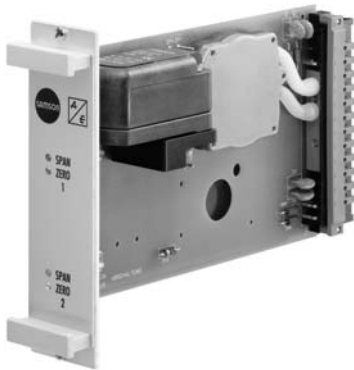


**System 6000**  
**Electropneumatic Converters**  
**for Direct Current Signals**  
**i/p Converter Type 6127**



*Type 6127-01 i/p Converter*



*Type 6127-04 i/p Converter*

*Fig. 1 · Type 6127 rack-mounting units*

**Mounting and**  
**Operating Instructions**

**EB 6127 EN**

Edition September 2006



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- ▶ *The devices may only be mounted, started up or serviced by fully trained and qualified personnel, observing the accepted industry codes and practices. Make sure employees or third persons are not exposed to any danger.  
All safety instructions and warnings in these mounting and operating instructions, particularly those concerning assembly, start-up and maintenance, must be observed.*
- ▶ *Any hazards which could be caused in the device by the signal pressure are to be prevented by means of the appropriate measures.*
- ▶ *Proper shipping and appropriate storage of the device are assumed.*
- ▶ *The device with the CE marking fulfills the requirements of the Directive 94/9/EC and the Directive 89/336/EEC.  
The declaration of conformity is available on request.*

## Article code

Type		6127-	x	x	x	x	x	x	x	x	x	x	x
<b>Explosion protection</b>	Without	0											
<b>Rack-mounting unit</b>	Single (Type 6109)	1											
	Double (Type 6109)	2											
	Single (Type 6112)	3											
	Double (Type 6112)	4											
<b>i/p module</b>	Type 6109	1											
	Type 6112	2											
<b>Input</b>	4 to 20 mA	1											
<b>Output</b>	0.2 to 1.0 bar	1											
	3 to 15 psi	2											
<b>Operating direction</b>	Increasing/increasing	1											
	Increasing/decreasing	0											
<b>Temperature range</b>	$T_{\min} \geq -10\text{ }^{\circ}\text{C}$	0											
<b>Special version</b>	Without	0									0	0	0

## 1 Description

### 1.1 Application

The devices are used to convert a direct current input signal into a pneumatic signal for measuring and control. They are especially suitable as intermediate elements between electrical measuring devices and pneumatic controllers or between electrical control devices and pneumatic control valves.

The input is a load-dependent direct current from 4 to 20 mA. The output is a pneumatic signal from 0.2 to 1 bar (3 to 15 psi).

### 1.2 Versions

#### Type

Rack-mounting unit with:  
 one i/p converter 6109  
 two i/p converters 6109  
 one i/p converter 6112  
 two i/p converters 6112

6127-	0	x
	1	
	2	
	3	
	4	

### 1.3 Technical data

Type	6127-01/-02	6127-03/-04
Explosion protection	Without	
	Converter module 6109	Converter module 6112
Input	4 to 20 mA	
Load	Approx. 300 $\Omega$ at 6 V (20 mA)	
Output	0.2 to 1 bar (3 to 15 psi)	
Air output capacity <sup>1)</sup>	For $Q_{\max}$ : 1.3 m <sup>3</sup> /h; min. connected volume > 0.025 dm <sup>3</sup> For $Q_{\min}$ : 0.5 m <sup>3</sup> /h; min. connected volume > 0.006 dm <sup>3</sup>	
Supply air	1.4 $\pm$ 0.1 bar (20 $\pm$ 1.5 psi)	
Air consumption	Max. 0.150 m <sup>3</sup> /h per duct at 1.4 bar upstream pressure	
Performance <sup>2)</sup>	Characteristic: Output linear to the input	
Hysteresis	$\leq$ 0.3 % of final value	
Deviation from terminal-based conformity	$\leq$ 1 % of final value	
Influence in % of final value	Supply air: 0.3 %/0.1 bar	
	Alternating load, supply air failure, interruption of input current $\leq$ 0.1 %	
	Ambient temperature: Lower measuring range value 0.02 %/K; measuring span $\leq$ 0.03 %/K	
Dynamic response		
Limiting frequency	8 Hz	
Phase shift	-128°	
Effect of variable mounting position	< 3.5 % at an output of $\leq$ 1 bar < 1.5 % at an output of > 1 bar	
Permissible ambient conditions		
Ambient temperature	-10 to 60 °C	
Storage temperature	-40 to 80 °C	
Relative humidity	5 to 90 %	
Degree of protection	IP 00	
Weight, approx.	Type 6127-01/-03: 0.25 kg Type 6127-02/-04: 0.35 kg	

<sup>1)</sup> Measured with 2 m hose 4 x 1

<sup>2)</sup> According to IEC 770

## 1.4 Principle of operation

The converter consists of an i/p converter unit and a connected volume booster. The supplied direct current  $i$  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). Air is supplied to the booster (9) and flows over the restrictor (8) and nozzle (7) against the flapper plate (6).

When the input current increases and, as a result, the forces at the plunger coil increase as well, the flapper plate (6) moves closer to the nozzle (7). This causes the dynamic back-pressure and the cascade pressure  $p_K$  forming at the restrictor (8) to increase. The cascade pressure increases until it is equal to the input current.

The downstream volume booster (9) amplifies the air output capacity of i/p converter unit and generates a pneumatic output signal  $p_A$  ranging from 0 to 1 bar. The air output capacity of the output signal can be adjusted at the volume restriction (10) to  $Q_{\min}$  or  $Q_{\max}$ . Lower measuring range value and measuring span can be adjusted at the ZERO and SPAN potentiometers (4).

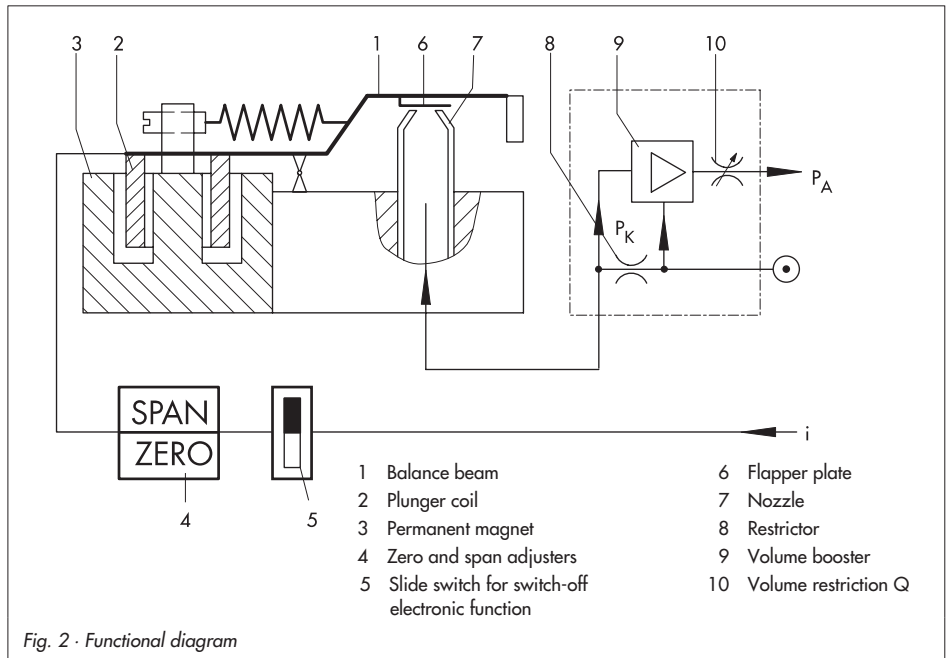


Fig. 2 · Functional diagram

### Switch-off electronic function

The instruments have a slide switch (5), which activates the switch-off electronic function. This function causes the input signal to be set to 0 mA when the switch point falls below a  $4.08 \pm$  tolerance. This function causes the pneumatic output to be vented up to approx. 100 mbar, ensuring, for example, the tight shut-off of a control valve.

## 2 Installation

### 2.1 Mounting

#### Accessories:

Electropneumatic connection strip Form F for crimping for

- Hose plug-on fitting 1400-5963
- Hose screw fitting 1400-5962

The rack-mounting units are usually delivered as ready-wired 19" racks. They are part of a pre-assembled automation unit.

The connectors comply with DIN 41612 (Form F). The integrated pneumatic plug-on connections seal the air lines when the converter module is removed from the rack.

### 2.2 Electrical connection



*As far as the electrical installation of the device is concerned, the relevant national regulations governing the installation of electrical equipment and the national accident prevention regulations of the country of destination must be adhered to.*

*In Germany, these are the VDE regulations and accident prevention regulations of the employer's liability insurance.*

How the units are wired depends on the rack. Refer to Fig. 3 for the terminal connections.

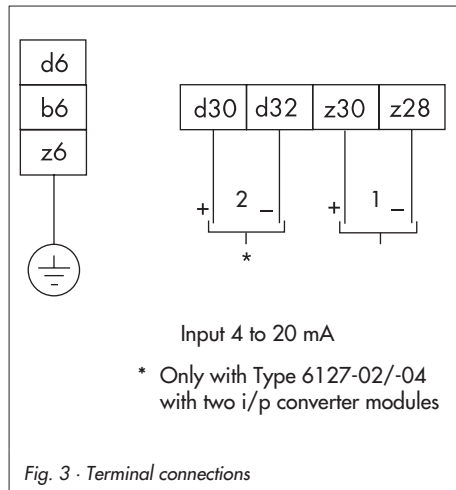


Fig. 3 · Terminal connections

## 2.3 Pneumatic connection

The pneumatic connections are determined by the plug-on connections on the rack. Refer to the dimensional drawing on page 9 for more details.

The compressed air supplied must be dry and free of oil and dust. Adjust the supply pressure to a value which is  $0.4 \pm 0.1$  bar higher than the upper range value of the output signal.

It is essential that the maintenance regulations for the upstream reducing stations are adhered to.

Thoroughly clean the pneumatic lines with compressed air prior to connecting them.

## 3 Operation

### 3.1 Checking zero and span

The converter is ready for operation and adjusted to the range indicated in the order. The indicated range is fixed and cannot be modified.

If you notice any discrepancy occurring with the converter, you should first check zero and span. The ZERO and SPAN potentiometers can be accessed through the holes in the front panel.

#### Zero:

1. Connect a pressure gauge (minimum accuracy class 1) to the output of the device.
2. Set the supply air to at least 0.4 bar above the upper range value of the output signal and apply it to the device.
3. Deactivate the switch-off electronic function at the switch (5) at the bottom on the printed circuit board.

#### Span

4. Set the input signal to the lower range value (e.g. to 4 mA for a range from 4 to 20 mA = 0.2 to 1 bar) using a suitable current source.  
The output signal at the test pressure gauge should indicate a lower range value of 0.2 bar.  
Should another value be indicated, readjust the zero point accordingly with the **ZERO** potentiometer.

5. Set the input signal to 20 mA using a suitable current source. The output signal at the test pressure gauge should indicate the upper range value of 1.0 bar. Should another value be indicated, readjust the span accordingly with the **SPAN** potentiometer.
6. Change the input signal abruptly from the upper range value 20 mA to 0 mA (or gently tap the device) and check whether the output signal assumes the upper range value, e.g. 1.0 bar.
7. Check both values again and correct them, if necessary since the adjustments of zero point and span influence each other.
8. Reactivate the switch-off electronic function, if required, at the switch (5).

### 3.2 Adjusting the air output capacity

The volume restriction (10) is used to adapt the air output capacity to the operating conditions. You can adjust from  $Q_{\max}$  to  $Q_{\min}$  and vice versa.

The restriction is installed at the back of the printed circuit board and can be turned by 90°. When delivered, the restriction is adjusted to  $Q_{\max}$ .

Versions with two i/p modules come supplied with two volume restrictions.

Position  maximum air output capacity

Position  minimum air output capacity

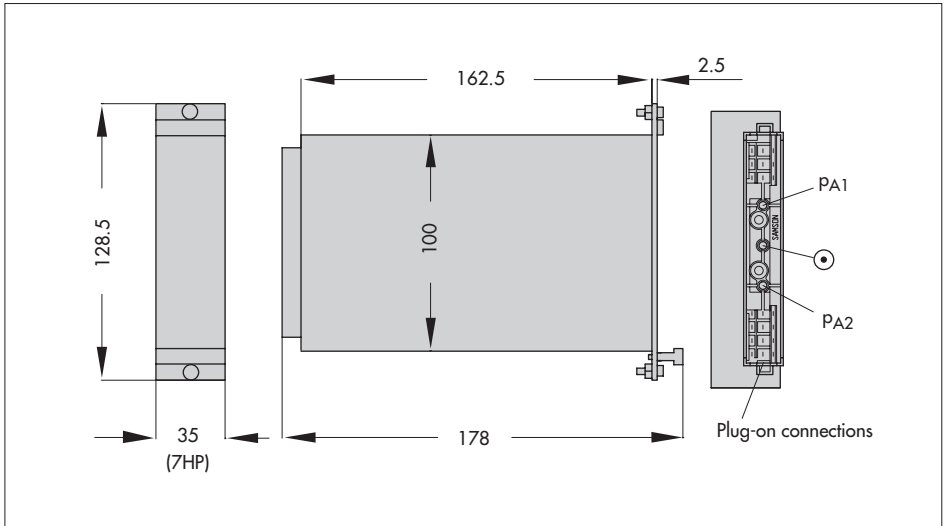
## 4 Maintenance

No particular maintenance steps are prescribed.

Proper functioning of the converter can only be guaranteed when the instrument air applied to the device is always clean. The air filter and separator of the pressure reducing station should be checked at regular intervals.



## 5 Dimensions in mm





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