Protoss-PE11

RS485 to Ethernet

User Manual

V 1.2

Overview of Characteristic

- ✧ **Cortex-M3 MCU with 2MB Flash and 128KB SRAM**
- ✧ **Use FreeRTOS Operation System**
- ✧ **Support TCP/UDP/MQTT/HTTP/WebSocket Protocol**
- ✧ **Support Modbus TCP to RTU, Modbus Master Function**
- ✧ **Support RS485 To 10M Ethernet Conversion, Serial Speed Up to 460800 bps**
- ✧ **Support 10M Ethernet Auto-Negotiation**

- **Support Webpage Easy Configuration or PC IOTService Tool**
- **Support Security Protocol Such As AES/DES3**
- **Support Heartbeat and Resister Packet Function**
- **Support Webpage OTA Wireless Upgrade**
- **Support Industrial Temperature: -40 to +70° C**
- **Multiple Type of Different Power Input：**
  - **Protoss-PE11-H：100～240VAC@50～60Hz**
  - **Protoss-PE11-M：9～48VDC@1A**
- **Size: 97.60 x 64.95 x 27.50 mm (L x W x H)，C45 rail installation**

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Ed. V1.0	02-10-2020	First Version
Ed. V1.1	03-18-2020	Update RS485 interface
Ed. V1.2	03-15-2021	Update Ethernet data rate 10M.

1. PRODUCT OVERVIEW

1.1. General Description

The Protoss-PE11 provides a RS485 interface to TCP/IP data transfer product. The Protoss-PE11 integrate TCP/IP controller, memory, 10M Ethernet transceiver, RS485 and integrates a fully developed TCP/IP network stack and FreeRTOS OS. Protoss-PE11 also includes an embedded web server used to configure device.

The Protoss-PE11 using highly integrated hardware and software platform, it has been optimized for all kinds of applications in the industrial control, smart grid, personal medical application and remote control that have lower data rates, and transmit or receive data on an infrequent basis.

1.2. Device Paremeters

Table1. Protoss-PE11 Technical Specifications

Item	Parameters
System Information	
Processor/Frequency	Cortex-M3/96MHz
Flash/SDRAM	2MB/128KB
Operating System	FreeRTOS
Ethernet Port	
Port Number	1
Interface Standard	10M Base-T
Transformer	Integrated
Network Protocol	IP，TCP，UDP，DHCP，DNS，HTTP Server/Client，ARP，AutoIP，ICMP， Telnet, NTP, Modbus TCP
Security Protocol	AES 128Bit DES3
Serial Port	
Port Number	1 RS485
Data Bits	5,6,7,8
Stop Bit	1,2
Check Bit	None, Even, Odd
Baud Rate	TTL: 600 bps~460800 bps
Flow Control	No Flow Control Software Xon/ Xoff flow control
Software	
Web Pages	Http Web Configuration Customization of HTTP Web Pages
Configuration	Web CLI XML import

	Telnet IOTService PC Software UART Fast Config
Firmware Upgrade	Webpage, IOTService Tools
Basic Parameter	
Size	97.60mm x 64.95mm x 27.50mm
Operating Temp.	-40 ~ 70°C
Storage Temp.	-40 ~ 85°C, 5 ~ 95% RH（no condensation）
Input Voltage	Protoss-PE11-H：100～240VAC@50～60Hz Protoss-PE11-M：9～48VDC@1A
Working Current	~100mA
Power	<400mW

1.3. Key Application

The Protoss-PE11 device connects serial device to Ethernet networks using the TCP/IP protocol:

- Remote equipment monitoring
- Asset tracking and telemetry
- Security Application
- Industrial sensors and controls
- Medical devices
- ATM machines
- Data collection devices
- Universal Power Supply (UPS) management units
- Telecommunications equipment
- Data display devices
- Handheld instruments
- Modems
- Time/attendance clocks and terminals

2. HARDWARE INTRODUCTION

The Protoss-PE11 unit is a complete solution for serial port device connecting to network. This powerful device supports a 10/100BASE-T Ethernet connection, a reliable and proven operating system stored in flash memory, an embedded web server, a full TCP/IP protocol stack, and standards-based (AES) encryption.

Through Ethernet cable connect router with Protoss-PE11 serial server for data transfer, which makes the data transformation very simple.

Figure 1. Protoss-PE11 Appearance

2.1. Protoss-PE11 Pins Definition

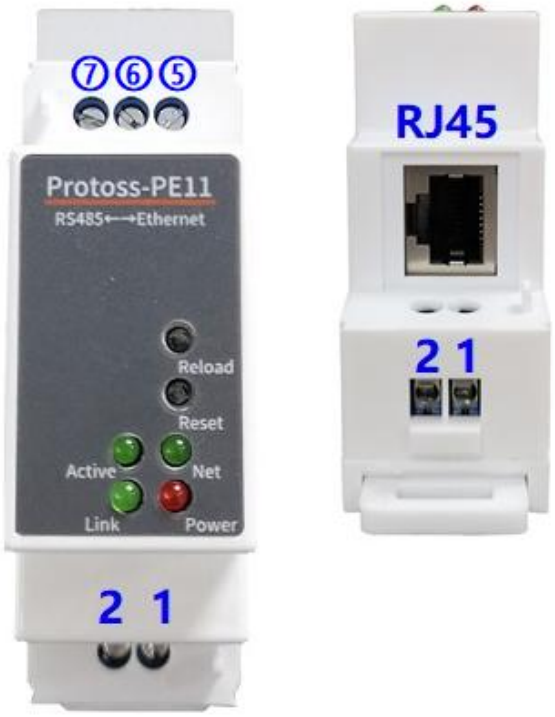

Figure 2. Protoss-PE11 Interface

Table2. Protoss-PE11-H Interface Definition

Pin	Description	Net Name	Signal Type	Comment
1	AC Power Input	L	Power	100～240VAC Input
2	AC Power Input	N	Power	
5		RS485_B-	IO	RS485 B-
6	Signal GND	GND	Power	Used for RS485 GND, usually leave it unconnected
7		RS485_A+	IO	RS485 A+
RJ45	Ethernet	RJ45	I/O	
Reload	Restore to factory setting button	Reload	I	Press down for more than 3 seconds and loose to restore factory setting.
Reset	Reset button	Reset	I	Hardware reset button
Net	Network status LED	Net	O	On: Ethernet connection is OK Off: No Ethernet connection
Active	UART Data Transfer	Active	O	Off: No data transfer 0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection.
Power	Power LED	Power	O	On: Power input OK Off: Power input NG.
Link	Server connection LED	Link	O	On: netp Socket connection OK. Off: no netp Socket connection.

Table3. Protoss-PE11-M Interface Definition

Pin	Description	Net Name	Signal Type	Comment
1	DC Power Input	VCC+	Power	9～48VDC@1A Input
2	DC Power Input	GND-	Power	
5		RS485_B-	IO	RS485 B-
6	Signal GND	GND	Power	Used for RS485 GND, usually leave it unconnected
7		RS485_A+	IO	RS485 A+
RJ45	Ethernet	RJ45	I/O	
Reload	Restore to factory setting button	Reload	I	Press down for more than 3 seconds and loose to restore factory setting.
Reset	Reset button	Reset	I	Hardware reset button
Net	Network status LED	Net	O	On: Ethernet connection is OK Off: No Ethernet connection
Active	UART Data Transfer	Active	O	Off: No data transfer 0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection.
Power	Power LED	Power	O	On: Power input OK Off: Power input NG.
Link	Server connection LED	Link	O	On: netp Socket connection OK. Off: no netp Socket connection.

<Notes>

I — Input; O — Output; I/O: Digital I/O; Power—Power Supply

2.2. RS485 Interface

RS485 use two wire links, A(DATA+), B(DATA-). Connect A(+) to A(+), B(-) to B(-) for communication. Suggest to connect GND together when interference is very severe.

The RS485 interface support maximum 32 RS485 device. The cable maximum length is 1200 meters. Need to add 120Ohm terminal resistor for over 300 meters.

2.3. RJ45 Interface

Ethernet port is 10M adaptive, support AUTO MDI/MDIX which means it support direct connecting to PC with Ethernet cable.

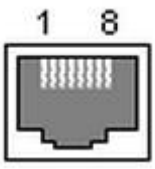

Figure 3. RJ45 Pin Defination

Table4. RJ45 Interface

Pin Number	Name	Description
1	TX+	Transfer Data+
2	TX-	Transfer Data-
3	RX+	Receive Data+
4	PHY-VCC	Transformer Tap Voltage
5	PHY-VCC	Transformer Tap Voltage
6	RX-	Receive Data-
7	N.C.	None Connect
8	N.C.	None Connect

2.4. Mechanical Size

The dimensions of Protoss-PE11 are defined as following picture (mm):

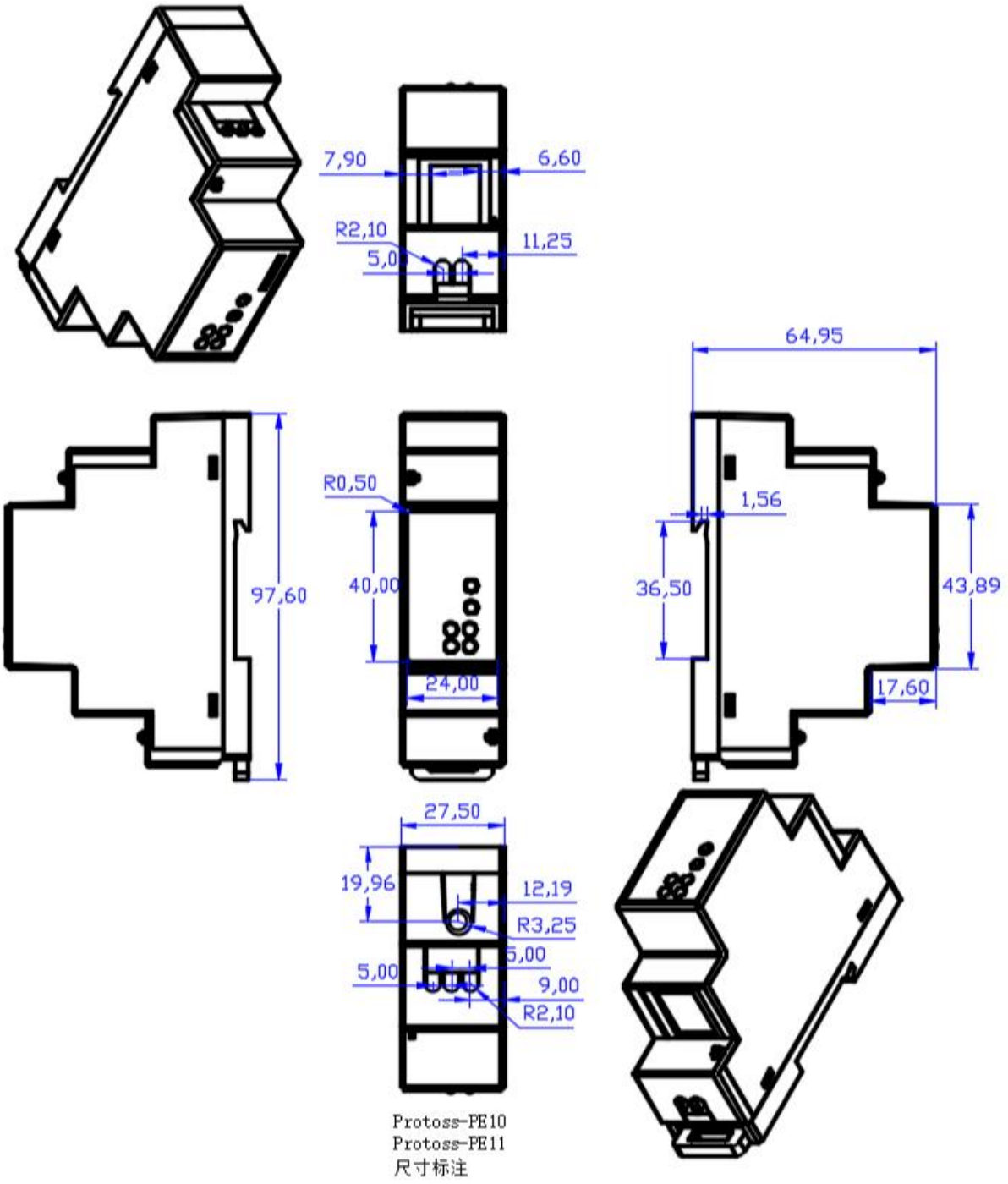

Figure 4. Protoss-PE11 Mechanical Dimension

2.5. Product Installation

Figure 5. Product Installation

2.6. Order Information

Base on customer detailed requirement, Protoss-PE11 provide different configuration version, Details as below:

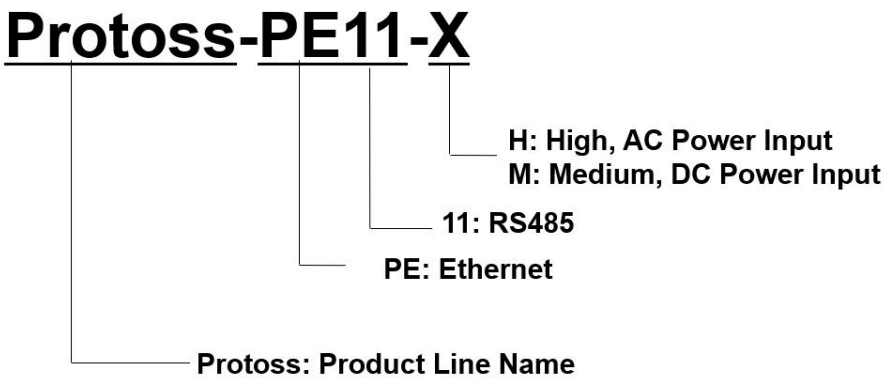

Figure 6. Protoss-PE11 Product Order Information

3. FUNCTION DESCRIPTION

Refer to “IOT_Device_Series_Software_Funtion” document for more detailed function.

APPENDIX A: CONTACT INFORMATION

Address: Room 1002,Building 1,No.3000,Longdong Avenue,Pudong New Area,Shanghai,China,201203
Web: www.iotworkshop.com or www.hi-flying.com
Contact:
Sales: sales@iotworkshop.com
Support: support@iotworkshop.com
Service: service@iotworkshop.com
Business: business@iotworkshop.com

For more information about IOTworkshop modules, applications, and solutions, please visit our web site www.iotworkshop.com

<END OF DOCUMENT>

DZ81-DZS900 Multi-channel Energy Meter User Manual

(V2.0)

Heyuan Intelligence Technology Co., Ltd

IMPORTANT DECLARATIONS

Please read this manual carefully before the product is operated. And once you start operating the meter, you'll be considered to have read this manual and accept all our terms. Heyuan shall not be responsible or liable for any damages or injuries caused by improper meter installation and/or operation.

Attention: the following symbols in this manual refer to meanings as follows

Electric Shock Symbol: Carries information about procedures which must be followed to reduce the risk of electric shock and danger to personal health

Safety Alert Symbol: Carries information about circumstances which if not considered may result in injury or death

The meter must be installed and operated by one who has experience with high-voltage devices or has qualifications. Please connect the meter to correct voltage before operating the meter. Please install and use the meter according to the user manual. Heyuan shall not be responsible or liable for any damages or injuries caused without following the instructions in the user manual.

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INTELLIGENCE

Contents

Chapter 1 Meter Overview

DZ81-DZS900 is an advanced, smart multi-channel networked multifunctional energy meter. It is widely used in power distribution sites, energy management systems and intelligent monitoring systems of different industries. It can monitor up to 9 three-phase channels or 27 single-phase channels. It measures electric parameters i.e. three-phase/line voltage, zero-sequence voltage, and 9 three-phase channel current, active power, reactive power, apparent power, power factor, active energy, reactive energy and 27 single-phase channel energies etc. Equipped 2-channel 485 communication interfaces support standard Modbus RTU communication protocol.

Chapter 2 Specifications

2.1 Input Voltage

Reference Voltage: 3×220V/380V Voltage Range: 0~1.2Un

2.2 Input Current

Measuring Range: 1‰In~1In Secondary Current of CT: 20mA

Starting Current: 1‰In

Remark: the current ratio should be set first after CT (current transformer) is connected. E.g. as for CT with 60A/20mA, its current ratio should be set as 60(the primary current). The current values should be calculated according to the formulas in register table.

2.3 Energy

Accuracy Class: Class 0.5S Resolution: 0.01kWh

2.4 Frequency Measurement

Frequency Measuring Range: 45~65Hz

2.5 Measuring Accuracy

Voltage/Current: 0.2% Energy Accuracy: Class 0.5S Power Factor: 1%

2.6 Communication

RS485/Modbus-RTU Communication Protocol Baud Rate: 2400~19200bps (programmable)

Remark: DZ81-DZS900 adopts RS485 interfaces and Modbus RTU communication protocol to communicate. The terminals are 485A1, 485B1, 485A2 and 485B2. The RS485 transmission medium is shielded twisted pair. In addition, the RS485 interfaces can also be used for device maintenance and upgrading. The communication default values are as follows.

Communication Default Value				
Address	Baud Rate	Data Bits	Stop Bits	Parity
01	9600bps	8	1	No

2.7 Power Supply

Power Supply: AC85~265V(45 ~ 55HZ)/ DC85 ~ 300V Power Consumption: <3VA
Power-line Connection Terminals: L/+ and N/-

2.8 Pulse Output of Import Active Energy

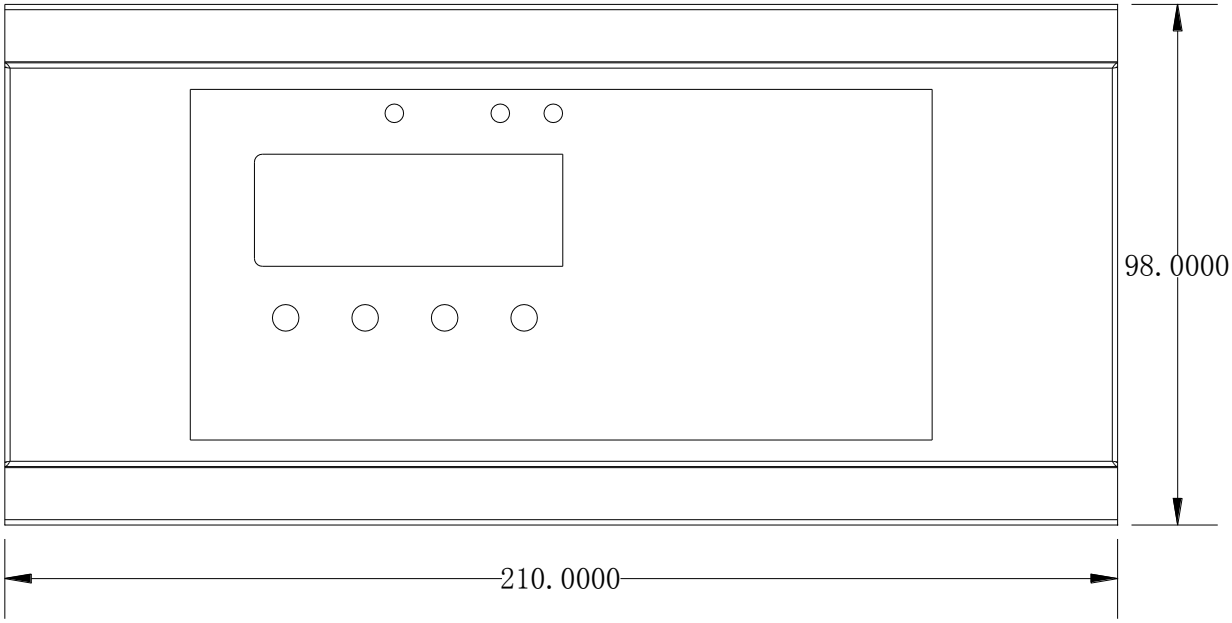
Pulse Constant	Pulse Width	Max. Current	Working Voltage
9600imp/kWh	50±2ms	10mA(DC)	5V~24V

2.9 Working Condition

Operating Temperature: -20℃ ~ +65℃ Storage Temperature: -40℃ ~ +85℃
Relative Humidity: 20% ~ 90%(non-condensing)

Chapter 3 Installation and Typical Wiring

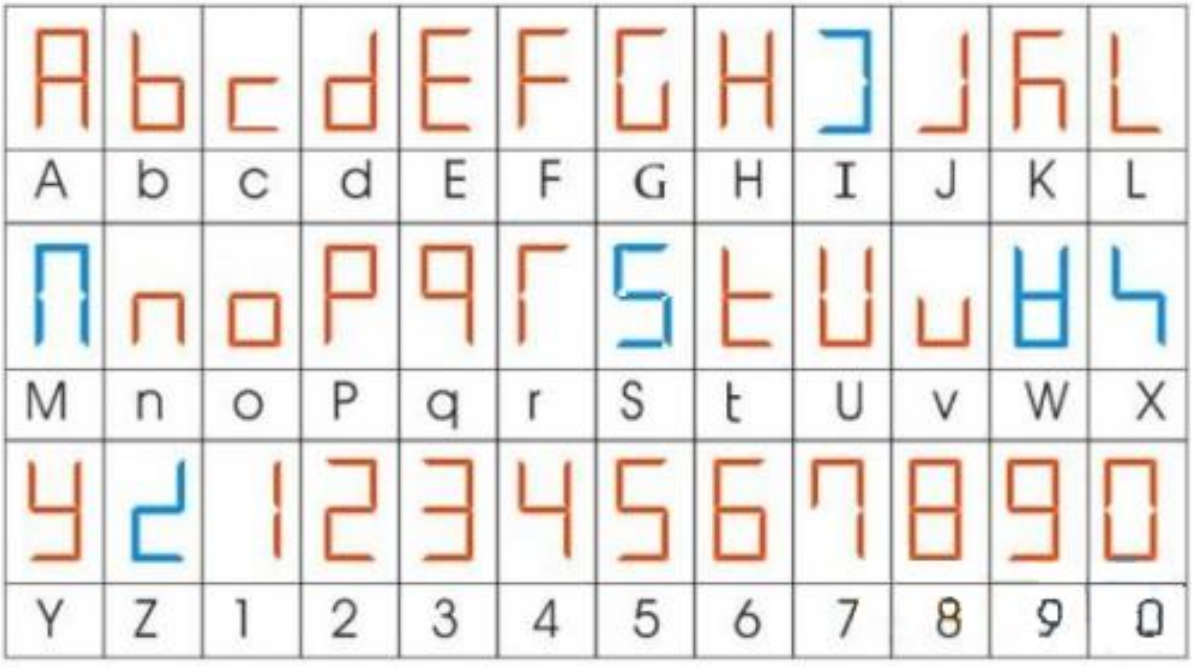
3.1 Dimension (unit: mm) and Comparison Table of Digital Letters Displayed



Front View

Model No.	Cut-out Size(mm)		Dimension(mm)		
DZ81-DZS900	W.	L.	L.	W.	H.
	35	210	210	98	46.1

Dimension



Comparison Table of Digital Letters Display

3.2 Installation Method

Installation Environment: DZS900 should be installed in a dry and dust free environment. Avoid exposing meter to excessive heat, radiation and high electrical noise sources.
Install Method: DIN rail Mounting.

Chapter 4 Terminals

1	2	3	4	5	6	7	8	9	10	11	12
In1	Ic1	Ib1	Ia1	In2	Ic2	Ib2	Ia2	In3	Ic3	Ib3	Ia3
Current of 1st Circuit				Current of 2nd Circuit				Current of 3rd Circuit			

13	14	15	16	17	18	19	20	21	22	23	24
In4	Ic4	Ib4	Ia4	NC	NC	In5	Ic5	Ib5	Ia5	NC	NC
Current of 4th Circuit						Current of 5th Circuit					

25	26	27	28	29	30	31	32	33	34
Ua	NC	NC	Ub	NC	NC	Uc	NC	NC	Un
Voltage									

Upper Row of Terminals

44	43	42	41	40	39	38	37	36	35
485B2	485A2	485B1	485A1	NC	NC	N/-	L/+	NC	PG
2nd-way RS485 Communication		1st-way RS485 Communication				Power Supply			

56	55	54	53	52	51	50	49	48	47	46	45
Ia6	Ib6	Ic6	In6	NC	NC	NC	NC	P1+	P1-	P2+	P2-
Current of 6th Circuit								1st-way Pulse		2nd-way Pulse	

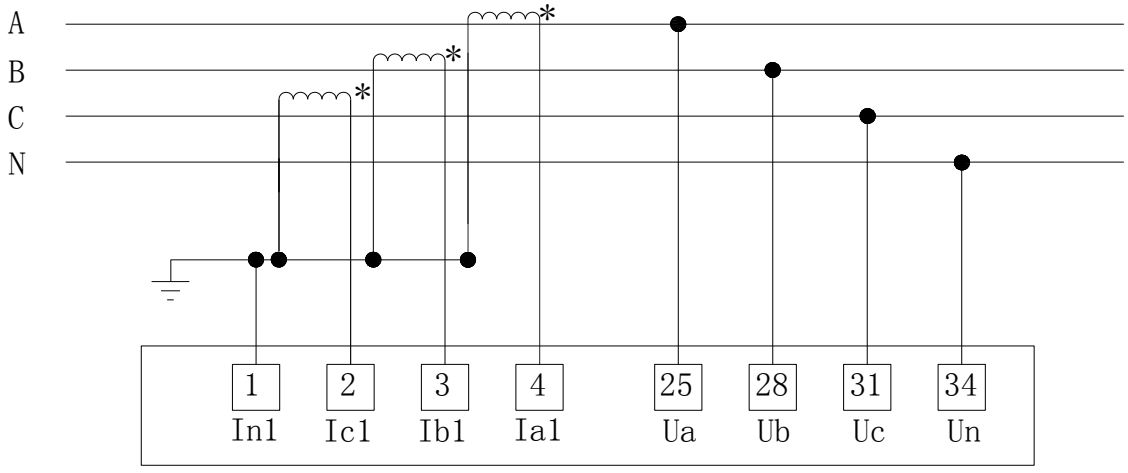
68	67	66	65	64	63	62	61	60	59	58	57
Ia9	Ib9	Ic9	In9	Ia8	Ib8	Ic8	In8	Ia7	Ib7	Ic7	In7
Current of 9th Circuit				Current of 8th Circuit				Current of 7th Circuit			

Lower Row of Terminals

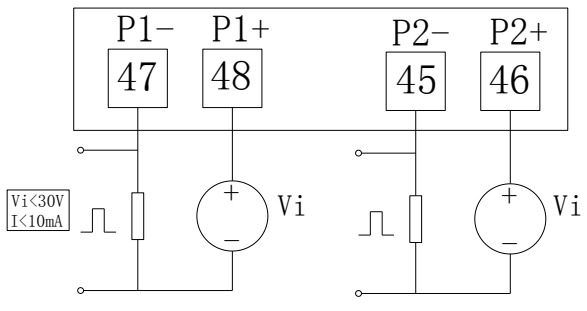
Chapter 5 Typical Wiring

5.1 Voltage and Current Wiring

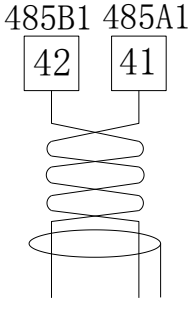
(remark: wiring of current circuits from 1st to 9th is the same)



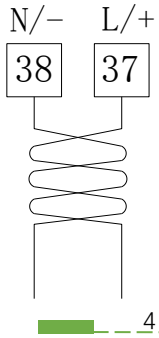
5.2 Interfaces of Energy Pulse Output



5.3 RS485 Wiring



5.4 Power Wiring

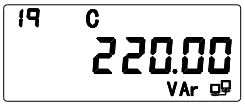


Chapter 6 Meter Display and Operation

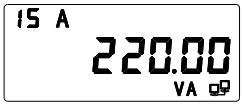
On voltage display interface, the present phase A voltage is 220.00V. Press buttons "↑" and "↓" to cyclically switch from phase A voltage, to phase B voltage, to phase C voltage, to average voltage and to zero sequence voltage. Press "↵ " to switch to the current display interface. If display values don't comply with real values, please check the setting value of PT ratio on chapter 7.

On current display interface, the present current value of phase A from the first circuit is 1.000A. Press buttons "↑" and "↓" to cyclically switch phase A current, phase B current, phase C current from the 9 circuits. Press button "↵" to switch to the active power display interface. If display values don't comply with real values, please check the setting value of CT ratio on chapter 7.

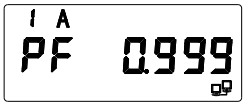
On active power display interface, the present active power of phase A from the first circuit is 220.00W. Press buttons "↑" and "↓" to cyclically switch phase A, phase B and phase C active power from the 9 circuits. Press button "↵" to switch to the reactive power display interface. If display values don't comply with real values, please check the setting values of PT and CT ratio on chapter 7.



On reactive power display interface, the present reactive power of phase C from the third circuit is 220.00VAr. Press "↑" and "↓" to cyclically switch phase A, phase B and phase C reactive power from the 9 circuits. Press button "↵" to switch to the apparent power display interface. If display values don't comply with real values, please check the setting values of PT and CT ratio on chapter 7.



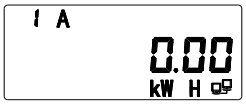
On apparent power display interface, the present apparent power of phase A from the fourth circuit is 220.00VA. Press buttons "↑" and "↓" to cyclically switch phase A apparent power, phase B apparent power, phase C apparent from the 9 circuits. Press button "↵" to switch to the power factor display interface. If display values don't comply with real values, please check the setting values of PT and CT ratio on chapter 7.



On power factor display interface, the present power factor of phase A from the fifth circuit is 0.999. Press buttons "↑" and "↓" to cyclically switch phase A power

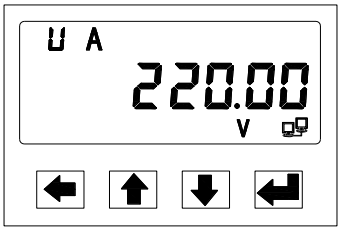
factor, phase B power factor, phase C power factor from the 9 circuits. Press button "↵" to switch to the energy display interface.

On energy display interface, press buttons "↑" and "↓" to cyclically display total active energy, import active energy, export active energy, total reactive energy, import reactive energy and export reactive energy from one circuit. Press button "↵" to switch back to single-phase energy display interface.



On single-phase energy display interface, it displays the present total active energy of phase A from the first circuit. Press buttons "↑" and "↓" to cyclically display total energy of phase A, phase B and phase C from 9 circuits. Press button "↵" to switch back to voltage display interface.

Chapter 7 Parameter Setting Interface



On measured value display interface, press buttons the "←" and "↵" at the same time, it will enter system parameters setting mode. Under setting mode, the button "←" will be used for digital shift. It can edit 1 digit shift left each time, and the digit will be flashing. The button "↑" is used to plus 1, i.e., the flashing digit will be plus 1 when pressing "↑" each time. If the flashing digit is 9, then press "↑" and the digit will become 0.The button "↓" is used to minus 1, i.e., the flashing digit will minus 1 when pressing "↓" each time. If the flashing digit is 0, then press "↓" and the digit will become 9. The button "↵" is used to confirm setting and enter the next setting interface. On any setting interface, press "←" and "↵" simultaneous and it will quit setting mode to switch to measured value display interface.

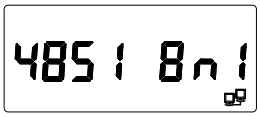
7.1 Password Setting Interface

Press buttons "←" and "↵" at the same time, it will enter system parameters setting mode. Enter password setting interface, the default password is 0000. If the password is not correct, press button "↵"(U/I). Then the upper right corner will show a warning sign. If the password is correct, press "↵" to enter address setting interface.

7.2 Address Setting Interface

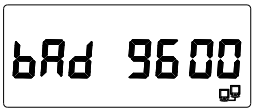
Enter address setting interface. The present meter address is 001. Setting range is 1-247. Press the buttons "↑", "↓" and "←" to set values. The address setting should comply with the requirements of register table. Press button "↵ " to confirm and enter setting interface of communication parameters.

7.3 Communication Parameter 1 Setting Interface



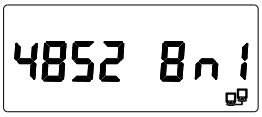
Enter communication parameter 1 setting interface. The present parameter of RS485 1 communication is "8n1". Press the buttons "↑" and "↓" to set the parameters as "8n1", "8o1", "8e1". Press button "↵ " to confirm and enter baud rate setting interface.

7.4 Baud Rate Setting Interface



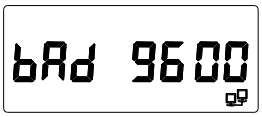
Enter baud rate setting interface. The present baud rate of RS485 1 is 9600. Press the buttons "↑" and "↓" to set the parameters as 2400 or 4800 or 9600 or 19200. After completing setting, press button "↵ " to confirm and enter setting interface communication parameter 2.

7.5 Communication Parameter 2 Setting Interface



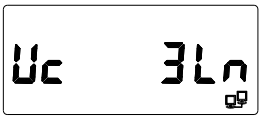
Enter communication parameter 2 setting interface. The present parameter of RS485 communication is "8n1". Press the buttons "↑" and "↓" to set the parameters as "8n1", "8o1", "8e1". Press button "↵ " to confirm and enter baud rate setting interface.

7.6 Baud Rate Setting Interface



Enter baud rate setting interface. The present baud rate of RS485 1 is 9600. Press the buttons "↑" and "↓" to set the parameters as 2400 or 4800 or 9600 or 19200. After completing setting, press button "↵ " to confirm and enter voltage connection mode setting interface.

7.7 Voltage Connection Mode Setting Interface



Enter voltage connection mode setting interface. Press the buttons "↑" and "↓" to set the voltage connection mode. 3Ln is 3 phase 4 wire connection and 2LL is 3 phase 3 wire connection. After completing setting, press button "↵ " to confirm and enter voltage ratio setting interface

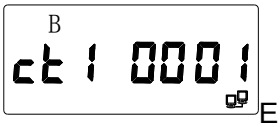
7.8 Voltage Ratio Setting Interface

Enter voltage ratio setting interface, setting range is 1~9999. Voltage ratio setting should comply with the requirements of register table. Press the buttons "↑" and "↓"and button "←" to set values. After completing setting, press button "↵ " to confirm and enter current ratio setting interface of circuit 1 phase A.

7.9 Current Ratio Setting Interface of Circuit 1, Phase A

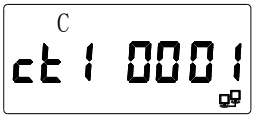
Enter current ratio setting interface of circuit 1, phase A. The present current ratio value of circuit 1, phase A is 1. Press the buttons "↑", "↓" and ← to set values. After setting, press button "↵ " to confirm and enter current ratio setting interface of circuit 1, phase B.

7.10 Current Ratio Setting Interface of Circuit 1, Phase B



Enter current ratio setting interface of circuit 1, phase B. The present current ratio value of circuit 1, phase B is 1. Press the buttons "↑", "↓"and ← to set value. After completing setting, press button "↵ " to confirm and enter current ratio setting interface of circuit 1, phase C.

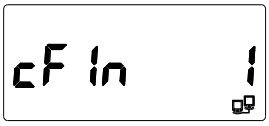
7.11 Current Ratio Setting Interface of Circuit 1, Phase C



Enter current ratio setting interface of circuit 1, phase C. The present current ratio value of circuit 1, phase C is 1. Press the buttons "↑", "↓" and button "←" to set value. After completing setting, press button "↵ " to confirm and enter current ratio setting interface of circuit 2, phase A. (Remark: the current ratio of rest circuits from 2nd to 9th can be set in the same manner.). Until current ratio setting of circuit 9, phase C is

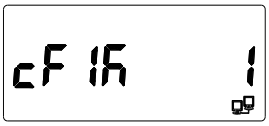
completed, press button "↵ " to confirm and enter setting interface of energy pulse output channel 1.

7.12 Energy Pulse Output Channel 1 Setting Interface



Enter setting interface of energy pulse output channel 1. The value is energy pulse output of which circuit. The present interface displays energy pulse of circuit 1. Press the buttons "↑" and "↓" to select energy pulse output channel. After completing setting, press button "↵" to confirm and enter setting interface of energy pulse output channel 1's types.

7.13 Energy Pulse Output Channel 1's Type Setting Interface



Enter energy pulse output channel 1's type setting interface. Press the buttons "↑" and "↓" to set the energy pulse output channel 1's types. Among the values, 1 is full-wave active power, 2 is full-wave reactive power, 3 is full-wave apparent power, 4 is fundamental wave active power, 5 is fundamental wave reactive power, 6 is fundamental wave apparent power. After completing setting, press button "↵ " to confirm and enter setting interface of energy pulse output channel 2.

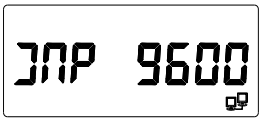
7.14 Energy Pulse Output Channel 2 Setting Interface

Enter setting interface of energy pulse output channel 2. The value is energy pulse output of which circuit. The present interface displays energy pulse of circuit 1. Press the buttons "↑" and "↓" to select energy pulse output channel. After completing setting, press button "↵ " to confirm and enter setting interface of energy pulse output channel 2's types.

7.15 Energy Pulse Output 2 Type Setting Interface

Enter energy pulse output channel 2's type setting interface. Press the buttons "↑" and "↓"to set the energy pulse output type. Among the values, 1 is full-wave active power, 2 is full-wave reactive power, 3 is full-wave apparent power, 4 is fundamental wave active power, 5 is fundamental wave reactive power, 6 is fundamental wave apparent power. After completing setting, press button "↵ " to confirm and enter energy pulse constant setting interface.

7.16 Energy Pulse Constant Setting Interface



Enter energy pulse constant setting interface. Press buttons "↑" and "↓" to set energy pulse constants. After completing setting “IMP 9600”, press button "↵ " to confirm and return to communication address setting interface.

Chapter 8 Basically Measured Parameters Zone (Modbus Protocol)

Address DEC	Address HEX		Parameter Name	Default Value	Value range
4096	1000	Phase Voltage Remark 1	phase A voltage	Magnifying 100 times	0～65535
4097	1001		phase B voltage	Magnifying 100 times	0～65535
4098	1002		phase C voltage	Magnifying 100 times	0～65535
4099	1003		phase voltage mean value	Magnifying 100 times	0～65535
4100	1004		zero sequence voltage	Magnifying 100 times	0～65535
4101	1005	Current of Circuit 1 Remark 2	phase/line A Current	Magnifying 10000 times	0～65535
4102	1006		phase/line B Current	Magnifying 10000 times	0～65535
4103	1007		phase/line C Current	Magnifying 10000 times	0～65535
4104	1008		zero sequence phase/line Current	Magnifying 10000 times	0～65535
4105	1009	Active power of Circuit 1 Remark 3	phase A active power	Magnifying 100 times	-32768~32767
4106	100A		phase B active power	Magnifying 100 times	-32768~32767
4107	100B		phase C active power	Magnifying 100 times	-32768~32767
4108	100C		total three-phase active power	Magnifying 100 times	-32768~32767
4109	100D	Reactive power of Circuit 1	phase A reactive power	Magnifying 100 times	-32768~32767
4110	100E		phase B reactive	Magnifying	-32768~32767

		Remark 3	power	100 times	
4111	100F		phase C reactive power	Magnifying 100 times	-32768~32767
4112	1010		total three-phase reactive power	Magnifying 100 times	-32768~32767
4113	1011	Apparent power of Circuit 1 Remark 3	phase A apparent power	Magnifying 100 times	-32768~32767
4114	1012		phase B apparent power	Magnifying 100 times	-32768~32767
4115	1013		phase C apparent power	Magnifying 100 times	-32768~32767
4116	1014		total three-phase apparent power	Magnifying 100 times	-32768~32767
4117	1015	Power factor of Circuit 1 Remark 4	phase A power factor	Magnifying 1000 times	-32768~32767
4118	1016		phase B power factor	Magnifying 1000 times	-32768~32767
4119	1017		phase C power factor	Magnifying 1000 times	-32768~32767
4120	1018		total three-phase power factor	Magnifying 1000 times	-32768~32767
4121	1019	Circuit 2	phase/line A Current	Magnifying 1000 times	0～65535
….	….				
4140	102C		phase A power factor	Magnifying 1000 times	-32768～32767
4141	102D	Circuit 3	phase/line A Current	Magnifying 1000 times	0～65535
….	….				
4160	1040		phase A power factor	Magnifying 1000 times	-32768～32767
4161	1041	Circuit 4	phase/line A Current	Magnifying 1000 times	0～65535
….	….				
4180	1054		phase A power factor	Magnifying 1000 times	-32768～32767
4181	1055	Circuit 5	phase/line A Current	Magnifying 1000 times	0～65535
….	….				
4200	1068		phase A power factor	Magnifying 1000 times	-32768～32767
4201	1069	Circuit 6	phase/line A Current	Magnifying 1000 times	0～65535

….	….				
4220	107C		phase A power factor	Magnifying 1000 times	-32768～32767
4221	107D	Circuit 7	phase/line A Current	Magnifying 1000 times	0～65535
….	….				
4240	1090		phase A power factor	Magnifying 1000 times	-32768～32767
4241	1091	Circuit 8	phase/line A Current	Magnifying 1000 times	0～65535
….	….				
4260	10A4		phase A power factor	Magnifying 1000 times	-32768～32767
4261	10A5	Circuit 9	phase/line A Current	Magnifying 1000 times	0～65535
….	….				
4280	10B8		phase A power factor	Magnifying 1000 times	-32768～32767

Remark 1：U(unit：V)= Modbus Registers' Values (hereinafter, Register)*PT/100
Remark 2：I(unit：A)=Register*CT/10000
Remark 3：P(unit：W)=Register*PT*CT/100；Q(unit：VAr)=Register*PT*CT/100
S(unit：VA)=Register*PT*CT/100
Remark 4：PF(unit：N/A)=Register/1000
The formulas between real values and Modbus registers' Values of circuits from 2 to 9 are same with those of circuit 1. The details of parameters' address see the register table

Chapter 9 Basic Set Parameters Zone (Modbus Protocol)

Address DEC	Address HEX	Parameter Name	Default Value	Value range
8192	2000	Password protection (basic parameter protection)	0	0 ~ 9999
8193	2001	Communication address	1	1~247
8194	2002	RS485-1 serial port parameter (high byte is parity check,low byte is baud rate)	2	High：0:(N,8,1)，1:(E,8,1)，2:(O,8,1) Low：0:2400, 1:4800, 2:9600, 3:19200
8195	2003	RS485-2 serial port parameter (high byte is parity check,low byte is baud rate)	2	High：0:(N,8,1)，1:(E,8,1)，2:(O,8,1) Low：0:2400, 1:4800, 2:9600, 3:19200

Address DEC	Address HEX	Parameter Name	Default Value	Value range
8196	2004	Voltage connection mode	0	0：3LN，1：2LL
8197	2005	PT	1	1~9999 Remark 1
8198	2006	CT【0-27】Remark 2	1	1 ~ 9999 Remark 1
8225	2021	CF1 Output type		high bytes of which circuit; low byte type
8226	2022	CF2 Output type		high bytes of which circuit; low byte type
8227	2023	Electric energy pulse constant	9600	600 ~ 50000
Remark 1: product of CT and PT should be less than 300,000. Remark 2: Here omit the CT address of each circuit. Details see the register table.				

Chapter 10 Measurement Parameters (Modbus Protocol)

Real-time Energy Consumption—Four-quadrant LCD Display (Function Code 03/04 Read)				
Address DEC	Address HEX	Type	Parameter Name	Value range
16384	4000	Circuit 1 Total Real-time energy consumption	Total active energy	0～9999999.99
16385	4001			
16386	4002		Import active energy	0～9999999.99
16387	4003			
16388	4004		Export active energy	0～9999999.99
16389	4005			
16390	4006		Total reactive energy	0～9999999.99
16391	4007			
16392	4008		Import reactive energy	0～9999999.99
16393	4009			
16394	400A		Export reactive energy	0 ~ 9999999.99
16395	400B			
16396	400C	Circuit 2 Total Real-time energy consumption	Total active energy	0～9999999.99
16397	400D			
….	….			
16406	4016		Export reactive energy	0 ~ 9999999.99
16407	4017			
16408	4018	Circuit 3 Total Real-time energy consumption	Total active energy	0～9999999.99
16409	4019			
….	….			
16418	4022		Export reactive energy	0 ~ 9999999.99
16419	4023			

16420	4024	Circuit 4 Total Real-time energy consumption	Total active energy	0～9999999.99
16421	4025			
….	….			
16430	402E		Export reactive energy	0 ~ 9999999.99
16431	402F			
16432	4030	Circuit 5 Total Real-time energy consumption	Total active energy	0～9999999.99
16433	4031			
….	….			
16442	403A		Export reactive energy	0 ~ 9999999.99
16443	403B			
16444	403C	Circuit 6 Total Real-time energy consumption	Total active energy	0～9999999.99
16445	403D			
….	….			
16454	4046		Export reactive energy	0 ~ 9999999.99
16455	4047			
16456	4048	Circuit 7 Total Real-time energy consumption	Total active energy	0～9999999.99
16457	4049			
….	….			
16466	4052		Export reactive energy	0 ~ 9999999.99
16467	4053			
16468	4054	Circuit 8 Total Real-time energy consumption	Total active energy	0～9999999.99
16469	4055			
…..	….			
16478	405E		Export reactive energy	0 ~ 9999999.99
16479	405F			
16480	4060	Circuit 9 Total Real-time energy consumption	Total active energy	0～9999999.99
16481	4061			
…..	….			
16490	406A		Export reactive energy	0 ~ 9999999.99
16491	406B			
Remark：Register address querying of energy consumption of circuits from 2 to 9 is same with that of circuit 1. The details of registers' address see the register table. Ep(unit：kWh)=Register/100；Eq(unit：kVarh)=Register/100				

Energy Values of Single Circuit		
Address		Parameter Name
DEC	HEX	
16640	4100	Total active energy of the No. 1 circuit
16641	4101	
….	….	
16656	4110	Total active energy of the No. 9 circuit
16657	4111	
…..	…	
16692	4134	Total active energy of the No. 27 circuit
16693	4135	
Remark：Only the addresses of circuit 1, 9, 27 were listed. Register address of the rest circuits from 2 to 26 is in the same manner. The details see the register table.		

Chapter 11 After-sales Service

Product Warranty

1. The product warranty period is one year.
2. The company is responsible for free maintenance or exchange within three-year warranty period.
3. The cost of the components and freight shall be charged for improper meter installation and/or operation.
4. Over the warranty period, part of the maintenance cost according to actual situation will be charged.

Service Guarantee

1. Product technical consulting and quality complaints will be replied within 12 hours.
2. Solutions for quality complaints will be provided within 24 hours.
3. Except statutory holidays and force majeure.

Chapter 12 Contact Us

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