



Ex II 3G Ex nA IIC T4
-20 °C ≤ Ta ≤ +60 °C



RoHS II
COMPLIANT

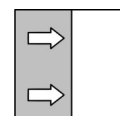


Data sheet

ME50 ... R

Programmable pressure transducer / pressure switch
for explosive areas

Gas explosion protection zone 2, gases and vapours



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.

Explosion hazard area classification

The pressure transducer is suitable as 'Electrical equipment for use in potentially explosive areas', Zone 2 - (Gases and vapours).

Designation as per guideline 2014/34/EU (ATEX):

 II 3G Ex nA IIC T4

$-20\text{ °C} \leq T_a \leq +60\text{ °C}$

1.3 Function diagram

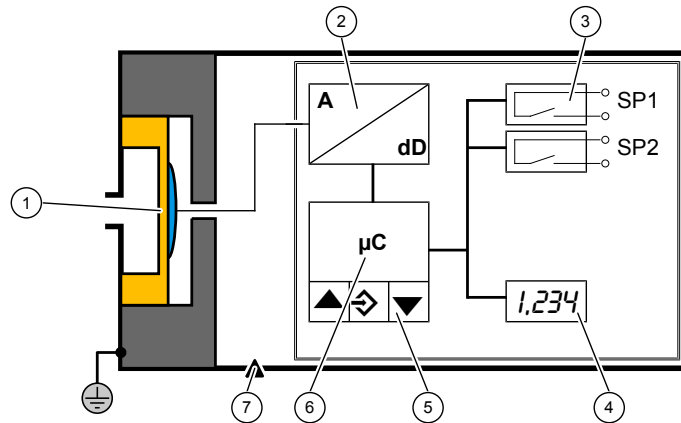


Illustration 1: Function diagram

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 ENf and NL . 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	$\pm 0.2\%$ of the measuring range (FS)
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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	$\pm 0.01\%$ FS/K
Zero-point measuring range	Temperature error band via the compensated temperature range
Compensated measurement range	-10 °C ... +70 °C
Long-term stability	< $\pm 0.1\%$ FS/year

2.5 Auxiliary energy



WARNING

Supply circuit

A CE-conform mains adapter with a slow 200 mA fuse only may be used in the power supply circuit.

Rated Voltage	24 V DC
Admissible operating voltage	12 ... 30 V DC
Absorbed power	< 1 W

2.6 Application conditions

Ambient temperature range	without display	-20 °C ... +60 °C
	with display	-20 °C ... +60 °C
Storage temperature range		-10 °C ... +70 °C
Medium temperature range (in operation)		-10 °C ... +85 °C
ATEX		EN 60079-0:2012 + A11:2013 EN 60079-15:2010
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

Casing		CrNi Steel 1.4404, 1.4571
Process adapter TC Clamp	light/solid	CrNi Steel 1.4404
	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 Clamp	light/solid	CrNi Steel 1.4404
	High pressure	CrNi Steel 1.4308
TC seal		FKM (Viton®)
Sensor membrane	Ceramics	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

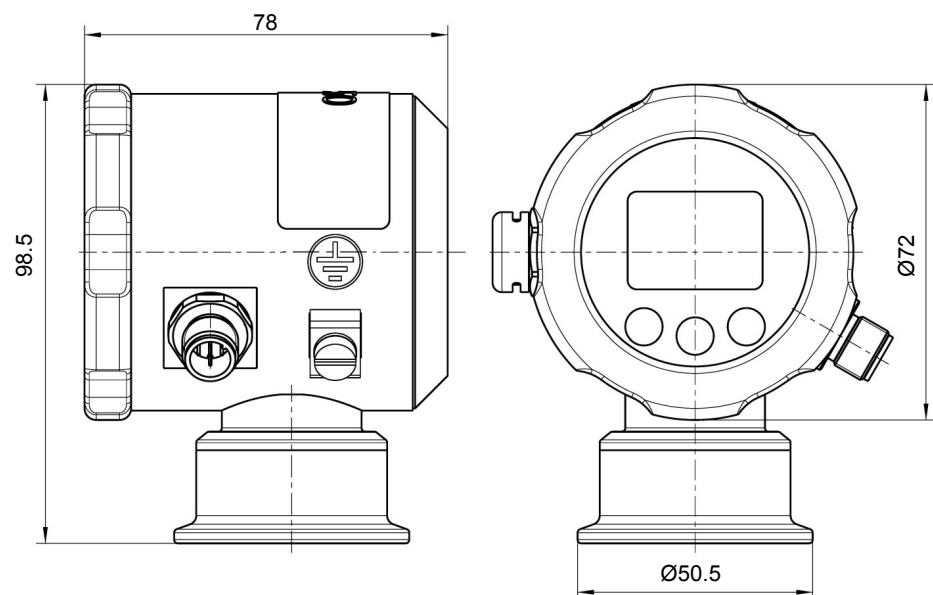


Illustration 2: Dimension drawing

2.7.2 Process connection

The process connection uses a Tri-Clamp connection acc. to DIN 32676. A G $\frac{1}{2}$ inch process adapter with a TC flange can be delivered for this connection.

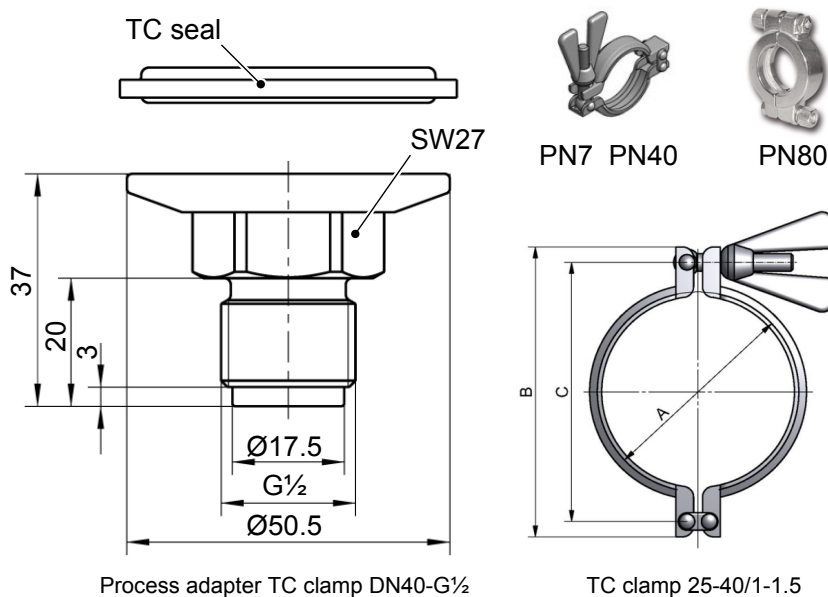


Illustration 3: Dimension drawing process parameters

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

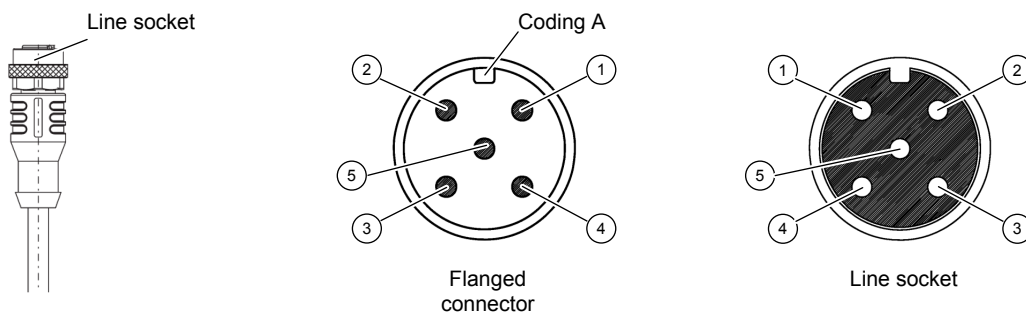


Illustration 4: M12 plug DIN EN 61076-2-101

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

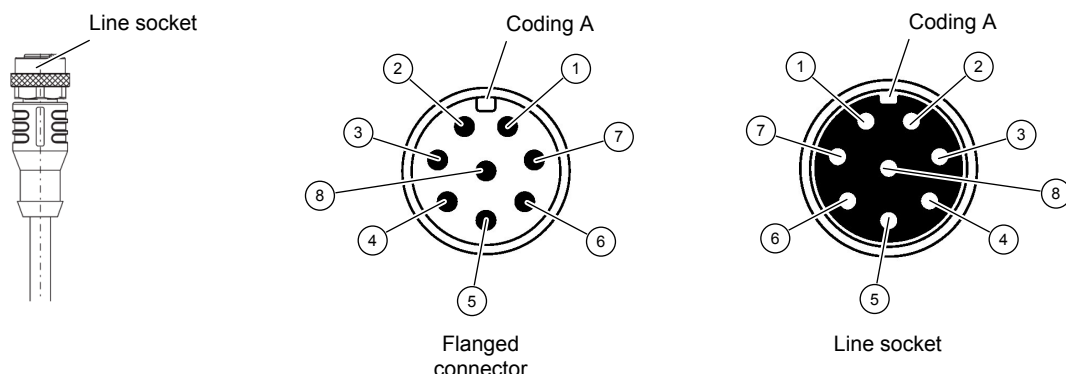
3-conductor version

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) yellow
5	Switching output 2		K2 (b) grey
6	Switching output 2		K2 (a) pink
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		PNP1 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		NPN1 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.

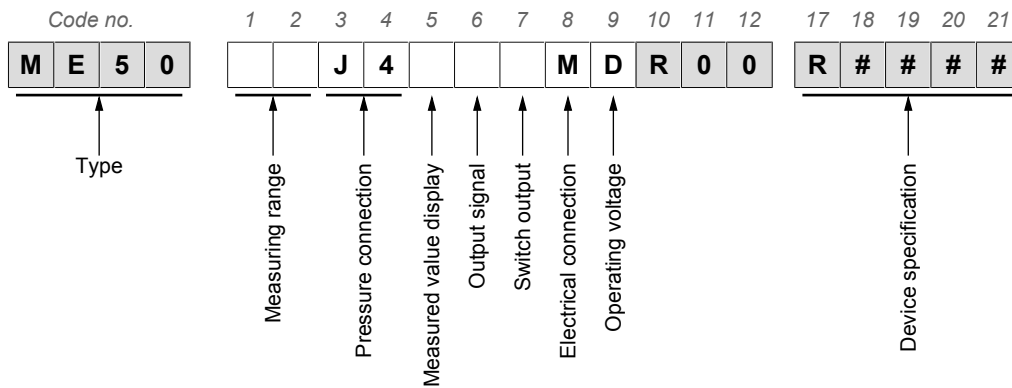
Characteristic curve inversion	Increasing; decreasing
Attenuation	0 ... 200 s
adjustable signal limits	
• upper current limit	3.5 ... 22.5 mA
• lower current limit	3.5 ... 22.5 mA
• Error signal	3.5 ... 22.5 mA
Turn down	1:5

Table 7: Parameters

**WARNING****Remote configuration**

Configuration with the Transmitter PC Interface from a PC is possible for 2-conductor units. The 'remote configuration' is not allowed in Zone 2.

3 Order Codes



[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 circuit	
A	0 ... 20 mA	3-wire circuit	
P	4 ... 20 mA		
[7] Switch output		Electrical connection	
M	without switch output		
N	2 potential-free semiconductor switches	AC/DC	only 3-wire circuit
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		

Device specification

[17] Ex-Classification	
R	Ⓔ II 3G Ex nA IIC T4
[18-21] Order No.	
####	

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	2 m
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 Salzuflen

Tel. +49 5222-974-0

Fax. +49 5222-7170

web : www.fischermesstechnik.de

eMail : info@fischermesstechnik.de

