KPM53 Three-phase Smart Power Meter

MODBUS-RTU Communication Protocol_V1.47

KPM53 three phase smart power meter provides MODBUS-RTU communication protocol, 1 start bit, 8-bit data bits, 1/0 parity bit, 1/2 stop bits, each byte length is 11 bits.

Supported baud rates:：1200bps、2400bps、4800bps、9600bps、19200bps、38400bps。

Factory default communication parameters: ：9600bps, no parity、1 stop bit.

1, Function code instruction

1.1 Read command function code 03H

The host reads the N-word data frame format from the slave (the data is hexadecimal)：

Slave add	Function code	Start add Hi	Start add Lo	reading quantity of data Hi	reading quantity of data Lo	CRC16 Hi	CRC16 Lo
00H	03H	xxH	xxH	00H	xxH	xxH	xxH

Slave add	Function code	Bytes counter	Data0	Data1	……	……	……
00H	03H	N			……	……	……

Slave response return frame format (data is in hexadecimal)：

DataN	CRC16 Hi	CRC16 Lo
	xxH	xxH

1.2 Write command Function code 10H

Query data frame：

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

The host writes the N-word data frame format to the slave:

Slave add	Function code	Start add high	Start add low	Data counter Hi	Data counter Lo	Bytes counter
00H	10H	xxH	xxH	00H	N	2N

Data1	Data2	……	Data2N	CRC16 Hi	CRC16 Lo
40H	00H	……		xxH	xxH

Preset multi-register query data frames

Response data frame：

The normal response to a preset multiple register request is to respond to the machine address, function number, data start address, number of data, and CRC checksum after the register value is changed. The following table.

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

Preset multi-register response data frames

1.3 Status of control and output of control relay

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
01H	05H	xx	xx	FFH	00H	xxH	xxH

Response data frame:

Addr	Fun	DO addr hi	DO addr lo	Value hi	Value lo	CRC16 hi	CRC16 lo
01H	05H	xx	xx	FFH	00H	xxH	xxH

1.3.2Read relay output status (function code 01H)

Request data frame:

Read the status of Relay1.

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	02H	xxH	xxH

Response data frame:

Response Data Frame: The slave responds to the host's data frame. Contains slave address, function code, number of data byte, relay status data, and CRC check. Each relay in the data packet occupies one bit (1 = ON, 0 = OFF). The first bit of the first byte is the lowest byte of the first byte. Address the relay state value, the rest of the order to the high order, useless bits filled with 0.

Read the contents of the 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 Closure）

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

1.4 Reading digital input status (function code 02H)

Request data frame:

Query data frame: This function allows the user to obtain the status of ON / OFF (1 = ON, 0 = OFF) of the switch input DI. In addition to the slave address and the function field, the data frame needs to included the initial address and the number of DIs to be read in the data field.The address of DI starts at 0000H (DI1 = 0000H, DI2 = 0001H ... and so on).

The following example shows the state of the DI1 to DI2 read from the slave address 01

Addr	Fun	DI start reg hi	DI start regs lo	DI num hi	DI num lo	CRC16 hi	CRC16 lo
01H	02H	00H	00H	00H	02H	xx	xx

Response data frame:

The response contains the slave address, function code, number of data, packet and CRC check, each bit in the packet occupies one bit (1 = ON, 0 = OFF), the least significant bit of the first byte is the addressed DI1 value. The rest are arranged in order of high, and the unused bits are filled with 0.

The following table shows an example of reading the digital output status (DI1=ON, DI2=ON).

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

Data

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

2, Status of digital input DI

This area is the current digital input DI state, the user can read the Modbus protocol 02H function code.

Address	Parameter	Numerical range	Data type	Attributes
0000H	DI1	1=ON，0=OFF	Bit	R
0001H	DI2	1=ON，0=OFF	Bit	R

3, **Relay output status**

This area stores relay status. Users can use the function code 01H of Modbus protocol to read the current status and use 05H function code to control the output. Note that control relay 0x0000 is a relay, 0xFF55 relay.

Address	Parameter	Numerical range	Data type	Attributes
0000H	Relay1	1=ON，0=OFF	Bit	R/W
0001H	Relay2	1=ON，0=OFF	Bit	R/W

4, System parameter area

This area stores system parameters related to equipment operation, including communication parameters, wiring modes, I/O settings, etc., which can be read by using the Modbus protocol 03H function code or using the 10H function code setting.

Address	Parameter	Numerical range	Data type
0000H	Protection password	0~9999	Word
0001H	Modbus address	Modbus address：1~247	Word
0002H	Serial port 1 baud rate and check mode	Baud rate (BIT0~7)： 0：1200bps 1：2400bps 2：4800bps 3：9600bps 4：19200bps 5：38400bps Data Format (BIT8~15)： 0: 8,1,n （No check） 1: 8,1,even （Even parity） 2: 8,1,odd （Odd parity）	
0003H	Serial port 2 baud rate and check mode	Baud rate (BIT0~7)： 0：1200bps 1：2400bps 2：4800bps 3：9600bps 4：19200bps 5：38400bps Data Format (BIT8~15)： 0: 8,1,n （No check） 1: 8,1,even （Even parity） 2: 8,1,odd （Odd parity）	Word
0004H	Voltage transformation ratio	0~9999	Word
0005H	Current ratio	0~9999	Word
0006H	Wiring	0~2 0:3LN 3CT three-phase four-wire 1:2LL 2CT three-phase three-wire 2CT 2:2LL 3CT three-phase three-wire 3CT	Word
0007H	Transmission settings	0~25 (three-phase four-wire) are three-phase voltage, three-phase current, three-phase line	Word

		voltage, active power, reactive power, apparent power, power factor and frequency. 0~10 (three-phase three-wire) are three-phase line pressure, three-phase current, total active power, total reactive power, total apparent power, power factor and frequency.	
0008H	Backlighting time	0~120（minutes）	Word
0009H	Reserved	1~30（minutes）Sliding block method	Word
000AH	Max and min clearance	0: never clear 1: daily clear, 2: Clear month	Word
000BH			Word
000CH	Clear the max/min value	Enter the 0xAA78 command to immediately clear the maximum and minimum values。	
000DH	Clear all electrical energy	Enter 0x5578 command to clear the power immediately	Word
000EH	Device fault indication	0: No fault 1: Faulty Bit0: Clock failure Bit1: Ferroelectric data failure	Word

5, System Time Statistics Area

The statistics of the running time of the storage system in the region and the statistics of the system load time. These data can be read using the Modbus protocol 03H function code. The data format is unsigned 32-bit integer data.

Address	Parameter	Data type	Unit
0012H	System running time statistics.	unsigned int	min
0014H	System load time statistics	unsigned int	min

6, Clock parameter area

This area stores the calendar clock parameters that can be read using the Modbus protocol 03H function code, which can be set using the 16-function code.

Address	Parameter	Numerical range	Data type
0020H	year	2000~2099	Word
0021H	mon	1~12	Word
0022H	day	1~31	Word
0023H	hour	0~23	Word
0024H	min	0~59	Word
0025H	sec	0~59	Word

7, Basic Measurement Parameters Area

Basic measurement area, mainly measuring basic voltage, current, power, power factor, etc.; Sequential quantity and unbalance analysis, an important parameter to measure power quality when the voltage and current in the power grid are unbalanced, voltage and current unbalance degree is negative sequence / Positive sequence. The zero-sequence voltage and current can reflect the neutral current and the neutral voltage.

The calculation of demand is calculated using the sliding block method, which is to set a window time, that is, the calculation period of the demand. The window is slid every 1 minute, and the demand value is updated once.

All parameters in this area are real-time measurement parameters and are read using the Modbus protocol 03H function code. The data format is floating-point data, and the data in this area has been multiplied by the transformation ratio.

Address	Parameter	Data type	Unit
0030H	Phase voltage Ua	Floating point	V
0032H	Phase voltage Ub	Floating point	V
0034H	Phase voltage Uc	Floating point	V
0036H	Line voltage Uab	Floating point	V
0038H	Line voltage Ubc	Floating point	V
003AH	Line voltage Uca	Floating point	V
003CH	Phase current Ia	Floating point	A
003EH	Phase current Ib	Floating point	A
0040H	Phase current Ic	Floating point	A
0042H	Split-phase active power Pa	Floating point	W
0044H	Split-phase active power Pb	Floating point	W
0046H	Split-phase active power Pc	Floating point	W
0048H	System active power Psum	Floating point	W
004AH	Split-phase reactive power Qa	Floating point	var
004CH	Split-phase reactive power Qb	Floating point	var
004EH	Split-phase reactive power Qc	Floating point	var
0050H	System reactive power Qsum	Floating point	var
0052H	Split-phase apparent power Sa	Floating point	VA
0054H	Split-phase apparent power Sb	Floating point	VA
0056H	Split-phase apparent power Sc	Floating point	VA
0058H	System apparent power Ssum	Floating point	VA
005AH	Split-phase power factor PF1	Floating point	
005CH	Split-phase power factor PF2	Floating point	
005EH	Split-phase power factor PF3	Floating point	
0060H	System power factor PF	Floating point	
0062H	System frequency F	Floating point	HZ

0064H	Reserved		
0066H	Reserved		
0068H	Reserved		
006AH	Reserved		
006CH	Voltage unbalance Yv	Floating point	%
006EH	Current imbalance Yi	Floating point	%
0070H	Reserved		
0072H	Reserved		
0074H	Reserved		
0076H	Temperature	Floating point	℃
0078H	Three-phase average phase voltage	Floating point	V
007AH	Three-phase average line voltage	Floating point	V
007EH	Zero-sequence voltage value U0	Floating point	V
0080H	Zero-sequence current value I0	Floating point	A

8, Power quality measurement parameter area

The device measurement includes total distortion rate, 2~31th harmonic content rate, odd number distortion rate, even number distortion rate, crest factor and K coefficient. This data is enlarged 1000 times. If it is data 185, the awareness is 18.5%.

The data can be read using the Modbus protocol 03H function code.

Address	Parameter	Numerical range	Instructions	Data type
0100H	UA or UAB Total Harmonic Distortion Rate THD_V1	0~1000	0~100.0%	Word
0101H	UB or UBC total harmonic content（THD_V2）	0~1000	0~100.0%	Word
0102H	UC or UCA total harmonic content（THD_V3）	0~1000	0~100.0%	Word
0103H	Ua or Uab even harmonic distortion	0~1000	0~100.0%	Word
0104H	Ua or Uab odd harmonic distortion	0~1000	0~100.0%	Word
0105H	Ub even harmonic distortion rate	0~1000	0~100.0%	Word
0106H	Ub odd harmonic distortion rate	0~1000	0~100.0%	Word
0107H	Uc or Ubc even harmonic distortion rate	0~1000	0~100.0%	Word
0108H	Uc or Ubc odd harmonic distortion rate	0~1000	0~100.0%	Word
0109H	Ia Total Harmonic Distortion Rate THD_I1	0~1000	0~100.0%	Word
010AH	Ib Total Harmonic Distortion Rate THD_I2	0~1000	0~100.0%	Word
010BH	Ic Total Harmonic Distortion Rate THD_I3	0~1000	0~100.0%	Word
010CH	I1 even harmonic distortion rate	0~1000	0~100.0%	Word
010DH	I1 odd harmonic distortion	0~1000	0~100.0%	Word
010EH	I2 even harmonic distortion rate	0~1000	0~100.0%	Word
010FH	I2 odd harmonic distortion	0~1000	0~100.0%	Word
0110H	I3 even harmonic distortion rate	0~1000	0~100.0%	Word
0111H	I3 odd harmonic distortion	0~1000	0~100.0%	Word

0112H	Va or Vab Crest factor	0~65535	65.535	Word
0113H	Vb or Vbc Crest factor	0~65535	65.535	Word
0114H	Vc or Vbc Crest factor	0~65535	65.535	Word
0115H	Ia K factor	0~65535	65.535	Word
0116H	Ib K factor	0~65535	65.535	Word
0117H	Ic K factor	0~65535	65.535	Word
0120H~013DH	Ua or Uab harmonic content ratio（2-31st harmonics）	0~1000	0~100.0%	Word
015EH~017BH	Ub harmonic content ratio（2-31st harmonics）	0~1000	0~100.0%	Word
019CH~01B9H	Uc or Ucb harmonic content ratio（2-31st harmonics）	0~1000	0~100.0%	Word
01DAH~01F7H	Ia harmonic content ratio（2-31st harmonics））	0~1000	0~100.0%	Word
0218H~0235H	Ib harmonic content ratio（2-31st harmonics）	0~1000	0~100.0%	Word
0256H~0273H	Ic harmonic content ratio（2-31st harmonics））	0~1000	0~100.0%	Word

9, Angle measurement

The phase angle difference is Ub, Uc, and the phase relationship between current and Ua. The angle is from 0 to 360.0. This function can help the user to connect, prevent the user from connecting the wrong line, but also can directly reflect the angle relationship between the voltage and current of the grid. Because the three-phase three-wire and three-phase four-wire connection are different, the reference input voltage is not the same, so the protocol specifically separates the two connection mode data. Users can read different data ranges according to the connection mode.

The data can be read using the Modbus protocol 03H function code.

Address	Parameter	Numerical range	Instructions	Data type
0300H	Ub phase angle difference with respect to Ua	0~3600	Three-phase four-wire：0~360.0°	Word
0301H	Uc phase angle difference with respect to Ua	0~3600	Three-phase four-wire：0~360.0°	Word
0302H	Phase angle difference between Ia and Ua	0~3600	Three-phase four-wire：0~360.0°	Word
0303H	Phase angle difference between Ib and Ua	0~3600	Three-phase four-wire：0~360.0°	Word
0304H	Phase angle difference between Ic and Ua	0~3600	Three-phase four-wire：0~360.0°	Word
0305H	Ubc phase angle difference relative to Uab	0~3600	Three-phase three-wire：0~360.0°	Word
0306H	Phase angle difference between Ia and Uab	0~3600	Three-phase three-wire：0~360.0°	Word
0307H	Phase angle difference between Ib and Uab	0~3600	Three-phase three-wire：0~360.0°	Word
0308H	Phase angle difference between Ic and Uab	0~3600	Three-phase three-wire：0~360.0°	Word

10, Maximum and minimum statistics area

This area statistics the maximum and minimum voltage current, power, power factor, power demand, frequency, voltage and current imbalance. And the statistical period can be set to "Month Clear", "Day Clear", "Never Clear". Set to "Month Clear", which is the start time of the month, the maximum and minimum values are cleared and re-compared; "Daily Clear" is the zero hour of each day, the maximum and minimum values are cleared and re-compared; "Never Clear" is the highest value if not Manually clear, the value is always compared.

This area stores the maximum and minimum values of important parameters and their time stamps. The data can be read using the Modbus protocol 03H function code.

Address	Parameter	Numerical range	Instructions	Unit
0320H	Ua max		Floating point	V
0322H	Occurred moments of Ua max 2C66	Year：2000~2099	Word	
0323H		Month：1~12	Word	
0324H		Day：1~31	Word	
0325H		Hour：0~23	Word	
0326H		Minute：0~59	Word	
0327H		Second+millisecond：0~59999	Word	
0328H	Ub max		Floating point	V
032AH~032FH	Occurred moments of Ub max	Same as Ua time format	Word	
0330H	Uc max		Floating point	V
0332H~0337H	Occurred moments of Uc max	Same as Ua time format	Word	
0338H	Uab max		Floating point	V
033AH~033FH	Occurred moments of Uab max	Same as Ua time format		
0340H	Ubc max		Floating point	V
0342H~0347H	Occurred moments of Ubc max	Same as Ua time format		
0348H	Uca max		Floating point	V
034AH~034FH	Occurred moments of Uca max	Same as Ua time format		
0350H	Ia max		Floating point	A
0352H~0357H	Occurred moments of Ia max	Same as Ua time format		
0358H	Ib max Ib		Floating point	A
035AH~035FH	Occurred moments of Ib max	Same as Ua time format		
0360H	Ic max		Floating point	A
0362H~0367H	Occurred moments of Ic max	Same as Ua time format		
0368H	System active power maximum		Floating point	W
036AH~036FH	Occurred moments of P max	Same as Ua time format		
0370H	System reactive power maximum		Floating point	var
0372H~0377H	Occurred moments of Q max	Same as Ua time format		
0378H	System apparent power maximum		Floating point	VA
037AH~037FH	Occurred moments of S max	Same as Ua time format		
0380H	System power factor maximum		Floating point	
0382H~0387H	Occurred moments of PF max	Same as Ua time format		
0388H	Frequency maximum		Floating point	Hz
038AH~038FH	Occurred moments of F max	Same as Ua time format		
0390H	Maximum voltage imbalance			%
0392H~0397H	The moment of maximum voltage imbalance occurs	Same as Ua time format		

0398H	Current imbalance maximum			%
039AH~039FH	The moment of maximum current imbalance occurs	Same as Ua time format		
03A0H	Reserved			
03A2H~03A7H	Reserved			
03A8H	Reserved			
03AAH~03AFH	Reserved			
03B0H	Reserved			
03B2H~03B7H	Reserved			
03B8H	Temperature maximum		Floating point	℃
03BAH~03BFH	Occurred moments of temperature max	Same as Ua time format		
The following is the minimum record				
03C0H	Ua min		Floating point	V
03C2H~03C7H	Occurred moments of Ua min			
03C8H	Ub min		Floating point	V
03CAH~03CFH	Occurred moments of Ub min	Same as Ua time format	Word	
03D0H	Uc min		Floating point	V
03D2H~03D7H	Occurred moments of Uc min	Same as Ua time format	Word	
03D8H	Uab min		Floating point	V
03DAH~03DFH	Occurred moments of Uab min	Same as Ua time format		
03E0H	Ubc min		Floating point	V
03E2H~03E7H	Occurred moments of Ubc min	Same as Ua time format		
03E8H	Uca min		Floating point	V
03EAH~03EFH	Occurred moments of Uca min	Same as Ua time format		
03F0H	Ia min		Floating point	A
03F2H~03F7H	Occurred moments of Ia min	Same as Ua time format		
03F8H	Ib min Ib		Floating point	A
03FAH~03FFH	Occurred moments of Ib min	Same as Ua time format		
0400H	Ic min		Floating point	A
0402H~0407H	Occurred moments of Ic min	Same as Ua time format		
0408H	System active power minimum		Floating point	W
040AH~040FH	Occurred moments of P min	Same as Ua time format		
0410H	System reactive power minimum		Floating point	var
0412H~0417H	Occurred moments of Q min	Same as Ua time format		
0418H	System apparent power minimum		Floating point	VA
041AH~041FH	Occurred moments of S min	Same as Ua time format		
0420H	System power factor minimum		Floating point	
0422H~0427H	Occurred moments of PE min	Same as Ua time format		
0428H	Frequency minimum		Floating point	Hz
042AH~042FH	Occurred moments of F min	Same as Ua time format		
0430H	Voltage imbalance minimum			%
0432H~0437H	The moment of voltage imbalance occurs	Same as Ua time format		

0438H	Current imbalance minimum			%
043AH~043FH	Occurred moments of current imbalance minimum	Same as Ua time format		
0440H	Reserved			
0442H~0447H	Reserved			
0448H	Reserved			
044AH~044FH	Reserved			
0450H	Reserved			
0452H~0457H	Reserved			
0458H	Temperature minimum		Floating point	℃
045AH~045FH	Occurred moments of temperature min	Same as Ua time format		

11, Relay settings

When DI is turned on, the software can design the anti-shake time and the relay pulse output width can be set. Only when the relay is set to remote control mode and the output type is pulse output, other modes are invalid.

Can use Modbus protocol 03H function code reading, or use 10H function code settings.

Address	Parameter	Explanation of meaning	Defaults	Data type
0460H	Switch input 1 anti-shake time	0~9999 mS(system default 20ms)	20	Word
0461H	Switch input 2 anti-shake time	0~9999 mS(system default 20ms)	20	Word
0462H	Reserved			
0463H	Reserved			
0464H	Relay 1 pulse output width	50~9999，(additional 1 number is 1mS)	200	Word
0465H	Relay 2 pulse output width	50~9999，(Each additional number is 1mS,)	200	Word
0466H	Reserved			
0467H	Reserved			
0468H	Relay remote control method	Bit0~1 Corresponds to the 1st to 2th relay output patterns 0-Remote control method。 1-Alarm method	0	Word
0469H	Relay Switch output method	Bit0~1Corresponds to the 1st to 3th relay output patterns 0 — Pulse output 1 — Level output	0	Word

12, Alarm event function

The device has 8 sets of alarm records. Each alarm set can be output to the relay. Note that the relay must be set to the alarm mode to be effective. If the relay is set to pulse mode, the relay will operate relays and relays in a pulse mode after the alarm occurs. If this alarm condition is established, only one pulse is output. If the alarm condition is not established, the alarm will be resumed. . If the relay is opened in a level output mode, the alarm condition is established and the relay is always output. Once the alarm condition is not established, the relay returns to the open state.

The corresponding parameters of the alarm measured parameters are as follows：

No.	Corresponding parameters
0~35	The basic measurement parameter data corresponding to this group of coefficients

Can use Modbus protocol 03H function code reading, or use 10H function code settings.

Address	Parameter	**Explanation of meaning**	**Numerical range**	**Defaults**	**Data type**
0470H	Whether the alarm group is closed	Bit0~bit8 One alarm group per bit 0：Close 1：Open		0	
0471H	Alarm group and DO1 relay (this relay must be set to alarm is valid)	Bit0~bit8 One alarm group per bit 0：Close 1：Open		0	
0472H	Alarm group and DO2 relay (this relay must be set to alarm is valid)	Bit0~bit8 One alarm group per bit 0：Close 1：Open		0	
0473H	Reserved				
0474H	Reserved				
0475H	Alarm group delay	0~999S	0~999S	0	Word
0476H	Group 1：Parameter no.	Check record table meaning (increase temperature alarm)	0~36	0	Word
0477H	Group 1：Setting value	Related to specific parameters			Floating point
0479H	Group 1：Comparison method	0：Less than，Lower limit of judgment 1: More than，Upper limit of judgment	0~1	1	Word
047AH	Group 2：Parameter no.	Check record table meaning	0~36	0	Word
047BH	Group 2：Setting value	Related to specific parameters			Floating point
047DH	Group 2：Comparison method	0：Less than，Lower limit of judgment 1: More than，Upper limit of judgment	0~1	1	Word
047EH	Group 3：Parameter no.	Check record table meaning	0~36	0	Word
047FH	Group 3：Setting value	Related to specific parameters			Floating point
0481H	Group 3：Comparison method	0：Less than，Lower limit of judgment 1: More than，Upper limit of judgment	0~1	1	Word
0482H	Group 4：Parameter no.	Check record table meaning	0~36	0	Word
0483H	Group 4：Setting value	Related to specific parameters			Floating point

0485H	Group 4：Comparison method	0：Less than，Lower limit of judgment 1: More than，Upper limit of judgment	0~1	1	Word
0486H	Group 5：Parameter no.	Check record table meaning	0~36	0	Word
0487H	Group 5：Setting value	Related to specific parameters			Floating point
0489H	Group 5：Comparison method	0：Less than，Lower limit of judgment 1: More than，Upper limit of judgment	0~1	1	Word
048AH	Group 6：Parameter no.	Check record table meaning	0~36	0	Word
048BH	Group 6：Setting value	Related to specific parameters			Floating point
048DH	Group 6：Comparison method	0：Less than，Lower limit of judgment 1: More than，Upper limit of judgment	0~1	1	Word
048EH	Group 7：Parameter no.	Check record table meaning	0~36	0	Word
048FH	Group 7：Setting value	Related to specific parameters			Floating point
0491H	Group 7：Comparison method	0：Less than，Lower limit of judgment 1: More than，Upper limit of judgment	0~1	1	Word
0492H	Group 8：Parameter no.	Check record table meaning	0~36	0	Word
0493H	Group 8：Setting value	Related to specific parameters			Floating point
0495H	Group 8：Comparison method	0：Less than，Lower limit of judgment 1: More than，Upper limit of judgment	0~1	1	Word

13. Electric metrics parameter area

Parametes in this area are the cumulative energy, which can be read using the Modbus protocol 03H function code.

Address	**Parameter**	**Numerical range**	**Data type**	**Unit**	
Four-quadrant electrical energy					
0580H	Total import active energy		Floating point	kWh	
0582H	Total export active energy		Floating point	kWh	
0584H	Total inductive reactive energy		Floating point	kvarh	
0586H	Total capacitive reactive energy		Floating point	kvarh	
Total Time Period Energy					
0588H	Total active energy		Floating point	kWh	
058AH	Total reactive energy		Floating	kvarh	
Phase energy metering					
05E0H	Phase A import active energy		Floating point	kwh	
05E2H	Phase A export active energy		Floating point	kwh	
05E4H	Phase A import reactive energy		Floating point	kvarh	
05E6H	Phase A export reactive energy		Floating point	kvarh	
05E8H	Phase B import active energy		Floating point	kwh	

05EAH	Phase B export active energy		Floating point	kwh	
05ECH	Phase B import reactive energy		Floating point	kvarh	
05EEH	Phase B export reactive energy		Floating point	kvarh	
05F0H	Phase C import active energy		Floating point	kwh	
05F2H	Phase C export active energy		Floating point	kwh	
05F4H	Phase C import reactive energy		Floating point	kvarh	
05F6H	Phase C export reactive energy		Floating point	kvarh	

Annex

Transfer project:

3 phase 4 wire			**3 phase 3 wire**	
0	**Ua**		**0**	**Uab**
1	**Ub**		**1**	**Ubc**
2	**Uc**		**2**	**Uca**
3	**Ia**		**3**	**Ia**
4	**Ib**		**4**	**Ib**
5	**Ic**		**5**	**Ic**
6	**Uab**		**6**	**PS**
7	**Ubc**		**7**	**QS**
8	**Uca**		**8**	**SS**
9	**Pa**		**9**	**PFs**
10	**Pb**		**10**	**F**
11	**Pc**			
12	**Ps**			
13	**Qa**			
14	**Qb**			
15	**Qc**			
16	**Qs**			
17	**Sa**			
18	**Sb**			
19	**Sc**			
20	**Ss**			
21	**PFa**			
22	**Pfb**			
23	**PFc**			
24	**PFs**			
25	**F**			

Instruction: $P=(P_x-12)\times P_e \times CT \times PT / 8$

Px is the measured value of analog, Unit: ***mA***;

Pe is the corresponding rated power value，Unit: ***W***

Different voltage levels correspond to different PE values, as follows:

200V/5A：*Pe*=3000W

200V/1A：*Pe*=600W

100V/5A：*Pe*=1500W

100V/1A：*Pe*=300W

Active power and reactive power follow the power curve