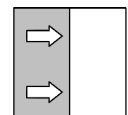




Data sheet

ME50

Programmable pressure transducer / pressure switch



1 Product and functional description

1.1 Performance characteristics

Important features

- Digital measured value display
- Highly precise
- Low hysteresis
- Can be configured
- Turn down 1:5
- Optional switch output
- Robust device model
- Large vibration resistance

Typical applications

- Pressure monitoring
- Content measurement

Application areas

- Procedural engineering
- Process technology
- Environmental technology
- Regenerative energies (biogas, etc.)

1.2 Use as intended

The ME50 is suitable for measuring relative pressure and under-pressure in fluid or gas-like, neutral, non-aggressive media.

If there is dirty or aggressive media in the system, or if this is to be expected, the device must be modified in terms of those parts that come into contact with the media. The device is to be exclusively used for the applications agreed between the manufacturer and the user.

1.3 Function diagram

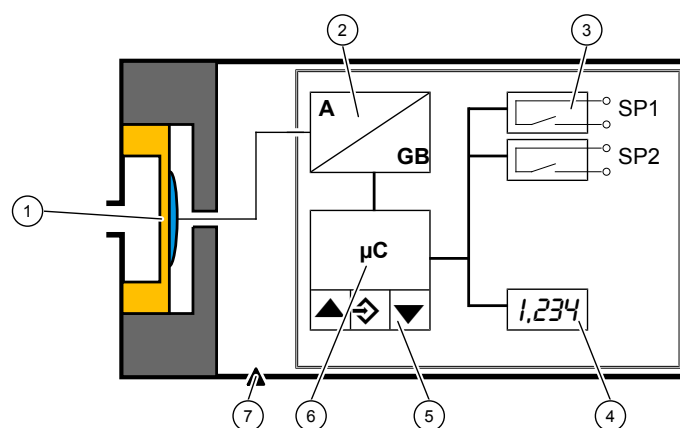


Illustration 1: Function diagram

1	Sensor	2	Signal converter
3	Switching outputs (only 3 conductors)	4	Measured Value Display
5	Keyboard	6	Micro-controller
7	Pressure compensation		

1.4 Design and mode of operation

Depending on the measuring range, the ME50 is produced with a ceramic or a piezo-resistive measuring cell. Two switch outputs are also possible in the version with a 3-conductor connection.

Ceramic measuring cell

In the ceramic measuring cell, the pressure acts directly on the ceramic membrane which in turn deforms. The membrane is constructed electrically like a plate capacitor whose capacity change is proportional to the effective pressure. The electronics that are controlled by a micro-controller implement this change in capacitance into an standard electrical signal.

Piezo-resistive measuring cell

In the piezo-resistive measuring cell, the pressure is applied to a silicon membrane into which the deformation-dependent resistances have been diffused. The material resistance changes proportionally to the effective pressure. The electronics that are controlled by a micro-controller implement this change in resistance into an standard electrical signal.

2 Technical Data

2.1 Generalities

Reference conditions (acc. to IEC 61298-1)		
Temperature error	+15 ... +25 °C	
Relative humidity	45 ... 75 %	
Air pressure	86 ... 106 kPa	860 ... 1060 mbar
Installation position	User-defined	

2.2 Input variables

Ceramic measuring cell

Measuring range	Smallest measuring span	Over-pressure safety
[mbar]	[mbar]	[bar]
-20 ... +20	10	4
-40 ... +40	20	
-100 ... +100	40	
0 ... 60	12	4
0 ... 100	20	
0 ... 200	40	

Piezo-resistive measuring cell

Measuring range	Smallest measuring span	Over-pressure safety
[mbar]	[mbar]	[bar]
0 ... 400	80	1
0 ... 600	120	3
[bar]	[bar]	[bar]
0 ... 1	0.2	3
0 ... 1.6	0.32	7.5
0 ... 2.5	0.5	7.5
0 ... 4	0.8	15
0 ... 6	1.2	15
0 ... 10	2	30
0 ... 16	3.2	90
-0.6 ... 0	0.12	3.0
-1 ... 0	0.2	3.0
-1 ... +0.6	0.32	3.0
-1 ... +1.5	0.5	7.5
-1 ... +3	0.8	15
-1 ... +5	1.2	15
-1 ... +9	2.0	30
-1 ... +15	3.2	90

The measuring cell can be set within the pre-defined measuring range, which is also stated on the type plate, using the parameters E_{NF} and n_L . The smallest settable measuring span is listed for every measuring range and is a minimum of 1:5 in relation to the basic measuring range.

2.3 Output parameters

Depending on the connection type, the versions of the ME50 vary in terms of the number and type of available outputs (see order code):

2-wire connection

No switch output is possible in the 2-conductor connection version.

Analogue output	0 ... 20 mA
Apparent ohmic resistance	$R_L \leq (U_b - 6 \text{ V})/0.02 \text{ A}$
Current limitation	ca. 26 mA

3-wire connection

Analogue output	0 ... 20 mA	4 ... 20 mA	
Apparent ohmic resistance	$R_L \leq (U_b - 6 \text{ V})/0.02 \text{ A}$	$R_L \leq ((U_b - 10 \text{ V}) * 50 \Omega) + 300 \Omega$	
Current limitation	ca. 26 mA		
Switch output	2 Photo MOS relays	not short circuit-proof thermally protected	
	U_{max}	I_{max}	R_{ON}
potential-free (AC/DC)	30V	200 mA	< 1 Ω
PNP/NPN-switching (DC)	U _b		

2.4 Measurement accuracy

Accuracy	± 0.2% of the measuring range (FS)
Including non-linearity, hysteresis, non-repetition, zero-point and end value deviation. Calibrated in a vertical installation position with the process connection facing downwards.	
Temperature drift	± 0.01% FS/K
Zero-point measuring range	Temperature error band via the compensated temperature range
Compensated measurement range	-10 °C ... +70 °C
Long-term stability	< ±0.1 % FS/year

2.5 Auxiliary energy

Rated Voltage	24V DC
Admissible operating voltage	12 ... 30 V DC
Power consumption	< 1 W

2.6 Application conditions

Ambient temperature range	without display	-20 °C ... +80 °C
	with display	-20 °C ... +80 °C
Storage temperature range		-40 °C ... +90°C
Medium temperature range (in operation)		-10 °C ... +85 °C
EMC		EN 61326-1:2013 EN 61326-2-3:2013
RoHS		EN 50581:2012
Type of protection:		IP 65 acc. to EN 60529

Materials of the parts that come into contact with the surroundings		
Housing		CrNi Steel 1.4404, 1.4571
Process adapter TC	light/solid	CrNi Steel 1.4404
Clamp	High pressure	CrNi Steel 1.4308
TC clamp		CrNi steel 1.4301
Front pane		Safety composite glass
M12 plug		Ms nickel-plated, PA, FKM, Ms
Materials of the parts that come into contact with the measuring medium		
Process adapter TC	light/solid	CrNi Steel 1.4404
Clamp	High pressure	CrNi Steel 1.4308
TC seal		FKM (Viton®)
Sensor membrane	ceramic	Aluminium oxide ceramic Al ₂ O ₃ (99.9 %)
	Piezo-resistive	CrNi 1.4435

2.7 Construction design.

All dimensions in mm unless otherwise stated

2.7.1 Dimensional picture

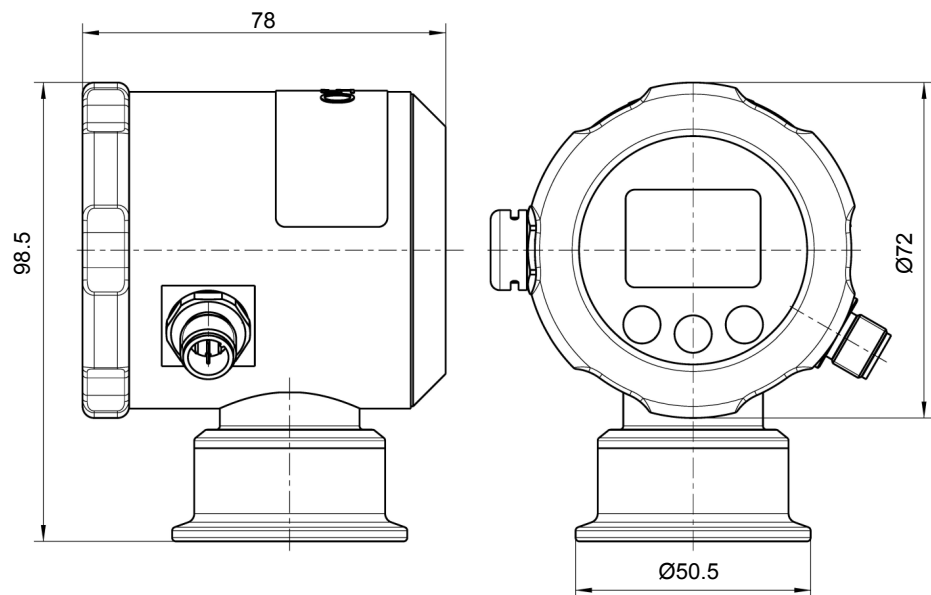


Illustration 2: Dimension drawing

2.7.2 Process connection

The process connection uses a Tri-Clamp connection acc. to DIN 32676. A G½ inch process adapter with a TC flange can be delivered from this connection.

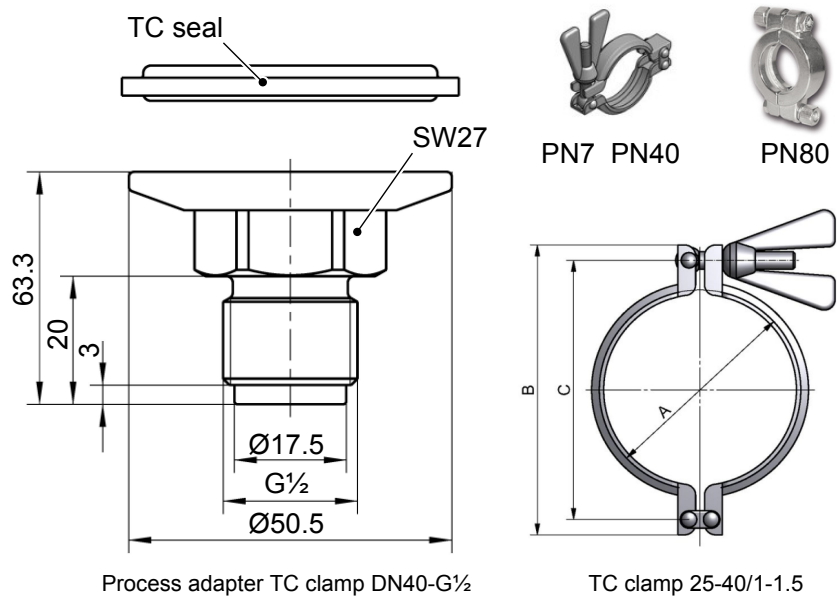


Illustration 3: Dimension drawing process parameters

Planned measures	Operating pressure	A	B	C
TC clamp DN40 light	PN7	53.0	84.5	69.0
TC clamp DN40 solid	PN40	53.0	90.0	57.0
TC clamp DN40 high pressure	PN80	53.5	102	---

Table 1: TC clamp

2.7.3 Electrical connection

2-conductor version

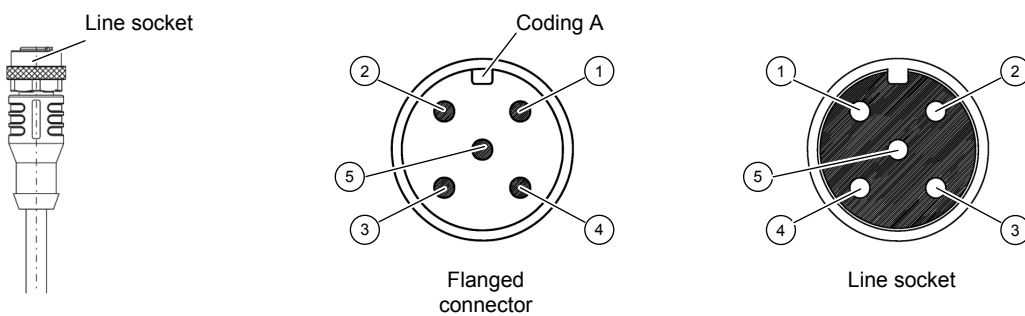


Illustration 4: M12 plug DIN EN 61076-2-101

Pin	Signal name			Cable colour
1	Supply/output	+U _b	+Sig1	brown
2	unused		nc	white
3	Supply/output	-U _b	+Sig2	blue
4	unused		nc	Black
5	Functional earth			green/yellow
A	Coding A			

Table 2: Supply and output signal

3-conductor version

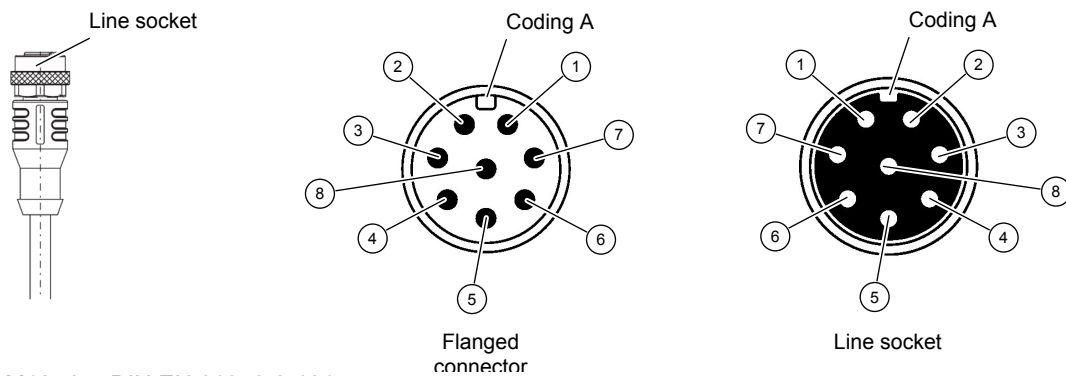


Illustration 5: M12 plug DIN EN 61076-2-101

Without switch output

Pin	Signal name		Cable colour
1	Outlet	+Sig	white
2	Supply	+U _b	brown
3	unused	nc	green
4	unused	nc	yellow
5	unused	nc	grey
6	unused	nc	pink
7	Supply	-U _b	blue
8	Functional earth	FE	red
A Coding A			

Table 3: Supply, and output signal

With switch output

There are three options available for the semiconductor switch contacts K1 and K2.

Potential-free contacts

Pin	Signal name		Cable colour
1	Outlet	+Sig	white
2	Supply	+U _b	brown
3	Switching output 1	K1 (a)	green
4	Switching output 1		K1 (b)
5	Switching output 2	K2 (b)	grey
6	Switching output 2		K2 (a)
7	Supply	-U _b	blue
8	Functional earth	FE	red
A Coding A			

Table 4: Supply, output signal and switch contacts

PNP-switching



Pin	Signal name		Cable colour
1	Outlet		+Sig white
2	Supply		+U _b brown
3	Switching output 1		green
4	unused		nc yellow
5	unused		nc grey
6	Switching output 2		PNP2 pink
7	Supply		-U _b blue
8	Functional earth		FE red
A	Coding A		

Table 5: Supply, output signal and PNP switch contacts

NPN-switching



Pin	Signal name		Cable colour
1	Outlet		+Sig white
2	Supply		+U _b brown
3	Switching output 1		green
4	unused		nc yellow
5	unused		nc grey
6	Switching output 2		NPN2 pink
7	Supply		-U _b blue
8	Functional earth		FE red
A	Coding A		

Table 6: Supply, output signal and NPN switch contacts

2.8 Parameters

The device can be configured on site using the membrane keyboard. The housing must be opened for this. In the 2-conductor versions, the configuration can also be set via connection wire as an alternative. To this end, the Transmitter PC Interface of type EU13 (which is available as an accessory) is required.



NOTICE

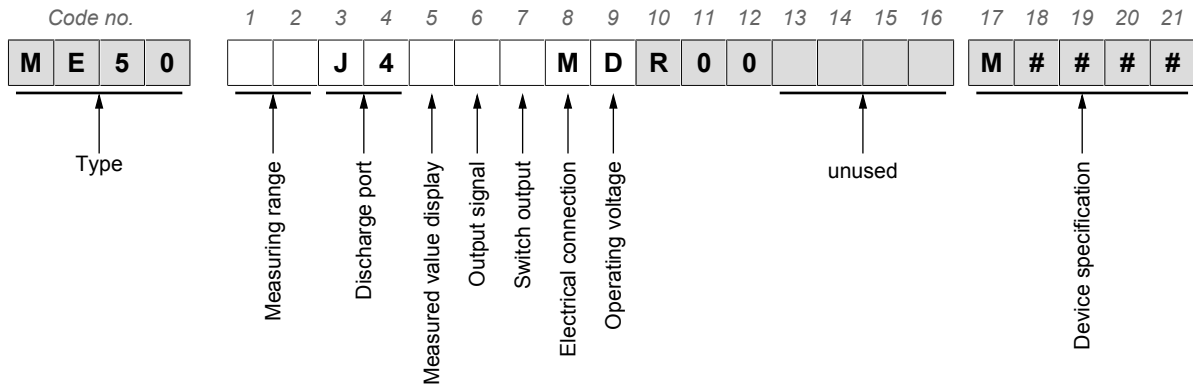
Configuration of the 3-conductor versions

Configuration only on site. Remote configuration with the Transmitter PC Interface like for the 2-conductor version is not possible.

Characteristic curve inversion	Increasing; decreasing
Attenuation	0 ... 200 s
adjustable signal limits	
• upper current limit	3.5 ... 22.5 mA
• lower current limit	3.5 ... 22.5 mA
• Error signal	3.5 ... 22.5 mA
Turn down	1:5

Table 7: Parameters

3 Order Codes



Ceramic measuring cell

[1.2] Measuring range	Measuring cell	
C7 -20 ... +20 mbar	Ceramic measuring cell	
C5 -40 ... +40 mbar		
B4 -100 ... +100 mbar		
58 0 ... 60 mbar		
59 0 ... 100 mbar		
44 0 ... 200 mbar		
83 0 ... 400 mbar		Piezo-resistive measuring cell
C1 0 ... 600 mbar		
02 0...1 bar		
03 0...1.6 bar		
04 0...2.5 bar		
05 0...4 bar		
06 0...6 bar		
07 0...10 bar		
08 0...16 bar		
30 -0.6...0 bar		
31 -1...0 bar		
32 -1...0.6 bar		
33 -1...1.5 bar		
34 -1 ... 3 bar		
35 -1...5 bar		
36 -1...9 bar		
37 -1...15 bar		
[3.4] Discharge port		
J4 Tri Clamp flange connection DN40 DIN 32676 / ISO 2852		

[5] Measured value display	
A	without display
B	3 ½ digit LC display
[6] Output signal	Electrical connection
B	4 ... 20 mA 2-Wire
A	0 ... 20 mA 3-Wire
P	4 ... 20 mA
[7] Switch output	Electrical connection
M	without switch output
N	2 potential-free semiconductor switches AC/DC only 3 conductors
8	2 semiconductor switches PNP-switching DC
9	2 semiconductor switches NPN-switching DC
[8] Electrical connection	
M	M12 plug connection
[9] Operating voltage	
D	24 V DC

3.1 Accessories

Order no.	Planned measures
06411173	Process adapter TC clamp DN40-G½ outer (incl. seal)
04001208	TC clamp light PN7 DN25-40/1-1.5
04001209	TC clamp solid PN40 DN25-40/1-1.5
04001210	TC clamp high pressure PN80 DN25-40/1-1.5
09001844	Connection cable with M12 coupling 8-pin 2 m
06401995	Connection cable with M12 coupling 5-pin 2m
EU13 F200	Transmitter PC interface for 2-conductor transmitter incl. PC software

3.2 Information about the document

This document contains all technical data about the device. Great care was taken when compiling the texts and illustrations; Nevertheless, errors cannot be ruled out.

Subject to technical amendments.



FISCHER Mess- und Regeltechnik GmbH

Bielefelder Str. 37a
D-32107 Bad Salzufflen

Tel. +49 5222-974-0

Fax. +49 5222-7170

web : www.fischermesstechnik.de

eMail : info@fischermesstechnik.de

