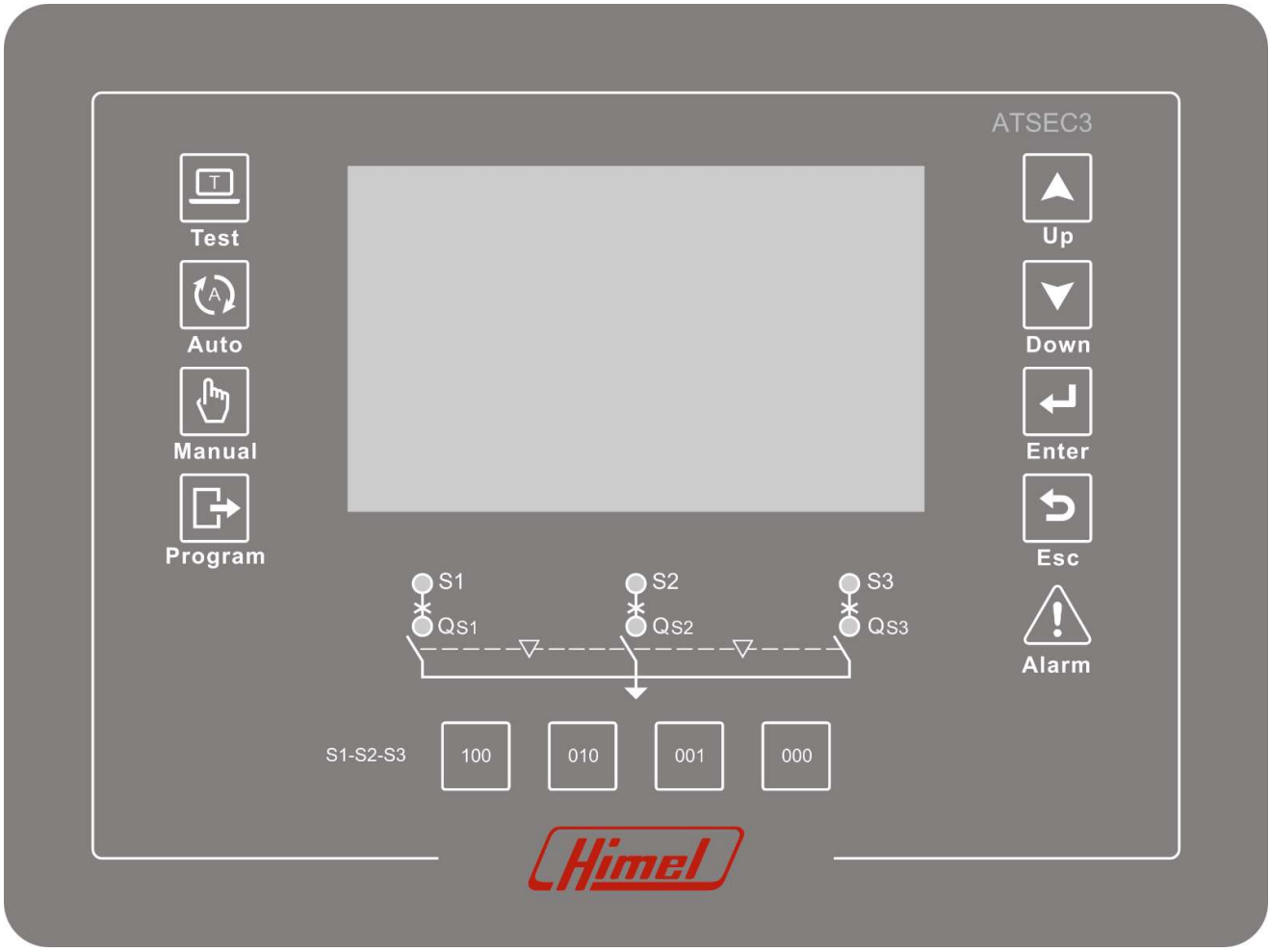
ATSE C3
Three-Power Controller

Operation Manual



Table

- The complete set must including 3 set of ACB，cable interlock ,220VAC motor/shunt release /closing coil / ATS Controller
- Do not install key lock with ACB, it will damaged the ACB when automatic transfer
- Do not install the under voltage release with ACB, It will impact ATS automatic transfer
- Do not use ACB's MODBUS or remote signal to Switch ON/OFF breaker by MX/XF, It will impact the ATS automatic transfer
- Please refer to HDW3 air circuit breaker’ s user manual before installed ACB
- Please refer to HDW3 cable mechanical interlock ‘s user manual before assemble mechanical interlock with ACB
- Default with 3m controller cable

I. Product introduction

ATSE C3 series three-power controller is an intelligent three-way power switching product integrated with programmable functions, automatic measurement, LCD menu display, and digital communication. It is an ideal product to control three-way power switching. The control can automatically perform the electrical parameter measurements such as voltage, frequency and phase, and realize the automation control according to the set parameters to reduce human operation errors.

The ATSE C3 series three-power controller consists of a microprocessor as its core to accurately detect three-way three-phase voltages, and make accurate judgment on voltage anomalies (overvoltage, undervoltage, phase loss, over-frequency, and underfrequency) and output the passive control switch value. By fully considering the application on a variety of ATS (load automatic transition system), this control can be directly used for special-purpose ATS, ATS composed of contactor, and ATS composed of circuit breaker and can realize the control and management of three-way power supply. Thanks to its compact structure, advanced circuits, simple wiring, and high reliability, this controller can be widely used in three-way power supply systems of the electrical device and automatic control in many industries and departments such as electric power, post and telecommunications, petroleum, coal, metallurgy, railways, municipalities, and intelligent buildings.

- Graphic 800x480 pixels, 5.0-inch LCD screen.
- 3-way AC power input: single-phase two-wire, three-phase four-wire.
- Chinese language is available for measured values, settings and message text.
- 10 ~ 30VDC DC power supply.
- With over-voltage, under-voltage, phase loss, reverse phase sequence, over-frequency and under-frequency detection functions.
- 8-way programmable digital inputs (effectively grounded).
- 10-way programmable digital outputs.
- Integrated RS-485 isolation interface, MODBUS communication protocol.
- Store up to recent 200 events (100 each for action records and alarm records).
- Real-time clock.
- All parameters are field programmable and password-protected for access to prevent mis-operation by non-professionals.
- Standard waterproof gasket; the protection level of the front panel is IP65.
- Modular structure design, anti-flaming PC shell, pluggable terminal blocks, embedded installation, compact structure and easy installation.

II. Function of touch button on the front panel

Icon	Key name	Function description
	Key 100	In manual mode, press this key to close circuit breaker I.
	Key 010	In manual mode, press this key to close circuit breaker II.
	Key 001	In manual mode, press this key to close circuit breaker III.
	Key 000	In manual mode, press this key to open all circuit breakers.
	Test key	Long press this key for 3S to enter the test function
	Auto mode key	Long press this key for 3S to set the controller to the auto mode.
	Manual mode key	Long press this key for 3S to set the controller to the manual mode.
	Program mode key	Long press this key for 3S to set the controller to the programming mode.
	Add key / Up KEY	After entering the menu interface, move the cursor up or increase the number located by cursor; The value Add key is available for parameters adjustment on the parameter configuration interface
	Minus key / Down key	After entering the menu interface, move the cursor down or decrease the number located by cursor; The value Minus key is available for parameters adjustment on the parameter configuration interface
	Enter key	After entering the menu interface, press the Enter key to enter the sub-menu and confirm the setting information
	Esc key	Return the previous menu interface; Press this key for alarm reset if there is an alarm; if the alarm is a switch action timeout alarm, switch to the program mode.

III. Indicators on the front panel

- Alarm indicator (red) — Normal-on, indicating that there is an alarm.
- S1 voltage status indicator (green) — If S1 is normal, the light is on; if S1 is abnormal, the light is flashing.
- S2 voltage status indicator (green) — If S2 is normal, the light is on; if S2 is abnormal, the light is flashing.
- S3 voltage status indicator (green) — If S3 is normal, the light is on; if S3 is abnormal, the light is flashing.

● Qs1 switch status indicator (green) — Lit, meaning ON; go out, meaning OFF.
● Qs2 switch status indicator (green) — Lit, meaning ON; go out, meaning OFF.
● Qs3 switch status indicator (green) — Lit, meaning ON; go out, meaning OFF.

IV. Working mode

● Program mode: Set parameters in this mode. Press and hold the program mode key for 3S to pop up the password input interface. Enter the correct password to enter the parameter setting.
● Manual mode: In this mode, you can manually control the transfer switch. Press and hold the manual mode key for 3S to enter the manual mode. Press the keys 100, 010, 001, and 000 to transfer the switch to the corresponding state.
● Auto mode: Long press the auto mode key for 3S to enter the auto mode. In auto mode, the device transfers the switch position automatically. When the electrical parameters of the priority power supply are out of the set range and the abnormal time is longer than the set delay time, the device will disconnect the load of the priority power supply and connect it to the backup power supply.
● Test mode: Long press the auto mode key 3S to enter the test mode. In test mode, the no-load test, load test, stop test, LED test, LCD / key test and auto test can be performed for controller with the main purpose to meet the self-inspection of the controller. For details, see Figures 9, 10, and 11 below.
After reset or power-on, the controller will restore to the work mode available before power-off.

V. Main menu

● The main menu consists of controller settings, system parameters, parallel conversion settings, DI / DO settings, and communication parameters, so user can conveniently and quickly access measured values and changed parameters.
● When parameter changes, press ESC key to return to the main interface to prompt whether to "save parameters". Select "Enter" key to save the current modification parameters, or "Esc" key to restore the parameter configuration before modification.

5.1 Controller settings

No.	Option	Description	Default	Range
1.1	Real-time clock	\	\	Real-time
1.2	Backlight hold time	Minute	Keep active	Keep active / 1-30 minutes
1.3	Brightness adj.	Standby / working brightness	15/30	0-100/10-100
1.4	User Password	\	0101	0000-9999
1.5	Restore factory settings			

5.2. System parameters

No.	Option	Description	Default	Range
2.1	Grid type	Number of working leads of the tested grid	Three-phase four-wire	Three-phase four-wire / three-phase three-wire
2.2	Rated line voltage	Grid line voltage	400	50-690V
2.3	Power conversion type	Source I of mains supply; Source II of mains supply; Source III of mains supply Source I of mains supply; Source II of mains supply; Source III of power generation	Source I of mains supply Source II of mains supply Source III of mains supply	
2.4	Power supply priority	Select the Source I of grid or Source II of grid as priority	Source I priority	Source I priority / Source II priority
2.5	Main power return mode	After the main power is available, main and backup switch conversion mode	Automatic transfer not automatic recover	Automatic transfer automatic recover / Automatic transfer not automatic recover / mutually

				reserved
2.6	Rated frequency	Grid rated frequency	50 Hz	50/60Hz
2.8	Phase sequence monitoring	Select and confirm the phase sequence of two Sources of power sources	OFF	L1L2L3/ L3L2L1/ OFF

2.8.1	Overvoltage threshold for Source I	Start to detect limits after power overvoltage of Source I	115%	102-130%
2.8.2	Overvoltage return threshold for Source I	Start to detect limits after power overvoltage return of Source I	110%	101-129%
2.8.3	Under-voltage threshold for Source I	Start to detect limits after power under-voltage of Source I	85%	70-98%
2.8.4	Under-voltage return threshold for Source I	Start to detect limits after power under-voltage return of Source I	95%	71-99%
2.8.5	Overvoltage threshold for Source II	Start to detect limits after power overvoltage of Source II	115%	102-130%
2.8.6	Overvoltage return threshold for Source II	Start to detect limits after power overvoltage return of Source II	110%	101-129%
2.8.7	Under-voltage threshold for Source II	Start to detect limits after power under-voltage of Source II	85%	70-98%
2.8.8	Under-voltage return threshold for Source II	Start to detect limits after power under-voltage return of Source II	95%	71-99%
2.8.9	Overvoltage threshold for Source III	Start to detect limits after power overvoltage of Source III	115%	102-130%
2.8.10	Overvoltage return threshold for Source III	Start to detect limits after power overvoltage return of Source III	110%	101-129%
2.8.11	Under-voltage threshold for Source III	Start to detect limits after power under-voltage of Source III	85%	70-98%
2.8.12	Under-voltage return threshold for Source III	Start to detect limits after power under-voltage return of Source III	95%	71-99%
2.9.1	Over-frequency threshold for Source I	Start to detect limits after power over-voltage of Source I	OFF	102-120%
2.9.2	Over-frequency return threshold for Source I	Start to detect limits after power over-voltage return of Source I	103%	101-119%
2.9.3	Under-frequency threshold for Source I	Start to detect limits after power under-voltage of Source I	OFF	80-98%
2.9.4	Under-frequency return threshold for Source I	Start to detect limits after power under-voltage return of Source I	97%	88-99%
2.9.5	Over-frequency threshold for Source II	Start to detect limits after power over-voltage of Source II	OFF	102-120%
2.9.6	Over-frequency return threshold for Source II	Start to detect limits after power over-voltage return of Source II	103%	101-119%
2.9.7	Under-frequency threshold for Source II	Start to detect limits after power under-voltage of Source II	OFF	80-98%
2.9.8	Under-frequency return threshold for Source II	Start to detect limits after power under-voltage return of Source II	97%	88-99%
2.9.9	Over-frequency threshold for Source III	Start to detect limits after power over-voltage of Source III	OFF	102-120%
2.9.10	Over-frequency return threshold for Source III	Start to detect limits after power over-voltage return of Source III	103%	101-119%
2.9.11	Under-frequency threshold for Source III	Start to detect limits after power under-voltage of Source III	OFF	80-98%
2.9.12	Under-frequency return threshold for Source III	Start to detect limits after power under-voltage return of Source III	97%	88-99%
2.10.1	Signal hold time	Pulse time during ON/OFF relay output	0.5S	0.1-20.0S
2.10.2	Available delay for Source I	Before transferring to the power supply of Source I, check it is stable and available	2.0Min	0-60.0Min
2.10.3	Fault delay for Source I	Source I power fault detection delay	5S	0-60S
2.10.4	Available delay for Source II	Before transferring to the power supply of Source II, check it is stable and available	2.0Min	0-60.0Min
2.10.5	Fault delay for Source II	Source II power fault detection delay	5S	0-60S
2.10.6	Available delay for Source III	Before transferring to the power supply of Source III, check it is stable and available	2.0Min	0-60.0Min
2.10.7	Fault delay for Source III	Source III power fault detection delay	5S	0-60S
2.10.8	Zero position delay	Zero position Zero position during power conversion	5S	0-20S
2.10.9	Generator start delay	Generator start delay in generator mode when the	1S	0－600S

		mains power is abnormal the load is switched from the mains power side to the generator side		
2.10.10	Generator cold-state delay	Generator cold-state delay when the load is transferred from the generator side to the mains power side	5Min	0-10Min

5.3 Programmable control:

No.	Option	Default	Range
3.1	Digital inputs		4-5
3.1.x.1	Input function		
3.1.x.2	Contact type	Normally-open	Normally open / Normally closed
3.1.x.3	Input delay	0.05S	0.01-600.00S
3.2	Digital output		11-12
3.2.x.1	Output function		
3.2.x.2	Contact type	Normally-open	Normally open / Normally closed

Input function

Variable	Description
Inhibit	External input function is inhibit.
Forced to 0 position	With forced to 0 position input, the switch will be converted to the 0 position immediately and an alarm will be issued, and the switch is in the manual mode; when confirming that the Forced to 0 position signal disappears, the switch will return to the auto mode.
Priority grid selection	When there is an external signal input, change the priority switch; when the external signal disappears, restore the current priority.
Position I remote control	Position I remote control conversion control is enabled t after input is activated
Position II remote control	Position II remote control conversion control is enabled t after input is activated
Position III remote control	Position III remote control conversion control is enabled t after input is activated
Position 0 remote control	Position 0 remote control conversion control is enabled t after input is activated
No-load test	No-load remote control test is enabled after input is activated to start or stop the generator without switch-over
On-load test	On-load remote control test is enabled after input is activated to start or stop the generator with switch-over
Load trip	Check that the load is normal or in the acceptable range before switching to S2.

Output function

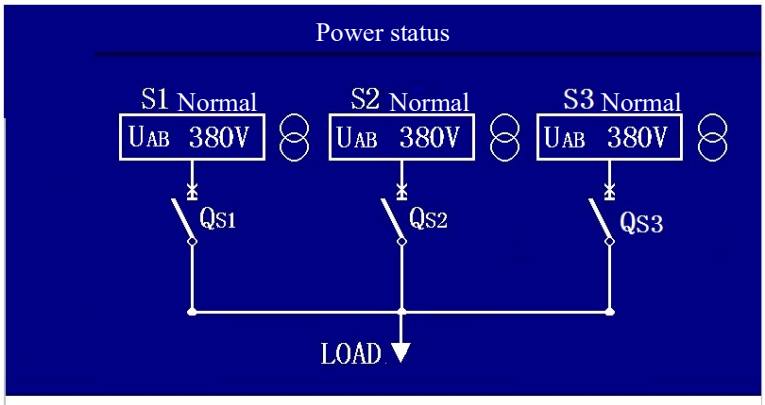
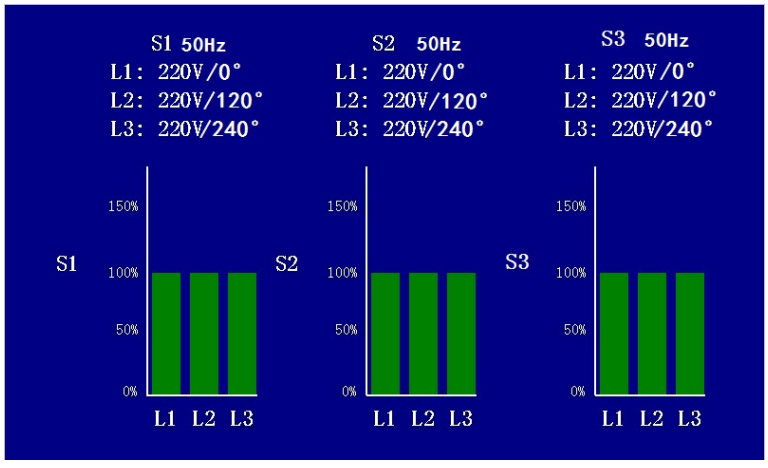
Variable	Description
Inhibit	External output function is inhibit.
ATS available	ATS and controller are normal, output is active
Power supply I is available	Power supply I is available and the output is activated
Power supply II is available	Power supply II is available and the output is activated
Power supply III is available	Power supply III is available and the output is activated
Alarm output	Controller failure alarm, output is activated
Fire linkage	Fire linkage input signal is valid, the switch works and the output is activated

ATS power L	Aux. power supply L for actuator
ATS power N	Aux. power supply N for actuator
Generator output	In generator mode, when the mains power is abnormal, the output is activated
Unload	The load trip input signal is valid, and the control is judged, and the output is activated.

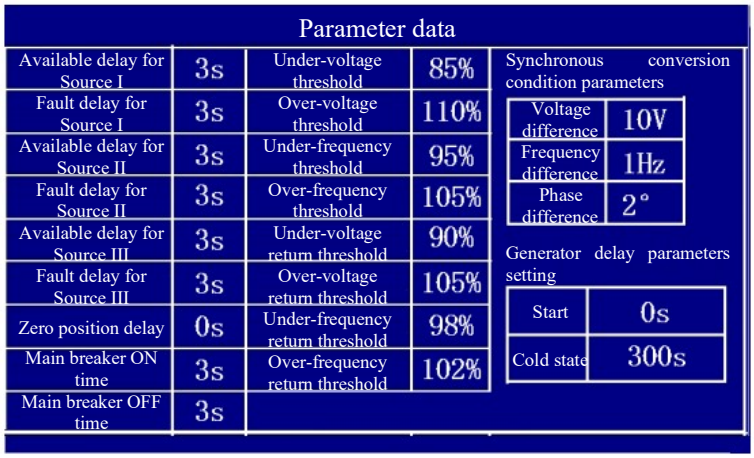
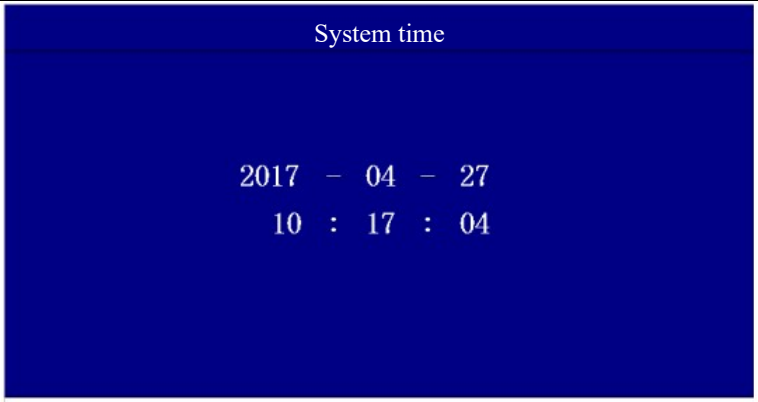
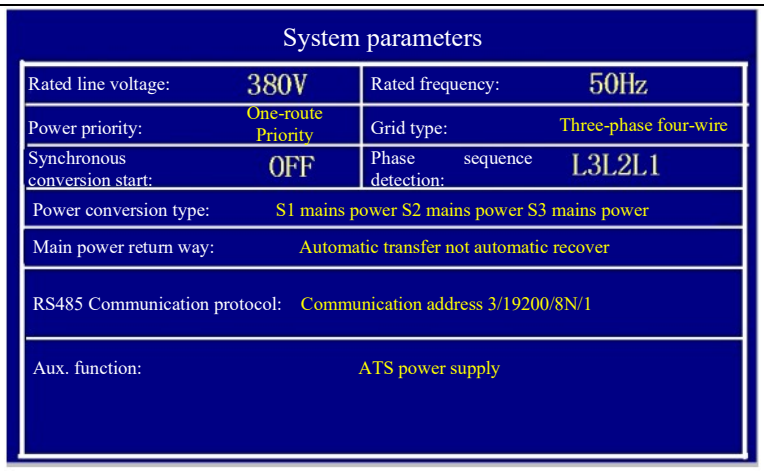
5.4 Communication parameters:

No.	Option	Default	Range
4.1	Communication address	3	001-254
4.2	Baud rate	19200	2400/4800/9600/19200 /38400
4.3	Data format	8N	8N/8O/8E/7O/7E
4.4	Stop bit	1	1/2

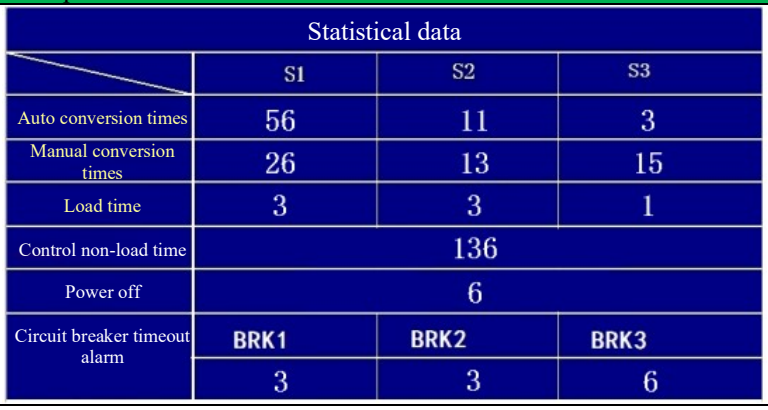
● **Power status, see Figure 1**

Page	Example	Description
Figure 1. Power status	 Program	LOAD: Load. There are switch signs in the picture.
Figure 2. Power status		Phase voltage (220V) / working frequency and each phase

● **Data display, see Figures 3, 4, 5**

Page	Example	Description
Figure 3. Data display		Delay parameters, voltage parameters, frequency parameters, and synchronous conversion conditions
Figure 4. Data display		Real-time system time.
Figure 5. Data display		System parameters

● **Data statistics, see Figure 6**

Page	Example	Description
Figure 6. Data statistics		Statistical data, as shown

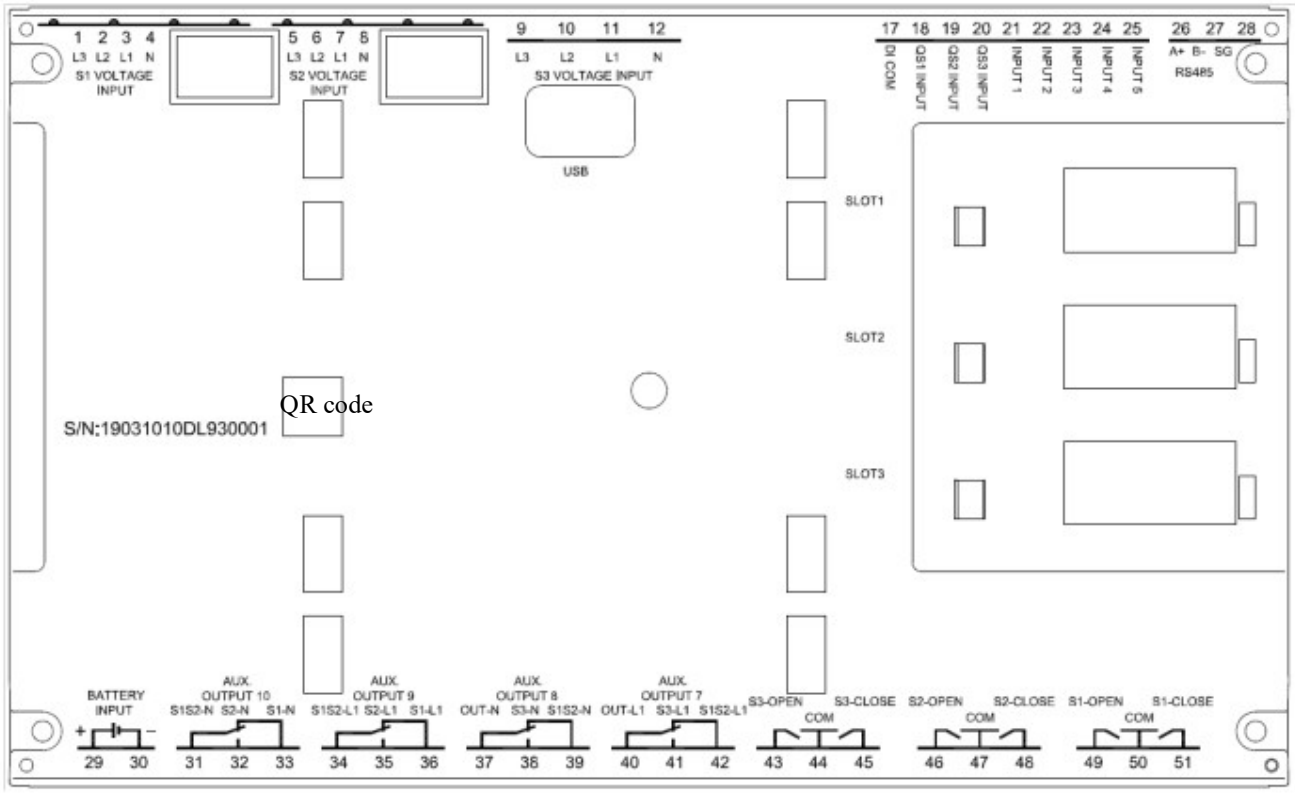
● **Event records, see Fig. 7**

Page	Example	Description
Figure 7. Event records	Historical data S1 Normal / S2 Normal / S3 Normal UAB 380V/50Hz / 380V/50Hz / 380V/50Hz UBC 380V / 380V / 380V UCA 380V / 380V / 380V Status: Source I ON kept; Source II OFF; Source III OFF Time: 2018-8-1 14:23:21 1/100	Save 100 records of the most recent switching actions, and record the corresponding power status and the three line voltages and the time of the event recording.

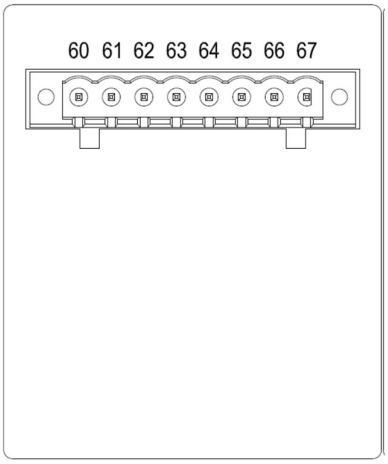
●**Test, see Figure 8, Figure 9, Figure 10**

Page	Example	Description
Figure 8. Test menu	Test Menu <1> No-Load Test <2> On-Load Test <3> Test Stop <4> LED Test <5> LCD/Key Test <6> Auto Test	1. Start the no-load test machine and control the relay action of generator output. Press the Test Stop key to reset the relay; 2. The power conversion type is that if there is a generator of Source I, start the generator output. After all are normal, disconnect the mains switch and turn the generator switch when normal. Until the end of the test, disconnect the generator output and transfer the switch back to the mains power; 3. The LED Test is to verify that all the LED indicators on the controller panel work normally. Click the LED Test to turn on all the LED indicators for 3 seconds and then turn off them. 4. Click the LCD / Key Test to display the interface shown in Figure 8. Click the keys on panel to display the relevant key information. 5. The Auto Test is to automatically detect the DI output signal of the ON/OFF operation and DI input signal of the position detection. According to the ON/OFF delay time set by the controller, output the Source I ON, Source I OFF, Source II ON, Source II OFF, Source III ON, AND Source III OFF signals in sequence, and detect the corresponding position signal. In case of failure, give the fault information prompt rather than a voice alarm.
Figure 9. Test menu	LCD/Key Test Key: UP Thanks your using our product	
Figure 10. Test menu	Power status S1 S2 S3 QS1 QS2 QS3 Load Circuit breaker I Timeout	

VI. Terminals layout



Expansion module terminals



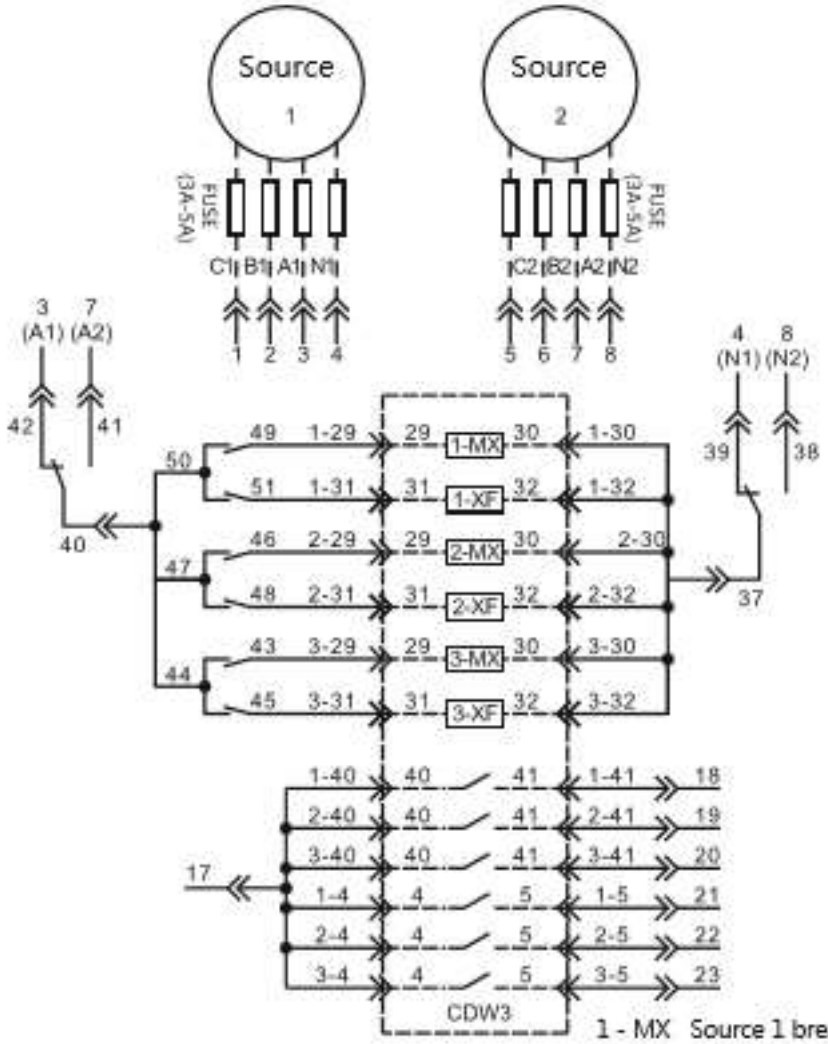
VII. Port definition and description:

Terminal No.	Item	Function Description	Remark
1	L3	S1 voltage input	L1 and N are AC power supply interfaces.
2	L2		
3	L1		
4	N		
5	L3	S2 voltage input	L1 and N are AC power supply interfaces.
6	L2		
7	L1		
8	N		
9	L3	S3 voltage input	L1 and N are AC power supply interfaces
10	L2		
11	L1		
12	N		
17	COM	Module grounding	Module grounding terminal
18	QS1 INPUT	Circuit breaker 1 ON detection	Effective grounding
19	QS2 INPUT	Circuit breaker 2 ON detection	
20	QS3 INPUT	Circuit breaker 3 ON detection	
21	INPUT1	Circuit breaker 1 failure detection	
22	INPUT2	Circuit breaker 2 failure detection	
23	INPUT3	Circuit breaker 3 failure detection	
24	INPUT4	User-defined input port function	
25	INPUT5		
26	A+	RS485 communication interface	RS485A+
27	B-		RS485B-
28	SG		RS485 ground
29	BATTERY+	DC power positive	
30	BATTERY-	DC power negative	
31	OUT-N	Aux. power output N	Programmable output port 10A (as aux. power input when used as DPS function)
32	S3-N	Aux. power input (S3 power N phase)	
33	S1S2-N	Aux. power input (S1S2 power N phase)	
34	OUT-L1	Aux. power output L1	Programmable output port 10A (as aux. power input when used as DPS function)
35	S3-L1	Aux. power input (S3 power L1 phase)	
36	S1S2-L1	Aux. power input (S1S2 power L1 phase)	
37	S1S2-N	Aux. power output (S1S2 power N phase)	Programmable output port 10A (as aux. power input when used as DPS function)
38	S2-N	Aux. power input (S2 power N phase)	
39	S1-N	Aux. power input (S1 power N phase)	
40	S1S2-L1	Aux. power output (S1S2 power L1 phase)	Programmable output port 10A (as aux. power input when used as DPS function)
41	S2-L1	Aux. power input (S2 power L1 phase)	
42	S1-L1	Aux. power input (S1 power L1 phase)	

43	S3-OPEN	Circuit breaker 3 OPEN output	Programmable output port 10A
44	COM	43-45 common terminal	
45	S3-CLOSE	Circuit breaker 3 CLOSE output	Programmable output port 10A
46	S2-OPEN	Circuit breaker 2 OPEN output	Programmable output port 10A
47	COM	46-48 common terminal	
48	S2-CLOSE	Circuit breaker 2 CLOSE output	Programmable output port 10A
49	S1-OPEN	Circuit breaker 1 OPEN output	Programmable output port 10A
50	COM	49-51 common terminal	
51	S1-CLOSE	Circuit breaker 1 CLOSE output	Programmable output port 10A
60	No	-	
61	No	-	
62	OUT11	Relay normally open end	Programmable output 3A
63		Relay common terminal	
64		Relay normally-closed end	Programmable output 5A
65	OUT12	Relay normally open end	Programmable output 3A
66		Relay common terminal	
67		Relay normally-closed end	Programmable output 5A

7.2 Wiring diagram

Electrical Schematic Diagram



1 - MX Source 1 breaker - shunt release
1 - XF Source 1 breaker - closing coil

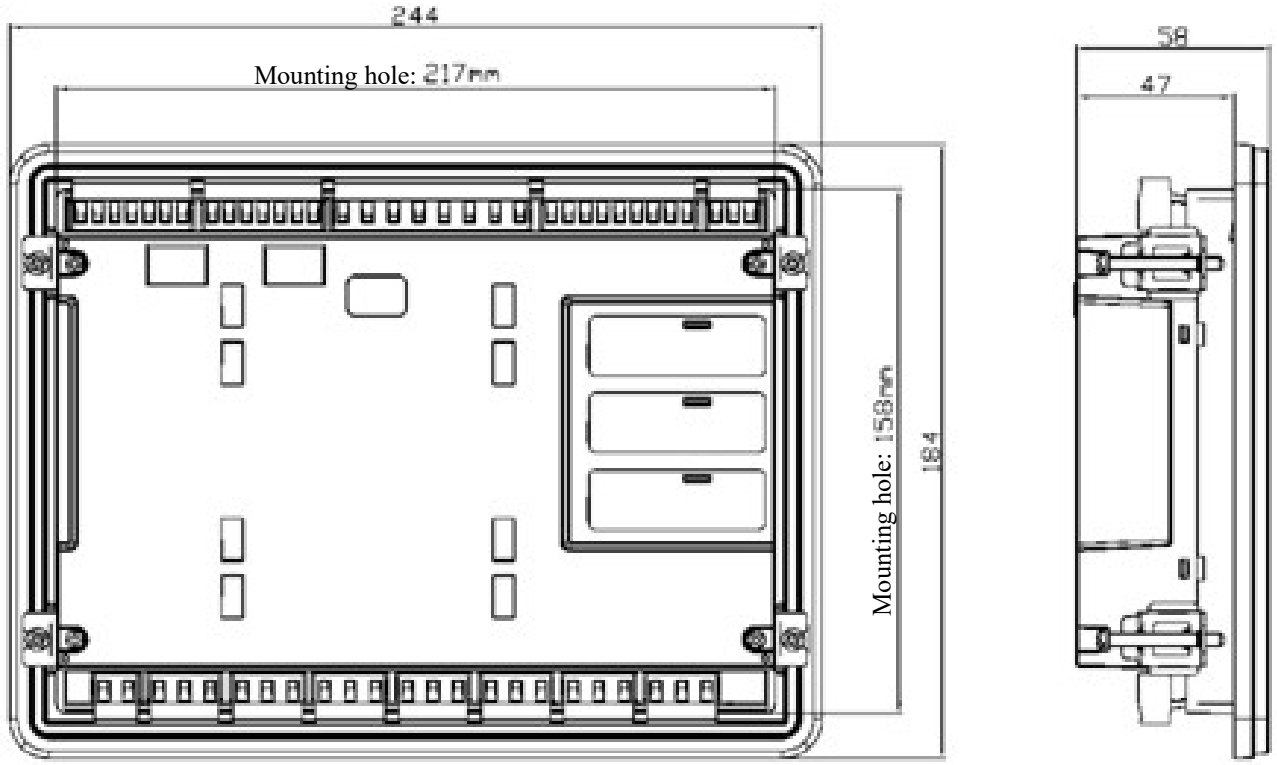
2 - MX Source 2 breaker - shunt release
2 - XF Source 2 breaker - closing coil

3 -MX bus tie breaker - shunt release
3 - XF bus tie breaker - closing coil

1-40 1-41 Source 1 breaker - Auxiliary contact
2-40 2-41 Source 2 breaker - Auxiliary contact
3-40 3-41 bus tie breaker - Auxiliary contact

Note
1: Default 4m cable
2: MX - shunt release 220VAC
XF - Closing coil 220VAC
OF3- Auxilary contact
AL - Alarm contact
3: The ACB must install with cabel interlock
4: out of dotted line is connect to ACB terminal by customer
5: ATS already have under & over voltage protection, do not install undervoltage release into ACB
6: Intelligent controller iTR326H, don't use MODBUS control ACB ON/OFF(MX+XF)
7: Not suitable for 1600 frame size

VIII. Mechanical dimensions and panel opening



IX. Technical specifications

1.Input power			
Measuring range		ATSC902	AC50-720V(LL)
Working power	AC (LN)	ATSC902	90-415VAC
	DC		10-30VDC
Frequency			45-65Hz
Power consumption			10W
2. Power input terminal	**AC power supply: terminals (3, 4), (7, 8) and (9, 10)**		
	DC power supply: terminals 29, 30		
3. Digital input: terminals 17-25			
Input type			Grounded type
Input current			≤8mA
Low input signal			≤1.0V
High input signal			≥3.0V

4. RS485 serial interface: terminals 26, 27, 28	
Interface type	Isolation
Baud rate	2400-38400bps
5.Output OUT1, OUT2, OUT3, OUT4, OUT5, OUT6, OUT7, OUT8, OUT9, OUT10	
Contact type	4 sets are normally open, normally closed; 6 sets are normally open;
Capacity	DC: 10A, 30V, AC: 10A, 250V
6.Expansion module	
Contact type	2 sets are normally open, normally closed
Capacity	AC: normally open 3A, 250V, normally closed 5A, 250V
7.Working environment conditions	
Working temperature	-20℃-70℃
Storage temperature	-30℃-80℃
Relative humidity	20%-93%
Max. environmental pollution level	3

Communication protocol addresses table and description

● The communication protocol adopts the standard MODBUS-RTU protocol that is a commonly used communication protocol, and the master-slave response connection (half duplex) is used. The master station (such as a PC) sends a signal to address the terminal settings, and the addressed terminal device sends a response signal to the host.

Supported function codes and data types:

Read function code:	0x03、0x04	Write function code:	0x10
Read-only data type:	RO	Readable and writable data type	RW

Address table:

Address (Decimal)	Type	Name	Value range	Remarks	Register
10000	RO	QS1 INPUT Input terminal status	0: input on 1: input off		1
10001	RO	QS2 INPUT input terminal state	As above		1
10002	RO	QS3 INPUT input terminal state	As above		1
10003~ 10007	RO	Programmable INPUT1~ INPUT5 Input terminal state	As above		5
10020	RW	Programmable output 1	0: no action 1: action		1
10021	RW	Programmable output 2	As above		1
10022	RW	Programmable output 3	As above		1
10023	RW	Programmable output 4	As above		1
10024	RW	Programmable output 5	As above		1
10025	RW	Programmable output 6	As above		1
10026	RW	Not used	As above		1
10027	RO	I and II position switch OFF output	As above		1
10028	RO	II position switch ON output	As above		1
10029	RO	I position switch ON output	As above		1
10040~ 10071	RO	System alarm Alarm 01~ Alarm 32	0: no alarm 1: alarm		32
10120	RO	Switch 1 state	0: switch off 1: switch on		1
10121	RO	Switch 2 state	As above		1
10123	RO	Dual-division position state	As above		1
10124	RO	Source I power state		*Note 1*	1
10125	RO	Source II power state		*Note 1*	1
10126	RO	Operation times of switch 1 in the Auto mode	0~999999		2
10128	RO	Operation times of switch 2 in the Auto mode	As above		2
10130	RO	Operation times of switch 1 in the Manual mode	As above		2
10132	RO	Operation times of switch 2 in the Manual mode	As above		2
10134	RO	A03 alarm times	As above		2
10136	RO	A04 alarm times	As above		2
10138	RO	Line 1 power supply hours	As above		2
10140	RO	Line 2 power supply hours	As above		2
10142	RO	Load power-off hours	As above		2
10144	RO	Control OFF times	As above		2
10170	RO	Controller series No.			8
10178	RO	Controller hardware version No.			1
10179	RO	Controller software version No.			1
10184	RO	Controller time -second	0~59	Hexadecimal	1
10185	RO	Controller time -minute	0~59	Hexadecimal	1
10186	RO	Controller time -hour	0~23	Hexadecimal	1
10187	RO	Controller time -day	1~31	Hexadecimal	1
10188	RO	Controller time -month	1~12	Hexadecimal	1
10189	RO	Controller time -year	2010~2200	Hexadecimal	1
10190	RO	Controller measured temperature		*Note 2*	2

10192	RO	Source I Phase-A voltage		Unit (V)	1
10193	RO	Source I Phase-B voltage		As above	1
10194	RO	Source I Phase-C voltage		As above	1
10195	RO	Source I average phase voltage		As above	1
10196	RO	Source I line voltage UAB		As above	1
10197	RO	Source I line voltage UBC		As above	1
10198	RO	Source I line voltage UCA		As above	1
10199	RO	Source I average line voltage		As above	1
10200	RO	Source I Phase-A phase angle		Unit (°)	1
10201	RO	Source I Phase-B phase angle		As above	1
10202	RO	Source I Phase-A phase angle		As above	1
10203	RO	Source I phase sequence		0: Positive 1: Reverse	1
10204	RO	Source I frequency		Unit (0.1Hz)	1
10205	RO	Source II Phase-A voltage		Unit (V)	1
10206	RO	Source II Phase-B voltage		As above	1
10207	RO	Source II Phase-C voltage		As above	1
10208	RO	Source II average phase voltage		As above	1
10209	RO	Source II line voltage UAB		As above	1
10210	RO	Source II line voltage UBC		As above	1
10211	RO	Source II line voltage UCA		As above	1
10212	RO	Source II average line voltage		As above	1
10213	RO	Source II Phase A phase angle		Unit (°)	1
10214	RO	Source II Phase B phase angle		As above	1
10215	RO	Source II Phase C phase angle		Unit (°)	1
10216	RO	Source II phase sequence		0: Positive 1: Reverse	1
10217	RO	Source II frequency		Unit (0.1Hz)	1
10309	RO	Source III Phase-A voltage		Unit (V)	1
10310	RO	Source III Phase-B voltage		As above	1
10311	RO	Source III Phase-C voltage		As above	1
10312	RO	Source III average phase voltage		As above	1
10313	RO	Source III line voltage UAB		As above	1
10314	RO	Source III line voltage UBC		As above	1
10315	RO	Source III line voltage UCA		As above	1
10316	RO	Source III average line voltage		As above	1
10317	RO	Source III Phase A phase angle		Unit (°)	1
10318	RO	Source III Phase B phase angle		As above	1
10319	RO	Source III Phase C phase angle		Unit (°)	1
10320	RO	3-way phase sequence		0: Positive 1: Reverse	1
10321	RO	3-way frequency		Unit (0.1Hz)	1
40005	RW	Controller work mode	1~4 *Note 3*	Default: 1	1
40006	RW	Backlighting time (minutes)	1~31 *Note 4*	Default: 31	1
40007	RW	Test password	0000~9999	Default: 0021	1
40009	RW	User password	0000~9999	Default: 0101	1
40017	RW	Controller communication parameters-serial node address	1~254	Default: 3	1
40018	RW	Baud rate	2~6*Note 5*	Default: 5	1
40019	RW	Data format	1~5*Note 6*	Default: 1	1
40020	RW	Stop bit	1~2	Default: 1	1
40027	RW	Rated voltage	50~400	Default: 400	1
40028	RW	Rated frequency	1: 50Hz 2: 60Hz	Default: 1	1
40029	RW	Grid type	1~4*Note 7*	Default: 1	1
40030	RW	Power conversion type	1~3 Note *8*	Default: 1	1
40031	RW	Power priority	Source 1:1 main power; Source 2:2 main power	Default: 1	1

40032	RW	Main power return mode	1~3 Note *9*	Default: 2	1
40033	RW	Breaking position setting	1~3 Note *10*	Default: 2	1
40035	RW	Available delay of Source I (minutes)	0.0~60.0	Default: 2.0	1
40036	RW	Fault delay of Source I (seconds)	0~60	Default: 5	1
40037	RW	Available delay of Source II (seconds)	0.0~60.0	Default: 2.0	1
40038	RW	Fault delay of Source II (seconds)	0~60	Default: 5	1
40040	RW	Phase sequence detection	1~3 Note *11*	Default: 3	1
40041	RW	Position feedback contact	1~3 Note *14*	Default: 2	1
40049	RW	Undervoltage threshold of Source I (%)	70~98	Default: 85	1
40050	RW	Undervoltage return threshold of Source I (%)	71~99	Default: 95	1
40052	RW	Over-voltage threshold of Source I (%)	102~130	Default: 115	1
40053	RW	Over-voltage return threshold of Source I (%)	101~129	Default: 110	1
40055	RW	Under-frequency threshold of Source I (%)	80~98	Default: 0	1
40057	RW	Over-frequency threshold of Source I (%)	102~120	Default: 0	1
40063	RW	Under-frequency return threshold of Source I (%)	88~99	Default: 98	1
40064	RW	Over-frequency return threshold of Source I (%)	101~119	Default: 102	1
40070	RW	Undervoltage threshold of Source II (%)	70~98	Default: 85	1
40071	RW	Undervoltage return threshold of Source II (%)	71~99	Default: 95	1
40073	RW	Over-voltage threshold of Source II (%)	102~130	Default: 115	1
40074	RW	Over-voltage return threshold of Source II (%)	101~129	Default: 110	1
40076	RW	Under-frequency threshold of Source II (%)	80~98	Default: 0	1
40078	RW	Over-frequency threshold of Source II (%)	102~120	Default: 0	1
40084	RW	Under-frequency return threshold of Source II (%)	88~99	Default: 98	1
40085	RW	Over-frequency return threshold of Source II (%)	101~119	Default: 102	1
40584	RW	Undervoltage threshold of Source III (%)	70~98	Default: 85	1
40585	RW	Undervoltage return threshold of Source III (%)	71~99	Default: 95	1
40587	RW	Over-voltage threshold of Source III (%)	102~130	Default: 115	1
40588	RW	Over-voltage return threshold of Source III (%)	101~129	Default: 110	1
40590	RW	Under-frequency threshold of Source III (%)	80~98	Default: 0	1
40592	RW	Over-frequency threshold of Source III (%)	102~120	Default: 0	1
40600	RW	Under-frequency return threshold of Source III (%)	88~99	Default: 98	1
40601	RW	Over-frequency return threshold of Source III (%)	101~119	Default: 102	1
40088	RW	Zero position delay (seconds)	0~20	Default: 0	
40090	RW	Signal hold time (seconds)	0~20.0	Default: 5.0	1
40106	RW	Generator cold-state delay (minutes)	0~10	Default: 5	1
40147	RW	Programmable digital input 1-input function	*Note 12*	Default: 1	1
40149	RW	- Contact type	1: Normally open	Default: 1	1

			2: Normally closed		
40150	RW	- Input delay (seconds)	0.01~600.00	Default: 0.05	1
40152	RW	Programmable digital input 2-input function	*Note 12*	Default: 1	1
40154	RW	- Contact type	1: Normally open 2: Normally closed	Default: 1	1
40155	RW	- Input delay (seconds)	0.01~600.00	Default: 0.05	1
40157	RW	Programmable digital input 3-input function	*Note 12*	Default: 1	1
40159	RW	- Contact type	1: Normally open 2: Normally closed	Default: 1	1
40160	RW	- Input delay (seconds)	0.01~600.00	Default: 0.05	1
40162	RW	Programmable digital input 4-input function	*Note 12*	Default: 1	1
40164	RW	- Contact type	1: Normally open 2: Normally closed	Default: 1	1
40165	RW	- Input delay (seconds)	0.01~600.00	Default: 0.05	1
40167	RW	Programmable digital input 5-input function	*Note 12*	Default: 1	1
40169	RW	- Contact type	1: Normally open 2: Normally closed	Default: 1	1
40170	RW	- Input delay (seconds)	0.01~600.00	Default: 0.05	1
40244	RW	Programmable digital output 5-output function	*Note 13*	Default: 15	1
40246	RW	- Contact type	1: Normally open 2: Normally closed	Default: 1	1
40247	RW	Programmable digital output 6-output function	*Note 13*	Default: 14	1
40249	RW	- Contact type	1: Normally open 2: Normally closed	Default: 1	1
40250	RW	Programmable digital output 7-output function	*Note 13*	Default: 16	1
40252	RW	- Contact type	1: Normally open 2: Normally closed	Default: 2	1
40253	RW	Programmable digital output 8-output function	*Note 13*	Default: 1	1
40255	RW	- Contact type	1: Normally open 2: Normally closed	Default: 1	1
40256	RW	Programmable digital output 9-output function	*Note 13*	Default: 1	1
40258	RW	- Contact type	1: Normally open 2: Normally closed	Default: 1	1
40259	RW	Programmable digital output 10-output function	*Note 13*	Default: 1	1
40261	RW	- Contact type	1: Normally open 2: Normally closed	Default: 1	1
40564	RW	Save parameters	1 *Note 15*	Default: 1	1
40565	RW	Switch position conversion	5: Switch to I position 2: Switch to II		1

			position 4: Switch to 0 position		
40566	RW	Sync device time	*Note 16*		7

Description: Note 1.

Bit0	*Bit1*	*Bit2*	*Bit3*	*Bit4*	*Bit5*	*Bit6*	*Bit7*	*State*
0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*Normal*
1	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*Open phase*
0	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*Over-voltage*
0	*0*	*1*	*0*	*0*	*0*	*0*	*0*	*Under-voltage*
0	*0*	*0*	*1*	*0*	*0*	*0*	*0*	Phase imbalance
0	*0*	*0*	*0*	*1*	*0*	*0*	*0*	Over-frequency
0	*0*	*0*	*0*	*0*	*1*	*0*	*0*	Under-frequency
0	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*N phase loss*

Note 2: Temperature value uses 4 bytes to show a float data, accords with IEEE-754 standard. Method to realize：union {float fdata; unsigned char cdata [4]};
Note 3: Controller working mode: range 1-4, 1-PROG, 2-MANU, 3-AUTO, 4-TEST
Note 4: Backlight ON time: range 1-31, setting 31 is keep activated (keep lighting)
Note 5: Serial baud rate: range 2-6, 2-2400, 3-4800, 4-9600, 5-19200, 6-38400
Note 6: Serial data format: range 1-5, 1-8N, 2-8O, 3-8E, 4-7O, 5-7E
Note 7: Power system type: range 1-4, 1-3 phases 4 wires, 2-3 phases 3 wires, 3-2 phases 3 wires, 4-1 phase 2 wires
Note 8: Power supply type: range 1-3, 1-Mains-Mains, 2-Mains - Genset, 3-Genset - Mains
Note9: Back to main power supply: range 1-3, 1- Automatic transfer not automatic recover, 2- Automatic transfer automatic recover, 3- mutually reserved
Note10: Off position: range 1-3, 1-two off position, 2-one off position, 3-no off position
Note11: Phase sequence detection: range1-3, 1-L1L2L3, 2-L3L2L1, 3-off
Note12: Programmable input function: 1- Inhibit, 2-Forced to 0 position, 3-Priority, 4-Remote control, 5-Remote position I, 6-Remote position II, 7-Remote position 0, 8-Test off load, 9-Test on load, 10-LSI
Note13: Programmable output function: 1- Inhibit, 2-ATS ready, 3-SI available, 4-SII available, 5-Alarm, 6-Manu mode, 7-Auto mode, 8-Test mode, 9- Position 1 signal; 10- Position 2 signal, 11- Position 0 signal, 12-Fire Linkage, 13-Load trip, 14-ATS Source N, 15- ATS Source, 16-Strat generator,17-Universal
Note14: Aux Connetor feedbacks: 1-three feedbacks, 2-two feedbacks, 3-zero feedback
Note15: Save Parameter: when configuration is done, write this data 1 to save the last parameter. The value is only 1.
Note16: The data in order to year (2010~2200), month (1~12), date (1~31), hour (0~23), minute (0~59), second (0~59), The seventh data set 1 means to write time, and other value is invalid.