



AUTOMATIC TRANSFER SWITCHES

SAFE IN OUR HANDS

INSTRUCTION MANUAL



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1. GENERAL INFORMATION

The Mercia Range is a PC class automatic transfer switch, rated working current 16A to 630A and to be used in power systems for ensuring the continuity of the supply, by transferring a load between two power supply sources.

The switch has three working positions of Main (I), Standby (II) and Off (0), which can be used for fire-fighting linkage and infrequent connection and disconnection of power supply systems. These units are mainly used in hospitals, shopping malls, banks, chemical industry, metallurgy, high-rise buildings, military facilities and fire-fighting occasions where power failure is not allowed.

The product conforms to IEC60947-6-1: Low-voltage switchgear and control gear - Part 6-1: Multiple function equipment-transfer switching equipment.

2. WORKING CONDITIONS

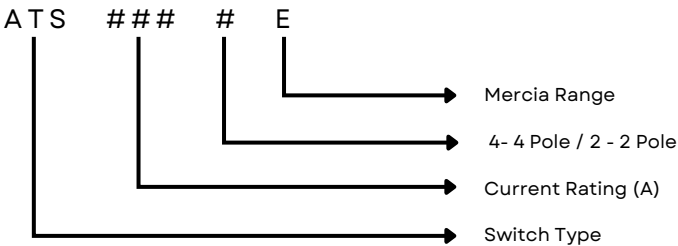
- 2.1 Ambient temperature: -5°C ~ $+40^{\circ}\text{C}$, average temperature within 24h must not exceed $+35^{\circ}\text{C}$.
- 2.2 Humidity: When the highest temperature is $+40^{\circ}\text{C}$, the relative humidity in the air must not exceed 50%. Higher relative humidity is allowed at lower temperatures, for example, up to 90% at $+25^{\circ}\text{C}$. Special measures should be taken for the occasional condensation due to temperature changes.
- 2.3 Installation altitude: The altitude of the installation site must not exceed 2000m.
- 2.4 Pollution degree: Level 3.
- 2.5 EMC electromagnetic compatibility: Class B (public).

Note: If the usage environment does not meet the above conditions, it should be explained to the manufacturer.

3. TRANSPORTATION AND STORAGE CONDITIONS

- 3.1 The product should not be exposed to rain or snow during transportation and storage.
- 3.2 Transportation and storage temperature range: -25°C ~ $+55^{\circ}\text{C}$, up to $+70^{\circ}\text{C}$ in a short time (within 24h).

4. MODEL DEFINITION



5. TECHNICAL DATA

| Application | Sym | Unit | 32A-80A | 100A-125A | 160A-250A | 400A-630A |
|---|--------------|---------|-----------------------------|-----------------------------|-------------------------|-------------------------|
| No. Of Poles | | | 2, 3, 4 | 2, 3, 4 | 2, 3, 4 | 2, 3, 4 |
| Rated Working Current | I_e | A | 16, 20, 25, 32, 40, 63, 80 | 80, 100, 125 | 140, 160, 200, 225, 250 | 315, 350, 400, 500, 630 |
| Rated Working Voltage | U_e | V | AC400V/415V 50Hz | | | |
| Rated Insulation Voltage | U_i | V | 690 | | | |
| Rated Impulse Withstand Voltage | U_{imp} | kV | 8 | | | |
| Utilization Category | | | AC33B | | | |
| Rated Short Time Withstand Current (0.2s) | I_{cw} | kA | 10 | 10 | 10 | 25 |
| Rated Short Time Making Capacity | I_{cm} | kA Peak | 15 | 20 | 30 | 50 |
| Rated Control Voltage | U_c | V | AC230V 50Hz | | | |
| Contact Transfer Time | Seconds | | 0.6±10% | 0.6±10% | 1.0±10% | 1.5±10% |
| Transfer Time | Seconds | | 1.2±10% | 1.25±10% | 2.1±10% | 3.3±10% |
| Recovery Transfer Time | Seconds | | (1.2+Time Delay) ±10% | (1.25+Time Delay) ±10% | (2.1+Time Delay) ±10% | (3.3+Time Delay) ±10% |
| Power Off Duration | Seconds | | (0.6±20%)+(Time Delay ±10%) | (0.6±20%)+(Time Delay ±10%) | (1.0+Time Delay)±10% | (1.5+Time Delay)±10% |
| Operational Cycles | Without Load | | 8500 | 8500 | 7000 | 3000 |
| | With Load | | 1500 | 1500 | 1000 | 1000 |
| | Total | | 10000 | 10000 | 8000 | 4000 |
| Switch Dimension | | mm | 230x125x130 | 245x130x122 | 295x175x175 | 430x272x228 |
| Weight | | kg | 2.5 | 4.3 | 9 | 22.5 |

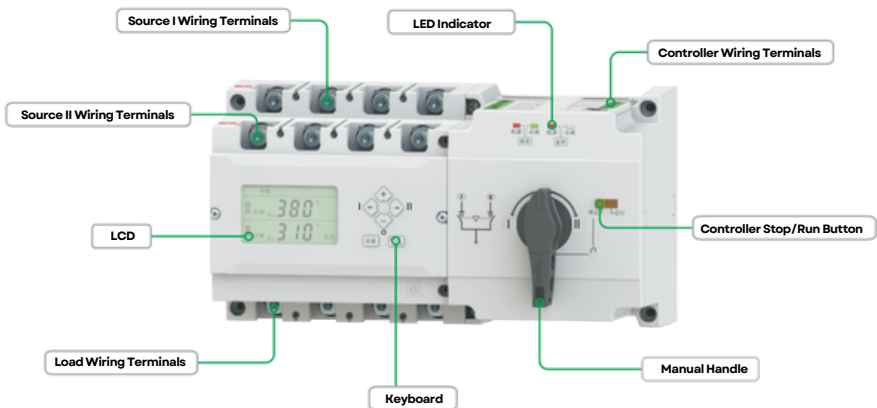
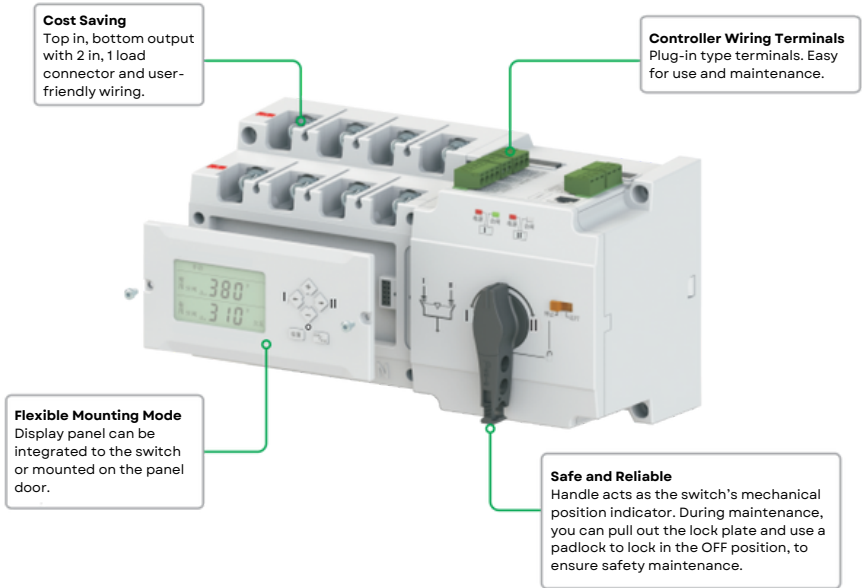
6. OPTIONAL MODULES

Functionality

| | |
|--------------------------|---|
| Control Voltage | AC230V 50/60Hz |
| Aux. Power | DC24V |
| Power Consumption | ≤10W |
| Status Position | 3 working positions of Main (I), Standby (II) & Off (O) |
| Operation Mode | Auto Mode, Manual Operation, Control Panel Operation, Remote Operation, RS485 Communication |
| Transfer Mode | Auto Transfer, Auto Recovery/Auto Transfer, No Auto Recovery |
| Display Mode | LED/LCD |
| Source 1 Monitoring | Under voltage, over voltage, power loss monitoring (A, B & C phase) |
| Source 2 Monitoring | Under voltage, over voltage, power loss monitoring (A, B & C phase) |
| Generator Control | Yes (Gen Start and Stop) |
| Fire-Linkage Control | One group voltage-free signal to cut off both power, and 1 group voltage-free feedback |
| Frequency Monitoring | ±20% Adjustable |
| Generator Test | Yes |
| Transfer Delay Timer (s) | Default 5s, 0~180s (Adjustable) |
| Recovery Delay Timer (s) | Default 5s, 0~180s (Adjustable) |
| Under Voltage Range | Default 187V, 154~198V Adjustable |
| Over Voltage Range | Default 263V, 242~330V Adjustable |
| Source Priority | Source 1 Priority (Default), Source 2 Priority, No Priority |
| RS485 Communication | Yes |

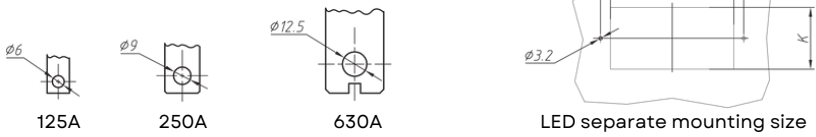
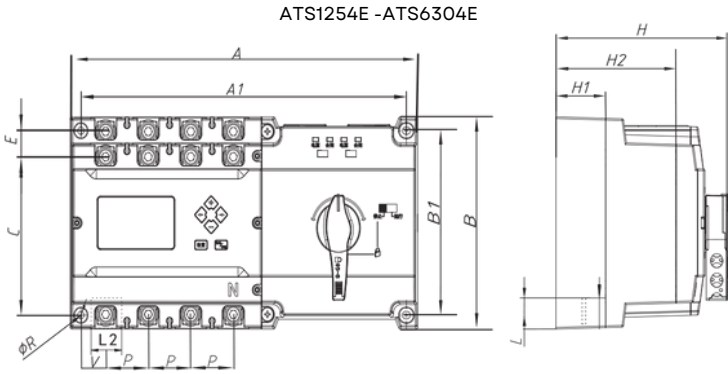
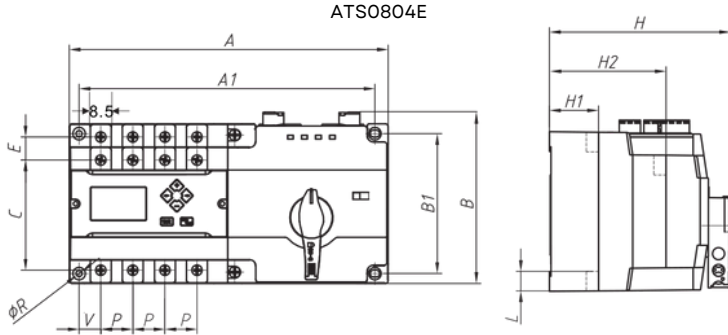
7. STRUCTURE AND OVERALL DIMENSIONS

7.1 Structure Introduction



7. STRUCTURE AND OVERALL DIMENSIONS

7.2 Overall Mounting Dimensions



| Size | Outline Dims (mm) | | | | | | | | | | Mounting Size (mm) | | | | | | LCD Mounting Size | | |
|------|-------------------|-----|-----|-----|-----|----|-----|------|------|-----|--------------------|----|----|------|-----|-----|-------------------|--|--|
| In | A | B | H | A1 | B1 | H1 | H2 | C | E | R | V | P | L | L2 | F | J | K | | |
| 80 | 230 | 125 | 130 | 212 | 100 | 35 | 83 | 79 | 16.5 | 4 | 15.5 | 23 | 14 | 9 | 105 | 98 | 41 | | |
| 125 | 245 | 130 | 122 | 230 | 113 | 31 | 71 | 97.5 | 15.5 | 4.5 | 25 | 30 | 16 | 21.5 | | | | | |
| 250 | 295 | 175 | 175 | 275 | 152 | 29 | 99 | 132 | 20 | 6 | 32 | 35 | 29 | 27 | 127 | 112 | 56 | | |
| 630 | 430 | 272 | 228 | 400 | 240 | 41 | 131 | 207 | 30 | 9 | 50 | 58 | 38 | 42 | | | | | |

8. CONTROLLER FEATURES

8.1 Controller Introduction

- Source I/II over/under-voltage monitoring
- Source I/II over/under frequency monitoring
- Source I/II power ON running status LED indication
- When the switch is working normally, the LCD displays the switch information. When adjusting the parameters, it will display the parameter settings. Before transfer operation and transfer delay timer is displayed in a countdown mode.
- Fire-fighting linkage function: The controller has a set of passive fire-fighting signal input terminals, which can accept external passive fire-fighting signals, and transfer to double off position. It also has a set of passive feedback signal output terminals, which can return the switch's in-position signal to the firefighting equipment.
- Generator control function: The controller has a set of relay dry contacts to control the start and stop of the generator, and can set the start delay and stop delay of the generator (needs to be connected to the auxiliary power supply DC24V).
- Communication function: Configure RS485 communication port and Modbus-RTU communication protocol, which can realize remote signalling, remote measurement, remote control, and remote adjustment (D-type controller).

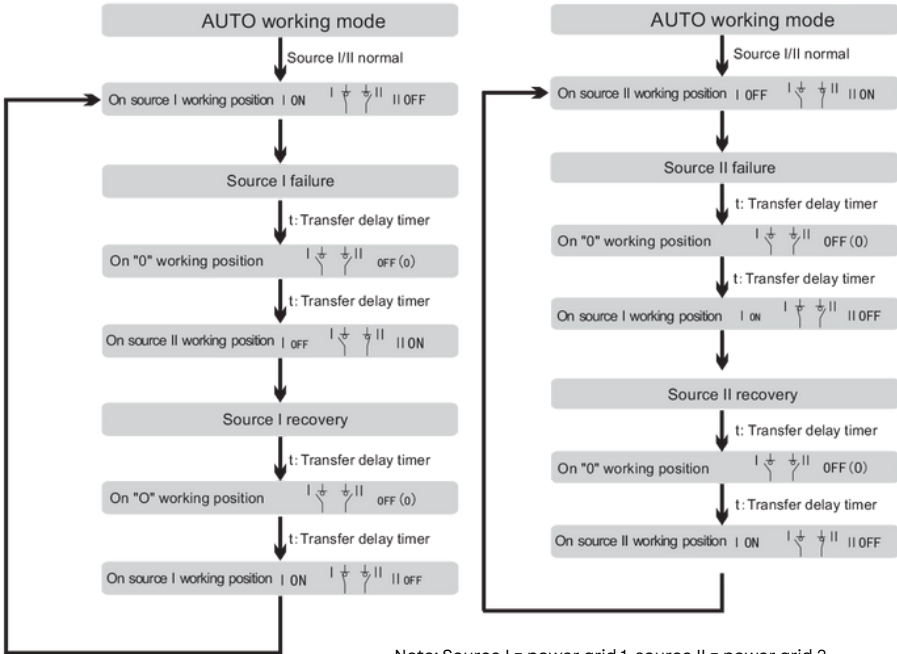
8.2 Transfer Mode

1. Power Grid

Transfer mode: auto transfer auto recovery. A menu set: A-9 "001" source I priority

2. Power Grid

Transfer mode: auto transfer auto recovery. A menu set: A-9 "002" source II priority



Note: Source I = power grid 1, source II = power grid 2

8. CONTROLLER FEATURES

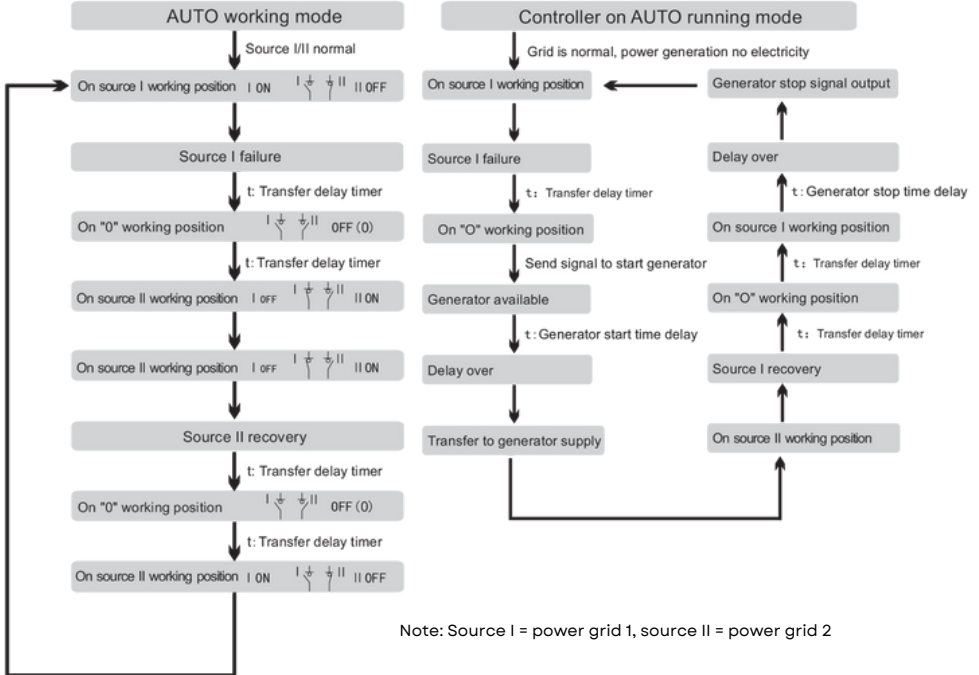
3. Power Grid - Power Grid

Transfer mode: auto transfer no auto recovery.

A menu set: A-9 "000" no source priority

4. Power Grid - Generator

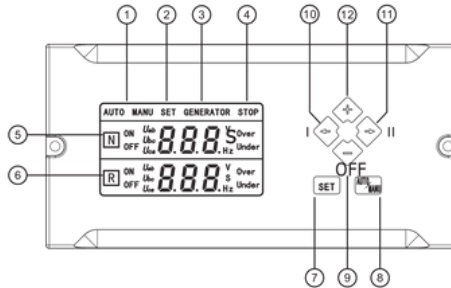
Transfer mode: A-9 "001" source I priority



8. CONTROLLER FEATURES

8.3 Control Panel Introduction

1. AUTO/MANU working status indicator.
2. SET entry setting menu indicator.
3. GEN generator start working status indicator.
4. STOP fire linkage working status indicator (force transfer to double off working position).
5. Source I voltage, frequency display.
6. Source II voltage, frequency display.
7. SET key: Press the entry setting interface on SET menu. Press to confirm the settings.
8. AUTO/MANU key to select transfer mode. AUTO is auto transfer, MANU is manual transfer. On SET menu, press to save the settings and exit.
9. On manual working mode and when either source I/II is available, press key transfer to double off working position: on SET menu, use the turn down key.
10. On manual working mode and when source I is available, press key transfer to source I supply: on SET menu, use the scroll up key.
11. On manual working mode and when source II is available, press key transfer to source II supply: on SET menu, use the scroll down key.
12. On setting menu, press to turn up.



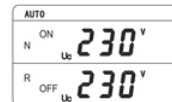
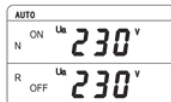
8.4 Basic Keyboards Operations

- On the main interface (voltage/frequency display), press “SET” key. Enter the password interface and input password “888”. Press “AUTO/MANU” key to exit. Press “SET” key to confirm password. If the password is correct, it will enter the settings menu. If wrong, it will go back to the voltage/frequency display.
- On main menu interface, “SET” key is to enter menu, “← →” keys are to scroll up/down the menu. “+ -” are to turn up/down the specific values, and “AUTO/MANU” key is to save and exit the menu.
- On menu interface, press “AUTO/MANU” key to go back to main menu display interface. When not at the main menu interface and there is no operation for a while, it will go back to main menu interface automatically.
- Calibrate voltage. On the main interface, press and hold “AUTO/MANU” key until come to password interface and input password “888” to enter the voltage calibration interface. Press key “+ -” to turn up/down the volts to calibrate the voltage at each phase voltage.
- On main menu interface, press and hold “-” key for 5s, it will restore factory settings. (Caution)

8.5 System Operation

When power on, it will display the main interface.

- On the main interface, the controller auto runs and source I is priority. ATS is on source I working position, LCD display supplying source’s three phase voltage in turn and supply power’s frequency. Below are examples of display in normal running status.



8. CONTROLLER FEATURES

Password Interface

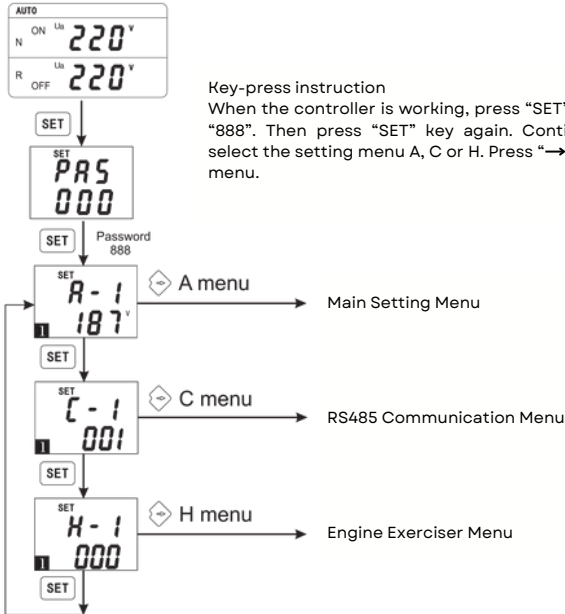
- The default password is "888". Below is an example of the password interface. Input password to the entry setting menu. If the password is wrong, then press "SET" key to go back and retry.



For easy operation, the before factory has set default values as below:

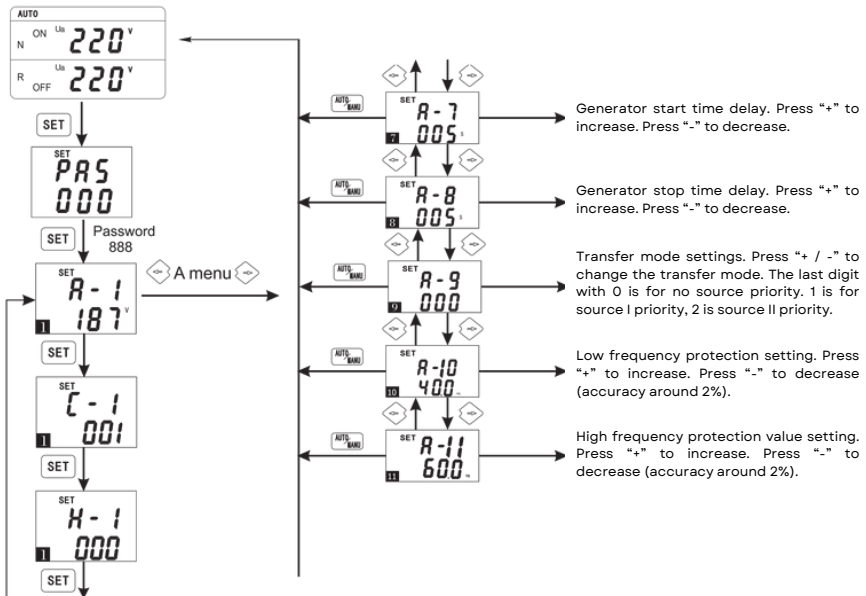
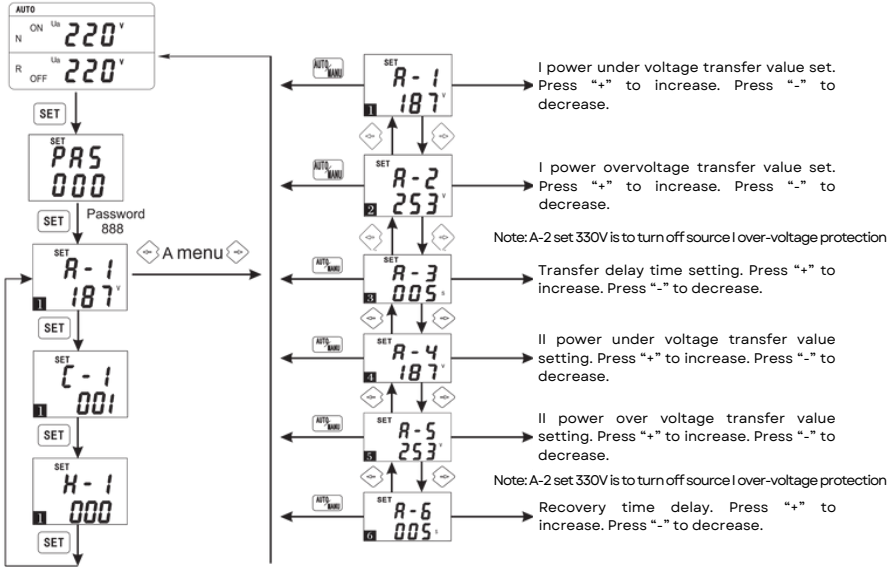
- A-1: Source I under voltage transfer volts: 187V.
- A-2: Source I over voltage transfer volts: 263V.
- A-3: Source I to source II transfer time delay: 5s.
- A-4: Source II under voltage transfer volts: 187V.
- A-5: Source II over voltage transfer volts: 263V.
- A-6: Source II to source I transfer time delay: 5s.
- A-7: Generator start time delay: 5s.
- A-8: Generator stop time delay: 5s.
- A-9: Transfer modes: 1 (source I priority).
- A-10: Under frequency lower limit: 40Hz/50Hz (base on 50Hz/60Hz).
- A-11: Over frequency upper limit: 60Hz/70Hz (base on 50Hz/60Hz).

Parameter Settings. Note: customers can customise the value per actual application, with reference to the setting below:



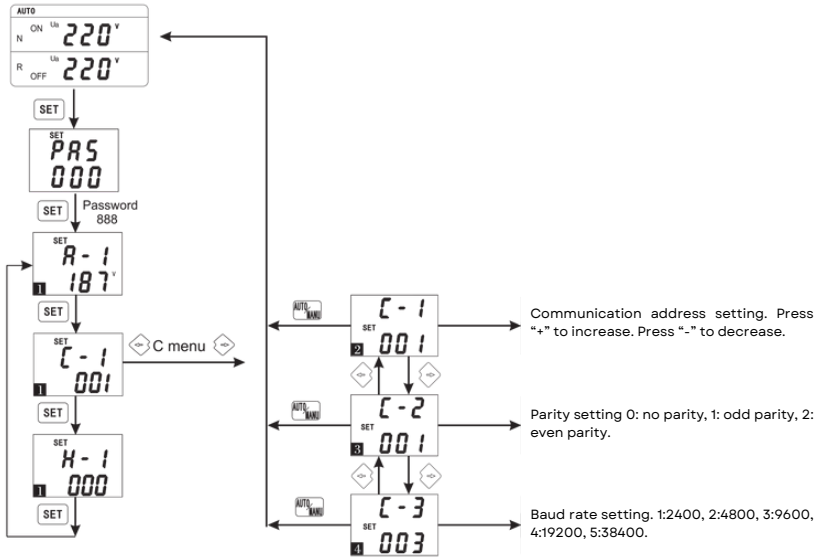
8. CONTROLLER FEATURES

A Menu: Transfer Value Settings

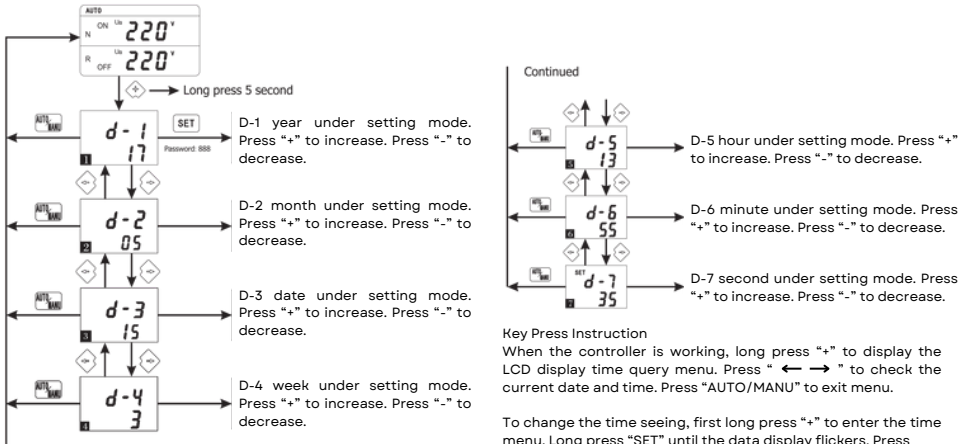


8. CONTROLLER FEATURES

C Menu: Communication Modbus



D Menu: To Calibrate Time Up To Date (base time for setting H menu generator start/stop timer)



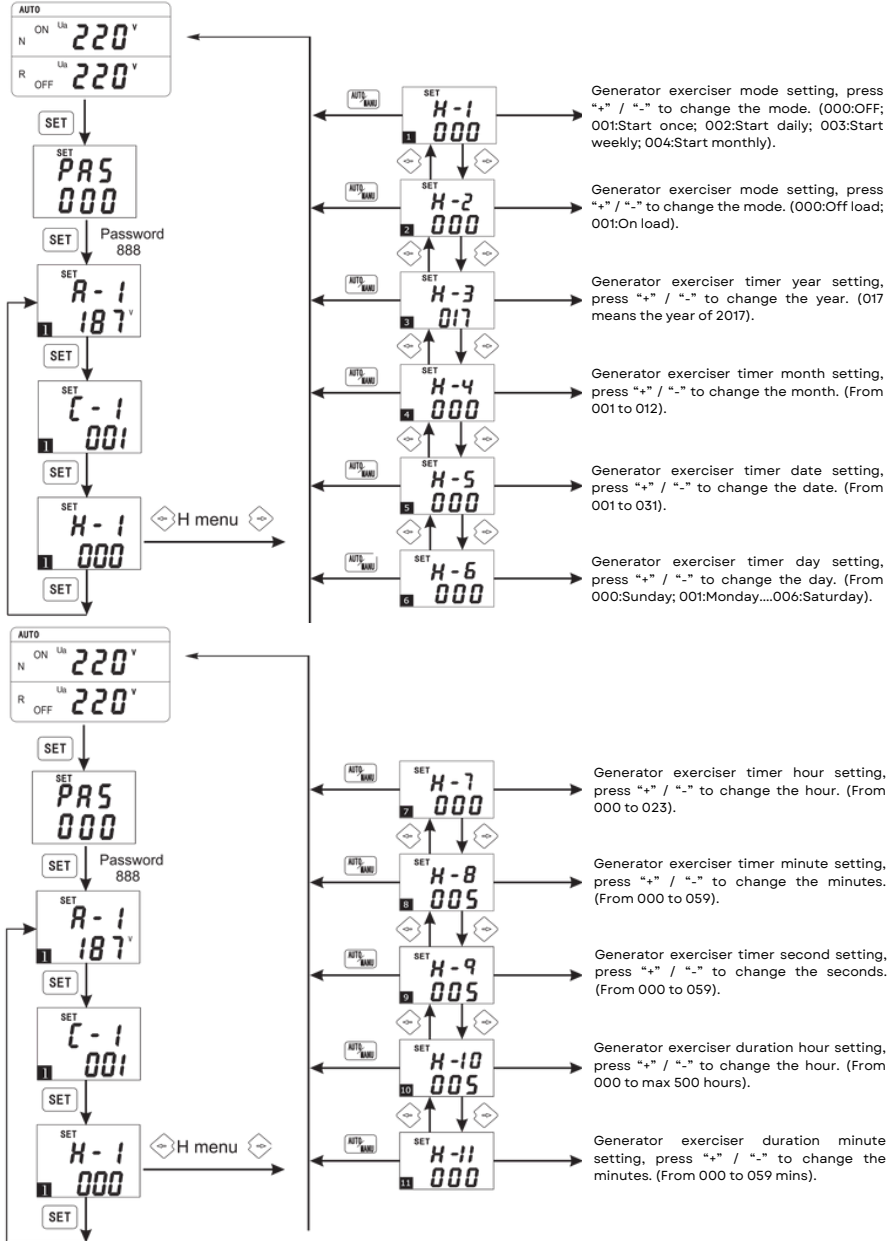
Key Press Instruction

When the controller is working, long press "+" to display the LCD display time query menu. Press "← →" to check the current date and time. Press "AUTO/MANU" to exit menu.

To change the time seeing, first long press "+" to enter the time menu. Long press "SET" until the data display flickers. Press "← →" to change the setting item. Press "+" or "-" to increase or decrease the data. Press "SET" to exit the menu. If there is no operation for 10 seconds, it will automatically exit the menu.

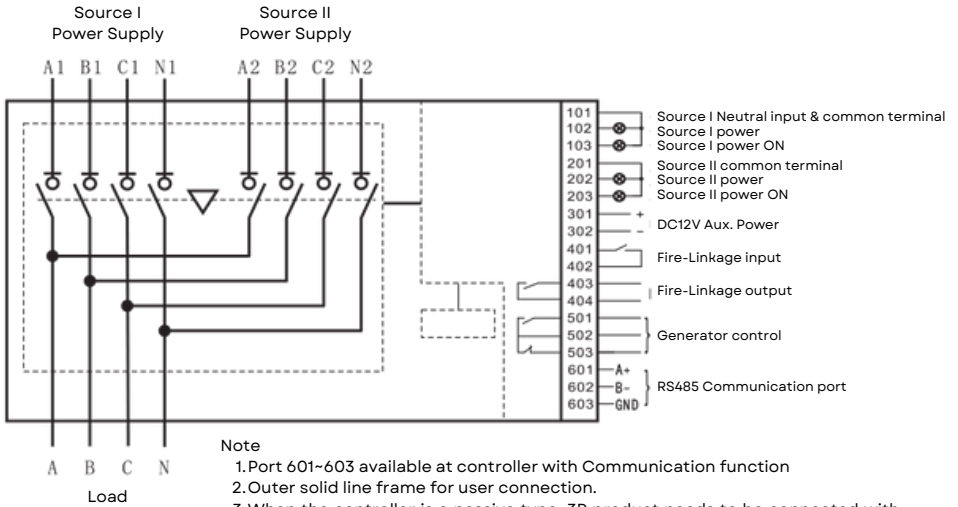
8. CONTROLLER FEATURES

H Menu: Generator Start/Stop Timer

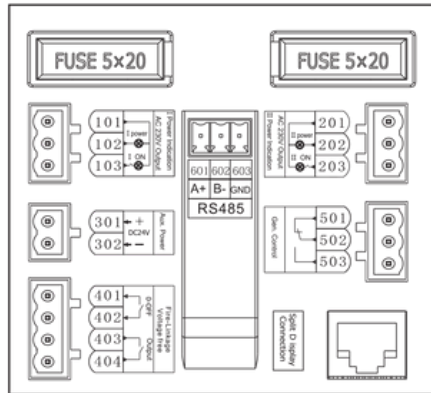


9. WIRING DIAGRAMS

9.1 Control modules wiring terminals instruction - 4P wiring diagram



D Module + RS485



9.2 Control terminals instruction

- 101-103: Source I power supply signal output (active output AC230V / 0.5A)
- 101: Source I external LED indicator common neutral line and 3P neutral line input terminal
- 101, 102: Source I power signal indication
- 101, 103: Source I Closing signal indication
- 201-203: Source II power supply signal output (active output AC230V/0.5A)
- 201: Source II external LED indicator common neutral line and 3P neutral line input terminal
- 201, 202: Source II power signal indication
- 201, 203: Source II closing signal indication

Note: 101-"N1" and 201-"N2" are control power neutral wires for 3P products.

9. WIRING DIAGRAMS

9.2 301-302: auxiliary power input port (DC12V/24V).

- The purpose of connecting the auxiliary power supply is to control the start delay timer of the generator when the switch is in the grid-generation mode.
- If there is no auxiliary power supply, the start delay time of the generator is 0s.
- If the generator delay function is not needed, the auxiliary power supply is not needed.

401-402: Fire linkage control port (passive).

- 401, 402- firefighting linkage signal input: 401, 402 ports can only be connected to a set of normally open passive contacts, when the normally open contacts are closed, the controller immediately controls the switch transfer to double off position, cut off the load power.

Note: If the fire signal is active, the signal must be transfer via a small relay then connect the normally open contact to the controller port.

403, 404: Fire linkage signal output.

- Inside ports 403 and 404 are a set of passive contacts that are normally open, which are used for the feedback signal of fire-fighting actions.
- Ports 403 and 404 are normally open, when the fire signal is input and the switch is switched to the double off position, the contacts 403 and 404 are closed.

Note: When the fire-fighting function is activated, the switch is in the double off position. If the switch needs to resume normal operation, press any key on the controller panel to remove the fire-fighting signal.

501-503: generator signal output port (passive).

- When the backup (II) power supply is a generator group, user can realize the automatic start function after connecting to the generator controller through terminals 501-503, inside ports of 501-503 are a group passive relay dry contact, 502 is the common terminal, 501 is the normally open point, and 503 is the normally closed point.
- In the grid-generator working mode and the controller is in AUTO mode, when the main power supply is normal, 502-501 is closed, and 502-503 is disconnected, if the main power supply fails, and when the standby is out of power, 502-503 will be closed after the generator start delay timer, and 502-501 will be disconnected at the same time, and send signal to start the generator.
- After the transfer delay timer is over, the switch will first switch to the double position. When the power generation group comes in, the controller will execute the generator warm-up delay timer. After the delay, the switch will automatically switch to the standby power supply side. During the standby side power supply process, when the main power supply is restored, if it is normal, the controller will control the switch to transfer to the main power supply after the return delay timer.
- After the main power ON, 502-501 will be closed after generator stop delay timer. At the same time, 502-503 will be disconnected and send signal to stop generator. Action flow can be referred to 8.2 Grid-generator mode.

601-603: RS485 communication port.

- 601 A+; 602 B; 603 GND; communication protocol MODBUS-RTU.

10. USAGE AND MAINTENANCE

- 10.1 The switch should be installed correctly. Check whether the content of the nameplate meets the requirements before installation, and confirm that the switch is in the off state.
- 10.2 When wiring the switch, it should be connected strictly in accordance with the signs. For three-pole products, the neutral wire should be connected to the neutral terminal. Connect the fire linkage and power generation control according to the actual situation, make sure the product is well grounded.
- 10.3 When the switch is working normally, the "Run/Stop" button needs to be set to the "Run" position. When the controller needs to be locked, it can be set to the "Stop" position. The controller cannot be operated in the "Stop" position.
- 10.4 Please regularly check (recommended every three months) the product is working properly. Clear the dust on the surface of the enclosure to maintain good insulation. Pay attention to moisture-proof and dust-proof for switches that are not used for a long time. Before use, operate the ATS manually or automatically to debug.

11. COMMON FAULTS & TROUBLESHOOTING METHODS

| Fault Status | Fault Causes | Troubleshooting |
|---|--|--|
| After power on, controller LED indicator not lighting | Power supply failure or bad connection | 1. Check input power supply 2. Check cable connection 3. Check controller's fuse |
| LCD suggest phase loss | Bad connection at the phase | Tight cable connection |
| | Phase voltage lower than set under-voltage value | Power supply failure, check mains power supply |
| After power on, ATS not working, but LCD display normal | Controller in "STOP" MODE | Switch the controller to "RUN" status. |

12. WARRANTY

In order to serve every customer well, Craig & Derricott makes the following instructions on the warranty period and after-sales service.

When the user follows the storage and use conditions, the product will be covered under warranty for 12 months from the date of delivery. During this period, users need to use and maintain in accordance with the instructions. When the product is damaged or cannot be used normally due to quality problems, Craig & Derricott will repair or replace it free of charge.

If the failure is caused by the following reasons, it can be repaired or replaced for a fee even within the warranty period:

- 1.Failure caused by improper use, self-modification and unauthorized disassembly;
- 2.Damage caused by dropping or bad installation;
- 3.Exceed the standard specifications for product use;
- 4.Due to factors: such as earthquakes, fires, lightning strikes, other natural disasters and secondary disasters.

When this product is at the end of its service life, in order to protect our environment, please recycle the product or its parts and materials.

For full details, please visit our website:
<https://craigandderricott.co.uk/customer-services/ats-warranty/>



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