KPM60 Modbus protocol（V1.2）

Content

1. Function code description

Communication application format description

1.1、Read command Function code 03H

Data frame format for the master to read register N words from the slave (data is hexadecimal):

Slave address	Function code	Start address high bit	Start address low bit	Read register number high bit	Read register number high bit	CRC16 High	CRC16 Low
xxH	03H	xxH	xxH	00H	N	xxH	xxH

Slave response return frame format（data is hexadecimal）:

Slave address	Function code	Return byte number	Byte 1	Byte 2	……	Byte 2N	CRC16 High	CRC16 Low
xxH	03H	2N			……	……	xxH	xxH

1.2、Write command Function code 10H

Function code 16 (decimal) (hexadecimal 10H) allows the user to change the content of multiple registers.

The data frame format for the master to write N words to the slave:

Slave address	Function code	Start address High bit	Start address Low bit	Data counter Hi	Data counter Lo	Bytes counter
xxH	10H	xxH	xxH	00H	N	2N

Data1	Data2	……	Data2N	CRC16 高	CRC16 低
40H	00H	……		xxH	xxH

Preset multi-register query data frame

Response data frame

The normal response to the preset multi-register request is to respond to the machine address, function number, data start address, number of data, and CRC check code after the register value is changed, as the following table:

Slave address	Function code	Start address Hi	Start address Lo	Data counter Hi	Data counter Lo	CRC16 Hi	CRC16 Lo
xxH	10H	xxH	xxH	00H	N	xxH	xxH

Preset multi-register response data frame

1.3 Control-relay control and output status

1.3.1 Relay control（Function code 05H）

Request data frame：

Addr	Fun	DO addr hi	DO addr lo	Value hi	Value lo	CRC16 hi	CRC16 lo
xxH	05H	xx	xx	AAH	55H	xxH	xxH

Response data frame：

Addr	Fun	DO addr hi	DO addr lo	Value hi	Value lo	CRC16 hi	CRC16 lo
xxH	05H	xx	xx	AAH	55H	xxH	xxH

1.3.2. Read relay output status (function code 01H)

Request frame to read the status of Relay 1 to Relay 4.

Addr	Fun	Relay start reg hi	Relay start regs lo	Relay #of reg hi	Relay #of regs lo	CRC16 hi	CRC16 lo
01H	01H	00H	00H	00H	04H	xxH	xxH

Response data frame

Response data frame, the data frame for the slave responds to the master. Contains the slave address, function code, number of data and CRC error check. Each relay status in the data packet occupies one bit (1 = ON, 0 = OFF), and the lowest bit of the first byte is the addressed relay status values, the rest are arranged in the high order, and the useless bits are filled with 0.

Reading digital output status response example

Addr	Fun	Byte count	Data	CRC16 hi	CRC16 lo
01H	01H	01H	03H	11H	89H

Data byte content（Relay1 、Relay2 ON, Relay3 、Relay4 0FF）

7	6	5	4	3	2	1	0
0	0	0	0	0	0	1	1

1.4. Read digital input status（Function code 02H）

Query data frame

This function allows the user to get the ON / OFF status of the digital input DI (1 = ON, 0 = OFF). The data frame also needs to contain the initial address and numbers of DIs to be read except the slave address and function domain.

The following example reads the status of DI1 to DI6 from the address 01 slave.

Addr	Fun	DI start reg hi	DI start	DI num hi	DI num lo	CRC16 hi	CRC16 lo

			regs lo				
01H	02H	xx	xx	00H	06H	xx	xx

Response data frame

The response data frame contains the slave address, function code, number of data, and CRC error check. Each DI in the data frame occupies one bit (1 = ON, 0 = OFF). The DI value is addressed by the lowest bit of first byte , the rest are arranged in order to the higher order, and the useless ones are filled with 0.

The following table shows examples of responses to read digital output states (DI1 = ON, DI2 = ON, DI3 = OFF, DI4 = OFF, DI5 = OFF, DI6 = OFF).

Addr	Fun	Byte count	Data	CRC16 hi	CRC16 lo
01H	02H	01H	03H	E1H	89H

Return byte parsing

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	0	0	0	0	0	1	1

2. MODBUS address

2.1 Time setting

These data can be read by 03 function code, and also can be set by 16 function code.

Address	Parameter	Data range	Data type	Read/Write	Unit
0000H	year	2000~2099	Word	R/W	
0001H	mon	1~12	Word	R/W	
0002H	day	1~31	Word	R/W	
0003H	hour	0~23	Word	R/W	
0004H	min	0~59	Word	R/W	
0005H	sec	0~59	Word	R/W	

2.2 System parameters

These data can be read by 03 function code, and also can be set by 16 function code. (The address 0072H can only be set, and those with read-only marks can only be read with the 03 function code)

Address	Function	Data type	Explanation
0060H	Password protection	Word	0000~9999
0061H	Voltage transformer ratio	Word	1~9999
0062H	Current transformer ratio	Word	1~9999
0063H	Zero-sequence transformer ratio	Word	1~9999
0064H	Motor rated voltage	Word	50~690V
0065H	Motor rated current	Word	50~50000(0.50~500.00A)

0066H	External zero-sequence transformer rating	Word	10~20000(0.01~20.000A)
0067H	Serial baud rate	Word	0：1200bps； 1：2400bps； 2：4800bps； 3：9600bps； 4：19200bps； 5：38400bps；
0068H	MOBUS address	Word	Setting range： 1~247（Modbus-RTU）；
0069H	Run mode	Word	0：Protection mode； 1：Direct start mode 2: Bidirectional reversible startup mode; 3: Star / delta start mode; 4: Automated transformer start
006AH	Operation authority	Word	00 Meter display 01 Remote DI terminal control 02 Remote communication control
006BH	Motor status (read only)	Word	00 ready standby 01 start status 02 running status 03 Stopping cooling status 04 Stopping status
006CH	Fault flag (read only)	DWord	0: No fault Bit0: Startup failure Bit1: Overload fault Bit2: spare Bit3: Stall failure Bit4: Phase failure Bit5: Imbalance fault Bit6: blocking failure Bit7: Ground or leakage fault Bit8: Underload fault Bit9: Overvoltage fault Bit10: Undervoltage fault Bit11: Underpower fault Bit12: TE failure Bit13: Contactor breaking current protection Bit14: spare Bit15: Power factor failure Bit16: External fault

			Bit17: Phase sequence failure Bit18: Temperature failure Bit19: wiring failure
006EH	Protective action mode flag	DWord	Bit0: start protection Bit1: Overload protection Bit2: spare Bit3: Stall protection Bit4: Phase failure protection Bit5: Imbalance protection Bit6: blocking protection Bit7: Ground or leakage protection Bit8: Underload protection Bit9: Overvoltage protection Bit10: Undervoltage protection Bit11: under power protection Bit12: TE protection Bit13: Contactor breaking current protection Bit14: spare Bit15: Power factor protection Bit16: External fault protection Bit17: Phase sequence protection Bit18: Temperature protection Bit19: Wiring protection 0 ----- Corresponding protection item is alarm mode 1 ----- Corresponding protection item is trip mode
0070H	Backlight time	Word	0 ~ 120 minutes, when it is 0, the backlight never goes off.
0071H	Transfer item	Word	An=0:Ia An=1:Ib An=2:Ic An=3:Iav An=4:Ig An=5:Uab An=6:Ubc An=7:Uca An=8:Uav An=9:F An=10:P

0072H	Clear run records Clear power Clear fault records Reset Clear startup record (Write only)		Function code 16 sends 0x5578 to clear power Function code 16 sends 0x5599 to clear the running record Function code 16 sends 0x55BB to clear fault records Function code 16 sends 0xA5CC to restore factory settings Function code 16 sends 0x55AA to clear the start record
0073H	Number of fault records (Read only)	Word	0~10
0074H	Firmware version unit 1 (Read-only)	Word	V1.0：10 Year：13　　2013
0075H	Firmware version unit 2 (Read-only)	Word	Month and date：0122　1 月 22 日
Spare			
0077H	Protector CT primary value and voltage range	Word	High byte：Voltage range 0-----380V 1-----660 Low byte：Current range 0-----5A 1-----25A 2-----32A 3-----100A 4-----150A 5-----250A 6-----400A 7-----500A
0078H	Transmission coefficient	Word	1-100（0.1-10 times）
0079H	Delay start A	Word	0-3000（0-30 seconds）
007AH	Delay start B	Word	0-3000（0-30 seconds）
007BH	External fault terminal level	Word	0- Low level active, high level fault 1- High level active, low level fault
007CH	Wiring check	Word	0- Close 1-Open
007DH	Block additional features options	Word	Bit0: Shield voltage function Bit1: Shield temperature function

			Bit2: Shield transmission function Bit3: Shield leakage function
007EH	CT current threading direction	Word	0：Forward 1：Reverse
007FH	CT threading current phase sequence	Word	0:A-B-C 1:A-C-B 2:B-A-C 3:B-C-A 4:C-A-B 5:C-B-A

2.3 External terminal setting

These data can be read by 03 function code, and also can be set by 16 function code.

Address	Function	Data range	Date type	Explanation
0080H	DI1 terminal anti-shake time	0~9999	Word	0~9.999
0081H	DI2 terminal anti-shake time	0~9999	Word	0~9.999
0082H	DI3 terminal anti-shake time	0~9999	Word	0~9.999
0083H	DI4 terminal anti-shake time	0~9999	Word	0~9.999
0084H	DI5 terminal anti-shake time	0~9999	Word	0~9.999
0085H	DI6 terminal anti-shake time	0~9999	Word	0~9.999
0086H	DI7 terminal anti-shake time	0~9999	Word	0~9.999
0087H	DI8 terminal anti-shake time	0~9999	Word	0~9.999
0088H	Breaker trip pulse time	0~9999	Word	0~9.999
0089H	DI6 terminal programming	0~3	Word	1-General DI 2-External fault 3- Delay start A 4- Delay start B
008AH	DI7 terminal programming	0~3	Word	0- General DI 1- External fault 2- Delay start A 3- Delay start B
008BH	DI8 terminal programming	0~3	Word	0- General DI 1- External fault 2- Delay start A 3- Delay start B

2.4 Measurement parameter area

These data can be read by 03 function code.

Address	Parameter	Data	Data type	Read/write	Unit

		range			
100H	Line voltage Uab		Floating point	R	V
102H	Line voltage Ubc		Floating point	R	V
104H	Line voltage Uca		Floating point	R	V
106H	Phase current Ia		Floating point	R	A
108H	Phase current Ib		Floating point	R	A
10AH	Phase current Ic		Floating point	R	A
10CH	External zero sequence current		Floating point	R	A
10EH	Ground current		Floating point	R	A
110H	Import current		Floating point	R	A
112H	Export current		Floating point	R	A
114H	Heat capacity		Floating point	R	%
116H	System active power		Floating point	R	w
118H	System reactive power		Floating point	R	var
11AH	System apparent power		Floating point	R	VA
11CH	Power factor		Floating point	R	
11EH	System frequency		Floating point	R	HZ
120H	Total active energy		Floating point	R	Kwh
122H	Total reactive energy		Floating point	R	kvarh
124H	Temperature value		Floating point	R	°C

2.5 Protection parameter set value table

These data can be read by 03 function code, and also can be set by 16 function code.

Address	Function	Parameter	Data range	Meaning	Default value
0200H	Start timeout protection	Setting time	1~100s	1 ~ 100s can be set	5s
0201H		Protection method	0~2	0: exit 1: alarm 2: tripping	2
0202H	Overload protection	Heating time constant (Tfr)	3000~60000	30~600 seconds	30000
0203H		Thermal coefficient (Ksr)	10~1000	0.1~10， 0.01	400
0204H		Negative sequence heating coefficient (Kfxfr)	300~1000	3.0~10.0， 0.01	600
0205H		Action mode	0~2	0: exit 1: alarm 2: tripping	2
0206H	spare	Setting value	50~600	50~600% Ie	120

0207H		Set time	10~9999	0.1~99.99S	1000
0208H		bit7 ~ 4	0~1	0: time limit 1: Inverse time limit	0
		Time characteristics	0～2	0: exit 1: alarm 2: tripping	2
0209H	Overcurrent stall protection	Setting value range	50~800	50%~800%Ie 。	600
020AH		Action time	10~6000	0.1s~60	500
020BH		Action mode	0~2	0: exit 1: alarm 2: tripping	2
020CH	Phase failure	Action time	10~2000	0.1~20.00S	400
020DH		Action mode	0~2	0: exit 1: alarm 2: tripping	2
020EH	Current imbalance protection	Setting value range	10~60	Current imbalance rate 10%~60%,	50
020FH		Action time	10~6000	0.1s~60.00s,	500
0210H		Action mode	0~2	0: exit 1: alarm 2: tripping	2
0211H	Blocking protection	Setting value range	50~800	50%Ie~800%Ie	300
0212H		Action time	10~6000	0.1s~60.00s	500
0213H		Protection mode	0~2	0: exit 1: alarm 2: tripping	2
0214H	Earth (Leakage) Protection	Setting value range	20~100	Three-phase vector superposition method （20~100%）Ie, External leakage transformer method （20~100%）Ig	60
0215H		Ground and leakage options		0：Ground 1：Leakage	0
0216H		Action time	10~999	0.1~9.99	50
0217H		Protection mode	0~2	0: exit 1: alarm 2: tripping	1
0218H	Underload protection	Setting value range	20~95	20%~95%Ie	40
0219H		Action time	10~9999	0.1s~99.99s,	1000
021AH		Protection mode	0~2	0: exit	0

				1: alarm 2: tripping	
021BH	Over voltage protection	Overvoltage setting value range	105~150	（100%~150%）Ue	120
021CH		Action time	10~2550	0.1s~25.50s，	500
021DH		Action mode	0~2	0: exit 1: alarm 2: tripping	0
021EH	Under voltage protection	Undervoltage range	50~95	（50%~95%）Ue	70
021FH		Action time	10~2550	0.1s~25.5s，	200
0220H		Action mode	0~2	0: exit 1: alarm 2: tripping	0
0221H	Under power protection	Setting value	20~95	（20%~95%）Pn	40
0222H		Set time	10~9999	0.1s~99.99s，	1000
0223H		Motor rated power	10~30000	(0.1~300.00)KW	3600
0224H		Action mode	0~2	0: exit 1: alarm 2: tripping	0
0225H	TE protection	Setting value	100~1500	1.00~15.00	480
0226H		Protection method	0~2	0: exit 1: alarm 2: tripping	0
0227H	Contactor segmented current protection	Segmented current setting value	600~1000	6~10 Ie	800
0228H		Action mode	0~1	0：Exit； 1：Enable	0
0229H	Under voltage restart	Recovery voltage setting	70~100	（70%~100%）Un	85
022AH		Restart time	50~6000	0.5~60.00S	1000
022BH		Delay start time after voltage recovery	10~30000	0.1～300.00S	500
022CH		Restart enable	0~1	0：Exit； 1：Enable	0
022DH	Power factor protection	Settilng value	10~100	0.1~1	40
022EH		Settilng time	10~6000	0.1~60S	300
022FH		Action mode	0~2	0: exit 1: alarm 2: tripping	0
0230H	External fault	Setting time	10~2500	0.1~25S	10
0231H		spare			

0232H	protection	Action mode	0~2	0: exit 1: alarm 2: tripping	0
0233H	Phase sequence protection	Setting time	10~500	0.1~5	10
0234H		Action mode	0~2	0: exit 1: alarm 2: tripping	0
0235H	Temperatur e protection	Set temperature	200~2000	20~200℃	1000
0236H		spare			
0237H		Action mode	0~1	0：Exit； 1：Enable	0

2.6 Statistical records

These data can be read by 03 function code.

300H	Total trips	0~65536	Word	
301H	Total stop times	0~65536	Word	
302H	Total motor running time	0~4294967295 （seconds）	Four bytes	
304H	Total motor stop time	0~4294967295 （seconds）	Four bytes	
306H	Motor current running time	0~4294967295 （seconds）	Four bytes	
308H	Motor maximum starting current		Floating point	
30AH	Motor current start time		Four bytes	

2.7 Fault record

These data can be read by 03 function code.

400H	Last fault record reason	Bit0~bit7： Fault reason1~20 Bit8~ Bit15： 0：Trip 1：Alarm	Word	
401H	Last fault record year	00~99	Word	
402H	Last fault record month	01~12	Word	
403H	Last fault record day	01~31	Word	
404H	Last fault record hour	00~23	Word	
405H	Last fault record minute	00~59	Word	
406H	Last fault record second+millisecond	00~59999	Word	

407H	Last fault record field current Ia	0~65536	Word	10 times of real value
408H	Last fault record field current Ib	0~65536	Word	10 times of real value
409H	Last fault record field current Ic	0~65536	Word	10 times of real value
40AH	Last fault record field current I0	0~65536	Word	10 times of real value
40BH	Last fault record field voltage Uab	0~65536	Word	10 times of real value
40CH	Last fault record field voltage Ucb	0~65536	Word	10 times of real value
40DH~419H	Last 2nd fault record	Data format is the same as above	Word	
41AH~426H	Last 3rd fault record	Data format is the same as above	Word	
427H~433H	Last 4th fault record	Data format is the same as above	Word	
434H~440H	5th recent fault record	Data format is the same as above	Word	
441H~44DH	6th recent fault record	Data format is the same as above	Word	
44EH~45AH	Last 7th fault record	Data format is the same as above	Word	
45BH~467H	Last 8th fault record	Data format is the same as above	Word	
468H~474H	Ninth recent fault record	Data format is the same as above	Word	
475H~481H	Last 10th fault record	Data format is the same as above	Word	

2.8 Start record

These data can be read by 03 function code.

500H	Last start record Starting method	Bit0~bit7：Control authority； Bit8~ Bit15： Start mode	Word	
501H	Last start record year	00~99	Word	
502H	Last start record month	01~12	Word	
503H	Last start record date	01~31	Word	
504H	Last start record hour	00~23	Word	

505H	Last start record minute	00~59	Word	
506H	Last start record Second + millisecond	00~59999	Word	
507H	Last start use time	0~65536	Word	10 times of real value
508H	Last start maximum current	0~65536	Word	10 times of real value
509H~511H	Last 2nd start record	Data format is the same as above	Word	
512H~51AH	Last 3rd start record	Data format is the same as above	Word	
51BH~523H	Last 4th start record	Data format is the same as above	Word	
524H~52CH	Last 5th start record	Data format is the same as above	Word	
53DH~535H	Last 6th start record	Data format is the same as above	Word	
536H~53EH	Last 7th start record	Data format is the same as above	Word	
53FH~547H	Last 8th start record	Data format is the same as above	Word	
548H~550H	Last 9th start record	Data format is the same as above	Word	
551H~559H	Last 10th start record	Data format is the same as above	Word	

2.9 Control relay output

The control-motor control command code is 05, the following example is to request the address 01 to set the motor to start：

Addr	Fun	DO addr hi	DO addr lo	Value hi	Value lo	CRC16 hi	CRC16 lo
01H	05H	00H	00H	AAH	51H	xxH	xxH

Control motor start / stop data frame

Response data frame：

Addr	Fun	DO addr hi	DO addr lo	Value hi	Value lo	CRC16 hi	CRC16 lo
01H	05H	00H	00H	AAH	51H	xxH	xxH

Response data frame for motor start / stop

Motor control command code

Value	Name Notes
0xAA51	Start A

0xAA52	Start B
0xAA53	Stop
0xAA54	Reset
0xAA55	Manually clearing the heat capacity and resetting the fault relay

Note: The final interpretation right belongs to Henan Compere Smart Technology Co., Ltd.