Measuring class parameter [Floating point format data]

Input Register Parameter [Function code : 04H]				Register Address [Hex]	
Description	**Length (bytes)**	**Data Format**	**Units**	**High Byte**	**Low Byte**
Phase 1 line to neutral volts.	4	Float	V	00	00
Phase 2 line to neutral volts.	4	Float	V	00	02
Phase 3 line to neutral volts.	4	Float	V	00	04
Phase 1 current.	4	Float	A	00	06
Phase 2 current.	4	Float	A	00	08
Phase 3 current.	4	Float	A	00	0A
Phase 1 active power.	4	Float	W	00	0C
Phase 2 active power.	4	Float	W	00	0E
Phase 3 active power.	4	Float	W	00	10
Phase 1 reactive power.	4	Float	var	00	12
Phase 2 reactive power.	4	Float	var	00	14
Phase 3 reactive power.	4	Float	var	00	16
Phase 1 apparent power.	4	Float	VA	00	18
Phase 2 apparent power.	4	Float	VA	00	1A
Phase 3 apparent power.	4	Float	VA	00	1C
Phase 1 power factor (1).	4	Float	None	00	1E
Phase 2 power factor (1).	4	Float	None	00	20
Phase 3 power factor (1).	4	Float	None	00	22
Phase 1 phase angle.	4	Float	Degrees	00	24
Phase 2 phase angle.	4	Float	Degrees	00	26
Phase 3 phase angle.	4	Float	Degrees	00	28
Line 1 to Line 2 volts.	4	Float	V	00	2A
Line 2 to Line 3 volts.	4	Float	V	00	2C
Line 3 to Line 1 volts.	4	Float	V	00	2E
Frequency of supply voltages.	4	Float	Hz	00	30
Total system active power.	4	Float	W	00	32
Total system reactive power.	4	Float	var	00	34
Total system apparent power.	4	Float	VA	00	36
Total system power factor (1).	4	Float	None	00	38
Total system phase angle.	4	Float	Degrees	00	3A
Sum of line currents.	4	Float	A	00	3C
Average line to neutral volts.	4	Float	V	00	3E
Average line to line volts.	4	Float	V	00	40
Average line current.	4	Float	A	00	42
Neutral current.	4	Float	A	00	44
Nature of L1 load (Resistive=1, inductive=2, capacitive =3, Non Load=4)	4	Float	None	00	4E
Nature of L2 load (Resistive=1, inductive=2, capacitive =3, Non Load=4)	4	Float	None	00	50

Nature of L3 load (Resistive=1, inductive=2, capacitive =3, Non Load=4)	4	Float	None	00	52
Nature of the system load(Resistive=1, inductive=2, capacitive =3, Non Load=4)	4	Float	None	00	54
Phase 1 voltage THD (2).	4	Float	%	00	7C
Phase 2 voltage THD (2).	4	Float	%	00	7E
Phase 3 voltage THD (2).	4	Float	%	00	80
Phase 1 current THD	4	Float	%	00	82
Phase 2 current THD	4	Float	%	00	84
Phase 3 current THD	4	Float	%	00	86
Average voltage THD (2).	4	Float	%	00	88
Average line current THD.	4	Float	%	00	8A
Total system active power demand (3).	4	Float	W	00	8C
Total system reactive power demand (3).	4	Float	var	00	8E
Total system apparent power demand.	4	Float	VA	00	90
Phase 1 current demand.	4	Float	A	00	92
Phase 2 current demand.	4	Float	A	00	94
Phase 3 current demand.	4	Float	A	00	96
Neutral current demand.	4	Float	A	00	98
Import active power demand	4	Float	W	00	9A
Export active power demand	4	Float	W	00	9C
Maximum total system active power demand (3).	4	Float	W	00	A2
Maximum total system reactive power demand (3).	4	Float	var	00	A4
Maximum total system apparent power demand.	4	Float	VA	00	A6
Maximum phase 1 current demand.	4	Float	A	00	A8
Maximum phase 2 current demand.	4	Float	A	00	AA
Maximum phase 3 current demand.	4	Float	A	00	AC
Maximum neutral current demand.	4	Float	A	00	AE
Maximum import active power demand	4	Float	W	00	B0
Maximum export active power demand	4	Float	W	00	B2
Total import active energy.	4	Float	kWh	05	00
Total export active energy.	4	Float	kWh	05	02
Total active Energy.	4	Float	kWh	05	04
Total import reactive energy.	4	Float	kvarh	05	08
Total export reactive energy.	4	Float	kvarh	05	0A
Total reactive Energy.	4	Float	kvarh	05	0C
Total apparent energy.	4	Float	kVAh	05	10
L1 import active Energy	4	Float	kWh	05	14
L2 import active Energy	4	Float	kWh	05	16
L3 import active Energy	4	Float	kWh	05	18
L1 export active Energy	4	Float	kWh	05	1A
L2 export active Energy	4	Float	kWh	05	1C
L3 export active Energy	4	Float	kWh	05	1E
L1 total active Energy	4	Float	kWh	05	20

L2 total active Energy	4	Float	kWh	05	22
L3 total active Energy	4	Float	kWh	05	24
L1 import reactive energy	4	Float	kvarh	05	26
L2 import reactive energy	4	Float	kvarh	05	28
L3 import reactive energy	4	Float	kvarh	05	2A
L1 export reactive energy	4	Float	kvarh	05	2C
L2 export reactive energy	4	Float	kvarh	05	2E
L3 export reactive energy	4	Float	kvarh	05	30
L1 total reactive energy	4	Float	kvarh	05	32
L2 total reactive energy	4	Float	kvarh	05	34
L3 total reactive energy	4	Float	kvarh	05	36

Notes:

1. The power factor has its sign adjusted to indicate the direction of the current. Positive refers to forward current, negative refers to reverse current.
2. In 3P3W mode, L1 represents the line voltage THD of L1-2, L2 represents the line voltage harmonic content of L2-3, and L3 represents the Line voltage THD of L3-1. In 3P4W, 1P2W, 1P3W and other modes, L1, L2 and L3 respectively represent the corresponding phase voltage harmonic content.
3. The power sum demand calculation is for import – export.

Measuring class parameter [Integer format data]

Holding Register Parameter [Read : Function code : 03H]				**Register Address [Hex]**	
Description	**Length (bytes)**	**Data Format**	**Units**	**High Byte**	**Low Byte**
Phase 1 line to neutral volts.	4	ULONG	0.01V	00	00
Phase 2 line to neutral volts.	4	ULONG	0.01V	00	02
Phase 3 line to neutral volts.	4	ULONG	0.01V	00	04
Phase 1 current.	4	ULONG	0.001A	00	06
Phase 2 current.	4	ULONG	0.001A	00	08
Phase 3 current.	4	ULONG	0.001A	00	0A
Phase 1 active power.	4	LONG	0.001kW	00	0C
Phase 2 active power.	4	LONG	0.001kW	00	0E
Phase 3 active power.	4	LONG	0.001kW	00	10
Phase 1 reactive power.	4	LONG	0.001kvar	00	12
Phase 2 reactive power.	4	LONG	0.001kvar	00	14
Phase 3 reactive power.	4	LONG	0.001kvar	00	16
Phase 1 apparent power.	4	ULONG	0.001kVA	00	18
Phase 2 apparent power.	4	ULONG	0.001kVA	00	1A
Phase 3 apparent power.	4	ULONG	0.001kVA	00	1C
Phase 1 power factor (1).	2	INT	0.001	00	1E
Phase 2 power factor (1).	2	INT	0.001	00	1F
Phase 3 power factor (1).	2	INT	0.001	00	20
Phase 1 phase angle.	2	INT	0.01°	00	21
Phase 2 phase angle.	2	INT	0.01°	00	22

Phase 3 phase angle.	2	INT	0.01°	00	23
Line 1 to Line 2 volts.	4	ULONG	0.01V	00	24
Line 2 to Line 3 volts.	4	ULONG	0.01V	00	26
Line 3 to Line 1 volts.	4	ULONG	0.01V	00	28
Frequency of supply voltages.	2	UINT	0.01Hz	00	2A
Total system active power.	4	LONG	0.001kW	00	2C
Total system reactive power.	4	LONG	0.001kvar	00	2E
Total system apparent power.	4	ULONG	0.001kVA	00	30
Total system power factor (1).	2	INT	0.001	00	32
Total system phase angle.	2	INT	0.01°	00	33
Sum of line currents.	4	ULONG	0.001A	00	34
Average line to neutral volts.	4	ULONG	0.01V	00	36
Average line to line volts.	4	ULONG	0.01V	00	38
Average line current.	4	ULONG	0.001A	00	3A
Neutral current.	4	ULONG	0.001A	00	3C
Nature of L1 load (Resistive=1, inductive=2, capacitive =3, Non Load=4)	2	UINT	None	00	46
Nature of L2 load (Resistive=1, inductive=2, capacitive =3, Non Load=4)	2	UINT	None	00	47
Nature of L3 load (Resistive=1, inductive=2, capacitive =3, Non Load=4)	2	UINT	None	00	48
Nature of the system load(Resistive=1, inductive=2, capacitive =3, Non Load=4)	2	UINT	None	00	49
Phase 1 voltage THD (2).	2	UINT	0.01%	00	5D
Phase 2 voltage THD (2).	2	UINT	0.01%	00	5E
Phase 3 voltage THD (2).	2	UINT	0.01%	00	5F
Phase 1 current THD	2	UINT	0.01%	00	60
Phase 2 current THD	2	UINT	0.01%	00	61
Phase 3 current THD	2	UINT	0.01%	00	62
Average voltage THD (2).	2	UINT	0.01%	00	63
Average line current THD.	2	UINT	0.01%	00	64
Total system active power demand (3).	4	LONG	0.001kW	00	66
Total system reactive power demand (3).	4	LONG	0.001kvar	00	68
Total system apparent power demand.	4	ULONG	0.001kVA	00	6A
Phase 1 current demand.	4	ULONG	0.001A	00	6C
Phase 2 current demand.	4	ULONG	0.001A	00	6E
Phase 3 current demand.	4	ULONG	0.001A	00	70
Neutral current demand.	4	ULONG	0.001A	00	72
Import active power demand	4	ULONG	0.001kW	00	74
Export active power demand	4	ULONG	0.001kW	00	76
Maximum total system active power demand (3).	4	LONG	0.001kW	00	7C
Maximum total system reactive power demand (3).	4	LONG	0.001kvar	00	7E
Maximum total system apparent power demand.	4	ULONG	0.001kVA	00	80
Maximum phase 1 current demand.	4	ULONG	0.001A	00	82

Maximum phase 2 current demand.	4	ULONG	0.001A	00	84
Maximum phase 3 current demand.	4	ULONG	0.001A	00	86
Maximum neutral current demand.	4	ULONG	0.001A	00	88
Maximum import active power demand	4	ULONG	0.001kW	00	8A
Maximum export active power demand	4	ULONG	0.001kW	00	8C
Total import active energy.	4	ULONG	0.01kWh	04	00
Total export active energy.	4	ULONG	0.01kWh	04	02
Total active Energy.	4	LONG	0.01kWh	04	04
Total import reactive energy.	4	ULONG	0.01kvarh	04	08
Total export reactive energy.	4	ULONG	0.01kvarh	04	0A
Total reactive Energy.	4	LONG	0.01kvarh	04	0C
Total apparent energy.	4	ULONG	0.01kVA	04	10
L1 import active Energy	4	ULONG	0.01kWh	04	14
L2 import active Energy	4	ULONG	0.01kWh	04	16
L3 import active Energy	4	ULONG	0.01kWh	04	18
L1 export active Energy	4	ULONG	0.01kWh	04	1A
L2 export active Energy	4	ULONG	0.01kWh	04	1C
L3 export active Energy	4	ULONG	0.01kWh	04	1E
L1 total active Energy	4	LONG	0.01kWh	04	20
L2 total active Energy	4	LONG	0.01kWh	04	22
L3 total active Energy	4	LONG	0.01kWh	04	24
L1 import reactive energy	4	ULONG	0.01kvarh	04	26
L2 import reactive energy	4	ULONG	0.01kvarh	04	28
L3 import reactive energy	4	ULONG	0.01kvarh	04	2A
L1 export reactive energy	4	ULONG	0.01kvarh	04	2C
L2 export reactive energy	4	ULONG	0.01kvarh	04	2E
L3 export reactive energy	4	ULONG	0.01kvarh	04	30
L1 total reactive energy	4	LONG	0.01kvarh	04	32
L2 total reactive energy	4	LONG	0.01kvarh	04	34
L3 total reactive energy	4	LONG	0.01kvarh	04	36
64-bit integer energy register					
Total import active energy.	8	INT64	Wh	1D	00
Total export active energy.	8	INT64	Wh	1D	04
Total active Energy (Import + Export).	8	INT64	Wh	1D	08
Total import reactive energy.	8	INT64	varh	1D	10
Total export reactive energy.	8	INT64	varh	1D	14
Total reactive energy (Import + Export).	8	INT64	varh	1D	18
Total apparent energy.	8	INT64	VAh	1D	20
L1 import active Energy	8	INT64	Wh	1D	24
L2 import active Energy	8	INT64	Wh	1D	28
L3 import active Energy	8	INT64	Wh	1D	2C
L1 export active Energy	8	INT64	Wh	1D	30
L2 export active Energy	8	INT64	Wh	1D	34
L3 export active Energy	8	INT64	Wh	1D	38

L1 total active Energy	8	INT64	Wh	1D	3C
L2 total active Energy	8	INT64	Wh	1D	40
L3 total active Energy	8	INT64	Wh	1D	44
L1 import reactive energy	8	INT64	varh	1D	48
L2 import reactive energy	8	INT64	varh	1D	4C
L3 import reactive energy	8	INT64	varh	1D	50
L1 export reactive energy	8	INT64	varh	1D	54
L2 export reactive energy	8	INT64	varh	1D	58
L3 export reactive energy	8	INT64	varh	1D	5C
L1 total reactive energy	8	INT64	varh	1D	60
L2 total reactive energy	8	INT64	varh	1D	64
L3 total reactive energy	8	INT64	varh	1D	68

Notes:

1. The power factor has its sign adjusted to indicate the direction of the current. Positive refers to forward current, negative refers to reverse current.
2. In 3P3W mode, L1 represents the line voltage THD of L1-2, L2 represents the line voltage harmonic content of L2-3, and L3 represents the Line voltage THD of L3-1. In 3P4W, 1P2W, 1P3W and other modes, L1, L2 and L3 respectively represent the corresponding phase voltage harmonic content.
3. The power sum demand calculation is for import – export.

Set class parameters

Holding Register Parameter [Read : Function code : 03H ; Write : Function code : 10H]				**Register Address [Hex]**		
Parameter	**Description**	**Length (bytes)**	**Data Format**	**High Byte**	**Low Byte**	**Mode**
Key Parameter Programming Authorization (KPPA)	Read: to get the status of the KPPA 0 = not authorized；1 = authorized Write the correct password to get KPPA, enable to program key parameters.	2	UINT	50	00	**R/W**
System Type	Write system type: 1 = 1P2W; 2 = 3P3W; 3 = 3P4W,(default); 4 = 1P3W; **(KPPA is asked)**	2	UINT	50	01	**R/W**
Demand Period	Write demand period: 0~60 minutes, Default 60. Range: 0~60, 0 means function update every second.	2	UINT	50	02	**R/W**
Slide time	Default 1, min. Range：1 ~ (Demand Period -1).	2	UINT	50	03	**R/W**
Modbus address	Write the modbus address Range: 1 to 247 for MODBUS Protocol,	2	UINT	50	05	**R/W**

	default 1.					
Network Baud Rate	Write the network port baud rate for MODBUS Protocol, where: 0 = 1200 baud. 1 = 2400 baud. 2 = 4800 baud. 3 = 9600 baud, default. 4 = 19200 baud. 5 = 38400 baud.	2	UINT	50	06	**R/W**
Parity and stop bit	Write the network port parity/stop bits for MODBUS Protocol, where: 0 = One stop bit and no parity, default. 1 = One stop bit and even parity. 2 = One stop bit and odd parity. 3 = Two stop bits and no parity.	2	UINT	50	07	**R/W**
Password	Read: to get the password of the meter Write: to program the new password of the meter Default : 0000 **(KPPA is asked)**	2	UINT	50	08	**R/W**
Pulse 1 Energy Type	Write MODBUS Protocol input parameter for pulse output 1： 1: import active energy 2: total active energy 4: export active energy, default 5: import reactive energy 6: total reactive energy 8: export reactive energy	2	UINT	50	09	**R/W**
Pulse 1 Rate	Write pulse rate index: n = 0 to 5 0 : 0.001 kwh/imp 1 : 0.01 kwh/imp, default 2 : 0.1 kwh/imp 3 : 1 kwh/imp 4 : 10 kwh/imp 5 : 100 kwh/imp	2	UINT	50	0A	**R/W**
Pulse 1 Width	Write pulse on period in milliseconds: 60, 100 or 200, default 100.	2	UINT	50	0B	**R/W**
Current Direction correction （when the external CT is connected reversely）	0 = L1 Frd，L2 Frd，L3 Frd 1 = L1 Rev，L2 Frd，L3 Frd 2 = L1 Frd，L2 Rev，L3 Frd 3 = L1 Rev，L2 Rev，L3 Frd 4 = L1 Frd，L2 Frd，L3 Rev 5 = L1 Rev，L2 Frd，L3 Rev	2	UINT	50	0F	**R/W**

	6 = L1 Frd，L2 Rev，L3 Rev 7 = L1 Rev，L2 Rev，L3 Rev Default 0 **(KPPA is asked)**					
PT1	PT1 Range 30 - 500000V, Default 230 **(KPPA is asked)**	4	ULONG	50	12	**R/W**
PT2	PT2 Range 30- 500V, Default 230 **(KPPA is asked)**	2	UINT	50	14	**R/W**
CT1	CT1 Range 1-9999A，Default 5， **(KPPA is asked)**	2	UINT	50	15	**R/W**
CT2	CT2 Range: 1A or 5A , Default 5A **(KPPA is asked)**	2	UINT	50	16	**R/W**
Automatic Scroll Display Time	Automatic scroll display time, unit : second Range 0~60，default : 0 Note: 0 mean stop automatic scroll display	2	UINT	50	18	**R/W**
Backlit time	Backlit time, unit : minute. Default 60. Range 0~120 or 255， 0 means backlit always on，255 means backlit always off.	2	UINT	50	19	**R/W**
Running time （Data in units of minutes）	Running time. Unit : minute. **Write 0 to reset the running time with load. No response if write other value.** **Note: The meter starts timing when it's powered on**	4	ULONG	50	3C	**R/W**
Running time with load （Data in units of minutes）	Running time with load. Unit : minute. **Write 0 to reset the running time with load. No response if write other value.** **Note: The meter starts timing when power greater than 0 detected**	4	ULONG	50	3E	**R/W**
Reset historical data	0 = reset max. demand 8 = reset daily energy consumption 9 = reset monthly energy consumption **(KPPA is asked)**	2	UINT	56	00	**W**
Meter code	The code of the meter	2	HEX	56	01	**R**
Serial number	The serial number of the meter	4	ULONG	56	02	**R**
Software version number	Software version number : XX.YY Data definition : The first byte represents XX, and the second byte represents YY	2	HEX	56	04	**R**
Hardware version number	Hardware version number : XX.YY Data definition : The first byte represents XX, and the second byte represents YY	2	HEX	56	05	**R**
version number of displayed	version number of displayed : XX.YY Data definition : The first byte represents	2	HEX	56	06	**R**

	XX, and the second byte represents YY					

Example:

1, Read Input Registers

Example: Read “Phase 1 line to neutral volts”

Request: 01 04 00 00 00 02 71 CB

Where, 01 = Meter address

04 = Function code

00 = High byte of registers starting address

00 = Low byte of registers starting address

00 = High byte of registers number

02 = Low byte of registers number

71 = CRC Low

CB = CRC High

Response: 01 04 04 43 66 33 34 1B 38

Where, 01 = Meter address

04 = Function code

04= Byte count

43 = Data, (High Word, High Byte)

66 = Data, (High Word, Low Byte)

33 = Data, (Low Word, High Byte)

34 = Data, (Low Word, Low Byte)

1B = CRC Low

38 = CRC High

Note: 43 66 33 34(Hex) = 230.2 (Floating point)

Example: Read “Phase 1 line to neutral volts” (ULONG Format)

Request: 01 03 00 00 00 02 C4 B0

Where, 01 = Meter address

03 = Function code

00 = High byte of registers starting address

00 = Low byte of registers starting address

00 = High byte of registers number

02 = Low byte of registers number

C4 = CRC Low

B0 = CRC High

Response: 01 03 04 00 00 61 AA 53 DC

Where, 01 = Meter address

04 = Function code

04= Byte count

00 = Data, (High Word, High Byte)

00 = Data, (High Word, Low Byte)

61 = Data, (Low Word, High Byte)

AA = Data, (Low Word, Low Byte)

53 = CRC Low

DC = CRC High

Note: 00 00 61 AA(Hex) = 25002(ULONG) * 0.01V = 250.02V

2, Read Holding Registers

Example: Read “Slide time”

Request: 01 03 50 03 00 01 65 0A

Where, 01 = Meter address

03 = Function code

50 = High byte of registers starting address

03 = Low byte of registers starting address

00 = High byte of registers number

01 = Low byte of registers number

65 = CRC Low

0A = CRC High

Response: 01 03 02 00 05 78 47

Where, 01 = Meter address

03 = Function code

04= Byte Count

00 = Data, (High Byte)

05 = Data, (Low Byte)

78 = CRC Low

47 = CRC High

Note: 00 05 (Hex) = 5 (UINT)

3, Write Holding Registers

Example: Write “Demand Period” = 30

Request: 01 10 50 02 00 01 02 00 1E 77 BF

Where, 01 = Meter address

10 = Function code

50 = High byte of registers starting address

02 = Low byte of registers starting address

00 = High byte of registers number

01 = Low byte of registers number

02 = Byte Count

00 = Data, (High Byte)

1E = Data, (Low Byte)

77 = CRC Low

BF = CRC High

Note: 00 1E (Hex) = 30(UINT)

Response: 01 10 50 02 00 01 B1 09

Where, 01 = Meter address

10 = Function code

50 = High byte of registers starting address

02 = Low byte of registers starting address

00 = High byte of registers number

01 = Low byte of registers number

B1 = CRC Low

09 = CRC High