PDC2420

POWER ISOLATED MODULE

COMMUNICATION PROTOCOL
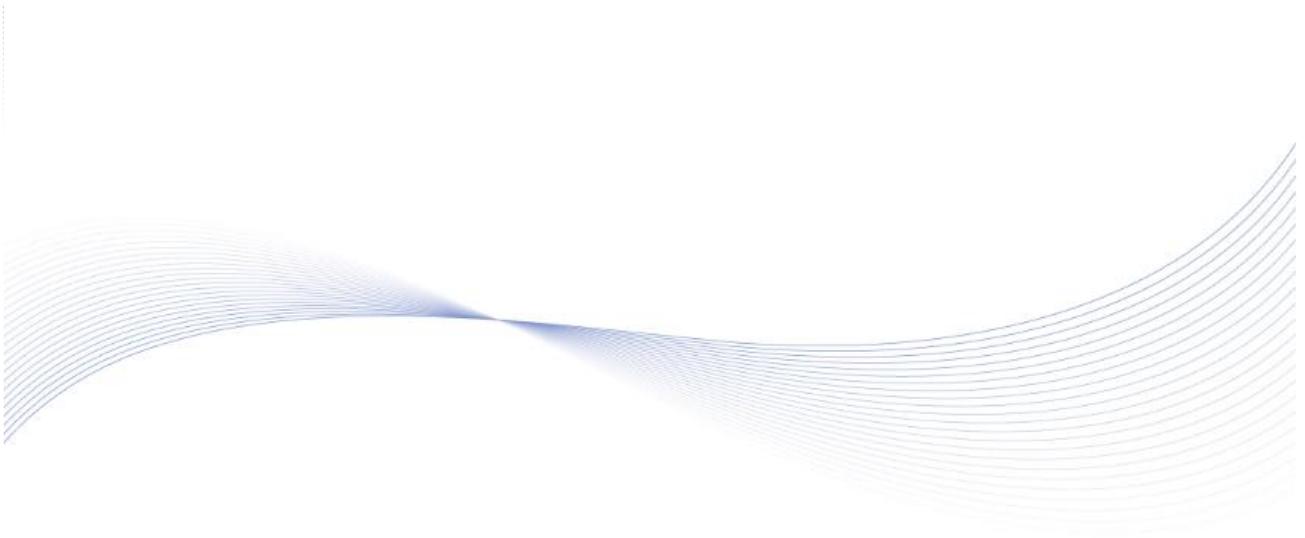
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Table 1 − Software Version

Date	Version	Content
2022-03-12	V1.0	Original release.
2025-07-22	V1.1	Modify the default communication address.

CONTENTS

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1. DESCRIPTION

This protocol describes read and write command format of RS485 half-duplex serial port communication and definition of internal information data for the third-party to develop and use.

The module is used as a slave, using Modbus-RTU protocol, and does not support other protocols such as Modbus-ASCII.

Communication address: 1~254 (default: 10)
Baud rate: 9600bps/19200bps/38400bps (default: 9600bps)
Start bit: 1-bit
Data bit: 8-bit
Parity bit: No Parity
Stop bit: 1-bit

Supported function code: 03H. Function code 03H is used for reading module alarm, status information and various electricity data.

Data check mode: CRC16.

Internal registers of controller are in the unit of "word (double bytes)".

Communication timeout period: over 200ms.

Communication distance: 9600 baud rate, the longest distance can reach 1,000m when using 120Ω shielding twisted pair.

Once maximum 120 data of word register can be read.

Up to 32 modules can be connected together for network communication.

When RS485 is connected, 120Ω twisted pair with shielding layer shall be used, and the shielding layer shall be grounded at one end.
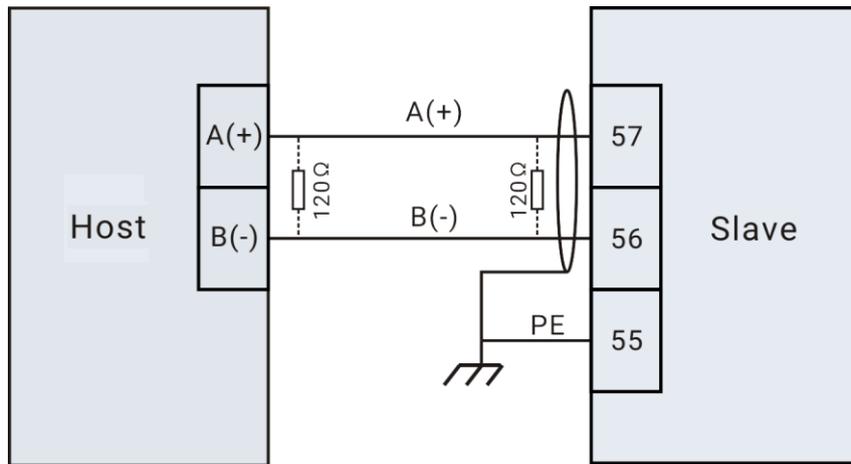
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2. WIRING DIAGRAM

Fig.1 Single Unit Communication Wiring Diagram

NOTE1: 2 120Ω impedance resistors can be connected automatically according to site situation, details refer to the following description.

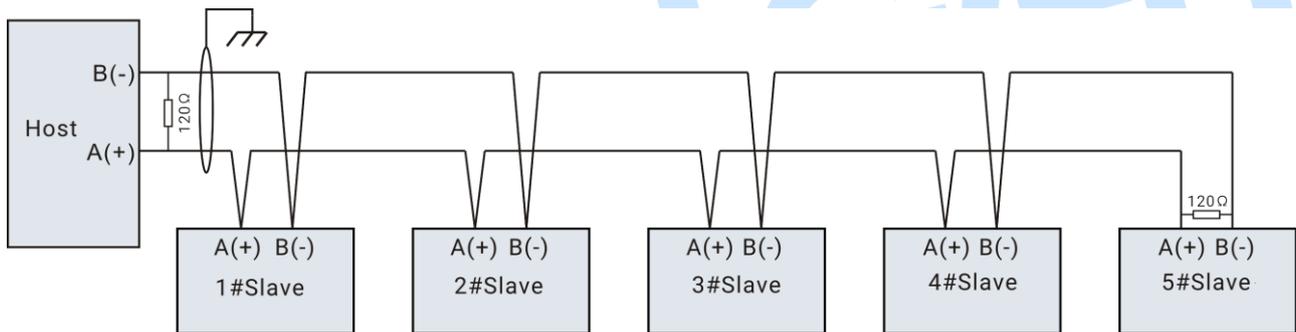**NOTE2:** This diagram is RS485-1 wiring diagram, RS485-2's is same.

Fig.2 Multi-unit Communication Wiring Diagram

NOTE 1: Please set each controller's communication module address before networking. Same module address is inhibited in the same network.

NOTE 2: The shielding layer of communication line is single-end grounded on the host side.

3. MODULE INTERNAL REGISTER ADDRESS AND DATA

Table 2 – Value Data Field

Modbus Address	Name	Ratio	Unit	Remark
1014	PDC Power Voltage	0.01	V	
1015	PDC Power Current	0.01	A	
1016	PDC Power Status	1		Binary combination, over temperature (bit3), over current (bit2), under voltage (bit1), over voltage bit0)
1017	PDC Power Temp.	1	°C	Signed
1018	PDC Accum. Run Time	1	Min	1018 is LSB, 1019 is MSB.
1019				
1020	PDC Accum. Output Energy	1	W*h	1020 is LSB, 1021 is MSB.
1021				

NOTE 1: Actual value=Received Data*Ratio. Take voltage as the example, received data is 2400 (1388H), ratio is 0.01V, so the actual voltage value is 24.0V (2400*0.01V);

NOTE 2: For 4-byte data, the actual value=Received Data MSB*65536 + Received Data LSB;

NOTE 3: When the received data is 32766, it means no normal data, "###" can be displayed;

NOTE 4: Definition of signed number. Take received data 8000H as the example, transfer it to binary 1000 0000 0000 0000b, the MSB is 1, which is a negative number. One's complement is obtained by subtracting 1 from it, which is inverted to obtain the absolute value of the negative number. Then transfer it to -32768 in decimal

Example:

Read "PDC Power Voltage", firstly get its corresponding address is 1014 by checking the table, it is known that you need to read 1 byte's data.

Assume the slave address is 01, the master request command is as following:

Table 3 – Master Request Command

Slave Address	Function Code	Starting Address (1014)		Data Qty. (2)		CRC 16 Calibration	
		MSB	LSB	MSB	LSB	LSB	MSB
01	03	03	F6	00	01	64	7C

Slave response command is as following:

Table 4 – Slave Response Command

Slave Address	Function Code	Data Qty. (Bytes)	Data		CRC 16 Calibration	
			Data MSB of Address 1014	Data LSB of Address 1014	LSB	MSB
01	03	02	09	60	BE	3C

Fill the received data into the corresponding address, as shown in the table below:

Table 5 – Data Analysis

Address	Received Data (Hex)	Accum. Close Times (Decimal)
1014	0960H	2400

4. FAQ

4.1 COMMUNICATION LINE SHIELDING LAYER GROUNDED

In order to prevent coupled interference signal on communication line, its single end needs to be grounded.

4.2 TERMINAL RESISTOR

At both ends of the linear network (on the two communication ports furthest apart), it is necessary to connect 120Ω terminal resistor in parallel on a pair of communication lines. According to the transmission line theory, the terminal resistor can absorb reflected waves on the network, effectively enhancing the signal strength. The value of two terminal resistors in parallel should be approximately equal to the characteristic impedance of the transmission line at the communication frequency.

A regular RS485 network usually uses terminal resistor. It can also be not used in the case of network connection line is very short, temporary or laboratory test.

4.3 RS485 TO USB COMMUNICATION ADAPTOR

PC can communicate with SG72A module produced by our company.

4.4 EXTENDED COMMUNICATION DISTANCE

Long distance (up to 10km) communication can be realized by a pair of SGCAN300 CANBUS relay module.
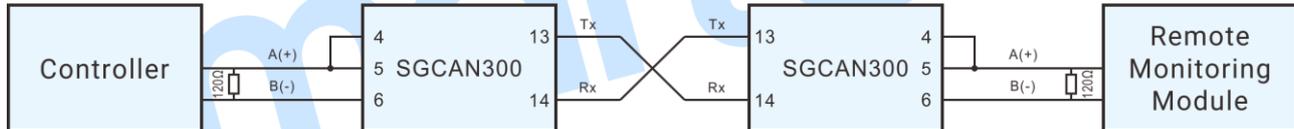

Fig.3 SGCAN300 Application Diagram

4.5 COMMON SOLUTIONS OF COMMUNICATION FAILURE

1) Check whether the positive and negative of RS485 is correctly connected;
2) Check whether the communication parameter setting in parameter setting is correct;
3) Check whether the RS485 converter (if configured) is normal;
4) Check whether the terminal resistor is correctly connected;
5) Disconnect the connection line of controller's RS485, measure the voltage difference of RS485's A and B terminal. If the difference is between ±200mV, it means communication port has abnormal situation;
6) It is recommended to download third-party communication software such as modscan32, modbus poll to check whether communication is normal.

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