



PT3 Pressure Transmitter Technical Data

Document Nr.: A3.5.020/E 3
Replaces doc.: A3.5.020/E 2
Date: 08.04.2002

The PT3 Pressure Transmitter converts a pressure into a linear electrical output signal. The heart of the transmitter is a piezo resistive chip enclosed in an oil capsule.

Features

- Pressure sensitive piezo-based cell with strong primary output signal for precise and noise-free operation
- Pressure cell protected by oil filled pressure enclosure
- Vibration and pulsation resistant
- Protection class IP 65
- Compact dimensions
- Standard output signal 4 to 20 mA
- Gauge pressure output ranges
- Standard pressure ranges compatible with former ALCO transmitters
- Pressure connector 7/16-20 UNF w. Schrader depressor
- Variable supply voltage
- CE-mark under EC EMC-Directive

Options

- Output signals 0...10 V or 1...6 V
- Other pressure ranges and calibrations
- Other pressure connectors
- Calibration for other supply voltages

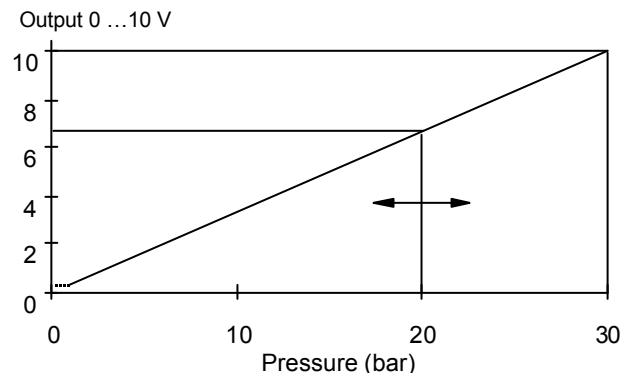
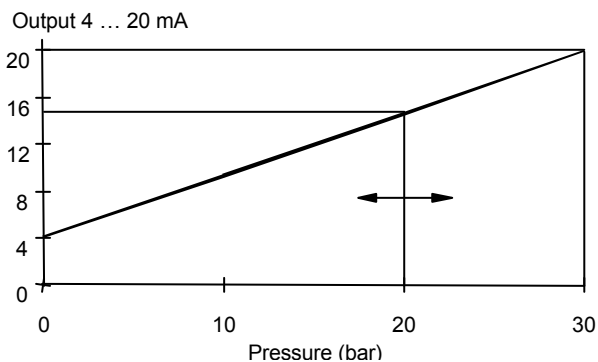


PT3
Pressure Transmitter

Introduction

The ALCO pressure transmitter PT3 is designed for pressure sensing and the generation of a linear electrical output signal. It is specifically aimed at applications in refrigeration and air conditioning systems. The standard 4 - 20 mA current output enables easy interfacing with the most common signal processing

equipment. Various pressure ranges are available to match the operating pressures commonly encountered in refrigeration systems. The PT3 meets the requirements of the European EMC directive and is labelled with the CE-mark.





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Description

Heart of the transmitter is a pressure sensitive piezo resistive cell. This is surrounded by an *oil cushion* enclosed by a Nickel diaphragm. The integrated electronic module conditions the output of the pressure cell to produce a temperature compensated signal of either 4...20 mA (or 0...10 V).

The PT3 pressure transmitter can be applied in digital and analog electronic systems.

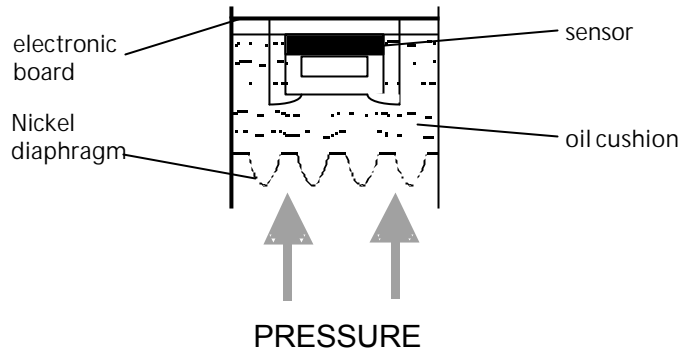
The pressure cell consists of a silicon diaphragm with strain gauges diffused into it. A particular advantage of using silicon is its good hysteresis and creeping behaviour. The direct integration of the strain gauges means that no additional errors can be introduced between the location where the pressure acts and where it is measured.

Separation of the pressure sensitive element by the oil cushion protects the sensor cell against external mechanical loads such as vibrations, pressure pulsations. This ensures reliable operation and a high life-time expectation even under severe operating conditions.

The protective Nickel diaphragm ensures compatibility with the media frequently encountered in refrigeration systems.

The outside of the PT3 consists of a corrosion resistant stainless steel cover. It is sealed at the cable entrance into the housing and at the pressure connector joint. This way, the PT3 meets the requirements of IP65.

The cable is stress relieved so that moderate pull forces occasionally experienced during installation will not damage the transmitter. Short-term protection against wrong polarity is



provided by an internal diode, up to 40 Vdc for the 4...20 mA output version and up to 24 Vdc for the voltage output version (supply lines only!).

The cable is a screened cable with the screen connected to the PT3 housing. This ensures compliance with present electromagnetic compatibility legislation and in particular with the EMC directives 89/336/EC, 91/263/EC, 92/31/EC and 93/68/EC.

Selection Chart

Type	Part Code No.:	Pressure Range (bar)	Output Signal	Test Pressure	Pressure Connection
PT3-07A	802 276	-0.8 to 7	4 to 20 mA	25 bar	7/16" -20 UNF
PT3-18A	802 277	0 to 18	4 to 20 mA	36 bar	7/16" -20 UNF
PT3-30A	802 278	0 to 30	4 to 20 mA	36 bar	7/16" -20 UNF
PT3-07U	802 302	-0.8 (-0.6) to 7*	0 to 10 V	25 bar	7/16" -20 UNF
PT3-18U	802 303	0 (0.5) to 18*	0 to 10 V	36 bar	7/16" -20 UNF
PT3-30U	802 304	0 (0.8) to 30*	0 to 10 V	36 bar	7/16" -20 UNF

*value in brackets designates lowest measurable value; below this value the output signal will be approximately 10 mV

Technical data

Supply voltage		
Nominal		24 Vdc
Total range	current output	8...28 Vdc
	voltage output	10...28 Vdc
Operating current		
4...20 mA output		max. 20 mA
0...10 V output		max. 4 mA
Load resistance		
4 - 20 mA output	$R_L \leq$	$\frac{U_b - 8.0V}{0.02A}$

Sensor lifetime		
PT3 -07 / -18 / -30	full stroke	$\geq 5.000.000$ cycles
Burst pressure		≥ 200 bar
Materials		
Housing cover		Stainless steel
Pressure connect. medium contact		Brass plated
Diaphragm medium contact		Nickel
Medium compatibility		HFC, HCFC, CFC
not suitable for ammonia and inflammable refrigerants !		

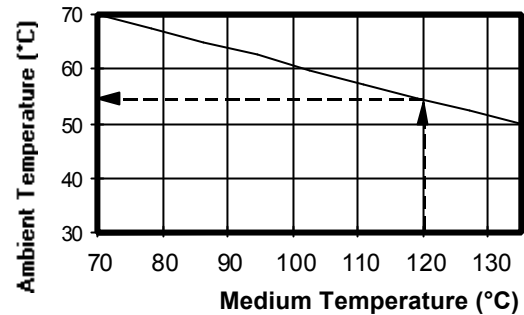


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Electrical insulation test	500 Vdc
Protection class acc. to EN 60529	IP65
Temperatures	
Operating ambient housing	-30.....70 °C
Medium ¹	-40...135 °C
Transport and storage	-40.....85 °C
Vibration at 10... 2000 Hz	max. 4 g
Precision²	
Offset deviation at 20 °C	≤ ±1.0 %
Linearity	≤ ±0.6 %
Hysteresis	≤ ±0.1 %
(all data according to IEC 770)	
Typical error of measurement ³	<u>PT3-07</u> <u>PT3-18/PT3-30</u>
temp. range	≤ ±1.5 % ≤ ±1.0 %
18...22°C	≤ ±2.5 % ≤ ±2.5 %
temp. range	
0...50°C	
(per IEC 770)	

Weight approx.	0.2 kg
Mounting position	not position sensitive



¹⁾ For medium temperatures above 70°C the ambient temperature must be derated as per chart above. For example, at 120°C the ambient temperature of the housing should not exceed 55°C.

²⁾ Percentage related to full sensor range

³⁾ Including linearity, hysteresis, zero and range error

Electrical connection

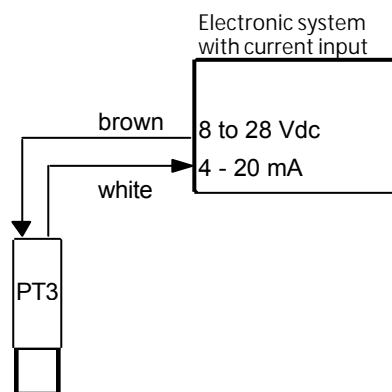
- Factory wired 2.0 m cable (standard)
- 4 ... 20 mA (Two wire connection)
- 0 ... 10 V (Three wire connection)
- Protected against inverted polarity

Note: Changing the length of the electrical connection lead beyond 2 m can have a negative impact on electromagnetic compatibility. Additional protection may be required.

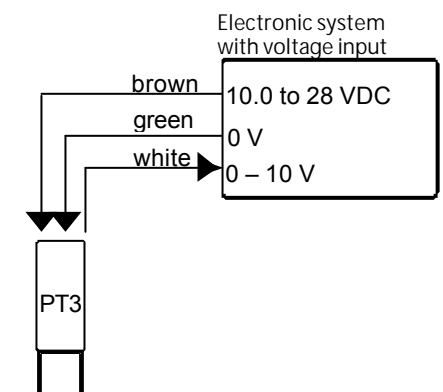
Pressure transmitters with current output (two wire connection) offer the following advantages:

- More suitable for signal transmission over long distance
- Higher immunity to electro-magnetic interference
- Open circuit detection enables fail-safe operation

Two wire connection



Three wire connection





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Conversion from other pressure Transmitters

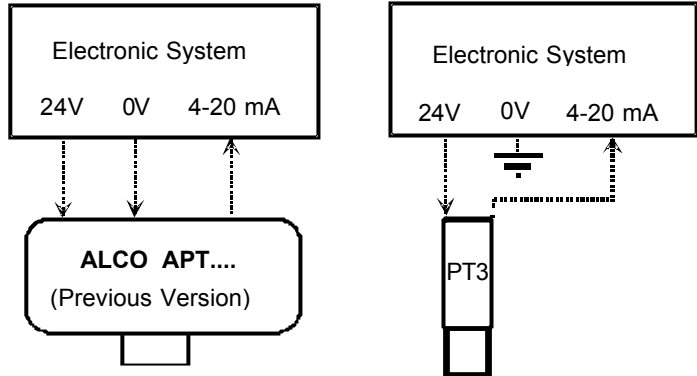
Converting from ALCO PT1/2 to PT3

Converting from standard PT1 / 2 models with 4...20 mA and pressure connection type 'S' to standard PT3 versions can be done on a one to one replacement basis.

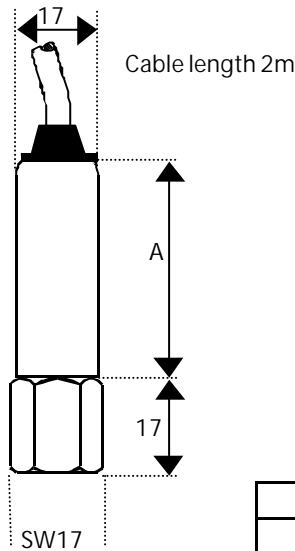
Converting from ALCO APT and other three wire transmitters with 4...20 mA output signal

The ALCO PT3 pressure transmitter with two wire connection can replace ALCO APT as well as all other pressure transmitters (4 ... 20 mA output) with three wire connections (see figure on the right).

In case of problems when converting from types not mentioned above please ask for ALCO application support.



Dimensions (in mm)



	PT3-xxA	PT3-xxU
A	40	50

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