

HIGH AND LOW VOLTAGE SWITCHGEAR SERIES

GCS

Low Voltage Switchgear and
Motor Control Center



Overview

GCS low-voltage draw-out switchgear is suitable for power plant, petroleum, chemical, metallurgy, textile, high-rise building and other industries of power distribution system. In large power plants, petrochemical systems and other places with high degree of automation and requiring computer interface, as a three-phase AC frequency of 50(60)Hz, The rated operating voltage is 380V(400V), (660V), and the rated current is 4000A and below in the power distribution system, motor centralized control, reactive power compensation for the use of low-voltage power distribution devices.

Model meaning

G	C	S	-	□	-	□
↓	↓	↓		↓		↓
Enclosed switchgear	Drawout type	Electrical system		Auxiliary circuit scheme number		Main circuit scheme number

Performance index

The design of the device meets the following criteria

IEC439-1 Low-voltage switchgear and control equipment

GB7251 Low voltage switchgear

ZBK360001 Low voltage withdrawable switchgear

Primary structure

- The main frame is made of 8MF open section steel, and the two sides of the section steel have installation holes with modules of 20mm and 100mm and $\Phi 9.2$ mm respectively, making the internal installation flexible and convenient;
- The main frame assembly form is designed in two ways, full assembly structure and part (side frame and beam) welded structure, for users to choose;
- Each function room of the device is isolated from each other, and its compartment is divided into function unit room, bus bar room and cable room. The function of each chamber is relatively independent;
- The ice flat main bus line is arranged in a flat mode behind the cabinet to enhance the ability of the bus to resist electric power, which is the basic measure to make the main circuit of the device have high short-circuit strength;
- The design of the cable compartment makes it very convenient for the cable to enter and exit.
- Size of universal cabinet (see table below)

Item	Argument									
High	2200									
Wide	400		600		800			1000		
Deep	800	1000	800	1000	600	800	1000	600	800	1000

Basic parameter

Item		Argument
Main circuit rated voltage (V)		AC 380(400), (660)
Auxiliary circuit rated voltage (V)		AC 220、380(400) DC 110/220
Rated frequency (Hz)		50(60)
Rated insulation voltage (V)		660(1000)
Rated current (A)	Horizontal bus, Vertical bus (MCC)	≤ 4000、1000
Bus rated short-time withstand current (kA/1s)		50,80
Bus rated peak withstand current (kA/0.1s)		105,176
Power frequency test voltage (V/1min)	Main circuit, auxiliary circuit	2500、1760
Bus bar	Three-phase four-wire system, three-phase five-wire system	A, B, C, PEN、A, B, C, PE, N
Class of protection		IP30, IP40

Functional unit

- The module of drawer height is 160mm. Divided into 1/2 unit, 1 unit, 3/2 unit, 2 unit, 3 unit, five size series. Unit circuit rated current 400A and below;
- The drawer changes only in the height size, and its width and depth dimensions remain unchanged. The drawers of the same functional unit have good interchangeability;
- Each MCC cabinet can be installed with a maximum of 11 one-unit drawers or 22 1/2 unit drawers. One of the drawers above adopts a multi-functional rear plate;
- Drawer inlet and outlet line according to the current size using different number of pieces of the same specification chip structure plug-in;
- The switch between the 1/2 unit drawer and the cable room adopts the back plate structure ZJ-2 type switch;
- The switch between the unit drawer and the cable room adopts the same size rod type or tube type structure ZJ-1 adapter according to the current classification;
- Drawer unit with mechanical interlocking device.

Major electrical component

The selection principle of the main electrical components is based on the introduction of technology, which can be a series of mass production in China and meet the requirements of high performance of the device;

- Power supply and feeder unit circuit breaker main choose AH series. Other more advanced M series produced by Schneider and F series produced by ABB can also be selected. AH circuit breaker has the characteristics of good performance, compact structure, light weight and strong series. The price is relatively low, the maintenance is easy to use, and the performance indicators can meet the requirements of the device;
- The drawer unit (motor control unit, part of the feed unit) circuit breakers mainly choose CM1, TG, TM30 series of plastic-case circuit breakers, and some of them choose NZM-100A series produced by MOELLER company. These switches have the characteristics of good performance, compact structure, short arc or no arc and high technical and economic index, which can meet the requirements of the device.
- Isolation switch and fuse type isolation switch choose Q series. The series has high reliability, strong breaking ability, and can realize mechanical interlocking;
- Fuse main selection NT series;
- AC contactor selected B series, LC1-D series.

Device characteristics

- Improve the heat capacity of the adapter, and greatly reduce the additional temperature rise caused by the temperature rise of the adapter to the connector, cable head and partition;
- The separation between functional units and compartments is clear and reliable, and the failure of a certain unit does not affect the work of other units, so that the failure is limited to the minimum range;
- Bus bar flat arrangement makes the device dynamic and thermal stability is good, can withstand 80/176kA short circuit current impact;
- The number of circuits of MCC cabinet is as high as 22 times, fully considering the needs of large single capacity power generation, petrochemical system and other industries automated electric door (machine) group;
- The connection between the device and the external cable is completed in the cable compartment, and the cable can be up and down. The current transformer is installed in the cable compartment to facilitate installation and maintenance;
- The same power distribution system can match the current limiting reactor to limit the short circuit current, stabilize the bus voltage at a certain value, and partially reduce the requirements for short circuit strength of components;

The drawer unit has a sufficient number of secondary connectors (32 pairs for 1 unit and above, 20 pairs for 1/2 unit) to meet the requirements of the number of contact points of the computer interface and automatic control loop.

Auxiliary circuit

The design of the auxiliary circuit diagram conforms to the relevant design technical regulations such as "Technical Regulations for the Design of Power Consumption in thermal power Plants". Suitable for power plants, substations of low-voltage plant (office) power system and factories and mining enterprises, high-rise buildings in the low-voltage distribution system.

The auxiliary circuit scheme is designed according to the main circuit scheme, which is divided into power supply line, feed line (PC) and motor feed line (MCC).

Installation and use

After the product arrives at the receiving place, it should first check whether the packaging is complete and intact. If any problem is found, the relevant departments of the contract should be notified in time to make business records, jointly analyze the reasons, and prepare visa and post-processing. For products that are not installed immediately, they should be placed in appropriate places and kept properly according to the normal conditions of use and the requirements of the temporary storage regulations of electrical equipment.

- The installation of the product shall be carried out according to the installation diagram (see the attached drawing). The basic channel steel and bolts are provided by the customer. When the main busbar is connected, if the surface is uneven due to transportation and storage reasons, it should be smooth and then connected tightly;
- When the device is installed alone or in a row, its verticality and the deviation of the cabinet surface unevenness and the gap between the cabinets shall comply with the following table.

Serial number	Item	Tolerance (mm)
1	Perpendicularity	3.3
2	Levelness	Top of two adjacent cabinets, top of a row of cabinets 2、 5
3	Unevenness	Adjacent two cabinet tops, a row of cabinet tops 1、 5
4	Spacing joint	2

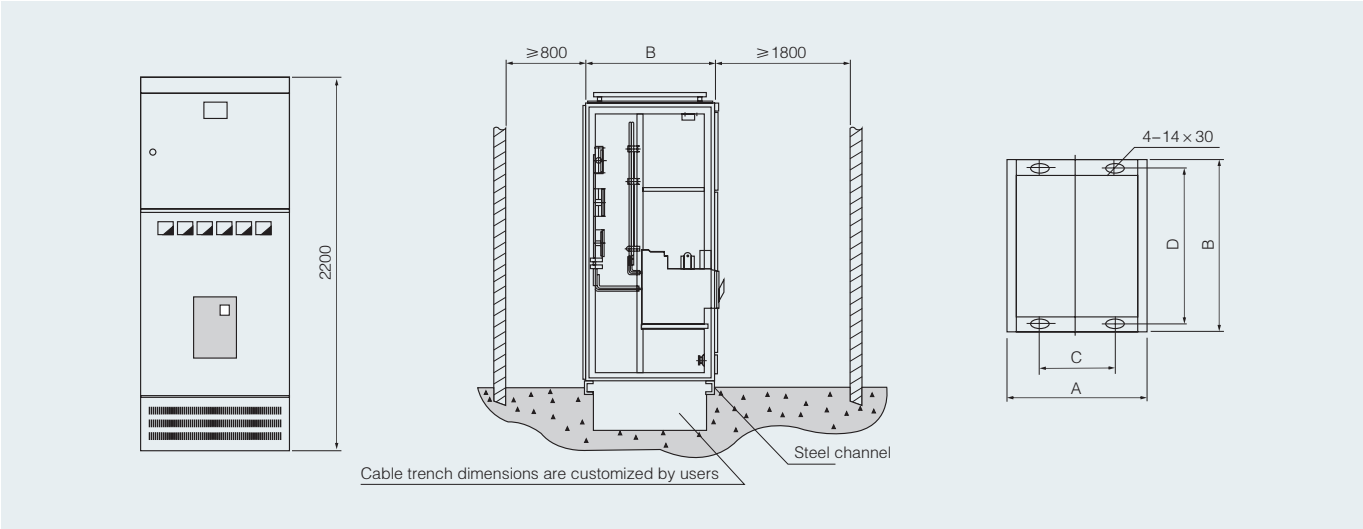
- Inspection and inspection of products after installation and before operation
 - Check whether the cabinet paint or other covering materials (such as spray plastic) are damaged, and whether the cabinet is dry and clean;
 - Whether the operating mechanism of electrical components is flexible, there should be no jammed or excessive operating force;
 - Whether the main and auxiliary contacts of major electrical appliances are reliable and accurate;
 - Drawer or pull-out mechanism should be flexible, lightweight, no blocking and collision phenomenon;
 - The center line of the dynamic and static contacts of the drawer or draw-out structure should be consistent, and the contact should be close. The insertion depth of the main and auxiliary contacts should meet the requirements. The mechanical or electrical interlocking device should operate correctly, and the lock or release should be reliable;
 - Drawers of the same size should be easily interchangeable, without jamming and collision;
 - The grounding contact between the drawer and the cabinet should be in close contact. When the drawer is pushed in, the grounding contact of the drawer is contacted first than the main contact. When the grounding contact is pulled out, the grounding contact is disconnected after the main contact.
 - The calibration of the instrument, the ratio and polarity of the transformer should be correct;
 - Fuse core specifications should meet the requirements of engineering design;
 - The rating and setting of the protection should be correct and the operation is reliable;
 - Insulation resistance measured by 1000V megohm meter shall not be less than 1MΩ;
 - Each bus should be properly connected, and the insulation support, mounting parts and other accessories should be firmly and reliably installed.
- Use precautions
 - The device is a low-voltage distribution cabinet without wall installation, positive operation, and double-side maintenance. Only qualified professionals can enter or open the maintenance channels and doors of cabinets for operation, inspection and maintenance.
 - Air circuit breaker, plastic-case circuit breaker after many parts, especially after short circuit, will make the contact local burn and produce carbon substances, so that the contact resistance increases, should be maintained and repaired according to the circuit breaker operating instructions.
 - After installation and maintenance, it is necessary to strictly check the isolation between the compartments and the functional units to ensure the good functional separation of the device and prevent the expansion of faults.

Product package

The manufacturer shall provide the following documents and attachments when supplying:

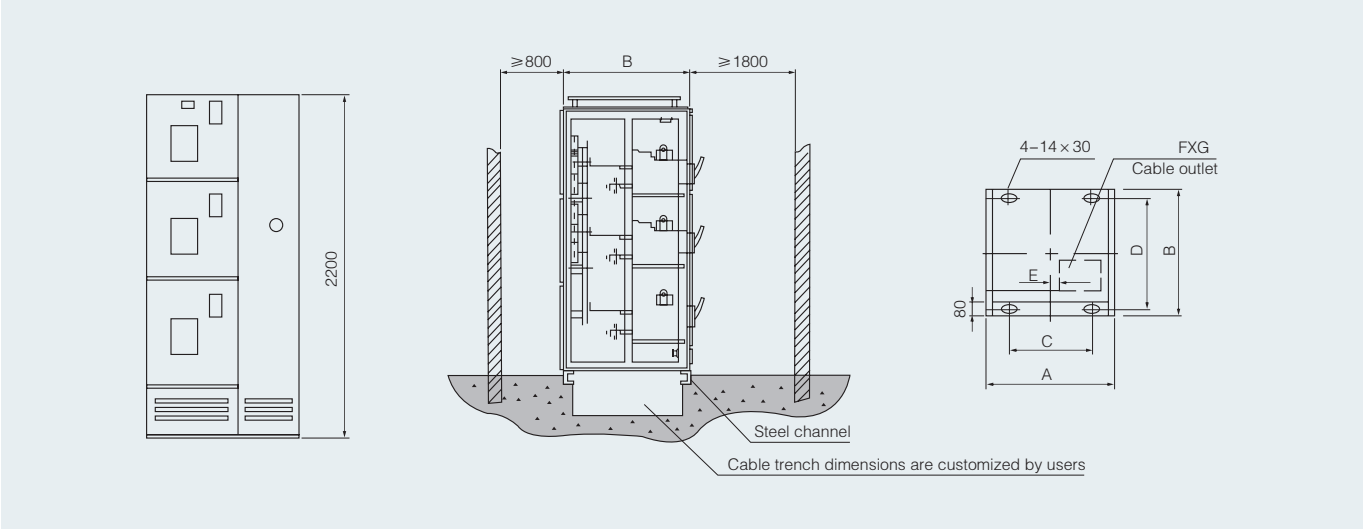
- Device list
- Product certificate
- Instruction manual
- Factory test report
- Electrical drawings
- Cabinet door key, operating handle and spare parts stipulated in the contract
- Installation and use instructions for the main components

Installation diagram



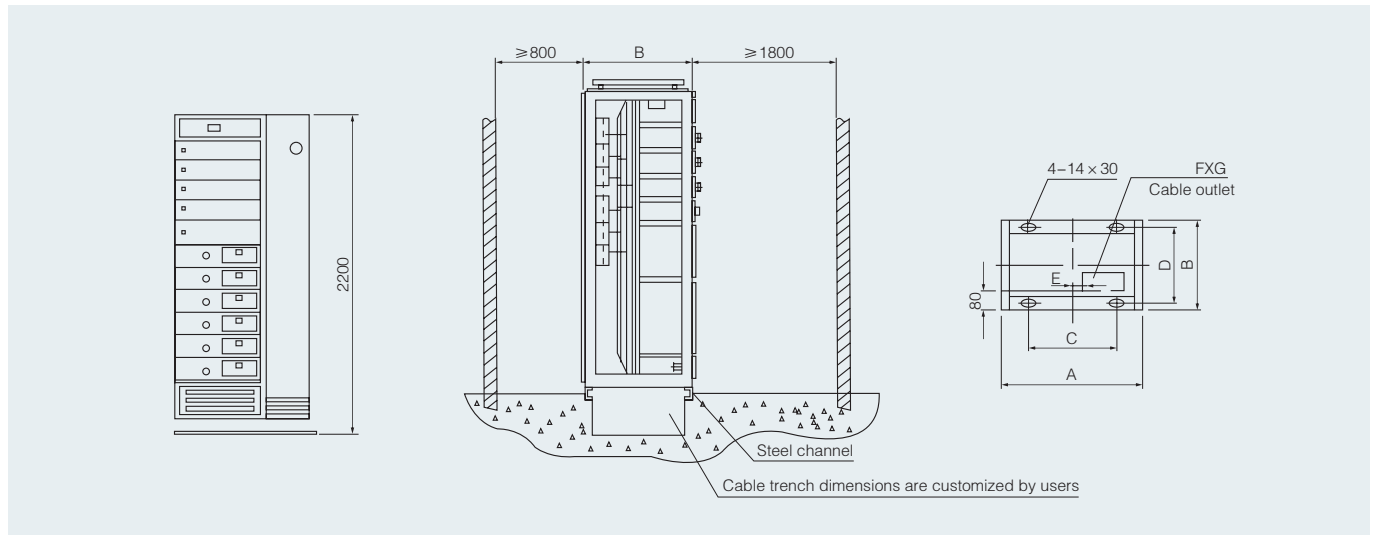
Common cabinet code	A	B	C	D	E	Remark
GCS-TG1010-4	1000	1000	850	956	60	400×400
GCS-TG0810-4	800	1000	650	956	160	200×400
GCS-TG0808-4	800	800	850	756	60	400×400
GCS-TG0608-4	600	800	450	756	160	200×400

PC cabinet installation diagram



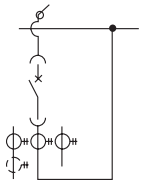
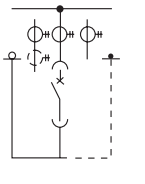
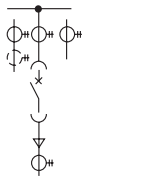
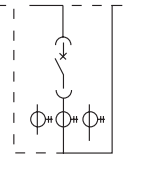
Common cabinet code	A	B	C	D	E	Remark
GCS-TG1010-2	1000	1000	850	956	60	400×400
GCS-TG0810-2	800	1000	650	956	160	200×400
GCS-TG1008-2	1000	800	850	756	60	400×400
GCS-TG0808-2	600	800	650	756	160	200×400

MCC cabinet installation diagram



Common cabinet code	A	B	C	D	E	FXG
GCS-TG1006-1	1000	600	850	556	60	400×350
GCS-TG0806-1	800	600	650	556	160	200×350

GCS type main circuit scheme

Scheme number	01	02	03	04
Main circuit scheme				
Model	A B C D E F G	A B C D E F G	A B C D E F G	A B C D E F G
Short/instantaneous Withstand Current (kA)	80/176	80/176	80/176	80/176
Rated current (A)	4000 3150 2500 2000 1600 1000 630	4000 3150 2500 2000 1600 1000 630	4000 3150 2500 2000 1600 1000 630	4000 3150 2500 2000 1600 1000 630
Main circuit electrical equipment selection	AH-40C 1	AH-30CH 1	AH-25C 1	AH-20C 1
	AH-16B 1	AH-10B 1	AH-6B 1	SDL-□ (1) (1) (1) (1)
	SDL-□ □/5 3(4) 3(4) 3(4) 3(4) 3(4) 3(4)	3(4) 3(4) 3(4) 3(4) 3(4) 3(4) 3(4)	3(4) 3(4) 3(4) 3(4) 3(4) 3(4) 3(4)	3(4) 3(4) 3(4) 3(4) 3(4) 3(4) 3(4)
W mm	800(1000)	600	800(1000)	600
D mm	1000	800	1000	800
Occupies cabin heightmm	Receiving power	Receiving power	Receiving power	Contact

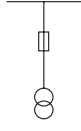
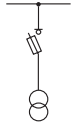
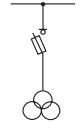
GCS type main circuit scheme

Scheme number		05			06			07			08		
Main circuit scheme													
Model		A B C			A B C D E F G			A B C D E F G					
Short/instantaneous Withstand Current (kA)		50/105			50/105			50/105					
Rated current (A)		1600 1000 630			1000 630			1000 630					
Main circuit electrical equipment selection	AH-16B	1			1			1					
	AH-10B	1			1			1					
	AH-6B	1			1			1					
	QPS-1000	1			1			1					
	QPS-630	1			1			1					
	SDL- □	(1) (1) (1)											
SDH- □ □ /5		1(3) 1(3) 1(3)			3(4) 3(4)			3(4) 3(4)					
W mm		400(600)			1000			1000					
D mm		800(1000)			800			800					
Occupies cabin height mm		640											
Use		Busbar switching			Feed			Dual power manual switch			Dual power manual switch		

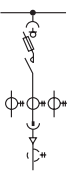
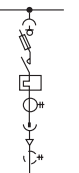
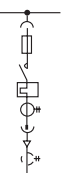
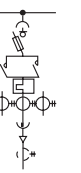
Note: 1.AH is the main circuit breaker, other more advanced performance or imported F, MT series circuit breakers can also be selected. 2.01, 02/04 solution If PE+N cable needs to enter the power cabinet, the size of the cabinet pipe in brackets. 3.SDL and SDH are special current transformers for BGCS cabinets

Scheme number		09	10	11	12
Main circuit scheme					
Model		A B	A B C D	A B C	
Short/instantaneous Withstand Current (kA)		50/105	50/105	50/105	
Rated current (A)		400 250	630 400 250 160	400 200 100	600
Main circuit electrical equipment selection	QSA-630				
	QSA-400				
	QSA-250				
	QSA-160				
	Current limiting reactor 600A 0.0084 Ω / Φ				3
	B370,LR1,CJ35	1			
	B250,LR1,CJ35	1			
	TG400BD,CM1-400L,TM30	1 1		1	
	TG225BD,CM1-225L,TM30			1	
	TG100BD,CM1-100L,TM30			1	
SDL- □		(1) (1) (1) (1)	(1) (1) (1)		
SDH- □ □ /5		1(3) 1(3) 1(3) 1(3)	1(3) 1 1		
W mm		800(1000)	1000	800(1000)	600
D mm		600	800(1000)	800	800
Occupies cabin height mm		480×2	480 320	240(160)	
Use		Dual power switching	Feed	Feed	Current limiting reactor

GCS type main circuit scheme

Scheme number	13	14	15	
Main circuit scheme				
Model				
Rated current (A)				
QSA-63		1	1	
NT00-□	3			
JDG-0.5 380/100	2	2		
JSGW-0.5				
SDH-□ □/5			1	
W mm	(Installed in the receiving cabinet without spacing or connected to the branch bus in the 05 scheme transfer cabinet)			
D mm				
Occupies cabin height mm				
Use	Voltage transformer	Voltage transformer	Voltage transformer	

Note: The feeder scheme can be equipped with zero sequence protection, and the zero sequence current transformer is installed in the cable compartment

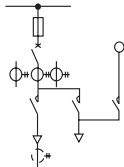
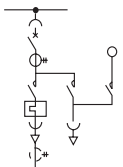
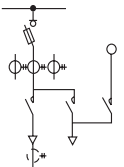
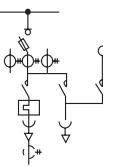
Scheme number	16	17	18	19
Main circuit scheme				
Model	A B C	A B		A B C
Maximum compensation (kW)	100 75 75	35 75	7.5	100 75 55
QSA-250	1			1
QSA-160	1			1
QSA-125	1	1		1
HH17-63		1		
NT00-□			3	
B250,LC1,CJ35	1			2
B170-105,LC1,CJ35	1 1			2 2
B85 或 LC1-D80		1		
B45 或 LC1-D32		1		
B16 或 LC1-D18			1	
T85,LR1		1		
TSA45,LR1		1		
T16,LR1	1 1 1		1	1 1 1
SDL-□	(1) (1) (1)	(1) (1)	(1)	(1) (1) (1)
SDH-□ □/5	3 3 3	1 1	1	3 3 3
W mm	800(1000)	800(1000)	800/2(1000/2)	800(1000)
D mm	600	600	600	600
Occupies cabin height mm	480	640	160	480
Use	Electric motor (irreversible)	Electric motor (irreversible)	Electric motor (irreversible)	Electric motor (irreversible)

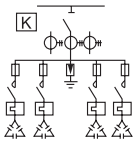
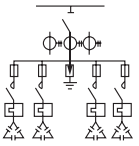
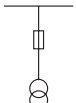
GCS type main circuit scheme

Scheme number	20			21			22			23			
Main circuit scheme													
Model	A	B					A	B	C		A	B	C
Maximum compensation (kW)	37	15			7.5		100	75	55		37	15	7.5
Main circuit electrical equipment selection	QSA-250	1											
	HH17-63		1										
	NT00- □				3								
	CM1-400LTG-400BD,TM30						1						
	CM1-225M,TM30							1	1				
	CM1-100M,TG-100BD,TM30										1	1	
	NZMS4,TM30												1
	B250,LC1,CJ35						1						
	B170-105,LC1,CJ35							1	1				
	B85 / LC1-D80	2									1		
B45 / LC1-D32		2									1		
B16 / LC1-D18					2							1	
T85,LR1	1									1			
TSA45,LR1		1									1		
T16,LR1					1		1	1	1				1
SDL- □	(1)	(1)			(1)		(1)	(1)	(1)				
SDH- □ □ /5	1	1			1		3	3	3				
W mm	800(1000)			800/2(1000/2)			800(1000)			800(1000)			800/2(1000/2)
D mm	600			600			600			600			600
Occupies cabin height mm	480			160			480 320			480			160
Use	Motor (reversible)			Motor (reversible)			Electric motor (irreversible)			Electric motor (irreversible)			

Scheme number	24			25					
Main circuit scheme									
Model	A	B	C	A	B	C			
Short/instantaneous Withstand Current (kA)	50/105			50/105					
Maximum compensation (kW)	30/63			30/63					
CM1-400LTG-400BD,TM30	1								
CM1-225M,TM30		1							
CM1-100M,TG-100BD,TM30				1	1				
NZMS4,TM30						1			
B250,LC1,CJ35	2								
B170-105,LC1,CJ35			2						
B85 / LC1-D80				2					
B45 / LC1-D32					2				
B16 / LC1-D18						2			
T85,LR1				1					
TSA45,LR1					1				
T16,LR1	1	1	1			1			
SDL-□	(1)	(1)	(1)	(1)	(1)	(1)			
SDH-□ □ /5	3	3	3	1	1	1			
W mm	800(1000)			800(1000)			800/2 1000/2		
D mm	600			600					
Occupies cabin height mm	480 320			240			160		
Use	Motor (reversible)			Motor (reversible)					

GCS type main circuit scheme

Scheme number	26	27	28	29
Main circuit scheme				
Model	A B	A B	A B	A B
Short/instantaneous	50/105	50/105	50/105	50/105
Withstand Current (kA)	30/63	30/63	30/63	30/63
Maximum compensation (kW)	160 90	37 15	160 90	37 15
Main circuit electrical equipment selection	QSA-400~250		1 1	
	QSA-125			1
	HH17-63			1
	NT3- □	3 3		
	TG-400BD,TM30	1		
	CM1-225M,TM30	1		
	CM1-100M,TG-100BD,TM30			
	B370+B250,LC1,CJ35	2+1	2+1	
	B370+B170,LC1,CJ35	2+1	2+1	
	B85 / LC1-D80	3		3
	B45 / LC1-D32	3		3
	T85,LR1	1		1
	TSA45,LR1	1		1
	T16,LR1	1 1	1 1	
	SDL- □	(1) (1)	(1) (1)	(1) (1)
	SDH- □ □ /5	3 3	3 3	1 1
W mm	1000	800(1000)	800(1000)	800(1000)
D mm	800(1000)	600	600	600
Occupies cabin height mm	1120 960	320	800	320
Use	Y- △ Start	Y- △ Start	Y- △ Start	Y- △ Start

Scheme number	30	31	32
Main circuit scheme			
Model	A B C	A B C	
Maximum compensation (kW)	160 128 96	160 128 96	
Main circuit electrical equipment selection	QA-400	1 1 1	1 1 1
	am-32	30 24 18	30 24 18
	QSA-125		
	NT00- □		3
	JBK3-400		1
	B30C	10 8 6	10 8 6
	T45,LR1	10 8 6	10 8 6
	BCMJJ-0.4-16-3	10 8 6	10 8 6
	SDH- □ □ /5	3 3 3	3 3
	W mm	1000 800	1000 800
D mm	800(1000)	800(1000)	
Occupies cabin height mm			
Use	Reactive power compensation (main cabinet)	Reactive power compensation (main cabinet)	Common power source