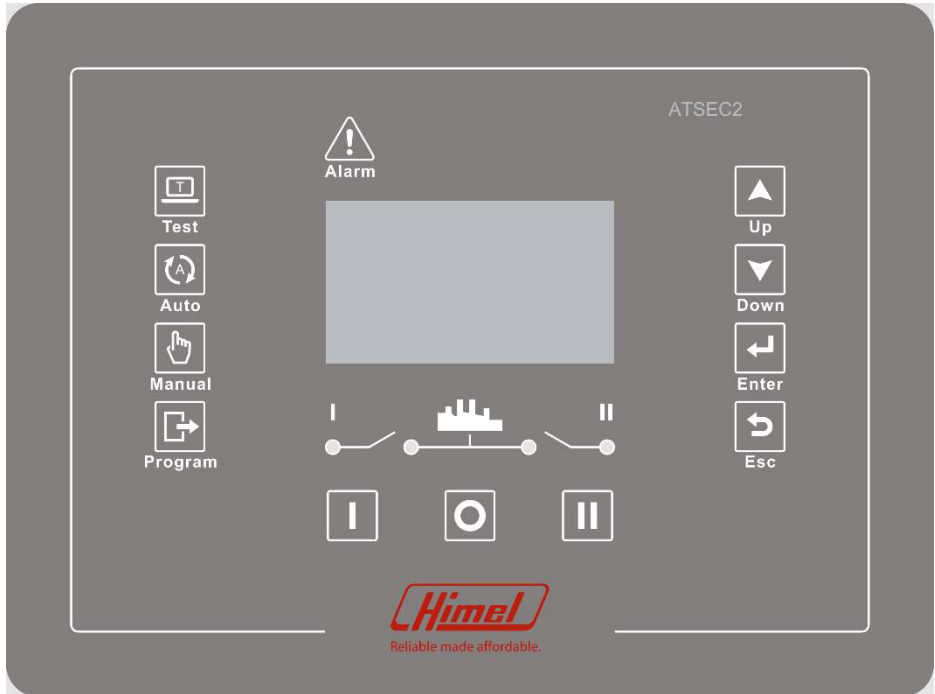


ATSE2C Controller

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 mechanical interlock 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 position 1 |
|  | 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 3 seconds to 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 3 seconds to lock/unlock the button. Press it can clear fault alarm when alarm occur. |

3. Front panel LED

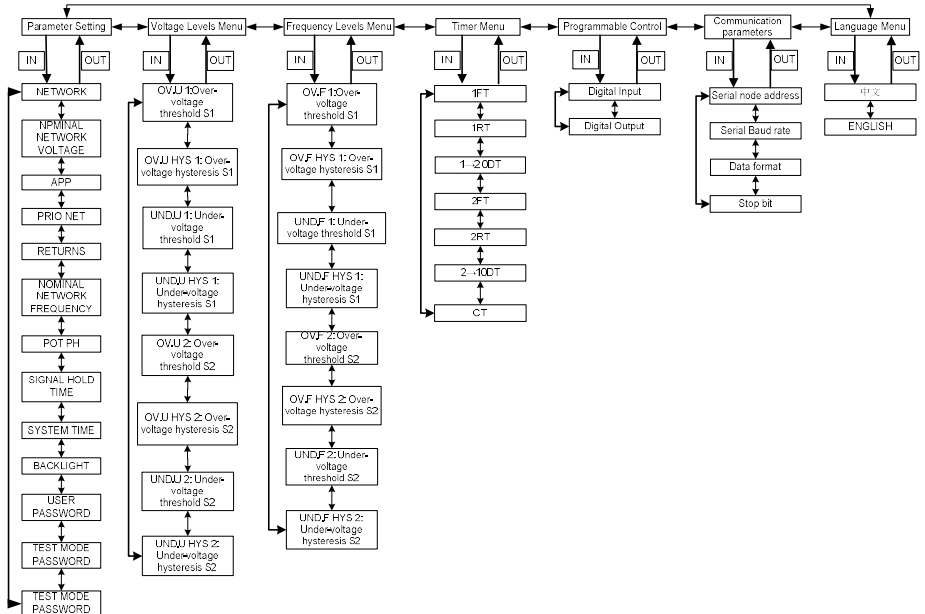
- Alarm LED (Red) –when fixed, indicates an alarm is active;
- S1 voltage status LED (Green) –S1 normal, fixed; S1 abnormal, blinking;
- S2 voltage status LED (Green) –S2 normal, fixed; S2 abnormal, blinking;
- Position 1 status LED (Green) –on, POS1 close; off, POS1 open;
- Position 2 status LED (Green)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

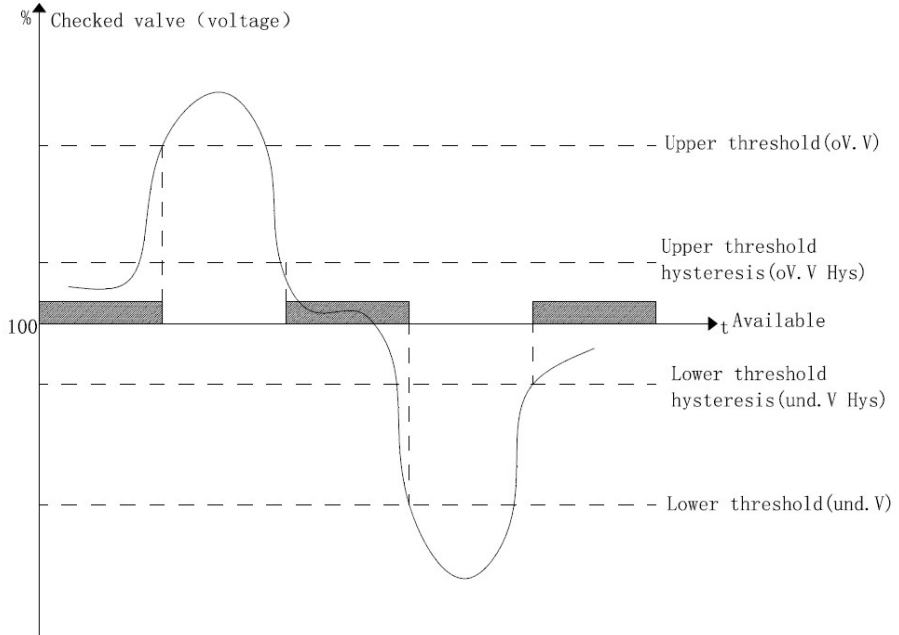
- Main menu consists of parameter setting, Voltage Levels Menu, Frequency Levels Menu, Timer Menu, Programmable Control, communication parameters and Language Menu to make it convenient for user to fast visit measuring value and revise parameters.
- Parameter setting: this operation is only valid under 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

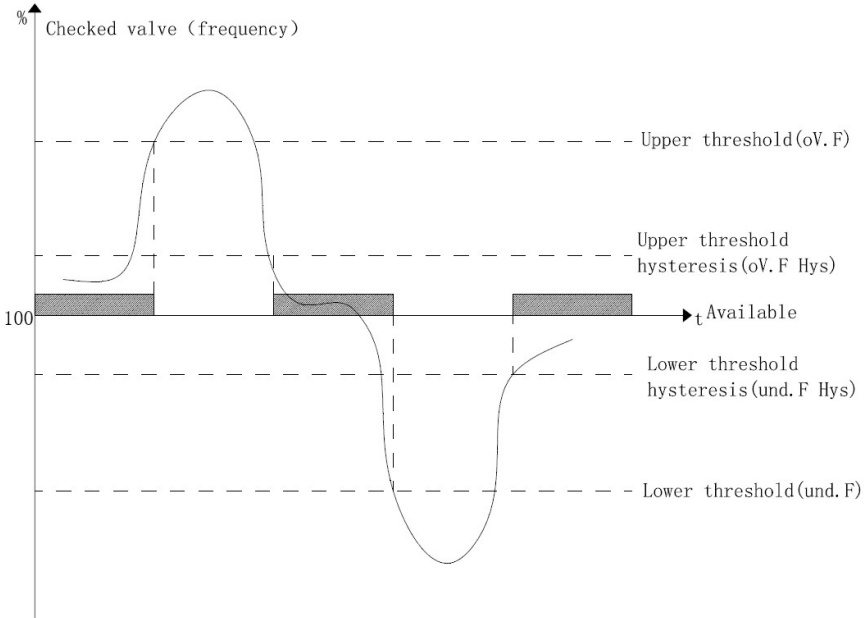
| No. | Option | Definition | Default | Adjustment Range |
|------|--------------------|---|---|--|
| 1.1 | NETWORK | Network Type | 4NBL | 4NBL |
| 1.2 | NOM.VOLT. | P-P Voltage | 400 | 50-690V |
| 1.3 | APP | M-M:Mains to Mains Supply M-G:Mains to Generator Supply G-M:Generator to Mains Supply | M-M | 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 | FACTORY SET | Set parameter to factory 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 ODT | 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 ODT | 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 |

Parameter Setting

| | |
|--------------|---|
| 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 (load shield) |
| 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.

Parameter Setting

'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 | | <p>I Main: S1 is normal power supply, next to it is actual voltage value.</p> <p>II Backup: S2 is reserved power supply, next to it is actual voltage value.</p> |

•Data display icon, refer to pic2-pic7

| Page | Example | Note | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|--|---------------|-------|-----|-------|------|-------|-------|------|-------|-------|------|-------|------|-----|-----|------------------------------------|-----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--|--|--|--|--|--|
| Pic2. Data display | <table border="1"> <thead> <tr> <th>NOR</th> <th>L-L</th> <th>BAP</th> </tr> </thead> <tbody> <tr> <td>380 V</td> <td>L1L2</td> <td>381 V</td> </tr> <tr> <td>380 V</td> <td>L2L3</td> <td>379 V</td> </tr> <tr> <td>381 V</td> <td>L3L1</td> <td>382 V</td> </tr> <tr> <td colspan="3">PROG</td> </tr> </tbody> </table> | NOR | L-L | BAP | 380 V | L1L2 | 381 V | 380 V | L2L3 | 379 V | 381 V | L3L1 | 382 V | PROG | | | Line voltage(380V) | | | | | | | | | | | | | | | | | | | | | |
| NOR | L-L | BAP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 380 V | L1L2 | 381 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 380 V | L2L3 | 379 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 381 V | L3L1 | 382 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pic3. Data display | <table border="1"> <thead> <tr> <th>NOR</th> <th>L-N</th> <th>BAP</th> </tr> </thead> <tbody> <tr> <td>220 V</td> <td>L1</td> <td>221 V</td> </tr> <tr> <td>221 V</td> <td>L2</td> <td>220 V</td> </tr> <tr> <td>220 V</td> <td>L3</td> <td>220 V</td> </tr> <tr> <td colspan="3">PROG</td> </tr> </tbody> </table> | NOR | L-N | BAP | 220 V | L1 | 221 V | 221 V | L2 | 220 V | 220 V | L3 | 220 V | PROG | | | Phase voltage(220V) | | | | | | | | | | | | | | | | | | | | | |
| NOR | L-N | BAP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 220 V | L1 | 221 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 221 V | L2 | 220 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 220 V | L3 | 220 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pic4. Data display | <table border="1"> <thead> <tr> <th>NOR</th> <th>PHASE</th> <th>BAP</th> </tr> </thead> <tbody> <tr> <td>0°</td> <td>L1</td> <td>0°</td> </tr> <tr> <td>118°</td> <td>L2</td> <td>122°</td> </tr> <tr> <td>241°</td> <td>L3</td> <td>241°</td> </tr> <tr> <td colspan="3">PROG</td> </tr> </tbody> </table> | NOR | PHASE | BAP | 0° | L1 | 0° | 118° | L2 | 122° | 241° | L3 | 241° | PROG | | | Actual phase 0° 120° 240° | | | | | | | | | | | | | | | | | | | | | |
| NOR | PHASE | BAP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0° | L1 | 0° | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 118° | L2 | 122° | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 241° | L3 | 241° | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pic5. Data display | <table border="1"> <thead> <tr> <th colspan="6">ALARMS STATUS</th> </tr> </thead> <tbody> <tr> <td>A01</td> <td>A05</td> <td>A09</td> <td>A13</td> <td>A17</td> <td></td> </tr> <tr> <td>A02</td> <td>A06</td> <td>A10</td> <td>A14</td> <td>A18</td> <td></td> </tr> <tr> <td>A03</td> <td>A07</td> <td>A11</td> <td>A15</td> <td>A19</td> <td>GLA</td> </tr> <tr> <td>A04</td> <td>A08</td> <td>A12</td> <td>A16</td> <td>A20</td> <td>GLB</td> </tr> <tr> <td colspan="6">PROG</td> </tr> </tbody> </table> | ALARMS STATUS | | | | | | A01 | A05 | A09 | A13 | A17 | | A02 | A06 | A10 | A14 | A18 | | A03 | A07 | A11 | A15 | A19 | GLA | A04 | A08 | A12 | A16 | A20 | GLB | PROG | | | | | | Alarm status, If there is A01 alarm, A01 in the pic will be selected |
| ALARMS STATUS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A01 | A05 | A09 | A13 | A17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A02 | A06 | A10 | A14 | A18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A03 | A07 | A11 | A15 | A19 | GLA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A04 | A08 | A12 | A16 | A20 | GLB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Parameter Setting

| | | | | | | | |
|-----------------------|---------------|-----|----------|--------|-----|-----|---|
| Pic6. Data display | ALARMS STATUS | | | | | | Alarm status, If there is A21 alarm, A21 in the pic will be selected |
| | A21 | A25 | A29 | UA1 | UA5 | | |
| | A22 | A26 | A30 | UA2 | UA6 | | |
| | A23 | A27 | A31 | UA3 | UA7 | GLA | |
| | A24 | A28 | A32 | UA4 | UA8 | GLB | |
| | PROG | | | | | | |
| Pic7. Data display | NOR | | CTRL THD | | BAP | | Control threshold, The max/min value of voltage and frequency of power supply |
| | 460V | MAX | ULL | 460V | | | |
| | 340V | MIN | ULL | 340V | | | |
| | 52.5Hz | MAX | Hz | 52.5Hz | | | |
| | 47.5Hz | MIN | Hz | 47.5Hz | | | |
| | PROG | | | | | | |

●Statistic data icon, refer to pic8-pic12

| Page | Example | Note | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|--|------------|----------------|----------|----------|---------|------------------|------------|---------|--------|---------|--------|---------|------|----|--------|--|----|----|---|----|----|----|----|----|----|------|--|--|--|--|--|
| Pic8 Statistic data | <table border="1"> <tr> <th colspan="3">STATISTICS</th> </tr> <tr> <td>000000</td> <td>CNT AUT</td> <td>000000</td> </tr> <tr> <td>000000</td> <td>CNT MAN</td> <td>000000</td> </tr> <tr> <td>000000h</td> <td>T-LOAD</td> <td>000000h</td> </tr> <tr> <td colspan="3">PROG</td> </tr> </table> | STATISTICS | | | 000000 | CNT AUT | 000000 | 000000 | CNT MAN | 000000 | 000000h | T-LOAD | 000000h | PROG | | | 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 | | | | | | | | | | | | | | | |
| STATISTICS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 000000 | CNT AUT | 000000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 000000 | CNT MAN | 000000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 000000h | T-LOAD | 000000h | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pic9 Statistic data | <table border="1"> <tr> <th colspan="3">STATISTICS</th> </tr> <tr> <td>T-NOLOAD</td> <td></td> <td>000001h</td> </tr> <tr> <td>POWER DOWN</td> <td></td> <td>000013</td> </tr> <tr> <td>A03</td> <td></td> <td>000001</td> </tr> <tr> <td>A04</td> <td></td> <td>000001</td> </tr> <tr> <td colspan="3">PROG</td> </tr> </table> | STATISTICS | | | T-NOLOAD | | 000001h | POWER DOWN | | 000013 | A03 | | 000001 | A04 | | 000001 | PROG | | | T-NOLOAD: Load blackout time POWER DOWN: Power off times A03: A03 alarm times A04: A04 alarm times | | | | | | | | | | | | |
| STATISTICS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T-NOLOAD | | 000001h | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| POWER DOWN | | 000013 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A03 | | 000001 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A04 | | 000001 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pic10 Statistic data | <table border="1"> <tr> <th colspan="5">INPUTS</th> </tr> <tr> <td>01</td> <td>05</td> <td>09</td> <td>13</td> <td>17</td> </tr> <tr> <td>02</td> <td>06</td> <td>10</td> <td>14</td> <td>18</td> </tr> <tr> <td>03</td> <td>07</td> <td>11</td> <td>15</td> <td>19</td> </tr> <tr> <td>04</td> <td>08</td> <td>12</td> <td>16</td> <td>20</td> </tr> <tr> <td colspan="5">PROG</td> </tr> </table> | INPUTS | | | | | 01 | 05 | 09 | 13 | 17 | 02 | 06 | 10 | 14 | 18 | 03 | 07 | 11 | 15 | 19 | 04 | 08 | 12 | 16 | 20 | PROG | | | | | Programmable input, if there is signal detected in 01 input port, then the 01 will be selected.(1~3 has been locked) |
| INPUTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 01 | 05 | 09 | 13 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 02 | 06 | 10 | 14 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03 | 07 | 11 | 15 | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 04 | 08 | 12 | 16 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pic11 Statistic data | <table border="1"> <tr> <th colspan="5">OUTPUTS</th> </tr> <tr> <td>01</td> <td>05</td> <td>09</td> <td>13</td> <td>17</td> </tr> <tr> <td>02</td> <td>06</td> <td>10</td> <td>14</td> <td>18</td> </tr> <tr> <td>03</td> <td>07</td> <td>11</td> <td>15</td> <td>19</td> </tr> <tr> <td>04</td> <td>08</td> <td>12</td> <td>16</td> <td>20</td> </tr> <tr> <td colspan="5">PROG</td> </tr> </table> | OUTPUTS | | | | | 01 | 05 | 09 | 13 | 17 | 02 | 06 | 10 | 14 | 18 | 03 | 07 | 11 | 15 | 19 | 04 | 08 | 12 | 16 | 20 | PROG | | | | | Programmable output, if there is output action in 01 output port, the 01 will be selected.(1~6 has been locked) |
| OUTPUTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 01 | 05 | 09 | 13 | 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 02 | 06 | 10 | 14 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03 | 07 | 11 | 15 | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 04 | 08 | 12 | 16 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pic12 Statistic data | <table border="1"> <tr> <th colspan="1">DATE/TIME</th> </tr> <tr> <td>2017-04-07 (5)</td> </tr> <tr> <td>10:28:02</td> </tr> <tr> <td>29.4℃</td> </tr> <tr> <td>PROG</td> </tr> </table> | DATE/TIME | 2017-04-07 (5) | 10:28:02 | 29.4℃ | PROG | time/temperature | | | | | | | | | | | | | | | | | | | | | | | | | |
| DATE/TIME | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2017-04-07 (5) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10:28:02 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29.4℃ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PROG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

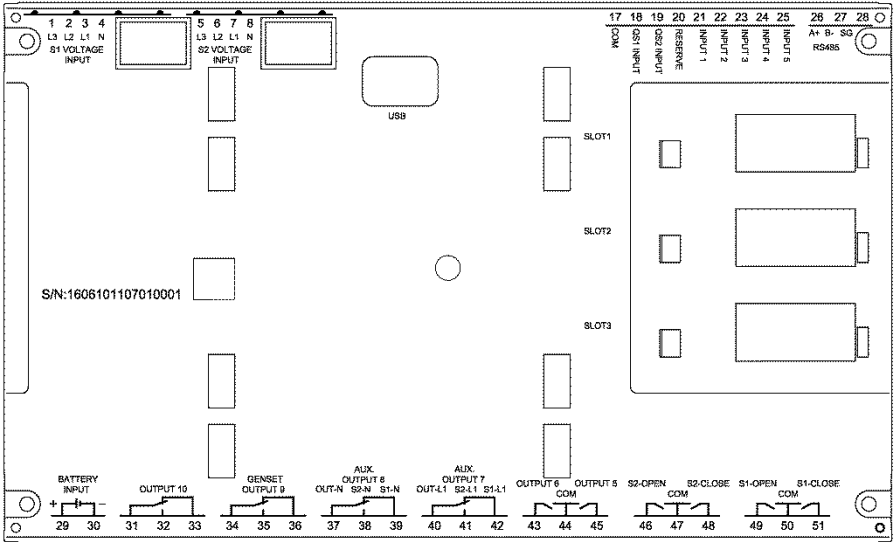
●Event record Icon, refer to pic13

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

●Commissioning Icon, refer to pic14、 15

| page | example | Note |
|------------------------|---|---|
| Pic14 Test off load | <pre> Main 01/03 Test offload [] Test onload ----- TEST </pre> | 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 | <pre> Main 02/03 Test offload Test onload [] ----- TEST </pre> | 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



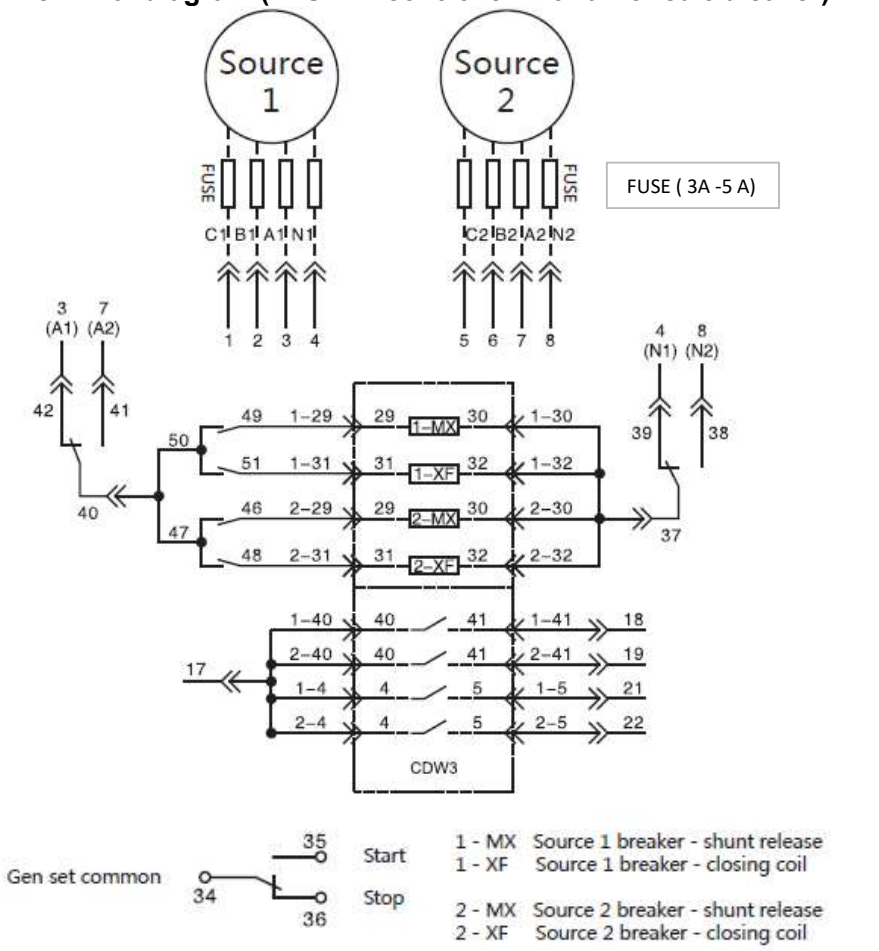
6.1 Terminal definition and description:

| Terminal No. | Item | Function description | Note |
|--------------|-----------|-------------------------------------|--|
| 1 | L3 | S1 AC 3-phase 4-wire voltage input | If single-phase, only L1, N connected L1, N are 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, N are 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 | | |

Mechanical dimension and panel opening

| | | | |
|----|----------|---------------------------------------|------------------------------------|
| 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 |

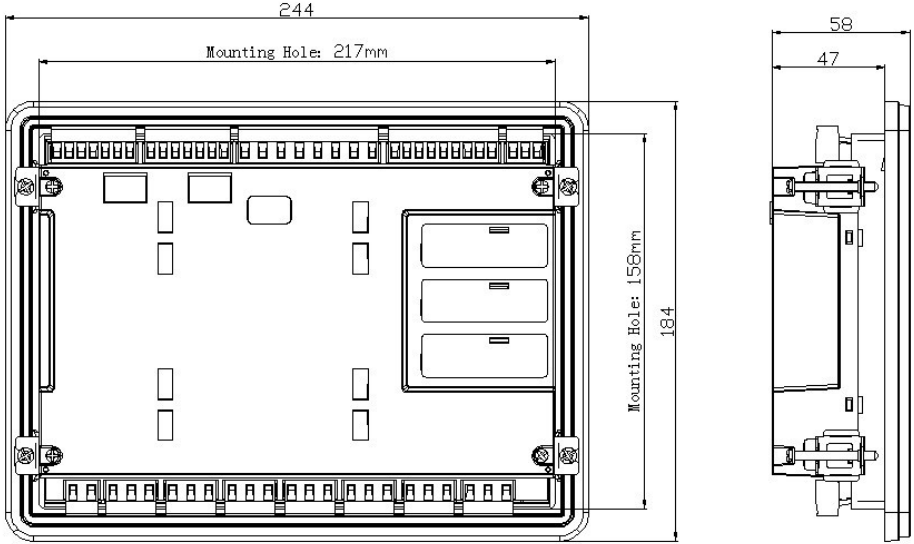
6.2 Terminal diagram (ATSE2C controller with air circuit breaker)



Note

- 1: Default 2m cable
- 2: MX - shunt release 220VAC
XF - Closing coil 220VAC
OF3 - Auxiliary contact
AL - Alarm contact
- 3: The ACB must install with cable 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 |

Mechanical dimension and panel opening

| | |
|--|-----------------------------|
| 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(PPOSITION O)、 49(PPOSITION II)、 51(PPOSITION 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 <i>Note 3</i> | Default: 1 | 1 |
| 40006 | RW | Backlight ON time (min) | 1~31 <i>Note4</i> | 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 <i>Note5</i> | Default: 3 | 1 |
| 40019 | RW | -Data format | 1~5 <i>Note6</i> | 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 <i>Note7</i> | Default: 1 | 1 |
| 40030 | RW | APP | 1~4 <i>Note8</i> | 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 <i>Note9</i> | Default: 2 | 1 |
| 40033 | RW | Off position | 1~3 <i>Note10</i> | 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 <i>Note11</i> | Default: 3 | 1 |
| 40041 | RW | Aux Connector | 1~3 <i>Note14</i> | 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 ODT(sec) | 0~20 | | |
| 40090 | RW | Signal hold time (0. 1s/unit) | 0~200 | Default: 50 | 1 |
| 40094 | RW | II → I ODT(sec) | 0~20 | | |
| 40106 | RW | Genset Cool Time (min) | 0~60 | Default: 5 | 1 |
| 40147 | RW | Programmable input1 -input function | <i>Note12</i> | 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 | <i>Note12</i> | 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 | <i>Note12</i> | 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 | <i>Note12</i> | 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 | <i>Note12</i> | 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 | <i>Note 13</i> | Default: 1 | 1 |
| 40234 | RW | Output mode | 1:normally open 2:normally close | Default: 1 | 1 |
| 40235 | RW | Programmable output2 -output function | <i>Note 13</i> | Default: 1 | 1 |
| 40237 | RW | Output mode | 1:NO 2:NC | Default: 1 | 1 |
| 40238 | RW | Programmable output3 -output function | <i>Note 13</i> | Default: 1 | 1 |
| 40240 | RW | Output mode | 1:NO 2:NC | Default: 1 | 1 |
| 40241 | RW | Programmable output4 -output function | <i>Note 13</i> | Default: 1 | 1 |
| 40243 | RW | Output mode | 1:NO 2:NC | Default: 1 | 1 |
| 40244 | RW | Programmable output5 -output function | <i>Note 13</i> | Default: 1 | 1 |
| 40246 | RW | Output mode | 1:NO 2:NC | Default: 1 | 1 |
| 40247 | RW | Programmable output6 -output function | <i>Note 13</i> | Default: 1 | 1 |
| 40249 | RW | Output mode | 1:NO 2:NC | Default: 1 | 1 |
| 40564 | RW | Save Parameter | <i>Note 15</i> | Default: 1 | 1 |
| 40565 | RW | Position switch | 5:position I 2:position II 4:position 0 | | 1 |
| 40566 | RW | System RealTime | <i>Note 16</i> | | 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.