

Active Harmonic Filter



wall-mount type



Rack-mount type

■ Customer Notice

Sommy 25A/30A Active Harmonic Filter has the following models for customers' selection:

	25A	35A	Remark
1	EM400-R25A/LED	EM400-R35A/LED	Rack-mounted LED display, 3phase 3wire, applicable to centralized monitoring parallel operation.
			Rack-mounted LED, 3phase 4wire, applicable to centralized monitoring parallel operation.
2	EM400-R25A/LCD	EM400-R35A/LCD	Rack-mounted LCD, 3phase 3wire, built-in LCD and monitoring in single device.
			Rack-mounted LCD, 3 phase 4wire, built-in LCD and monitoring in single device.
3	EM400-H25A/LCD	EM400-H35A/LCD	Wall-mounted LCD, 3phase 3wire, built-in LCD and monitoring in single device.
			Wall-mounted LCD, 3 phase 4wire, built-in LCD and monitoring in single device.

Note: When ordering goods and receiving the product, please confirm the model!

■ Safety Precautions

This manual is about installation and operation of Sommy EM Series Active Harmonic Filter.

Please read this manual before installation.

EM400 harmonics filter must be commissioned and maintained by the engineer designated by the manufacturer or its agent. Otherwise, it might endanger the personal safety and result in equipment failure. EM damage caused thereby is beyond the warranty scope.

EM400 harmonic filter is only for commercial/industrial purpose and cannot be used as a life support equipment and relevant equipment.

This product is Class-A Active Harmonic Filter device and might have radio interference when being used for saving residential electricity.



Applicable Standards:

This device complies with CE 73/23 & 93/68 (low voltage safety) and 89/336 (EMC), Australian and New Zealand EMC standard (C - Tick); The device installation shall follow the above requirements, and the appointed accessories shall be used.



Warning -- Large Leakage Current:

The earth leakage current of this model goes between 3.5 mA ~ 1,000mA. Before power supply is connected, please ensure that the device is reliably grounded.

During selection of instantaneous RCCB or RCD component, the possible transient and steady earth leakage current shall be taken into consideration when the device is started.

Residual current circuit breakers (RCCBs) that are insensitive to one-way DC pulse (Class-A) and transient current pulse must be selected.

Please note that the loaded earth leakage current will also pass through RCCB or RCD. The device grounding must comply with the local electric code.



Warning -- Installed By Professionals

Untrained personnel may not connect, commission and maintain active harmonic filter.

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Chapter I Module Introduction

1.1 Module Overall And Installing Dimension

Please refer to the following figure for specific overall dimension. Fig.1-1 is a diagram of racked-mounted LCD overall dimension. Fig.1-2 is a diagram of wall-mounted LCD overall dimension. Rack-mounted LED overall dimension is the same as rack-mounted LCD overall dimension.

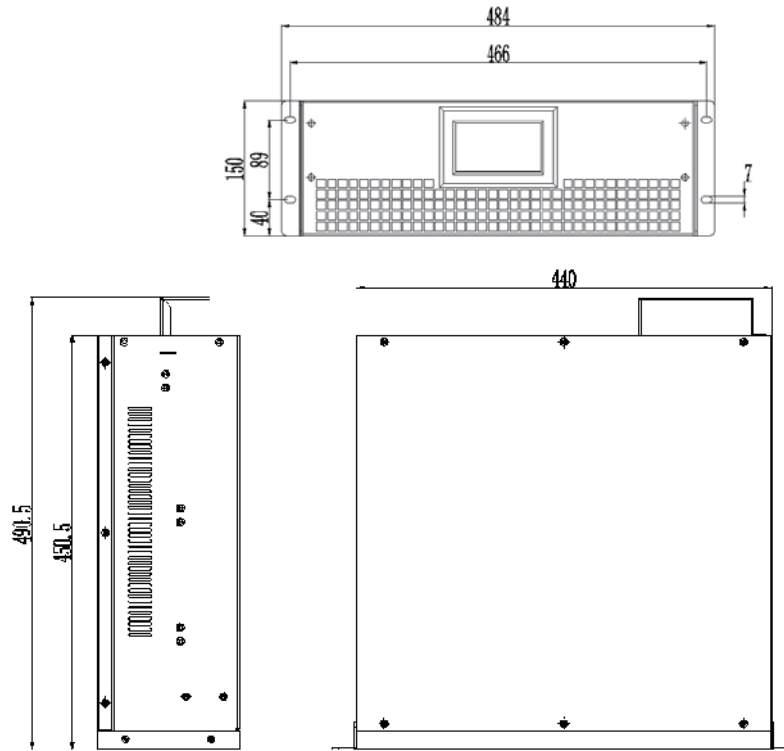


Fig. 1-1 Diagram of rack mounted LCD25A/35A overall dimension

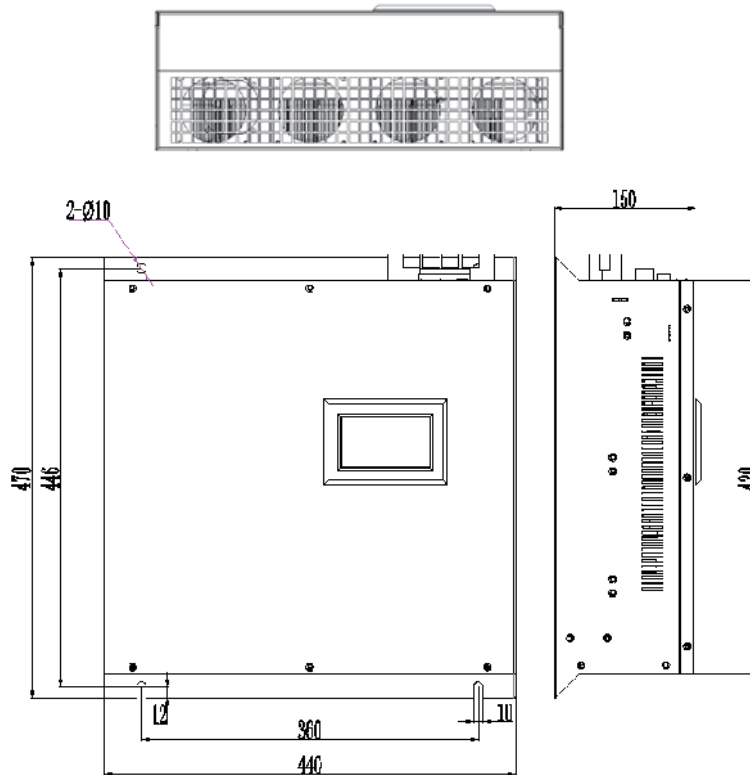


Fig.1-2 Diagram of wall-mounted LCD 25A/35A overall dimension

1.2 Power Distribution Interface

Regardless of any model type, its power distribution interface shall be consistent, as shown in Fig. 1-3. There are power input terminal and CT input wiring terminal at wire inlet terminal of EM series harmonic filter chassis.

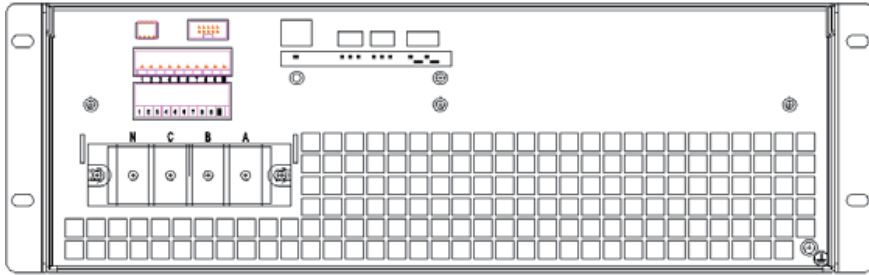


Fig. 1-3 Distribution diagram of power and signal interface

EM series harmonic filter has four wiring terminals with external power. For specific position, please refer to the power distribution interface as shown in Fig. 1-3.

- Input A—A-phase input terminal for mains supply
- Input B—B-phase input terminal for mains supply
- Input BC—C-phase input terminal for mains supply
- N—neutral input terminal
- PE—Grounding point is located at the lower right corner behind chassis. It needs to be grounded before startup.

The signal port is defined in Fig. 1-4. Monitoring interface is used to connect with centralized monitoring system. Dial switch is a device number of designed single module (used for parallel operation setting). For specific dial methods, please refer to Table 1-1. For the definition of signal terminal, please refer to Table 1-2.

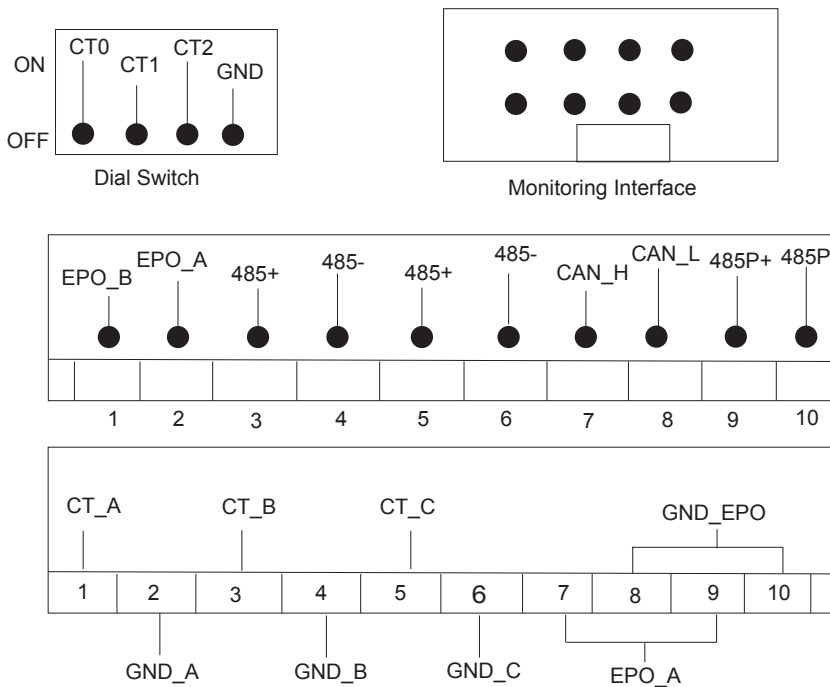


Fig. 1-4 Diagram of signal port

A dial switch has 4 digits, but its valid digits go between 1~3. 4 digits are reserved by the manufacturer. The relation between dial switch and device number is expressed by binary system, as shown in Table 1-1: ("1" indicates "on", and "0" indicates "off").

Table 1-1 Description of dial switch

CT2	CT1	CT0	Device number
0	0	0	1
0	0	1	2
0	1	0	3
0	1	1	4
1	0	0	5
1	0	1	6
1	1	0	7
1	1	1	8

Table 1-2 Description of CT and communication signals

Series No.	Identification	Description
1	CT_A	Connect S1 terminal of A - phase CT.
2	GND_A	Connect S2 terminal of A - phase CT.
3	CT_B	Connect S1 terminal of B - phase CT.
4	GND_B	Connect S2 terminal of B - phase CT.
5	CT_C	Connect S1 terminal of C - phase CT.
6	GND_C	Connect S2 terminal of C - phase CT.
7	EPO_A	Connect with centralized monitoring EPO button.
8	GND_ISO	Connect with centralized monitoring EPO button.
9	EPO_B	Connect with externally set monitoring EPO button.
10	485+	485 signal is used to connect module and monitoring.
11	485-	485 signal is used to connect module and monitoring.
12	485P+	485 signal is used to connect module and background.
13	485P-	485 signal is used to connect module and background.
14	CAN_H	Reserved channel (CAN signal)
15	CAN_L	Reserved channel (CAN signal)

Dry contact board and communication interface of internet access are optional components. These two function boards are not installed in the standard device. These two boards can be purchased separately in case of any requirements from customers. Internet access and interface of dry contact board are shown in Fig.1-5. For the definition of each port identification, please refer to Table 1-3:

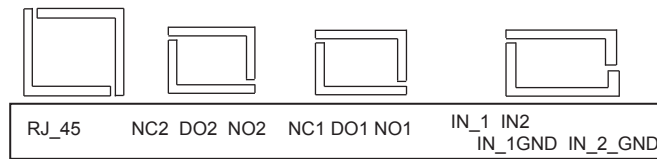


Fig. 1-5 Internet access and interface of dry contact board

Table 1-3 Definition of internet access and dry contact board

Series No.	Identification	Description
1	RJ_45	Standard internet access
2	NC1	#1 dry contact NC port
3	DO1	#1 dry contact neutral port
4	NO1	#1 dry contact NO port
5	NC2	2# dry contact NC port
6	DO2	#2 dry contact midpoint port
7	NO2	#2 dry contact NO port
8	IN_1	Dry contact input port 1
9	IN_1_GND	Dry contact input port 1 neutral point
10	IN_2	Dry contact input port 2
11	IN_2_GND	Dry contact input port 2 neutral point

Chapter II Installation Guide

2.1 Module Fixing

Rack-mounted model is fixed into the cabinet. Refer to Fig. 2-1 for details. Wall-mounted model is fixed on the hardened wall or directly hung in the cabinet. Refer to Fig. 2-2 for specific dimension.

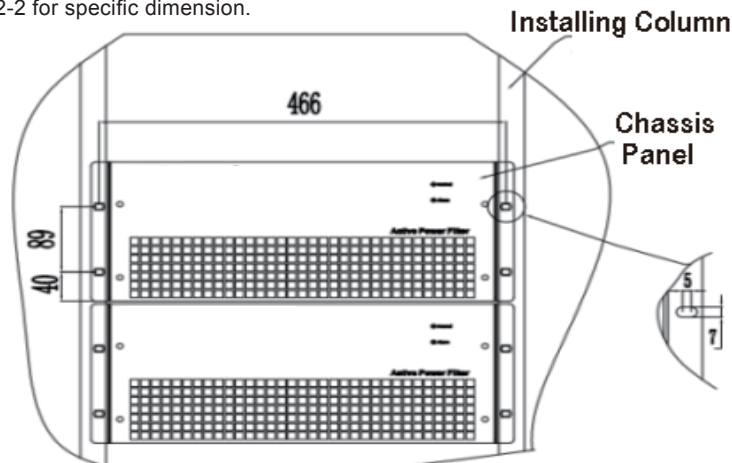


Fig.2-1 Diagram of rack-mounted fixing dimension

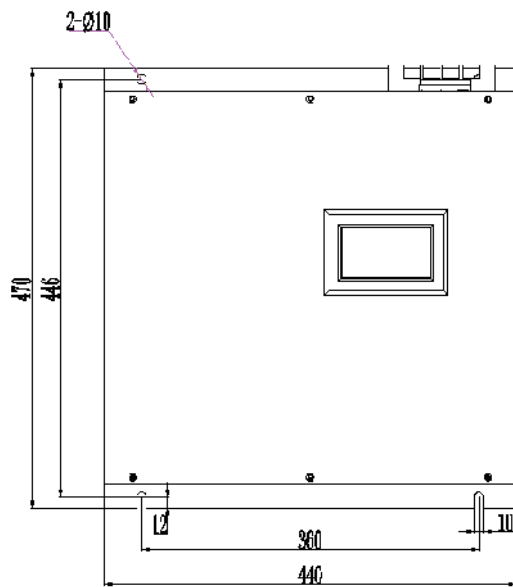


Fig.2-2 Diagram of wall-mounted fixing dimension

2.2 Power Distribution For Single Device

Except different fixing modes, wall-mounted wiring and rack-mounted wiring are the same, as shown in Fig. 2-3.

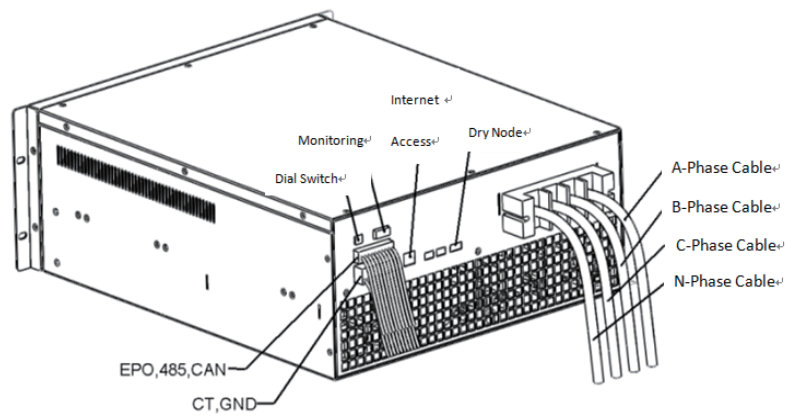


Fig.2-3 Diagram of wiring ports of single device

2.3 Power Distribution For Parallel Operation

Each module used for parallel operation is fixed and installed according to the site conditions. The maximum quantity of parallel operation is 8 sets. The connection of power lines for each single module in parallel operation is the same as the wiring of single device. Series mode for CT line connection is recommended, as shown in Fig 2-4.

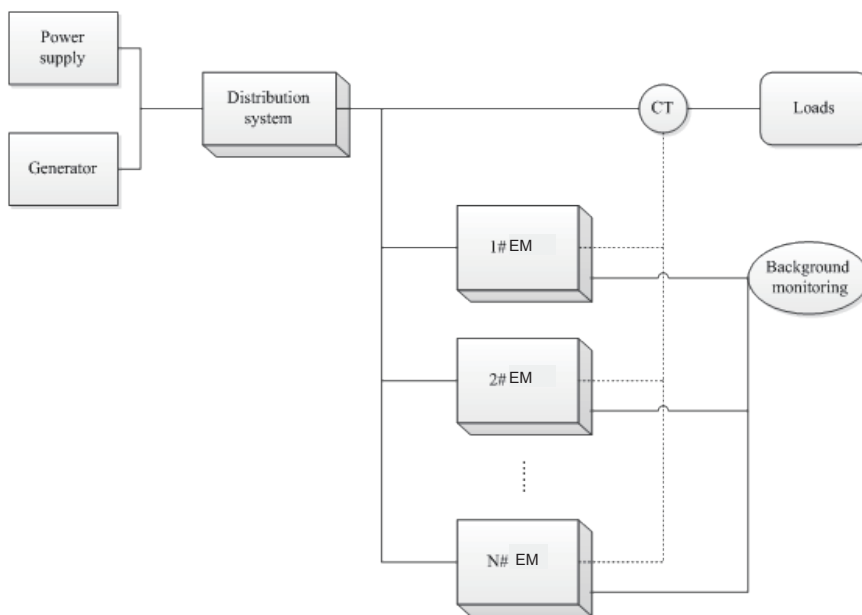


Fig.2-4 Diagram of parallel installation of N EMs

The specific details for CT parallel installation need to be confirmed with Sommy product engineers.

2.4 Description Of Optional Components

Table 2-1 is a list for optional components provided by Sommy and caters for customers' selection according to the actual situation.

Table 2-1 List for optional components of Sommy EM

Optional	Model	Remark
External CT component	Please contact product sales engineer	It is optional between 150/5~10000/5. The excessive CT ratio (such as CT of 25A>2000/5, 50A CT>4000/5) is not applicable to single device or the parallel operation system for CT secondary parallel connection.
CT cable component	Please contact product sales engineer	The configured sets are determined by the sets of parallel operation or CT installation mode. Refer to the description for CT cable components.
AC (or DC) fan	Please contact product sales engineer	It is selected by the customer as per the requirements in integrated system.
Internet access and dry contact board	Please contact product sales engineer	System information is transmitted to the background via networking protocol. Two-way input and two-way output dry contract are realized.
Monitoring component	Please contact product sales engineer	8-inch LCD and monitoring system are applicable to the application of centralized monitoring or large cabinet door.

Note: For models and installation of switches and cables, please refer to the national standard, industrial standard, and the general specifications of the industry. Shielded twisted pair is recommended for CT secondary cable.

2.5 CT Wiring Mode

During EM parallel operation, series connection is firstly recommended for CT secondary cables.

When parallel connection is adopted for CT secondary cable, the distance between the control cable from external CT and each single device should be the same, so that current sharing can be achieved. The cable for parallel operation is normally not more than 15m. If the length of selected cable is more than 30m, corresponding measures need to be taken (for example, the shielding needs to be strengthened, or the cable with smaller resistivity can be used). If the cable for parallel operation is more than 30m in length, please contact Sommy product engineer in advance.

Two parallel operations are exemplified to explain how signal cables are connected. Refer to Fig. 2-5 and Fig. 2-6: S1 and S2 indicate the two output ports of CT in a phase. Fig. 2-5 is a diagram of CT parallel connection during parallel operation. In this connecting mode, the cable lengths from S1 and S2 to the two terminals need to consistent so that current sharing for parallel operation can be ensured. Fig. 2-6 is a diagram of CT series connection during parallel operation. Fig. 2-5 and Fig. 2-6 are exemplified by two parallel operations. Multiple parallel connections take these two diagrams as reference.

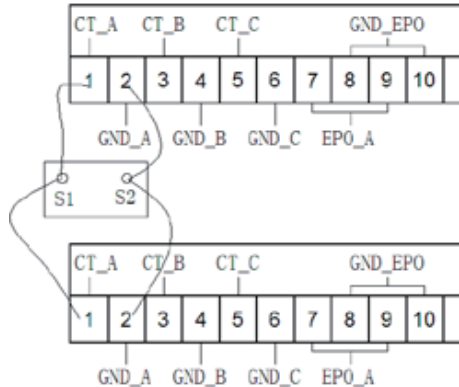


Fig.2-5 Diagram of parallel connection of CT cables

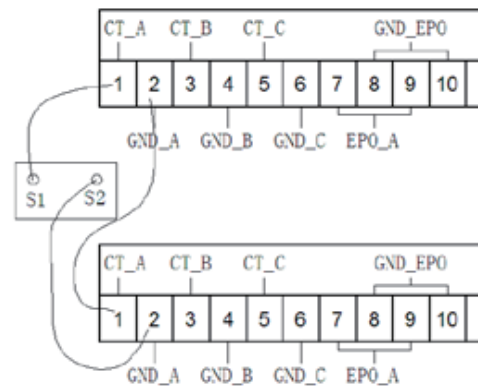


Fig.2-6 Diagram of parallel connection of CT cables

2.6 Centralized Monitoring Parallel Operation System

There are only operating and warning LED lights in each module of centralized monitoring parallel operation system. The system sets the parameters and displays the data through large centralized monitoring screen (refer to Commissioning Instructions for details). The basic installation steps for each module are the same as those for LCD parallel operation.

485+ and 485- of each single device need to be combined together in the centralized monitoring parallel operation system. Then, the monitoring interface of the host in parallel operation is connected to the corresponding interface in the centralized monitoring system by specially configured communication cable, as shown in Fig. 2-7:

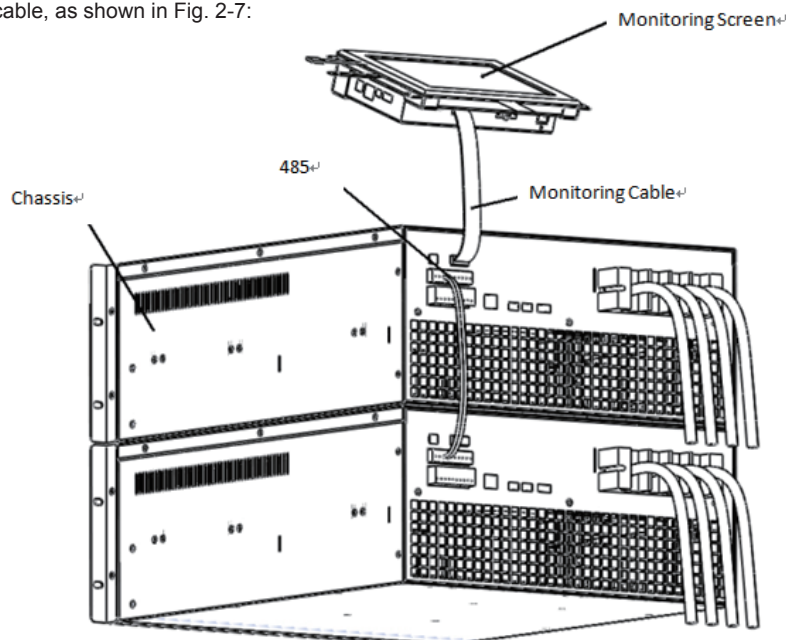


Fig.2-7 Communication wiring diagram of centralized monitoring parallel operation system

Chapter III Commissioning Instructions

3.1 Sommy EM Startup And Shutdown

3.1.1 Startup Steps

This startup step is applicable to the startup of EM when EM is fully disconnected with power supply. The operation steps are as follows:
 1. Fasten the shell of Sommy EM and connect power and signal cables.

Warning: When the startup step for EM is executed, EM output terminal might be electrified. If any load is connected with EM output terminal, please confirm with the user as to whether the power supply for the load is safe. If the load is not ready for power supply, please ensure that the load is safely separated from EM output terminal.

2. Connecting the switch between mains supply and EM.

At this moment, LCD displays the start screen, and the indicator light is flickering in green color. For about 20 seconds, the indicator light is in green and stably on. EM is normally powered on. In case of any failure of EM, then LED light will be in red, and EM cannot be powered on normally.

3.1.2 Shutdown Steps

There are two shutdowns. One is to directly disconnect the disconnecting switch between EM and mains supply. This mode is a full shutdown mode. That is, the system is not electrified, and relevant maintenance for the system can be carried out. The other is to conduct shutdown by using the setting of LCD control panel. In this shutdown mode, only the operation of power component is closed in the system. Since the system bus and auxiliary power supply are still electrified, the relevant control system is in a standby state.

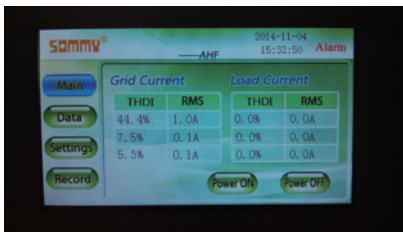
3.1.3 Manual/ Automatic Startup

After EM is electrified, there are two startup modes: manual mode and automatic mode which can be set by monitoring system or background.

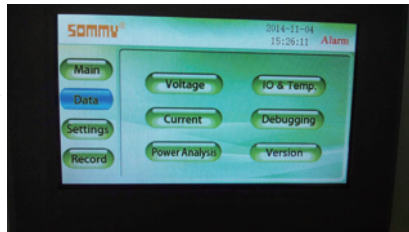
If manual mode is set, then the startup compensation can be realized by manually clicking startup key after EM is electrified. If automatic mode is set, then it will automatically start after EM is electrified.

3.2 Color Touch Screen Display And Operation Of Single Module

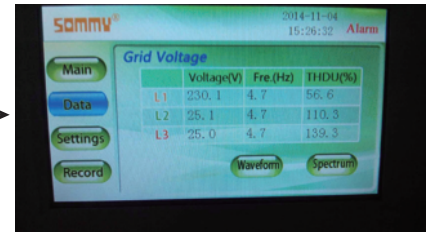
3.2.1 Color Touch Screen Display and operation



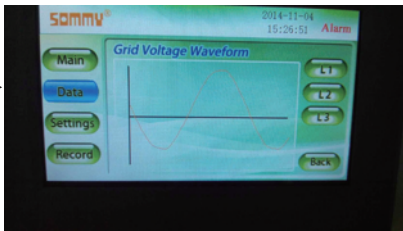
Main interface



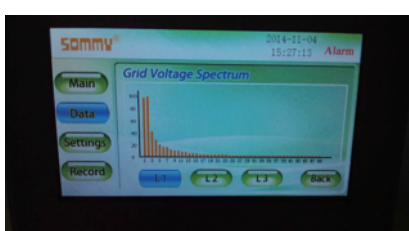
Data interface



data-voltage



grid voltage waveform



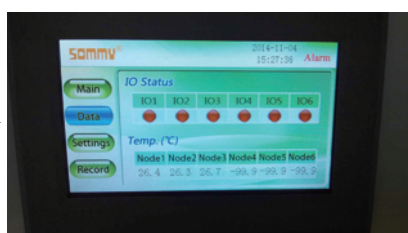
grid voltage spectrum



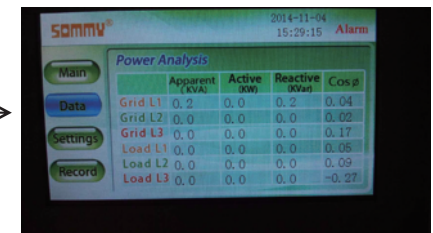
Current interface



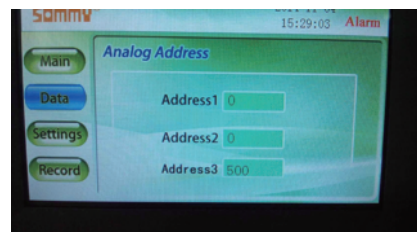
Current interface



IO status and temperature



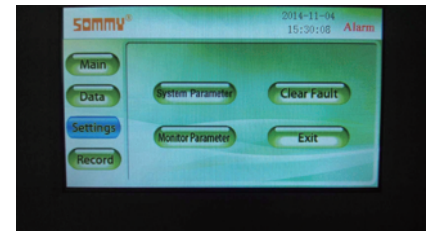
power analysis



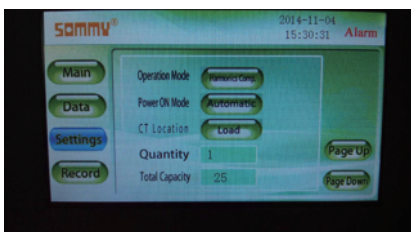
Analog address



Setting interface(password:1111)



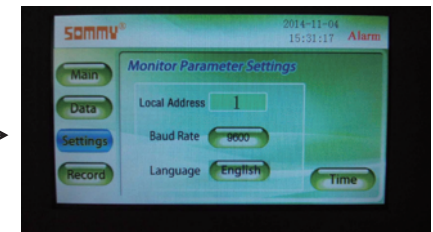
Main setting interface



Setting parameter



compensation mode setting



Com setting



Table 3-3 EM menu window and data window items description

Menu Name	Items		Description	
Voltage	RMS Voltage	Voltage (V)	Phase voltage	
		Frequency (Hz)	Frequency	
		THDU (%)	Total harmonic distortion of Voltage	
	L1/L2/L3 - Waveform		Phase voltage waveform	
Current	Load Current (A)	RMS Load Current	Load phase current	
		Load PF	Power factor of load phase	
		THDI	Load phase current THDi	
		Waveform	Current waveform of L1/L2/L3	
	Compensated Current (A)	RMS Comp. Current	Comp. I	System compensated current of L1/L2/L3
		Load Rate		Proportion of the compensation current in the rated output current
		Waveform		Current waveform of L1/L2/L3
	Grid Current (A)	RMS Grid Current	Grid I	Grid phase current
			Grid PF	Power factor of grid phase
THDI			Grid phase current THDi	
Waveform			Current waveform of L1/L2/L3	
Harmonic Analysis	THD Voltage & Current	Grid THDI	Grid phase current THDi	
		Load THDI	Load phase current THDi	
		THDU	Load THDi and column diagram	
	Harmonic Spectrum		Harmonic spectrum before and after compensation	
Temperature	Internal Temp. [1] to [3]		The inverters temp. of L1/L2/L3	
	Internal Temp. [4] to [6]		The partial temperature of inductance board	
Settings	System Parameter Settings	Op. Mode	Setup the operation mode of AHF, harmonic compensation, harmonic and reactive power compensation, load balancing and auto-aging (this mode CANNOT be selected by costumers).	
		CT Ratio	External CT ration , such as 300:5 or 600: 5...	
		CT Location	Should be selected in the load side or supply side	
		PT Ration	The ration of the transformer	
		Harmonic comp. setting	Should be selected in sequential, intelligent or all.	
		Individual	Selecte the 2nd to 50th order harmonic	
		Slave Module Quantity	Setup the quantity of slave module	
		Total Capacity Setting	The total capacity of milt-set system	
	System Display Settings	Power ON Mode Setting	Should be selected in auto or manual	
		LCD Brightness Setting	Adjust the LCD screen brightness	
		Time	Setup the time	
		Date	Setup the date	
	System Communication Settings	language	Chinese or English are available	
		RS485 Adress	Monitoring address	
		RS485 Band Rate	The transformation times of carrier wave in unit time	
		RS485 Protocol	TelCom or Modbus are available	
		IP Address	Matches to the setting in computer	
Alarm Events	Gateway IP	Matches to the setting in computer		
	Subnetmask IP	Matches to the setting in computer		
Power ON/OFF	Active Alarm Events		The active alarm events No., name and occurrence time	
	History Alarm Events		The history alarm events No., name, occurrence time and end time	
	Power ON		Confirm power ON	
	Power OFF		Confirm power OFF	
	Clear Fault		Clear the fault in order to restar the EM	

Chapter IV Product Specification

4.1 Applicable Standards

Sommy EM design complies with the following European and international standards.

Table 4-1 European and international standards

Items	Standards
General safety requirements for EM use and operation area	EN 50178:1997/IEC 50178:1997
EM EMC requirements	EN 61000_6_2(2005)/EN55011, GROUP1, CALSSA
	IEC 61000_6_2(1999)/CISPR11, GROUP1, CALSSA
EM performance requirements	EN 50091-3/IEC 62040-3/AS 62040-3(VFI SS 111)

4.1 Performance Specification

Table 4-2 Environmental characteristics

Environmental characteristics	Unit	Sommy 025/035 EM
Noise (within 1 meter)	dB	56
Altitude	m	For <1,500m, or >1,500m, refer to GB/T3859.2 derating
Relative Humidity	-	5%~95%, no condensation
Operating temperature	°C	-10~40
EM storage temperature	°C	-20~70

Table 4-3 EM AC input (mains supply)

Parameters of electricity system	Unit	Sommy 025/035 EM
Rated voltage of input line	Vac	380/400/415
Scope of input phase current	Vac	132V~264V
Frequency	Hz	50/60Hz (scope: 45Hz~63Hz)

Table 4-4 Overall efficiency, loss and air exchange

Mains supply mode	Unit	Sommy 025/035 EM
Overall efficiency	%	>97
Normal mode (full load) loss	kW	<0.9/1.08
Forced cooling	L/sec	151

Table 4-5 EM mechanical characteristics

Mechanical characteristics	Unit	Sommy 025/035 EM
Mechanical dimension W×D×H	mm	440×470×150
Weight	kg	18
Gross weight	kg	20
Color	N/A	RL7035 (or as per customer)
Protection level	N/A	IP20

Chapter V Maintenance

5.1 Precautions

Sommy EM is a modular design. For daily maintenance, observe whether the date displayed on LCD is correct. If possible, the customer can use infrared thermometer to observe whether each temperature of the device has any abnormal high temperature point. In case of any abnormality, please contact Sommy customer service engineer.

Sommy EM is a strong current product. For the safety of maintainers, don't touch any live part of the product during normal operation. Conduct frequent check on whether the grounding point of the product is connected reliably.

5.2 Daily Maintenance

Sommy EM has realized air duct separation, so no strainer mesh is required in general application environment. However, if the daily environment is severe (such as the environment with high temperature, high humidity and much conductive dust), contact Sommy product engineer when preparing the plan. Confirm the specific plan.

5.3 Failure Diagnosis

Device failures can be divided as follows:

Failure caused by user's wrong operation: If CT cable is connected reversely, phase sequence of power line is reverse or reference setting is wrong, observe whether this kind of failure can be found during startup commissioning. If the compensation effect is poor but there is no warning information, please contact Sommy product engineer.

Warning information on LCD: Please contact Sommy product engineer.

No response after electrification: Please contact Sommy product engineer.

Note: For your personal safety, please don't disassembly the device without Sommy's permission no matter what failure it is. The easily damaged products are not in the warranty scope.