



AT20 Series Installation Manual

Read this manual thoroughly and retain it for future reference before installation and operation. This manual is subject to revision due to technical upgrades or manufacturing improvements.

1 Scope of Application

The AT20 series is a PC Class automatic transfer switching equipment (ATSE) for dual power supplies. This product features the following:

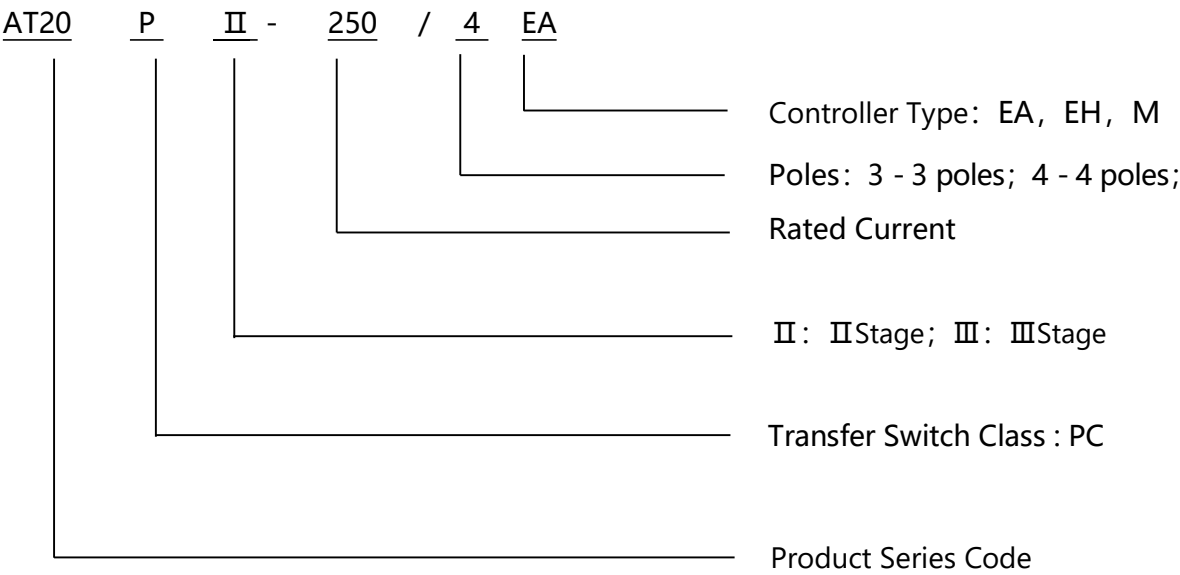
- Contact transfer time $\leq 100\text{ms}$
- Service category: AC-33B
- Internal sampling, avoiding complicated wiring
- Multiple controller types available for user selection

This product complies with *IEC60947-6-1 Low-voltage Switchgear and Controlgear - Part 6-1: Multi-function Equipment - Transfer Switching Equipment*.

2 Normal Operating Conditions

- 2.1 The AT20 can operate in an environment with a temperature range of $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$, and the storage temperature range is $-30^{\circ}\text{C} \sim +75^{\circ}\text{C}$.
- 2.2 The altitude of the installation site shall not exceed 2000m.
- 2.3 The relative humidity of the air at the installation site shall not exceed 50% when the maximum ambient air temperature is $+40^{\circ}\text{C}$; higher relative humidity is allowed at lower temperatures. When the monthly average minimum temperature in the wettest month is $+20^{\circ}\text{C}$, the relative humidity can reach 90%. Appropriate measures shall be taken to prevent condensation caused by temperature changes.
- 2.4 The product shall be installed in a medium without explosion hazard and in a location free from rain and snow erosion.
- 2.5 Pollution Degree 3
- 2.6 Installation Category: III, IV
- 2.7 Front Protection Level: IP30

3 Model Designation



4 Main Performance Indicators

4.1 Main Parameters of the Main Body

Model Specification	AT20 Series					
Frame Grade	125A		250A		630A	
Rated Current	16A、20A、25A、 32A、40A、50A、 63A、80A、 100A、125A		160A、200A、 250A		350A、400A、 500A、630A	
Rated Voltage	AC380V/400V					
Wiring Method	F Front Wiring					
Service Category	AC-33B (10Ie making, 10Ie breaking) Cos φ =0.35, when(Ie≤100A, Cos φ =0.45)					
Rated Insulation Voltage	AC800V (Main Circuit)、AC300V (Control Circuit)					
Rated Insulation Voltage	Class-PC					
Pole Number	3P	4P	3P	4P	3P	4P
Weight (kg) (For Reference Only)	8.3	9	9.3	10.5	21.5	25.2
Rated Limiting Short-Circuit Current	65kA					
Transfer Time	≤0.2s					
Mechanical Life	10000 Cycles					
Electrical Life	6000 Cycles				2000 Cycles	
Auxiliary Switch	Power sides I and II each have 1 normally open and 1 normally closed non-source contact; Switching Capacity: AC220V 10A					

4.2 Controller Functions

Function	EA	EH	MT100
Display Mode	LED	LCD	LCD
Power Supply Voltage Display	-	■	■
Power Failure Indication	■	■	■

Transfer Switch Status Indication	■	■	■
Automatic Closing and Automatic Restoring	■	■	■
Automatic Closing without Automatic Restoring	■	■	■
Grid Generator	□	□	■
Manual Operation	■	■	■
Remote Control	■	■	■
Transfer Delay	■	■	■
Communication Accessory	-	□	■
Programmable Output	-	-	■

Note: ■ indicates standard configuration, □ indicates optional configuration, - indicates no such function.

5 Mechanical Operation

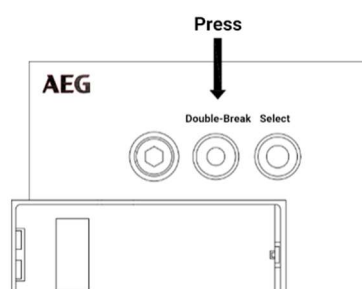
For the AT20 series automatic transfer switching equipment (in accordance with IEC 60947-6-1), manual mechanical operation shall be performed under the following circumstances:

- ① When there is no power supply connected at all;
- ② When inspecting the operating mechanism and contact parts under no-load conditions;
- ③ When the electric operation fails and cannot act.

Note: After manual operation, be sure to remove the handle from the transfer switch.

5.1 Manual Opening

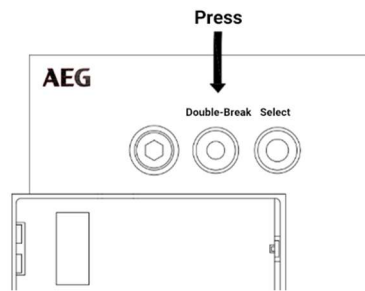
Only applicable to AT20-Ⅲ; AT20-Ⅱ can only transfer but cannot open.



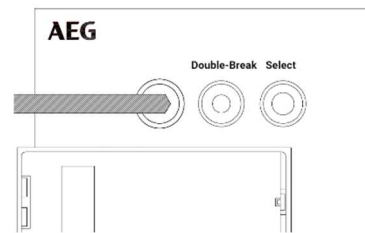
Remove the operating handle and press the middle "double-open" button to complete opening. (Please confirm the closing and opening status of the automatic transfer switch by the closing and opening indicator plates installed on each pole's main circuit.)

5.2 Power Source I Closing

AT20-III can be performed only after operation (1) is completed, while AT20-II does not require this operation.



(1)



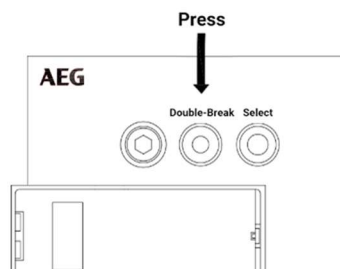
(2)

1. Remove the operating handle and press the middle "double-open" button to complete the opening.

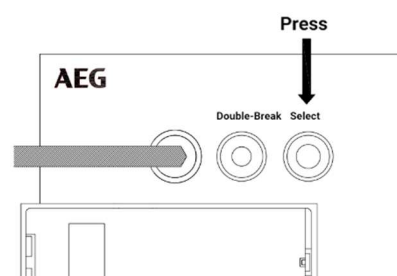
2. Install the operating handle and rotate the handle in the direction marked on the product to close Power Source I.

5.3 Power Source II Closing

AT20-III can be performed only after operation (1) is completed, while AT20-II does not require operation (1).



(1)



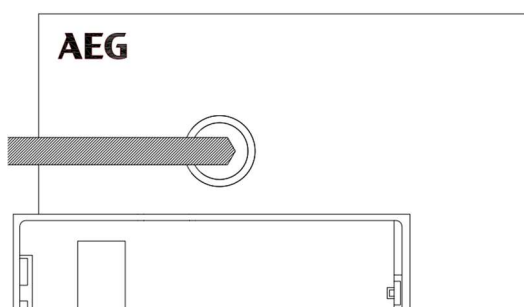
(2)

1. Remove the operating handle and press the middle "double-open" button to complete the opening.

2. Install the operating handle, press the right-side "select" button, and then rotate the handle in the direction marked on the product to close Power Source II.

5.4 Closing of AT20-II Product

AT20-II



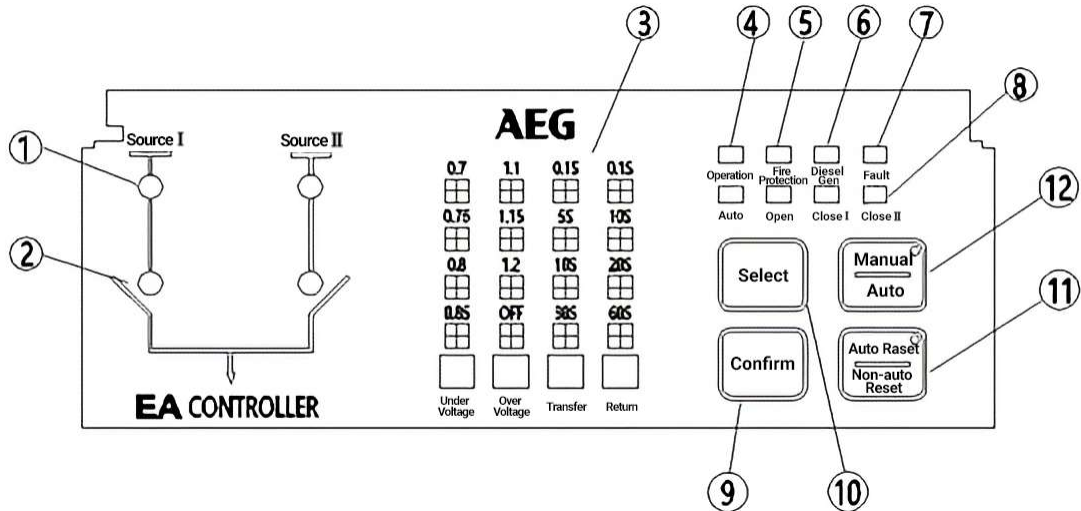
The AT20-II product has no "double-open" or "select" buttons; you can directly rotate the handle in the direction marked on the product to close (the circuit).

Note: ■ Strictly follow the direction marked on the product for closing operation; reverse operation may cause product damage.

6 Controller Functions

6.1 AT20 EA (DIP Switch Type) Controller

6.1.1 Panel and Description



1. Power Supply Voltage Indicator
2. Transfer Switch Status Indicator
3. Parameter Setting Dial
4. Controller Normal Operation Indicator
5. Fire Protection Indicator
6. Oil Generator Indicator
7. Fault Indicator
8. Power Supply Closing and Opening Indicator
9. Confirm Button: used in conjunction with the Select Button; long press for 3 seconds to reset
10. Select Button: used in conjunction with the Confirm Button
11. Automatic Control Mode Indicator
12. "Manual/Auto" Button: switches between the controller's automatic control operation and manual control operation

6.1.2 Operating Modes

The controller has three operating modes: Manual Control, Automatic Control, and remote Control.

The priority is in the order of: Manual Control → Remote Control → Automatic Control.

6.1.3 Manual Control Operation

Via the "Manual/Auto" Button, switch the controller to the Manual Control mode, and operate the transfer switch for switching via button operations.

Power Source I On (10) — Power Source I closes, connecting Power Source I.

Power Source II On (01) — Power Source II closes, connecting Power Source II.

Full Open (00) — Both Power Source I and Power Source II open, disconnecting the two power supplies.

6.1.4 Remote Control Operation

When the controller is in the Automatic Control mode, it can automatically switch to the Remote Control mode by short-circuiting the Power Source I Closing Terminal, Power Source II Closing Terminal, and Full Open Terminal respectively via non-powered self-locking contacts. In the Remote Control mode, remote control of the opening and closing operations of Power Source I and Power Source II for the transfer switch can be performed to realize the selective connection of the two power supplies. After releasing the short-circuited points, the controller restores to the Automatic Control mode.

Note: *The Remote Control mode is only valid when the controller is in the Automatic mode.*

6.1.5 Automatic Control Operation

Via the "Manual/Auto" Button, switch the controller to the Automatic Control mode, and the controller will automatically select the operating logic.

Auto-transfer with Auto-restore (R)

The controller controls the transfer switch to automatically switch between two power supplies (referred to as Power Source I and Power Source II respectively). Under normal conditions, Power Source I shall supply power, and the transfer switch shall be in the Power Source I position. When the input voltage on the Power Source I side is abnormal (undervoltage, overvoltage, or phase loss occurs in any phase) and Power Source II is normal, the switch will automatically switch to the Power Source II position after the user-set delay time, with Power Source II supplying power. When Power Source I returns to normal, the switch will automatically switch back to the Power Source I position after the user-set delay time, with Power Source I resuming power supply.

Power Source II must be in a normal state, and its three-phase voltage shall meet the specified value. When the input voltage on the Power Source II side is abnormal (abnormality or phase loss in any phase), the controller will display a fault.

Power Source I	Power Source II	Control Function
Normal	Normal	Power Source I supplies power
Normal	Abnormal	Power Source I supplies power; Power Source II displays fault
Abnormal	Normal	Power Source II supplies power - Three-Stage Type: After T1 delay, Power Source I is opened; after T3 delay, Power Source II is closed, and Power Source II supplies power - Two-Stage Type: After T1 delay, Power Source I is opened and Power Source II is closed, and Power Source II supplies power
Restores to Normal	Normal / Abnormal	Power Source I supplies power - Three-Stage Type: After T2 delay, Power Source II is opened; after T3 delay, Power Source I is closed, and Power Source I supplies power - Two-Stage Type: After T2 delay, Power Source II is opened and Power Source I is closed, and Power Source I supplies power

Auto-transfer without Auto-restore (S)

The controller controls the transfer switch to automatically switch between two power supplies (referred to as Power Source I and Power Source II respectively). Under normal conditions, Power Source I shall supply power, and the transfer switch shall be in the Power Source I position. When the input voltage on the Power Source I side is abnormal, the switch will automatically switch to the Power Source II position after the user-set delay time, with Power Source II supplying power.

When the input voltage on the Power Source I side restores to normal, the switch cannot automatically switch back to the Power Source I position. Only when the input voltage on the Power Source II side is abnormal (undervoltage, overvoltage, or phase loss occurs in any phase) and Power Source I is normal, the switch will return to the Power Source I position after the user-set return delay time, with Power Source I resuming power supply.

Power Source II must be in a normal state, and its three-phase voltage shall meet the specified value. When the input voltage on the Power Source II side is abnormal (undervoltage, overvoltage, or phase loss occurs in any phase), the controller will display a fault.

Power Source I	Power Source II	Control Function
Normal	Normal	Power Source I supplies power
Abnormal	Normal	Power Source II supplies power - Three-Stage Type: After T1 delay, Power Source I is opened; after T3 delay, Power Source II is closed, and Power Source II supplies power - Two-Stage Type: After T1 delay, Power Source I is opened and Power Source II is closed, and Power Source II supplies power
Restores to Normal	Normal	Power Source II still supplies power
Normal	Abnormal	Power Source I supplies power - Three-Stage Type: After T2 delay, Power Source II is opened; after T3 delay, Power Source I is closed, and Power Source I supplies power - Two-Stage Type: After T2 delay, Power Source II is opened and Power Source I is closed, and Power Source I supplies power

Grid-Generator (F)

Grid-Generator (F): The controller controls the transfer switch to automatically switch between two power supplies: the grid and the self-provided generator. Under normal conditions, Power Source I (grid) shall supply power, and the transfer switch shall be in the Power Source I position. When the grid voltage is abnormal, the controller sends a generator start command after the user-set delay time; the generator starts generating power upon receiving the command. When the generator voltage reaches the normal voltage, Power Source I (grid) is first opened, then the switch is switched to the Power Source II (generator) position to connect the generator power supply.

When the grid (Power Source I) returns to normal, the switch switches back to the Power Source I position after the user-set delay time, and Power Source I (grid) resumes power supply. If the grid voltage remains normal within the fixed delay time, the generator command will be canceled, and the generator stops generating power.

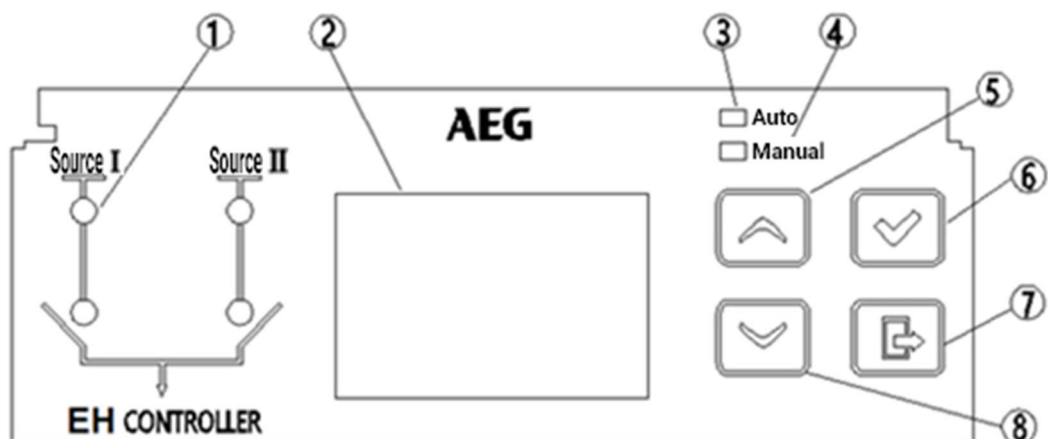
Power Source I	Power Source II	Control Function
Normal	Not generating power	Grid (Power Source I) supplies power

Abnormal	Start the generator	Grid (Power Source I) supplies power first; after T1 delay, a generator start command is sent, and the generator starts generating power
Abnormal	Generator voltage is normal	Generator (Power Source II) supplies power - Three-Stage Type: Open Power Source I (grid); after T3 delay, close Power Source II (generator), and the generator (Power Source II) supplies power - Two-Stage Type: Open Power Source I (grid) and close Power Source II (generator), and the generator (Power Source II) supplies power
Restores to Normal	Normal	Grid (Power Source I) supplies power - Three-Stage Type: After T2 delay, open Power Source II (generator); after T3 delay, close Power Source I (grid), and the grid (Power Source I) supplies power - Two-Stage Type: After T2 delay, open Power Source II (generator) and close Power Source I (grid), and the grid (Power Source I) supplies power
Normal	Stop generating power	After T5 delay, a generator stop command is sent

Note: (1) T1: Transfer switch switching delay time;
 (2) T2: Transfer switch return delay time;
 (3) T3: Transfer switch closing delay time (user non-adjustable; this parameter is not available for Two-Stage Type controllers);
 (4) T5: Power Source I normal confirmation delay time (fixed at 60s, user non-adjustable).

6.2 AT20 EH (LCD Type) Controller

6.2.1 Panel and Description



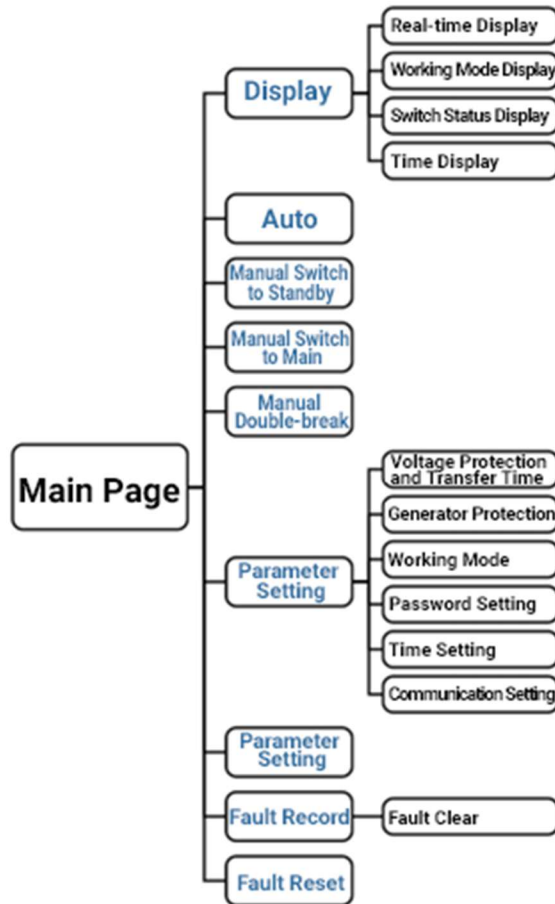
1. Status Indicator
2. LCD Display Screen
3. Automatic Control Indicator
4. Manual Control Indicator
5. "▲" Key: Including menu scrolling up function and digital increment operation function
6. "Confirm/Menu" Key: Including confirmation function and menu function; long press for 3 seconds to reset
7. "Cancel/Return" Key: Including cancellation function and return function
8. "▼" Key: Including menu scrolling down function and digital decrement operation function

6.2.2 Operating Modes

The controller has three operating modes: Manual Control, Automatic Control, and Remote Control.

The priority is in the order of: Manual Control → Remote Control → Automatic Control.

6.2.3 Operation and Description of the Menu Page



6.2.4 Manual Control Operation

On the menu interface, press the "▲" and "▼" keys until the Manual Operation item is selected, then press the "Confirm" key. The transfer switch can be switched via key operations.

Power Source I On (10) — Power Source I closes, connecting Power Source I.

Power Source II On (01) — Power Source II closes, connecting Power Source II.

Full Open (00) — Both Power Source I and Power Source II open, disconnecting the two power supplies.

6.2.5 Remote Control Operation

When the controller is in the Automatic Control mode, it can automatically switch to the

Remote Control mode by short-circuiting the Power Source I Closing Terminal, Power Source II Closing Terminal, and Full Open Terminal respectively via non-powered self-locking contacts. In the Remote Control mode, remote control of the opening and closing operations of Power Source I and Power Source II for the transfer switch can be performed to realize the selective connection of the two power supplies. After releasing the short-circuited points, the controller restores to the Automatic Control mode.

Note: *The Remote Control mode is only valid when the controller is in the Automatic mode.*

6.2.6 Communication Control Operation

For the AT20 EH (LCD Type) controller, this function is optional. When the controller is in the Communication Control state, the Automatic Operation Indicator and Manual Operation Indicator flash simultaneously.

In the Manual Control mode, send commands via the network to remotely control the transfer switch switching.

Power Source I On (10) — Power Source I closes, connecting Power Source I.

Power Source II On (01) — Power Source II closes, connecting Power Source II.

Full Open (00) — Both Power Source I and Power Source II open, disconnecting the two power supplies.

6.2.7 Automatic Control Operation

On the menu interface, press the "▲" and "▼" keys until the Automatic Operation item is selected, then press the "Confirm" key to switch the controller to the Automatic Control mode, where the controller automatically selects the operating logic.

Auto-transfer with Auto-restore (R)

Auto-transfer with Auto-restore (R): The controller controls the transfer switch to automatically switch between two power supplies (referred to as Power Source I and Power Source II respectively). Under normal conditions, Power Source I shall supply power, and the transfer switch shall be in the Power Source I position. When the input voltage on the Power Source I side is abnormal (undervoltage, overvoltage, or phase loss occurs in any phase) and Power Source II is normal, the switch will automatically switch to the Power Source II position after the user-set delay time, with Power Source II supplying power. When Power Source I returns to normal, the switch will automatically switch back to the Power Source I position after the user-set delay time, with Power Source I resuming power supply.

Power Source II must be in a normal state, and its three-phase voltage shall meet the specified value. When the input voltage on the Power Source II side is abnormal (abnormality or phase loss in any phase), the controller will display a fault.

Power Source I	Power Source II	Control Function
Normal	Normal	Power Source I supplies power
Normal	Abnormal	Power Source I supplies power; Power Source II displays fault
Abnormal	Normal	Power Source II supplies power - Three-Stage Type: After T1 delay, Power Source I is opened; after T3 delay, Power Source II is closed, and Power Source II supplies power - Two-Stage Type: After T1 delay, Power Source I is opened and Power Source II is closed, and Power Source II supplies power
Restores to Normal	Normal/Abnormal (for Power Source II)	Power Source I supplies power - Three-Stage Type: After T2 delay, Power Source II is opened; after T3 delay, Power Source I is closed, and Power Source I supplies power - Two-Stage Type: After T2 delay, Power Source II is opened and Power Source I is closed, and Power Source I supplies power

Auto-transfer without Auto-restore (S)

The controller controls the transfer switch to automatically switch between two power supplies (referred to as Power Source I and Power Source II respectively). Under normal conditions, Power Source I shall supply power, and the transfer switch shall be in the Power Source I position. When the input voltage on the Power Source I side is abnormal, the switch will automatically switch to the Power Source II position after the user-set delay time, with Power Source II supplying power.

When the input voltage on the Power Source I side restores to normal, the switch cannot automatically switch back to the Power Source I position. Only when the input voltage on the Power Source II side is abnormal (undervoltage, overvoltage, or phase loss occurs in any phase) and Power Source I is normal, the switch will return to the Power Source I position after the user-set return delay time, with Power Source I resuming power supply.

Power Source II must be in a normal state, and its three-phase voltage shall meet the specified value. When the input voltage on the Power Source II side is abnormal (undervoltage, overvoltage, or phase loss occurs in any phase), the controller will display a

fault.

Power Source I	Power Source II	Control Function
Normal	Normal	Power Source I supplies power
Abnormal	Normal	Power Source II supplies power - Three-Stage Type: After T1 delay, Power Source I is opened; after T3 delay, Power Source II is closed, and Power Source II supplies power - Two-Stage Type: After T1 delay, Power Source I is opened and Power Source II is closed, and Power Source II supplies power
Restores to Normal	Normal	Power Source II still supplies power
Normal	Abnormal	Power Source I supplies power - Three-Stage Type: After T2 delay, Power Source II is opened; after T3 delay, Power Source I is closed, and Power Source I supplies power - Two-Stage Type: After T2 delay, Power Source II is opened and Power Source I is closed, and Power Source I supplies power

Grid-Generator (F)

Grid-Generator (F): The controller controls the transfer switch to automatically switch between two power supplies: the grid and the self-provided generator. Under normal conditions, Power Source I (grid) shall supply power, and the transfer switch shall be in the Power Source I position. When the grid voltage is abnormal, the controller sends a generator start command after the user-set delay time; the generator starts generating power upon receiving the command. When the generator voltage reaches the normal voltage, Power Source I (grid) is first opened, then the switch is switched to the Power Source II (generator) position to connect the generator power supply.

When the grid (Power Source I) returns to normal, the switch switches back to the Power Source I position after the user-set delay time, and Power Source I (grid) resumes power supply. If the grid voltage remains normal within the fixed delay time, the generator command will be canceled, and the generator stops generating power.

Power Source I	Power Source II	Control Function
Normal	Not generating power	Grid (Power Source I) supplies power
Abnormal	Generator starting	Grid (Power Source I) supplies power; after T1 delay, a generator start command is sent, and the generator starts generating power
Abnormal	Generator voltage normal	Generator (Power Source II) supplies power - Three-Stage Type: Open Power Source I (grid); after T3 delay, close Power Source II (generator), and the generator (Power Source II) supplies power - Two-Stage Type: Open Power Source I (grid) and close Power Source II (generator), and the generator (Power Source II) supplies power
Restores to normal	Normal	Grid (Power Source I) supplies power - Three-Stage Type: After T2 delay, open Power Source II (generator); after T3 delay, close Power Source I (grid), and the grid (Power Source I) supplies power - Two-Stage Type: After T2 delay, open Power Source II (generator) and close Power Source I (grid), and the grid (Power Source I) supplies power
Normal	Stopping generating power	After T5 delay, a generator stop command is sent

Note: (1) T1: Transfer switch switching delay time;

(2) T2: Transfer switch return delay time;

(3) T3: Transfer switch closing delay time (user non-adjustable; this parameter is not available for Two-Stage Type controllers);

(4) T5: Power Source I normal confirmation delay time (fixed at 60s, user non-adjustable);

(5) Power supply normal: A power supply is deemed normal if its voltage is higher than the user-set undervoltage threshold U1 and lower than the user-set overvoltage threshold U2; otherwise, it is deemed abnormal.

6.3 MT100 Controller

6.3.1 Panel and Description





- | | |
|-------------------------------------|--|
| 1. LCD Display Screen | 9. Opening Key (valid in III Stage Mode) |
| 2. Alarm Indicator | 10. Power Source II Closing Key |
| 3. Automatic Control Indicator | 11. Scroll Down Key/Lamp Test Key |
| 4. Manual Status Indicator | 12. Setting/Confirm Key |
| 5. Power Source I Indicator | 13. Power Source II Indicator |
| 6. Power Source I Closing Indicator | 14. Power Source II Closing Indicator |
| 7. Manual-Auto Switch Key | |
| 8. Power Source I Closing Key | |

6.3.2 Description of Indicators and Buttons

Indicator	Description
Alarm Indicator	<ul style="list-style-type: none"> ● Slow flashing (1Hz) : Warning. ● Rapid flashing (5Hz) : Fault.
Auto Mode Indicator	Illuminates in automatic mode.
Manual Mode Indicator	Illuminates in manual mode.
Power Source I Status	<ul style="list-style-type: none"> ● Steady on : AC normal.

	<ul style="list-style-type: none"> ● Flashing : Abnormal. Off : No power.
Power I Closing Status	Illuminated when I switch auxiliary contact is valid.
Power II Closing Status	Illuminated when II switch auxiliary contact is valid.
Power Source II Status	<ul style="list-style-type: none"> ● Steady on : AC normal. ● Flashing : Abnormal. Off : No power.

Icon	Key	Function
	Manual/Automatic Key	Toggle between manual and automatic mode.
	I Power Closing Key	Close power source I (manual mode only).
	Opening Key	Disconnect load (three-position switch).
	II Power Closing Key	Close power source II (manual mode only).
	Set/Confirm Key	In the main interface, press this key to enter the menu page. In the menu interface, the confirm key can move the cursor and confirm setting information. Long press this key for 3 seconds in alarm status to clear the alarm.
	Down Key/Test Light Key	In the main interface, press this key to scroll down the display. In the menu interface, it can move the cursor down or decrease the number at the cursor position. In the main interface, long press this key for a test light, during which the LCD backlight lights up, the LCD displays all black, and all LED lights on the panel light up.

Note: Press the “Setting”  Key and “Down” Key  simultaneously to set the backlight to stay on. Press the two keys simultaneously again or power on the device again to cancel the backlight always-on mode.

6.3.3 Controller Interface




Item	Display Content
Parameter Settings	AC Settings; Switch Settings; Generator Set Settings; Scheduled Start/Stop Settings; Programmable Input Settings;

Item	Display Content
	Programmable Output Settings; Module Information Settings.
History Records	Operating Mode Switching Events; Start/Stop Events; Fault Events.
Auto-transfer with Auto-restore Settings	Auto-transfer with Auto-restore Settings; Mutual Standby Settings.
Manual Test Run	Manual start or stop of the device.
Date & Time Settings	Set the module's date and time.
Language Settings	Set the display language.
Cumulative Information	Current continuous power supply time; Last continuous power supply time; Cumulative power supply time of Power Source I ; Cumulative power supply time of Power Source II ; Cumulative closing times of Power Source I ; Cumulative closing times of Power Source II .
Controller Information	Model, Version Number, Release Date, and Startup Interface.

6.3.4 Alarm Information

No.	Status Name	Description
1	Power Source I Closing Failure	After the closing signal of Power Source I stops outputting, the switch fails to reach the successful closing position.
2	Power Source I Opening Failure	After the opening signal of Power Source I stops outputting, the switch fails to reach the successful opening position (applicable to MT100-III).
3	Power Source II Closing Failure	After the closing signal of Power Source II stops outputting, the switch fails to reach the successful closing position.
4	Power Source II Opening Failure	After the opening signal of Power Source II stops outputting, the switch fails to reach the successful opening position (applicable to MT100-III).
5	Forced Interruption Fault	The forced interruption (Fire Protection Non-Cutoff Input) action is set as a fault; when the forced interruption input is valid, a forced interruption warning alarm is triggered (applicable to MT100-III).
6	Power Source I & II Simultaneous Closing Alarm	The switches on both Power Source I and Power Source II sides are in the closing state.

6.3.5 Parameter Settings

In the main interface, press the “Setting” key  to enter the menu page, select "Parameter Settings", and then press the “Setting” key  to confirm. This will lead to the parameter settings password confirmation interface. Enter the correct password to access the parameter main interface. If the password is incorrect, it will exit directly back to the main interface. **The factory default password is: 01234.** In the parameter configuration page, long press the “Setting” key  to exit this interface and return to the main display interface.

No.	Parameter Name	Setting Range	Default Value	Description
AC Settings				
1	Power Source I Voltage Normal Delay Time	(0~3600) s	10	The time required to confirm that the voltage of Power Source I changes from abnormal to normal.
2	Power Source I Voltage Abnormal Delay Time	(0~3600)s	5	The time required to confirm that the voltage of Power Source I changes from normal to abnormal.
3	Power Source II Voltage Normal Delay Time	(0~3600)s	10	The time required to confirm that the voltage of Power Source II changes from abnormal to normal.
4	Power Source II Voltage Abnormal Delay Time	(0~3600)s	5	The time required to confirm that the voltage of Power Source II changes from normal to abnormal.
5	Main Power Selection Setting	(0~1)	0	0: Power Source I as main power, Power Source II as backup power 1: Power Source II as main power, Power Source I as backup power
6	System Type Setting	(0~2)	0	0: Power Source I (mains), Power Source II (generator) 1: Power Source I (generator), Power Source II (mains) 2: Power Source I (mains), Power Source II (mains)
7	AC Power	(0~3)	0	0: Three-Phase Four-Wire

No.	Parameter Name	Setting Range	Default Value	Description
	Supply Type			1: Three-Phase Three-Wire (requires custom configuration) 2: Two-Phase Three-Wire 3: Single-Phase Two-Wire
8	Rated Voltage	(0~30000)V	220	Rated voltage of the AC system.
9	Over-Voltage Enable	(0~1)	1	0: Disable 1: Enable
10	Over-Voltage Threshold	(0~200)%	120	Upper voltage limit; if the voltage exceeds this limit, it is deemed abnormal.
11	Over-Voltage Return Threshold	(0~200)%	115	Return threshold for over-voltage; the voltage is deemed normal only when it is lower than this threshold.
12	Under-Voltage Enable	(0~1)	1	0: Disable 1: Enable
13	Under-Voltage Threshold	(0~200)%	80	Lower voltage limit; if the voltage is lower than this limit, it is deemed abnormal.
14	Under-Voltage Return Threshold	(0~200)%	85	Return threshold for under-voltage; the voltage is deemed normal only when it is higher than this threshold.
15	Rated Frequency	(10.0~75.0)Hz	50.0	Rated frequency of the AC system.
16	Over-Frequency Enable	(0~1)	1	0: Disable 1: Enable
17	Over-Frequency Threshold	(0~200)%	110	Upper frequency limit; if the frequency exceeds this limit, it is deemed abnormal.
18	Over-Frequency Return Threshold	(0~ 200)%	104	Return threshold for over-frequency; the frequency is deemed normal only when it is lower than this threshold.
19	Under-Frequency Enable	(0~1)	1	0: Disable 1: Enable
20	Under-Frequency	(0~ 200)%	90	Lower frequency limit; if the frequency is lower than this limit, it is

No.	Parameter Name	Setting Range	Default Value	Description
	Threshold			deemed abnormal.
21	Under-Frequency Return Threshold	(0~ 200)%	96	Return threshold for under-frequency; the frequency is deemed normal only when it is higher than this threshold.
22	Phase Loss Monitoring Enable	(0~1)	1	0: Disable 1: Enable
23	Reverse Phase Sequence Monitoring Enable	(0~1)	1	0: Disable 1: Enable
24	Voltage Transformer Enable	(0-1)	0	0: Disable 1: Enable
25	Voltage Transformer Primary Voltage	(30-30000)V	100	
26	Voltage Transformer Secondary Voltage	(30-1000)V	100	
Switch Settings				
1	Closing Delay	(0~100.0)s	5.0	Pulse time of the closing relay output; continuous output when set to 0.
2	Opening Delay	(0~100.0)s	5.0	Pulse time of the opening relay output; continuous output when set to 0.
3	Switch Transfer Interval	(1~9999)s	1	Delay time between opening Power Source I and closing Power Source II (or vice versa) (applicable to MT100-III).
4	Reclosing Delay	(0~20.0)s	1.0	If the switch fails to open for the first time, it will close again and start the reclosing delay. After the delay ends,



No.	Parameter Name	Setting Range	Default Value	Description
				it will attempt to open again; if it still fails, an "Opening Failure" alarm is triggered.
5	Reopening Delay	(0~20.0)s	1.0	If the switch fails to close for the first time, it will open again and start the reopening delay. After the delay ends, it will attempt to close again; if it still fails, a "Closing Failure" alarm is triggered (applicable to MT100-III).
6	Switch Type Setting	(0~2)	0	0: Two-Opening Positions 1: One-Opening Position (III Stage) 2: No Opening Position (II Stage)
7	Forced Interruption Action	(0~1)	0	0: Warning Alarm 1: Fault Alarm
8	Auto-Transfer with Auto-Restore Setting	(0-1)	1	0: Auto-Transfer without Auto-Restore 1: Auto-Transfer with Auto-Restore
9	Mutual Standby Setting	(0-1)	1	0: Invalid 1: Valid
10	Opening Input Enable	(0~1)	0	0: Disable; 1: Enable (applicable to MT100-III). Set to "Disable" if the opening position input is not connected.
11	No-Opening Transfer Enable	(0~1)	1	0: Disable; 1: Enable. When enabled, the controller transfers directly from one power source to the other without opening control output during the transfer (applicable to MT100-III).
Generator Set Settings				
1	Generator Set Start Delay Time	(0~9999)s	1	The delay starts when the generator set is ready to start; the generator set start signal is sent after the delay ends.

No.	Parameter Name	Setting Range	Default Value	Description
2	Generator Set Stop Delay Time	(0~9999)s	5	The delay starts when the generator set is ready to stop; the generator start signal is disconnected after the delay ends.
Scheduled Start/Stop Settings				
1	Scheduled Inspection Start Enable Setting	(0~1)	0	0: Disable 1: Enable
2	Scheduled Inspection Start Load Setting	(0~1)	0	0: No Load 1: With Load
3	Scheduled Inspection Start Cycle Selection	(0~2)	0	0: Monthly 1: Weekly 2: Daily
4	Scheduled Inspection Start Month Setting	Month Selection		<input checked="" type="checkbox"/> January <input checked="" type="checkbox"/> February <input checked="" type="checkbox"/> March <input checked="" type="checkbox"/> April <input checked="" type="checkbox"/> May <input checked="" type="checkbox"/> June <input checked="" type="checkbox"/> July <input checked="" type="checkbox"/> August <input checked="" type="checkbox"/> September <input checked="" type="checkbox"/> October <input checked="" type="checkbox"/> November <input checked="" type="checkbox"/> December
5	Scheduled Inspection Start Date Setting	(1~31)	1	Date of the month for scheduled start.
6	Scheduled Inspection Start Weekday Setting	Week Selection		<input checked="" type="checkbox"/> Sunday <input type="checkbox"/> Monday <input type="checkbox"/> Tuesday <input type="checkbox"/> Wednesday <input type="checkbox"/> Thursday <input type="checkbox"/> Friday <input type="checkbox"/> Saturday
7	Scheduled Start Time (Hour)	(0~23)h	0	Time for scheduled start.
8	Scheduled Start Time (Minute)	(0~59)min	0	
9	Scheduled Start Operation Duration	(0~30000)min	30	Continuous operation time after scheduled start.
Programmable Input Settings				
1	Programmable Input Port 1	(0~20)	0	Not Used

No.	Parameter Name	Setting Range	Default Value	Description
	Setting			
2	Input Port 1 Valid Type	(0~1)	0	0: Valid on Closure 1: Valid on Disconnection
Programmable Output Settings				
1	Output Port 1 Valid Type	(0~1)	0	0: Normally Open Output 1: Normally Closed Output
2	Output Port 1 Setting	(0~36)	1	Common Alarm
3	Output Port 2 Valid Type	(0~1)	1	0: Normally Open Output 1: Normally Closed Output
4	Output Port 2 Setting	(0~36)	36	Generator Set Start
Module Settings				
1	Module Power-On Mode	(0~2)	0	0: Hold (retains the mode before power-off) 1: Manual Mode 2: Automatic Mode
2	Language Selection	(0~1)	0	0: Simplified Chinese 1: English
3	Password Setting	(00000~65535)	01234	Password for accessing Parameter Settings.
4	Module Address	(1~247)	1	Communication address for RS485 network communication.
5	Communication Port Baud Rate	(0~3)	2	0: 2400 bps, 1: 4800 bps, 2: 9600 bps, 3: 19200 bps
6	Communication Port Parity Bit	(0~2)	0	0: None 1: Odd Parity 2: Even Parity
7	Communication Port Stop Bit	(1~2)	2	Can be set to 1 or 2 stop bits.
8	Module Date and Time Setting			
9	Communication Function Setting	(0~3)	0	0: Remote Adjustment & Remote Control Enabled 1: Remote Control Disabled


No.	Parameter Name	Setting Range	Default Value	Description
				2: Remote Adjustment Disabled 3: Remote Adjustment & Remote Control Disabled

6.3.6 Historical Records

On the home page of the Main Interface, press the "Setting" Key  to enter the Menu Page. Select "History Records" and press the "Setting" Key  again to confirm; this will lead to the History Records Page.

Each historical record includes the following contents:

- ① Date and time of the record
- ② Record type
- ③ Recorded event
- ④ Power supply status of Power Source I
- ⑤ Power supply status of Power Source II
- ⑥ Three-phase voltage of Power Source I
- ⑦ Three-phase voltage of Power Source II
- ⑧ Frequency of Power Source I
- ⑨ Frequency of Power Source II

The History Records can store a maximum of 50 entries, with the 1st entry being the latest record. Users can view each entry via the "Down" Key . When the number of records exceeds 50, new entries will overwrite the earliest ones.

Record types include:

- Action Events
- Warning Events: Refer to all warning alarms.
- Fault Events: Refer to all fault alarms.

Action Events refer to events recorded at the moment the following actions occur:

No.	Action Event	Description
1	Power Source I Closing Output	Recorded when the closing output of Power Source I is activated.

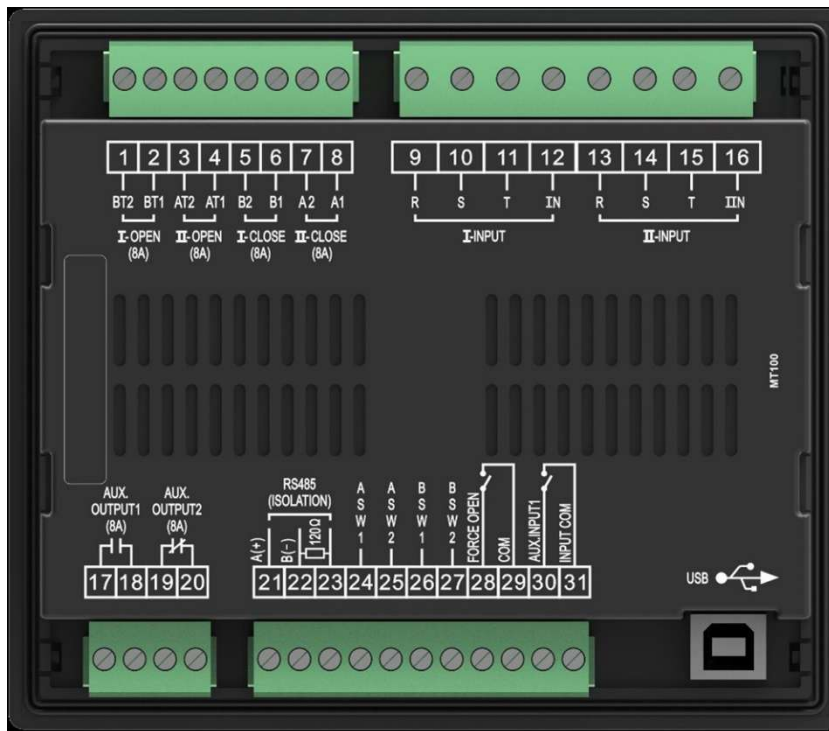
No.	Action Event	Description
2	Power Source II Closing Output	Recorded when the closing output of Power Source II is activated.
3	Power Source I Opening Output	Recorded when the opening output of Power Source I is activated (for Three-Stage Type Switches).
4	Power Source II Opening Output	Recorded when the opening output of Power Source II is activated (for Three-Stage Type Switches).
5	Power Source I & II Simultaneous Closing Fault	Recorded when both Power Source I and Power Source II are loaded simultaneously.
6	Generator Set Start	Recorded when the generator set start signal is output.
7	Generator Set Stop	Recorded when the generator set start signal is disconnected (output stopped).
8	Automatic Mode	Recorded when switching to Automatic Mode.
9	Manual Mode	Recorded when switching to Manual Mode.

6.3.7 Communication

The MT100 Dual Power Transfer Controller is equipped with an RS485 communication port and a USB communication port. Among them, the RS485 communication port supports connection to a local area network (LAN) with an open structure, and the communication port adopts the Modbus communication protocol. With the help of software running on a PC or data acquisition system, it provides a dual power transfer management solution for factories, telecommunications, industrial and civil buildings, and realizes the "three remote functions" of dual power monitoring: remote control, remote measurement, and remote signaling.

For specific information on the communication protocol, please refer to the MT100 Communication Protocol.

6.3.8 Terminal Definition



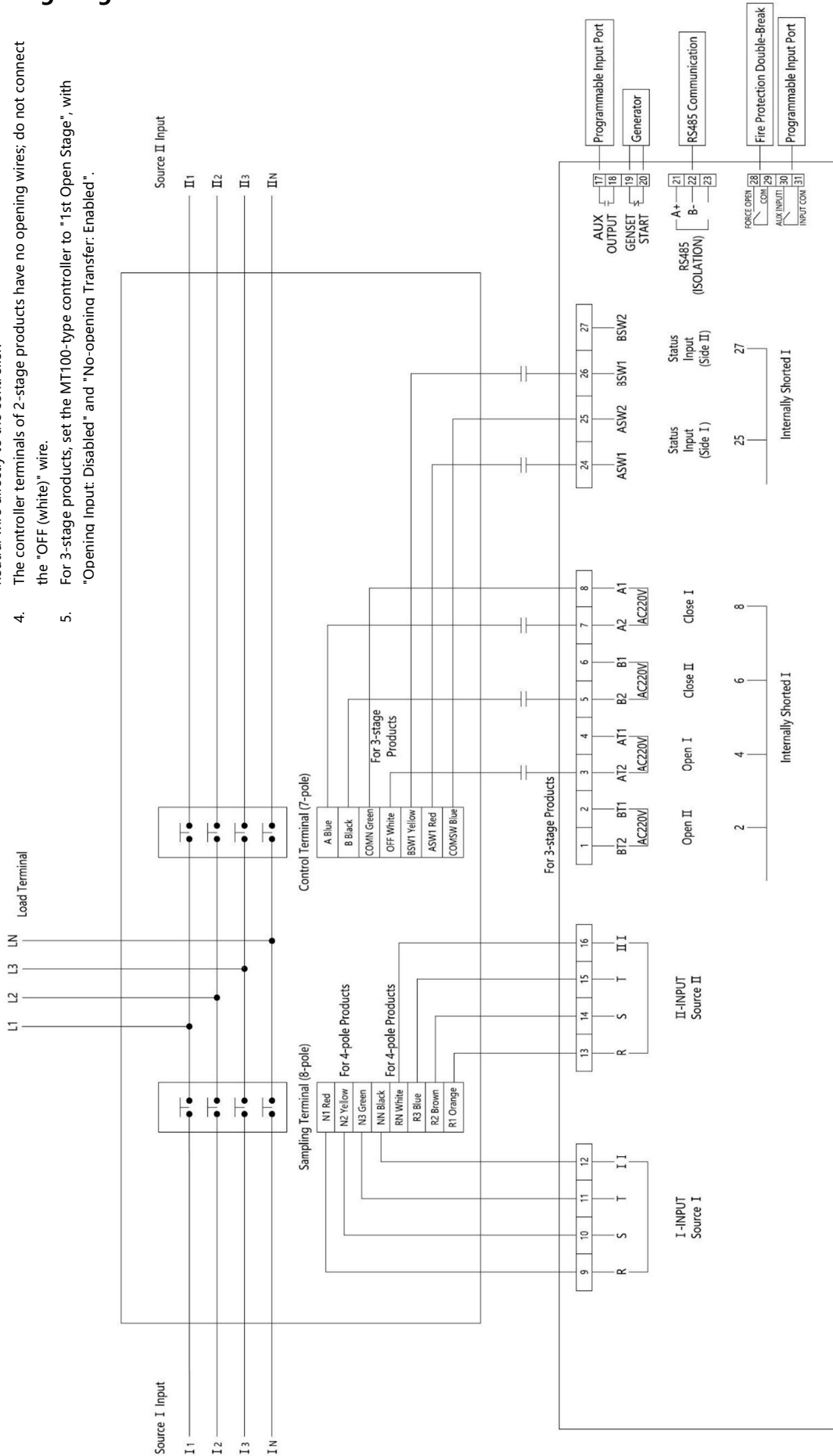
Description of Input/Output Port Functions

No.	Name		Function Description	Remarks
1	BT2		Power Source II Disconnection Output N	Outputs AC power to control the disconnection of the Power Source II switch; Rated 8A.
2	BT1		Power Source II Disconnection Output L	
3	AT2		Power Source I Disconnection Output N	Outputs AC power to control the disconnection of the Power Source I switch; Rated 8A.
4	AT1		Power Source I Disconnection Output L	
5	B2		Power Source II Connection Output N	Outputs AC power to control the connection of the Power Source II switch; Rated 8A.
6	B1		Power Source II Connection Output L	
7	A2		Power Source I Connection Output N	Outputs AC power to control the connection of the Power Source I switch; Rated 8A.
8	A1		Power Source I Connection Output L	
9	R	I - INPUT	AC three-phase four-wire voltage input for Power Source I	For single-phase input, only connect to R and I N.
10	S			
11	T			

No.	Name		Function Description	Remarks
12	I N	Ⅱ- INPUT	AC three-phase four-wire voltage input for Power Source Ⅱ	For single-phase input, only connect to R and ⅡN.
13	R			
14	S			
15	T			
16	ⅡN			
17	AUX.OUTPUT		Programmable Output Port 1	Default: Common Alarm Output, Normally Open Output; Capacity: 8A 250VAC
18				
19	AUX.OUTPUT2		Programmable Output Port 2	Default: Generator Start Control Output, Normally Closed Output; Capacity: 8A 250VAC
20				
21	A(+)		RS485 Communication Port	Built-in 120Ω impedance matching resistor.
22	B(-)			
23	120 Ohm Resistor		RS485 Impedance Matching Resistor	Users need to connect this terminal to Terminal 21 according to on-site networking conditions to access the controller's built-in 120Ω impedance matching resistor.
24	ASW1		Power Source I Switch Closing Status Input	Detects the closing status of the Power Source I switch; Passive Contact Input. The input port is valid when ASW1 is short-circuited with ASW2.
25	ASW2			
26	BSW1		Power Source Ⅱ Switch Closing Status Input	Detects the closing status of the Power Source Ⅱ switch; Passive Contact Input. The input port is valid when BSW1 is short-circuited with BSW2.
27	BSW2			
28	FORCE OPEN		Forced Interruption Input	Forced interruption; Valid on short-circuit.
29	COM			
30	AUX. INPUT 1		Programmable Input 1	Default: Not used; Valid on short-circuit.
31	INPUTCOM			
USB	USB		Type-D USB Communication Port	Can be connected to a PC for parameter configuration and program upgrade.

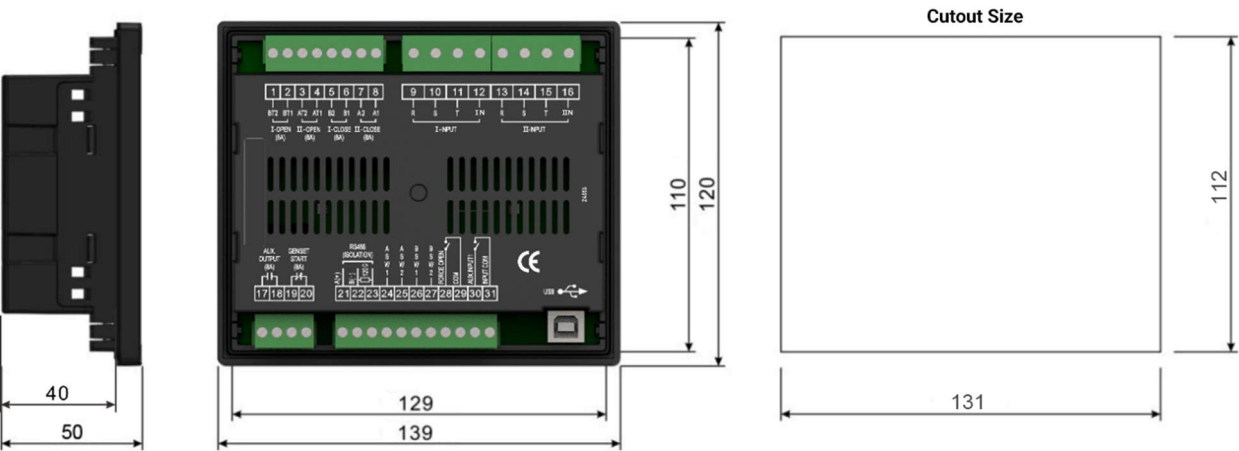
6.3.8 Wiring Diagram

1. Wire according to the diagram; use 0.5mm² PVC-insulated wires.
2. Wire harnesses shall be neat, and wire ends shall be crimped tightly with wire lugs.
3. There is no neutral wire on the body of 3-pole products; do not connect "NN" (black) and "RN" (white)" to the sampling terminals, and connect the external neutral wire directly to the controller.
4. The controller terminals of 2-stage products have no opening wires; do not connect the "OFF (white)" wire.
5. For 3-stage products; set the MT100-type controller to "1st Open Stage", with "Opening Input: Disabled" and "No-opening Transfer: Enabled".



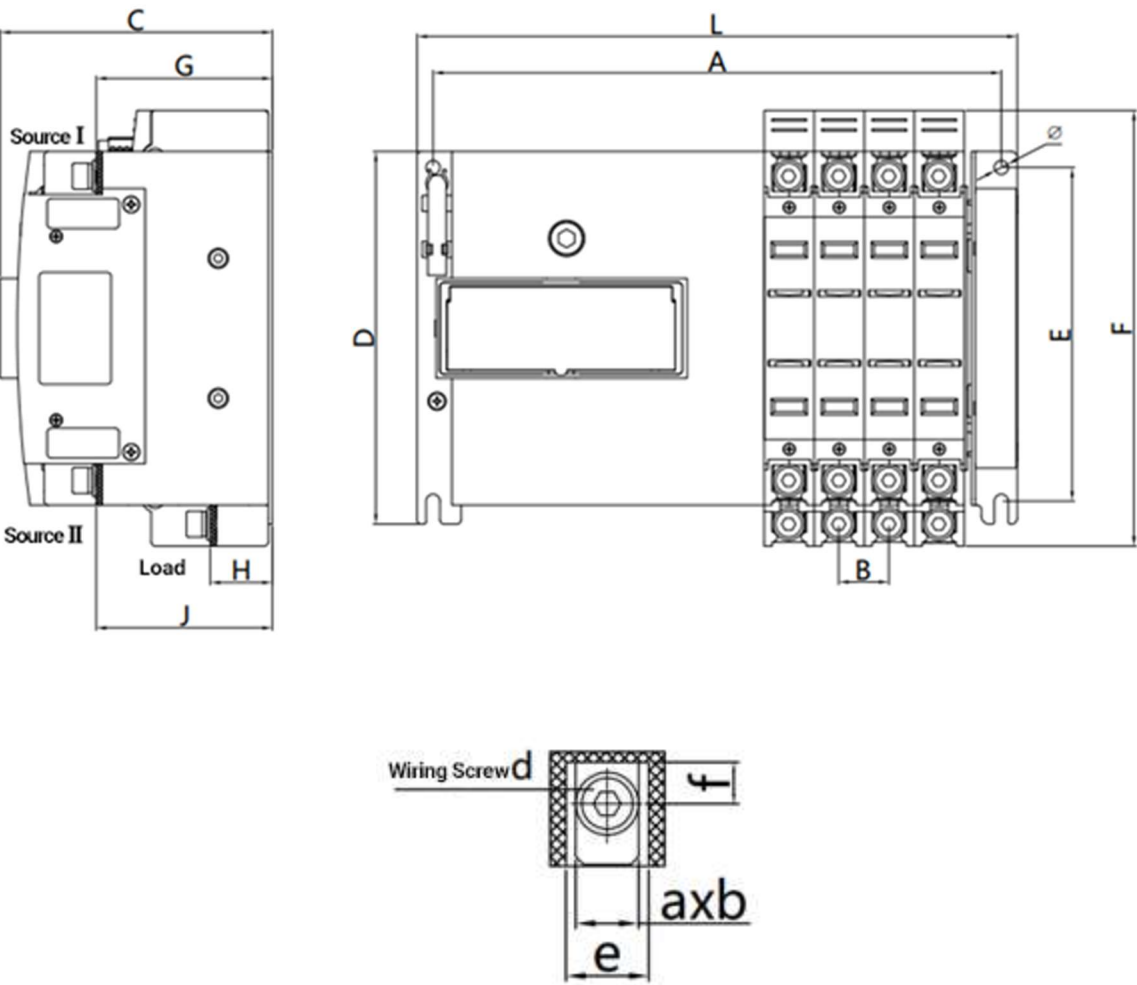
6.3.9 Overall Dimensions and Cutout Dimensions of MT100 Controller

Unit: mm



7 Switch Overall Dimensions and Mounting Dimensions

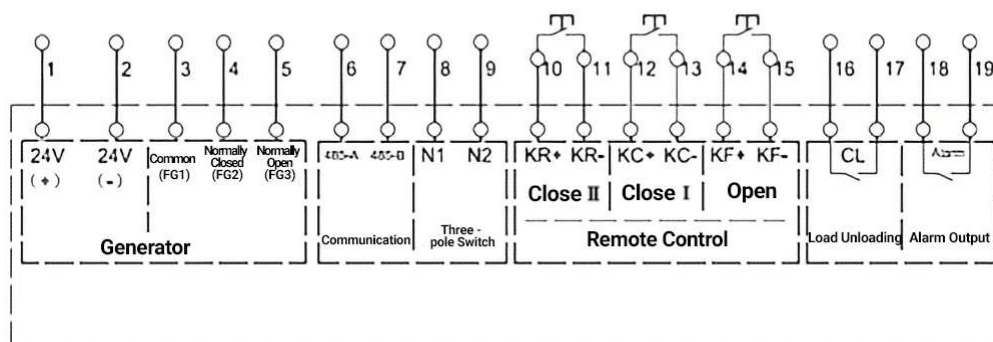
Unit: mm



Model	L	A	D	E	F	B	C	G	H	J	Φ	d	f	e	axb
AT20P 16-125/3	278	259	186.5	167	219	25	137	88	32	88	Φ7	M8	8	17	15x3
AT20P 16-125/4	303	284	186.5	167	219	25	137	88	32	88	Φ7	M8	8	17	15x3
AT20P 160-250/3	309	289	186.5	167	219	35	137	88	32	88	Φ7	M8	9.5	27	20x4
AT20P 160-250/4	344	324	186.5	167	219	35	137	88	32	88	Φ7	M8	9.5	27	20x4
AT20P 400-630/3	401.5	380.5	320	302	356	60	171	113.5	47	113.5	Φ9	M12	25.5	48	40x6
AT20P 400-630/4	461.5	440.5	320	302	356	60	171	113.5	47	113.5	Φ9	M12	25.5	48	40x6

8 External Terminal Diagram

Wiring Diagram of AT20 Series EA, EH Automatic Transfer Switch



Two - stage Non - opening (KF+, KF-) Terminals

8.1 Terminal Definition:

No.	Name	Function Description	Remarks
1	+	Input Terminal, for external DC24V power supply	
2	-	Input Terminal, for external DC24V power supply	
3	FG1	Output Terminal, in Grid-Generator Mode: common contact for generator start	
4	FG2	Output Terminal, in Grid-Generator Mode: normally closed (NC) contact for generator start	
5	FG3	Output Terminal, in Grid-Generator Mode: normally open (NO) contact for generator start	
6, 7	485(A,B)	Communication Terminals, used to transmit control commands via network	AT20-EH
8, 9	N1,N2	For selecting 3-Pole Transfer Switch; N1 and N2 must be connected, otherwise the Transfer Switch Intelligent Controller will not work	AT20-3P
10, 11	KR+, KR-	Input Terminals: When the external self-locking button is closed, Power Source II closes; when the external self-locking button is open, if the dual power supply is in auto-transfer with auto-restore mode, it will switch to Power Source I after a delay time	
12, 13	KC+, KC-	Input Terminals: When the external self-locking button is closed, it actively switches to Power	

		Source I	
14, 15	KF+, KF-	Input Terminals: When the external self-locking button is closed, fire alarm signal is input; when the external switch is open, fire alarm is released	AT20-III
16, 17	CL	Output Terminal, in Grid-Generator Mode: When Power Source I is normal, the terminal is a normally open (NO) contact; when Power Source I fails, the terminal is a normally closed (NC) contact to unload non-critical loads and operate under reduced load	
18, 19	Alarm	Output Terminal: When there is a failure of both power sources or a transfer switch failure, the normally open (NO) contact for alarm is activated	

- Notes:**
- (1) KR-, KC-, KF- can be connected to the same common terminal;
 - (2) Terminals 10, 11, 12, 13, 14, and 15 must be connected to passive buttons with self-locking function;
 - (3) The normally closed (NC) contact of the generator start terminal closes when there is a fault on the Power Source I side. The maximum power rating that the generator start terminal can withstand is $250\text{VAC} \times 10\text{A}$;
 - (4) Generators can only be connected to the Power Source II side;
 - (5) The maximum power rating that the alarm contact terminal can withstand is $250\text{VAC} \times 5\text{A}$;
 - (6) **When in Grid-Generator Mode or using the communication function, users must connect an external DC24V power supply to ensure the controller operates normally.**

9 Installation

9.1 Installation Method

Correct installation method for AT20 series Automatic Transfer Switches:

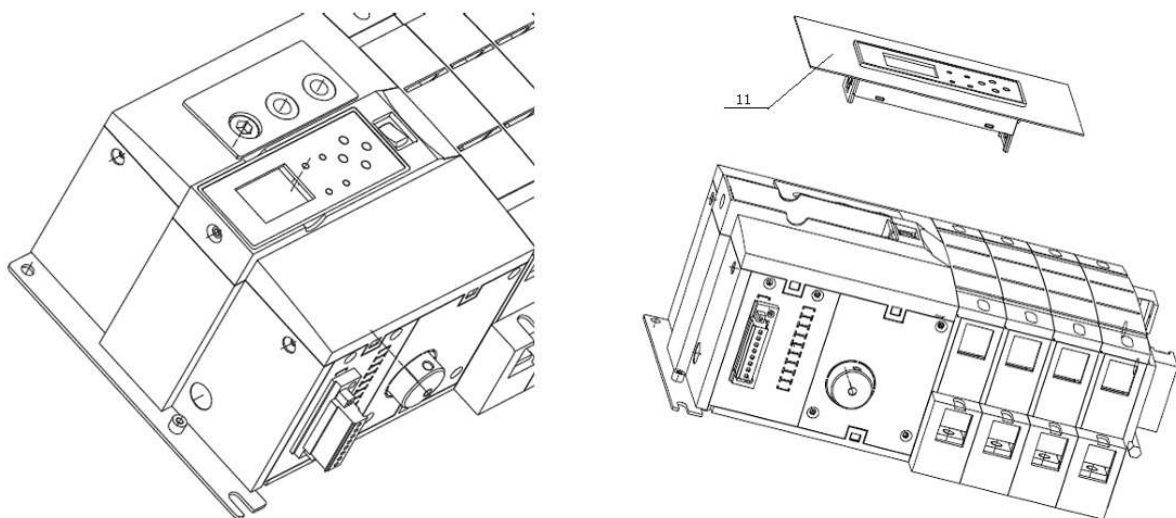
- 1) Vertical installation.
- 2) When wiring the main circuit terminals, avoid applying the bending pressure of wires directly to the terminals.
- 3) The safety distance outside the arc extinguisher shall be more than 30mm.
- 4) The terminal protective covers for the switch's main circuit shall be properly installed.

9.2 Correct Installation Method for the Display Module:

For user convenience, the display module of the AT20 EH type automatic transfer switch can be removed from the main unit and installed on the panel of the low-voltage switchgear cabinet. Refer to Figure 9.2 for details; the specific installation steps are as follows:

- 1) Remove the side countersunk screws, then hold the LCD display module with two fingers at the recessed area on the front and pull it out firmly.
- 2) Install the display module on the switchgear cabinet panel. Take out two plastic clamping plates from the accessory bag, insert them into the reserved card slots at both ends of the display module, and push them tightly to secure. Then take out the special DB9 adapter cable from the accessory bag and connect the interfaces of the display module and the switch main unit.
- 3) The size of the reserved hole on the low-voltage switchgear cabinet panel for installing the EH display module is 118×48mm.

Installation Schematic Diagram of AT20 EH Automatic Transfer Switch Display Module



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Samples are subject to change without prior notice Version:
AENUCPAP25V2

