FISCHER MESS- UND REGELTECHNIK

Instruction Manual

ME49 Pressure Transmitter

for Assignment in Explosion-hazardous Areas per Directive 94/9/EC (ATEX)
Gas explosion proof to Zone 1

Table of Contents

Ex II 2 G
EEx ib IIC T6

1. Safety Instructions

1.1. General

This manual contains detailed information about the product and instructions for its installation, operation and maintenance. Operators and other technical personnel responsible for the equipment must read this thoroughly before attempting to install or operate this equipment. A copy of this manual must always be kept accessible at the place of work for reference by concerned personnel.

Chapter 1 (sections 1.2 through 1.7) contains general as well as specific safety instructions. Chapters 2 through 10, covering topics ranging from intended purpose of the equipment to its final disposal, also include important points relating to safety. Overlooking or ignoring any of these safety points can endanger humans and animals, and possibly cause damage to other equipment.

1.2. Personnel Qualification

Personnel responsible for installation, operation, maintenance and inspection of this product must have the qualifications, training and experience necessary to carry out such work on this type of equipment.

Qualified personnel are people who are able to judge delegated work and possible dangers due to technical education, proficiency and experiences and especially by knowledge about the relevant norms.

When working with explosion proof constructed instruments personnel needs to be educated or instructed resp. have the authorisation to work with explosion proof instruments in explosion-hazardous plants.

1.3. Risks of Disregarding Safety Instructions

Disregarding safety instructions, use of this product for purposes for which it is not intended, and/or operation of this product outside the limits specified for any of its technical parameters, can result in harm to persons, the environment, or the plant on which it is installed. Fischer Mess- und Regeltechnik GmbH will not be responsible for consequences in such circumstances.

1.4. Safety Instructions for Operators

Safety instructions for the proper use of this product must be followed. This information must be available at all times to personnel responsible for installation, operation, maintenance and inspection of this product. Adequate steps must be taken to prevent the occurrence of hazardous conditions that can be caused by electric energy and the convertible energy of the process media. Such conditions can, for example, be the result of improper electrical or process connections. Detailed information is available in relevant published norms (DIN EN, UVW in Germany; and equivalents in other countries), industrial standards such as DVWG, Ex-, GL-, VDE guidelines, as well as regulations of the local authorities (e.g., EVUs in Germany).

The instrument must be put out of action and protected against accidental use if safe operation can not be guaranteed anymore. A reason for this might be one of the following incidents:

- apparent damage of instrument
- failure of electrical function
- longer storage periods at temperatures higher than 85°C
- bad packaging during transport

Repairing is only allowed to be done by Fischer Mess- und Regeltechnik GmbH.

Before the instrument is put into operation again a professional routine test acc. to DIN EN 61010, part 1 needs to be done. This inspection should necessarily be done by Fischer Mess- und Regeltechnik GmbH. Appropiate transport and professional storage of instrument are understood.

1.5. Modifications Forbidden

Modification or other technical alteration of the product is not permissible. This also applies to the use of unauthorized spare parts for repair / maintenance of the product. Any modifications to this product, if and as necessary, should be done only by Fischer Mess- und Regeltechnik GmbH.

1.6. Operational Restrictions

The operational reliability of the product is guaranteed only when used for intended purposes. The product must be selected and configured for use specifically with defined process media. The limiting values of operating parameters, as given in the product specification sheet, must never be crossed.

1.7. Safety Considerations during Installation and Maintenance

The safety instructions given in this manual, existing national regulations relating to accident prevention and the internal safety rules and procedures of the user organization regarding safety during installation, operation and servicing must all be followed meticulously.

It is the responsibility of the users to ensure that only suitably qualified and experienced technical personnel are used for installation, operation and servicing of this equipment.

2. Intended Applications

The 2-wire pressure transmitter ME49... with resistance type measuring cell serves as exact pressure measurement equipment in explosion-hazardous areas. The supply circuit on clamps 1 and 2 must be conform to type of protection “intrinsic safety“ category “ib“.

The product must be used only for applications and under conditions specified by the manufacturer in the data sheet / instruction manual.

The maximum permissible ambient temperature range of -20°C to +60°C may not be exceeded.

Please confer with Fischer Mess- und Regeltechnik GmbH prior to using this transmitter along with polluted or aggressive media. For use with this media it needs to be adapted in every part with direct contact to the media.

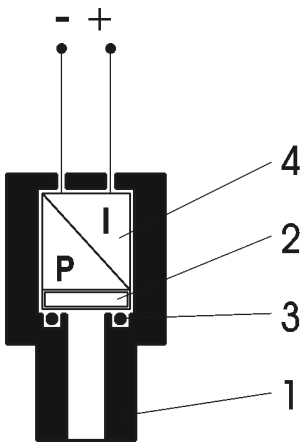
Follow mounting instructions in accordance to application!

Declaration per Directive 94/9/EC (ATEX)

II 2 G EEx ib IIC T6

3. Product Description and Functions

3.1. Schematic Diagram



1. Threaded stem
2. Gauge head
3. O-ring
4. Electric transformer

3.2. Principles of Operation

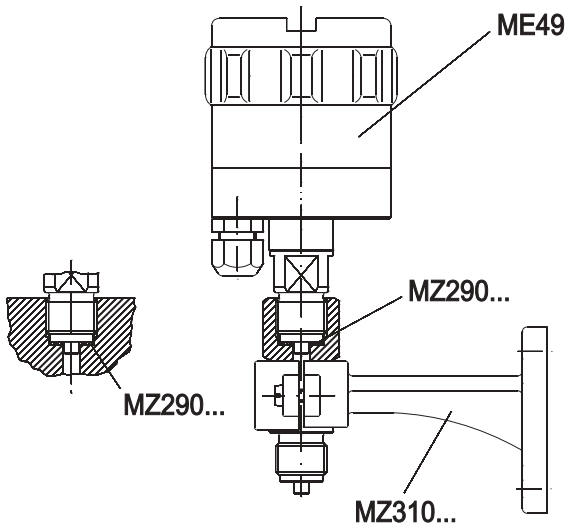
The measuring pressure directly acts on a ceramic membrane which deforms during pressurization.

When the membrane is deformed the output signal of the measuring bridge - located on the back of the membrane - changes.

The electronic transformer located in the housing of the pressure transmitter converts the sensor signal into an electric standard signal.

4. Installation

The instrument is intended for screwing into screw plug holes with cylindric pipe thread and sealing by flat seal by default.



The instrument can be wall mounted by wall mount MZ310... .

Manometer screw connexion MZ27... enables the instrument to be mounted directly on pipe.

The instrument is factory calibrated for vertical mounting, it may be mounted in any direction. If the mounting position is other than vertical the zero point may be adjusted using zero point potentiometer (see 5.2).

To ensure safety during installation and maintenance integrate adequate shut-off valves. By recommended accessories MZ5... the instrument can be

- depressurized or shut down,
- cut off a plant to enable controlling or repairing,
- operational checked on site.

The shut-off valves offer to vent the connected pipework by vent screw.

4.1. Process Connection

Any hazards caused by pressure on the instrument are to be avoided by appropiate steps.

- Qualified and authorized personnel only.
- Only for intended mechanical process connection (see ordering code on type plate of instrument).
- Ensure that process equipment and pressure lines are at atmospheric pressure before making pressure connections.
- The instrument should be provided with suitable protection against pressure surges (e.g., snubber or pulsation damper).
- Ensure that the mechanical configuration and materials of construction of the instrument are compatible with the process media.
- Ensure that process pressure is always less than the specified safe pressure rating.

4.2. Electrical Connection

The ME49 is an intrinsically safe equipment for application in explosion-hazardous areas. Specifications of EC type-examination certificate apply to connection of the intrinsically safe circuit.

- **Caution! During operation in explosion-hazardous areas the specifications given in EC type-examination certificate (see pages 10-12) as well as the local regulations and directives for construction and operation of electrical plants in explosion-hazardous areas must be followed.**
- Qualified and authorized personnel only (see 1.2).
- Switch off electrical power to the plant before attempting electrical installation work of any kind.
- Make electrical connections to the instrument through a suitable energy-limiting safety device (isolation or zener barrier).

5. Commissioning

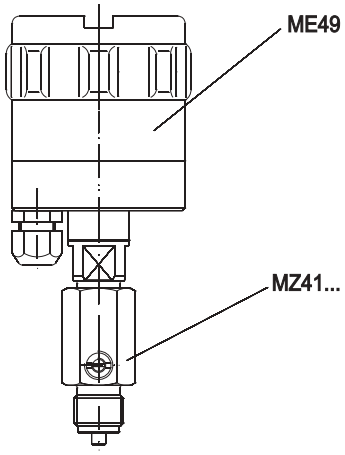
- Power supply, signal cabling, pressure and measurement pipes to the instrument must be correctly selected to meet operational requirements, and installed in a way that does not cause physical stress to the instrument.
- The pressure line must have a downward gradient throughout, from the pressure instrument to the process vessel / pipe. This is to prevent formation of air / gas pockets (for liquid applications) and liquid plugs (for air / gas applications). If this continuous downward gradient cannot be provided for any reason, then suitable water and / or air separation devices must be inserted in the pressure line.
- The pressure line must be kept as short as possible and must not have short bends to avoid measurement errors induced by pressure line delays.
- Carefully check the pressure-tightness of pressure connection before start-up.

5.1. Shock Pressure Moderation

Any hazards caused by pressure on the instrument are to be avoided by appropiate steps.

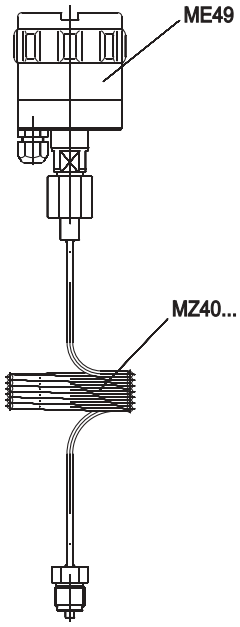
During pulsating pressure on the plant disturbances in functional capability may occur. To avoid this we recommend installing absorbers into the pressure line.

For gaseous media



Adjustable attenuator valve MZ410. Adjust needle valve during operating condition that way, that the output signal is calmed to the desired rate.

For liquid media



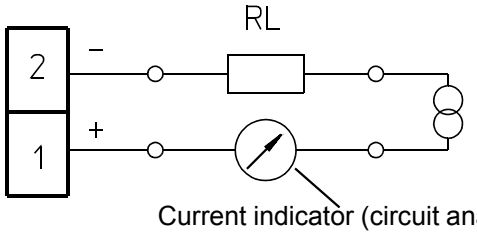
Capilliary reactive coil MZ40

5.2. Zero Point and Measuring Range Adjustment

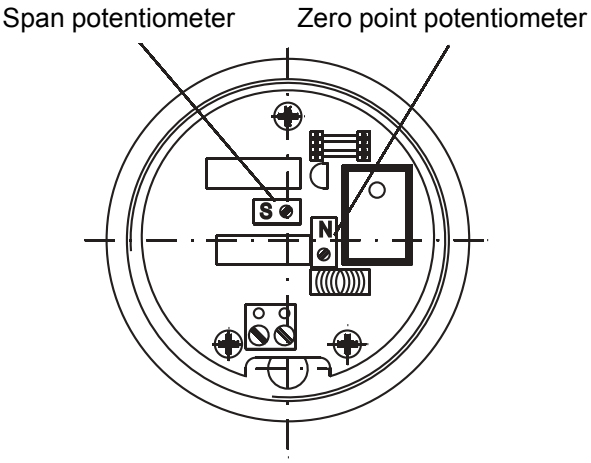
Carry out adjustment works only outside of explosion hazardous areas.

Because the pressure transmitters are factory calibrated adjustment works are not necessary at normal case. If the output signal needs to be adjusted use potentiometers “S“ and “N“.

The potentiometers are accessible after the housing cover is unscrewed. The instrument is then electrical connected according to the connection scheme and an additional current indicator is connected between pressure transmitter and auxiliary power.



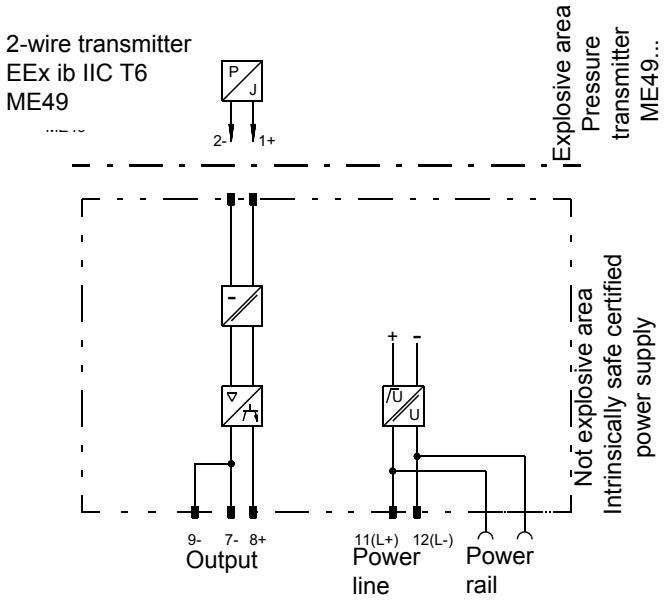
Connection scheme
(only for adjustment work outside of explosion hazardous area)



Adjustment Sequence:

- Switch on auxiliary power
- Measuring system depressurized: p = 0
  Default measuring range display = 4.0 mA
- Correct pressure transmitter's output signal offset displayed by current indicator using zero point potentiometer (N).
- Change pressure to upper range value (e.g. by hand pump and pressure comparison device) Display = 20 mA. Correct offset using span potentiometer (S).
- In a final step double check zero point and measuring range. Repeat adjustment sequence if needed.

5.3. Connection Scheme



6. Maintenance

The instrument is inherently maintenance-free.

However, to ensure reliable operation and maximize the operating life of the instrument, it is recommended that the instrument, its external electrical and process connections and external connected devices be regularly inspected, e.g.:

- Check the output signal.
- Check all pressure connections for leak-tightness.
- Check the integrity of all electrical connections of the instruments.

Inspection and test schedules depend on operating and site conditions. The operating manuals of other equipment to which the instrument is connected must be read thoroughly to ensure that all of them work correctly when connected together.

7. Transport

The product must be protected against shock and vibration during transport. It must therefore be properly packed, preferably in the original factory packaging, whenever it is to be transported.

8. Service

Any defective devices or devices with missing parts should be returned to Fischer Mess- und Regeltechnik GmbH. For quick service contact our service department.

Remaining medium in and on dismantled measuring instruments may cause danger to persons, environment and equipment. Take reasonable precautions! Clean the instrument thoroughly if necessary.

9. Accessories

N.A.

10. Disposal

Protect your environment!
Use the product in accordance with relevant regulations. Please be aware of environmental consequences of disposal at the end of the product's life, and take care accordingly.

11. Specifications

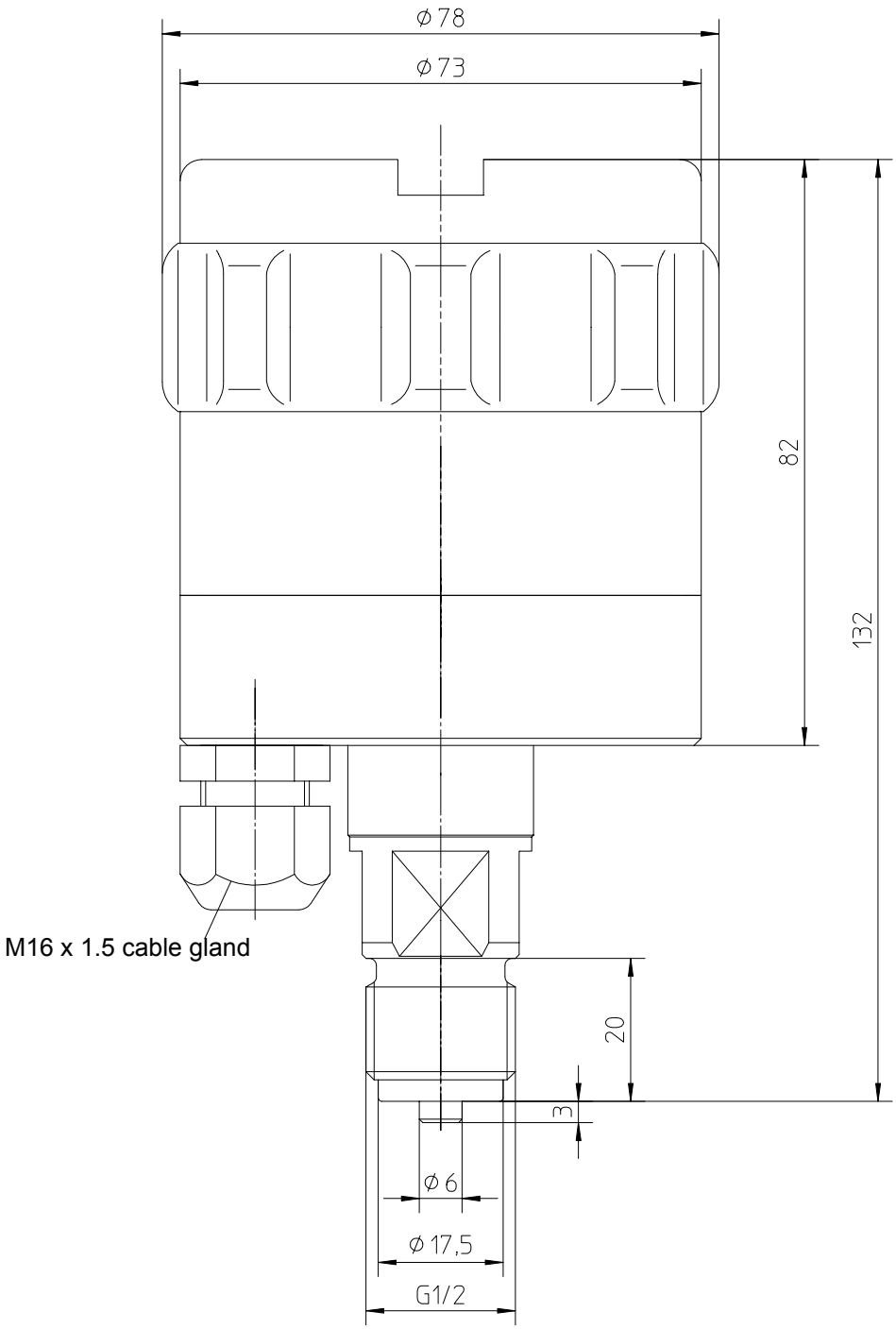
Allgemein

Measuring range	40 mbar	60 mbar	100 mbar	160 mbar	250 mbar	400 mbar	600 mbar	1 bar
Safe overpressure limit	4 bar	4 bar	4 bar	6 bar	6 bar	6 bar	10 bar	4 bar

Measuring range	1.6 bar	2.5 bar	4 bar	6 bar	10 bar	16 bar	25 bar	40 bar
Safe overpressure limit	4 bar	8 bar	8 bar	12 bar	32 bar	32 bar	60 bar	60 bar

Linearity	± 0.5% FS
Hysteresis	< 0.1% FS
Perm. ambient temperature	-20° to +60°C
Perm. medium temperature	-20° to +60°C
Perm. storing temperature	-30° to +70°C
Electrical Data	
Power supply	**24 V DC nominal (Range 15 - 30 V DC)**
Limit values for loop power supply	**$U_i \leq$ 30 V** **$I_i \leq$ 100 mA** **$P_i \leq$ 750 mW**
Inner effective capacity	C_i 15 nF
Inner effective inductivity	L_i 90 µH
Output signal	4... 20 mA
Electrical connection	2-wire
Output load impedance	≤ 450 Ω or R_L [Ω] ≤ (UB-15 V) / 0.02 A
Output current limit	approx. 30 mA
Temperature coefficient: zero	0.4 % FS/10 K
Temperature coefficient: span	0.05 % FS/10 K
Type of protection	**EEx ib IIC T6**
Declaration acc. to directive 94/9/EC	**CE0032 ⟨Ex⟩ II 2 G**
EC-Type Examination Certificate	**BVS 03 ATEX E 414**
Connection, Materials, Mounting	
Pressure connection	G1/2B threaded stem according to DIN EN 837
Electrical connection	Internal clamps, M16 x 1.5 cable gland
Protection class	IP 65 acc. to DIN EN 60529
Material: air/gas contact parts	Chrome-nickel-Steel 1.4571, ceramic, FPM (fluorelastomere)
Material: housing	Coated aluminium
Mounting	- Mounting by connection shank or sleeve per DIN EN 837 - Wall-mounting by mounting panel MZ 310... and manometer connection unit MZ 290... - Screwed manometer connection MZ 27... enables direct connection of pipework

12. **Dimensions** (all units in mm unless otherwise stated)



13. Ordering Code

Pressure Transmitter
EEx ib IIC T 6

ME49

F			8	7	B	E	A	0	0	0	0

Construction
Construction in Fischer type field housing

Measuring Range

0 . . . 40 mbar	>	5 7
0 . . . 60 mbar	>	5 8
0 . . . 100 mbar	>	5 9
0 . . . 160 mbar	>	6 0
0 . . . 250 mbar	>	8 2
0 . . . 400 mbar	>	8 3
0 . . . 0.6 bar	>	0 1
0 . . . 1 bar	>	0 2
0 . . . 1.6 bar	>	0 3
0 . . . 2.5 bar	>	0 4
0 . . . 4 bar	>	0 5
0 . . . 6 bar	>	0 6
0 . . . 10 bar	>	0 7
0 . . . 16 bar	>	0 8
0 . . . 25 bar	>	0 9
0 . . . 40 bar	>	1 0
-1 . . . 0 bar	>	3 1
-1 . . . 0.6 bar	>	3 2
- 1 . . . 1.5 bar	>	3 3
- 1 . . . 3 bar	>	3 4
- 1 . . . 5 bar	>	3 5
- 1 . . . 9 bar	>	3 6
- 1 . . . 15 bar	>	3 7

Pressure Connection
G½ B male threaded stem (bottom), stainless steel > 8 7

Electrical Output Signal
4 - 20 mA 2-wire > B

Electrical Connection
Clamps > E

Supply Voltage
15 - 30 V DC > A

14. Declaration of Conformity

FISCHER
MESS- UND REGELTECHNIK

TÜV CERT
DIN EN ISO 9001 : 2000
08 100 981909

EG-Konformitätserklärung

Wir erklären in alleiniger Verantwortung, dass nachstehend genannte Produkte

EC-Declaration of Conformity

We declare under our sole responsibility that the products mentioned below

Fischer-Typen / Fischer-models
Datenblätter - Bedienungsanleitung / Data sheets - operating instructions

Drucktransmitter / Pressure Transmitter
ME49# # # # # # # # # # # #
DB_D_ME49 DB_GB_ME49
BA_D_ME49 BA_GB_ME49

gemäß gültigem Datenblatt die Anforderungen der

specified by the actual data sheet complies with the regulations of the

EG-Richtlinie	Explosionsschutz-Richtlinie	EC-directive	Guideline for explosion protection
2004/108/EG (EMV)	94/9/EG	2004/108/EC (EMC)	94/9/EC

erfüllen.

Die Produkte wurden entsprechend den Normen

DIN EN 61326-1:2004-05 EN 50014 (1997)
DIN EN 61326-2-3 EN 50020 (2002)
DIN EN 61010-1:2002-08

The instruments have been tested in compliance with the norms

DIN EN 61326-1:2004-05 EN 50014 (1997)
DIN EN 61326-2-3 EN 50020 (2002)
DIN EN 61010-1:2002-08

geprüft.

Die EG-Baumusterprüfung wurde unter

The EC-type test has been carried out in compliance with

BVS03 ATEX E414

erstellt.

Kennzeichnung:

Marking:

Ex II 2 G EEx ib IIC T6

Benannte Stelle für die QS-Überwachung

Named authority for the quality control

TÜV NORD CERT GmbH *0044*

Bad Salzuflen, 05.12.2007
(Ort, Datum / place, date)

(rechtsverb. Unterschrift / authorized signature)

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Postbank Hannover
(BLZ 250 100 30)
Kto-Nr.: 0201 830 307
BIC: PBNKDEFF
IBAN: DE98250100300201830307

Sitz: Bad Salzuflen
Amtsgericht Lemgo HRB 226
Geschäftsführer
Günter B. Gödde

15. EC-Type Examination Certificate

DEKRA

Translation

(1) # EC-Type Examination Certificate

(2) **- Directive 94/9/EC -**
Equipment and protective systems intended for use in potentially explosive atmospheres

(3) **BVS 03 ATEX E 414**

(4) **Equipment:** **Pressure transmitter type ME 49 ********000***

(5) **Manufacturer:** **Klaus Fischer**

(6) **Address:** **32107 Bad Salzuflen, Germany**

(7) The design and construction of this equipment and any acceptable variation thereto are specified in the schedule to this type examination certificate.

(8) The certification body of Deutsche Montan Technologie GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in the test and assessment report BVS PP 03.2268 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with:

EN 50014:1997 + A1 – A2 General requirements
EN 50020:2002 Intrinsic safety 'i'

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate

(12) The marking of the equipment shall include the following:

II 2G EEx ib IIC T6

Deutsche Montan Technologie GmbH
Bochum, dated 02. December 2003

Signed: Dr. Jockers
Certification body

Signed: Dr. Eickhoff
Special services unit

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Germany Phone +49 234/3696-105 Fax +49 234/3696-110 E-mail zs-exam@dekra.com
(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)

DEKRA

(13) Appendix to

(14) # EC-Type Examination Certificate

BVS 03 ATEX E 414

(15) 15.1 Subject and type

	type ME 49 * ** ** * * * 000*
Pressure transmitter	
Construction in Fischer type field housing	= F
Measuring range	
0 up to 40 mbar	= 57
0 up to 60 mbar	= 58
0 up to 100 mbar	= 59
0 up to 160 mbar	= 60
0 up to 250 mbar	= 82
0 up to 400 mbar	= 83
0 up to 0.6 bar	= 01
0 up to 1 bar	= 02
0 up to 1.6 bar	= 03
0 up to 2.5 bar	= 04
0 up to 4 bar	= 05
0 up to 6 bar	= 06
0 up to 10 bar	= 07
0 up to 16 bar	= 08
0 up to 25 bar	= 09
0 up to 40 bar	= 10
-1 up to 0 bar	= 31
-1 up to 0.6 bar	= 32
-1 up to 1.5 bar	= 33
-1 up to 3 bar	= 34
-1 up to 5 bar	= 35
-1 up to 9 bar	= 36
-1 up to 15 bar	= 37
Pressure connection: G1/2B male threaded stem	G1/2B = 87
Output signal	
4..20 mA 2-wire (ascending characteristic)	= B
Electrical connection	
Terminals	= E
Supply voltage	
DC 15 V up to 30 V	= A
Diaphragm seal	
Without diaphragm seal	= 0
With diaphragm seal	= 1

DEKRA EXAM GmbH Dinnendahlstrasse 9 44809 Bochum Germany Phone +49 234/3696-105 Fax +49 234/3696-110 E-mail zs-exam@dekra.com
(until 31.05.2003: Deutsche Montan Technologie GmbH Am Technologiepark 1 45307 Essen Germany)

DEKRA

15.2 Description

The pressure transmitter type ME 49 ********000* is to measure non-flammable media and transmits the pressure signal into an intrinsically safe circuit (4..20 mA current loop).

The pressure transmitter consists of a light metal housing which clearance contains insulating plates with partially casting compound covered electronic components.

Pressure sensors adjusted according to respective application and process connection are inbuilt into the bottom of the housing.

The intrinsically safe supply and signal circuit is wired into the housing and applied to the clamps.

15.3 Parameters

17.3.1 Supply and signal circuit

Voltage	U_i	DC		30	V
Current	I_i			100	mA
Power	P_i			750	mW
Effective internal capacity	C_i			15	nF
Effective internal inductivity	L_i			90	µH
Capacity between circuit and housing			≤	2.2	nF

17.3.2 Ambient temperature range $-20°C \leq T_a \leq +60°C$

(16) Test and assessment report
BVS PP 03.2268 EG as of 02.12.2003

(17) Special conditions for safe use

None

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, 06.11.2007
BVS-Scha/Ar E 1562/07

DEKRA EXAM GmbH

Certification body

Special services unit

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