ABB MEASUREMENT & ANALYTICS | DATA SHEET

TEIP11

I/P signal converter for standard signals



Current 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 % at 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)

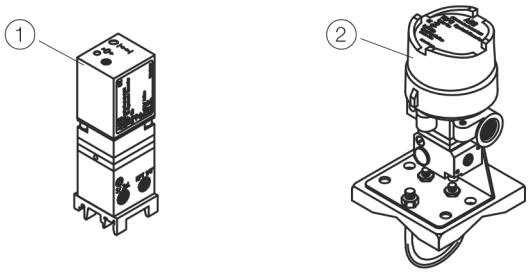
Approvals for explosion protection
- ATEX, FM / CSA, EACEx for operation with type of protection ‘Intrinsic Safety’ and ‘Flameproof Enclosure’.

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).

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

Expected service life of the device

With proper use and consideration of relevant environmental conditions, the service life of the TEIP11 can reach approx. 10 years.

Regular maintenance work and / or proper repairs by ABB Service, along with the use of ABB spare parts, can extend the service life of the TEIP11.

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 **Design for control room housing unit for rail mounting** on page 10.

… Specification

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 **Design for aluminum or stainless steel field mount housing** on page 11.

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

ATEX / UKEX

ATEX – 'Ex d' flameproof enclosure type of protection

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 IEC 60079-0: 2018 (General requirements) EN 60079-1: 2014 (Flameproof enclosure 'd')

System bus, computer interfaces	
Current	≤ 50 mA

Pneumatic data	
Supply pressure	1.4 to 10 bar (20 to 150 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 may not be installed in areas in which processes with very high electrostatic charges may occur. 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. The Ex designation of the device should be updated accordingly.

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.

ATEX – 'Ex ia' instrinsic safety type of protection

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

… Ex relevant specifications

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-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

EAC TR-CU-012

Designation of the device	Constructional design	Explosion protection marking according to GOST 31610.0-2014 (IEC 60079-0:2011)
Power/pressure transducer of TEIP types TEIP 11 and TEIP 11-PS	Doc. 901068, Doc. 901069	1Ex ia IIC T6…T4 Gb X
	Doc. 900771	1Ex d IIC T6…T4 Gb X

Flameproof (enclosure) '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 TEIP11	
Supply pressure	1.4 to 10 bar (20 to 150 psi)
Output signal	0.2 to 1 bar (3 to 15 psi)

Pneumatic data TEIP11-PS	
Supply pressure	1.4 bar (20 psi) / 2.5 bar (37 psi)*
Output signal	0.2 to 1 bar (3 to 15 psi) / 0.4 to 2 bar (6 to 30 psi)*

* Valid for Option 509 only – increased input signal.

Special conditions

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

The I/P signal converter TEIP11-PS Doc. 901068 or TEIP11-PS Doc. 901069 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.

Temperature characteristic curves

Intrinsically safe circuit according to ATEX, IECEx and EAEU / TR CU 012/2011
Device category 1: Use in Zone 0
Device category 2: Use in Zone 1
Device category 3: Use in Zone 2

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

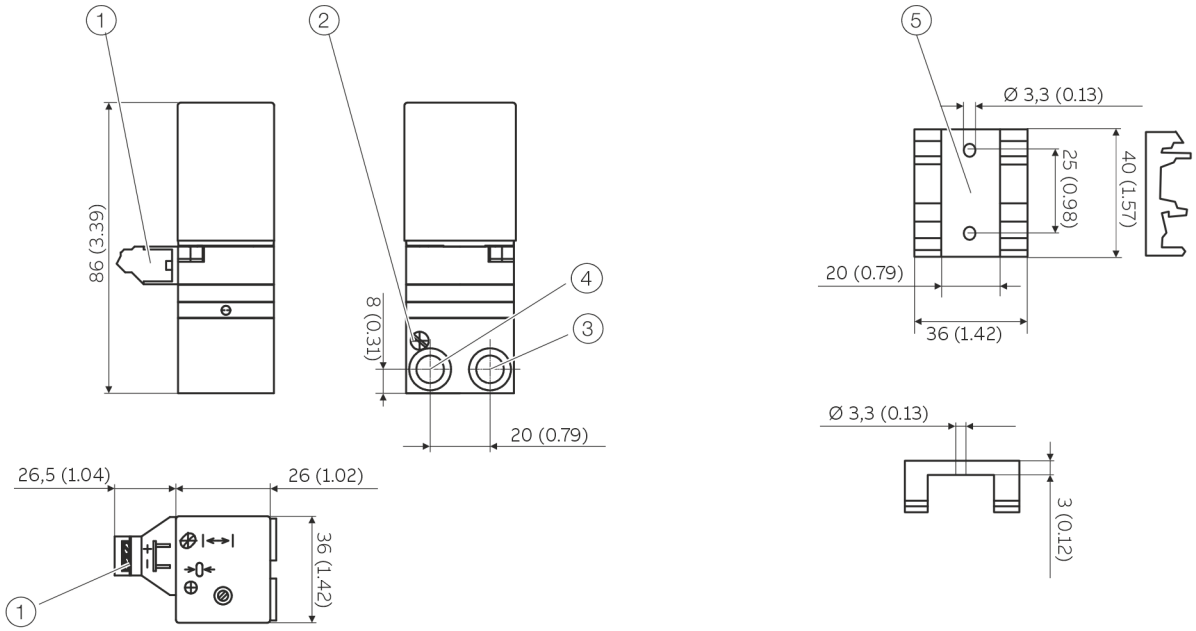
Ex limit values

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

Dimensions

Design for control room housing unit for rail mounting

Dimensions in mm (in)



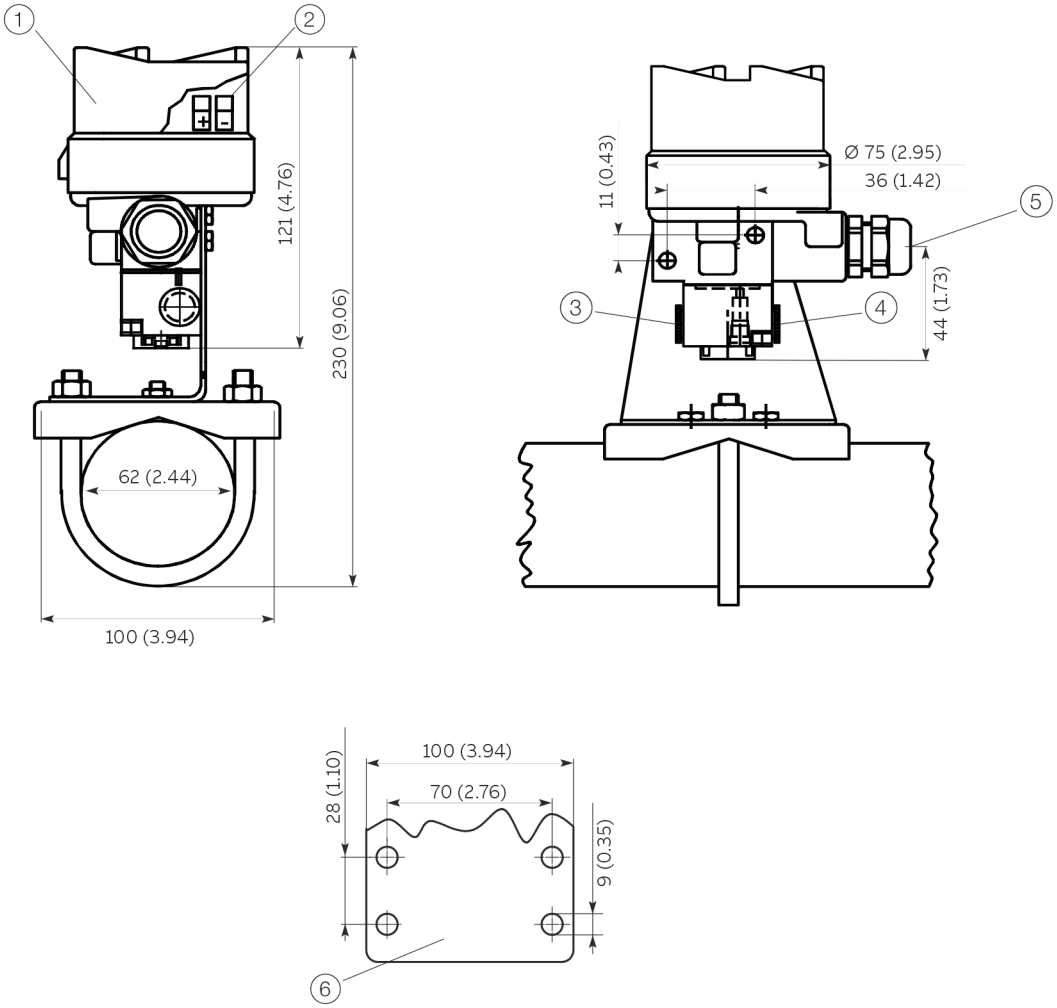
1. Electrical connections
2. Filter
3. Output
4. Supply air
5. Mounting bracket for DIN rail mounting

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

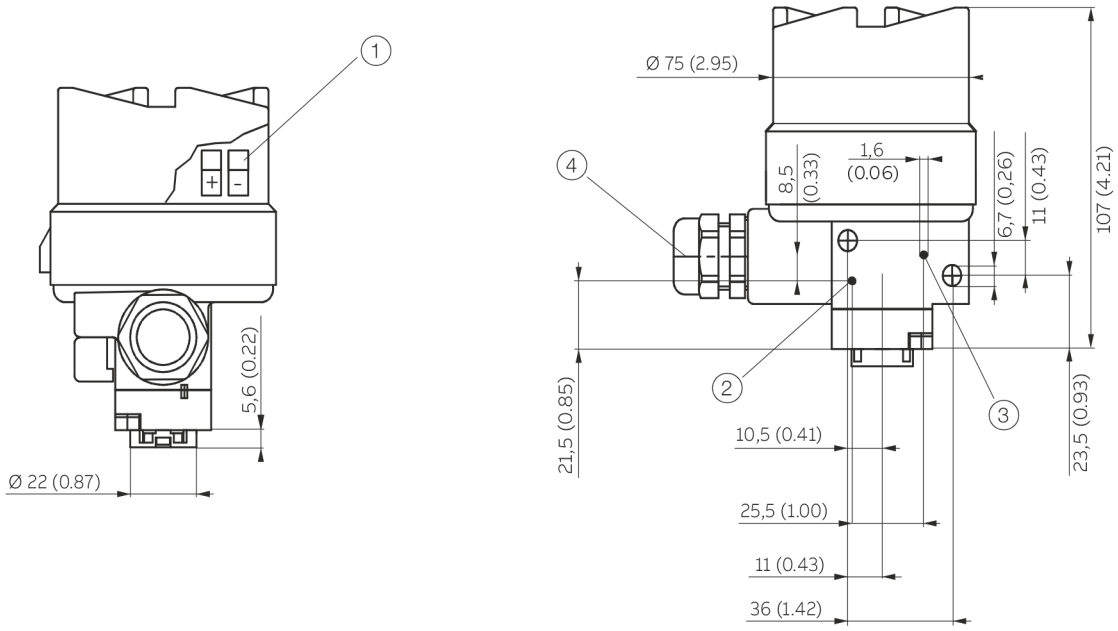
Figure 3: Dimensions of field mount housing for wall or pipe mounting

… Dimensions

… Design for aluminum or stainless steel field mount housing

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[1)]								
FM / CSA Intrinsically Safe	5[2)]								
FM / CSA Intrinsically Safe and Explosion-proof	6[1)]								
FM Approvals Intrinsically Safe according to order code 5	E[2)]								
FM Approvals Intrinsically Safe and FM / CSA Explosion proof according order code 6	F[1)]								
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 (80 psi)							4		
Adjusted to 6 bar (87 psi)							5		
Adjusted to 8 bar (116 psi)							7		
Adjusted to 10 bar (145 psi)							8	0	0

1) Only with aluminum or stainless steel field housing

2) Not with field housing

Fortsetzung siehe nächste Seite

… Ordering Information

… Main ordering information TEIP11

TEIP11 I/P Converter, signal converter for standard signals, without power stage	**V18312H**	**X**	**X**
Design (Varnish / Label)			
Black		2	
Grey-blue		4	
White		5	
American-yellow		6	
Red		8	
Standard		0	
OEM version			
Only for, IC Eckardt			2
Only for, Bailey Fischer & Porter			3
Only for, Controls International			4
Only for, Valtek			5
ABB Sensycon			6
Only for, IC Eckardt			0

Additional ordering information TEIP11

TEIP11 I/P Converter, signal converter for standard signals, without power stage	**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			
Handling of Certificates					
Send via e-mail			GHE		
Send via mail			GHP		
Send via mail express			GHD		
Send with instrument			GHA		
Only archived			GHS		
Certificate preparation					
per device				GPD	
per salesorder item				GPP	
Device Identification Label					
Stainless steel 18.5 x 65 mm (0.73 x 2.56 in.)					MK1[3)]
Sticker 11 x 25 mm (0.43 x 0.98 in.)					MK3

3) Plain text, max. 16 letters

Accessories

Accessories	Ordering number
TEIP11 cable gland EEx d, made of brass, with M20 × 1.5 thread	319343
TEIP11 mounting bracket made of stainless steel, for wall mounting	319344
TEIP11 mounting bracket made of stainless steel, for wall mounting or 2-in. pipe mounting	319345
TEIP11-PS / EDP300 / TZIDC cable gland NPT1/2” plastic, non-Ex (available Q2-Q3 2023)	3KXE001070U0100
TEIP11-PS/EDP300/TZIDC cable gland M20x1.5 plastic, non-Ex (available Q2-Q3 2023)	3KXE001071U0100
TEIP11-PS / EDP300 / TZIDC cable gland M20x1.5 EMC, brass, nickel-plated for Ex eb IIC Gb, Ex ta IIIC Da, Ex i (IP68) ambient temperature –20 °C to 95 °C (available Q2-Q3 2023)	3KXE001072U0100
TEIP11-PS / EDP300 / TZIDC cable gland NPT1/2" EMC, brass, nickel-plated for Ex eb IIC Gb, Ex ta IIIC Da, Ex i (IP68) ambient temperature –20 °C to 95 °C (available Q2-Q3 2023)	3KXE001073U0100
TEIP11-PS / EDP300 / TZIDC cable gland M20x1.5 INOX/ stainless steel for Ex db IIC Gb, Ex ta IIIC Da, Ex i (IP68) ambient temperature –60 °C to 105 °C (available Q2-Q3 2023)	3KXE001074U0100
TEIP11-PS / EDP300 / TZIDC cable gland NPT1/2" INOX/ stainless steel for Ex db IIC Gb, Ex ta IIIC Da, Ex i (IP68) ambient temperature –60 °C to 105 °C (available Q2-Q3 2023)	3KXE001075U0100
TEIP11-PS / EDP300 / TZIDC cable gland PG11, brass, nickel-plated for Ex eb IIC Gb, Ex ta IIIC Da, Ex i (IP68) ambient temperature –60 °C to 95 °C (available Q2-Q3 2023)	3KXE001076U0100
TEIP11-PS / EDP300 / TZIDC screw plug M20x1.5 black plastic for Ex eb IIC Gb, Ex tb IIIC Db, Ex i (IP66) ambient temperature –55 °C to 95 °C (available Q2-Q3 2023)	3KXE001077U0100
TEIP11-PS / EDP300 / TZIDC screw plug M20x1.5 INOX/ stainless steel for Ex db eb IIC Gb, Ex ta IIIC Da, Ex i (IP68) ambient temperature –60 °C to 180 °C (available Q2-Q3 2023)	3KXE001078U0100
TEIP11-PS / EDP300 / TZIDC screw plug NPT 1/2 INOX/ stainless steel for Ex db eb IIC Gb, Ex ta IIIC Da, Ex i (IP68) ambient temperature –60 °C to 180 °C (available Q2-Q3 2023)	3KXE001079U0100

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