TEIP11
I/P signal converter for standard signals
Flow in air pressure

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Proven and reliable concept

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Integral mount design
• Small dimensions, low weight

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

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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)

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

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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**
\[ R_i = 260 \, \Omega \text{ at } 20 \, ^\circ\text{C (68 °F), } T_k + 0.4 \%/K \]

**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**

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<tr>
<th>at supply air pressure</th>
<th>[kg/h]</th>
<th>[Nm³/h]</th>
<th>[scfm]</th>
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<tr>
<td>1.4 bar (20 psi)</td>
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<td>0.024</td>
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<td>2.0 bar (30 psi)</td>
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<td>4.0 bar (60 psi)</td>
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<td>6.0 bar (90 psi)</td>
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<td>0.130</td>
<td>0.076</td>
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<tr>
<td>10.0 bar (150 psi)</td>
<td>0.25</td>
<td>0.205</td>
<td>0.120</td>
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</table>

**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 mm² (14 AWG)

Pneumatic connection
1/8 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 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
1/4 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’

<table>
<thead>
<tr>
<th>Marking</th>
<th>II 2G Ex d IIC T4/T5/T6 Gb</th>
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<tr>
<td>Type Examination Test Certificate</td>
<td>DMT 02 ATEX E 121 X</td>
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<td>Standards</td>
<td>EN 60079-0: 2012 (General requirements)</td>
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<td>EN 60079-1: 2007 (Flameproof enclosure ‘d’)</td>
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<table>
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<tr>
<th>System bus, computer interfaces</th>
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<td>Current</td>
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Pneumatic data

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<tr>
<th>Supply pressure</th>
<th>1.4 to 10 bar (20 to 145 psi)</th>
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</thead>
<tbody>
<tr>
<td>Output signal</td>
<td>0.2 to 1 bar (3 to 15 psi)</td>
</tr>
</tbody>
</table>

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
TÜV 99 ATEX 1487 X

Certificate

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

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<th>Input current</th>
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<td>T4</td>
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<td>-55 to 60 °C</td>
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<td>100 mA</td>
<td>-55 to 85 °C</td>
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<tr>
<td>T4</td>
<td>60 mA</td>
<td>-55 to 40 °C</td>
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<tr>
<td>T6</td>
<td>60 mA</td>
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<tr>
<td>T6</td>
<td>60 mA</td>
<td>-55 to 55 °C</td>
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<tr>
<td>T5</td>
<td>60 mA</td>
<td>-55 to 70 °C</td>
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<td>T4</td>
<td>60 mA</td>
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<td>T4</td>
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<td>T5</td>
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TEIP11 Doc. 901068 and TEIP11-PS Doc. 901068 and TEIP11-PS Doc. 901069

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<td>T5</td>
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<td>-55 to 70 °C</td>
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<td>T4</td>
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<td>T5</td>
<td>100 mA</td>
<td>-55 to 55 °C</td>
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<tr>
<td>T4</td>
<td>100 mA</td>
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<td>T5</td>
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Ex limit values

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<td>2.125 W</td>
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<td>60 mA</td>
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<td>100 mA</td>
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<td>120 mA</td>
<td>28 V</td>
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<td>150 mA</td>
<td>25.5 V</td>
<td>3.825 W</td>
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## 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)

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

Mounting module for OEM applications

Dimensions in mm (in)

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![Diagram showing dimensions](image)

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

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<th>TEIP11 I/P Converter, signal converter for standard signals, without power stage</th>
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* 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 |

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Order code</th>
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<tr>
<td>TEIP11 Cable gland EEx d, brass, M 20 x 1.5 thread</td>
<td>319343</td>
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<tr>
<td>TEIP11 Mounting bracket, stainless steel, for wall mounting</td>
<td>319344</td>
</tr>
<tr>
<td>TEIP11 Mounting bracket, stainless steel, for wall or 2 in pipe mounting</td>
<td>319345</td>
</tr>
</tbody>
</table>
Notes
— 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