

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

Current 0 ... 20 mA / 4 ... 20 mA  
in air pressure 0.2 ... 1 kg/cm<sup>2</sup> (3 ... 15 psi)

- **Proven and reliable concept**
- **Compact design**
  - Small dimensions, light 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 kg/cm<sup>2</sup> (3... 15 psi)
- **High air capacity**
- **Complies with the following directives**
  - EMC Directive 89/336/EEC as of May 1989
- **Additional temperature range**
  - from -40 ... 85 °C
- **Ex protection approvals for use worldwide**
  - Intrinsically safe and  
Explosion proof operation
- **Several different designs**
  - IP 20 control room housing unit for rail 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 kg/cm<sup>2</sup> (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 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.

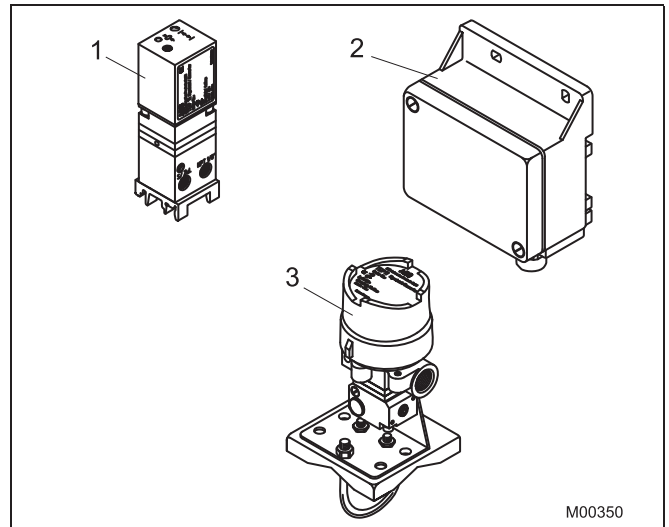


Fig. 1

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

### 3 Technical data

#### 3.1 Input (electrical)

##### 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

R<sub>i</sub> = 260 Ω at 20 °C (68 °F), T<sub>k</sub> + 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 kg/cm<sup>2</sup> (3 ... 15 psi)

##### Air capacity

≥ 5 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)

##### Power supply

≤ 0.3% / 0.1 kg/cm<sup>2</sup> (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.

-40 ... 85 °C (-40 ... 185 °F)

##### Required protection

IP 20 For control room housing unit for rail 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	-45 ... 85 °C (-49 ... 185 °F) for operation, storage or transport
Relative humidity	75 % mean, 95 % short-term no condensation

#### CIMFR FORMERLY (CMRI)

EEx d IIC  
 EEx ib IIC

Other explosion protection certificates on request

### 3.7 Explosion protection

Intrinsically safe (all designs)

2G EEx ib IIC /T4/T5/T6

Flameproof (metal field housing only)

EEx d IIC T4/T5/T6

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	-40... 60 °C (-40 ... 140 °F)
T6	60 mA	-40 ... 55 °C (-40 ... 131 °F)
T5	60 mA	-40 ... 70 °C (-40 ... 158 °F)
T4	60 mA	-40 ... 85 °C (-40 ... 185 °F)
T5	100 mA	-40 ... 55 °C (-40 ... 131 °F)
T4	100 mA	-40 ... 85 °C (-40 ... 185 °F)
T5	120 mA	-40 ... 45 °C (-40 ... 113 °F)
T4	120 mA	-40 ... 80 °C (-40 ... 176 °F)
T4	150 mA	-40 ... 70 °C (-40 ... 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

### 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 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

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

#### Material/protection

Aluminum or stainless steel housing IP 65

#### Surface

Aluminum housing (epoxy)  
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  
Stainless steel mounting bracket (CS Standard Optional)

#### 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 intrinsically safe  
Threads M20 x 1.5 for cable entry

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

#### 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

### 3.11 Accessories

#### Cable gland EEx d

brass, with M20 x 1.5 threads

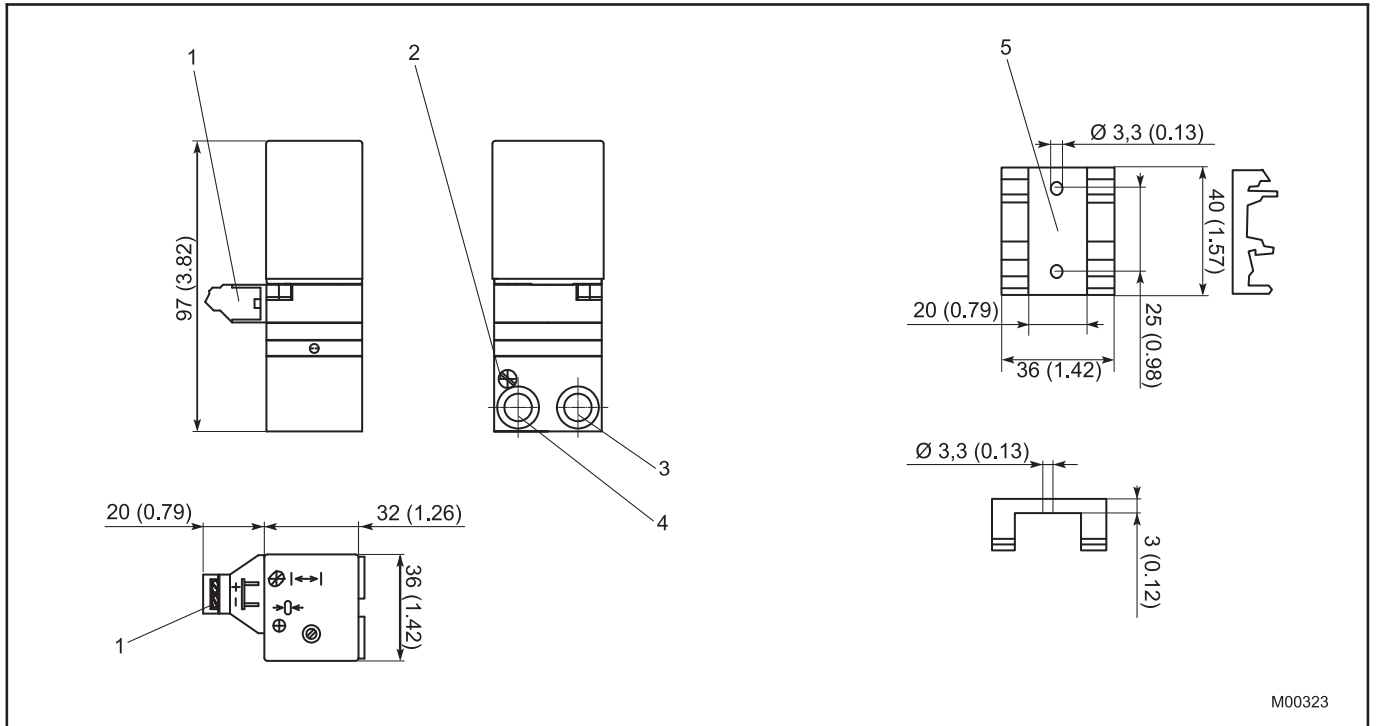
#### Mounting bracket of carbon steel or stainless steel

for aluminum or stainless steel field housing unit

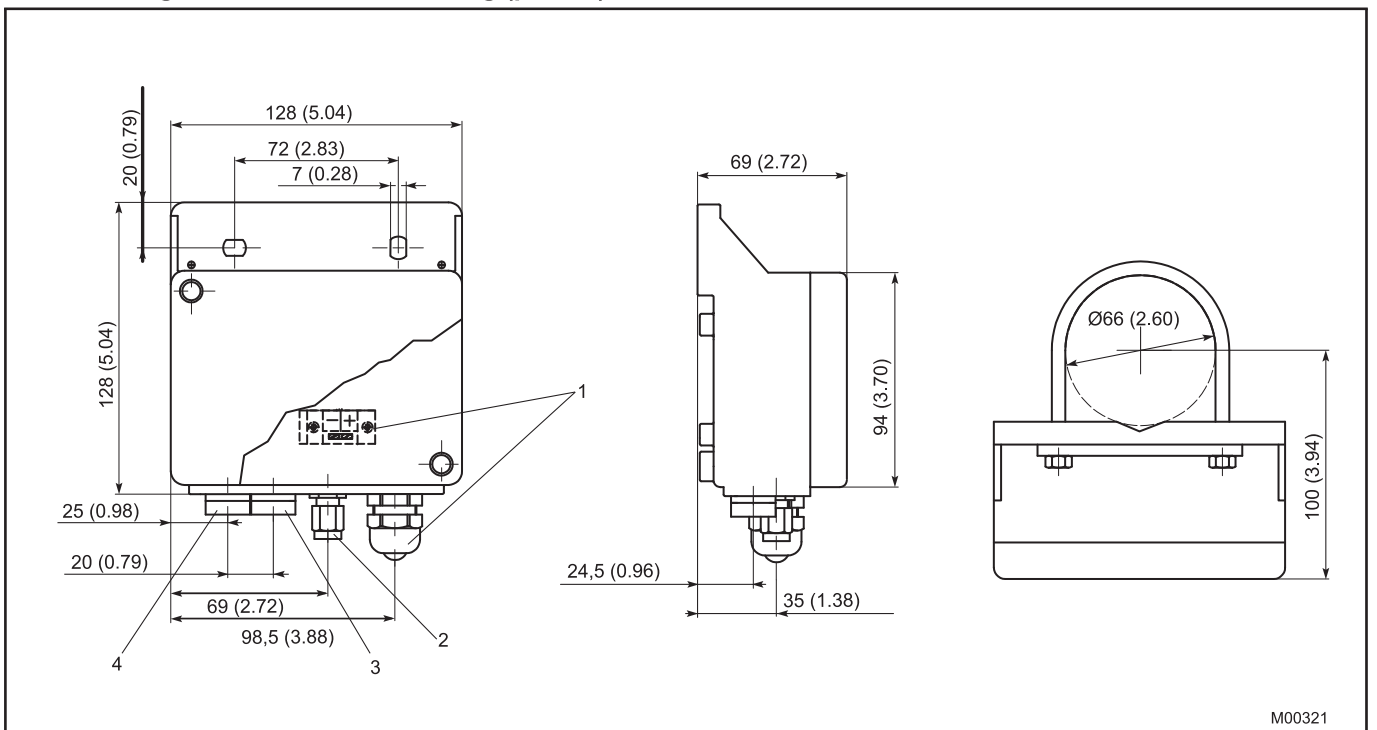
Air supply filter regulator Metal body

### 3.12 Dimensioned drawings

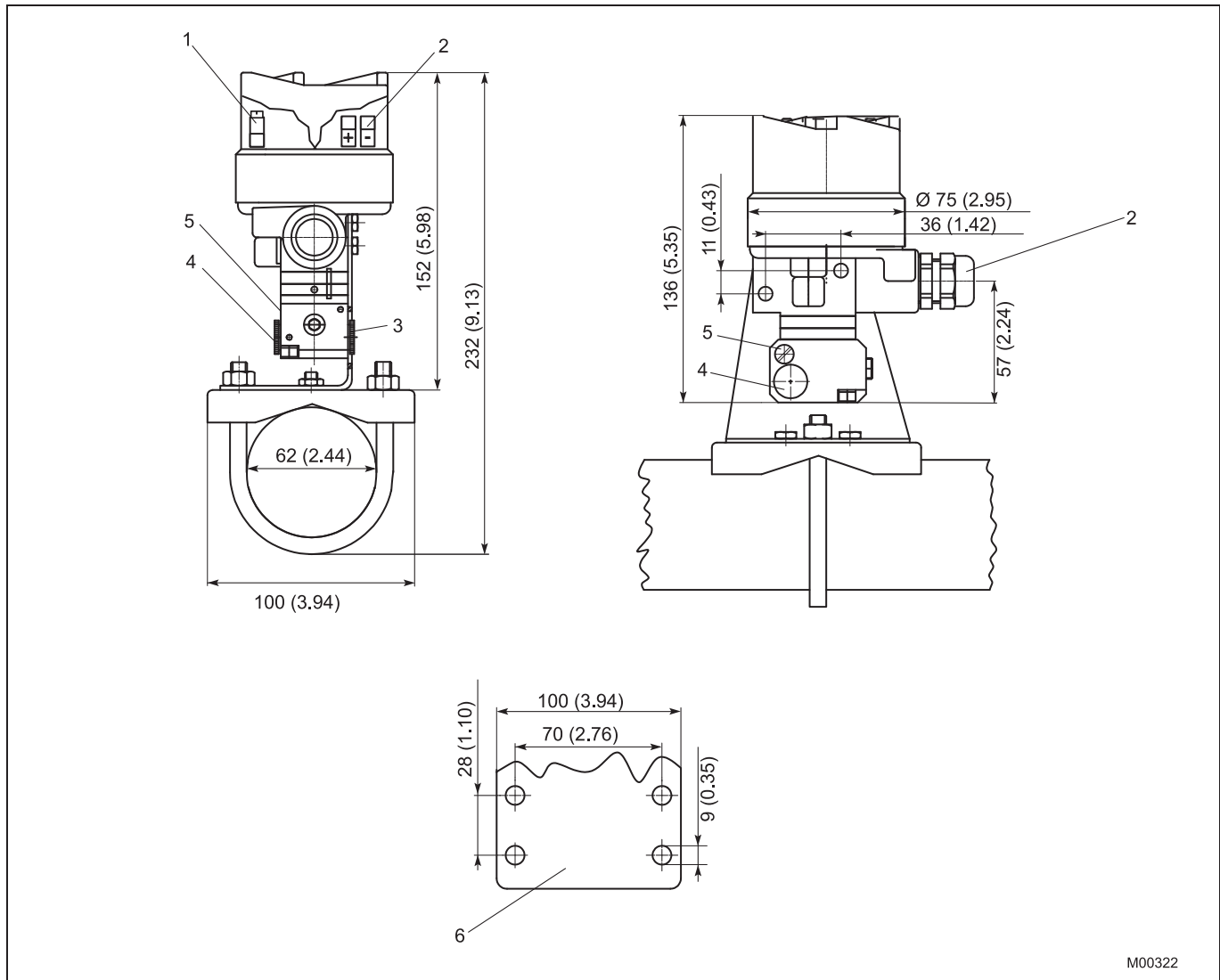
#### 3.12.1 Design for control room housing unit for rail mounting



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



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



M00322

Fig. 5: Dimensions in mm (inch)

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



#### 4 Ordering information

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

#### 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 with calibration results	CF3			
<b>Device identification label</b>				
stainless steel 18.5 x 65 mm	MK1			
<b>Operation with inflammable gas</b> 3)				
	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 kg/cm <sup>2</sup>	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) only for signal converter EEx ia IIC with polyester field housing

#### 4.2 Order information, accessories (Optional)

TEIP11-PS	Catalog No.	Code			
Cable gland EEx d, brass, M 20x1.5 thread	319343				
Mounting bracket, stainless steel for wall mounting	319345				
Carbon Steel for wall or 2" pipe mounting (for mounting the aluminium or stainless steel field housing)	7959350				
Air supply filter regulator	1004FA02215B				

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Printed in India (02.2008)

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