

REN-380 Series Rail Mounting 3 Phase Energy Meter Manual



- Features:
- True effective value measurement, electric parameters display, Kwh display can be switched by panel key.
 - Optional multi-tariff rate function
 - Kwh pulse output
 - RS485 communication port, MODBUS-RTU or DL/T 645 protocol
 - In accordance with DL/T 614 and GB/T 17215

■ Specifications

Item	Specifications
Accuracy class (active/reactive)	0.5S/2.0 or 1.0/2.0
Rated Voltage	3X220V/380V (3 phase 4 wire)
Rated Current	1.5(6)A
Measure Net	3 phase 4 wire
Rated Frequency	50/60Hz
Work Voltage	Normal working voltage: 0.9Un-1.1Un , working voltage limit : 0.7Un-1.2Un
Start Current	0.004Ib
Power Consumption	Voltage circuit: < 5VA/phase Current circuit: < 4VA/phase
Energy Pulse Output	Active power pulse , optoelectronic isolation , open-collector output , pulse width=80ms±20ms
Digit Communication	RS485, MODBUS-RTU or DL/T645-1997, DL/T645-2007
Clock Error	≤0.5 Sec/Day
Electromagnetic Compatibility	Meet for all the standard requirements in GB/T 17215
Temperature Range	Normal working temperature: -10~+45℃, Working temperature limit: -20~+55℃, Storage temperature: -40~+70℃
Relative humidity	≤95%RH (No condensation)
Dimension(mm)	126LX88WX65H

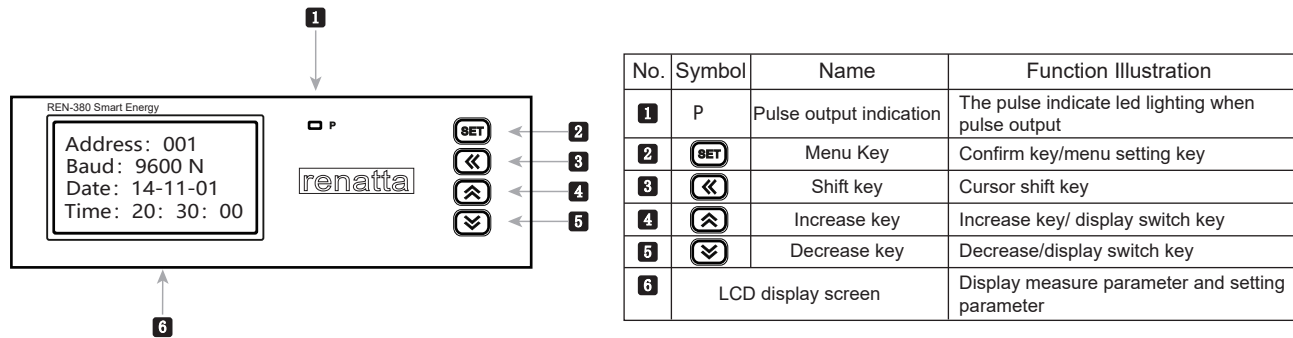
■ Function Illustration

Item	Function
Measure	Forward direction active energy and oppsite active energy accumulated separately
	Electric power is accumulated and stored in total, and T1, T2, T3, T4 four tariff rates
	Datasheet can be saved for 10 years after cutting off power.
Clock & tariff rate	Clock has calendar, timing and leap year shift function, clock error is within 0.5sec/day.
	Programable T1, T2, T3, T4 rate setting , can set 14 periods/day , time period interval is 15 minutes
Display	LCD display , white background light
	Red LED indicates the active energy pulse output
Energy Pulse Output	One active energy pulse output , used for meter cablibration or outside energy collection
Communication	Used for meter setting , remote meter reading , data collection ect
	Communication port: RS485
	Communication protocol : Modbus RTU or DL/T645-1997, DL/T645-2007
	Baud rate: 1200bps , 2400bps, 4800bps , 9600bps
Meter Programing	Date , time setting
	Communication address setting
	T1 , T2, T3, T4 tariff rate setting
	Kwh clearance to zero setting
	Meter programming is by pc software

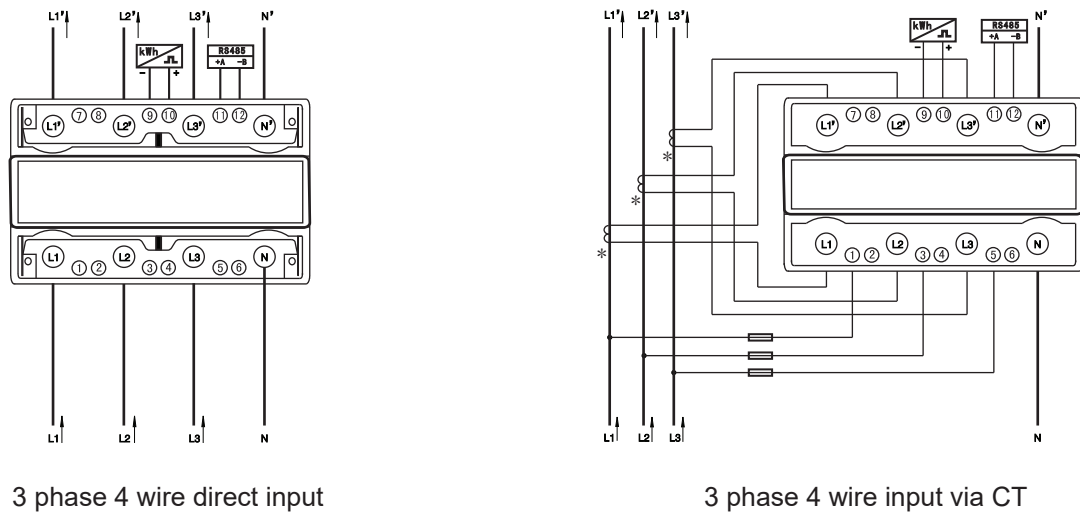
Model

Model	Accuracy	Rated Voltage	Rated current	Input type	Multi-tariff rate	Communication	Pulse constant
REN-380-DS	Active energy 1.0	3x220V/380V	1.5(6)A	Input via CT	Yes	MODBUS-RTU DL/T645-1997 DL/T645-2007	6400 imp/kWh

Panel Illustration

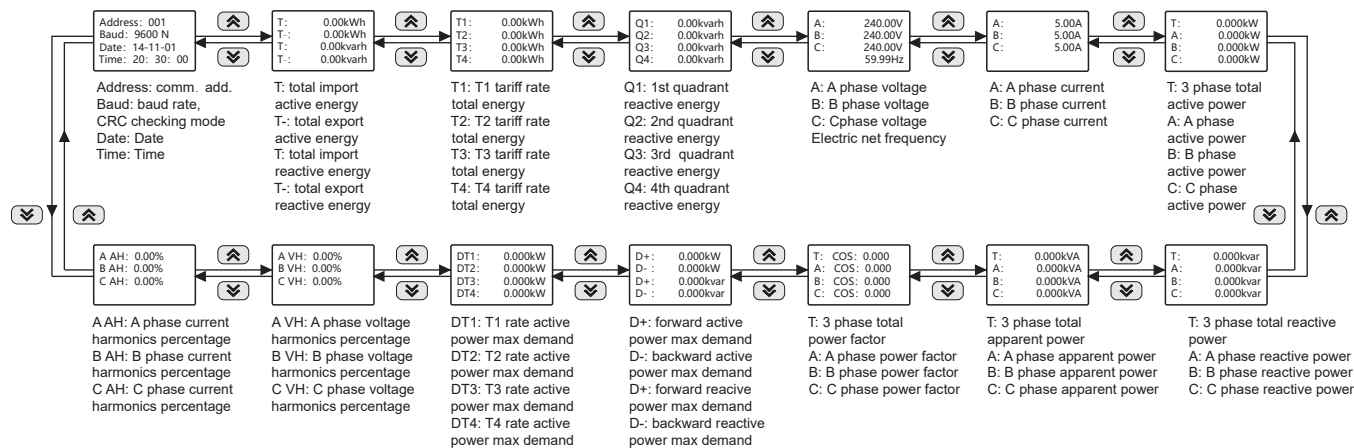


Wire Connection



Measure Display

1.Meter will display the following parameter in cycle(display interval is about 5S), User can press or to shift the display by manual.



No.	Address reflection	Variable name	Register number	Data type	Write/read	Remarks
121	0x0009	Voltage ratio	1	int	R\W	
122	0x000A	Current ratio	1	int		
123		Reserve				
124						
125	0x002A	Backlight delay time	1	int	R\W	Unit: minute
126	0x002B	Demand cycle	1	int	R\W	Unit: minute
127		Reserve				
128		Reserve				
129	0x0064	Comm. (high bit check mode, low bit baud rate)	1	int	R\W	0xCCBB CC = 0x00 No check BB = 0x10 4800bps BB = 0x20 9600bps
130		Reserve				
131	0x000E	Day period 1 high bit	1	int	R\W	
132	0x000F	Day period 1 low bit	1	int	R\W	000n: tariff rate No. mmhh: start time
133	0x0010	Day period 2 high bit	1	int	R\W	000n: tariff rate No.
134	0x0011	Day period 2 low bit	1	int	R\W	mmhh: start time
135	0x0012	Day period 3 high bit	1	int	R\W	000n: tariff rate No.
136	0x0013	Day period 3 low bit	1	int	R\W	mmhh: start time
137	0x0014	Day period 4 high bit	1	int	R\W	000n: tariff rate No.
138	0x0015	Day period 4 low bit	1	int	R\W	mmhh: start time
139	0x0016	Day period 5 high bit	1	int	R\W	000n: tariff rate No.
140	0x0017	Day period 5 low bit	1	int	R\W	mmhh: start time
141	0x0018	Day period 6 high bit	1	int	R\W	000n: tariff rate No.
142	0x0019	Day period 6 low bit	1	int	R\W	mmhh: start time
143	0x001A	Day period 7 high bit	1	int	R\W	000n: tariff rate No.
144	0x001B	Day period 7 low bit	1	int	R\W	mmhh: start time
145	0x001C	Day period 8 high bit	1	int	R\W	000n: tariff rate No.
146	0x001D	Day period 8 low bit	1	int	R\W	mmhh: start time
147	0x001E	Day period 9 high bit	1	int	R\W	000n: tariff rate No.
148	0x001F	Day period 9 low bit	1	int	R\W	mmhh: start time
149	0x0020	Day period 10 high bit	1	int	R\W	000n: tariff rate No.
150	0x0021	Day period 10 low bit	1	int	R\W	mmhh: start time
151	0x0022	Day period 11 high bit	1	int	R\W	000n: tariff rate No.
152	0x0023	Day period 11 low bit	1	int	R\W	mmhh: start time
153	0x0024	Day period 12 high bit	1	int	R\W	000n: tariff rate No.
154	0x0025	Day period 12 low bit	1	int	R\W	mmhh: start time
155	0x0026	Day period 13 high bit	1	int	R\W	000n: tariff rate No.
156	0x0027	Day period 13 low bit	1	int	R\W	mmhh: start time
157	0x0028	Day period 14 high bit	1	int	R\W	000n: tariff rate No.
158	0x0029	Day period 14 low bit	1	int	R\W	mmhh: start time
159		Reserve				

The program of achieving 16 bit CRC check co de
 unsigned int Get_CRC(uchar*pBuf,uchar num)

```

{
    unsigned i,j;
    unsigned int wCrc=0xFFFF;
    for(i=0;i<num;i++)
    {
        wCrc ^= (unsigned int)(pBuf[i]);
        for(j=0;j<8;j++)
        {
            if(wCrc & 1){wCrc>>=1; wCrc=0xA001;}
            else wCrc>>=1;
        }
    }
    return wCrc;
}

```

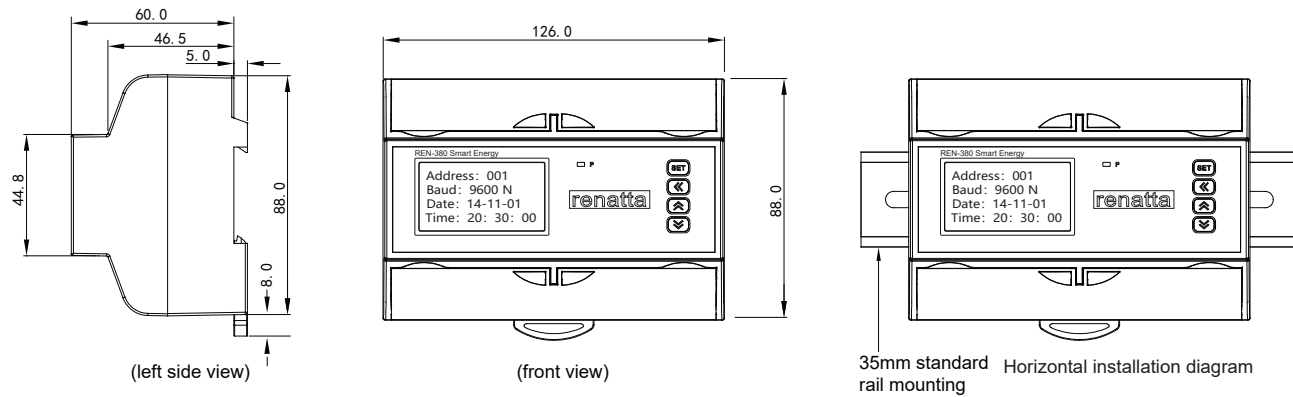
No.	Address reflection	Variable name	Register number	Data type	Write/read	Remarks
61	0x0192	Total power factor bit	1	int	R	(negative number is complement code) 0.001
62	0x0193	A phase power factor bit	1	int		
63	0x0194	B phase power factor bit	1	int		
64	0x0195	C phase power factor bit	1	int		
65	0x0199	Frequency	1	int	R	0.01Hz
66	0x019A	Total forward active energy max demand high bit	1	long	R	0.0001kW
67	0x019B	Total forward active energy max demand low bit	1			
68	0x01A1	T1 rate forward active energy max demand high bit	1	long		
69	0x01A2	T1 rate forward active energy max demand low bit	1			
70	0x01A8	T2 rate forward active energy max demand high bit	1	long		
71	0x01A9	T2 rate forward active energy max demand low bit	1			
72	0x01AF	T3 rate forward active energy max demand high bit	1	long		
73	0x01B0	T3 rate forward active energy max demand low bit	1			
74	0x01B6	T4 rate forward active energy max demand high bit	1	long	R	0.0001kW
75	0x01B7	T4 rate forward active energy max demand low bit	1			
76	0x01BD	Total backward active energy max demand high bit	1	long	R	0.0001kW
77	0x01BE	Total backward active energy max demand low bit	1			
78	0x01E0	Total forward reactive energy max demand high bit	1	long	R	(negative number is complement code) 0.0001kvar
79	0x01E1	Total forward reactive energy max demand low bit	1			
80	0x0203	Total backward reactive energy max demand high bit	1	long	R	(negative number is complement code) 0.0001kvar
81	0x0204	Total backward reactive energy max demand low bit	1			
82		Reserve				
83	0x0226	Line voltage Uab high bit	1	long	R	0.0001V
84	0x0227	Line voltage Uab low bit	1			
85	0x0228	Line voltage Ubc high bit	1	long	R	0.0001V
86	0x0229	Line voltage Ubc low bit	1			
87	0x022A	Line voltage Uca high bit	1	long	R	0.0001V
88	0x022B	Line voltage Uca low bit	1			
89	0x11E1	A phase voltage 1~21 harmonic content	1	int	R	0.01
90	0x11F5		1	int		
91	0x11F6	B phase voltage 1~21 harmonic content	1	int		
92	0x120A		1	int		
93	0x120B	C phase voltage 1~21 harmonic content	1	int	R	0.01
94	0x121F		1	int		
95	0x12E0	A phase current 1~21 harmonic content	1	int		
96	0x12F4		1	int		
97	0x12F5	B phase current 1~21 harmonic content	1	int		
98	0x1309		1	int		
99	0x130A	C phase current 1~21 harmonic content	1	int		
100	0x131E		1	int		
101	0x14E4	A phase voltage total harmonic content	1	int	R	0.01
102	0x14E5	B phase voltage total harmonic content	1	int		
103	0x14E6	C phase voltage total harmonic content	1	int		
104	0x14E7	A phase current total harmonic content	1	int	R	0.01
105	0x14E8	B phase current total harmonic content	1	int		
106	0x14E9	C phase current total harmonic content	1	int		
107		Reserve				
108		Reserve				
109		Reserve				
110		Reserve				
111		Reserve				
112		Reserve				
113	0x0000	Second	1	int	R/W	Compression BCD
114	0x0001	Minute	1	int		
115	0x0002	Hour	1	int		
116	0x0003	Week	1	int		
117	0x0004	Day	1	int		
118	0x0005	Month	1	int		
119	0x0006	Year	1	int	R/W	
120	0x0007	Communication address	1	int		

Menu Framework

- 1.In measure status, long press  more than 5 seconds to enter set menu.
2. In set menu, press  to move position , press  or  to modify , press  to confirm and enter next level menu.
3. After modifying the menu, long press  to exit the menu

No.	Menu	Default Setting	Set Range	Description
1	Password	0000	0 - 9999	Menu password. Input correct password ,if you want to make setting. (password:9180)
2	ADDR	001	1 - 255	Communication address setting
3	BAUD	09600 N	600 N - 19200 E	Baud rate& check mode (N:no check O:odd check E:even check)
4	PT	000001	1 - 999999	Voltage ratio
5	CT	000001	1 - 999999	Current ratio
6	DEM TIME	15	1 - 15	Demand cycle (unit:minute)
7	BL TIME	00	0 - 60	Backlight delay time(unit:minute). Set as 0, keep on lighting all the time
8	DEMAND CLEAR	NO	NO or YES	Clear demand statistics or not
9	ENERGY CLEAR	NO	NO or YES	Clear energy data or not
10	01-h:00 m:00 T:0	h:00 m:00 T:0 h: start hour of present period m: start minute of present period T: present period tariff rate	h:00 - 23 (hour) m:00 - 59 (minute) T:0 - 4 (tariff rate) Note: T=0, present period is not valid	Tariff rate period 1 parameters setting
11	02-h:00 m:00 T:0			Tariff rate period 2 parameters setting
⋮	⋮			⋮
23	14-h:00 m:00 T:0			Tariff rate period 14 parameters setting

Dimension



■ Communication protocol

☼ This energy meter adopts Modbus communication protocol, to process RS485 half-duplex communication;
Reading function code: 0x03, writing function code: 0x10; adopt 16 digit CRC check. The meter does not return for error check.

Data frame format:

Start bit	Data bit	Stop bit	Check bit
1	8	1	No

Abnormal communication processing:
When abnormal response, put 1 on the highest bit of function code. For example: if host request function code is 0x04, slave response function code is 0x84.

Error code type:
0x01--- Function code error :Meter received the unsupported function code
0x02--- Variable address error :Data location designated by host exceeds range of meter
0x03--- Variable value error : Data value sent from host exceeds the corresponding data range of meter
The first reading digit of negative data is 8.

1. Read multi – register
For example, host reads floating data Ua (A phase voltage is 220.0000V)
The address code of Ua is 0x016E, because Ua is double byte (4 Bytes), and seizes 2 data registers.
The decimal system 220.0000V is correspond to 0X0021 91C0.

Host request (Read multi – register)							
1	2	3	4	5	6	7	8
Meter add.	Function code	Start add. High bit	Start add. Low bit	Data byte length high bit	Data byte length low bit	CRC code low bit	CRC code high bit
0x01	0x03	0x01	0x6E	0x00	0x02	0xA4	0x2A

Slave normal answer(Read multi-register)								
1	2	3	4	5	6	7	10	11
Meter add.	Function code	Data byte number	Data 1 high byte	Data 1 low byte	Data 2 high byte	Data 2 low byte	CRC code low bit	CRC code high bit
0x01	0x03	0x04	0x00	0x21	0x91	0xC0	0xC7	0xF9

Function code of abnormal answer: (For example: host request function code is 0x04)

Slave abnormal answer (Read multi-register)				
1	2	3	8	9
Meter Add.	Function code	Error Code	CRC Code Low Bit	CRC Code High Bit
0x01	0x84	0x01	0x82	0xC0

2. Write multi-register
Eg: Host writes fixed data Year (Year data: 14 year)
Suppose the address code of Year is 0x0006, because Year is compression BCD format, seizes 1 data registers , decimalist code of 14 year is 0x0014.

Host request (write multi – register)										
1	2	3	4	5	6	7	8	9	10	11
Meter Add.	Function code	Start add. high bit	Start add. low bit	Data byte length high bit	Data byte length low bit	Date byte length	Data 1 hight bit	Data 1 low bit	Data 2 hight bit	Data 2 low bit
0x01	0x10	0x00	0x06	0x00	0x01	0x02	0x00	0x14	0xA6	0x39

Slave normal answer (write multi-register)							
1	2	3	4	5	6	7	8
Meter add.	Function code	Start add. high 8 bit	Start add. low 8 bit	Data byte length high bit	Data byte length low bit	CRC code low bit	CRC code high bit
0x01	0x10	0x00	0x06	0x00	0x01	0xE1	0xC8

Date position error answer: (eg.: host request write address index is 0x0050)

Slave abnormal answer (write multi-register)				
1	2	3	4	5
Meter add.	Function code	Error code	CRC code low bit	CRC code high bit
0x01	0x90	0x02	0xCD	0xC1

No.	Address reflection	Variable name	Register number	Data type	Write/read	Remarks
1	0x0100	Total active energy high bit	1	long	R	(negative number is complement code) 0.01kWh
2	0x0101	Total active energy low bit	1			
3	0x0102	T1 tariff rate total active energy high bit	1	long		
4	0x0103	T1 tariff rate total active energy low bit	1			
5	0x0104	T2 tariff rate total active energy high bit	1	long		
6	0x0105	T2 tariff rate total active energy low bit	1			
7	0x0106	T3 tariff rate total active energy high bit	1	long		
8	0x0107	T3 tariff rate total active energy low bit	1			
9	0x0108	T4 tariff rate total active energy high bit	1	long		
10	0x0109	T4 tariff rate total active energy low bit	1			
11	0x0114	Backward total active energy high bit	1	long		
12	0x0115	Backward total active energy low bit	1			
13	0x011E	Total reactive energy high bit	1	long	R	(negative number is complement code) 0.01kvarh
14	0x011F	Total reactive energy low bit	1			
15	0x0128	Backward total reactive energy high bit	1	long		
16	0x0129	Backward total reactive energy low bit	1			
17	0x0132	1st quadrant total reactive energy high bit	1	long		
18	0x0133	1st quadrant total reactive energy low bit	1			
19	0x013C	2nd quadrant total reactive energy high bit	1	long		
20	0x013D	2nd quadrant total reactive energy low bit	1			
21	0x0146	3rd quadrant total reactive energy high bit	1	long		
22	0x0147	3rd quadrant total reactive energy low bit	1			
23	0x0150	4th quadrant total reactive energy high bit	1	long		
24	0x0151	4th quadrant total reactive energy low bit	1			
25	0x016E	A phase voltage high bit	1	long	R	0.0001V
26	0x016F	A phase voltage low bit	1			
27	0x0170	B phase voltage high bit	1	long		
28	0x0171	B phase voltage low bit	1			
29	0x0172	C phase voltage high bit	1	long		
30	0x0173	C phase voltage low bit	1			
31	0x0174	A phase current high bit	1	long	R	0.0001A
32	0x0175	A phase current low bit	1			
33	0x0176	B phase current high bit	1	long		
34	0x0177	B phase current low bit	1			
35	0x0178	C phase current high bit	1	long		
36	0x0179	C phase current low bit	1			
37	0x017A	Total active power high bit	1	long	R	(negative number is complement code) 0.0001kW
38	0x017B	Total active power low bit	1			
39	0x017C	A phase active power high bit	1	long		
40	0x017D	A phase active power low bit	1			
41	0x017E	B phase active power high bit	1	long		
42	0x017F	B phase active power low bit	1			
43	0x0180	C phase active power high bit	1	long		
44	0x0181	C phase active power low bit	1			
45	0x0182	Total reactive power high bit	1	long	R	(negative number is complement code) 0.0001kvar
46	0x0183	Total reactive power low bit	1			
47	0x0184	A phase reactive power high bit	1	long		
48	0x0185	A phase reactive power low bit	1			
49	0x0186	B phase reactive power high bit	1	long		
50	0x0187	B phase reactive power low bit	1			
51	0x0188	C phase reactive power high bit	1	long		
52	0x0189	C phase reactive power low bit	1			
53	0x018A	Total apparent power high bit	1	long	R	0.0001kVA
54	0x018B	Total apparent power low bit	1			
55	0x018C	A phase apparent power high bit	1	long		
56	0x018D	A phase apparent power low bit	1			
57	0x018E	B phase apparent power high bit	1	long		
58	0x018F	B phase apparent power low bit	1			
59	0x0190	C phase apparent power high bit	1	long		
60	0x0191	C phase apparent power low bit	1			