网为电气®
Wangwei Electric

Operation Instruction of WQ7A ATS Controller

Beijing Wangwei Electric Limited Company

Foreword

Version updates

Date	Version	Contents
2019-3-1	1.0	Start
2019-12-16	1.1	Revise some parameters specification

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Contents

1. Overview

WQ7A ATS Controller is an intelligent dual power switching control module integrating automatic measurement, LCD display and digital communication.Digitalization, intelligence and network are its main characteristics, it can achieve automation in the process of measurement and control, reduce human error, which is the ideal product of dual power switch control.

WQ7A ATS Controller is composed of microprocessor as the core, which can accurately detect the voltage, frequency and other parameters of the two three-phase power supply, and make accurate judgment on voltage anomalies (overvoltage, undervoltage, missing phase) and frequency anomalies (overfrequency, underfrequency) and output the passive switching quantity.The device fully considers the application of dual power conversion in power supply system and has a variety of control modes.Its compact structure, advanced circuit, simple connection, high reliability, can be widely used in electric power, posts and telecommunications, petroleum, coal, metallurgy, railway, municipal, intelligent building and other industries.

2. Performance and characteristics

Optional two power supply: mains + mains, mains + power generation, power generation + mains;

LCD pixel is 128×64, with backlight, touch button operation;

Collect and display the phase voltage, line voltage and frequency of two - way three - phase;

t has the detection function of over voltage, lack of voltage, missing phase, inverse phase sequence, overfrequency, underfrequency and so on;

With automatic/manual mode, you can force the switch to open/close in manual mode;

All parameters can be set in the field, using password verification, to prevent non-professional personnel error operation;

It has the function of switch reclosing and button again after power failure;

Separation design of two - way N - line

Real-time clock display; It has the function of history recording and it can record 99 pieces of data;

Ac power supply range 185 ~ 255V;

It is equipped with RS485 isolated communication interface and MODBUS communication protocol, with remote control, remote communication, telemetry and remote modulation functions;

Suitable for three - phase four - wire ac system;

Modular design structure, flame retardant ABS shell, pluggable terminal, embedded installation, compact structure, easy installation.

3. Specification

Items	Details
Operation voltage	The ac power: A1-N1/A2-N2; Voltage range: AC 185～255 V.
	DC power supply (optional), voltage range DC 9 ~ 36 V;
Machine power	8W (Standby: < 4W)

consumption		
Alternating voltage input	Ac system	
	three－phase four－wire(L-N)	Phase voltage: 185～255 V
	It can be extended to single-phase two-wire, two-phase three-wire and three-phase three-wire in the future	
Rated frequency	50Hz	
Relay output capacity	Passive output 5A/250V	
Switch input interface	Valid when connecting to the public terminal (COM)	
Communication mode	RS485 isolation interface, MODBUS protocol	
Overall dimensions	197mm×152mm×57mm(L×W×H)	
Size of opening	186mm×141mm	
Operation condition	Environment temperature: (-15～+60) ℃; Relative humidity :(20 ~ 90) %RH	
Storing condition	Environment temperature: (-25～+70) ℃	
Protection grade	IP55: When there is a waterproof rubber ring between the controller and the control panel	
Dielectric strength	AC2kV voltage was applied between the ac high voltage terminal and the low voltage terminal, and the leakage current within 1min was no more than 3mA	
Weight	0.7 kg	

4. Measurement and data display

Phase voltage of I and II power supply (A-N, B-N, C-N)	●
Voltage of power lines of channels I and II (A-B、B-C、C-A)	●
Power frequency of I and II	●
Load current & power	●
Real-time alarm	●
Alarm status	●
History record	●

5. Operation

5.1 LED

Panel indicator map

Specification of LED

Name	Function description
Alarm	Alraming (flash 1s/time)
I power status indicator	The LED will stay on when the I power supply is normal, flicker when there is abnormal (1 time per second), and go off when there is no pressure
Indication of closing status of I power	Light up when the auxiliary contact input of circuit I closing is effective
power status indicator	The LED will stay on when the II power supply is normal, flicker when there is abnormal (1 time per second), and go off when there is no pressure
Indication of closing status of II power	Light up when the auxiliary contact input of circuit II closing is effective
Manual mode indication	The LED light will light up when the current mode is manual
Automation mode indication	The LED light will light up when the current mode is automation.

5.2 Key function description

Panel key map

Key function description

Icon	Key name	Function description
	Iclose/Tripping	Available in manual mode. After pressing this key, if channel I is in the state of tripping, then channel I will close and output. If the I channel is in the closed state, the I channel will be released.
	IIclose/Tripping	Availablr in manual mode. After pressing this key, if channel II is in the state of tripping, then channel I will close and output. If the II channel is in the closed state, the II channel will be released.
	Manual	Set the controller to manual mode.
	Automation	Set the controller to automation mode.
	Menu/Enter	In the main interface, short press this key to enter the menu interface, long press (> for 3 seconds) this key to remove the alarm state; In the menu interface, short press this key to enter the parameter setting mode, long press (>3 seconds) this key to return to the main interface.
	Up/Increase	In the main interface, press this key, you can use the screen up display function. In the menu interface, you can move the options or cursor up, or increase the value of the number in the cursor position.

	Down/Recrease	In the main interface, press this key, you can use the screen down display function. In the menu interface, you can move the options or cursor down, or decrease the value of the number in the cursor position.

6. OSD

6.1 Main interface

Electric quantity	
U1(L-N) 220V 220V 220V U2(L-N) 220V 220V 220V F1 50.0Hz F2 50.0Hz Auto Mode	I phase voltage (A-N、B-N、C-N) II phase voltage (A-N、B-N、C-N) I channel frequency II channel frequency Current status, alarm status, prompt message and other status information.
U1(L-L) 380V 380V 380V U2(L-L) 380V 380V 380V 2015-12-01 12:00:00 Auto Mode	Line I voltage (A-B、B-C、C-A) Line II voltage (A-B、B-C、C-A) Current date Current time Current status, alarm status, prompt message and other status information.
I 0.0A 0.0A 0.0A S 0.0VA P 0.0W Q 0.0Var PF 1.00 Auto Mode	Load current (wire A, wire B, wire C) Load conjunction apparent power Load conjunction active power Load conjunction reactive power Load conjunction power factor Current status, alarm status, prompt message and other status information.
Operation status	
1# Normal Power 2# Normal Power Auto Mode	The state of a circuit I voltage or its operating state The state of a circuit II voltage or its operating state Other status information Current status, alarm status, prompt message and other status information.
Alarm	
Alarm (00) No Alarm	Number of alarms Event of alarms Event of alarms Event of alarms
Short press  (up) and  (down) on the main interface to turn the page; Short press  (menu key) in the main interface to enter the main menu interface; Long press  (menu key) (>3 seconds) on the main interface to reset the alarm state.	

6.2 Status description

The state of the I circuit power supply or its operating state

No.	Status name	Status description
1	**1# Normal Power**	The supply voltage and frequency are within the specified range
2	**1# Over Voltage**	The voltage is greater than the upper limit of the set voltage
3	**1# Loss of Voltage**	Voltage is 0
4	**1# Miss Phase**	One or two phases are missing from phase A, B, and C
5	**1# Phase Seq. Wrong**	A-B-C phase sequence error
6	**1# Under Voltage**	The voltage is less than the lower limit of the set voltage
7	**1# Over Frequency**	The power frequency is greater than the upper limit of the set frequency value
8	**1# Under Frequency**	The power supply frequency is less than the lower limit of the set frequency value
9	**1# Close Failed**	I failed to close in automation status
10	**1# Open Failed**	I failed to open in automation status

The state of the II circuit power supply or its operating state

No.	Status name	Status description
1	**2# Normal Power**	The supply voltage and frequency are within the specified range
2	**2# Over Voltage**	The voltage is greater than the upper limit of the set voltage
3	**2# Loss of Voltage**	Voltage is 0
4	**2# Miss Phase**	One or two phases are missing from phase A, B, and C
5	**2# Phase Seq. Wrong**	A-B-C phase sequence error
6	**2# Under Voltage**	The voltage is less than the lower limit of the set voltage
7	**2# Over Frequency**	The power frequency is greater than the upper limit of the set frequency value
8	**2# Under Frequency**	The power supply frequency is less than the lower limit of the set frequency value
9	**2# Close Failed**	II failed to close in automation status
10	**2# Open Failed**	II failed to open in automation status

Other status information

No.	Status name	Status description
1	**Switch Fault**	In case of switch failure, the input signal is still valid

2	**Power Parallel**	Circuit I and II are closed, which leads to the parallel connection of circuit I and II power supply
3	**Forced Open**	Forced break of input signal is valid
4	**Controller Lock**	The controller locks the input signal is valid

Dynamic running status

No.	Status name	Status description
1	**1# Open Delay...**	In automatic mode, route I is in the delay state of tripping
2	**1# Opening...**	Circuit I is outputting the tripping signal
3	**1# Close Delay...**	In automatic mode, route I is in the closing delay state
4	**1# Closing...**	Circuit I is outputting the closing signal
5	**2# Open Delay...**	In automatic mode, route II is in the delay state of tripping
6	**2# Opening...**	Circuit II is outputting the tripping signal
7	**2# Close Delay...**	In automatic mode, route II is in the closing delay state
8	**2# Closing...**	Circuit II is outputting the closing signal
9	**Open Again Delay...**	In the automatic mode, when the first closing of route I or route II is unsuccessful, the "Re-tripping time delay" shall be performed first, and the "Re-tripping" shall be performed again after the delay.
10	**1# Open Again...**	In the automatic mode, when the first closing of route I is not successful, the "Re-tripping time delay" is completed and the re-trip is under way
11	**2# Open Again...**	In the automatic mode, when the first closing of route II is not successful, the "Re-tripping time delay" is completed and the re-trip is under way
12	**Close Again Delay...**	In the automatic mode, when the first tripping of route I or route II is not successful, the "Reclose the brake to delay" shall be performed first, and the "Re-close" shall be performed again after the delay.
13	**1# Close Again...**	In the automatic mode, when the first tripping of route I is unsuccessful, the "re-tripping and closing delay" is completed and the re-tripping and closing is under way
14	**2# Close Again...**	In the automatic mode, when the first tripping of route II is unsuccessful, the "re-tripping and closing delay" is completed and the re-tripping and closing is under way
15	**Re-action Delay...**	When detected that the switch state of the

		completed action is not in line with the expected state, and the delay of switch reaction begins. After the delay ends, the signal of switch action again delay
16	**No Parallel of Power**	In manual mode, when the I or II circuit has been closed, press the closing button of the other circuit, "Forbiding two sources of power in parallel " will be displayed.
17	**Generator Start...**	When the output of generator start signal is turned on, "generator start" is displayed.
18	**Generator Stop...**	When the generator start signal is stopped, "generator stop" is displayed.

Warning alarm

When the controller detects the warning and alarm state, the alarm light will flash (1times/S). After the warning is restored, the alarm light will be off and the warning and alarm will be lifted.

No.	State name	State description
1	**1# Phase Seq. Wrong**	I power supply a-b-c phase sequence is wrong
2	**2# Phase Seq. Wrong**	II power supply a-b-c phase sequence is wrong
3	**Forced Open**	When the input is valid, the warning is given
4	**Controller Lock**	When the controller lock input is valid, the controller lock warning alarms
5	**Power Parallel**	Circuit breakers of circuit I and II are in closed state, resulting in the parallel warning and alarm of circuit I and II power supply

Fault alarm

When the controller detects the fault alarm state, the alarm light will flash (1times/S), and the fault alarm will be locked until the manual reset alarm is eliminated.

No.	State name	State description
1	**1# Close Failed**	In auto mode, I closing failed
2	**1# Open Failed**	In automatic mode, I the trip failed
3	**2# Close Failed**	In auto mode, II closing failed
4	**2# Open Failed**	In automatic mode, II the trip failed
5	**1# Switch Fault**	I switch fault input signal is valid
6	**2# Switch Fault**	II switch fault input signal is valid

其他状态信息 Other status information

No.	State name	State description
1	**Manual Mode**	The current state is in manual mode
2	**Auto Mode**	The current state is in automatic mode

6.3 Alarm query interface

Short press (menu key) on the main alarm interface to enter the alarm inquiry interface	
Alarm query interface	
Alarm (01/02) 1# Switch Fault 2# Switch Fault	Alarm serial number and alarm number Alarm events Alarm events
Short press (upturn key) and (down turn key) on the alarm query interface to make the alarm item scroll query; Note: when the number of alarms is 3 >, all alarm information can only be checked by rolling query. Short press (menu key) in the alarm inquiry interface to return to the main alarm interface; In the alarm query interface, long press (menu key) (>3 seconds) to remove the alarm state.	

6.4 The main menu

Short press (menu key) in the main interface to enter the main menu interface. Long press (menu key) (>3 seconds) in the main menu interface to return to the main interface.	
Main menu interface	
1.History Record 2.Configuration 3.Calibration 4. Generator Test	View historical information Query and set the function parameters Calibration controller data detection accuracy (manufacturer's only) Manually test generator on/off
2.Configuration 3.Calibration 4. Generator Test 5.Information	Display the relevant technical information of the controller
In the main menu interface short press (up), (down) key, you can select different main menu entry line (currently selected line anti-black), and then short press (confirm), you can enter the corresponding menu options interface.	

Note: there are 4 main menu items (>). All main menu items can only be viewed by scrolling query.

Note 1: to enter the parameter setting, you need to enter the password. The default password is "00000". The operator can change the password to prevent others from changing the configuration of the controller at will.Please remember after changing your password. If you forget your password, please contact the service staff.

Note 2: the data calibration is used for the data of the calibration controller of the manufacturer, which can only be accessed by entering the manufacturer's password, but not by the user.

7. History record

7.1 History interface

In the main menu interface, select the "history" item, and then press OK (menu key) to enter the history interface. In the history interface, long press OK (menu key) (> for 3 seconds) to return to the main interface.	
History entry query	
1#OFF/2#ON 01/50 1# Normal Power 2# Normal Power 2017-01-01 10:00:00	Record events, serial number/total number of records; I power state II power state Record the date and time
Short press (up), (down), you can query each history page; Press OK (menu key) to enter the detailed query mode on the current history page; Long press OK (menu key) (>3 seconds) to return to the main interface.	
Historical records for detailed inquiry	
1#OFF/2#ON 01/50 1# Normal Power 2# Normal Power 2017-01-01 10:00:00	Record events, serial number/total number of records;(anti-black display) I power state II power state Record the date and time
1#OFF/2#ON 01/50 U1(L-N)220V 220V 220V U2(L-N)220V 220V 220V F1 50.0Hz F2 50.0Hz	Record events, serial number/total number of records;(anti-black display) I phase voltage (A-N、B-N、C-N) II phase voltage (A-N、B-N、C-N) I frequency II frequency
Short press (up), (down), you can turn the page to query the details of the current history;	

Short press (menu key) to return to history entry query mode.

Long press (menu key) (>3 seconds) to return to the main interface.

The historical records include: recording events, state of circuit I power supply, state of circuit II power supply, three-phase voltage of circuit I, three-phase voltage of circuit II, frequency of circuit I, frequency of circuit II and recorded date and time.

Record event types include warning events, fault events, and action events.

Warning event alarms for all warnings.

Fault events are all fault alarms.

An action event is an event that occurs at the time of the following action:

Action event list

No.	Event	Description
1	2#OFF/1#ON	Records of the operation of route II open and route I close
2	1#OFF/2#ON	Records of the operation of route I open and route II close
3	1#OFF/2#OFF	Records of the operation of route I and route II open

8. Parameter setting

8.1 Parameter setting interface

Under the main menu interface, select "parameter setting" and then press (menu) to enter the parameter setting password confirmation interface. Then enter the correct password to enter the parameter menu interface, password error will directly exit and return to the main interface, factory default password is: 00000.

Under the parameter menu interface, select any parameter menu and then press (menu) to enter the parameter details interface.

Long press (menu) in the parameter details interface (>3 seconds) to return the parameter menu interface.

Password input

Parameter set password, current setting bit anti - black display.

Short press (up), (down) to set the password value of the current bit;

Press (menu)  to go to the next setting, then press  (menu) to check the password.

Long press  (menu) (>3 seconds) to return to the main interface.

Parameter menu selection

1.System Set	The controller runs the associated system parameters
2.Switch Set	Circuit breaker switch related delay, action time and other parameters
3.Generator Set	Related parameters of generator start and stop.
4.AC Power set	Power supply test related parameters
5.Load Current Set	Related parameters of load detection
6.Unload Signal Set	Related parameters of load unloading function
7.Input func. Set	Parameters of Multi-function input Setting
8.Output func. Set	Parameters of Multi-function output Setting

Short press  (up), (down)  to select different parameters menu line (currently selected line is anti-black), and then short press (confirm)  to enter the corresponding parameter details interface.

Note: when the number of parameter menu items is >4, all parameter menus can only be seen by rolling query.

Long press  (menu key) (>3 seconds) to return to the main interface.

Parameters details

01 1# Close Delay	No and name of the parameter
Range(0-9999)s	Scope and unit of parameter
Default: 0010	Default(for reference only)
Current: 0010	Set value at present

Short press (up), (down) to query each parameter page.

Press (menu key) to enter the setting mode of the current parameter page (the first line of the interface is shown in black).

Long press (menu key) (>3 seconds) to return the parameter menu interface

Parameter setting

01 1# Close Delay	No and name of the parameter(anti-black display)
Range(0-9999)s	Scope and unit of parameter
Default: 0010	Default(for reference only)
Current: 0013	Set value at present,Current setting bit anti - black display

Short press (up), (down) to set the value of the current bit;

Short press (menu key) to skip to the next setting, short press (menu key) to save the parameter value after setting the parameter value, and exit the parameter setting mode to return to the parameter details interface.

Long press (menu key) (>3 seconds) to return the parameter menu interface.

8.2 Parameter configuration table

Table of parameter configuration items

1.System Set				
No.	Name	Setting range	Default value	Description
01	**ATS System Type**	POWER-GEN/ GEN-POWER/ POWER-POWER	POWER-GEN	Composition type of dual power conversion system
02	**Work Mode**	1# Priority/ 2# Priority/ No Priority	1# Priority	The operating mode of the controller
03	**ATS Switch Type**	CB/CC	CB/CC	Control of "dual power switch" type
04	**AC System Type**	3phase 4wire	3phase 4wire	Ac power system
05	**Check Phase Seq.**	Enable/Disable	Disable	Choose whether to detect the voltage phase sequence of two sources
06	**Device Address**	1～255	1	RS485 network communication address
07	**Comm. Baud Rate**	4800/9600/ 19200/38400	9600	The communication baud rate of RS485 network communication
08	**Language**	中文/English	中文	Liquid crystal interface display language is optional
09	**Password Set**		00000	Password for entering parameter Settings
10	**Date & Time Set**			Set the date and time of the real-time clock
2.Switch Set				
No.	Name	Setting range	Default value	Description
01	**1# Close Delay**	(0-9999) seconds	10	The delay time between the detection to the requirement of circuit I closing and the formal output of circuit I breaker closing signal.
02	**1# Open Delay**	(0-9999) seconds	10	The delay time between the detection to the requirement of circuit I tripping and the formal output of circuit I breaker tripping signal.
03	**2# Close Delay**	(0-9999) seconds	10	The delay time between the detection to the requirement of

				circuit II closing and the formal output of circuit II breaker closing signal.
04	2# Open Delay	(0-9999) seconds	10	The delay time between the detection to the requirement of circuit II tripping and the formal output of circuit II breaker tripping signal.
05	Close Time	(0-999.9) seconds	1.0	The pulse time of the closing relay.
06	Open Time	(0-999.9) seconds	1.0	The pulse time of the tripping relay.
07	Again Close Delay	(0-999.9) seconds	5.0	If the first switch is not successful, the switch will start to close again for a delay. After the delay, the switch will close for the second time. When the re-closing delay is set to 0, the re-closing step is skipped. (available in auto mode only)
08	Again Open Delay	(0-999.9) seconds	5.0	If the first time the switch is not closed successfully, the delay time of the brake will start again. After the delay, the switch will be opened for the second time. When the time delay of re-tripping time delay is set to 0, the re-tripping step is skipped. (available in auto mode only)
09	Second Close Delay	(0-999.9) seconds	5.0	After the completion of the re-closing, start the second closing delay. After the end of the delay, try to switch the second closing. If the closing fails, the alarm signal of closing failure will be issued. When the second closing delay is set to 0, the step of re-tripping and the second closing step are skipped. (available in auto mode only)
10	Second Open Delay	(0-999.9) seconds	5.0	After the completion of the re-closing, start the second

				tripping delay. After the end of the delay, try to switch the second tripping. If the tripping fails, the alarm signal of tripping failure will be issued.When the second tripping delay is set to 0, the step of re-closing and the second tripping step are skipped. (available in auto mode only)
11	**Exceed Close Time**	(0-999.9) seconds	0.0	The time that the closing relay continues to output after the closing state signal is detected.
12	**Exceed Open Time**	(0-999.9) seconds	0.0	The time that the tripping relay continues to output after the tripping state signal is detected.
13	**Re-action Delay**	(0-9999) seconds	5	When the switch state of the completed action is detected to be inconsistent with the expected, the thief will start to delay the repetitive action of the switch. After the delay, the signal of the repetitive action of the switch will be sent. (available in auto mode only)
14	**Fault Detect Delay**	(0-999.9) seconds	3.0	After the signal of switch fault (or tripping) is detected, the delay of switch fault detection will begin. After the delay, alarm signal and protection action will be issued.
3.Generator Set				
No.	Name	Setting range	Default value	Description
01	**Generator Start**	Enable/Disable	Disable	Choose whether to use the engine start function
02	**Start Condition**	1# POW Fault/ 2# POW Fault/ Both Fault	1# POW Fault	A prerequisite for engine start
03	**Start Signal**	NO. Signal/ NC. Signal	NO. Signal	Output type of engine start signal

04	Start delay	(0-999.9) second	1.0	The delay time between the detection of engine start condition and the formal output of engine start signal.
05	Stop delay	(0-999.9) second	10.0	The delay time between the detection of the engine stop condition and the official stop output engine start signal.
4.AC Power Set				
No.	Name	Setting range	Default value	Description
01	1# Over Voltage	(100-355) VAC	255	The phase voltage of circuit I power supply has an upper limit value, and any value greater than the upper limit value shall be regarded as abnormal.
02	1# Return Overvolt	(100-355) VAC	245	The phase voltage of circuit I power supply has an upper return value, which is less than the return value shall be regarded as normal.
03	2# Over Voltage	(100-355) VAC	255	There is an upper limit value for the phase voltage of the II power supply. Any value greater than the upper limit value is considered abnormal.
04	2# Return Overvolt	(100-355) VAC	245	There is an upper limit return value for the phase voltage of the II power supply. Any value less than this return value is considered normal.
05	1# Under Voltage	(100-355) VAC	185	There is a lower limit value for the phase voltage of circuit I power supply, and any lower value is considered abnormal.
06	1#Return Undervolt	(100-355) VAC	195	There is a lower return value for the phase voltage of circuit I, and any value greater than this return value is considered normal.
07	2# Under Voltage	(100-355) VAC	185	There is a lower limit value for the phase voltage of circuit II power supply, and any lower value is considered abnormal.
08	2#Return	(100-355) VAC	195	There is a lower return value

	Undervolt			for the phase voltage of circuit II, and any value greater than this return value is considered normal.
09	**1# Over Freq.**	(40.0-70.0) Hz	55.0	The frequency of channel I power supply has an upper limit value, and any value greater than the upper limit value is abnormal.
10	**1# Return Overfreq**	(40.0-70.0) Hz	54.0	Channel I power frequency has an upper limit return value, less than which is considered normal.
11	**2# Over Freq.**	(40.0-70.0) Hz	55.0	The frequency of channel II power supply has an upper limit value, and any value greater than the upper limit value is abnormal.
12	**2# Return Overfreq**	(40.0-70.0) Hz	54.0	Channel II power frequency has an upper limit return value, less than which is considered normal.
13	**1# Under Freq.**	(40.0-70.0) Hz	45.0	The frequency of channel I power supply has a lower limit value, and any lower value is abnormal.
14	**1#Return Underfreq**	(40.0-70.0) Hz	46.0	Channel I power supply frequency has a lower limit return value, greater than the return value is normal.
15	**2# Under Freq.**	(40.0-70.0) Hz	45.0	The frequency of channel II power supply has a lower limit value, and any lower value is abnormal.
16	**2#Return Underfreq**	(40.0-70.0) Hz	46.0	Channel II power supply frequency has a lower limit return value, greater than the return value is normal.
5.Load Current Set				
No.	Name	Setting range	Default value	Description
01	**Current Monitoring**	Enable/Disable	Disable	Select whether to perform current detection
02	**Transformer Ratio**	(5-9999) /5	5	Set the change rate of the external primary current transformer. If the primary current transformer is not

				used, set the value as 5.
6.Unload Signal Set				
No.	Name	Setting range	Default value	Description
01	**Unload Function**	Enable/Disable	Disable	Choose whether to use the load /unloading function
02	**Unload Condition**	1# POW Fault/ 2# POW Fault/ Both Fault	1# POW Fault	Preconditions for output load /unloading signals
03	**Unload Out Delay**	(0-999.9) 秒	1.0	The delay time between the detection of the output condition of the load unloading signal and the official output unloading signal.
04	**Stop Unload Delay**	(0-999.9) 秒	10.0	The delay time between the output condition of the detected stop load unload signal and the official stop load unload signal.

7.Input func. Set				
No.	Name	Setting range	Default value	Description
01	**Aux. Input 1**	Please see details as 8.3 "List of multi-function input function description"	1# SW Fault	The interface of external signal input, each of them can be set as the input port of any kind of external signal.
02	**Aux. Input 2**		2# SW Fault	
03	**Aux. Input 3**		Forced Open	
04	**Aux. Input 4**		CTR Lock	
05	**Aux. Input 5**		Alarm Reset	
06	**Aux. Input 6**		Test Light	

8.Output func. Set				
No.	Name	Setting range	Default value	Description
01	**Aux. Output 1**	Please see details as 8.3 "List of multi-function output function description "	Alarm	The interface of auxiliary signal output, each of them can be set as the outlet of any kind of auxiliary signal.
02	**Aux. Output 2**		Unload	
03	**Aux. Output 3**		GEN Start	

Note:

1. Setting of tripping time, closing time and over conversion time:

In setting, attention shall be paid to the duration of continuous energizing allowed by the breaker's switching coil and closing coil,

The closing time & over conversion time shall not be greater than the continuous

energizing time allowed by the closing coil, otherwise the closing coil may be damaged.

The switching time shall not be longer than the continuous energizing time allowed by the switching coil, otherwise the switching coil may be damaged

2. (over voltage, over frequency) limit value and recovery limit value setting:(over voltage, over frequency) limit value setting should be higher than the recovery limit, otherwise the controller may work abnormal.There should be a difference between the limit value (over voltage, over frequency) and the recovery limit value, so as to avoid frequent switching between the controller (over voltage, over frequency) and normal state.

3. (under voltage, under frequency) limit value and recovery limit value setting:(under voltage, under frequency) limit value setting should be lower than the recovery limit, otherwise the controller may work abnormal.There should be a certain difference between the limit value (under voltage, under frequency) and the recovery limit value, so as to avoid frequent switching between the controller (under voltage, under frequency) and normal state.

8.3 Multi-function input/outlet function description

List of multi-function input function description

No.	Items	Description
1	**No Function**	There is no function in this input port
2	**1# SW Fault**	I switch fault signal (or circuit breaker trip signal) input.
3	**2# SW Fault**	II switch fault signal (or circuit breaker trip signal) input.
4	**Forced Open**	Forced break signal input,It is suitable for switch with tripping control.When the forced break signal is in effect, switch all switches to a full switch (or switch to 0 bits), whether in manual or automatic mode.
5	**CTR Lock**	The controller locks the signal input,When the lock signal of the controller is valid, the manual function and automatic function are prohibited to control the switch action, but the monitoring and alarm functions of the controller are still valid.
6	**Alarm Reset**	Reset the current alarm message.
7	**Test Light**	Test panel display element,When the test light signal is valid, the indicator light on the panel is all on, the LCD backlight is all on, and the LCD display is all black.

List of multi-function output function description

No	Items	Description
1	**No Function**	There is no function in this input port
2	**Alarm**	Output when any alarm message is detected.

3	Unload	Load unloading signal output.
4	GEN Start	Generator start signal output
5	Auto Mode	Output in automatic mode.
6	1#POW Fault	Output when abnormal I power supply is detected.
7	1#POW Normal	Output when I power supply is normal.
8	2#POW Fault	Output when abnormal II power supply is detected.
9	2#POW Normal	Output when II power supply is normal.
10	1#Close Fail	Output when I failed to close.
11	1#Open Fail	Output when I failed to tripping.
12	2#Close Fail	Output when II failed to close.
13	2#Open Fail	Output when II failed to tripping.
14	POW Parallel	Output when circuit breakers of circuit I and II are in closed state

9. Generator start function

By using the generator starting function, the generator can be started automatically when the power supply fails.When the mains power is restored, the operation of the generator can be stopped automatically.

9.1 Automatic start and stop of generator

In the automatic mode, when the generator start function is enabled, if the generator start condition is detected, the generator start delay will be started.At the end of the delay, a generator start signal will be sent to start the generator operation.If the generator start condition is detected to have disappeared, the generator stop delay will be started. After the delay, the generator start signal will stop output, causing the generator to stop.

Generator start function enable option can be set in the parameter setting interface;Generator starting conditions can be selected from the parameter setting interface.

9.2 Manual trial machine of generator

In manual mode, you can enter the "generator test" interface to start or stop the generator manually, which can be used to test the generator starting function.

Under the main menu interface, select "generator test", and then press (menu key) to enter the generator test interface. Long press (menu key) (>3 seconds) on the generator test interface to return to the main interface.	
Generator Test	
1.Quit	Exit the generator trail interface
2.Manual Start	Manual start generator
3.Manuel Stop	Manual stop generator
Disable Stop	Generator start enable state and generator stop state
Short press (upturn key) and (down turn key) on the generator test interface to select	

different entry lines (the currently selected line is anti-black), and then short press (confirm key) to execute the corresponding entry option function.
Line 4 of the generator test interface can display the enabling state of the generator start function and the start and stop state of the generator.

10.Load unloading function

By enabling the load unloading function, when the generator set power is insufficient, can automatically unload some of the unimportant load.

In automatic mode, when the load unloading function is enabled, if the output condition of load unloading signal is detected, the output delay of load unloading signal will start. After the delay, the load unloading signal will be issued.If the output condition of load unloading signal is detected to have disappeared, the unloading signal will stop delay. After the delay, the output load unloading signal will stop.

Load unloading function enables the option to be set in the parameter setting interface;Load unloading signal output conditions can be selected in the parameter setting interface.

11. Switch operation

11.1 Manual operation

Press the manual button 

, the manual status indicator light is on, the controller is in the manual status.

Press the I close/break key  , and the I close relay outputs. After the close output time, the I close relay disconnects, and I carries the power supply.Press the I close/break down key again  , and the I break down relay outputs. After the break down time, the I break down relay disconnects, and I stops supplying power to the load.

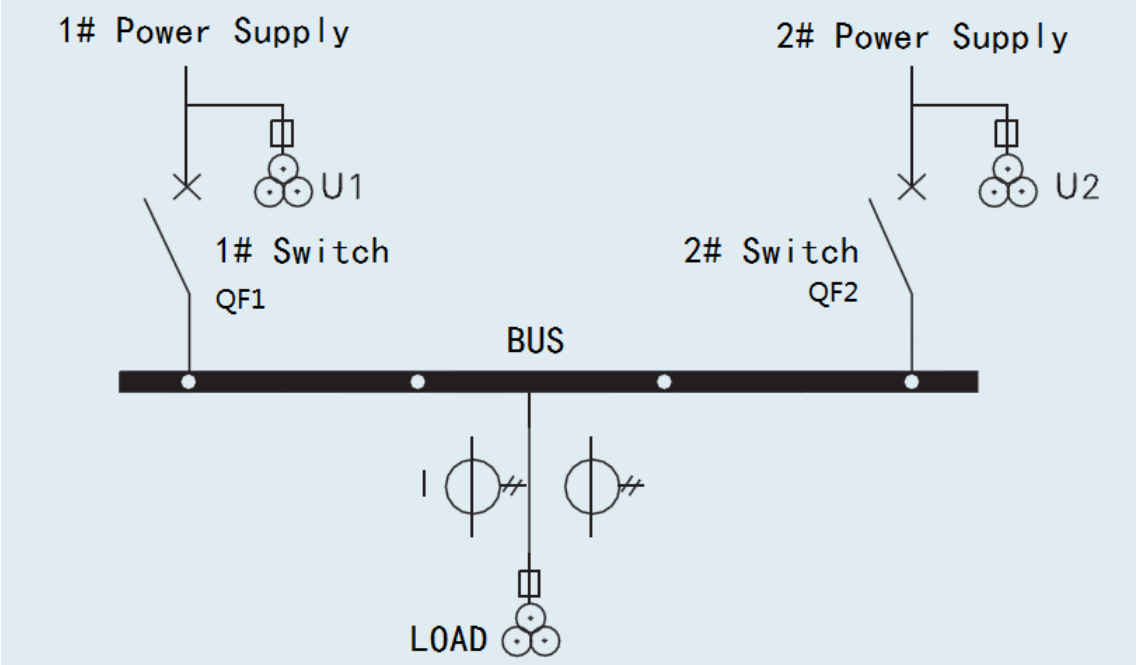
Press the II close/break key  to output the II closing relay. When the closing output time is up, the II closing relay is disconnected and the II is carrying power supply.Press the II close/break down key  again, and the II break down relay outputs. After the break down time, the II break down relay disconnects, and II stops supplying power to the load.

(note: if one circuit breaker is already in the closed state and the close/break key  of the other circuit breaker is pressed, the closing relay will not operate, and the controller will send a prompt message "do not connect two sources of power in parallel".)

11.2 Automatic operation

Press the automatic key 

, the indicator light of the automatic state is on, the controller is in the automatic state, the controller can automatically control the breaker opening/closing according to the function setting and other conditions.



Two circuit breakers constitute a dual power conversion configuration

Three working modes (taking the dual power conversion configuration composed of two circuit breakers as an example):

① 1# Priority

1、When the I power supply and II power supply are normal: QF2 is divided first, then QF1 is combined;

2、When circuit I power supply is abnormal and circuit II power supply is normal, QF1 is divided first, then QF2 is closed;

3、When the I power supply is normal and the II power supply is abnormal, QF2 is divided first, then QF1 is combined;

4、When the I power supply and II power supply are abnormal: QF1, QF2 are divided.

② 2# Priority

1、When the I power supply and II power supply are normal: QF1 is divided first, then QF2 is combined;

2、When circuit I power supply is abnormal and circuit II power supply is normal, QF1 is divided first, then QF2 is closed;

3、When the I power supply is normal and the II power supply is abnormal, QF2 is divided first, then QF1 is combined;

4、When the I power supply and II power supply are abnormal: QF1, QF2 are divided.

③ No Priority

1、When circuit I power supply is abnormal and circuit II power supply is normal, QF1 is divided first, then QF2 is closed;If the circuit I power supply returns to normal, the circuit breaker will not operate;

2、When the I power supply is normal and the II power supply is abnormal, QF2 is divided first, then QF1 is combined;If the circuit II power supply returns to normal, the circuit breaker will not operate;

3、When the I power supply and II power supply are abnormal: QF1, QF2 are divided.

(note: if there is a warning alarm or fault alarm in the automatic mode, it will automatically return to the manual operation mode. You need to exclude all alarm situations and remove the alarm indication, then press the automatic key to enter the automatic working mode again.)

12. The operating power supply of the switch

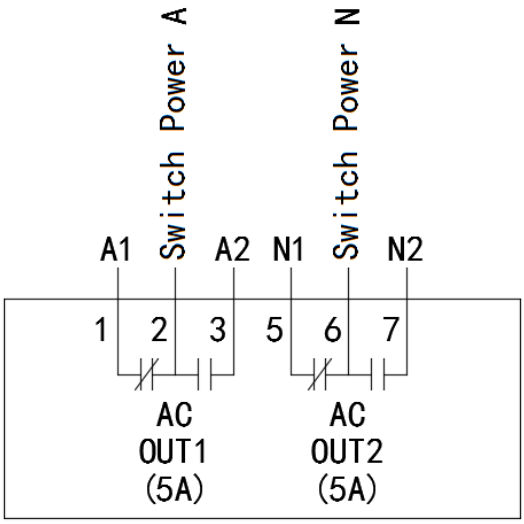
The power supply of the switch (or circuit breaker) can be provided by the controller, so long as there is a normal voltage along the switch (or circuit breaker) to ensure that the power supply is normal, so that it can be normal switching.

The user shall select the supply voltage (phase voltage or line voltage) according to the switch model.

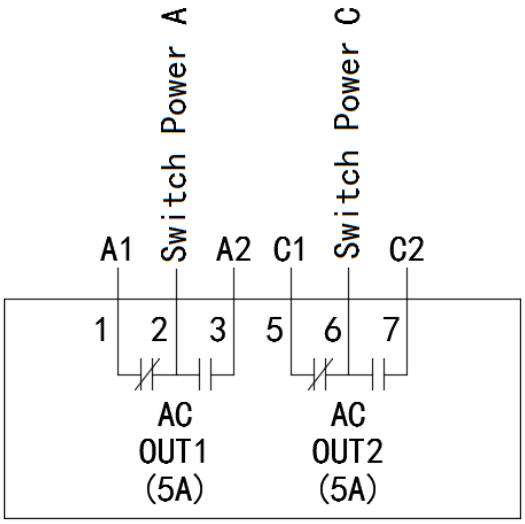
If it is A phase voltage power supply, connect the A phase of route I and route II to port 1 and port 3 respectively, then connect the N phase of route I and route II to port 5 and port 7 respectively, and then connect the power supply outlet ports 2 and port 6 to the switch power supply.

If the switch supplies power to the line voltage, the setting method is the same as above. Simply change the phase voltage to the line voltage (for example, a-c line) and access it.

Please see details as below:



Switch A-N phase voltage supply



Switch A-C line voltage supply

(Note: The normally closed access voltage must be the I voltage.)

13. Communication configuration and connection

WQ7A ATS Controller has an RS485 communication port that allows connection to an open architecture LAN. By using ModBus communication protocol and software running on PC or data acquisition system, it can provide a simple two-way power supply management scheme for factories, telecommunications, industrial and civil buildings,

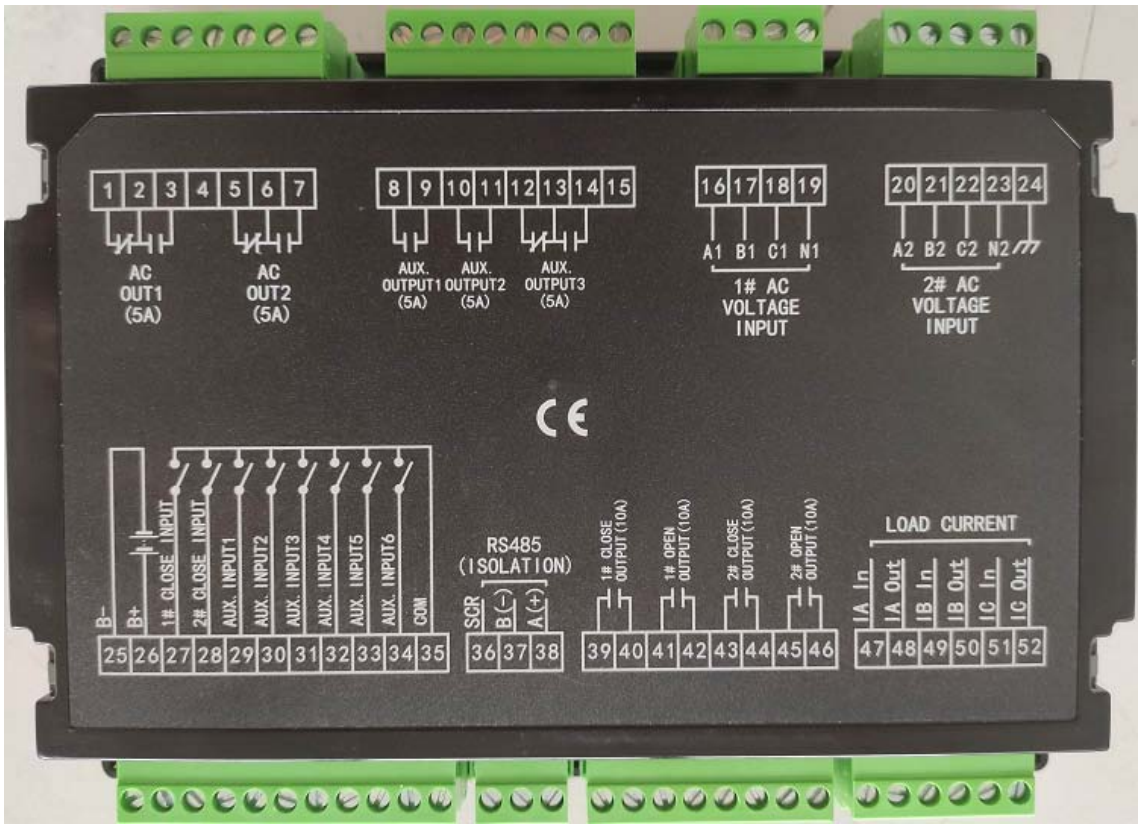
and realize the four-way functions of "remote control, telemetry, remote signal and remote regulation" for two-way power supply monitoring.

For the specific information of the communication protocol, please refer to the "communication protocol of WQ7A ATS Controller". The user needs to connect the 120 ohm impedance matching resistor externally according to the field networking.

Communication parameters

Baud rate	9600 bps(Optional:4800/9600/19200/38400 bps)
Data bits	8 bits
Check digit	None
Stop bit	2 bits
Communication location	1(Range:1~255)

14. Port definition and application schematic diagram



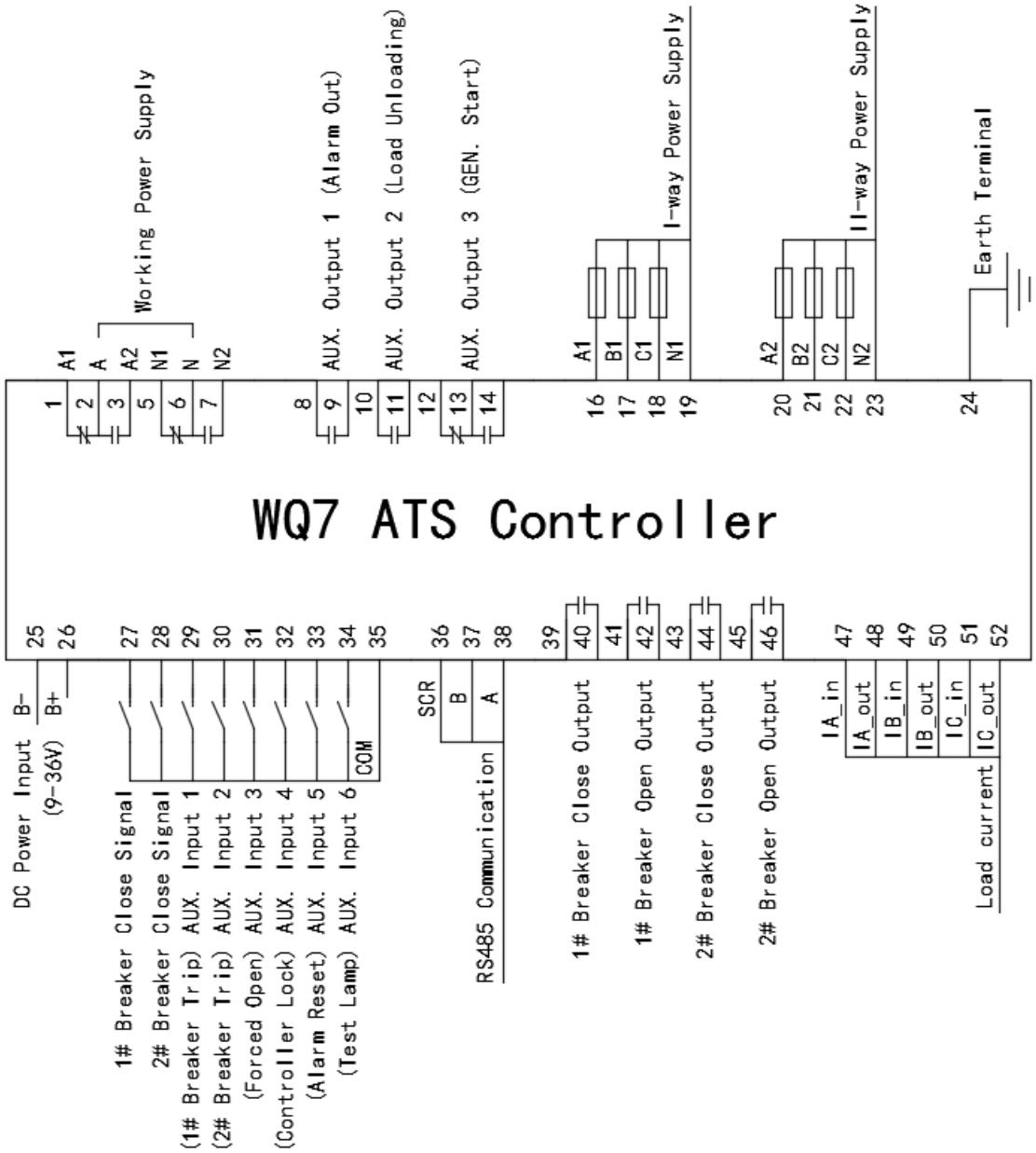
Back panel of controller

Function description of Input/output port

No.	Items	Function description		Remark
1	AC OUT 1	NC.	Passive contact output	250V/5A
2		COM		
3		NO.		
4	NC	None		
5	AC OUT 2	NC.	Passive contact output	250V/5A
6		COM		

7		NO.		
8	AUX. OUTPUT 1	NC.	Passive contact output	250V/5A
9				
10	AUX. OUTPUT 2	NC.	Passive contact output	250V/5A
11				
12	AUX. OUTPUT 3	NC.	Passive contact output	250V/5A
13		COM		
14		NO.		
15	NC	None		
16	A1	I ac three phase four wire voltage input		
17	B1			
18	C1			
19	N1			
20	A2	II ac three phase four wire voltage input		
21	B2			
22	C2			
23	N2			
24	PE	Protective earthing end		
25	B-	Controller dc supply negative pole		(Optional)
26	B+	The controller is supplied with a dc positive electrode		
27	1# CLOSE INPUT	Detect closing state of circuit breaker I, passive contact input		Effective to connect COM port
28	2# CLOSE INPUT	Detect closing state of circuit breaker II, passive contact input		
29	AUX. INPUT 1	Passive contact output		
30	AUX. INPUT 2	Passive contact output		
31	AUX. INPUT 3	Passive contact output		
32	AUX. INPUT 4	Passive contact output		
33	AUX. INPUT 5	Passive contact output		
34	AUX. INPUT 6	Passive contact output		
35	COM	Input signal common end		
36	SCR	RS485 communication port(users need to access 120 ohm impedance matching resistance externally according to field networking)		
37	B(-)			
38	A(+)			
39	1# CLOSE OUTPUT	NO.	Passive contact output	250V/10A
40				
41	1# OPEN OUTPUT	NO.	Passive contact output	250V/10A
42				
43	2# CLOSE OUTPUT	NO.	Passive contact output	250V/10A
44				
45	2# OPEN OUTPUT	NO.	Passive contact output	250V/10A

46				
47	IA In	Load A phase current signal		The phase sequence of the load current signal should be consistent with the phase sequence of the I /II ac voltage input
48	IA Out			
49	IB In	Load B phase current signal		
50	IB Out			
51	IC In	Load C phase current signal		
52	IC Out			



Application schematic

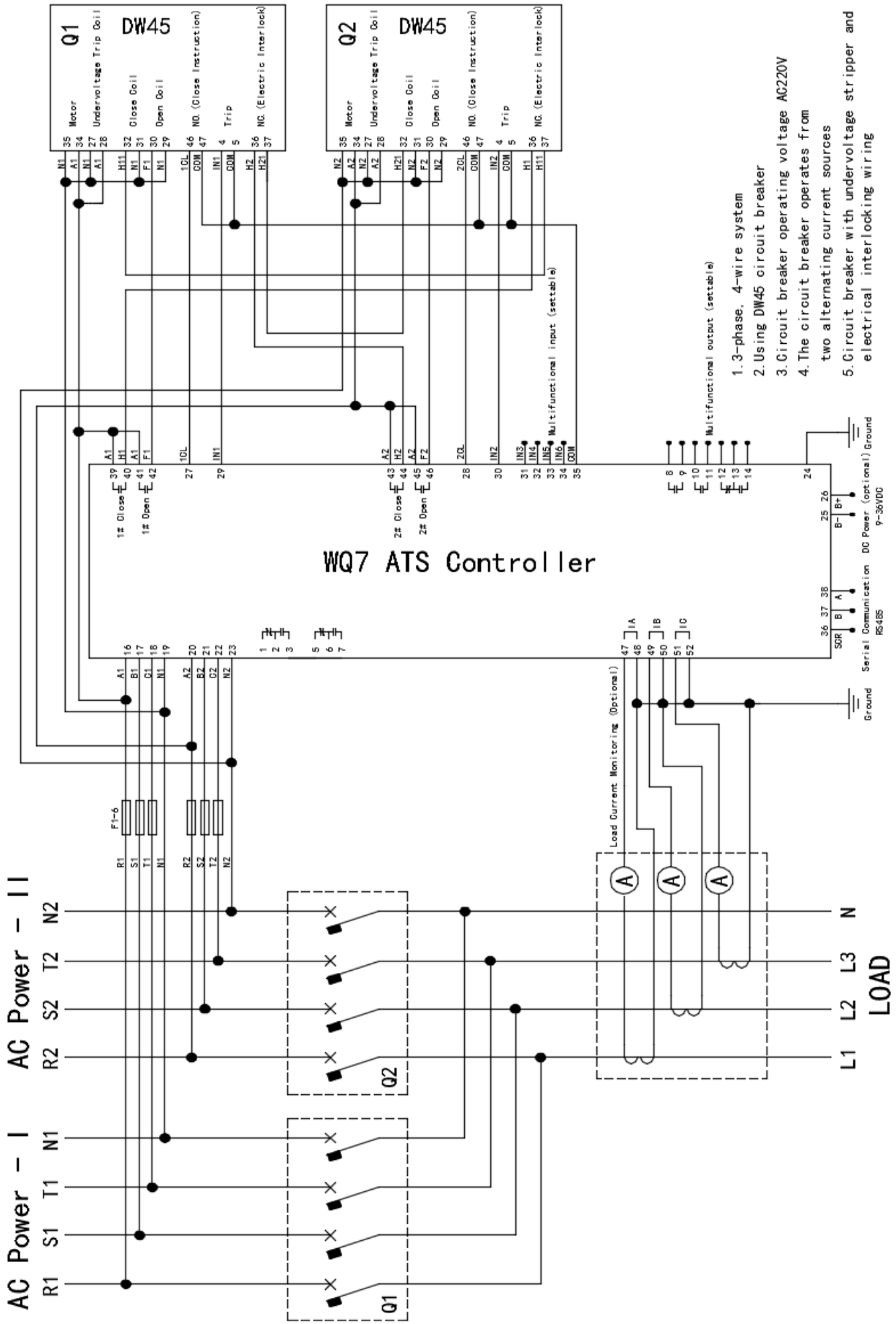
15. WQ7A ATS Controller with circuit breaker wiring instructions

1、The executive circuit breaker can be connected to the controller with an

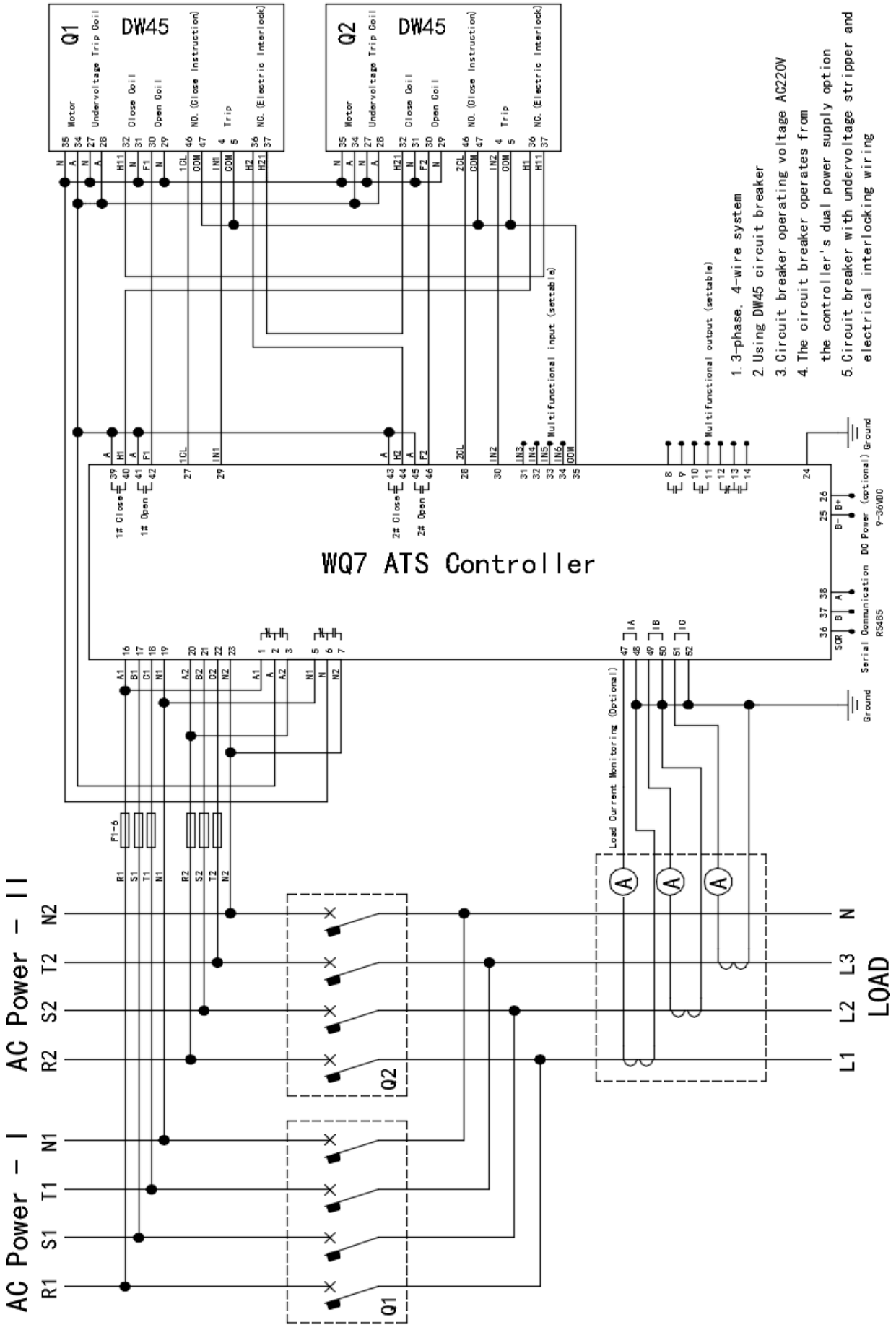
electric operating mechanism, such as DW45, ABB Emax, schneider MT, DW17, DW15, etc.;Maximum current 6300A;Each circuit breaker shall be equipped with undervoltage tripping device.

2、The product has been strictly tested before delivery. Wrong wiring and testing will damage the controller.

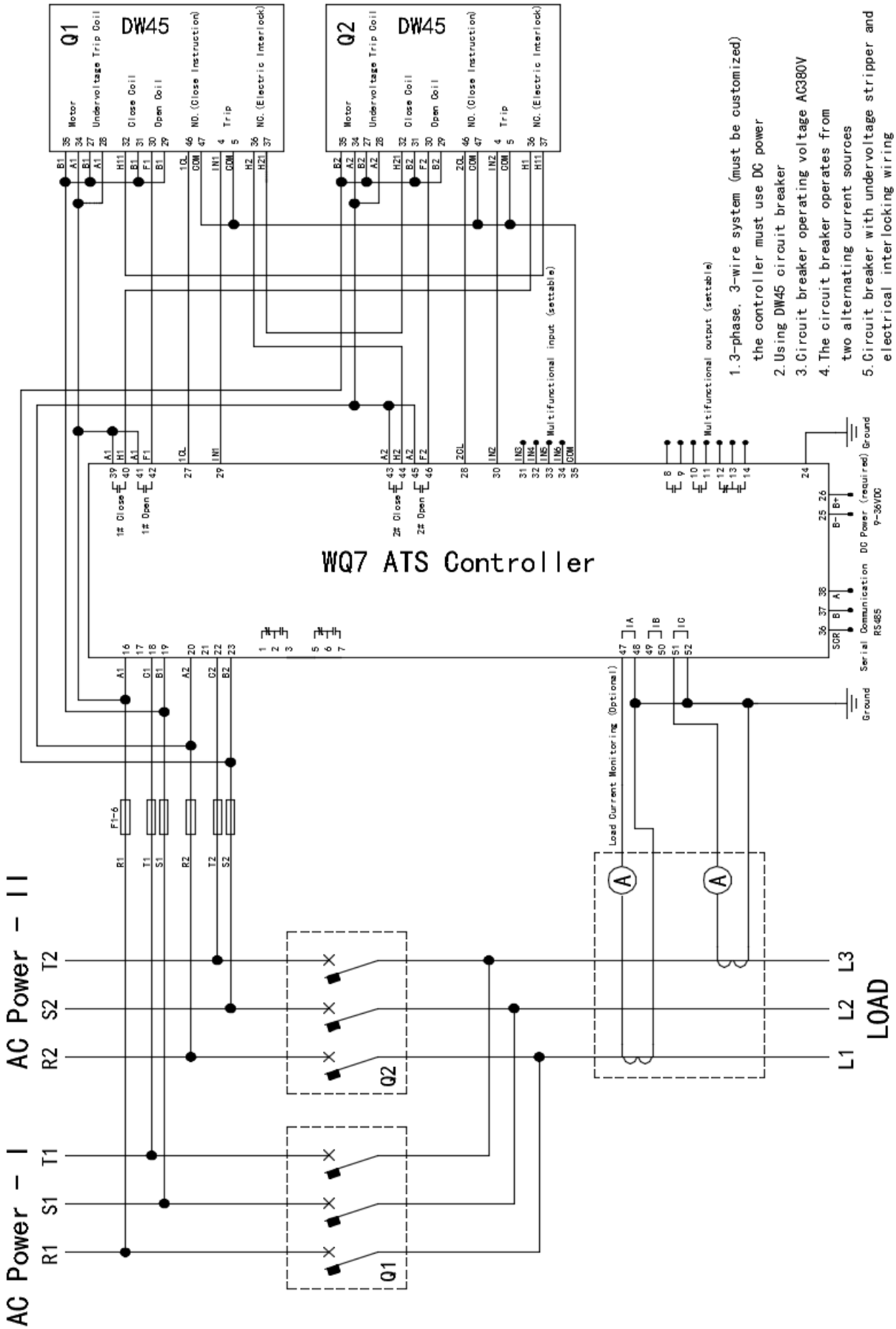
Pic1. WQ7A ATS Controller for DW45 circuit breakers 3-phase 4-wire wiring diagram 1



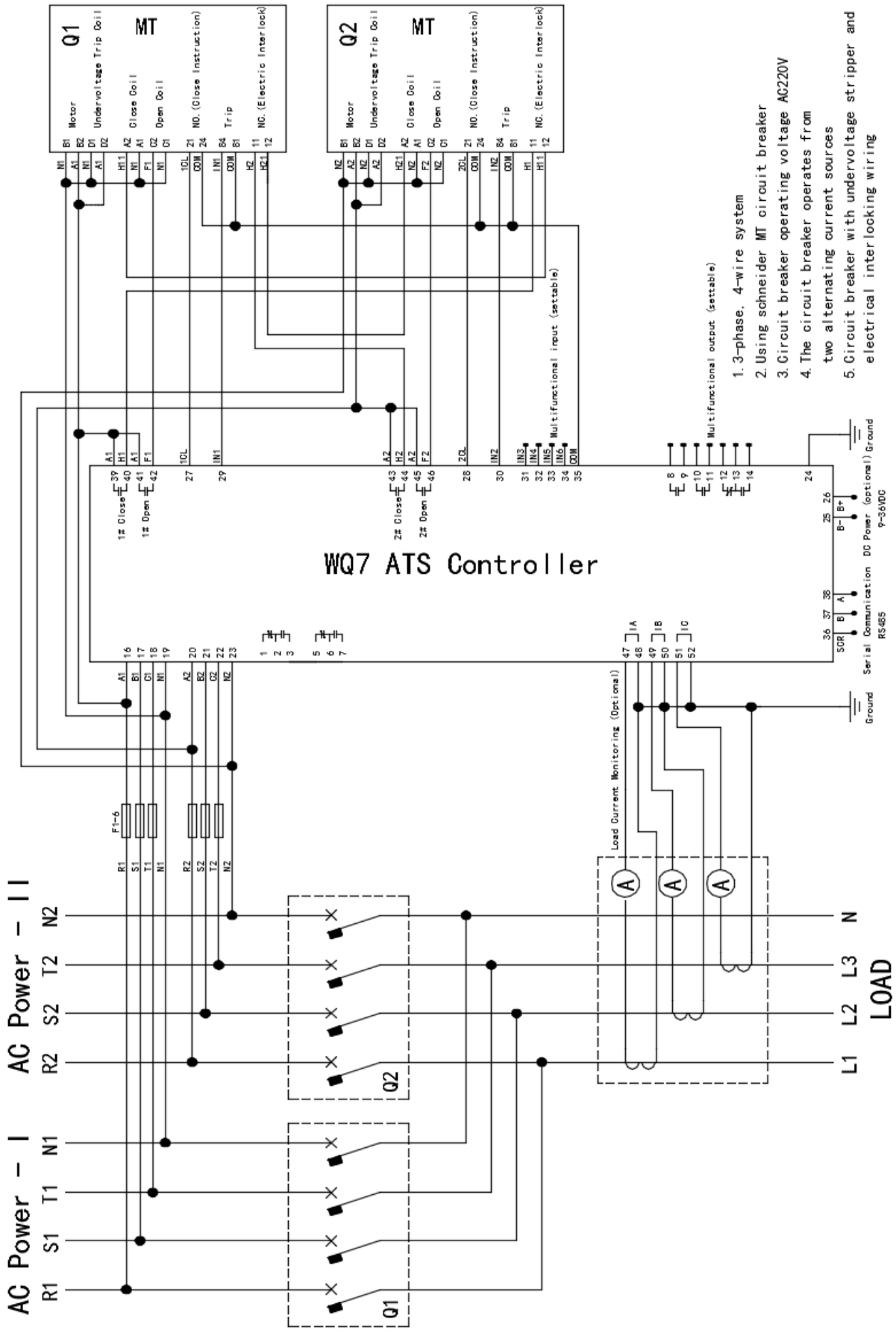
Pic2. WQ7A ATS Controller for DW45 circuit breakers 3-phase 4-wire wiring diagram 2



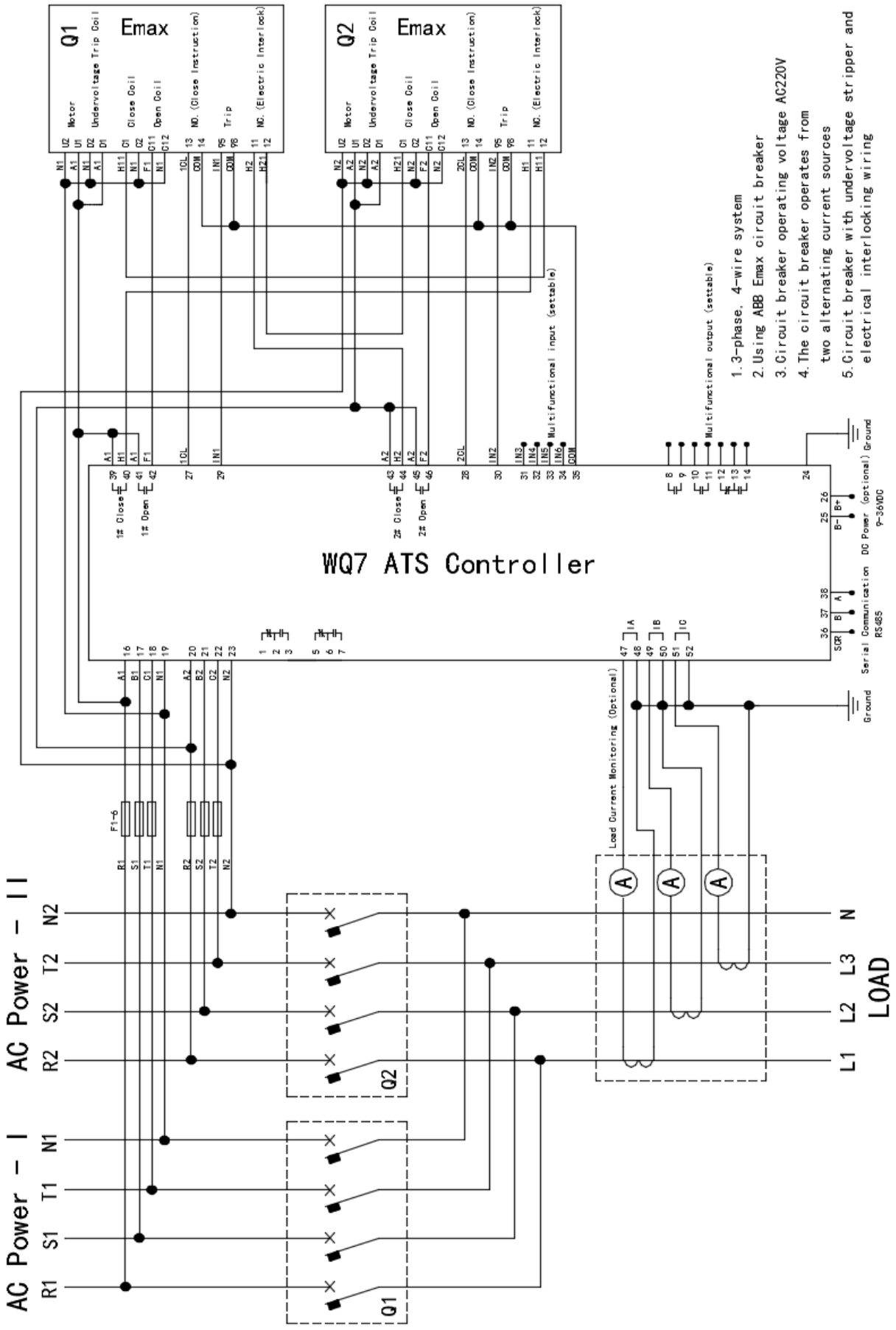
Pic3. WQ7A ATS Controller for DW45 circuit breaker 3-phase 3-wire Wiring Diagram



Pic4. WQ7A ATS Controller for schneider MT circuit breaker 3-phase 4-wire Wiring Diagram

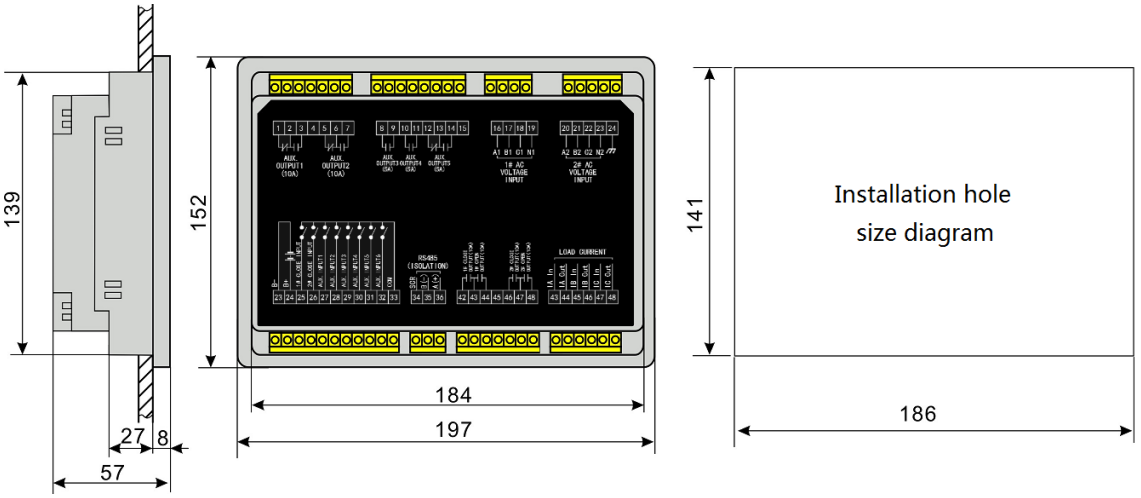


Pic5. WQ7A ATS Controller for ABB Emax circuit breaker 3-phase 4-wire wiring diagram



16. Installation dimension

The controller is panel mounted and is fixed by the card during installation.



Note: unit (mm)

17. Troubleshooting

Troubles	Possible causes and countermeasures
No reaction of controller	Check the ac power supply; Check exchange insurance; Check whether the ac connection is correct; If dc supply, check dc supply voltage.
Abnormal current detection	Check current detection function setting and current transformer change rate setting; Check whether the current detection wiring and phase sequence are correct; If the primary transformer is connected after conversion, check whether the functions and wiring of the primary transformer are correct;
Output is incorrect	Check the function setting and output type of multi-function outlet; Check the outlet connections and pay attention to the normally open/normally closed.
Input is abnormal	Check the function setting of multi-function input port and the valid type of input; Check whether the input port is a passive contact input (note: if the input port is connected with too high voltage, it may burn the input port); Check whether the input port is reliably connected to the COM terminal when the input is valid.
Switch cut is abnormal	Check whether the parameter setting is consistent with the switch type; Check the connection between the controller and the switch;

	Test switch power supply Settings and wiring; Check switch mechanical structure.
RS485 communication is abnormal	Check whether the device number and baud rate in parameter setting are correct; Check whether the Settings of data bit, stop bit and check bit are correct; Check whether the RS485 port connection is connected correctly; If the RS485 converter is used for communication, check whether the RS485 converter is normal; If none of the above methods can solve the problem, try to incorporate the 120 ohm terminal matching resistance between the A and B terminals of the controller RS485.