458

AMC100 AC Precision power distribution monitoring device

Installation instruction V1.1

Acrel Co., Ltd

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1 General

With the rapid development of data centers, the energy consumption of data centers has become more and more prominent. Energy management and power supply and distribution design of data centers have become hot issues. An efficient and reliable data center power distribution system solution is to improve data centers. Electric energy use efficiency, an effective way to reduce equipment energy consumption. To achieve energy saving in the data center, it is first necessary to monitor each electrical load, and there are many load loops in the data center. Traditional measuring instruments cannot meet the requirements of cost, volume, installation, construction and other aspects. Therefore, it is necessary to adopt suitable data Multi-loop monitoring device required by central centralized monitoring

Acrel AMC100 series AC precision power distribution monitoring device is a measuring device designed specifically for power management of data center servers. The device is compact in design and can monitor the full electrical parameters, input and output switches and the status of the lightning arrester of A+B two incoming lines and 192 outgoing lines in real time. The alarm thresholds of all measurement channels can be set individually, and the outgoing line The limited event immediately triggers the system's sound and light alarms, and the high integration of the monitoring loop is realized in the volume of the traditional instrument.

2 Product Model

Model	Function Description
AMC100-ZA	Monitoring the full power parameters of the A+B dual three-phase AC incoming circuit, 8 switching status inputs, 4 switching status outputs, 2 leakage monitoring, 1 temperature and humidity detection, 3 RS485 communications
AMC100-FAK30	Monitor the full power parameters and switch status of a total of 30 branches of A+B dual AC outlets, and 1 RS485 communication
AMC100-FAK48	Monitor the full power parameters and switch status of a total of 48 branches of A+B dual AC outlets, and 1 RS485 communication
AMC100-FA30	Monitor the full power parameters of a total of 30 branches of A+B dual AC outlets, and 1 RS485 communication
AMC100-FA48	Monitor the full power parameters of a total of 48 branches of A+B dual AC outlets, and 1 RS485 communication
AMC100-KA30	Wet contact, monitor the switching status of 30 branches A+B, 1 RS485 communication
AMC100-KA48	Wet contact, monitor the switching status of 48 branches A+B, 1 RS485 communication
AMC100-KD30	Dry contact, monitor the switching status of 30 branches A+B, 1 RS485 communication
AMC100-KD48	Dry contact, monitor the switching status of 48 branches A+B, 1 RS485 communication
AMC100-FT30	1 way RS485 communication, 30 way temperature measurement
AMC100-FT48	1 way RS485 communication, 48 way temperature measurement

3 Technical Parameters

AC incoming line

Instrument model		AMC100-ZA
Measurement parameters		Voltage, current, frequency, active power, reactive power, power factor, active energy, reactive energy, Zero-to-ground voltage, leakage current and zero sequence current, total harmonic content (THD), 2-63 harmonics, current and voltage unbalance, ambient temperature and humidity
Bus voltage	Rated	220VAC
	Measuring range	±20%
	Overload	Instantaneous voltage 2 times/sec
Current incoming circuit	Rated	Secondary 5A
	Range	0～6A
	Overload	Continuous 1.2 times, instantaneous 10 times/sec
Temperature and humidity	Temperature Range	-40℃～+99℃
	Humidity Range	20%～90%

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Input frequency		AC45～65Hz
Measurement accuracy	Incoming line	Voltage/current level 0.2, active power/energy level 0.5, reactive power/energy level 1
	Temperature	±1℃
	Humidity	±5%
Auxiliary power		AMC100-ZA: signal to take power (≤15W) AMC100-ZA-P220: 220V independent power supply AMC100-ZA-P24: DC 12-24V independent power supply
Environment	Temperature	Work: -20℃～150℃ Storage: -25℃～70℃
	Humidity	Relative humidity≤93%
	elevation	≤2500m
Switch output		4 channels 3A 250VAC/3A 30VDC
Switch input		8 dry nodes
Communication		1 isolated RS485/Modbus-RTU to the background system 1 RS485/Modbus-RTU to touch screen 1 RS485/Modbus-RTU connection downstream module Optional 1-channel Ethernet communication function
Installation Method		DIN35mm rail or bottom plate installation
Protection level		IP20
Pollution level		2
Security	Insulation	The insulation resistance between all terminals and the conductive parts of the shell is not less than 100MΩ
	Withstand voltage	A voltage and current signal//B voltage and current signal//switch output//isolated communication port//between other ports meet AC2kV 1min, switch input and other ports should meet AC0.5kV 1min, leakage current Should be less than 2mA, no breakdown or flashover phenomenon.
Electromagnetic compatibility	Anti-static interference	Level 4
	Anti-electric fast transient burst	Level 3
	Anti-surge interference	Level 4
	Resistance to radio frequency electromagnetic field radiation	Level 3

AC outlet

Instrument model		AMC100-FA30	AMC100-FA48
Measurement parameters		Voltage, current, frequency, active power, reactive power, power factor, active energy, reactive energy, 2-31 times total current harmonic content	
Bus voltage	Rated	220VAC	
	Measuring range	±20%	
	Overload	Instantaneous voltage 2 times/sec	
Current outlet loop	Rated	50mA	
	Range	0.125～60mA	
	Overload	Continuous 1.2 times, instantaneous 10 times/sec	
Input frequency		AC45～65Hz	
Measure	Outlet	Voltage/current/active power/active energy level 0.5, reactive power/reactive energy level 1	
Auxiliary power		Powered by AMC100-ZA; DC 12-24V power supply when used alone	
Environment	Temperature	Work: -15℃～55℃ Storage: -25℃～70℃	
	Humidity	Relative humidity≤93%	
	elevation	≤2500m	

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Communication		RS485/Modbus-RTU
Installation Method		DIN35mm rail or bottom plate installation
Protection level		IP20
Pollution level		2
Security	Insulation	The insulation resistance between all terminals and the conductive parts of the shell is not less than 100MΩ
	Withstand voltage	The voltage and current signals of circuit A//the voltage and current signals of circuit B//other ports meet AC2kV for 1min, the leakage current should be less than 2mA, and there is no breakdown or flashover.
Electromagnetic compatibility	Anti-static interference	Level 4
	Resistance to radio frequency electromagnetic field radiation	Level 3

Note: The rated input current of the secondary side of the AC outlet module is 50mA, and the default value of the primary side current is 50A. If the current transformer is different, the customer can set the transformation ratio through the touch screen or the host computer according to the actual use.

Instrument model		AMC100-FAK30	AMC100-FAK48
Measurement parameters		Voltage, current, frequency, active power, reactive power, power factor, active energy, reactive energy, 2-31 times total current harmonic content	
Bus voltage	Rated	220VAC	
	Measuring range	±20%	
	Overload	Instantaneous voltage 2 times/sec	
Current outlet loop	Rated	50mA	
	Range	0.125～60mA	
	Overload	Continuous 1.2 times, instantaneous 10 times/sec	
Input frequency		AC45～65Hz	
Measure	Outlet	Voltage/current/active power/active energy level 0.5, reactive power/reactive energy level 1	
Auxiliary power		Powered by AMC100-ZA; DC 12-24V power supply when used alone	
Environment	Temperature	Work: -15℃～55℃ Storage: -25℃～70℃	
	Humidity	Relative humidity≤93%	
	elevation	≤2500m	
Communication		RS485/Modbus-RTU	
Installation Method		DIN35mm rail or bottom plate installation	
Protection level		IP20	
Pollution level		2	
Security	Insulation	The insulation resistance between all terminals and the conductive parts of the shell is not less than 100MΩ	
	Withstand voltage	The voltage and current signals of circuit A//the voltage and current signals of circuit B//other ports meet AC2kV for 1min, the leakage current should be less than 2mA, and there is no breakdown or flashover.	
Electromagnetic compatibility	Anti-static interference	Level 4	
	Resistance to radio frequency electromagnetic field radiation	Level 3	

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Note: The rated input current of the secondary side of the AMC100-FAK module is 50mA, and the default value of the primary side current is 50A. If the current transformer is different, the customer can set the transformation ratio through the touch screen or the host computer according to the actual use.

Active switch module

Instrument model		AMC100-KA30	AMC100-KA48
Input frequency		45-65Hz AC45-65Hz	
Auxiliary power		Powered by AMC100-ZA, DC 12-24V power supply when used alone	
Environment	Temperature	Work: -15℃～55℃ Storage: -25℃～70℃	
	Humidity	Relative humidity≤93%	
	elevation	≤2500m	
Switch input		30 wet nodes (AC 220V)	48 wet nodes (AC 220V)
Communication		RS485/Modbus-RTU	
Installation Method		DIN35mm rail or bottom plate installation	
Protection level		IP20	
Pollution level		2	
Security	Insulation	The insulation resistance between all terminals and the conductive parts of the shell is not less than 100MΩ	
	Withstand voltage	A switch value input signal//B switch value input signal//other ports meet AC2kV 1min between two, the leakage current should be less than 2mA, no breakdown or flashover phenomenon.	
Electromagnetic compatibility	Anti-static interference	Level 4	
	Resistance to radio frequency electromagnetic field radiation	Level 3	

Passive switch module

Instrument model		AMC100-KD30	AMC100-KD48
Auxiliary power		Powered by AMC100-ZA, DC 12-24V power supply when used alone	
Environment	Temperature	Work: -15℃～55℃ Storage: -25℃～70℃	
	Humidity	Relative humidity≤93%	
	elevation	≤2500m	
Switch input		30-way trunk node	48-way trunk node
Communication		RS485/Modbus-RTU	
Installation Method		DIN35mm rail or bottom plate installation	
Protection level		IP20	
Pollution level		2	
Security	Insulation	The insulation resistance between all terminals and the conductive parts of the shell is not less than 100MΩ	
	Withstand voltage	A switch value input signal//B switch value input signal//other ports meet AC2kV 1min between two, the leakage current should be less than 2mA, no breakdown or flashover phenomenon.	
Electromagnetic compatibility	Anti-static interference	Level 4	
	Resistance to radio frequency electromagnetic field radiation	Level 3	

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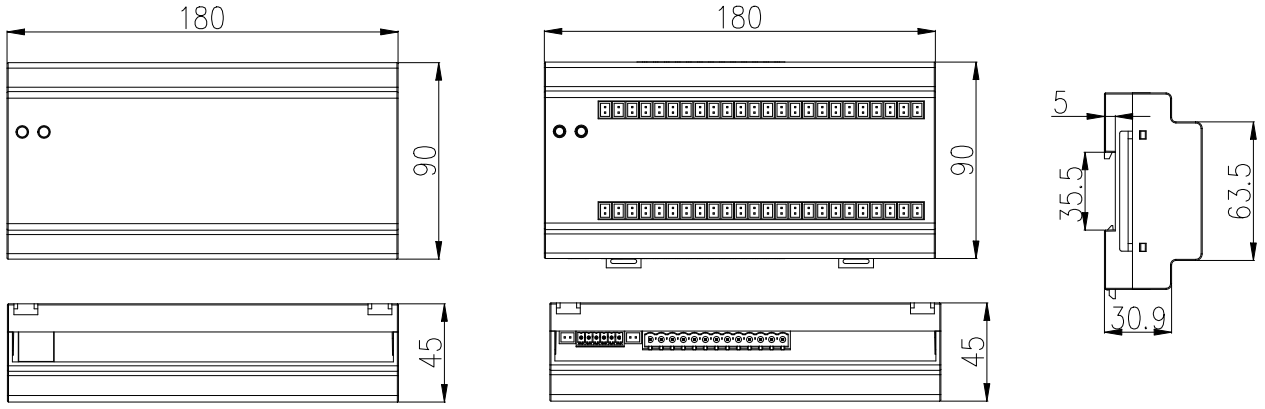
Temperature measurement module

Instrument model		AMC100-FT30	AMC100-FT48
Number of measuring channels		30 channels	48 channels
Auxiliary power		Powered by AMC100-ZA, DC 12-24V power supply when used alone	
Function	Temperature Range	-20℃～150℃	
	Communication	RS485/Modbus-RTU	
Installation Method		DIN35mm rail or bottom plate installation	
Protection level		IP20	
Pollution level		2	
Environment	Temperature/humidity/elevation	Working temperature: -20℃～60℃ Storage temperature: -25℃～70℃ Relative humidity: ≤93% Altitude: ≤2500m	
Security	Insulation	The insulation resistance between all terminals and the conductive parts of the shell is not less than 100MΩ	
	Withstand voltage	AC2kV 1min between auxiliary power supply and temperature measurement, leakage current should be less than 2mA, no breakdown or flashover phenomenon	
Electromagnetic compatibility	Anti-static interference	Level 4	
	Resistance to radio frequency electromagnetic field radiation	Level 3	

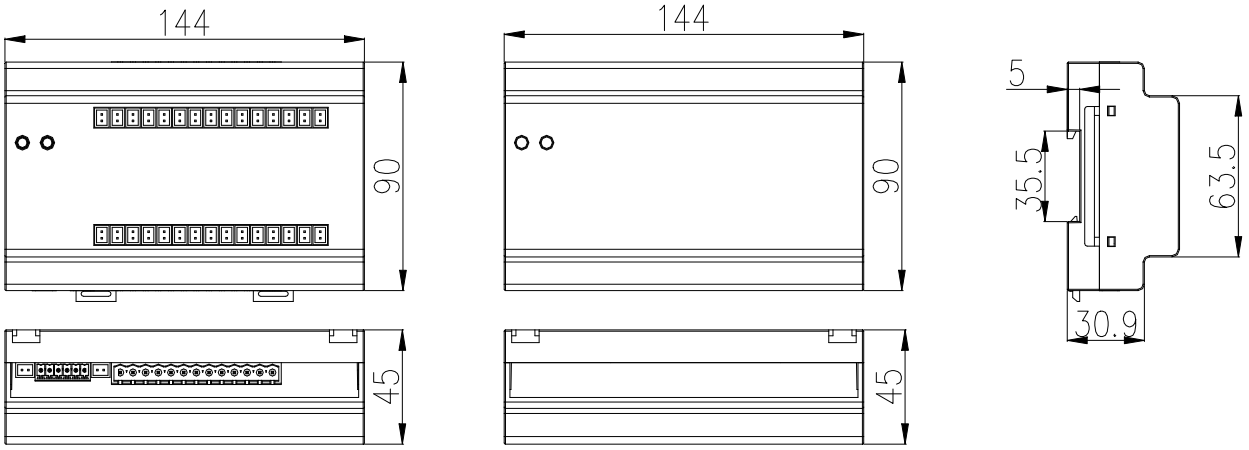
4 Appearance and structure

AMC100 series AC precision power distribution monitoring device　　Unit：mm

AMC100-ZA、AMC100-FA□48、AMC100-K□48、AMC100-FT48



AMC100-FA□30、AMC100-K□30、AMC100-FT30

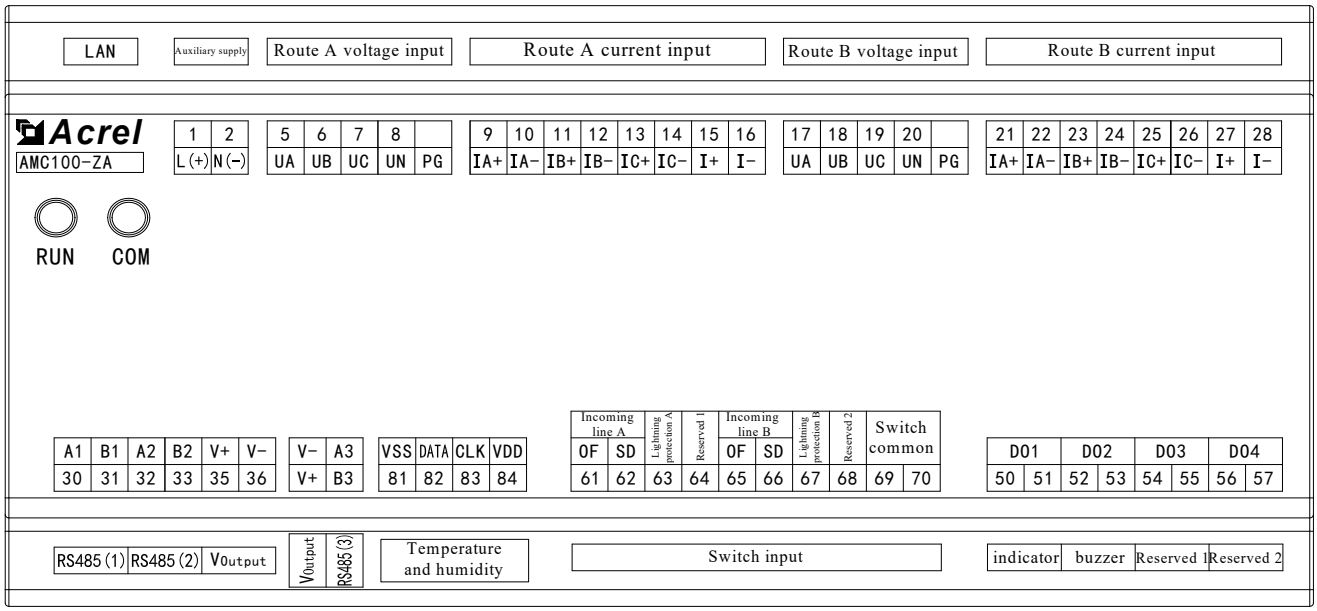


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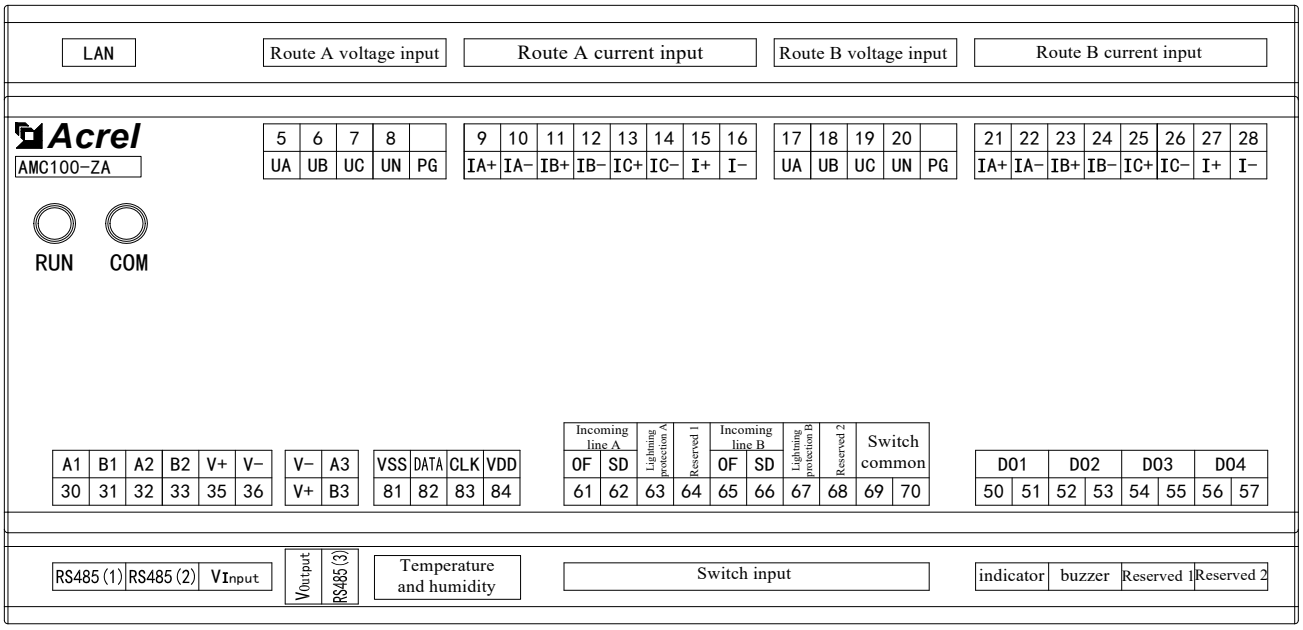
5 Wiring Terminals

5.1 AMC100-ZA Series

AMC100-ZA/CE-P220



AMC100-ZA/CE-P24



Terminal number	Definition	Description	Remark
1	L(+)	Auxiliary power	P220 used, not connected by default
2	N(-)		
5	UA	AC voltage Phase A	Three-phase voltage input of circuit A incoming line
6	UB	AC voltage Phase B	
7	UC	AC voltage Phase C	
8	UN	AC voltage neutral line	
PG		Ground	
9	IA+	Current input phase A	Three-phase current input of circuit A incoming line
10	IA-		
11	IB+	Current input phase B	
12	IB-		
13	IC+	Current input phase C	

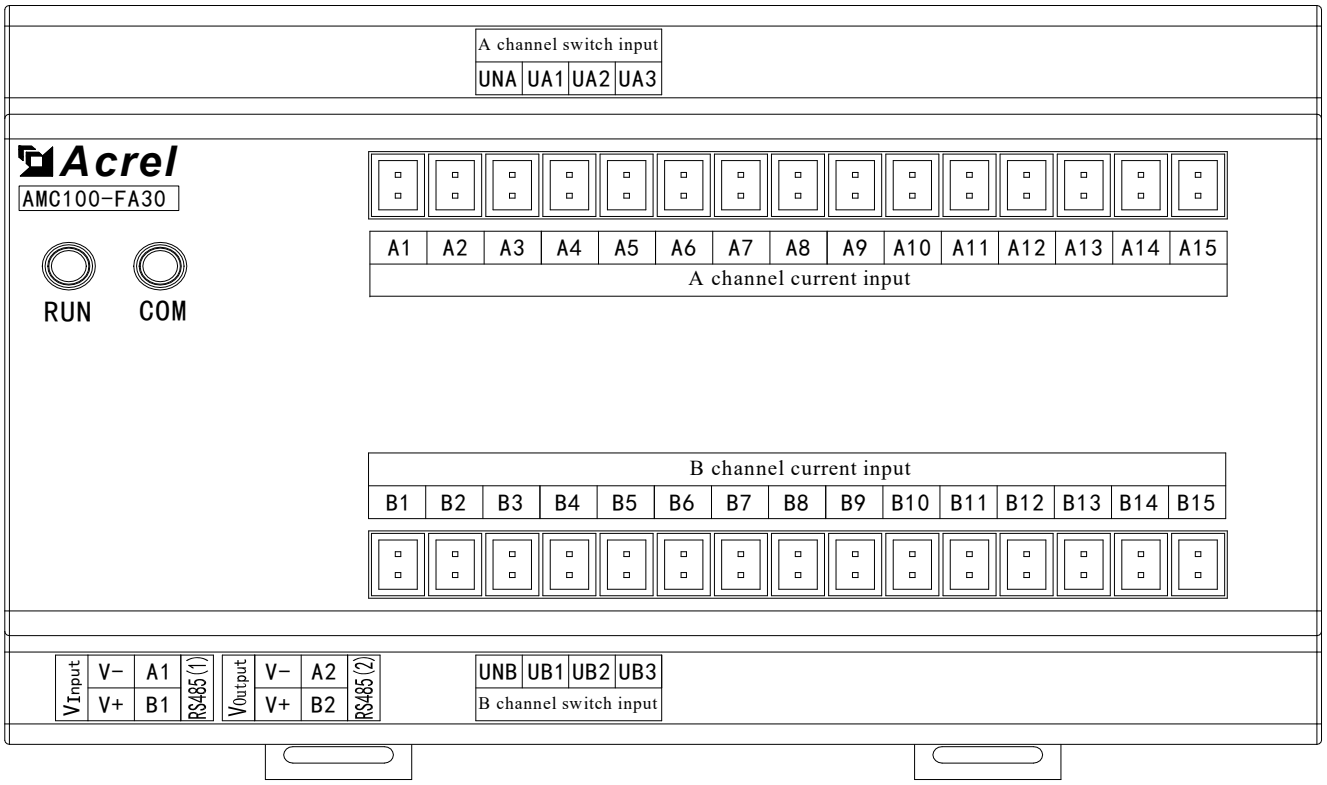
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14	IC-		
15	I+	A channel leakage current input	
16	I-		
17	UA	AC voltage Phase A	Three-phase voltage input of circuit B incoming line
18	UB	AC voltage Phase B	
19	UC	AC voltage Phase C	
20	UN	voltage neutral line	
PG		Ground	
21	IA+	Current input phase A	Three-phase current input of circuit B incoming line
22	IA-		
23	IB+	Current input phase B	
24	IB-		
25	IC+	Current input phase C	
26	IC-		
27	I+	B channel leakage current input	
28	I-		
30	A1	RS485(1)	The first isolated communication interface, connected to the background system
31	B1		
32	A2	RS485(2)	The second channel is connected to the touch screen or RS485 hub
33	B2		
	A3	RS485(3)	The third way is connected to the downstream module
	B3		
	LAN	Ethernet	CE with Ethernet communication
35	V+	Power Output (auxiliary power input when use p24)	Power supply to AMC100-FA30/48, AMC100-FAK30/48,AMC100-KA30/48,AMC100-KD30/48,AMC100-FT30/FT48 and touch screen, this power supply prohibits external external devices (such as indicator lights, buzzers)
36	V-		
50	DO1	Switch output	Connect the buzzer
51			
52	DO2		Connection indicator
53			
54	DO3		Reserved 1
55			
56	DO4		Reserved 2
57			
61	Incoming line A	Switch input	OF
62			SD
63	Lightning protection A		Determine the SPD status of route A
64	Reserve		Reserved 1
65	Incoming line B		OF+SD
66			SD
67	Lightning protection B		Determine the SPD status of route B
68	Reserve		Reserved 2
69	Common port		Switch common
70			
81	VSS	Temperature and humidity	Connect WH-3 temperature and humidity sensor
82	DATA		
83	CLK		
84	VDD		

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5.2 AMC100-FA30/FA48

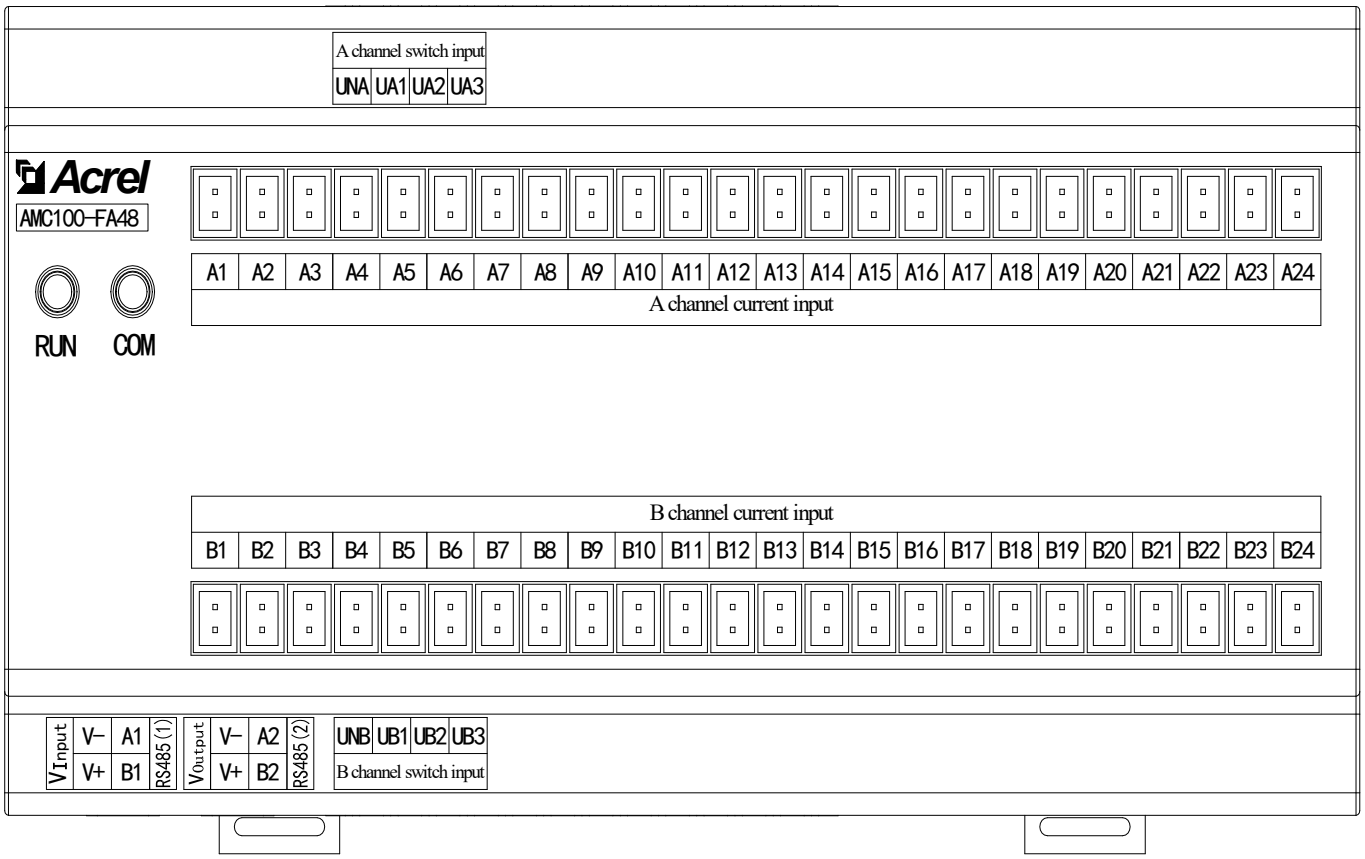
AMC100-FA30



Definition	Illustrate	Remark
V+	Auxiliary power	Powered by AMC100-ZA Or powered by DC12-24V power supply
V-		
A1	RS485(1)	Connect the pre-module
B1		
A2	RS485(2)	Connect the subsequent sub-module
B2		
UNA	Route A voltage input	Three-phase voltage input of circuit A outgoing line
UA1		
UA2		
UA3		
UNB	Route B voltage input	Three-phase voltage input of circuit B outgoing line
UB1		
UB2		
UB3		
A1-A15	Route A current input	circuit A outgoing line AC current input(15 channels)
B1-B15	Route B current input	circuit A outgoing line AC current input(15 channels)

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AMC100-FA48

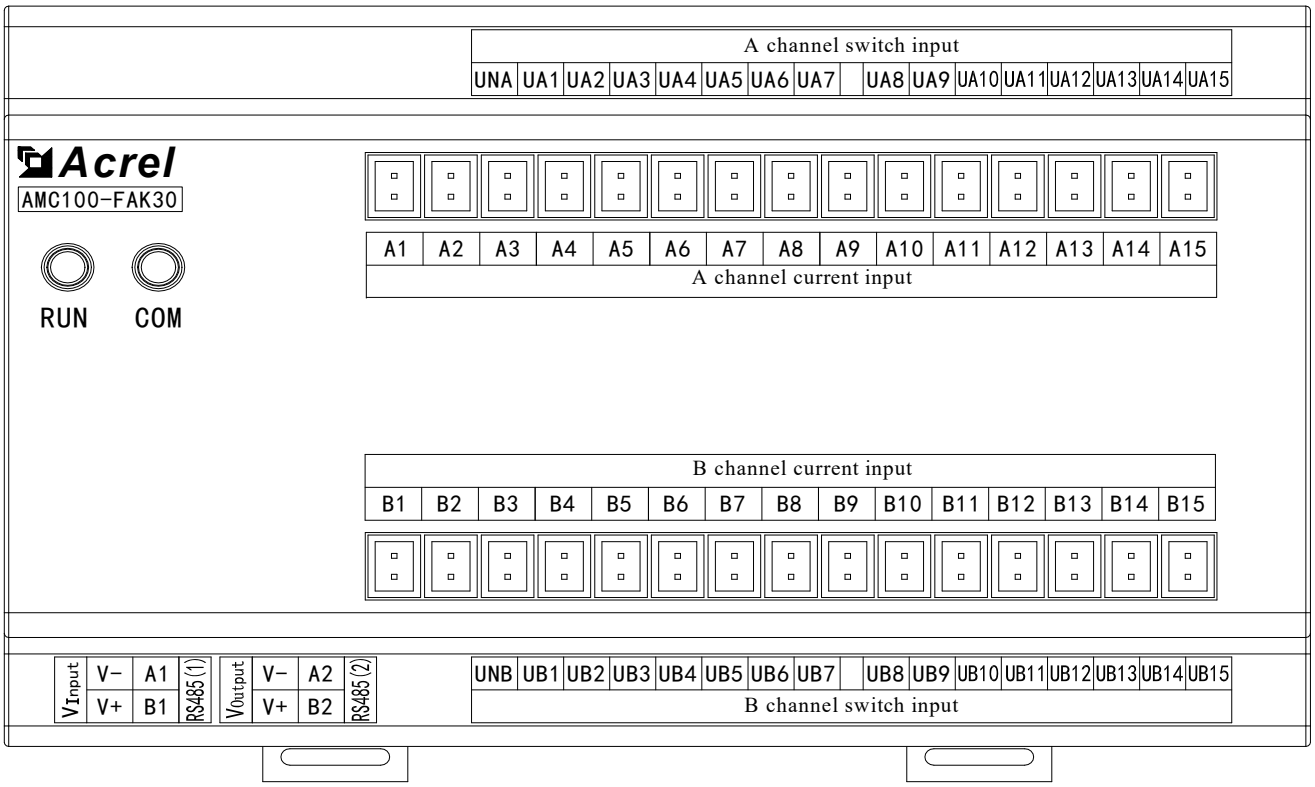


Definition	Illustrate	Remark
V+	Auxiliary power	Powered by AMC100-ZA Or powered by DC12-24V power supply
V-		
A1	RS485(1)	Connect the pre-module
B1		
A2	RS485(2)	Connect the subsequent sub-module
B2		
UA+	Route A voltage input	Three-phase voltage input of circuit A outgoing line
UA-		
UB+	Route B voltage input	Three-phase voltage input of circuit B outgoing line
UB-		
A1-A24	Route A current input	circuit A outgoing line AC current input(24 channels)
B1-B24	Route B current input	circuit A outgoing line AC current input(24 channels)

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5.3 AMC100-FAK30/FAK48

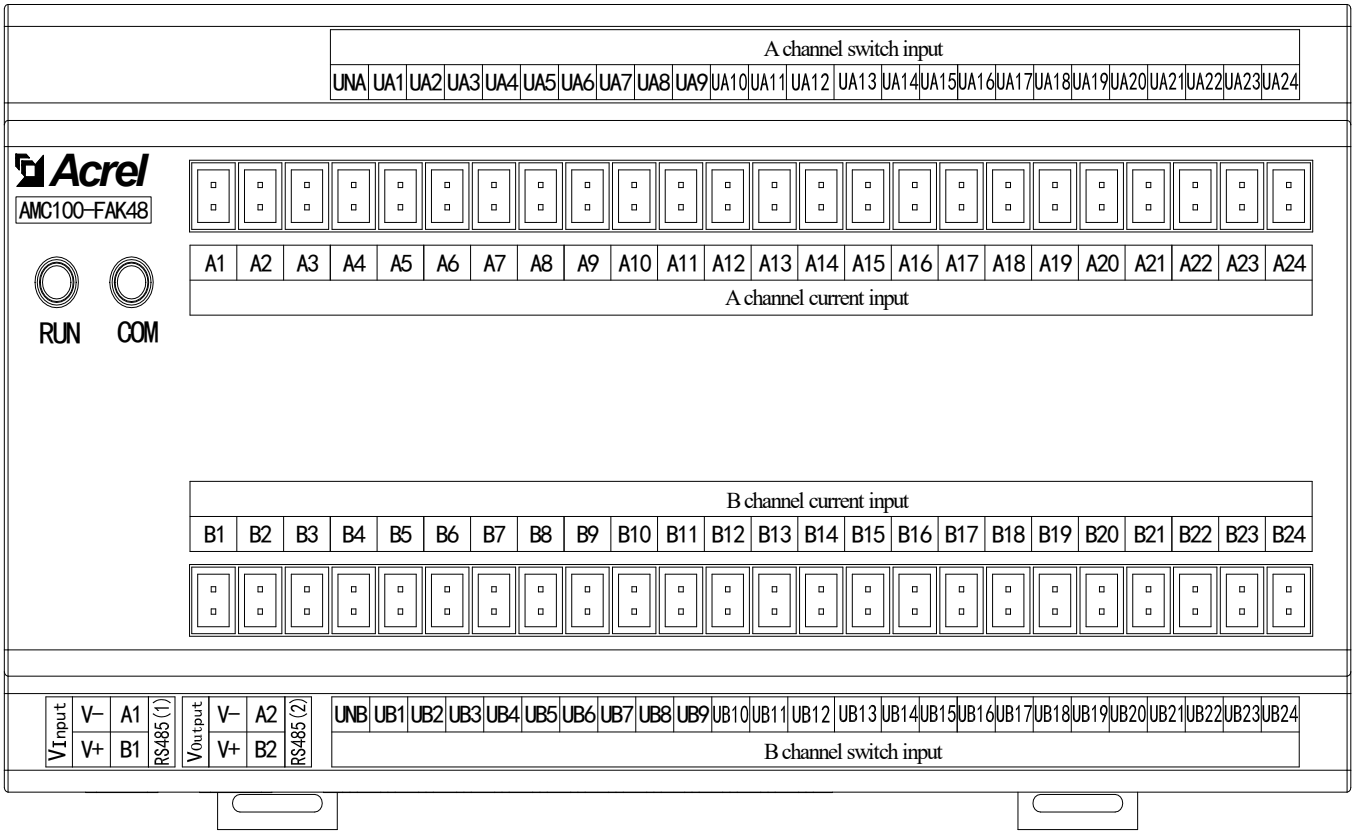
AMC100-FAK30



Definition	Illustrate	Remark
V+	Auxiliary power	Powered by AMC100-ZA Or powered by DC12-24V power supply
V-		
A1	RS485(1)	Connect the pre-module
B1		
A2	RS485(2)	Connect the subsequent sub-module
B2		
UA1-UA15	Route A voltage input	Route A switch input (15 channels)
UNA		
UB1-UB15	Route B voltage input	Route B switch input (15 channels)
UNB		
A1-A15	Route A current input	circuit A outgoing line AC current input(15 channels)
B1-B15	Route B current input	circuit A outgoing line AC current input(15 channels)

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AMC100-FAK48

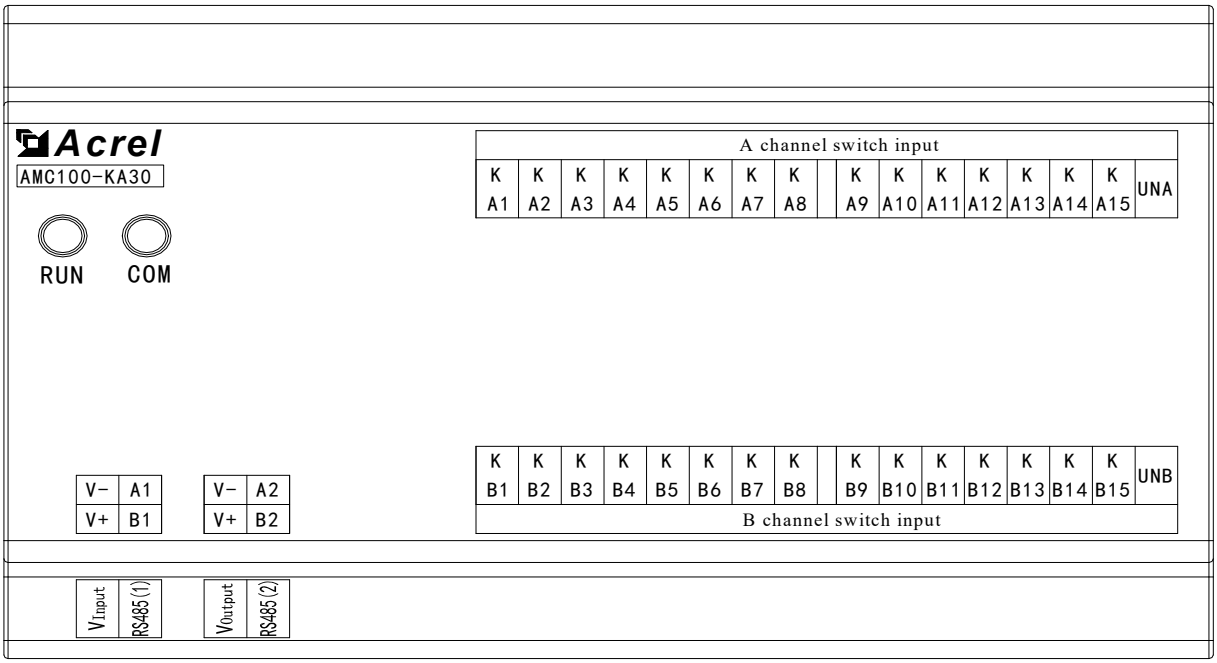


Definition	Illustrate	Remark
V+	Auxiliary power	Powered by AMC100-ZA Or powered by DC12-24V power supply
V-		
A1	RS485(1)	Connect the pre-module
B1		
A2	RS485(2)	Connect the subsequent sub-module
B2		
UA1-UA24	Route A voltage input	Route A switch input (24 channels)
UNA		
UB1-UB24	Route B voltage input	Route B switch input (24 channels)
UNB		
A1-A24	Route A current input	circuit A outgoing line AC current input(24channels)
B1-B24	Route B current input	circuit A outgoing line AC current input(24channels)

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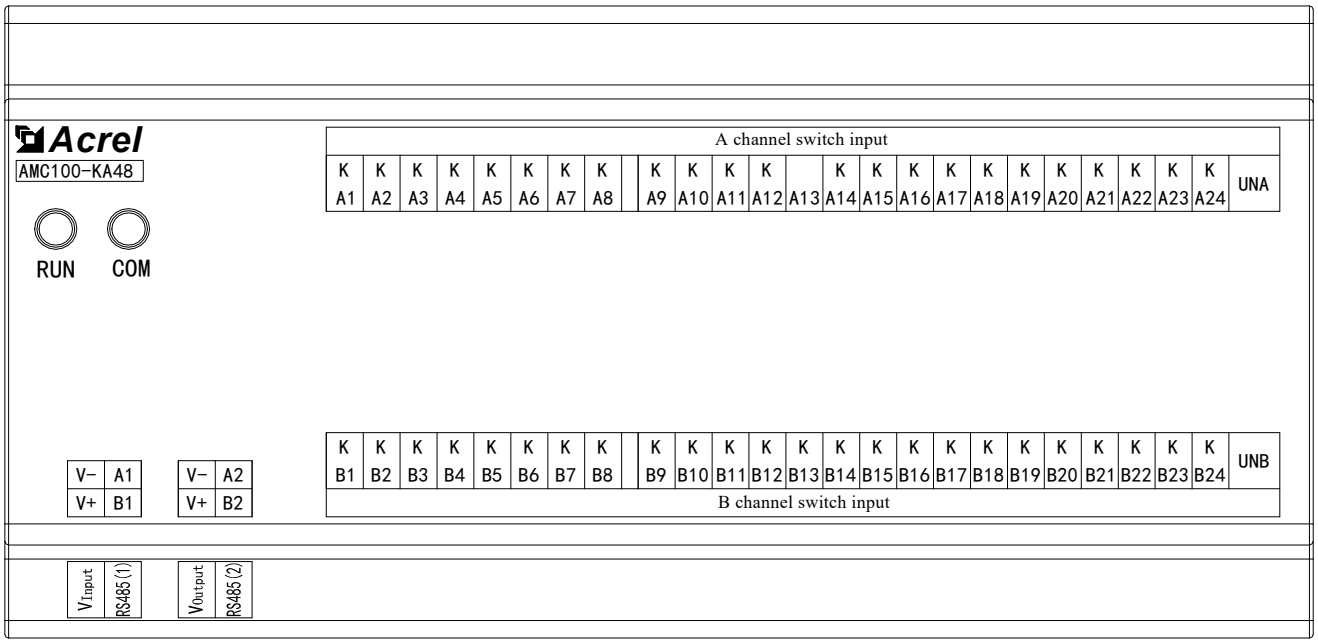
5.4 AMC100-KA30/KA48

AMC100-KA30



Definition	Description	Remark
V+	Auxiliary supply	Powered by AMC100-ZD Or powered by DC12-24V power supply
V-		
A1	RS485(1)	Connect the pre-module
B1		
A2	RS485(2)	Connect the subsequent sub-module
B2		
KA1-KA15	A channel switch input	A channel active switch input (15 channels)
UNA		
KB1-KB15	B channel switch input	B channel active switch input (15 channels)
UNB		

AMC100-KA48

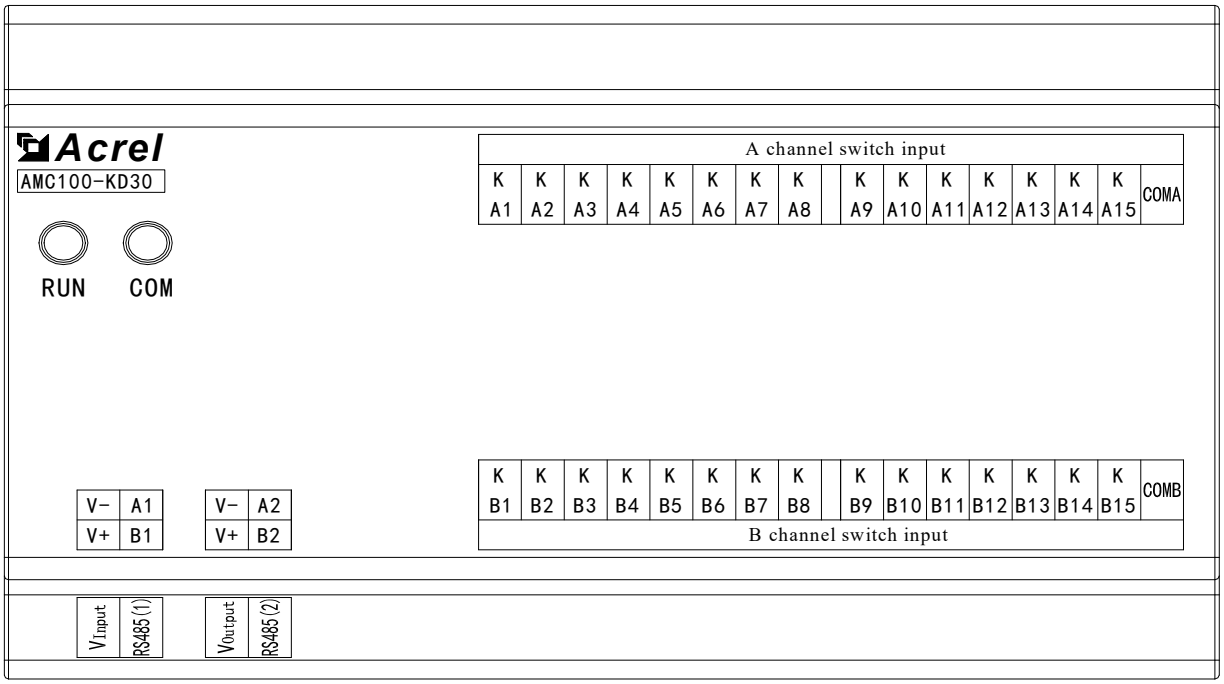


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Definition	Description	Remark
V+	Auxiliary supply	Powered by AMC100-ZD Or powered by DC12-24V power supply
V-		
A1	RS485(1)	Connect the pre-module
B1		
A2	RS485(2)	Connect the subsequent sub-module
B2		
KA1-KA24	A channel switch input	A channel active switch input (24 channels)
UNA		
KB1-KB24	B channel switch input	B channel active switch input (24 channels)
UNB		

5.5 AMC100-KD30/KD48

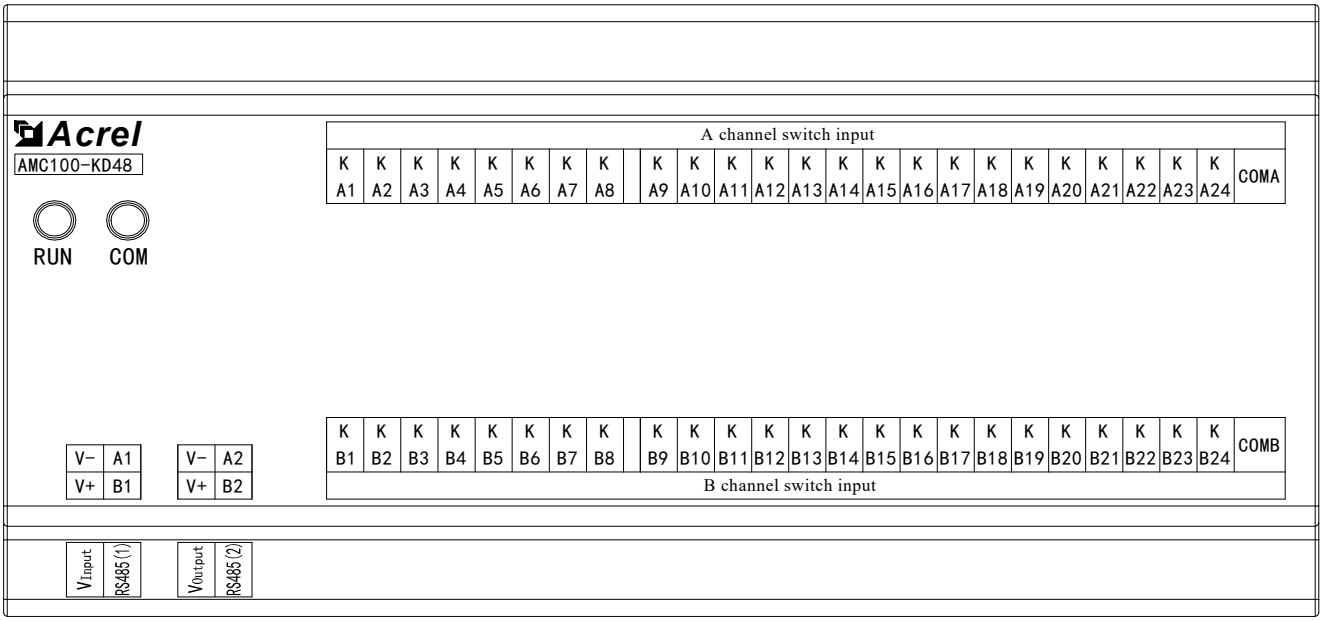
AMC100-KD30



Definition	Description	Remark
V+	Auxiliary supply	Powered by AMC100-ZD Or powered by DC12-24V power supply
V-		
A1	RS485(1)	Connect the pre-module
B1		
A2	RS485(2)	Connect the subsequent sub-module
B2		
KA1-KA15	A channel switch input	A passive switch input (15 channels)
COMA		
KB1-KB15	B channel switch input	B passive switch input (15 channels)
COMB		

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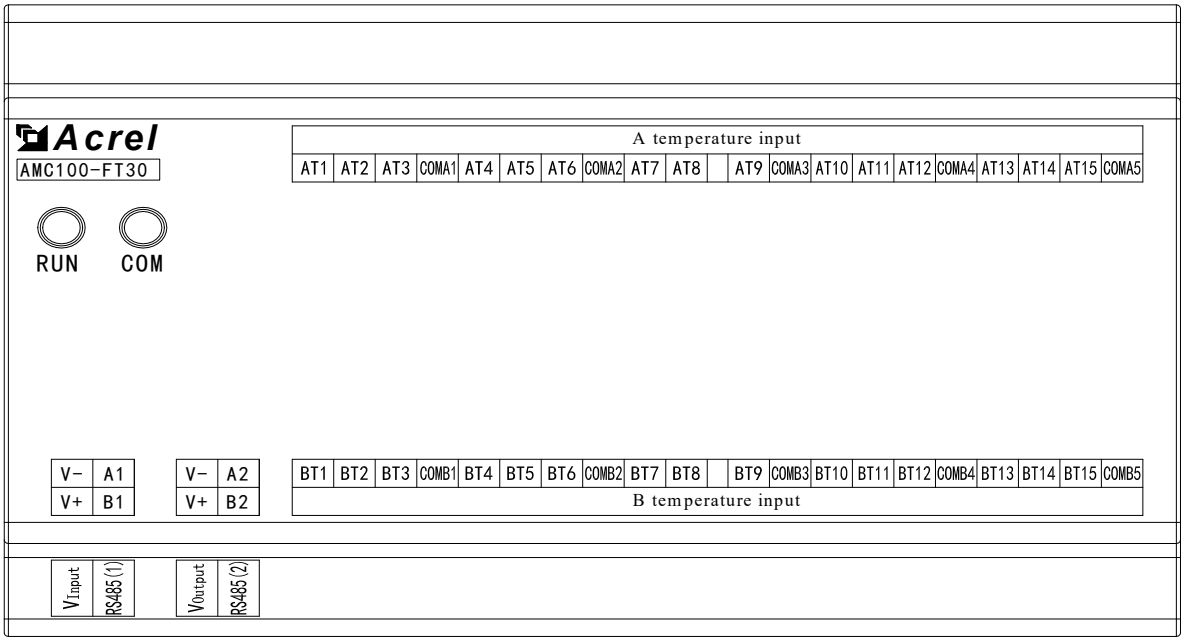
AMC100-KD48



Definition	Description	Remark
V+	Auxiliary supply	Powered by AMC100-ZD Or powered by DC12-24V power supply
V-		
A1	RS485(1)	Connect the pre-module
B1		
A2	RS485(2)	Connect the subsequent sub-module
B2		
KA1-KA24	A channel switch input	A passive switch input (24 channels)
COMA		
KB1-KB24	B channel switch input	B passive switch input (24 channels)
COMB		

5.6 AMC100-FT30/FT48

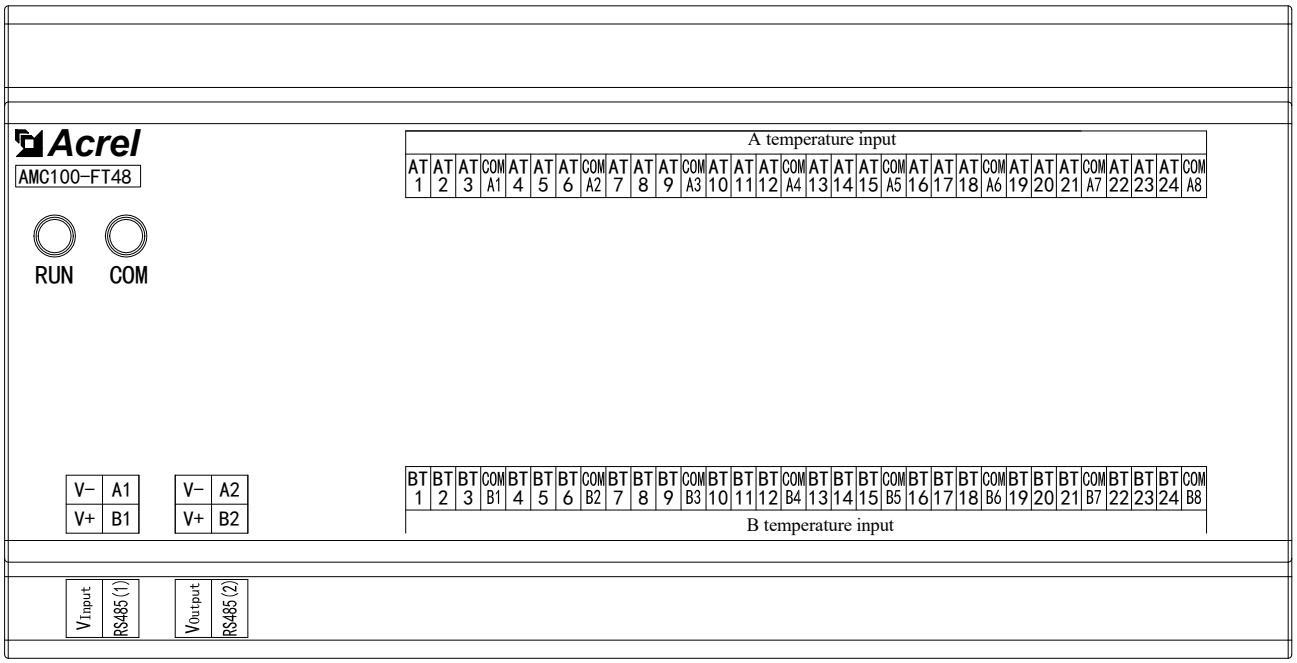
AMC100-FT30



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Definition	Description	Remark
V+	Auxiliary power	Powered by AMC100-ZD Or powered by DC12-24V power supply
V-		
A1	RS485(1)	Connect the pre-module
B1		
A2	RS485(2)	Connect the subsequent sub-module
B2		
AT1-AT15	A channel temperature input	A temperature input(15 channels)
BT1-BT15	B channel temperature input	A temperature input(15 channels)

AMC100-FT48



Definition	State	Remark
V+	Auxiliary supply	Powered by AMC100-ZD Or powered by DC12-24V power supply
V-		
A1	RS485(1)	Connect the pre-module
B1		
A2	RS485(2)	Connect the subsequent sub-module
B2		
AT1-AT24	A temperature input	A temperature input(24channels)
BT1-BT24	B temperature input	A temperature input(24 channels)

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6 Protocol

This agreement specifies the physical connection and communication protocol for data exchange between the AMC100 series AC precision power distribution monitoring device and the data terminal equipment. The protocol is similar to the Modbus_RTU communication protocol.

6.1 Brief description of the agreement

The communication protocol used by the AMC100 series AC device defines the data sequence definition of address code, function code, and check code in detail, which are all necessary content for specific data exchange. This protocol uses a master-slave response connection (half-duplex) on a communication line, which means that the signal is transmitted in two opposite directions on a single communication line. First, the signal from the host computer is addressed to a unique terminal device (slave), and then the response signal from the terminal device is transmitted to the host in the opposite direction.

This protocol only allows communication between the host (PC, PLC, etc.) and terminal equipment, and does not allow data exchange between independent terminal equipment, so that each terminal equipment will not occupy the communication line when they are initialized, but only in response Inquiry signal to the machine.

6.2 Transfer Method

The information transmission is asynchronous, and the unit is byte. The communication information transmitted between the master and the slave is an 11-bit word format, including 1 start bit, 8 data bits (the least effective bit is sent first), Parity check bit (no parity), 2 stop bits.

6.2.1 Data frame format

Address code	Function code	Data area	CRC verification code
1 byte	1 byte	n bytes	2 bytes

6.2.2 Address domain

The address field is at the beginning of the frame and consists of one byte (8-bit binary code), and the decimal system is 0～255. In our system, only 1～247. Other addresses are reserved. These bits indicate the address of the terminal device designated by the user, which will receive data from the host connected to it. The address of each terminal device must be unique, and only the addressed terminal will respond to the query containing the address. When the terminal sends back a response, the slave address data in the response tells the host which terminal is communicating with it.

6.2.3 Functional domain

The function field code tells which function is performed by the addressed terminal. The following table lists the function codes used in this series of devices, as well as their meanings and functions.

Code	meaning	behavior
03	Read data	register to get the current binary value of one or more registers
16	Preset multiple registers	Set the binary value to a series of multiple registers

6.2.4 Data field

The data field contains the data required by the terminal to perform a specific function or the data collected when the terminal responds to a query. The content of these data may be numerical values, reference addresses or setting values. For example, the function domain code tells the terminal to read a register, and the data domain needs to specify which register to start and how many data to read. The embedded address and data vary according to the type and the content of the slave.

6.2.5 Error check field

This field allows the host and terminal to check for errors during transmission. Sometimes, due to electrical noise and other interference, a set of data may have some changes on the line when it is transmitted from one device to another. Error checking can ensure that the host or terminal does not respond to the data that has changed during the transmission. This improves the safety and efficiency of the system, and the error check uses a 16-bit cyclic redundancy method (CRC16).

6.2.6 Methods of error detection

The error check field occupies two bytes and contains a 16-bit binary value. The CRC value is calculated by the transmitting device and then appended to the data frame. The receiving device recalculates the CRC value when receiving the data, and then compares it with the value in the received CRC field. If the two values are not equal, it will happen. mistake.

During CRC operation, first preset a 16-bit register to all 1s, and then continuously calculate the 8 bits in each byte in the data frame with the current value of the register, only 8 data per byte Bit participates in generating CRC, start bit, stop bit and possible parity bit do not affect CRC. When generating the CRC, the 8 bits of each byte are

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XORed with the contents of the register, and then the result is shifted to the low bit, and the high bit is supplemented with "0", and the least significant bit (LSB) is shifted out and checked. If it is 1, This register will perform an exclusive OR operation with a preset fixed value (0A001H). If the lowest bit is 0, no processing will be performed.

The above processing is repeated until 8 shift operations are performed. After the last bit (the 8th bit) is shifted, the next 8-bit byte is XORed with the current value of the register, and the other 8 above is also performed. When all the bytes in the data frame are processed, the final value generated is the CRC value.

The process of generating a CRC is:

(1)Preset a 16-bit register as 0FFFFH (all 1s), which is called CRC register. . XOR the 8 bits of the first byte in the data frame with the low byte in the CRC register, and store the result back to the CRC register. Shift the CRC register one bit to the right, fill the highest bit with 0, and shift the lowest bit out and check. If the lowest bit is 0: repeat the third step (the next shift); if the lowest bit is 1: change the CRC register to a preset fixed value (0A001H) Perform exclusive OR operation.

Repeat the third and fourth steps until 8 shifts. A complete eight bits have been processed in this way.

(2)Repeat steps 2 to 5 to process the next eight bits until all bytes are processed. The final CRC register value is the CRC value.

In addition, there is a method to calculate CRC using a preset table. Its main feature is fast calculation speed, but the table requires a larger storage space. This method will not be repeated here, please refer to the relevant information.

6.3 Introduction to Function Code

6.3.1 Function code 03H: read register

This function allows users to obtain the data and system parameters collected and recorded by the device. The number of data requested by the host at one time is not limited, but it cannot exceed the defined address range.

The following example is reading 3 basic data collected from slave 01 (each address in the data frame occupies 2 bytes) Uab, Ubc, Uca, where the address of Uab is 03H, the address of Ubc is 04H, Uca The address is 05H.

Host send		Send message
address code		01H
function code		03H
Starting Address	high byte	00H
	Low byte	03H
register Quantity	high byte	00H
	Low byte	03H
CRC check code	Low byte	F5H
	High byte	CBH

Return from the machine		Return information
address code		01H
function code		03H
Number of bytes		06H
Register data	high byte	0EH
	Low byte	EEH
Register data	high byte	0EH
	Low byte	E8H
Register data	high byte	0EH
	Low byte	E9H
CRC check code	Low byte	8FH
	High byte	7EH

6.3.2 Function code 10H: write multiple registers

Function code 10H allows users to change the contents of multiple registers. The system parameters and switch output status of the instrument can be written with this function number. The host can write up to 16 (32 bytes) data at a time.

The following example is that the instrument with the preset address 01 outputs the switch value DO at the same time. The switch output status indication register address is 0045H, and the first bit corresponds to DO.

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Host send		Send message
address code		01H
function code		10H
Starting Address	high byte	00H
	Low byte	45H
register Quantity	high byte	00H
	Low byte	01H
Number of bytes		02H
0045H Data to be written	high byte	00H
	Low byte	01H
CRC Check code	Low byte	69H
	High byte	05H

Return from the machine		Return information
address code		01H
function code		10H
Starting Address	high byte	00H
	Low byte	45H
register Quantity	high byte	00H
	Low byte	01H
CRC check code	Low byte	10H
	High byte	1CH

6.4 Communication Adress

6.4.1 AMC100-ZA

Telemetry,remote control

Parameter setting area （0x0000～0x006A）

Number	variable	Adress	R/W	Length (bytes)	Unit	Data Type
1	1 relay output	0x0000	R/W	2		u16
2	2 relay outputs	0x0001	R/W	2		u16
3	3 relay outputs	0x0002	R/W	2		u16
4	4 relay outputs	0x0003	R/W	2		u16
5	Power zero	0x0004	R/W	2		u16
6	Address 1	0x0005	R/W	2	1-247	u16
7	Baud rate 1	0x0006	R/W	2	Factory default 57600 0-115200 1-2400 2-4800 3-9600 4-19200 5-38400 6-57600 7-115200	u16
8	Check method 1	0x0007	R/W	2	0-none 1-odd 2-even	u16
9	Address 2	0x0008	R/W	2	1-247	u16
10	Baud rate 2	0x0009	R/W	2	Factory default 57600 0-115200 1-2400 2-4800 3-9600 4-19200 5-38400 6-57600 7-115200	u16
11	Check method 2	0x000A	R/W	2	0-none 1-odd 2-even	u16
12	Wiring	0x000B	R/W	2	0-3P4L、1-3P3L	u16
13	Rated Voltage	0x000C	R/W	2	V	u16
14	Rated current 1	0x000D	R/W	2	A	u16
15	Rated current 2	0x000E	R/W	2	A	u16
16	Voltage transformation ratio	0x000F	R/W	2		u16
17	Incoming wire ratio 1 ①	0x0010	R/W	2		u16
18	Incoming wire ratio 2	0x0011	R/W	2		u16
19	Outgoing mode (single and double)	0x0012	R/W	2	0-single 1-double	u16

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20	spare	0x0013	R/W	2		u16
21	Humidity alarm threshold	0x14-0x15	R/W	4	%	float
22	Temperature alarm threshold	0x16-0x17	R/W	4	℃	float
23	Slave address 1-20	0x18-0x2B	R/W	40	Set the address of the slave connected later	u16
24	spare	0x002C	R/W	2		u16
25	spare	0x002D	R/W	2		u16
26	spare	0x002E	R/W	2		u16
27	spare	0x002F	R/W	2		u16
A	High leakage current	0x0030	R/W	4	A	float
	Zero sequence current H	0x0032	R/W	4	A	float
	Zero ground voltage H	0x0034	R/W	4	V	float
	Over frequency	0x0036	R/W	4	Hz	float
	Underfrequency	0x0038	R/W	4	Hz	float
	Current imbalance	0x003A	R/W	4	%	float
	电压不平衡 Voltage unbalance	0x003C	R/W	4	%	float
	Power overload	0x003E	R/W	4	kW	float
	Current H2	0x0040	R/W	4	A	float
	Current H1	0x0042	R/W	4	A	float
	Current L1	0x0044	R/W	4	A	float
	Current L2	0x0046	R/W	4	A	float
	Overpressure	0x0048	R/W	4	V	float
	Undervoltage	0x004A	R/W	4	V	float
	Lack of phase	0x004C	R/W	4	V	float
B	High leakage	0x004E	R/W	4	A	float
	current Zero sequence	0x0050	R/W	4	A	float
	current H Zero ground voltage H	0x0052	R/W	4	V	float
	Over frequency	0x0054	R/W	4	Hz	float
	Underfrequency	0x0056	R/W	4	Hz	float
	Current imbalance	0x0058	R/W	4	%	float
	Voltage unbalance	0x005A	R/W	4	%	float
	Power overload	0x005C	R/W	4	kW	float
	Current H2	0x005E	R/W	4	A	float
	Current H1	0x0060	R/W	4	A	float
	Current L1	0x0062	R/W	4	A	float
	Current L2	0x0064	R/W	4	A	float
	Overpressure	0x0066	R/W	4	V	float
	Undervoltage	0x0068	R/W	4	V	float
	Lack of phase	0x006A	R/W	4	V	float

①Note：AMC100-ZA CT setting is different according to transformer model such as 100A/5V CT set to 20、200A/5V set to 40.

Electric parameter data area （0x0100～0x01AA）

Number	variable	Address	R/W	Length (bytes)	Unit	Data Type
A	Phase A voltage	0x0100	R	4	V	float
	Phase B voltage	0x0102	R	4	V	float
	Phase C voltage	0x0104	R	4	V	float

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	AB line voltage	0x0106	R	4	V	float
	BC line voltage	0x0108	R	4	V	float
	CA line voltage	0x010A	R	4	V	float
	frequency	0x010C	R	4	Hz	float
	phase A current	0x010E	R	4	A	float
	Phase B current	0x0110	R	4	A	float
	Phase C current	0x0112	R	4	A	float
	phase A active	0x0114	R	4	kW	float
	phase B active	0x0116	R	4	kW	float
	Phase C active	0x0118	R	4	kW	float
	Total Phase active	0x011A	R	4	kW	float
	Phase A reactive power	0x011C	R	4	kvar	float
	Phase B reactive	0x011E	R	4	kvar	float
	Phase C reactive	0x0120	R	4	kvar	float
	Total reactive	0x0122	R	4	kvar	float
	Phase A inspecting power	0x0124	R	4	kVA	float
	Phase B inspecting power	0x0126	R	4	kVA	float
	Phase C inspecting power	0x0128	R	4	kVA	float
	Total inspecting power	0x012A	R	4	kVA	float
	A phase power factor	0x012C	R	4		float
	B-phase power factor	0x011E	R	4		float
	C-phase power factor	0x0120	R	4		float
	Total power factor	0x0122	R	4		float
	EPA	0x0124	R	4	kWh	u32
	EPB	0x0126	R	4	kWh	u32
	EPC	0x0128	R	4	kWh	u32
	EP	0x013A	R	4	kWh	u32
	EQA	0x013C	R	4	kvarh	u32
	EQB	0x013E	R	4	kvarh	u32
	EQC	0x0140	R	4	kvarh	u32
	EQ	0x0142	R	4	kvarh	u32
	Zero-ground voltage	0x0144	R	4	V	float
	Leakage	0x0146	R	4	A	float
	Neutral current	0x0148	R	4	A	float
	Voltage unbalance	0x014A	R	4	%	float
	Current imbalance	0x014C	R	4	%	float
	Load percentage 1	0x014E	R	4	%	float
	Load percentage 2	0x0150	R	4	%	float
	Load percentage 3	0x0152	R	4	%	float
B	Phase A voltage reactive power	0x0154	R	4	V	float
	Phase B voltage	0x0156	R	4	V	float
	Phase C voltage	0x0158	R	4	V	float
	AB line voltage	0x015A	R	4	V	float
	BC line voltage	0x015C	R	4	V	float

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CA line voltage	0x015E	R	4	V	float
frequency	0x0160	R	4	Hz	float
A phase current	0x0162	R	4	A	float
Phase B current	0x0164	R	4	A	float
C phase current	0x0166	R	4	A	float
A phase active	0x0168	R	4	kW	float
B phase active	0x016A	R	4	kW	float
C-phase active	0x016C	R	4	kW	float
Total Phase active	0x016E	R	4	kW	float
Phase A reactive power	0x0170	R	4	kvar	float
Phase B reactive	0x0172	R	4	kvar	float
Phase C reactive	0x0174	R	4	kvar	float
Total reactive power	0x0176	R	4	kvar	float
Phase A inspecting power	0x0178	R	4	kVA	float
Phase B inspecting power	0x017A	R	4	kVA	float
Phase C inspecting power	0x017C	R	4	kVA	float
Total inspecting power	0x017E	R	4	kVA	float
A phase power factor	0x0180	R	4		float
B-phase power factor	0x0182	R	4		float
C-phase power factor	0x0184	R	4		float
Total power factor	0x0186	R	4		float
EPA	0x0188	R	4	kWh	u32
EPB	0x018A	R	4	kWh	u32
EPC	0x018C	R	4	kWh	u32
EP	0x018E	R	4	kWh	u32
EQA	0x0190	R	4	kvarh	u32
EQB	0x0192	R	4	kvarh	u32
EQC	0x0194	R	4	kvarh	u32
EQ	0x0196	R	4	kvarh	u32
Zero-ground voltage	0x0198	R	4	V	float
Leakage	0x019A	R	4	A	float
Neutral current	0x019C	R	4	A	float
Voltage unbalance	0x019E	R	4	%	float
Current imbalance	0x01A0	R	4	%	float
Load percentage 1	0x01A2	R	4	%	float
Load percentage 2	0x01A4	R	4	%	float
Load percentage 3	0x01A6	R	4	%	float
Temperature	0x01A8	R	4	%	float
Humidity	0x01AA	R	4	%	float

Harmonic data area （0x0200～0x05D8）

Number	variable	Adress	R/W	Length (bytes)	Unit	Data Type
A	THDUA	0x0200	R	2	0.01%	u16
	THDUB	0x0201	R	2	0.01%	u16
	THDUC	0x0202	R	2	0.01%	u16
	THDIA	0x0203	R	2	0.01%	u16

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	THDIB	0x0204	R	2	0.01%	u16
	THDIC	0x0205	R	2	0.01%	u16
	THDUA 2-63	0x0206	R	2	0.01%	u16
	THDUB 2-63	0x0244	R	2	0.01%	u16
	THDUC 2-63	0x0282	R	2	0.01%	u16
	THDIA 2-63	0x02C0	R	2	0.01%	u16
	THDIB 2-63	0x02FE	R	2	0.01%	u16
	THDIC 2-63	0x033C	R	2	0.01%	u16
B	THDUA	0x037A	R	2	0.01%	u16
	THDUB	0x037B	R	2	0.01%	u16
	THDUC	0x037C	R	2	0.01%	u16
	THDIA	0x037D	R	2	0.01%	u16
	THDIB	0x037E	R	2	0.01%	u16
	THDIC	0x037F	R	2	0.01%	u16
	THDUA 2-63	0x0380	R	2	0.01%	u16
	THDUB 2-63	0x03BE	R	2	0.01%	u16
	THDUC 2-63	0x03FC	R	2	0.01%	u16
	THDIA 2-63	0x043A	R	2	0.01%	u16
	THDIB 2-63	0x0478	R	2	0.01%	u16
	THDIC 2-63	0x04B6	R	2	0.01%	u16
A fundamental	THDPA	0x04F4	R	4	kW	float
	THDPB	0x04F6	R	4	kW	float
	THDPC	0x04F8	R	4	kW	float
	THDPT	0x04FA	R	4	kW	float
	THDQA	0x04FC	R	4	kW	float
	THDQB	0x04FE	R	4	kW	float
	THDQC	0x0500	R	4	kW	float
	THDQT	0x0502	R	4	kW	float
	THDSA	0x0504	R	4	kW	float
	THDSB	0x0506	R	4	kW	float
	THDSC	0x0508	R	4	kW	float
	THDST	0x050A	R	4	kW	float
A harmonic	THDPA	0x050C	R	4	kW	float
	THDPB	0x050E	R	4	kW	float
	THDPC	0x0510	R	4	kW	float
	THDPT	0x0512	R	4	kW	float
	THDQA	0x0514	R	4	kW	float
	THDQB	0x0516	R	4	kW	float
	THDQC	0x0518	R	4	kW	float
	THDQT	0x051A	R	4	kW	float
	THDSA	0x051C	R	4	kW	float
	THDSB	0x051E	R	4	kW	float
	THDSC	0x0520	R	4	kW	float
	THDST	0x0522	R	4	kW	float
B fundamental	THDPA	0x0524	R	4	kW	float
	THDPB	0x0526	R	4	kW	float
	THDPC	0x0528	R	4	kW	float

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	THDPT	0x052A	R	4	kW	float
	THDQA	0x052C	R	4	kW	float
	THDQB	0x052E	R	4	kW	float
	THDQC	0x0530	R	4	kW	float
	THDQT	0x0532	R	4	kW	float
	THDSA	0x0534	R	4	kW	float
	THDSB	0x0536	R	4	kW	float
	THDSC	0x0538	R	4	kW	float
	THDST	0x053A	R	4	kW	float
B harmonic	THDPA	0x053C	R	4	kW	float
	THDPB	0x053E	R	4	kW	float
	THDPC	0x0540	R	4	kW	float
	THDPT	0x0542	R	4	kW	float
	THDQA	0x0544	R	4	kW	float
	THDQB	0x0546	R	4	kW	float
	THDQC	0x0548	R	4	kW	float
	THDQT	0x054A	R	4	kW	float
	THDSA	0x054C	R	4	kW	float
	THDSB	0x054E	R	4	kW	float
	THDSC	0x0550	R	4	kW	float
	THDST	0x0552	R	4	kW	float

Alarm status data read

variable	**Address**	**R/W**	**Word length**	**Data Type**	Status bit							
Main module	0x01B0	R	4	u32	Bit31	Bit30	Bit29	Bit28	Bit27	Bit26	Bit25	Bit24
					Bit23	Bit22	Bit21	Bit20	Bit19	Bit18	Bit17	Bit16
											Humidity	**Temperature**
					Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
									DO4	DO3	DO2	DO1
					Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
					DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1
A side incoming line alarm	0x01B2	R	4	u32	Bit31	Bit30	Bit29	Bit28	Bit27	Bit26	Bit25	Bit24
						High leakage current	Zero sequence current H	Zero ground voltage H	Over frequency	Under-frequency	Current imbalance	Voltage unbalance
					Bit23	Bit22	Bit21	Bit20	Bit19	Bit18	Bit17	Bit16
					A-phase power overload	B-phase power overload	C-phase power overload	A phase current H2	Phase B current H2	C phase current H2	A phase current H1	Phase B current H1
					Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
					C phase current H1	A phase current L1	Phase B current L1	C phase current L1	A phase current L2	Phase B current L2	C phase current L2	Phase A over-voltage
					Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
					Phase B over-	Phase C over-	Phase A under-	Phase B under-	Phase C under-	Phase A missing	Phase B missing	phase C missing

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					voltage	voltage	voltage	voltage	voltage	phase	phase	phase
B side incoming line alarm	0x01B4	R	4	u32	Bit31	Bit30	Bit29	Bit28	Bit27	Bit26	Bit25	Bit24
						High leakage current	Zero ground voltage L	Zero ground voltage H	Over frequency	Under-frequency	Current imbalance	Voltage unbalance
					Bit23	Bit22	Bit21	Bit20	Bit19	Bit18	Bit17	Bit16
					A-phase power overload	B-phase power overload	C-phase power overload	A phase current H2	Phase B current H2	C phase current H2	A phase current H1	Phase B current H1
					Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
					C C phase current H1	A phase current L1	Phase B current L1	C phase current L1	A phase current L2	Phase B current L2	C phase current L2	Phase A over-voltage
					Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
					Phase B over-voltage	Phase C over-voltage	Phase A under-voltage	Phase B under-voltage	Phase C under-voltage	Phase A missing phase	Phase B missing phase	C phase missing phase
Slave communication alarm	0x01B6	R	2	u16	Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
					Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
									Slave 20	Slave 19	Slave 18	Slave 17
	0x01B7		2	u16	Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
					Slave 16	Slave 15	Slave 14	Slave 13	Slave 12	Slave 11	Slave 10	Slave 9
					Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
					Slave 8	Slave 7	Slave 6	Slave 5	Slave 4	Slave 3	Slave 2	Slave 1

6.4.2 AMC100-FAK48（30）/FA48(30)

telemetry,remote control

Parameter Setting Area（0x0000～0x007F）**When the module is FAK30/FA30,CT and load values can be set as 1-15 and 25-39 channel parameters.**

Address	variable	Remark	Length (Bite)	Unit	Data Type
0x0000	address	R/W	2	1-254, 0 is the universal address	u16
0x0001	Baud rate	R/W	2	0 115200 1-2400 2-4800 3-9600 4-19200 5-38400 6-57600 7-115200	u16
0x0002	Check method	R/W	2	0-None 1-odd 2-even	u16
0x0003	spare	R/W	2		u16
0x0004	Power zero	R/W	2	0x6601--0x6630 Clear the power of the 1st--48th channel 0x66F1 Clear the 1-24 channel 0x66F2 Clear the 25--48 channel 0x66FF Clear the 1-48 channel	u16
0x0005	spare	R/W	2		u16
0x0006	spare	R/W	2		u16
0x0007	spare	R/W	2		u16
0x0008	Switch A	R/W	2	V	u16
0x0009	Over-current ratio two	R/W	2	Load percentage>over-current ratio level 2 %%will alarm	u16
0x000A	Over-current ratio level one	R/W	2	%	u16

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0x000B	Undercurrent ratio one level	R/W	2	%	u16
0x000C	Undercurrent ratio two	R/W	2	%	u16
0x000D	PT1	R/W	2	Voltage transformation ratio	u16
0x000E	CT1①	R/W	2	Current transformation ratio of 1 circuit	u16
0x000F	CT2	R/W	2	Current transformation ratio of 2 circuit	u16
0x0010	CT3	R/W	2	Current transformation ratio of 3 circuit	u16
0x0011	CT4	R/W	2	Current transformation ratio of 4 circuit	u16
0x0012	CT5	R/W	2	Current transformation ratio of 5 circuit	u16
0x0013	CT6	R/W	2	Current transformation ratio of 6 circuit	u16
0x0014	CT7	R/W	2	Current transformation ratio of 7 circuit	u16
0x0015	CT8	R/W	2	Current transformation ratio of 8 circuit	u16
0x0016	CT9	R/W	2	Current transformation ratio of 9 circuit	u16
0x0017	CT10	R/W	2	Current transformation ratio of 10 circuit	u16
0x0018	CT11	R/W	2	Current transformation ratio of 11 circuit	u16
0x0019	CT12	R/W	2	Current transformation ratio of 12 circuit	u16
0x001A	CT13	R/W	2	Current transformation ratio of 13 circuit	u16
0x001B	CT14	R/W	2	Current transformation ratio of 14 circuit	u16
0x001C	CT15	R/W	2	Current transformation ratio of 15 circuit	u16
0x001D	CT16	R/W	2	Current transformation ratio of 16 circuit	u16
0x001E	CT17	R/W	2	Current transformation ratio of 17 circuit	u16
0x001F	CT18	R/W	2	Current transformation ratio of 18 circuit	u16
0x0020	CT19	R/W	2	Current transformation ratio of 19 circuit	u16
0x0021	CT20	R/W	2	Current transformation ratio of 20 circuit	u16
0x0022	CT21	R/W	2	Current transformation ratio of 21 circuit	u16
0x0023	CT22	R/W	2	Current transformation ratio of 22 circuit	u16
0x0024	CT23	R/W	2	Current transformation ratio of 23 circuit	u16
0x0025	CT24	R/W	2	Current transformation ratio of 24 circuit	u16
0x0026	ALLCT1	R/W	2	The default value is 1, when it is greater than 1, all CT values become ALLCT values, when it is 0, all CT values become 1, and ALLCT becomes 1 again after updating, without affecting other CT values(1-24 CT all set)	u16
0x0027	LoadV1	R/W	2	This parameter is used to calculate the load percentage/current I/rated load value If the Load parameter is set to 0, the alarm of this road will be turned off, and the load percentage of this road will be 0 the load percentage=current I /rated load value	u16
0x0028	Rated load value of 1 circuit	R/W	2	A	u16
0x0029	Rated load value of 2 circuit	R/W	2	A	u16
0x002A	Rated load value of 3 circuit	R/W	2	A	u16
0x002B	Rated load value of 4 circuit	R/W	2	A	u16
0x002C	Rated load value of 5 circuit	R/W	2	A	u16
0x002D	Rated load value of 6 circuit	R/W	2	A	u16
0x002E	Rated load value of 7 circuit	R/W	2	A	u16

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0x002F	Rated load value of 8 circuit	R/W	2	A	u16
0x0030	Rated load value of 9 circuit	R/W	2	A	u16
0x0031	Rated load value of 10 circuit	R/W	2	A	u16
0x0032	Rated load value of 11 circuit	R/W	2	A	u16
0x0033	Rated load value of 12 circuit	R/W	2	A	u16
0x0034	Rated load value of 13 circuit	R/W	2	A	u16
0x0035	Rated load value of 14 circuit	R/W	2	A	u16
0x0036	Rated load value of 15 circuit	R/W	2	A	u16
0x0037	Rated load value of 16 circuit	R/W	2	A	u16
0x0038	Rated load value of 17 circuit	R/W	2	A	u16
0x0039	Rated load value of 18 circuit	R/W	2	A	u16
0x003A	Rated load value of 19 circuit	R/W	2	A	u16
0x003B	Rated load value of 20 circuit	R/W	2	A	u16
0x003C	Rated load value of 21 circuit	R/W	2	A	u16
0x003D	Rated load value of 22 circuit	R/W	2	A	u16
0x003E	Rated load value of 23 circuit	R/W	2	A	u16
0x003F	Rated load value of 24 circuit	R/W	2	A	u16
0x0040	Spare	R/W	2		u16
0x0041	Spare	R/W	2		u16
0x0042	Spare	R/W	2		u16
0x0043	Spare	R/W	2		u16
0x0044	Spare	R/W	2		u16
0x0045	Spare	R/W	2		u16
0x0046	Spare	R/W	2		u16
0x0047	Spare	R/W	2		u16
0x0048	Switch B	R/W	2	V	u16
0x0049	Undercurrent ratio B1	R/W	2	%	u16
0x004A	Undercurrent ratio B2	R/W	2	%	u16
0x004B	Undercurrent ratio B1	R/W	2	%	u16
0x004C	Undercurrent ratio B2	R/W	2	%	u16
0x004D	PT2	R/W	2	Voltage transformation ratio	u16
0x004E	CT25	R/W	2	Current transformation ratio of 25 circuit	u16
0x004F	CT26	R/W	2	Current transformation ratio of 26 circuit	u16
0x0050	CT27	R/W	2	Current transformation ratio of 27 circuit	u16
0x0051	CT28	R/W	2	Current transformation ratio of 28 circuit	u16
0x0052	CT29	R/W	2	Current transformation ratio of 29 circuit	u16
0x0053	CT30	R/W	2	Current transformation ratio of 30 circuit	u16

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0x0054	CT31	R/W	2	Current transformation ratio of 31 circuit	u16
0x0055	CT32	R/W	2	Current transformation ratio of 32 circuit	u16
0x0056	CT33	R/W	2	Current transformation ratio of 33 circuit	u16
0x0057	CT34	R/W	2	Current transformation ratio of 34 circuit	u16
0x0058	CT35	R/W	2	Current transformation ratio of 35 circuit	u16
0x0059	CT36	R/W	2	Current transformation ratio of 36 circuit	u16
0x005A	CT37	R/W	2	Current transformation ratio of 37 circuit	u16
0x005B	CT38	R/W	2	Current transformation ratio of 38 circuit	u16
0x005C	CT39	R/W	2	Current transformation ratio of 39 circuit	u16
0x005D	CT40	R/W	2	Current transformation ratio of 40 circuit	u16
0x005E	CT41	R/W	2	Current transformation ratio of 41 circuit	u16
0x005F	CT42	R/W	2	Current transformation ratio of 42 circuit	u16
0x0060	CT43	R/W	2	Current transformation ratio of 43 circuit	u16
0x0061	CT44	R/W	2	Current transformation ratio of 44 circuit	u16
0x0062	CT45	R/W	2	Current transformation ratio of 45 circuit	u16
0x0063	CT46	R/W	2	Current transformation ratio of 46 circuit	u16
0x0064	CT47	R/W	2	Current transformation ratio of 47 circuit	u16
0x0065	CT48	R/W	2	Current transformation ratio of 48 circuit	u16
0x0066	ALLCT2	R/W	2	25-48 CT all sets	u16
0x0067	Rated load value of 25 circuit	R/W	2	A	u16
0x0068	Rated load value of 26 circuit	R/W	2	A	u16
0x0069	Rated load value of 27 circuit	R/W	2	A	u16
0x006A	Rated load value of 28 circuit	R/W	2	A	u16
0x006B	Rated load value of 29 circuit	R/W	2	A	u16
0x006C	Rated load value of 30 circuit	R/W	2	A	u16
0x006D	Rated load value of 31 circuit	R/W	2	A	u16
0x006E	Rated load value of 32 circuit	R/W	2	A	u16
0x006F	Rated load value of 33 circuit	R/W	2	A	u16
0x0070	Rated load value of 34 circuit	R/W	2	A	u16
0x0071	Rated load value of 35 circuit	R/W	2	A	u16
0x0072	Rated load value of 36 circuit	R/W	2	A	u16
0x0073	Rated load value of 37 circuit	R/W	2	A	u16
0x0074	Rated load value of 38 circuit	R/W	2	A	u16
0x0075	Rated load value of 39 circuit	R/W	2	A	u16
0x0076	Rated load value of 40 circuit	R/W	2	A	u16
0x0077	Rated load value of 41 circuit	R/W	2	A	u16
0x0078	Rated load value of 42	R/W	2	A	u16

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	circuit				
0x0079	Rated load value of 43 circuit	R/W	2	A	u16
0x007A	Rated load value of 44 circuit	R/W	2	A	u16
0x007B	Rated load value of 45 circuit	R/W	2	A	u16
0x007C	Rated load value of 46 circuit	R/W	2	A	u16
0x007D	Rated load value of 47 circuit	R/W	2	A	u16
0x007E	Rated load value of 48 circuit	R/W	2	A	u16
0x007F	ALLLoadV2	R/W	2	A	u16

①Note：CT setting is different according to transformer model such as 50A/50mA CT set to 10、100A/50mA set to 20、200A/50mA set to 40.

Electrical parameter data area (0x0090 ~ 0x03EF) **When the module is FAK30/FA30,the valid data are 1-25 and 25-39 channels.When the module address is set to 20-29,the valid data is 1-30 channels.**

Number	Address	variable	Remark	Length(Bite)	Unit	Type
1	0x0090	U (voltage)	R	4	V	float
	0x0091					
	0x0092	I (current)	R	4	A	
	0x0093					
	0x0094	P (active power)	R	4	kW	
	0x0095					
	0x0096	Q (reactive power)	R	4	kvar	
	0x0097					
	0x0098	S (apparent power)	R	4	kVA	
	0x0099					
	0x009A	PF (power factor)	R	4		
	0x009B					
	0x009C	EP (active energy)	R	4	0.01kWh	u32
	0x009D					
	0x009E	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x009F					
	0x00A0	THDI (total current harmonic content)	R	2	0.01%	u16
	0x00A1	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
2	0x00A2	U (voltage)	R	4	V	float
	0x00A3					
	0x00A4	I (current)	R	4	A	
	0x00A5					
	0x00A6	P (active power)	R	4	kW	
	0x00A7					
	0x00A8	Q (reactive power)	R	4	kvar	
	0x00A9					
	0x00AA	S (apparent power)	R	4	kVA	
	0x00AB					
	0x00AC	PF (power factor)	R	4		
	0x00AD					
	0x00AE	EP (active energy)	R	4	0.01kWh	u32

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	0x00AF					
	0x00B0	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x00B1					
	0x00B2	THDI (total current harmonic content)	R	2	0.01%	u16
	0x00B3	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
3	0x00B4	U (voltage)	R	4	V	float
	0x00B5					
	0x00B6	I (current)	R	4	A	
	0x00B7					
	0x00B8	P (active power)	R	4	kW	
	0x00B9					
	0x00BA	Q (reactive power)	R	4	kvar	
	0x00BB					
	0x00BC	S (apparent power)	R	4	kVA	
	0x00BD					
	0x00BE	PF (power factor)	R	4		
	0x00BF					
	0x00C0	EP (active energy)	R	4	0.01kWh	u32
	0x00C1					
	0x00C2	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x00C3					
	0x00C4	THDI (total current harmonic content)	R	2	0.01%	u16
	0x00C5	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
4	0x00C6	U (voltage)	R	4	V	float
	0x00C7					
	0x00C8	I (current)	R	4	A	
	0x00C9					
	0x00CA	P (active power)	R	4	kW	
	0x00CB					
	0x00CC	Q (reactive power)	R	4	kvar	
	0x00CD					
	0x00CE	S (apparent power)	R	4	kVA	
	0x00CF					
	0x00D0	PF (power factor)	R	4		
	0x00D1					
	0x00D2	EP (active energy)	R	4	0.01kWh	u32
	0x00D3					
	0x00D4	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x00D5					
	0x00D6	THDI (total current harmonic content)	R	2	0.01%	u16
	0x00D7	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
5	0x00D8	U (voltage)	R	4	V	float
	0x00D9					
	0x00DA	I (current)	R	4	A	
	0x00DB					
	0x00DC	P (active power)	R	4	kW	

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	0x00DD					
	0x00DE	Q (reactive power)	R	4	kvar	
	0x00DF					
	0x00E0	S (apparent power)	R	4	kVA	
	0x00E1					
	0x00E2	PF (power factor)	R	4		
	0x00E3					
	0x00E4	EP (active energy)	R	4	0.01kWh	u32
	0x00E5					
	0x00E6	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x00E7					
	0x00E8	THDI (total current harmonic content)	R	2	0.01%	u16
	0x00E9	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
6	0x00EA	U (voltage)	R	4	V	float
	0x00EB					
	0x00EC	I (current)	R	4	A	
	0x00ED					
	0x00EE	P (active power)	R	4	kW	
	0x00EF					
	0x00F0	Q (reactive power)	R	4	kvar	
	0x00F1					
	0x00F2	S (apparent power)	R	4	kVA	
	0x00F3					
	0x00F4	PF (power factor)	R	4		
	0x00F5					
	0x00F6	EP (active energy)	R	4	0.01kWh	u32
	0x00F7					
	0x00F8	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x00F9					
	0x00FA	THDI (total current harmonic content)	R	2	0.01%	u16
	0x00FB	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
7	0x00FC	U (voltage)	R	4	V	float
	0x00FD					
	0x00FE	I (current)	R	4	A	
	0x00FF					
	0x0100	P (active power)	R	4	kW	
	0x0101					
	0x0102	Q (reactive power)	R	4	kvar	
	0x0103					
	0x0104	S (apparent power)	R	4	kVA	
	0x0105					
	0x0106	PF (power factor)	R	4		
	0x0107					
	0x0108	EP (active energy)	R	4	0.01kWh	u32
	0x0109					
	0x010A	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x010B					

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	0x010C	THDI (total current harmonic content)	R	2	0.01%	u16
	0x010D	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
8	0x010E	U (voltage)	R	4	V	float
	0x010F					
	0x0110	I (current)	R	4	A	
	0x0111					
	0x0112	P (active power)	R	4	kW	
	0x0113					
	0x0114	Q (reactive power)	R	4	kvar	
	0x0115					
	0x0116	S (apparent power)	R	4	kVA	
	0x0117					
	0x0118	PF (power factor)	R	4		
	0x0119					
	0x011A	EP (active energy)	R	4	0.01kWh	u32
	0x011B					
	0x011C	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x011D					
	0x011E	THDI (total current harmonic content)	R	2	0.01%	u16
	0x011F	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
9	0x0120	U (voltage)	R	4	V	float
	0x0121					
	0x0122	I (current)	R	4	A	
	0x0123					
	0x0124	P (active power)	R	4	kW	
	0x0125					
	0x0126	Q (reactive power)	R	4	kvar	
	0x0127					
	0x0128	S (apparent power)	R	4	kVA	
	0x0129					
	0x012A	PF (power factor)	R	4		
	0x012B					
	0x012C	EP (active energy)	R	4	0.01kWh	u32
	0x012D					
	0x012E	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x012F					
	0x0130	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0131	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
10	0x0132	U (voltage)	R	4	V	float
	0x0133					
	0x0134	I (current)	R	4	A	
	0x0135					
	0x0136	P (active power)	R	4	kW	
	0x0137					
	0x0138	Q (reactive power)	R	4	kvar	
	0x0139					

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	0x013A	S (apparent power)	R	4	kVA	
	0x013B					
	0x013C	PF (power factor)	R	4		
	0x013D					
	0x013E	EP (active energy)	R	4	0.01kWh	u32
	0x013F					
	0x0140	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0141					
	0x0142	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0143	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
11	0x0144	U (voltage)	R	4	V	float
	0x0145					
	0x0146	I (current)	R	4	A	
	0x0147					
	0x0148	P (active power)	R	4	kW	
	0x0149					
	0x014A	Q (reactive power)	R	4	kvar	
	0x014B					
	0x014C	S (apparent power)	R	4	kVA	
	0x014D					
	0x014E	PF (power factor)	R	4		
	0x014F					
	0x0150	EP (active energy)	R	4	0.01kWh	u32
	0x0151					
	0x0152	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0153					
	0x0154	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0155	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
12	0x0156	U (voltage)	R	4	V	float
	0x0157					
	0x0158	I (current)	R	4	A	
	0x0159					
	0x015A	P (active power)	R	4	kW	
	0x015B					
	0x015C	Q (reactive power)	R	4	kvar	
	0x015D					
	0x015E	S (apparent power)	R	4	kVA	
	0x015F					
	0x0160	PF (power factor)	R	4		
	0x0161					
	0x0162	EP (active energy)	R	4	0.01kWh	u32
	0x0163					
	0x0164	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0165					
	0x0166	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0167	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16

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13	0x0168	U (voltage)	R	4	V	float
	0x0169					
	0x016A	I (current)	R	4	A	
	0x016B					
	0x016C	P (active power)	R	4	kW	
	0x016D					
	0x016E	Q (reactive power)	R	4	kvar	
	0x016F					
	0x0170	S (apparent power)	R	4	kVA	
	0x0171					
	0x0172	PF (power factor)	R	4		
	0x0173					
	0x0174	EP (active energy)	R	4	0.01kWh	u32
	0x0175					
	0x0176	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0177					
	0x0178	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0179	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
14	0x017A	U (voltage)	R	4	V	float
	0x017B					
	0x017C	I (current)	R	4	A	
	0x017D					
	0x017E	P (active power)	R	4	kW	
	0x017F					
	0x0180	Q (reactive power)	R	4	kvar	
	0x0181					
	0x0182	S (apparent power)	R	4	kVA	
	0x0183					
	0x0184	PF (power factor)	R	4		
	0x0185					
	0x0186	EP (active energy)	R	4	0.01kWh	u32
	0x0187					
	0x0188	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0189					
	0x018A	THDI (total current harmonic content)	R	2	0.01%	u16
	0x018B	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
15	0x018C	U (voltage)	R	4	V	float
	0x018D					
	0x018E	I (current)	R	4	A	
	0x018F					
	0x0190	P (active power)	R	4	kW	
	0x0191					
	0x0192	Q (reactive power)	R	4	kvar	
	0x0193					
	0x0194	S (apparent power)	R	4	kVA	
	0x0195					
	0x0196	PF (power factor)	R	4		

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	0x0197					
	0x0198	EP (active energy)	R	4	0.01kWh	u32
	0x0199					
	0x019A	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x019B					
	0x019C	THDI (total current harmonic content)	R	2	0.01%	u16
	0x019D	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
16	0x019E	U (voltage)	R	4	V	float
	0x019F					
	0x01A0	I (current)	R	4	A	
	0x01A1					
	0x01A2	P (active power)	R	4	kW	
	0x01A3					
	0x01A4	Q (reactive power)	R	4	kvar	
	0x01A5					
	0x01A6	S (apparent power)	R	4	kVA	
	0x01A7					
	0x01A8	PF (power factor)	R	4		
	0x01A9					
	0x01AA	EP (active energy)	R	4	0.01kWh	u32
	0x01AB					
	0x01AC	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x01AD					
	0x01AE	THDI (total current harmonic content)	R	2	0.01%	u16
	0x01AF	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
17	0x01B0	U (voltage)	R	4	V	float
	0x01B1					
	0x01B2	I (current)	R	4	A	
	0x01B3					
	0x01B4	P (active power)	R	4	kW	
	0x01B5					
	0x01B6	Q (reactive power)	R	4	kvar	
	0x01B7					
	0x01B8	S (apparent power)	R	4	kVA	
	0x01B9					
	0x01BA	PF (power factor)	R	4		
	0x01BB					
	0x01BC	EP (active energy)	R	4	0.01kWh	u32
	0x01BD					
	0x01BE	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x01BF					
	0x01C0	THDI (total current harmonic content)	R	2	0.01%	u16
	0x01C1	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
18	0x01C2	U (voltage)	R	4	V	float
	0x01C3					
	0x01C4	I (current)	R	4	A	

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	0x01C5					
	0x01C6	P (active power)	R	4	kW	
	0x01C7					
	0x01C8	Q (reactive power)	R	4	kvar	
	0x01C9					
	0x01CA	S (apparent power)	R	4	kVA	
	0x01CB					
	0x01CC	PF (power factor)	R	4		
	0x01CD					
	0x01CE	EP (active energy)	R	4	0.01kWh	u32
	0x01CF					
	0x01D0	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x01D1					
	0x01D2	THDI (total current harmonic content)	R	2	0.01%	u16
	0x01D3	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
19	0x01D4	U (voltage)	R	4	V	float
	0x01D5					
	0x01D6	I (current)	R	4	A	
	0x01D7					
	0x01D8	P (active power)	R	4	kW	
	0x01D9					
	0x01DA	Q (reactive power)	R	4	kvar	
	0x01DB					
	0x01DC	S (apparent power)	R	4	kVA	
	0x01DD					
	0x01DE	PF (power factor)	R	4		
	0x01DF					
	0x01E0	EP (active energy)	R	4	0.01kWh	u32
	0x01E1					
	0x01E2	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x01E3					
	0x01E4	THDI (total current harmonic content)	R	2	0.01%	u16
	0x01E5	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
20	0x01E6	U (voltage)	R	4	V	float
	0x01E7					
	0x01E8	I (current)	R	4	A	
	0x01E9					
	0x01EA	P (active power)	R	4	kW	
	0x01EB					
	0x01EC	Q (reactive power)	R	4	kvar	
	0x01ED					
	0x01EE	S (apparent power)	R	4	kVA	
	0x01EF					
	0x01F0	PF (power factor)	R	4		
	0x01F1					
	0x01F2	EP (active energy)	R	4	0.01kWh	u32
	0x01F3					

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	0x01F4	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x01F5					
	0x01F6	THDI (total current harmonic content)	R	2	0.01%	u16
	0x01F7	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
21	0x01F8	U (voltage)	R	4	V	float
	0x01F9					
	0x01FA	I (current)	R	4	A	
	0x01FB					
	0x01FC	P (active power)	R	4	kW	
	0x01FD					
	0x01FE	Q (reactive power)	R	4	kvar	
	0x01FF					
	0x0200	S (apparent power)	R	4	kVA	
	0x0201					
	0x0202	PF (power factor)	R	4		
	0x0203					
	0x0204	EP (active energy)	R	4	0.01kWh	u32
	0x0205					
	0x0206	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0207					
	0x0208	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0209	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
22	0x020A	U (voltage)	R	4	V	float
	0x020B					
	0x020C	I (current)	R	4	A	
	0x020D					
	0x020E	P (active power)	R	4	kW	
	0x020F					
	0x0210	Q (reactive power)	R	4	kvar	
	0x0211					
	0x0212	S (apparent power)	R	4	kVA	
	0x0213					
	0x0214	PF (power factor)	R	4		
	0x0215					
	0x0216	EP (active energy)	R	4	0.01kWh	u32
	0x0217					
	0x0218	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0219					
	0x021A	THDI (total current harmonic content)	R	2	0.01%	u16
	0x021B	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
23	0x021C	U (voltage)	R	4	V	float
	0x021D					
	0x021E	I (current)	R	4	A	
	0x021F					
	0x0220	P (active power)	R	4	kW	
	0x0221					

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	0x0222	Q (reactive power)	R	4	kvar	
	0x0223					
	0x0224	S (apparent power)	R	4	kVA	
	0x0225					
	0x0226	PF (power factor)	R	4		
	0x0227					
	0x0228	EP (active energy)	R	4	0.01kWh	u32
	0x0229					
	0x022A	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x022B					
	0x022C	THDI (total current harmonic content)	R	2	0.01%	u16
	0x022D	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
24	0x022E	U (voltage)	R	4	V	float
	0x022F					
	0x0230	I (current)	R	4	A	
	0x0231					
	0x0232	P (active power)	R	4	kW	
	0x0233					
	0x0234	Q (reactive power)	R	4	kvar	
	0x0235					
	0x0236	S (apparent power)	R	4	kVA	
	0x0237					
	0x0238	PF (power factor)	R	4		
	0x0239					
	0x023A	EP (active energy)	R	4	0.01kWh	u32
	0x023B					
	0x023C	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x023D					
	0x023E	THDI (total current harmonic content)	R	2	0.01%	u16
	0x023F	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
25	0x0240	U (voltage)	R	4	V	float
	0x0241					
	0x0242	I (current)	R	4	A	
	0x0243					
	0x0244	P (active power)	R	4	kW	
	0x0245					
	0x0246	Q (reactive power)	R	4	kvar	
	0x0247					
	0x0248	S (apparent power)	R	4	kVA	
	0x0249					
	0x024A	PF (power factor)	R	4		
	0x024B					
	0x024C	EP (active energy)	R	4	0.01kWh	u32
	0x024D					
	0x024E	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x024F					
	0x0250	THDI (total current	R	2	0.01%	u16

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		harmonic content)				
	0x0251	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
26	0x0252	U (voltage)	R	4	V	float
	0x0253					
	0x0254	I (current)	R	4	A	
	0x0255					
	0x0256	P (active power)	R	4	kW	
	0x0257					
	0x0258	Q (reactive power)	R	4	kvar	
	0x0259					
	0x025A	S (apparent power)	R	4	kVA	
	0x025B					
	0x025C	PF (power factor)	R	4		
	0x025D					
	0x025E	EP (active energy)	R	4	0.01kWh	u32
	0x025F					
	0x0260	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0261					
	0x0262	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0263	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
27	0x0264	U (voltage)	R	4	V	float
	0x0265					
	0x0266	I (current)	R	4	A	
	0x0267					
	0x0268	P (active power)	R	4	kW	
	0x0269					
	0x026A	Q (reactive power)	R	4	kvar	
	0x026B					
	0x026C	S (apparent power)	R	4	kVA	
	0x026D					
	0x026E	PF (power factor)	R	4		
	0x026F					
	0x0270	EP (active energy)	R	4	0.01kWh	u32
	0x0271					
	0x0272	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0273					
	0x0274	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0275	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
28	0x0276	U (voltage)	R	4	V	float
	0x0277					
	0x0278	I (current)	R	4	A	
	0x0279					
	0x027A	P (active power)	R	4	kW	
	0x027B					
	0x027C	Q (reactive power)	R	4	kvar	
	0x027D					

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	0x027E	S (apparent power)	R	4	kVA	
	0x027F					
	0x0280	PF (power factor)	R	4		
	0x0281					
	0x0282	EP (active energy)	R	4	0.01kWh	u32
	0x0283					
	0x0284	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0285					
	0x0286	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0287	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
29	0x0288	U (voltage)	R	4	V	float
	0x0289					
	0x028A	I (current)	R	4	A	
	0x028B					
	0x028C	P (active power)	R	4	kW	
	0x028D					
	0x028E	Q (reactive power)	R	4	kvar	
	0x028F					
	0x0290	S (apparent power)	R	4	kVA	
	0x0291					
	0x0292	PF (power factor)	R	4		
	0x0293					
	0x0294	EP (active energy)	R	4	0.01kWh	u32
	0x0295					
	0x0296	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0297					
	0x0298	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0299	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
30	0x029A	U (voltage)	R	4	V	float
	0x029B					
	0x029C	I (current)	R	4	A	
	0x029D					
	0x029E	P (active power)	R	4	kW	
	0x029F					
	0x02A0	Q (reactive power)	R	4	kvar	
	0x02A1					
	0x02A2	S (apparent power)	R	4	kVA	
	0x02A3					
	0x02A4	PF (power factor)	R	4		
	0x02A5					
	0x02A6	EP (active energy)	R	4	0.01kWh	u32
	0x02A7					
	0x02A8	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x02A9					
	0x02AA	THDI (total current harmonic content)	R	2	0.01%	u16
	0x02AB	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16

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31	0x02AC	U (voltage)	R	4	V	float
	0x02AD					
	0x02AE	I (current)	R	4	A	
	0x02AF					
	0x02B0	P (active power)	R	4	kW	
	0x02B1					
	0x02B2	Q (reactive power)	R	4	kvar	
	0x02B3					
	0x02B4	S (apparent power)	R	4	kVA	
	0x02B5					
	0x02B6	PF (power factor)	R	4		
	0x02B7					
	0x02B8	EP (active energy)	R	4	0.01kWh	u32
	0x02B9					
	0x02BA	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x02BB					
	0x02BC	THDI (total current harmonic content)	R	2	0.01%	u16
	0x02BD	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
32	0x02BE	U (voltage)	R	4	V	float
	0x02BF					
	0x02C0	I (current)	R	4	A	
	0x02C1					
	0x02C2	P (active power)	R	4	kW	
	0x02C3					
	0x02C4	Q (reactive power)	R	4	kvar	
	0x02C5					
	0x02C6	S (apparent power)	R	4	kVA	
	0x02C7					
	0x02C8	PF (power factor)	R	4		
	0x02C9					
	0x02CA	EP (active energy)	R	4	0.01kWh	u32
	0x02CB					
	0x02CC	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x02CD					
	0x02CE	THDI (total current harmonic content)	R	2	0.01%	u16
	0x02CF	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
33	0x02D0	U (voltage)	R	4	V	float
	0x02D1					
	0x02D2	I (current)	R	4	A	
	0x02D3					
	0x02D4	P (active power)	R	4	kW	
	0x02D5					
	0x02D6	Q (reactive power)	R	4	kvar	
	0x02D7					
	0x02D8	S (apparent power)	R	4	kVA	
	0x02D9					
	0x02DA	PF (power factor)	R	4		

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	0x02DB					
	0x02DC	EP (active energy)	R	4	0.01kWh	u32
	0x02DD					
	0x02DE	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x02DF					
	0x02E0	THDI (total current harmonic content)	R	2	0.01%	u16
	0x02E1	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
34	0x02E2	U (voltage)	R	4	V	float
	0x02E3					
	0x02E4	I (current)	R	4	A	
	0x02E5					
	0x02E6	P (active power)	R	4	kW	
	0x02E7					
	0x02E8	Q (reactive power)	R	4	kvar	
	0x02E9					
	0x02EA	S (apparent power)	R	4	kVA	
	0x02EB					
	0x02EC	PF (power factor)	R	4		
	0x02ED					
	0x02EE	EP (active energy)	R	4	0.01kWh	u32
	0x02EF					
	0x02F0	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x02F1					
	0x02F2	THDI (total current harmonic content)	R	2	0.01%	u16
	0x02F3	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
35	0x02F4	U (voltage)	R	4	V	float
	0x02F5					
	0x02F6	I (current)	R	4	A	
	0x02F7					
	0x02F8	P (active power)	R	4	kW	
	0x02F9					
	0x02FA	Q (reactive power)	R	4	kvar	
	0x02FB					
	0x02FC	S (apparent power)	R	4	kVA	
	0x02FD					
	0x02FE	PF (power factor)	R	4		
	0x02FF					
	0x0300	EP (active energy)	R	4	0.01kWh	u32
	0x0301					
	0x0302	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0303					
	0x0304	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0305	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
36	0x0306	U (voltage)	R	4	V	float
	0x0307					
	0x0308	I (current)	R	4	A	

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	0x0309					
	0x030A	P (active power)	R	4	kW	
	0x030B					
	0x030C	Q (reactive power)	R	4	kvar	
	0x030D					
	0x030E	S (apparent power)	R	4	kVA	
	0x030F					
	0x0310	PF (power factor)	R	4		
	0x0311					
	0x0312	EP (active energy)	R	4	0.01kWh	u32
	0x0313					
	0x0314	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0315					
	0x0316	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0317	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
37	0x0318	U (voltage)	R	4	V	float
	0x0319					
	0x031A	I (current)	R	4	A	
	0x031B					
	0x031C	P (active power)	R	4	kW	
	0x031D					
	0x031E	Q (reactive power)	R	4	kvar	
	0x031F					
	0x0320	S (apparent power)	R	4	kVA	
	0x0321					
	0x0322	PF (power factor)	R	4		
	0x0323					
	0x0324	EP (active energy)	R	4	0.01kWh	u32
	0x0325					
	0x0326	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0327					
	0x0328	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0329	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
38	0x032A	U (voltage)	R	4	V	float
	0x032B					
	0x032C	I (current)	R	4	A	
	0x032D					
	0x032E	P (active power)	R	4	kW	
	0x032F					
	0x0330	Q (reactive power)	R	4	kvar	
	0x0331					
	0x0332	S (apparent power)	R	4	kVA	
	0x0333					
	0x0334	PF (power factor)	R	4		
	0x0335					
	0x0336	EP (active energy)	R	4	0.01kWh	u32
	0x0337					

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	0x0338	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0339					
	0x033A	THDI (total current harmonic content)	R	2	0.01%	u16
	0x033B	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
39	0x033C	U (voltage)	R	4	V	float
	0x033D					
	0x033E	I (current)	R	4	A	
	0x033F					
	0x0340	P (active power)	R	4	kW	
	0x0341					
	0x0342	Q (reactive power)	R	4	kvar	
	0x0343					
	0x0344	S (apparent power)	R	4	kVA	
	0x0345					
	0x0346	PF (power factor)	R	4		
	0x0347					
	0x0348	EP (active energy)	R	4	0.01kWh	u32
	0x0349					
	0x034A	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x034B					
	0x034C	THDI (total current harmonic content)	R	2	0.01%	u16
	0x034D	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
40	0x034E	U (voltage)	R	4	V	float
	0x034F					
	0x0350	I (current)	R	4	A	
	0x0351					
	0x0352	P (active power)	R	4	kW	
	0x0353					
	0x0354	Q (reactive power)	R	4	kvar	
	0x0355					
	0x0356	S (apparent power)	R	4	kVA	
	0x0357					
	0x0358	PF (power factor)	R	4		
	0x0359					
	0x035A	EP (active energy)	R	4	0.01kWh	u32
	0x035B					
	0x035C	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x035D					
	0x035E	THDI (total current harmonic content)	R	2	0.01%	u16
	0x035F	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
41	0x0360	U (voltage)	R	4	V	float
	0x0361					
	0x0362	I (current)	R	4	A	
	0x0363					
	0x0364	P (active power)	R	4	kW	
	0x0365					

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	0x0366	Q (reactive power)	R	4	kvar	
	0x0367					
	0x0368	S (apparent power)	R	4	kVA	
	0x0369					
	0x036A	PF (power factor)	R	4		
	0x036B					
	0x036C	EP (active energy)	R	4	0.01kWh	u32
	0x036D					
	0x036E	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x036F					
	0x0370	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0371	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
42	0x0372	U (voltage)	R	4	V	float
	0x0373					
	0x0374	I (current)	R	4	A	
	0x0375					
	0x0376	P (active power)	R	4	kW	
	0x0377					
	0x0378	Q (reactive power)	R	4	kvar	
	0x0379					
	0x037A	S (apparent power)	R	4	kVA	
	0x037B					
	0x037C	PF (power factor)	R	4		
	0x037D					
	0x037E	EP (active energy)	R	4	0.01kWh	u32
	0x037F					
	0x0380	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0381					
	0x0382	THDI (total current harmonic content)	R	2	0.01%	u16
	0x0383	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
43	0x0384	U (voltage)	R	4	V	float
	0x0385					
	0x0386	I (current)	R	4	A	
	0x0387					
	0x0388	P (active power)	R	4	kW	
	0x0389					
	0x038A	Q (reactive power)	R	4	kvar	
	0x038B					
	0x038C	S (apparent power)	R	4	kVA	
	0x038D					
	0x038E	PF (power factor)	R	4		
	0x038F					
	0x0390	EP (active energy)	R	4	0.01kWh	u32
	0x0391					
	0x0392	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x0393					
	0x0394	THDI (total current	R	2	0.01%	u16

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		harmonic content)				
	0x0395	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
44	0x0396	U (voltage)	R	4	V	float
	0x0397					
	0x0398	I (current)	R	4	A	
	0x0399					
	0x039A	P (active power)	R	4	kW	
	0x039B					
	0x039C	Q (reactive power)	R	4	kvar	
	0x039D					
	0x039E	S (apparent power)	R	4	kVA	
	0x039F					
	0x03A0	PF (power factor)	R	4		
	0x03A1					
	0x03A2	EP (active energy)	R	4	0.01kWh	u32
	0x03A3					
	0x03A4	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x03A5					
	0x03A6	THDI (total current harmonic content)	R	2	0.01%	u16
	0x03A7	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
45	0x03A8	U (voltage)	R	4	V	float
	0x03A9					
	0x03AA	I (current)	R	4	A	
	0x03AB					
	0x03AC	P (active power)	R	4	kW	
	0x03AD					
	0x03AE	Q (reactive power)	R	4	kvar	
	0x03AF					
	0x03B0	S (apparent power)	R	4	kVA	
	0x03B1					
	0x03B2	PF (power factor)	R	4		
	0x03B3					
	0x03B4	EP (active energy)	R	4	0.01kWh	u32
	0x03B5					
	0x03B6	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x03B7					
	0x03B8	THDI (total current harmonic content)	R	2	0.01%	u16
	0x03B9	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
46	0x03BA	U (voltage)	R	4	V	float
	0x03BB					
	0x03BC	I (current)	R	4	A	
	0x03BD					
	0x03BE	P (active power)	R	4	kW	
	0x03BF					
	0x03C0	Q (reactive power)	R	4	kvar	
	0x03C1					

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	0x03C2	S (apparent power)	R	4	kVA	
	0x03C3					
	0x03C4	PF (power factor)	R	4		
	0x03C5					
	0x03C6	EP (active energy)	R	4	0.01kWh	u32
	0x03C7					
	0x03C8	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x03C9					
	0x03CA	THDI (total current harmonic content)	R	2	0.01%	u16
	0x03CB	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
47	0x03CC	U (voltage)	R	4	V	float
	0x03CD					
	0x03CE	I (current)	R	4	A	
	0x03CF					
	0x03D0	P (active power)	R	4	kW	
	0x03D1					
	0x03D2	Q (reactive power)	R	4	kvar	
	0x03D3					
	0x03D4	S (apparent power)	R	4	kVA	
	0x03D5					
	0x03D6	PF (power factor)	R	4		
	0x03D7					
	0x03D8	EP (active energy)	R	4	0.01kWh	u32
	0x03D9					
	0x03DA	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x03DB					
	0x03DC	THDI (total current harmonic content)	R	2	0.01%	u16
	0x03DD	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16
48	0x03DE	U (voltage)	R	4	V	float
	0x03DF					
	0x03E0	I (current)	R	4	A	
	0x03E1					
	0x03E2	P (active power)	R	4	kW	
	0x03E3					
	0x03E4	Q (reactive power)	R	4	kvar	
	0x03E5					
	0x03E6	S (apparent power)	R	4	kVA	
	0x03E7					
	0x03E8	PF (power factor)	R	4		
	0x03E9					
	0x03EA	EP (active energy)	R	4	0.01kWh	u32
	0x03EB					
	0x03EC	EQ (reactive energy)	R	4	0.01kvarh	u32
	0x03ED					
	0x03EE	THDI (total current harmonic content)	R	2	0.01%	u16
	0x03EF	Load (load percentage)	R load ratio=I/load value without decimal point	2	%	u16

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Alarm status data read （0x03F0～0x0420） **When the module is FAK30/FA30,the effective alarm data are 1-15 and 25-39 channels of data,When the address is set to 20-29, the effective alarm data is 1-30 channels.When the module is FA48(30),the status bit of switching value is always 0 and no acquisition is required.**

Alarm status assignment

Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
			Switch	Over-current secondary alarm	Over-current level 1 alarm	Low current level 1 alarm	Under current secondary alarm

Number	Address	variable	Remark	Length(Bite)	Unit
1	0x03F0	ALMData1（channel 1 alarm status）	R	2	u16
2	0x03F1	ALMData2（channel 2 alarm status）	R	2	u16
3	0x03F2	ALMData3（channel 3 alarm status）	R	2	u16
4	0x03F3	ALMData4（channel 4 alarm status）	R	2	u16
5	0x03F4	ALMData5（channel 5 alarm status）	R	2	u16
6	0x03F5	ALMData6（channel 6 alarm status）	R	2	u16
7	0x03F6	ALMData7（channel 7 alarm status）	R	2	u16
8	0x03F7	ALMData8（channel 8 alarm status）	R	2	u16
9	0x03F8	ALMData9（channel 9 alarm status）	R	2	u16
10	0x03F9	ALMData10（channel 10 alarm status）	R	2	u16
11	0x03FA	ALMData11（channel 11 alarm status）	R	2	u16
12	0x03FB	ALMData12（channel 12 alarm status）	R	2	u16
13	0x03FC	ALMData13（channel 13alarm status）	R	2	u16
14	0x03FD	ALMData14（channel 14 alarm status）	R	2	u16
15	0x03FE	ALMData15（channel 15 alarm status）	R	2	u16
16	0x03FF	ALMData16（channel 16 alarm status）	R	2	u16
17	0x0400	ALMData17（channel 17 alarm status）	R	2	u16
18	0x0401	ALMData18（channel 18 alarm status）	R	2	u16
19	0x0402	ALMData19（channel 19 alarm status）	R	2	u16
20	0x0403	ALMData20（channel 20 alarm status）	R	2	u16
21	0x0404	ALMData21（channel 21 alarm status）	R	2	u16
22	0x0405	ALMData22（channel 22 alarm status）	R	2	u16
23	0x0406	ALMData23（channel 23 alarm status）	R	2	u16
24	0x0407	ALMData24（channel 24 alarm status）	R	2	u16
25	0x0408	ALMData25（channel 25 alarm status）	R	2	u16
26	0x0409	ALMData26（channel 26 alarm status）	R	2	u16
27	0x040A	ALMData27（channel 27 alarm status）	R	2	u16
28	0x040B	ALMData28（channel 28 alarm status）	R	2	u16
29	0x040C	ALMData29（channel 29 alarm status）	R	2	u16
30	0x040D	ALMData30（channel 30 alarm status）	R	2	u16
31	0x040E	ALMData31（channel 31 alarm status）	R	2	u16
32	0x040F	ALMData32（channel 32 alarm status）	R	2	u16
33	0x0410	ALMData33（channel 33 alarm status）	R	2	u16
34	0x0411	ALMData34（channel 34 alarm status）	R	2	u16
35	0x0412	ALMData35（channel 35 alarm status）	R	2	u16
36	0x0413	ALMData36（channel 36 alarm status）	R	2	u16
37	0x0414	ALMData37（channel 37 alarm status）	R	2	u16
38	0x0415	ALMData38（channel 38 alarm status）	R	2	u16

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39	0x0416	ALMData39（channel 39 alarm status）	R	2	u16
40	0x0417	ALMData40（channel 40 alarm status）	R	2	u16
41	0x0418	ALMData41（channel 41 alarm status）	R	2	u16
42	0x0419	ALMData42（channel 42 alarm status）	R	2	u16
43	0x041A	ALMData43（channel 43 alarm status）	R	2	u16
44	0x041B	ALMData44（channel 44 alarm status）	R	2	u16
45	0x041C	ALMData45（channel 45 alarm status）	R	2	u16
46	0x041D	ALMData46（channel 46 alarm status）	R	2	u16
47	0x041E	ALMData47（channel 47 alarm status）	R	2	u16
48	0x041F	ALMData48（channel 48 alarm status）	R	2	u16
49	0x0420				

7 Precautions

7.1 The device should be installed in a dry, clean place away from heat sources and strong electromagnetic fields.

7.2 Pay attention to the phase sequence and polarity of AC voltage and current when wiring the device, otherwise the measurement will be inaccurate.

7.3 CT must be used for current input, and the transformation ratio parameter of incoming line CT must be set through communication.

7.4 The accuracy of CT affects the measurement accuracy of this device. The angle difference of CT will affect the measurement accuracy of the power and electric energy of the device.

7.5 When applied to direct access system without PT, a 2A fuse should be installed.

7.6 The CT grounding terminal of the current input on the device should be led to the grounding terminal separately. It is not allowed to connect the current input grounding terminal in parallel on the device and then lead to the grounding terminal.

7.7 The communication cable should use shielded twisted pair.

8 Common fault diagnosis and troubleshooting methods

8.1 The measurement of the device is inaccurate

*Check whether the wiring of voltage and current is correct, and whether the incoming and outgoing wires of current input are correct;

*Check whether the CT setting of the device corresponds to the actual external CT;

8.2 The voltage and current measurement is correct but the power measurement is inaccurate

*Check whether the current input direction is correct;

*Check whether the phase corresponding to each current loop is correct; the outgoing loop needs to be adjusted according to the actual connection;

8.3 Abnormal communication

*Check whether the communication cable is connected properly;

*Check whether the A and B terminals of communication are staggered;

*Check whether the address of the device is set correctly, and whether the communication baud rate is set correctly;

*When the communication of multiple devices is abnormal, first try to see if the communication of the single device is normal;

8.4 The incoming line voltage, current, and power are all, but the electric energy has no value

*Check the CT ratio setting of the incoming line.

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Change record：

Before change	After change	Change content
V1.0	V1.1	1、Fixed some errors in the text; 2、Delete the measurement accuracy in FT30/48 technical parameters; 3、Modify the address of AC harmonic part;

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