DATA SHEET

T 6111 EN

Type 6111 i/p Converter

Electropneumatic Converter for Direct Current Signals

CE Ex certified

Application

Conversion of a DC signal into a pneumatic output signal for measuring and control tasks

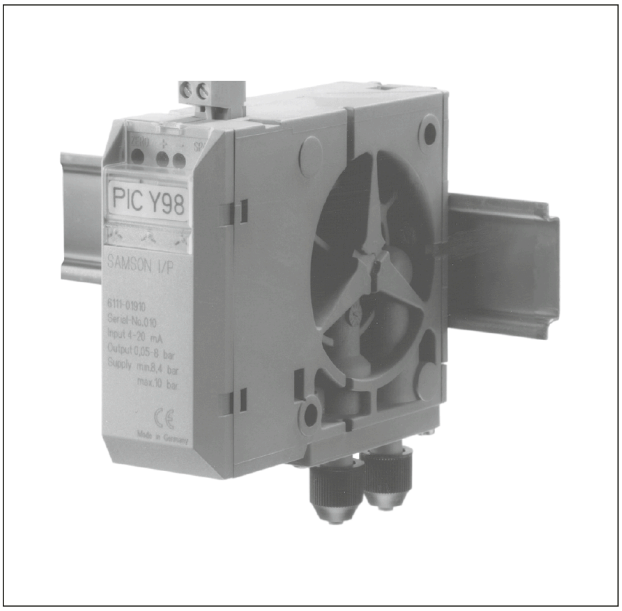


Fig. 1: *Type 6111, rail-mounting unit*

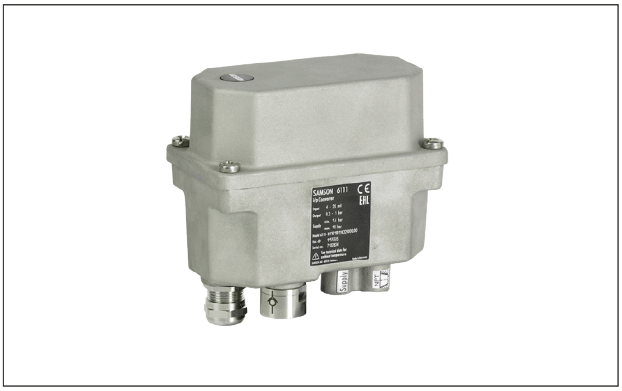


Fig. 2: *Type 6111, field unit for offshore applications*

The converter can be used as an intermediate element between electric measuring devices and pneumatic controllers or between electric control devices and pneumatic control valves. It is suitable for all kinds of industrial applications in the field of process engineering.

Special features

- Wide selection of measuring ranges
- High output pressure
- Easy replacement of i/p module
- Zero reset at specific mA value when switch-off electronics function is activated (function can be activated as required)
- Operation possible without an upstream pressure regulator
- Version designed as rail-mounting unit with plastic housing or as field unit for offshore applications in a stainless steel housing
- Supply air manifold for rail-mounting units available as accessories for 3, 4, 5 and 6 converter units (see Fig. 1)

Versions

- As a rail-mounting unit, mounted on a top-hat rail
- As a field unit for offshore applications, mounted using a bracket

Options (on request)

- 0/2 to 10 V input signal with Type 6151 module
- Electrical connection with male angle connector according to DIN EN 175301-803 A
- AS-Interface connection over Type 6150 module
- Initial pressure of 0.0 bar possible
- Special versions on request

Principle of operation

⇨ See Fig. 3.

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Edition May 2026

The converter accepts a load-independent 4 to 20 mA direct current input signal. This input signal is converted proportionally into a pneumatic output signal. Wide output pressure ranges can be selected by installing various converter modules (see "Technical data"). The maximum output pressure that can be achieved is 8 bar.

The supply air (SUPPLY 9) flows to the bottom chamber of the volume booster (8). A certain amount of air determined by the diaphragm position flows past the sleeve (8.5) and leaves through the output (OUTPUT 36).

The output signal p_A is used also to supply the nozzle (7). The offset spring (8.2) ensures that the output signal is at least 100 mbar even at an input signal of 0 mA.

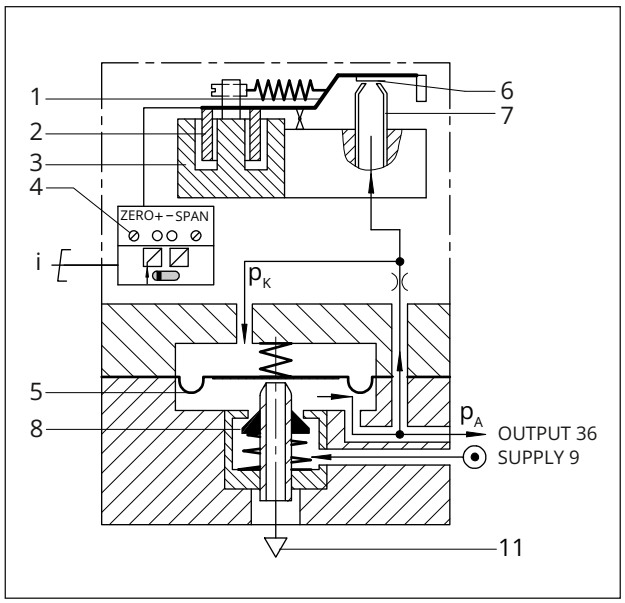


Fig. 3: *Type 6111 · Functional drawing*

1 Balance beam
2 Plunger coil
3 Permanent magnet
4 Zero point and span adjusters (not in version without electronics)
5 Diaphragm
6 Flapper plate
7 Nozzle
8 Sleeve
p_A Output pressure
p_K Backpressure



Fig. 4: *Supply air manifold for Type 6111*

Mounting

- **Rail-mounting unit** for mounting on a top-hat rail according to DIN EN 60714, 35 mm wide
  - Wall mounting possible, using holes with Ø5.5 mm
  - Pneumatic connections (supply air and output): Hose connection suitable for hose (4 mm inside diameter and 6 mm outside diameter) as standard; also available with ⅛ NPT, G ⅛ or M5 female thread
  - Mounting on supply air manifold possible
  - Electrical connection: Plug-in two-pole terminal for wires between 0.5 and 2.5 mm²

- **Field unit** for offshore applications, mounting using a bracket
  - Mounting bracket (stainless steel), order no. 1400-7432 (included in scope of delivery)
  - Pneumatic connections: ¼ NPT
  - Cable entry: M20x1.5

Electrical connection

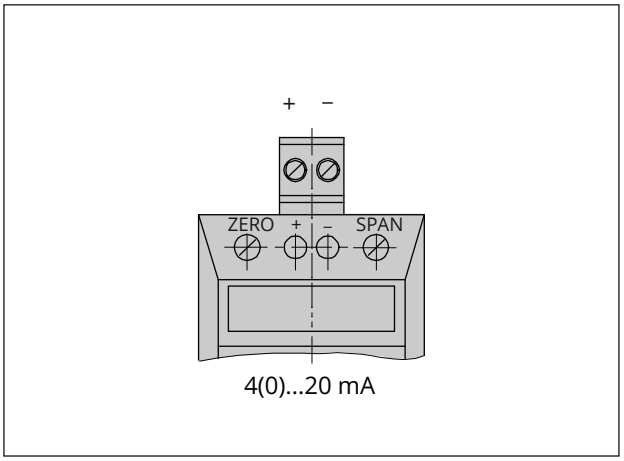
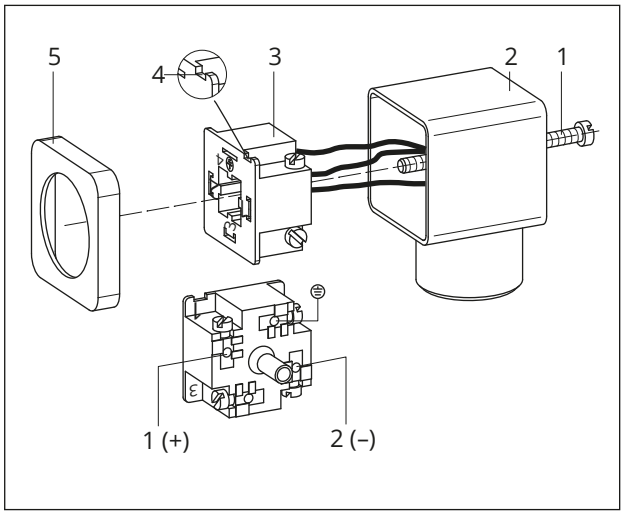


Fig. 5: *Terminal connection (input signal · Type 6111)*

Option with male angle connector

The i/p converter can also be connected using a male angle connector (DIN EN 175301-803).



1 Fastening screw
2 Plug connector case
3 Insert
4 Recess
5 Rubber seal

This male angle connector allows an i/p converter to be easily changed into an u/p converter or an AS-Interface-compatible i/p converter.

⇨ See ▶ T 6150 and ▶ T 6151.

Technical data

Table 1: *Technical data*

Type 6111		**Rail-mounting unit**	**Field unit**
Input		4 to 20 mA (0 to 20 mA on request) · For split-range: 4 to 12 mA or 12 to 20 mA · Other signals on request	
Load	Standard Explosion-protected version Without switch-off electronics	≤6 V (corresponding to 300 Ω at 20 mA) 7 V (corresponding to 350 Ω at 20 mA) ≤4 V (corresponding to 200 Ω at 20 mA)	
Output	Standard range	0.2 to 1 bar (3 to 15 psi) 0.4 to 2 bar (6 to 30 psi)	
	With Type 6112 i/p Module	Special ranges adjustable according to customer specifications	
		Initial value [2]	**Span** Δp
	Module A Module B Module C Module D Module E Module F Module G Module H	0.1 to 0.4 bar 0.1 to 0.4 bar 0.1 to 0.4 bar 0.1 to 0.8 bar 0.1 to 0.8 bar 0.1 to 0.8 bar 0.1 to 1.2 bar 0.1 to 1.2 bar	0.75 to 1.0 bar 1.0 to 1.35 bar 1.35 to 1.81 bar 1.81 to 2.44 bar 2.44 to 3.28 bar 3.28 to 4.42 bar 4.42 to 5.94 bar 5.94 to 8.0 bar[1]
	Max. air output capacity [3]	2.0 m^3/h with an output of 0.6 bar (0.2 to 1.0 bar) 2.5 m^3/h with an output of 1.2 bar (0.4 to 2.0 bar) 8.5 m^3/h with an output of 5.0 bar (0.1 to 8.0 bar)	
Supply air		Minimum 0.4 bar above the upper signal pressure range value, max. 10 bar without supply pressure regulator	
	Air quality acc. to ISO 8573-1	Max. particle size and density: Class 4 · Oil content: Class 3 · Pressure dew point: Class 3 or at least 10 K below the lowest ambient temperature to be expected	
	Air consumption	0.08 m_n^3/h with 1.4 bar 0.1 m_n^3/h with 2.4 bar max. 0.26 m_n^3/h at 10 bar	
Characteristic		Characteristic: Output linear to input	
	Hysteresis	≤0.3 % of upper range value	
	Deviation from terminal-based conformity	≤1 % of upper range value (for upper range values ≤5 bar); more exact values on request ≤1.5 % of upper range value (for upper range values >5 bar)	
	Influence in % of upper range value	Supply air: 0.1 %/0.1 bar	
		Alternating load, supply air failure, interruption of the input current: <0.3 %	
		Ambient temperature: lower range value <0.03 %/K, span <0.03 %/K	
Dynamic response		At an output of 0.2 to 1 bar	
	Limiting frequency	5.3 Hz	
	Phase shift	-130°	
Variable position		Max. 3.5 % depending on mounting position: e.g. ±1 % when mounted horizontally	
Ambient conditions, degree of protection			
	Storage temperature range	-40 to +70 °C	
	Ambient temperature range	-20 to +70 °C	
	Degree of protection	IP20	IP65
Materials			
	Housing	Glass-fiber-reinforced polyamide	Stainless steel 1.4581 Mounting bracket 1.4301
Weight			
		0.35 kg	1.9 kg
EMC		According to EN 61000-6-2, EN 61000-6-3 and EN 61326-1	

Type 6111	Rail-mounting unit	Field unit
RoHS compliance	According to EN 50081-1 and EN 50081-2	
Conformity	CE	

[1] The max. possible output pressure is 8 bar.

[2] Lower range value raised up to max. 3.0 bar (special version)

[3] Measured with 2 m hose with 4 mm inside diameter

Dimensions

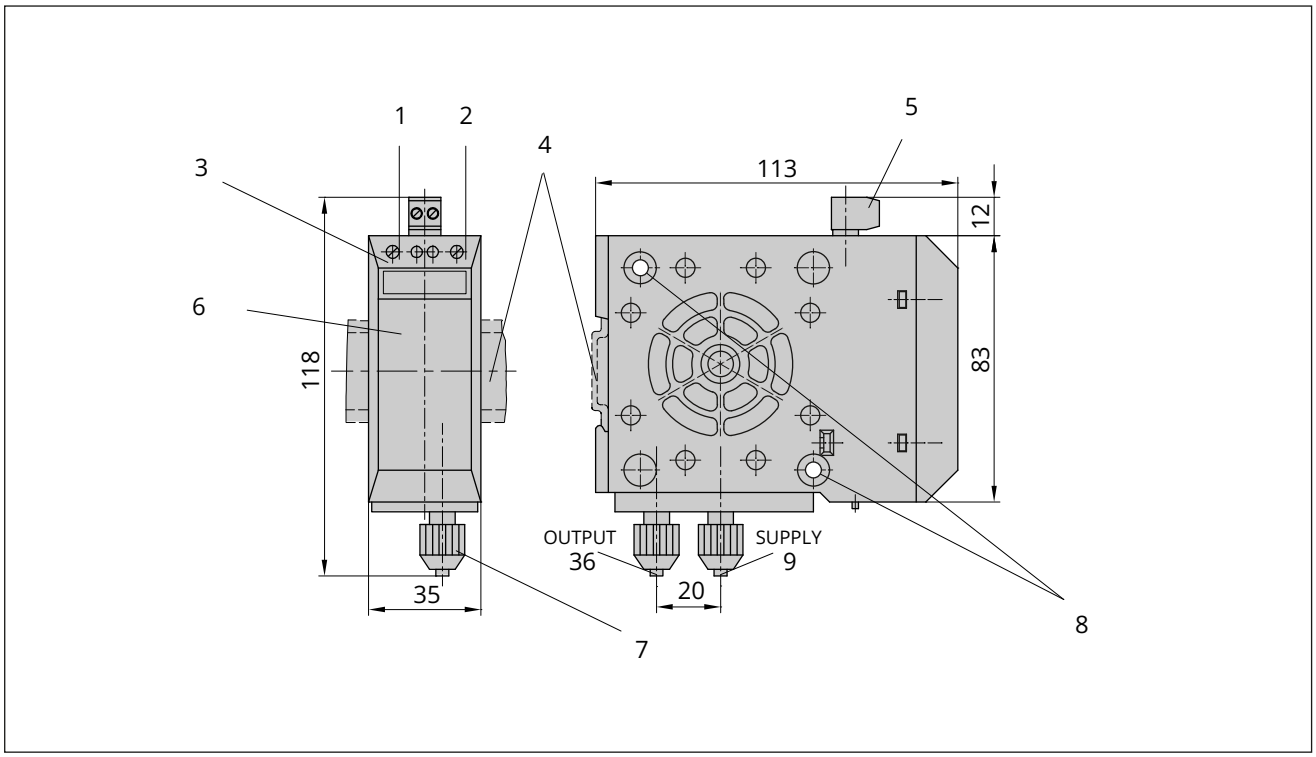


Fig. 6: *Dimensions in mm · Type 6111 as rail-mounting unit*

1 Zero adjuster
2 Span adjuster
3 Plastic cover
4 Top-hat rail
5 Terminals (electric)
6 Label
7 Pneumatic connections for hose with 4 mm inside diameter and 6 mm outside diameter
8 Ø5.5 mm holes for wall mounting

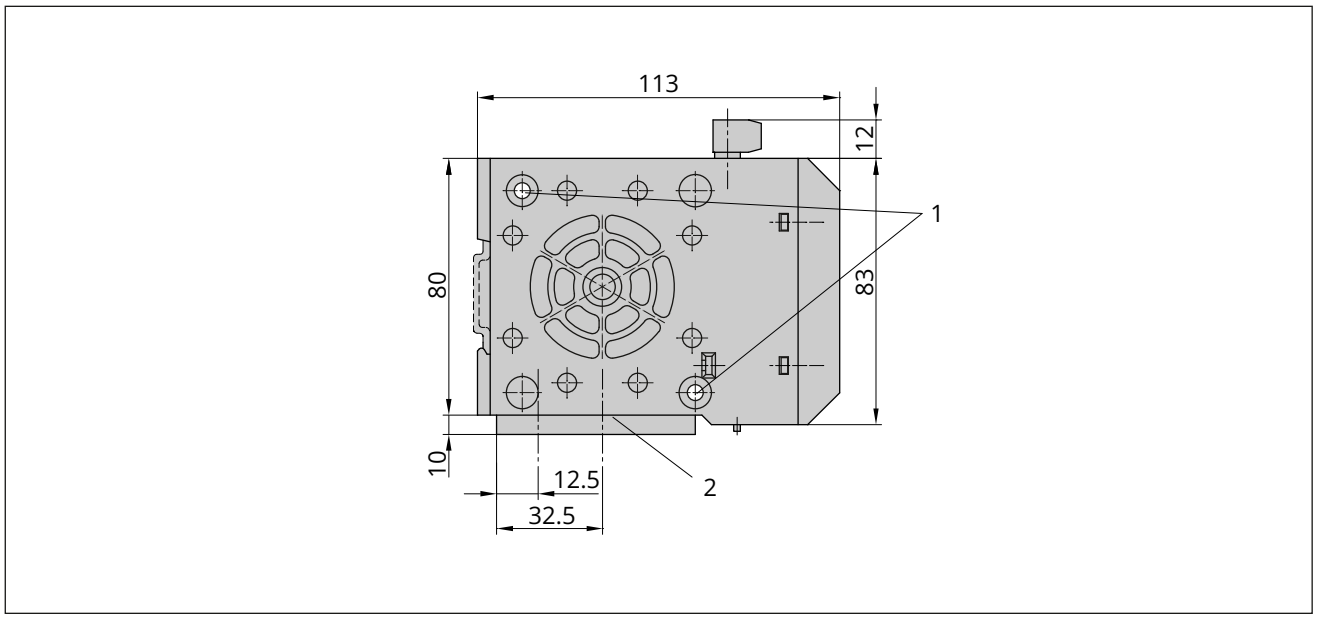


Fig. 7: *Dimensions in mm · Type 6111 as rail-mounting unit, version with connecting plate G ⅛ or ⅛ NPT thread*

1 Ø5.5 mm holes for wall mounting
2 Connecting plate

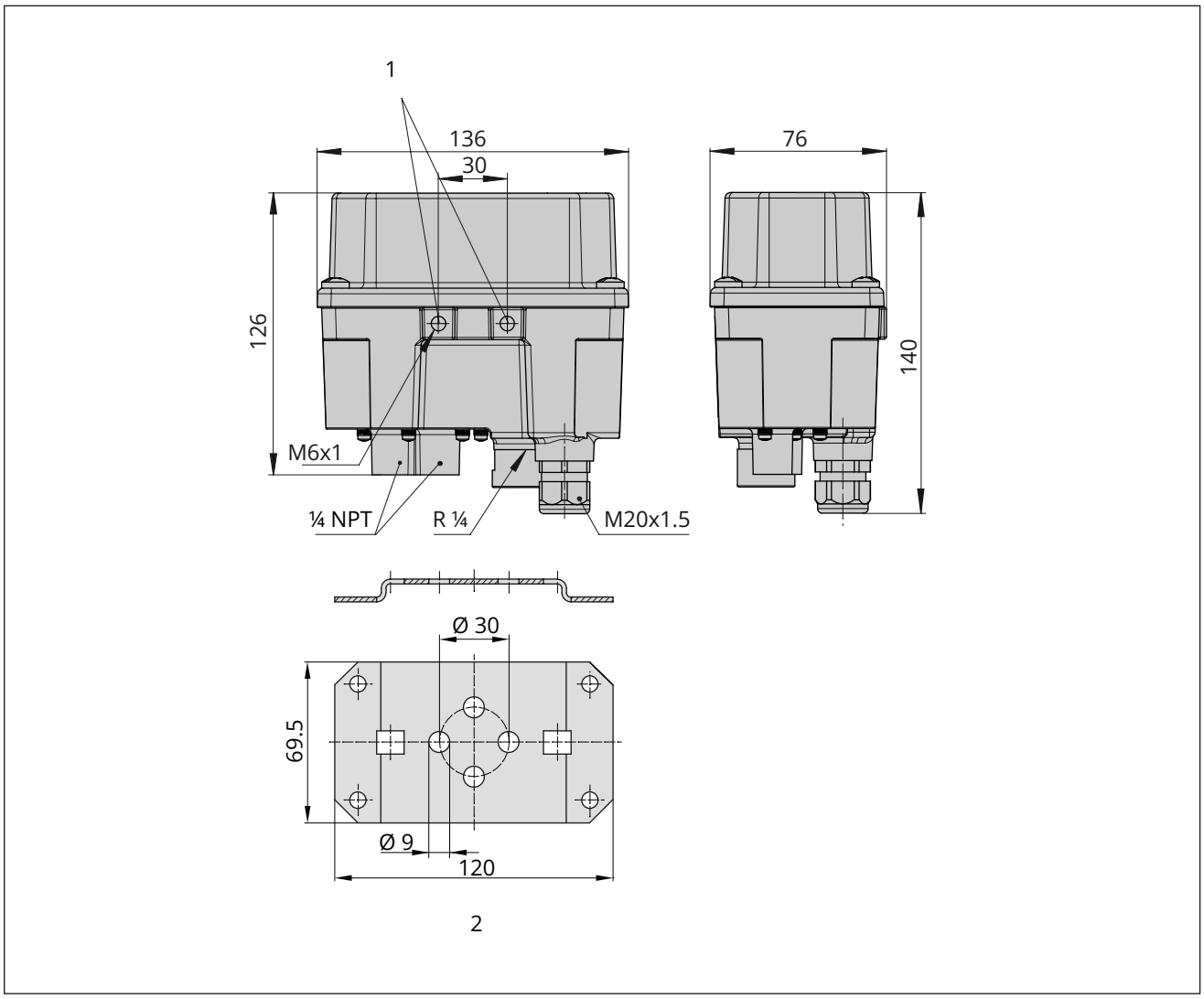


Fig. 8: *Dimensions in mm · Type 6111 as field unit*

1 Holes (M6, 15 mm deep) for attaching the bracket

2 Mounting bracket

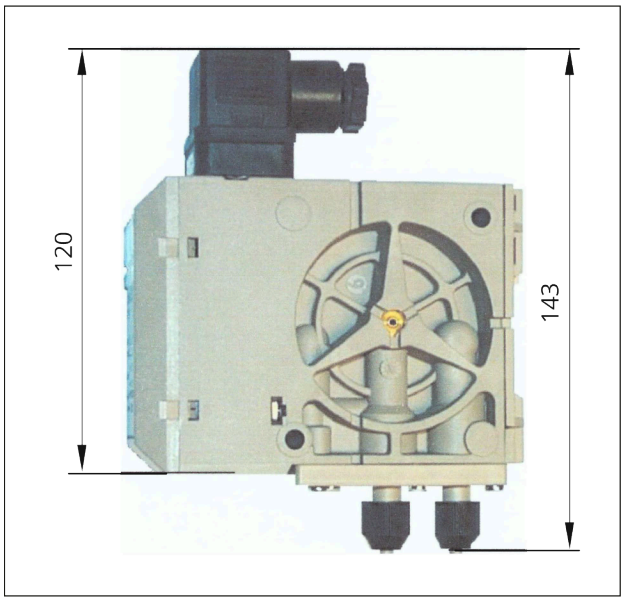


Fig. 9: *Dimensions in mm · Type 6111 with male angle connector (cable socket) and pneumatic hose connection M10x1*

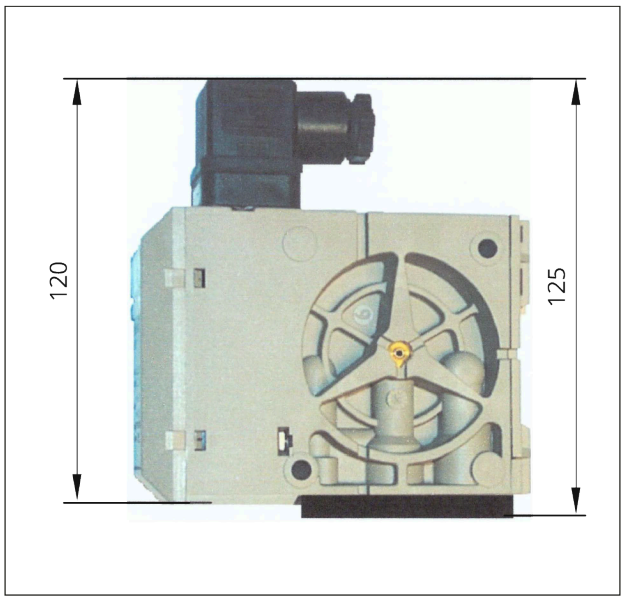


Fig. 11: *Dimensions in mm · Type 6111 with male angle connector (cable socket) and pneumatic connecting plate with ⅛ NPT or G ⅛ thread*

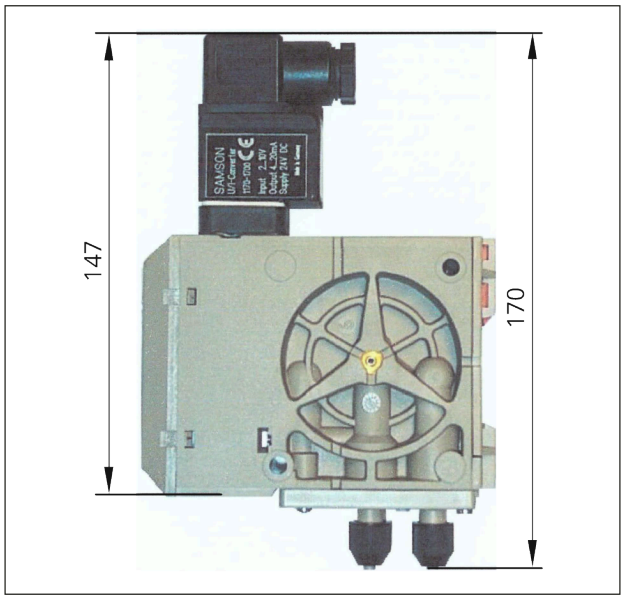


Fig. 10: *Dimensions in mm · Type 6111 with male angle connector (cable socket), Type 6151/6150 module and hose connection*

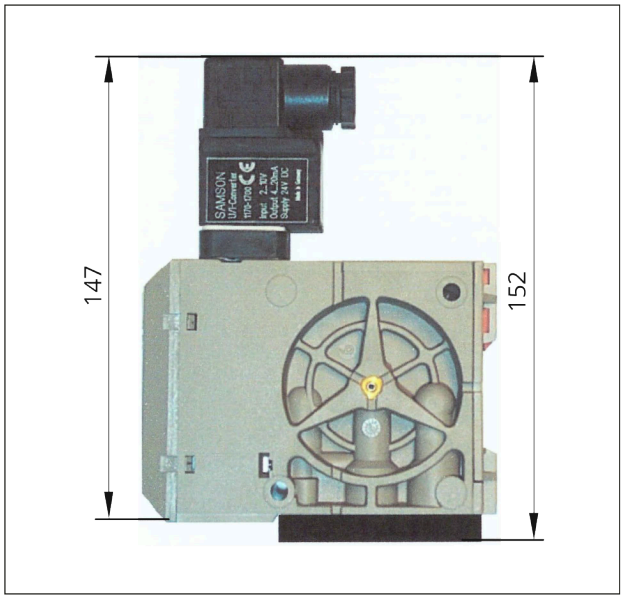


Fig. 12: *Dimensions in mm · Type 6111 with male angle connector (cable socket) and Type 6151/6150 module, with pneumatic connecting plate with ⅛ NPT or G ⅛ thread*

Accessories

Table 2: *Accessories/spare parts · Connecting plate/adapter plate*

Article	Order no.
Connecting plate with hose connection (without coupling nut, 15) M10x1 coupling nut for hose connection (15) Connecting plate ⅛ NPT (15) Connecting plate G ⅛ (15) Adapter plate for supply air manifold (16)	0360-2950 0250-1831 0360-3251 0360-3250 0360-3096
3x12 mm screw for connecting plate with hose connection 3x16 mm screw for connecting plate (NPT and G) 3x10 mm screw for adapter plate for supply air manifold	8336-0728 8336-0730 8336-0727
Male screw fitting G ⅛ on hose with 4 mm inside diameter and 6 mm outside diameter, brass Male screw fitting ¼ NPT on hose with 4 mm inside diameter and 6 mm outside diameter, brass	8582-1450 8582-1523
Sintered filter for SUPPLY and OUTPUT connection	0550-0653
Seal for SUPPLY and OUTPUT connection	0430-1134

Table 3: *Accessories · Field unit*

Article	Order no.
Mounting bracket (stainless steel) including two M6x12 hex head screws and washers to mount the field unit to the bracket (included in the scope of delivery)	1400-7432

Table 4: *Accessories · Converter units*

Article		3	4	5	6
		Order no.			
Supply air manifold (basic version) including two G ¼ connectors		1400-			
	With one screw plug	7266	7273	7280	7287
	With pressure gauge (0 to 10 bar)	7269	7276	7283	7290
	With pressure gauge (0 to 10 bar) and air blocker	7270	7277	7284	7291
Supply air manifold with hose push-on fittings for outputs (hose with 4 mm inside and 6 mm outside diameter) and supply air (hose with 8 mm inside and 10 mm outside diameter)		1400-			
	With one screw plug	7267	7274	7281	7288
	With pressure gauge (0 to 10 bar) and air blocker	7271	7278	7285	7291
Supply air manifold with hose screw fittings for outputs (hose with 4 mm inside and 6 mm outside diameter) and supply air (hose with 8 mm inside and 10 mm outside diameter)		1400-			
	With one screw plug	7268	7275	7282	7289
	With pressure gauge (0 to 10 bar) and air blocker	7272	7279	7286	7293
Coupling (5) to connect supply air manifolds including two NBR seals (4)		1400-7294			

Table 5: *Accessories/spare parts · Supply air manifold*

Article	Thread	Connection for hose D/d [1]	Length in mm, mounted	Order no.
Pressure gauge, 0 to 6 bar (1), NG 40	G ¼ A		27	8520-0019
Pressure gauge, 0 to 10 bar (1), NG 50	G ¼ A		27	8520-1058
Air blocker (11)	G ¼	–	30	8502-0044
Connector (3)	G ¼		20	–
Connector G ¼ (3)				0230-2581
Seal for connector (14x2.5 mm), NBR (4)				8421-0347
Hose screw fitting, output (7a)	G ⅛ A	D/d = 6/4	19	8582-1450
Hose push-on fitting, output (7b)	G ⅛ A	D/d = 6/4	13	8582-1563
Washer (7.1)				8414-0136
Hose screw fitting, supply air (10a)	G ¼ A	D/d = 10/8	21	8582-1735
Seal (10.1), hose connection	G ¼ A	D/d = 10/8	23	8414-0140
Hose push-on fitting, supply air (10b)				8582-1564
Connecting plate, standard (15)	D 6 hose, mounting on supply air manifold			0360-2950
Connecting plate, supply air manifold (16)				0360-3096
Screw plug (2)				8323-0005
M4x6 grub screw (6)				8324-0605
M4x6 cap screw (8)				8333-0495
3 x 2.7 mm O-ring, NBR (9)				8421-0235

1) D = Outside diameter
d = Inside diameter

Article code

Type 6111-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Explosion protection	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
Without	0	|	|	|	|	|	|	|	|	|	|	|	|	|	|
⟨Ex⟩ II 2G Ex ia IIC T6 according to ATEX[6]	1	|	|	|	|	|	|	|	|	|	|	|	|	|	|
⟨Ex⟩ II 3G Ex nA II T6 according to ATEX[4] [6]	8	|	|	|	|	|	|	|	|	|	|	|	|	|	|
	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
Housing	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
For rail mounting, 35 mm top-hat rail (DIN EN 60714)	|	0	|	|	|	|	|	|	|	|	|	|	|	|	|
Field housing in stainless steel 1.4581	|	1	|	|	|	|	|	|	|	|	|	|	|	|	|
	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
i/p converter module	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
Type 6109	|	|	1	|	|	|	|	|	|	|	|	|	|	|	|
Type 6112	|	|	2	|	|	|	|	|	|	|	|	|	|	|	|
	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
Input	|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
4 to 20 mA with switch-off electronics	|	|	|	0	1	|	|	|	|	|	|	|	|	|	|
0 to 20 mA without switch-off electronics [1]	|	|	2	0	2	|	|	|	|	|	|	|	|	|	|
4 to 12 mA with switch-off electronics	|	|	2	0	3	|	|	|	|	|	|	|	|	|	|
12 to 20 mA with switch-off electronics	|	|	2	0	4	|	|	|	|	|	|	|	|	|	|
	|	|	|			|	|	|	|	|	|	|	|	|	|
Volume booster	|	|	|			|	|	|	|	|	|	|	|	|	|
I (output from 0.1 bar/3 psi)	|	|	|		1	|	|	|	|	|	|	|	|	|	|
II (output from 0 bar/0 psi)[2]	|	|	2		2	|	|	|	|	|	|	|	|	|	|
	|	|	|		|	|	|	|	|	|	|	|	|	|	|

Output	|	|	|		|	|	|	|	|	|	|	|	|	|	|
0.2 to 1.0 bar	|	|	|		1	0	1	|	|	|	|	|	|	|	|
3 to 15 psi	|	|	|		1	0	2	|	|	|	|	|	|	|	|
0.4 to 2.0 bar	|	|	2		1	0	3	|	|	|	|	|	|	|	|
6 to 30 psi	|	|	2		1	0	4	|	|	|	|	|	|	|	|
	|	|	|			|	|	|	|	|	|	|	|	|	|
Special ranges	|	|	|			|	|	|	|	|	|	|	|	|	|
Lower range value[5]/span Δp	|	|	|			|	|	|	|	|	|	|	|	|	|
0.1 to 0.4 bar/0.75 to 1.00 bar	|	|	2			1	1	|	|	|	|	|	|	|	|
0.1 to 0.4 bar/1.00 to 1.35 bar	|	|	2			1	2	|	|	|	|	|	|	|	|
0.1 to 0.4 bar/1.35 to 1.81 bar	|	|	2			1	3	|	|	|	|	|	|	|	|
0.1 to 0.8 bar/1.81 to 2.44 bar	|	|	2			1	4	|	|	|	|	|	|	|	|
0.1 to 0.8 bar/2.44 to 3.28 bar	0	|	2			1	5	|	|	|	|	|	|	|	|
0.1 to 0.8 bar/3.28 to 4.42 bar	0	|	2			1	6	|	|	|	|	|	|	|	|
0.1 to 1.2 bar/4.42 to 5.94 bar	0	|	2			1	7	|	|	|	|	|	|	|	|
0.1 to 1.2 bar/5.94 to 8.00 bar	0	|	2			1	8	|	|	|	|	|	|	|	|
		|	|					|	|	|	|	|	|	|
Direction of action		|	|					|	|	|	|	|	|	|
Increasing/increasing		|	|				1	|	|	|	|	|	|	|
Increasing/decreasing		|	2					2	|	|	|	|	|	|	|
		|						|	|	|	|	|	|	|
Pneumatic connection		|						|	|	|	|	|	|	|
For hose with 4 mm inside and 6 mm outside diameter (hose connection M10x1)		0						0	|	|	|	|	|	|	|
⅛-27 NPT female thread		0						1	|	|	|	|	|	|	|
ISO-228/G ⅛ female thread		0						2	|	|	|	|	|	|	|
M5 female thread		0						3	|	|	|	|	|	|	|
¼-18 NPT		1						4	|	|	|	|	|	|	|
		|							|	|	|	|	|	|
Electrical connection		|							|	|	|	|	|	|
For 0.5 to 2.5 mm² terminals		0							1	|	|	|	|	|	|
Male angle connector according to DIN EN 175301-803		0							2	|	|	|	|	|	|
M20x1.5		1							3	|	|	|	|	|	|
		|							|	|	|	|	|	|
Degree of protection		|							|	|	|	|	|	|
IP20		0								1	|	|	|	|	|
IP65		1								2	|	|	|	|	|
											|	|	|	|	|
Temperature											|	|	|	|	|
T_{min} ≥–20 °C											0	|	|	|	|
												|	|	|	|
Special version												|	|	|	|
Without												0	0	0	0	0

1) Without switch-off electronics and without potentiometer for zero point correction and explosion-protected device without potentiometer for span correction

2) A relatively stable supply air network is required for the special version with volume booster II.

3) Specify setting range, e.g. set to 0.1 to 4 bar; output pressure max. 8 bar, supply air 10 bar

4) For Ex nA applications, the rail-mounting unit must be installed in a housing with a minimum IP54 degree of protection.

5) Lower range value raised up to max. 3.0 bar (special version 300 and 301)

6) Upper range value of the output signal up to max. 2.0 bar

Associated Mounting and Operating Instructions

– Type 6111 ▶ EB 6111

Associated Information Sheet

– Information Sheet System 6000 ▶ T 6000

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