DPM-6 Series Communication Protocol (V2.1.0)

1.

1.1 Protocol types: Modbus RTU Protocol

This Protocol apply to communication PAN-GLOBE DPM-6 series meters.

The protocol formulates data exchange mode between meters and host computer

It adopts non-synchronous and master half-duplex for communication, host computer as the main station, instrument as the slave station;and host computer inquire information, instrument response accordingly.

1.2 Physical Layer

Transfer Interface: RS485

Communication Address :1-247 (Max 128 stations in one network)

Baud rate: 9600

Communication Media: Shield twisted-pair

1.3: Data Link Layer

It uses 8-bit binary, each code consists of two hexadecimal characters.

The frame format is: one start bit, 8 data bits, 2 stop bits.

A data packet format is:

Address	Functional Code	Data Code	CRC Vericode
8bits	8bits	n*8bits	16bits

Functional Code Definition

Code	Function definition
03H	Reading one or multi- registers' value
10H	Writing multi-registers' value
06H	Wrirting one register's value

Note:One register accounts for two bytes.

1.4: CRC correction algorithm

The process to generate a CRC :

（1）first write a 16-bit registers (CRC register) into 0FFFFH.

(2) Do XOR operation between the first 8-bits byte in the information packet with the low-bit byte in the CRC,store the result in CRC register.

(3) Move the CRC one bite to the right,fill in "0"for the highest digit,move out and check the minimum digital.

(4) If the out bit is "0", repeat step 3

If the out bit is "1",XOR the CRC register with a fixed value (0A001H).

(5) Repeat steps 3 and 4,until finish 8 shift, thus handling a 8-bit bytes is finished..

(6) Repeat steps 2 and 5 to handle next one 8-bit bytes,until all the bytes are completely handled..

(7) Finally the value of CRC register is the CRC value.

2: Application Layer Function Detailed Annotation

The purpose of the application layer detailed annotation is to define the common format for a specific valid commands. Software programmers can use the following method: Instrument can establish rightly specific application through the agreement.

Communiction Protocol usesthe following format:

SlaveAddress	Functional Code	Address high byte	Address low byte	Data Number high Byte	Data Number low Byte	CRC Low Byte	CRC High Byte
01	03	00	10	00	02	C5	CE

2．1 PC Read Data（Function Code03）

This feature allows the master to read the data the station collected or recorded and instruments' system parameters

The data pack main station sent is as following.

For example: address is 01H, SV address is 00H

Address	Functional Code	Address high byte	Address low byte	Data Number High Byte	Data Number low Byte	CRC Low Byte	CRC High Byte
01	03	00	00	00	02	C4	0B

The data pack salve station response is as following：

Address	Functional Code	Variable Total bytes	Variable High byte	Variable Low byte	Variable High byte	Variable low byte	CRC Low byte	CRC High byte
01	03	04	02	BC	00	00	3A	6F

2.2 Preset multiple registers (Function Code 10H)

This feature allows the master station rewrites 3-byte variable value of the slave station.(Has been chaged to 2-byte, Negative for the 4-byte form of complement)

PC write data Example: Write SV

Slave Address	Functional Code	Address high byte	Address low byte	Variable value Number High byte	variable value Number low byte	variable total byte	Variable value Number High byte	Variable value total byte	Variable value Number High byte	Variable value total byte	CRC high byte	CRC low byte
01	10	00	00	00	02	04	03	E8	00	00	73	DF

The data pack salve station response is as following：

Slave Address	Functional Code	Address high byte	Address low byte	Variable Number High	Variable Number low	CRC Low byte	CRC Hith byte

				byte	byte		
01	10	00	00	00	02	41	C8

2.3 Preset single register (Function Code 06H)

This feature allows the master to rewrite variable value of single byte, because each time send in form of double-byte registers ,fill the high-level 0.

For example: Write CYT

Address	Functional Code	Address high byte	Address low byte	Variable Value High byte	Variable Value Low byte	CRC Low byte	CRC High byte
01	06	00	23	00	09	B8	06

The data pack salve station response is as following：

Slave Address	Functional Code	Address high byte	Address low byte	Variable Value High byte	Variable Value Low byte	CRC Low byte	CRC Hith byte
01	06	00	23	00	09	B8	06

Parameters address distributions

Parameters	address	BYTE	R/W	format
SV	00H	3	R/W	/10
UT	03H	1	R/W	*1
AL1	04H	3	R/W	/10
AL2	08H	3	R/W	/10
AL3	0CH	3	R/W	/10
SV1	10H	3	R/W	/10
ADD	13H	1	R/W	*1
P	14H	333	R/W	/10
I	18H	1	R/W	/10
D	1CH	3	R/W	/10
OUD	1FH	1	R/W	*1
HYS	20H	3	R/W	/10
CYT	23H	1	R/W	*1
HY1	24H	3	R/W	/10
AD1	27H	1	R/W	*1
HY2	28H	3	R/W	/10
AD2	2BH	1	R/W	*1
HY3	2CH	3	R/W	/10
AD3	2FH	1	R/W	*1
P1	30H	3	R/W	/10
I1	34H	3	R/W	/10
D1	38H	3	R/W	/10

CYT1	3BH	1	R/W	*1
OUL	3CH	3	R/W	/10
OUH	40H	3	R/W	/10
LOCK	45H	1	R/W	*1
INP	46H	1	R/W	*1
LSP	48H	3	R/W	/10
USP	4CH	3	R/W	/10
CFA	57H	1	R/W	*1
SFT	58H	1	R/W	*1
DP	5BH	1	R/W	*1
TC	60H	3	R/W	/10
KC	64H	3	R/W	/10
PVOS	70H	3	R/W	/10
BAUD	74H	1	R/W	/10
FLAG	61H	1	R	*1
MV	62H	3	R	/10
R-W	44H	1	R/W	*1
PV	C3H	3	R	/10

Unit comparision table

Item	Hex	symbol	item	Hex	symbol
0	00H	/	1	01H	C
2	02H	F	3	03H	MPA
4	04H	PA	5	05H	PS1
6	06H	KG	7	07H	MMH0
8	08H	MMHG	9	09H	RH
10	OAH	M3H	11	0BH	M3M
12	OCH	LPM	13	0DH	RPM
14	OEH	PPM	15	0FH	O2
16	10H	CO	17	11H	CO2
18	12H	PH	19	13H	LUX
20	14H	KW	21	15H	W
22	16H	MA	23	17H	PF
24	18H	HZ	25	19H	A
26	IAH	V	27	1BH	MILL

Index parameter comparision table

Item	Hex	symbol	Item	hex	Symbol
0	00H	B	1	01H	S
2	02H	R	3	03H	T
4	04H	E	5	05H	J
6	06H	K	7	07H	PT
8	08H	CU	9	09H	LN

10	0AH	W1	11	0BH	W2
12	0CH	N	13	0DH	VA

Note:

Write 01H in R-W Before wirte PV , so that PV can be written into the state system;

Write 00H to the R-W read-only state to allow PV