# OPERATION MANUAL
# FASK + ROI-3



Thank you for choosing our Rogowski coils FASK and the associated measurement transducer ROI-3.

Read these operating instructions carefully before installing the product!

MBS AG · Eisbachstr. 51  Germany - 74429 Sulzbach-Laufen
Technical support: +49 7946 9581-0 · Fax: +49 7946 9581-90
E-Mail: info@mbs-ag.com · Internet: http://www.mbs-ag.com

Changes and errors excepted

The "operation manual" is not a complete directory of all safety measures required to operate the device.
Special operating conditions may require further measures. The "operation manual" contains instructions that must be observed to ensure your personal safety and to prevent damage to property.

## Symbols used:

| | |
|---|---|
|  | This symbol is an addition to the safety instructions and indicates an electrical hazard.. |
|  | This symbol is an addition to the safety instructions and indicates a potential hazard. |
|  | This symbol with the word<br>**Note!** describes:<br>▪ Procedures that do not pose any risks of injures.<br>▪ Important information, procedures or handling steps. |

## Table of Contents

## General product description

The MBS Rogowski current transformer FASK in combination with the transducer ROI-3 is used for current measurement of AC currents and is primarily used for retrofitting existing systems - either on busbars or on power cables. Subsequent installation around the current conductor is possible because you can open the FASK sensor. The output signal of the FASK sensor goes to the transducer ROI-3, which generates an AC current of 1 A at the output. The transducer ROI-3 is available with different transmission ratios up to a maximum of 10 kA at 1 A.

- Measuring of 50 Hz alternating currents up to 10 kA (FASK in combination with the transducer ROI-3)
- The output signals of the FASK sensor are connected to the transducer ROI-3.

## Safety information

- Only qualified electrical specialists are permitted to install, put into operation, maintain and operate the device.
- During all work on the device comply with the national health, safety and accident prevention regulations.
- If you do not observe the safety regulations, this can result in death, serious physical injuries or extensive property damage.
- During set-up and operation, observe the applicable provisions and safety regulations (also national safety regulations), as well as standard engineering practice.
- Observe the installation instructions provided!
- De-energise the system before starting the work. Check that it is de-energised!
- De-energise the device before starting the work. Check that it is de-energised!
- The safety-related data can be found in this document and the certificates (EC type approval certificate, if applicable any further approvals).
- Do not exceed the threshold values specified in the operation manual and on the rating plate.
- Install the device in an appropriate enclosure with suitable protection type in accordance with IEC 60529 to protect against mechanical or electrical damage.
- Do not exceed the threshold values specified in the operation manual and on the rating plate.
- Never operate equipment and current transformer circuits whilst open.
- It is prohibited to open or modify the device. Do not repair the device yourself, but rather replace it with an equivalent device.
- Repairs must be carried out by the manufacturer only. The manufacturer shall not be liable for damage due to violations.
- The prerequisites for faultless, safe operation of the device are proper transport and proper storage, set-up and installation, as well as operation and maintenance.
- Only use accessories that comply with the specifications of the device manufacturer (e.g. combination of FASK current transformer and ROI-3 measurement transducer).
- Store the product documentation.

☞ Do not use outdoors!

## Technical data

### FASK: Used material

| | |
|---|---|
| Model | FASK 100, 150, 200 and 300 |
| Coil & connection cable | Thermoplastic rubber flame retardant according to UL 94 V-0 |
| Fastener | acc. PA6 UL 94 V-0 |
| Colour (Coil) | orange |
| Shielding | 100% coil and 100% electric wire |

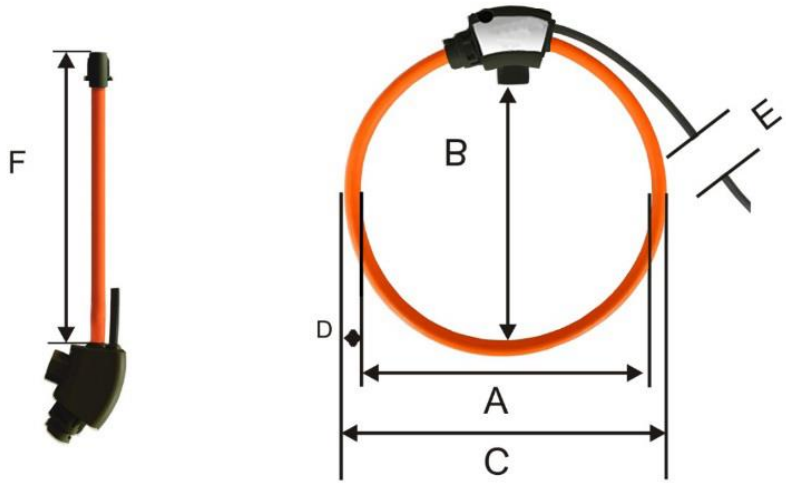
### FASK: Safety

| | |
|---|---|
| Model | FASK 100, 150, 200 and 300 |
| Certifications | CE certified (This product satisfies the provisions of the low voltage directive 2014/35/EU<br>This product satisfies the provisions of RoHS 2.0 directive 2011/65/EU<br>Protection degree: IP 68 |
| Insulation voltage | coil: 3000V<br>electric wire: 1000V |
| Measurement cat. | 1000V CATIII; 600V CATIV |

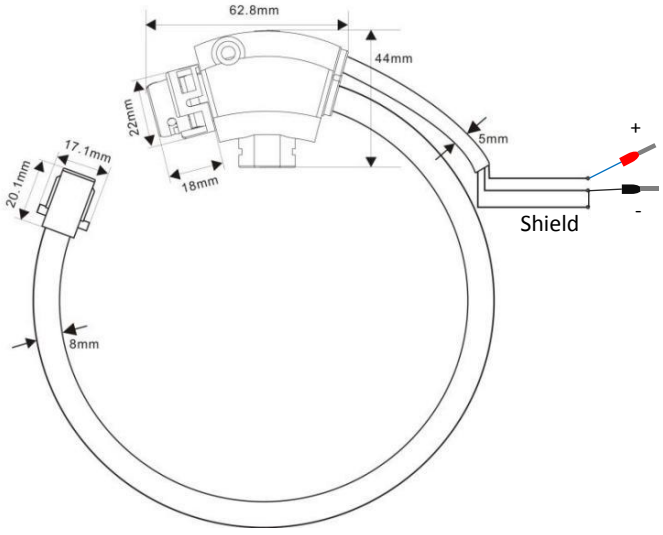
### FASK: Technical data

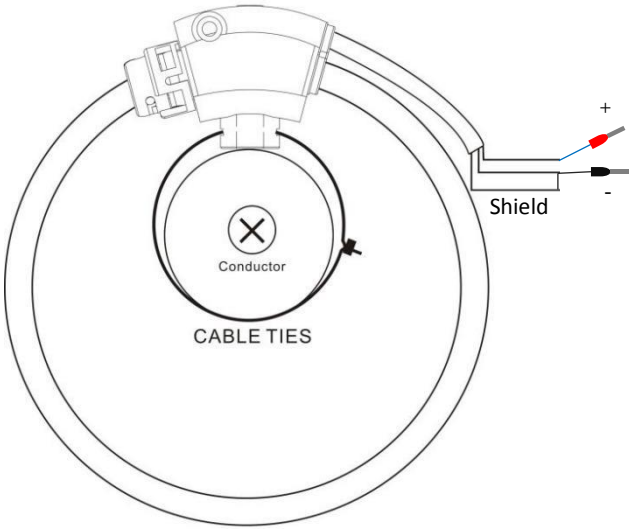
| Model | FASK-100 | FASK-150 | FASK-200 | FASK-300 |
|---|---|---|---|---|
| Coil length | 395 mm | 525 mm | 665 mm | 965 mm |
| Window size | 100 mm | 150 mm | 200 mm | 300 mm |
| Reference rated current | 1,000 A | 3,000 A | 6,000 A | 10,000 A |
| Weight | app. 100-160 g | | | |
| Output signal | 100 mV/kA @ 50 Hz | | | |
| Transformation errors | < 0.5 % (central position near the fastener @ 25 °C) | | | |
| Phase error | ≤ 0.5 ° (30 arc minutes) | | | |
| Maximum current measurable | 100 kA | | | |
| Coil resistance | between 100 and 250 Ohm | | | |
| Coil diameter (orange cable) | 8 mm | | | |
| Connection cable length | 3 m / 5 m / 10 m | 3 m / 10 m | 3 m / 10 m | 3 m / 10 m |
| Temperature coefficient | 400 ppm/K | | | |
| Position error | ± 1 % maximum | | | |
| Linearity error | ± 0.2 % maximum of the measured value | | | |
| Bandwidth | 1 Hz up to 100 kHz (- 3dB) | | | |
| Ambient temperature | -30 up to +80 °C | | | |
| Storage temperature | -40 up to +90 °C | | | |

## FASK: Dimensions




| Designation | Descriptions | FASK-100 | FASK-150 | FASK-200 | FASK-300 |
|---|---|---|---|---|---|
| **A** | Window size A [mm] | 135 | 165 | 210 | 310 |
| **B** | Window size B [mm] | 100 | 150 | 200 | 300 |
| **C** | Outside diameter coil [mm] | 151 | 181 | 226 | 326 |
| **D** | Coil diameter [mm] | 8 | | | |
| **E** | Connection cable length [m] | 3 / 5 / 10 | 3 / 10 | 3 / 10 | 3 / 10 |
| **F** | Coil length [mm] | 395 | 525 | 665 | 965 |



## ROI-3: Technical data

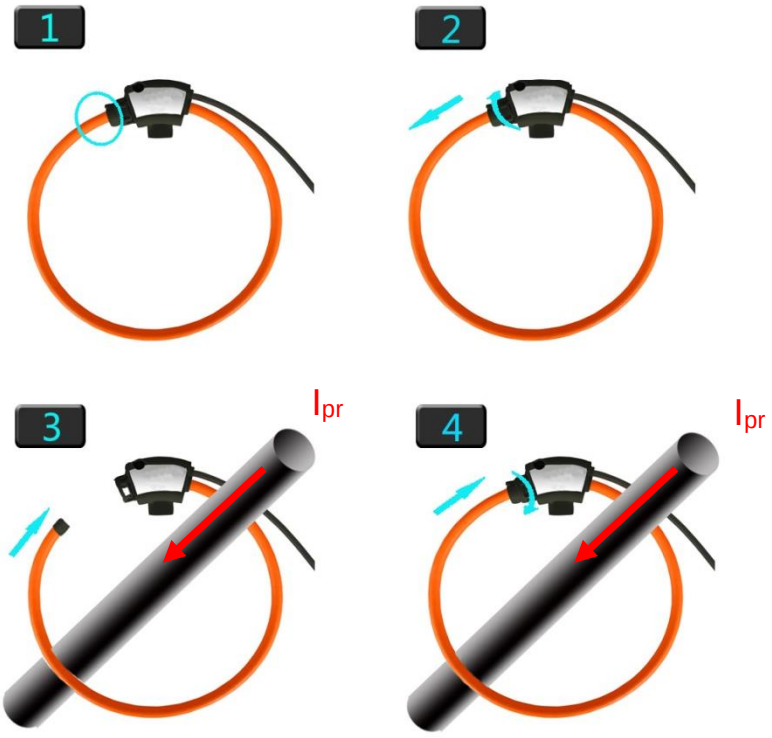
| Model | ROI-3 |
|---|---|
| Number of phase connections | 3 |
| Rated signal output | 1A AC rms |
| Max. output (overload) | 1.5A AC rms |
| Rated primary current [A] | 250; 400; 630; 1.000; 1.500;<br>2.000; 4.000; 6.000; 10.000 |
| Measuring error | 0.5 % @ 1 % (≥10 A) up to 110 % of rated primary current @ 25 °C |
| Phase error | ≤ 0.5 ° |
| Linearity error | ± 0.2 % of measurement value (@ 10 – 120 % of rated current) |
| Frequency bandwidth | 30 Hz up to 5 kHz |
| Maximum burden per phase | 0.5 Ω |
| Energy consumption | 10 W |
| Output @ 0A (zero drift) | ≤ 0.01A |
| Temperature coefficient | 200 ppm/K |
| Weight | 185 g |
| Dimensions | 114 x 100 x 22.5 mm |
| Power supply | 24V DC |
| Operating temperature | -30 °C up to +70 °C |
| Storage temperature | -30 °C up to +70 °C |
| Relative humidity | 80 % max without condensation |
| Protection degree | IP 20 |
| Certifications | CE certified (This product satisfies the provisions of the low voltage directive 2014/35/EU)<br>and complies with the requirements of EN 61326-1: 2013 |

## Installation

### FASK-Current sensor

The installation of these sensors is very easy. In a few simple steps, the coil is placed around the primary conductor and closed at the lock. The primary conductor does not have to be disconnected.

- To open the FASK Rogowski current transformer, turn the bayonet catch to the left (unlock measuring line). (Fig. 2)
- Pull the coil line out of the housing. (Fig. 3)
- Guide the coil cable around the power rail. (Fig. 3)
- Slide the coil cable into the enclosure. (Fig. 4)
- Turn the bayonet catch to the right until the end of the measuring coil audibly latches.
- Make sure that the measuring coil does not touch the power rail that is to be measured or a neighbouring rail, because the maximum permissible temperature of the signal line is +80 °C.
- Connect the signal line of the FASK Rogowski current transformer to the input terminals of the measurement transducer ROI-3.
- Secure the FASK Rogowski current transformer to the primary conductor. To do so, guide a cable tie through the intended fixture on the enclosure of the current transformer.




The direction of the primary current is shown as an arrow on the black plastic fastener. This direction of current must be considered during installation.

A cable tie can be used to fix the coil to the primary conductor. Please pay attention here to the appropriate temperature range.

## ROI-3 measurement transducer

- Select the correct ROI-3 transducer (ratio).
- Connect the FASK Rogowski coil to the input of the ROI-3 transducer!
- The FASK Rogowski current transformer and its connection cables must not exhibit any insulation damage.
- The output signal (1 A) must be connected exclusively with potential-separated 1 A current transformer inputs.
- It is prohibited to connect the input or output signal with external voltage. This can lead to the destruction of the ROI-3 measurement transducer.
- Ensure adequate dimensioning of the power supply unit (24 V / 1 A)!
- It is necessary to connect the earth of the supply voltage (- 24 V) to ground (GND)
- Do not use the device in close proximity to strong, high frequency fields (distortion of the measured value)

# Liability

The choice of the transducer used, as well as the selection of the measuring devices used, are the sole responsibility of the user. No liability or guarantee is assumed for this choice. The information in the catalogs and data sheets does not represent any assurance of special properties, but results from empirical values and measurements. Liability for damage caused by incorrect operation / configuration or malfunctions of the measuring circuit is excluded. The operator / project planner must ensure that incorrect operation, incorrect configuration and malfunctions cannot cause further damage.

No warranty is assumed for defects and damage caused by improper use of the FASK Rogowski current transformer or the ROI-3 measurement transducer or by disregarding this manual.

# Installation instructions and connection diagram

As with any Rogowski coil, the positioning of the primary conductor affects the accuracy. The FASK series is designed in such a way that the slightest error occurs directly on the lock and thus in the area of the fixing option. The following figure illustrates this and defines the exact error values.

| Primary conductor position | Typical error [%] |
|---|---|
| Right on the clasp | < 0.5 |
| In the center up to the outer edges of the coil | < 0.8 |
| Right on the opposite side of the clasp | < 1.0 |

Connection example to a meter with 1 A current transformer inputs