

# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

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Freely programmable Ex-i temperature transducer with analog output and 1 limit value relay, standard configuration, resistance thermometer in 2-, 3-, or 4-wire technology, thermocouples, electrical isolation, wide-range power supply, screw connection, SIL, PL.

## Your advantages

- ✓ Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, and mV sources, [Ex ia] IIC
- ✓ Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- ✓ Cold junction compensation with separate plug
- ✓ Configuration via software (FDT/DTM) or IFS-OP-UNIT operator interface and display unit
- ✓ Installation in zone 2, protection type "n" (EN 60079-15) permitted
- ✓ Up to SIL 2 according to EN 61508
- ✓ Status indicator for supply voltage, cable, sensor, and module errors
- ✓ Plug-in screw or spring-cage connection technology (Push-in technology)
- ✓ Wide-range power supply of 19.2 ... 253 V AC/DC
- ✓ Measure differential temperatures
- ✓ Inverse output signal ranges as an option
- ✓ Relay switching output
- ✓ Freely programmable input and output



## Key Commercial Data

Packing unit	1 pc
GTIN	 4 046356 296670
GTIN	4046356296670

## Technical data

### Note

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area
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### Dimensions

# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

## Technical data

### Dimensions

Width	17.5 mm
Height	112.8 mm
Depth	113.7 mm

### Ambient conditions

Ambient temperature (operation)	-20 °C ... 65 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Maximum altitude	≤ 2000 m
Permissible humidity (operation)	typ. 5 % ... 95 % (non-condensing)
Degree of protection	IP20 (not assessed by UL)
Noise immunity	EN 61000-6-2 When being exposed to interference, there may be minimal deviations.
Shock	15g, according to IEC 60068-2-27
Vibration (operation)	5g, accordance to IEC 60068-2-6

### Input data

Sensor types (RTD) that can be used	Pt, Ni, Cu sensors: 2, 3, 4-wire
Sensor types that can be used (TC)	B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG
Temperature measuring range	-250 °C ... 2500 °C (Range depending on the sensor type)
Input signal range	0 Ω ... 50 kΩ
Potentiometer resistance range	0 Ω ... 50 kΩ
Input signal range	-1000 mV ... 1000 mV

### Output data

Configurable/programmable	Yes
Max. voltage output signal	± 11 V
Current output signal	4 mA ... 20 mA (in the case of SIL; further free configuration without SIL)
Max. current output signal	22 mA
Load/output load voltage output	≥ 10 kΩ
Load/output load current output	≤ 600 Ω (20 mA)
Behavior in the event of a sensor error	according to NE 43 or freely configurable
Output name	Switching output
Configurable/programmable	Yes
Contact type	1 PDT
Contact material	AgSnO <sub>2</sub> , hard gold-plated
Maximum switching voltage	30 V AC (30 V DC)
Maximum inrush current	0.5 A (30 V AC)
	1 A (30 V DC)
Mechanical service life	1x 10 <sup>5</sup> cycles

### Power supply

Supply voltage range	24 V ... 230 V AC/DC (-20 %/+10 %, 50/60 Hz)
Typical current consumption	< 50 mA (24 V DC)

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## Technical data

### Power supply

Power consumption	< 1.5 W
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### Connection data

Connection method	Screw connection
Stripping length	7 mm
Screw thread	M3
Conductor cross section solid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section AWG	24 ... 14
Torque	0.5 Nm ... 0.6 Nm

### General

Maximum transmission error	0.1 % (E.g., at Pt 100, 300 K min. span)
Maximum temperature coefficient	0.01 %/K
Step response (0–99%)	typ. 1000 ms (With SIL)
	typ. 700 ms (Without SIL)
Status display	Green LED (supply voltage, PWR)
	Red LED, flashing (line, sensor error, ERR)
	Red LED (module error, ERR)
	Yellow LED (switching output)
Degree of pollution	2
Overvoltage category	II
Electromagnetic compatibility	Conformance with EMC directive
Interference emission	EN 61000-6-4
Housing material	PA 6.6-FR
Color	gray
Designation	Input/output/power supply
	Input/output
Electrical isolation	375 V (Peak value in accordance with IEC/EN 60079-11)
Designation	Input/power supply
Electrical isolation	375 V (Peak value in accordance with IEC/EN 60079-11)
Designation	Input/switching output
Electrical isolation	375 V (Peak value in accordance with IEC/EN 60079-11)
Designation	Output/supply

### Safety data

Max. internal inductance $L_i$	negligible
Max. internal capacitance $C_i$	44 nF
Max. output voltage $U_o$	6 V
Max. output current $I_o$	7.4 mA
Max. output power $P_o$	11 mW
Group	IIC

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## Technical data

### Safety data

Max. external inductivity $L_o$	100 mH
Max. external capacitance $C_o$	1.3 $\mu$ F
Additional text	mixed circuit
Group	IIC
Max. external inductivity $L_o$	10 mH
Max. external capacitance $C_o$	1.7 $\mu$ F
Additional text	mixed circuit
Group	IIC
Max. external inductivity $L_o$	1 mH
Max. external capacitance $C_o$	2.6 $\mu$ F
Additional text	mixed circuit
Group	IIB
Max. external inductivity $L_o$	100 mH
Max. external capacitance $C_o$	6.8 $\mu$ F
Additional text	mixed circuit
Group	IIB
Max. external inductivity $L_o$	10 mH
Max. external capacitance $C_o$	9.2 $\mu$ F
Additional text	mixed circuit
Group	IIB
Max. external inductivity $L_o$	1 mH
Max. external capacitance $C_o$	15 $\mu$ F
Additional text	mixed circuit
Group	IIA
Max. external inductivity $L_o$	100 mH
Max. external capacitance $C_o$	10 $\mu$ F
Additional text	mixed circuit
Group	IIA
Max. external inductivity $L_o$	10 mH
Max. external capacitance $C_o$	13 $\mu$ F
Additional text	mixed circuit
Group	IIA
Max. external inductivity $L_o$	1 mH
Max. external capacitance $C_o$	21 $\mu$ F
Additional text	mixed circuit
Safety-related maximum voltage $U_m$	253 V AC/DC

### EMC data

Designation	Electromagnetic RF field
Standards/regulations	EN 61000-4-3

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## Technical data

### EMC data

Typical deviation from the measuring range final value	2 %
Designation	Fast transients (burst)
Standards/regulations	EN 61000-4-4
Typical deviation from the measuring range final value	2 %
Designation	Conducted interferences
Standards/regulations	EN 61000-4-6
Typical deviation from the measuring range final value	2 %

### Standards and Regulations

Electromagnetic compatibility	Conformance with EMC directive
Noise emission	EN 61000-6-4
Designation	Electromagnetic RF field
Standards/regulations	EN 61000-4-3
	EN 61000-4-4
Designation	Conducted interferences
Standards/regulations	EN 61000-4-6
Electrical isolation	4-way, between input/output/power supply/switching output
Shock	15g, according to IEC 60068-2-27
Vibration (operation)	5g, accordance to IEC 60068-2-6
Conformance	CE-compliant
ATEX	# II (1) G [Ex ia Ga] IIC
	# II (1) D [Ex ia Da] IIIC
	# II 3 G Ex nA nC ic IIC T4 Gc X
IECEX	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex nA nC ic IIC T4 Gc X
UL, USA/Canada	UL 508 Listed
DNV GL-Temperature	B
DNV GL-Humidity	B
DNV GL-Vibration	A
DNV GL-EMC	A
DNV GL-Enclosure	Required protection according to the Rules shall be provided upon installation on board
Group	IIC
	IIC
	IIC
	IIB
	IIB
	IIB

### Conformance/approvals

Designation	CE
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# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

## Technical data

### Conformance/approvals

Identification	CE-compliant
Designation	ATEX
Identification	# II (1) G [Ex ia Ga] IIC
	# II (1) D [Ex ia Da] IIIC
	# II 3 G Ex nA nC ic IIC T4 Gc X
Certificate	IBExU 10 ATEX 1044
Designation	IECEX
Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex nA nC ic IIC T4 Gc X
Certificate	IECEX IBE 10.0004 X
Designation	UL, USA/Canada
Identification	UL 508 Listed
Certificate	#, C.D.-No 83104549
Designation	KC-s
Identification	[Ex ia] IIC/IIB
Certificate	17-KA4BO-0411X
Designation	Shipbuilding approval
Certificate	DNV GL TAA000020C
Designation	Safety Integrity Level (SIL, IEC 61508)
Identification	2
Certificate	SEBS-A.150520/17TB
Designation	Performance Level (ISO 13849)
Identification	d
Designation	EAC Ex
Identification	# [Ex ia Ga] IIC
	# [Ex ia Da] IIIC
Certificate	RU C-DE.AB72.B.00093/19
Designation	INMETRO
Identification	[Ex ia Ga] IIC
	[Ex ia Da] IIIC
	Ex nA nC ic IIC T4 Gc
Certificate	DNV 18.0143 X
Temperature	B
Humidity	B
Vibration	A
EMC	A
Enclosure	Required protection according to the Rules shall be provided upon installation on board

### Environmental Product Compliance

# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

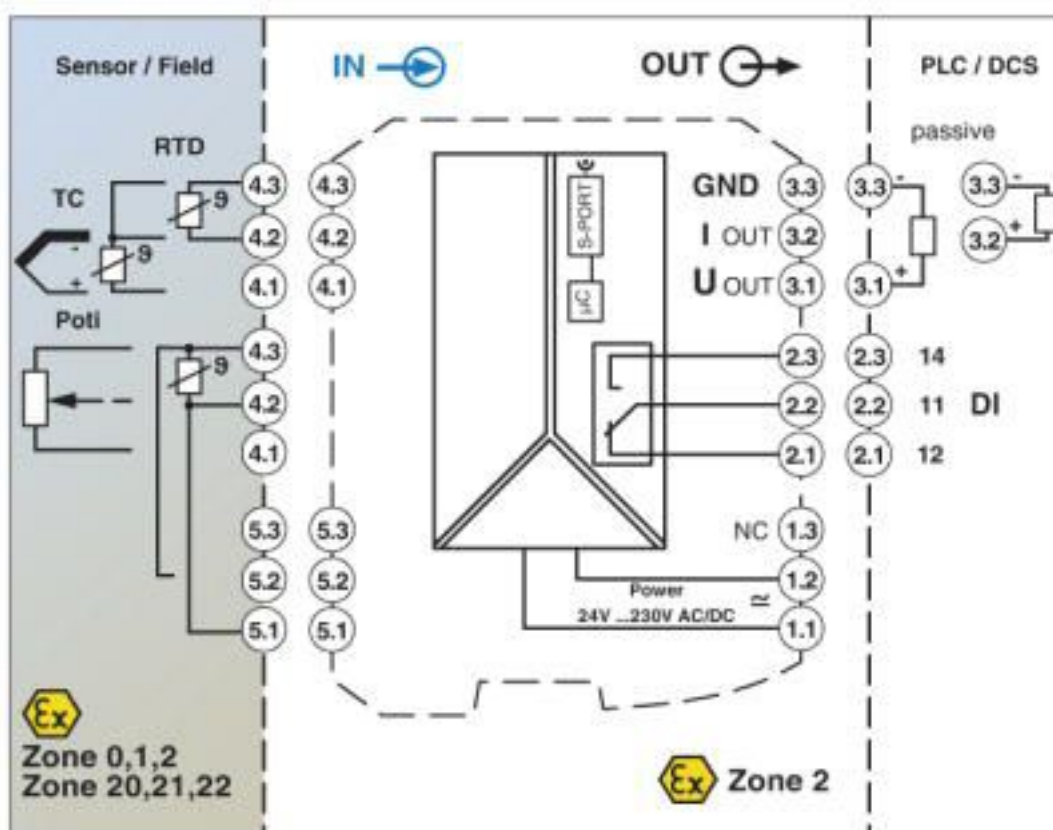
## Technical data

### Environmental Product Compliance

REACH SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50 years
	For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration"

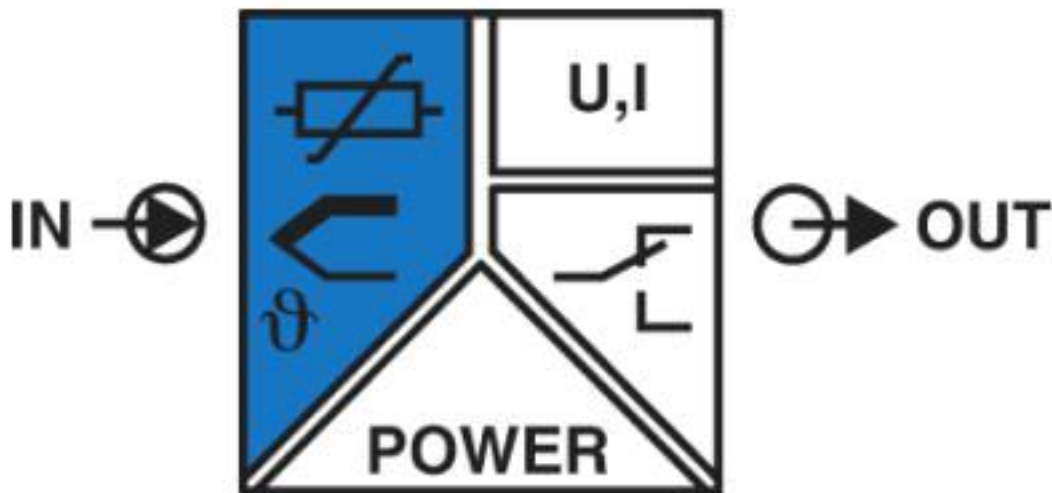
## Drawings

Block diagram



# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

Pictogram



## Classifications

### eCl@ss

eCl@ss 10.0.1	27210129
eCl@ss 4.0	27200200
eCl@ss 4.1	27200200
eCl@ss 5.0	27200200
eCl@ss 5.1	27200200
eCl@ss 6.0	27200200
eCl@ss 7.0	27200206
eCl@ss 8.0	27200206
eCl@ss 9.0	27210129

### ETIM

ETIM 2.0	EC001446
ETIM 3.0	EC001446
ETIM 4.0	EC001446
ETIM 5.0	EC001446
ETIM 6.0	EC002919
ETIM 7.0	EC002919

### UNSPSC

UNSPSC 6.01	30211506
UNSPSC 7.0901	39121008
UNSPSC 11	39121008
UNSPSC 12.01	39121008
UNSPSC 13.2	41112105
UNSPSC 18.0	41112105



# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

## Classifications

### UNSPSC

UNSPSC 19.0	41112105
UNSPSC 20.0	41112105
UNSPSC 21.0	41112105

## Approvals

### Approvals

#### Approvals

UL Listed / cUL Listed / DNV GL / cULus Listed

#### Ex Approvals

KC-s / IECEx / ATEX / UL Listed / cUL Listed / EAC Ex / cULus Listed

### Approval details

UL Listed		<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>	FILE E 238705
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cUL Listed		<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>	FILE E 238705
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DNV GL		<a href="https://approvalfinder.dnvgl.com/">https://approvalfinder.dnvgl.com/</a>	TAA000020C
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cULus Listed			
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## Accessories

### Accessories

Cradle unit

# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

## Accessories

Adapter module - IFS-OP-CRADLE - 2811886



The adapter (IFS-OP-CRADLE) for the operator interface is ideal for use as a remote operator panel and display device for 17.5 mm / 35 mm modules. Can be mounted directly on the DIN rail. Replacement part: 2905872 IFS-BT-PROG-ADAPTER.

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## Device marking

Plastic label - UC-EMLP (11X9) - 0819291



Plastic label, Sheet, white, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

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Plastic label - UC-EMLP (11X9) YE - 0822602



Plastic label, Sheet, yellow, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

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Plastic label - UC-EMLP (11X9) SR - 0828094



Plastic label, Sheet, silver, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10

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Plastic label - US-EMLP (11X9) - 0828789



Plastic label, Card, white, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 135

# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

## Accessories

### Plastic label - US-EMLP (11X9) YE - 0828871



Plastic label, Card, yellow, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 135

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### Plastic label - US-EMLP (11X9) SR - 0828872



Plastic label, Card, silver, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 135

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### Device marker - LS-EMLP (11X9) WH - 0831678



Device marker, Sheet, white, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 255

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### Device marker - LS-EMLP (11X9) YE - 0831732



Device marker, Sheet, yellow, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 255

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### Device marker - LS-EMLP (11X9) SR - 0831705



Device marker, Sheet, silver, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 255

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## Insulating sleeve

# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

## Accessories

Insulating sleeve - MPS-IH BK - 0201731

Insulating sleeve, color: black



Insulating sleeve - MPS-IH GY - 0201728

Insulating sleeve, color: gray



Insulating sleeve - MPS-IH GN - 0201702

Insulating sleeve, color: green



Insulating sleeve - MPS-IH YE - 0201692

Insulating sleeve, color: yellow



Insulating sleeve - MPS-IH BU - 0201689

Insulating sleeve, color: blue



# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

## Accessories

Insulating sleeve - MPS-IH RD - 0201676

Insulating sleeve, color: red



Insulating sleeve - MPS-IH WH - 0201663

Insulating sleeve, color: white



## Labeled device marker

Plastic label - UC-EMLP (11X9) CUS - 0824547

Plastic label, can be ordered: by sheet, white, labeled according to customer specifications, mounting type: adhesive, lettering field size: 11 x 9 mm



Plastic label - UC-EMLP (11X9) YE CUS - 0824548

Plastic label, can be ordered: by sheet, yellow, labeled according to customer specifications, mounting type: adhesive, lettering field size: 11 x 9 mm



Plastic label - UC-EMLP (11X9) SR CUS - 0828098

Plastic label, can be ordered: by sheet, silver, labeled according to customer specifications, mounting type: adhesive, lettering field size: 11 x 9 mm, Number of individual labels: 10



## Operator interface

# Temperature measuring transducer - MACX MCR-EX-T-UI-UP - 2865654

## Accessories

Operator interface - IFS-OP-UNIT - 2811899



The operator interface facilitates straightforward parameterization and operation of the MACX MCR(-EX)-...-UI(REL) (-UP) on-site, even without software. Can be snapped onto the 35 mm module. Replacement part: 2905872 IFS-BT-PROG-ADAPTER.

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## Plug

Plug - MACX MCR-EX-I20 - 2905679



Connection terminal block for current signals +20 mA ...-20 mA for safe switching of limit values, in combination with MACX...EX-T-UI... temperature transducers.

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Plug - MACX MCR-EX-CJC - 2925002



Plug for cold junction compensation for thermocouples, for safe switching of limit values, in combination with MACX ...EX-T-UI... temperature transducers.

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## Programming adapter

Programming adapter - IFS-USB-PROG-ADAPTER - 2811271



Programming adapter with USB interface, for programming with software. The USB driver is included in the software solutions for the products to be programmed, such as measuring transducers or motor managers.

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## Test plug terminal block

Test plugs - MPS-MT - 0201744



Test plugs, with solder connection up to 1 mm<sup>2</sup> conductor cross section, color: gray

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