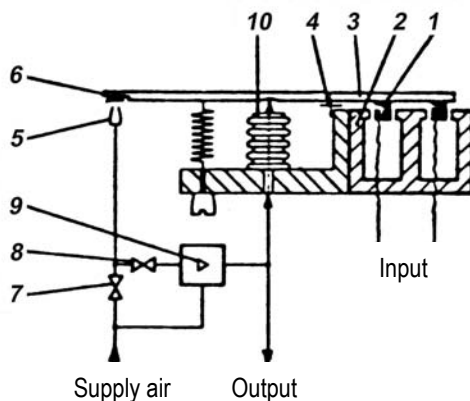


IP24 Transducer for field service

1 GENERAL

The instrument operates on force-balance principles and converts electrical signals into pneumatic signals.

2 METHOD OF OPERATION



The input signal flows through the

- 1 plunger coil, which creates a force in the field of the
- 2 permanent magnet. This force acts with a torque on the
- 3 balance beam, which is suspended in the
- 4 flexure strips. This causes the balance beam to be deflected and varies the clearance between the
- 5 nozzle and
- 6 flapper.

The cascade pressure between the nozzle and the

- 7 pre-restrictor varies as a function of the clearance between the nozzle and flapper. Via the
- 8 damping throttle, the cascade pressure acts on the
- 9 booster, which forms the proportional output signal.

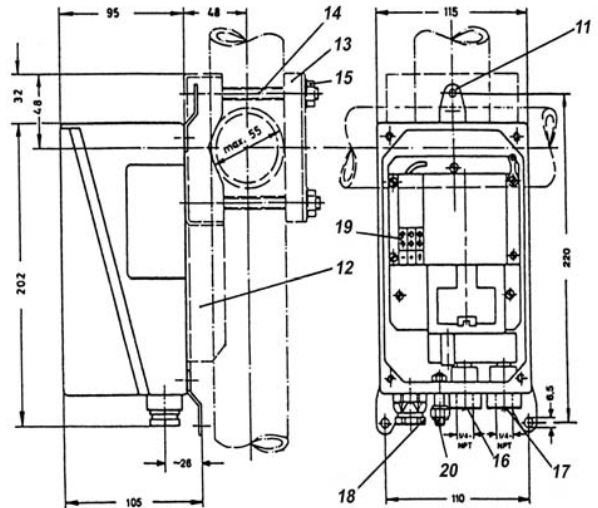
At the same time, the output signal acts on the

- 10 compensation bellows, and thus opposes the deflection of the balance beam (3).

The balance beam thus attains a new balance relationship.

3 INSTALLATION

3.1 DIMENSIONS



3.1 MOUNTING POSITION

The instrument can be mounted in any desired position. A change in orientation has no effect on the span of the instrument.

The effect on the zero negligibly small.

In a horizontal mounting position, the instrument has protection class IP54, and in a vertical position (connections underneath) the protection class is IP 55 or IP 65.

3.3 MOUNTING OF THE SIGNAL CONVERTER

The instrument is designed for wall or pipe mounting.

For mounting on the wall, the

- 11 3 fastening lugs mounted on the inside for shipping must be turned outward.

For mounting on pipe, a parts kit, type ZGE 407 758 026, must be ordered, which allows the signal converter to be mounted on horizontal or vertical pipes or pipe sockets up to max. 55 mm diameter. The parts kit includes

- 12 mounting plate,
- 13 bracket,
- 14 bolts and
- 15 nuts. For this type of mounting, the mounting plate (12) is fastened to the signal converter in place of the 3 fastening lugs (11).

Repairs and maintenance must be carried out by qualified personnel!

3.4 PNEUMATIC CONNECTIONS

The

- 16** output signal connection and the
17 supply air connection take the form of female threads 1/4–18 NPT. Supply air pressure :
 1.4 ± 0.1 bar or 20 ± 1.4 psi. The supply air pressure must be E + 1 bar.


The supply air must conform to the following requirements (see also IEC 654-2)


1. The dew point of the supply air should be at least 10 K lower than the lowest ambient temperature. The dew point applies to the maximum supply air pressure.
2. Contamination:
 - The supply air must be free from significant amounts of oil vapour, oil and other liquids. ECKARDT recommendation: max. 10^{-3} g aerosols per m^3 air at 1.01325 bar and 273.15 K; particle size of 92% of aerosols $\leq 0,5 \mu m$.
 - The supply air must be free from significant amounts of corrosive gases or vapours and solvents.
 - Solid particles must not be present in any significant quantities and no particles must have a diameter greater than $3 \mu m$.

3.5 ELECTRICAL CONNECTIONS

The electrical leads should be passed through the

- 18** cable gland to the
19 terminals, suitable for max. 2.5 mm² leads.

The terminals are identified -/+ and .

Whether the instrument is earthed via the  terminal or from the

- 20** earth connection on the housing, depends on the safety regulations and requirements in force at the plant.

In general, the installation requirements of VDE 0100 will have to be observed, and additionally, DVE 0165 in the case of explosion protected instruments.

4 COMMISSIONING

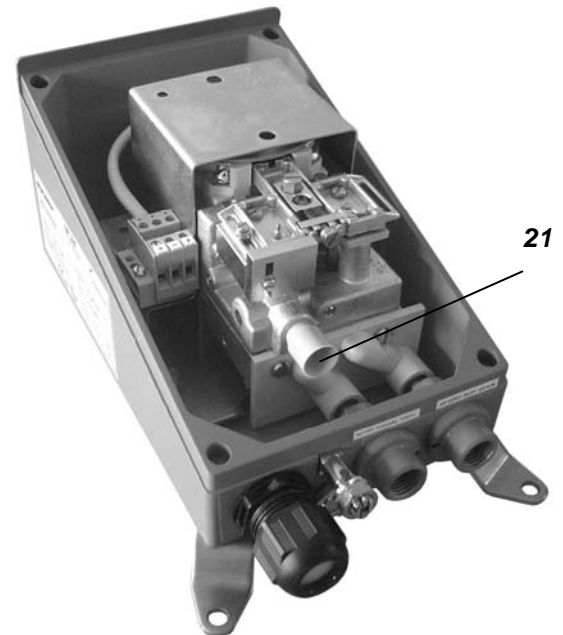
Assuming that the converter has been ordered for the correct input and output signal ranges, the instrument is ready for operation after making the necessary pneumatic and electrical connections.

5 ZERO ADJUSTMENT

Apply a current signal, 0 mA true zero to the converter. Rotate the **21** zero screw until the pneumatic output is 0.2 bar.

When the zero screw is turned in a clockwise direction, the output signal rises, and when turned in an anti-clockwise direction, the output falls.

With the reverse-acting version, the output signal should be 1 bar.



6 SAFETY REQUIREMENTS

6.1 GENERAL REQUIREMENTS

The device fulfils the requirements of IEC Publ. 348*, for protection class I.

Work may only be carried out on electrical components by qualified personnel, if any voltage sources are connected to the device.

The device contains no built-in fuses. Protection against electric shock must be provided on the system side.

6.2 CONNECTION REQUIREMENTS

The device is to be used and to be connected in accordance with the relevant connection diagram (see 3.5) and the application intended.

Local regulations valid for such installations, in Germany DIN VDE 0100 resp. DIN VDE 0800, are to be observed.

The device may be connected to low-voltage circuits, providing the insulation of these circuits against hazardous voltages (e.g. 220 V mains) meets at least the requirements for basic insulation.

The ground conductor must be connected to the corresponding terminal prior to connection of other leads and during operation of the device.

the device can be operated without a ground conductor (protection class III).

If the connected circuits meet the requirement laid down in IEC 348 for protective low voltages,

* See DIN IEC 348/VDE 0411, Part 1/...81 (draft March 1981)

7 FAULT FINDING

The required test instrumentation is:

- a) Current or voltage source
- b) Ammeter and voltmeter or ohmmeter
- c) Pressure test gauge for the output signal (class corresponding to the desired accuracy).

Malfunction	Cause	Rectification						
Input current rises, output signal falls	Incorrect polarity at electrical terminals	Reverse leads at terminals (19)						
	Reverse-acting version fitted in place of direct-acting							
Output pressure does reach full scale value	Supply air pressure too low	Check supply air pressure						
	Span or zero incorrectly set	Check out converter in accordance with para. 5 "CALIBRATION"						
	Pre-restrictor (7) or damping throttle (8) stopped up (see illustration, page 3)	Unscrew and replace restrictor and throttle.						
	Nozzle/flapper system dirty	Clean the nozzle and flapper, see para. 6.1						
	Sintered metal filter stopped up	Replace filter, see para. 6.3						
	Coil defective (shorted windings)	<p>Measure the resistance of the coil. Coil resistances of the individual versions at 20°C:</p> <table style="border: none;"> <tr> <td>Type IP24 – *K**</td> <td rowspan="4" style="font-size: 3em; vertical-align: middle;">}</td> <td rowspan="4" style="vertical-align: middle;">220 ohms – 50 ohms</td> </tr> <tr> <td>IP24 – *L**</td> </tr> <tr> <td>IP24 – *M**</td> </tr> <tr> <td>IP24 – *N/P/Q**</td> <td>1000 ohms – 50 ohms</td> </tr> </table> <p>Note: Protective diodes are connected in parallel with the plunger coil. If the measuring instrument is not connected properly, these diodes can cause the resistance reading to be too low. After reversing the polarity, the coil resistance is indicated.</p>	Type IP24 – *K**	}	220 ohms – 50 ohms	IP24 – *L**	IP24 – *M**	IP24 – *N/P/Q**
Type IP24 – *K**	}	220 ohms – 50 ohms						
IP24 – *L**								
IP24 – *M**								
IP24 – *N/P/Q**			1000 ohms – 50 ohms					

The pneumatic pick-up system is functioning correctly when the output signal rises to 1.3 bar (with 1.4 bar supply air) or to 4.5 bar (with 5 bar supply air) when the flapper is pressed against the nozzle.

Note:

If (Ex) –type instruments are repaired by others than the manufacturer, then the instrument must be checked after repair by approved specialist staff, § 6 Ex VO.
All repair work outside that described under "FAULT FINDING" must be carried out by the manufacturer, as otherwise trouble-free operation of the converter cannot be guaranteed.

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FOXBORO ECKARDT GmbH
Pragstrasse 82
D-70376 Stuttgart
Germany
Tel. + 49(0)711 502-0
Fax + 49(0)711 502-597
<http://www.foxboro-eckardt.de>



DOKT 535 884 501

ECKARDT S.A.S.
20 rue de la Marne
F-68360 Sultz
France
Tel. + 33 (0)3 89 62 15 30
Fax + 33 (0)3 89 62 14 85
<http://www.foxboro-eckardt.com>