# DCE.230 DC Energy Meter

**DCE.230 User Manual 1.7**

## 1. Introduction

DCE.230 series DC energy meters are designed for measuring and monitoring in DC systems. The din rail DC energy meters can measure of important DC parameters: Voltage, current, power and energy etc. It also support bi-directional measurement with pulse output. All data in the meter are accessible via RS485 using Modbus RTU. The meter has DC power supply. Input voltage range up to 1000V DC, and current inputs are flexible with DC shunt and current sensors.

- Measures kWh, W, V, A etc.
- Bi-directional measurement IMP & EXP
- Pulse output
- RS485 Modbus
- Din rail mounting 35mm
- DC shunt connection
- Class 1

### 1.1 General Specifications
Voltage DC Input: 5~1000V DC
Auxiliary Supply: 9-40V DC
DC Shunt Input: 75mV
Current Range: 0~2000A
Power consumption: ≤ 2W / 5VA
AC voltage withstand: 4400V/ 1min
Impulse voltage withstand: 6.4kV - 1.2/50µS waveform
Pulse output: 1, 10, 100, 1000 imp/kWh (default)
Pulse duration: 60, 100 (default), 200mS
Pulse output indicate: Total kWh/ import kWh/ export kWh
Display: LCD with backlit
Max. Reading: 999999.9kWh
Weight: 220g
Standard: GB/T 33708-2017

### 1.2 Unit Characteristics
The Unit can measure and display:
- voltage
- Currents
- Power
- Active energy imported and exported

Pulse output indicates real-time energy measurement. An RS485 output allows remote monitoring from another display or a computer.

### 1.3 Shunt Primary Current
The unit can be configured to operate with primary current and secondary input.
Primary current range: 0~2000A.
Second input: 75mV

### 1.4 RS485 Output for Modbus RTU
For Modbus RTU, the following RS485 communication parameters can be configured from the Set-up menu:
**Baud rate** 1200,2400, 4800, 9600,19200
**Parity** none (default)/odd/even
**Stop bits** 1 or 2
**RS485 address** 3-digit, 001 to 247
Modbus™ Word order Hi/Lo byte order is set automatically to normal or reverse. It cannot be configured from the set-up menu. Set-up screens are provided for setting up the RS485 port.
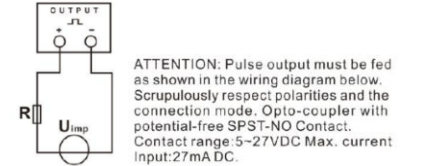
### 1.5 Pulse output
The unit provides a pulse output. The constant can be configured to below:
10000 imp/kWh
1000 imp/kwh
100 imp/kWh
10 imp/kWh
1 imp/kWh
Pulse width: 200/100(default)/60 ms.
Note: the relationship between pulse constant and CT1

| CT1 | Default pulse imp/kWh | Settable pulse imp/kWh |
|---|---|---|
| 1–20 | 1000 | 1000,100,10,1 |
| 21–200 | 100 | 100,10,1 |
| 201–2000 | 10 | 10,1 |

*when the CT setting on meter is 2000A, the default pulse constant is 10 imp/kWh and it can be set to 10imp/kWh or 1 imp/kWh.*

*Over-current alarm: Alarm will happened when the current is over the CT1 value set on the meter. The Alarm LED will stay solid and the corres-ponding register value will be changed. The user can read this register through communication to determine whether an overcurrent alarm has occurred.*
The pulse outputs can be set to generate pulses to represent Import kWh/ Export kWh/ total kWh.

The pulse output is passive type, complies with IEC62053-31 Class A.



ATTENTION: Pulse output must be fed as shown in the wiring diagram below. Scrupulously respect polarities and the connection mode. Opto-coupler with potential-free SPST-NO Contact. Contact range:5-27VDC Max. current Input:27mA DC.

### 1.7 Environment
Operating temperature -25 to + 55℃
Reference temperature 23 ℃±2℃

Relative humidity 0 to 90%, non-condensing
Altitude up to 2000m
Installation category CATIII
Mechanical Environment M1
Electromagnetic environment E2
Degree of pollution 2

### 1.8 Mechanics
Din rail dimensions 36x100x63 (WxHxD) DIN 43880
Mounting DIN rail 35mm
Ingress Protection IP51 (indoor)
Material Self-extinguishing UL94V-0

## 2. Operation

### 2.1 Initialization Display
When it is powered on, the meter will initialize and do self-checking.

| | |
|---|---|
|  | Full Screen (stay 2s) |
|  | Software Version (stay 2s) (This information is for reference only.) |
|  | Current Modbus address (stay 2s) |
|  | Current baud rate (stay 2s) |
|  | Total active energy(kWh) Total=Import+ Export Max read: 999999.9 kWh |

### 2.1 Buttons function
There are two buttons on the front panel.

| | |
|---|---|
|  | >Scroll the display for data checking. >Changing option at Set-up mode >Exit the Set-up mode |
|  | >Set-up mode entry >Confirmation |

### 2.1.1 Scroll display
After initialization and self-checking program, the meter displays the measured values. The default page is total kWh. If the user wants to check other information, please press the scroll button on the front panel.

| | |
|---|---|
|  | Total active energy(kWh) Total=Import+ Export Display format: 5+2 -> 6+1 -> 5+2 99999.99 -> 100000.0 -> 999999.9 -> 00000.00 |
|  | Partial resettable active energy Display format: 5+2 -> 6+1 -> 5+2 99999.99 -> 100000.0 -> 999999.9 -> 00000.00 |
|  | Voltage |
|  | Current |
|  | Power Display format: <1000 W: XXX W <1000kW: XXX.XXX kW For other value: XXXX.XX kW |
|  | Pulse constant |

| | |
|---|---|
|  | CT1 Primary current |
|  | Meter address |
|  | Baud rate |
|  | Parity |
|  | Software Version |

### Set-up Mode
To get into Set-up Mode, the user need press the "Enter" button for 3 second.



| | |
|---|---|
|  | **1 Password** To get into Set-up mode, it asks a password confirmation. Default password: 1000 Use **Scroll** and **Set** to enter correct password. |
|  | **2** Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** and **Set** to change the Modbus address. Options: 1~247 Keep press **Set** for 3s to confirm the selection. |
|  | **3** Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** and **Set** to change the Baud rate. Options: 1.2k, 2.4k,4.8k,9.6k ( default ),19.2k Keep press **Set** for 3s to confirm the selection. |
|  | **4** Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** and **Set** to change the Parity. Options: EVEN, ODD, NONE ( default ) |
|  | **5** Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** and **Set** to change the type of Pulse Output. Options: total kWh, IMP kWh, EXP kWh |
|  | **6** Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** and **Set** to change the pulse constant. Options: 1000, 100, 10, 1 imp/kWh *Default pulse constant is related to the CT1 setting |
|  | **7** Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** and **Set** to change the pulse width. Options: 60, 100, 200, unit: ms |
|  | **8** Use **Scroll** to select the CT1 option. Keep pressing for **Set** 3 second, the current selection will flash, use **Scroll** and **Set** to enter the Primary current. The range is from 0001 to 2000. For example, if using a 100A/75mV current transformer, the CT1 shall be 0100. Keep press **Set** for 3s to confirm the selection. Default : 1A |
|  | **9** Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** and **Set** to change the DIT(Demand Integration Time). Options: 0,5,8, 10,15, 20,30,60( default) |
|  | **10** Use **Scroll** to select the scroll display time option. Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** and **Set** to enter the options: 0~60s. |

| | |
|---|---|
| | Default: 0 s, represent do not scroll display |
|  | **11** Use **Scroll** to select the backlit time option. Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** and **Set** to enter the options:0,5,10, 20,30,60 minutes. 0 means the light is always on. Default: 60 min. |
|  | **12** Use **Scroll** to select the Password option. Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** and **Set** to enter the new password. The range is from 0001 to 9999. Default: 1000 |
|  | **13** Shunt wiring Use **Scroll** to select the shunt connection option. Keep pressing **Set** for 3 second, the current selection will flash, use **Scroll** to choose the connection way. Option: N, P N: Negative type (default) P: Positive type |

Keep pressing **SCROLL** button to exit the set-up mold.
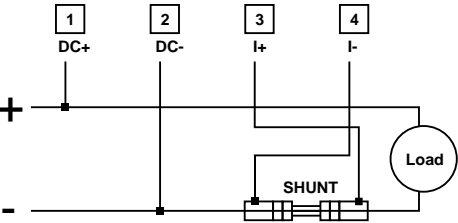
## 3. Wiring diagram
### 3.1 Terminal Connection
AC/DC Power Supply: 9-60V
Voltage DC Input: 5~1000V DC
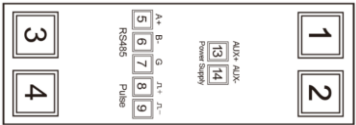


### 3.2 Shunt Connection
DC Shunt Input: 75mV
Current Range: 0~2000A



## 4. Shunt
Below a listing of common shunt resistors

| ESFL-2A Series | | | |
|---|---|---|---|
| Primary Input | Rated Voltage Output | Accuracy | Dimension(mm) |
| 10-50 A | 75/60/45 mV | 0.5% | 25x120x22 |
| 75-100 A | 75/60/45 mV | 0.5% | 23x109x11 |
| 150-200 A | 75/60/45 mV | 0.5% | 22x118x22 |
| 300 A | 75/60/45 mV | 0.5% | 26x127x22 |
| 400 A | 75/60/45 mV | 0.5% | 36x127x22 |
| 500 A | 75/60/45 mV | 0.5% | 46x127x22 |
| 600 A | 75/60/45 mV | 0.5% | 55x127x22 |
| 750 A | 75/60/45 mV | 0.5% | 76x127x22 |
| 1000 A | 75/60/45 mV | 0.5% | 96x127x22 |
| 1500 A | 75/60/45 mV | 0.5% | 113x127x22 or 87x200x97 |
| 2000 A | 75/60/45 mV | 0.5% | 136x200x97 |

## 5. Dimensions
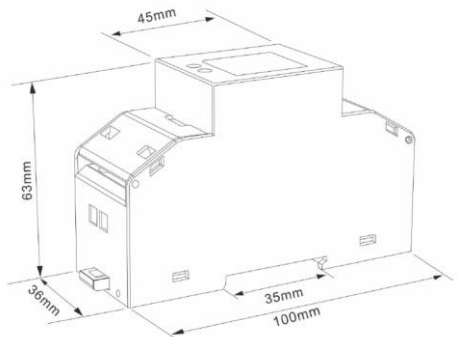




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