



MULTI CLICK SOLUTION

Measurement and monitoring system
for multi-circuit loads



MCS-U/ I Modules User Manual

V 1.0



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1. DOCUMENTATION

All documentation on MCS-U is available on the EASTRON Website:

www.eastrongroup.com

2. HAZARDS AND WARNINGS

The term “device” used in this document covers MSC-U Series, MCS-I Series and ESCT-RJ CTs.

The assembly, use, servicing and maintenance of this equipment must only be carried out by trained, qualified professionals.

Eastron shall not be held responsible for failure to comply with the instructions in this manual.

2.1 Risk of electrocution, burns or explosion

- This Device must only be installed and serviced by qualified personnel who have good knowledge of installing, commissioning and operating the device. He/she must have read and understood the various safety measures and warnings in this manual.
- Before carrying out any work on the device, the power supply must be switched off.
- Make sure the devices are working with correct voltage.
- Install the devices in a suitable electrical cabinet.

2.2 Risk of damaging the device

Please make sure the wiring of the devices is correct.

All devices are installed correctly.

The power supply voltage must be in the range of that indicated on the devices

1A fast fuse is recommended at the auxiliary power supply

3. PRELIMINARY OPERATIONS

To ensure the safety of personnel and the device, please carefully read the contents of these instructions before installation.

Check the following points as soon as you receive the package containing the device:




The packaging is in good condition

The device has not been damaged during transportation

The packaging includes the device fitted with removable terminal blocks

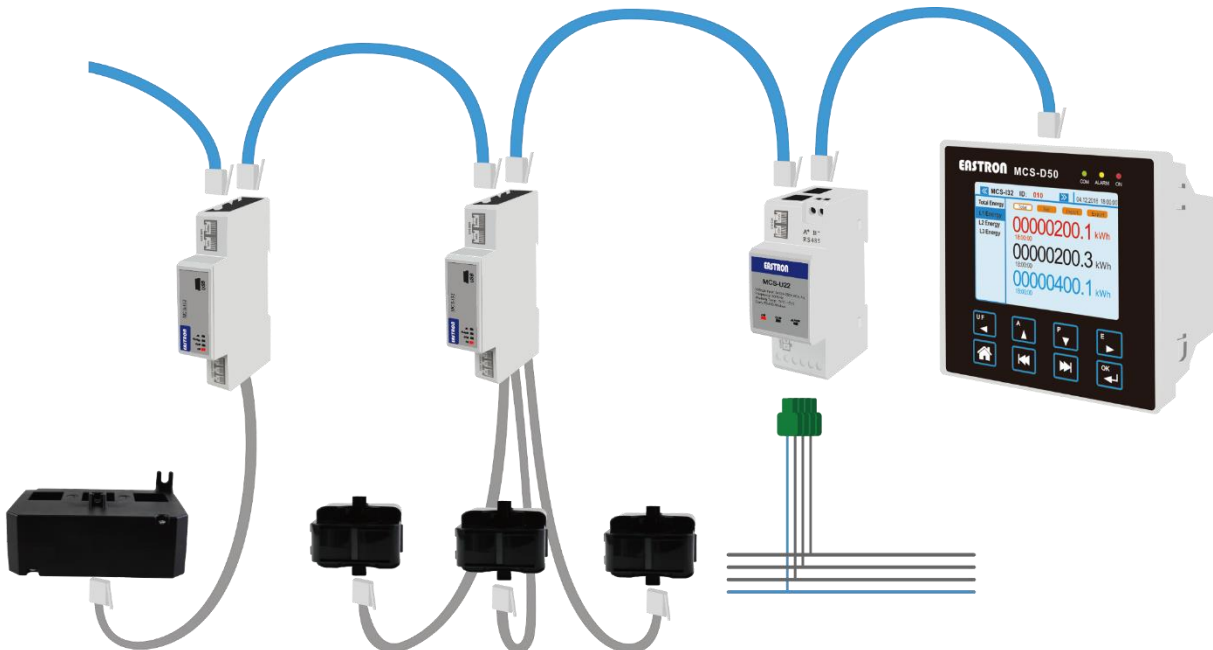
4. INTRODUCTION OF MCS-U

4.1 Range

		
MCS-U20	MCS-U21	MCS-U22
Voltage monitoring Power supply	Voltage monitoring Power supply Alarms	Voltage monitoring Power supply Alarms RS485 Modbus RTU

4.2 Introduction

MCS-U20/21/22 works as voltage input module in our new “MultiClick” solution. It measures the input voltages for the whole system, provides power supply to the MCS-I current modules connected via RJ45 MCS-BUS. MCS-22 also plays the role of a communication model and equip with RS485 terminals for Modbus communication.



4.3 LED indicators



ON

- off: device is off power
- on: device is on power

COM:

- Off: no communication
- Flashing: communication in progress on the MCS-BUS.

ALARM

- off: no alarm
- Solid: modbus address conflict
- Flashing: over-voltage or under-voltage

NOTE: The MCS-U21/22 has the functionality of voltage alarms. Once the voltage measured is over or below the limits of the alarm levels, the MAC-U's alarm LED flashes and it will send alarm information to the display module. The alarm levels can be set through MSC-D module or through RS485 Modbus.

4.4 Characteristics

4.4.1 Measurements

	U20	U21	U22
Measurements			
L-N voltage	●	●	●
L-N voltage	●	●	●
Frequency	●	●	●
Average L-N voltage	●	●	●
Average L-L voltage	●	●	●
Quality			
L-N Voltage THD		●	●
L-L voltage THD		●	●
Average L-N voltage THD		●	●
Average L-L voltage THD		●	●
Communication			
RS485 Modbus RTU			●

4.4.2 Alarms

	U20	U21	U22
Address conflict	●	●	●
Over-voltage		●	●
Under-voltage		●	●

4.4.3 Specification

Input voltage	3x100-280V AC L-N	
Frequency	50/60Hz	
Insulation capabilities	AC voltage withstands	3KV for 1 minute
	Impulse voltage withstands	6kV – 1.2 μ S waveform
Accuracy	Class 0.5S	
International standard	IEC 62053-22	
Power Consumption	\leq 2W/10VA	
Storage temperature	-30 $^{\circ}$ C~+70 $^{\circ}$ C	
Operating temperature	-25 $^{\circ}$ C~+55 $^{\circ}$ C	
Storage humidity	95% at 40 $^{\circ}$ C	
Operating humidity	\leq 90%	
Installation category- degree of pollution	CAT III, 2	
Mechanical environment	M1	
Electromagnetic environment	E2	
Protection against penetration of dust and water	IP51 (indoor)	
Attitude	Up to 2000m	

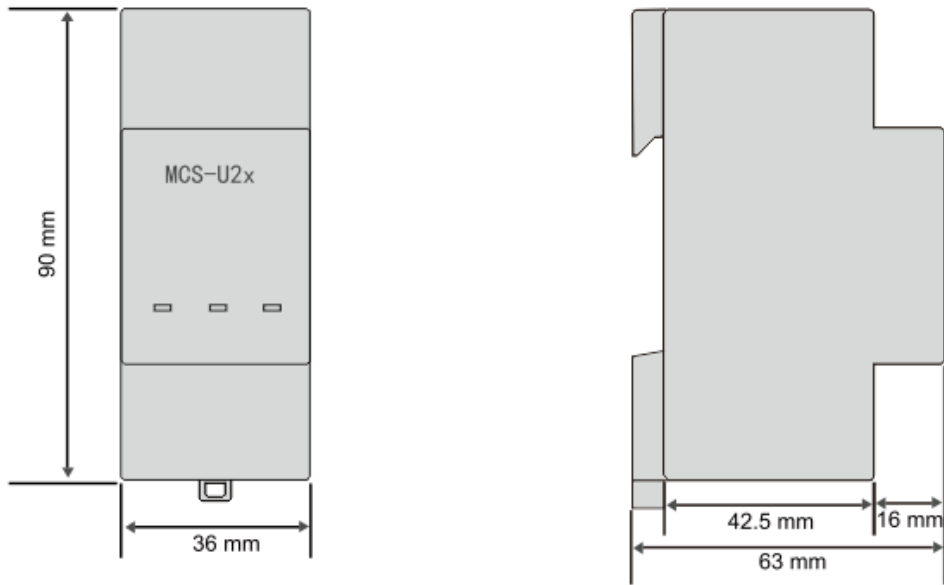
4.4.4 RS485 Communication (only for MCS-U23)

Bus type	RS485 (Semi-duplex)	
Protocol	Modbus RTU	
Baud Rate	1200/2400/4800/9600 (in default)/ 19200/38400/115200 bps	
Address range	1-247	
Max.Bus loading	32pcs MCS-I	
Communication distance	1000M	
Parity	EVEN/ODD/NONE	
Data bit	8	
Stop bit	1	

4.4.5. Terminals

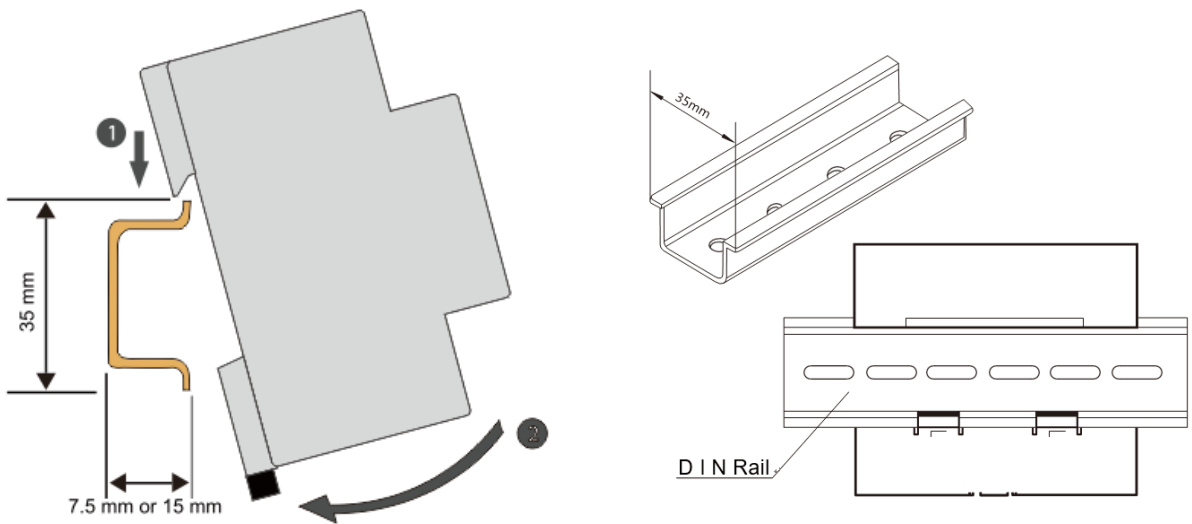
Type	Quantity	Description
MCS-BUS (RJ45 connection)	2 ports	interconnection with MCS-D module and the next MCS-I modules
Voltage input	1 port	Power Supply
RS485 port	1 port	RS485 Modbus communication ports

5. Dimensions



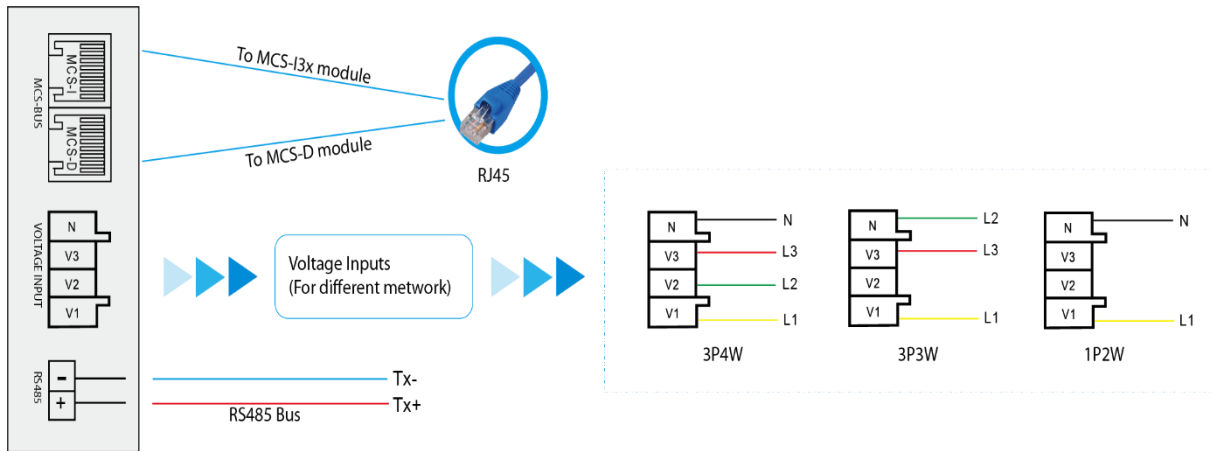
6. Mounting

MCS-U modules are din rail mounted with standard 35mm size.

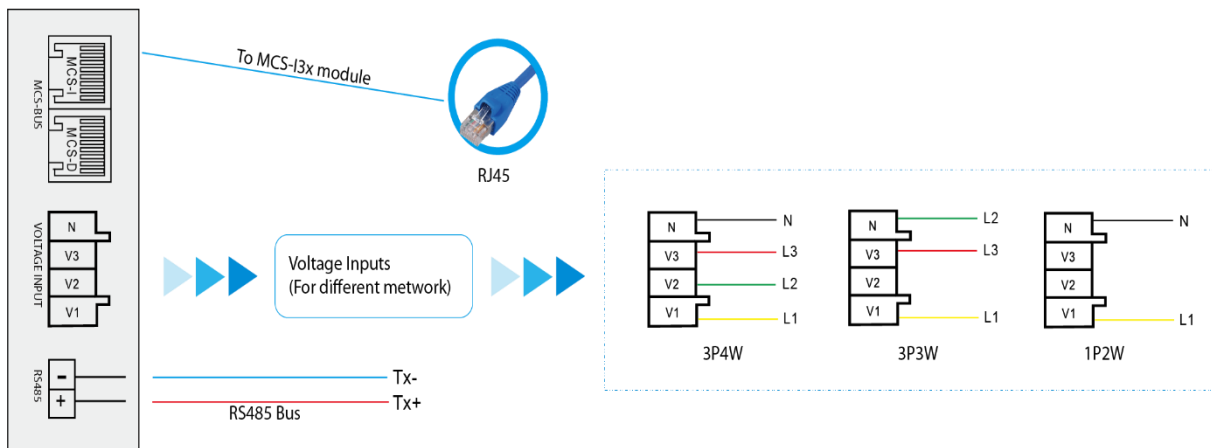


7. Connection (RJ45 interconnection of modules)

7.1 MCS-D + MCS-U20/21/22 + MCS-I



7.2 MCS-U22 + MCS-I (without display version)






Note:

For 3P4W, 1P2W, one MCS-U can connect up to 32pcs MCS-I, i.e. 32pcs three phase circuits or 96pcs single phase circuits. For 3P3W network, up to 16pcs MCS-I modules can be connected to the MCS-U module.

MCS-U22 and MCS-I can be connected without display module (MCS-D)

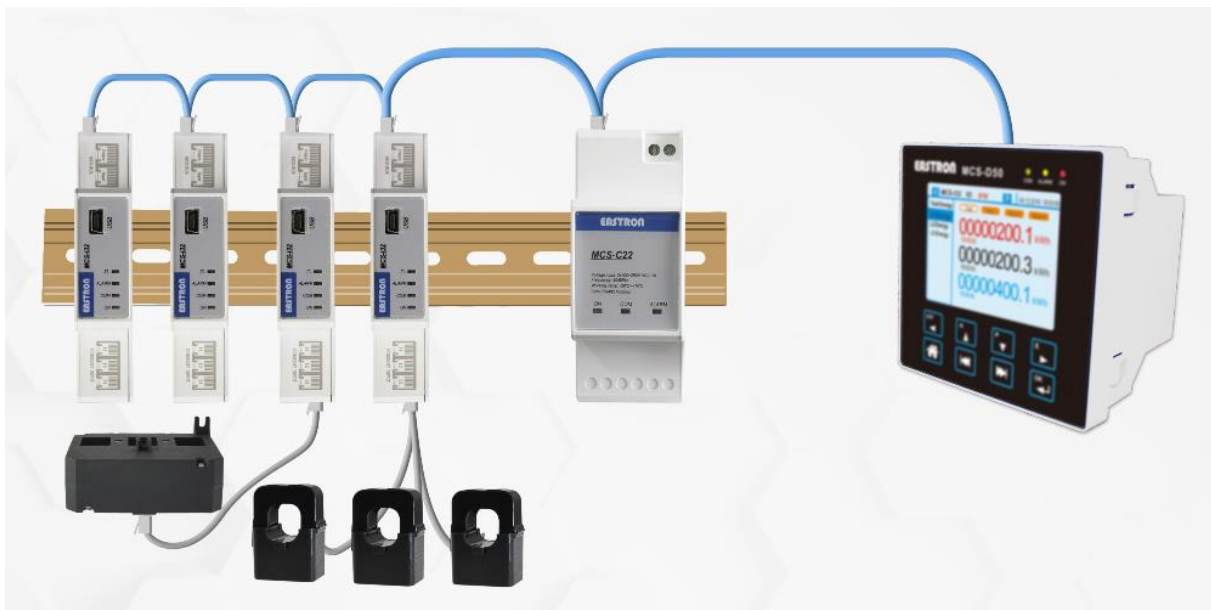
8. INTRODUCTION OF MCS-I

8.1 Range

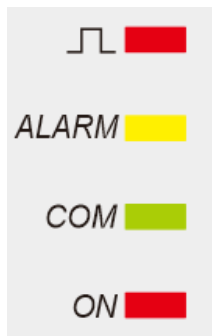
		
MCS-I30	MCS-I31	MCS-I32
Measure multi-parameters 1x three phase load 3x single phase loads	Measure multi-parameters 1x three phase load 3x single phase loads	Measure multi-parameters 1x three phase load 3x single phase loads
	THD	THD, Max. demand
		Alarm

8.2 Introduction

MCS-I30/31/32 are the current input modules in the “Multi-click” solution. It measures current, power, energy consumption on single phase or three phase loads, it connects to the MCS-U and other MCS-I current module via RJ45 MCS-BUS, connects to current transformers via RJ12. Moreover, a Maximum of 32 units three phase or 96 units single phase circuits can be connected after by MCS-BUS.



8.3 LED indicators



ON :

- off: device is off power
- on: device is on power

COM :

- Off: no communication
- Flashing: communication in progress on the MCS-BUS.

ALARM :

- off: no alarm
- Solid: address conflict
- Flashing: over-current or under-current

PULSE :

- Flashing: pulse output signal

NOTE:

The MCS-U modules will check the connecting status of MCS-I modules every 10 seconds through RS485 Modbus communication. Thus the COM led indicator will flash every 10 seconds 1 time when MCS-I modules receive the command sent from MCS-U.

The MCS-I32 has the functionality of current alarms. Once the current measured is over the limit of alarm level, the MCS-I's alarm LED flashes and it will send alarm information to the display module. The alarm levels can be set through MSC-D module or through RS485 Modbus.

8.4 Characteristics

8.4.1 Measurements

		I-30	I-31	I-32
Current	I1, I2, I3, In (instantaneous)	•	•	•
	I (Average, total)	•	•	•
	I (L-N) THD, Average THD		•	•
	I-demand (instantaneous, Max. current)			•
Power, PF, Angle	Active Power: P1,P2,P3,P Σ	•	•	•
	Reactive Power: Q1,Q2,Q3,Q Σ	•	•	•
	Apparent Power: S1, S2, S3, S Σ	•	•	•
	P-demand (instantaneous, Max. power)			•
	Power Factor: PF1, PF2, PF3, PF Σ	•	•	•
	Angle (L1, L2, L3, Σ	•	•	•
Energy	Total Energy (total/net/import/export of kwh/kvarh, total kVAh)	•	•	•
	L1 Energy (total/import/export of kwh/kvarh)	•	•	•
	L2 Energy (total/import/export of kwh/kvarh)	•	•	•
	L3 Energy (total/import/export of kwh/kvarh)	•	•	•
	Ah	•	•	•

8.4.2 Alarms

	I-30	I-31	I-32
Address conflict	•	•	•
Over-current			•
Under-current			•

8.4.3 Specification

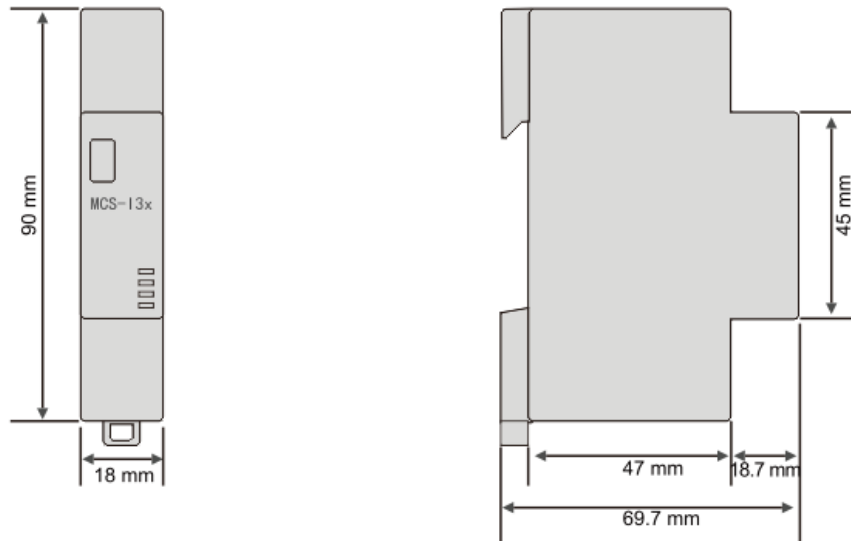
Input current	100mV	
Over current withstand	20 I _{max} for 0.01s	
Pulse output	1000imp/kWh	
Insulation capabilities	AC voltage withstands	3KV for 1 minute
	Impulse voltage withstands	6kV – 1.2 μ S waveform
Accuracy	Class 0.5S	
International standard	IEC 62053-22	
Power Consumption	\leq 2W/10VA	
Storage temperature	-40 $^{\circ}$ C~+70 $^{\circ}$ C	
Operating temperature	-25 $^{\circ}$ C~+55 $^{\circ}$ C	
Storage humidity	95% at 40 $^{\circ}$ C	
Operating humidity	\leq 90%	
Installation category- degree of pollution	CAT III, 2	
Mechanical environment	M1	
Electromagnetic environment	E2	

Protection against penetration of dust and water	IP51 (indoor)
Attitude	Up to 2000m

8.4.4. Terminals

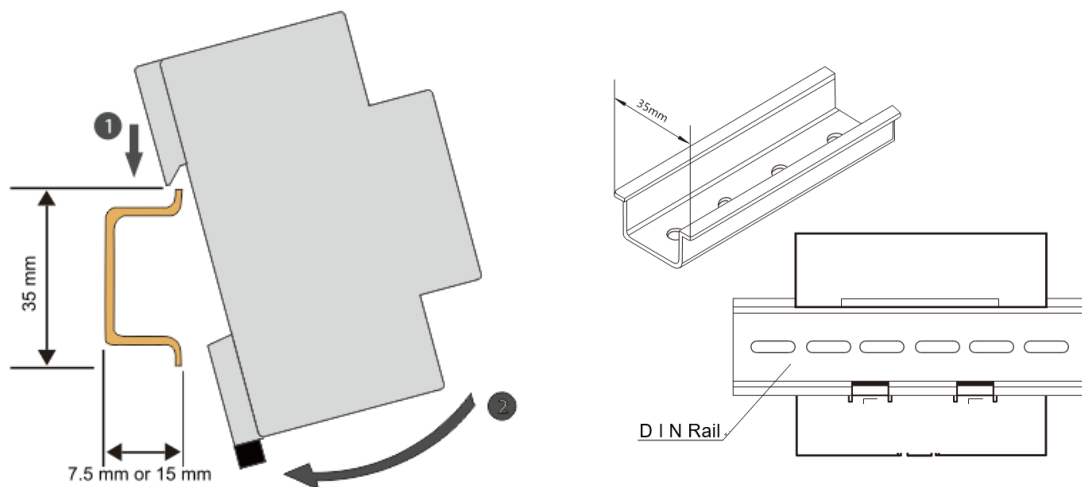
Type	Quantity	Description
Micro USB Type-B	1 port	Connect to a PC for programming and reading
MCS-BUS (RJ45 connection)	2 ports	interconnection with MCS-U module and the next MCS-I modules
CURRENT INPUTS (RJ12 connection)	3 ports	Connect with 1x three phase current transformer or 3x single phase current transformers

9. Dimension



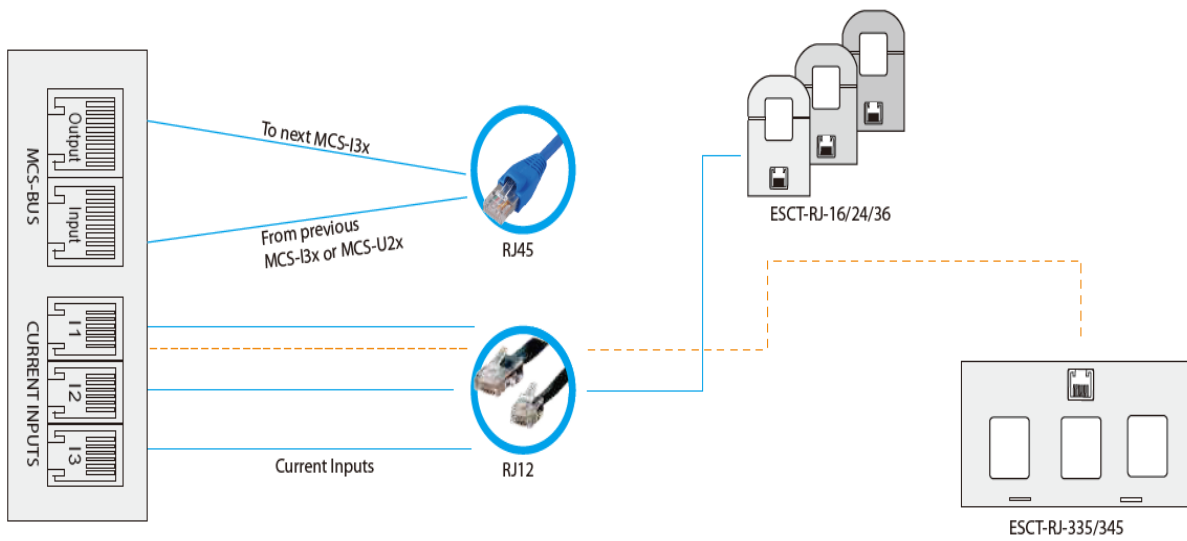
10. Mounting

MCS-I modules are din rail mounted with standard 35mm size.



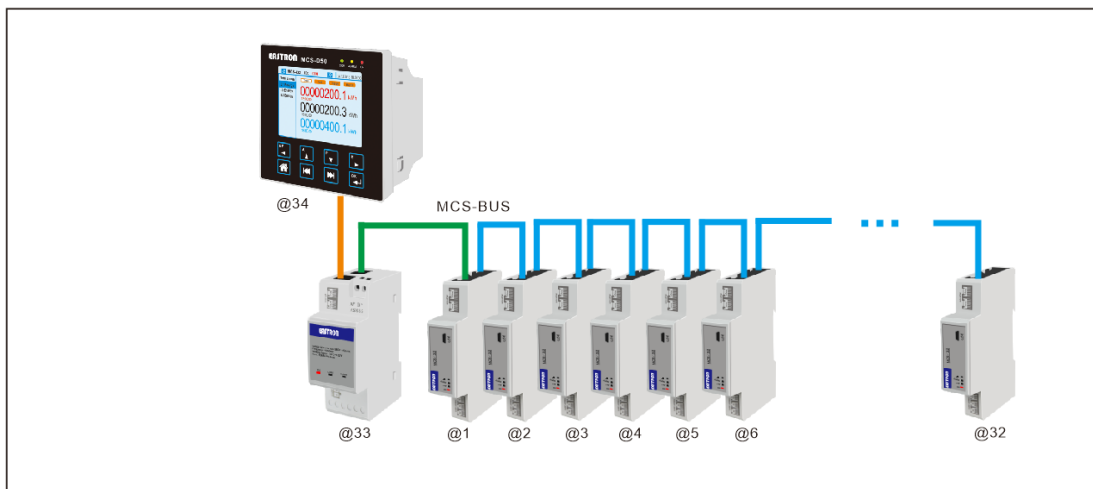
11. Connection (RJ45 interconnection of modules)

11.1 MCS-U20/21/22+ MCS-I+ ESCT-RJ Series



12 Length of cables for MCS-BUS

RJ45 cable is used to connect the MCS-D, MCS-U, and MCS-I modules. The RJ45 cable provides data transmission between them, and also power supply from MCS-U to MCS-I.



The cable between them shall be as short as possible to make the reliability. The max. Length of them are:

- The cable length between MCS-D and MCS-U module can up to 10M.
- The cable length between MCS-U and the first MCS-I module can up to 1.5M.
- + — The total cable length between MCS-U and MCS-I modules shall no more than 7M.

Caution: Over-length cable might cause errors in measurement.
Only use Eastron RJ45 MCS-BUS cables.

13. Current transformers

13.1 Introduction

A range of RJ12 plug in current transformers are designed to be used on “Multi-click” solution. From 3-in-1 Moulded case CT’s for use in new build applications, or Split core CT’s for use in retrofit applications. Compared with other current transformers, it takes advantages of easy connection and error free.

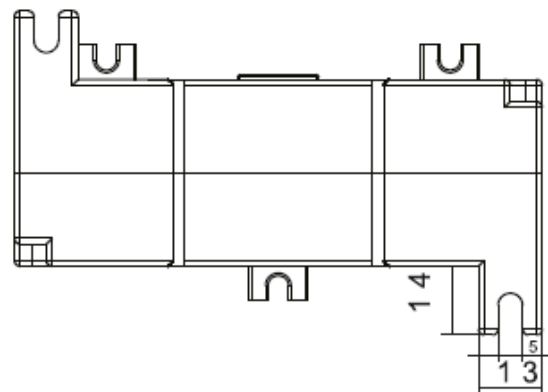
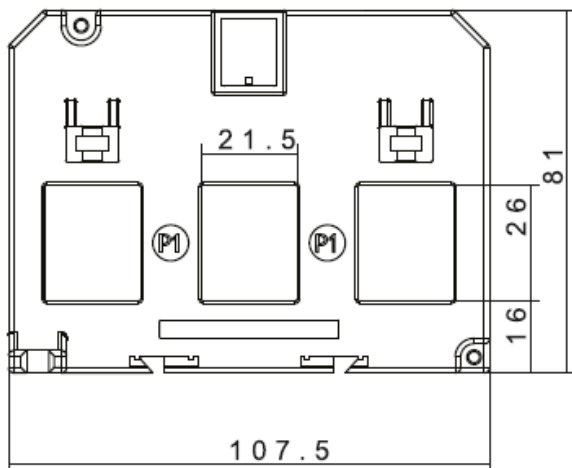
If the CT is installed reversely on the load or on wrong phase, the user can change the direction of the load according to the real physical installation direction or correct the phase connection through MCS-D module (Display setting) or MCS-U22 module (RS485 Modbus communication).

13.2 Model table

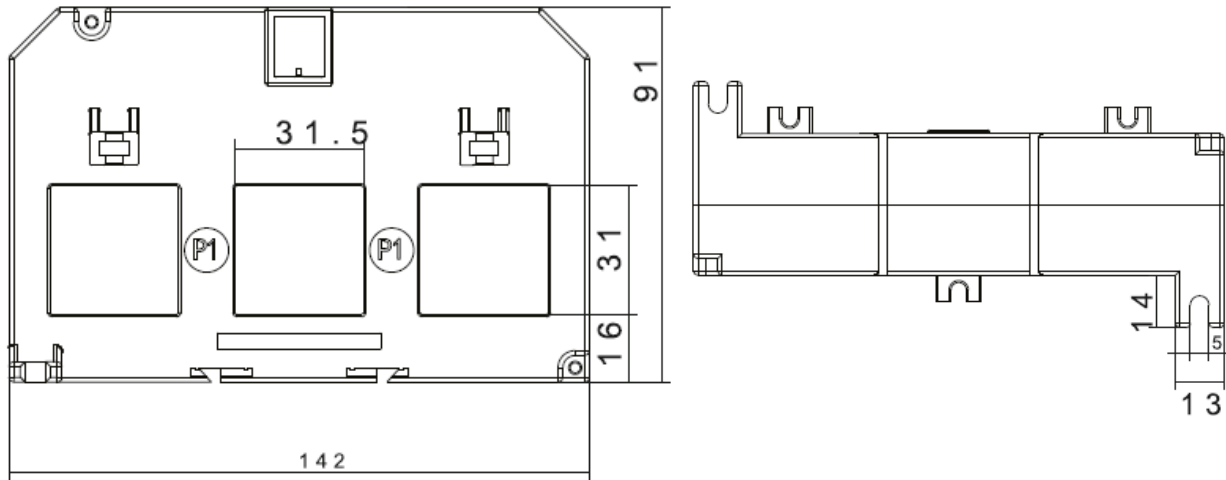
13.2.1 Three phase current transformer

ESCT-RJ 335/345 3-in-1 three phase solid core current transformer			
Product codes	CT Ratio	Accuracy	Aperture (3xWxH)
ESCT-RJ335	60/100mV	0.5/1	3x21.5x26mm
	125/100mV	0.5/1	
	150/100mV	0.5/1	
	200/100mV	0.5/1	
	250A/100mV	0.5/1	
ESCT-RJ345	250A/100mV	0.5/1	3x21.5x31mm
	300/100mV	0.5/1	
	400/100mV	0.5/1	
	500/100mV	0.5/1	
	600/100mV	0.5/1	
	630/100mV	0.5/1	

ESCT-RJ335



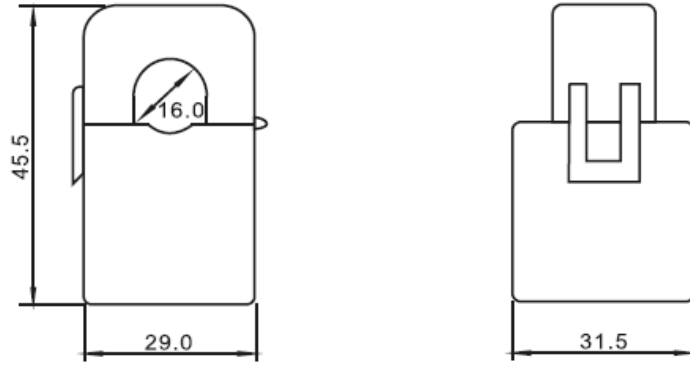
ESCT-RJ345



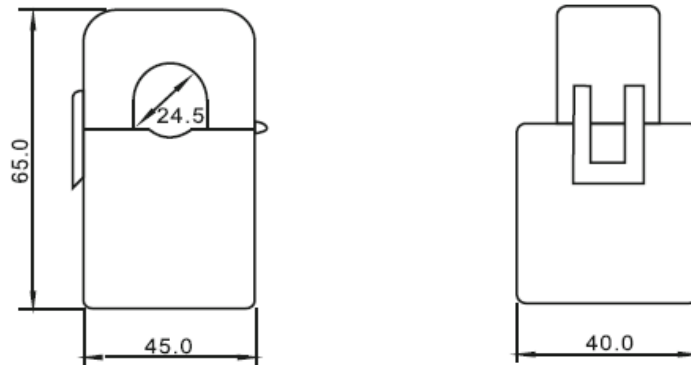
13.2.2 Single phase current transformer

ESCT-RJ16/24/36 Single phase split core current transformer			
Product codes	CT Ratio	Accuracy	Aperture (WxH)
ESCT-RJ16	5/100 mV	0.5/1	16mm ϕ
	10/100 mV	0.5/1	
	50/100 mV	0.5/1	
	100/100 mV	0.5/1	
	150/100 mV	0.5/1	
ESCT-RJ24	10/100 mV	0.5/1	24mm ϕ
	50/100 mV	0.5/1	
	100/100 mV	0.5/1	
	250/100 mV	0.5/1	
	300/100 mV	0.5/1	
ESCT-RJ36	20/100mV	0.5/1	36mm ϕ
	100/100mV	0.5/1	
	150/100 mV	0.5/1	
	250/100mV	0.5/1	
	400/100mV	0.5/1	
	500/100 mV	0.5/1	
	600/100mV	0.5/1	

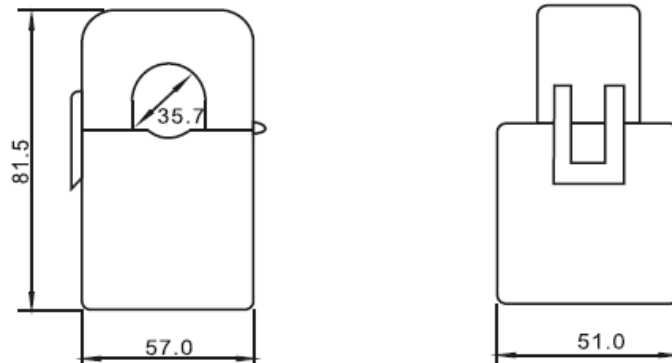
ESCT-RJ16



ESCT-RJ24



ESCT-RJ36



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