

TEIP11

I/P signal converter for standard signals



Current in air pressure

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)

Wide 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 pressure-resistant operation

Several different designs

- IP 20 control room housing unit for rail mounting
- IP 65 aluminum or stainless steel field housing unit
- For OEM application (on request)

TEIP11

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Concept

The TEIP11 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 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 ... 10 bar (20 ... 145 psi) of compressed air is required.

In order to ensure smaller dimensions and lower costs, an air power stage is not included in the pneumatic unit.

This reduces the air capacity, meaning that the I/P signal converter can only be used to control small-volume air systems.

Designs

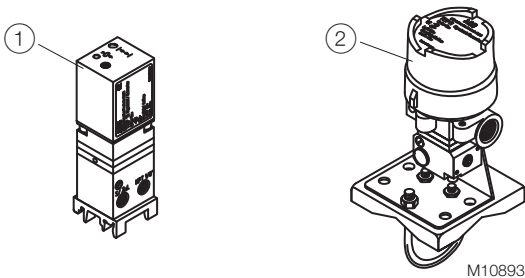


Fig. 1

- ① Control room housing unit for rail mounting
- ② 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.

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.

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 5).

Capacitance/inductance

Negligible

Output (pneumatic)

Signal range

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

Air capacity

at supply air pressure	[kg/h]	[Nm ³ /h]	[scfm]
1.4 bar (20 psi)	0.05	0.041	0.024
2.0 bar (30 psi)	0.07	0.057	0.033
4.0 bar (60 psi)	0.10	0.082	0.048
6.0 bar (90 psi)	0.16	0.130	0.076
10.0 bar(150 psi)	0.25	0.205	0.120

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 ... 10 bar (20 ... 145 psi)

Output signal

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

Air consumption

Equivalent to air capacity

Transmission data and influences

Characteristic curve

Linear, direct, or reverse action

Characteristic curve deviation

$\leq 1 \text{ \%}$

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

$\leq 0.8 \text{ \%}$ at 1.4 ... 2 bar (20 ... 30 psi)

$\leq 0.8 \text{ \%}$ at 2 ... 3 bar (30 ... 45 psi)

$\leq 0.5 \text{ \%}$ at 3 ... 10 bar (45 ... 150 psi for every 1 bar (15 psi))

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 $\leq 0.5 \text{ \%}$ 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 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

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 ... 10 bar (20 ... 145 psi)
Output signal	0,2 ... 1 bar (3 ... 15 psi)

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

Type examination certificate	II 2G Ex ia IIC T6 resp. T4 Gb 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

L_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

TEIP11

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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

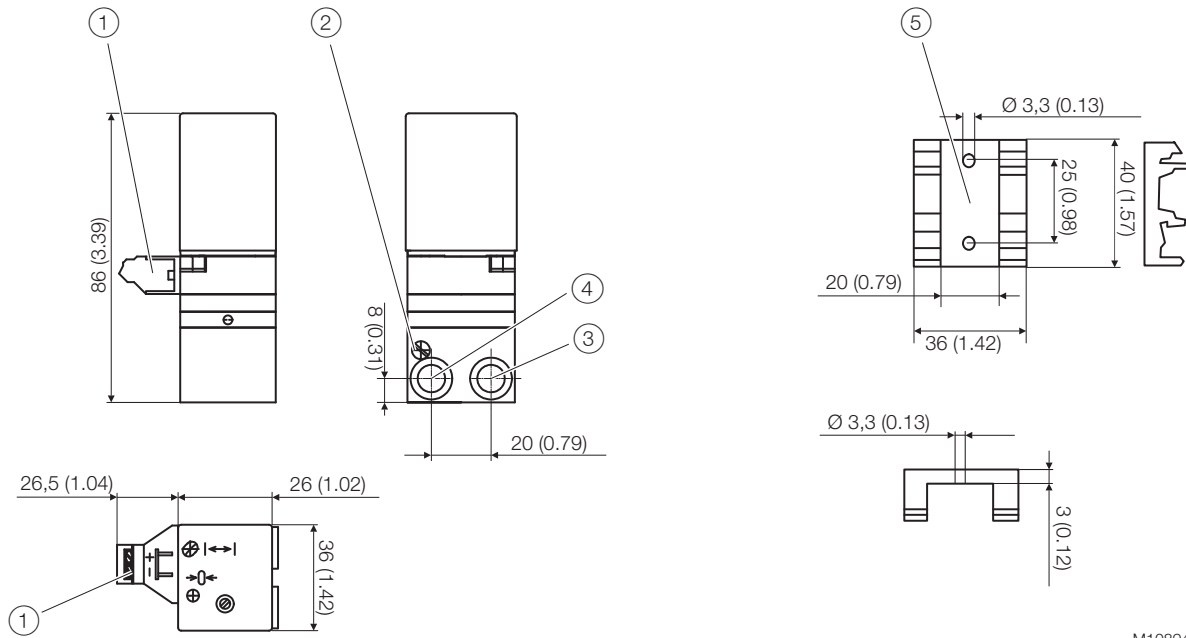
D.I.P.: CL II III/Div 2/Grp E F G

CSA "explosion proof" (only for metal field housing units)

X.P.: CL I/Div 1/Grp B C D

Dimensions

Design for control room housing unit for rail mounting



M10894

Fig. 2: Dimensions in mm (inches)

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

TEIP11

I/P signal converter for standard signals

Design for aluminum or stainless steel field housing unit
 For wall mounting or pipe mounting

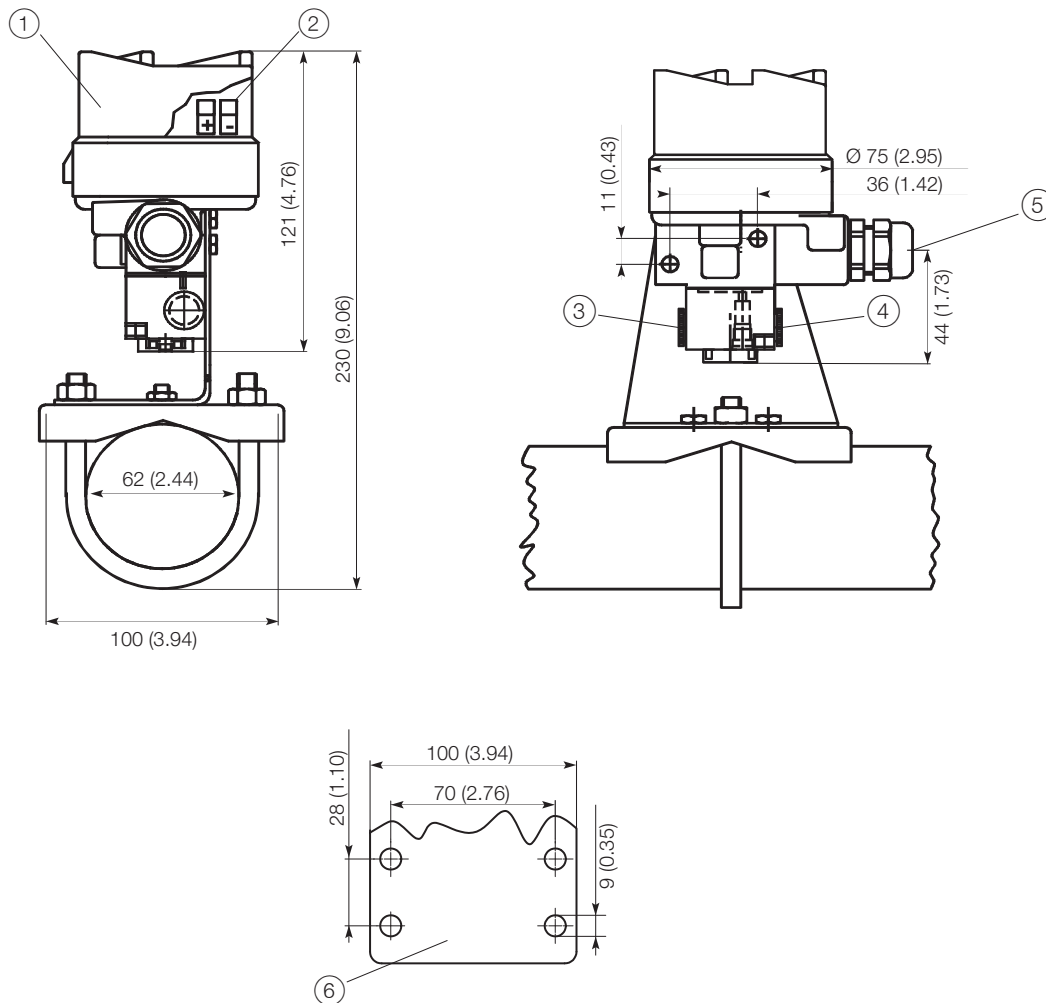


Fig. 3: Dimensions in mm (inches)

① Ground terminal ② Electrical connections ③ Air supply ④ Output ⑤ Cable gland

M10895

Mounting module for OEM applications

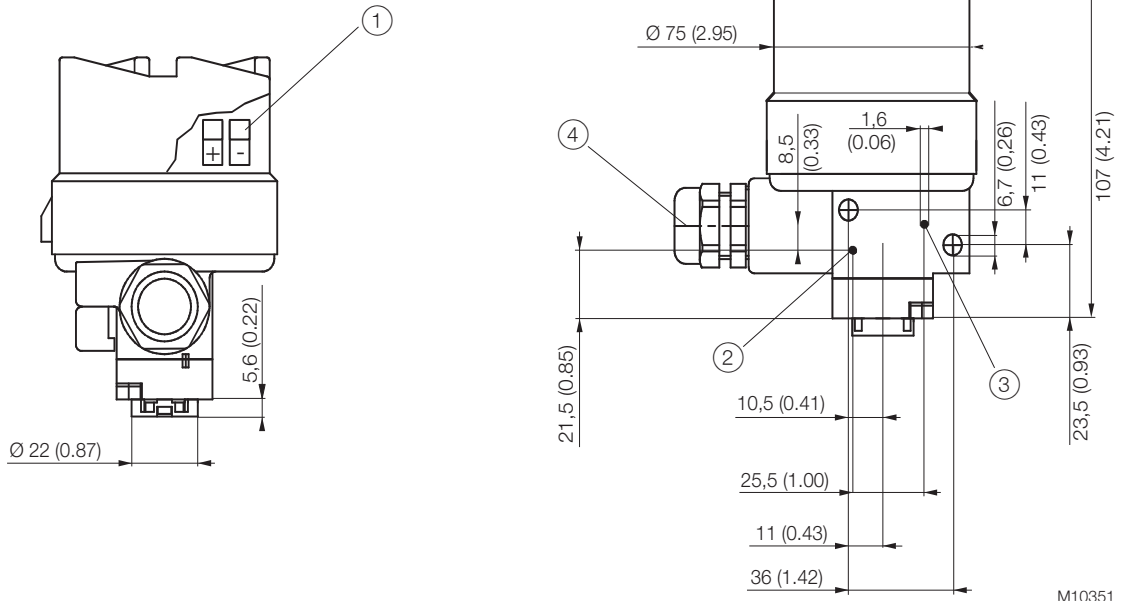


Fig. 4: Dimensions in mm (inches)

① Electrical connections ② Air supply ③ Output ④ Cable gland

M10351

TEIP11

I/P signal converter for standard signals

Ordering Information

Main ordering information TEIP11

Base model	V18312H	X	X	X	X	X	X	X	0	0
TEIP11 I/P Converter, signal converter for standard signals, without power stage										
Explosion Protection										
Standard (without explosion protection)		1								
ATEX II 2 G Ex ia IIC T6 resp. T4 Gb		2								
ATEX II 2 G Ex d IIC T4/T5/T6 Gb		1) 3								
FM / CSA Intrinsically Safe		2) 5								
FM / CSA Intrinsically Safe and Explosion-proof		1) 6								
GOST Russia - Ex ia		3) A								
GOST Russia - Ex d		3) D								
Design										
Control room housing IP 20, for rail mounting		1								
Aluminium field housing, IP 65, for wall or pipe mounting		2								
Aluminium field housing, IP 65, add-on module for OEM applications		3								
Stainless steel field housing, IP 65, for wall or pipe mounting		4								
Stainless steel field housing, IP 65, add-on module for OEM applications		5								
Input Signal										
0 ... 20 mA					1					
4 ... 20 mA					2					
Output Signal										
0.2 ... 1 bar						1				
3 ... 15 psi						2				
Characteristic										
Direct action							1			
Reverse action							2			
Ambient Temperature										
-40 ... 85 °C								1		
-55 ... 85 °C								2		
Air Supply (Air Pressure)										
Adjusted to 1.4 bar (20 PSI)									1	
Adjusted to 3 bar (45 PSI)									2	
Adjusted to 4 bar (60 PSI)									3	
Adjusted to 5 bar (80PSI)									4	
Adjusted to 6 bar (87PSI)									5	
Adjusted to 8 bar (116PSI)									7	
Adjusted to 10 bar (145PSI)									8	
									0	0

Additional ordering information TEIP11

	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

- 1) Not with control room housing IP 20.
- 2) Only with control room housing IP 20.
- 3) Only with aluminium or stainless steel field housing.

Accessories	Order code
TEIP11 Cable gland EEx d, brass, M 20 x 1.5 thread	319343
TEIP11 Mounting bracket, stainless steel, for wall mounting	319344
TEIP11 Mounting bracket, stainless steel, for wall or 2 in. pipe mounting	319345

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