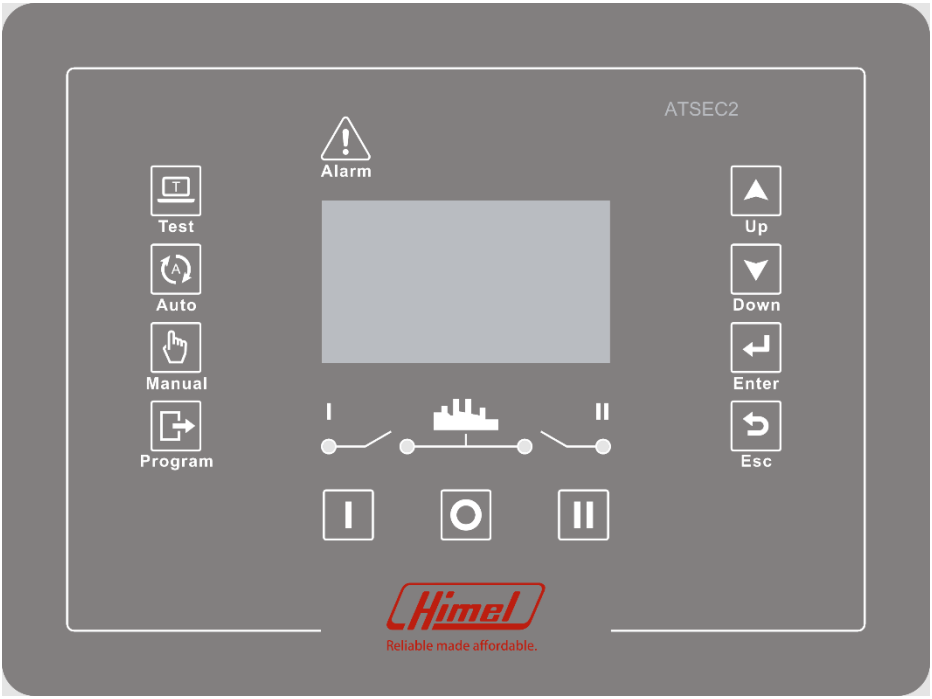
ATSE2C Controller

Operation Manual



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Attention:

- The complete set must including 2 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 with ACB
- Default with 2m controller cable

1. Product Introduction

ATSE2C automatic transfer controller is an intelligent ATSE controller with programmable functions, automatic measuring, LCD menu display, and digital communication. It can automatically realize voltage, frequency, phase etc. electrical parameters measurement and automatic control according to setting strategy which can reduce human operation error. It is an ideal product of ATSE.

ATSE2C automatic transfer controller consists of microprocessor as core. It can precisely detect two-source 3-phase voltage and make precise recognition about abnormal voltage (over-voltage, under-voltage, loss phase, over - frequency, under - frequency) and output passive control digital. This device can be widely applied to electrical devices, automatic control and debug system in industry of power, post and telecommunications, petroleum, coal, metallurgical, railway, municipal, intelligent building etc.

Functional parameter

- Graphic LCD128x64 pixel;
- Two-source AC power input:, 3-phase 4-wire;
- Measured values, settings, and message texts are supported in English and Chinese
- 10~30VDC power supply.
- Detection function for over-voltage, under-voltage, phase loss, reverse phase sequence, over-frequency, under-frequency;
- 8-channel programmable digital input (grounding effective);
- 10-channel programmable digital output;
- Integrated RS-485 isolation interface, MODBUS protocol;
- Storage of last 200 events;
- Real time clock
- All parameters are field programmable, use password access to avoid mis-operation by unprofessional persons;
- The fixed washer is IP65 degree of protection
- Module structure design, Retardant PC cover, pluggable terminal, embedded installation mode, compact structure and easy installation;

2. Front panel touch button function

Icon	Button name	Function description
	Position 1	In Manual mode, press this button to transfer load to position1
	Position 2	In Manual mode, press this button to transfer load to position 2
	Position 0	In Manual mode, press this button to transfer load to position 0
	Test mode	Press this button for 3 seconds to enter test function.
	Auto mode	Press this button for 3 seconds to set controller as Auto mode.
	Manual mode	Press this button for 3secondsto set controller as manual mode.
	Programming mode	Press this button for 3 seconds to set controller as programming mode.
	Increase/ up	In menu page, press this button to scroll page. In parameter setting page. Press this key to up cursor or increase value.
	Decrease / down	In menu page, press this button to scroll page. In parameter setting page. Press this key to down cursor or decrease value..
	Enter	Press this button to enter sub-menu or confirm setting information.
	Return	Press this button to return prior menu screen, press this button for 3seconds to lock/unlock the button. Press it can clear fault alarm when alarm occur.

3. Front panel LED

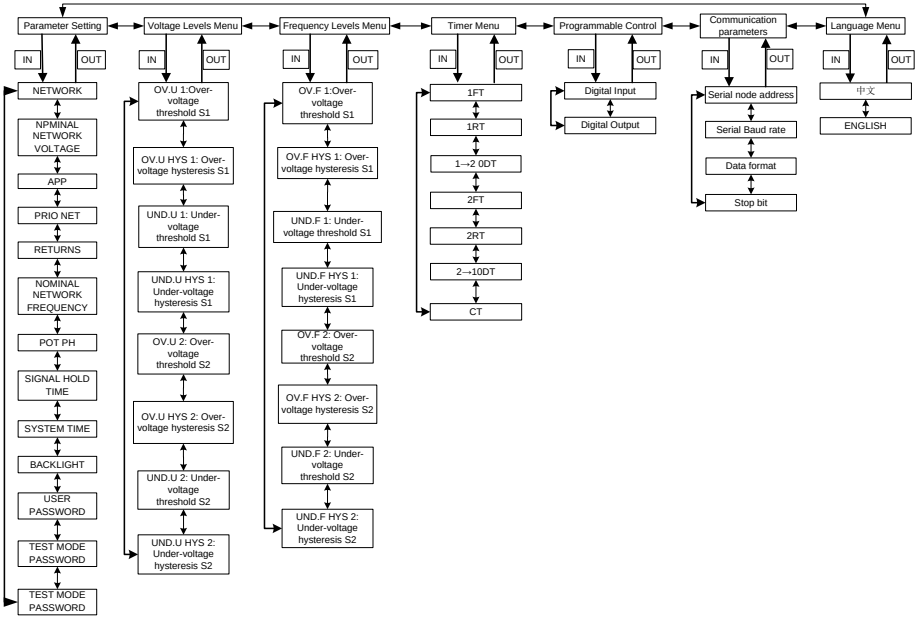
- Alarm LED (Red) –when fixed, indicates an alarm is active;
- S1 voltage status LED (Green) –S1 normal, fixed; S1 abnormal, blinking;
- S2 voltage status LED (Green) –S2 normal, fixed; S2 abnormal, blinking;
- Position 1 status LED (Green) –on, POS1 close; off, POS1open;
- Position 2 status LED (Green) –on, POS2 close; off, POS2 open;

4. Working mode

- Programming mode: parameter setting operation under this mode, long pressing “programming mode” button for 3s to enter. All measuring values and status LED display keep activated. Set as programming mode before visiting programming menu.
- Manual mode: can control switch manually, long pressing “manual mode” button for 3s to enter. Pressing I close and II close can change the switch position. Pressing 0 can open the two sources.
- Automatic mode: long pressing “automatic mode” button for 3s to enter. Under automatic mode, device automatically executes operation of open/close switch and start/stop generator. When the time of exceeding limit of prior source is longer than the set delay time, the device will open the load of the main source and connect to the emergency source.

5. Main menu

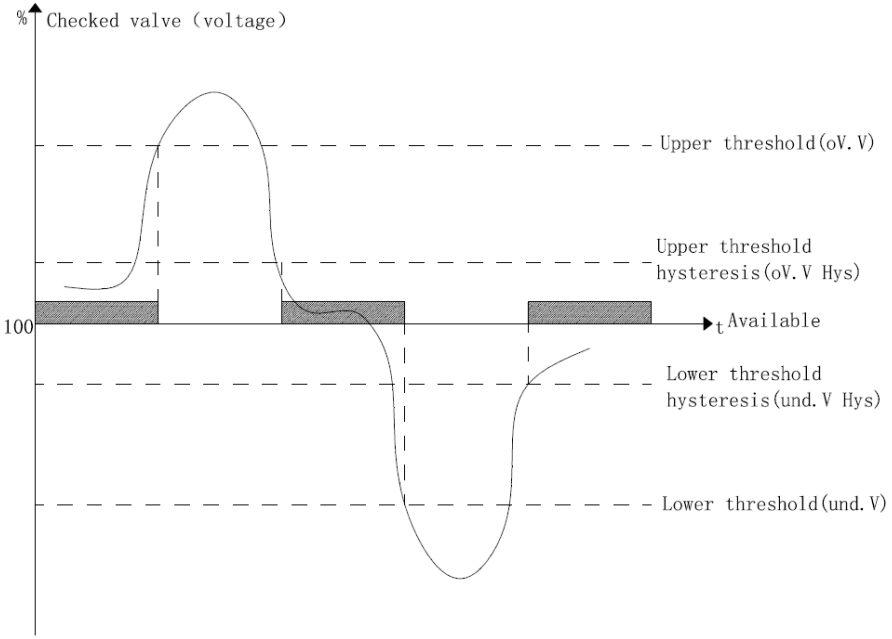
- Main menu consists of parameter setting, Voltage Levels Menu, Frequency Levels Menu, Timer Menu, Programmable Control, communication parameters and Language Menu to make it convenient for user to fast visit measuring value and revise parameters.
- Parameter setting: this operation is only valid under the programming mode. When there are changes of parameter, it will show “save parameter?” before returning to main menu. Select ”YES” to save parameters. For parameter setting please refer as below.



5.1、Parameter Setting

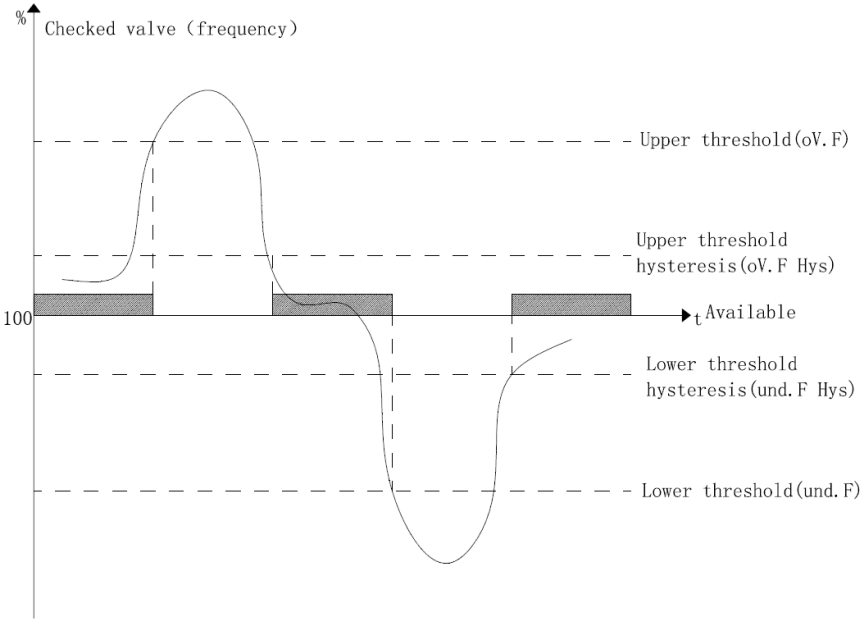
No.	Option	Definition	Default	Adjustment Range
1.1	NETWORK	Network Type	4NBL	4NBL
1.2	NOM.VOLT.	P-P Voltage	400	50-690V
1.3	APP	M-M:Mains to Mains Supply M-G:Mains to Generator Supply G-M:Generator to Mains Supply	M-M	M-M/M-G/G-M
1.4	PRIO NET	Choose S1 or S2 for Priority Net	S1	S1/S2
1.5	RETURNS	Inhibit the automatic retransfer	Automatic retransfer to the priority source	Automatic retransfer to the priority source/ Don't automatic retransfer to the priority source/ Backup
1.6	NOM.FREQ.	Nominal network frequency	50 Hz	50/60Hz
1.7	POT PH.	Select and verify Phase Sequence	OFF	L1L2L3/ L3L2L1/ OFF
1.8	SIGNAL HOLD TIME	Pulse time of the opening and closing relay output	5.0S	0.1-20.0S
1.9	SYSTEM TIME	\	\	Real time
1.10	BACKLIGHT	Min	Active	Active /1-30Min
1.11	USER PASSWORD	\	0101	0000-9999
1.12	TEST MODE PASSWORD	\	0021	0000-9999
1.13	FATORY SET	Set parameter to fatory default	yes	Yes/no

5.2、Voltage Levels Menu：



No.	Option	Definition	Adjustment Range
2.1	OV.U 1:Over-voltage threshold S1	115%	102-130%
2.2	OV.U HYS 1: Over-voltage hysteresis S1	110%	101-129%
2.3	UND.U 1: Under-voltage threshold S1	85%	70-98%%
2.4	UND.U HYS 1: Under-voltage hysteresis S1	95%	71-99%
2.5	OV.U 2: Over-voltage threshold S2	115%	102-130%
2.6	OV.U HYS 2: Over-voltage hysteresis S2	110%	101-129%
2.7	UND.U 2: Under-voltage threshold S2	85%	70-98%
2.8	UND.U HYS 2: Under-voltage hysteresis S2	95%	71-99%

5.3、**Frequency Levels Menu：**



No.	Option	Definition	Adjustment Range
3.1	OV.F 1:Over-voltage threshold S1	OFF	OFF/102-120%
3.2	OV.F HYS 1: Over-voltage hysteresis S1	103%	101-119%
3.3	UND.F 1: Under-voltage threshold S1	OFF	80-98%
3.4	UND.F HYS 1: Under-voltage hysteresis S1	97%	88-99%
3.5	OV.F 2: Over-voltage threshold S2	OFF	OFF/102-120%
3.6	OV.F HYS 2: Over-voltage hysteresis S2	103%	101-119%
3.7	UND.F 2: Under-voltage threshold S2	OFF	80-98%
3.8	UND.F HYS 2: Under-voltage hysteresis S2	97%	88-99%

5.4、Timer Menu:

No.	Option	Definition	Default	Adjustment Range
4.1	1FT	Source 1 Failure Timer	5S	0-60S
4.2	1RT	Source 1 Return Timer	2Min	0-60Min
4.3	1→2 0DT	Source 1 to Source 2 dead time in 0 position	5S	2-20S
4.4	2FT	Source 2 Failure Timer	5S	0-60S
4.5	2RT	Source 2 Return Timer	2.0 Min	0-60.0Min
4.6	2→1 0DT	Source 2 to Source 1 dead time in 0 position	5S	2-20S
4.7	CT	Generator cool down Timer	5Min	0-60Min

5.5、Programmable Control:

No.	Option	Default	Adjustment Range
5.1	Digital Input		1-5
5.1.x.1	Input function		
5.1.x.2	Contact Type	NO	NO/NC
5.1.x.3	Input delay	0.05S	0.01-600.00S
5.2	Digital Output		6-10
5.2.x.1	Output function		
5.2.x.2	Contact Type	NO	NO/NC

INPUT MENU

Input Menu	Input code definition
Inhibit	Inhibit input function
Forced to pos. 0	The transfer switch is immediately driven to 0 position, and the controller in manu mode, meantime when the input signal disappear, the controller feedback to auto mode
Priority	Priority network select; change S1 or S2 priority state when input is activated, return to current priority state when input is not activated
Remote control	Remote control is enable when input is activated
Remote position 1	Switch transfer to position 1 when input is activated
Remote position 2	Switch transfer to position 2 when input is activated
Remote position 0	Switch transfer to position 0 when input is activated
Test off load	Activates on an off load test, this will start/stop the generator without transferring the load to S2

Test on load	Activates on an on load test, this will start/stop the generator with transferring the load to S2
LS	Verify the generator don't overload before transfer to S2

OUTPUT MENU

Output Menu	Output code definition
Inhibit	Inhibit output function
ATS ready	The output signal is activated when switch and controller are OK
S1 available	The output signal is activated when S1 available
S2 available	The output signal is activated when S2 available
Alarm	The output signal is activated when controller failure
Manu mode	The output signal is activated when controller in manu mode
Auto mode	The output signal is activated when controller in auto mode
Test mode	The output signal is activated when controller in auto mode
Position 1	The output signal is activated when ATS in position 1
Position 2	The output signal is activated when ATS in position 2
Position 0	The output signal is activated when ATS in position 0
Forced to pos. 0	The output signal is activated when ATS forced to 0 position
LS	Verify the generator don't overload before transfer to S2
ATS Source N	Auxiliary Source N
ATS Source L	Auxiliary Source L
Start generator	When APP is M-G/G-M, the mains source failure，the output signal is activated
Universal	The Communication control

5.6、Communication parameters

No.	Option	Unit	Default value	Range
5.1	Serial node address	\	3	001-254
5.2	Serial Baud rate	\	19200	2400/4800/9600/19200/38400
5.3	Data format	\	8N	8N/8O/8E/7O/7E
5.4	Stop bit	\	1	1/2

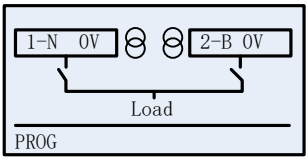
Note: Data format '8N' means 8 data bits, 'N' means no parity, '8O' means 8 data bits, 'O' means odd parity.'8E' means 8 data bits, 'E' means even parity.

'7N' means 7 data bits, 'N' means no parity, '7O' means 7 data bits, 'O' means odd parity.'7E' means 8 data bits, 'E' means even parity.

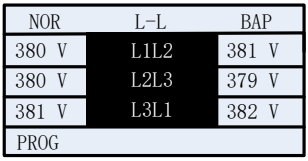
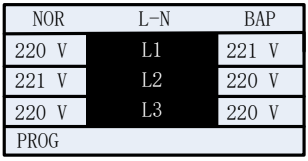
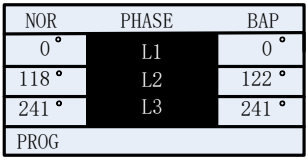
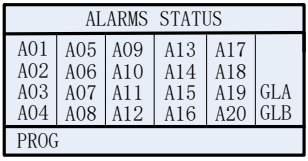
5.7、Language Menu：

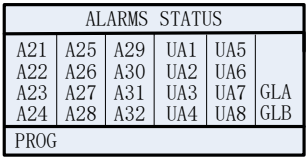
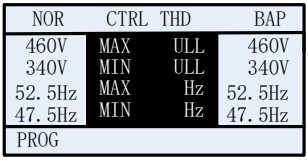
No.	Option	Definition	Default value	Range
7.1	Language Menu	\	Chinese	Chinese/English

●Power supply status icon, refer topic1:

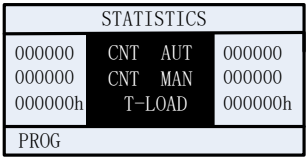
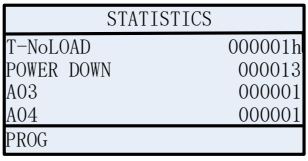
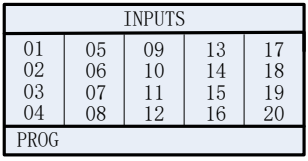
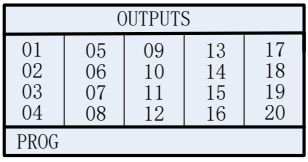
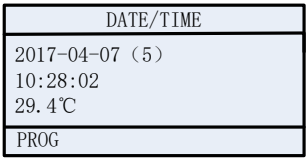
Page	Example	Note
Pic.1 Power supply status		I Main： S1 is normal power supply, next to it is actual voltage value. II Backup：S2 is reserved power supply, next to it is actual voltage value.

●Data display icon, refer to pic2-pic7

Page	Example	Note
Pic2. Data display		Line voltage(380V)
Pic3. Data display		Phase voltage(220V)
Pic4. Data display		Actual phase 0° 120° 240°
Pic5. Data display		Alarm status, If there is A01 alarm, A01 in the pic will be selected

Pic6. Data display		Alarm status, If there is A21 alarm, A21 in the pic will be selected
Pic7. Data display		Control threshold, The max/min value of voltage and frequency of power supply

●Statistic data icon, refer to pic8-pic12

Page	Example	Note
Pic8 Statistic data		CNT AUT: closing times of line1(Left) and line2(Right) under automatic mode; CNT MAN: closing times of line1(Left) and line2(Right) under manual mode; T-LOAD: The current time when S1 or S2 supply power to load
Pic9 Statistic data		T-NOLOAD: Load blackout time POWER DOWN：Power off times A03：A03 alarm times A04：A04 alarm times
Pic10Statistic data		Programmable input, if there is signal detected in 01 input port, then the 01 will be selected.(1~3 has been locked)
Pic11 Statistic data		Programmable output, if there is output action in 01 output port, the 01 will be selected.(1~6 has been locked)
Pic12 Statistic data		time/temperature

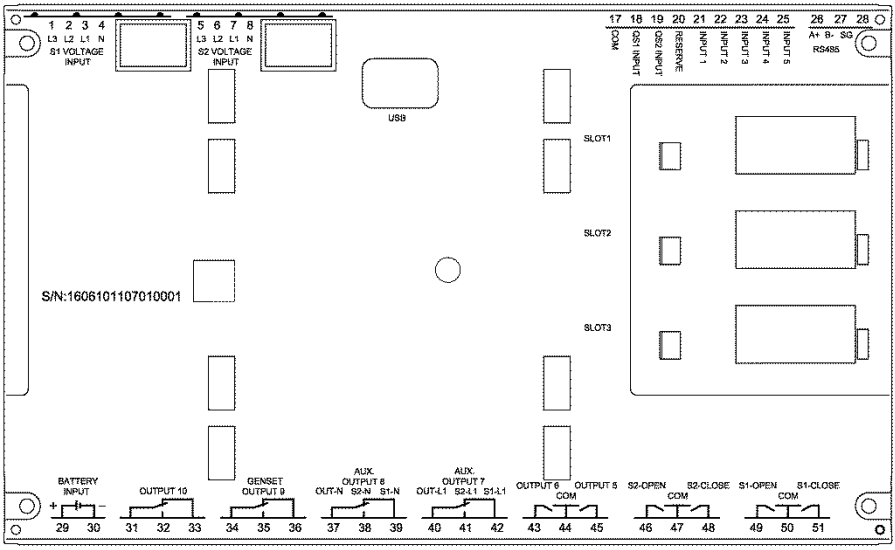
●Event record Icon, refer to pic13

page	example	Note
Pic13 Event record	S1 Close OK 2017-01-18 19:26:25 ULL 374V 375V 375V F 50.0Hz 65/100 PROG	Device Event record

●Commissioning Icon, refer to pic14、15

page	example	Note
Pic14 Test off load	Main 01/03 Test offload □ Test onload TEST	Activates on an off load test, this will start/stop the generator without transferring the load to S2,when activation is missed ,the relay reset.
Pic15 Test on load	Main 02/03 Test offload Test onload □ TEST	Activates on an on load test, this will start/stop the generator with Transferring the load to S2, when activation is missed, the ATS transfer to main side, and relay reset.

6. Wiring diagram

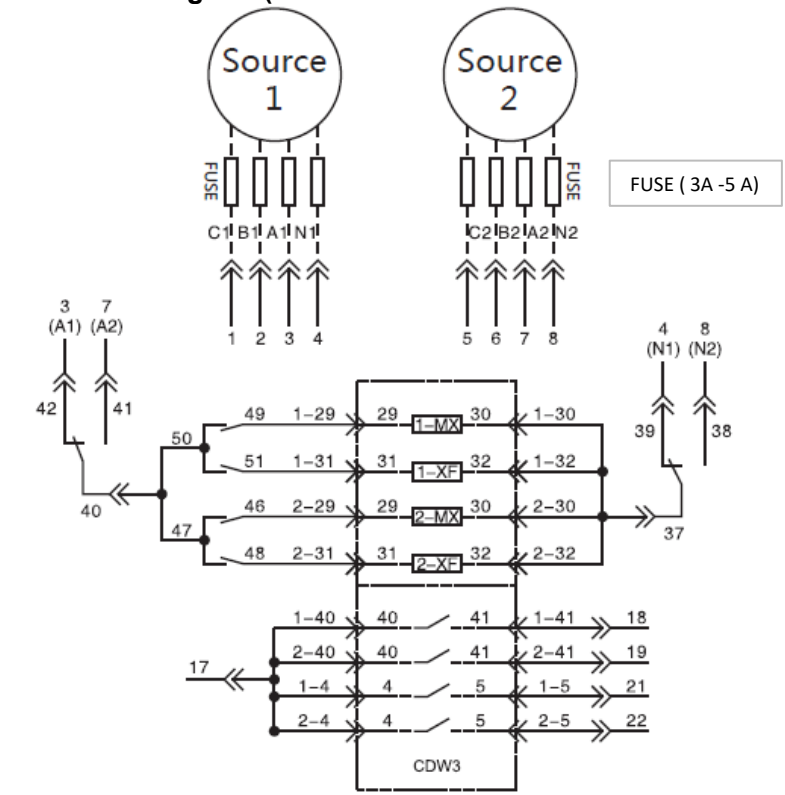


6.1 Terminal definition and description：

Terminal No.	Item	Function description	Note
1	L3	S1 AC 3-phase 4-wire voltage input	If single-phase, only L1, N connected L1,Nare AC power supply terminal.
2	L2		
3	L1		
4	N		
5	L3	S2 AC 3-phase 4-wire voltage input	If single-phase, only L1, N connected L1,Nare AC power supply terminal.
6	L2		
7	L1		
8	N		
17	COM	Module grounding	Module ground terminal
18	QS1 INPUT	1 position switch closure detection	Grounding effective
19	QS2 INPUT	2 position switch closure detection	
20	RESERVE	RESERVE	
21	INPUT1	1 position switch TRIP detection	Grounding effective
22	INPUT2	2 position switch TRIP detection	
23	INPUT3	input port function defined by user	
24	INPUT4		
25	INPUT5		

26	A	RS485 communication interface	RS485A
27	B		RS485B
28	SG		RS485 grounding
29	BATTERY+	Positive electrode of DC power supply	
30	BATTERY-	Negative electrode of DC power supply	
31	OUT10	Relay common	Programmable output port 10A
32		Relay normally open	
33		Relay normally close	
34	OUT9	Genset common	Genset start output port 10A
35		Genset start normally open	
36		Genset start normally close	
37	OUT8	change-over switch N	auxiliary power output port 10A
38		S2 power supply N	
39		S1 power supply N	
40	OUT7	change-over switch L1	auxiliary power output port 10A
41		S2 power supply L1	
42		S1 power supply L1	
43	OUT6	Relay output	Programmable output port 10A
44	COM	43 and 45 Common	
45	OUT5	Relay output	output port 10A
46	S2-OPEN	BRK2 open output	output port 10A
47	COM	46 and 48 Common	
48	S2-CLOSE	BRK2 close output	output port 10A
49	S1-OPEN	BRK1 open output	output port 10A
50	COM	49 and 51 Common	
51	S1-CLOSE	BRK1 close output	output port 10A

6.1 Terminal diagram (ATSE2C controller with air circuit breaker)



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

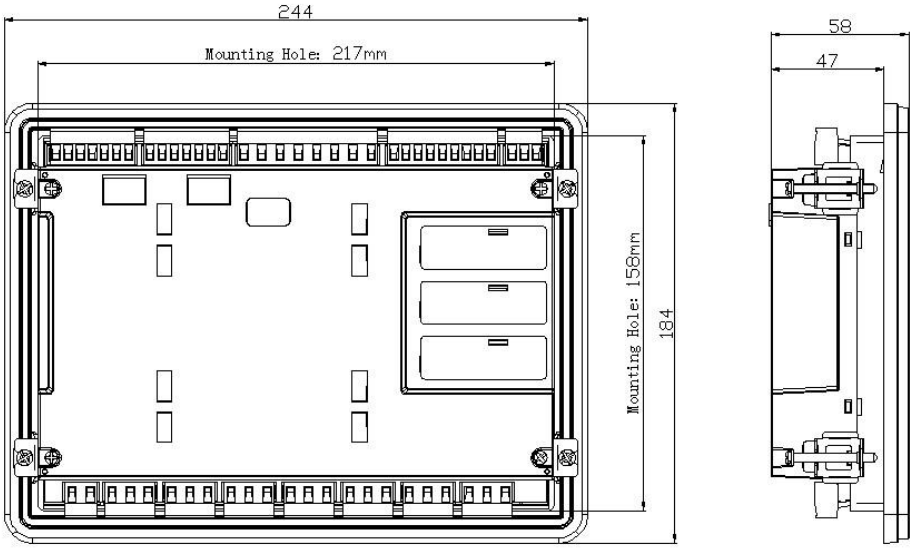
2 - MX Source 2 breaker - shunt release
2 - XF Source 2 breaker - closing coil

1-40 1-41 Source 1 breaker - Auxiliary contact
2-40 2-41 Source 2 breaker - Auxiliary contact

1-4 1-5 Source 1 breaker - Alarm contact
2-4 2-5 Source 2 breaker - Alarm contact

Note
1: Default 2m 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. Mechanical dimension and panel opening



8. Technical parameters

1、AC supply: terminal 3,4 and 7,8	
Rated voltage	400VAC(LL)
Operating limit value	90-300VAC(LN)
Frequency	45-65Hz
Power consumption	10W
2、DC supply：terminal 29,30	
Rated battery voltage	24VDC
Operating limit value	10-30VDC
Max power consumption	10W
3、Digital input：terminal 17—25	
Input type	negative
Input current	≤8mA
Low input signal	≤2.2V
High input signal	≥3.4V
4、RS485serial interface：terminal 26,27,28	
Interface Type	isolation
Baud rate	2400-38400bps

5、Output 31-33（OUT1）、34-36（OUT2）、37-39(OUT3)、40-42(OUT4)	
Contact Type	single-pole double throw
Rated value	DC：10A、30V，AC：10A、250V
6、Output 43(OUT5)、46（OUT6）、48(POSITION O)、49(POSITION Ⅱ)、51(POSITION Ⅰ)	
Contact Type	single-pole single throw
Rated value	DC：10A、30V，AC：10A、250V
7、Working environment condition	
Working temperature	-25℃-70℃
Storage temperature	-30℃-80℃
Relative humidity	20%-93%
Max environmental pollution	Level 3

Annex A. Alarm code description

Code	Description	Alarm reason
A03	Position1 timeout	No open/close operation of breaker 1 within set time
A04	Position2 timeout	No open/close operation of breaker 2 within set time
A05	Wrong phase sequence of S1	Phase sequence detected by S1 does not meet with the set one
A06	Wrong phase sequence of S2	Phase sequence detected by S2 does not meet with the set one
A01	Not used	Not used
A02	Not used	Not used
A07	Not used	Not used
A08	Not used	Not used
A09	Not used	Not used
A10 … A17	Not used	

Annex B: Modbus protocol

●Support function code and data type.

Read function	03 04	Write function	10
Read only data	RO	Readwrite-able data	RW

Address (DEC)	Type	Name	Range	Note	Register
10000	RO	POSITION1 INPUT state	0: input on 1: input off		1
10001	RO	POSITION2 INPUT state	0: input on 1: input off		1
10002	RO	POSITION 0 INPUT state	0: input on 1: input off		1
10003~10007	RO	ProgrammableINPUT1~ INPUT5 input terminal state	0: input on 1: input off		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	No Use	As above		1
10027	RW	POSITION0 switch output	As above		1
10028	RW	POSITION1 switch output	As above		1
10029	RW	POSITION2 switch output	As above		1
10040~10071	RO	System alarm Alarm01~ Alarm32	0: no alarm 1: alarm		32
10120	RO	1 Position state	0: switch off 1: switch on		1
10121	RO	2 Position state	0: switch off 1: switch on		1
10123	RO	0 position state	0: switch off 1: switch on		1
10124	RO	Source 1 power status		*Note 1*	1
10125	RO	Source 2 power status		*Note 1*	1
10126	RO	Position 1 operation times in AUTO mode	0~999999		2
10128	RO	Position 2 operation times in AUTO mode	0~999999		2
10130	RO	Position 1 operation times in MANU mode	0~999999		2
10132	RO	Position 2 operation times in MANU mode	0~999999		2

10134	RO	A03 alarm times	0~999999		2
10136	RO	A04 alarm times	0~999999		2
10138	RO	Source 1 supply hours	0~999999		2
10140	RO	Source 2 supply hours	0~999999		2
10142	RO	No load hours	0~999999		2
10144	RO	ATSC power down times	0~999999		2
10170	RO	Serial Number			8
10178	RO	HardWare Version			1
10179	RO	SoftWare Version			1
10184	RW	System time–second	0~59		1
10185	RW	System time –minute	0~59		1
10186	RW	System time –hour	0~23		1
10187	RW	System time –day	1~31		1
10188	RW	System time –month	1~12		1
10189	RW	System time –year	2010~2200		1
10190	RO	Ambient Temperature		*Note 2*	2
10192	RO	Source 1 A phase voltage		Unit (V)	1
10193	RO	Source 1 B phase voltage		Unit (V)	1
10194	RO	Source 1 C phase voltage		Unit (V)	1
10195	RO	Source 1 avg phase voltage		Unit (V)	1
10196	RO	Source 1 line voltage UAB		Unit (V)	1
10197	RO	Source 1 line voltage UBC		Unit (V)	1
10198	RO	Source 1 line voltage UCA		Unit (V)	1
10199	RO	Source 1 avg line voltage		Unit (V)	1
10200	RO	Source 1 A phase angle		Unit (°)	1
10201	RO	Source 1 B phase angle		Unit (°)	1
10202	RO	Source 1 C phase angle		Unit (°)	1
10203	RO	Source 1 phase sequence			1
10204	RO	Source 1 frequency		Unit (0.1Hz)	1
10205	RO	Source 2 A phase voltage		Unit (V)	1
10206	RO	Source 2 B phase voltage		Unit (V)	1
10207	RO	Source 2 C phase voltage		Unit (V)	1
10208	RO	Source 2 avg phase voltage		Unit (V)	1

10209	RO	Source 2 line voltage UAB		Unit (V)	1
10210	RO	Source 2 line voltage UBC		Unit (V)	1
10211	RO	Source 2 line voltage UCA		Unit (V)	1
10212	RO	Source 2 avg line voltage		Unit (V)	1
10213	RO	Source 2 A phase angle		Unit (°)	1
10214	RO	Source 2 B phase angle		Unit (°)	1
10215	RO	Source 2 C phase angle		Unit (°)	1
10216	RO	Source 2 phase sequence			1
10217	RO	Source 2 frequency		Unit (0.1Hz)	1
40005	RW	ATSC operating mode	1~4*Note 3*	Default: 1	1
40006	RW	Backlight ON time (min)	1~31*Note4*	Default: 31	1
40007	RW	Test Mode password	0000~9999	Default:4000	1
40009	RW	User password	0000~9999	Default:1000	1
40017	RW	ATSC communication node address	0~255	Default: 3	1
40018	RW	-Baud rate	2~6*Note5*	Default: 3	1
40019	RW	-Data format	1~5*Note6*	Default: 1	1
40020	RW	-Stop bit	1~2	Default: 1	1
40027	RW	NPMinalNetWork voltage	50~400	Default: 400	1
40028	RW	System rated frequency	1：50Hz 2：60Hz	Default: 1	1
40029	RW	NetWork	1~4*Note7*	Default: 1	1
40030	RW	APP	1~4*Note8*	Default: 1	1
40031	RW	Prior Net	1:line1 as normal 2:line2 as normal	Default: 1	1
40032	RW	Return to main power supply	1~3*Note9*	Default: 2	1
40033	RW	Off position	1~3*Note10*	Default: 2	1
40035	RW	Source 1 normal delay (sec)	0~9999	Default: 10	1
40036	RW	Source 1 abnormal delay (sec)	0~9999	Default: 5	1
40037	RW	Source 2 normal delay (sec)	0~9999	Default: 10	1
40038	RW	Source 2 abnormal delay (sec)	0~9999	Default: 5	1

40040	RW	Phase sequence detection	1~3*Note11*	Default: 3	1
40041	RW	Aux Connector	1~3*Note14*	Default: 2	1
40049	RW	S1 Under-voltage threshold (%)	70~98	Default: 85	1
40050	RW	S1 Under-voltage return threshold (%)	71~99	Default: 90	1
40052	RW	S1 Over-voltage threshold (%)	102~130	Default: 115	1
40053	RW	S1 Over-voltage return threshold (%)	101~129	Default: 110	1
40055	RW	S1 Under-frequency threshold(%)	80~99	Default: 95	1
40057	RW	S1 Over-frequency threshold (%)	101~120	Default:105	1
40063	RW	S1 Under-frequencyreturn threshold (%)	88~100	Default: 98	1
40064	RW	S1 Over-frequency return threshold (%)	100~119	Default: 102	1
40070	RW	S2 Under-voltage threshold (%)	70~98	Default: 85	1
40071	RW	S2 Under-voltage return threshold (%)	71~99	Default: 90	1
40073	RW	S2 Over-voltage threshold (%)	102~130	Default: 115	1
40074	RW	S2 Over-voltage return threshold (%)	101~129	Default: 110	1
40076	RW	S2 Under-frequency threshold(%)	80~99	Default: 95	1
40078	RW	S2 Over-frequency threshold (%)	101~120	Default:105	1
40084	RW	S2 Under-frequencyreturn threshold (%)	88~100	Default: 98	1
40085	RW	S2 Over-frequency return threshold (%)	100~119	Default: 102	1
40088	RW	Ⅰ→Ⅱ 0DT(sec)	0~20		
40090	RW	Signal hold time (0. 1s/unit)	0~200	Default: 50	1
40094	RW	Ⅱ→Ⅰ 0DT(sec)	0~20		
40106	RW	Genset Cool Time (min)	0~60	Default: 5	1
40147	RW	Programmable input1 -input function	*Note12*	Default: 1	1
40149	RW	-contact type	1:normally open 2:normally close	Default: 1	1
40150	RW	-input delay (0.01s/unit)	0~60000	Default: 5	1
40152	RW	Programmable input2 -input function	*Note12*	Default: 1	1
40154	RW	-contact type	1:NO 2:NC	Default: 1	1

40155	RW	-input delay (0.01s/unit)	0~60000	Default: 5	1
40157	RW	Programmable input3 -input function	*Note12*	Default: 1	1
40159	RW	-contact type	1:NO 2:NC	Default: 1	1
40160	RW	-input delay (0.01s/unit)	0~60000	Default: 5	1
40162	RW	Programmable input4 -input function	*Note12*	Default: 1	1
40164	RW	-contact type	1:NO 2:NC	Default: 1	1
40165	RW	-input delay (0.01s/unit)	0~60000	Default: 5	1
40167	RW	Programmable input5 -input function	*Note12*	Default: 1	1
40169	RW	-contact type	1:NO 2:NC	Default: 1	1
40170	RW	-input delay (0.01s/unit)	0~60000	Default: 5	1
40232	RW	Programmable output1 -output function	*Note 13*	Default: 1	1
40234	RW	Output mode	1:normally open 2:normally close	Default: 1	1
40235	RW	Programmable output2 -output function	*Note 13*	Default: 1	1
40237	RW	Output mode	1:NO 2:NC	Default: 1	1
40238	RW	Programmable output3 -output function	*Note 13*	Default: 1	1
40240	RW	Output mode	1:NO 2:NC	Default: 1	1
40241	RW	Programmable output4 -output function	*Note 13*	Default: 1	1
40243	RW	Output mode	1:NO 2:NC	Default: 1	1
40244	RW	Programmable output5 -output function	*Note 13*	Default: 1	1
40246	RW	Output mode	1:NO 2:NC	Default: 1	1
40247	RW	Programmable output6 -output function	*Note 13*	Default: 1	1
40249	RW	Output mode	1:NO 2:NC	Default: 1	1
40564	RW	Save Parameter	*Note 15*	Default: 1	1
40565	RW	Position switch	5:position I 2:position II 4:position 0		1
40566	RW	System RealTime	*Note 16*		7

Description：Note1.

Bit0	*Bit1*	*Bit2*	*Bit3*	*Bit4*	*Bit5*	*Bit6*	*Bit7*	*Status*
0	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*Normal*
1	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*Missing 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*	*unbalanced phase*
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*	*Phase N loss*

Note2： 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]};

Note3：ATSC working mode: range 1-4, 1-PROG, 2-MANU, 3-AUTO, 4-TEST

Note4： Backlight ON time: range1-31, setting 31 is keeping activated (keep lighting)

Note5：Serial baud rate: range 2-6, 2-2400,3-4800,4-9600,5-19200,6-38400

Note6：Serial data format: range1-5，1-8N,2-8O,3-8E,4-7O,5-7E

Note7：Power system type: range1-4，1- 3 phase 4 wires，2-3 phase 3 wires，3-2 phase 3 wires，4-1 phase 2 wires

Note8：Power supply type: range 1-4，1-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-Test mode,8-Position I,9-Position II,10-Position 0,11-Forced to 0 position,12-LSC,13-ATS Source N,14-ATS Source L,15-Strat generator,16-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.
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 last one data set 1 means to update time.