TEIP11-PS
I/P signal converter for standard signals
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)

Complies with the following directives
• EMC directive 2014/30/EU
• EC directive for CE declaration of conformity

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

The **TEIP11-PS** 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-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 Specification on page 4).

The device requires only compressed air 1.4 bar (20 psi) for the power supply.

Designs

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

Figure 1: **TEIP11-PS** 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.

**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.
**Designs**

**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.

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.

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**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**
  - \( R_i = 260 \, \Omega \) at 20 °C (68 °F), \( T_k + 0.4 \%/K \)

- **Overpressure limit**
  - 30 mA (for Ex devices see *Ex relevant specifications* on page 8).

- **Capacitance / inductance**
  - Negligible

**Output (pneumatic)**

- **Signal range**
  - 0.2 to 1 bar (3 to 15 psi)

- **Air capacity**
  - \( \geq 5 \, \text{kg/h} = 4.1 \, \text{Nm}^3/\text{h} = 2.4 \, \text{scfm} \)

- **Load power in accordance with 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)*

- **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.

**Air consumption**

- \( \leq 0.2 \, \text{kg/h} = 0.16 \, \text{Nm}^3/\text{h} = 0.1 \, \text{scfm} \)
Transmission data and contributing factors

Characteristic curve
- Linear, direct, or reverse action

Characteristic curve deviation
- ≤ 0.5 %

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
- ≤ 0.3 % / 0.1 bar (1.5 psi) change in pressure

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 ≤ 0.4 % 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
... Specification

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 mm² (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 10.

Design for block mounting

Material / IP rating
IP 20 aluminum housing unit, with plastic cover

Mounting
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
⅛ NPT threaded hole for supply air
(main connection to connection block)
⅛ NPT threaded hole for output
(on each individual signal converter)

Mounting position
Any

Weight
0.3 kg (0.66 lb)

Dimensions
Refer to ‘Dimensions’.

Design for field mount housing (plastic)

Material / IP rating
Polyester housing unit, black, IP 54

Mounting
Wall or 2 in pipe mounting
(2 in pipe mounting for vertical pipes only)

Electrical connection
2-pole screw terminal for 2.5 mm² (14 AWG) in housing
PG 11 cable gland for cable entry

Pneumatic connection
⅛ NPT-threaded hole for supply air and output

Air outlet
For gas exhaust with 6 mm (0.24 in) cut or crimp connection

Mounting position
Any

Weight
1.0 kg (2.20 lb)

Dimensions
Refer to Dimensions on page 10.
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 mm² (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 10.

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 ¾ NPT, dummy panel
Ex relevant specifications

Flameproof (enclosure), ATEX ‘Ex d’

<table>
<thead>
<tr>
<th>Marking</th>
<th>II 2G Ex d IIC T4/T5/T6 Gb</th>
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<td>(Flameproof enclosure ‘d’)</td>
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System bus, computer interfaces

| Current                  | ≤ 50 mA                              |

Pneumatic data

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<th>Supply pressure</th>
<th>1.4 bar (20 psi) / 2.5 bar (37 psi) *</th>
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<tbody>
<tr>
<td>Output signal</td>
<td>0.2 to 1 bar (3 to 15 psi) / 0.4 to 2 bar (6 to 30 psi) *</td>
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* Valid for Option 509 only – increased input signal.

Thermal data

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<th>Input current</th>
<th>Ambient temperature range</th>
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<td>T4</td>
<td>120 mA</td>
<td>-55 to 60 °C</td>
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<td>T4</td>
<td>100 mA</td>
<td>-55 to 85 °C</td>
</tr>
<tr>
<td>T6</td>
<td>60 mA</td>
<td>-55 to 40 °C</td>
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</table>

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

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Temperature classes for the following versions: TEIP11 Doc. 901068-SMD and TEIP11-PS Doc. 901068-SMD and TEIP11-PS Doc. 901069-SMD

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<tr>
<td>T4</td>
<td>120 mA</td>
<td>-55 to 60 °C</td>
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<td>T4</td>
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<td>-55 to 85 °C</td>
</tr>
<tr>
<td>T6</td>
<td>60 mA</td>
<td>-55 to 40 °C</td>
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TEIP11 Doc. 901068 and TEIP11-PS Doc. 901068 and TEIP11-PS Doc. 901069

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Ex limit values

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<td>150 mA</td>
<td>25.5 V</td>
<td>3.825 W</td>
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Special conditions
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.

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

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)

![Diagram with labels and dimensions]

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 control room housing unit for block mounting

Dimensions in mm (in)

![Diagram of control room housing unit](image)

1. Output
2. Supply air
3. Filter
4. Electrical connections
5. End panel with central supply air connection
6. Connection blocks
7. End panels, blank

Figure 3: Dimensions of control room housing design for block mounting

* Version 0.2 to 1 bar (2.90 to 14.50 psi)
** Version 0.4 to 1 bar (5.80 to 14.50 psi)
*** Length 80 mm (3.15 in) per connection block
... Dimensions

Design for plastic field housing unit

Dimensions in mm (in)

Figure 4: Dimensions of plastic field mount housing design

1 Electrical connections
2 Connection only with version for operation with flammable gas for diverting the escaping gas / 6 mm (0.24 in) screw terminal connection
3 Supply air
4 Output
5 Cable gland
Design for aluminum or stainless steel field mount housing

Dimensions in mm (in)

Figure 5: Dimensions of aluminum or stainless steel field mount housing design
## Ordering Information

### Main ordering information TEIP11-PS

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* Only with aluminium or stainless steel field housing
** Not with field housing
*** Not with explosion protection Ex d or FM / CSA explosion proof
### Additional ordering information TEIP11-PS

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<td><strong>Device Identification Label</strong></td>
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<td>Stainless steel 18.5 × 65 mm (0.73 × 2.56 in)</td>
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<td>12 to 20 mA</td>
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<td>0.2 to 1.8 bar</td>
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<td>3 to 27 psi</td>
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<td>0.4 to 2 bar</td>
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<td>6 to 30 psi</td>
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* Only for signal converter EEx ia IIC with polyester field housing

** Supply pressure 2.5 bar

*** Supply pressure 37 psi
## Ordering Information

<table>
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<tr>
<th>Accessories</th>
<th>Order Code</th>
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<tbody>
<tr>
<td>TEIP11-PS Cable gland EEx d, brass, M 20 x 1.5 thread</td>
<td>319343</td>
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<tr>
<td>TEIP11-PS Mounting bracket, stainless steel, for wall mounting</td>
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<tr>
<td>TEIP11-PS Mounting bracket, stainless steel, for wall or 2 in pipe mounting</td>
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<tr>
<td>TEIP11-PS Connection block for 4 converters</td>
<td>7958243</td>
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<tr>
<td>TEIP11-PS Termination block with central supply air connection ⅜ NPT</td>
<td>7958251</td>
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<tr>
<td>TEIP11-PS Termination block without connection</td>
<td>7958245</td>
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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)
Complies with the following directives
• EMC directive 2014/30/EU
• EC directive for CE declaration of conformity
Wide temperature range
• From –40° (optional –55°) to 85 °C
(–40° (optional –67°) to 185 °F)
ABB Limited
Measurement & Analytics
Howard Road, St. Neots
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UK
Tel: +44 (0)870 600 6122
Fax: +44 (0)1480 213 339
Email: enquiries.mp.uk@gb.abb.com

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Tel: +49 571 830-0
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abb.com/positioners

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