

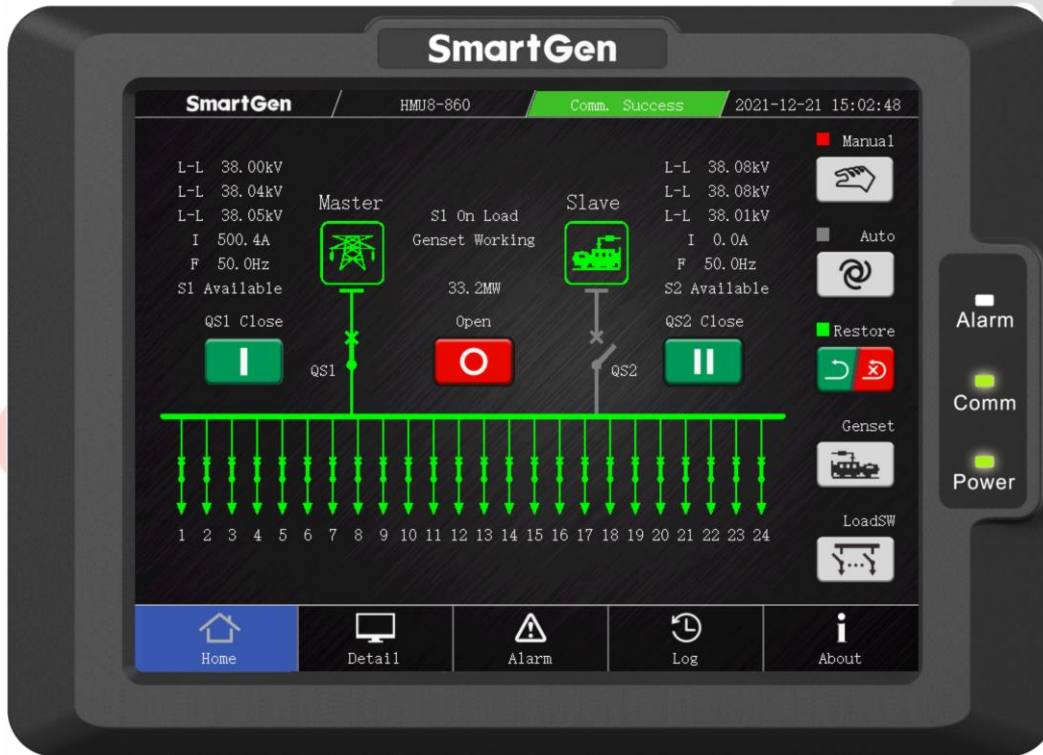


SmartGen
ideas for power

HMU8-860

ATS REMOTE MONITORING CONTROLLER

USER MANUAL



SMARTGEN (ZHENGZHOU) TECHNOLOGY CO., LTD.



Chinese trademark

SmartGen English trademark

SmartGen – make your generator *smart*

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Table 1 – Software Version

Date	Version	Note
2021-11-11	1.0	Original release.



Table 2 – Notation Clarification

Sign	Instruction
 NOTE	Highlights an essential element of a procedure to ensure correctness.
 CAUTION!	Indicates a procedure or practice, which, if not strictly observed, could result in damage or destruction of equipment.
 WARNING!	Indicates error operation may cause death, serious injury and significant property damage.

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1 OVERVIEW

HMU8-860 ATS Remote Monitoring Controller adopts high-performance ARM chip, large, high-resolution capacitive touch screen with Chinese and English display, which can realize remote control, data monitoring and parameter configuration of HAT860 medium voltage ATS controller via RS485 interface. It has compact structure, easy operation and reliable running.

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2 PERFORMANCE AND CHARACTERISTICS

HMU8-860 ATS remote monitoring controller (hereinafter called monitoring module) is used for the remote data monitoring and control of HAT860 MV-ATS controller (hereinafter called master control module). The two modules communicate via RS485 interface.

Main features are the followings:

- 8-inch color LCD with 800*600 resolution, HMI display and capacitive touch screen operation;
- Chinese and English operations are optional for on-site and convenient for commissioning staff;
- Home screen displays master control module dual power configuration and real-time status of power, ATS, generator and load breaker;
- Control manual/auto, auto transfer/restore, auto transfer non-restore of master control module;
- Stepwise switch status monitoring and control function, max. 24-way load breakers can be controlled;
- Realize one-key close/open control and genset start/stop operation of master control module in manual mode;
- Display defined character string of master control module;
- Display S1/S2 voltage, current, frequency and other electric parameters of master control module in real time;
- Display load information like active power, reactive power, apparent power and power factor of master control module;
- Display S1/S2 accumulated active energy, reactive energy, close times, auto transfer times, mains failure transfer times of master control module;
- Display current continuous supply time, S1/S2 accumulated supply time, auto transfer running time of master control module;
- Display master control module alarm information in real time;
- Event log function of master control module, adjust its real-time clock;
- Allow users to change and set the parameters of master control module;
- RS485 communication parameters of monitoring module and master control module has auto synchronization function;
- Suitable for 12/24VDC battery voltage environment;
- With power indicator, communication indicator, alarm indicator;
- Monitoring module screen has 10-level brightness, which can adjust brightness according to environment;
- Monitoring module has 4 RS485 interfaces, 1 CANBUS interface, 1 ETHERNET interface;
- RS485 interface and network parameters can be configured and cannot be lost even in case of system dropout;
- USB device interface is used for upgrading controller firmware;
- USB master interface is used for upgrading controller screen picture and font file;
- Rubber seal ring is installed between enclosure and control panel, front panel protection can reach IP65;
- Enclosure is built by aluminium alloy, which is beautiful and strong;
- Modular design, pluggable terminal, embedded-in installation, compact structure and easy mounting.

3 SPECIFICATION

Table 3 – Monitoring Module Parameters

Items	Contents
Working Voltage	DC10V~DC35V continuous power supply, DC reverse connection protection
Overall Consumption	<6W
RS485 Interface	Isolated, half-duplex, 2400/4800/9600/19200bps baud rate, the maximum communication distance is 1000m (at 9600bps baud rate).
Ethernet	Self-adaption 10/100Mbit
CAN BUS Interface	Isolated, the maximum communication distance is 250m, using Belden 9841 cable or equivalent.
Vibration	Frequency: 5Hz-8Hz Amplitude: ±7.5mm Range: 8Hz-500Hz Fixed acceleration: 2g IEC60068-2-6
Shock	Acceleration: 50g Pulse continuous time: 11ms Waveform: half-sine Finish the shock test from three directions. There are total 18 shocks per test. IEC60068-2-27
Collision	Acceleration: 20g Pulse continuous time: 16ms Waveform: half-sine IEC60255-21-2
Case Dimension	221mm x 163mm x 51mm
Panel Cutout	205mm x 147mm
Working Temperature	(-25~+70)°C
Working Humidity	(20~93)%RH
Storage Temperature	(-30~+80)°C
Protection Level	Front Panel: IP65, when a waterproof rubber ring is installed between the controller and the panel. Rear Panel: IP20
Weight	1.3kg

4 DISPLAY AND OPERATION

4.1 FRONT PANEL OF MONITORING MODULE

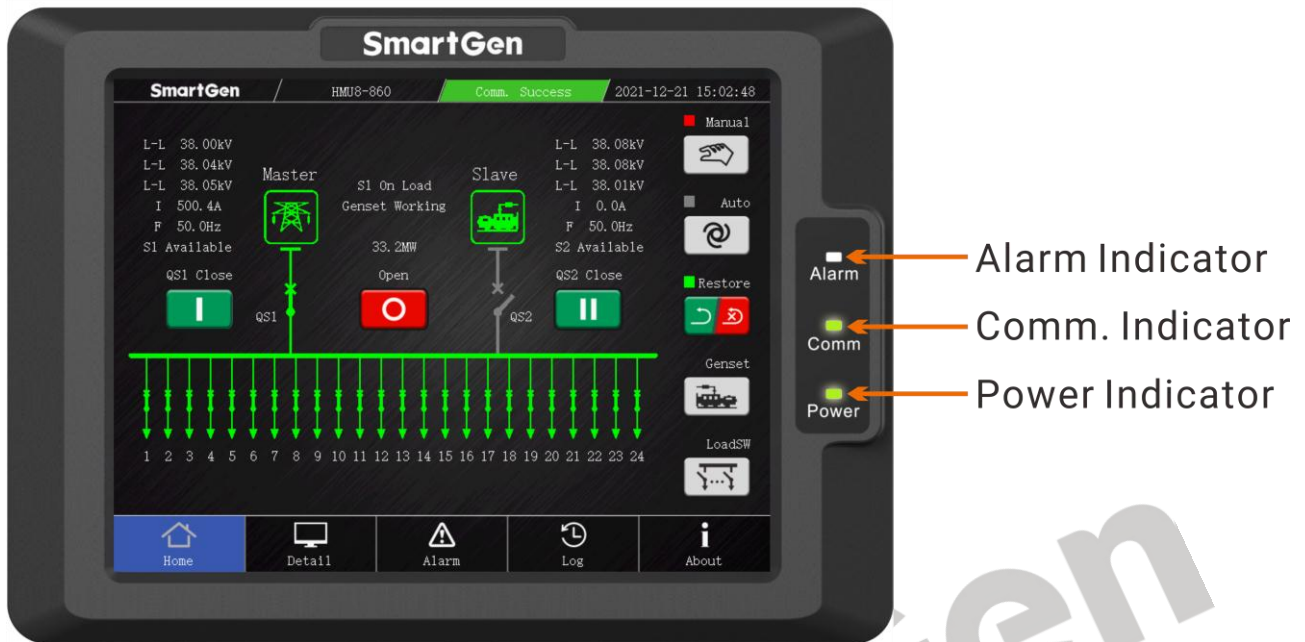


Fig.1 – Monitoring Module Front Panel

Table 4 – Description of Indicators

Indicators	Description
Alarm	Warning alarm: slow flash (1 time per second) Shutdown alarm: fast flash (5 times per second) No alarm: extinguish.
Comm.	It is always illuminated when the communication between display module and master control module is normal; It is extinguished when the communication is abnormal.
Power	It is always illuminated when controller is powered on and in operation; It is extinguished when controller stops working.

4.2 DISPLAY INTERFACE AND OPERATION

There are 5 interfaces of the monitoring module, namely homepage, detailed information, alarm, event log and about. Transfer them through the key icon in the page switch bar.

4.2.1 HOMEPAGE DISPLAY

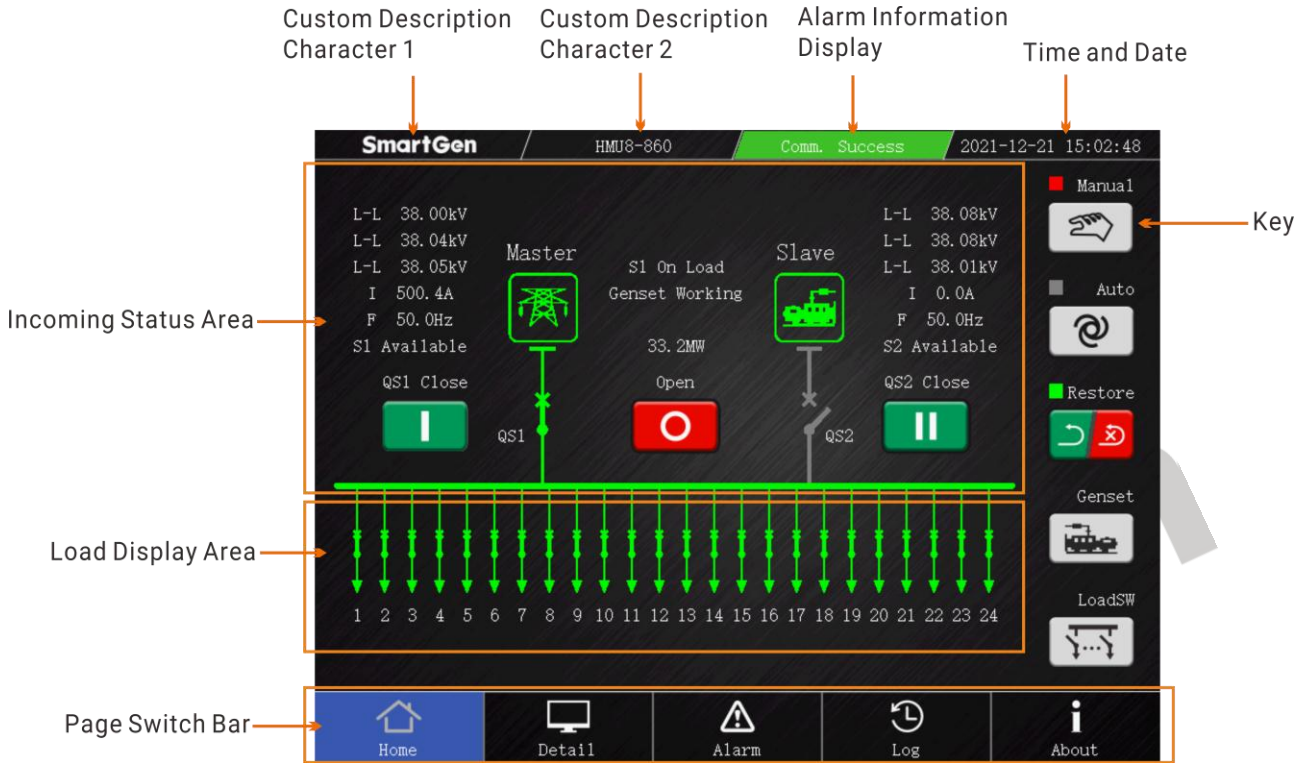


Fig. 2 – Homepage Display Interface

The incoming status area on the homepage can display S1/S2 line voltage, current, frequency, power status and load power, ATS status, genset status, etc..

Table 5 – Display Area Description

Display Area	Description
Custom Description Character 1	Display HAT860 custome description character 1.
Custom Description Character 2	Display HAT860 custome description character 2.
Alarm Information Display Area	Red light flashes when there are communication failure and fault alarm, yellow light flashes when there is warning alarm; Green light indicates that communication is normal.
Time and Date	Display real-time clock of master control module.
Incoming Status Area	Display power electric parameters, power status, load power, ATS close status and genset status; Power icon is shown in green when the power is normal, otherwise it is gray; It is shown in green when ATS and load breaker are available, otherwise it is gray.













Display Area	Description
Load Display Area	<p>Display load work position and close/open status. Load breaker number varies with master control configuration. It can display 24-way breakers at most. It displays green when there is power, otherwise it is gray.</p> <p>Display legends:</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Work position closes</p> </div> <div style="text-align: center;">  <p>Test position closes</p> </div> <div style="text-align: center;">  <p>Isolated position</p> </div> </div>

Table 6 – Homepage Key Description

Icon	Key	Description
	QS1 Close	When the master control module is in manual mode, press it can control QS1 to close.
	Open	When the master control module is in manual mode, press it can control ATS to open.
	QS2 Close	When the master control module is in manual mode, press it can control QS2 to close.
	Manual Mode	Press it to transfer master control module to manual mode, then the upper indicator color block is shown in red, otherwise it is gray.
	Auto Mode	Press it to transfer master control module to auto mode, then the upper indicator color block is shown in green, otherwise it is gray.
	Restore	Press it to switch auto trans./restore and auto trans. non-restore mode, when the master control module is in auto trans./restore mode, the upper indicator color block is shown in green, while in auto trans. non-restore mode, it is shown in gray.
	Genset	Press it to enter into genset operation page.
	Load Switch	Press it to enter into load manual switch page.

4.2.2 GENSET OPERATION DISPLAY

Press  key on the homepage to enter into genset operation interface, which can manually control genset start/stop. When genset starts, genset icon is shown in green and text indicates “Genset Working”; when genset is in standby, the icon is shown in gray and text indicates “Genset Standby”.

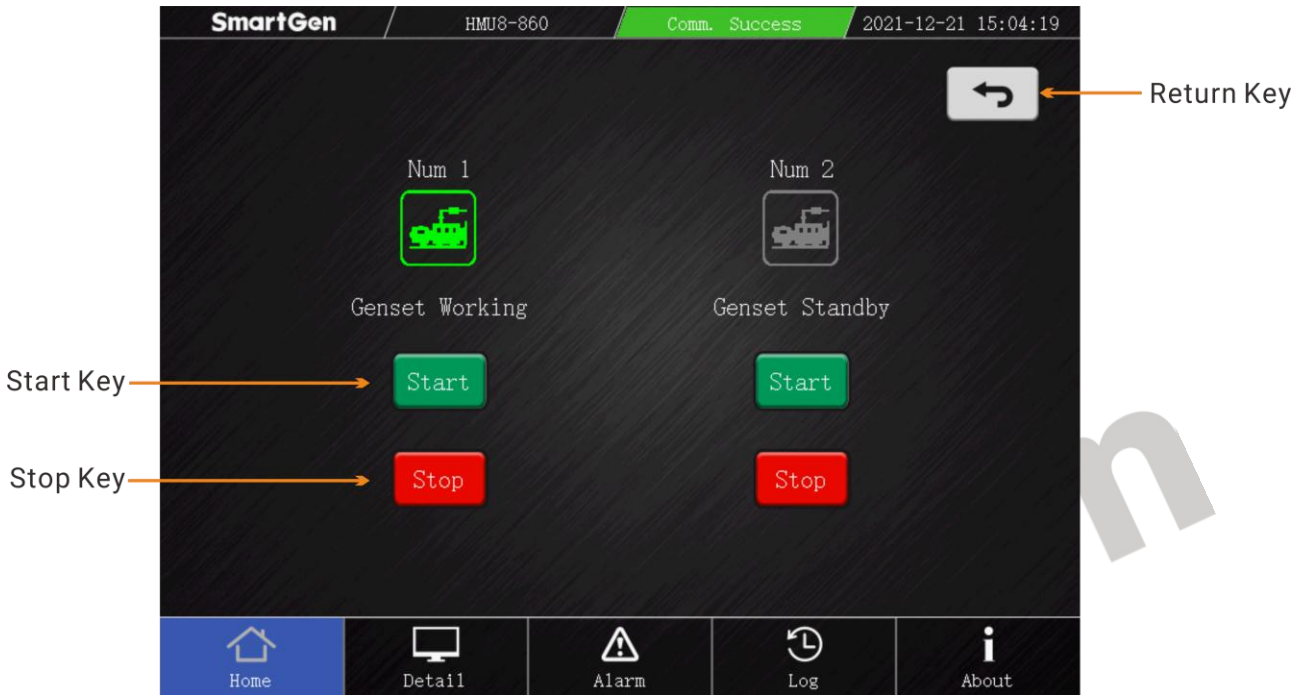






Fig. 3 – Genset Operation Interface

Table 7 –Key Description of Genset Operation Interface

Icon	Key	Description
	Start	Press it to manually control corresponding genset to start.
	Stop	Press it to manually control corresponding genset to stop.
	Return	Press it to return to homepage.

4.2.3 LOAD STEPWISE SWITCH DISPLAY



Press  key to enter into load stepwise switch interface, this page can display and control the current status of load breaker. Load breaker has three positions (work position, test position, isolated position), close, open status. Load breaker number varies with master control configuration, each page can display up to 6 items, and the maximum number of items is 24.

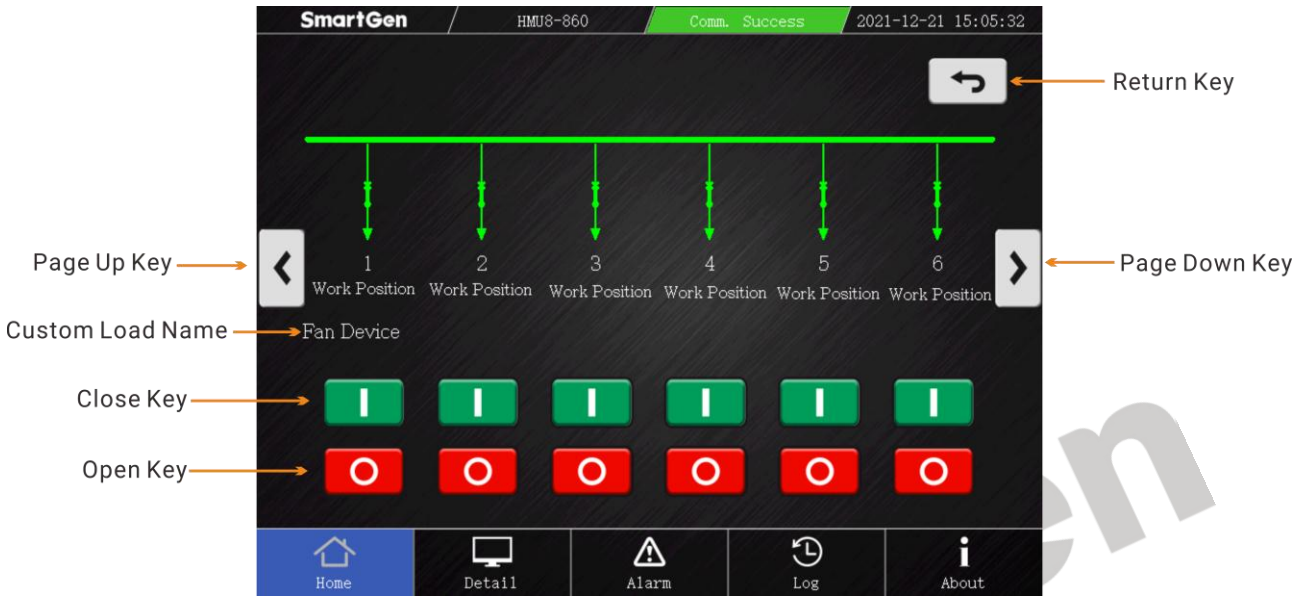







Fig. 4 – Manual Operation Interface of Load Stepwise Switch

Table 8 –Key Description of Load Stepwise Switch

Icon	Key	Description
	Load Breaker Close	Press it to manually control corresponding load to close.
	Load Breaker Open	Press it to manually control corresponding load to open.
	Page Up	Press it to adjust load breaker display items forward.
	Page Down	Press it to adjust load breaker display items backward.
	Return	Press it to return to homepage.



4.2.4 DETAILED INFORMATION DISPLAY

SmartGen				HMU8-860				Comm. Success		2021-12-21 15:06:07	
S1				LOAD							
UL-N	L1	L2	L3		L1	L2	L3	Total			
(kV)	22.02	22.06	22.06	MW	11.0	11.0	11.1	33.2			
I(A)	500.7	499.9	500.8	kvar	-50.0	-20.0	-60.0	-130.0			
UL-L	L1-2	L2-3	L3-1	MVA	11.0	11.0	11.1	33.2			
(kV)	38.00	38.04	38.05	PF	1.00	1.00	1.00	1.00 (Avg)			
Phase	0°	119.2°	239.2°	TOTAL							
F(Hz)	50.0			Cont. PowerSupply Time				0:16:1			
S2				Last Cont. PowerSupply				0:2:1			
UL-N	L1	L2	L3	Total Supply Time		(S1)	0:21:44	(S2)	0:2:1		
(kV)	22.10	22.07	22.03	Total kWh		(S1)	9367.7	(S2)	8.1		
I(A)	0	0	0	Total kvarh		(S1)	-38.9	(S2)	-1.2		
UL-L	L1-2	L2-3	L3-1	Total Close Nums		(S1)	0	(S2)	0		
(kV)	38.09	38.07	38.02	Total Auto Close Nums		0					
Phase	0°	119.7°	239.3°	Mains No-trans Nums		0					
F(Hz)	50.0			Total Auto Run Time		0(d)		0:0:0			
Home		Detail		Alarm		Log		About			

Fig. 5 – Detailed Information Display Interface

The detailed information interface displays S1 electric parameters (includes phase voltage, line voltage, current, phase sequence, frequency information), S2 electric parameters, load power information, total supply time and power.

4.2.5 ALARM DISPLAY





SmartGen		HMU8-860		Comm. Success		2021-12-21 15:06:32			
Fault				Warn					
None				None					
				<div style="text-align: right;">  Alarm Mute </div> <div style="text-align: right; margin-top: 20px;">  Alarm Reset </div>					
Home		Detail		Alarm		Log		About	

Fig. 6 – Alarm Display Interface

The alarm interface can display contents of fault alarm and warning alarm. Each type of alarm can display up to 20 detailed contents. If there are specific alarm contents, check HAT860 status according to the content.

Table 9 – Key Descriptions of Alarm Interface

Icon	Key	Description
	Alarm Mute	Press this key to eliminate the alarm sound of display module, and the key white part turns red at the same time; Press this key again, the alarm sound is active again, and the key red part turns white.
	Alarm Reset	Press this key to reset the alarm initiated by the master control module.

When receiving the fault alarm of master control module, fault alarm is active, alarm light will fast flash (5 times 1 second), the upper alarm information display area will flash red at the same time; when the alarm is removed, alarm light will extinguish.

Table 10 – Fault Alarm Descriptions

No.	Status Name	Description
1	QS1 Close Failure	QS1 fails to close.
2	QS1 Open Failure	QS1 fails to open.
3	QS2 Close Failure	QS2 fails to close.
4	QS2 Open Failure	QS2 fails to open.
5	S1 Load Overcurrent Trip	When the overcurrent action is set as trip and S1 takes load, current is greater than the set value.
6	S2 Load Overcurrent Trip	When the overcurrent action is set as trip and S2 takes load, current is greater than the set value.
7	Forced Open Fault	Forced open (non-fire cutoff) action is set as fault, when this input is active, forced open fault alarm occurs.
8	S1 Genset Fault	Only when system has 2 gensets and S1 is generating, S1 fails to start.
9	S2 Genset Fault	Only when system has 2 gensets and S2 is generating, S2 fails to start.
10	S1 Breaker Trip Alarm	This input is active.
11	S1 Breaker Trip Alarm	This input is active.
12	Input 1-6 Comm. Failure Fault	Fault alarm will be initiated when expand input port 1-6 communication fails and alarm action is set as fault.
13	Output 1-3 Comm. Failure Fault	Fault alarm will be initiated when expand output port 1-3 communication fails and alarm action is set as fault.
14	Load Switching Fail	In load stepwise switching process, close or open failure alarm occurs and switching failure action is set as fault.
15	Earth Fault	When earth current detection is enabled and the current is greater than the set value, fault alarm will be initiated when the action is selected.
16	QTIE Close Failure	In auto mode, if QTIE close signal can't be detected after close output delay, QTIE close failure alarm will be initiated.



No.	Status Name	Description
17	QTIE Open Failure	In auto mode, if there is still a close signal after open output delay, QTIE open failure alarm will be initiated.
18	QTIE Breaker Trip	It alarms when this input is active.
19	Load Breaker Trip	It alarms when this input is active.

When receiving the warning alarm of master control module, warning alarm is active, warning light will fast flash (1 time 1 second), the upper alarm information display area will flash yellow at the same time; when the alarm recovers, warning light will extinguish.

Table 11 – Warning Alarm Descriptions



No.	Status Name	Description
1	S1 Load Overcurrent	Overcurrent action is set as warning, when S1 takes load, current is greater than the set value.
2	S2 Load Overcurrent	Overcurrent action is set as warning, when S2 takes load, current is greater than the set value.
3	Forced Open	Forced open (non-fire cutoff) action is set as warning, when this input is active, forced open warning alarm occurs.
4	S1 PT Break	Alarm is initiated when PT secondary circuit is broken.
5	S2 PT Break	Alarm is initiated when PT secondary circuit is broken.
6	Input 1-6 Comm. Failure	Alarm is initiated when expand input module 1-6 communication fails and alarm action is set as warning,
7	Output 1-3 Comm. Failure	Alarm is initiated when expand output module 1-3 communication fails and alarm action is set as warning,
8	Load Switching Failure	In load stepwise switching process, close or open failure alarm occurs and switching failure action is set as warning.
9	Earth Fault	When earth current detection is enabled and the current is greater than the set value, warning alarm will be initiated when the action is selected.



4.2.6 EVENT LOG DISPLAY



Fig.7 – Event Log Display Interface

Each page of the event log interface can display 5 event records, including the serial number/total numbers of the current event, the type of event, the detailed contents of the event and the time when it happened. By  and  keys, up to 200 event records can be viewed circularly. Click log serial number, it will display the detailed information of current log, which is shown as following:

Event Log Details	
3/10	2021-12-10 11:04:59
Warning Events	Load Switching Failure
UA1 (kV) 22.13	UA2 (kV) 22.09
UB1 (kV) 22.04	UB2 (kV) 22.12
UC1 (kV) 22.04	UC2 (kV) 22.03
IA1 (A) 501.8	IA2 (A) 0
IB1 (A) 501.5	IB2 (A) 0
IC1 (A) 501.8	IC2 (A) 0
F1 (Hz) 50.00	F2 (Hz) 50.00
PF 1.00	P (kW) 33378.3
S1 Voltage Normal	S2 Voltage Normal

Fig.8 – Detailed Information Display of Event Log

Table 12 – Key Description of Event Log




Icon	Key	Description
	Last Page	Press it can display 5 logs upward.
	Next Page	Press it can display up to 5 logs downward.
	U Disk Save	Press it to save current event log into U disk.

Table 13 – Display Contents of Event Log

No.	Event Type	Event Contents
1	Action Event	QS1 close output QS2 close output QS1 open output QS2 open output QS1 synchronous close QS2 synchronous close NEL1 trip NEL2 trip NEL3 trip Genset start S1 genset start S2 genset start Genset stop S1 genset stop S2 genset stop Auto mode Manual mode Manual open key Manual S1 close key Manual S2 close key Remote open key Remote S1 close key Remote S2 close key
2	Warning Event	S1 load overcurrent warning S1 load overcurrent warning Forced open warning alarm S1 PT break S2 PT break Input 1-6 comm. Failure warning Output 1-3 comm. failure warning Load switching failure Earth fault warning
3	Fault Event	QS1 close failure

No.	Event Type	Event Contents
		QS1 open failure QS2 close failure QS2 open failure S1 load overcurrent trip S2 load overcurrent trip Forced open fault alarm S1 genset fault S2 genset fault S1 breaker trip alarm S2 breaker trip alarm Input 1-6 comm. Failure fault Output 1-3 comm. Failure fault Load switching failure Earth fault QTIE close failure QTIE open failure QTIE breaker trip alarm Load breaker trip alarm

4.2.7 ABOUT DISPLAY









Fig.9 – About Display Interface


The about display interface includes hardware information, the version of hardware and software,

release date and other data of monitoring module and master control module, as well as some function setting keys.

Table 14 – Key Descriptions of About Interface

Icon	Key	Description
	Parameter Setting	Press this key to select monitoring module and master control module for parameter setting respectively.
	Language Setting	Press this key to set the language of monitoring module as Chinese or English.
	Time and Date	Press this key to set the time and date of master control module.
	Brightness	Press this key to adjust the screen brightness of monitoring module, adjusting range is 0-10, default is 6, and conduct lamp test operation for 2 seconds at the same time.
	Advanced Parameter Setting	Press this key and enter the password to clear event log of the master control module and recover monitoring module parameters.
	Expand IO Port Status Display	Press this key can display HAT860 external expand input/output port status.

4.3 PARAMETR CONFIGURATION

In the “About” interface, press  key to enter the module selection page and select the module that needs parameters configuration.

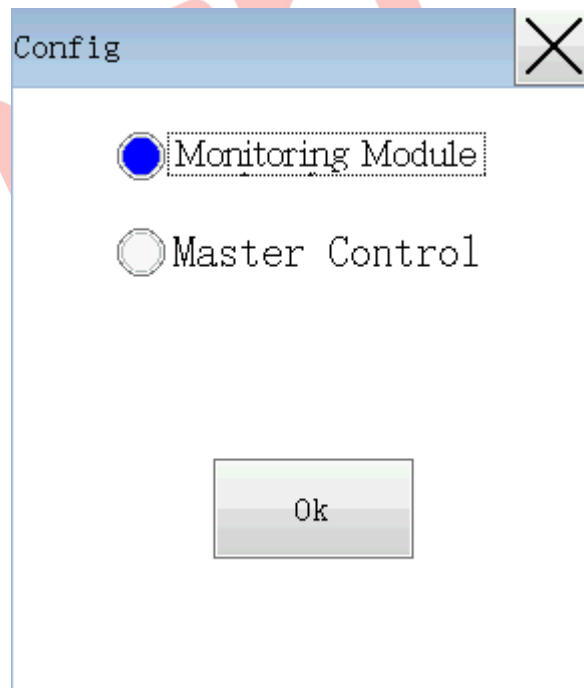


Fig.10 – Module Selection Interface

4.3.1 PARAMETER CONFIGURATION OF MONITORING MODULE

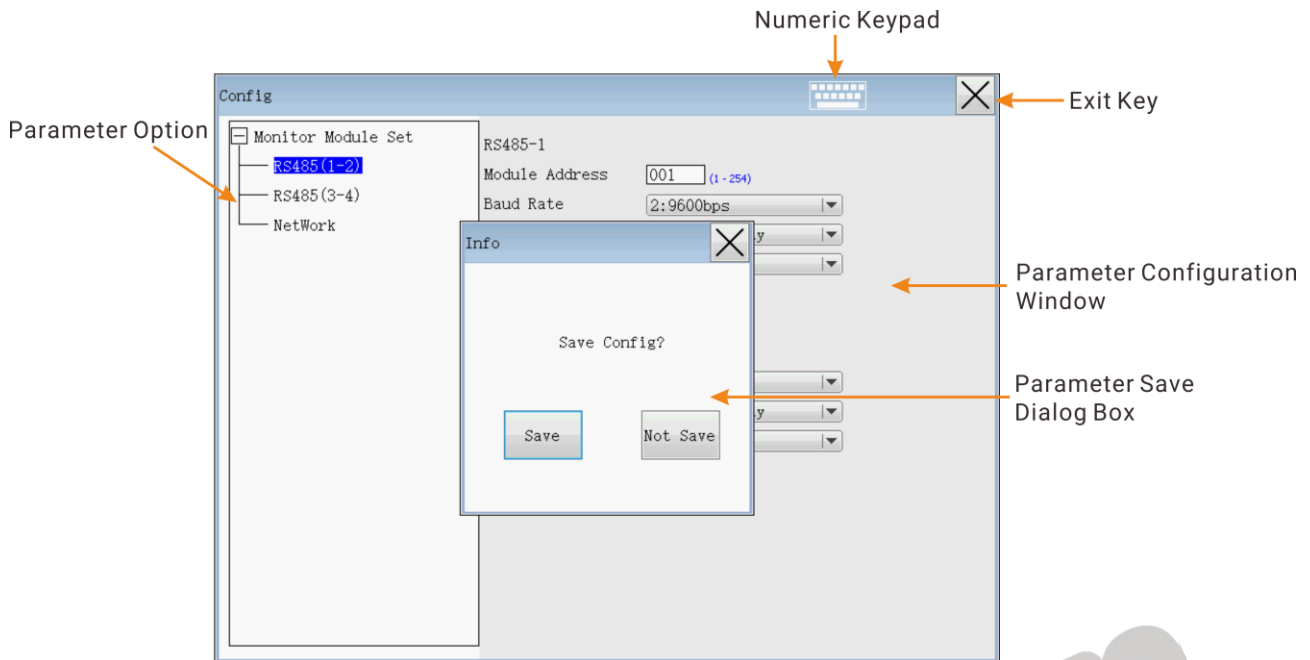


Fig.11 – Parameter Configuration Interface of Monitoring Module

The parameter configuration steps of the monitoring module are as follows:

- 1) Select parameters to be configured by the tree diagram;
- 2) Set parameters to be changed in the right window. Press the numeric keypad key when necessary to pop up the numeric keypad;
- 3) After the parameter configuration, press the exit key to pop up the parameter saving dialog box and save according to the prompts.

4.3.2 PARAMETER CONFIGURATION OF MASTER CONTROL MODULE

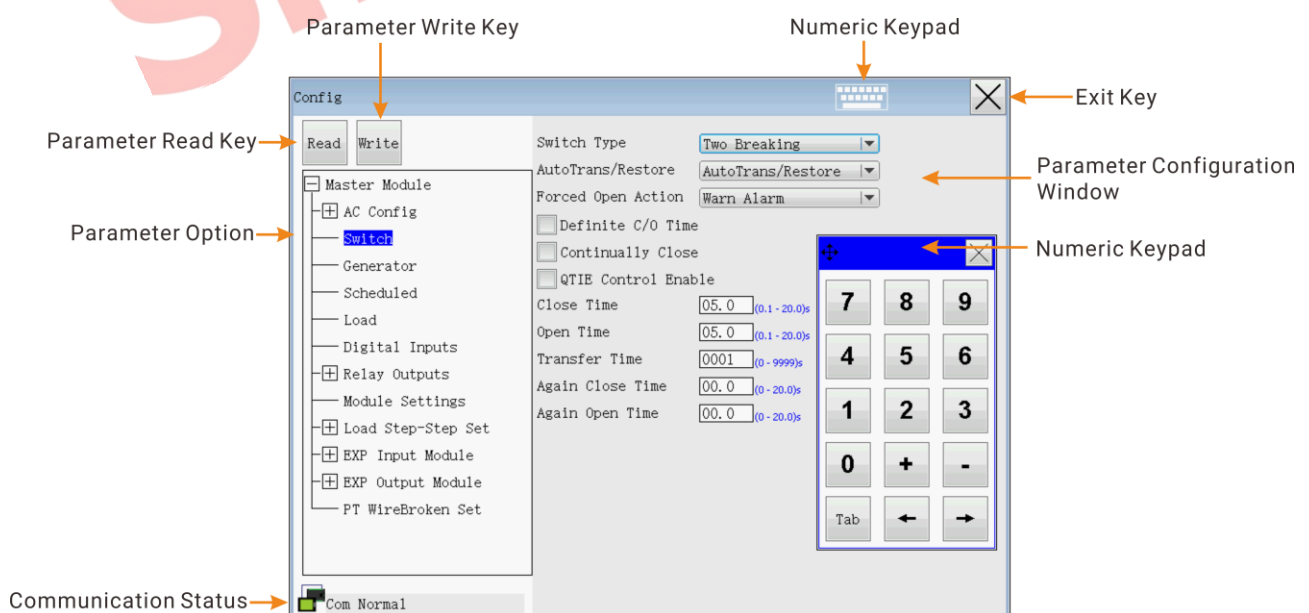


Fig.12 – Parameter Configuration Interface of Master Control Module

Before entering the parameter configuration interface of the master control module, the monitoring module will first read the parameters of the master control module. If communication fails at this time, the monitoring module will load the factory default parameter values of the master control module.

The parameter configuration steps of the master control module are as follows:

- 1) Select parameters to be configured by the tree diagram;
- 2) Set parameters to be changed in the right window. Press the numeric keypad key when necessary to pop up the numeric keypad
- 3) After the parameter configuration, click the parameter write key to write the parameter. Before writing, a password dialog box will pop up. After entering the correct password of the master control module, the parameters can be written successfully; otherwise, it cannot be written. After the correct password is inputted and held for 5 minutes, within which time the configuration can be repeated without re-entering the password.
- 4) After the parameters are written, click the exit key to exit the interface.

NOTE1: The default password of the master control module is "01234". If you forget the password, please contact the manufacturer.


NOTE2: In the process of parameter configuration, if communication fails and then returns to normal, the monitoring module will re-read and load the parameter configuration of the master control module.

NOTE3: The monitoring module cannot configure custom character string description parameters of master control module.

Attentions:

- a) Please modify the internal parameters of the controller in standby mode (eg: programmable input, output configuration, various delays, etc.), otherwise n alarm or other abnormal phenomena may occur.
- b) Higher limit value must be greater than lower limit value, such as over voltage limit value must be greater than under voltage limit value, otherwise both over voltage and under voltage may occur at the same time.
- c) When setting the warning alarm, please set the return value correctly, otherwise it will fail to alarm normally. When setting over limit warning, the return value should be less than the set value; When setting under limit warning, the return value should be greater than the set value.
- d) The programmable input port 1-12 cannot be set to the same item, otherwise the correct function will not appear, while the programmable output port 1-13 can be set to the same item.

4.3.3 ADVANCED PARAMETER CONFIGURATION

Press  key to enter advanced parameter configuration interface, which includes event log clear of HAT860 master control module, HMU8-860 default factory value, standard value and remove UI resource. Part of the items need to enter a specific password to access, if necessary, please contact the manufacturer.

5 WIRING

5.1 HUM8-860 MONIROTING MODULE REAR PANEL



Fig.13 – Rear Panel Drawing of Monitoring Module

Table – 15 Wiring Terminal Description

No.	Function	Size	Remark	
1	B-	1.0mm ²	Connect starting battery negative.	
2	B+	1.0mm ²	Connect starting battery positive.	
3	PE		Protective earth.	
4	CAN	Terminal match resistor (120Ω)	Reserved interface. It is recommended to use twisted shielding wire with 120Ω impedance, whose single end is grounded. Short connect terminal 4 and 6 and connect 120Ω terminal resistor.	
5		CAN L		0.5mm ²
6		CAN H		0.5mm ²
7		PE1		
8	RS485-1	Terminal match resistor (120Ω)	Used for connecting master control module. It is recommended to use twisted shielding wire with 120Ω impedance, whose single end is grounded. Short connect terminal 8 and 10 and connect 120Ω terminal resistor.	
9		B(-)		0.5mm ²
10		A(+)		0.5mm ²
11		PE2		
12	RS485-2	Terminal match resistor (120Ω)	Reserved interface. It is recommended to use twisted shielding wire with 120Ω impedance, whose single end is grounded. Short connect terminal 12 and 14 and connect 120Ω terminal resistor.	
13		B(-)		0.5mm ²
14		A(+)		0.5mm ²



No.	Function	Size	Remark	
15	PE3		Protective earth.	
16	RS485-3	Terminal match resistor (120Ω)	Reserved interface t. It is recommended to use twisted shielding wire with 120Ω impedance, whose single end is grounded. Short connect terminal 16 and 18 and connect 120Ω terminal resistor.	
17		B(-)		0.5mm ²
18		A(+)		0.5mm ²
19	PE4		Protective earth.	
20	RS485-4	Terminal match resistor (120Ω)	Reserved interface. It is recommended to use twisted shielding wire with 120Ω impedance, whose single end is grounded. Short connect terminal 20 and 22 and connect 120Ω terminal resistor.	
21		B(-)		0.5mm ²
22		A(+)		0.5mm ²
23		PE5		

NOTE1: Slave USB interface (DEVICE) on controller side is used for upgrading controller firmware.

NOTE2: Master USB interface (HOST) on controller side is used for updating controller display pictures and word stock.

NOTE3: ETHERNET interface on controller side is reserved interface.

5.2 CONNECTION DIAGRAM OF HUM8-860 AND HAT860

HAT860 master control module connects RS485-1 interface, HUM8-860 monitoring module connects RS485-2 interface.

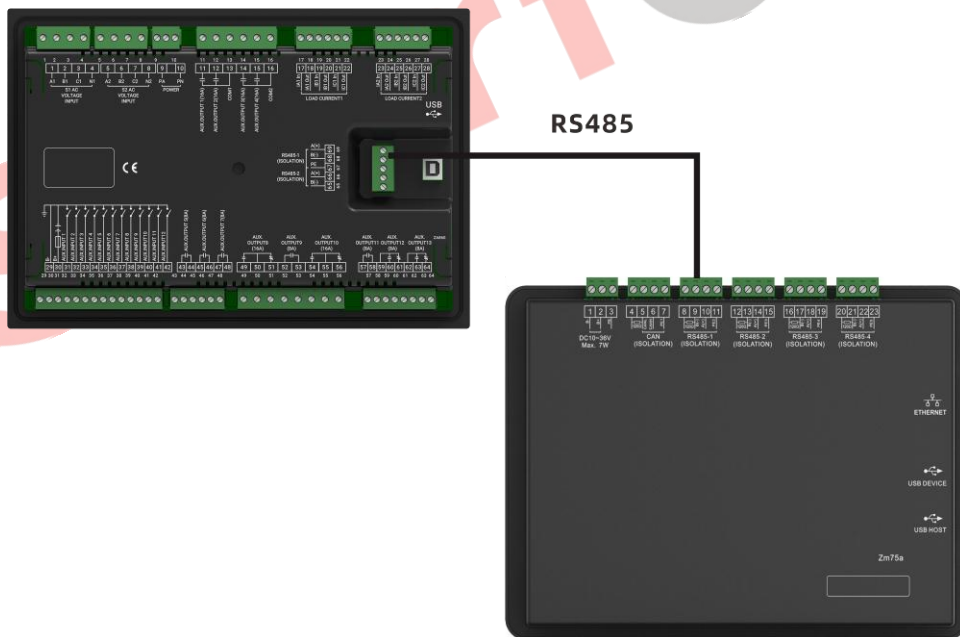


Fig.14 – Connection Diagram of Monitoring Module and Master Control Module

6 SCOPES AND DEFINITIONS OF PROGRAMMABLE PARAMETERS

6.1 PARAMETER CONTENTS AND SCOPES OF MONITORING MODULE

Table 16 – Parameter Contents and Scopes

No.	Item	Range	Default	Description
RS485-1 Setting				
1	Module Address	(1-254)	001	The module address of current RS485 interface communicates with the master control module.
2	Baud Rate	(0-3)	2	0: 2400bps 1: 4800bps 2: 9600bps 3: 19200bps
3	Parity Bit	(0-2)	0	0: None 1: Odd Parity 2: Even Parity
4	Stop Bit	(1-2)	2	1: 1 Bit 2: 2 Bits
RS485-2 Setting (Reserved)				
1	Module Address	(1-254)	001	The module address of current RS485 interface is not used when communicating with the master control module.
2	Baud Rate	(0-3)	2	0: 2400bps 1: 4800bps 2: 9600bps 3: 19200bps
3	Parity Bit	(0-2)	0	0: None 1: Odd Parity 2: Even Parity
4	Stop Bit	(1-2)	2	1: 1 Bit 2: 2 Bits
RS485-3 Setting (Reserved)				
1	RS485-3 Module Address	(1-254)	001	The module address of current RS485 interface is not used when communicating with the master control module.
2	RS485-3 Baud Rate	(0-3)	2	0: 2400bps 1: 4800bps 2: 9600bps 3: 19200bps
3	RS485-3 Parity Bit	(0-2)	0	0: None 1: Odd Parity 2: Even Parity
4	RS485-3 Stop Bit	(1-2)	2	1: 1 Bit 2: 2 Bits



No.	Item	Range	Default	Description
RS485-4 Setting (Reserved)				
1	RS485-4 Module Address	(1-254)	001	The module address of current RS485 interface is not used when communicating with the master control module.
2	RS485-4 Baud Rate	(0-3)	2	0: 2400bps 1: 4800bps 2: 9600bps 3: 19200bps
3	RS485-4 Parity Bit	(0-2)	0	0: None 1: Odd Parity 2: Even Parity
4	RS485-4 Stop Bit	(1-2)	2	1: 1 Bit 2: 2 Bits
ETHERNET Setting (Reserved)				
1	Network Communication Enable	(0-1)	0	0: Disable 1: Enable
2	IP Address	192.168.010.025		
3	Subnet Mask	255.255.255.000		
4	Gateway	192.168.010.001		
5	DNS Address	211.138.024.066		

6.2 PARAMETER CONTENTS AND SCOPES OF MASTER CONTROL MODULE

Table 17 – Parameter Contents and Scopes

No.	Item	Range	Default	Description
AC Setting				
1	S1 Volt Normal	(0-3600)s	10	The delay from S1 voltage abnormal to normal.
2	S1 Volt Abnormal	(0-3600)s	5	The delay from S1 voltage normal to abnormal.
3	S2 Volt Normal	(0-3600)s	10	The delay from S2 voltage abnormal to normal.
4	S2 Volt Abnormal	(0-3600)s	5	The delay from S2 voltage normal to abnormal.
5	Master Set	(0~1)	0	0: S1 Master 1: S2 Master
6	System Type	(0~3)	0	0: S1 Mains S2 Gen; 1: S1 Gen S2 Mains; 2: S1 Mains S2 Mains; 3: S1 Gen S2 Gen.
7	AC System	(0~3)	1	0: 3 Phase 4 Wire (3P4W) 1: 3 Phase 3 Wire (3P3W) 2: 2 Phase 3 Wire (2P3W)



No.	Item	Range	Default	Description
				3: Single Phase 2 Wire (1P2W)
8	PT Fitted	(0~1)	1	0: Disable 1: Enable
9	PT Primary Volt	(30~30000)V	10000	Primary voltage of voltage transformer ratio.
10	PT Secondary Volt	(30~1000)V	100	Secondary voltage of voltage transformer ratio.
11	Rated Voltage	(0~30000)V	10500	Rated voltage of AC system.
12	Over Volt Warn	(0~1)	1	0: Disable 1: Enable
13	Set Value	(0~200)%	120	Upper limit value of voltage; it is abnormal if the value has exceeded the set value.
14	Return Value	(0~200)%	115	Upper limit return value of voltage; it is normal only when the value has fallen below the set value.
15	Under voltage Warn	(0~1)	1	0: Disable 1: Enable
16	Set Value	(0~200)%	80	Lower limit value of voltage; it is abnormal if the value has fallen below the set value.
17	Return Value	(0~200)%	85	Lower limit return value of voltage; it is normal only when the value has exceeded the set value.
18	Rated Frequency	(10.0~75.0)Hz	50.0	Rated frequency of AC system.
19	Over Frequency Warn	(0~1)	1	0: Disable 1: Enable
20	Set Value	(0~200)%	110	Upper limit value of frequency; it is abnormal if the value has exceeded the set value.
21	Return Value	(0~200)%	104	Upper limit return value of frequency; it is normal only when the value has fallen below the set value.
22	Under Frequency Warn	(0~1)	1	0: Disable 1: Enable
23	Set Value	(0~200)%	90	Lower limit value of frequency; it is abnormal if the value has fallen below the set value.
24	Return Value	(0~200)%	96	Lower limit return value of frequency; it is normal only when the value has exceeded the set value.
25	Reverse Phase Seq.	(0~1)	1	0: Disable 1: Enable
Breaker Setting				
1	Auto Transfer/Restore	(0~1)	1	0: Auto Transfer Non-restore; 1: Auto Transfer/Restore.



No.	Item	Range	Default	Description
2	Fixed C/O Time	(0~1)	0	0: Disable 1: Enable Disable: The output time is depended on the close status; the longest output time is the set c/o time. Enable: The output time lasts for the preset time.
3	Close Delay	(0.1~20.0)s	5.0	Pulse time of close relay.
4	Open Delay	(0.1~20.0)s	5.0	Pulse time of open relay.
5	Transfer Rest	(0~9999)s	1	Delay time from S1 open to S2 close or from S2 open to S1 close.
6	Again Close Delay	(0~20.0)s	0.0	When the breaker fails to open for the first time, then the module will close for the second time and the Again Close Delay begins, after the delay has expired, if it still fails to open for the second time, the module will send out fail to open alarm.
7	Again Open Delay	(0~20.0)s	0.0	When the breaker fails to close for the first time, then the module will open for the second time and the Again Open Delay begins, after the delay has expired, if it still fails to close for the second time, the module will send out fail to close alarm.
8	Type Setting	(0~1)	0	0: 2-breaking 1: 1-breaking
9	Forced Open Action	(0~1)	0	0: Warning Alarm 1: Fault Alarm
10	Continuous Close	(0~1)	0	0: Disable 1: Enable When continuous close is active, it needs to be enabled, and close time and open time are inactive.
11	QTIE Enable	(0~1)	0	0: Disable 1: Enable When bustie breaker control is required, it needs to be enabled.
Genset Setting				
1	Start Delay	(0-9999)s	1	When the genset is ready to start, start delay begins, after the delay has expired, start signal will be initiated.
2	Stop Delay	(0-9999)s	5	When the genset is ready to stop, stop delay begins, after the delay has expired, start signal will be disconnected.
3	Two Gensets Start Mode	(0~3)	0	0: Cycle Run; 1: Master-Slave Run;



No.	Item	Range	Default	Description
				2: Balanced Time Run; 3: None.
4	S1 Cycle Run Time	(0~9999)min	720	Gens cycle start S1 running time.
5	S2 Cycle Run Time	(0~9999)min	720	Gens cycle start S2 running time.
6	Supply Delay	(0~9999)s	120	When the start signal is active, the start delay will be initiated. If the gen voltage lasts abnormal after the delay has expired, genset fault alarm will be initiated.
Scheduled Run/Not Run Setting				
1	Schedule Run	(0~1)	0	0: Disable ; 1: Enable
2	Run Mode	(0~1)	0	0: Off Load; 1: On Load.
3	Cycle Selection	(0~2)	0	0: Monthly; 1: Weekly; 2: Daily.
4	Run Time (Month)	(1~12)month	monthly	<input checked="" type="checkbox"/> Jan. <input checked="" type="checkbox"/> Feb. <input checked="" type="checkbox"/> Mar. <input checked="" type="checkbox"/> Apr. <input checked="" type="checkbox"/> May <input checked="" type="checkbox"/> June <input checked="" type="checkbox"/> July <input checked="" type="checkbox"/> Aug. <input checked="" type="checkbox"/> Sep. <input checked="" type="checkbox"/> Oct. <input checked="" type="checkbox"/> Nov. <input checked="" type="checkbox"/> Dec.
5	Run Time (Date)	(1~31)	1	The date of start the genset monthly.
6	Run Time (Week)	Mon ~ Sun	Sunday	<input checked="" type="checkbox"/> Sunday <input type="checkbox"/> Monday <input type="checkbox"/> Tuesday <input type="checkbox"/> Wednesday <input type="checkbox"/> Thursday <input type="checkbox"/> Friday <input type="checkbox"/> Saturday
7	Run Time (Hour)	(0~23)h	0	The time of genset start.
8	Run Time (Minute)	(0~59)min	0	



No.	Item	Range	Default	Description
9	Duration	(0~30000)min	30	The duration time of genset running.
10	Scheduled Not Run	(0~1)	0	0: Disable 1: Enable
11	Cycle Selection	(0~2)	0	0: Monthly; 1: Weekly; 2: Daily.
12	Not Run Time (Month)	(1~12)month	monthly	<input checked="" type="checkbox"/> Jan. <input checked="" type="checkbox"/> Feb. <input checked="" type="checkbox"/> Mar. <input checked="" type="checkbox"/> Apr. <input checked="" type="checkbox"/> May <input checked="" type="checkbox"/> June <input checked="" type="checkbox"/> July <input checked="" type="checkbox"/> Aug. <input checked="" type="checkbox"/> Sep. <input checked="" type="checkbox"/> Oct. <input checked="" type="checkbox"/> Nov. <input checked="" type="checkbox"/> Dec.
13	Not Run Time (Date)	(1~31)	1	The date of genset not start monthly.
14	Not Run Time (Week)	Mon ~ Sun	Sunday	<input checked="" type="checkbox"/> Sunday <input type="checkbox"/> Monday <input type="checkbox"/> Tuesday <input type="checkbox"/> Wednesday <input type="checkbox"/> Thursday <input type="checkbox"/> Friday <input type="checkbox"/> Saturday
15	Not Run Time (Hour)	(0~23)h	0	The time of genset not start.
16	Not Run Time (Minute)	(0~59)min	0	
17	Not Run Duration	(0~30000)min	30	The duration time of genset <i>NOT</i> running.
Load Setting				
	Elevator Enable	(0~1)	0	0: Disable 1: Enable
1	Elevator Delay	(0~300)s	300	It's the delay time before the load disconnect or switch transfer. Used for control the running elevator stop at the nearest floor until the switch transfer is terminated.



No.	Item	Range	Default	Description
2	Current Monitoring	(0~1)	1	0: Disable 1: Enable
3	CT Ratio/5	(5~6000)A	500	CT primary current.
4	S1 Full-load Current	(5~6000)A	500	Current of S1 full-loading.
5	S2 Full-load Current	(5~6000)A	500	Current of S2 full-loading.
6	S1 Max. Active Power	(1~20000)kW	8000	Max. S1 loading active power.
7	S2 Max. Active Power	(1~20000)kW	8000	Max. S2 loading active power.
8	Overcurrent Protect	(0~1)	1	0: Disable 1: Enable
9	Overload Current	(0~200)%	120	Load overcurrent threshold.
10	Protect Action	(0~1)	0	0: Warning 1: Trip
11	Delay Type	(0~1)	0	0: DMT Delay 1: IDMT Delay
12	DMT Delay Value	(0~3600)s	10	Overcurrent delay value of DMT delay.
13	IDMT Delay Rate	(1~36)	36	Overcurrent delay rate of IDMT delay.
14	NEL Trip	(0~1)	0	0: Disable 1: Enable
15	NEL Over Power Trip 1 Set Value	(0~200)%	90	When load power is greater than the set value and delay is over, it will take off load.
16	NEL Over Power Trip 1 Delay	(0~3600)s	5	
17	NEL Over Power Trip 2 Set Value	(0~200)%	100	When load power is greater than the set value and delay is over, it will take off load.
18	NEL Over Power Trip 2 Delay	(0~3600)s	1	
19	NEL Over Power Return	(0~1)	0	0: Disable 1: Enable
20	NEL Over Power Return Set Value	(0~200)%	50	When load power is lower than the set value and delay is over, trip will disconnect..
21	NEL Over Power Return Delay	(0~3600)s	5	
22	NEL Numbers	(1~3)	3	Set NEL numbers.
23	Mains Loading NEL	(0~1)	0	0: Disable 1: Enable
24	Earth Fault Detect	(0~1)	0	0: Disable 1: Enable
25	Earth Fault Detect Overcurrent Value	(0~200)%	20	When the earth current is greater that set rated current percentage and delay is over, earth fault alarm will be initiated. If alarm action is set as warning, when earth current is lower than set return value, the alarm will be removed.
26	Earth Fault Detect Overcurrent Return Value	(0~200)%	18	
27	Earth Fault Detect Delay Value	(0~3600)s	5	
28	Earth Fault Action	(0~2)	0	0: No Action 1: Warning Alarm 2: Fault Alarm



No.	Item	Range	Default	Description
Digit Inputs Setting				
1	Digital Input 1	(0~159)	42	S1 Closed.
2	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
3	Digital Input 2	(0~159)	43	S2 Closed.
4	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
5	Digital Input 3	(0~159)	1	Forced Open.
6	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
7	Digital Input 4	(0~159)	8	S1 Breaker Trip.
8	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
9	Digital Input 5	(0~159)	9	S2 Breaker Trip.
10	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
11	Digital Input 6	(0~159)	0	Not Used.
12	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
13	Digital Input 7	(0~159)	0	Not Used.
14	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
15	Digital Input 8	(0~159)	0	Not Used.
16	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
17	Digital Input 9	(0~159)	0	Not Used.
18	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
19	Digital Input 10	(0~159)	0	Not Used.
20	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
21	Digital Input 11	(0~159)	0	Not Used.
22	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
23	Digital Input 12	(0~159)	0	Not Used.
24	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
25	Digital Input 13	(0~159)	0	Not Used.
26	Active Type	(0~1)	0	0: Close to activate; 1: Open to activate.
Relay Outputs Setting				



No.	Item	Range	Default	Description
1	Relay Output 1 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
2	Contents Setting	(0~159)	34	QS1 Close.
3	Relay Output 2 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
4	Contents Setting	(0~159)	35	QS1 Open.
5	Relay Output 3 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
6	Contents Setting	(0~159)	36	QS2 Close.
7	Relay Output 4 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
8	Contents Setting	(0~159)	37	QS2 Open.
9	Relay Output 5 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
10	Contents Setting	(0~159)	0	Not Used.
11	Relay Output 6 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
12	Contents Setting	(0~159)	0	Not Used.
13	Relay Output 7 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
14	Contents Setting	(0~159)	0	Not Used.
15	Relay Output 8 Active Type	(0~1)	1	0: Output (NO) 1: Output (NC)
16	Contents Setting	(0~159)	32	Genset Start.
17	Relay Output 9 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
18	Contents Setting	(0~159)	0	Not Used.
19	Relay Output 10 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
20	Contents Setting	(0~159)	0	Not Used.
21	Relay Output 11 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
22	Contents Setting	(0~159)	0	Not Used.
23	Relay Output 12 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
24	Contents Setting	(0~159)	0	Not Used.
25	Relay Output 13 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
26	Contents Setting	(0~159)	0	Not Used.
27	Combined 1 or Out 1 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)



No.	Item	Range	Default	Description
28	Combined 1 or Out 1 Contents Setting	(0~159)	23	S1 Voltage Normal.
29	Combined 1 or Out 2 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
30	Combined 1 or Out 2 Contents	(0~159)	25	S2 Voltage Normal.
31	Combined 1 and Out Active Type	(0~1)	1	0: Output (NO) 1: Output (NC)
32	Combined 1 and Out Contents	(0~159)	0	Not Used.
33	Combined 2 or Out 1 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
34	Combined 2 or Out 1 Contents Setting	(0~159)	0	Not Used.
35	Combined 2 or Out 2 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
36	Combined 2 or Out 2 Contents	(0~159)	0	Not Used.
37	Combined 2 and Out Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
38	Combined 2 and Out Contents	(0~159)	0	Not Used.
39	Combined 3 or Out 1 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
40	Combined 3 or Out 1 Contents	(0~159)	0	Not Used.
41	Combined 3 or Out 2 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
42	Combined 3 or Out 2 Contents	(0~159)	0	Not Used.
43	Combined 3 and Out Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
44	Combined 3 and Out Contents	(0~159)	0	Not Used.
45	Combined 4 or Out 1 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
46	Combined 4 or Out 1 Contents	(0~159)	0	Not Used.
47	Combined 4 or Out 2 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
48	Combined 4 or Out 2 Contents	(0~159)	0	Not Used.
49	Combined 4 and Out Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)



No.	Item	Range	Default	Description
50	Combined 4 and Out Contents	(0~159)	0	Not Used.
51	Combined 5 or Out 1 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
52	Combined 5 or Out 1 Contents	(0~159)	0	Not Used.
53	Combined 5 or Out 2 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
54	Combined 5 or Out 2 Contents	(0~159)	0	Not Used.
55	Combined 5 and Out Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
56	Combined 5 and Out Contents	(0~159)	0	Not Used.
57	Combined 6 or Out 1 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
58	Combined 6 or Out 1 Contents	(0~159)	0	Not Used.
59	Combined 6 or Out 2 Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
60	Combined 6 or Out 2 Contents Setting	(0~159)	0	Not Used.
61	Combined 6 and Out Active Type	(0~1)	0	0: Output (NO) 1: Output (NC)
62	Combined 6 and Out Contents	(0~159)	0	Not Used.
Module Setting				
1	Language	(0~2)	0	0: Simplified Chinese; 1: English; 2: Other (This must be set via upper computer software, Default: Traditional Chinese).
2	Password	(00000~65535)	01234	Password for entering parameters setting.
3	Power On Mode	(0-2)	0	0: Last Mode (Keep the working mode last time running); 1: Manual Mode; 2: Auto Mode.
4	Module Address	(1~254)	1	RS485 communication address. Press synchronization key, this parameter of monitoring module and master control module can be set simultaneously without affecting following communication.



No.	Item	Range	Default	Description
5	RS485-1 Baud Rate	(0~3)	2	0: 2400bps; 1: 4800bps; 2: 9600bps; 3: 19200bps. Press synchronization key, this parameter of monitoring module and master control module can be set simultaneously without affecting following communication.
6	RS485-1 Stop Bit	(1~2)	1	1 stop bit or 2 stop bits can be set. Press synchronization key, this parameter of monitoring module and master control module can be set simultaneously without affecting following communication.
7	RS485-1 Parity Bit	(0~2)	0	0: None; 1: Odd Parity; 2: Even Parity. Press synchronization key, this parameter of monitoring module and master control module can be set simultaneously without affecting following communication.
8	RS485-2 Baud Rate	(0~3)	2	0: 2400bps; 1: 4800bps; 2: 9600bps; 3: 19200bps.
9	RS485-2 Stop Bit	(1~2)	1	1 stop bit or 2 stop bits can be set.
10	RS485-2 Parity Bit	(0~2)	0	0: None; 1: Odd Parity; 2: Even Parity.
11	RS485-1 Comm. Set	(0~3)	0	0: Remote Adjusting/Control Enable; 1: Remote Control Disable; 2: Remote Adjusting Disable; 3: Remote Adjusting/Control Disable.
12	RS485-2 Comm. Set	(0~3)	0	0: Remote Adjusting/Control Enable; 1: Remote Control Disable; 2: Remote Adjusting Disable; 3: Remote Adjusting/Control Disable.
13	Date and Time			
14	Controller Description 1	(0~20) characters		Information displayed in "About" interface.
15	Controller Description 2	(0~20) characters		Any characters can be inputted via PC software (letter occupies 1 character,



No.	Item	Range	Default	Description
				Chinese character occupies 2.).
Load Stepwise Switch Setting				
1	Stepwise Switch	(0~1)	0	0: Disable 1: Enable
2	Control Mode	(0~1)	0	0: Current Unit Stepwise Switch; 1: External Stepwise Switch. Current unit stepwise switch: it can detect c/o control and status of each load breaker via expand input/output ports. External stepwise switch: Load breaker stepwise switch can be realized by close and open output signal of load switching device.
3	Breaker Numbers	(0~24)	24	Breaker numbers that allows c/o control.
4	Position Detection	(0~1)	1	0: Disable 1: Enable Disable: It does not detect breaker position status and switch according to set priority. Enable: This load breaker can be allowed to control c/o when it is in working position.
5	Fixed C/O Time	(0~1)	0	0: Disable 1: Enable Disable: Output time is detected according to close status when close/open pulse outputs, the max. time is set close/open time. If it keeps closed status during open time, load stepwise switch fails. Enable: It does not detect close status of load breaker, close/open pulse output time is set fixed close/open time.
6	Close Time	(0.1~20.0)s	5.0	Pulse time of close relay output.
7	Open Time	(0.1~20.0)s	5.0	Pulse time of open relay output.
8	Transfer Rest	(0~9999)s	1	Interval time from current load breaker close/open to next load breaker close/open.
9	Open Control	(0~1)	1	0: Disable 1: Enable When it is enabled, it can control the stepwise open of load breaker.
10	Stepwise Switch Failure Action	(0~2)	0	0: No Action; 1: Warning Alarm; 2: Fault Alarm.



No.	Item	Range	Default	Description
				During the load stepwise switching process, if some load breaker close/open fails, switch failure alarm signal will be initiated.
11	Priority Set	(1~24)	1-24	It can set the priority in S1/S2 c/o of 24 loading breaker. When the priority is same, corresponding breaker will be active.
12	Manual Switch Mode	(0~2)	2	0: No Action; 1: Auto Stepwise Switch; 2: Action after Prompt Confirm. No action: When the main breaker is manually closed/opened, load breaker is not stepwise switched; Auto stepwise switch: When the main breaker is manually closed/opened, load breaker will automatically control stepwise close/open; Action after prompt confirm: When the main breaker is manually closed/opened, prompt box "Confirm to stepwise switch load?" will be popped out. Press Up/Down key to select "Confirm", "Cancel", then press Set key to confirm operation, and exit prompt box. If no action over 10s, it will exit automatically and stepwise switch will be cancelled. If select "Confirm", it will enter stepwise switch; if select "Cancel", there is no switch action.
Expand Input Modules (1-6) Setting				
1	Enable	(0~1)	0	0: Disable 1: Enable When it is enabled, it can communicate with DIN16A-2 module.
2	Comm. Fail Action	(0~1)	0	0: Warning Alarm 1: Fault Alarm
3	Comm. Module Address	(1~254)	100	RS485 network communication address.
4	Expand Input Ports	(1~16)	1	It can set 16 input ports function and active type of DIN16A-2 module.
Expand Output Modules (1-3) Setting				
1	Enable	(0~1)	0	0: Disable 1: Enable When it is enabled, it can communicate with DOUT16B-2 module.
2	Comm. Fail Action	(0~1)	0	0: Warning Alarm 1: Fault Alarm



No.	Item	Range	Default	Description
3	Comm. Module Address	(1~254)	106	RS485 network communication address.
4	Expand Output Ports	(1~16)	1	It can set 16 output ports function and active type of DOUT16B-2 module.
PT Break Communication Detection Setting				
1	PT Break Comm. Detection	(0~1)	0	0: Disable 1: Enable When it is enabled, PT break is judged according to AC sampling voltage, current.
2	PT Break Delay	(0~60)s	3	When the communication detection is enabled, PT break sign is detected, PT break warning is triggered after set delay time.
3	Max. Line Volt Multiple	(0~1.00)	0.20	It is the multiple that max. line voltage set value of PT break judgment accounts for rated voltage.
4	Max. Current Multiple	(0~1.00)	0.02	It is the multiple that max. current set value of PT break judgment accounts for rated current.
5	Line Volt Amplitude Difference Multiple	(0~1.00)	0.20	It is the multiple that line voltage amplitude difference set value of PT break judgment accounts for rated voltage.
6	Break Reset Volt Multiple	(0~1.00)	0.90	It is the multiple that PT break reset voltage set value accounts for rated voltage.

6.3 DIGITAL INPUT/OUTPUT FUNCTION DESCRIPTION

6.3.1 INPUT PORTS FUNCTION DESCRIPTION

Table 18 – Function Description of Input Ports

No.	Item	Description
0	Not Used	Input port is invalid.
1	Forced Open	Forced open (non-fire cutoff) only suits for breaker with open control. When it is active, breaker will transfer to 0 position whether in manual or auto mode.
2	Remote Start On Load	Genset start output, when mains is normal, genset will close the breaker.
3	Remote Start Off Load	Genset start output, when mains is normal, mains will close the breaker.
4	Lamp Test	All LED lights on the panel are illuminated and the backlight of the LCD is illuminated while the LCD screen is all black.
5	Gen1 Fault Input	In cycle start, if the input is active, S1 Gens start will be inhibited.



No.	Item	Description
6	Gen2 Fault Input	In cycle start, if the input is active, S2 Gens start will be inhibited.
7	Start Inhibit Input	In Auto mode, start signal will be deactivated after the stop delay has expired. In Manual mode, if the genset is running, users should stop it manually; then the manual start signal will be deactivated.
8	S1 Breaker Trip	S1 breaker trip fault input.
9	S2 Breaker Trip	S2 breaker trip fault input.
10	S1 Load Inhibit	In Manual mode, S1 manual close is inhibited; if breaker is already closed, users should open it manually. In Auto mode, if breaker is already closed, then load will disconnect or S2 takes load.
11	S2 Load Inhibit	In Manual mode, S2 manual close is inhibited; if breaker is already closed, users should open it manually. In Auto mode, if breaker is already closed, then load will disconnect or S1 takes load.
12	QS1 Ready PF	When S1 close ready signal inputs, it needs to wait S1 PF input active before closing.
13	QS2 Ready PF	When S2 close ready signal inputs, it needs to wait S2 PF input active before closing.
14	S1 Close Key Input	Same as S1 close key, the self-reset key is used to control S1 close.
15	S2 Close Key Input	Same as S2 close key, the self-reset key is used to control S2 close.
16	Open Input	Same as open key, the self-reset key is used to control breaker open.
17	Alarm Reset	Reset the current alarm.
18	Alarm Mute	Silence the audible alarm.
19	Manual NEL Trip Input	Please select self-reset key to manually control NEL offload.
20	Manual NEL Re-connect Input	Please select self-reset key to manually control NEL on-load again.
21	S1 Master Input	Set S1 master use compulsively.
22	S2 Master Input	Set S2 master use compulsively.
23	Forced Manual Mode	Set the controller in Manual mode compulsively.
24	Forced Auto Mode	Set the controller in Auto mode compulsively.
25	Panel Lock	Panel key operations are inhibited (Except Up, Down, Confirm, Return and Alarm Reset and Alarm Mute keys).
26	Reserved	
27	Scheduled Start/Stop Inhibit	Schedule start and stop function are deactivated.
28	Simulate S1 OK	Simulate S1 voltage is normal; the S1 voltage abnormal delay is deactivated.
29	Simulate S2 OK	Simulate S2 voltage is normal; the S2 voltage abnormal delay is deactivated.



No.	Item	Description
30	Auto Transfer/Restore Input	Auto trans. auto restore when active and auto trans. non-restore when inactive.
31	S1 Open Input	QS1 open feedback input.
32	S2 Open Input	QS2 open feedback input.
33	Remote Control Inhibit	Remote control operation is inactive when input is active.
34	S1 PT Break	S1 PT secondary coil break input.
35	S2 PT Break	S2 PT secondary coil break input.
36	QTIE Closed Input	QTIE closed status input.
37	QTIE Trip Fault	QTIE trip fault input.
38	QS1 Closed Status at Contact Side	QS1 closed status of bustie breaker another side in 4-incoming 2-bustie scheme.
39	QS2 Closed Status at Contact Side	QS2 closed status of bustie breaker another side in 4-incoming 2-bustie scheme.
40	External Closed Status	When the external stepwise switch is selected, switch device will close.
41	Reserved	
42	S1 Closed Input	QS1 Closed feedback input.
43	S2 Closed Input	QS2 Closed feedback input.
44	Reserved	
45	Reserved	
46	Reserved	
47	Reserved	
48	Reserved	
49	Reserved	
50	Reserved	
51	Reserved	
52	Load 1 Close Status	Load breaker 1 closed status input.
53	Load 1 Work Position Status	Load breaker 1 work position status input.
54	Load 1 Test Position Status	Load breaker 1 test position status input.
55	Load 1 Breaker Trip	Load breaker 1 trip fault input.
56	Load 2 Close Status	Load breaker 2 closed status input.
57	Load 2 Work Position Status	Load breaker 2 work position status input.
58	Load 2 Test Position Status	Load breaker 2 test position status input.
59	Load 2 Breaker Trip	Load breaker 2 trip fault input.
60	Load 3 Close Status	Load breaker 3 closed status input.
61	Load 3 Work Position Status	Load breaker 3 work position status input.
62	Load 3 Test Position Status	Load breaker 3 test position status input.
63	Load 3 Breaker Trip	Load breaker 3 trip fault input.
64	Load 4 Close Status	Load breaker 4 closed status input.
65	Load 4 Work Position Status	Load breaker 4 work position status input.



No.	Item	Description
66	Load 4 Test Position Status	Load breaker 4 test position status input.
67	Load 4 Breaker Trip	Load breaker 4 trip fault input.
68	Load 5 Close Status	Load breaker 5 closed status input.
69	Load 5 Work Position Status	Load breaker 5 work position status input.
70	Load 5 Test Position Status	Load breaker 5 test position status input.
71	Load 5 Breaker Trip	Load breaker 5 trip fault input.
72	Load 6 Close Status	Load breaker 6 closed status input.
73	Load 6 Work Position Status	Load breaker 6 work position status input.
74	Load 6 Test Position Status	Load breaker 6 test position status input.
75	Load 6 Breaker Trip	Load breaker 6 trip fault input.
76	Load 7 Close Status	Load breaker 7 closed status input.
77	Load 7 Work Position Status	Load breaker 7 work position status input.
78	Load 7 Test Position Status	Load breaker 7 test position status input.
79	Load 7 Breaker Trip	Load breaker 7 trip fault input.
80	Load 8 Close Status	Load breaker 8 closed status input.
81	Load 8 Work Position Status	Load breaker 8 work position status input.
82	Load 8 Test Position Status	Load breaker 8 test position status input.
83	Load 8 Breaker Trip	Load breaker 8 trip fault input.
84	Load 9 Close Status	Load breaker 9 closed status input.
85	Load 9 Work Position Status	Load breaker 9 work position status input.
86	Load 9 Test Position Status	Load breaker 9 test position status input.
87	Load 9 Breaker Trip	Load breaker 9 trip fault input.
88	Load 10 Close Status	Load breaker 10 closed status input.
89	Load 10 Work Position Status	Load breaker 10 work position status input.
90	Load 10 Test Position Status	Load breaker 10 test position status input.
91	Load 10 Breaker Trip	Load breaker 10 trip fault input.
92	Load 11 Close Status	Load breaker 11 closed status input.
93	Load 11 Work Position Status	Load breaker 11 work position status input.
94	Load 11 Test Position Status	Load breaker 11 test position status input.
95	Load 11 Breaker Trip	Load breaker 11 trip fault input.
96	Load 12 Close Status	Load breaker 12 closed status input.
97	Load 12 Work Position Status	Load breaker 12 work position status input.
98	Load 12 Test Position Status	Load breaker 12 test position status input.



No.	Item	Description
99	Load 12 Breaker Trip	Load breaker 12 trip fault input.
100	Load 13 Close Status	Load breaker 13 closed status input.
101	Load 13 Work Position Status	Load breaker 13 work position status input.
102	Load 13 Test Position Status	Load breaker 13 test position status input.
103	Load 13 Breaker Trip	Load breaker 13 trip fault input.
104	Load 14 Close Status	Load breaker 14 closed status input.
105	Load 14 Work Position Status	Load breaker 14 work position status input.
106	Load 14 Test Position Status	Load breaker 14 test position status input.
107	Load 14 Breaker Trip	Load breaker 14 trip fault input.
108	Load 15 Close Status	Load breaker 15 closed status input.
109	Load 15 Work Position Status	Load breaker 15 work position status input.
110	Load 15 Test Position Status	Load breaker 15 test position status input.
111	Load 15 Breaker Trip	Load breaker 15 trip fault input.
112	Load 16 Close Status	Load breaker 16 closed status input.
113	Load 16 Work Position Status	Load breaker 16 work position status input.
114	Load 16 Test Position Status	Load breaker 16 test position status input.
115	Load 16 Breaker Trip	Load breaker 16 trip fault input.
116	Load 17 Close Status	Load breaker 17 closed status input.
117	Load 17 Work Position Status	Load breaker 17 work position status input.
118	Load 17 Test Position Status	Load breaker 17 test position status input.
119	Load 17 Breaker Trip	Load breaker 17 trip fault input.
120	Load 18 Close Status	Load breaker 18 closed status input.
121	Load 18 Work Position Status	Load breaker 18 work position status input.
122	Load 18 Test Position Status	Load breaker 18 test position status input.
123	Load 18 Breaker Trip	Load breaker 18 trip fault input.
124	Load 19 Close Status	Load breaker 19 closed status input.
125	Load 19 Work Position Status	Load breaker 19 work position status input.
126	Load 19 Test Position Status	Load breaker 19 test position status input.
127	Load 19 Breaker Trip	Load breaker 19 trip fault input.
128	Load 20 Close Status	Load breaker 20 closed status input.



No.	Item	Description
129	Load 20 Work Position Status	Load breaker 20 work position status input.
130	Load 20 Test Position Status	Load breaker 20 test position status input.
131	Load 20 Breaker Trip	Load breaker 20 trip fault input.
132	Load 21 Close Status	Load breaker 21 closed status input.
133	Load 21 Work Position Status	Load breaker 21 work position status input.
134	Load 21 Test Position Status	Load breaker 21 test position status input.
135	Load 21 Breaker Trip	Load breaker 21 trip fault input.
136	Load 22 Close Status	Load breaker 22 closed status input.
137	Load 22 Work Position Status	Load breaker 22 work position status input.
138	Load 22 Test Position Status	Load breaker 22 test position status input.
139	Load 22 Breaker Trip	Load breaker 22 trip fault input.
140	Load 23 Close Status	Load breaker 23 closed status input.
141	Load 23 Work Position Status	Load breaker 23 work position status input.
142	Load 23 Test Position Status	Load breaker 23 test position status input.
143	Load 23 Breaker Trip	Load breaker 23 trip fault input.
144	Load 24 Close Status	Load breaker 24 closed status input.
145	Load 24 Work Position Status	Load breaker 24 work position status input.
146	Load 24 Test Position Status	Load breaker 24 test position status input.
147	Load 24 Breaker Trip	Load breaker 24 trip fault input.
148	Reserved	
149	Reserved	
150	QTIE Inhibit Close	Inhibit QTIE breaker close.
151	Reserved	
152	QTIE Close Key Input	When bustie control is enabled, it controls QTIE breaker close in manual mode.
153	QTIE Open Key Input	When bustie control is enabled, it controls QTIE breaker open in manual mode.
154	Reserved	
155	Reserved	
156	Reserved	
157	Reserved	
158	Reserved	
159	Reserved	



6.3.2 OUTPUT PORTS FUNCTION DESCRIPTION

Table 19 – Function Description of Output Ports

No.	Items	Description
0	Not Used	Output port is invalid.
1	Custom Combined 1	
2	Custom Combined 2	
3	Custom Combined 3	
4	Custom Combined 4	
5	Custom Combined 5	
6	Custom Combined 6	
7	Reserved	
8	Reserved	
9	Reserved	
10	Reserved	
11	Common Alarm	It includes fault alarm and warn alarm.
12	Common Fault Alarm	It includes "Transfer Failure", "Overcurrent Trip" alarm.
13	Common Warn Alarm	It includes "S1 Reverse Phase Sequence", "S2 Reverse Phase Sequence", "Load Overcurrent", "Forced Open" warning.
14	Transfer Failure	It includes "QS1 Close failure", "QS1 Open Failure", "QS2 Close Failure", "QS2 Open Failure".
15	Audible Alarm	Action when common alarm occurs. Can be connected annunciator externally. When "alarm mute" input is active or 60s delay has expired, it can remove the alarm.
16	Reserved	
17	Genset Start Delay	Output when start signal is initiated.
18	Genset Stop Delay	Output when stop signal is initiated.
19	Elevator Control	Output before the load disconnect or switch transfer. Used for control the running elevator stop at the nearest floor until the switch transfer is terminated.
20	Reserved	
21	Reserved	
22	Reserved	
23	S1 Voltage Normal	Output when S1 power is normal.
24	S1 Voltage Abnormal	Output when S1 power is abnormal.
25	S2 Voltage Normal	Output when S2 power is normal.
26	S2 Voltage Abnormal	Output when S2 power is abnormal.
27	S1 Overcurrent Output	Output when S1 overcurrent loading.
28	S2 Overcurrent Output	Output when S2 overcurrent loading.
29	Reserved	
30	Auto Mode	Output when the genset is in Auto mode.
31	Manual Mode	Output when the genset is in Manual mode.
32	Genset Start	Control the genset to start.
33	Reserved	
34	QS1 Close Control	Control the QS1 to close.



No.	Items	Description
35	QS1 Open Control	Control the QS1 to open.
36	QS2 Close Control	Control the QS2 to close.
37	QS2 Open Control	Control the QS2 to open.
38	S1 PT Break	Output when S1 PT secondary coil is broken.
39	S2 PT Break	Output when S2 PT secondary coil is broken.
40	NEL1 Trip	When it is active, it controls NEL offload; when it is inactive, it can be used for NEL on-load again.
41	NEL2 Trip	
42	NEL3 Trip	
43	Reserved	
44	Reserved	
45	QS1 Closed Input	The close status of S1 breaker.
46	QS2 Closed Input	The close status of S2 breaker.
47	S1 Genset Start	When the system type is "S1 Gen S2 Gen", it controls the S1 genset start.
48	S2 Genset Start	When the system type is "S1 Gen S2 Gen", it controls the S2 genset start.
49	ATS Power L1	ATS power supply.
50	ATS Power L2	
51	ATS Power L3	
52	ATS Power N	
53	Remote Control	Control the output via RS485 communication command.
54	Aux. Input 1 Status	Aux. Input port status.
55	Aux. Input 2 Status	
56	Aux. Input 3 Status	
57	Aux. Input 4 Status	
58	Aux. Input 5 Status	
59	Aux. Input 6 Status	
60	Aux. Input 7 Status	
61	Aux. Input 8 Status	
62	Aux. Input 9 Status	
63	Aux. Input 10 Status	
64	S1 Blackout	S1 power supply status.
65	S1 Over Volt	
66	S1 Under Volt	
67	S1 Over Freq	
68	S1 Under Freq	
69	S1 Loss of Phase	
70	S1 Reverse Phase Sequence	
71	Reserved	
72	Reserved	
73	S2 Blackout	S2 power supply status.
74	S2 Over Volt	



No.	Items	Description
75	S2 Under Volt	
76	S2 Over Freq	
77	S2 Under Freq	
78	S2 Loss of Phase	
79	S2 Reverse Phase Sequence	
80	Reserved	
81	Reserved	
82	Reserved	
83	Reserved	
84	Transferring	Output during the breaker transfer process, stop after transfer is over.
85	Reserved	
86	Reserved	
87	Scheduled Not Run	Output during the Scheduled Not Run process.
88	Scheduled Run	Output during the Scheduled Run process.
89	Reserved	
90	Reserved	
91	Reserved	
92	Reserved	
93	QTIE Breaker Trip Fault	QTIE breaker trip fault output.
94	QTIE Breaker Close	Control QTIE to close.
95	QTIE Breaker Open	Control QTIE to open.
96	Aux. Input 11 Status	Aux. Input port status.
97	Aux. Input 12 Status	
98	Reserved	
99	Reserved	
100	External Close Control	When load stepwise switch selects external way, load breaker close output.
101	External Open Control	When load stepwise switch selects external way, load breaker open output.
102	Reserved	
103	Reserved	
104	Load 1 Close Output	Expand output control way, load breaker 1 close output.
105	Load 1 Open Output	Expand output control way, load breaker 1 open output.
106	Load 2 Close Output	Expand output control way, load breaker 2 close output.
107	Load 2 Open Output	Expand output control way, load breaker 2 open output.
108	Load 3 Close Output	Expand output control way, load breaker 3 close output.
109	Load 3 Open Output	Expand output control way, load breaker 3 open output.
110	Load 4 Close Output	Expand output control way, load breaker 4 close output.
111	Load 4 Open Output	Expand output control way, load breaker 4 open output.
112	Load 5 Close Output	Expand output control way, load breaker 5 close output.
113	Load 5 Open Output	Expand output control way, load breaker 5 open output.

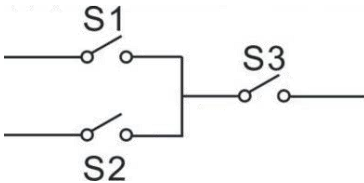


No.	Items	Description
114	Load 6 Close Output	Expand output control way, load breaker 6 close output.
115	Load 6 Open Output	Expand output control way, load breaker 6 open output.
116	Load 7 Close Output	Expand output control way, load breaker 7 close output.
117	Load 7 Open Output	Expand output control way, load breaker 7 open output.
118	Load 8 Close Output	Expand output control way, load breaker 8 close output.
119	Load 8 Open Output	Expand output control way, load breaker 8 open output.
120	Load 9 Close Output	Expand output control way, load breaker 9 close output.
121	Load 9 Open Output	Expand output control way, load breaker 9 open output.
122	Load 10 Close Output	Expand output control way, load breaker 10 close output.
123	Load 10 Open Output	Expand output control way, load breaker 10 open output.
124	Load 11 Close Output	Expand output control way, load breaker 11 close output.
125	Load 11 Open Output	Expand output control way, load breaker 11 open output.
126	Load 12 Close Output	Expand output control way, load breaker 12 close output.
127	Load 12 Open Output	Expand output control way, load breaker 12 open output.
128	Load 13 Close Output	Expand output control way, load breaker 13 close output.
129	Load 13 Open Output	Expand output control way, load breaker 13 open output.
130	Load 14 Close Output	Expand output control way, load breaker 14 close output.
131	Load 14 Open Output	Expand output control way, load breaker 14 open output.
132	Load 15 Close Output	Expand output control way, load breaker 15 close output.
133	Load 15 Open Output	Expand output control way, load breaker 15 open output.
134	Load 16 Close Output	Expand output control way, load breaker 16 close output.
135	Load 16 Open Output	Expand output control way, load breaker 16 open output.
136	Load 17 Close Output	Expand output control way, load breaker 17 close output.
137	Load 17 Open Output	Expand output control way, load breaker 17 open output.
138	Load 18 Close Output	Expand output control way, load breaker 18 close output.
139	Load 18 Open Output	Expand output control way, load breaker 18 open output.
140	Load 19 Close Output	Expand output control way, load breaker 19 close output.
141	Load 19 Open Output	Expand output control way, load breaker 19 open output.
142	Load 20 Close Output	Expand output control way, load breaker 20 close output.
143	Load 20 Open Output	Expand output control way, load breaker 20 open output.
144	Load 21 Close Output	Expand output control way, load breaker 21 close output.
145	Load 21 Open Output	Expand output control way, load breaker 21 open output.
146	Load 22 Close Output	Expand output control way, load breaker 22 close output.
147	Load 22 Open Output	Expand output control way, load breaker 22 open output.
148	Load 23 Close Output	Expand output control way, load breaker 23 close output.
149	Load 23 Open Output	Expand output control way, load breaker 23 open output.
150	Load 24 Close Output	Expand output control way, load breaker 24 close output.
151	Load 24 Open Output	Expand output control way, load breaker 24 open output.
152	Reserved	
153	Reserved	
154	Reserved	
155	Reserved	
156	Reserved	

No.	Items	Description
157	Reserved	
158	Reserved	
159	Reserved	

6.3.3 CUSTOM COMBINED OUTPUT

Defined combination output is composed by 3 parts, OR condition output S1, S2, AND condition output S3.



S1 or S2 is **TRUE**, while S3 is **TRUE**, defined combination output is outputting;

S1 and S2 are **FALSE**, or S3 is **FALSE**, defined combination output is not outputting.

NOTE1: S1, S2, S3 can be set as any contents except for “defined combination output” in the output setting.

NOTE2: 3 parts of defined combination output (S1, S2, and S3) couldn't include or recursively include themselves.

Example,

Contents of OR condition output S1: input port 1 is active;

Close when OR condition output S1 is active /inactive: close when active (disconnect when inactive);

Contents of OR condition output S2: input port 2 is active;

Close when OR condition output S2 is active /inactive: close when active (disconnect when inactive);

Contents of AND condition output S3: input port 3 is active;

Close when AND condition output S3 is active /inactive: close when active (disconnect when inactive);

When input port 1 active or input port 2 active, if input port 3 is active, defined combination output is outputting; If input port 3 inactive, defined combination output is not outputting;

When input port 1 inactive and input port 2 inactive, whatever input port 3 is active or not, defined combination output is not outputting.

7 INSTALLATION

7.1 HUM8-860 FIXING CLIPS

- Controller is panel built-in design; it is fixed by clips when installed.
- Withdraw the fixing clip screw (turn anticlockwise) until it reaches proper position.
- Pull the fixing clip backwards (towards the back of the module) and ensure four clips are inside their allotted slots.
- Turn the fixing clip screws clockwise until they are fixed on the panel.
- Care should be taken not to over tighten the screws of fixing clips, the torque is 2.75 kgf.cm (0.27 N.m).

7.2 OVERALL DIMENSION AND PANEL CUTOUT

Unit: mm

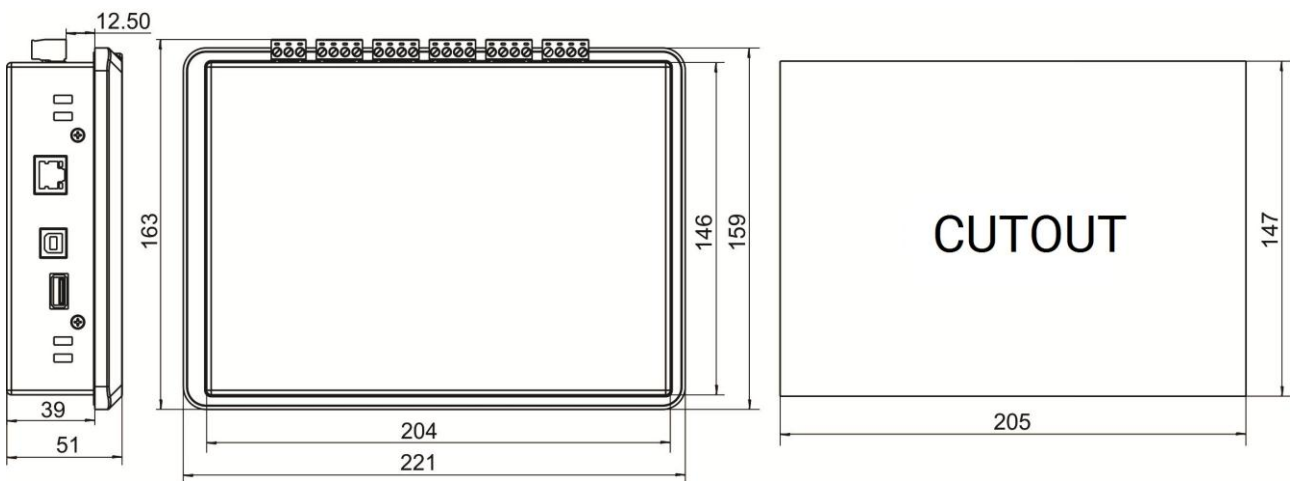


Fig. 15 – Overall Dimension and Panel Cutout



8 TROUBLESHOOTING

Table 20 – Troubleshooting

Symptoms	Possible Solutions
Monitoring module no response for power	Check starting batteries; Check controller connection wirings; Check DC fuse.
RS485 comm. abnormal	Check connection wirings; Check setting of COM port is correct or not; Check RS485's A and B connection is reversely connected or not; Check whether the RS485 conversion module is damaged or not; Check RS485 communication port is damaged or not.

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