MCS-I Protocol V1.0

Part I. Input Registers，Function code (Hex): 04

Address (Register)	Input Register Parameter				Modbus Protocol Start Address Hex		Model		
	Description	Length (bytes)	Data Format	Units	Hi Byte	Lo Byte	I30	I31	I32
Multifunction Parameters									
30001	Phase 1 line to neutral volts.	4	Float	V	00	00	●	●	●
30003	Phase 2 line to neutral volts.	4	Float	V	00	02	●	●	●
30005	Phase 3 line to neutral volts.	4	Float	V	00	04	●	●	●
30007	Phase 1 current.	4	Float	A	00	06	●	●	●
30009	Phase 2 current.	4	Float	A	00	08	●	●	●
30011	Phase 3 current.	4	Float	A	00	0A	●	●	●
30013	Phase 1 active power.	4	Float	W	00	0C	●	●	●
30015	Phase 2 active power.	4	Float	W	00	0E	●	●	●
30017	Phase 3 active power.	4	Float	W	00	10	●	●	●
30019	Phase 1 apparent power.	4	Float	VA	00	12	●	●	●
30021	Phase 2 apparent power.	4	Float	VA	00	14	●	●	●
30023	Phase 3 apparent power.	4	Float	VA	00	16	●	●	●
30025	Phase 1 reactive power.	4	Float	VAr	00	18	●	●	●
30027	Phase 2 reactive power.	4	Float	VAr	00	1A	●	●	●
30029	Phase 3 reactive power.	4	Float	VAr	00	1C	●	●	●
30031	Phase 1 power factor (1).	4	Float	None	00	1E	●	●	●
30033	Phase 2 power factor (1).	4	Float	None	00	20	●	●	●
30035	Phase 3 power factor (1).	4	Float	None	00	22	●	●	●
30037	Phase 1 phase angle.	4	Float	Degrees	00	24	●	●	●
30039	Phase 2 phase angle.	4	Float	Degrees	00	26	●	●	●
30041	Phase 3 phase angle.	4	Float	Degrees	00	28	●	●	●
30043	Average line to neutral volts.	4	Float	V	00	2A	●	●	●
30047	Average line current.	4	Float	A	00	2E	●	●	●
30049	Sum of line currents.	4	Float	A	00	30	●	●	●
30053	Total system power.	4	Float	W	00	34	●	●	●
30057	Total system volt amps.	4	Float	VA	00	38	●	●	●
30061	Total system VAr.	4	Float	VAr	00	3C	●	●	●
30063	Total system power factor (1).	4	Float	None	00	3E	●	●	●
30067	Total system phase angle.	4	Float	Degrees	00	42	●	●	●
30071	Frequency of supply voltages.	4	Float	Hz	00	46	●	●	●
30201	Line 1 to Line 2 volts.	4	Float	V	00	C8	●	●	●

30203	Line 2 to Line 3 volts.	4	Float	V	00	CA	●	●	●
30205	Line 3 to Line 1 volts.	4	Float	V	00	CC	●	●	●
30207	Average line to line volts.	4	Float	V	00	CE	●	●	●
30225	Neutral current.	4	Float	A	00	E0	●	●	●
Energy Measurements									
30073	Total import active energy .	4	Float	kWh	00	48	●	●	●
30075	Total export active energy .	4	Float	kWH	00	4A	●	●	●
30077	Total import reactive energy .	4	Float	kVArh	00	4C	●	●	●
30079	Total export reactive energy .	4	Float	kVArh	00	4E	●	●	●
30081	Total apparent energy.	4	Float	kVAh	00	50	●	●	●
30083	Ah.	4	Float	Ah	00	52	●	●	●
30343	Total active Energy (2)	4	Float	kWh	01	56	●	●	●
30345	Total reactive Energy（2）	4	Float	kVArh	01	58	●	●	●
30347	L1 import active Energy	4	Float	kWh	01	5A	●	●	●
30349	L2 import active Energy	4	Float	kWh	01	5C	●	●	●
30351	L3 import active Energy	4	Float	kWh	01	5E	●	●	●
30353	L1 export active Energy	4	Float	kWh	01	60	●	●	●
30355	L2 export active Energy	4	Float	kWh	01	62	●	●	●
30357	L3 export active Energy	4	Float	kWh	01	64	●	●	●
30359	L1 total active Energy（2）	4	Float	kWh	01	66	●	●	●
30361	L2 total active Energy（2）	4	Float	kWh	01	68	●	●	●
30363	L3 total active Energy（2）	4	Float	kWh	01	6A	●	●	●
30365	L1 import reactive energy	4	Float	kVArh	01	6C	●	●	●
30367	L2 import reactive energy	4	Float	kVArh	01	6E	●	●	●
30369	L3 import reactive energy	4	Float	kVArh	01	70	●	●	●
30371	L1 export reactive energy	4	Float	kVArh	01	72	●	●	●
30373	L2 export reactive energy	4	Float	kVArh	01	74	●	●	●
30375	L3 export reactive energy	4	Float	kVArh	01	76	●	●	●
30377	L1 total reactive energy（2）	4	Float	kVArh	01	78	●	●	●
30379	L2 total reactive energy（2）	4	Float	kVArh	01	7A	●	●	●
30381	L3 total reactive energy（2）	4	Float	kVArh	01	7C	●	●	●
30397	Total Active Power by algebraic sum method（4）	4	Float	kWh	01	8C	●	●	●
30399	Total Reactive Power by algebraic sum method（4）	4	Float	kVArh	01	8E	●	●	●
THD Measurements									
30235	Phase 1 L/N volts THD	4	Float	%	00	EA		●	●
30237	Phase 2 L/N volts THD	4	Float	%	00	EC		●	●
30239	Phase 3 L/N volts THD	4	Float	%	00	EE		●	●
30241	Phase 1 Current THD	4	Float	%	00	F0		●	●
30243	Phase 2 Current THD	4	Float	%	00	F2		●	●
30245	Phase 3 Current THD	4	Float	%	00	F4		●	●
30249	Average line to neutral volts THD.	4	Float	%	00	F8		●	●
30251	Average line current THD.	4	Float	%	00	FA		●	●
30335	Line 1 to line 2 volts THD.	4	Float	%	01	4E		●	●

30337	Line 2 to line 3 volts THD.	4	Float	%	01	50		●	●
30339	Line 3 to line 1 volts THD.	4	Float	%	01	52		●	●
30341	Average line to line volts THD.	4	Float	%	01	54		●	●
Demand Measurements									
30085	Total system power demand (3)	4	Float	W	00	54			●
30087	Maximum total system power demand (3)	4	Float	W	00	56			●
30101	Total system VA demand.	4	Float	VA	00	64			●
30103	Maximum total system VA demand.	4	Float	VA	00	66			●
30109	Total system reactive power demand (3)	4	Float	VAr	00	6C			●
30111	Maximum total system reactive power demand (3)	4	Float	VAr	00	6E			●
30259	Phase 1 current demand.	4	Float	A	01	02			●
30261	Phase 2 current demand.	4	Float	A	01	04			●
30263	Phase 3 current demand.	4	Float	A	01	06			●
30265	Maximum phase 1 current demand.	4	Float	A	01	08			●
30267	Maximum phase 2 current demand.	4	Float	A	01	0A			●
30269	Maximum phase 3 current demand.	4	Float	A	01	0C			●

Note:

(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). Total active energy / reactive energy equals to Import + export.

(3). Power demand equals to Import -export. (default)

(4). Total active energy / reactive energy equals to Import - export.

Part II. Holding Register，Function code (Hex) : 03 / 10

Address Register	Parameter	Modbus Protocol Start Address Hex		Valid range	Mode	Model		
		High Byte	Low Byte			I30	I31	I32
Parameters								
40011	System Type	00	0A	Range：1 ~4，Default:1. 1 = 1P2W； 2 = 3P3W； 3 = 3P4W； 4 = 1P3W； **Length : 4 byte** **Data Format : Float**	r/w	●	●	●
40021	Modbus address	00	14	Address：1~247，Default 1 **Length : 4 byte** **Data Format : Float**	r/w	●	●	●
40051	Circuit 1 CT1	00	32	Range：1~9999，Default 5. **Length : 4 byte** **Data Format : Float**	r/w	●	●	●
40053	Circuit 2 CT1	00	34	Range：1~9999，Default 5. **Length : 4 byte** **Data Format : Float**	r/w	●	●	●
40055	Circuit 3 CT1	00	36	Range：1~9999，Default 5. **Length : 4 byte** **Data Format : Float**	r/w	●	●	●
40057	Current Direction correction（when the external CT is connected reversely）	00	38	Range: 0~7，Default: 0 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 6 = L1 Frd，L2 Rev，L3 Rev 7 = L1 Rev，L2 Rev，L3 Rev **Length : 4 byte** **Data Format : Float**	r/w	●	●	●
41155	CT phase Sequence setting	04	82	The first byte means the voltage matching with CT1; 1 means L1, 2 means L2, 3 means L3. The second byte means the voltage matching with CT2; 1 means L1, 2 means L2, 3 means L3. The third byte means the voltage matching with CT3;	r/w	●	●	●

				The forth byte is fixed 0. Note: Under 1p2w network, all CTs are matched to L1. **Length : 4 byte** **Data Format : Hex**				
461697	Model Information（1）	F1	00	Model Information and Software Version **Length : 16 byte** **Data Format : Hex**	r/w	●	●	●
461953	Name of CT1	F2	00	Name of CT1 If the name is less than 16 bytes, fill the remaining bytes with 0x00 **Length : 16 byte** **Data Format : ASCII**	r/w	●	●	●
461961	Name of CT2	F2	08	Name of CT2 If the name is less than 16 bytes, fill the remaining bytes with 0x00 **Length : 16 byte** **Data Format : ASCII**	r/w	●	●	●
461969	Name of CT3	F2	10	Name of CT3 If the name is less than 16 bytes, fill the remaining bytes with 0x00 **Length : 16 byte** **Data Format : ASCII**	r/w	●	●	●
464513	Serial number	FC	00	Serial number **Length : 4 byte** **Data Format : unsigned int32**	ro	●	●	●
464515	Model code	FC	02	Product model code **Length : 2 byte** **Data Format : Hex**	ro	●	●	●
Demand Parameters								
40003	Demand Period	00	02	Range：0, 5, 8, 10, 15, 20, 30, 60，Unit：Minute，Default: 60 0 means function closed **Length : 4 byte** **Data Format : Float**	r/w			●
461457	Reset	F0	10	00 00 = reset the Maximum demand。 **Length: 2 byte** **Data Format: Hex**	wo			●
Overload Alarm Parameters								
41027	Current Alarm Value limit	04	02	Current Alarm Value limit, percentage of nominal current. Unit: %, default 120. Setting range: 0~120. **Length : 4 byte** **Data Format : Float**	r/w			●

41153	Current module alarm status （2）	04	80	The first byte shows the current status of L1: =0 means no alarm, =1 means current overload alarm. The second byte shows the current status of L2: =0 means no alarm, =1 means current overload alarm. The third byte shows the current status of L3: =0 means no alarm, =1 means current overload alarm. The forth byte shows the conflict status of current module address, =0 means no alarm; =1 means the Modbus address of current module has conflict of other equipment; **Length : 4 byte** **Data Format : Hex** **For example：** **If the register shows:** 01 00 00 01, it means the current of L1 has alarm, current of L2 and L3 is normal, current module address has conflict with other equipment.	ro			●

Note：

（1）。Field definition of model information

The equipment code of MCS-I30 is 0x10; MCS-I31 is 0x11; MCS-I32 is 0x12.

For example, if the software version of MCS-I32 is 1.2, the data of model information is as below:

Data position	Field Explanation	Examples
The First Byte	Equipment code（Hex）	0x12
The Second Byte	Description of model information [0]（ASCII）	0x4D (‘M’)
The Third Byte	Description of model information [1]（ASCII）	0x43 (‘C’)
The Fourth Byte	Description of model information [2]（ASCII）	0x53 (‘S’)
The Fifth Byte	Description of model information [3]（ASCII）	0x2D (‘-’)
The Sixth Byte	Description of model information [4]（ASCII）	0x49 (‘I’)
The Seventh Byte	Description of model information [5]（ASCII）	0x33 (‘3’)
The Eighth Byte	Description of model information [6]（ASCII）	0x32 (‘2’)
The Ninth Byte	Description of model information [7]（ASCII）	0x00 (‘’)
The Tenth Byte	Description of model information [8]（ASCII）	0x00 (‘’)
The Eleventh Byte	Description of model	0x00 (‘’)

	information [9]（ASCII）	
The Twelfth Byte	Description of software version information [0]（ASCII）	0x30 (‘0’)
The Thirteenth Byte	Description of software version information [1]（ASCII）	0x31 (‘1’)
The Fourteenth Byte	Description of software version information [2]（ASCII）	0x2E (‘.’)
The Fifteenth Byte	Description of software version information [3]（ASCII）	0x30 (‘0’)
The Sixteenth Byte	Description of software version information [4]（ASCII）	0x32 (‘2’)

Part III.
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)

2. Read Holding Registers

Example: Read "System Type"

Request: 01 03 00 0A 00 02 E4 09

Where, 01 = Meter address

03 = Function code

00 = High byte of registers starting address

0A = Low byte of registers starting address

00 = High byte of registers number

02 = Low byte of registers number

E4 = CRC Low

09 = CRC High

Response: 01 03 04 40 40 00 00 EE 27

Where, 01 = Meter address

03 = Function code

04= Byte Count

40 = Data, (High Word, High Byte)

A0 = Data, (High Word, Low Byte)

00 = Data, (Low Word, High Byte)

00 = Data, (Low Word, Low Byte)

EE = CRC Low

27 = CRC High

Note: 40 40 00 00 (Hex) = 3 (Floating point)

3. Write Holding Registers

Example: "Demand Period" = 60 min

Request: 01 10 00 02 00 02 04 42 70 00 00 67 D5

Where， 01 = Meter address

10 = Function code

00 = High byte of registers starting address

02 = Low byte of registers starting address

00 = High byte of registers number

02 = Low byte of registers number

04 = Byte Count

42 = Data, (High Word, High Byte)

70 = Data, (High Word, Low Byte)

00 = Data, (Low Word, High Byte)

00 = Data, (Low Word, Low Byte)

67 = CRC Low

D5 = CRC High

Note: 42 70 00 00 (Hex) = 60 (Floating point)

Response: 01 10 00 02 00 02 E0 08

Where, 01 = Meter address

10 = Function code

00 = High byte of registers starting address

02 = Low byte of registers starting address

00 = High byte of registers number

02 = Low byte of registers number

E0 = CRC Low

08 = CRC High

If you have any question, please feel free to contact our sales team.

Zhejiang Eastron Electronic Co., Ltd.

No.1369, Chengnan Rd. Jiaxing, Zhejiang, 314001, China

Tel: +86-573-83698881 Fax: +86-573-83698883

Email: sales@eastrongroup.com

www.eastrongroup.com