RSI32 RCM32 RCU16

Technical Instruction

RCM32

Fig.1 Appearance of RCM32

1 Overview

The RCM32 unit serves the function of metering analog signals and converting them to digital signals for data exchange with MODBUS communication interface. It is used as the hardware unit of remote metering of ESD2000 Substation Supervisory & Control System. It is also applicable for other intelligent system in which the remote metering of analog signals, like current, voltage, power, temperature, pressure and humidity etc, is required.

2 Features and Technical Data

The RCM32 unit allows the simultaneous collection of 32 0–20mA AC/DC or 0–2.5V DC analog signals. The unit is connected to the upper computer with an RS485 bus, and utilizes Polling for data exchange to reflect the value of the metered object on a real-time basis.

2.1 Technical Data

Input:	32 analog signals			
Input Mode:	0-20mA /AC, 4-20mA/DC, 0-2.5V(DC)			
Operational Power Supply:	24 VDC ± 10%, Ripple Coefficient < 5%			
Power Consumption:	⩽ 2.5W			
Bus Mode:	RS485			
Bus Capacity:	⩽ 32			
Refreshing Rate:	< 1s			
Accuracy:	0.5%			
Communication Response Time:	20ms			
Communication Rate:	selectable rate 9600/4800/1200/600 bit/s			
Address:	The range from 1 to 32; broadcast address - 0x00			
Degree of Protection:	IP40, Terminal IP20			
Operational Temperature:	-5℃ - 55℃			
Storage Temperature:	-25℃ - 85℃			
Standards:	IEC61000-4-2:	1995	Electrostatic discharge immunity test	Level 3
	IEC61000-4-3:	1995	Radiated, radio-frequency, electromagnetic field immunity test	Level 3
	IEC61000-4-4:	1995	Electrical fast transient pulse immunity test	Level 3
	IEC61000-4-5:	1995	Surge immunity test	Level 3
	EN55022:	1998	Information technology equipment (ITE)	Level B

2.2 Communication

The bus is in the two-wire half-duplex RS485 mode, capable of supporting up to 32 RCM32 units. The Shielded Twisted Pair (STP) is used for connection between units.

The communication interface is based on high-reliability lightning-proof port chips, which are capable of suppressing the transient overvoltage on the circuit resulting from lightning and other causes, thereby preventing damage to the interface and improving communication reliability.

The data transmission is based on the CRC circulating redundancy calibration which greatly improves the data reliability and enhances its anti-interference capability.

3 Installation & Wiring

3.1 Dimension & Installation

Unit Dimension: (L × W × H) :145 × 40 × 135mm

Installation: Standard Clip Track TS35 × 7.5

3.2 Unit Wiring

The terminal is indicated in Fig.2:

Terminal 37 is the common point of the analog signal connection. Terminal 38 is for protection earthing. Terminals 1-16 and 21-36 are the input terminals of the analog signals; all analog signals must be input in a manner consistent with applicable requirements.

Terminals 19 and 20 are for RS485 connection. Terminals 17 and 18 are the ones for shield of communication wire.

Terminals 39 and 40 are for power supply connection. The voltage of the power supply is 24V DC.

The four indicators are defined as follows:

TX: Communication Transmission Indicator. When the unit transmits data to the connected computer, this light blinks.

RX: Communication Reception Indicator. When the unit receives commands from the connected computer, this light blinks.

RUN: Running Indicator. When the unit is running normally, this light blinks per a second.

POWER: Power Indicator. When the power supply is normal, this light remains on.

The terminal connection is shown in Fig.3.

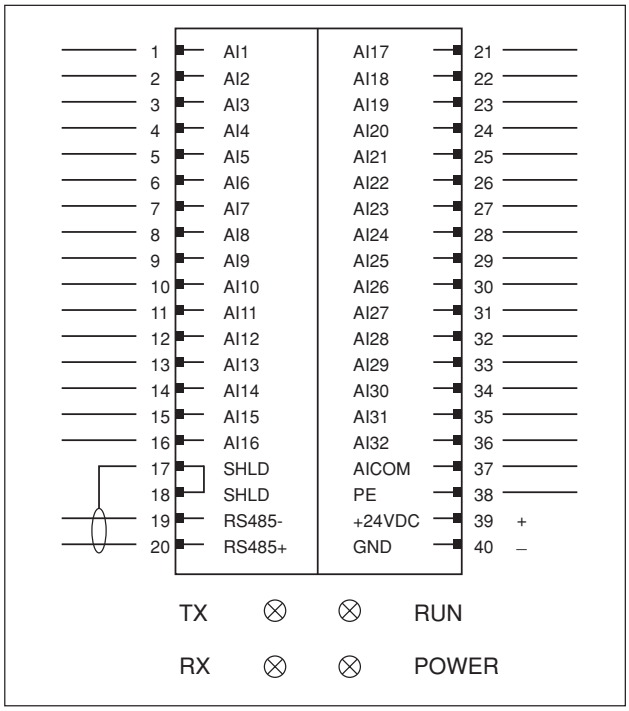

Fig.2 The Definition of RCM32 Terminals

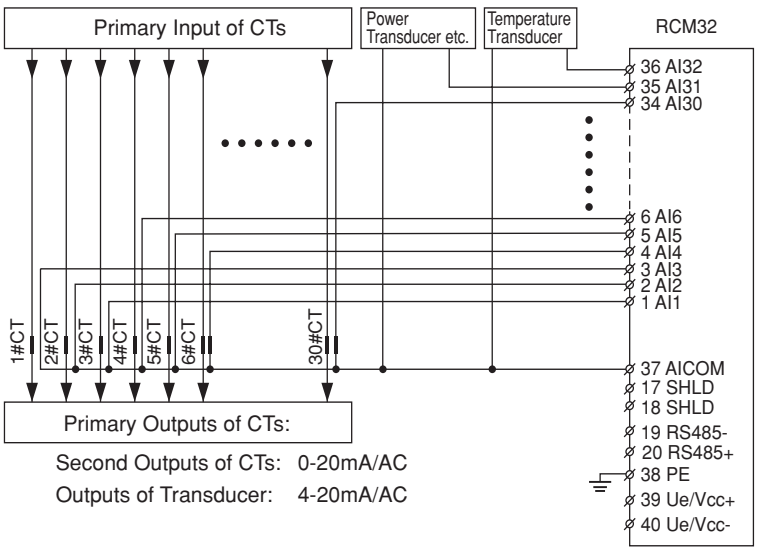

Fig.3 The Terminals Connection

3.3 Communication Connection

The communication connection of RCM32 is shown in Fig.4.

A terminal resistance should be connected to the RS485+ and RS485− communication parts of the last RCM32 Module of the communication loop in order to assure communicational matching. The resistance is about 120 Ω(RJ−1/8−120I).

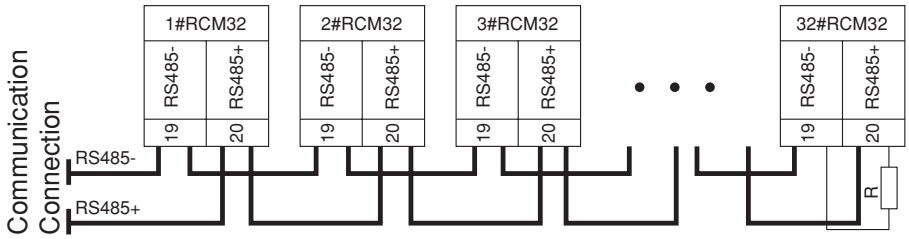

Fig.4 The Communication Connection of RCM32

3.4 Address, Communication mode and Communication Rate

The diagram Fig.5 shows the definition of the 10−digit dial−up of the RCM32 Unit.

The first five digits are the address bits of the address dial−up switches. The "6" and "7" digits are the setting bits for the communication mode. The last two digits "9" and "10" are the setting bits for the communication rate. "0" is for OFF and "1" is for ON.

Switches

1	2	3	4	5	6	7	8	9	10
Address Setting					Com. Data Format Setting			Baud Rate Setting	

Address Setting

1	2	3	4	5	Address	Remark
1	0	0	0	0	1	OFF: 0 ON: 1
0	1	0	0	0	2	
-	-	-	-	-	-	
1	1	1	1	1	31	
0	0	0	0	0	32	

Fig.5 The Definition of 10-digit Dial-up of The RCM32 Unit

No.s 1−5 of dial−up (SW) is for setting station numbers (1−32).

SW1	SW2	SW3	SW4	SW5	Address
1	0	0	0	0	1
0	1	0	0	0	2
-	-	-	-	-	-
0	1	1	1	1	30
1	1	1	1	1	31
0	0	0	0	0	32

No.s 6 and 7 of dial−up (SW) are for setting communication mode.

SW6	SW7	Communication Mode
0	0	10 bits: 1 start bit, 8 data bits, 1 stop bit
1	0	11 bits: 1 start bit, 8 data bits, even, 1 stop bit
0	1	11 bits: 1 start bit, 8 data bits, odd, 1 stop bit
1	1	11 bits: 1 start bit, 8 data bits, 2 stop bits

The last two digits "9" and "10" are the setting bits for the communication rate.

SW9	SW10	Baud Rate(bit/s)
0	0	9600
1	0	4800
0	1	1200
1	1	600

The status of dial-up (SW) is shown in Fig.6. If the ID address is 1, communication mode is 10 bits: 1 start bit, 8 data bits, 1 stop bit and the baud rate is 9600bps.

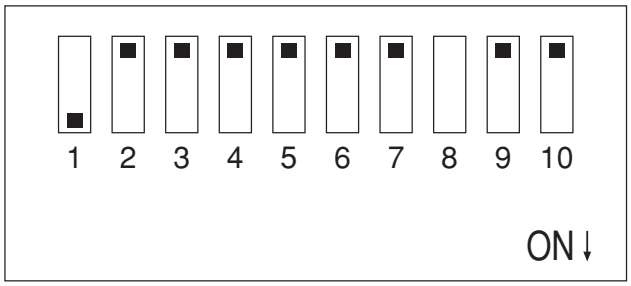

Fig.6 The Status of Dial-up (SW)

The status of dial-up (SW) is shown in Fig.7. If the ID address is 31, communication mode is 11 bits: 1 start bit, 8 data bits, odd, 1 stop bit and the baud rate is 600bps.

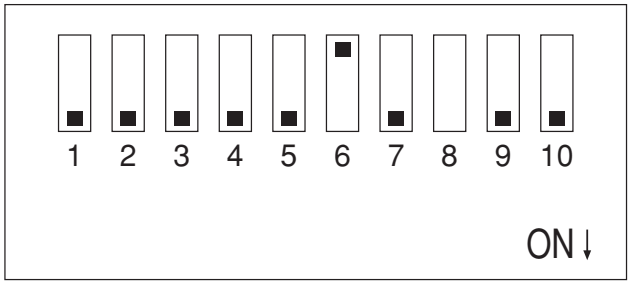

Fig.7 The Status of Dial-up (SW)

4 Testing & Maintenance

4.1 Usage

1) Make sure the power cable is properly connected before turning on the power.

2) When the power is turned on, the power indicator will illuminate and the running indicator will blink every second.

3) Setting Communication

   a) Tie in the RS485 bus correctly and connect it to the upper computer.

   b) The upper computer issues commands in the prescribed format according to the unit address and the Baud rate. The reception indicator (RX) should be blinking.

   c) When the transmission light (TX) of the unit is blinking, it means that the unit has responded to the command issued by the upper computer, and that communication has been established.

4.2 Testing

1) Before turning on the power, make sure the power connection is correct.

2) After turning on the power, check the power indicator. If it does not illuminate, the power connection is faulty.

3) Check the running light. If it does not blink, the module is not running correctly.

4) Prior to the connection to the upper computer, the transmission and reception indicatiors are both off. When communication with the upper computer is underway, check the transmission and reception indicators; the red indicates that the downward transmission of data is underway, and the green shows that the upward transmission of data is underway. Only after communication has been properly established will the green light blink.

5) Setting the rogatory interval of the upper computer. Due to the half-duplex mode of the bus, the time must be appropriate to avoid failure of communication. The minimum interval is 60ms and the commendatory value is 100ms.