosed in the SF_6 gas tank welded by 3mm thick stainless steel sheets, thus the whole switchgear is impervious to external environment conditions to guarantee maintenance-free, reliable operation and personal safety. The adoption of expandable busbar can realize any combination and achieve complete modularization. The completely-insulated and shielded expandable busbar also helps to ensure high reliability and safety. Moreover, the tailor-made automation solution of GIR series switchgear for factory is available, which integrates the intelligent switchgear idea and minimizes the onsite installation and commissioning workload.

The standard GIR assembly adopts 2, 3, 4, 5 or 6-way configuration; however, other devices can also be added upon request. Thanks to the combination of whole module and semi-module and its own expandability, the GIR features exceptional flexibility.

The GIR series switchgear is developed in accordance with IEC298 standard, and has a designed life when running in the indoor environment (20℃) of more than 30 years (IEC298-Appendix GG).

The GIR series ring main module is applicable to urban electrical grid renovation, distribution substation and central load station, petrochemical industry, iron and steel industry, mining industry, enterprises and public institutions, high-rise buildings, etc.

1.1 Technical Features

Harmony and moduley between fixed type and flexible expansion

The GIR assembly adopts the ring main module structure. Up to 6 modules can be configured for GIR in the same SF_6 gas tank, providing 16 fixed combination modes for the distribution network, thus adapts to most applications of ring main module. The combination modes of GIR include DF, CF, CCC, CCF, CFC, FCC, CCCC, CCCF, CCFF, CFFC, CCVV, CCCCC, CCFFF, CCCFF, CCCCF and CCCCCC.

Due to its compact design, up to 6 modules can be configured for GIR in the same SF_6 gas tank; in case of more than 6 modules, the switchgear can be connected via the expandable busbar to realize semi-modular structure; it can also use the expandable bus bar to connect all modules to realize whole-modular structure. Any distribution solution, from simple to sophisticated, can be provided through the 9 different combinations of functional modules, meeting various configuration requirements of the secondary substation and sub-section post. C, De, D, F, V, SL, SvBr, Be, M and CB modules are available for GIR.

Compact design

All modules are only 325mm wide except the circuit-breaker module and gas-insulated metering module. The metering module is 696mm wide (850mm for

Fujian area); and the circuit-breaker module is 446mm, 500mm or 696mm wide. The cable sleeves of all parts are maintained on the same height above ground to facilitate construction on site.

Impervious to environment conditions

All HV live parts are kept in the stainless steel tank filled with SF_6 gas of 1.4 bar, the protection degree of IP67. The switchgear can be installed in humid, sandy and dusty or salt-polluted environment, mines, compact substations or any place that is prone to pollution flashover on the surface due to air pollution without any special preventive measures. In addition, there is no need to clean busbar or prevent small animals; even the fuse cell features IP67 protection grade. The expandable busbar is completely insulated and shielded to keep it way from any change of the external environment and realize maintenance-free operation.

Guaranteed personal safety

All live parts are enclosed in the SF_6 gas tank, and the switch compartment is provided with reliable arc exhaust duct. The product passes the 20kA/1s arc est; the load break/earthing switch is three-position type to simplify the interlock between each other; the reliable mechanical interlock is installed between the cable compartment door and load break/earthing switch; and arc interrupter can be installed for the incoming module to meet the internal arc suppression requirement, in this case, no SF_6 arc exhaust arc will be provided for the switch compartment.

GIR - IRMU (Intelligent Main Module) integrating industrial automation technologies

It can provide effective protection, control and monitoring systems, as well as plug & play automated distribution RTU solutions for factory. Without any external control box, all electronic components, battery and modem are installed in the dedicated space behind the switchgear door.

Two options available for transformer protection

Two options, namely, switch-fuse disconnector module, and circuit breaker with relay protection module, are available, of which, the former is used for transformers of 1600kVA and below, while the latter is used for transformer protection of various capacities.

Two types of circuit-breakers available for circuit protection

Both types of circuit-breakers are provided with VG series vacuum interrupter and sealed in the SF_6 gas tank. The rated current of V module is 630A and that of CB module is 1250A.

Environmental protection

The environmental protection principle is strictly followed from development to production and then to the lifelong operation of GIR product. To be exact, the GIR product is produced with environment-friendly materials through zero-leakage clean techniques; it also features lifelong sealing and 90%-95% of the materials are recyclable.

1.2 Technical Parameters

Normal service conditions

In general, the GIR operates under normal indoor conditions according to IEC60694 standard.

Ambient temperature	Max. temperature +40℃	Max. temperature (ave. daily) +35℃	Min. temperature –40℃
Humidity			
Max. average relative humidity	daily ⩽ 95%	Monthly ⩽ 90%	
Altitude	⩽ 1000 m		
SF6 gas pressure	1.4 bar at 200C (absolute pressure)		
Annual leakage rate	0.25‰/ year		
Water immersion test	24kV, 24h at 0.3bar underwater		
Arcing test	1s for 20kA with arc interrupter, 1s for 16kA without arc interrupter		
Cable sleeve standard	DIN 47636T1 and T2/EDF HN 525–61		
Protection grade	SF6 gas tank IP67	Circuit–breaker cartridge IP67	Switchgear enclosure IP3X
Busbar	400mm^2 Cu internal busbar of switchgear	150mm^2 Cu earthing busbar of switchgear	
Thickness of stainless steel gas tank	3.0mm		
Color	Front door of switchgear – RAL 7012	Side plates and front cover plate of cable compartment–RAL 7035	

Special service conditions

According to IEC60694 standard, the user should negotiate with the manufacturer to reach a consensus first in case of any special service conditions other than the above mentioned normal service conditions. In case of extremely severe conditions, the user must consult the manufacturer or supplier. When the installation altitude of the equipment is over 1000m, it should be specially specified so that the pressure can be adjusted accordingly during manufacturing.

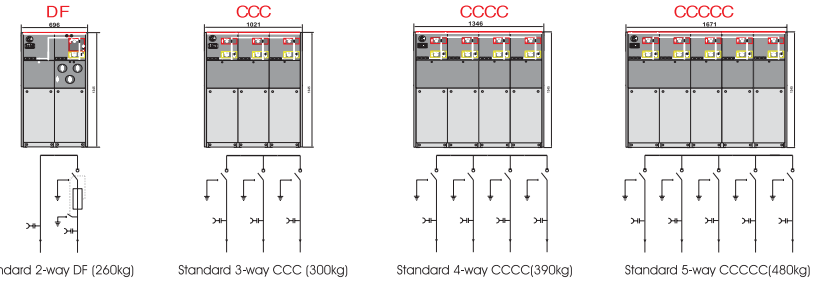
		C module	F module	V module		CB module	
		Load switch	Composite apparatus	Vacuum switch	Isolating/ earthing switch	Vacuum circuit breaker	Isolating/ earthing switch
Rated voltage	(kV)	12/24	12/24	12/24	12/24	12/24	12/24
Power frequency withstand voltage	(kV)	28/50	28/50	28/50	28/50	28/50	28/50
Lightning impulse withstand voltage	(kV)	75/125	75/125	75/125	75/125	75/125	75/125
Rated current	(A)	630/630	1)	630/630		1250/800	
Breaking capacity:							
Closed–circuit breaking current	(A)	630/630					
Cable–charging breaking current	(A)	135/135					
5% rated active load breaking current	(A)	31.5/–					
Earthing fault breaking current	(A)	200/150					
Cable–charging breaking current during earthing fault	(A)	115/87					
Short–circuit breaking current	(kA)		2)	20/16		25/20 3)	
Making capacity	(kA)	63/52.5	2)	50/40	50/40	63/50 3)	63/50
Short time withstand current 2s	(kA)	25/–					
Short time withstand current 3s	(kA)	–/21		20/16	20/16	25/20 3)	25/20
Mechanical life	(times)	5000	3000	5000	2000	5000	5000

Note: 1) depends on the rated current of fuse; 2) limited to HV fuse; 3) figure in the parentheses refers to the parameter of 800A module in 24kV system.

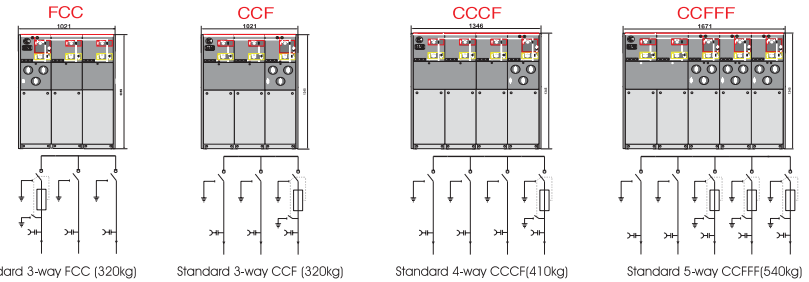
The GIR switchgear meets the standards of IEC60056, IEC60129, IEC60265, IEC60298, IEC60420, IEC60694.

2 GIR Ring standard configurations

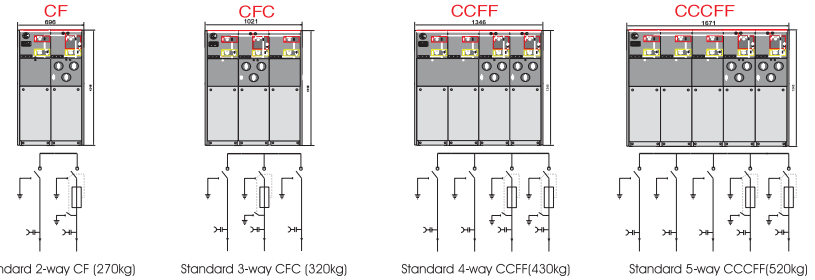
16 standard configurations of GIR are available



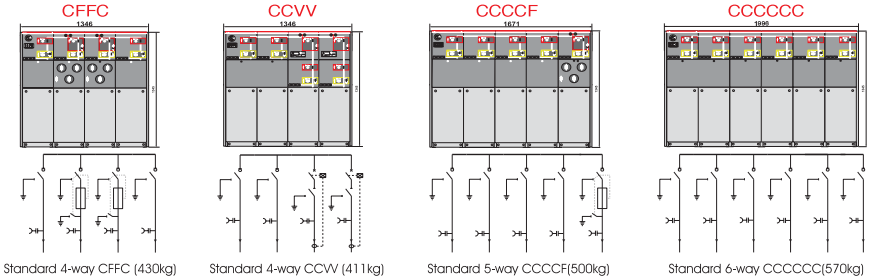
Standard 2-way DF (260kg) | Standard 3-way CCC (300kg) | Standard 4-way CCCC(390kg) | Standard 5-way CCCCC(480kg)



Standard 3-way FCC (320kg) | Standard 3-way CCF (320kg) | Standard 4-way CCCF(410kg) | Standard 5-way CCFFF(540kg)



Standard 2-way CF (270kg) | Standard 3-way CFC (320kg) | Standard 4-way CCFF(430kg) | Standard 5-way CCCFF(520kg)



Standard 4-way CFFC (430kg) | Standard 4-way CCVV (411kg) | Standard 5-way CCCCF(500kg) | Standard 6-way CCCCCC(570kg)

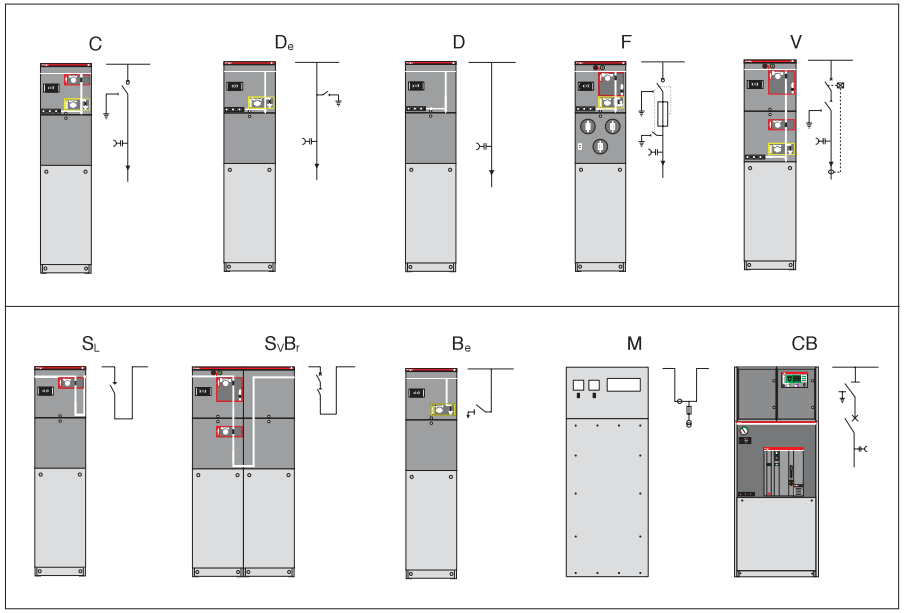
3 GIR modules

Usable modules for GIR

C	cable switch module	(width = 325mm)
De	cable connection module w/ earthing switch*	(width = 325mm)
D	cable connection module w/o earthing switch*	(width = 325mm)
F	switch-fuse disconnector module	(width = 325mm)
V	vacuum switch module	(width = 325mm)
SL	busbar sectionalizing switch module (load break/earthing switch)*	(width = 325mm)
SvBr	busbar sectionalizing switch module (vacuum switch)*	
	Sv is always combined with busbar rising module	(total width = 650mm)
Be	busbar earthing module*	(width = 325mm)
M/PT	metering module 12kV	(width = 696mm)
	metering module 24kV	(width = 900mm)
CB	vacuum circuit breaker module	(width = 446/500/696mm)

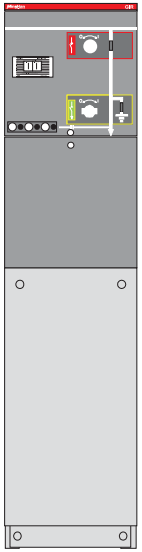
Note 1: single GIR module can be used only after connecting to an extender;

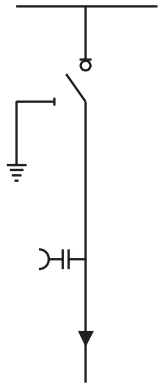
Note 2: for details of any module with *, please contact Xiamen Minghan Electric Co., Ltd.



Weight of GIR (excluding accessories)

- Standard 1-way 130kg
- 6-way about 570-800kg
- CB module about kg
- 2 / 3-way and 4-way similar to the weight of GIR
- Metering module about 250kg





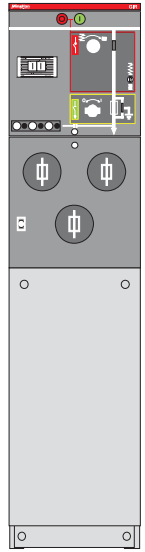
3.1 GIR-cable switch module C

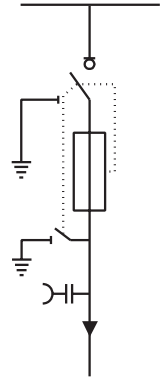
Standard configuration & characteristics

- 630A internal busbar
- Three-position load break /earthing switch
- Three-position single-spring operating mechanism, with two separated operating shafts for load switch and earthing switch respectively
- Indicator for load break switch/earthing switch positions
- Outgoing cable sleeve horizontally arranged in front, 400 series 630A bolt-type sleeve
- Capacitive voltage indicator showing the sleeve is charged
- Additional convenient padlocks on the door for various switch functions
- SF_6 gas pressure gauge (only one in every SF6 gas tank)
- Earthing bus bar
- Interlock between earthing switch and front door of cable compartment

Optional configuration & characteristics

- Reserved extension space for external busbar
- External busbar
- 24V/48V DC, 110V/220V DC/AC motor for load switch operation
- Short-circuit and earthing fault indicator
- Toroidal current transformer and ammeter for measuring purpose
- Toroidal current transformer and ammeter for metering purpose
- MWD type lightning arrester or dual cable heads can be added to the incoming cable sleeve
- Key interlock (e.g. Ronis lock)
- 24V/48V DC, 110V/220V AC/DC lock of earthing switch for charged incoming cable (locking earthing switch when the sleeve is charged)
- Auxiliary contacts
  - Load switch position 2NO + 2NC
  - Earthing switch position 2NO + 2NC
  - Pressure gauge w/ signal 1NO
  - Arc interrupter w/ signal contact 1NO
- Secondary devices may be installed in
  - Secondary line compartment on the top of switchgear
  - LV compartment on the tope of switchgear





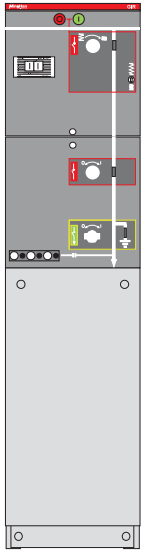
3.2 GIR-Switch-fuse disconnector module F

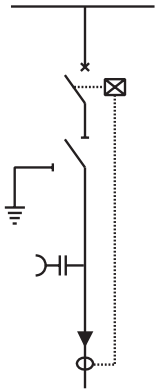
Standard configuration & characteristics

- 630A internal busbar
- Three-position load break / earthing switch
- Three-position single-spring operating mechanism, with two separated operating shafts for load switch and earthing switch respectively
- Indicator for load break switch and earthing switch positions
- Fuse cartridge
- Horizontally-laid fuse
- Fuse trip indicator
- Outgoing cable sleeve horizontally arranged in front, 200 series 200A inserted sleeve
- Capacitive voltage indicator showing the sleeve is charged
- Additional convenient padlocks on the door for various switch functions SF_6 gas pressure gauge (only one in every SF_6 gas tank)
- Earthing busbar
- Fuse for transformer protection
  - For 12kV transformer, max. 125A fuse
  - For 24kV transformer, max. 63A fuse
- Interlock between earthing switch and front door of cable compartment

Optional configuration & characteristics

- Reserved extension space for external busbar
- External busbar
- 24V/48V DC, 110V/220V DC/AC motor for load break switch operation
- 24V/48DC, 110V/220V DC/AC parallel trip coil
- 24V/48DC, 110V/220V DC/AC parallel closing coil
- Toroidal current transformer and ammeter for measuring purpose
- Toroidal current transformer and watt-hour meter for metering purpose
- 24V/48V DC, 110V/220V AC/DC lock of earthing switch for charged
- incoming cable (locking earthing switch when the sleeve is charged)
- Auxiliary contacts
  - Load break switch position 2NO + 2NC
  - Earthing switch position 2NO + 2NC
  - Pressure gauge w/ signal 1NO
  - Arc interrupter w/ signal contact 1NO
- Secondary devices may be installed in
  - Secondary line compartment on the top of switchgear
  - LV compartment on the tope of switchgear





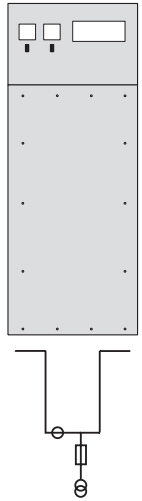
3.3 GIR-Vacuum switch module V

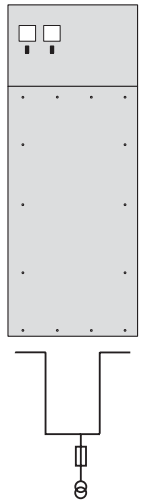
Standard configuration & characteristics

- 630A internal busbar
- 630A vacuum switch for transformer / line protection
- Two-position dual-spring operating mechanism of vacuum switch
- Three-position isolating / earthing switch under vacuum switch
- Three-position single-spring operating mechanism of isolating / earthing switch
- Mechanical interlock between vacuum switch and three-position switch
- Indicator for vacuum switch and three-position switch positions
- Self-supplied electronic protection relay SEG-WICI (w/ protection CT)
- Trip coil (for relay operation)
- Outgoing cable sleeve horizontally arranged in front, 400 series 630A bolt-type sleeve
- Capacitive voltage indicator showing the sleeve is charged
- Additional convenient padlocks on the door for various switch functions
- SF_6 gas pressure gauge (only one in every SF_6 gas tank)
- Earthing bus bar
- Interlock between earthing switch and front door of cable compartment

Optional configuration & characteristics

- Reserved extension space for external busbar
- External busbar
- 24V/48V DC, 110V/220V DC/AC motor for vacuum switch operation
- 24V/48DC, 110V/220V DC/AC parallel trip coil
- Toroidal current transformer and ammeter for measuring purpose
- Toroidal current transformer and watt-hour meter for metering purpose
- Key interlock (e.g. Ronis lock)
- 24V/48V DC, 110V/220V AC/DC lock of earthing switch for charged incoming cable (locking earthing switch when the sleeve is charged)
- Auxiliary contacts
  - Vacuum switch position 2NO + 2NC
  - Isolating switch position 2NO + 2NC
  - Earthing switch position 2NO + 2NC
  - Vacuum switch trip signal 2NO + 2NC
  - Pressure gauge w/ signal 1NO
  - Arc interrupter w/ signal contact 1NO
- Secondary devices may be installed in
  - Secondary line compartment on the top of switchgear
  - LV compartment on the tope of switchgear
- Other relays like SPAJ140C





3.4 GIR-Metering module M

12kV metering module

Standard configuration & characteristics

- 2 x AS12 current transformer
- 2 x UNZ10 potential transformer
- 6 x 400 series sleeve for connecting GIR to the external busbar, incoming cable & outgoing cable at the upper end
- LV parts
  1 x voltmeter w/change-over switch/1 x ammeter w/ change-over switch
  W x H x D = 696 x 1806 x 820 mm
  Note: the metering module is 850mm wide for Fujian area

Optional configuration & characteristics

- 3 x AS12 current transformer
- 3 x REL10 potential transformer
- Lightning arrester
- Capacitive voltage indicator showing the switchgear is charged
- LV parts
  1 x active watt-hour meter
  1 x reactive watt-hour meter

12kV potential transformer module

Standard configuration & characteristics

- 2 xUNZ10 potential transformer
- Fuse for PT protection
- 1 x voltmeter w/ change-over switch
  1. incoming / outgoing cables at the upper end, 3 x (6 x) 400 series sleeve for connecting GIR to the external bus bar
     W x H x D = 696 x 1806 x 820mm
  2. incoming / outgoing cables at the lower end
     W x H x D = 696 x 1460 x 820mm

Optional configuration & characteristics

- Lightning arrester
- Capacitive voltage indicator showing the switchgear is charged
- 24VDC charger and storage battery
- GIR-I isolating switch (only for side module)

24kV metering module

Standard configuration & characteristics

- 6 x 400 series sleeve for connecting GIR to the external bus bar, incoming cable & outgoing cable at the upper end
- 3 x UNE20 potential transformer
- 3 x AS24 current transformer
- Fuse for PT protection
- 1 x voltmeter w/ change-over switch
- 1 x ammeter w/ change-over switch
- W x H x D = 900 x 2080 x 1020mm

Optional configuration & characteristics

- Lightning arrester
- Capacitive voltage indicator showing the switchgear is charged
- 1 x active watt-hour meter
- 1 x reactive watt-hour meter

For other requirements, please contact Xiamen Minghan Electric Co., Ltd.

4 GIR series outdoor substation

4.1 Characteristics of outdoor substation

The outdoor substation consists of completely-insulated SF6 switchgear GIR and station enclosure CPS.

- The station enclosure is made of Al-Zn-coated steel sheets (no less than 1.5mm thick) with spray coating on the surface, thus is provided with strong corrosion prevention; and the accessories are made of sheet metal. The plates are connected with each other by riveting or bolt joints, rather than welding that is easy to deform. The enclosure features light weight and tidy appearance.
- The enclosure is provided with good theft protection since there is no fastener on the surface; as well as IP33 protection grade and sound water proofness.
- The top cover features air interlayer structure with air vents; the air inlet locates on the door of enclosure and is provided with dismountable dustproof filter screen; and the air outlet locates on the top of enclosure and hides under the eaves; therefore, cross-ventilation from bottom to top is formed to provide sound heat insulation and ventilation for the enclosure. The top cover features an inclination of 3° angle for drain.
- The enclosure is provided with sealed floor with cable inlet to prevent moisture in the cable trench from entering.
- The door and lifting lugs are sealed with weather strip; the door lock features waterproof structure; limited drag hook is provided to fasten the door when opening the door.
- The switchgear in the enclosure features SF_6 completely sealed structure without any heater since it's free from condensation.
- The switchgear is pre-installed in the enclosure before delivery; lifting lugs are provided to fix the enclosure during transportation; thus, it needs only to hoist the enclosure to the required place on site to facilitate installation. Due to its small size, the closure takes up little floor space and does not block the view.
- Available colors of closure:
  1) RAL 7024 (door frame), RAL 7032 (door door) ; 2) RAL 7032; 3) RAL 6005
  For other color requirements, please contact Xiamen Minghan Electric Co., Ltd.

4.2 Dimension of outdoor substation

Standard outdoor stations available:

L x W x H = 1350 x 1000 x 1650 (2150)mm, for module combination of 3 modules and below
L x W x H = 2000 x 1000 x 1650 (2150)mm, for module combination of 4 modules and below
L x W x H = 2300 x 1000 x 1650 (2150)mm, for module combination of 5 modules and below
L x W x H = 2300 x 1000 x 1650 (2150)mm, for module combination of 6 modules and below
L x W x H = 2300 x 1350 x 2050mm, for combination of metering module + 4-module module
L x W x H = 2700 x 1350 x 2050mm, for combination of metering module + 5-module module
L x W x H = 3000 x 1350 x 2050mm, for combination of 4-module module + metering module + 2-module module
L x W x H = 3000 x 1854 x 2150mm, w/ indoor passageway, can be arbitrarily configured
L x W x H = 3500 x 1854 x 2150mm, w/ indoor passageway, can be arbitrarily configured
L x W x H = 4000 x 1854 x 2150mm, w/ indoor passageway, can be arbitrarily configured
L x W x H = 4500 x 1854 x 2150mm, w/ indoor passageway, can be arbitrarily configured

Please refer to the outdoor substation instructions for details. For other dimension requirements, please contact Xiamen Minghan Electrica Co., Ltd.

5 Transformer/line protection

The GIR series ring main module provides two methods of transformer protection: switch-fuse disconnector module and circuit breaker with relay protection module.

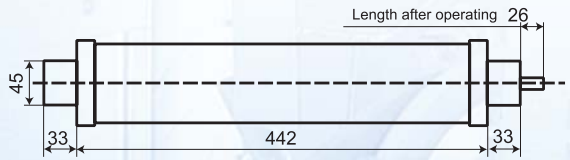
In the switch-fuse disconnector module, the transformer protection is realized via combination of HV current-limited fuse and load break switch. The fuse is installed in the separated cartridge with lock in front of the module. The load break switch is provided with charged spring mechanism which is activated by the fuse striker.

Please see the below table for transformer and fuse matching:

Woring voltage (kV)	Rated voltage (kV)	Rated capacity of transformer (kVA)												
		50	100	160	200	250	315	400	500	630	800	1000	1250	1600
10	12	6	16	25	40	40	40	63	63	100	100	125	160	160
13.8	24	6	10	16	25	25	40	40	63	63	100	100	125	160
15	24	6	10	16	25	25	40	40	40	63	63	100	100	125
20	24	6	10	16	25	25	25	40	40	63	63	63	100	100

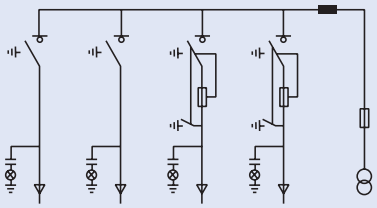
Fuse dimension

The core of the fuse in the switchgear is designed according to the dimension shown in the below figure.



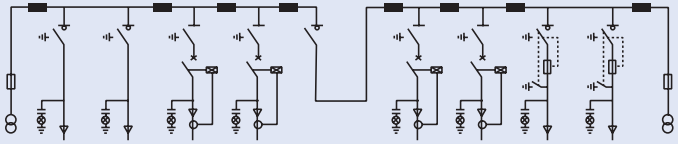
6 Application of typical GIR schemes

RMU transformer protection



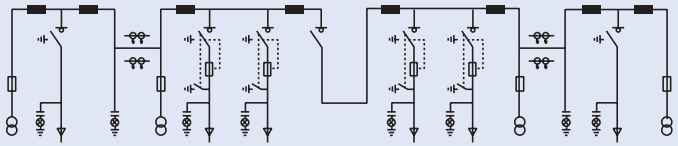
Scheme: CCFF+PT

Normal sub-section post



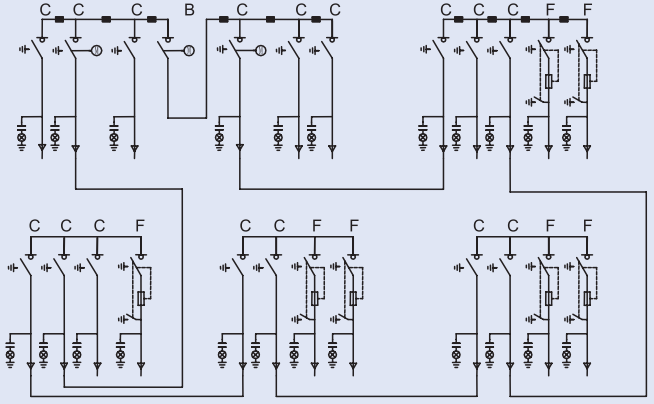
Scheme: PS +CC+V+V+Sc +V+V+FF+PS

Two-way incoming lines for mutual backup



Scheme: PS+C+M+FF+Sc+FF+M+C+PS

Typical design scheme of ring network



Scheme: PS+C+M+FF+Sc+FF+M+C+PS

7 Accessories

Voltage indicator

Cable connection

Pressure indicator

External bus bar

Foundation

LV module on the top of switchgear

1. Auxiliary contact

2NO+2NC indicator switch contacts are available for all load break switches and circuit breakers. A shunt trip coil (AC or DC) can be installed on the transformer switch/circuit breaker. The LV control modules are behind the front door.

2. Voltage indicator

Capacitive voltage indicator shows the sleeve is charged, of which the jack can be used for phase verification.

3. Short-circuit/earthing fault indicator

To locate fault, the cable switch module can be equipped with short-circuit/earthing fault indicator for simple fault detection.

4. Electric operating mechanism

The manual operating mechanism is standard supplied for cable switch module and transformer module; and electric operating mechanism is also available.

The cable switch, vacuum circuit breaker and earthing switch are operated via the mechanism behind the front door. All switches and circuit breakers can be operated via the operating handle (standard supplied), or motor operating mechanism (accessory). However, the earthing switch can only be manually operated and is equipped with a mechanism of closing fault current function.

The electric operating mechanism can be easily implemented by stages.

5. Cable connection

The GIR is equipped with standard sleeves complying with DIN47636. All sleeves are installed on the same height above ground and protected by the cover plate of cable compartment. The cover plate can be interlocked with the earthing switch. For dual incoming cables, a dedicated cover plate can be provided for the dual-cable compartment.

6. Pressure indicator

The GIR is generally equipped with pressure indicator in the form of pressure gauge. Moreover, it can be equipped with electric contacts to indicate pressure drop.

7. Key lock

The GIR can be equipped with key lock for the circuit breaker, load switch and earthing switch. The GIR can also be equipped with Ronis key lock for circuit breaker, load switch and earthing switch.

8. Arc interrupter

All GIR ring main module can be equipped with arc interrupter. In case of arc inside GIR, the arc interrupter will shutdown automatically on the incoming cable sleeve. All cable modules of GIR and D, De and V modules can be equipped with an arc interrupter, which must be ordered together with the GIR and can not be changed. The operation of arc interrupter can be indicated through connecting the electric contacts in the SF_6 gas tank to the terminals behind the front door.

9. External busbar

The GIR can be equipped with external busbar (rated current 1250A).

10. Foundation

The GIR can be installed on a separated foundation. The foundation is provided with cable inlets on both ends and the back. Two heights, 272mm and 450mm, are available.

11. Secondary line compartment/LV module

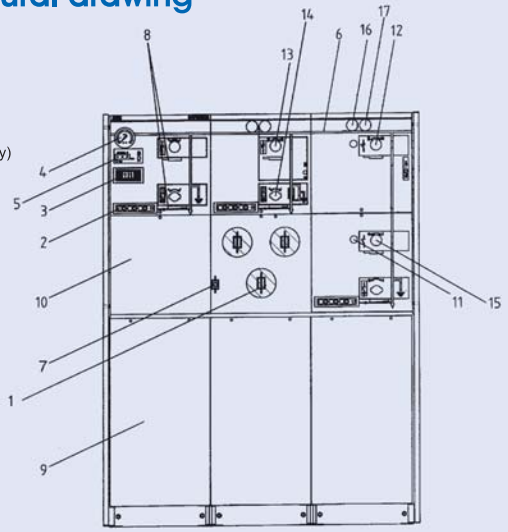
The GIR can be equipped with secondary line compartment or LV module on the top of switchgear. The secondary line compartment is used to install the ammeter (w/or w/o change-over switch) and live lock control module. The LV module is used to install the SPAJ140CREF and other relays, ammeter (w/or w/o change-over switch) and live lock control module as well.

12. Lightning arrestor

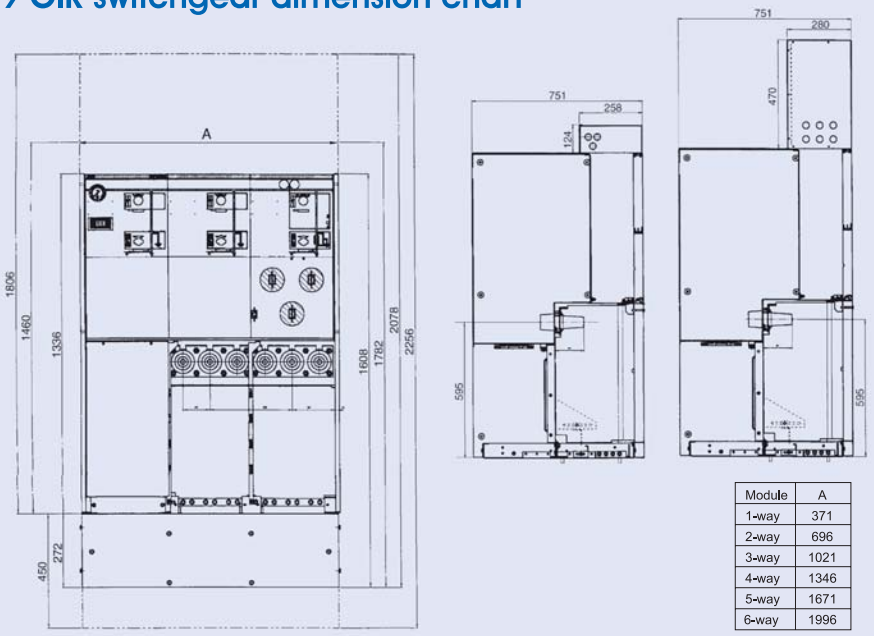
The incoming / outgoing cable modules of GIR can be equipped with lightning arrestor on the cables. The lightning arrestor can also be installed on the bus bar or in the M module.

8 GIR switchgear structural drawing

1. Fuse compartment
2. Capacitive voltage indicator
3. Short-circuit / earthing fault indicator (accessory)
4. Pressure indicator
5. Nameplate with serial number
6. Analog circuit diagram
7. Fusing indicator
8. Padlock on the door
9. Cable compartment
10. RTU compartment
11. Ronis lock
12. Operation hole of circuit breaker
13. Operation hole of load switch
14. Operation hole of earthing switch
15. Operation hole of isolating switch
16. Opening button
17. Closing button



9 GIR switchgear dimension chart

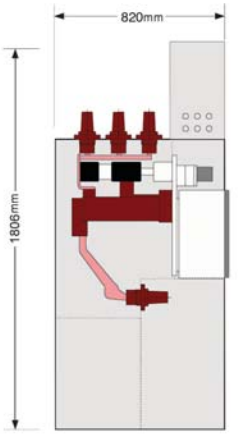


Module	A
1-way	371
2-way	696
3-way	1021
4-way	1346
5-way	1671
6-way	1996

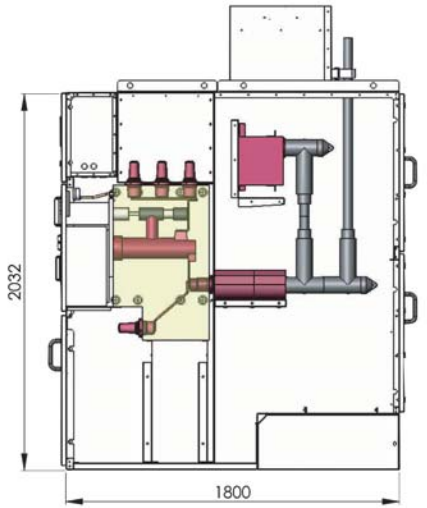
10 GIR CB modulestructural drawing

GIR-CB

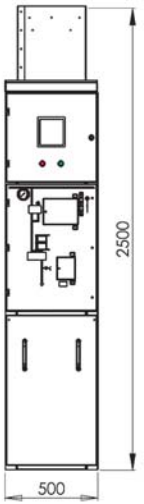
GIR-CB/E



Side section of CB & CB/E



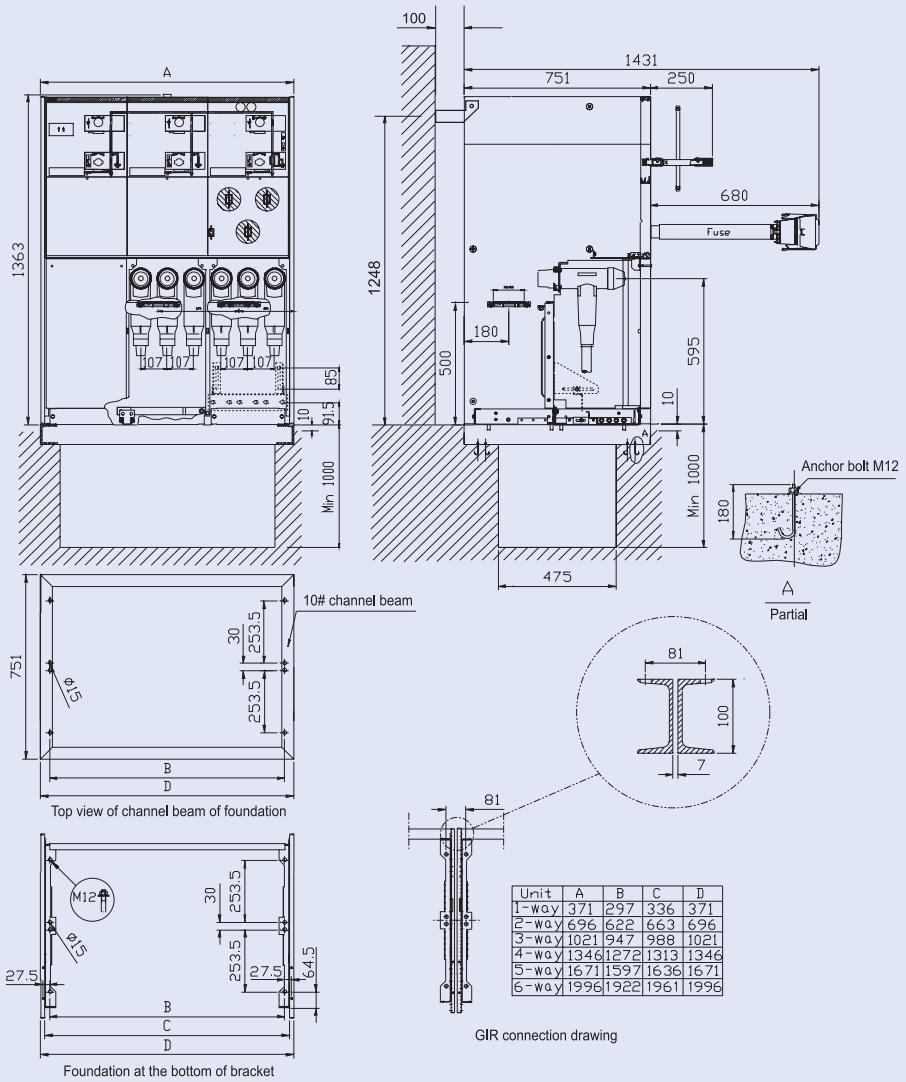
Side section of GIR-CB/B



Front view of CB/B

11 GIR foundation schematic diagram

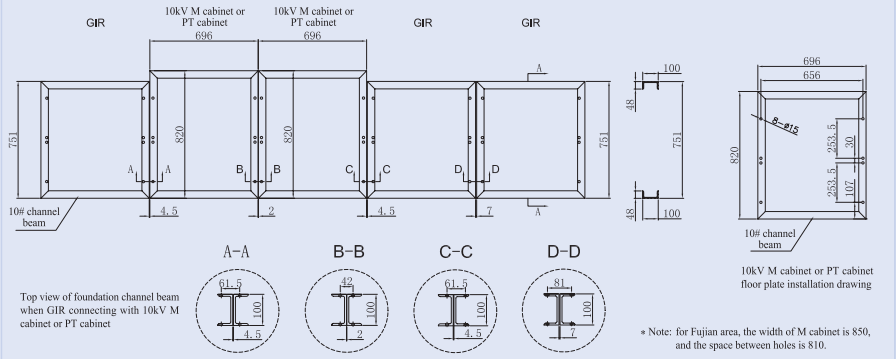
11.1 Standard module



Unit	A	B	C	D
1-way	371	297	336	371
2-way	696	622	663	696
3-way	1021	947	988	1021
4-way	1346	1272	1313	1346
5-way	1671	1597	1636	1671
6-way	1996	1922	1961	1996

Note: in case of three-core cable with the cross-section bigger than 240mm2, when installing CT, the cable should be branched off in the cable trench and be fastened if necessary.

11.2 Channel beam arrangement schematic diagram of various modules

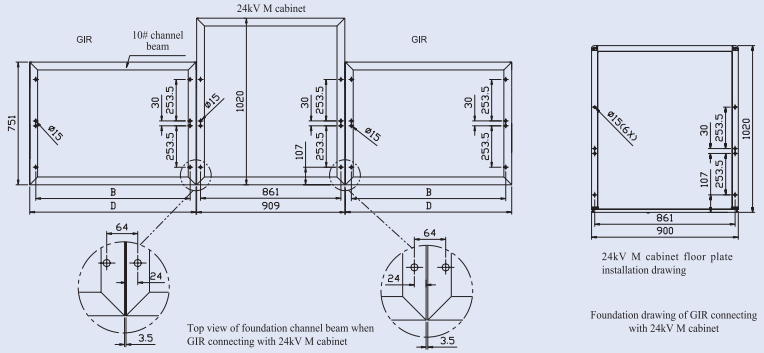


Top view of foundation channel beam when GIR connecting with 10kV M cabinet or PT cabinet

10kV M cabinet or PT cabinet floor plate installation drawing

* Note: for Fujian area, the width of M cabinet is 850, and the space between holes is 810.

11.3 24kV metering module

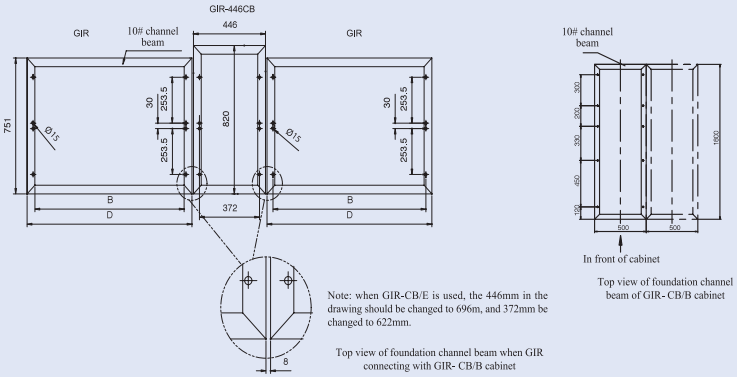


Top view of foundation channel beam when GIR connecting with 24kV M cabinet

24kV M cabinet floor plate installation drawing

Foundation drawing of GIR connecting with 24kV M cabinet

11.4 CB module



Note: when GIR-CB/E is used, the 446mm in the drawing should be changed to 696m, and 372mm be changed to 622mm.

Top view of foundation channel beam when GIR connecting with GIR- CB/B cabinet

Top view of foundation channel beam of GIR- CB/B cabinet