BRN-SVG
STATIC VAR GENERATOR
User Manuals

Shanghai Brilliant Automation Technology Co.,Ltd





Catalogue

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Preface

To help you better use the product and protect you and the product safety, please carefully read and understand the relevant security information and about the equipment and user manual information before operating this product.

Disclaimer

Following the contents of the user manual is a prerequisite for safe operation, and also a prerequisite for achieving the described performance features and product functions;

Our company shall not bear the responsibility for the material loss, economic loss or personal injury caused by the neglect of the product information;

Copyright Statement

We reserve the final interpretation right of this manual, prohibiting the reproduction, modification or dissemination of the contents of this manual without permission;

Technical changes

Please read and understand the information related to the product;

Please keep this manual during the service period of the product to avoid emergencies;

As the product is constantly updated and upgraded, and not without notice;

Warranty service

Within the shelf life of the product, due to the quality problems of the product can enjoy free after-sales service;

Do not try to disassemble, repair, modify, upgrade the equipment, or all warranty services will fail.

Safe

This instruction is very important for the installation and use of a static reactive power generator (BRN-SVG). Ignoring these instructions may cause you physical injury and even death. The following safety information summarizes the safety measures required for the operation of the equipment and its components. Follow the safety tips and safety information to ensure your personal safety and avoid material and economic losses.

1. The symbol used

Safety information is marked with a symbol, according to the danger level, the danger level is shown as follows:

 Attention	Please always pay attention to possible dangerous situations, if not careful, may lead to mild injury.
 Be careful	Please always pay attention to the dangerous situations that may occur, if not careful, may lead to moderate injury.
 Warning	Please always pay attention to possible dangerous situations, if not careful, may lead to serious injury.
 Danger	Please be careful of electrical hazards.

2.Precautions

Some parts of the BRN-SVG equipment will inevitably produce hazardous voltage when operating electrical equipment. If not handled properly, serious physical injury or equipment damage may occur.

◆BRN-SVG equipment is suitable for 0.2/0.4/0.48/0.69KV power supply system, and it is strictly prohibited to access to the power grid at will without understanding, so as not to cause equipment damage and personal safety harm!

◆Improper use will damage the static reactive power generator and the connected equipment;

◆All system installation or routine maintenance must be operated in the case of power failure;

◆It is strictly prohibited to place combustible materials near the BRN-SVG equipment or install them in the

environment containing explosive gas, otherwise there is a risk of fire or even explosion;

◆Ensure that the input power is completely disconnected before installation and wiring, otherwise there is the risk of electric shock; after power on, never touch the BRN-SVG and other parts of the equipment;

◆Bare cables, power terminal joints, and ungrounded live equipment may cause electric shock. Please ask the electrical engineer or professional technician to confirm that the BRN-SVG equipment is fully grounded and determine the live parts of the joints and components; please use appropriate safety protective clothing and test tools and follow the safety operation specifications;

◆No maintenance of BRN-SVG equipment in working condition;

◆When maintaining the product, be sure to cut off the main circuit and wait for at least 15 minutes to ensure that the AC side voltage drops to 0V and the internal capacitor is fully discharged;

◆In wet conditions, the resistance of the human body will drop, at this time there may be a dangerous large current through the human body, so do not maintain and install BRN-SVG in a wet place. When it is impossible to avoid working under such conditions, stand on a dry rubber mat or dry board and use insulating gloves to keep the clothes dry and work with a companion.

3. Personnel with electrical qualifications

To avoid personal injury and material loss, only professionally qualified personnel are allowed to operate on BRN-SVG equipment, assembly, systems, and current circuits, and they must have the following knowledge:

◆National and international regulations on electrical safety accidents;

◆Power supply technical standard of safety prevention system and national standard of low-voltage electrical safety technical specification;

◆Installation, commissioning, operation, disconnect, grounding and marking of electrical equipment;

◆Basic requirements for personal protection.

Chapter 1 Arrival Inspection and Storage

1.1 Transportation

Each set of stationary reactive power generator (BRN-SVG) is generally transported through carton packaging (default carton, optional wooden box). buffer foam cotton and other protective items are placed in the carton, but they can not be inverted or tilted in the process of transportation and handling, so as to ensure that the filter can not be damaged in the process of movement.

1.2 Receiving and checking the equipment

BRN-SVG equipment has been professionally tested and inspected before leaving the factory, and is prepared according to the requirements of safe transportation. However, during the long-distance transportation, the fixed parts on BRN-SVG equipment may still become loose due to vibration turbulence and other reasons, so after receiving the equipment, please conduct the following inspection:

◆After the equipment delivery arrives at the site, please check the goods according to the delivery list. If there are any abnormal conditions, such as damaged packaging, obvious deformation of equipment, inconsistent equipment quantity and the delivery list, please sign the carrier for confirmation, and contact the manufacturer immediately;

◆When removing the equipment package, please pay attention to avoid violent removal. When you use scissors, pliers, etc. to remove the packaging, please be careful to avoid scratches and damage to the equipment;

◆Check whether there is any external damage on the equipment, such as panel scratches, paint drop, depression, etc., and observe whether there are falling components and loose wiring in the equipment. In case of transportation damage should request logistics claim, need assistance in the claim process, please contact the company;

◆Check the specifications and models. Our BRN-SVG equipment shell has a striking nameplate tag, which clearly describes the equipment model, rated capacity and other information. Please work carefully again to check the invoice and whether the goods are consistent with the delivery list.

1.3 Packaging of the module

The module packaging is divided into cartons and wooden boxes, generally the default carton. If you need a wooden box package, please note it in advance.

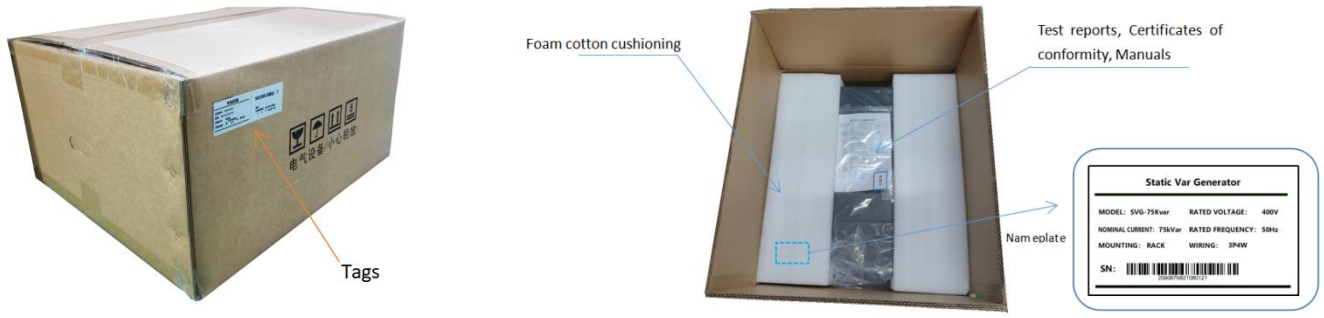


Figure 1-1 Appearance diagram of the rack type

1.4 Storage

◆Packaging of BRN-SVG equipment avoids long-term outdoor storage, can be stored indoors for 6 months (from the date of delivery), if you need to store for a longer time, order can propose to the company to make a longer storage time packaging;

◆If the BRN-SVG equipment is not installed immediately, the BRN-SVG equipment should be placed in the warehouse of dry, ventilated, no dust and corrosive substances, and no strong mechanical vibration and magnetic field in the warehouse;

◆Storage environment temperature: (-45℃ ~70℃), relative humidity of air: (5%~95%) (when lower than 25℃);

◆When long-term storage needs, please regularly check to confirm whether the equipment packaging is moldy and damaged.

Chapter 2 Product Overview

2.1 Appearance and composition of the products

BRN-SVG series products is rack-mounted. Each installation mode module has 200V / 400V / 480V and 690V voltage grade products, and the product capacity covers 50 kVar ~ 200 kVar.

The 4.3-inch LCD display is an optional module, and you can choose whether to have a screen according to the requirements.

Take the rack-type 75 kVar, with the screen module as an example.

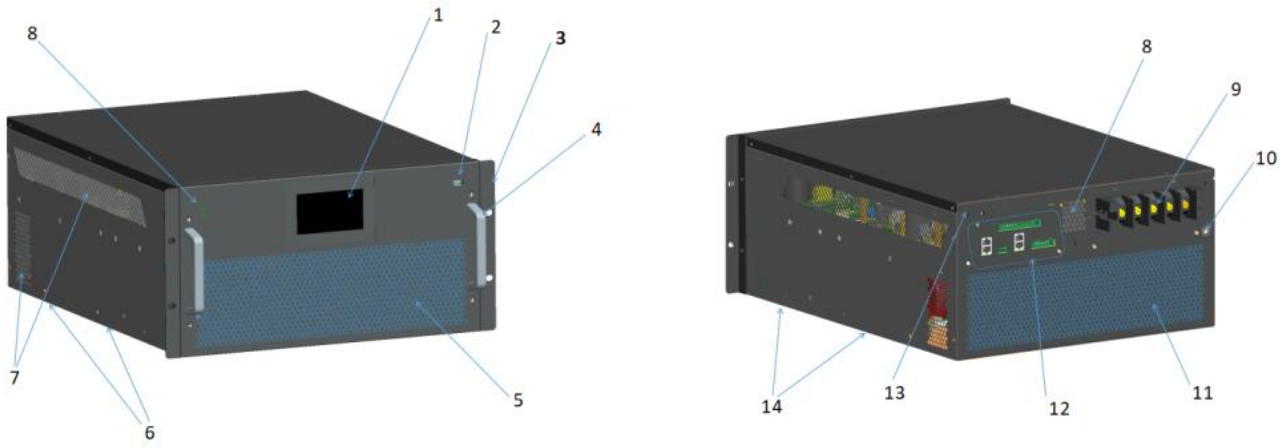


Figure 2-1 Frame-type appearance drawing

Serial number	Instructions	Serial number	Instructions
1	4.3-inch LCD display (optional)	8	Upper heat dissipation hole
2	USB port (can flash reprogramming)	9	Power terminals
3	Rack mounted hanging ears	10	PE ground terminal
4	Hold hands	11	Lower back heat sink hole
5	Lower front panel heat dissipation hole	12	Control terminals
7	Side heat dissipation holes	13	Reserve WIFI antenna ports

*** BRN-SVG Rack series 400V voltage class 100kVar / 150kVar and 690V voltage class 120kVar products have the upper half of the front panel, others are consistent with the figure above, please refer to Appendix 1, without additional display here.**

2.2 Overall dimensions

Under the same specification, the screen-free module and the screen module are the same as the overall size. Below, the screen module is taken as an example.

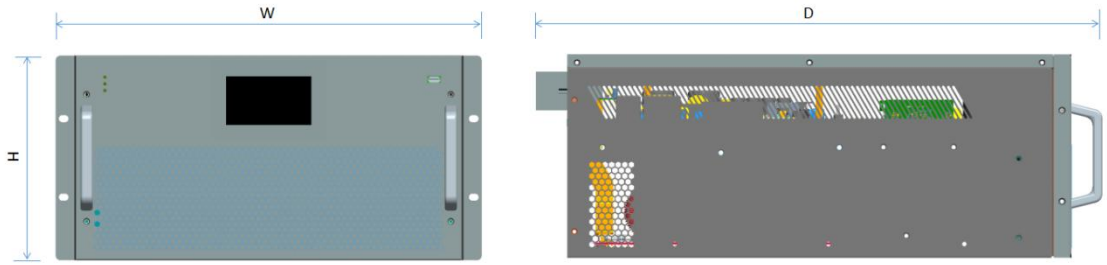


Figure 2-3 rack type dimensions

Project	200V/400V/480V					690V
capacity (kVar)	35kVar	50kVar	75kVar	100kVar	150kVar	120kVar
Dimension W * D * H (mm)	359*538*200	399*626*200	484*646*232	554*656*250	674*715*250	569*697*250
weight (kg)	22	27	38	47	56	50

2.3 Technical parameters

Rated voltage (V)	200/400	480	690
input voltage range	-20%~+20%	Maximum voltage: 500V	-20%~+10%
Single-module capacity (kVar)	35、50、75、100、150	35、50、75、100、150	120
frequency	50/60Hz (-10%~+10%)		
Scope of compensation	Capacitive and inductive continuously adjustable		
CT way to install	Open or closed loop (recommended in parallel case)		
CT installation site	Grid side / load side		
response time	≤10ms		
wiring system	Three-phase three-line / three-phase four-wire		
overload capacity	110% rated current and 1min at 120% rated current		
Circuit topology	Three-level topology		
switching frequency	20 kHz		
Number of parallel machines	Parallel between modules	≤ 20	
	Parallel machine under HMI control	No more than 8 modules are combined	
redundance	Any unit can become separate units		
Unbalanced governance	can provide sth		
SVC	can provide sth		
show	Screen / 4.3 / 7 inch screen (optional)		
communication interface	RS485		

	CAN Protocol, RJ 45 interface, for communication between modules
Noise level	<56 dB max to <69 dB (depending on module or load condition)
above sea level	The decrease was used at> 1500m
ambient temperature	Operating temperature: -45°C~55°C, drop over 45°C
	Storage temperature: -45°C~70°C
humidity	5% ~ 95% RH, with no condensation
cooling-down method	Intelligent air cooling
levels of protection	IP20
General structural and security issues	EN 62477-1(2012)，EN 61439-1 (2011)
EMC	EN / IEC 61000-6-4, of the kVar class
attestation	CE，CQC

2.4 Heat dissipation requirements

The BRN-SVG module adopts intelligent air cooling. During the design of the complete system, the heat dissipation design shall meet the following requirements:

the classification of voltage	Product capacity	Demand volume (L / Sec)	Minimum air inlet area (mm)	Minimum opening size of front and rear door panels (mm)
200V /400V /480V	35kVar	150	$2.6*10^4$	383*87
	50kVar	225	$3.0*10^4$	383*100
	75kVar	300	$3.5*10^4$	383*120
	100kVar	450	$5.5*10^4$	430*140
	150kVar	525	$6.3*10^4$	520*160
690V	120kVar	450	$5.5*10^4$	430*140

For example, the complete cabinet of BRN-SVG-400kVar should be designed to 4 times of the BRN-SVG-100kVar module (required air volume, minimum air inlet area, minimum opening size of front and rear door panels).

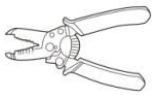
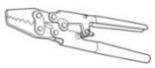
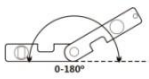
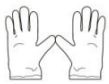
Chapter 3 System Installation

 Attention	◆The screen-less module is consistent with its installation and wiring mode; ◆The module can be monitored by a 4.3 inch small screen (optional), or by an external 7 inch large screen (optional).
 Be careful	◆Provide sufficient air circulation in the installation environment. When the ambient temperature is high, please cool down the BRN-SVG equipment as required; ◆Follow the installation instructions in this manual and related accessories; ◆Install the rack-type module, please install it horizontally. Try not to tilt, inverted and other directions for installation;
 Warning	Because ignoring the installation instructions can easily cause damage to the equipment and may endanger personal safety in serious cases, please strictly abide by the following regulations: ◆Before starting work, disconnect and make sure it is not closed by people and check that the BRN-SVG is dead! Temporary cover the adjacent live part with insulating material; ◆In the process of operation and troubleshooting, please check whether there is a dangerous voltage in the environment in advance, and please close them off if necessary; ◆When working on the electrical system, please wear the protective clothing and protective equipment according to the applicable guidelines; ◆Before connecting the equipment / components, keep ground and ensure the equipment is power off; ◆Do not contact the exposed or peeled wire, the twisted wire should be equipped with wire sleeve; ◆Dangerous voltage is possible in all circuit parts connected to the power supply / grid; ◆Use a suitable line disconnecting switch / circuit breaker / fuse; ◆Even after disconnection from the power supply / grid, dangerous voltage may still

	exist in the equipment or components (capacitor); ◆Do not operate the equipment when the current transformer circuit is open; ◆Do not make the BRN-SVG equipment run at full load for a long time, and do not set the parameters beyond the limit value that the equipment can bear; ◆Note the warning and safety identification of all documents related to the equipment; ◆Please pay attention to all warnings and safety signs in the site environment.

3.1 Tools

Prepare the tools that may be used for installation and wiring in advance. Only part of the tools that may be used are listed here for reference only.

order number	tool	description	function
1		churn drill	Wall hole
2		One-word screwdriver	Remove, install screws and wiring
3		Phillips screwdriver	Remove, install screws and wiring
4		connection cover cutting pliers	wire stripping
5		inner hexagon spanner	Fixed module
6		Press wire clamp	Press the communication and control the terminal wiring And the crimded CT extension cord
7		multimeter	Check the cable wiring, Whether the grounding is reliable
8		marker pen	The punch mark
9		band tape	measured range
10		levelling instrument	Ensure the module level
11		Insulating and protective gloves	Wear it when installing the machine

3.2 Installation environment

The following are our suggestions for the working and installation environment of the equipment. If we do not take our suggestions, the equipment will be vulnerable to damage:

（1）Site requirements：

◆BRN-SVG equipment must be installed in the electrical control room, the room must maintain a good ventilation environment;

◆Air inlet and air outlet must have professional rain, dustproof, sand prevention treatment, necessary fire and rodent prevention treatment;

◆If there are serious dust (especially charged dust) and fly ash problems at the installation site, it is recommended to equip the BRN-SVG equipment with special protective treatment to avoid reducing the efficiency of the equipment, reducing the service life, failure and damage.

（2）Foundation requirements

◆The installation surface must be smooth and dry, and the ground is strictly prohibited from standing water;

◆Make sure that the ground does not shake horizontally, the plot is strong, and can withstand the weight of the BRN-SVG device.

（3）Space requirement

◆Sufficient space should be reserved in the left and right directions (at least 30cm) for heat dissipation;

◆BRN-SVG equipment should be kept away from flammable and explosive articles and corrosive materials;

◆A certain space should be reserved around the BRN-SVG equipment for operation, wiring and future maintenance;

◆The installation position must comply with the fire safety regulations.

（4）Environmental requirements

◆Full load at an altitude below 1500m; at 1500m-4000m; GB / T3859.2 per 100m increase;

◆Humidity: 5~95%, no condensation;

◆Ambient temperature: -45℃ ~55℃.

◆Equipment as far as possible to avoid dealing with strong impact load of machinery and equipment (such as: intermediate frequency furnace, high-frequency furnace, etc.).

 Attention	If you need to use the equipment in the field of strong salt, strong acid and alkali corrosion, you need special instructions when communicating with our company. If you have special on-site needs and do not Explain the product damage or can not be used, the company will not be responsible!

3.3 Mechanical installation

The module is installed in a rack-mounted configuration.

3.3.1 Rack-type installation

For rack installation, the cabinet can be fixed on the mounting post on both sides of the module (as shown below.

The armrest of the front panel of the module is only held as an auxiliary installation, and is not used for load-bearing!



Figure 3-1 Frack front panel

the classification of voltage	capacity	H（mm）	d（mm）	Install aperture φ
200V /400V /480V	35kVar	200	89	4-φ8*11
	50kVar	200	89	4-φ8*11
	75kVar	232	89	4-φ8*11
	100kVar	250	89	4-φ8*11
	150kVar	250	89	4-φ8*11
690V	120kVar	250	89	4-φ8*11

Take the 300kVar reactive power compensation cabinet (composed of 475kVar modules) as an example:

	Recommended size W * L * H (mm)
Reactive compensation cabinet	800*800*2200
	800*1000*2200
	1000*1000*2200

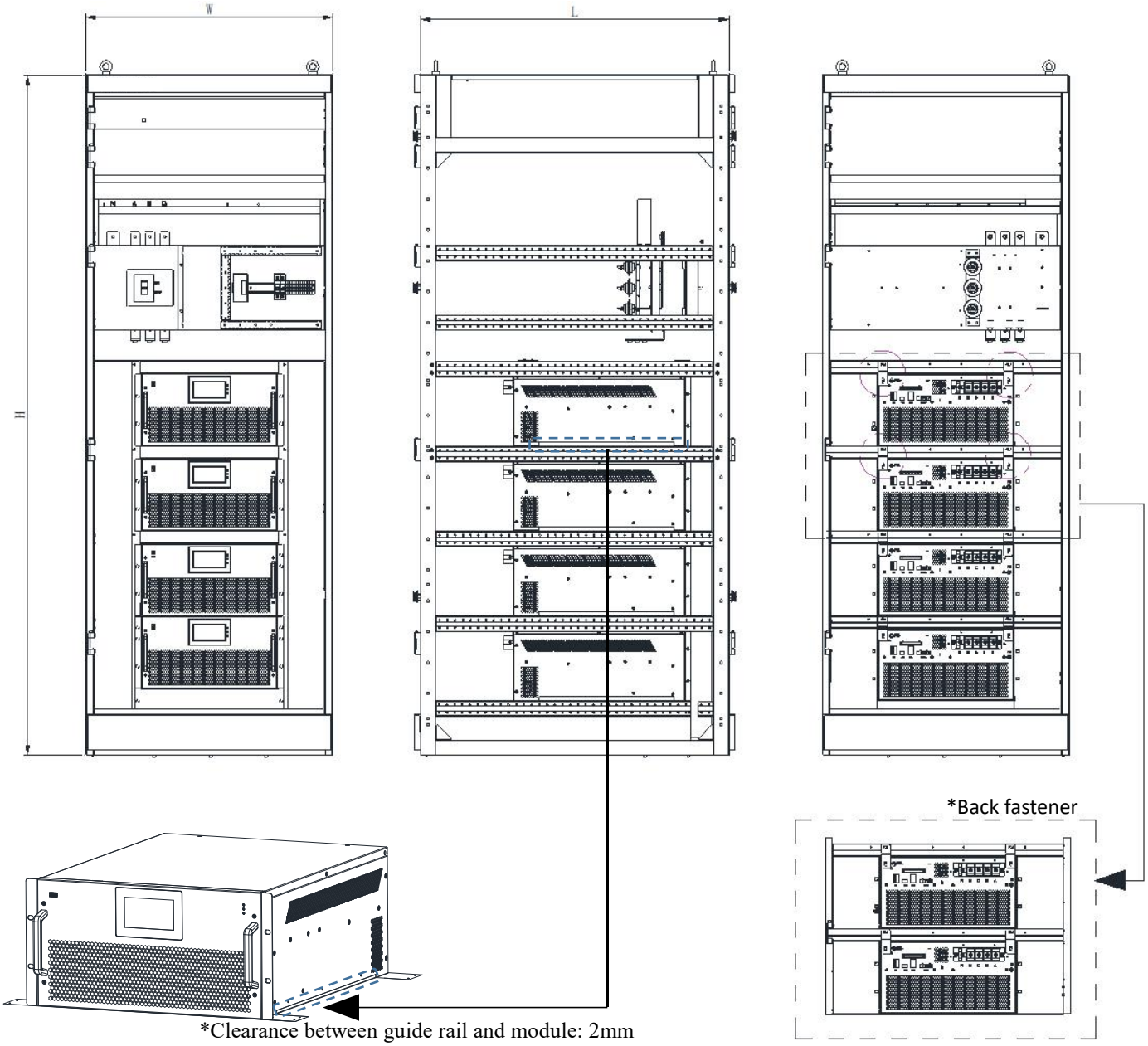


Figure 3-2 Rack installation diagram

3.4 Electrical connection

3.4.1 Port Overview

BRN-SVG module port is divided into power terminal, communication port (can be divided into monitoring port, debugging port and parallel communication port), control port and CT.

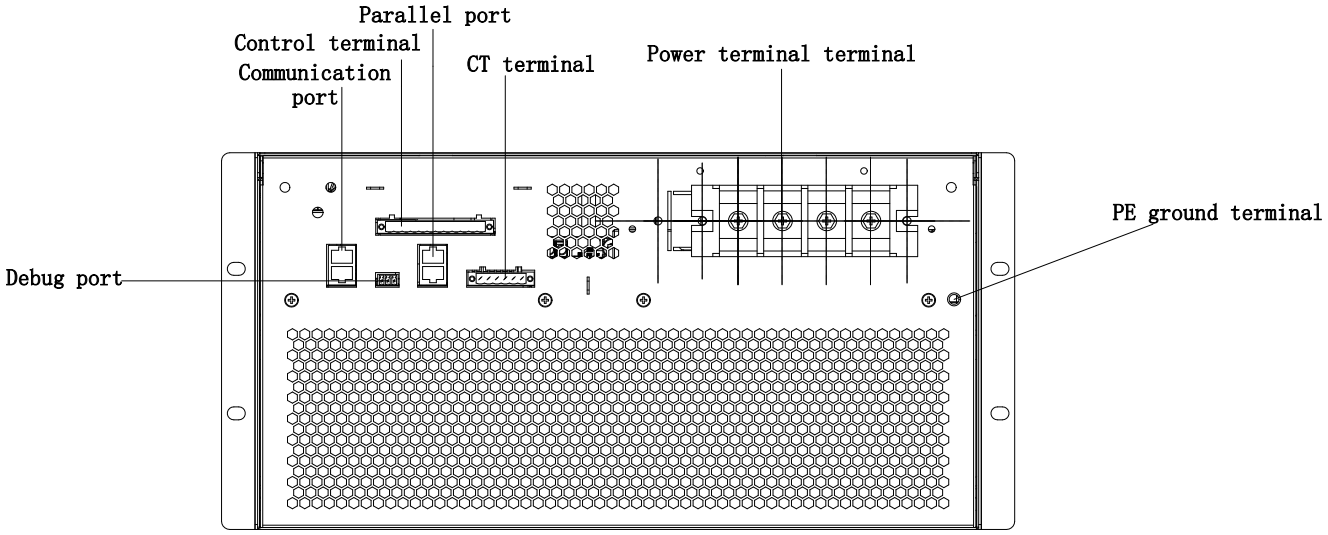


Figure 3-5 Back overview

Note: The power terminal N of the BRN-SVG module is only connected to one channel.

3.4.2 Power terminal

Warn	◆ The wiring of the power terminal must be connected correctly, please be sure to check for many times: no leakage, no mixing, otherwise it may cause equipment failure or damage; ◆ **BRN-SVG module power terminal N can be connected to one circuit;** ◆ Please keep the power terminal dry and can be protected if necessary; ◆ Power terminal is conductive material, do not touch by hand!

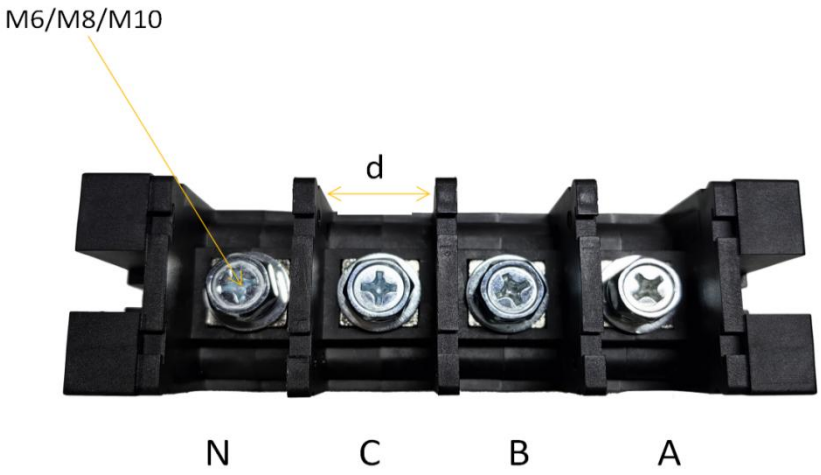


Figure 3-6 Power terminal diagram

(1) Meaning of terminals

Project	Explain
A	Phase A input
B	Phase B input
C	Phase C input
N	N phase input
PE	earth terminal

Voltage level	capacity	Power terminal specification	Terminal width d	PE ground stud
200V /400V /480V	35kVar	M6	13mm	M6
	50kVar	M8	23mm	M6
	75kVar	M8	23mm	M6
	100kVar	M8	23mm	M6
	150kVar	M10	30mm	M6
690V	120kVar	M8	23mm	M6

(2) Recommended cables

Project	capacity	A /B/C（L1/L2/L3）	N	PE	fuse A
Power cable	35kVar	16mm^2	25mm^2	16mm^2	80
	50kVar	25mm^2	35mm^2	16mm^2	125
	75kVar	35mm^2	35mm^2	16mm^2	160
	100kVar	50mm^2	50mm^2	25mm^2	250
	150kVar	70mm^2	70mm^2	25mm^2	400
	Copper core cable is recommended				

3.4.3 Communication port

	◆ Do not conduct wiring debugging of the TEST port without authorization from the manufacturer! If the unauthorized wiring debugging and modification parameters, may cause equipment failure or even equipment damage, the company is not responsible for!

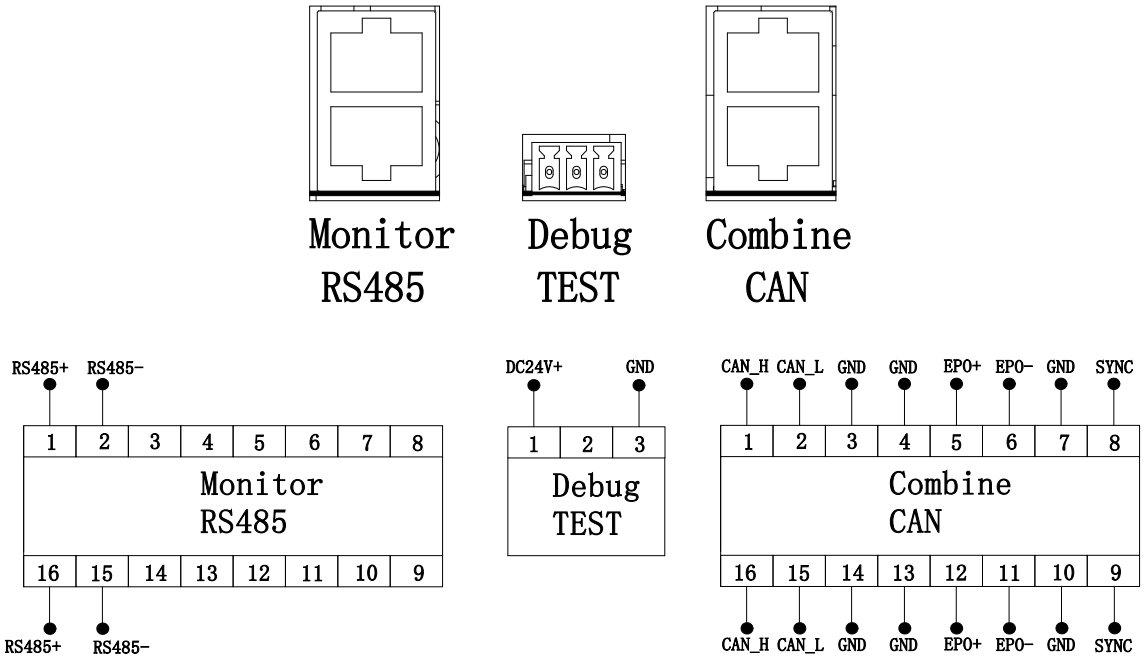


Figure 3-7, Communication port and definition figure

Name	Definition	Instructions	Notes
Monitoring RS485	RS485 Communication network port	RS485 port: used to connect the background computer control system or external screen display, to realize real-time monitoring of the entire BRN-SVG configuration system; In addition to the first BRN-SVG module, it is used to connect the upper port of the next BRN-SVG module to establish parallel connection (refer to Section 3.4.7).	Follow the "top to top, bottom to bottom" principle
		RS485 lower port: When there is only one BRN-SVG module, it can be empty; When multiple modules establish parallel communication, the lower port can be used to establish communication between parallel modules	
Debugging TEST	Test Debug interface	TEST port for manufacturers to debug the equipment testing special power-on interface (DC 24V input)	Special for debugging
Parallel machine CAN	CAN Parallel port	When the BRN-SVG module is normally combined, the CAN port can be empty; When the module controls the capacitor (optional), CAN port parallel is used.	Follow the "top to top, bottom to bottom" principle

3.4.4 Control ports

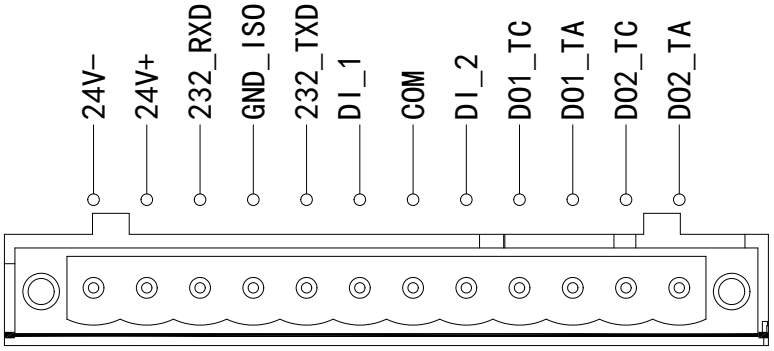
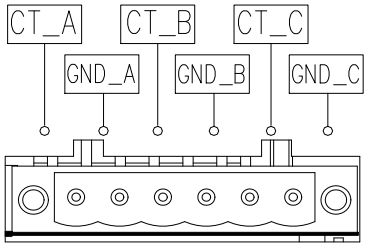


Figure 3-8 Control port diagram

Project		Terminal symbol	Description of terminal function	Electrical specifications
Control terminal	24V output	24V-	24V minus end	24V output,1Amax
		24V+	24V is the end	
	RS232	232_RXD	232 Receiver	The RS232 interface, The 9,600 baud rate
		GND_ISO	232 Ground end	
		232_TXD	232 Send end	
	digital input	DI_1	Digital input to port 1	Light-coupled isolation input Input voltage: 9 ~ 24 Vdc Input impedance: 5k Ω
		COM	Digital input into the common end	
		DI_2	Digital input to port 2	
	numeric output	DO1_T A	Relay output: 1 neutral terminal	TA-TC: normally open contact; Contact capacity: 250 VAc / 2A (cos φ =1), 30 Vdc /1A
		DO1_TC	Relay output 1 often start	
		DO2_T A	Relay output 2 neutral terminal	
		DO2_TC	Relay output 2 often start	

3.4.5CT-Transformer



Current transformer
CT

Figure 3-9 The CT port diagram

Project	Explain	Project	Explain
CT_A	To the S1 end of the phase A CT	GND_A	To the S2 end of the phase A CT
CT_B	To the S1 end of the phase B CT	GND_B	To the S2 end of the phase B CT
CT_C	To the S1 end of the phase C CT	GND_C	To the S2 end of the phase C CT

Project	Parameter requirements		
CT cable	CT rated load	Cable section area	One-way wiring length
	5V A	2.5mm^2	≤10m
		4.0mm^2	10m~20m
	10V A	2.5mm^2	≤20m
		4.0mm^2	20~40m
	15V A	2.5mm^2	≤30m
		4.0mm^2	30~60m

(1) Secondary power is greater than 1V A;

(2) Accuracy requirement of 0.5 level or above;

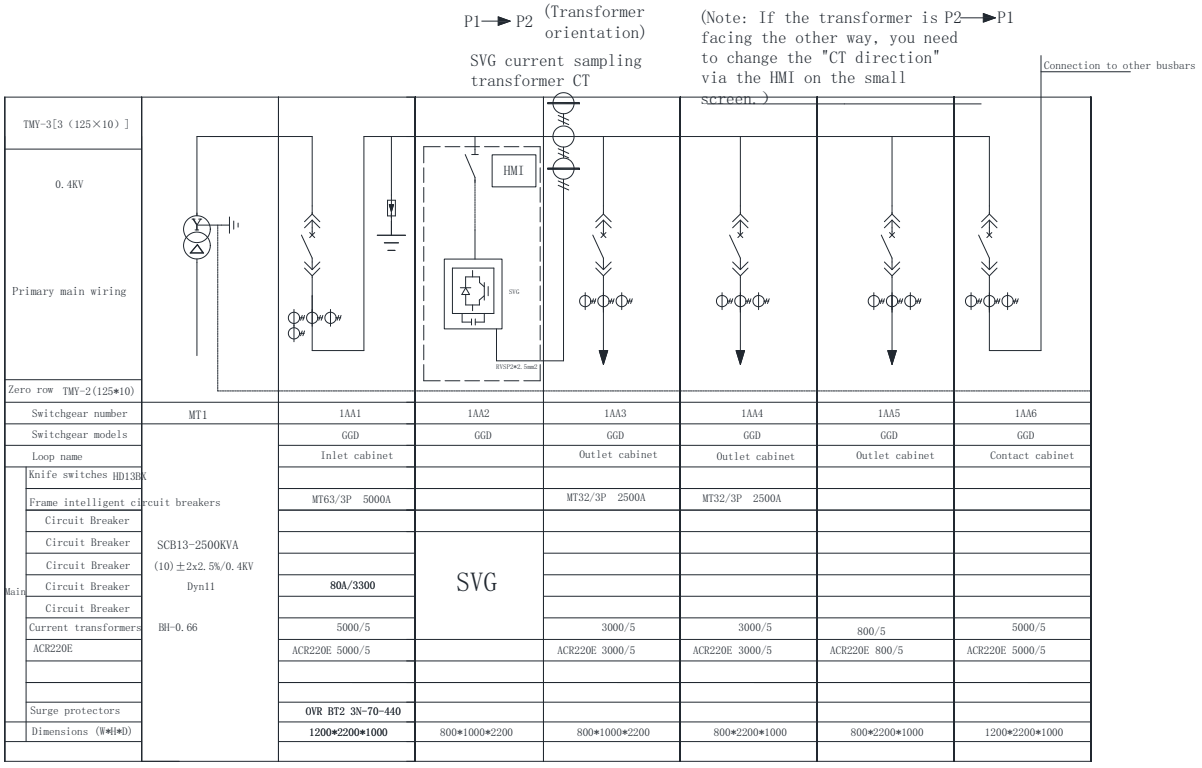
(3) The variable ratio range of CT is: 50 / 5~20000 / 5, and the variable ratio specification is selected according to 1.2~1.5 times of the system current. In the actual Project, it can also be selected according to 1.5 times of the transformer capacity (400V), for example: the transformer capacity is 2000 kVA, 1.5 times the option is 3000 / 5;

(4) The secondary side of CT shall be reliable grounded (only one end can be grounded). The transformer sample cable is recommended with shielding twisted pair cable (RVVP), 15m with an inner diameter of 2.5mm^2, 15m~30m line diameter to take 4mm^2.

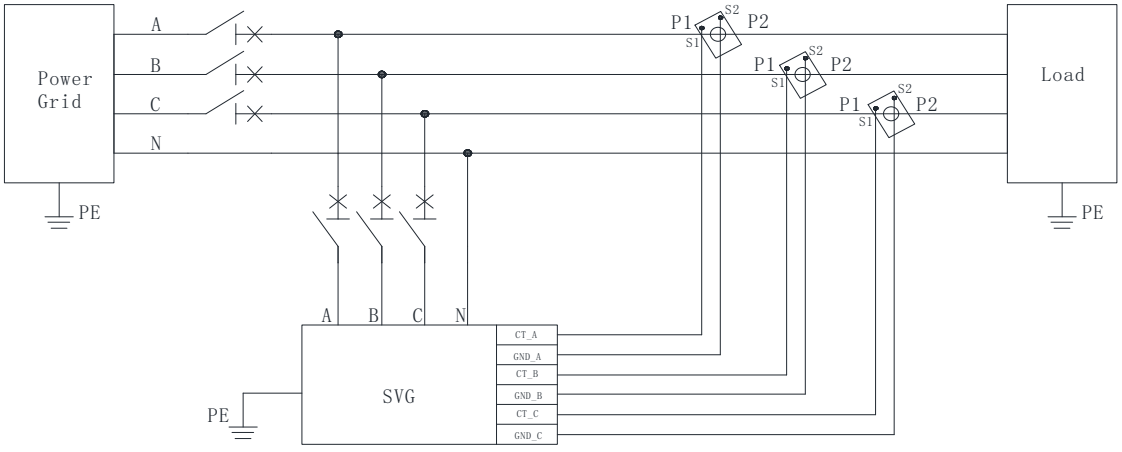
 Attention	◆External CT is recommended to be installed on the load side; ◆Current transformer, as the external accessory of BRN-SVG, plays a vital role in the normal work of BRN-SVG, so the selection of external current transformer is very important, please be sure to refer to the above instructions for selection; ◆If the current transformer is not connected correctly, it may cause insufficient filtering effect or equipment failure; ◆Before installing the current transformer, first short circuit the secondary side and power off the equipment; ◆Before separating the current transformer and BRN-SVG, it can be short circuit; ◆After measuring the load current, a certain margin should be left for the transformer.
 Warn	◆When CT wiring, the outgoing terminals S1 and S 2 of CT are connected to BRN-SVG respectively, and the positive end (CT_A) and negative end (GND _ A) of the CT terminal of the device, refer to 3.5.5 and 3.5.6; ◆The P1 end of CT is toward the power side and the P2 end is towards the load side; ◆S1 and S2 of each transformer must correspond to the terminals of the corresponding mark, and it is strictly prohibited to open the second twice. Any violation of this article may cause the transformer to burn; ◆Ensure the current transformer is in short circuit state until the CT connection terminals of BRN-SVG are connected.

3.4.6 Single-machine power distribution

Take the load-side sampling as an example:



TMY-3[3（125×10）]							
0.4KV							
Primary main wiring							
Zero row TMY-2(125*10)							
Switchgear number	MT1	1AA1	1AA2	1AA3	1AA4	1AA5	1AA6
Switchgear models		GGD	GGD	GGD	GGD	GGD	GGD
Loop name		Inlet cabinet		Outlet cabinet	Outlet cabinet	Outlet cabinet	Contact cabinet
Knife switches HD13BK							
Frame intelligent circuit breakers		MT63/3P 5000A		MT32/3P 2500A	MT32/3P 2500A		
Circuit Breaker							
Circuit Breaker	SCB13-2500KVA						
Circuit Breaker	(10)±2x2.5%/0.4KV						
Main Circuit Breaker	Dyn11	80A/3300	SVG				
Circuit Breaker							
Current transformers	BH-0.66	5000/5		3000/5	3000/5	800/5	5000/5
ACR220E		ACR220E 5000/5		ACR220E 3000/5	ACR220E 3000/5	ACR220E 800/5	ACR220E 5000/5
Surge protectors		OVR BT2 3N-70-440					
Dimensions (W*H*D)		1200*2200*1000	800*1000*2200	800*1000*2200	800*2200*1000	800*2200*1000	1200*2200*1000



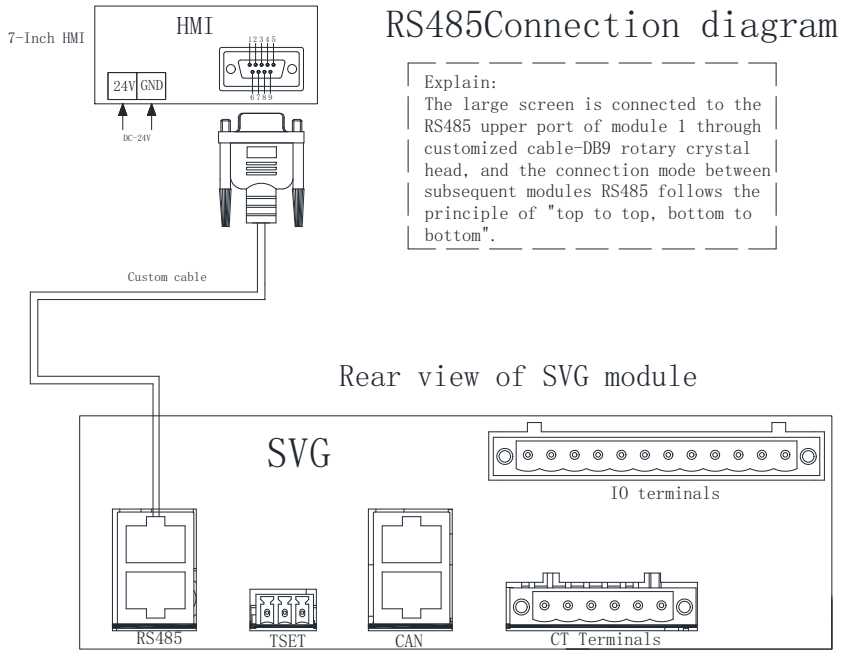


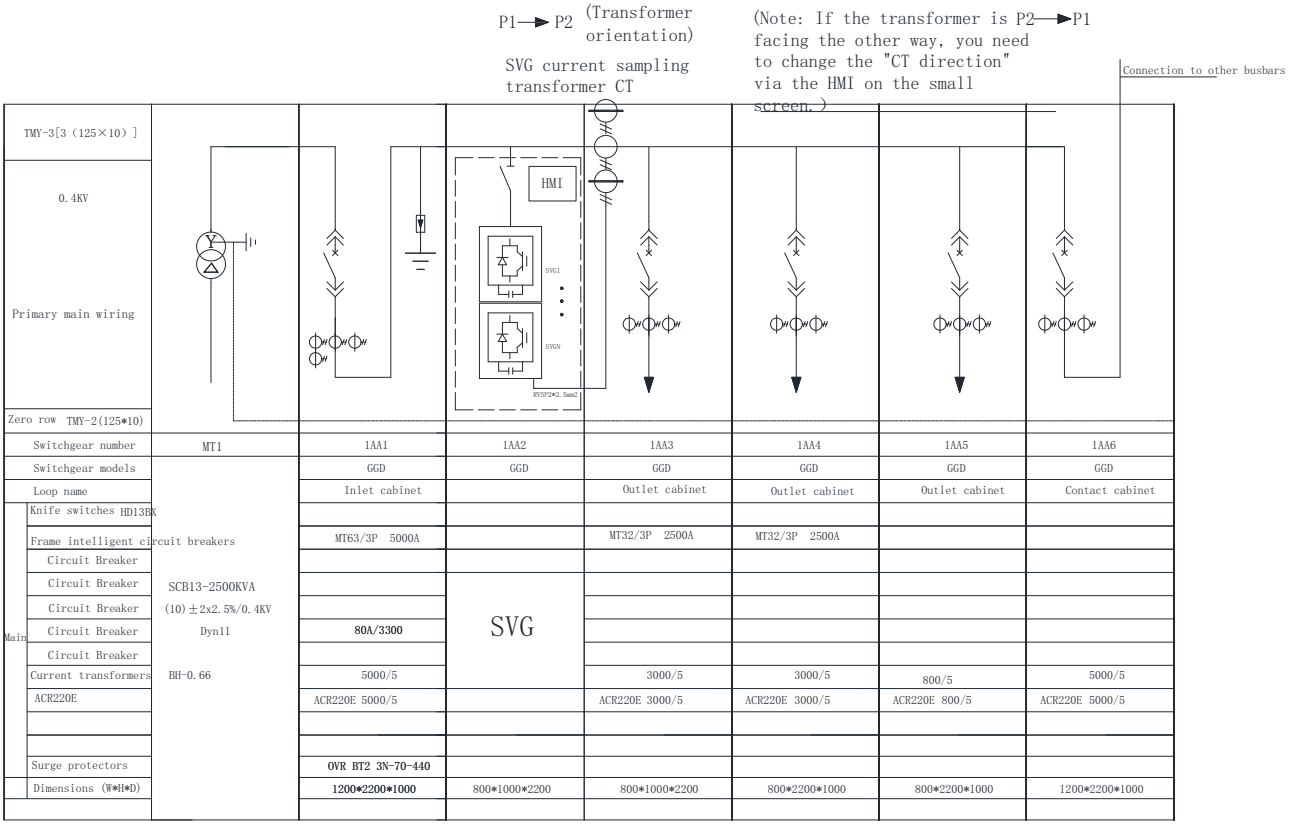
Figure 3-10, single-machine power distribution diagram

Attention	◆The circuit diagram shown here is simplified (three phase and four lines), please refer to the physical object; **◆When running, the CT wiring mode of the power side and the load side is consistent;** ◆When the external large screen is connected, DB9 special cable (available) shall be used between the large screen and the module, and connected to the upper port of RS485; ◆Large screen power can be external wiring power, but also from the BRN-SVG module back DC24V "+, -" terminal wiring power; ◆With background forwarding communication function is optional content, compared with the wiring without forwarding function, more cable and adapter, our company can provide supporting; **◆Background forwarding instructions and interface definition are shown in Appendix 2.**

3.4.7 Distribution and distribution

Attention	◆The power connection is the same as the single machine; ◆When the power side sampling, two sets of consistent transformer can be installed to do subtraction; ◆CT side side cable recommended to use series connection method; ◆The wiring between parallel modules with different capacities (100kVar + 50 k Var) is consistent with the wiring between modules with the same capacity (100kVar + 100kVar); ◆When parallel communication, the large screen can take power from the DC24V of one of the modules. **◆The wiring principle of the cabinet is the same as that of the machine. The wiring between the cabinet can be long with the parallel cable, which is not Explained here. For details, please consult our engineer.**

(1) CT load-side sampling



TMY-3[3（125×10）]							
0.4KV							
Primary main wiring							
Zero row TMY-2(125*10)							
Switchgear number	MT1	1AA1	1AA2	1AA3	1AA4	1AA5	1AA6
Switchgear models		GGD	GGD	GGD	GGD	GGD	GGD
Loop name		Inlet cabinet		Outlet cabinet	Outlet cabinet	Outlet cabinet	Contact cabinet
Knife switches HD13BX							
Frame intelligent circuit breakers		MT63/3P 5000A		MT32/3P 2500A	MT32/3P 2500A		
Circuit Breaker							
Circuit Breaker	SCB13-2500KVA						
Circuit Breaker	(10)±2x2.5%/0.4KV						
Main Circuit Breaker	Dyn11	80A/3300	SVG				
Circuit Breaker							
Current transformers	BH-0.66	5000/5		3000/5	3000/5	800/5	5000/5
ACR220E		ACR220E 5000/5		ACR220E 3000/5	ACR220E 3000/5	ACR220E 800/5	ACR220E 5000/5
Surge protectors		OVR BT2 3N-70-440					
Dimensions (W*H*D)		1200*2200*1000	800*1000*2200	800*1000*2200	800*2200*1000	800*2200*1000	1200*2200*1000

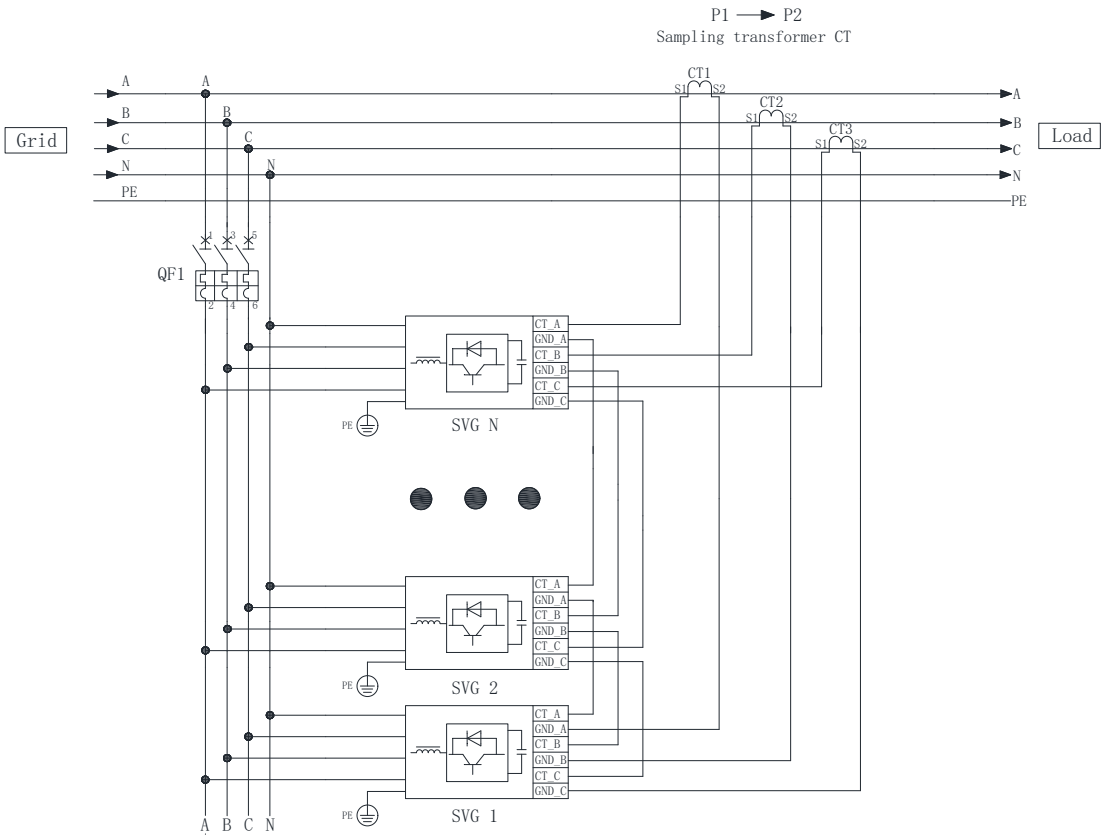
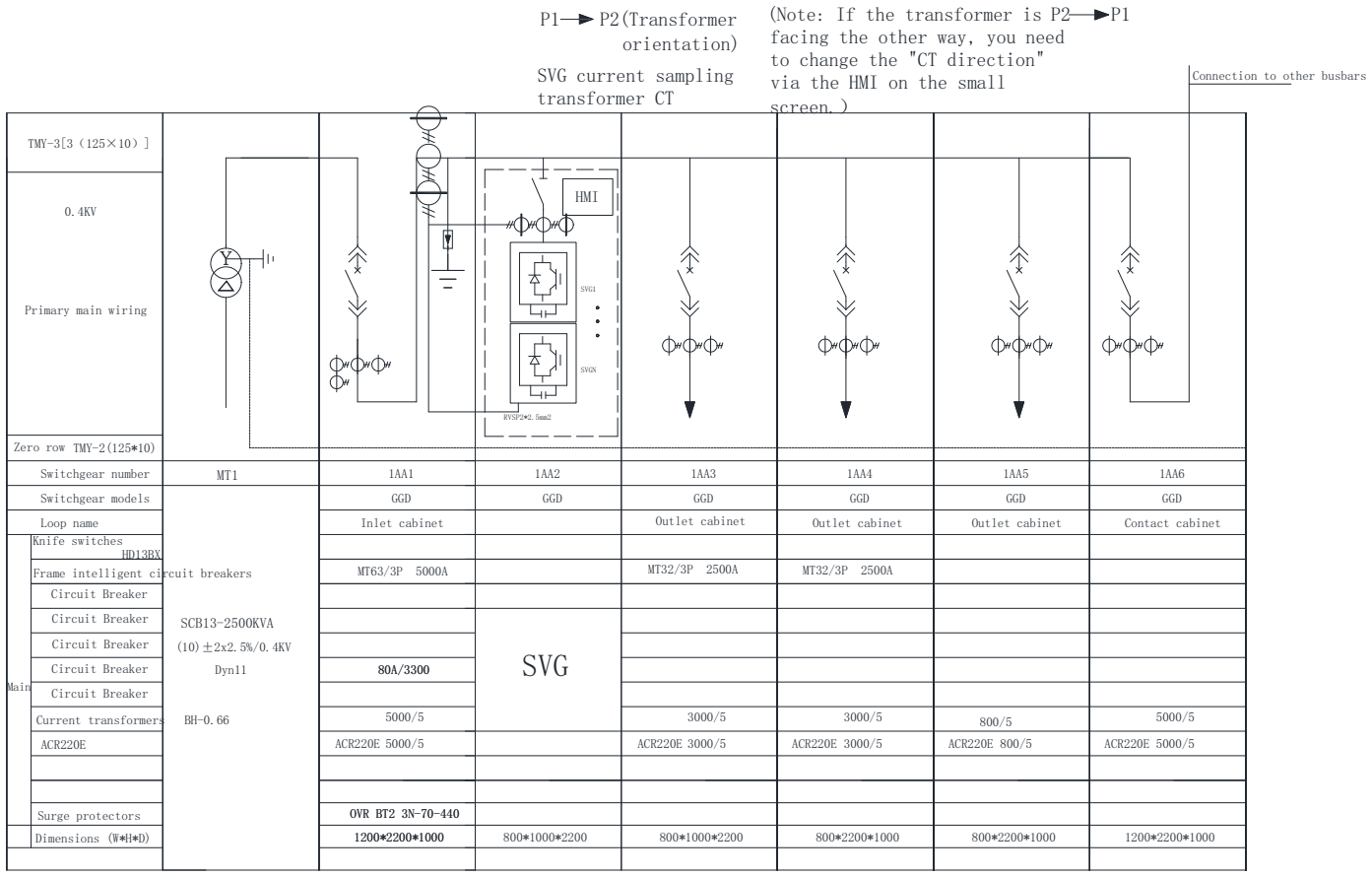


Figure 3-11 Combined distribution-CT load side sampling wiring diagram

（2）CT power supply side sampling



TMY-3[3（125×10）]							
0.4KV							
Primary main wiring							
Zero row TMY-2(125*10)							
Switchgear number	MT1	1AA1	1AA2	1AA3	1AA4	1AA5	1AA6
Switchgear models		GGD	GGD	GGD	GGD	GGD	GGD
Loop name		Inlet cabinet		Outlet cabinet	Outlet cabinet	Outlet cabinet	Contact cabinet
Knife switches HD13BX							
Frame intelligent circuit breakers		MT63/3P 5000A		MT32/3P 2500A	MT32/3P 2500A		
Circuit Breaker							
Circuit Breaker	SCB13-2500KVA						
Circuit Breaker	(10)±2x2.5%/0.4KV						
Circuit Breaker	Dyn11	80A/3300	SVG				
Main Circuit Breaker							
Current transformers	BH-0.66	5000/5		3000/5	3000/5	800/5	5000/5
ACR220E		ACR220E 5000/5		ACR220E 3000/5	ACR220E 3000/5	ACR220E 800/5	ACR220E 5000/5
Surge protectors		OVR BT2 3N-70-440					
Dimensions (W*H*D)		1200*2200*1000	800*1000*2200	800*1000*2200	800*2200*1000	800*2200*1000	1200*2200*1000

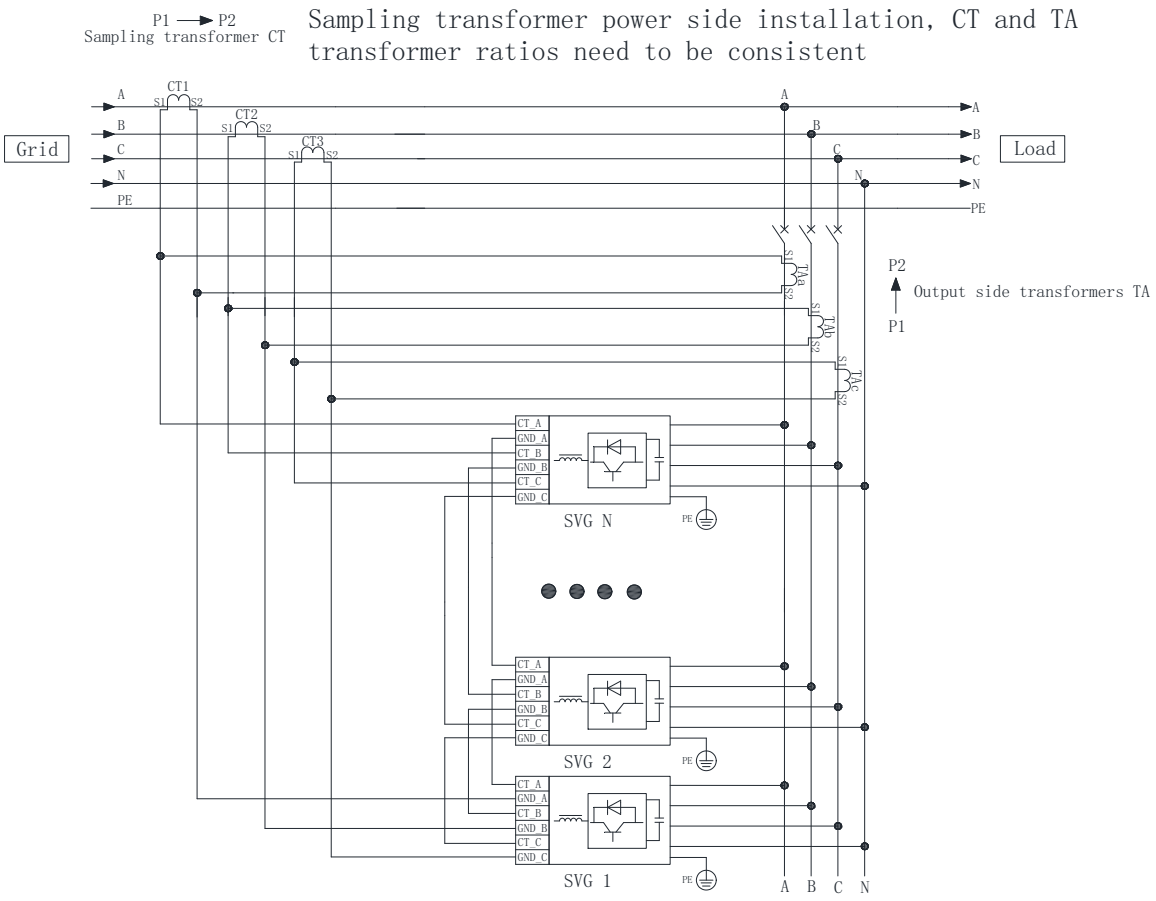


Figure 3-12 Combined power distribution-CT power supply side sampling wiring diagram

(3) Communication wiring

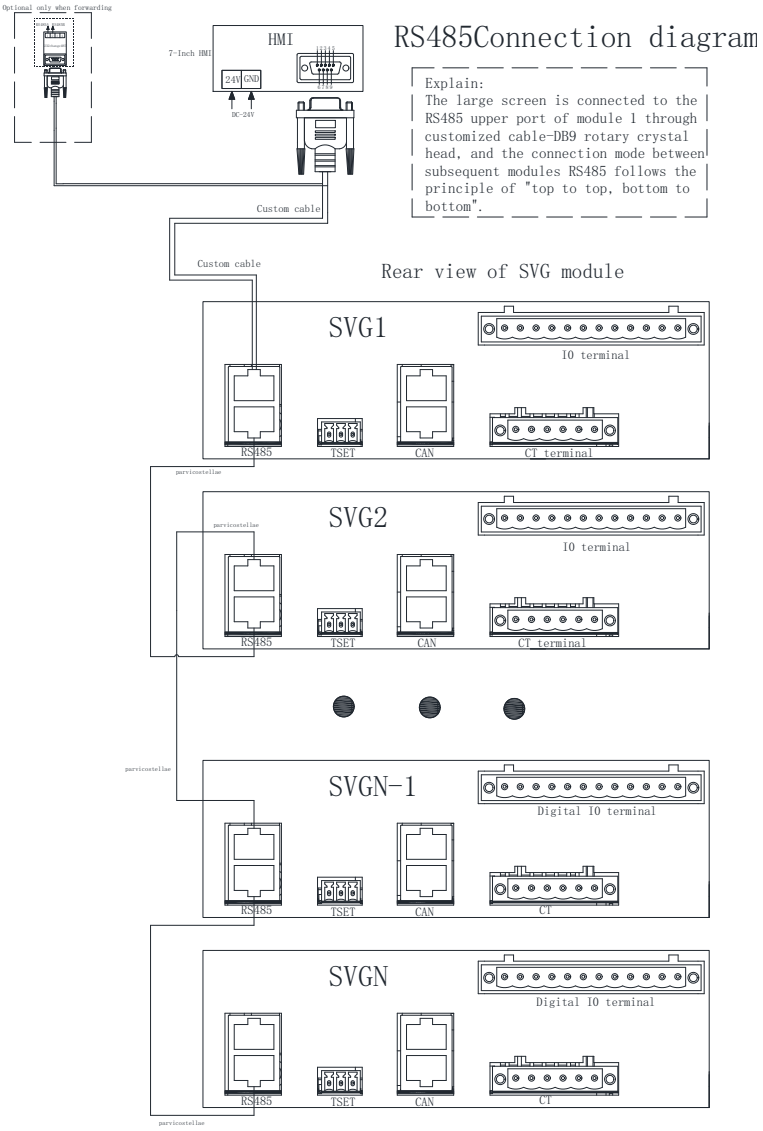


Figure 3-13 Integrated communication wiring diagram

Attention	◆When connected with the machine, the external cabinet is generally equipped with a centralized monitoring screen, and the large screen and the module should be connected with DB9 special cable (our company), and connected to the monitoring port of the first module; ◆Modules are connected with ordinary network cable, and the principle of "bottom to bottom, top to top" should be followed.

Chapter 4 Cabinet 7-inch HMI

7- inch HMI Presentation

The LCD 7-inch HMI is installed on the front side of the reactive power compensation cabinet door and comes in two different sizes. Users can monitor the reactive power compensation cabinet through HMI, read and set the modified BRN-SVG parameter data, which is an optional item. For detailed information about the 7-inch HMI!

The two different opening sizes of 7-inch HMI are 215 * 152mm and 192 * 138mm respectively. Generally, 215 * 152mm hole size screen is selected by default. If you need to choose 192 * 138mm hole size screen, please note in advance.

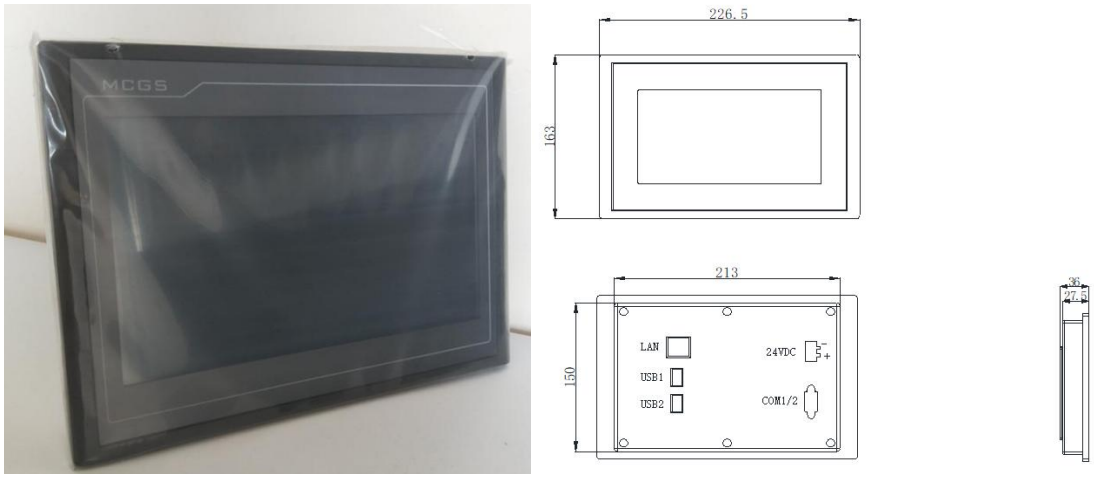


Figure 7-1 215 * 152 Open large screen

product features		peripheral interface	
LCD	7 Inch TFT	serial interface	COM1 (RS232), COM2 (RS485), scalable (COM3, COM4)
Backlight	LED	USB joggle	1 Main 1 from
input voltage	DC：24V±20%	CAN Interface	open end
power rating	5W	Ethernet port	nonsupport
attestation		ambient condition	
product certification	CE/FCC	Storage temperature	-10～60℃
levels of protection	The IP65 front panel	working temperature	0～45℃
electromagnetic	Industrial level 3	Working humidity	5%～95%

compatibility			
		size of product	
		Case material	Industrial plastic
		Panel size	226.5*163（mm）
		Open hole size	215*152（mm）

*** In addition, we can provide a large 10-inch HMI screen, with the recommended cabinet opening size of 261 * 180mm.**

Chapter 5 Maintenance and Maintenance

In order to ensure the normal and safe operation of the BRN-SVG equipment, we recommend the regular maintenance of the equipment.

 Danger	◆Beware of electric shock, pay attention to protection!

5.1 Attention before maintenance

(1)BRN-SVG equipment operates with strong electricity, for safety, the maintenance personnel shall not touch any part of the equipment during the equipment operation;

(2)Due to the large number of capacitances of the BRN-SVG equipment bus, the maintenance work must be carried out after 15 minutes of power failure;

(3)After the power supply is disconnected, a warning sign should be set at the disconnected place to prevent someone from being on in the maintenance process;

(4)In order to avoid accidental risks, the maintenance personnel should wear insulation equipment during the maintenance process;

(5)Personnel with professional and technical qualifications are required to maintain the BRN-SVG equipment.

5.2 Content and cycle of daily maintenance

Maintenance Project	Maintain the content	Recommended time
routine inspection	Need toBRN-SVG equipmentInput, output voltage and current and operating state for real-time monitoring, observe whether it is within the normal range;	Daily
	Check whether the air inlet and outlet are unobstructed;	
	Read the internal temperature of the BRN-SVG equipment and see if it is in the normal range.	
Status check	check upBRN-SVG equipmentWhether the appearance is damaged or rusty;	half a month
	hearBRN-SVG equipmentWhether there is an abnormal sound when running, smell whether there is a peculiar smell;	
	Check whether the ambient humidity, temperature, dust and ventilation conditions around the equipment meet the requirements.	

Cable inspection	Check whether the cable and terminals are damaged;	trimester
	Whether the main circuit wiring, grounding wire and communication wiring are reliably connected;	
	Check whether there are signs of aging and burning at the wiring bolts, and shake it by hand to confirm whether it is tightened.	

5.3 Complete maintenance steps

Step 1: Check the surrounding environment

（1）Test the temperature and humidity of the current environment with professional instruments to ensure that it is within the normal range;

（2）Remove the debris around the module and keep it dry.

Step 2: Shut off

（1）Disconnect the disconnecting switch, and BRN-SVG power off;

（2）Wait for at least 15 minutes before the capacitor in the module is fully discharged.

Step 3: Clean the equipment

（1）Check whether the surface of the equipment is damaged or missing;

（2）Visual check whether the cable is deformed or damaged;

（3）Clean up the dust and debris on the surface of the equipment, and pay attention to the cleaning in the air outlet for foreign body blockage.

Step 4: Check the disconnecting switch

（1）Check whether the isolating switch is aging and damaged.

Step 5: Check the mechanical installation / electrical connection

（1）Check whether the installation screws at all mechanical connections are firm, and clean up the dust above;

（2）Check whether the electrical wiring is firm, and the cable can be properly strengthened or replaced.

Step 6: Other abnormalities

（1）For example, if the internal cable is damaged, please contact the technical personnel of the manufacturer in time.

Step 7: Restart the device

（1）Restore all cable connections and check;

（2）Close the isolation switch and start the equipment;

（3）Check the parameters;

（4）Start-up and operation.

Chapter 6 Common fault handling

Fault List

order number	Fault name	processing method
1	EPO hitch	Check whether the emergency stop switch button is pressed, reset the button switch and click the reset switch on the small screen; if not solved, please contact the professional technicians of the manufacturer!
2	The IGBT hardware overflows	Reset or restart boot,If not solved, please contact the professional and technical personnel of the manufacturer!
3	Bus hardware overpressure	Click the small screen data interface to view the BRN-SVG data bus voltage V, the normal module standby bus voltage is about 650, if beyond the range, please contact the manufacturer professional technicians!
4	Overflow of module hardware	Check whether the CT installation direction is consistent with the setting, and whether the CT secondary wiring is reverse. If not solved, please contact the professional and technical personnel of the manufacturer!
5	Auxiliary power failure	This fault occurs, please contact the professional technicians of the manufacturer to solve it!
6	Fan fault	Check whether the fan is running normally, if the fan is not replaced, the normal operation can be reset before starting. If not solved, please contact the professional technicians of the manufacturer!
7	Single board connection failure	Click to reset or restart boot,If not solved, please contact the professional and technical personnel of the manufacturer!
8	Melt damage	Click to reset or restart boot,If not solved, please contact the professional and technical personnel of the manufacturer!
9	The power module is too warm	Check whether the ambient temperature is too high, and whether the inlet and outlet of the system are smooth. If everything is normal, it can be reset and then boot. If not solved, please contact the professional and technical personnel of the manufacturer!

10	Voltage A / AB overvoltage	Confirm whether the input voltage is normal, if not solved, please contact the manufacturer professional technician!
11	Voltage B / BC overvoltage	Confirm whether the input voltage is normal, if not solved, please contact the manufacturer professional technician!
12	Voltage A / AC overvoltage	Confirm whether the input voltage is normal, if not solved, please contact the manufacturer professional technician!
13	Voltage A / AB undervoltage	Confirm whether the input voltage is normal, if not solved, please contact the manufacturer professional technician!
14	Voltage B / BC undervoltage	Confirm whether the input voltage is normal, if not solved, please contact the manufacturer professional technician!
15	Voltage C / CA undervoltage	Confirm whether the input voltage is normal, if not solved, please contact the manufacturer professional technician!
16	Power grid overfrequency	Confirm whether the input voltage frequency is in the range of 40.5~62.5Hz. If this is the system misalarm, please contact the professional technical personnel of the manufacturer。
17	Power grid underfrequency	Confirm whether the input voltage frequency is in the range of 40.5~62.5Hz. If this is the system misalarm, please contact the professional technical personnel of the manufacturer。
18	Power grid phase inversion	Check whether the input power grid phase sequence and the allowable phase sequence are correct, if not solved, please contact the professional and technical personnel of the manufacturer!
19	A phase flow	Reduce the input current value of the power grid, if not solved, please contact the professional technicians of the manufacturer!
20	B phase flow	Reduce the input current value of the power grid, if not solved, please contact the professional technicians of the manufacturer!
21	C phase flow	Reduce the input current value of the power grid, if not solved, please contact the professional technicians of the manufacturer!
22	Pre-charging bus overvoltage	Click reset shutdown, disconnect the circuit and adjust the bus for power,If not solved, please contact the professional and technical

		personnel of the manufacturer!
23	Pre-charging bus bar is undervoltage	Click reset shutdown, disconnect the circuit and adjust the bus for power,If not solved, please contact the professional and technical personnel of the manufacturer!
24	Uncontrolled rectified bus undervoltage	Click the reset shutdown, disconnect the circuit and restart the circuit switch,If not solved, please contact the professional and technical personnel of the manufacturer!
25	Run the bus overpressure	Confirm whether the bus voltage is normal, if not solved, please contact the professional and technical personnel of the manufacturer!
26	Running bus underpressure	Confirm whether the bus voltage is normal, if not solved, please contact the professional and technical personnel of the manufacturer!
27	Plus and minus bus line imbalance	Check whether the N line is connected, if not solved, please contact the professional technicians of the manufacturer!
28	Background communication protocol error	Check whether the connection between the module and the large screen is normal. If not, please contact the professional technical personnel of the manufacturer!
29	EEPROM hitch	Click reset restart boot, if not solved, please contact the manufacturer professional and technical personnel!
30	Auxiliary DSP failure	Click reset restart boot, if not solved, please contact the manufacturer professional and technical personnel!
31	Synchronous phase locking between DSP s	Click reset restart boot, if not solved, please contact the manufacturer professional and technical personnel!
32	System resonance	Click reset restart boot, if not solved, please contact the manufacturer professional and technical personnel!
33	The module does not communicate with the large screen	Check whether the communication line is connected, whether the positive and negative electrode of the 24V power line is connected, and whether the wiring screw is tightened. If not solved, please contact the professional and technical personnel of the manufacturer!

*** Only common faults and response methods are listed here. In case of other unknown faults, please contact professional manufacturers in time!**

Appendix:

1. 400V-100kVar / 150kVar and 690V-120kVar appearance

The 400V-100kVar / 150kVar and 120kVar and 690V-120 kV ar modules have the same appearance style except for different dimensions.

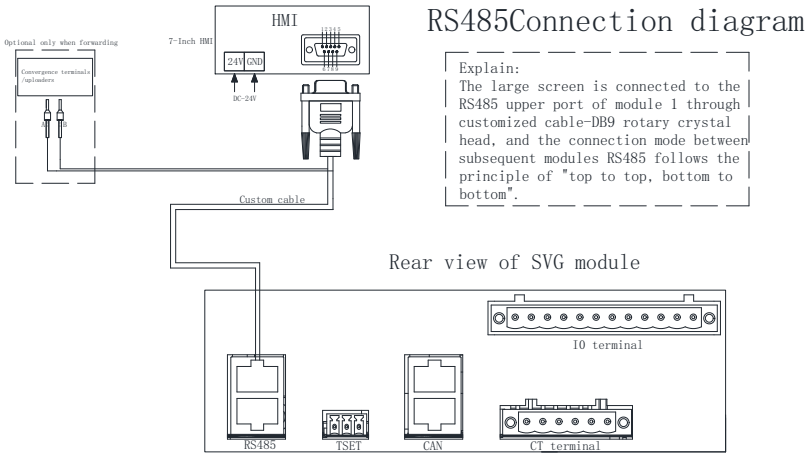


Appendix Figure 1-1 Rack Mounted

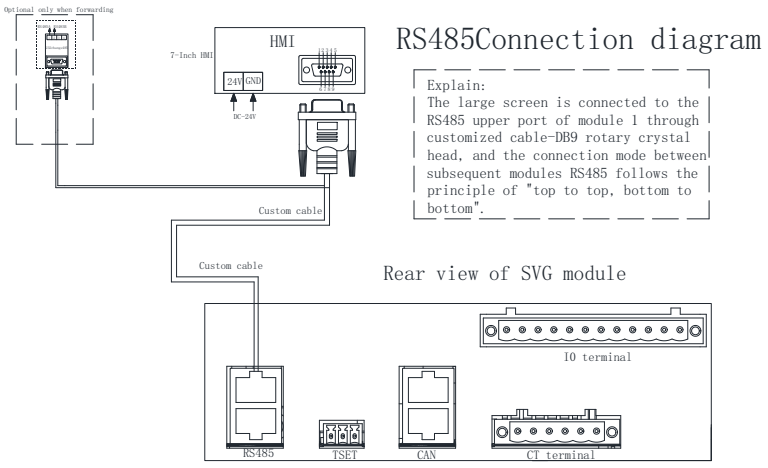
2. Background forwarding instructions and interface definition

The background forwarding function is a function that sends the BRN-SVG and device data collected on the large screen or directly sends BRN-SVG device data to other receiving devices through customized cables. At present, only "one-to-one" forwarding is supported, that is, the data sent by a large screen or an BRN-SVG can only be received by one device (upper machine, background terminal, etc.).

(1) Large-screen forwarding



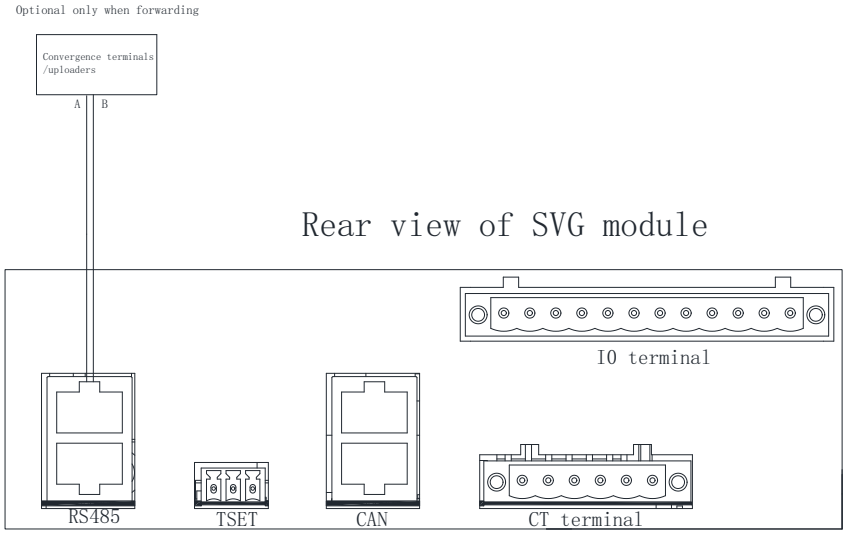
Appendix Figure 2-1 New version



Appendix Figure 2-2 Old version

When data is forwarded through the large screen, the master head interface of the large screen can be connected through the DB9 male head at one end of the customized cable, and the 8P crystal head at the other end is connected to the RS485 upper port of the BRN-SVG device. There is also a set of 485 signals on the large screen that can be connected to the upper computer or background terminal through the customized cable.The new version has the same cable forwarding effect as the old version.

(2) BRN-SVG device forwarding



Appendix Figure 2-3 Module Forwarding

When the BRN-SVG device transfers the large screen, the 8P crystal head is connected to the RS485 port of the BRN-SVG device at the end of the customized cable, and the other end is the RS485 line, and the 485A / 485B is connected to the upper computer or the background terminal to realize data forwarding.