# Single Phase Multifunction Din Rail Meter

# SDM320C

## User Manual V1.2


**Zhejiang Eastron Electronic Co., Ltd.**

# Statement



The company reserves the right to amend the product specifications in this manual without prior notice.

Before placing an order, please contact our company or local agent to get the latest specifications.

# Catalogue

# SDM320C

## Chapter 1. Product Overview

### 1.1 Product Introduction

The SDM320C is a single phase multi-function remote control energy meter. It measures all important electrical parameters, such as Active Energy (kWh), Current (A), Voltage (V), Frequency(Hz), Power Factor, Power Demand, import and export energy etc. With built-in relay inside, the meter can be remotely controlled to turn on or off the electricity supply via RS485. The user can also set alarm objects and alarm level, once the alarm is activated the relay will be turned off automatically.

### 1.2 Product Feature

- Max.100A Direct Connect
- Multifunction Measurement, Displays Scroll Settings
- Support AMR, SCADA system
- Remote Control with Bulit-in Relay
- Energy Resettable
- White Backlit LCD Display
- Din Rail Mounting 35mm

### 1.3 Application Scenarios

The SDM320C is suitable for scenarios where remote control switches are required.

## Chapter 2. Technical Specification

### 2.1 Technical Parameters

| | | |
|---|---|---|
| Input Voltage | Basic Voltage (Un): | 230V AC L-N, 120V AC L-N |
| | Operating Voltage Range: | ±20% of Un |
| | Measurement Form: | RMS |
| Input Current | Basic Current (Ib/ Iref): | 5A |
| | Max. current(Imax.): | 100A |
| | Over Current Withstand: | 20 Imax for 0.5s |
| Input Frequency | | 45-65 Hz |
| Insulation Capabilities | AC voltage withstand: | 4KV/1min |
| | Impulse Voltage Withstand: | 6kV – 1.2μS waveform |
| Power Consumption | | ≤ 2W |
| Pulse Port： | | Can be Set（See Operating Instructions for Details） |
| Pulse Output Rate | | 1000imp/kWh(Default) |
| Display | | LCD with White Backlit |
| Max reading | | 999999.99 kWh |

### 2.2 Measurement Accuracy

- Voltage: 0.5%
- Current: 0.5%
- Frequency: 0.1%
- Power Factor: 0.01
- Active Power: 0.5%
- Reactive Power: 1%
- Apparent power: 0.5%
- Active Energy: Class 0.5s
- Reactive Energy: Class 2

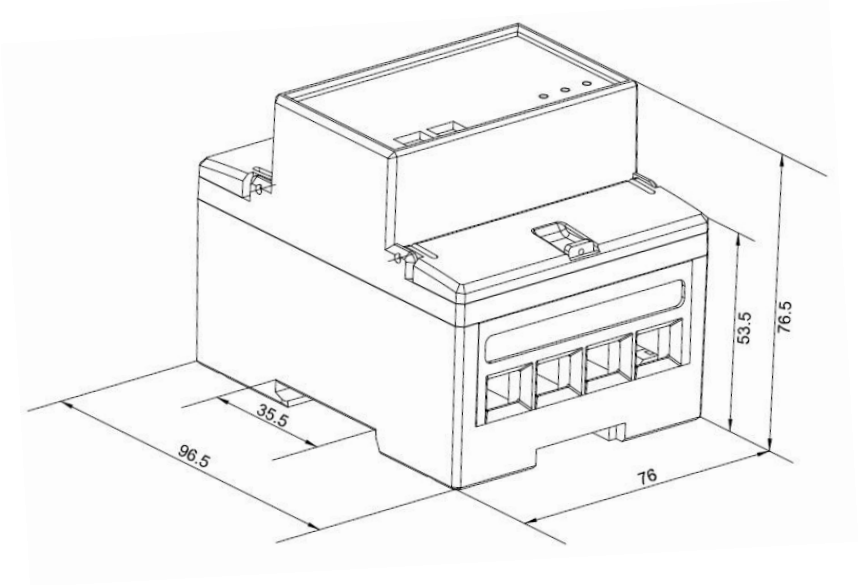
### 2.3 RS485 Communication

- Bus Type: RS485
- Protocol: Modbus RTU
- Baud Rate: 1200/2400/4800/9600bps (Default)
- Address Range: 1-247 (Default:1)
- Max. Bus loading: 64pcs
- Max. Bus loading: 1000m
- Parity: EVEN /ODD/NONE (Default)
- Data Bit: 8
- Stop Bit: 1

### 2.4 performance standard

- Operating Humidity: ≤90%
- Storage Humidity: ≤95%
- Operating Temperature: -25℃~+55℃
- Storage Temperature: -40℃~+70℃
- International Standard: GB-T 17215/ IEC62053-22
- Accuracy Class: Class 0.5S
- Installation Category: CAT II
- Protection against Penetration of Dust and Water: IP51 (Indoor)
- Insulating Encased Meter of Protective Class: II
- Altitude: ≤2000m

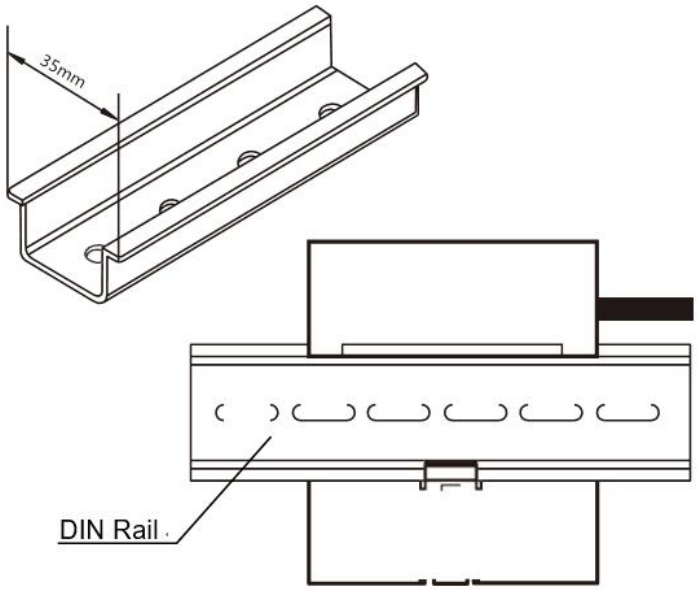
## 2.5 Dimensions



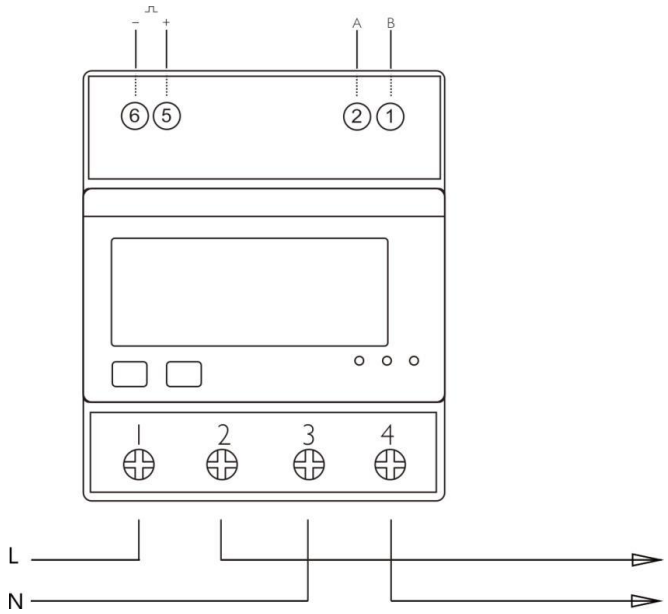

Height：76.5 mm

Width：96.5 mm

Length: 76 mm



### 2.6 Wiring diagram




## Chapter 3. Operating instructions

### 3.1 Panel Instructions and Key Operation Instructions

#### 3.1.1 Panel Instructions


After the correct connection, it will enter the normal measurement state, and the screen is displayed as follows:

| | |
|---|---|
| **1st Screen** | Start up Screens: All Display Segments |
| **2nd Screen** | Start up Screens: Software Version |

| | |
|---|---|
| **Failure Interface** | Display fault code: the display interface of fault code and normal display interface automatic scrolling display, with the switching time of 3s. Error-01 indicates that the relay cannot close. |

### 3.1.2 key Definitions：

| | |
|---|---|
|  | ◆ Measurement mode, short press: switch the display<br>◆ Setting mode: short press: switch menu or single-digit increases at the same level; Long press: return to the previous menu. |
|  | ◆ Measurement mode, short press: invalid; Long press: enter the setting mode;<br>◆ Setting mode, short press: move the cursor (the cursor is flashing digital bit); Long press: menu item selection confirmation and parameter modification confirmation. |

### 3.2 Measurement Parameters

View by pressing the button:

Total active energy → Import active energy → Export active energy → Total reactive energy → Import reactive energy →Export reactive energy → Voltage → Current → Active power → Power factor → Frequency → Maximum total active power demand → Communication Address → Communication Baud Rate → Communication Parity → Pulse Constant → Software Version

| Page | Display | Description |
|---|---|---|
| 1 |  | Total active energy<br>Example energy： 120.00kWh<br>  Represents relay open |
| 2 |  | Import active energy<br>Example： 60.00kWh |
| 3 |  | Export active energy<br>Example： 60.00kWh |
| 4 |  | Total reactive energy<br>Example： 200.00 kVArh |

| | | |
|---|---|---|
| 5 |  | Import reactive energy<br>Example：100.00 kVArh |
| 6 |  | Export reactive energy<br>Example：100.00kVArh |
| 7 |  | Voltage<br>Example：230V |
| 8 |  | Current<br>Example：50.809A |
| 9 |  | Active power<br>Example：1.800kW |
| 10 |  | Power factor<br>Example：1.000 |
| 11 |  | Frequency<br>Example：50.00hz |

| | | |
|---|---|---|
| 12 |  | Maximum total active power demand<br>Example：2.680kW |
| 13 |  | Communication Address<br>Example：001 |
| 14 |  | Communication Baud Rate<br>Example：9600 bps |
| 15 |  | Communication Parity<br>Example：N (None)<br>Note:<br>N represents none;<br>E represents even;<br>O represents odd |
| 16 |  | Pulse Constant<br>Example：1000imp/kWh<br>The current output mode of the optocoupler pulse is total active energy mode |
| 17 |  | Software Version<br>Example：02 01.00 |
| 18 |  | The failure interface<br>Example：ERR-01<br>Automatic display when fault occurs, and ERR-01 represents the relay cannot open. |

| | | |
|---|---|---|
| 19 |  | Over-limit alarm interface<br>In the measurement interface, if the upper right corner<br>appears  and  , it indicates that the measured value of the alarm object exceeds the alarm value.<br>The relay can be closed manually or by modbus communication after the troubleshooting. |

### 3.3 Basic Setting

Long press "  " for three seconds to enter the setting mode.

Note: If there is no operation in 1 minute under the setting mode, the meter will exit the setting interface and return to the display of total active power.

Instructions: Press the right button for 3s to enter into the setting mode, which is password protected and need to input the correct password.

Under the setting mode, press the left button for 3s to exit the setting mode.

Under the setting mode, press the right button for 3s to enter/confirm the setting. Short press on the left button to choose the setting;

Under the setting mode, short press on the left button to scroll or change the setting item;

| Page | Display | Description |
|---|---|---|
| 1 |  | Set successful, display: good |
| 2 |  | Setting failed, display: err |
| 3 |  | **Password**<br>Enter password into the Settings screen<br>Default password: 1000<br>Press  select number, press  select shift.<br>Then long press to enter the setup |

| | | |
|---|---|---|
| | | system. |
| 4 |  | **Communication Address**<br>Default Communication Address：001<br>Communication address range: 001~247 |
| 4-1 |  | Long press [↵] into the communication address setting interface, the current character flashing. Then, press [↻] select new communication address. Finally, long press [↵] to confirm Settings. |
| 5 |  | **Baud Rate**<br>Default baud rate: 9600bps<br>Baud rate range: 1200, 2400, 4800, 9600. |
| 5-1 |  | Long press [↵] enter baud rate setting interface, the current character flashing. Then, press [↻] select the new baud rate. Finally, long press [↵] confirm Settings. |
| 6 |  | **Parity Bit**<br>Default: None<br>Optional：None, Even, Odd |
| 6-1 |  | Long press [↵] enter the parity bit setting interface, the current character flashing. Then, press [↻] select the new parity bit. Finally, long press [↵] confirm Settings. |

| | | |
|---|---|---|
| 7 |  | **Pulse Constant**<br>Default: 1000imp/kwh<br>Optional：1000, 100,10,1. |
| 7-1 |  | Long press [↵] into the constant setting interface, the current character flashing.<br>Then, press [↻] select the new constant.<br>Finally, long press [↵] confirm Settings. |
| 8 |  | **pulse width**<br>Default: 100ms<br>Optional:200, 100,60.<br>If the pulse constant is equal to 1000imp/kWh, the setting interface cannot be set to 200ms at this time. |
| 8-1 |  | Long press [↵] enter pulse width setting interface, the current character flashing.<br>Then, press [↻] select the new pulse width.<br>Finally, long press [↵] confirm Settings. |
| 9 |  | **Pulse output type**<br>Default：P（Total active energy）<br>Option:<br>P: Total Active Energy<br>Q: Total Reactive Energy |
| 9-1 |  | Long press [↵] into the pulse output type setting interface, the current character flicker. current charact Then, press [↻] select the new pulse output type.Finally, long press [↵] confirm Settings. |
| 10 |  | **Demand cycle**<br>Default: 60 min<br>Demand cycle range: 0-60min. 0 represents real-time update demand. |

| | | |
|---|---|---|
| 10-1 |  | Long press [↵] into the demand period setting interface, the current character flicker. Then, select [↻] a new demand cycle. Finally, long press [↵] ok Settings. |
| 11 |  | **Clear the maximum demand**<br>Enter this setting to clear the maximum demand. |
| 11-1 |  | Long press [↵] enter the maximum demand reset setting interface, the current character flicker.<br>Finally, long press [↵] to confirm zero clearing. |
| 12 |  | **Auto wheel display time**<br>Default：0s (without round show)<br>Rotation time range：0~ 30s |
| 12-1 |  | Long press [↵] enter auto wheel display time setting interface, the current character flicker.<br>Then, press [↻] select the new auto wheel display time.<br>Finally, long press [↵] confirm Settings. |
| 13 |  | **Backlight lighting time**<br>Default：60 min<br>optional：off,on,5,10,20,30,60,120<br>Off means that the backlight is turn off； on means that the backlight is turn on. |
| 13-1 |  | Long press [↵] into the backlit time setting interface, the current character flicker. [↻] n, press select the new backlight lighting time.<br>Finally, long press [↵] to confirm Settings. |

| | | |
|---|---|---|
| 14 |  | **User Password**<br>Default：1000<br>optional：0 ~ 9999 |
| 14-1 |  | Long press [↵] to enter the user password setting interface and the current character flashes. Then, click on [↻] the new User Password. Finally, long press [↵] to confirm Settings. |
| 15 |  | **Check alarm information**<br>Enter this setting to check alarm associated information: Voltage 、 Current 、 Active power 、 reactive power、apparent power、Frequency |
| 15-1 |  | **Alarm object**<br>Default：NULL（No alarm object）<br>Note: this option can only be set via communication |
| 15-2 |  | **Alarm Value**<br>Default：100000.0<br>Note: this option can only be set via communication |
| 15-3 |  | **Relay Control**<br>The display status of this option is off for relay open and on for relay close.<br>This option can be set only if the alarm occurs when the relay automatically disconnects. Set relay close through this option, which means manually disarming the alarm. Therefore, before you do this, make sure the alarm object is troubleshooting. |

| | | |
|---|---|---|
| 15-3-1 |  | Long press enter relay status setting interface, current character flicker. Then, press select the new relay status. Finally, long press to confirm settings.. |

## Chapter 4. Communication Introduction

4.1 Input register, function code (Hex) : 04

| register Serial number | Enter register parameters | | | | Register start address Hex | |
|---|---|---|---|---|---|---|
| | parameter-definition | data length (bytes) | data format | unit | high byte | low byte |
| 30001 | Voltage | 4 | Float | V | 00 | 00 |
| 30007 | Current | 4 | Float | A | 00 | 06 |
| 30013 | Active power | 4 | Float | W | 00 | 0C |
| 30019 | apparent power | 4 | Float | VA | 00 | 12 |
| 30025 | reactive power | 4 | Float | VAr | 00 | 18 |
| 30031 | Power factor（1） | 4 | Float | None | 00 | 1E |
| 30037 | phase angle | 4 | Float | Degrees | 00 | 24 |
| 30071 | Frequency | 4 | Float | Hz | 00 | 46 |
| 30073 | Import Total active energy | 4 | Float | kWh | 00 | 48 |
| 30075 | Export Total active energy | 4 | Float | kWH | 00 | 4A |
| 30077 | Import Total reactive energy | 4 | Float | kVArh | 00 | 4C |
| 30079 | Export Total reactive energy | 4 | Float | kVArh | 00 | 4E |
| 30081 | Total apparent power | 4 | Float | kVAh | 00 | 50 |
| 30085 | Active power demand（2） | 4 | Float | W | 00 | 54 |
| 30087 | Max.Active power demand（2） | 4 | Float | W | 00 | 56 |
| 30101 | apparent power demand | 4 | Float | VA | 00 | 64 |
| 30103 | Max.apparent power demand | 4 | Float | VA | 00 | 66 |
| 30109 | reactive power demand（2） | 4 | Float | VAr | 00 | 6C |
| 30111 | Max.reactive power demand（2） | 4 | Float | VAr | 00 | 6E |
| 30259 | Current demand | 4 | Float | A | 01 | 02 |
| 30265 | Max.Current demand | 4 | Float | A | 01 | 08 |
| 30343 | Total active energy | 4 | Float | kWh | 01 | 56 |
| 30345 | Total reactive energy | 4 | Float | kVArh | 01 | 58 |

Remark:

(1) the Power factor display will be adjusted automatically according to the Current direction.

Negative value indicates export Current, while positive value represents import Current.

(2) The default power demand = the forward value - the reverse value.

### 4.2 Keep register, function code (Hex) : 03 / 10

| Register | Parameter | Register start address （Hex） | | Description | mode |
|---|---|---|---|---|---|
| | | high byte | low byte | | |
| 40003 | Demand cycle | 00 | 02 | The set range:0~60<br>Unit： minute<br>Default:60.<br>0 represent real time updates, i.e. update every second.<br>**data length : 4 byte**<br>**data type : Float** | r/w |
| 40005 | Sliding time | 00 | 04 | The set range: 1 ~ (demand cycle-1)<br>unit:min<br>Default1.<br>**data length : 4 byte**<br>**data type : Float** | r/w |
| 40013 | Pulse 1 output pulse width | 00 | OC | The set range: 60, 100, 200<br>Unit : ms<br>Default: 100.<br>Note: if Pulse Constant of pulse 1=1000imp/kWh, the pulse width will be fixed at 35mS and is not configurable.<br>**data length : 4 byte**<br>**data type : Float** | r/w |
| 40019 | Parity and stop bit | 00 | 12 | Set range： 0~3; Default: 0<br>0 = 1 stop bit, none parity.<br>1 = 1 stop bit, even parity;<br>2 = 1 stop bit, odd parity;<br>3 = 2 stop bits, none parity.<br>**data length : 4 byte**<br>**data type : Float** | r/w |
| 40021 | Modbus address | 00 | 14 | The set range: 1~247<br>Default: 1<br>**data length : 4 byte**<br>**data type : Float** | r/w |
| 40023 | Pulse1 Pulse Constant | 00 | 16 | The set range: 0~3; Default: 0<br>0 = 1000 imp/kWh<br>1 = 100 imp/kWh<br>2 = 10 imp/kWh<br>3 = 1 imp/kWh | r/w |

| | | | | | |
|---|---|---|---|---|---|
| | | | | Note: if the Pulse width of Pulse 1 is 200ms, Pulse Constant cannot be set to 1000 imp/kWh.<br>**data length : 4 byte**<br>**data type : Float** | |
| 40025 | Password | 00 | 18 | The set range 0000 ~ 9999.<br>Default1000<br>**data length : 4 byte**<br>**data type : Float** | r/w |
| 40029 | Baud rate | 00 | 1C | Baud rate could be set to: 0, 1, 2, 5, Default2.<br>0 = 2400 bps<br>1 = 4800 bps<br>2 = 9600 bps<br>5 = 1200 bps<br>**data length : 4 byte**<br>**data type : Float** | r/w |
| 40059 | Automatic rotation time (Display) | 00 | 3A | The set range 0~30; Default: 0.<br>unit: s<br>0 = Automatic rotation display off。<br>**data length : 4 byte**<br>**data type : Float** | r/w |
| 40061 | Backlight time | 00 | 3C | The set range 0 ~ 121;<br>Unit: minute<br>Default: 60.<br>0 = the backlight is always on;<br>121 = the backlight is always off<br>**data length : 4 byte**<br>**data type : Float** | r/w |
| 40087 | Pulse 1 output type | 00 | 56 | Values can be set: 2, 6, Default2.<br>2 = Total active energy.<br>6 = Total reactive energy.<br>**data length : 4 byte**<br>**data type : Float** | r/w |
| 41025 | Alarm object (1) | 04 | 00 | The set range: 0~5, and 255; Default: 255.<br>255 = no alarm object is associated.<br>**data length : 2 byte**<br>**data type : unsigned int16** | r/w |
| 41027 | Alarm value | 04 | 02 | The threshold value of the alarm is triggered. When the measured value of the alarm object is greater than the threshold value, the alarm is triggered and the relay will be automatically disconnected.<br>Note: After an alarm occurs and the relay is automatically disconnected, it is necessary to manually issue a command to control the relay and close it to release the alarm. | r/w |

| | | | | | |
|---|---|---|---|---|---|
| | | | | **data length : 4 byte**<br>**data type : Float** | |
| 461457 | Clear historical data | F0 | 10 | 00, 00 = reset Max. demand info.<br>**data length: 2 byte**<br>**data type: Hex** | wo |
| 463777 | Measurement mode | F9 | 20 | The value can be set: 0001 ~ 0005<br>00 01 : total kWh = Import kWh<br>00 02 : total kWh = Import kWh + Export kWh<br>00 03 : total kWh = import kWh – Export kWh<br>00 04 : total kWh = Export kWh<br>00 05: total kWh = Export kWh – Import kWh<br>**data length : 2 byte**<br>**data type: Hex** | r/w |
| 464511 | Meter fault code | FB | FE | 00 00 = no failures<br>00 01 = the relay cannot open<br>**data length : 2 byte**<br>**data type : Hex** | ro |
| 464513 | serial number | FC | 00 | serial number of the meter<br>**data length : 4 byte**<br>**data type : unsigned int32** | ro |
| 464769 | Relay control command | FD | 00 | Values can be set: 00 00, FF 00.<br>FF 00 = to contro the relay colse;<br>00 00 =to control the relay open;<br>Note: when the alarm occurs, the relay needs to be closed through the command to remove the alarm.<br>**Length : 2 byte**<br>**Data Format : Hex** | wo |

**Note:**

**(1) Table-1 Alarm object**

| reference number | Alarm parameter |
|---|---|
| 0 | Voltage |
| 1 | Current |
| 2 | Active power |
| 3 | reactive power |
| 4 | apparent power |
| 5 | Frequency |

4.3 Read the coil status, function code (Hex) : 01

| Register | parameter | Register start address （Hex） | | values indicating | mode |
|---|---|---|---|---|---|
| | | high byte | low byte | | |
| 00001 | DO-1 status | 00 | 00 | 1 = close<br>0 = open<br>Note: DO-1 represents the relay inside the meter**data length : 1 bit**<br>**data type: Binary** | ro |

4.4 Control coil, function code (Hex) : 05

| Register | parameter | Register start address （Hex） | | values indicating | mode |
|---|---|---|---|---|---|
| | | high byte | low byte | | |
| 00001 | DO-1 control | 00 | 00 | FF 00 = to contro the relay colse;<br>00 00 =to control the relay open;<br>Note: DO-1 represents the relay inside the meter<br>**data length :2 byte**<br>**data type :Hex** | wo |

4.5 For example

**Read the input register**

**Example: reading "Voltage"**

**Send: 01 04 00 00 00 02 71 CB**

**Where, 01 = modbus address of the meter**

**04 = function code**

**00 = high byte of Register start address**

**00 = low byte of Register start address**

**00 = high byte of register number**

**02 = low byte of register number**

**71 = low byte of CRC check code**

**CB = high byte of CRC check code**

**Return: 01 04 04 43 66 33 34 1B 38**

**Where, 01 = modbus address of the meter**

**04 = function code**

**04 = number of bytes returned**

**43 = data, (high byte of high word)**

**66 = data, (high word low byte)**

**33 = data, (low word high byte)**

**34 = data, (low byte of low word)**

**1B = low byte of CRC check code**

**38 = high byte of CRC check code**

**Note: 43 66 33 34(Hex) = 230.2 (Floating point)**

**2. Read hold register**

**Example: read "slip time"**

**Send: 001 03 0004 0002 85 CA**

**Where, 01 = modbus address of the meter**

**03 = function code**

**00 = high byte of Register start address**

**04 = low byte of Register start address**

**00 = high byte of register number**

**02 = low byte of register number**

**85 = low byte of CRC check code**

**CA = high byte of CRC check code**

**Return: 01 03 04 40 A0 00 00 EF D1**

**Where, 01 = modbus address of the meter**

**03 = function code**

**04= number of bytes returned**

**40 = data, (high byte of high word)**

**A0 = data, (high low byte)**

**00 = data, (low word high byte)**

**00 = data, (low byte of low word)**

**EF = low byte of CRC check code**

**D1 = high byte of CRC check code**

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

**3. Write hold register**

**Example: set "demand period" = 60 min**

**Send: 01 10 00 02 00 02 04 42 70 00 00 00 67 D5**

**Where, 01 = modbus address of the meter**

**10 = function code**

**00 = high byte of Register start address**

**02 = low byte of Register start address**

**00 = high byte of register number**

**02 = low byte of register number**

**04 = number of bytes written to data**

**42 = data, (high byte of high word)**

**70 = data, (high word low byte)**

**00 = data, (low word high byte)**

**00 = data, (low byte of low word)**

**67 = low byte of CRC check code**

**D5 = high byte of CRC check code**

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

**Return: 01 10 00 02 00 02 E0 08**

**Where, 01 = modbus address of the meter**

**10 = function code**

**00 = high byte of Register start address**

**02 = low byte of Register start address**

**00 = high byte of register number**

**02 = low byte of register number**

**E0 = low byte of CRC check code**

**08 = high byte of CRC check code**

**4. Read the coil status**

**Example: read DO-1 status**

**Send: 01 01 00 00 00 01 FD CA**

**Where, 01 = modbus address of the meter**

**01 = function code**

**00 = high byte of Register start address**

**00 = low byte of Register start address**

**00 = read the high byte of the number of DO**

**01 = read low byte of the number of DO**

**FD = low byte of CRC check code**

**CA = high byte of CRC check code**

**Return: 01 01 01 01 E0 50**

**Where, 01 = modbus address of the meter**

**01 = function code**

**01 = the number of bytes returned**

**01 = data (DO state)**

**E0 = low byte of CRC check code**

**50 = high byte of CRC check code**

**Description: data 0x01 = 0000 0001 (Binary Value).**

**Bit 0 stands for DO-1 status.**

**Bit0 = 1, which means DO-1 is closed;**

**Bit0 = 0, which means DO-1 is disconnected.**

**5. Control coil**

**Example: control DO-1 becomes closed**

**Send: 01 05 00 00 FF 00 8C 3A**

**Where, 01 = modbus address of the meter**

**05 = function code**

**00 = high byte of Register start address**

**00 = low byte of Register start address**

**FF = DO control command data high byte**

**00 = DO control command data low byte**

**8C = low byte of CRC check code**

**3A = high byte of CRC check code**

**Return: 01 05 00 00 FF 00 8C 3A**

**Where, 01 = modbus address of the meter**

**05 = function code**

**00 = high byte of Register start address**

**00 = low byte of Register start address**

**FF = DO control command data high byte**

**00 = DO control command data low byte**

**8C = low byte of CRC check code**

**3A = high byte of CRC check code**

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