Magnetic Field Transducer

MFT-110

The MFT-110 is a single-axis magnetic field transducer for fields up to ±2 Tesla. Its probe withstands up to 180 °C and adds a digital threshold output alongside the 4–20 mA analogue signal, for extended durability and easier alarm integration.

KEY FEATURES

- Single axis magnetic field measurement system
- Measuring range up to ±2 Tesla
- Probe temperature range up to 180 °C
- Immune to deposits and vibrations
- Small and flat design for installation in small air gaps
- Interchangeability of the sensor head
- Single +24 V_{DC} power supply

MADE IN SWITZERLAND



MONITORING SOLUTIONS

Magnetic flux

TYPICAL APPLICATIONS

Hydrogenerators

Wind turbines

Gearless millsdrives

CE

DESCRIPTION

The MFT-110 is a single-axis high accuracy, linearity and stability magnetic field to analogue current transducer. It is particularly appropriate for mapping the magnetic field in the range up to ±2 Tesla. The sensor's head contains a high quality Hall element.

The MFT-110 uses the MFS-110 probe: an ultra-thin probe offering a radial magnetic field measurement into the air gap of a generator. The probe is designed with best-in-class material, allowing it to withstand

temperatures as high as 180 °C for long term operation.

The transducer consists of the MFS-110 probe equipped with an integral high temperature cable of 10 meters connected to the conditioning unit. The conditioning unit is then supplied with a 1.2 m long cable containing the power supply and the output wires.

GLOBAL SPECIFICATIONS

OPERATION

Output 1 (Analog)	
• Linear magnetic field range	$\pm$2T (full scale)
• Current output signal	4 to 20 mA $\triangleq -2$T to $+2$T
• Output bias current	12 mA ($\pm$5 µA)
• Sensitivity to magnetic field	4 mA/T
• Output noise and ripple (RMS)	5 mT
Output 2 (Digital)	
• Rising edge threshold	12 mT $\pm$1%
• Falling edge threshold	-12 mT $\pm$1%
• Output high level	$>$22 V (20.0 mA via 1.2 kΩ internal shunt)
• Output low level	$<$0.5 V (0.0 mA via 1.2 kΩ internal shunt)
Common	
• Tolerance of sensitivity (B = 1T d.c.)	$<$ 1%
• Linearity error of output	$<$ 0.1%
• Long term instability of sensitivity	$<$ 1% over 10 years
• Probe temp. coefficient of sensitivity (T = 0°C to 150°C)	-0.04%/°C to -0.06%/°C
• Conditioning unit temp. coefficient of sensitivity (T = 25°C to 80°C)	$\leq \pm$100 ppm/°C
• Output 1 (analog) load resistor	Max 500 Ω
• Output 2 (digital) load resistor	1.2 kΩ internally connected
• Frequency range of the magnetic field	DC to 1.4 kHz @ -3 dB
Power supply	
• Voltage	+24 V nominal (18 to 36 V)
• Current consumption	60 mA typ. (current output not connected)

DIELECTRIC STRENGTH

MFS-110 probe	
• Acc. to 43-2000 IEEE	1000 V_{DC} for 1 min.
• Acc. to IEC 60034-1	1500 V_{AC}

ENVIRONMENTAL

Temperature range	Operation	Storage
MFS-110 probe + cable	-25°C to $+180$°C	0°C to $+100$°C
MFC-110 conditioning unit	-25°C to $+80$°C	0°C to $+60$°C

Ingress protection	
• MFS-110 probe + cable	IP60
• MFC-110 conditioner	IP66
Chemical resistance	
• MFS-110 probe + cable / MFC-110 conditioner	Resistant to most industrial solvents and greases, limited resistance to concentrated acids
MTBF	
• MFS-110	14 years

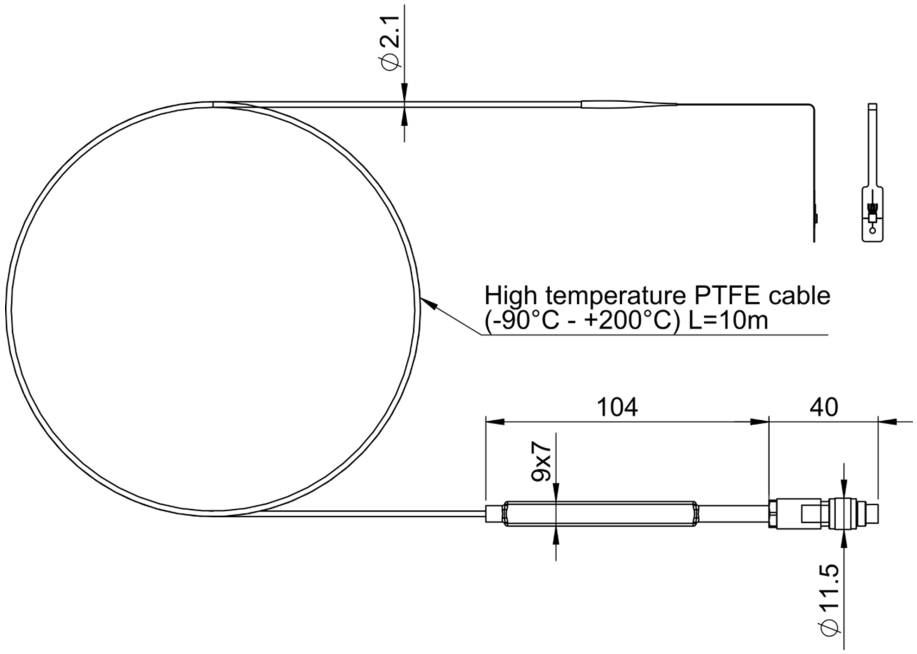
EMC	EN 61326-1:2013
	EN 61326-2-3:2013
	EN 61000-6-5:2015
	Level: Group 1, Class B

PHYSICAL

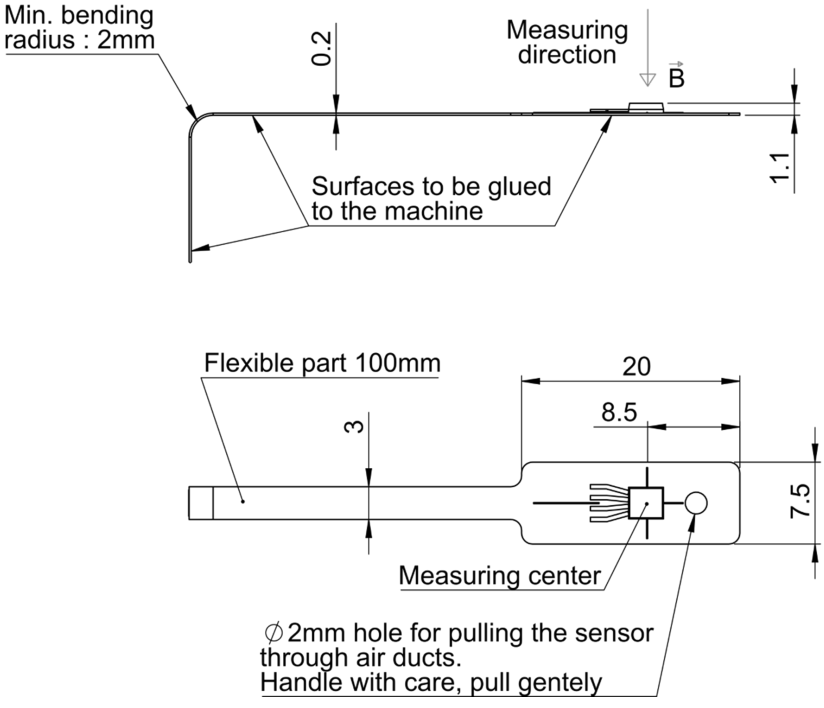
Sensitive surface [mm]	0.07 × 0.07
Angular accuracy of the axes	±1° to the reference surface
Probe dimensions [mm]	See mechanical drawing below
Probe-to-conditioning unit cable	Connected through a 4-pole connector; 10 m length
Conditioning electronics	High mechanical strength, electrically shielded
• Aluminium case dimensions [mm]	63 × 149 × 35 (W×L×H)
• With mounting plate dimensions [mm]	63 × 170 × 38 (W×L×H)

MECHANICAL DRAWING (MFS-110)

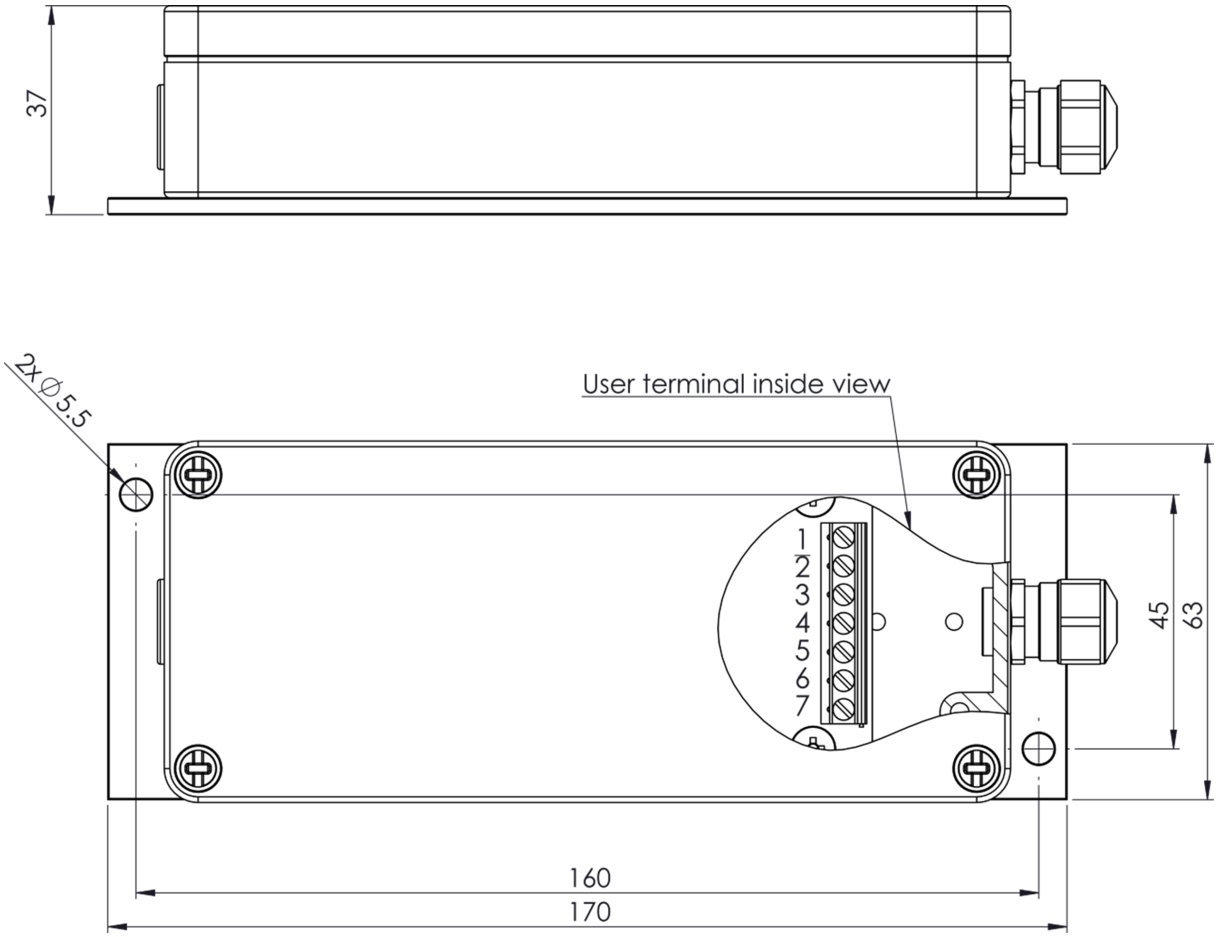
MFS-110 Overview



Probe detailled view



ELECTRICAL WIRING (MFC-110)



Terminal number	Wire colour	Description
1	Brown	+24 V power supply
2	White	0 V power supply
3	–	0 V (internally connected)
4	Grey	DO+, isolated 0/24 V output +
5	Pink	DO–, isolated 0 V
6	Green	Iout+, isolated 4–20 mA output +
7	Yellow	Iout–, isolated 4–20 mA output –
–	Clear	Cable shield, internally connected to 0 V

APPLICATION INFORMATION

HANDLE WITH CARE!

The MFS-110 uses a high temperature ultra-flexible PCB with a thickness of 0.2 mm which must be glued into the machine. During all steps of the installation, the PCB must be secured and considered as fragile.

USE HIGH TEMPERATURE ADHESIVE!

The MFS-110 is intended to be installed into the machine using Epoxy adhesive. Please note that not all adhesives can withstand temperatures as high as the MFS-110 can. For operating temperatures up to 150 °C, MC-monitoring recommends the Loctite 4090HY. For higher temperatures, please contact us.

ORDERING INFORMATION

Part type	Ordering code	Description
MFT-110	03.110.000	Magnetic Field Transmitter, including sensor MFS-110 and conditioner MFC-110
MFS-110	03.110.100	Ultra-thin Magnetic Field Sensor with 10 m shielded cable. Factory calibrated
MFC-110	03.110.200	Magnetic Field Conditioner with 4–20 mA output corresponding to -2T to $+2$T and digital output with threshold at ± 12 mT
Protective tube 10m	03.100.900	Protective tube for MFS installation, ID = 5.6 mm, OD = 10 mm, material PA-6, temperature range -40°C to $+120$°C. Made of two parts for easy in-line assembly. Total length 10 m, to be adjusted by the user.
AGS/MFS installation kit – Starter	44.906.002	Note: the Loctite 4090HY is not recommended for applications where the working temperature is above 150 °C. For more detailed information about the Loctite 4090HY characteristics, please contact us.
AGS/MFS installation kit – Refill	44.906.003	

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Quality certification

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