

# TEIP11-PS

## 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)

### Additional temperature range

- From -40 (optional -55) ... 85 °C  
(-40 (optional -67) ... 185 °F)

### Ex protection approvals

- ATEX, FM/CSA, GOST for intrinsically safe and Explosion proof operation

### Several different designs

- IP 20 control room housing unit for rail mounting
- IP 20 control room housing unit for block mounting
- IP 54 plastic field housing unit
- IP 65 aluminum or stainless steel housing unit

### Single module

- For OEM application (upon request)

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## 1 Concept

The TEIP11-PS signal converter transforms electrical signals, e.g., 4 ... 20 mA in 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-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 Explosion proof encapsulation are available with international approval certificates for use worldwide.

A variety of signal conversion ranges are available on the input and output sides (see chapter **Technical data**, page 4) For auxiliary power, compressed air at 1.4 bar (20 psi) may be required.

## 2 Designs

### 2.1 Control room housing unit for rail mounting

The control room housing unit for rail mounting is the easiest to use and lowest priced model in the signal converter line. A mounting base that is compatible with virtually all currently available EN rails is used for installation. The housing unit with plastic cap has an IP 20 protection class.

### 2.2 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 connected to the connection blocks required for block mounting. If necessary, 2 or 3 (or max. 4) connection blocks can be connected with 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.

### 2.3 Field housing unit

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 units are suitable for wall mounting and 2"-pipe installation.

A specially designed signal converter in plastic housing unit supports the use of combustible gas for auxiliary power instead of the standard compressed air.

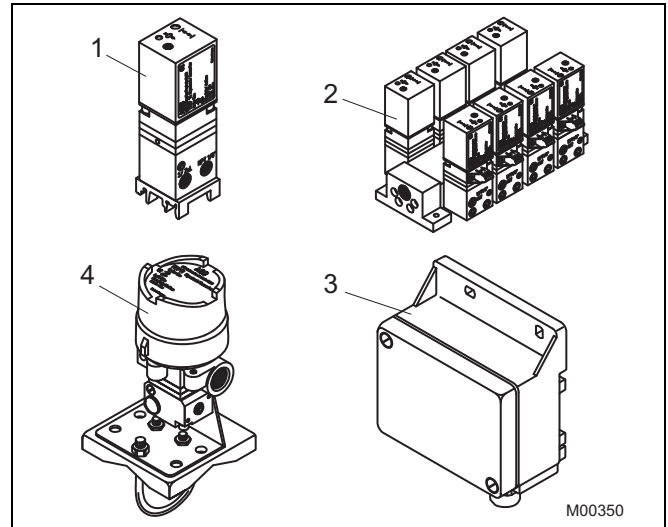


Fig. 1

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

### 3 Technical data

#### 3.1 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 (see specifications "Explosion protection" for Ex devices)

##### Capacitance/Inductance

negligible

#### 3.2 Output (pneumatic)

##### Signal range

0.2 ... 1 bar (3 ... 15 psi)

##### Air capacity

≥kg/h = 4.1 Nm<sup>3</sup>/h = 2.4 scfm

##### Load power acc. to VDE / VDI 3520

≥ 0.95 kg/h = 0.9 Nm<sup>3</sup>/h = 0.5 scfm

#### 3.3 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 ± 0.1 bar (20 ± 1.5 psi) (with output 1 bar (15 psi))

##### Air consumption

≤ 0.2 kg/h = 0.16 Nm<sup>3</sup>/h = 0.1 scfm

#### 3.4 Transmission data and influences

##### Characteristic

linear, direct or reverse action

##### Deviation:

≤ 0,5 %

##### 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

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

##### Mechanical vibration

≤ 1% to 10 g and 20 ... 80 Hz

##### Seismic vibration

Meets 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 ... 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

#### 3.5 Operating conditions at installation site

##### Ambient temp.

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)

##### Required protection

IP 20 For control room housing unit for rail or block mounting

IP 54 For plastic housing

IP 65 For aluminum or stainless steel field housing unit

##### Installation position

any

### 3.6 Environmental capabilities

#### Climate class

GPF or FPF acc. to DIN 40040

Temperature	-55 ... 85 °C (-67 ... 185 °F)
	-45 ... 85 °C (-49 ... 185 °F)
	for operation, storage or transport
Relative humidity	75 % mean, 95 % short-term
	no condensation

### 3.7 Explosion protection

#### Explosion protection

ATEX / GOST Russia / GOST Ukraine, intrinsically safe (all designs)

2G EEx ia IIC /T4/T5/T6 TÜV 1487x (for the control room housing and field housing unit)

ATEX / GOST Russia / GOST Ukraine, flameproof (metal field housing only)

EEx d IIC T4/T5/T6

#### Thermal specifications for explosion protection class Ex ia

(doc no. 901068 or doc no. 901069)

The following limit values for the temperature classes must be observed for the intrinsically safe versions:

Temperature class	Input current	Ambient temp.
T6	50 mA	-55 ... 60 °C (-67 ... 140 °F)
T6	60 mA	-55 ... 55 °C (-67 ... 131 °F)
T5	60 mA	-55 ... 70 °C (-67 ... 158 °F)
T4	60 mA	-55 ... 85 °C (-67 ... 185 °F)
T5	100 mA	-55 ... 55 °C (-67 ... 131 °F)
T4	100 mA	-55 ... 85 °C (-67 ... 185 °F)
T5	120 mA	-55 ... 45 °C (-67 ... 113 °F)
T4	120 mA	-55 ... 80 °C (-67 ... 176 °F)
T4	150 mA	-55 ... 70 °C (-67 ... 158 °F)

#### Thermal specifications for explosion protection class Ex d

The following limit values for the temperature classes must be observed for Ex d versions (doc. no. 900771):

Temperature class	Input current	Ambient temp.
T6	50 mA	-40 ... 55 °C (-40 ... 131 °F)
T5	50 mA	-40 ... 70 °C (-40 ... 158 °F)
T4	40 mA	-40 ... 85 °C (-40 ... 185 °F)

#### FM "intrinsically safe" (not for metal field housing units)

I.S.: CL I / Div 1 / Grp A B C D

N.I.: CL I / Div 2 / Grp A B C D

#### FM "intrinsically safe" (for metal field housing units only)

I.S.: CL I-II-II / Div 1 / Grp A B C D E F G

N.I.: CL I / Div 2 / Grp A B C

S.: CL II / Div 2 / Grp G

S.: CL III / Div 2

#### FM "explosion proof" (for metal field housing units only)

X.P.: CL I / Div 1 / Grp A B C D

D.I.P.: CL II III / Div 2 / Grp E F G

#### 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" (for metal field housing units only)

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

#### CSA "explosion proof" (for metal field housing units only)

IX.P.: CL I / Div 1 / Grp B C D

CL II / Div 2 / Grp E F G

#### Gost

#### Explosion protection requirements

ATEX EEx ia or EEx d

FM/CSA intrinsically safe

FM/CSA explosion proof

GOST EEx ia or EEx d (Russia / Ukraine)

Other explosion protection certificates on request

### 3.8 Design for rail mounting

#### Material/protection

Housing IP 20

aluminum with plastic cap

#### Mounting

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 mm<sup>2</sup> (14 AWG)

#### Pneumatic connection

two 1/8 NPT threads for air supply and output

#### Weight

0,25 kg (0.55 lb)

#### Dimensions

Refer to dimensioned drawings

### 3.9 Design for block mounting

**Material/protection**

Housing IP 20  
aluminum with plastic cap

**Mounting**

In block format with special connection block (accessory),  
max. 4 connection blocks each with 4 converters

**Electrical connection**

2-pole screw terminal for 2.5 mm<sup>2</sup> (14 AWG)

**Pneumatic connection**

3/8 NPT threads for air supply  
(main connection to connection block)  
1/8 NPT threads for output  
(on each individual signal converter)

**Installation position**

any

**Weight**

0,3 kg (0.66 lb)

**Dimensions**

Refer to dimensioned drawings

### 3.10 Design for field-mount housing (plastic)

**Material/protection**

Housing, polyester, black, IP 54

**Mounting**

Wall mount or 2" pipe installation  
(2" pipe installation for vertical pipes only)

**Electrical connection**

2-pole screw terminal for 2.5 mm<sup>2</sup> (14 AWG) in housing,  
Cable gland Pg 11 for cable entry

**Pneumatic connection**

two 1/8 NPT threads for air supply and output

**Air outlet**

For gas exhaust with 6 mm (0.24 inch) cut or crimp connection

**Installation position**

any

**Weight**

1,0 kg (2.20 lb)

**Dimensions**

Refer to dimensioned drawings

### 3.11 Design for field-mount housing (aluminum / stainless steel)

**Material/protection**

Aluminum or stainless steel housing IP 65

**Surface**

Aluminum housing  
painted with dual component coating  
Lower section, black, RAL 9005  
Screw-on cap Pantone 420

Stainless steel housing  
electrolytically polished

**Mounting**

Wall mount or 2" pipe installation  
With stainless steel mounting bracket (accessory)

**Electrical connection**

2-pole screw terminal for 2.5 mm<sup>2</sup> (14 AWG) in housing,  
Cable gland NPT 1/2" for cable entry

for ATEX intrinsically safe

Threads M20 x 1.5 for cable entry

for ATEX EEx d:

(on request cable gland with Ex d certificate as accessory)

Cable entry NPT 1/2" for cable entry with FM/CSA

**Pneumatic connection**

1/4" NPT threads for air supply and output

**Weight**

0.62 kg (1.37 lb) with aluminum housing

1.20 kg (2.65 lb) with stainless steel housing

**Dimensions**

Refer to dimensioned drawings

### 3.12 Accessories

**Cable gland EEx d**

brass, with M20 x 1.5 threads

**Mounting angle of stainless steel for wall or 2" pipe installation**

for aluminum or stainless steel field housing unit

**Material for block mounting**

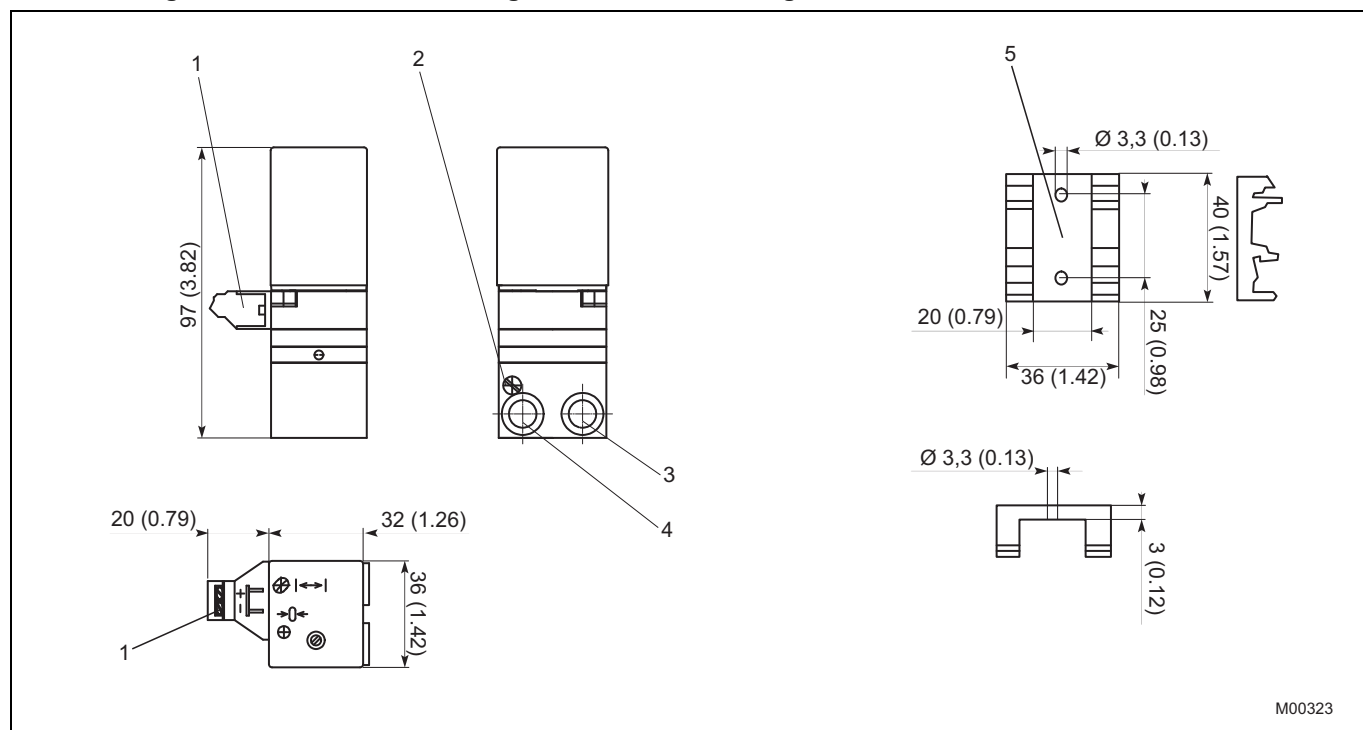
Connection block for 4 converters

Dummy panel with central air connector 3/8 NPT

Dummy panel

### 3.13 Dimensioned drawings

#### 3.13.1 Design for control room housing unit for rail mounting



M00323

Fig. 2: Dimensions in mm (inch)

- 1 Electrical connections
- 2 Filter
- 3 Output

- 4 Supply air
- 5 Mounting bracket for DIN rails

3.13.2 Control room housing unit for block mounting

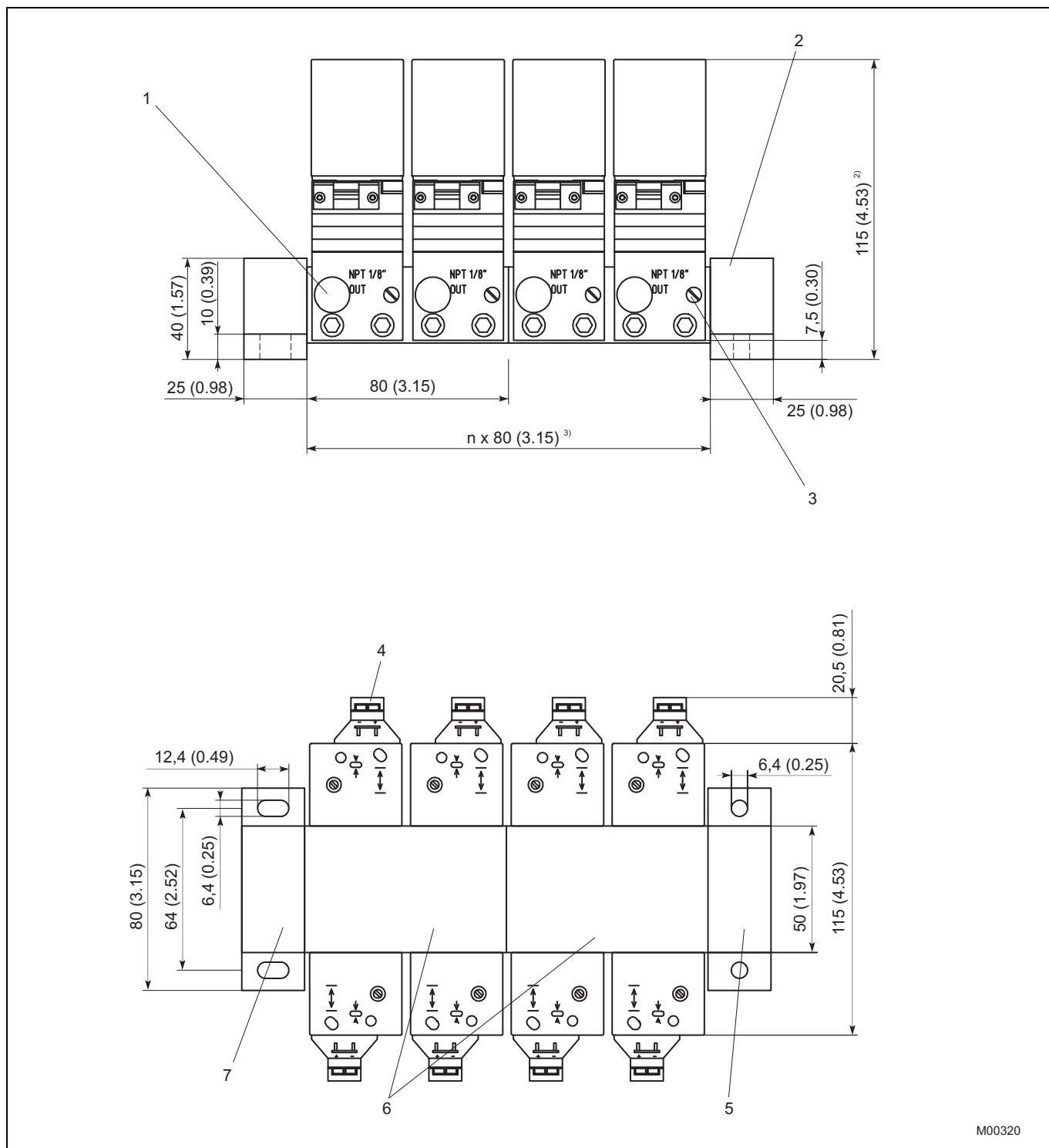


Fig. 3: Dimensions in mm (inch)

- |                          |                                    |
|--------------------------|------------------------------------|
| 1 Output                 | 5 Panel with central air connector |
| 2 Supply air             | 6 Mounting block                   |
| 3 Filter                 | 7 Dummy panel                      |
| 4 Electrical connections |                                    |

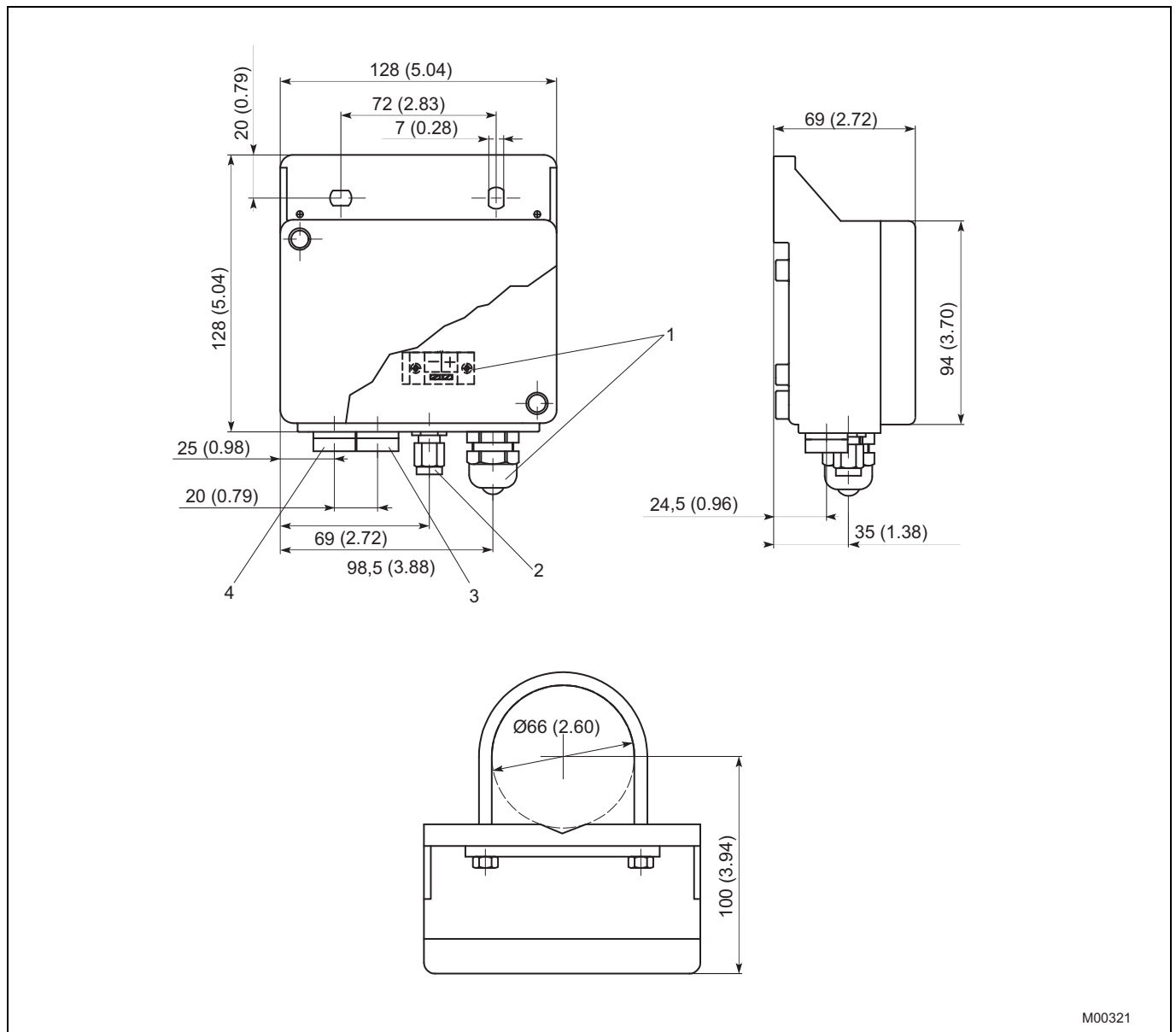
<sup>1)</sup> Design 0.2 ... 1 bar (2.90 ... 14.50 psi)

<sup>2)</sup> Design 0.4 ... 1 bar (5.80 ... 14.50 psi)

<sup>3)</sup> Length 80 mm (3.15 inch) for each mounting block



3.13.3 Design for field-mount housing (plastic)

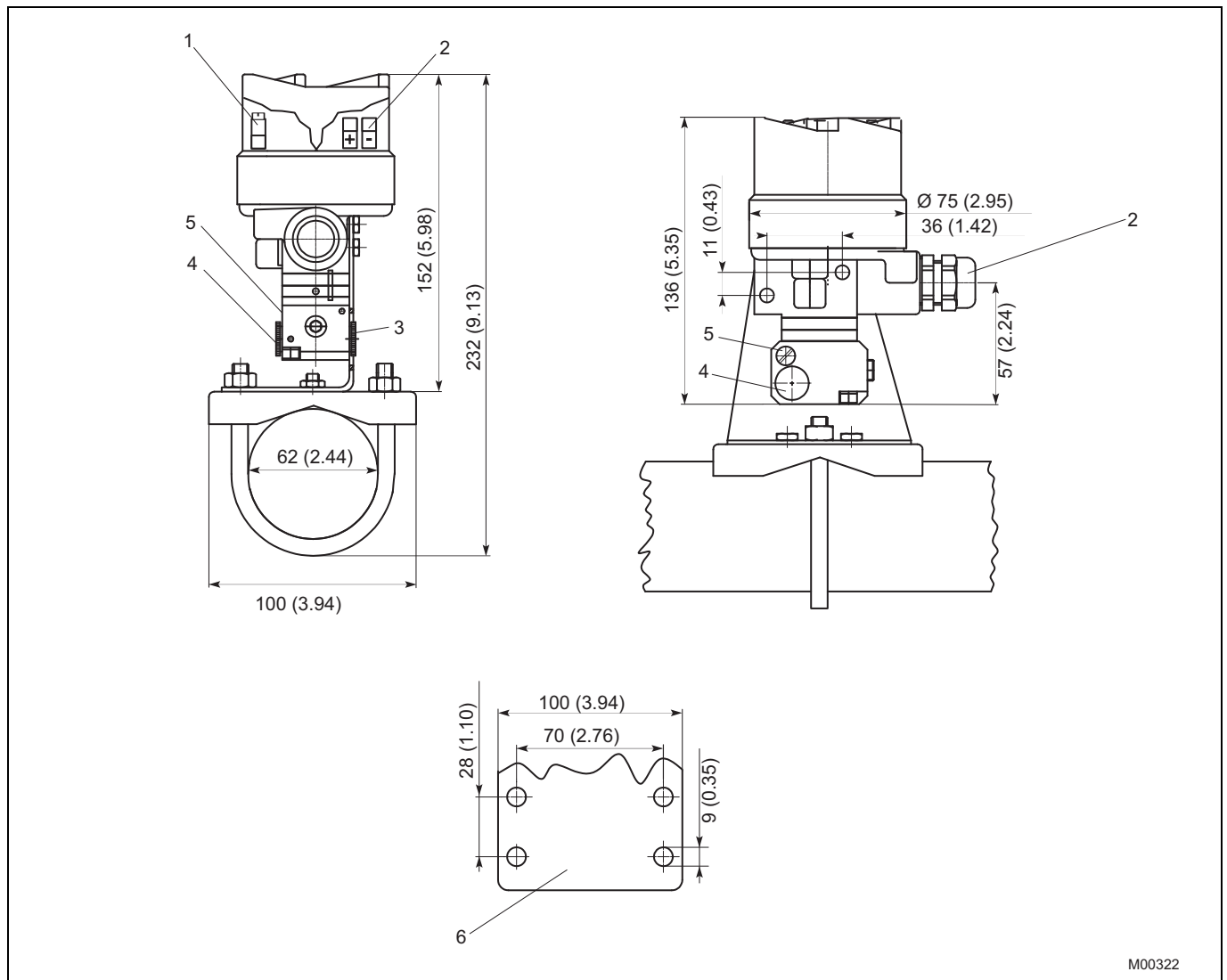


M00321

Fig. 4: Dimensions in mm (inch)

- 1 Electrical connections
- 2 Connection only with design for operation with combustible gas for diverting the escaping gas / 6 mm (0.24) screw terminal connection
- 3 Supply air
- 4 Output

**3.13.4 Aluminum or stainless steel field-mount housing unit**



M00322

Fig. 5: Dimensions in mm (inch)

- |   |                        |   |                                  |
|---|------------------------|---|----------------------------------|
| 1 | Ground terminals       | 4 | Supply air                       |
| 2 | Electrical connections | 5 | Filter                           |
| 3 | Output                 | 6 | Profiled sheet for wall mounting |

## 4 Ordering information

I/P Converter TEIP11-PS	Variant digit No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Code				
	Catalog No.	V18311H-																			
<b>Explosion protection</b>																					
without explosion protection																					
ATEX EEx ia IIC																					
ATEX EEx d IIC		1)																			
FM/CSA "intrinsically safe"		2)																			
FM/CSA "intrinsically safe" and "explosion proof"		1)																			
<b>Design</b>																					
Control room housing IP 20 for rail mounting																					
Control room housing IP 20 for block mounting																					
Field housing Polyester, IP 54																					
Aluminium, IP 65																					
Stainless steel, IP 65																					
<b>Input signal</b>																					
Input signal 0 ... 20 mA																					
Input signal 4 ... 20 mA																					
Other input signal																					
<b>Output signal</b>																					
Output signal 0.2 ... 1 bar																					
Output signal 3 ... 15 psi																					
Other output signal																					
<b>Characteristic</b>																					
Direct-action																					
Reverse-action																					
<b>Ambient temperature</b>																					
-40 ... + 85 °C																					
-55 ... + 85 °C																					

### 4.1 Additional ordering information

	Code			
<b>Certificate of compliance</b>				
Certificate of compliance with the order acc. to EN 10204-2.1 (DIN 50049-2.1)	CF1			
Certificate of compliance with the order acc. to EN 10204-2.1 (DIN 50049-2.1) with item description	CF2			
Test Report acc. to EN 10204-2.2 (DIN 50049-2.2)	CF3			
<b>Inspection certificate</b>				
Inspection certificate 3.1 acc. to EN 10204 with max. deviation	CBA			
<b>Device identification label</b>				
includes lettering (plain text, max. 16 letters)				
stainless steel 18.5 x 65 mm	MK1			
sticker 11 x 25 mm	MK3			
<b>Operation with inflammable gas</b>	4)	480		
<b>Input signal</b>				
4 ... 12 mA		503		
12...20 mA		504		
Other input signals on request				
<b>Output signal</b>				
0.4 ... 2 bar		508		
6 ... 30 psi		509		
Other output signals on request				

- 1) only with aluminium or stainless steel field housing  
 2) not with field housing  
 3) not with explosion protection Exd (4) or FM / CSA explosion proof (7)  
 4) only for signal converter EEx ia IIC with polyester field housing

**4.2 Order information, accessories**

TEIP11-PS	Catalog No.	Code			
Cable gland EEx d, brass, M 20x1.5 thread	319343				
Mounting bracket, stainless steel for wall mounting	319344				
for wall or 2" pipe mounting	319345				
(for mounting the aluminium or stainless steel field housing)					
Parts for block mounting					
Connection block for 4 converters 4)	7958243				
Termination block with central supply air connection 3/8 NPT	7958251				
Termination block without connection	7958245				

**4.3 Order information, ball bearing designs**

				Catalog No.	Code			
<b>I/P Converter TEIP11-PS</b>								
Control room housing IP 20 for rail mounting								
Explosion protection		Input	Output					
without		0 ... 20 mA	0.2 ... 1 bar	V18311H - 1111101				
			3 ... 15 psi	V18311H - 1112101				
		4 ... 20 mA	0.2 ... 1 bar	V18311H - 1121101				
			3 ... 15 psi	V18311H - 1122101				
ATEX EEx ia IIC		0 ... 20 mA	0.2 ... 1 bar	V18311H - 3111101				
			3 ... 15 psi	V18311H - 3112101				
		4 ... 20 mA	0.2 ... 1 bar	V18311H - 3121101				
Field housing								
Explosion protection	Material	Input	Output					
without	Polyester	4 ... 20 mA	0.2 ... 1 bar	V18311H - 1621101				
			3 ... 15 psi	V18311H - 1622101				
	Aluminium	4 ... 20 mA	0.2 ... 1 bar	V18311H - 1821101				
			3 ... 15 psi	V18311H - 1822101				
ATEX EEx ia IIC	Polyester	4 ... 20 mA	0.2 ... 1 bar	V18311H - 3621101				
			3 ... 15 psi	V18311H - 3622101				
	Aluminium	4 ... 20 mA	0.2 ... 1 bar	V18311H - 3821101				
			3 ... 15 psi	V18311H - 3822101				
	Stainless steel	4 ... 20 mA	0.2 ... 1 bar	V18311H - 3921101				
ATEX EEx d IIC	Aluminium	4 ... 20 mA	0.2 ... 1 bar	V18311H - 4821101				
			3 ... 15 psi	V18311H - 4822101				
	Stainless steel	4 ... 20 mA	0.2 ... 1 bar	V18311H - 4921101				

4) up to 4 connection blocks can be fitted together to block units carrying 4-8-12-16 converters







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