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)
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

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.

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.
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
Ri = 260 Ω at 20 °C (68 °F), Tk + 0.4 %/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
<table>
<thead>
<tr>
<th>Air capacity at supply air pressure</th>
<th>[kg/h]</th>
<th>[Nm³/h]</th>
<th>[scfm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4 bar (20 psi)</td>
<td>0.05</td>
<td>0.041</td>
<td>0.024</td>
</tr>
<tr>
<td>2.0 bar (30 psi)</td>
<td>0.07</td>
<td>0.057</td>
<td>0.033</td>
</tr>
<tr>
<td>4.0 bar (60 psi)</td>
<td>0.10</td>
<td>0.082</td>
<td>0.048</td>
</tr>
<tr>
<td>6.0 bar (90 psi)</td>
<td>0.16</td>
<td>0.130</td>
<td>0.076</td>
</tr>
<tr>
<td>10.0 bar (150 psi)</td>
<td>0.25</td>
<td>0.205</td>
<td>0.120</td>
</tr>
</tbody>
</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 ... 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
≤ 1 %

Hysteresis
≤ 0.3 %

Dead band
≤ 0.1 %

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

Power supply
≤ 0.8 % at 1.4 ... 2 bar (20 ... 30 psi)
≤ 0.8 % at 2 ... 3 bar (30 ... 45 psi)
≤ 0.5 % at 3 ... 10 bar (45 ... 150 psi for every 1 bar (15 psi))

Mechanical vibration
≤ 1 % 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 ≤ 0.5 % 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
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) 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

**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)
Ex relevant specifications

Flameproof (enclosure), ATEX "Ex d"

Labeling
Type examination certificate
Type
Device class
Standards

Electrical data
Current

Pneumatic data
Supply pressure
Output signal

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
Type
Type examination certificate
Device class
Standards

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

TEIP11 Doc. 901068 and TEIP11-PS Doc. 901068 and TEIP11-PS Doc. 901069

Explosion protection ratings

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<th>L</th>
<th>U</th>
<th>P</th>
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<tbody>
<tr>
<td>50 mA</td>
<td>42.5 V</td>
<td>2.125 W</td>
</tr>
<tr>
<td>60 mA</td>
<td>38.8 V</td>
<td>2.328 W</td>
</tr>
<tr>
<td>100 mA</td>
<td>30 V</td>
<td>3.0 W</td>
</tr>
<tr>
<td>120 mA</td>
<td>28 V</td>
<td>3.36 W</td>
</tr>
<tr>
<td>150 mA</td>
<td>25.5 V</td>
<td>3.825 W</td>
</tr>
</tbody>
</table>
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-IV/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

Fig. 2: Dimensions in mm (inches)
1 Electrical connections  2 Filter  3 Output  4 Air supply  5 Mounting element for DIN rail mounting
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
Mounting module for OEM applications

Fig. 4: Dimensions in mm (inches)
1 Electrical connections  2 Air supply  3 Output  4 Cable gland
Ordering Information

Main ordering information TEIP11

<table>
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<tr>
<th>Base model</th>
<th>V18312H</th>
<th>X</th>
<th>X</th>
<th>X</th>
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<th>X</th>
<th>0</th>
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<tbody>
<tr>
<td>TEIP11 I/P Converter, signal converter for standard signals, without power stage</td>
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</table>

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 3
- GOST Russia - Ex d 3

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**

### Certificate of Compliance

<table>
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<tr>
<th>Description</th>
<th>Code</th>
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<tr>
<td>Certificate of compliance with the order acc. EN 10204-2.1 (DIN 50049-2.1)</td>
<td>CF2</td>
</tr>
<tr>
<td>Test report 2.2 acc. EN 10204 (DIN 50049-2.2)</td>
<td>CF3</td>
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</tbody>
</table>

### Inspection Certificate

- Inspection certificate 3.1 acc. EN 10204

### Accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEIP11 Cable gland EEx d, brass, M 20 x 1.5 thread</td>
<td>319343</td>
</tr>
<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>

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.
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