

TEIP11-PS

I/P signal converter for standard signals



Proven and reliable concept

Compact design

- Small dimensions, low weight

Sturdy construction and solid functionality

- Influence of shock and vibration < 1% at 10 g

Variety of signal ranges

- Input, e.g., 0 ... 20 mA or 4 ... 20 mA
- Output 0.2 ... 1 bar (3 ... 15 psi)

Complies with the following directives

- EMC Directive 2014/30/EU
- CE mark meets the EC directive for the CE certificate of conformity

Additional temperature range

- From -40 (optional -55) ... 85 °C
(-40 (optional -67) ... 185 °F)

Approvals for explosion protection

- ATEX, FM/CSA, GOST for intrinsically safe and Explosion proof operation

Several different designs

- IP 20 control room housing unit for rail mounting
- IP 20 control room housing unit for block mounting
- IP 54 plastic field housing unit
- IP 65 aluminum or stainless steel housing unit

Single module

- For OEM application (upon request)

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Concept

The TEIP11-PS signal converter converts electrical standard signals, e.g. 4 ... 20 mA to 0.2 ... 1 bar (3 ... 15 psi). It is therefore a connecting link between electrical/electronic and pneumatic systems. The signal conversion process is similar to the patented force balance method.

Special features of the TEIP11-PS signal converter are its relatively small dimensions and outstanding operational stability when subject to shock and vibration. The converter can be subjected to loads up to 10 g with less than 1% effect on function.

The housing units are available in a variety of models to meet your installation requirements. For potentially explosive conditions, units that offer intrinsically safe operation or pressure-resistant encapsulation are available with international approval certificates for use worldwide.

Various ranges can be supplied on the input side and the output side for signal conversion (see information in chapter Specifications, page 3).

A power supply of only 1,4 bar (20 psi) of compressed air is required.

Designs

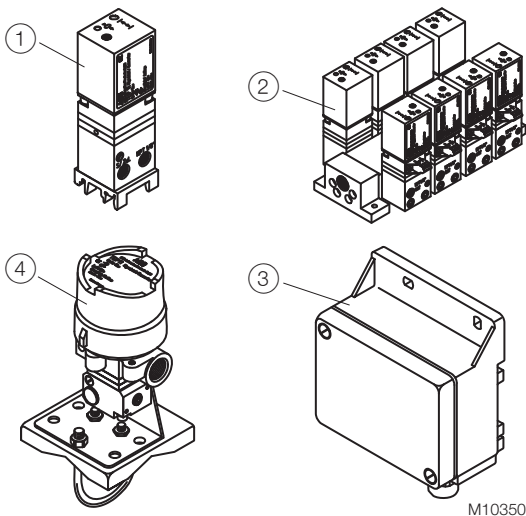


Fig. 1

- ① Control room housing unit for rail mounting
- ② Control room housing unit for block mounting
- ③ Plastic field housing unit
- ④ Aluminum or stainless steel field housing unit

Control room housing unit for rail mounting

The control room housing unit for rail mounting is the most user-friendly and lowest priced model in the signal converter line.

A mounting base that is compatible with all commercially available EN rails is used for installation.

The housing unit with plastic cap has an IP 20 protection class.

Control room housing unit for block mounting

The control room housing unit for block mounting enables you to install a number of converters in a small space. This design features central air supply via connection block and stop valves in the air connectors of the integrated signal converter.

A maximum of 4 signal converters can be fitted on the connection blocks required for block mounting. If necessary, 2 or 3 (or max. 4) connection blocks can be connected to each other to create block units of 4-8-12-16 signal converters. Stop valves allow you to mount or remove individual converters during operation.

Field housing

The field housing unit is designed for installation onsite or in the field. Housing units are available in the following models (and protection classes): plastic (IP 54), aluminum (IP 65) and stainless steel (IP 65). The housing units are suitable for wall mounting and 2" pipe mounting.

A specially designed signal converter in a plastic housing unit enables the use of combustible gas as a power supply instead of the standard compressed air.

Specifications

Input (electric)

Signal range

0 ... 20 mA or 4 ... 20 mA

0 ... 10 mA or 10 ... 20 mA

4 ... 12 mA or 12 ... 20 mA

(additional ranges available upon request)

Input resistance

$R_i = 260 \Omega$ at 20 °C (68 °F), $T_k + 0.4 \text{ \%}/K$

Overload limit

30 mA (for explosion-proof devices, see the information in chapter "Ex relevant specifications" on page 6).

Capacitance/inductance

Negligible

Output (pneumatic)

Signal range

0.2 ... 1 bar (3 ... 15 psi)

Air capacity

$\geq 5 \text{ kg/h} = 4.1 \text{ Nm}^3/\text{h} = 2.4 \text{ scfm}$

Load power acc. to VDE / VDI 3520

$\geq 0.95 \text{ kg/h} = 0.9 \text{ Nm}^3/\text{h} = 0.5 \text{ scfm}$

Power supply (pneumatic)

Instrument air

Free of oil, water, and dust acc. to DIN/ISO 8573-1

Pollution and oil content according to Class 3

Pressure dew point 10 K below operating temperature

Supply pressure

1,4 bar (20 psi)

2,5 bar (36 psi)¹

Output signal

0,2 ... 1 bar (3 ... 15 psi)

0,4 ... 2 bar (6 ... 30 psi)¹

¹ Only valid for option 509 - increased input signal

Air consumption

$\leq 0.2 \text{ kg/h} = 0.16 \text{ Nm}^3/\text{h} = 0.1 \text{ scfm}$

Transmission data and influences

Characteristic curve

Linear, direct, or reverse action

Deviation

$\leq 0.5 \text{ \%}$

Hysteresis

$\leq 0.3 \text{ \%}$

Dead band

$\leq 0.1 \text{ \%}$

Temperature

$\leq 1 \text{ \%} / 10 \text{ K}$ within -20 ... 85 °C (-4 ... 185 °F)

$\leq 2 \text{ \%} / 10 \text{ K}$ within -55 ... -20 °C (-67 ... -4 °F)

Power supply

$\leq 0.3 \text{ \%} / 0.1 \text{ bar}$ (1.5 psi) change in pressure

Mechanical vibration

$\leq 1 \text{ \%}$ up to 10 g and 20 ... 80 Hz

Seismic vibration

Meets the requirements of DIN IEC 68-3-3 Class III for strong and strongest earthquakes.

Mounting orientation

Zero point $\leq 0.4 \text{ \%}$ at 90° change of position

Step response

10 ... 90 % and 90 ... 10 % 0.6 s

5 ... 15 % and 15 ... 5 % 0.25 s

45 ... 55 % and 55 ... 45 % 0.2 s

85 ... 95 % and 95 ... 85 % 0.15 s

EMC

Meets the requirements of EMC Directive 2014/30/EU (increased interference immunity as per EN 50082-2 PR).

CE marking

Complies with the EC directive for CE conformity

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Operating conditions at installation site

Ambient temperature

Depending on the ordered model:

-40 ... 85 °C (-40 ... 185 °F)

-55 ... 85 °C (-67 ... 185 °F)

For Ex d:

-40 ... 85 °C (-40 ... 185 °F)

Mounting position

Any

Environmental capabilities

Climate class

GPF or FPF acc. to DIN 40040

Temperature:

-55 ... 85 °C (-67 ... 185 °F)

-45 ... 85 °C (-49 ... 185 °F)

Relative humidity for operation, storage, or transport:

75 % average, 95 % short-term,

no condensation

Design for rail mounting

Material / IP rating

IP 20 aluminum housing unit, with plastic cover

Assembly

Rail mounting:

EN 50022 - 35 x 7.5

EN 50035 - G 32

EN 50045 - 15 x 5

Electrical connection

2-pole screw terminal for 2.5 mm² (14 AWG)

Pneumatic connection

1/8 NPT tap hole for air supply and output

Weight

0.25 kg (0.55 lb)

Dimensions

See chapter "Dimensions".

Design for block mounting

Material / IP rating

IP 20 aluminum housing unit, with plastic cover

Assembly

In block format with special connection block (accessory),
max. 4 connection blocks each with 4 signal converters

Electrical connection

2-pole screw terminal for 2.5 mm² (14 AWG)

Pneumatic connection

3/8 NPT tap hole for air supply

(main connection to connection block)

1/8 NPT tap hole for output

(on each individual signal converter)

Mounting position

Any

Weight

0.3 kg (0.66 lb)

Dimensions

See chapter "Dimensions".

Design for field housing unit (plastic)

Material / IP rating

Polyester housing unit, black, IP 54

Assembly

Wall or 2" pipe mounting
(2" pipe mounting for vertical pipes only)

Electrical connection

2-pole screw terminal for 2.5 mm² (14 AWG) in housing unit,
Pg 11 cable gland for cable entry

Pneumatic connection

1/8 NPT tap hole for air supply and output

Air outlet

For gas exhaust with 6 mm (0.24 inch) cut or crimp
connection

Mounting position

Any

Weight

1.0 kg (2.20 lb)

Dimensions

See chapter "Dimensions".

Design for field housing unit (aluminum/stainless steel)

Material / IP rating

IP 65 aluminum or stainless steel housing unit

Surface

Aluminum housing,
painted with dual component coating,
lower section, black, RAL 9005,
screw-on cover, Pantone 420,
stainless steel housing unit,
electrolytically polished

Assembly

Wall or 2" pipe mounting
With stainless steel mounting bracket (accessory)

Electrical connection

2-pole screw terminal for 2.5 mm² (14 AWG) in housing unit,
NPT 1/2" cable gland for cable entry.

For ATEX "intrinsically safe":

NPT 1/2" tap hole for cable entry.

For ATEX "Ex d":

M20 x 1.5 tap hole for cable entry with FM/CSA

(Cable gland with Ex d approval available as an accessory on
request)

Pneumatic connection

1/4" NPT tap hole for air supply and output

Weight

0.62 kg (1.37 lb) with aluminum housing unit

1.20 kg (2.65 lb) with stainless steel housing unit

Dimensions

See chapter "Dimensions".

Accessories

"Ex d" cable gland

Brass, with M20 x 1.5 thread

Stainless steel mounting bracket for wall mounting or 2"-pipe mounting

For aluminum or stainless steel field housing unit

Material for block mounting

Connection block for 4 signal converters,
panel with 3/8 NPT central air connector,
dummy panel

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Ex relevant specifications

Flameproof (enclosure), ATEX "Ex d"

Labeling	II 2G Ex d IIC T4/T5/T6 Gb
Type examination certificate	DMT 02 ATEX E 121 X
Type	DOC. 900771
Device class	II 2G
Standards	EN 60079-0: 2012 (General requirements) EN 60079-1: 2007 (Flameproof enclosure "d")

Electrical data

Current	≤ 50 mA
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Pneumatic data

Supply pressure	1,4 bar (20 psi) / 2,5 bar (37 psi) ¹
Output signal	0,2 ... 1 bar (3 ... 15 psi) / 0,4 ... 2 bar (6 ... 30 psi) ¹

¹ Only valid for option 509 - increased input signal.

Thermal data

T4: -40 °C < Tamb < 85 °C
T5: -40 °C < Tamb < 70 °C
T6: -40 °C < Tamb < 55 °C

Special Requirements

The I/P signal converter is suited to use in an ambient temperature range of -40 °C to max. 85 °C.

If the I/P signal converter is used at an ambient temperature above 60 °C or below -20 °C, use cable entries and cables suited to an operating temperature that corresponds to the maximum ambient temperature plus 10 K or that corresponds to the minimum ambient temperature.

Versions with an intrinsically safe control head may no longer be operated as intrinsically safe if they have been previously operated with the "flameproof (enclosure)" type of protection with a non-intrinsically safe power supply.

Operation as intrinsically safe equipment

Labeling	II 2G Ex ia IIC T6 resp. T4 Gb
Type examination certificate	TÜV 99 ATEX 1487 X
Type	TEIP11, Doc. 901068-SMDxxxx TEIP11-PS, Doc. 901068-SMDxxxx TEIP11-PS, Doc. 901069-SMDxxxx
Device class	II 2G
Standards	EN 60079-0:2009 EN 60079-11:2012

Temperature classes for the following versions:

TEIP11 Doc. 901068-SMD and TEIP11-PS Doc. 901068-SMD and TEIP11-PS Doc. 901069-SMD

Temperature class	Input current	Ambient temperature range
T4	120 mA	-55 ... 60 °C
T4	100 mA	-55 ... 85 °C
T6	60 mA	-55 ... 40 °C

TEIP11 Doc. 901068 and TEIP11-PS Doc. 901068 and TEIP11-PS Doc. 901069

Temperature class	Input current	Ambient temperature range
T6	50 mA	-55 ... 60 °C
T6	60 mA	-55 ... 55 °C
T5	60 mA	-55 ... 70 °C
T4	60 mA	-55 ... 85 °C
T5	100 mA	-55 ... 55 °C
T4	100 mA	-55 ... 85 °C
T5	120 mA	-55 ... 45 °C
T4	120 mA	-55 ... 80 °C
T4	150 mA	-55 ... 70 °C

Explosion protection ratings

I_i	U_i	P_i
50 mA	42.5 V	2.125 W
60 mA	38.8 V	2.328 W
100 mA	30 V	3.0 W
120 mA	28 V	3.36 W
150 mA	25.5 V	3.825 W

Special Requirements

The I/P converter TEIP11-PS Doc. type 901069 or Doc. 901069-SMD must be set up outdoors as a pneumatic power supply when used with combustible gases.

The supplied gas must be kept sufficiently free of air and oxygen to prevent a potentially explosive atmosphere from forming.

The gas must always be routed to the outside.

FM/CSA

Intrinsically safe FM

FM "intrinsically safe" (not for metal field housing units)
I.S.: CL I/Div 1/Grp A B C D

FM "intrinsically safe" (only for metal field housing units)
I.S.: CL I-II/Div 1/Grp A B C D E F G
S.: CL II/Div 2/Grp G
S.: CL III/Div 2

Non-incendive FM

N.I.: CL I/Div 2/Grp A B C D (not for metal field housing units)
N.I.: CL I/Div 2/Grp A B C (only for metal field housing units)

Intrinsically safe CSA

CSA "intrinsically safe" (not for metal field housing units)
I.S.: CL I/Div 1/Grp A B C D
CL I / Div 2 / Grp A B C D

CSA "intrinsically safe" (only for metal field housing units)
I.S.: CL I/Div 1/Grp A B C D
CL II / Div 1 / Grp E F G
CL III
CL I / Div 2 / Grp A B C D
CL II / Div 2 / Grp E F G

Non-incendive CSA

FM "explosion proof" (only for metal field housing units)
X.P.: CL I/Div 1/Grp B C D
D.I.P.: CL II III/Div 2/Grp E F G

CSA "explosion proof" (only for metal field housing units)
X.P.: CL I/Div 1/Grp B C D

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Dimensions

Design for control room housing unit for rail mounting

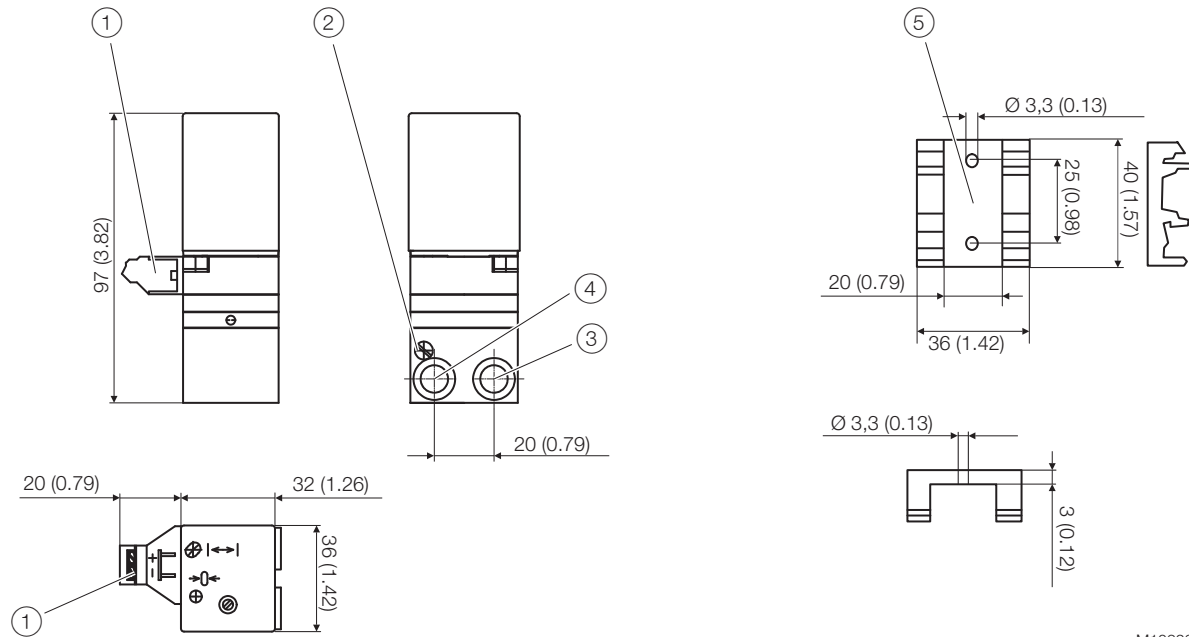
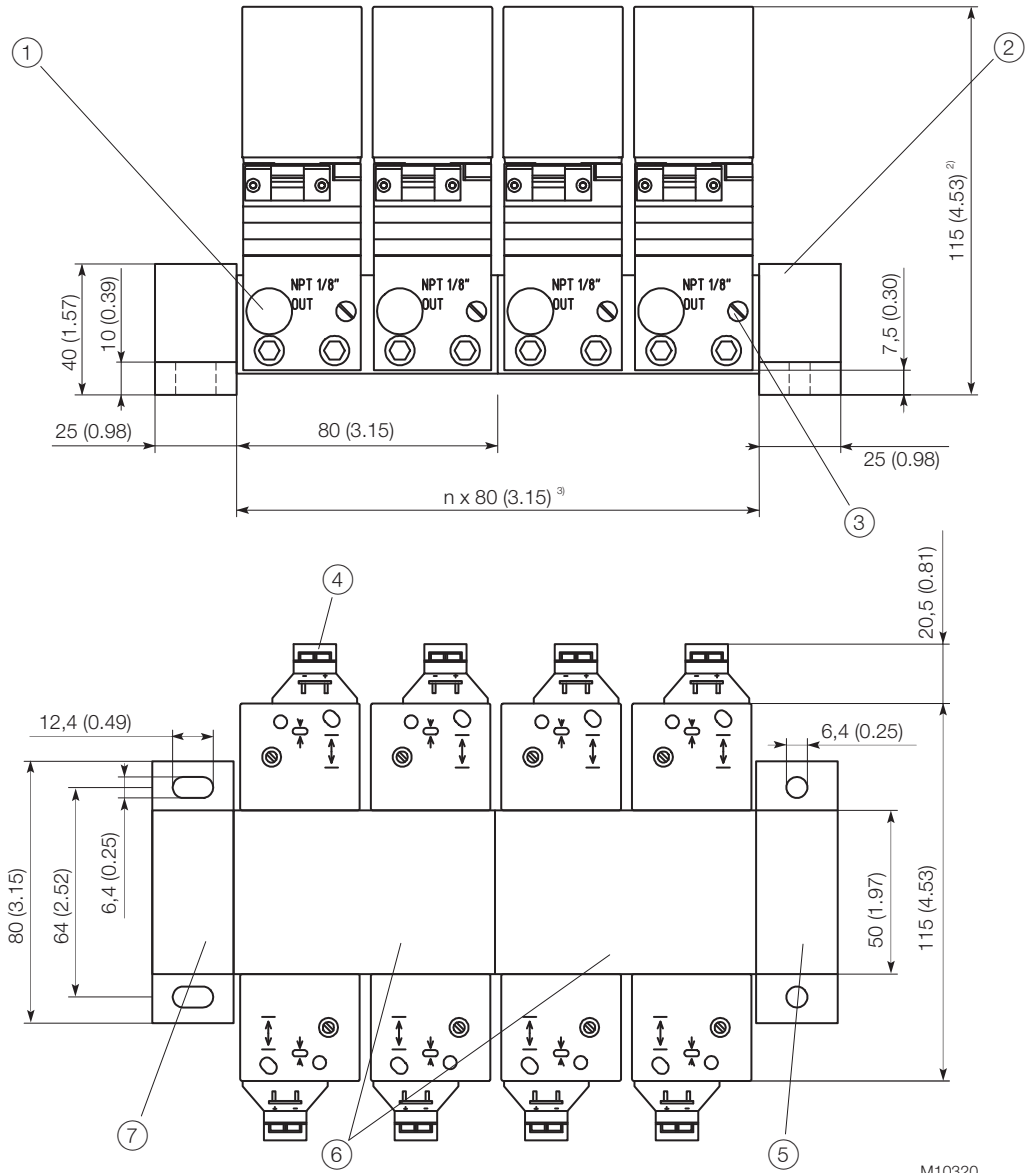


Fig. 2 Sensor side, dimensions in mm (inch)

① Electrical connections ② Filter ③ Output ④ Air supply ⑤ Mounting element for DIN rail mounting

M10323

Design for control room housing unit for block mounting



M10320

Fig. 3: Dimensions in mm (inches)

- ① Output
- ② Air supply
- ③ Filter
- ④ Electrical connections
- ⑤ Panel with central air supply connection
- ⑥ Connection blocks
- ⑦ Dummy panel

1) 0.2 ... 1 bar (2.90 ... 14.50 psi) version

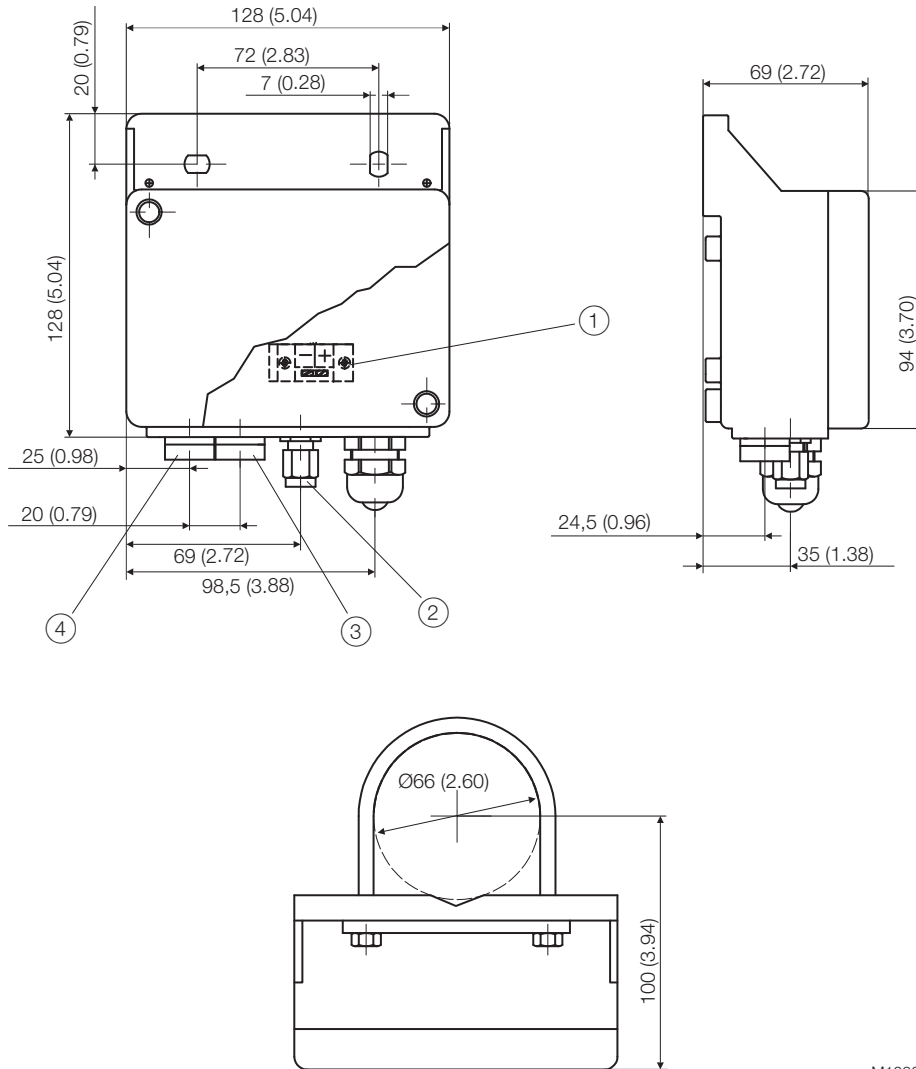
2) 0.4 ... 1 bar (5.80 ... 14.50 psi) version

3) Length 80 mm (3.15 inch) for each connection block

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I/P signal converter for standard signals

Design for plastic field housing unit



M10321

Fig. 4: Dimensions in mm (inches)

① Electrical connections ② Connection only with version for operation with combustible gas for diverting the escaping gas/6 mm (0.24) screw crimp connection ③ Air supply ④ Output ⑤ Cable gland

Design for aluminum or stainless steel field housing unit

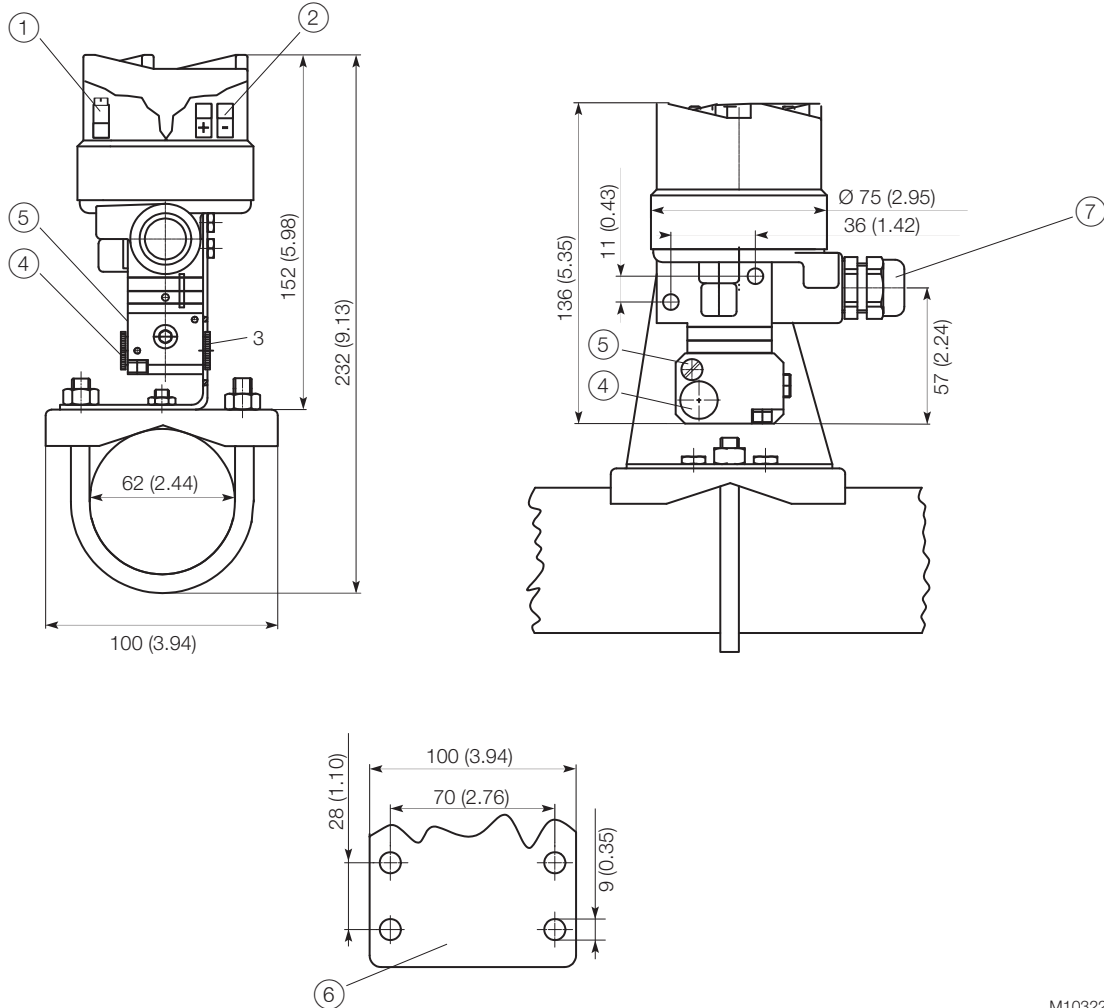


Fig. 5: Dimensions in mm (inches)

- ① Ground terminal ② Electrical connections ③ Output ④ Air supply ⑤ Filter ⑥ Profiled sheet for wall mounting ⑦ Cable gland

M10322

TEIP11-PS

I/P signal converter for standard signals

Ordering Information

Main ordering information TEIP11-PS

Base model	V18311H	X	X	X	X	XX	X	0	0
TEIP11-PS I/P Converter, signal converter for standard signals, with power stage									
Explosion Protection									
Without explosion protection		1							
ATEX II 2 G Ex ia IIC T6 resp. T4 Gb		3							
ATEX II 2 G Ex d IIC T4/T5/T6 Gb		1) 4							
FM / CSA Intrinsically Safe		2) 6							
FM / CSA Intrinsically Safe and Explosion-proof		1) 7							
GOST Russia - Ex ia		1) A							
GOST Russia - Ex d		1) D							
Design									
Control room housing IP 20, for rail mounting			1						
Control room housing IP 20, for block mounting			A						
Field housing polyester, IP 54			6						
Field housing aluminium, IP 65			8						
Field housing stainless steel, IP 65			9						
Input Signal									
Input signal 0 ... 20 mA				1					
Input signal 4 ... 20 mA				2					
Airtight closed function 4 ... 20 mA				8					
Other input signal				0					
Output Signal									
Output signal 0.2 ... 1 bar					1				
Output signal 3 ... 15 psi					2				
Other output signal					0				
Characteristic									
Direct action						10			
Reverse action						20			
Ambient Temperature									
-40 ... 85 °C							1		
-55 ... 85 °C							3) 2	0	0

Additional ordering information TEIP11-PS

	XXX	XXX	XXX	XXX	XXX	XXX
Certificate of Compliance						
Certificate of compliance with the order acc. EN 10204-2.1 (DIN 50049-2.1) with item description	CF2					
Test report 2.2 acc. EN 10204 (DIN 50049-2.2)	CF3					
Inspection Certificate						
Inspection certificate 3.1 acc. EN 10204		CBA				
Device Identification Label						
Stainless steel 18.5 x 65 mm (0.73 x 2.56 in.)						MK1
Sticker 11 x 25 mm (0.43 x 0.98 in.)						MK3
Operation with Inflammable Gas						
Increased climate stability						300
Operation with inflammable gas					4)	480
No special approval						999
Special Input Signal						
0 ... 10 mA						501
10 ... 20 mA						502
4 ... 12 mA						503
12 ... 20 mA						504
Specify split-range						505
Special input range						506
No special input range						999
Special Output Signal						
1 ... 18 psi						511
20 ... 100 kPa						513
0.2 ... 1 kg/cm ²						514
0.2 ... 1.8 bar					5)	515
3 ... 27 psi					6)	512
0.4 ... 2 bar					5)	508
6 ... 30 psi					6)	509
Special output signal						999

- 1) Only with aluminium or stainless steel field housing
- 2) Not with field housing
- 3) Not with explosion protection Ex d or FM / CSA explosion proof
- 4) Only for signal converter EEx ia IIC with polyester field housing
- 5) Supply pressure 2.5 bar
- 6) Supply pressure 37 psi

Accessories	Order code
TEIP11-PS Cable gland EEx d, brass, M 20 x 1.5 thread	319343
TEIP11-PS Mounting bracket, stainless steel, for wall mounting	319344
TEIP11-PS Mounting bracket, stainless steel, for wall or 2 in. pipe mounting	319345
TEIP11-PS Connection block for 4 converters	7958243
TEIP11-PS Termination block with central supply air connection 3/8 NPT	7958251
TEIP11-PS Termination block without connection	7958245

Notes

Notes

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