

TC55M-TCP Series Protocol V1.0

1. Measurement Parameters (In Float Format)

Input Register (Function code: 04 in Hex)				Modbus Protocol Start Address (Hex)	
Description	Length (bytes)	Data Format	Unit	Hi Byte	Lo Byte
L1-N Voltage	4	Float	V	00	00
L2-N Voltage	4	Float	V	00	02
L3-N Voltage	4	Float	V	00	04
L1-2 Voltage	4	Float	V	00	06
L2-3 Voltage	4	Float	V	00	08
L3-1 Voltage	4	Float	V	00	0A
L1 Current	4	Float	A	00	0C
L2 Current	4	Float	A	00	0E
L3 Current	4	Float	A	00	10
L1 Active Power	4	Float	W	00	12
L2 Active Power	4	Float	W	00	14
L3 Active Power	4	Float	W	00	16
L1 Reactive Power	4	Float	var	00	18
L2 Reactive Power	4	Float	var	00	1A
L3 Reactive Power	4	Float	var	00	1C
L1 Apparent Power	4	Float	VA	00	1E
L2 Apparent Power	4	Float	VA	00	20
L3 Apparent Power	4	Float	VA	00	22
L1 Power Factor(1)	4	Float	None	00	24
L2 Power Factor(1)	4	Float	None	00	26
L3 Power Factor(1)	4	Float	None	00	28
L1 Phase Angle	4	Float	Degrees	00	2A
L2 Phase Angle	4	Float	Degrees	00	2C
L3 Phase Angle	4	Float	Degrees	00	2E
Frequency	4	Float	Hz	00	30
Total Active Power	4	Float	W	00	32
Total Reactive Power	4	Float	var	00	34
Total Apparent Power	4	Float	VA	00	36
Total Power Factor(1)	4	Float	None	00	38
Total Phase Angle	4	Float	Degrees	00	3A
Total Current	4	Float	A	00	3C
Average Line Current	4	Float	A	00	3E
Neutral Current	4	Float	A	00	40
Average Phase-to-Neutral Voltage	4	Float	V	00	42
Average Phase-to-Phase Voltage	4	Float	V	00	44

THD of L1-N Voltage (2)	4	Float	%	00	4E
THD of L2-N Voltage(2)	4	Float	%	00	50
THD of L3-N Voltage(2)	4	Float	%	00	52
THD of L1 Current	4	Float	%	00	54
THD of L2 Current	4	Float	%	00	56
THD of L3 Current	4	Float	%	00	58
THD of Average Voltage(2)	4	Float	%	00	5A
THD of Average Current	4	Float	%	00	5C
L1 Load Nature (Resistive=1、 inductive=2、 capacitive=3、 none=4)	4	Float	None	00	5E
L2 Load Nature(Resistive=1、 inductive=2、 capacitive=3、 none=4)	4	Float	None	00	60
L3 Load Nature(Resistive=1、 inductive=2、 capacitive=3、 none=4)	4	Float	None	00	62
Total System Load Nature(Resistive=1、 inductive=2、 capacitive=3、 none=4)	4	Float	None	00	64
Total Active Power Demand(3)	4	Float	W	03	80
Total Reactive Power Demand(3)	4	Float	var	03	82
Total Apparent Power Demand	4	Float	VA	03	84
L1 Current Demand	4	Float	A	03	86
L2 Current Demand	4	Float	A	03	88
L3 Current Demand	4	Float	A	03	8A
Neutral Current Demand	4	Float	A	03	8C
Import Active Power Demand	4	Float	W	03	8E
Export Active Power Demand	4	Float	W	03	90
Max. Demand of Total Active Power(3)	4	Float	W	03	96
Max. Demand of Total Reactive Power(3)	4	Float	var	03	98
Max. Demand of Total Apparent Power	4	Float	VA	03	9A
Max. Demand of L1 Current	4	Float	A	03	9C
Max. Demand of L2 Current	4	Float	A	03	9E
Max. Demand of L3 Current	4	Float	A	03	A0
Max. Demand of Neutral Current	4	Float	A	03	A2
Max. Demand of Import Active Power	4	Float	W	03	A4
Max. Demand of Export Active Power	4	Float	W	03	A6
Import Active Energy	4	Float	kWh	06	00
Export Active Energy	4	Float	kWh	06	02
Import Reactive Energy	4	Float	kvarh	06	04
Export Reactive Energy	4	Float	kvarh	06	06
Total Active Energy	4	Float	kWh	06	08
Total Reactive Energy	4	Float	kvarh	06	0A
Total Apparent Energy	4	Float	kVAh	06	0C
Ah	4	Float	Ah	06	12
L1 Import Active Energy	4	Float	kWh	06	14
L2 Import Active Energy	4	Float	kWh	06	16
L3 Import Active Energy	4	Float	kWh	06	18

L1 Export Active Energy	4	Float	kWh	06	1A
L2 Export Active Energy	4	Float	kWh	06	1C
L3 Export Active Energy	4	Float	kWh	06	1E
L1 Total Active Energy	4	Float	kWh	06	20
L2 Total Active Energy	4	Float	kWh	06	22
L3 Total Active Energy	4	Float	kWh	06	24
L1 Import Reactive Energy	4	Float	kvarh	06	26
L2 Import Reactive Energy	4	Float	kvarh	06	28
L3 Import Reactive Energy	4	Float	kvarh	06	2A
L1 Export Reactive Energy	4	Float	kvarh	06	2C
L2 Export Reactive Energy	4	Float	kvarh	06	2E
L3 Export Reactive Energy	4	Float	kvarh	06	30
L1 Total Reactive Energy	4	Float	kvarh	06	32
L2 Total Reactive Energy	4	Float	kvarh	06	34
L3 Total Reactive Energy	4	Float	kvarh	06	36
Resettable Import Active Energy	4	Float	kWh	07	04
Resettable Export Active Energy	4	Float	kWh	07	06
Resettable Total Active Energy	4	Float	kWh	07	08
Resettable Import Reactive Energy	4	Float	kvarh	07	0A
Resettable Export Reactive Energy	4	Float	kvarh	07	0C
Resettable Total Reactive Energy	4	Float	kvarh	07	0E

Note:

- (1). The power factor has its sign adjusted to indicate the direction of the current. Positive refers to import current, negative refers to export current;
- (2). In 3P3W mode, L1 represents the L1-2 voltage THD, L2 represents the L2-3 voltage THD, and L3 represents L3-1 voltage THD;
- In 3P4W, 1P2W, 1P3W, L1, L2 and L3 respectively represent the corresponding phase voltage THD.
- (3) . The power sum demand calculation is = import – export.

2. Setting Parameters (In Float Format)

Holding Registers (Reading Function Code: 03 in Hex ; Writing Function Code: 10 in Hex)				Modbus Protocol Start Address (Hex)		Mode
Parameters	Description	Length (bytes)	Data Format	Hi Byte	Lo Byte	
Key Parameter Programming Authorization (KPPA)	Read: Get the Status of the KPPA 0 = not authorized; 1 = authorized Write the correct password to get KPPA to program key parameters.	4	FLOAT	60	00	R/W
Modbus Address	Set Modbus Address Range: 1 ~ 247, Default: 1	4	FLOAT	60	02	R/W
Baud rate	Set Baudrate 0 = 1200 bps 1 = 2400 bps 2 = 4800 bps 3 = 9600 bps (Default) 4 = 19200 bps 5 = 38400 bps	4	FLOAT	60	04	R/W
Parity and Stop Bit	Set Parity and Stop Bit 0 = No Parity, 1 Stop bit(Default) 1 = Even Parity, 1 Stop bit 2 = Odd Parity, 1 Stop bit 3 = None Parity, 2 Stop bit	4	FLOAT	60	06	R/W
Demand Period	Set Demand Period Range: 0~60 mins (Default: 60mins) Note: 0 = Update every second.	4	FLOAT	60	08	R/W
Slide Time	Set Slide Time Unit: Min Range: 1 ~ (Demand Period - 1) Default: 1min	4	FLOAT	60	0A	R/W
Pulse Type	Set Pulse Type 1 = Import Active Energy 2 = Total Active Energy, (Default) 4 = Export Active Energy 5 = Import Reactive Energy 6 = Total Reactive Energy 8 = Export Reactive Energy	4	FLOAT	60	0E	R/W
Pulse Ratio	Set Pulse Ratio, Range: 0~5 0 represents 1imp = 0.001kWh(kvarh) 1 represents 1imp = 0.01kWh(kvarh) (Default) 2 represents 1imp = 0.1kWh(kvarh)	4	FLOAT	60	10	R/W

	3 represents 1imp = 1kWh(kvarh) 4 represents 1imp = 10kWh(kvarh) 5 represents 1imp = 100kWh(kvarh)					
Pulse Width	Set Pulse Width , Unit: ms Option: 60, 100(Default) , 200ms	4	FLOAT	60	12	R/W
Password	Set Password Range: 0000~9999 Default: 1000 (KPPA is asked.)	4	FLOAT	60	1A	R/W
Networks	Set Networks 1 = 1P2W 2 = 3P3W 3 = 3P4W(Default); 4 = 2P3W (KPPA is asked.)	4	FLOAT	60	1C	R/W
Current Direction correction	Set Current Direction 0 = L1 Frd, L2 Frd, L3 Frd(Default) 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 (KPPA is asked.)	4	FLOAT	60	1E	R/W
PT1	Range: 30 - 500000V (Default:230) (KPPA is asked.)	4	FLOAT	60	22	R/W
PT2	Range: 30 - 500V (Default:230) (KPPA is asked.)	4	FLOAT	60	24	R/W
CT1	Range: 1-9999A (Default: 5) (KPPA is asked.)	4	FLOAT	60	26	R/W
CT2	Options: 1 or 5 (Default: 5) (KPPA is asked.)	4	FLOAT	60	28	R/W
LCD Scroll Time	Automatic scroll display time Unit: second Range: 0~60, (Default: 0) Note: 0 = no scroll	4	FLOAT	60	EA	R/W
Backlit Time	Set Backlit Time Unit: minute Range: 0~120, or 255 (Default: 10)	4	FLOAT	60	EC	R/W

	Note: 0 = Always on; 255 = Always off					
Running Time Since Power-on	Running Time Since Power-on Unit: 1min Note: Write 00 00 00 00 to reset the time.	4	FLOAT	61	06	R/W
Running Time with Load	Running time since the meter measures power Unit: 1min Note: Write 00 00 00 00 to reset the time.	4	FLOAT	61	08	R/W
Serial Number	Serial Number	4	ULONG	66	00	Read Only
Ethernet Communication Parameters	Ethernet communication parameter includes IP address(4byte), Subnet mask(4byte), default gateway,(4byte),IP port(2 byte),DHCP(2byte) Data format: IP address-Subnet mask-default gateway-IP port-DHCP (High byte first) Default: IP address = 192-168-1-200 Subnet mask = 255-255-255-0 Default gateway = 192-168-1-1 IP port = 502 DHCP = 00 01 (OFF) Note: For DHCP, 00 01 = DHCP close; 00 02 =DHCP open. DHCP means to acquire IP address automatically.If the function is open, the IP address of the meter is automatically obtained from devices such as routers. (KPPA is asked.)	16	HEX	61	0E	R/W
Ethernet TCP/IP Working Mode	Set Working mode of Ethernet port 1 = slave mode (the Ethernet port is only used for TCP/IP communication for this meter); 2 = master mode (the meter can be worked as an RS485-TCP/IP gateway. Via the Ethernet port, it can read the devices connected to its RS485 port on the same Bus line.) (KPPA is asked.)	4	FLOAT	61	18	R/W
Enable the reading function of IP address information	Write 1 to start obtaining the IP address information of the meter. If the register is read, it indicates the status of obtaining IP address information. If 1 is returned, it indicates that obtaining IP address information failed. If 0 is returned, the IP address is successfully obtained. Note: One minute after the IP address is successfully obtained, the status automatically changes to 1.	4	FLOAT	61	1A	R/W

Reset	0 = Reset Max. Demand 10 = Reset Resettable Energy (KPPA is asked.)	2	UINT	66	03	Read Only
Software Version	Software version: XX.YY Data Definition: The first byte = XX; The second byte = YY	2	HEX	66	04	Read Only
Hardware Version	Hardware Version: XX.YY Data Definition: The first byte = XX; The second byte = YY	2	HEX	66	05	Read Only
Version Number on Display	Version Number on Display: XX.YY Data Definition: The first byte = XX; The second byte = YY	2	HEX	66	06	Read Only
Rated Voltage of the System	Rated Voltage of the System Default: 230V It represents the input voltage for measurement. If a PT is connected, here means the secondary side of the PT.	4	FLOAT	66	08	R/W
Rated Current of the System	Rated Current of the System Default: 5A It represents the input current for measurement. If a CT is connected, here means the secondary side of CT.	4	FLOAT	66	0A	R/W

Examples:

1. Read Input Registers

Read: "L1-N Voltage":

Request: 01 04 00 00 00 02 71 CB		Response: 01 04 04 43 66 33 34 1B 38	
01	Meter address	01	Meter address
04	Function code	04	Function code
00	High byte of registers starting address	04	Byte count
00	Low byte of registers starting address	43	Data, (High Word, High Byte)
00	High byte of register number	66	Data, (High Word, Low Byte)
02	Low byte of registers number	33	Data, (Low Word, High Byte)
71	CRC Low	34	Data, (Low Word, Low Byte)
CB	CRC High	1B	CRC Low
		38	CRC High
Note: 43 66 33 34(Hex) = 230.2 (Floating Point)			

2. Read Holding Registers

Read: "Slide Time":

Request: 01 03 60 0A 00 02 FA 09		Response: 01 03 04 40 A0 00 00 EF D1	
01	Meter address	01	Meter address
03	Function code	03	Function code
60	High byte of registers starting address	04	Byte count

0A	Low byte of registers starting address	40	Data, (High Word, High Byte)
00	High byte of registers number	A0	Data, (High Word, Low Byte)
02	Low byte of registers number	00	Data, (Low Word, High Byte)
FA	CRC Low	00	Data, (Low Word, Low Byte)
09	CRC High	EF	CRC Low
		D1	CRC High

Note: 40 A0 00 00(Hex) = 5 (Floating point)

3. Write Holding Registers

Write Demand Period as "30":

Request: 01 10 60 08 00 02 04 41 F0 00 00 4E 04		Response: 01 10 60 08 00 02 DE 0A	
01	Meter address	01	Meter address
10	Function code	10	Function code
60	High byte of registers starting address	60	High byte of registers starting address
08	Low byte of registers starting address	08	Low byte of registers starting address
00	High byte of registers number	00	High byte of registers number
02	Low byte of registers number	02	Low byte of registers number
04	02 = Byte Count	DE	CRC Low
41	Data, (High Word, High Byte)	0A	CRC High
F0	Data, (High Word, Low Byte)		
00	Data, (Low Word, High Byte)		
00	Data, (Low Word, Low Byte)		
4E	CRC Low		
04	CRC High		

Note: 41 F0 00 00(Hex) = 30 (Floating point)

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