DCM232

Double Channels DC Energy Meter

- Dual channels
- Bi-directional measurement IMP & EXP
- 9-40VDC power supply
- Two pulse outputs
- RS485 Modbus RTU
- Din rail 72mm
- Class 1

USER MANUAL

2024 V1.2

Risk Reduction

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. These information are 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 are authorized to commission, start up, ground and label devices, systems and circuits according to safety and Regulatory standards.

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 insulating tools.
- ✧ Do not connect while circuit is live (hot).
- ✧ Do not connect the meter to a AC network.
- ✧ 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 DC 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.
- ✧ Installation, maintenance and reparation should only be done by qualified personnel.
- ✧ 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.
- ✧ Designed to be mounted inside of switchboards or cabinet on DIN RAIL

- ✧ This device must have a suitable sized Circuit Breaker feeding the Multi Function Energy Meter so it does not exceed the maximum rated current.
- ✧ The supply wiring of this device shall be suitable sized cable to match the installed circuit breaker.
- ✧ A Disconnection Device (Circuit Breaker) should be installed close to the Multi Function Energy Meter.
- ✧ The Disconnection Device shall be marked as the Disconnection Device for the Multi Function Energy Meter

Disclaimer

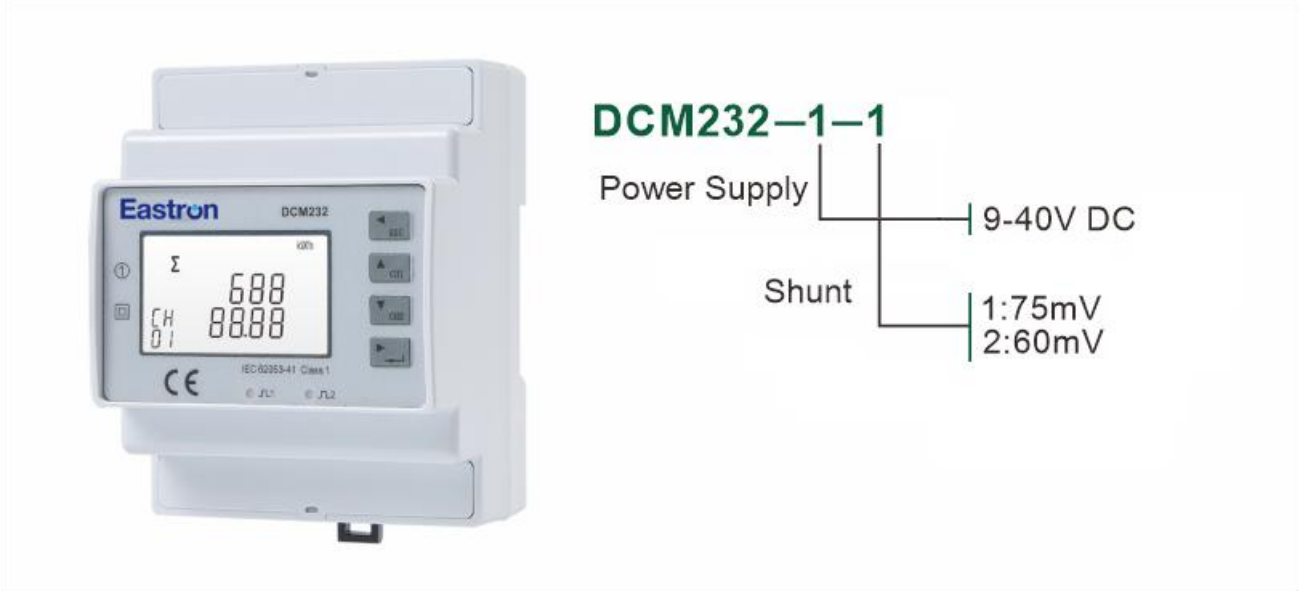
We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible.

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.

1. Introduction

Eastron DCM232 series DC energy meters are designed for measuring and monitoring in DC systems,especially for the dual channel DC EV Chargers. The din rail DC energy meters can measure of important DC parameters: voltage, current, power and energy etc. It also supports bi-directional measurement with pulse output. All data in the meter are accessible via RS485 Modbus RTU. The meter working with DC power supply. Input voltage range up to 1000V DC, and current inputs are flexible with DC shunt.

Model list



2. Operation

2.1 Initialization Display

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

	Full Screen

 	Software Version
	The interface performs a self-test and indicates the result if the test passes.

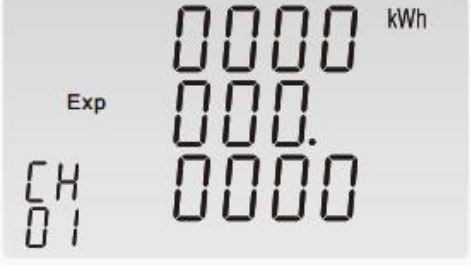
2.2 Buttons function

There are four touch keypads on the front panel.

	> move to the left > Exit the Set-up mode
	> scroll up the display > add the digit > short-cut to check channel 01 data
	> scroll down the display > reduce the digit > short-cut to check channel 02 data
	> move to the right > Set-up mode entry > Confirmation

2.3 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.

	Power,voltage and current of CH01 (CH 01 = Channel 1)
	Power,voltage and current of CH02 (CH 02 = Channel 2)
	The total kWh of CH01
	The import kWh of CH02
	The export kWh of CH01

	The total kWh of CH02
	The import kWh of CH01
	The export kWh of CH02

3. Set-up Mode

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

Page	Display	Descriptions
1		Password Input Default：1000
2		Modbus address

2-1		Set Communication Address Mode Mode 1: Single communication address mode. Mode 2: Dual communication addresses mode. (Refer to 4.3.1 for details)
2-2		Modbus address setting Range: 001~247 Default :001
3		Baud rate of communication Range: 2400~38400bps Default: 9600bps
4		Parity of communication Options: None (default), Even, Odd
5		Stop bit Options: 1 or 2 Default: 1
6		Pulse output setting, there are two pulse outputs. P1 is for CH01 P2 is for CH02

6-1		Press button to choose CH01 or CH02 first.
6-2		There are 3 options for pulse output: Total kWh Import kWh Export kWh Press button to choose pulse output type of the channel be chosen.
7		Pulse constant. There are two pulse outputs. P1 is for CH01 P2 is for CH02
7-1		Press button to choose CH01 or CH02 first.
7-2		Press button to choose pulse constant of the channel selected before. Options: 10000, 1000, 100, 10, 1 imp/kWh Default:10000imp/kWh
8		Pulse time (pulse width) P1 is for CH01 P2 is for CH02

8-1		Press button to choose CH01 or CH02 first.
8-2		Press button to change the pulse time (pulse width) of the channel be chosen. Options: 60, 100, 200 mS Default: 100mS
9		Primary current setting
9-1		Press button to choose CH01 or CH02 first.
9-2		Press button to set primary current of the channel selected before. It must be set according to the shunt connected externally. Range 1-1999A Default:1
10		Scroll: automatic screen scroll time interval. Options: 0, 5,10,15,30,60 seconds. Default: 0

11		Backlight: to set the backlight duration time after button operation. Options: on, off, 5, 10, 15, 30, 60, 120 minutes. Default: 60 minutes
12		Password: allows user to set a new password.
13		Shunt Connection setting Options: positive type(P),negative type(N) Default: negative type(N)
14		Charger line loss setting
14-1		Press button to choose CH01 or CH02 first.
14-2		Press button to change the Line loss of the channel be chosen. Options: OFF, ON(two-lines) Default: OFF

15		Charger line resistance setting
15-1		Press button to choose CH01 or CH02 first.
15-2		Press button to set line resistance of the channel selected before. Range 0-999.9 mΩ Default:0

Keep pressing button ESC to exit the Set-up Mode.

4. Specifications

4.1 Electrical specifications

- Power: auxiliary power supply 9-40V DC
- Consumption: <1W, 5VA
- Voltage DC input: 150~1000V DC
- DC shunt input: 75mV; (60mV optional)
- Primary current range: 0~2000A
- Accuracy:
  - active energy Class 1(IEC62053-41)
  - Voltage 0.5% of range maximum
  - Current 0.5% of nominal
  - Power (W) ±1% of range maximum

4.2 Environmental specifications

- Operating temperature -25°C to +55°C
- Storage temperature -40°C to +80°C
- Relative humidity 0 to 90%, non-condensing @40°C
- Altitude Up to 2000m
- Mechanical environment M2
- Electromagnetic environment E2

4.3 Output specifications

Two interfaces are available:

- Modbus RS485 port output
- two Pulse outputs

4.3.1 Modbus RS485 port output

Baud rate:	2.4k, 4.8k, 9.6k(default), 19.2k, 38.4k
Parity:	none /odd/even
Stop bits:	1 or 2
RS485 address:	001 to 247
Response time:	<30mS
Transmission distance:	1000m

*Note: DCM232 has 2 modes of communication address. The modes can be set by pressing the buttons on the meter or via RS485 Modbus.
Mode 1: Single communication address mode. Under this mode, the register address of different channels (CH01-CH02) will be showed in segments. Channel 1(CH01) will be matched to 0~2999; Channel 2(CH02) 3000~5999;
Mode 2: Dual communication addresses mode. Under this mode, each meter will have 2 different modbus addresses. Each channel (CH01-CH02) matches to one modbus address and all the channels share the same registers. The measurement data will be distinguished by different Modbus addresses.

Please check the protocol for detailed explanation of register codes.

4.3.2 Pulse Output

The unit provides two pulse outputs indicating real-time measured energy. Pulse output 1 is channel 1; Pulse output 2 is for channel 2. Both pulse outputs are passive type.

Both pulse outputs are configurable for pulse type, constant and width. Please check the operation in part 3.
Note: the relationship between pulse constant and CT1:

CT1 setting	Default pulse constant	Settable pulse constant
1 – 20	1000 imp/kWh	10000,1000,100,10,1 imp/kWh

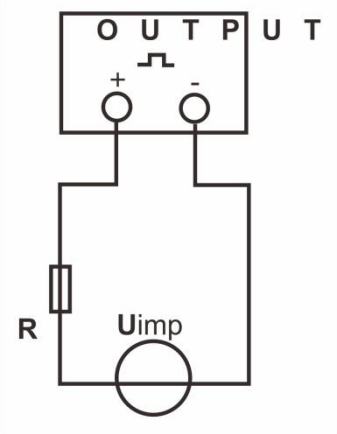
21 – 200	100 imp/kWh	100,10,1 imp/kWh
201 – 2000	10 imp/kWh	10,1 imp/kWh

*when the CT setting on meter is 2000A, the default pulse constant is 10 imp/kWh and it can be set to 10 imp/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 corresponding register value will be changed. The user can read this register through communication to determine whether an over-current 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:Pule output must be fed as shown in the wiring diagram on the left.

Scrupulously respect polarities and the connection mode.

Opto-coupler with potential-free SPST-NO Contact.

Contact range:5~27VDC

Max. current Input:27mA DC

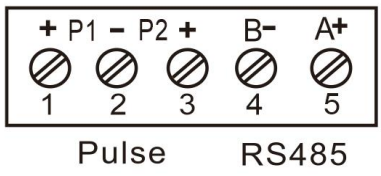
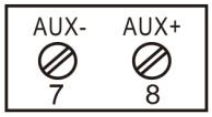
4.4 Safety and EMC

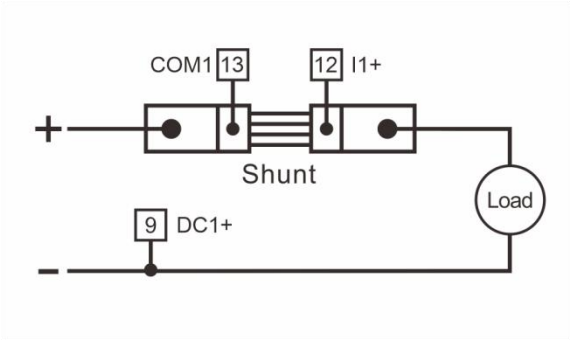
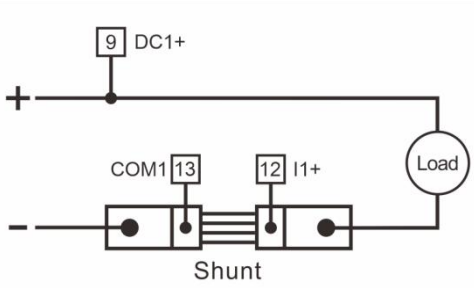
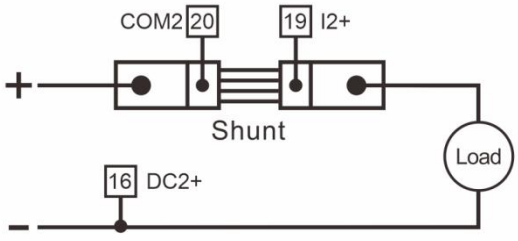
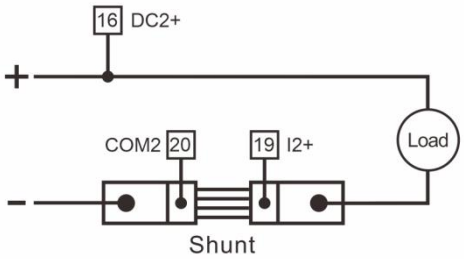
- Measurement category IEC 61010-1 CAT III
- Current input Direct connect
- Over-voltage category CAT III
- Dielectric withstand IEC 61010-1 double insulated
- Protective class II
- EMC IEC 61326-1:2013 ; IEC 61326-2-3:2013

4.5 Mechanics specifications

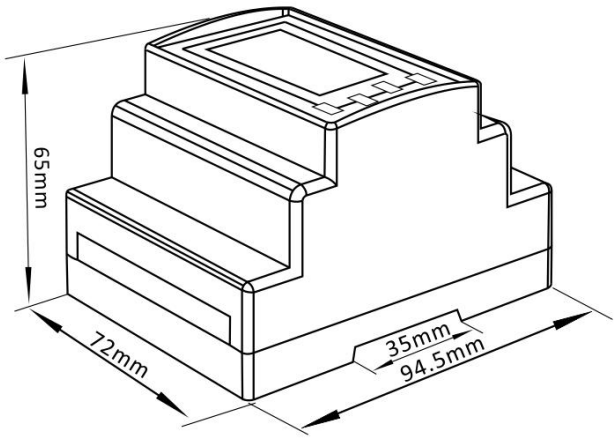
- DIN rail dimensions 72x94.5x65mm(WxHxD)
- Mounting DIN Rail 35mm
- Ingress protection IP51 front panel (indoor)
- Material Self-extinguishing UL94 V-0
- Net Weight 280g

5. Wiring diagram

Terminal Connection	
	1. Pulse output 1+ 2. Pulse output com- 3. Pulse output 2+ 4. RS485 B- 5. RS485 A+
	power supply: 9~40V DC

Shunt Connection		
	Positive Type:	Negative Type:
First Circuit		
Second Circuit		

6. Dimensions



7. Shunt

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

8. Modbus register Map

8.1 Input register

Address (Register)	Input Register Parameter				Modbus Protocol Start Address Hex	
	Description	Length (bytes)	Data Format	Units	Hi Byte	Lo Byte
30001	line to neutral volts.	4	Float	V	00	00
30007	current.	4	Float	A	00	06
30013	power.	4	Float	W	00	0C
30073	Import Wh.	4	Float	kWh	00	48
30075	Export Wh.	4	Float	kWH	00	4A
30343	Total kwh (3)	4	Float	kWh	01	56
320005	Positive line loss energy	4	Float	kWh	4E	24
320007	Negative line loss energy	4	Float	kWh	4E	26
320009	Line loss Power	4	Float	w	4E	28
320011	Line loss kWh	4	Float	kWh	4E	2A
320031	Total kwh(Import - Export)	4	Float	kWh	4E	3E
320035	Total kwh(Export - Import)	4	Float	kWh	4E	42

Note : In single communication address mode (mode 1), above registers are all for CH01.
CH02 registers are CH01 + 3000.
E.g. the line to neutral volts for CH01 is 30001, for CH02 is 33001.

8.2 Modbus Protocol Holding Registers and Digital meter set up

Address Register	Parameter	Modbus Protocol Start Address Hex		Valid range	Mode
		High Byte	Low Byte		
40013	CH01 Pulse Width	00	OC	Write pulse on period in milliseconds: 60, 100 or 200,. default 100. **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
40019	Parity and stop bit	00	12	Write the network port parity/stop bits for MODBUS Protocol, where: 0 = One stop bit and no parity, default. 1 = One stop bit and even parity. 2 = One stop bit and odd parity. 3 = Two stop bits and no parity. **Length : 4 byte** **Data Format : Float**	r/w
40021	Modbus address	00	14	Write the Modbus address for the whole meter In one communication address mode, only one address is to be set. Address: 1 to 247 for MODBUS Protocol, default 1. **Length : 4 byte** **Data Format : Float**	r/w
40023	CH1 Pulse Rate	00	16	Write pulse rate index: n = 0 to 3 0-- 0.001 kwh/imp 1--0.01kwh/imp 2--0.1kwh/imp 3--1kwh/imp **Length : 4 byte** **Data Format : Float**	r/w
40025	Password	00	18	Read: to get the password of the meter Write: to program the new password of the meter Default 1000 **Length : 4 byte** **Data Format : Float**	r/w
40029	Network Baud Rate	00	1C	Write the network port baud rate for MODBUS Protocol, where: 0 = 2400 baud. 1 = 4800 baud. 2 = 9600 baud, default. 3 = 19200 baud. 4 = 38400 baud **Length : 4 byte** **Data Format : Float**	r/w
40059	Automatic Scroll Display Time	00	3A	Default: 0, Unit: s Range: 0~255， 0 means no scroll **Length : 4 byte** **Data Format : Float**	r/w
40061	Backlit time	00	3C	Default 60, min	r/w

				Range 0~121，0 means backlit always on ，121 means backlit always off **Length : 4byte** **Data Format : Float**	
40087	CH01 Pulse Energy Type	00	56	Write MODBUS Protocol input parameter for pulse output 1： 1: import active energy 2: total active energy，default 4: export active energy **Length : 4 byte** **Data Format : Float**	r/w
40257	CT1 for CH01	01	00	CT1 Range 1-1999A，Default 1， **Length : 4 byte** **Data Format : Float** (KPPA is asked)	r/w
401537	CH01 charger line loss mode	06	00	0000：Off 0001：ON(two-lines) **Length : 2byte** **Data Format :Hex** (KPPA is asked)	r/w
401538	CH01 charger line resistance	06	01	Charger line resistance Range 0~999.9mΩ (default 0) E.g：10 = 1.0mΩ **Length : 2byte** **Data Format :Hex** (KPPA is asked)	r/w
403013	CH02 Pulse Width	0B	C4	Write pulse on period in milliseconds: 60, 100 or 200, default 100. **Length : 4 byte** **Data Format : Float**	r/w
403023	CH02 Pulse Rate	0B	CE	Write pulse rate index: n = 0 to 3 0- - 0.001 kwh/imp 1--0.01kwh/imp 2--0.1kwh/imp 3--1kwh/imp **Length : 4 byte** **Data Format : Float**	r/w
403087	CH02 Pulse Energy Type	0C	0E	Write MODBUS Protocol input parameter for pulse output 1： 1: import active energy 2: total active energy，default 4: export active energy	r/w

				Length : 4 byte **Data Format : Float**	
403259	CT1 for CH02	0C	BA	CT1 Range 1-1999A，Default 1， **Length : 4 byte** **Data Format : Float** (KPPA is asked)	r/w
404537	CH02 charger line loss mode	11	B8	0000：Off 0001：ON(two-lines) **Length : 2byte** **Data Format :Hex** (KPPA is asked)	r/w
404538	CH02 charger line resistance	11	B9	Charger line resistance Range 0~999.9mΩ (default 0) E.g：10 = 1.0mΩ **Length : 2byte** **Data Format :Hex** (KPPA is asked)	r/w
48193	Shunt connection mode	20	00	Shunt Connection setting Options: 00 4E=negative type；(default) 00 50=positive type； **Length : 2byte** **Data Format :Hex**	r/w
461445	Running time	F0	04	Day-hour-minute, day = 2byte;hour = 1byte; minute=1byte **Length : 4 byte** **Data Format:BCD** **Explame:** **04 23 21 57 mean** **Running time=423 day + 21 hour + 57 min** **For write,only allow write 00 00 00 00.it mean clear running time.** (KPPA is asked)	r/w
464513	Serial number	FC	00	Serial number **Length : 4 byte** **Data Format : unsigned int32** **Note: Only read**	r
464673	Communication address mode	FC	A0	Communication address mode setting 31 64：Single communication address mode 32 64：Dual communication address mode **Length : 2 byte** **Data Format : Hex** (KPPA is asked)	r/w

CONTACT US

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