System 6000

Electropneumatic Converters for Direct Current Signals

Current-to-Pressure Converter Type 6126
Voltage-to-Pressure Converter Type 6126

Application

Devices used to convert a direct current signal into a pneumatic signal for measurement and control equipment. Especially suitable as intermediate element between electric measuring devices and pneumatic controllers, or between electric control devices and pneumatic control valves.

The converter input accepts a load-independent (0)4 to 20 mA direct current signal or a (0)2 to10 V voltage signal.

Depending on the supply air pressure, the converter provides a pneumatic output signal of 0.2 to 1 bar (3 to 15 psi) or 0.4 to 2 bar (6 to 30 psi). The electropneumatic converter is available with two different converter modules, Type 6109 or 6112. Type 6112 offers further output signal ranges (see "Technical data").

Special features

- Small dimensions, low weight and rugged housing
- Excellent dynamic response
- Relatively large air output with low air supply consumption
- Output pressure up to 5 bar
- Central venting
- Low vibration effect
- Versions with reversed characteristic available (only with Type 6112 i/p Module)
- Option of connecting a pressure gauge parallel to the output
- Operation possible without upstream pressure regulator
- Zero reset at a specific mA value when a venting function (switch-off) is enabled (function can be activated as required)
- Zero point and span can be adjusted via potentiometers in devices with electronics

Versions

For use in non-hazardous areas:

Type 6126-0 with electronics, i. e. switch-off electronic function and potentiometer for zero and span

Type 6126-0 without electronics

Fig. 1 · Type 6126 Electropneumatic Converter with mounting bracket and pressure gauge

Principle of operation

The electropneumatic converter consists of an i/p module which operates according to the principle of force equilibrium and a downstream volume booster.

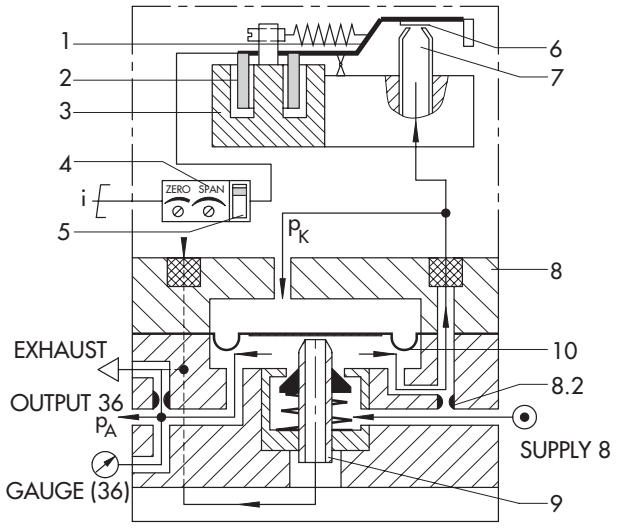
When operated, the supplied direct current (4) flows through the plunger coil (2) located in the field of a permanent magnet (3). At the balance beam (1), the force of the plunger coil, which is proportional to the current, is balanced against the force of the dynamic back-pressure.

The back-pressure is produced on the flapper plate (6) by the air jet leaving the nozzle (7). The air supply (8) flows into the lower chamber of the volume booster. A certain amount of air determined by the position of the diaphragm reaches the sleeve (9) and flows to the output (36).

When the input current increases and, as a result, the force of the plunger coil increases as well, the flapper moves closer to the nozzle.

This causes the dynamic back-pressure and the cascade pressure p_K forming upstream of the restrictor (8.2) to increase. The cascade pressure increases until it corresponds to the input current and pushes both the diaphragm (10) and the sleeve (9) downwards, causing the output pressure p_A to increase until a new state of equilibrium is reached in the diaphragm chambers. When the cascade pressure decreases, the diaphragm is pressed upwards and it releases the sleeve. The output pressure p_A escapes through the sleeve to the vent (EXHAUST) until the forces on the diaphragm are balanced again.

Converters with an input signal range from 4 to 20 mA are equipped with a slide switch which activates the switch-off electronic function. This function causes the pneumatic output to be vented up to approx. 100 mbar when the input signal falls below 4.08 mA ± tolerance. This ensures tight shut-off of a valve.



1 Balance beam
2 Plunger coil
3 Permanent magnet
4 Input
5 Slide switch
6 Flapper plate
7 Nozzle
8 Supply air, volume booster
8.2 Fixed restrictor
9 Sleeve
10 Diaphragm
36 Output

Fig. 2 · Functional diagram

Installation

The converter can be mounted to a wall, pipe or directly to the control valve. The mounting bracket for wall mounting is included in the scope of delivery (see Accessories).

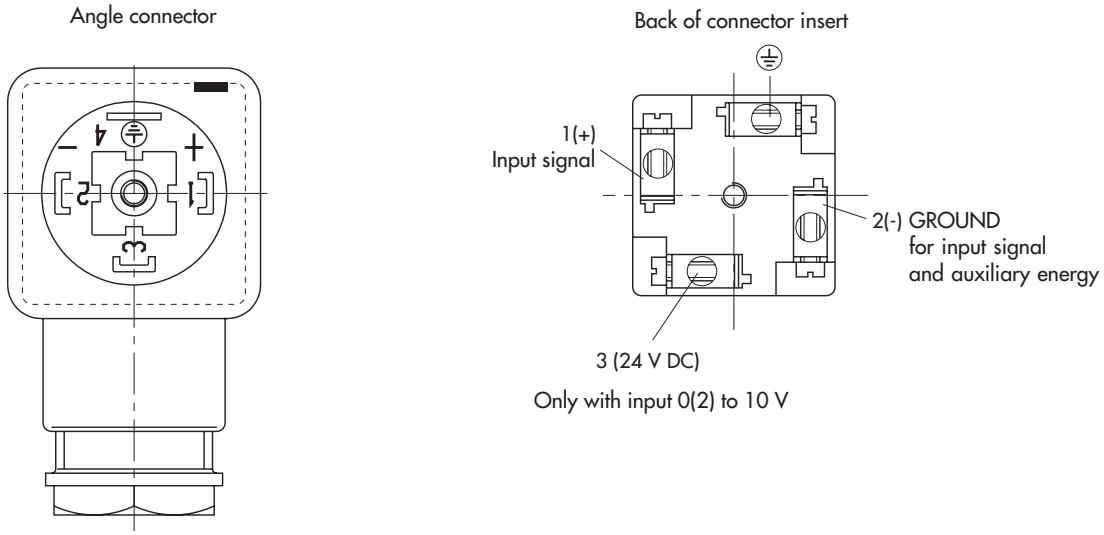
Install the converter in horizontal position with the pressure gauge (or screw plug) facing upwards. If a different mounting position is required, zero must be readjusted for devices with electronics, using the ZERO adjuster.

Table 1 · Technical data

Type	**without explosion protection**	**Type 6126-0**
Input		(0)4 to 20 mA 0(2) to 10 V (input resistance 30 kΩ) with 24 V DC auxiliary power Load ≤ 6 V (corresponds to 300 Ω at 20 mA)
Output		0.2 to 1 bar (3 to 15 psi) with Types 6109 and 6112 i/p Converter modules 0.4 to 2 bar (6 to 30 psi) with Type 6112 i/p Converter module Special ranges up to 5 bar (75 psi) with Type 6112 i/p Converter module
	Air output capacity [1]	2.0 m^3/h at 0.6 bar output (0.2 to 1.0 bar) 2.5 m^3/h at 1.2 bar output (0.4 to 2.0 bar)
Auxiliary power	Supply air	Min. 0.4 bar (6 psi) above upper pressure range value, max. 5.4 bar (81 psi) without upstream pressure regulator
	Air consumption [2]	0.08 m_n^3/h at 1.4 bar (20 psi) 0.1 m_n^3/h at 2.4 bar (35 psi)
	24 V DC (with voltage-to-pressure converter)	10 to 28 V DC 9 to 25 mA (max. 30 mA) for 0(2) to 10 V input
Performance		Characteristic: Output linear to input
	Hysteresis	≤ 0.3 % of final value; more accurate values on request
	Deviation from terminal-based conformity	≤ 1 % of final value; more accurate values on request
	Effect in % of final value	Supply air: 0.1 %/0.1 bar [2]
		Alternating load, supply air failure, interruption of input current: < 0.3 %
		Ambient temperature: Lower range value < 0.03 %/K, measuring span < 0.03 %/K
Dynamic response (measured according to IEC 770)		
	Limiting frequency	5.3 Hz
	Phase shift	–130°
Effect of variable mounting position		Max. 3.5 % depending on how the device is mounted; ±1 % in horizontal position (with Type 6109) Max. 1 % depending on how the device is mounted; ± 0.3 % in horizontal position (with Type 6112)
Ambient conditions, degree of protection, weight		
Ambient temperature		–25 to +70 °C
Degree of protection		IP 54/IP 65
Weight	Approx.	0.6 kg
Materials		
Housing		Die-cast aluminum, chromated, plastic-coated/glass fiber reinforced polyamide
Other parts		Corrosion-resistant material

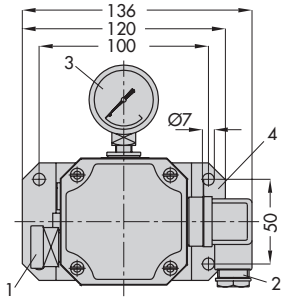
1) Measured with 2 m hose 4 x 1 mm
2) Measured at average output pressure

Electrical connection

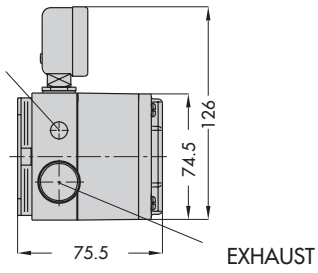


Dimensions in mm

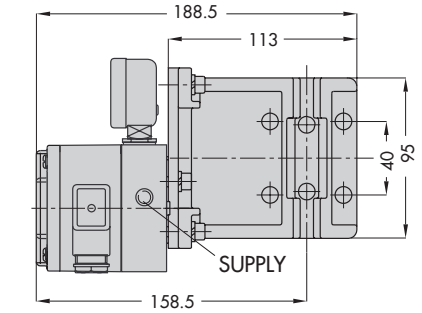
Wall mounting with bracket, order no. 1400-7432 (included in the scope of delivery)



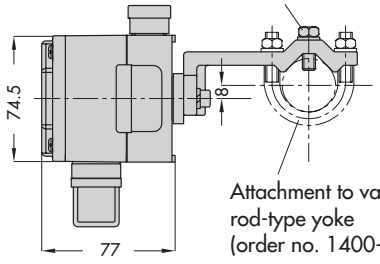
1 EXHAUST
2 Electrical connection (angle connector DIN EN 175301-803 A)
3 Pressure gauge
4 Mounting bracket



Attachment to a control valve



Attachment to valve with cast yoke
(order no. 1400-6217)



Attachment to valve with rod-type yoke (order no. 1400-6218)

Wall and pipe mounting
(order no. 1400-6216)

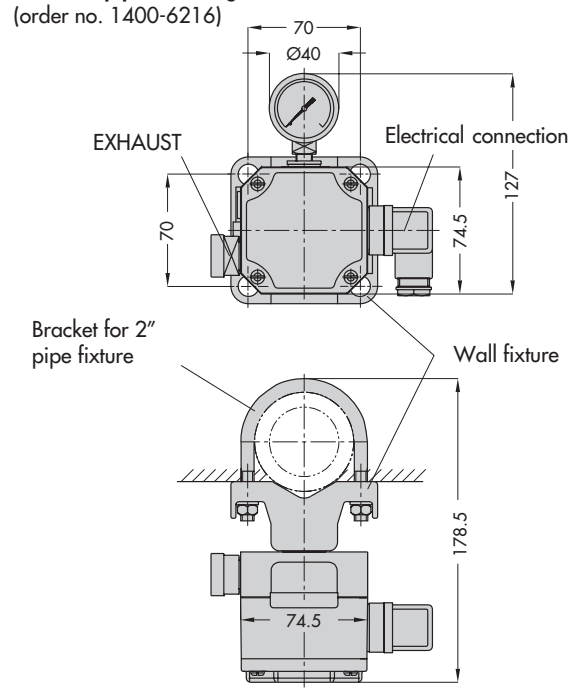


Fig. 4 · Dimensions with different mounting versions

Article code

Article code		Type 6126-	x	x	x	x	x	x	x	x	x	x	x	x	x
Explosion protection	Without		0												
Pneumatic connection	¼ - 18 NPT			1											
	ISO-228/1 - G ¼			2											
i/p module	Type 6109 [1]				1					0					
	Type 6112				2										
Input	4 to 20 mA					1									
	0 to 20 mA, without electronics [2]				2	2									
	4 to 20 mA, without electronics [2]					3									
	0 to 10 V, 24 V DC auxiliary power [5]					4									
	2 to 10 V, 24 V DC auxiliary power					5									
Output	0.2 to 1.0 bar						0	1							
	3 to 15 psi						0	2							
	0.4 to 2.0 bar				2		0	4							
	6 to 30 psi				2		0	5							
Special ranges [3], [4]:	Initial value 0.1 to 0.4 bar; span 0.75 to 1.00 bar				2		1	1							
	Initial value 0.1 to 0.4 bar; span 1.00 to 1.35 bar				2		1	2							
	Initial value 0.1 to 0.4 bar; span 1.35 to 1.81 bar				2		1	3							
	Initial value 0.1 to 0.8 bar; span 1.81 to 2.44 bar				2		1	4							
	Initial value 0.1 to 0.8 bar; span 2.44 to 3.28 bar				2		1	5							
	Initial value 0.1 to 0.8 bar; span 3.28 to 4.42 bar				2		1	6							
	Initial value 0.1 to 1.2 bar; span 4.42 to 5.94 bar				2		1	7							
Operating direction	Increasing/increasing								0						
	Increasing/decreasing								1						
Degree of protection	IP 54									0					
	IP 65									1					
Output pressure gauge	Without										0				
	With										1				
Temperature range	$T_{min} \geq -25$ °C											0			
Special version	None												0	0	0

1) Only with output 0.2 to 1 bar or 3 to 15 psi
2) Without switch-off electronic function and without potentiometer for zero point and span correction, not possible with Type 6109 i/p module, output 3 to 15 psi
3) Raised zero up to 3 bar (45 psi) possible as special version
4) Specify setting range, e.g. set to 0.1 to 4 bar output pressure max. 5 bar, supply air 5.4 bar
5) 0 to 5 V input possible as special version

Accessories

Mounting material	**Order no.**
– Bracket for wall mounting, stainless steel (1.4301)	1400-7432 (included in scope of delivery)
– Wall and pipe mounting (2″ pipes)	1400-6216
– Attachment to cast yokes acc. to NAMUR	1400-6217
– Attachment to valves with rod-type yokes acc. to NAMUR	1400-6218

Pressure gauges for retrofitting

– Pressure gauge: 0 to 1.2 bar range	0800-0185
– Pressure gauge: 0 to 6 bar range	0800-0186
– Pressure gauge: 0 to 10 bar range	0800-0032
– Screw fitting (to fit above pressure gauges)	0250-1090

– Male connector G ¼ onto 4x1 mm hose, brass	8582-1452
– Male connector ¼ NPT onto 4x1 mm hose, brass	8582-1523
– T-piece screw fitting for 4x1 mm hose, brass	8582-1480

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