RI-F550
Multifunction Power Meter

User Manual

Rayleigh Instruments

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1. Safety Instructions

The manufacturer shall not be held responsible for failure to comply with the instructions in this manual.

The equipment must be installed and serviced only by qualified personnel.

Never work alone.

Prior to any work on or in the equipment, isolate the voltage inputs and auxiliary power supplies, short the secondary of all CT, but never short the secondary of PT.

Always use a properly rated voltage sensing device to confirm that all power is off.

Risk of damaging device

◆ The voltage of the auxiliary power supply is beyond the rated range.

◆ The frequency of the power distribution system is beyond the rated range.

◆ The input polarity of the voltage or the current is wired improperly.

2. Product description

2.1 Overview

RI-F550 is equipped with electrical variable measurement, energy metering and power quality analysis functions. RI-F550 also can be extended with I/O modules for monitoring and controlling equipment at field, realizing system integration with different smart electricity distribution system and energy management system, and sharing monitoring data and energy data.

2.2 Extend modules

RI-F550 has two extension interfaces for connecting modules and expanding functions. Please pay attention to the following points when connecting modules to RI-F550.

a）Two modules for one interface at most, and four modules for RI-F550 at most.

b）Only one communication module can be connected to RI-F550. The communication modules are RI-A5ETNT, RI-A5PROF, RI-A5WIFI, RI-A5GPRS, RI-A5RS485, RI-A5MBUS, RI-A5RSBAC, RI-A5IPBAC, and RI-A5RS232. Two interfaces should be connected with different communication modules except for RI-A5PROF,

RI-A5RS485 and RI-A5RS232.

c） The arrangement of modules can be set according to user's requirements in compliance with a) and b). For example, four RI-A5DCDI modules, two RI-A5DCDI modules + one RI-A5RO5A module + one RI-A5GPRS modules; one RI-A5DCDI module + one RI-A5DCAO module + one RI-A5RS485 module.

Module type	Description
RI-A5ACDI	2 AC digital input
RI-A5DCDI	4 digital inputs
RI-A5RO5A	2 relay outputs
RI-A5DCAI	2 analog inputs：mA
RI-A5PT100	2 analog inputs：PT100
RI-A5DCAO	2 analog outputs：mA
RI-A5ETNT	Ethernet: Modbus/TCP
RI-A5PROF	DB9, Profibus-DP
RI-A5WIFI	WIFI: Modbus/TCP
RI-A5GPRS	GPRS: Modbus/TCP, SMS
RI-A5RS485	RS485, Modbus-RTU
RI-A5MBUS	M-Bus communication
RI-A5RSBAC	BACnet/MSTP communication
RI-A5IPBAC	BACnet/IP communication
RI-A5RS232	RS232, Modbus-RTU

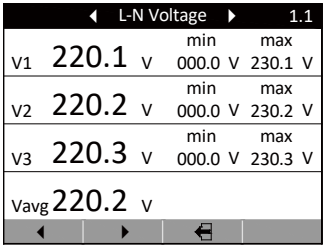
2.3 Measurement

The following list shows variables which can be measured by RI-F550 including relative variables calculated from basic electrical parameters.

Measurement variable	Instant	Max	Min	Demand	Sum	Unit
V1/V2/V3	●	●	●	—	—	[V, kV]
V12/V23/V31	●	●	●	—	—	[V, kV]
I1/I2/I3	●	●	●	●	—	[A, kA]

F	●	●	●	—	—	[Hz]
P1/P2/P3	●	—	—	—	—	[kW, MW, GW]
P	●	●	●	●	—	[kW, MW, GW]
Q1/Q2/Q3	●	—	—	—	—	[kvar, Mvar, Gvar]
Q	●	●	●	●	—	[kvar, Mvar, Gvar]
S1/S2/S3	●	—	—	—	—	[kVA, MVA, GVA]
S	●	●	●	●	—	[kVA, MVA, GVA]
PF1/PF2/PF3	●	—	—	—	—	—
PF	●	●	●	—	—	—
EP+/EP-	—	—	—	—	●	[kWh, MWh, GWh]
EQ1/EQ2/EQ3/EQ4	—	—	—	—	●	[kvarh, Mvarh, Gvarh]
THDV1/THDV2/THDV3	●	—	—	—	—	[%]
THDI1/THDI2/THDI3	●	—	—	—	—	[%]
Harmonic RMS-U (1～63rd)	●	—	—	—	—	[%]
Harmonic RMS-I (1～63rd)	●	—	—	—	—	[%]
Unbalance-U	●	—	—	—	—	[%]
Unbalance-I	●	—	—	—	—	[%]

2.4 Real-time measurement



The left picture shows three phase instantaneous voltage, average voltage, max voltage and min voltage. Click ◀ or ▶ to check other pages, press ↩ to return to main interface.

2.5 Energy metering and tariff meter reading

This meter has excellent energy metering functions as follows:

·Total bi-direction active and reactive energy metering

·Phase separated bi-direction active and reactive energy metering

·Fundamental energy metering.

·Four-quadrant reactive energy metering.

·Apparent energy metering.

·Tariff energy metering

The meter shows primary value. Primary value is equal to the secondary value multiplied by voltage or current transformer ratio. Secondary value is the reference to all the energy. The smallest resolution ratio of secondary value is 1Wh or 1varh. The smallest resolution ratio of energy shown on meter is 0.01kWh or 0.01kvarh.

The storage range of energy is secondary energy 4294967295 Wh, and the display range of energy is primary energy 99999999999 kWh (99.9 billion). The data will not exceed the range if the meter is in its mean time between failures. Users can clear the energy data after entering correct password.

Tariff energy: the meter has two sets of tariffs with four kinds of rates in twelve time zones. It starts energy metering in one time zone according to digital input status.

2.5.1 Tariff energy

①Rate number

Rate number is used to indicate the present tariff of working meter. T 1 indicates Tip rate; T2 indicates Peak rate; T3 indicates Flat rate; T4 means valley rate.

②Time period

One day can be divided into 12 time periods at most in the meter. The time period must be continuous, which means the end time of the first time period is the start time of the second time period.

③Rate schedule

Different rate schedules can be preset in the meter. They can perform different tariffs in the specified time period. Up to 4 rates can be preset. During programming, the rate schedule number is used to indicate what tariff that the meter performs. 1 indicates the first-rate schedule.

④Holiday

Holiday includes regular holidays (22 days） and irregular holidays (60 days), a total

of 82 days. Regular holidays mean the same annual holiday that nation has stipulated, such as January 1st, May 1st, etc. It can be set according to the requirement. Irregular holiday means annual holidays stipulated by different nations, such as Spring Festive (February 9th, 2005). It can be set according to the requirement. The tariff for a holiday can be any one of the four tariffs.

⑤Weekly tariff

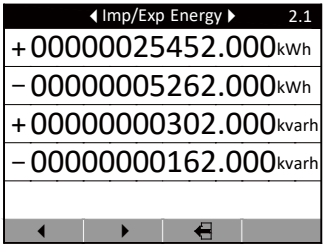
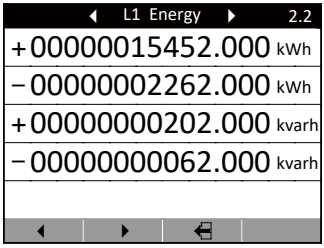
Each of the four rates is available for seven days a week.

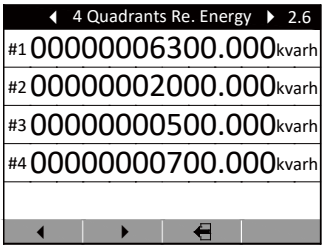
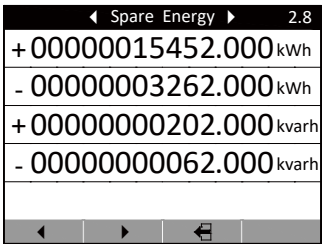
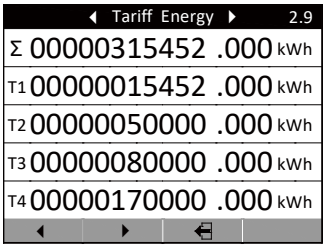
⑥Monthly tariff

Each of the four rates is available for each month.

⑦Priority order of tariff

There are two modes to perform tariffs: holiday tariff and monthly tariff. In holiday tariff mode, the holiday tariff will be performed if the day is holiday, otherwise the weekly tariff will be performed. In monthly tariff mode, it will be performed according to the rate schedule that is set monthly.

	Left picture shows bi-direction active/reactive energy. EP+= 25452kWh， EP- = 5262kWh， EQ+ = 302kvarh， EQ- = 162kvarh。
	Left picture shows Phase A bi-direction active/reactive energy. EP+= 15452kWh， EP- = 2262kWh， EQ+ = 202kvarh， EQ- = 62kvarh。

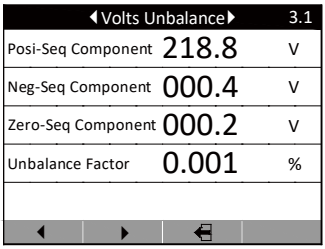
	Left picture shows four-quadrant reactive energy. First quadrant Q1 = 6300kvarh， Second quadrant Q2 = 2000kvarh， Third quadrant Q3 = 500kvarh， Fourth quadrant Q4 = 700kvarh。
	Left picture shows bi-directional spare active and reactive energy. EP+= 15452kWh， EP- = 3262kWh， EQ+ = 202kvarh， EQ- = 62kvarh。
	Left picture shows import active energy in different time zones. Total active energy (Σ) 315452kWh Energy of tariff 1 (T1) 15452kWh Energy of tariff 2 (T2) 50000kWh Energy of tariff 3 (T3) 80000kWh Energy of tariff 4 (T4) 170000kWh

2.6 Power quality

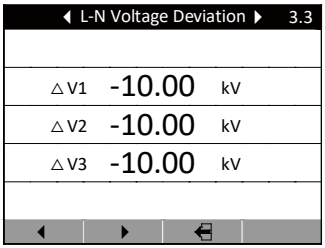
RI-F550 can monitor and analyze power quality of gird and measure the following variables:

Three phase voltage and current sequence component and unbalance

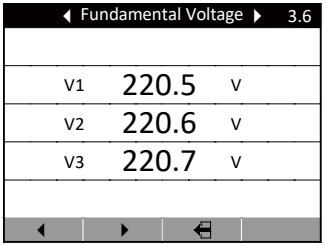
Electrical variables in three phase system can be divided into positive sequence component, negative sequence component and zero sequence component according to symmetrical component method. If the electric system is in normal operation mode, the ratio between negative sequence component RMS value and positive sequence component RMS value is defined as three phase unbalance of an electrical variable.

	Left picture shows three phase voltage and current sequence component and unbalance.

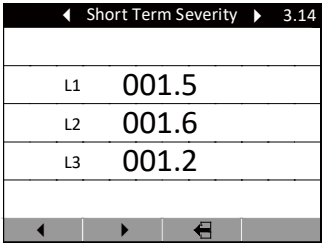
Phase voltage, line voltage and frequency deviation.

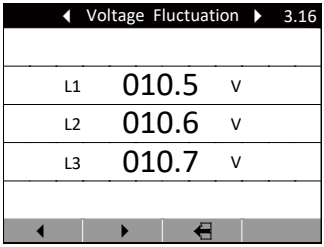
	Left picture shows three phase voltage deviation.

Fundamental wave voltage/ current, harmonic voltage/current, fundamental wave active power/reactive power/apparent power, fundamental wave power factor.

	Left picture shows three phase voltage fundamental wave content.

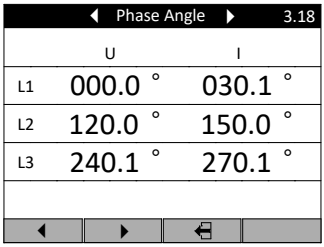
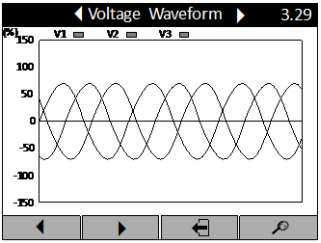
Voltage short-term flicker, long-term flicker and fluctuation

	Left picture shows voltage short-term flicker value.

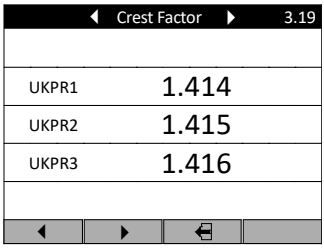
	Left picture shows voltage fluctuation value.

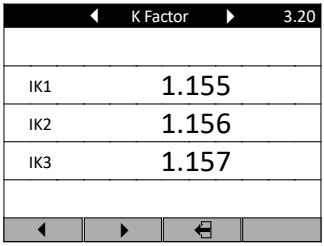
Voltage and current phase angle

RI-F550 shows three phase voltage and current phase angles. L1 voltage angle is defaulted as 0°. Other phase angles are shown phase difference relative to L1 voltage. Unit: °

	Left picture shows three phase voltage and current phase angles.
	Left picture shows three phase voltage waveforms.

Voltage crest factor, current K factor

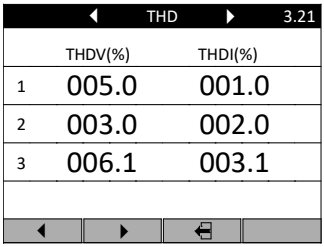
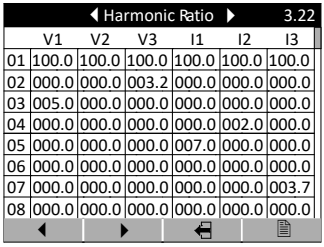
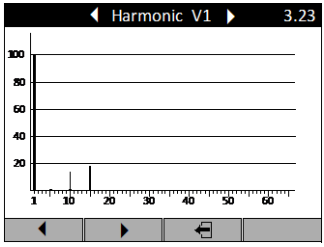
	Left picture shows three phase voltage crest factors.

	Left picture shows current K factor.

RI-F550 can measure harmonic content of grid. The detailed functions are as follows:

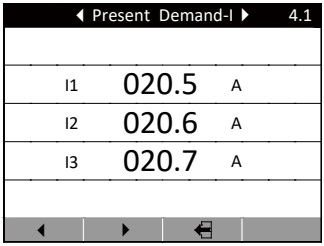
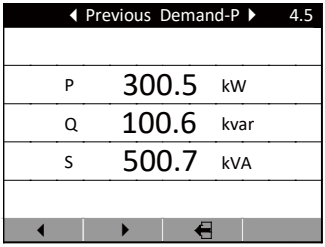
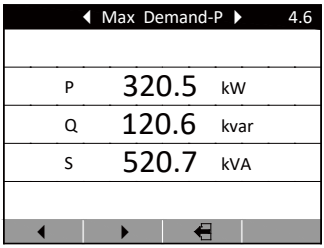
■Measuring 2nd to 63rd harmonics.

■Showing voltage and current bar graph.

	Left picture shows three phase voltage and current THD.
	Left picture shows three phase voltage and current subharmonics content.
	Left picture shows voltage subharmonics bar graph.

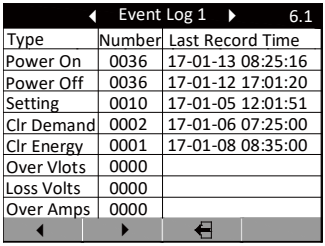
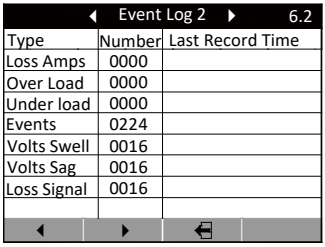
2.7 Demand record

RI-F550 has six independent demand recording channels to measure and record max demand, present demand and previous demand of three phase current, total active power, total reactive power and total apparent power.

	Left picture shows present demand of three-phase current.
	Left picture shows three-phase total active power, reactive power, apparent power in last cycle.
	Left picture shows max demand of three-phase total active power, reactive power and apparent power.

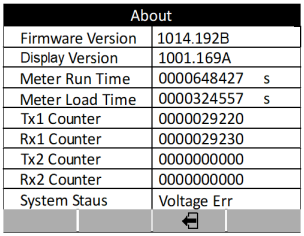
2.8 Event record

Event record includes the total times and latest occurrence time of power on record, parameter modification record, over current record and so on.

	Left picture shows event record 1.
	Left picture shows event record 2.

2.9 Help information

The page shows the software version and module status.

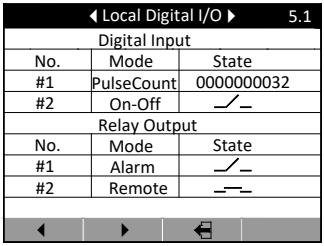
	The left picture shows user help information. The last column shows present status of system. “OK” means the system operates normally. “Voltage Err” means there is voltage fault.

2.10 Extend module

RI-F550 has two extension interfaces for connecting modules and expanding functions.

2.10.1 Digital input and relay output of RI-F550

RI-F550 has two digital inputs and two relay outputs.



Left picture shows digital input and relay output information of RI-F550.

2.10.2 Digital input（RI-A5ACDI, RI-A5DCDI）

RI-A5ACDI module has digital input adopting wet contact mode to measure AC 220V signal.

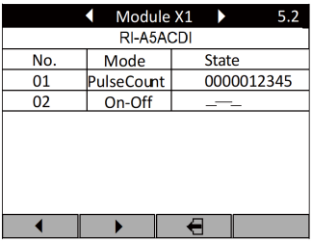
RI-A5DCDI module has digital input adopting dry contact mode which gets power supply from inside of meter and with no need for external power supply.

Digital input supports three working modes:

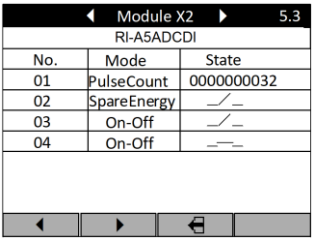
Status monitoring: the meter receives the status of terminal node and shows it on the window. It also shows the newest status immediately when the status of terminal node changes.

Pulse counting: the meter receives and counts the number of pulses from terminals. It adds by one when it receives one pulse.

Spare energy: a meter starts accumulating spare energy and stops accumulating total energy at the same time when it detects that the digital input becomes closed.



Left picture shows working modes of two digitals inputs are synchronous demand and status monitoring. No. 2 digital input receives signal.



The left pictures shows workings modes of four digital inputs. No. 1 digital input is in pulse counting mode, and the pulse number is 32; No. 2 is spare energy, No. 3 and No. 4 digital inputs are in status monitoring mode, No.4 digital input has signal input.

2.10.3 Relay output（RI-A5RO5A）

RI-F550 has two relay outputs. RI-A5RO5A module is used to add more relay outputs to the meter.

RI-F550 relay outputs have two working modes: remote control and off-limit alarm.

RI-A5RO5A module relay outputs have two working modes: remote control and off-limit alarm. Working mode, alarm item and alarm range of each relay output can be set in programming.

As for detailed information about relay output setting, please refer to Appendix 2.

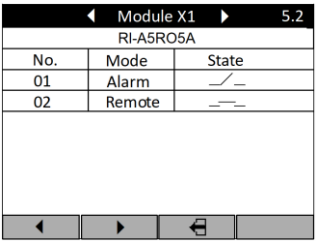
Notice:

Remote control

If user needs to remotely control relay output, please set the working mode as “Remote”. Set delay as electrical level mode or set delay time as N * 100ms.

Off-limit alarm

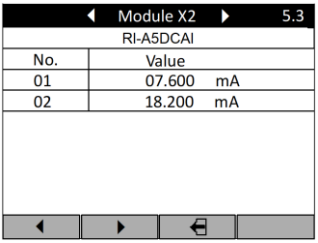
Set relay output as “Alarm” mode, “Mode” is used to select an electrical variable, “Delay” is used to set alarm delay time, “Value” is used to set alarm limit value, “Reset” is used to set alarm recovery threshold value for electrical variable.



Left picture shows RI-A5RO5A status information. No. 1 is in off-limit alarm mode, No. 2 is in remote control mode.

2.10.4 Analog input module（RI-A5DCAI）

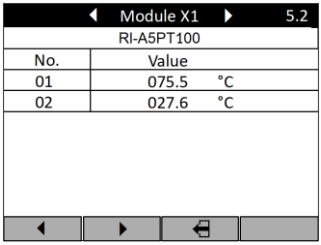
RI-A5DCAI module is used to measure 4~20mA signal. The measurement display page is shown as follows,



Left picture shows DC analog input value. No. 1 input 7.6mA, No. 2 input 18.2mA.

2.10.5 Analog input module（RI-A5PT100）

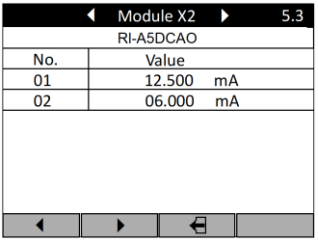
RI-A5PT100 module is used to measure PT100 signal. The measurement display page is shown as follows,



Left picture shows PT100 input value. No.1 input temperature is 75.5℃, No.2 input temperature is 27.6℃.

2.10.6 Analog output module（RI-A5DCAO）

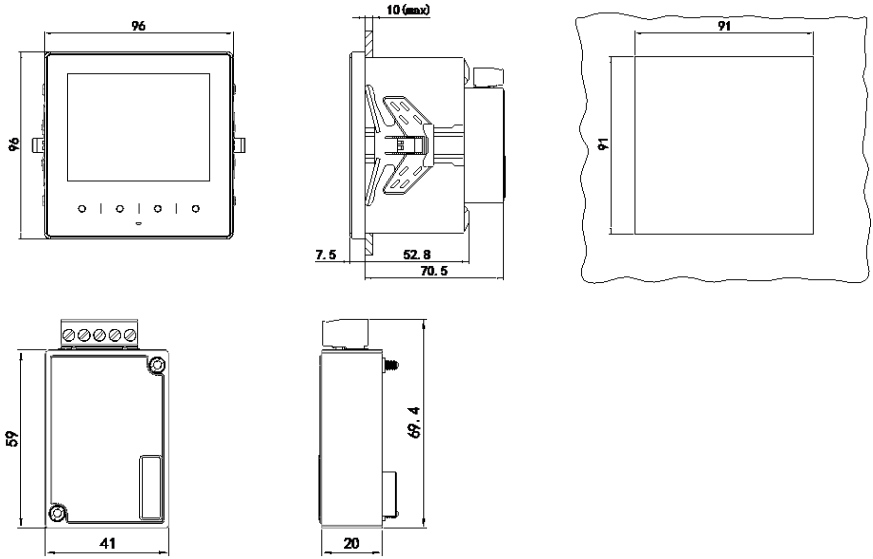
Analog output module can transfer instantaneous electrical variables to DC current signal output. If analog output module is connected to meter, the corresponding display page will be shown on meter. The current value shown in the page is theoretical output value in present status. Analog output item and range can be set through meter.



Left picture shows analog output theoretical value. No. 1 output 12.5mA, No. 2 output 6mA.

3 Installation and wiring

3.1 Dimension



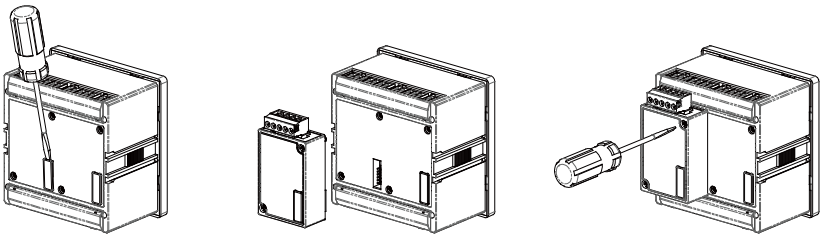
3.2 Installation

1) Choose the right place on the fixed distribution cabinet for cutout by size 91×91mm.

2) Take off the supporting clips of the meter.

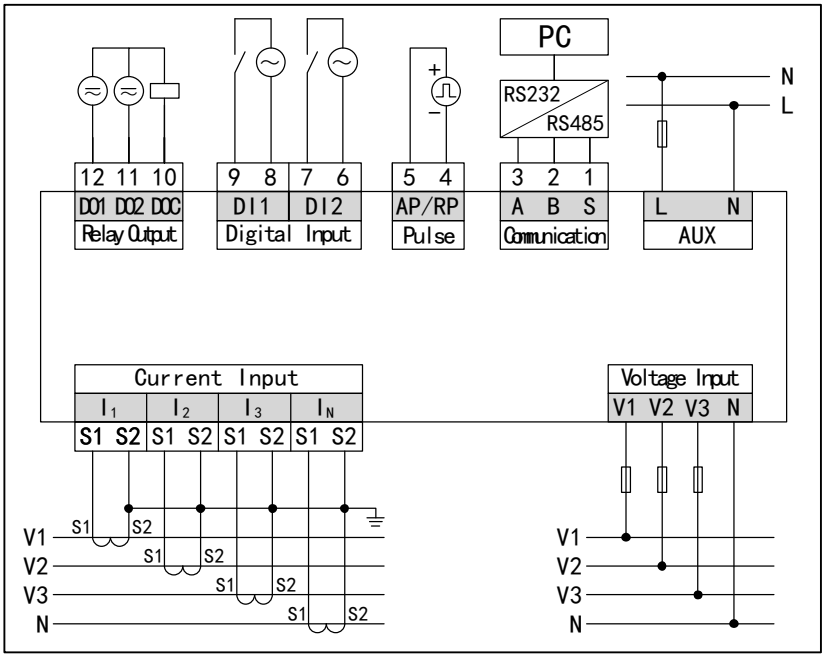
3) Insert the meter into the cutout.

4) Insert and push the supporting clips to fix the meter.



3.3 Wiring

Typical wiring

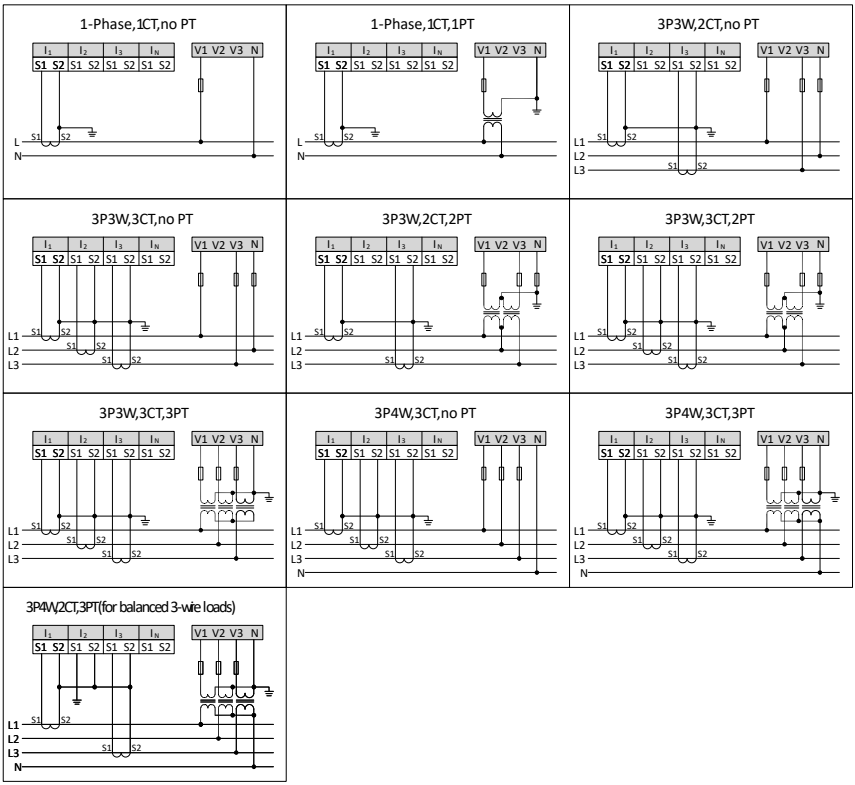


Note:

Auxiliary power supply：AC/DC (80～270) V

Rated current of fuse：0.5A

3.4 Signal wiring diagram



Wiring instruction:

(a) External wiring method must be the same as the inner wiring method of the meter. Otherwise, the measured data will be incorrect.

(b) Voltage and current signals must be AC signals. Please do not connect DC signals to input terminals.

(c) Voltage input: make sure the input voltage is not higher than the rated voltage of the meter, otherwise, please connect external PT to the meter. If external PT is adopted, the accuracy of meter will depend on the accuracy of external PT. Please make sure the accuracy of external PT is equal to or better than that of meter. For

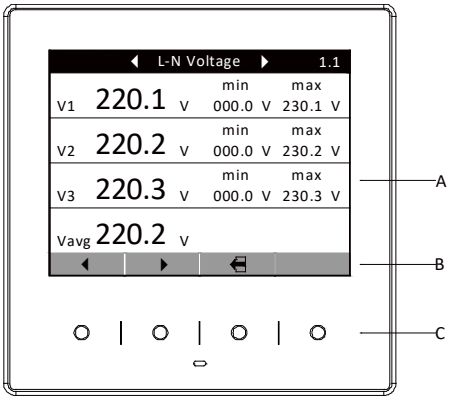
your convenient maintenance, please adopt wiring terminal row.

(d) Current input: make sure the input current is not higher than the rated current of the meter, otherwise, please connect external CT to the meter. If external CT is adopted, the accuracy of meter will depend on the accuracy of external CT. Please make sure the accuracy of external CT is equal to or better than that of meter. If there is more than one meter connected to the CT, please connect them in serial. Before removing the current input wires of the meters, make sure to cut off the first loop of CT or short connect its second loop. For your convenient maintenance, please adopt wring terminal row.

(e) Make sure voltage and current of three phases correspond to each other, that means the phase sequence and direction are same. Otherwise, the numbers and signals will be incorrect (power and energy).

4. Operation

4.1 Panel



A: Display window B: Function indication for keys C: Touch type keys

5 Setup

5.1 Signs for keys and corresponding functions

Users can set parameters for meter through keys.

Sign	Function
	Add number at selected bit
	Move downward, switch to next page, change parameter
	Move left to change or show data/ switch data bit
	Move right to change or show data
	Return to Main interface directly, return to upper-level menu/cancel modification
	Enter selected item
	Confirm
	Zoom display image
	Edit
	Next page
	Ineffective key

The method of changing numbers

Click  to select a bit, click  to add number at selected bit

Enter and exit programming status

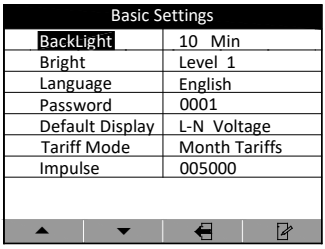
Enter programming mode: Click  or  to select “System setting” in main interface, and then click  to enter programming interface. Select “User” and input correct password to enter parameter setting mode. (Programming password is defaulted as 1000 in factory. User can change the password.).

Exit programming mode: return to first level of menu at first, and then click  . The meter will indicate whether to save modified data or not at this step. If “Yes” is selected, the meter will save modified data and return to main interface; if “No” is selected, the meter will cancel modified data and return to main interface.

5.2 Programming and setting menu

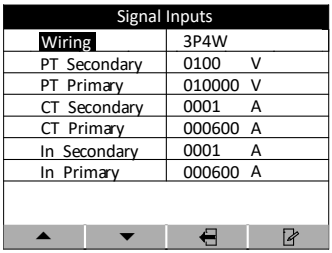
Programming and setting menu adopt hierarchical mode.

5.2.1 Basic parameter setting



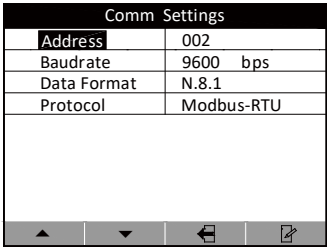
Backlight	00s-99 min 00-backlight constant on
Bright	1-5
Language	English
Password	0001-9999
Default display	Set first the display interface after power on. This interface can be set as U, I, P, E, THD, Waveform, Demand and Max/Min
Tariff Mode	Set tariff mode. This Can be set as Month Tariffs and Week (Holiday) Tariffs.
Impulse	0~999999

5.2.2 Signal input setting



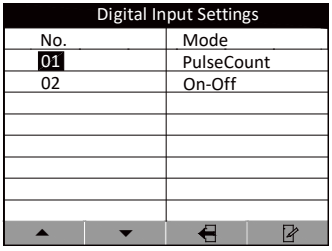
Wiring method	1P2W,3P3W,3P4W
PT secondary value	0-690V
PT primary value	0-999999V
CT secondary value	0-6A
CT primary value	0-999999A
Neutral current primary value	0-999999A
Neutral current secondary value	0-6A

5.2.3 Communication setting



Address	1~247
Baud rate	1200~38400bps
Check mode	E81, O81,N81,N82
Communication protocol	Modbus-RTU

5.2.4 Digital input setting



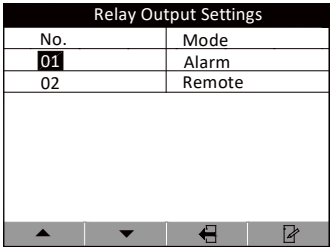
There are three working modes of digital input.

Pulse counting

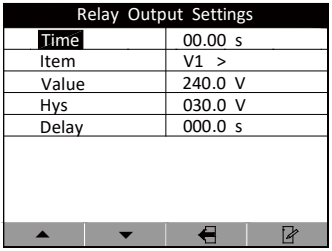
Status monitoring

Spare energy

5.2.5 Relay output setting

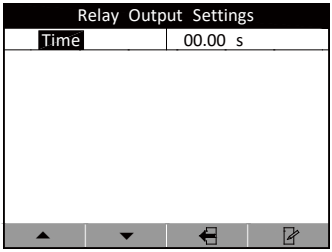


There are two working modes of relay output which are remote communication and alarm.



Alarm output Settings

Time	Pulse width: 0.10～99.99s
Item	See following list
Value	Limit value
Hys	Hysteresis value
Delay	Delay time: (0~9999) ×100ms



Remote control output mode

Time	0-99.99s

Electrical variables for alarm are shown in the following list:

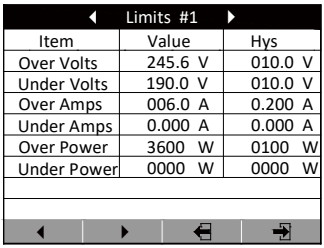
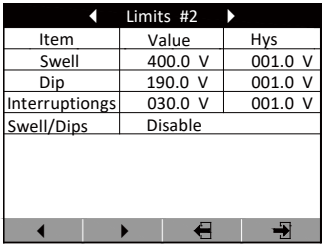
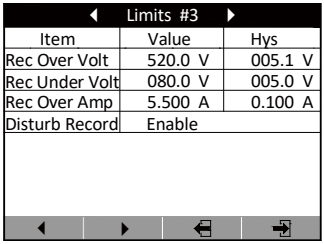
Item	Format	Instruction
OFF		Off
DI	0/1	Switching linkage action, relay acts according to digital input status. If it is 0, relay closes when digital input is 0; if it is 1, relay closes when digital input is 1.
X4.PT L	xxx.x ℃	X4 low temperature alarm for any loop

X4.PT H		X4 high temperature alarm for any loop
X4.PT2L		X4 low temperature alarm for second loop
X4.PT2H		X4 high temperature alarm for second loop
X4.PT1L		X4 low temperature alarm for first loop
X4.PT1H		X4 high temperature alarm for first loop
X3.PT L		X3 low temperature alarm for any loop
X3.PT H		X3 high temperature alarm for any loop
X3.PT2L		X3 low temperature alarm for second loop
X3.PT2H		X3 high temperature alarm for second loop
X3.PT1L		X3 low temperature alarm for first loop
X3.PT1H		X3 high temperature alarm for first loop
X2.PT L		X2 low temperature alarm for any loop
X2.PT H		X2 high temperature alarm for any loop
X2.PT2L		X2 low temperature alarm for second loop
X2.PT2H		X2 high temperature alarm for second loop
X2.PT1L		X2 low temperature alarm for first loop
X2.PT1H		X2 high temperature alarm for first loop
X1.PT L		X1 low temperature alarm for any loop
X1.PT H		X1 high temperature alarm for any loop
X1.PT2L		X1 low temperature alarm for second loop
X1.PT2H		X1 high temperature alarm for second loop
X1.PT1L		X1 low temperature alarm for first loop
X1.PT1H		X1 high temperature alarm for first loop
dmd. S <	xxxx	Present demand S <
dmd. S >		Present demand S >
dmd. Q <		Present demand Q <
dmd. Q >		Present demand Q >
dmd. P <		Present demand P<
dmd. P >		Present demand P>

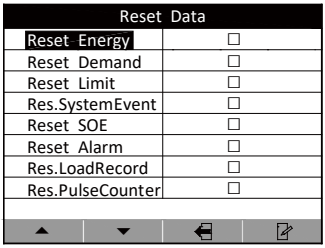
dmd. I <	x.xxx _A	Present demand I <
dmd. I >		Present demand I >
dmd. I3 <		Present demand I3<
dmd. I3 >		Present demand I3>
dmd. I2 <		Present demand I2<
dmd. I2 >		Present demand I2>
dmd. I1 <		Present demand I1<
dmd. I1 >		Present demand I1>
THDi <	xx.xx%	Current harmonic distortion rate low alarm
THDi >		Current harmonic distortion rate high alarm
THDv <		Voltage harmonic distortion rate low alarm
THDv >		Voltage harmonic distortion rate high alarm
Iunb <	xxx.x %	Current unbalance low alarm
Iunb >		Current unbalance high alarm
Vunb <		Voltage unbalance low alarm
Vunb >		Voltage unbalance high alarm
F <	xx.xx Hz	Grid frequency low alarm
F >		Grid frequency high alarm
PF <	x.xxx	Total power factor low alarm
PF >		Total power factor high alarm
S <	xxxx _VA	Total apparent power low alarm
S >		Total apparent power high alarm
Q <	xxxx _var	Total reactive power low alarm
Q >		Total reactive power high alarm
P <	xxxx _W	Total active power low alarm
P >		Total active power high alarm
Io <	x.xxx _A	Zero-sequence current low alarm
Io >		Zero-sequence current high alarm
Iavg >		Current average value low alarm

Iavg <		Current average value high alarm
I <		One of three phase currents low alarm
I >		One of three phase currents high alarm
I3 <		I3 low alarm
I3 >		I3 high alarm
I2 <		I2 low alarm
I2 >		I2 high alarm
I1 <		I1 low alarm
I1 >		I1 high alarm
Vllavg <		Line voltage average value low alarm
Vllavg >		Line voltage average value high alarm
Vlnavg <		Phase voltage average value low alarm
Vlnavg >		Phase voltage average value high alarm
Vll <		One of three line-voltages low alarm
Vll >		One of three line-voltages high alarm
V31 <		V31 voltages low alarm
V31 >		V31 voltages high alarm
V23 <		V23 voltages low alarm
V23 >	xxx.x	V23 voltages high alarm
V12 <	_V	V12 voltages low alarm
V12 >		V12 voltages high alarm
Vln <		One of three phases' voltages low alarm
Vln >		One of three phases' voltages high alarm
V3 <		V3 voltages low alarm
V3 >		V3 voltages high alarm
V2 <		V2 voltages low alarm
V2 >		V2 voltages high alarm
V1 <		V1 voltages low alarm
V1 >		V1 voltages high alarm

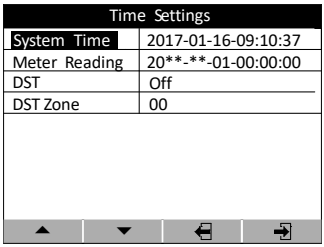
5.2.6 Limit value setting

	Used for setting off-limit alarm for voltage, current and power.
	Used for setting voltage swell, sag and interruption.
	Used for setting over voltage, under voltage and over current in fault wave record.

5.2.7 Clear synchronous setting

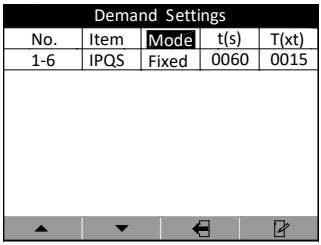
	Parameters of energy, demand, Max./Min. value and Event are cleared in this interface. If the parameters are cleared, the relative value will be zero and not be reset; If energy is cleared, a piece of energy clearance SOE is made.

5.2.8 Time setting and meter reading time



System time	Setup real-timeclock
Meter reading time	
DST	Daylight Saving Time Mode
DST Zone	Daylight Saving Time Zone

5.2.9 Demand setting

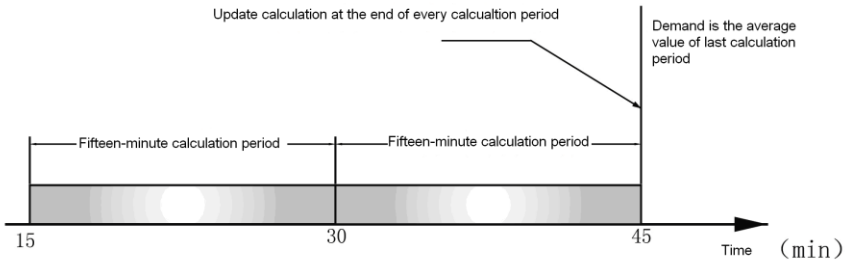


No.	1-6
Item	I1, I2, I3, P, Q, S
Mode	Slip/Fixed
t	Update time
T	T=n*t,

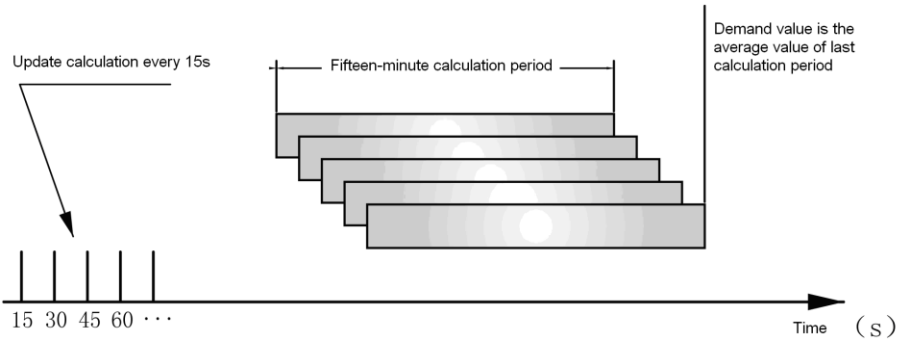
There are two demand measurement modes which are slip and fixed. The relative time parameters are set as t (updating time) and T (time zone).

Slip: meter calculates average demand during latest T minutes every t second, tests and records the value, automatically reads the demand every month.

Fixed: meter calculates average demand during latest T minutes after T minutes, tests and records the value, automatically reads the demand every month.



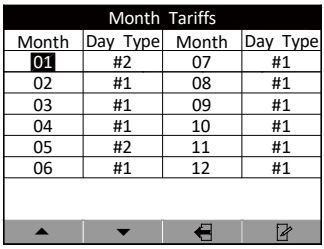
Fixed mode



Slip mode

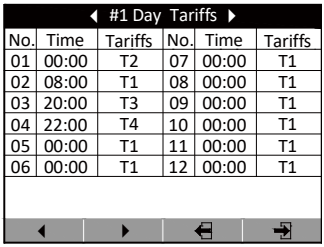
Note: calculation method in upper pictures takes 15min as example.

5.2.10 Monthly tariff setting



RI-F550 has two sets of daily tariffs. One month can be selected to follow one set of daily tariffs. Daily tariffs can be set in daily tariff page.

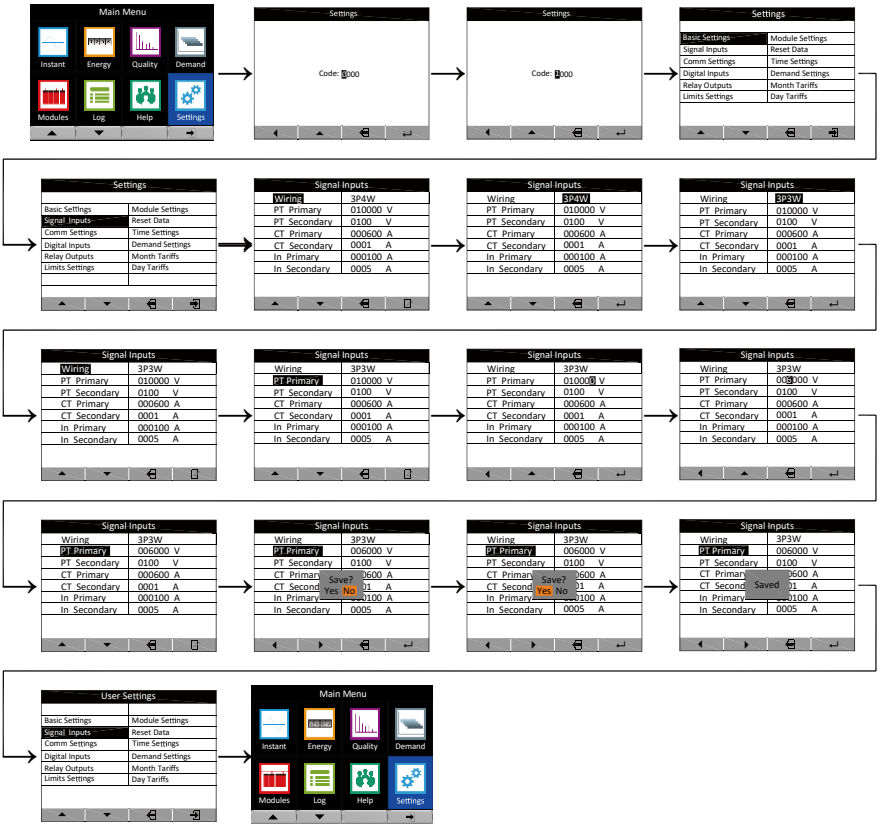
5.2.11 Daily tariff setting



RI-F550 has two sets of daily tariffs. 24 hours a day are divided into 12 twelve zone. Each time zone can be selected with one of four kinds of tariffs.

5.3 Example for programming operation

Suppose the wiring method of meter is three phase four wire and primary voltage is 10KV, change the wiring method to be three phase three wire and change primary voltage to be 6000V, the programming operation process is as follows,



6. Communication

Meter is defaulted to be equipped with one communication, RS-485 interface, Modbus-RTU protocol. It also can be extended with one communication by connecting with a module.

7. Technical specifications

Electric Characteristics			
Accuracy	Voltage and current		0.2%
	Power, Power Factor		0.2%
	Frequency		±0.01Hz
	Active power		IEC62053-22, class 0.2S
	Reactive power		IEC62053-23, class 2
Data update rate			1s
Input	Wiring mode		1P2W、3P3W、3P4W
	Voltage	Rated value	400 VAC L-N (690 VAC L-L)
		Overload	1.2Vln
		Impedance	>1MΩ
	Current	Rated value	1A or 5A
		Overload	Continuous: 1.2In
			Instantaneous: 10In/5s
		burden	<0.1VA
		Rated value	<20mΩ
	Grid frequency		(45～65) Hz
Auxiliary supply	Working range		AC/DC（80～270）V
	consumption		≤ 10VA
Energy pulse output			1 optocoupled output, pulse width (80±20%) mS
Digital input			AC220V input, isolation：2000VAC
Relay output			Contact rated at AC 250V/5A or DC 30V/5A
			Isolation： 2500VAC
Communications			
RS485 port			Modbus-RTU, 2-wire, up to 38400bps
Mechanical Characteristics			
IP index	IP65（front panel）and IP20（meter body）		
Dimensions	96×96×55mm		

Environmental Characteristics	
Operating temperature	(-10～60) ℃
Storage temperature	(-25～70) ℃
Relative humidity	(5～95) % (no gel)
Insulation	IEC 61010-1
Electromagnetic Compatibility	
Immunity to electrostatic discharge	IEC 61000-4-2-Level III
Immunity to radio-frequency field	IEC 61000-4-3- Level III
Immunity to electrical fast transients/bursts	IEC 61000-4-4- Level Ⅳ
Immunity to impulse waves	IEC 61000-4-5- Level Ⅳ
Immunity to conducted disturbances	IEC 61000-4-6- Level III
Immunity to power frequency magnetic fields	IEC 61000-4-8- Level III
Immunity to voltage dips and short interruptions	IEC 61000-4-11- Level III
Module	
RI-A5ACDI	2 AC digital input
RI-A5DCDI	4 digital inputs
RI-A5RO5A	2 relay outputs
RI-A5DCAI	2 analog inputs：mA
RI-A5PT100	2 analog inputs：PT100
RI-A5DCAO	2 analog outputs：mA
RI-A5ETNT	RJ45, Modbus/TCP
RI-A5PROF	DB9, Profibus-DP
RI-A5WIFI	WIFI: Modbus/TCP
RI-A5GPRS	GPRS: Modbus/TCP, SMS
RI-A5RS485	RS485, Modbus-RTU
RI-A5MBUS	M-Bus communication
RI-A5RSBAC	BACnet/MSTP communication
RI-A5IPBAC	BACnet/IP communication
RI-A5RS232	RS232, Modbus-RTU

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