ABB MEASUREMENT & ANALYTICS | DATA SHEET

TEIP11

I/P signal converter for standard signals

Flow in air pressure

Proven and reliable concept

Integral mount design
- Small dimensions, low weight

Sturdy construction and solid functionality
- Influence of shock and vibration < 1 % bei 10 g

Variety of signal ranges
- Input e.g. 0 to 20 mA or 4 to 20 mA
- Output 0.2 to 1 bar (3 to 15 psi)

Wide temperature range
- From –40°(optional –55°) to 85° C (–40° [optional 67°] to 185°F)

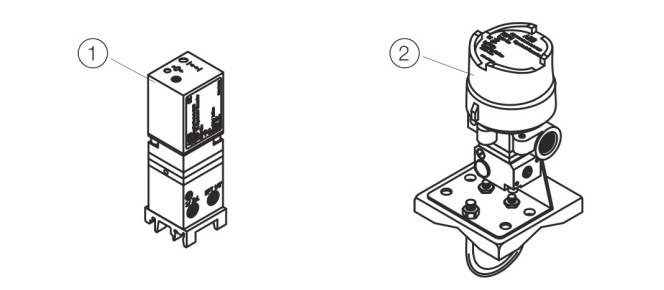
Approvals for explosion protection
- ATEX, FM / CSA, GOST for intrinsically safe and pressure-resistant operation

Concept

The **TEIP11** signal converter converts standard electrical signals, e.g. 4 to 20 mA to 0.2 to 1 bar (3 to 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 **Specification** on page 4).
The device requires only compressed air 1.4 to 10 bar (20 to 145 psi) for the power supply.

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



① Control room housing for rail mounting

② Aluminum or stainless steel field mount housing

Figure 1: TEIP 11 designs

Control room housing unit for rail mounting

The control room housing for rail mounting is the simplest and lowest priced version of the I/P signal converter.
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 rating.

Field mount housing

The field mount housing is suited for installation on-site or in open areas. The housing can be made from plastic with IP rating IP 54, from aluminum with IP rating IP 65 and from stainless steel with IP rating IP 65. The housing is suited for wall mounting and for 2 in pipe mounting.

Specification

Input (electric)

Signal range
0 to 20 mA or 4 to 20 mA
0 to 10 mA or 10 to 20 mA
4 to 12 mA or 12 to 20 mA
(additional ranges available upon request)

Input resistance
Ri = 260 Ω at 20 °C (68 °F), Tk + 0.4 %/K

Overpressure limit
30 mA (for Ex devices see **Ex relevant specifications** on page 6).

Capacitance / inductance
Negligible

Output (pneumatic)

Signal range
0.2 to 1 bar (3 to 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 to 10 bar (20 to 145 psi)

Output signal
0.2 to 1 bar (3 to 15 psi)

Air consumption
Equivalent to air capacity

Transmission data and contributing factors

Characteristic curve
Linear, direct, or reverse action

Characteristic curve deviation
≤ 1 %

Hysteresis
≤ 0.3 %

Dead band
≤ 0.1 %

Temperature
≤ 1 % / 10 K within –20 to 85 °C (–4 to 185 °F)
≤ 2 % / 10 K within –55 to –20 °C (–67 to –4 °F)

Power supply
≤ 0.8 % at 1.4 to 2 bar (20 to 30 psi)
≤ 0.8 % at 2 to 3 bar (30 to 45 psi)
≤ 0.5 % to 3 to 10 bar (45 to 150 psi, each 1 bar [15 psi])

Mechanical vibration
≤ 1 % to 10 g and 20 to 80 Hz

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

Mounting orientation
Zero point≤ 0.5 % at 90° change of position

Step response
10 to 90 % and 90 to 10 % 0.6 s
5 to 15 % and 15 to 5 % 0.25 s
45 to 55 % and 55 to 45 % 0.2 s
85 to 95 % and 95 to 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

Operating conditions at installation site

Ambient temperature

Depending on the ordered model:

−40 to 85 °C (−40 to 185 °F)

–55 to 85 °C (–67 to 185 °F)

For Ex d:

−40 to 85 °C (−40 to 185 °F)

Mounting position

Any

Environmental capabilities

Climate class

GPF or FPF acc. to DIN 40040

Temperature:

–55 to 85 °C (–67 to 185 °F),

–45 to 85 °C (–49 to 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

Mounting

Rail mounting:

EN 50022 - 35 × 7.5

EN 50035 - G 32

EN 50045 - 15 × 5

Electrical connection

2-pole screw terminal for 2.5 mm^2 (14 AWG)

Pneumatic connection

⅛ NPT threaded hole for supply air and output

Weight

0.25 kg (0.55 lb)

Dimensions

Refer to **Dimensions** on page 8.

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

Mounting

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

Electrical connection

2-pole screw terminal for 2.5 mm^2 (14 AWG) in the housing, screw connection NPT ½ in for the cable entry.

For ATEX ‘intrinsically safe’:

Threaded hole NPT ½ in for the cable entry

For ATEX ‘Ex d’:

M20 × 1.5 threaded hole for cable entry at
FM/CSA
(Cable gland with Ex d approval available as an accessory on request)

Pneumatic connection

¼ in NPT threaded hole for supply air and output

Weight

0.62 kg (1.37 lb) with aluminum housing unit
1.20 kg (2.65 lb) for stainless steel housings.

Dimensions

Refer to **Dimensions** on page 8.

… Specification

Accessories

'Ex d' cable gland
Brass, with M20 × 1.5 thread

Stainless steel mounting bracket for wall mounting or 2 in pipe mounting
For aluminum or stainless steel field housing unit

Material for block mounting
Connection block for 4 signal converters,
End panel with central supply air connection ⅜ NPT,
dummy panel

Ex relevant specifications

Flameproof (enclosure), ATEX 'Ex d'

Marking	II 2G Ex d IIC T4/T5/T6 Gb
Type Examination Test 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')

System bus, computer interfaces	
Current	≤ 50 mA

Pneumatic data	
Supply pressure	1.4 to 10 bar (20 to 145 psi)
Output signal	0.2 to 1 bar (3 to 15 psi)

Thermal data	T4: –40 °C < Tamb < 85 °C
	T5: –40 °C < Tamb < 70 °C
	T6: –40 °C < Tamb < 55 °C

Special conditions
The I/P signal converter is suited for use in an ambient temperature range of –40 °C to maximum 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

Marking	II 2G Ex ia IIC T6 resp. T4 Gb
Type Examination Test 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 to 60 °C
T4	100 mA	–55 to 85 °C
T6	60 mA	–55 to 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 to 60 °C
T6	60 mA	–55 to 55 °C
T5	60 mA	–55 to 70 °C
T4	60 mA	–55 to 85 °C
T5	100 mA	–55 to 55 °C
T4	100 mA	–55 to 85 °C
T5	120 mA	–55 to 45 °C
T4	120 mA	–55 to 80 °C
T4	150 mA	–55 to 70 °C

Ex limit values

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

FM / CSA

öIntrinsically 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-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

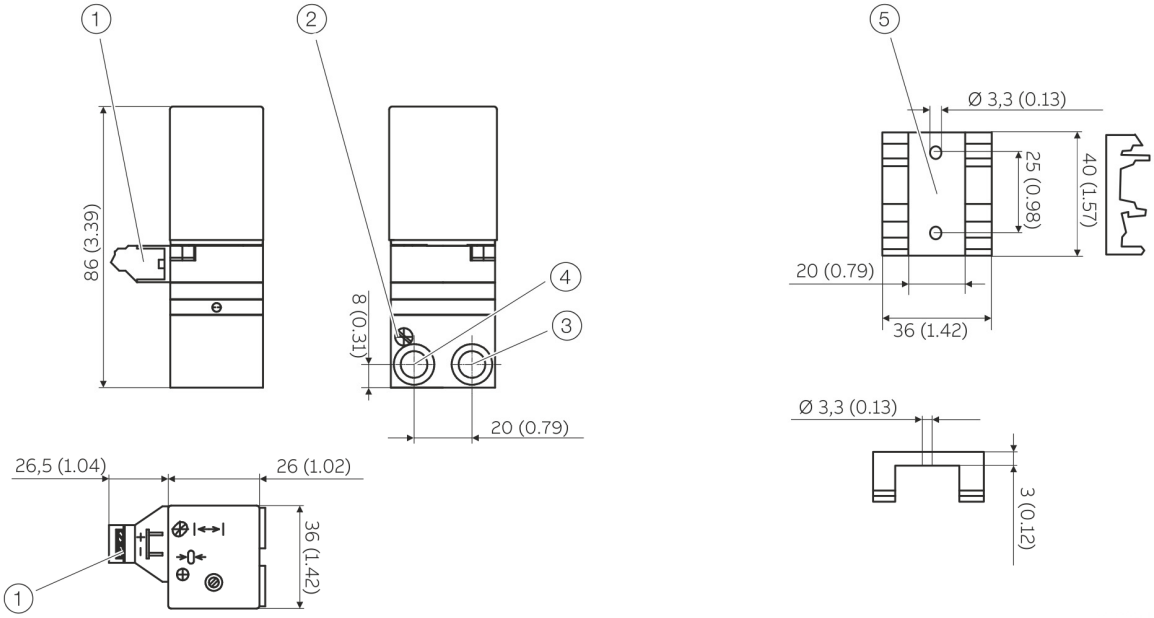
Non-incendive CSA
FM ‘explosion proof’ (only for metal field housing units)
X.P.: CL I/Div 1/Grp B C D
D.I.P.: CL II III/Div 2/Grp E F G

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

Dimensions in mm (in)



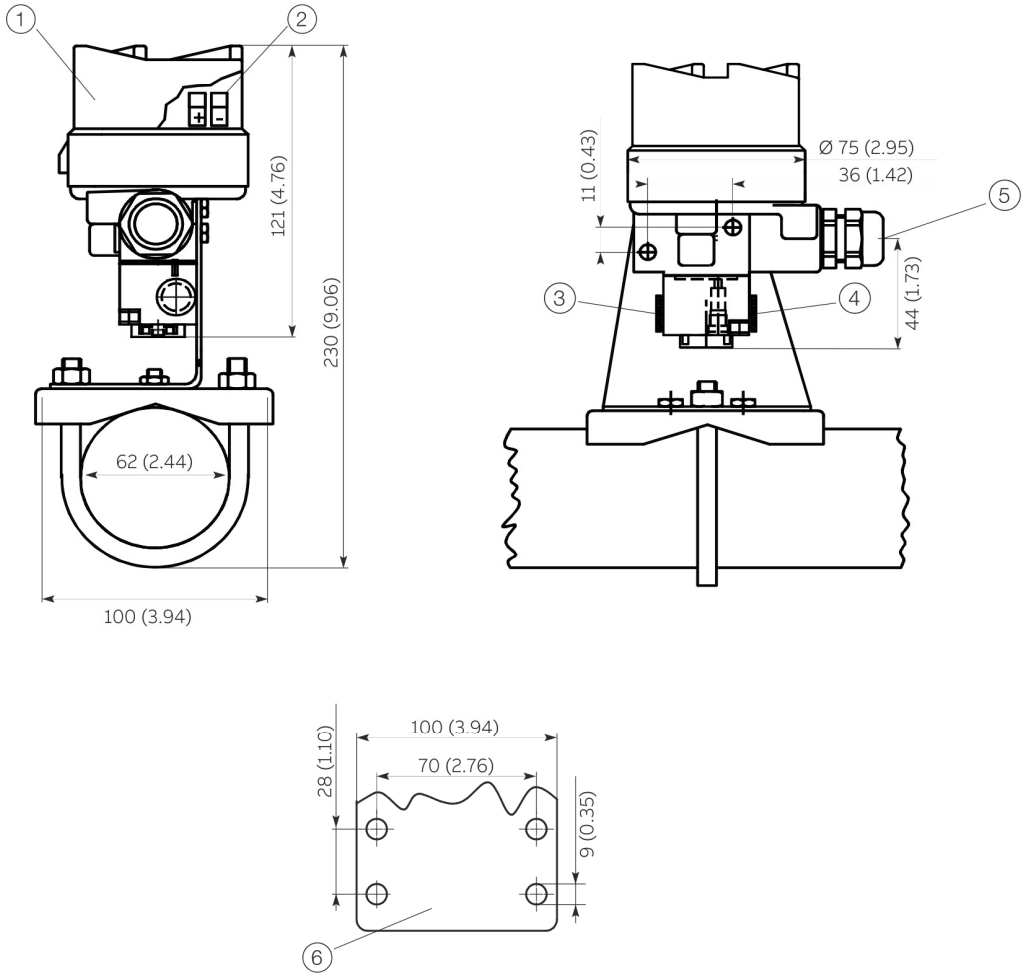
1. Electrical connections
2. Filter
3. Output
4. Supply air
5. Mounting bracket for DIN rail mounting

Figure 2: Dimensions of control room housing design for rail mounting

Design for aluminum or stainless steel field mount housing

For wall mounting or pipe mounting

Dimensions in mm (in)



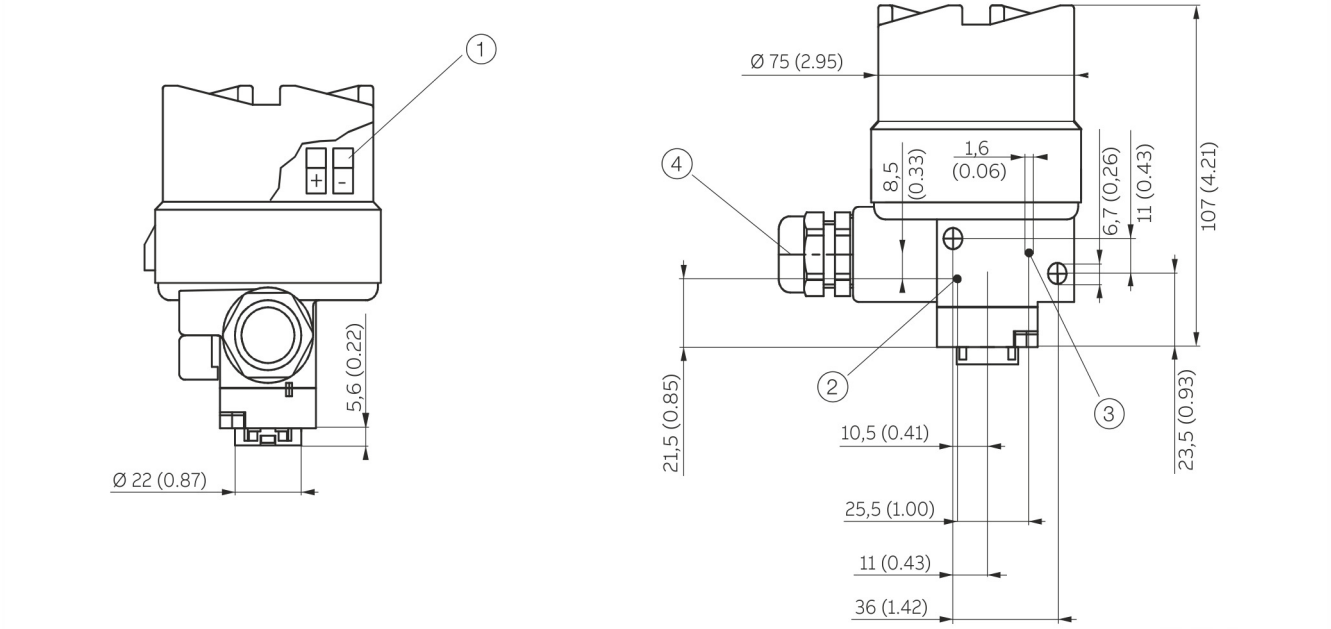
1. Ground terminal
2. Electrical connections
3. Supply air
4. Output
5. Cable gland

Figure 3: Dimensions of field mount housing for wall or pipe mounting

… Dimensions

Mounting module for OEM applications

Dimensions in mm (in)



1 Electrical connections
2 Supply air
3 Output
4 Cable gland

Figure 4: Dimensions of mounting module for OEM applications

Ordering Information

Main ordering information TEIP11

TEIP11 I/P Converter, signal converter for standard signals, without power stage	**V18312H**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**0**	**0**
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		3*								
FM / CSA Intrinsically Safe		5**								
FM / CSA Intrinsically Safe and Explosion-proof		6*								
GOST Russia - Ex ia		A***								
GOST Russia - Ex d		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 to 20 mA				1						
4 to 20 mA				2						
Output Signal										
0.2 to 1 bar					1					
3 to 15 psi					2					
Characteristic										
Direct action						1				
Reverse action						2				
Ambient Temperature										
−40 to 85 °C							1			
−55 to 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

* Not with control room housing IP 20.

** Only with control room housing IP 20.

*** Only with aluminium or stainless steel field housing.

… Ordering Information

Additional ordering information TEIP11

TEIP11 I/P-Umformer, Signalumformer für Normsignale, ohne Leistungsstufe	**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

Accessories	**Order code**
TEIP11 Cable gland EEx d, brass, M 20 × 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

Notes

Sales

Service

Notes

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