FAULT INDICATOR
TYPE MD
panel-mounted

General description

The fault indicator type MD can be used in radial networks with one input and open-ring networks. The device detects short-circuits by measuring the phase-currents and earth-faults by measuring the sum current. Faults are identified when the measured current is exceeding an adjusted threshold. Detected faults will be displayed through the liquid crystal display (LCD) and by one signalling LED.
The fault indicator type MD consists of one display unit and up to four sensors for short-circuit and/or earth-fault detection. The sensors have a rigid housing and their interior is fully sealed from the environment. The sensors are divisible and can be retrofitted on the cables. All sensors must be mounted on screened cables only.
The type MD stands out for it's flexible settings. With the help of the LCD and an encoder push-button all settings can be easily adjusted at site. Furthermore, current read-outs of all sensors can be displayed through the display.
The device can be power supplied by an exchangeable long-life lithium battery or by an external AC or DC power supply.

Modbus communication

As an option the device can be equipped with a serial RS485 interface for communication through the Modbus protocol. For Modbus communications an external power supply is recommended. Due to the internal lithium battery the external power supply can fail in case of a fault.
To optimize power consumption a Modbus trailing time can be adjusted that keeps the Modbus communication up for a certain amount of time after failure of the power supply. The device will enter power-safe mode afterwards.

Features and Options

Current read-out:	Phase-currents and sum-current can be displayed through LCD
Permanent earth-faults:	Indication of permanent earth-faults (only types MD-EK and MD-E)
2nd short-circuit pass-through:	Indication of a second short-circuit pass-through (only types MD-EK and MD-K)
Separate response delays:	The response delay for short-circuits and earth-faults can be adjusted individually
Remote test and reset inputs:	The device has separate inputs for remote testing and resetting
Two relays:	Two remote contact relays to indicate earth-faults and short-circuits separately
Versatile power supply:	The device can be powered by 10-110 V DC, 110 / 230 V AC and lithium battery
Optional Modbus interface:	The device can be equipped with a serial RS485 interface for Modbus communication

External Connectors

Connector 1 - 3:	SCADA change-over contact for short-circuit
Connector 4 - 5:	sensor type SE (sum current sensor)
Connector 6 - 11:	sensors type SK (phase sensors)
Connector 12 - 14:	SCADA change-over contact for earth-fault
Connector 15 - 17:	RS485 interface with Modbus protocol
Connector 18 - 19:	blinking lamp (Type BL4.1 + Type BL6)
Connector 20 - 21:	remote test input
Connector 21 - 22:	remote reset input
Connector 23 - 24:	115V AC to 230V AC power supply
Connector 26 - 27:	12V DC to 110V DC power supply

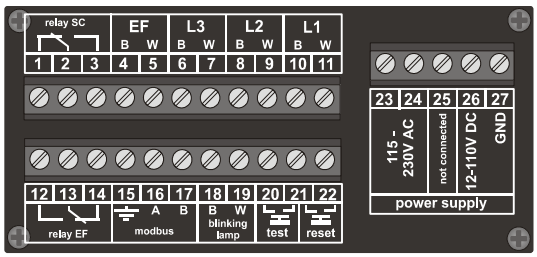


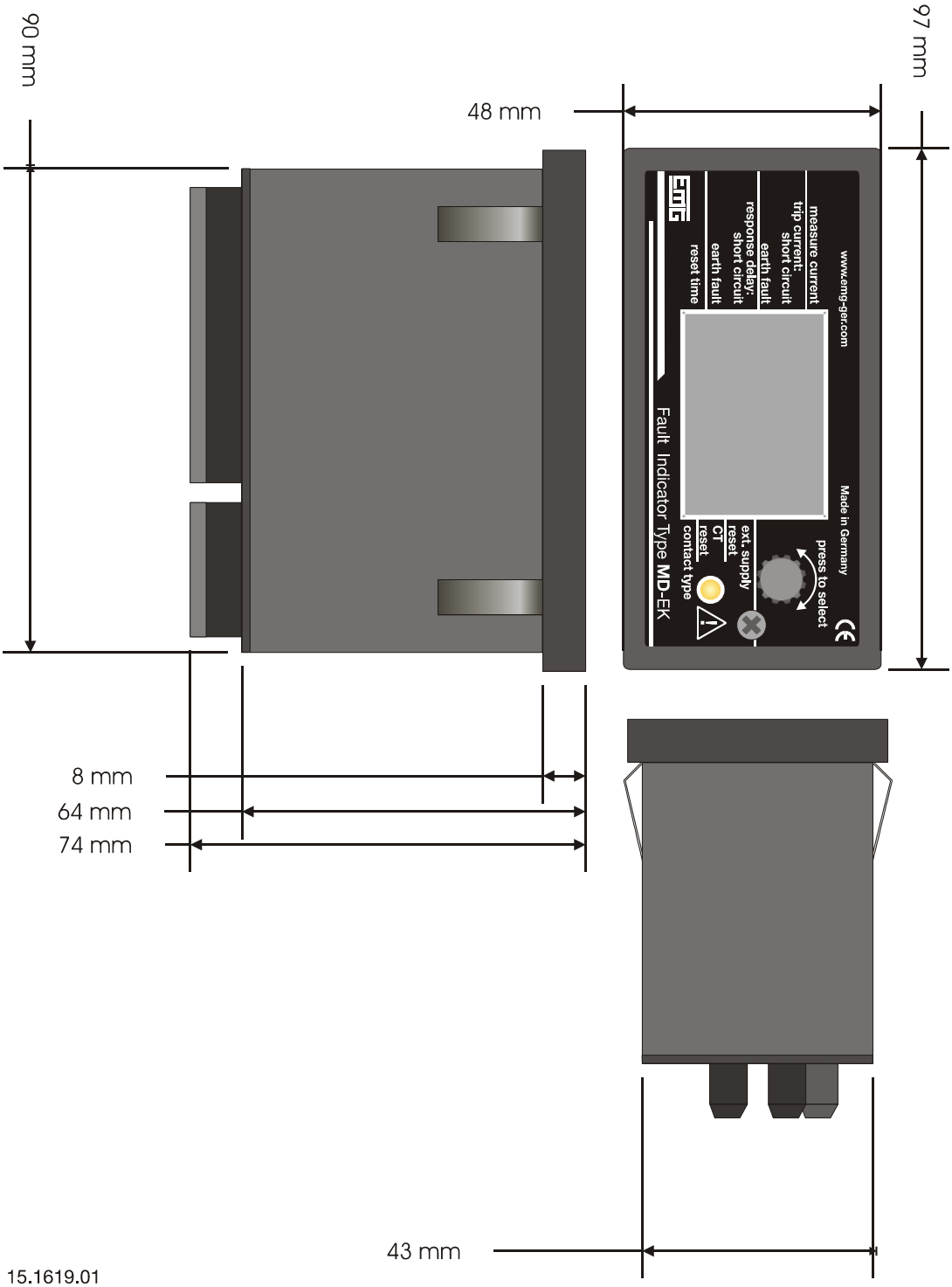
figure 1: connector

General Data

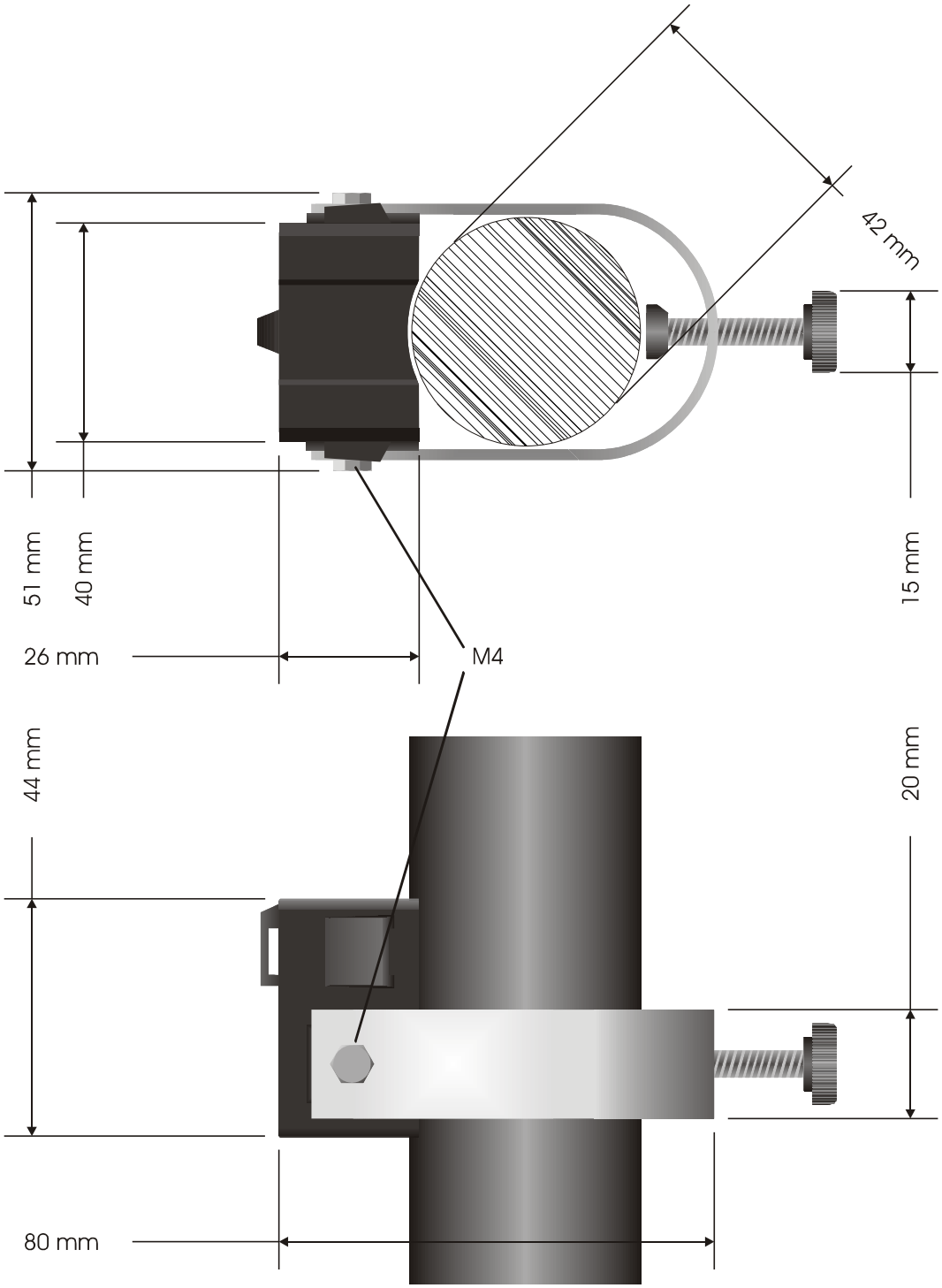
Subject	Value
short-circuit current	any value between 40A to 1500A in steps of 10A (±10 %) optional: automatic trip current on basis of net current (150% to 500% factor in steps of 50%)
earth-fault current	any value between 10A to 300A in steps of 5A (±10 %)
Response delay short-circuit	any value between 40ms to 500ms in steps of 20ms
Response delay earth-fault	any value between 40ms to 500ms in steps of 20ms
Indication unit	suitable for panel installation
Indication of a) short-circuit b) battery	 a) display on LCD for each phase/earth-fault and common yellow LED b) display on LCD for low-battery indication and common yellow LED
Reset of the indicator	a) manual by push-button b) connection for a potential-free remote reset c) time: adjustable from 0.5h to 36h in steps of 0.5h after fault d) self-acting after recovering external power supply e) self-acting after recovering net current f) Modbus command
on site function and battery test	encoder push-button has to be pressed for 3 seconds
Dimensions: display unit	(WxHxD) 97 mm x 48 mm x 74 mm (dimensions of cut-out: 92+0.8 x 45+0.6 mm / IEC61554 / DIN43700)
Protection class: display unit	IP40
Protection class: sensors	IP67
Internal type test	According to IEEE 495-2007
Operation temperature range	-20°C to +70°C
Power supply	a) lithium battery (LiSOCl2) / 3.6V / 2600 mAh b) 115V AC to 230V AC c) 12V DC to 110V DC
SCADA contacts	1 x change-over for short-circuit 1 x change-over for earth-fault permanent / wipe contact (100 * ms), configurable via LCD max. 230 V AC / max. 2 A / max. 30 W
Modbus	Transmission mode: RTU mode Adressing: 1 to 247 Parity checks: None, Odd, Even Baudrates: 9600, 19200 Electrical interface: RS485 (2W cabling)
Short-circuit sensors	**MD-EK / MD-K** 3x short-circuit sensors type SK (copper cable) diameter: 22-42** mm connection cable length: 3* m (** Other diameter ranges for all standard cables are available.)
Earth-fault sensor	**MD-EK / MD-E** 1x earth-fault sensor type SE (copper cable cable) diameter: 80-100** mm connection cable length: 3* m (** Other diameter ranges for all standard cables are available.)

* **Please note:** Other values can be ordered.

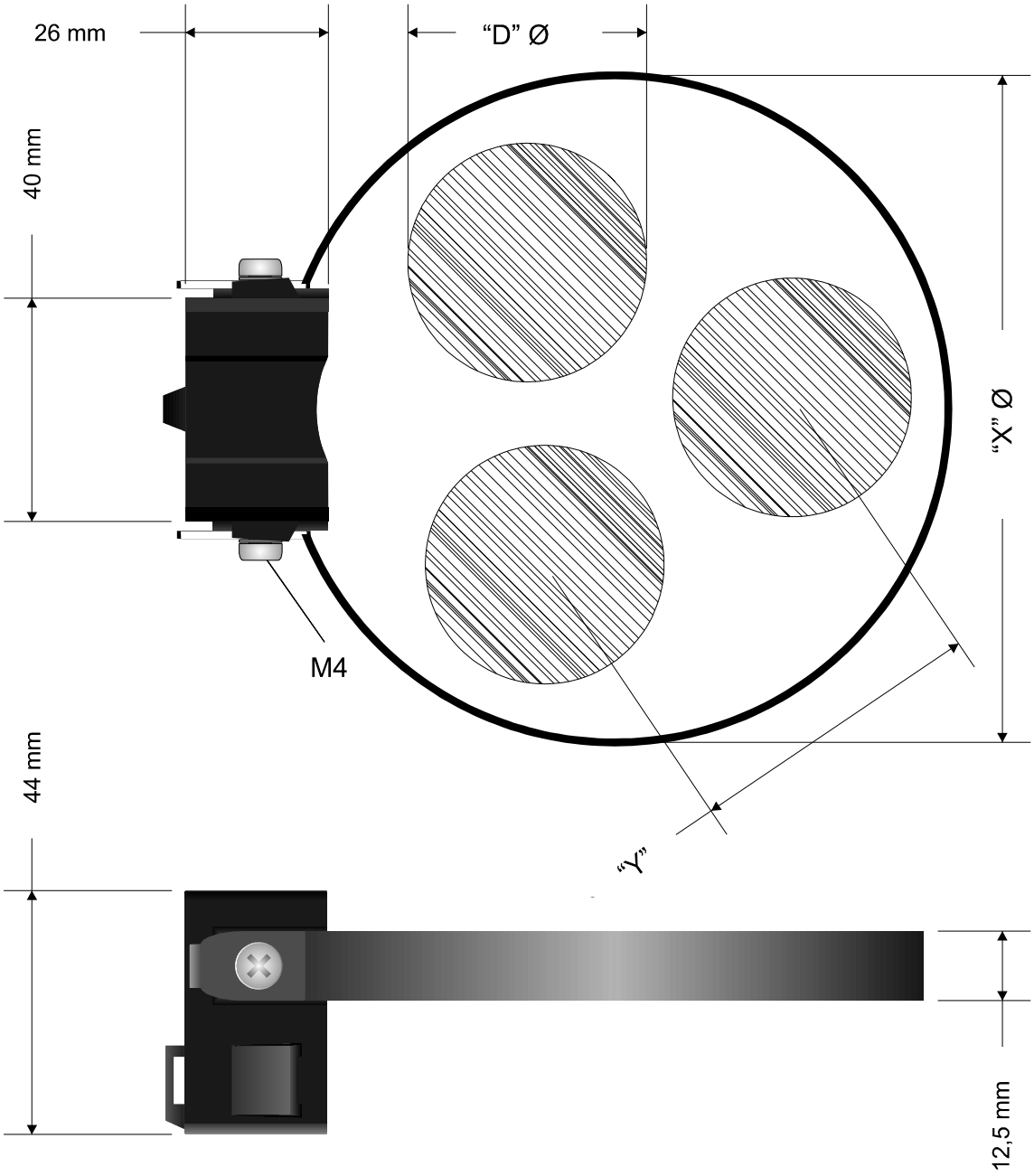
Display unit



Sensor type SK



Sensor type SE



Sensor (CT) is fixed to the monitored cables with a cable tie.

Verbindungskabel/connection cable:
- LIYY 2 x 0,5 mm²
- PB-free
- Ø = 5 mm
- length customer specific

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