1. Function Code = 0x04

Address (Register)	Input Register Parameter				Modbus Protocol Start Address Hex		3 Ø	3 Ø	1 Ø
	Description	Length (bytes)	Data Format	Units	Hi Byte	Lo Byte	4 W	3 W	2 W
30001	Phase 1 line to neutral volts.	4	Float	V	00	00	√	X	√
30003	Phase 2 line to neutral volts.	4	Float	V	00	02	√	X	X
30005	Phase 3 line to neutral volts.	4	Float	V	00	04	√	X	X
30007	Phase 1 current.	4	Float	A	00	06	√	√	√
30009	Phase 2 current.	4	Float	A	00	08	√	√	X
30011	Phase 3 current.	4	Float	A	00	0A	√	√	X
30013	Phase 1 active power.	4	Float	W	00	0C	√	X	√
30015	Phase 2 active power.	4	Float	W	00	0E	√	X	X
30017	Phase 3 active power.	4	Float	W	00	10	√	X	X
30019	Phase 1 apparent power.	4	Float	VA	00	12	√	X	√
30021	Phase 2 apparent power.	4	Float	VA	00	14	√	X	X
30023	Phase 3 apparent power.	4	Float	VA	00	16	√	X	X
30025	Phase 1 reactive power.	4	Float	VAr	00	18	√	X	√
30027	Phase 2 reactive power.	4	Float	VAr	00	1A	√	X	X
30029	Phase 3 reactive power.	4	Float	VAr	00	1C	√	X	X
30031	Phase 1 power factor (1).	4	Float	None	00	1E	√	X	√
30033	Phase 2 power factor (1).	4	Float	None	00	20	√	X	X
30035	Phase 3 power factor (1).	4	Float	None	00	22	√	X	X
30037	Phase 1 phase angle.	4	Float	Degrees	00	24	√	X	√
30039	Phase 2 phase angle.	4	Float	Degrees	00	26	√	X	X
30041	Phase 3 phase angle.	4	Float	Degrees	00	28	√	X	X
30043	Average line to neutral volts.	4	Float	V	00	2A	√	X	X
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	√	√	√
30073	Total Import kWh	4	Float	kWh	00	48	√	√	√
30075	Total Export kWh.	4	Float	kWH	00	4A	√	√	√
30077	Total Import kVArh .	4	Float	kVArh	00	4C	√	√	√
30079	Total Export kVArh .	4	Float	kVArh	00	4E	√	√	√
30081	Total VAh	4	Float	kVAh	00	50	√	√	√
30083	Ah	4	Float	Ah	00	52	√	√	√
30085	Total system power demand (2) .	4	Float	W	00	54	√	√	√
30087	Maximum total system power demand (2).	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	√	√	√
30105	Neutral current demand.	4	Float	Amps	00	68	√	X	X
30107	Maximum neutral current demand.	4	Float	Amps	00	6A	√	X	X
30109	Total system reactive power demand. (2)	4	Float	VAr	00	6C	√	X	√
30111	Maximum total system reactive power demand(2)	4	Float	VAr	00	6E	√	X	√
30201	Line 1 to Line 2 volts.	4	Float	V	00	C8	√	√	X
30203	Line 2 to Line 3 volts.	4	Float	V	00	CA	√	√	X
30205	Line 3 to Line 1 volts.	4	Float	V	00	CC	√	√	X
30207	Average line to line volts.	4	Float	V	00	CE	√	√	X
30225	Neutral current.	4	Float	A	00	E0	√	X	X
30235	Phase 1 L/N volts THD	4	Float	%	00	EA	√	X	√
30237	Phase 2 L/N volts THD	4	Float	%	00	EC	√	X	X

30239	Phase 3 L/N volts THD	4	Float	%	00	EE	√	X	X
30241	Phase 1 Current THD	4	Float	%	00	F0	√	√	√
30243	Phase 2 Current THD	4	Float	%	00	F2	√	√	X
30245	Phase 3 Current THD	4	Float	%	00	F4	√	√	X
30249	Average line to neutral volts THD.	4	Float	%	00	F8	√	X	√
30251	Average line current THD.	4	Float	%	00	FA	√	√	√
30255	Total system power factor (1).	4	Float	Degrees	00	FE	√	√	√
30259	Phase 1 current demand.	4	Float	A	01	02	√	√	√
30261	Phase 2 current demand.	4	Float	A	01	04	√	√	X
30263	Phase 3 current demand.	4	Float	A	01	06	√	√	X
30265	Maximum phase 1 current demand.	4	Float	A	01	08	√	√	√
30267	Maximum phase 2 current demand.	4	Float	A	01	0A	√	√	X
30269	Maximum phase 3 current demand.	4	Float	A	01	0C	√	√	X
30335	Line 1 to line 2 volts THD.	4	Float	%	01	4E	√	√	X
30337	Line 2 to line 3 volts THD.	4	Float	%	01	50	√	√	X
30339	Line 3 to line 1 volts THD.	4	Float	%	01	52	√	√	X
30341	Average line to line volts THD.	4	Float	%	01	54	√	√	X
30343	Total kWh (3)	4	Float	kWh	01	56	√	√	√
30345	Total kVArh (3)	4	Float	kVArh	01	58	√	√	√
30347	L1 import kWh	4	Float	kWh	01	5A	√	√	√
30349	L2 import kWh	4	Float	kWh	01	5C	√	√	X
30351	L3 import kWh	4	Float	kWh	01	5E	√	√	X
30353	L1 export kWh	4	Float	kWh	01	60	√	√	√
30355	L2 export kWh	4	Float	kWh	01	62	√	√	X
30357	L3 export kWh	4	Float	kWh	01	64	√	√	X
30359	L1 total kWh	4	Float	kWh	01	66	√	√	√
30361	L2 total kWh	4	Float	kWh	01	68	√	√	X
30363	L3 total kWh	4	Float	kWh	01	6A	√	√	X
30365	L1 import kVArh	4	Float	kVArh	01	6C	√	√	√

30367	L2 import kVArh	4	Float	kVArh	01	6E	√	√	X
30369	L3 import kVArh	4	Float	kVArh	01	70	√	√	X
30371	L1 export kVArh	4	Float	kVArh	01	72	√	√	√
30373	L2 export kVArh	4	Float	kVArh	01	74	√	√	X
30375	L3 export kVArh	4	Float	kVArh	01	76	√	√	X
30377	L1 total kVArh	4	Float	kVArh	01	78	√	√	√
30379	L2 total kVArh	4	Float	kVArh	01	7A	√	√	X
30381	L3 total kVArh	4	Float	kVArh	01	7C	√	√	X
30385	Resettable total active energy	4	Float	kWh	01	80	√	√	√
30387	Resettable total reactive energy	4	Float	kVArh	01	82	√	√	√
30389	Resettable import active energy	4	Float	kWh	01	84	√	√	√
30391	Resettable export active energy	4	Float	kWh	01	86	√	√	√
30393	Resettable import reactive energy	4	Float	kVArh	01	88	√	√	√
30395	Resettable export reactive energy	4	Float	kVArh	01	8A	√	√	√

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. The power sum demand calculation is for import – export.
3. Total kWh / kVArh equals to Import + export.

2. Function Code = 0x10/0x03

Address Register	Parameter	Modbus Protocol Start Address Hex		Valid range	Mode
		High Byte	Low Byte		
40001	Demand Time	00	00	Read minutes into first demand calculation. When the demand time reaches the demand Period then the demand values are valid. **Length : 4 byte** **Data Format : Float**	ro
40003	Demand Period	00	02	Write demand period: 0, 5,8, 10, 15, 20, 30 or 60 minutes, default 60. Setting the period to 0 will cause the demand to show the current parameter value, and demand max to show the maximum	r/w

				parameter value since last demand reset. **Length : 4 byte** **Data Format : Float**	
40011	System Type	00	0A	Write system type: 1 = 1P2W; 2 = 3P3W; 3 = 3P4W,(default); 4 = 1P3W; **Length : 4 byte** **Data Format : Float** (KPPA is asked)	r/w
40013	Pulse output 1 Width	00	OC	Write relay on period in milliseconds: 60, 100 or 200, default 200. **Length : 4 byte** **Data Format : Float**	r/w
40015	Key Parameter Programming Authorization (KPPA)	00	0E	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. **Length : 4 byte** **Data Format : Float**	r/w
40023	Pulse 1 Divisor	00	16	Write pulse divisor index: n = 0 to 6 0 =0.001 kWh/imp 1 =0.01 kWh/imp 2 =0.1 kWh/imp 3 =1 kWh/imp 4 =10 kWh/imp 5 =100 kWh/imp 6 =1000 kWh/imp **Length : 4 byte** **Data Format : Float**	r/w
40025	Password	00	18	Write password for access to protected registers. Default: 1000. **Length: 4 byte** **Data Format: Float**	r/w
40047	PT1	00	2E	PT1 Range 100- 500000V, Default 230 **Length : 4 byte** **Data Format : Float** (KPPA is asked)	r/w

40049	PT2	00	30	PT2 Range 100- 480V, Default 230 **Length : 4 byte** **Data Format : Float** (KPPA is asked)	r/w
40051	CT1	00	32	CT1 Range 1-9999A，Default 5， **Length : 4 byte** **Data Format : Float** (KPPA is asked)	r/w
40053	CT2	00	34	CT2 Range: 1A or 5A , Default 5A **Length : 4 byte** **Data Format : Float** (KPPA is asked)	r/w
40057	Current Direction correction（when the external CT is connected reversely）	00	38	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 Default 0 **Length : 4 byte** **Data Format :Float** (KPPA is asked)	r/w
40061	Backlit time	00	3C	Default 60, unit: min Range 0~121， 0 means backlit always on 121 means backlit always off **Length : 4byte** **Data Format : Float**	r/w
461457	Reset historical data	F0	10	00 00 = reset demand info 00 03 = reset energy info **Length : 2 byte** **Data Format: Hex**	r/w
40087	Pulse 1 Energy Type	00	56	Write MODBUS Protocol input parameter for pulse out 1: 1: import active energy 2: total active energy 4: export active energy 5: import reactive energy	r/w

				6: total reactive energy, default 8: export reactive energy **Length : 4 byte** **Data Format : Float**	
464513	Serial number	FC	00	Serial number **Length : 4 byte** **Data Format : unsigned int32** **Note: Only read**	ro
464641	Firmware version	FC	80	Firmware version :XX YY XX: High Byte YY: Low Byte E.g.：XX YY = 01 02，Software version is 01.02 **Length : 2 byte** **Data Format : Hex** **Note: read only**	ro
464643	Hardware version	FC	82	Hardware version: XX YY XX: High Byte YY: Low Byte E.g.：XX YY = 01 02，Hardware version is 01.02 **Length : 2 byte** **Data Format : Hex** **Note: read only**	ro
465025	Active upload mode(1)	FE	00	Active upload mode 00 00 = active-upload off 00 55 = active-upload on **Length : 2 byte** **Data Format : Hex** (KPPA is asked)	r/w
465026	Interval of Active upload (1)	FE	01	Interval of Active upload Range：0~255，Unit：min **Length : 2 byte** **Data Format : Hex** (KPPA is asked)	r/w
465027	Active upload parameters (2)	FE	02	Active upload parameters Range：00 ~ 49，FF = invalid parameter, won't be uploaded An active upload window supports up to 30 parameter upload operations. **Length : 30 byte**	r/w

				Data Format : Hex (KPPA is asked)	
465043	Number of Registers in each active upload command (3)	FE	12	Under the active upload mode, to read/write how many registers are going to be read in one command. Range：3 ~ 8，default：3 **Length : 2 byte** **Data Format : Hex** (KPPA is asked)	r/w
465044	Offline detection time (4)	FE	13	LORAWAN Offline detection time。 Range：0~255, Unit：Min 0 = no detection。 **Length : 2 byte** **Data Format : Hex** (KPPA is asked)	r/w
465045	LoRaWAN Confirm mode	FE	14	LORAWAN message transfer mode 00 00 = Non-confirm mode 00 55 = confirm mode **Length : 2 byte** **Data Format : Hex** (KPPA is asked)	r/w

Note:

(1). When the active upload mode is turned on, the interval of active upload needs to be set to a value not equal to 0, otherwise the active upload function cannot be properly enabled.

(2). Active upload window represents a time window for the meter to start its active upload operation when the active upload interval is reached; During the active upload, the meter will upload in order according to the parameters set through register until the invalid parameter (FF) appears. Please refer to the following table 1 for the active upload parameters.

(3). This is to set the number of registers in each active upload. If the registers amount exceeds the set value. Meter will upload the parameters in stages. For example, if set 3 for the number of registers in each uploading command while the total quantity of registers is 10, then the meter will upload 3 registers each time and will have all the registers uploaded within 4 commands.

(4). Offline detection: the time is counted since the last data reception from the gateway. If over a period of time, the meter doesn't receive information from gateway, it will be judged as OFF LINE, and will re-Join to the network actively. This period of time is the off-line detection time.

Table1:

SDM630MCT-LORAWAN Active Upload Parameters					
Index Number		Parameter	Unit	Data format	Length (Byte)
Decimalism	Hex				
0	00	L1-N Voltage	V	Float	4
1	01	L2-N Voltage	V	Float	4
2	02	L3-N Voltage	V	Float	4
3	03	L1-2 Voltage	V	Float	4
4	04	L2-3 Voltage	V	Float	4
5	05	L3-1 Voltage	V	Float	4
6	06	Frequency	Hz	Float	4
7	07	L1 Current	A	Float	4
8	08	L2 Current	A	Float	4
9	09	L3 Current	A	Float	4
10	0A	Total Current	A	Float	4
11	0B	Neutral Current	A	Float	4
12	0C	L1 Power factor	None	Float	4
13	0D	L2 Power factor	None	Float	4
14	0E	L3 Power factor	None	Float	4
15	0F	Total Power factor	None	Float	4
16	10	L1 Active power	W	Float	4
17	11	L2 Active power	W	Float	4
18	12	L3 Active power	W	Float	4
19	13	Total Active power	W	Float	4
20	14	L1 Reactive power	var	Float	4
21	15	L2 Reactive power	var	Float	4
22	16	L3 Reactive power	var	Float	4
23	17	Total Reactive power	var	Float	4
24	18	L1 Apparent power	VA	Float	4
25	19	L2 apparent power	VA	Float	4
26	1A	L3 apparent power	VA	Float	4
27	1B	Total apparent power	VA	Float	4
28	1C	L1 Phase Angle	Degrees	Float	4
29	1D	L2 Phase Angle	Degrees	Float	4
30	1E	L3 Phase Angle	Degrees	Float	4
31	1F	System Phase Angle	Degrees	Float	4
32	20	Maximum total system power demand	W	Float	4
33	21	Maximum total system reactive power demand	var	Float	4
34	22	Maximum total system apparent power demand	VA	Float	4
35	23	Maximum L1 current demand	A	Float	4

36	24	Maximum L2 current demand	A	Float	4
37	25	Maximum L3 current demand	A	Float	4
38	26	Maximum neutral current demand	A	Float	4
39	27	Phase 1 L/N volts THD	%	Float	4
40	28	Phase 2 L/N volts THD	%	Float	4
41	29	Phase 3 L/N volts THD	%	Float	4
42	2A	Phase 1 Current THD	%	Float	4
43	2B	Phase 2 Current THD	%	Float	4
44	2C	Phase 3 Current THD	%	Float	4
45	2D	Import Active Energy	kWh	Float	4
46	2E	Export Active Energy	kWh	Float	4
47	2F	Total kWh	kWh	Float	4
48	30	Import Reactive Energy	kvarh	Float	4
49	31	Export Reactive Energy	kvarh	Float	4
50	32	Total kvarh	kvarh	Float	4
51	33	Total kvah	kVAh	Float	4
52	34	L1 import kwh	kWh	Float	4
53	35	L2 import kwh	kWh	Float	4
54	36	L3 import kwh	kWh	Float	4
55	37	L1 export kwh	kWh	Float	4
56	38	L2 export kwh	kWh	Float	4
57	39	L3 export kwh	kWh	Float	4
58	3A	L1 total kwh	kWh	Float	4
59	3B	L2 total kwh	kWh	Float	4
60	3C	L3 total kwh	kWh	Float	4
61	3D	L1 import kvarh	kvarh	Float	4
62	3E	L2 import kvarh	kvarh	Float	4
63	3F	L3 import kvarh	kvarh	Float	4
64	40	L1 export kvarh	kvarh	Float	4
65	41	L2 export kvarh	kvarh	Float	4
66	42	L3 export kvarh	kvarh	Float	4
67	43	L1 total kvarh	kvarh	Float	4
68	44	L2 total kvarh	kvarh	Float	4
69	45	L3 total kvarh	kvarh	Float	4
70	46	Active Energy by algebraic sum method	kWh	Float	4
71	47	Reactive Energy by algebraic sum method	kvarh	Float	4
72	48	Resettable total active energy	kWh	Float	4
73	49	Resettable total reactive energy	kvarh	Float	4
74	4A	Resettable import active energy	kWh	Float	4
75	4B	Resettable export active energy	kWh	Float	4
76	4C	Resettable import reactive	kvarh	Float	4

		energy			
77	4D	Resettable export reactive energy	kvarh	Float	4

Example: If the register is set as:

00 01 02 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF,

there are 3 active upload parameters:

L1-N Voltage，L2-N Voltage，L3-N Voltage

Data Format：

Serial Number of the energy meter （4byte）	Number of active upload parameter (1byte)	The bytes number of sent data	Data1 (4byte)	Data 2 (4byte)	Data 3 (4byte)	CRC (2byte)
Integer, Big-endian	N	Represent bytes number of the following data, not including CRC （Fixed= 0x0C）	Format: Float, Big-endian	Format: Float, Big-endian	Format: Float, Big-endian	Little-endian

Note：

1) For active uploading parameters, only 3 data can be uploaded at a time. If there are more than 3 parameters, the meter will be actively uploaded in batches (completed in each upload window. The operation method is: once the last uploading works successfully, the next data will upload immediately.
2) Sometimes, the meter will upload parameters in multiples. The number of active upload parameter (N) can help to check more clearly on which registers are uploaded.
   For example:
   NO.1: L1 voltage, L2 voltage, L3 voltgae,
   NO.2: L1 current, L2 current, L3 current
   NO.3: Total kWh, Total kVArh
   N=01 represent the uploading data of L1 Voltage, L2 Voltage, L3 voltage
3) The active upload parameters are uploaded in the order specified when the active upload data type is set.