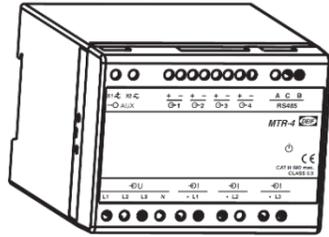




Multi-transducer  
MTR-4



Document no. 4189300026B

Health and safety

It is essential that everyone using the product is familiar with security advices and warnings. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Waste

It is forbidden to deposit electrical and electronic equipment as municipal waste. The manufacturer or provider shall take waste electrical and electronic equipment free of charge. The complete procedure after lifetime should comply with the Directive EZ 2002/96/EG about restriction on the use of certain hazardous substances in electrical and electronic equipment or a corresponding Url 118/04.

Safety warnings and instructions for use

Check the following before switching on the device:

- Nominal voltage
- Proper connection of auxiliary supply
- Nominal frequency
- Voltage ratio and phase sequence
- Current transformer ratio and terminals integrity
- Protection fuse - recommended maximum external fuse size is 6 A
- Proper connection of I/O modules

**Important:** The secondary side of the current transformer should be short-circuited before connecting the transducer.

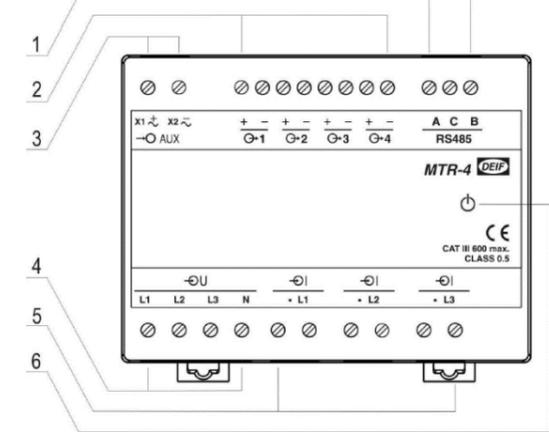
Warnings, information and notes regarding designation of the product

- See product documentation.
- Double insulation in compliance with the SIST EN 61010-1 standard.
- Functional ground potential.  
**Note:** This symbol is also used for marking a terminal for protective ground potential if it is used as a part of connection terminal or auxiliary supply terminals.
- Compliance of the product with directive 2002/96/EC
- Compliance of the product with European CE directives.

Description of the product

The measuring transducer is intended for measuring, analyzing and monitoring a single-phase or three-phase electrical power network. It measures RMS value by means of fast sampling of voltage and current signals, which makes the instrument suitable for acquisition of transient events. A built-in microcontroller calculates measurements (voltage, current, frequency, energy, power, power factor, THD phase angles, etc.) from the measured signals.

- 1 – Communication ports
- 2 – I/O module
- 3 – Auxiliary supply
- 4 – Voltage inputs
- 5 – Current inputs
- 6 – Power ON LED



Communication ports and LED indicators

Serial communication can be connected by using a screw-in connector (RS485). USB can be connected through a USB-mini type connector at the bottom of the transducer. The LED indicator is intended for POWER ON signaling (red LED).

Analogue outputs

Four slots are intended for different equipping of analogue outputs, which should be chosen when placing the order.

Relay outputs

Four relay outputs can be used for warning and alarms.

Auxiliary supply

Auxiliary supply is connected through two screw-in connectors. For safety purposes, it is important that all wires are firmly connected. Auxiliary supply is wide range (24 V DC – 250 V DC  $\pm 20\%$ ; 48 V AC – 230 V AC  $\pm 20\%$ ).

Voltage inputs

Each voltage input is connected to measuring circuit through input resistor chain (3.3 M $\Omega$  per phase). Maximum value of input voltage is 600 V<sub>L-N</sub> (1000 V<sub>L-L</sub>).

Current inputs

Each current input is connected to the measuring circuit through a current transformer (0.01  $\Omega$  per phase). Maximum allowed thermal value of input current is 15 A (cont.).

Connection

**Before use:** check voltages and phase rotation, supply voltage and nominal frequency. Check protective fuse rating (the recommended maximum rating of the external protective fuse for this equipment is 6 A - red spot type or equivalent).

**Warning!**  
**Wrong or incomplete connection of supply, measurement or other terminals can cause malfunction or damage the device.**

**Note**  
After connection, settings have to be performed via communication (connection mode, current and voltage transformers ratio ...).

Mounting

The MTR-4 multi-transducer is designed for DIN rail mounting. It should be mounted on a 35 mm DIN rail by means of three plastic fasteners. Before installation, the fasteners should be in open position (pulled). After the device is in place, the fasteners are locked (pushed) to close position.

Electric connection

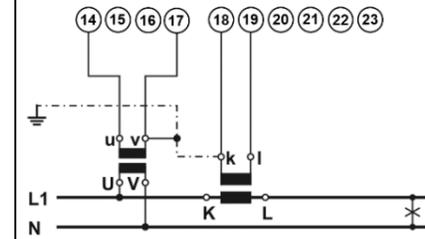
Voltage inputs of the measuring transducer can be connected directly to a low-voltage network or via an appropriate voltage measuring transformer to medium or high voltage network.

Current inputs of the measuring transducer can be connected directly to a low-voltage network or via a corresponding current transformer.

Choose the corresponding connection from the figures below and connect the corresponding voltages and currents.

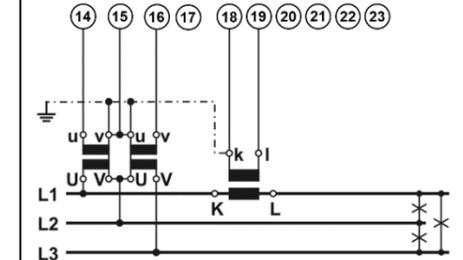
Connection 1b (1W)

Single-phase – one CT – connection



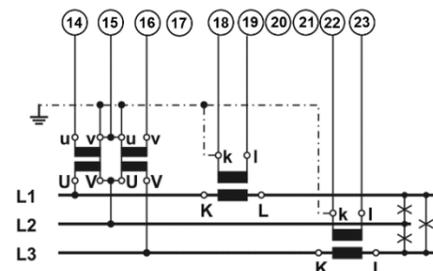
Connection 3b (1W3)

Three-phase – one CT – three-wire connection with balanced load



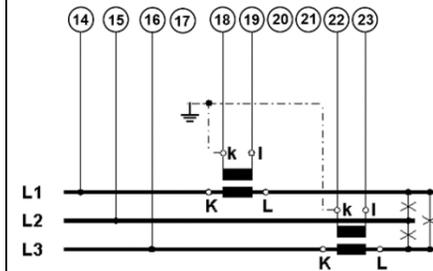
Connection 3u (2W3)

Three-phase – two CT – three-wire connection with unbalanced load



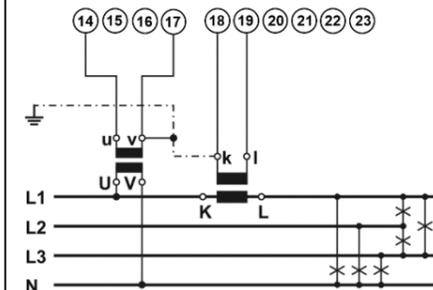
Connection 3u (3W3)

Three-phase, three-wire direct connection



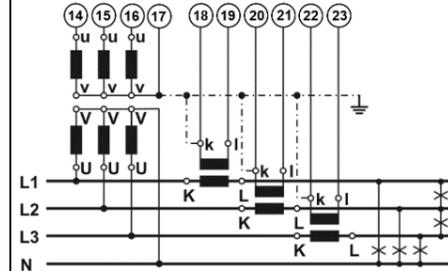
Connection 4b (1W4)

Three-phase – one CT – four-wire connection with balanced load



Connection 4u (3W4)

Three-phase – three CT – four-wire connection with unbalanced load



Connection of output modules

**Warning!**

**Check the module features that are specified on the label, before connecting module contacts. Wrong connection can cause damage or destruction of module and/or device.**

Connect module contacts as specified on the label. Examples of labels are given below and describe modules built in the device.

I/O 1	
Fast analogue output	
0.../+20 mA	3
0.../+10 V	4

The fast analogue output is proportional to measured quantities. The outputs may be either short- or open-circuited. They are electrically isolated from each other and from all other circuits.

I/O 1	
Relay output	
48 V AC/DC	3
1000 mA	4

Electromechanical relay output module.

### Communication connection

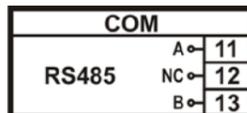
MTR-4 is equipped with one standard serial (RS485) communication port and one service communication port (USB).

#### Warning!

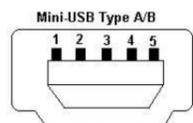
**The USB communication port is NOT galvanically separated and can be used ONLY UNconnected to aux. supply and power inputs.**

Connect a communication line by means of a corresponding terminal. Corresponding data are stated on the instrument label, regarding the selected communication. Connector terminals are marked on the label on the upper side of the instrument.

USB connector is positioned on the bottom of the instrument under the plastic cover.



COM1 serial communication port (RS485)



SERVICE communication port (USB)

### RS485

RS485 communication is intended for connection of devices to networks where several instruments with RS485 communication are connected to a common communication interface.

The individual terminals of the screw terminal connector must be connected correctly.

### USB

USB communication serves as a fast peer-to-terminal data link. The instrument is detected by host as a USB 2.0 compatible device. The USB connection is provided through a USB standard type mini B connector.

#### Note!

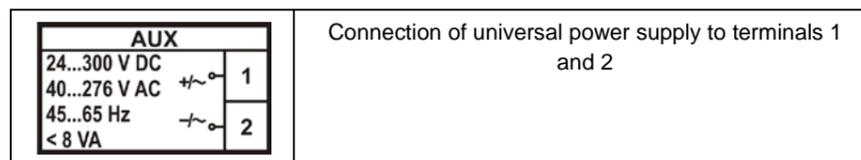
When the MTR-4 is connected to a PC through USB communication for the first time, a user is prompted to install a driver. The driver can be downloaded from the DEIF A/S web page [www.DEIF.com](http://www.DEIF.com) (included in M-Set software package).

With this driver installed, USB is redirected to a serial port, which should be selected when using M-Set software.

### Survey of communication connections

Connector	Terminals	Position	RS232	RS485
SCREW TERMINAL		11	Rx	A
		12	GND	NC
		13	Tx	B
USB-mini B		Standard USB 2.0 compatible cable recommended (type mini B plug)		

### Connection of auxiliary power supply



Connection of universal power supply to terminals 1 and 2

#### Warning!

For safety purposes, it is important that both wires (Line and Neutral) are firmly connected.

### Inputs

Input type	Specifications
Voltage input	<p>Nominal range values: 62.5, 125, 250, 500 V<sub>LN</sub> - Autorange</p> <p>Nominal voltage(U<sub>N</sub>): 500 V<sub>LN</sub></p> <p>Measuring range (cont.): 2 to 600 V<sub>LN</sub> (1000 V<sub>LL</sub>) sinusoidal</p> <p>Max. allowed value (acc. to IEC/EN 60 688): 2 × U<sub>N</sub>; 10 s and 10sec interval</p> <p>Frequency range: 50/60 Hz</p> <p>Consumption: &lt; U<sup>2</sup>/3.3 MΩ per phase</p> <p>Input impedance: 3.3 MΩ per phase</p>
Current input	<p>Nominal range values: 1, 5, or 10 A - Autorange</p> <p>Nominal current (I<sub>N</sub>): 5 A</p> <p>Measuring range: 1 mA to 12.5 A sinusoidal</p> <p>Min. measurement (noise reduction): Settings from "starting current for all powers"</p> <p>Max. allowed value (thermal): 15 A cont.</p> <p>(acc. to IEC/EN 60 688): 20 × I<sub>N</sub>; 5 × 1s; 300 ms interval</p> <p>Frequency range: 50/60 Hz</p> <p>Consumption: &lt; I<sup>2</sup> × 0.01 Ω per phase</p>

### Communication

Type	RS485	USB
Type of connection	Network	Direct
Max. connection length	1000 m	-
Number of bus stations	≤ 32	-
Terminals	Screw terminals	USB-mini
Insulation	Protection class I, 3.3 kV AC RMS 1 min	<b>NO INSULATION!</b>
Transfer mode	Asynchronous	
Protocol	MODBUS RTU	
Transfer rate	2.400 to 115.200 bit/s	USB 2.0

### Connection

#### Permitted conductor cross-sections

Terminals	Max. conductor cross-sections
Voltage inputs (4)	2.5 mm <sup>2</sup> with pin terminal 4 mm <sup>2</sup> solid wire
Current inputs (6)	2.5 mm <sup>2</sup> with pin terminal 4 mm <sup>2</sup> solid wire
Supply (2)	2.5 mm <sup>2</sup> with pin terminal 4 mm <sup>2</sup> solid wire
Modules & Com (8 + 3)	2.5 mm <sup>2</sup> with pin terminal 4 mm <sup>2</sup> solid wire

### Frequency

Nominal frequency (f <sub>N</sub> )	50, 60 Hz
Measuring range	16...400 Hz **

### Power supply

Universal	Nominal voltage AC	48 ... 230 V ±20 %
	Nominal frequency	45 ... 65 Hz
	Nominal voltage DC	24 ... 250 V ±20 %
	Consumption	< 8 VA
	Power-on transient current	< 20 A; 1 ms

\* Starting current is set by setting software M-Set; /settings/general

\*\* Only for frequency measurement

Default communication settings:

Address: 33 (address range 1 - 247)

Parameters: 115200,n,8,2 (rate range 2400 - 115200 b/s)

When connected to USB, choose only the appropriate communication port.