USER MANUAL

Three phase multifunction din rail meter SMART VEN580D

SMART VEN580 (CT CONNECTION TYPE)
SMART VEN580D (DIRECT CONNECTION TYPE)

1 Safety instructions
Information for Your Own Safety

This manual does not contain all of the safety measures operating the equipment (module, device) for different conditions and requirements. However, it does contain information, which you must know for your own safety and to avoid damages.
This information is highlighted by a warning triangle indicating the degree of potential danger.

Warning

This means that failure to observe the instruction can result in death, serious injury or considerable material damage

Caution

This means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage.

Qualified personnel

Operation of the equipment (module, device) described in this manual may only be performed by qualified personnel. Qualified personnel in this manual means person who is authorized to commission, start up, ground and label devices, systems and circuits according to safety and Regulatory standards.

Use for the intended purpose

The equipment (device, module) may only be used for the application specified in the catalogue and the user manual, and only be connected with devices and components recommended and approved by Smartcontroller.

Proper handling

The prerequisites for perfect, reliable operation of the product are proper transport, proper storage, installation and proper operation and maintenance. When operating electrical equipment, parts of this equipment automatically carry dangerous voltages. Improper handling can therefore result in serious injuries or material damage.

- Use only isolating tools.
- Do not connect while circuit is live (hot).
- Place the meter only in dry surroundings.
- Do not mount the meter in an explosive area or expose the meter to dust, mildew and insects.
- Make sure the wires are suitable for the maximum current of this meter.
- Make sure the AC wires are connected correctly before activating the current/voltage to the meter.
- Do not touch the meter connecting clamps directly with metal, blank wire and your bare hands as you may get electrical shock.
- Make sure the protection cover is placed after installation.
- Qualified personnel should only do installation, maintenance and reparation.
- Never break the seals and open the front cover as this might influence the function of the meter, and will cause no warranty.
- Do not drop, or allow strong physical impact on the meter as the high precisely components inside may be damaged.

Disclaimer

We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible.

However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors

Contained in the information given. The data in this manual is checked regularly and the necessary corrections are included in subsequent editions. We are grateful for any improvements that you suggest.

Subject to technical modifications without prior notice.

Product Overview

The Smartcontroller SMART VEN580 SERIES Multi-function is a three-phase DIN rail power quality meter with multi-tariff. Output is LCD displayed and the data can be transported by isolated RS485. The meter is provided with a non-volatile memory system that ensures that the readings are not lost or altered when power off.

The SMART VEN580 has both direct connection version and CT connection version. The direct connection version meter measures up to 100A load. And the CT connection type requests an external current transformer with 5A secondary input.

Although we produce the SMART VEN580 meter according to IEC 62053-21 and our quality inspection is very accurate there might always be a possibility that your product shows a fault or failure for which we do apologize. Under normal conditions your product should give you years of benefit and pleasure. In case there is a problem with the energy meter you should contact your dealer immediately. All energy meters are sealed with a special seal. Once this seal is broken there is no possibility to claim for warranty. Therefore NEVER open an energy meter or break the seal of the energy meter. The warranty time is 18 months, after installation, and only valid for construction faults.

Performance criteria

Operating humidity	≤ 85%
Storage humidity	≤ 95%
Operating temperature	-20°C - +50°C
Storage temperature	-30°C - +70°C
International standard	IEC 62053-21 IEC61010

Meter specifications

Meter type	SMART VEN580 (LCD display)
Nominal voltage (Un)	230/400V AC (3~) ; 110/190V AC (3~)
Operational voltage	161/279 – 300/520V AC (3~) ; 77/133 – 143/247V AC

Insulation capabilities	4KV for 1 minute
- AC voltage withstand	6KV – 1.2μS waveform
- Impulse voltage withstand	
Basic current (Ib)	1.5A
- CT type	10A
- Directly connect	
Maximum rated current (Imax)	6A
- CT type	100A
- Directly connect	0.4% Ib- Imax
Operational current range	20Imax for 0.01s
Over current withstand	50Hz ±10%
Operational frequency range	≤2W / 10VA per phase
Internal power consumption	
Test output flash rate (PULSE LED)	3200imp/kWh
- CT type	400imp/kWh
- Directly connect	
Test pulse output rate (pins 8 & 9)	3200imp/kWh
- CT type	400imp/kWh
- Directly connect	Flashing at load running
Consumption indicator (PULSE & SO LED)	Flashing at communication running
Communication indicator	RS485 and far infrared
Data communication port	The data can be stored more than
Data save	20 years when power off

Accuracy class

Voltage, LN & LL (Phase1, 2,3)	±0.5%
Amps (Phase 1,2,3)	±0.5%
PF (Phase 1,2,3 &Σ)	±0.5%
Active power (Phase 1,2,3&Σ)	±0.5%
Reactive power (Phase 1,2,3&Σ)	±1%
Apparent power (Phase 1,2,3&Σ)	±1%
Frequency	±0.5%
Active energy	± 1%
Reactive energy	±1%
Protection against penetration of dust and water	IP51
Insulating encased meter of protective class	⊠

RS485 Communication

Bus type	RS485
Protocol	MODBUS RTU with 16 bit CRC & DL/T645
Baud rate	1200(default), 2400, 4800,9600
Address range	0-247 user settable
Bus loading	32 meters per bus
Rage	1200m
Parity	Even
Data bit	8
Stop bit	1

Far Infrared communication

Infrared wavelengths	900- 1000nm
Baud rate	1200bps (default), 9600bps (optional)
Communication distance	5m
Communication angle	-15°~+15°
Protocol	MODBUS RTU with 16 bit CRC & DL/T645

Tariff specifications

Tariff number	4
Time segments	10
Clock accuracy	≤0.5S (every 24 hours)
Battery Voltage	3.6V DC, ≥1200mAh

Basic errors

With balanced loads

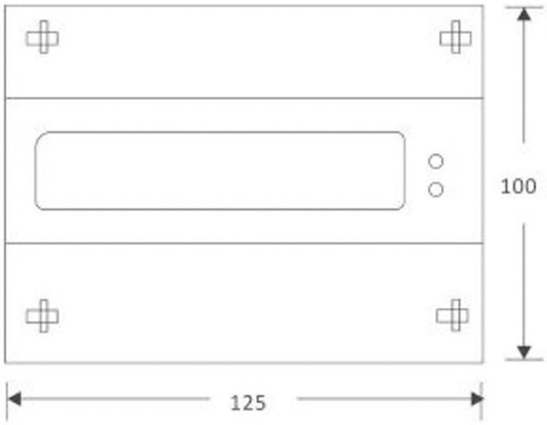
0.05Ib	Cosφ = 1	±1.5%
0.1Ib	Cosφ = 0.5L	±1.5%
	Cosφ = 0.8C	±1.5%
0.1Ib - Imax	Cosφ = 1	±1.0%
0.2Ib - Imax	Cosφ = 0.5L	±1.0%
	Cosφ = 0.8C	±1.0%

With single phase load

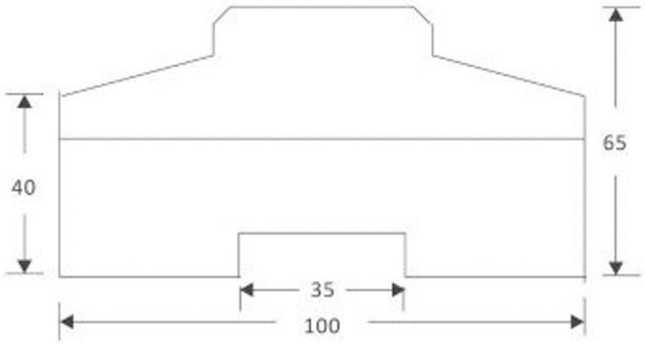
0.1Ib - Imax	Cosφ = 1	±2.0%
0.2Ib - Imax	Cosφ = 0.5L	±2.0%

Materials and Dimension

Front panel	PC inflammable retarding
Cover	ABS inflammable retarding
Base	ABS inflammable retarding
Security hasp	ABS inflammable retarding



front view



laterial view

Height	100 mm
Width	125 mm
Depth	65 mm
Weight	0.7 Kg (net)

Installation

Caution

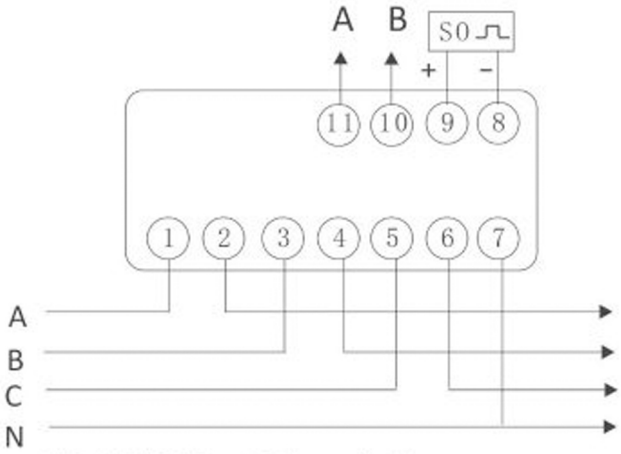
- Turn off all the power before working on it.
- Always use a properly rated voltage-sensing device to confirm that power is off

Warning

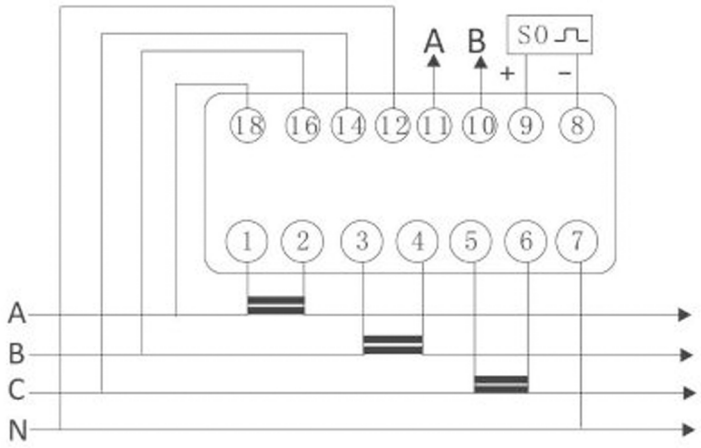
- Qualified personnel familiar with applicable codes and regulations should perform installation.
- Use isolated tools to install the meter.
- Fuse or thermal cut-off or single-pole circuit breaker can't be fitted on the supply line and not the neutral line.

- We recommend that the connecting wire, which is used to connect the meter to the outside circuit, should be sized according to local codes and regulations for the amp city of the circuit breaker or over current device used in the circuit.
- An external switch or a circuit breaker should be installed on the inlet wire, which will be used as a disconnection device for the meter. And there it is recommended that the switch or circuit breaker be near the meter so that it is more convenience for the operator. The switch or circuit breaker should comply with the specifications of the buildings electrical design and all local regulations.
- An external fuse or thermal cut-off which will be used as a over current protection device for the meter must be installed on the supply side wire, and it is recommended that the over current protection device is near the meter so that it is more convenience for the operator. The over current protection device should comply with the specifications of the buildings electrical design and all local regulations.
- This meter can be installed indoor directly, or in a meter box, which is waterproofed outdoor, subject to local codes and regulations.
- To prevent tampering, secure the meter with a padlock or a similar device.
- The meter has to be installed against a wall, which is fire resistant.
- The meter has to be installed in a good ventilated and dry place.
- The meter has to be installed in a protection box when placed in dangerous or dusty environment.
- The meter can be installed and used after being tested and sealed with a letterpress printing.
- The meter can be installed on a 35mm DIN rail or direct on a meter board with screws.

- The meter should be installed in an available height so that it is easy to read.
- When the meter is installed in an area with frequent surges due to e.g. Thunderstorms, welding machines, inverters etc., protect the meter with Surge Protection Devices
- After finishing installation, the meter must be sealed to prevent tampering.
- Connection of the wires should be done in accordance with the underneath connection diagram.



1/2 A IN/OUT 7 Neutral wire
3/4 B IN/OUT 8/9 Test pulse output contact
5/6 C IN/OUT 10/11 Rs485 port



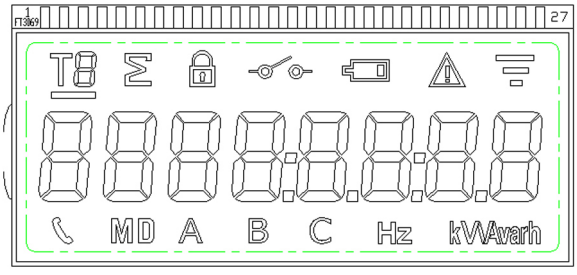
1/2 3/4 5/6 three phase CT input 8/9 pulse output
10/11 Rs485 port 12 Neutral Line
14 16 18 three phase voltage input

Display Content

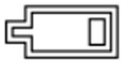
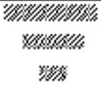
Consumption indication

On the SMART VEN580 front panel, there are three LEDs, which are indicators for energy pulse, communications, and Alarms. The constant of the impulse is shown on the nameplate of the meter.

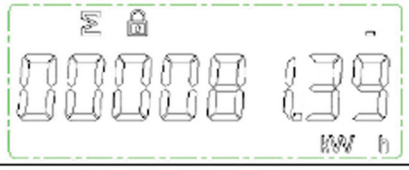
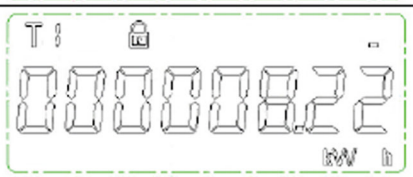
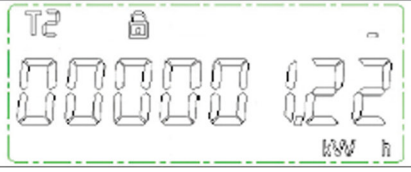
Reading the meter:

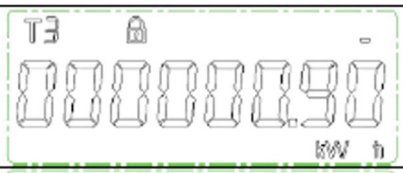
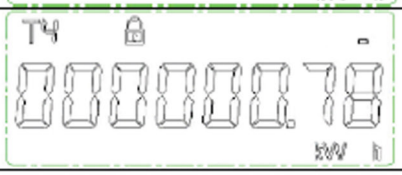
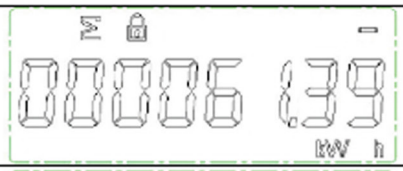
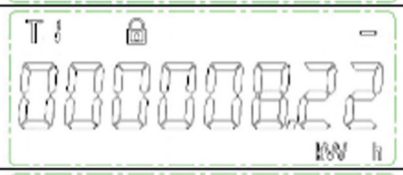
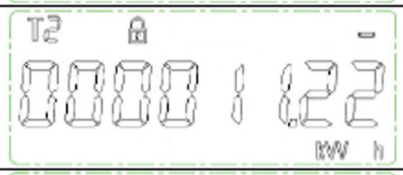
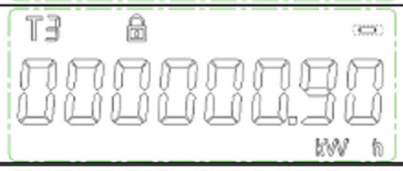
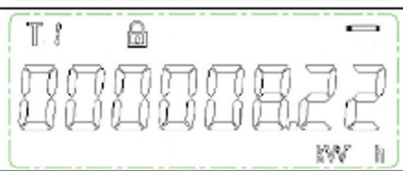


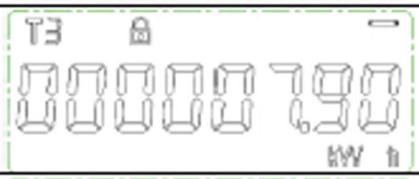
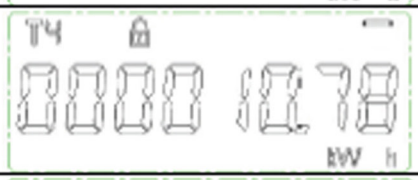
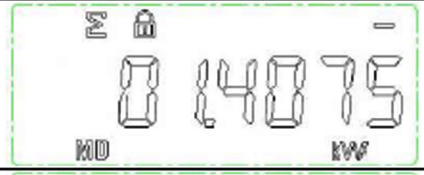
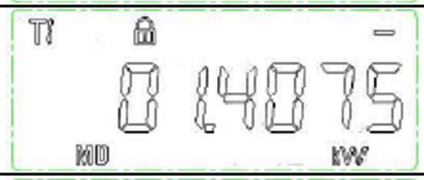
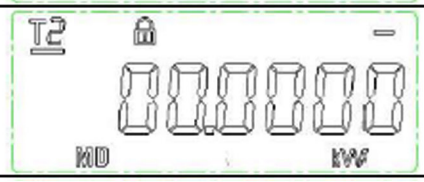
DESCRIPTION OF LCD SYMBOLS DISPLAYED

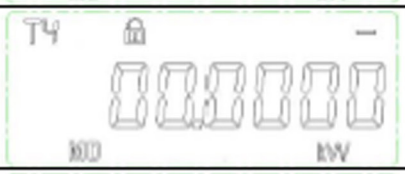
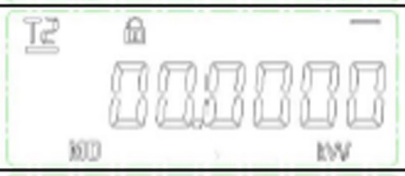
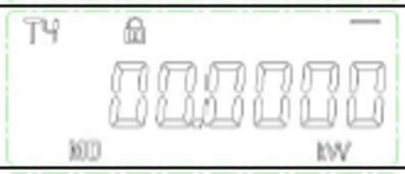
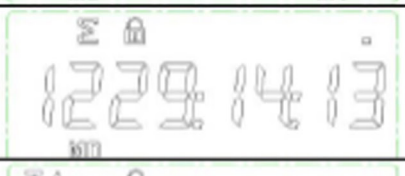
Symbol	Description
kWh	Unit indicator： kWh—active energy kW—active power
kvar	Unit indicator ： kvar—reactive power
kvA	Unit indicator ： KVA — apparent energy
	Displayed: not allowed programming Disappear: allow programming
	Battery status:3.6V When the battery voltage is low, flashes show
	LCD alarm indicator
	Communication symbols（ When communicating, it flashed ）， For 485 and infrared communication interface in communication instructions
MD	Max demand
	Tariff: T1, T2, T3, T4
	 this month  last 1 month  last 2 month

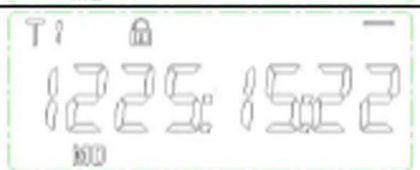
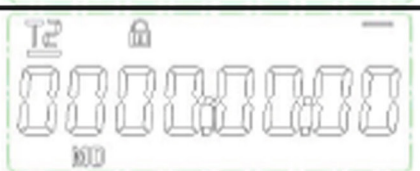
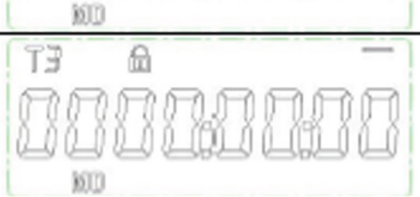
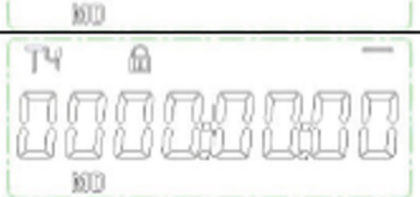
Display Content

Item	Description	Format	HEX	LCD Display
1	Current Total Active Energy	xxxxxx.xx kWh	9010H	
2	Current Active Energy of Tariff 1	xxxxxx.xx kWh	9011H	
3	Current Active Energy of Tariff 2	xxxxxx.xx kWh	9012H	

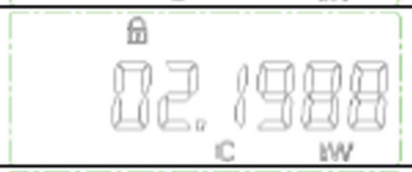
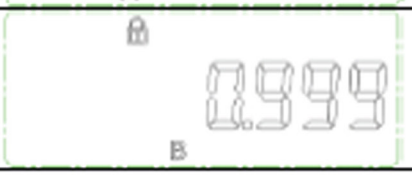
4	Current Active Energy of Tariff 3	xxxxxx.xx kWh	9013H	
5	Current Active Energy of Tariff 4	xxxxxx.xx kWh	9014H	
6	Total active energy of last month	xxxxxx.xx kWh	9410H	
7	Active energy of Tariff one of last month	xxxxxx.xx kWh	9411H	
8	Active energy of Tariff two of last month	xxxxxx.xx kWh	9412H	
9	Active energy of Tariff three of last month	xxxxxx.xx kWh	9413H	
10	Active energy of Tariff four of last month	xxxxxx.xx kWh	9414H	
11	Total active energy of last-last-month	xxxxxx.xx kWh	9810H	
12	Total active energy of tariff one of last-last-month	xxxxxx.xx kWh	9811H	

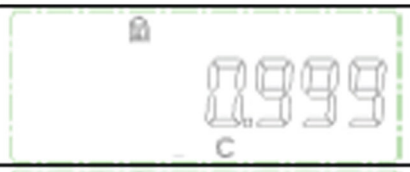
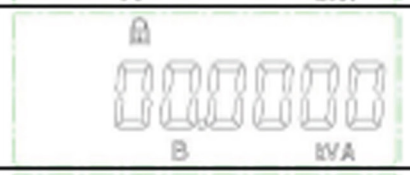
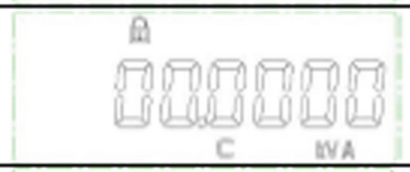
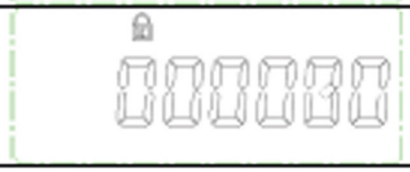
13	Total active energy of tariff two of ast-last-month	xxxxxx.xx kWh	9812H	
14	Total active energy of tariff three of last-last-month	xxxxxx.xx kWh	9813H	
15	Total active energy of tariff four of last-last-month	xxxxxx.xx kWh	9814H	
16	Current Max demand for active power	xx.xxxx kW	A010H	
17	Current Max demand for active power of tariff 1	xx.xxxx Kw	A011H	
18	Current Max demand for active power of tariff 2	xx.xxxx kW	A012H	
19	Current Max demand for active power of tariff 3	xx.xxxx kW	A013H	
20	Current Max demand for active power of tariff 4	xx.xxxx kW	A014H	
21	Max demand for active power of last month	xx.xxxx kW	A410H	
22	Max demand for active power of Tariff 1 of last month	xx.xxxx Kw	A411H	
23	Max demand for active power of Tariff 2 of last month	xx.xxxx kW	A412H	

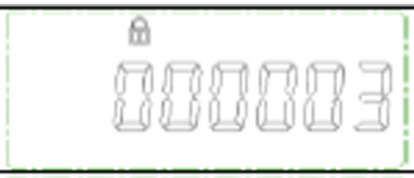
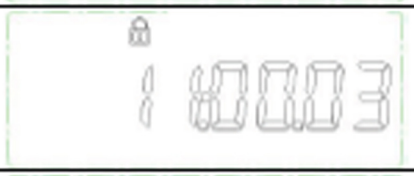
24	Max demand for active power of Tariff 3 of last month	xx.xxxx kW	A413H	
25	Max demand for active power of Tariff 4 of last month	xx.xxxx kW	A414H	
26	Max demand for active power of last-last-month	xx.xxxx kW	A810H	
27	Max demand for active power of Tariff 1 of last-last- month	xx.xxxx Kw	A811H	
28	Max demand for active power of Tariff 2 of last-last- month	xx.xxxx kW	A812H	
29	Max demand for active power of Tariff 3 of last-last- month	xx.xxxx kW	A813H	
30	Max demand for active power of Tariff 4 of last-last- month	xx.xxxx kW	A814H	
31	Time of max, demand in current month	MMDD.HH:mm	B110H	
32	Time of max, demand of tariff 1 in current month	MMDD.HH:mm	B111H	
33	Time of max, demand of tariff 2 in current month	MMDD.HH:mm	B112H	
34	Time of max, demand of tariff 3 in current month	MMDD.HH:mm	B113H	

35	Time of max, demand of tariff 4 in current month	MMDD.HH:mm	B114H	
36	Time of max, demand in last month	MMDD.HH:mm	B410H	
37	Time of max. demand of tariff 1 in last month	MMDD.HH:mm	B411H	
38	Time of max, demand of tariff 2 in last month	MMDD.HH:mm	B412H	
39	Time of max, demand of tariff 3 in last month	MMDD.HH:mm	B413H	
40	Time of max, demand of tariff 4 in last month	MMDD.HH:mm	B414H	
41	Time of max, demand in last-last-month	MMDD.HH:mm	B810H	
42	Time of max, demand of tariff 1 in last-last-month	MMDD.HH:mm	B811H	
43	Time of max, demand of tariff 2 in last-last- month	MMDD.HH:mm	B812H	
44	Time of max, demand of tariff 3 in last-last- month	MMDD.HH:mm	B813H	
45	Time of max, demand of tariff 4 in last-last- month	MMDD.HH:mm	B814H	

46	Voltage of Phase A	XXXX V	B611H	
47	Voltage of Phase B	XXXXX V	B612H	
48	Voltage of Phase C	XXXX V	B613H	
49	Current of Phase A	XX. XX A	B621H	
50	Current of Phase B	XX. XX A	B622H	
51	Current of Phase C	XX. XX A	B623H	
52	Total active power	XX. XXXX kW	B630H	
53	Active power of phase A	XX. XXXX kW	B631H	
54	Active power of phase B	XX. XXXX kW	B632H	
55	Active power of phase C	XX. XXXX kW	B633H	
56	Polarity of active power	XX	B636H	

54	Active power of phase B	XX. XXXX kW	B632H	
55	Active power of phase C	XX. XXXX kW	B633H	
56	Polarity of active power	XX	B636H	
57	Total reactive power	XX. XX kvar	B640H	
58	Reactive power of phase A	XX. XX kvar	B641H	
59	Reactive power of phase B	XX. XX kvar	B642H	
60	Reactive power of phase C	XX. XX kvar	B643H	
61	Polarity of reactive power	XX	B644H	
62	Total CosΦ	X.XXX	B650H	
63	CosΦ of phase A	X.XXX	B651H	
64	CosΦ of phase B	X.XXX	B652H	

65	Cosϕ of phase C	X.XXX	B653H	
66	Total apparent power	XX . XXXX kVA	B660H	
67	Apparent power of phase A	XX . XXXX kVA	B661H	
68	Apparent power of phase B	XX . XXXX kVA	B662H	
69	Apparent power of phase C	XX . XXXX kVA	B663H	
70	Frequency	XX.XX	B664H	
71	3.6V battery voltage	X.X V	B673H	
72	Date	YYMM.DD	C010H	
73	Time	Hh:mm:ss	C011H	
74	Constant	NNNNNN imp/kWh	C030H	
75	Meter ID (High 6 digits)	NNNNNN	C032H	

76	Meter ID (Low 6 digits)	NNNNNN		
77	Automatic meter-reading date	DD.hh	C117H	
78	Current period and tariff			
79	Starting Time of period and tariff 1	HH:MM.NN	C331H	
80	Starting Time of period and tariff 2	HH:MM.NN	C332H	
81	Starting Time of period and tariff 3	HH:MM.NN	C333H	
82	Starting Time of period and tariff 4	HH:MM.NN	C334H	

OUTPUT

Pulse output

Smartcontroller SMART VEN580 DIN rail power quality meter is equipped with a pulse output which is fully separated from the inside circuit. That generates pulses in proportion to the measured energy. They are test pulse output (terminals 8 & 9). Usually, the test pulse output is used as testing accuracy or reading purpose in close quarters.
The test pulse output is a polarity dependent, passive transistor output requiring an external voltage source for correct operation. For this external voltage source, the voltage (Ui) should be 5-27V DC, and the maximum input current (Imax) should be 27mA DC. To connect the impulse output, connect 5-27V DC to connector 9 (anode), and the signal wire (S) to connector 8 (cathode). The meter pulses are indicated on the front panel.

Communication port

Smartcontroller SMART VEN580 has equipped a far infrared port and a RS485 port; we can program the meter's operation data or reading via these 2 ports. The communication protocol conforms to MODBUS RTU protocol.
All the technical setting is done through RS485 Modbus. When you need program t he meter, make sure you have unlock the meter.

 This symbol shall not show on the LCD. The way to unlock the meter is pressing the PRG button. As for the Modbus Protocol information, please check the "Modbus Protocol for SMART VEN580"

The default setting of the meter is: Address: 01
Baud rate: 1200bps
Parity: EVEN
Data bits: 8
Stop Bit: 1

Far infrared communication port

The far infrared communication port is on the left of LCD screen. It is infrared wireless communication port. The TP900 hand-held programmer can directly communicate the data between the meter and this port.
The data transmission speed is 1200bps (default).
The communication distance is not less than 5m

Rs485 output

RS485 communication port is between the meter terminals 11 and 10.
It is a synchronization wire port. Installing a software in PC, via RS485 adapter Connecting the terminal 11 and 10, PC can communicate with the meter immediately.

Communication Protocol

Smartcontroller SMART VEN580 has a RS485 port with Modbus RTU protocol.
RS485 is a balanced line, half-duplex transmission system allowing transmission distances of up to 1 km

PARAMETER	
Mode of Operation	Differential
Number of Drivers and Receivers	32 Drivers 32Receivers
Maximum Cable Length	1200m
Maximum Data Rate	10M baud
Maximum Common Mode Voltage	12V to -7V
Minimum Driver Output Levels(Loaded)	±1.5V
Minimum Driver Output Levels(Uploaded)	±6V
Drive load	Minimum 60 ohms
Driver Output Short Circuit Current Limit	150mA to Ghd 250mA to 12V 250mA to -7V
Minimum Receiver Input Resistance	12kohms
Receiver Sensitivity	±200mV

Further information relating to RS485 may be obtained from either the Smartcontroller directly or the various RS485 device manufacturers, for example Texas Instruments or Maxim Semiconductors. This list is not exhaustive.

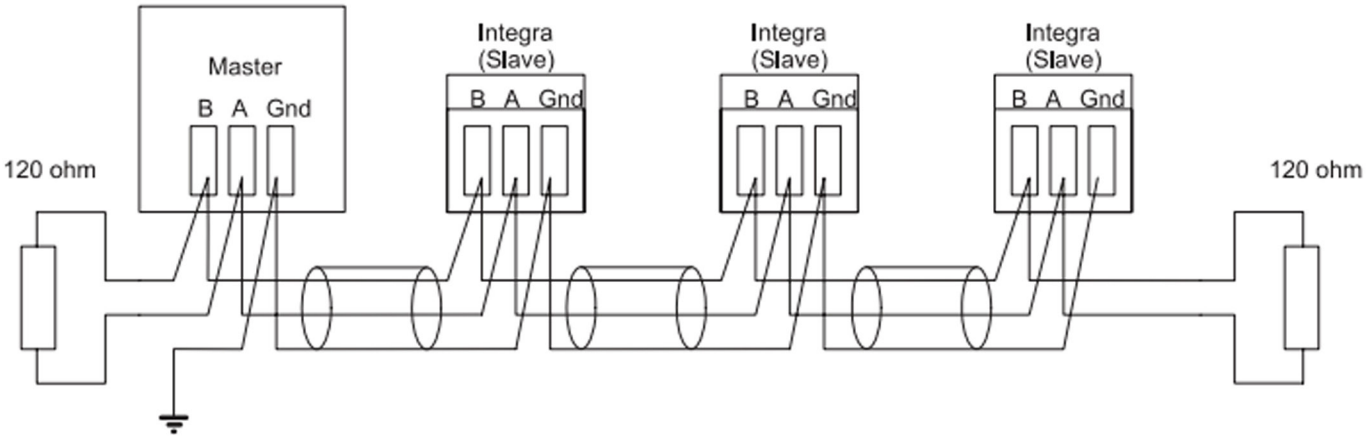
Half Duplex

Half duplex is a system in which one or more transmitters (talkers) can communicate with one or more receivers (listeners) with only one transmitter being active at any one time. For example, a "conversation" is started by asking a question, the person who has asked the question will then listen until he gets an answer or until he decides that the individual who was asked the question is not going to reply. In a 485 network the "master" will start the "conversation" with a "query" addressed to a specific "slave", the "master" will then listen for the "slave's" response. If the "slave" does not respond within a pre–defined period, (set by control software in the "master"), the "master" will abandon the "conversation".

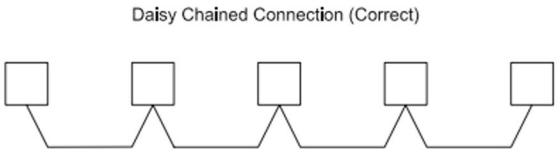
Connecting the Instruments

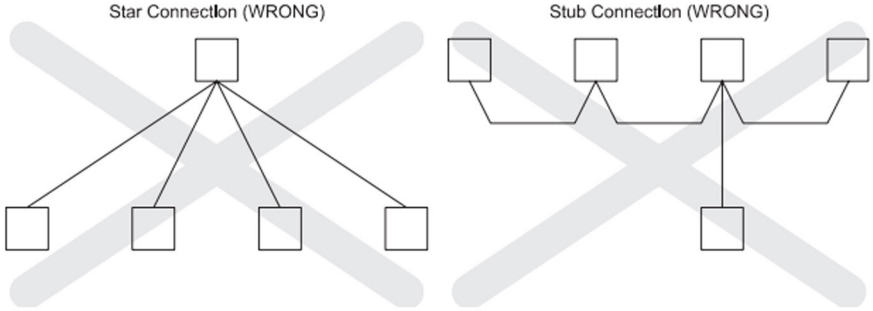
If connecting an RS485 network to a PC use caution if contemplating the use of an RS232 to 485 converter together with a USB to RS485 adapter. Consider either an RS232 to RS485 converter, connected directly to a suitable RS232 jack on the PC, or use a USB to RS485 converter or, for desktop PCs a suitable plug in RS485 card. (Many 232:485 converters draw power from the RS232 socket

If using a USB to RS232 adapter, the adapter may not have enough power available to run the 232:485 converter.)Screened twisted pair cable should be used. For longer cable runs or noisier environments, use of a cable specifically designed for RS485 may be necessary to achieve optimum performance. All "A" terminals should be connected together using one conductor of the twisted pair cable; all "B" terminals should be connected together using the other conductor in the pair. The cable screen should be connected to the "Gnd" terminals. A good quality (Single pair) or (Two pair) or similar cable with a characteristic impedance of 120 ohms is recommended. The cable should be terminated at each end with a 120 ohm, quarter watt (or greater) resistor. Note: Diagram shows wiring topology only. Always follow terminal identification on Integra Digital meter product label.



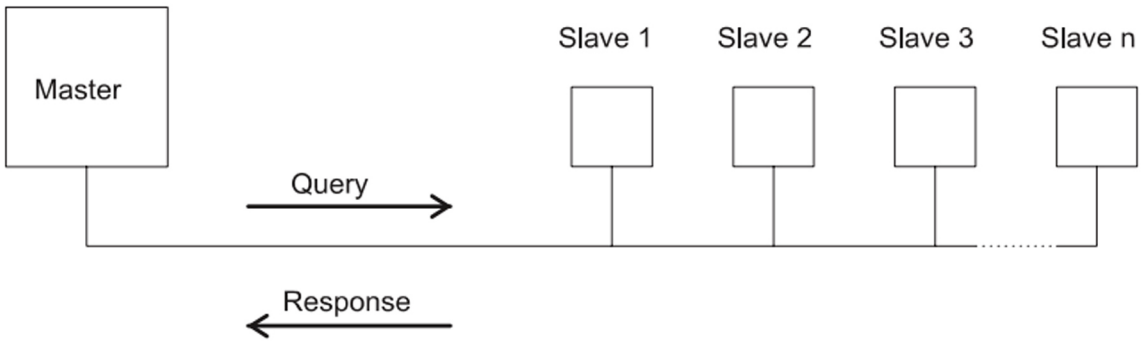
There must be no more than two wires connected to each terminal, this ensures that a "Daisy Chain or "straight line" configuration is used. A "Star" or a network with "Stubs (Tees)" is not recommended as reflections within the cable may





MODBUS Protocol General Information

Communication on a MODBUS Protocol Network is initiated (started) by a "Master" sending a query to a "Slave". The "Slave", which is constantly monitoring the network for queries addressed to it, will respond by performing the requested action and sending a response back to the "Master". Only the "Master" can initiate a query.



In the MODBUS Protocol the master can address individual slaves, or, using a special "Broadcast" address, can initiate a Broadcast message to all slaves. The Integra Digital meter does not support the broadcast address.

MODBUS Protocol Message Format

There are two MODBUS Protocol serial transmission modes;
ASCII and RTU.320c Meter support the support mode. The MODBUS Protocol defines the format for the master's query and the slave's response. The query contains the device (or broadcast) address, a function code defining the requested action, any data to be sent, and an error–checking field.

The response contains fields confirming the action taken, any data to be returned, and an error–checking field. If an error occurred in receipt of the message then the message is ignored, if the slave is unable to perform the requested action, then it will construct an error message and send it as its response. The following example illustrates a request for two 16–bit Modbus Protocol Registers

First Byte							Last Byte
Slave Address	Function Code	Start Address (Hi)	Start Address (Lo)	Number of Points (Hi)	Number of Points (Lo)	Error Check (Lo)	Error Check (Hi)

Slave Address: 8–bit value representing the slave being addresse (1 to 255), 0 is reserved for the Broadcast address. The Integra Digital meters do not support the broadcast address. Function Code: 8–bit value telling the addressed slave what action is to be performed. (3, 4, 8 or 16 are valid for Integra Digital meter)

Start Address (Hi): The top (most significant) eight bits of a 16–bit number specifying the start address of the data being requested.

Start Address (Lo): The bottom (least significant) eight bits of a 16–bit number specifying the start address of the data being requested. As registers are used in pairs and start at zero, then this must be an even number (Number of Points) (Hi): The top (most significant) eight bits of a 16–bit number specifying the number of registers being requested.

Number of Points (Lo): The bottom (least significant) eight bits of a 16–bit number specifying the number of registers being requested. As registers are used in pairs, then this must be an even number.

Error Check(Lo): The bottom (least significant) eight bits of a 16–bit number representing the error check value.

Error Check (Hi): The top (most significant) eight bits of a 16–bit number representing the error check value.

Response
The example illustrates the normal response to a request for two 16–bit Modbus Protocol Registers

First Byte								Last Byte
Slave Address	Functio n Code	Byte Count	First Register (Hi)	First Register (Lo)	Second Register (Hi)	Second Register (Lo)	Error Check (Lo)	Error Check (Hi)

Slave Address: 8–bit value representing the address of slave that is responding.Function Code: 8–bit value which, when a copy of the function code in the query, indicates The slave recognized the query and has responded. (See also Exception Response).
Byte Count: 8–bit value indicating the number of data bytes contained within this response
First Register (Hi)*: The top (most significant) eight bits of a 16–bit number representing the first Register requested in the query

First Register (Lo)*: The bottom (least significant) eight bits of a 16–bit number representing the First register requested in the query.
Second Register (Hi)*: The top (most significant) eight bits of a 16–bit number representing the Second register requested in the query.
Second Register (Lo)*: The bottom (least significant) eight bits of a 16–bit number representing the second register requested in the query.
Error Check (Lo): The bottom (least significant) eight bits of a 16–bit number representing the Errors check value.
Error Check (Hi): The top (most significant) eight bits of a 16–bit number representing the error Check value.

Register Map

The following table describes the global register map for the function Codes 0X03(register read) and 0x10(register write) for SMART VEN580 (Three phase DIN rail power quality meter with multi–tariff)

Address (hex)	Length (bytes)	Parameter Name	Access (R/W)	Function code	Data Format	Units
0x0010	4	Voltage L1	R	03	Hex	V
0x0012	4	Voltage L2	R	03	Hex	V
0x0014	4	Voltage L3	R	03	Hex	V
0X0016	4	Current L1	R	03	Hex	A
0X0018	4	Current L2	R	03	Hex	A
0X001A	4	Current L3	R	03	Hex	A
0X001C	4	Current Neutral	R	03	Hex	A
0X001E	4	Frequency	R	03	Hex	Hz

0x0020	4	Power Total	R	03	Hex	kW
0x0022	4	Reactive Power Total	R	03	Hex	KWh
0x0024	4	Import Energy	R	03	Hex	KWh
0x0026	4	Export Energy	R	03	Hex	KWh
0x0030	4	Power L1	R	03	Hex	kW
0x0032	4	Power L2	R	03	Hex	kW
0x0034	4	Power L3	R	03	Hex	kW
0x0036	4	Reactive Power L1	R	03	Hex	kvar
0x0038	4	Reactive Power L2	R	03	Hex	kvar
0x003A	4	Reactive Power L3	R	03	Hex	kvar
0x003C	4	Power Factor L1	R	03	Hex	
0x003E	4	Power Factor L2	R	03	Hex	
0x0040	4	Power Factor L3	R	03	Hex	
0x0042	4	Power Factor Total	R	03	Hex	
0x0044	4	Apparent Power L1	R	03	Hex	kVA
0x0046	4	Apparent Power L2	R	03	Hex	kVA
0x0048	4	Apparent Power L3	R	03	Hex	kVA
0x004A	4	Apparent Power Total	R	03	Hex	kVA
0x07D0	4	Import Energy Rate 1	R	03	Hex	KWh
0x07D2	4	Import Energy Rate 2	R	03	Hex	KWh
0x07D4	4	Import Energy Rate 3	R	03	Hex	KWh
0x07D6	4	Import Energy Rate 4	R	03	Hex	KWh
0x08D0	4	Export Energy Rate 1	R	03	Hex	KWh
0x08D2	4	Export Energy Rate 2	R	03	Hex	KWh
0x08D4	4	Export Energy Rate 3	R	03	Hex	KWh
0x08D6	4	Export Energy Rate 4	R	03	Hex	KWh
0XF000	4	Time	R/W		BCD	s--min--hour--week

				03/10		. Date—Month—Year--20
0XF111	20	Last 1 month positive Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF121	20	Last 2 month positive Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF131	20	Last 3 month positive Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF141	20	Last 4 month positive Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF151	20	Last 5 month positive Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF161	20	Last 6 month positive Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF171	20	Last 7 month positive Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF181	20	Last 8 month positive Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh

0XF191	20	Last 9 month positive Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF1A1	20	Last 10 month positive Energy (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF1B1	20	Last 11 month positive Energy (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF1C1	20	Last 12 month positive Energy (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF211	20	Last 1 month reverse Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF221	20	Last 2 month reverse Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF231	20	Last 3 month reverse Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF241	20	Last 4 month reverse Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF251	20	Last 5 month reverse Energy (Total 、	R	03	Hex	kWh

		Rate1、Rate2、Rate3、Rate4				
0XF261	20	Last 6 month reverse Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF271	20	Last 7 month reverse Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF281	20	Last 8 month reverse Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF291	20	Last 9 month reverse Energy (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF2A1	20	Last 10 month reverse Energy (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF2B1	20	Last 11 month reverse Energy (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF2C1	20	Last 12 month reverse Energy (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kWh
0XF311	20	Last 1 month positive max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW

0XF321	20	Last 2 month positive max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF331	20	Last 3 month positive max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF341	20	Last 4 month positive max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF351	20	Last 5 month positive max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF361	20	Last 6 month positive max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF371	20	Last 7 month positive max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF381	20	Last 8 month positive max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF391	20	Last 9 month positive max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF3A1	20	Last 10 month positive max Demand	R	03	Hex	kW

		(Total、Rate1、Rate2、Rate3、Rate4				
0XF3B1	20	Last 11 month positive max Demand (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF3C1	20	Last 12 month positive max Demand (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF411	20	Last 1 month reverse max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF421	20	Last 2 month reverse max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF431	20	Last 3 month reverse max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF451	20	Last 5 month reverse max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF461	20	Last 6 month reverse max Demand (Total、	R	03	Hex	kW
		Rate1、Rate2、Rate3、Rate4				
0XF471	20	Last 7 month reverse max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF481	20	Last 8 month reverse max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW

0XF491	20	Last 9 month reverse max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF4A1	20	Last 10 month reverse max Demand (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF4B1	20	Last 11 month reverse max Demand (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF4C1	20	Last 12 month reverse max Demand (Total 、Rate1、Rate2、Rate3、Rate4	R	03	Hex	kW
0XF500	4	Demand interval 、slide time 、Display time、Display interval	R/W	03/10	BCD	min-min-s-s
0XF600	4	Meter number	R/W	03/10	Hex	
0XF700	30	Tariff	R/W	03/10	BCD	Tariff number-Min-Hour
0XF800	2	Baud rate	W	10	Hex	0001H:1200bps 0002H:2400bps 0003H:4800bps 0004H:9600bps
0XFA01	20	Current month positive max Demand (Total、Rate1、Rate2、Rate3、Rate4	R	10	Hex	kW
0XFB01	20	Current month reverse max Demand (Total 、Rate1、Rate2、Rate3、Rate4	R	10	Hex	kW