



Multi Instrument

- Saving cost
- Saving space
- Simple to use
- Simple to install

Multi Instrument

The MI-1 and MI-2 is a 3 phase digital metering system in a standard 96 x 96 mm DIN case with a depth of only 94 mm. All functions are performed via the two front control buttons making the MI-1 and MI-2 simple to use.

The products have a big range of functions and types. This enables the user to choose the product that suits the application, space and cost requirements.

Applications

Applications include building management systems, distribution feeders, high, medium and low voltage switchgear, control panels, generating sets, UPS systems, process control, cogeneration systems, power management and control.

Programmable

The front push buttons enable the users to entering system current and voltage ratios as well as program their own custom display.

Memory

All data including energy registers, current-, voltage ratios and calibration data is stored in a non volatile ee-prom memory.

Communications

The MI-1 and MI-2 has the option of providing either RS232 or RS485 communication.

The RS485 enables remote reading and programming of up to 32 MI's on a 2 wire bus using the Modbus protocol.

The Modbus protocol allows the MI to be used with PC, PLC, RTU, Data loggers and Scada programs.

The RS232 output is 2 wire one way communication and does not have a protocol. The data is ASCII data string. i.e. continuous data.

Display

The display is a backlit custom LCD with high contrast and a wide viewing angle.



Multi Instrument MI-1

Parameters measured and displayed

Phase and Line Voltages (V)

Phase Currents (A)

Frequency (Hz)

Active Power (W)

Apparent Power (VA)

Multi Instrument MI-2

Parameters measured and displayed

Phase and Line Voltages (V)

Phase Currents (A)

Neutral Current (A) [Option]

Frequency (Hz)

Active Power (W)

Apparent Power (VA)

Reactive Power (VAr)

Power Factor (P.F.)

Active Energy (Wh)

Reactive Energy (VArh)

Demand Current

Active Power Demand (Watt Demand)

Apparent Power Demand (VA Demand)

Input values

Voltage

Rated U_N	57.8 to 600 V specify nominal voltage.
Range	20-120% U_N
Burden	0.5 VA per phase
Overload	1.5 x U_N continuous 4 x U_N for 1 second

Current

Rated I_N	1 or 5 A
Range	MI-1: 20-120% I_N MI-2: 10-120% I_N
Burden	0.5 VA per phase
Overload	4 x I_N continuous. 50 x I_N for 1 sec

Frequency

Frequency	45 to 65 Hz
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Auxiliary supply

AC voltage	115 or 230 V ($\pm 15\%$) 45 to 65 Hz burden <7 VA
DC voltage (Option)	12 V, 24 V, 30 V, 48 V, 110 V

Accuracy

Volt and Current	0.5% of reading ± 2 digit
Frequency	0.1 Hz ± 1 digit
Active Power	1% of reading ± 2 digit
Reactive Power	1% of reading ± 2 digit
Apparent Power	1% of reading ± 2 digit
Power Factor	2% of range
Energy	Cl. 1 (according to IEC 1036)

Options

Pulsed Output active or reactive energy (MI-2 only)
RS485 Modbus protocol
RS232 ASCII
DC Auxiliary supply
Neutral Current (MI-2 only)

Systems

MI-1-12, MI-2-12	Single phase
MI-1-23, MI-2-23	3 phase 3 wire unbalanced load
MI-1-34, MI-2-34	3 phase 4 wire unbalanced load

Demand (MI-2 only)

Programmable	In steps of 1 min from 3 to 30 min
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Output realy (MI-2 only)

Programmable for Relay	Active or reactive energy
Max ratios	Single pole, normally open
Pulse rate	50 V, 150 mA, 5 W, AC or DC
Pulse duration	Automatically set
	Programmable in steps of 20 ms from 20 ms to 200 ms

Environmental

Working Temperature	0 to +50 °C
Function Temperature	-5 to +60 °C
Storage Temperature	-10 to +65 °C
Temperature Coefficient	0.01% per °C
Relative Humidity	0-95% non condensing
Warm up time	1 min.
Shock	10 G in 3 planes

Enclosure

Standard DIN case	96 x 96 x 100 mm
Panel mount	Via 4 retaining brackets.
Cutout	92 +0.8 mm x 92 +0.8 mm
Material	Black Polycarbonate complying with UL 94 VO
Terminals	Screws for 2 x 0.5-5 mm ²
Weight	0.7 kg

Insulation

Test Voltage:	3 kV RMS 50 Hz for 1 min between case, input, aux. 1 kV between case, input, aux., relay output and RS485 output.
Impulse Test:	EMC 5 kV transient comply with IEC 801 / EN 55020 HF
Surge withstand:	IEC 801 / EN55020 ANSI C37.90A
Interference:	EHF 2.5 kV 1MHz complying with IEC 255-4
Protection ClassII:	Complying with IEC348 / BS4753 / DIN 57411 / VDE

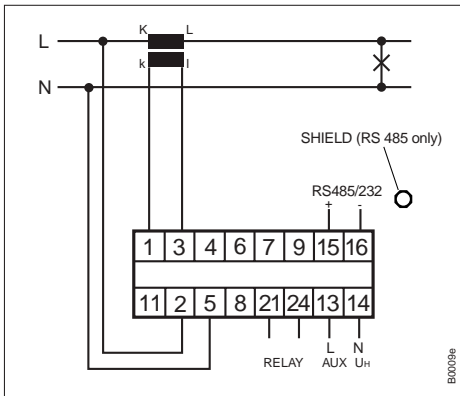
Approvals

UL, C-UL, CSA

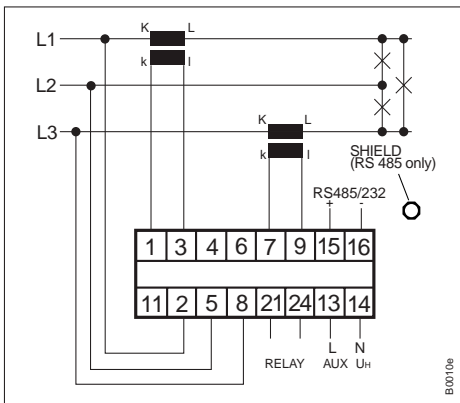
Applied standards

General	IEC 688, BS4889, IEC 359
EMC	Emissions BSEN50081/ Immunity BSEN50082/2
Safety	IEC 1010

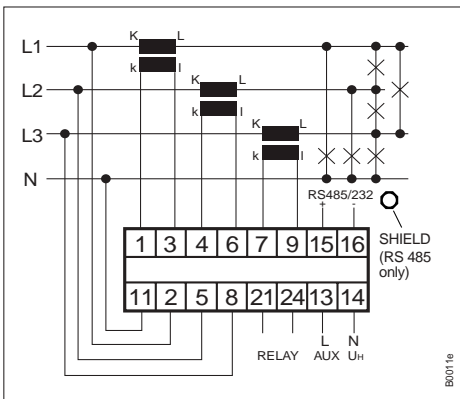
Connections



MI-1-12 and MI-2-12 (single phase connection)

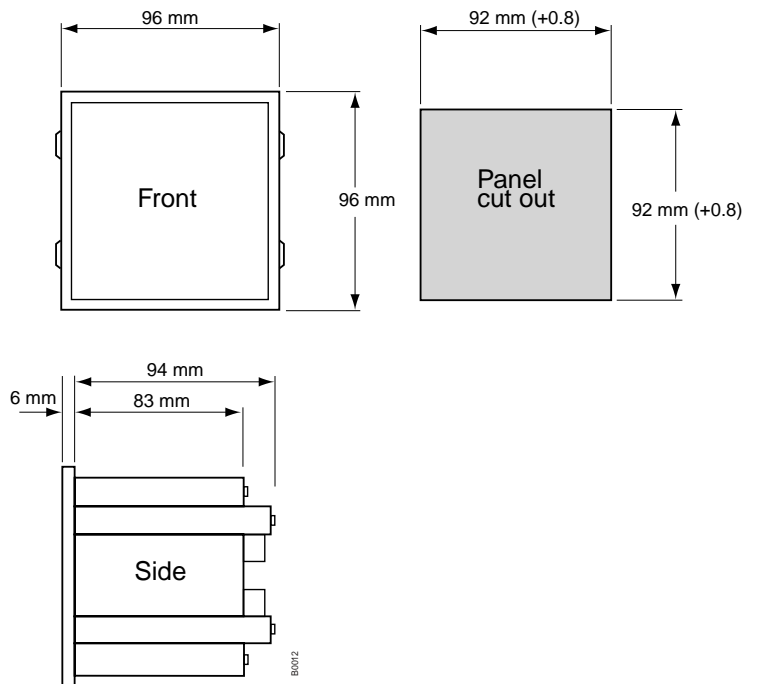


MI-1-23 and MI-2-23 (3 phase, 3 wire unbalanced load connection)



MI-1-34 and MI-2-34 (3 phase, 4 wire unbalanced load connection)

Dimensions



Types and options

Type	Option 1	Option 2	Option 3
MI-1-12	RS485 or RS232	DC aux	
MI-1-23	RS485 or RS232	DC aux	
MI-1-34	RS485 or RS232	DC aux	
MI-2-12	RS485 or RS232	DC aux	Pulse out
MI-2-23	RS485 or RS232	DC aux	Pulse out
MI-2-34	RS485 or RS232	DC aux	Pulse out

Ordering information

The example below shows the information necessary when ordering.

Type	System	Voltage	Current	Aux volt.	Option 1	Option 2	Option 3
MI-2	-34	110	5	110	RS485	DC aux	Pulse



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