Remote Terminal Unit

PZ-P32

(32 Pulse inputs)

Version: 20090318

1. General

PZ-P32 can accept the 32 pulse signals and then transmit the measured data to PC by RS485 port. It can be used to count pulse of kWh, kVarh or other pulse signals. And it has the data storage when power off.

2. Norms

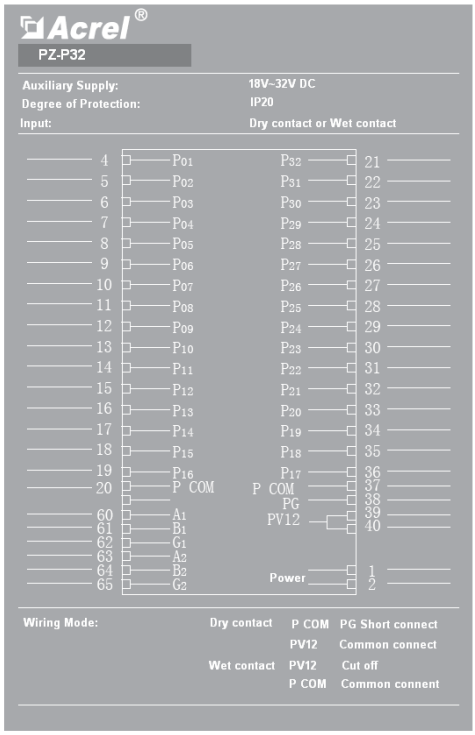
IEC61000-4-2	(EN61000-4-2)	Personnel Electrostatic Discharge Immunity
IEC61000-4-3	(EN61000-4-3)	Testing and measurement techniques - Radiated
IEC61000-4-4	(EN61000-4-4)	Electrical fast transient burst immunity test
IEC61000-4-5	(EN61000-4-5)	Combination wave and surge impulse test
IEC61000-4-6	(EN61000-4-6)	Measurement Uncertainty In Immunity Test
EN55011		Measuring radiated emissions

3. Technical Feature

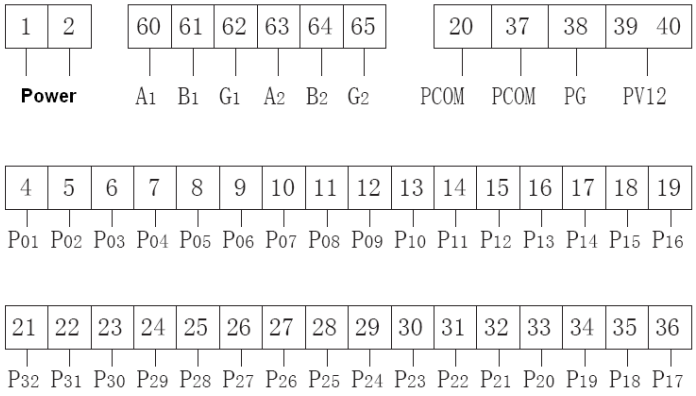
1) Power supply: 24VDC (18~36VDC); 220VAC (80~270VAC)
2) Consumption: ≤5W
3) Working Temperature: -5~55C
4) Relative Humidity: 5~95%
5) Storage Temperature: -25~70C
6) Altitude: ≤2500m
7) Protection: IP20
8) Isolation: 2kV/1min, 50Hz
9) Installation: 35mm DIN rail

Item	Value
Input	32 channels
Input mode	Wet contact with power or dry contact without power
Output	Half Duplex RS485 (Modbus)
Pulse width	> 10ms
Maximal count	4294967296

4. Fix and wire



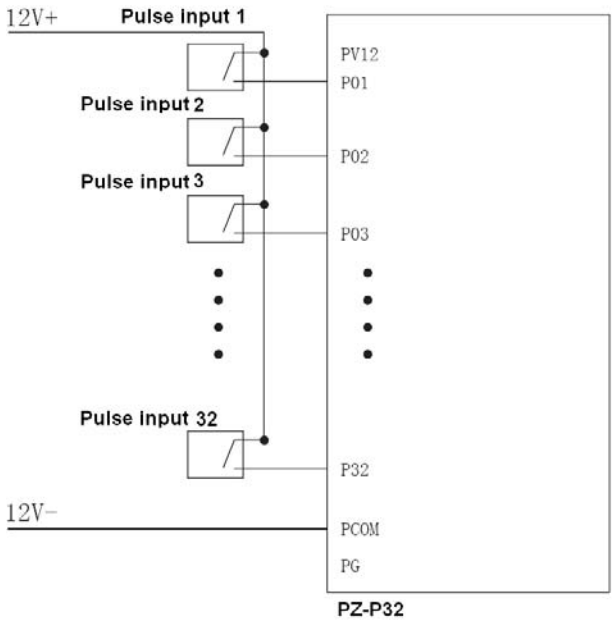
4.1 Size: 160 × 50 ×110mm (L*W*H)
4.2 Fixing: standard DIN TS35



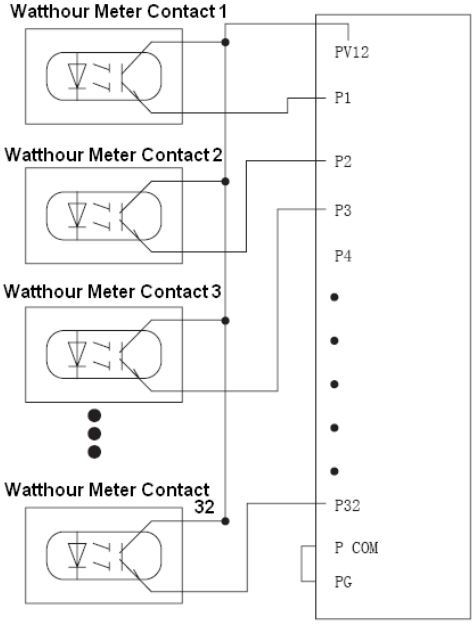
Note:
Wet contact with power, every Pi（i=1~32） connect with common port PCOM, at the same time PV12 and PG port GND
Dry contact without power: every Pi（i=1~32） connect with Pi common port（i=1~32）, at the same time PCOM and PG short.

4.3 The application example:

Wet contact with power



Dry contact without power`



5. Communication

5.1 Modbus address list

	Items	R/W	Order	Byte	Port
00	Meter code	R	03 / 04	2	
01	Version	R	03 / 04	2	
02	Address	R/W	03 / 04 /16	2	COMM2
03	Speed	R/W	03 / 04 /16	2	COMM2
04	CRC	R/W	03 / 04 /16	2	COMM2
05	Time: second, minute	R/W	03 / 04 /16	2	COMM2
06	Date: hour, Day	R/W	03 / 04 /16	2	COMM2
07	Date: Month, Year	R/W	03 / 04 /16	2	COMM2
08	Allow clock: (1: yes, 0: no)	R/W	03 / 04 /16	2	COMM2
09	Reserved				
10	Reserved				
11	Reserved				
12	Reserved				
13	Current time: second, minute	R	03 / 04	2	
14	Current date: hour, Day	R	03 / 04	2	
15	Current date: Month, Year	R	03 / 04	2	
16	Reserved				
17	Reserved				
18	Reserved				
19	Data clear / block / unblock	R/W	03 / 04 /16	2	COMM1
20	Reserved				
21	Reserved				
25	Pulse 1	R/W	03 / 04 /16	4	COMM1
26	Pulse 2	R/W	03 / 04 /16	4	COMM1
27	Pulse 3	R/W	03 / 04 /16	4	COMM1
28	Pulse 4	R/W	03 / 04 /16	4	COMM1
29	Pulse 5	R/W	03 / 04 /16	4	COMM1
30	Pulse 6	R/W	03 / 04 /16	4	COMM1
31	Pulse 7	R/W	03 / 04 /16	4	COMM1
32	Pulse 8	R/W	03 / 04 /16	4	COMM1
33	Pulse 9	R/W	03 / 04 /16	4	COMM1
34	Pulse 10	R/W	03 / 04 /16	4	COMM1
35	Pulse 11	R/W	03 / 04 /16	4	COMM1
36	Pulse 12	R/W	03 / 04 /16	4	COMM1
37	Pulse 13	R/W	03 / 04 /16	4	COMM1
38	Pulse 14	R/W	03 / 04 /16	4	COMM1
39	Pulse 15	R/W	03 / 04 /16	4	COMM1
40	Pulse 16	R/W	03 / 04 /16	4	COMM1
41	Pulse 17	R/W	03 / 04 /16	4	COMM1
42	Pulse 18	R/W	03 / 04 /16	4	COMM1
43	Pulse 19	R/W	03 / 04 /16	4	COMM1
44	Pulse 20	R/W	03 / 04 /16	4	COMM1
45	Pulse 21	R/W	03 / 04 /16	4	COMM1
46	Pulse 22	R/W	03 / 04 /16	4	COMM1
47	Pulse 23	R/W	03 / 04 /16	4	COMM1
48	Pulse 24	R/W	03 / 04 /16	4	COMM1
49	Pulse 25	R/W	03 / 04 /16	4	COMM1
50	Pulse 26	R/W	03 / 04 /16	4	COMM1
51	Pulse 27	R/W	03 / 04 /16	4	COMM1
52	Pulse 28	R/W	03 / 04 /16	4	COMM1
53	Pulse 29	R/W	03 / 04 /16	4	COMM1

54	Pulse 30	R/W	03 / 04 /16	4	COMM1
55	Pulse 31	R/W	03 / 04 /16	4	COMM1
56	Pulse 32	R/W	03 / 04 /16	4	COMM1

5.2 Explanation:

1. The default address 202
2. Address 04:

0100: 1 bit start, 8 bits data, 1 bit stop
01: reserved
0121: 1 bit start, 8 bits data, 1 bit stop
0131: 1 bit start, 8 bits data, 1 bit stop
3: pulse code19 (0x13): High byte 0x81H/0x82H/0x83H: clear / block / unblock; low byte is the pulse channel. 0x81FF is clear all channels; 0x8203 is blocking the 3rd channel.

4. GPS adjusting

With NMEA protocol communication COMM2. This unit can be adjusted to the date and the time, with $GPZDA format.
Date and time
Normal time format: day, month, year, local time;
$--ZDA, hhmmss. sss, xx, xx, xxxx, xx, xx
hhmmss. sss = UTC（Normal time）
xx = day, 1 to 31
xx = month, 00112
xxxx = year
xx = local hour difference 00 to +/- 13 hours
xx = local minute difference
Example:
GPS sends: $GPZDA,020102.012,05,11,2007,
Change to ASCⅡ: 24 47 50 5A 44 41 2C 30 32 30 31 30 32 2E 30 31 32 2C 30 35 2C 31 31 2C 32 30 30 37 2C
The time of unit is set to 10h01m02s, November 22nd, 2007

5.3 Examples

Example1: clear zero of all pulse input of PZ-P32 address 0001.
Sent: 0x01,0x10,0x00,0x13,0x00,0x01,0x02,0x81,0Xff,0x84,0xE3
Return: 0x01,0x10,0x00,0x13,0x00,0x01,0xF0,0xC
Example2: clear zero of 4th pulse input of PZ-P32 address 0001.
Sent: 0x01,0x10,0x00,0x13,0x00,0x01,0x02,0x81,0x04,0xC5,0x60
Return: 0x01,0x10,0x00,0x13,0x00,0x01,0xF0,0x0C
Example3: block the value of 4th pulse input of PZ-P32 address 0001.
Sent: 0x01,0x10,0x00,0x13,0x00,0x01,0x02,0x82,0x04,0xC5,0x90
Return: 0x01,0x10,0x00,0x13,0x00,0x01,0xF0,0x0C
Example4: unblock the value of 4th pulse input of PZ-P32 address 0001.
Sent: 0x01,0x10,0x00,0x13,0x00,0x01,0x02,0x83,0x04,0xC4,0x00
Return: 0x01,0x10,0x00,0x13,0x00,0x01,0xF0,0x0C
Example5: set the value of 4th pulse input of PZ-P32 address 0001 as 256。
Sent: 0x01,0x10,0x00,0x1F,0x00,0x02,0x04,0x00,0x00,0x01,0x00,0xB3,0x73
Return: 0x01,0x10,0x00,0x1F,0x00,0x02,0x70,0x0E
Example6: set the clock of PZ-P32 address 0001
Sent: 0x01,0x10,0x00,0x05,0x00,0x04,0x08,0x12,0x14,0x10,0x21,0x09,0x07,0x00,0x01,0xA3,0xA8
Return: 0x01,0x10,x00,0x05,0x00,0x04,0xD1,0xCB
Note: the set time as 10h14m12s, September 21st, 2007.
Example7: current time
Sent: 0x01,0x03,0x00,0x0D,0x00,0x03,0x94,0x08
Return: 0x01,0x03,0x06,0x56,0x17,0x10,0x01,0x11,0x07,0x41,0xd2
Note: the current time is 10h17m56s, November 1st, 2007.

6. Others

6.1 DIP Switch setting

6.1.1 DIP definition

1	2	3	4	5	6	7	8	9	10
Address setting					Baudrate setting		Mode setting	communication	
1	0	0	0	0	0	0	0	0	0

6.2.1 Address setting

DIP1	DIP2	DIP3	DIP4	DIP5	Address
1	0	0	0	0	1
0	1	0	0	0	2
31					
1	1	1	1	1	31
0	0	0	0	0	32

6.1.3 Baudrate setting

Baudrate	DIP6	DIP7
9600 bps	0	0
4800 bps	1	0
2400 bps	0	1
1200 bps	1	1

6.1.4 Mode setting

	DIP8	Note: when reset DIP8, have to reset address and baudrate, then the PZ-P32 can work under new mode.
Setting address and baudrate locally	0	
Setting address and baudrate by PC	1	

6.1.5 Data format setting

Format	DIP9	DIP10
10 bits: 1 start, 8 data, 1 stop	0	0
11bits: 1 start, 8 data, 2 stop	1	0
11bits: 1 start, 8 data, even parity, 1 stop	0	1
11bits: 1 start, 8 data, odd parity, 1 stop	1	1

Note: the explanation of DIP: 1(off), 0(on)

6.2 Function data

6.2.1 The return format when receiving error order

PC read (MODBUS 01H/02H)			
Address	Error function	Error data	CRC
Byte	Byte	Byte	Word
XX	XX(Demand code + 08H)	01H, 02H, 03H, 04H	XXXX (CRC value)

Definition of error code

01 error function code

02 error position of data

03 error value

04 the rupture of slave

6.2.2 The 01H/02H function code

PC read (MODBUS 01H/02H)				
Code	Function	Address	Data	CRC
Byte	Byte	Word	Word	Word
XX	XX(01H/02H)	XXXX	XXXX	XXXX (CRC value)

Slave return (MODBUS 01H/02H)				
Code	Function	Data length	Data	CRC
Byte	Byte	Byte	N Byte	Word
XX	XX(01H/02H)	XX	XXXX….	XXXX (CRC value)

Error slave return (MODBUS 81H/82H)			
Code	Error function	Error Data	CRC
Byte	Byte	Byte	Word
XX	XX(81H/82H)	XX(02H error address, 03H error data)	XXXX (CRC value)

6.2.3 The 03H/04H function code

PC read (MODBUS 03H/04H)				
Code	Function	Start address	Data	CRC
Byte	Byte	Word	Word	Word
XX	XX(03H/04H)	XXXX	XXXX (N)	XXXX (CRC value)

Slave return (MODBUS 03H/04H)				
Code	Function	Data length	Data	CRC
Byte	Byte	Byte	2*N Byte	Word
XX	XX(03H/04H)	XX (2*N)	XXXX….	XXXX (CRC value)

Error slave return (MODBUS 83H/84H)			
Code	Error function	Error Data	CRC
Byte	Byte	Byte	Word
XX	XX(83H/84H)	XX(02H error address, 03H error data)	XXXX (CRC value)

6.2.4 The 05H function code

PC read (MODBUS 05H)				
Code	Function	Address	Data	CRC
Byte	Byte	Word	Word	Word
XX	XX(05H)	XXXX	OFF00H or 000H	XXXX (CRC value)

Slave return (MODBUS 05H)				
Code	Function	Data length	Data	CRC
Byte	Byte	Byte	2*N Byte	Word
XX	XX(05H)	XX (as PC read)	XXXX(as PC read)	XXXX (CRC value)

Error slave return (MODBUS 85H)			
Code	Error function	Error Data	CRC
Byte	Byte	Byte	Word
XX	XX(85H)	XX(02H error address, 03H error data)	XXXX (CRC value)

6.2.5 The 06H function code

PC write one data (MODBUS 06H)				
Code	Function	Start Address	Data	CRC
Byte	Byte	Word	Word	Word
XX	XX(06H)	XXXX	XXXX	XXXX (CRC value)

Error Slave return (MODBUS 06H)				
Code	Function	Start Address	Data	CRC
Byte	Byte	Word	Word	Word
XX	XX(06H)	XXXX	XXXX	XXXX (CRC value)

Error slave return (MODBUS 86H)			
Code	Error function	Error Data	CRC
Byte	Byte	Byte	Word
XX	XX(86H)	XX(02H error address, 03H error data, 04H no wrote)	XXXX (CRC value)

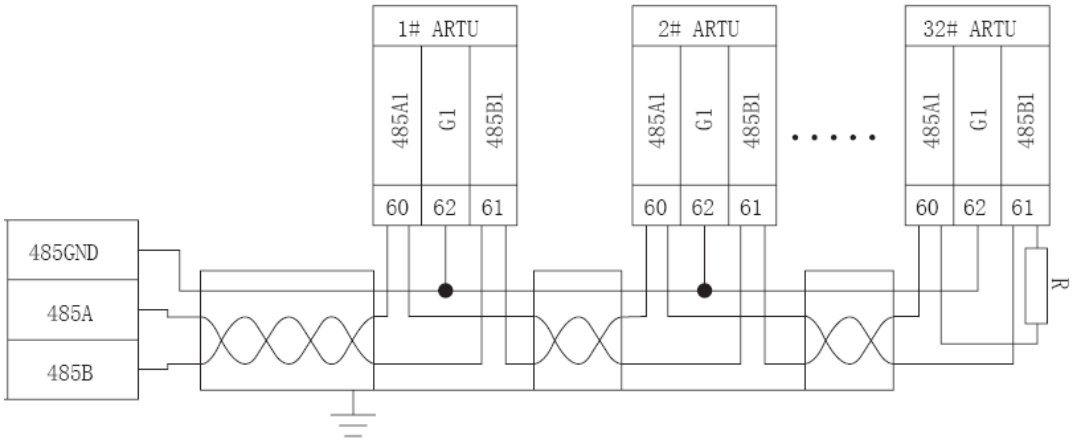
6.2.6 The 10H function code

PC write multi data (MODBUS 16(10H))						
Code	Function	Start Address	Data number	Data length	Data	CRC
Byte	Byte	Word	Word	Byte	2*N bytes	Word
XX	XX(06H)	XXXX	XXXX(n)	XX (2*N)	XXXX	XXXX (CRC value)

Slave return (MODBUS 16(10H))				
Code	Function	Start Address	Data number	CRC
Byte	Byte	Word	Word	Word
XX	XX(10H)	XXXX	XXXX	XXXX (CRC value)

Error slave return (MODBUS 90H)			
Code	Error function	Error Data	CRC
Byte	Byte	Byte	Word
XX	XX(90H)	XX(02H error address, 03H error data, 04H no wrote)	XXXX (CRC value)

6.3 Connection mode:



Note: When in a network, there are several PZ-P32, the connectors A and B of last PZ-P32 have to parallel one terminal R (120ohm~10kohm) to assure suitable communication resistance. According to the wiring, the terminal R is different.
In the schema above, use 3 cores cable, Shield connects GND; the connect G1 of each equipment parallel.

6.4 Adjustment and maintenance

6.4.1 Adjustment

Check whether the wiring is OK;

After powered, the power LED is ON, the running LED is glittering, and the interval is 1s.

Setting communication

Wire RS485 cable and to PC

After PC read the slave according to its address and baudrate, the communication LED glitters. The communication has realized.

6.4.1 Maintenance

Check power cable

Check the power LED on

Check the running LED on. If off, the unit doesn't work

Check the communication LED on.

Set the PC read interval. Because the bus is half-duplex, the PC should be set the suitable read interval, which is defined by the length of demand / answer order and baudrate. If the interval is not good, the communication maybe is not realized.

6.5 Diagram of Unit