FISCHER MESS- UND REGELTECHNIK

Operating Manual

DE39 | **Digital differential pressure transmitter**

With internal pressure sensors

GL type tested certificate no. 59 364 - 08 HH

Table of contents

1 Safety Instructions

1.1 General

This operating manual contains instructions fundamental to the installation, operation and maintenance of the device that must be observed unconditionally. It must be read by the assembler, operator and the specialized personnel in charge of the device before it is installed and put into operation.

This operating manual is part of the product and must be kept close by where it is easily accessible to the responsible specialized personnel.

The subsequent sections, in particular the instructions on assembly, commissioning and maintenance, contain important safety instructions, non-observance of which can endanger persons, animals, the environment and physical objects.

1.2 Personnel Qualification

The device may only be installed and commissioned by specialized personnel familiar with the installation, commissioning and operation of this product.

Specialized personnel are persons who can assess the work they have been assigned and recognize potential dangers by virtue of their specialized training, their skills and experience and their knowledge of the relevant standards.

1.3 Risks due to Non-Observance of Safety Instructions

Non-observance of these safety instructions, the intended use of the device or the limit values given in the technical specifications can be hazardous or cause harm to persons, the environment or the system itself.

The manufacturer will not be liable for damage claims if this should happen.

1.4 Safety Instructions for the Operating Company and the Operator

The safety instructions on correct operation of the device must be observed. The operating company must make them available to the installation, maintenance, inspection and operating personnel.

Dangers arising from electrical components, energy discharged by the medium, escaping medium and incorrect installation of the device must be eliminated. For more information, please see the applicable national and international regulations.

In Germany these are the DIN, EN, accident prevention regulations (UVV) and - for industry-specific individual applications - also in the industry guidelines issued by the DVWG, Ex, GL, etc. as well as VDE and local EVUs.

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1.5 Unauthorised Modification

Modifications of or other technical alterations to the device by the customer are not permitted. This also applies to replacement parts. Any modifications / alterations required must be carried out by Fischer Mess- und Regeltechnik GmbH only.

1.6 Inadmissible Modes of Operation

The operational safety of this device can only be guaranteed if it is used as intended. The device model must be suitable for the medium used in the system. The limit values given in the technical data may not be exceeded.

1.7 Safe working practices for maintenance and installation work

The safety instructions given in this operating manual, any nationally applicable regulations on accident prevention and any of the operating company's internal work, operating and safety guidelines must be observed.

The operating company is responsible for ensuring that all required maintenance, inspection and installation work is carried out by qualified specialized personnel.

1.8 Pictogram explanation

WARNING!
… indicates a potentially dangerous situation, non-observance of which could endanger persons, animals, the environment or objects.

INFORMATION!
… highlights important information efficient and smooth operation.

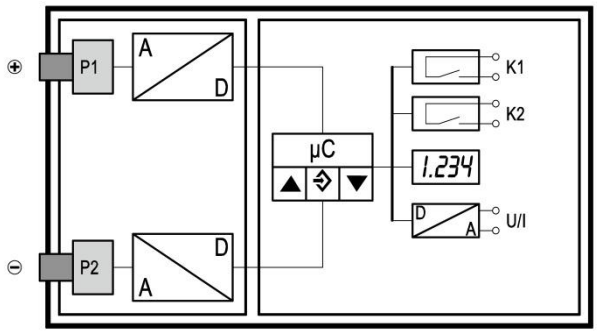
TIP!
… indicates recommendations that are not specifically necessary in certain situations but which could be useful.

2 Application Purpose

Transmitter with analogue output and display, and switching unit for differential pressure for liquid and gaseous media.

3 Description of the Product and Functional Description

3.1 Function Diagram



3.2 Design and mode of operation

The unit is based on an electronic analysis switch that analyses the measuring signals from two integrated pressure sensors. The signals of the pressure sensors can be displayed separately for testing.

The integrated pressure sensors work with ceramic pressure measuring cells. The signals are digitalised and made available to the analysis unit for further processing.

The main task is to calculate the differential pressure that can be displayed and analysed. The analysis allows the configuration of two independent switching points and the provision of an output signal that is proportional to the differential pressure.

The rated pressures of the integrated sensors and the differential pressure measuring range are set ex-works and shown on the type plate. The differential pressure measuring range can be spread 10:1.

4 Installation and Assembly

The device is designed for installation onto flat assembly plates. For screw connection to the assembly plate, the device features four assembly bores on its back, which can be used for Ø 3.5 mm tapping screws.

Optionally, the device can be supplied with a wall mounting plate (see order code).

The casing protection class IP65 is only guaranteed if a suitable connection cable is used.

If the device is intended for outdoor use, we recommend permanently protecting the membrane keypad against UV radiation and using a suitable enclosure or at least the erection of a sufficiently dimensioned canopy as a protection measure against constant rain or snow.

4.1 Process connection

- By authorized and qualified specialized personnel only.
- The pipes need to be depressurized when the device is being connected.
- Appropriate steps must be taken to protect the device from pressure surges.
- Check the suitability of the device for the media to be measured.
- Maximum pressures must be observed.
- Check that the pressure connections do not leak before commissioning.

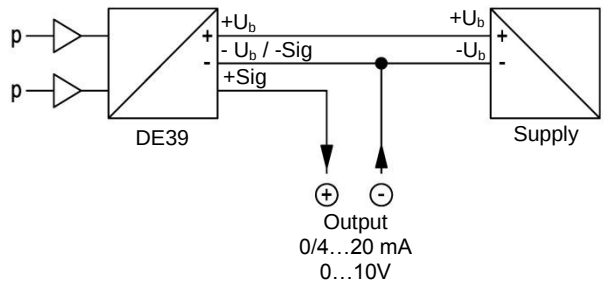
The pressure sensing lines need to be kept as short as possible and installed without sharp bends to avoid interfering delay times.

The pressure connections are marked with (+) and (-) symbols on the device. For differential pressure measurements, the higher pressure is connected to the (+) side and the lower pressure to the (-) side of the device.

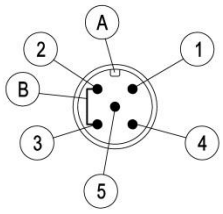
4.2 Electronic connection

- By authorized and qualified specialized personnel only.
- The electrical connection of the device shall be performed according to relevant VDE and local electricity board regulations.
- Disconnect the system from the mains before connecting the device.
- Add a fuse adapted to the energy requirements.

4.2.1 3 wire connection

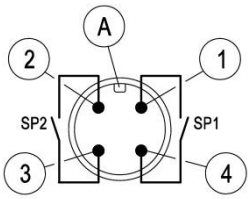


4.2.2 Socket assignment



Pin	Signal name		Cable colour
1	Supply	$+U_b$	brown
2	Delivery	-Sig	white
3	Supply	$-U_b$	blue
4	Delivery	+Sig	black
5	n.c.		
A	Coding		
B	Bridge		

4.2.3 Switching outputs



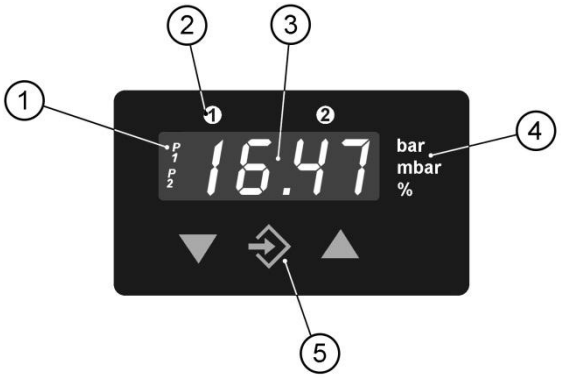
Pin	Signal name		Cable colour
1	Switch output 1	SP1	brown
2	Switch output 2	SP2	white
3	Switch output 2	SP2	blue
4	Switch output 1	SP1	black
A	Coding		

5 Commissioning

All electrical supply, operating and measuring lines, and the pressure connections must have been correctly installed before commissioning. All supply lines are arranged so that there are no mechanical forces acting on the device.

Check that the pressure connections do not leak before commissioning.

5.1 Display



Pos	Designation
1	Display function
2	Status display of the switching outputs
3	Measured Value Display
4	Measuring value unit
5	Keyboard

The 3½ digit LED display shows the current differential pressure in normal mode. The symbols **P1** and **P2** on the left next to the display are backlit depending on the selected display function (see 5.3.2.).

The selected measuring unit is backlit to the right of the display. Two light diodes ① ② above the display symbolise the status of the switching outputs (LED shines = switch is closed).

When configuring the parameters, the display either shows the respective menu point or the associated parameter value. The device continues to work whilst the parameters are being set; apart from two exceptions, the changes come into effect immediately.

The exceptions are a change in the switching times - the previously valid time must run down - and a change in the support point table (see 5.3.8). In this case, all output signals and switching statuses are frozen until the changes have been completed.

Please note that for a 3½ digit display, only numbers between -1999 and +1999 can be shown.

5.2 Operating keys

The operating keys have the following function:

▼	Page down menu Reduce value
⇨	Enter key
▲	Page up menu Increase value

By using the middle ⇨ key on the membrane keypad you can access the parameter menu (setting mode). The reading now shows the text *ESC*.

Press the right button ▲ to move upwards in the menu and select a large range of parameters.

Press the left button ▼ to move downwards in the menu, return to the parameters by pressing *ESC*.

Press the middle key ⇨ to call up a parameter.

You can set the parameter value using the keys ▼ and ▲.

To confirm a set parameter value, press the key ⇨.

All set parameters are only saved when the user leaves the parameter menu via *ESC*.

5.3 Parameters

For commissioning there is a multitude of setting options for optimum adaptation of the device to the measuring point and task at hand. This section covers these options step by step.

Depending on the current device model, some menu items may not be available. For instance, all characteristic curve functions are hidden in the menu if the device does not have a signal output.

The device can also be completely configured easily on the PC via a Transmitter PC Interface EU03. Here, all parameters are directly visible and accessible. Also, the entire configuration can be loaded, saved and documented in a printout. For more information about this program, please refer to the documentation on the Transmitter PC Interface.

5.3.1 Selecting the pressure unit

First select the required pressure measuring unit. The currently valid unit is backlit on the right next to the display. To make the settings, press the middle button ⇨ and then search for the parameter *Ein* via the right button ▲. Then press ⇨ again and change the display value via ▲ or ▼. After selection, save the value with ⇨ and *Ein* appears again in the display.

Then leave the configuration mode. Press ▼ until *ESC* appears and then ⇨. The pressure currently measured is now shown. The correct pressure unit should be backlit to the right of this figure.

The display range is restricted to ±1999. Therefore, it may not be possible to select all defined pressure units in some cases.

5.3.2 Display setting

In DE39 the differential pressure is calculated by subtracting two relative pressures P1 and P2. In some cases it is helpful if these values can be viewed separately. You can select the display value with the *dSP* parameter.

Parameter	
dSP = 0	shows the relative pressure P1 (Symbol P1 shines)
dSP = 1	shows the relative pressure P2 (Symbol P2 shines)
dSP = 2	shows the differential pressure at P1-P2 (Symbols P1 and P2 shine). This value is the default value

5.3.3 Zero-point control and adjustment

Because the differential pressure can be blanketed by static pressures due to the arrangement of the two external pressure sensors, the differential pressure when the system is in an idle state is not always zero.

The current differential pressure can be set to zero via the menu item *-0-*.

The value saved in this parameter is subtracted from the measured differential pressure, i.e. the static differential pressure is eliminated. The display now shows zero.

5.3.4 Damping and zero-point stabilising

If there are unsteady pressure readings at this point of time or during operation, you can use parameters *dAM* and *nP* to stabilise the reading (and the output signal).

The effect of the *dAM* parameter corresponds to a capillary throttle. However it only impacts on the

display, output signal and switching points, not on the load cell itself. This parameter can be used to set the response time to pressure jumps. The value range comprises 0,0 s to 100,0 s.

But with maximum damping, it will take more than 2 minutes for the reading also to reach zero after a pressure jump from nominal pressure (100 %) to zero!

In many cases, unsteady readings are not a problem during normal operating mode, but this is not true for the idle state, i.e. if zero (differential) pressure is expected.

This is the purpose of the parameter nP. Its value defines a measuring range around zero. Within this range the measuring value is set to zero.

Example:
A value of 0,08 bar is entered for nP. In this case, all pressures that lie within the range -0,08 bar to +0,08 bar are set to zero. Zero only disappears from the display when the pressure exceeds these tolerances. The pressure value and display however do not correspond exactly. They only correspond again at twice the value, i.e. from 0,16 bar.

5.3.5 Setting the output signal

The transmitter output signal primarily depends on the sensed pressure. However, you have the option of adjusting the output signal to a large extent to suit your requirements.

However the basic measuring range (indicated on the type label) and the type of output signal (voltage / current) are not variable.

Parameters nA (start of measuring range) and nE (End of measuring range) define the two pressures between which the output signal will change at all. Both values are adjustable across the entire basic measuring range. The set values always refer to pressure (in the relevant measuring unit) and are converted when the measuring unit is changed.

The assigned signal values for nA and nE are invariable (type label, e.g. 0…10 V or 4…20 mA).

If nA is smaller than nE this is referred ´to as a rising characteristic curve. The output signal grows as the pressure increases.

If ME is smaller than MA, this is a decreasing characteristic curve and the output signal decreases with the falling pressure.

The difference of the two values nA and nE must be at least 10% of the basic measuring range. The device cannot accommodate larger spreads. You cannot leave the menu if the range definitions are incorrect.

Example:
The following applies for a basic measuring range of 0…6 bar : nE – nA ≥ 0,6 bar.

5.3.6 Output signal limits (Namur)

Independent of the pressure, the three parameters oG1, oG2 and oEr define the tolerances for the output currents or voltages that cannot be exceeded or undercut.

These tolerances take priority over the range defined by the nA and nE. They primarily serve to stop error messages in the downstream systems caused by brief overstepping of measuring ranges.

The oG1 parameter defines the tolerance for the minimum output signal. The output signal cannot undercut this value. Usually this parameter only makes sense for devices with an output signal of 4..20 mA because in these devices a value below 3,8 mA is often evaluated as an error signal.

The parameter oG2 defines the limit value for the maximum output signal. The output signal may not exceed this value. This parameter can be used for all outputs (voltage and current) to limit the maximum value of e.g. 10.2 V.

The value for the error signal is defined via the oEr parameter. The value defined with oEr is issued as an output signal if the device recognises an internal error and can no longer work correctly; however, not all possible errors and defects can be recognised by the device.

If you set oG1 = oG2 = 0, the output signal will no longer be checked for limits.

If oG1 is set to the maximum value (11 V or 21 mA), the output signal can be adjusted as required from zero to the maximum value regardless of the pressure via oG2. It is not necessary to quit the menu item, the output is followed immediately. You can then operate the device as a signal transducer and therefore simply check other signal processing.

5.3.7 Characteristic curve function F

In some applications, measuring pressure is an indirect unit for the actual measuring variable. Flow measurements via a panel or determining the filling level by means of hydrostatic pressure measurements are two typical examples of this. In these cases, you might want to change the output signal of the transmitter to a non-linear characteristic curve so that the following analysis receives a signal that is linear-proportional to the actual measuring variable (e.g. volume in m³ or volume flow cm³/s etc.)

The parameter F allows you to select between the following variants:

F	
0	linear characteristic curve (standard)
1	square rooted characteristic curve
2	flat cylindrical tank
3...30	Support point table with 3 to 30 pairs of values

Whenever you change the value from F, the program creates a new table. All previous values in the table are rejected and replaced with new linear entries.

The tables of type F = 0 to F = 2 are not visible. Internal values are used here to calculate the table. These values are invariable.

At F = 3...30 you can only influence the interim values 1..28. You only have access to the start and end values via the parameters nA and nE.

When the parameters nA and nE are changed, the table is deleted and F = 0 is set.

At the start of the measuring range (nA), 0% of the output signal (e.g. 0 mA) is issued.

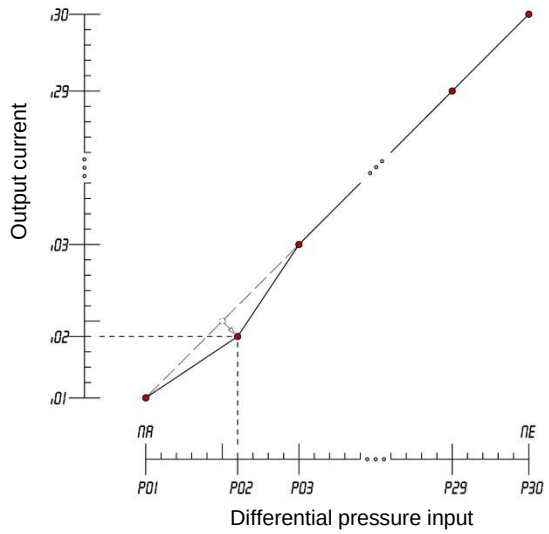
At the end of the measuring range (nE), 100% of the output signal (e.g. 20 mA) is issued.

5.3.8 Menu jump Lin

If the value of F is greater than or equal to 3, there is a submenu Lin. here you can access all table values apart from the table start (nA) and end (nE).

This submenu has its own entry and exit point that is shown with End. The table is only saved if you return to the main menu at this point, i.e. if you change to the parameter Lin again via the key ⏎.

If the table is not structured correctly, an error message Err will appear here and you cannot quit the submenu.



The table comprises 3…30 value pairs. For devices with a power output, the first value pair is {i02|P02}[1]. The first value i02 defines the level of the output signal. The second value P02 determines the pressure at which the output signal is issued.

Followed by the pairs of values {i03|P03} ... {i29|P29}.

Entering or changing values in the table via the membrane keypad is tiresome and prone to errors. This is only intended as an emergency solution in case access to the PC adapter is not possible.

The table is correct if the following applies for all signal values: the following value is greater or equal to the previous value. For the pressure values, the following applies either greater than (increasing characteristic curve) or smaller than (decreasing characteristic curve). A transition from increasing to decreasing characteristic curve or vice versa is not allowed.

5.3.9 Switch points

The two switch outputs ❶ ❷ are configured by four parameters respectively.

The function of the switching output ❶ is determined by the parameters r1A, r1E, r1d and r1F.

The function of the switching output ❷ is determined by the parameters r2A, r2E, r2d and r2F.

r1A defines the deactivation point, r1E defines the activation point from switch output 1. The values are set in the valid measuring unit (shown on the right).

Together, the two parameters R1A and R1E determine the switch function of switch output 1:

If r1A is smaller than r1E, the output switches on if the measured value exceeds r1E. It is only switched off again if the measured value r1A is undercut (hysteresis function).

If r1A = r1E, the output switches on if the measured value exceeds r1E and off if the measured value undercuts r1A.

If r1A is larger than r1E, the output switches on if r1E < measured value < r1A applies (window function).

Both parameters can be set independently over the entire range.

If the measuring unit is switched over, the switching points are converted accordingly. Rounding errors may cause deviations in the last position.

r1d allows the reaction of the switch output 1 to be delayed by between 0.0 and 100.0 s. This value applies equally for switching on and off.

[1] At a voltage output {u02|P02} ... {u29|P29}.

rIF reverses the function of the switch output. If the value = 1, the switch output works as an NO contact, if the value = 2, the switch output works as an NC contact.

5.3.10 Password

The last menu item -P- is used to enter a password. A value between 001 and 999 can be selected for the password. The value 000 cancels the password function.

If a password has been issued, the text PAS appears after ESC and ◈, and you need to enter the correct value using ◈ and ▲,▼. You will only arrive at all other menu items after doing this.

In the event of an error, the display will jump back to the start of the menu ESC.

If the password is forgotten, it can only be reset by the manufacturer or overwritten via the PC adapter.

5.3.11 Display options

The parameter dO enables the reading to settle if the measuring value fluctuates heavily. This filter function is similar to the dAN function, but only impacts on the reading not on the output signal.

dO	
-2	Display off, LED switching point off
-1	Display off, LED switching point on
0	Display on, LED switching point on
1…100	Display attenuation

5.3.12 Reset to default

The rES function allows all settings to be reset to standard values. The standard values can only be specified with the PC Software "FernPara".

5.3.13 Free unit

If the device is designed for a "free" third unit (membrane symbol: 🡻), the display can be scaled infinitely using the parameters nAF, nEF and dPF.

The measuring range defined by the parameters nA and nE is converted to nAF and nEF. This also takes into account the table function (F). The value of dPF determines the position of a decimal point.

5.4 Parameter overview

After switching on the device, it will briefly indicate the software version number and before entering the normal operating mode. By using the middle ◈ key on the membrane keypad you can access the parameter menu. The reading now shows the text ESC. By using the right þ key, you can choose the parameters from the following list one by one:

Note:
Depending on the device model, individual parameters may not be available if the device does not have this feature.

PAS **Enter password**
(only appears if the password is active), value range 000...999
000 = deactivated

-0- **Nulling**
The input difference

dSP **Display value**
Selection of the displayed measured value

dAN **Attenuation**
(Jump response time T90) , value range 0.0..100.0s

dO **Display options**
Value range -2...0...100.
-2 = Display off, LED Switch point off
-1 = Display off, LED Switch point on
0 = Display on, LED Switch point on
1...100 Display attenuation

rIA **Switch-off point**
From switching output ❶

rIE **Switch-on point**
From switching output ❶

rId **Switching delay**
from switch output ❷
Value range 0.0 to 100.0s. This value applies equally for switching on and off.

rIF **Switching function**
From switching output ❶
Values range 1,2
1 = Switching output as NO contact, 2 = Switching output as NC contact

r2A **Switch-off point**
From switching output ②

r2E **Switch-on point**
From switching output ②

r2d **Switching delay**
from switch output ❷
Value range 0.0 to 100.0s. This value applies equally for switching on and off.

r2F **Switching function**
from switch output ②
Value range 1,2
1 = switch output as NO contact,
2 = switch output as NC contact

on	**Measuring range unit** Value range 1,2,3 The selection is backlit on the right next to the display. Not all basic measuring ranges allow random switchover. The respective unit size can only be selected if the basic measuring range of the device can be shown sensibly.
nA	**Start of measuring range** The measuring value is set in that the output signal is minimal. (e.g.: 0V, 0mA or 4mA).
nE	**End of measuring range** The measuring value is set in that the output signal is maximum. (e.g.: 10V, or 20mA).
nP	**Zero-point stabilising** Value range 0 to ⅓ of the basic measuring range. The value is symmetrical around the real zero-point.
dPF	**Free unit** Decimal point position
nAF	**Free unit** Start of measuring range (display)
nEF	**Free unit** End of measuring range (display)
F	**Characteristic curve function** Value range 0...30 0 = linear, 1 = square rooted, 2 = flat cylindrical tank 3..30 = table
Lin	**Menu jump** Submenu table processing If F < 3 this menu item is faded out.
oG1	**Limit value** Minimum output signal
oG2	**Limit value** Maximum output signal
oEr	**Error signal** Output signal in error case
rES	**Reset** all parameters to standard values (specification of the standard values per PC)
-P-	**Password setting** Value range 000 to 999 Value 000 does not hold password protection.

6 Maintenance and Repeat Tests

The instrument is maintenance-free. We recommend the following regular inspection to guarantee reliable operation and a long service life:

- Check the function in combination with downstream components.
- Check the leak-tightness of the pressure connection lines.
- Check the electrical connections.

The exact test cycles need to be adapted to the operating and environmental conditions. In combination with other devices, the operating instructions for the other devices also need to be observed.

7 Transport

The measuring device must be protected against impacts. It should be transported in the original packaging or a suitable transport container.

8 Service

All damaged or faulty devices must be sent directly to our repair department. Please coordinate all shipments with our sales department.

Warning

Process media residues in and on dismantled devices can be a hazard to people, animals and the environment. Take adequate preventive measures. If required, the devices must be cleaned thoroughly.

Return the device in the original packaging or a suitable transport container.

9 Accessories

- Transmitter PC Interface EU03
- Various connection cables for power supply and switch outputs.

10 Disposal

Incorrect disposal may pose a risk to the environment.

Please help to protect the environment by always disposing of the work pieces and packaging materials in compliance with the valid national waste and recycling guidelines or reuse them.

11 Technical data

Basic measuring range [2]	0…	bar	6	10	16	25	40
Static operating pressure	max.	bar	6	10	16	25	40
Bursting pressure		bar	25	25	50	100	100
Characteristic curve deviation*	max.	%FS	< 2.5				
	typ.	%FS	< 1.0				
Tk span°°)	max.	%FS/10K	< 0.3				
	typ.	%FS/10K	< 0.1				
Tk zero-point °°)	max.	%FS/10K	< 0.4				
	typ.	%FS/10K	< 0.15				

°) : Characteristic curve deviation (non-linearity and hysteresis) at 25°C and rated voltage, Basic measuring range (Characteristic curve linear, not spread)
○○) : in terms of the basic measuring range (characteristic line linear, not spread)

	General points	
Admissible ambient temperature	-10 … 70 °C	
Admissible media temperature	-10 ... 80 °C	
Admissible storage temperature	-20 … 70 °C	
Enclosure protection class	IP 65 acc. to DIN EN 60529	
Authorization	Type testing according to guidelines of Germanischer Lloyd, Text code, certificate no. 59 364 - 08 HH (see order code)	
	Electrical data	
Rated Voltage	24 V AC/DC	
Admissible operating voltage U_b	12 … 32 V AC/DC	
Power consumption	approx. 2 W (VA)	
Electrical connection type	Three-wire	
Characteristic curve	linear, square rooted, flat cylindrical tank 3 … 30 support points	
Output signal	0/4…20 mA	0…10 V
Admissible apparent ohmic resistance	$U_b \leq 26$ V : $R_L \leq (U_b - 4\ V) / 0{,}02$ A $U_b < 26$ V : $R_L \leq 1100\ \Omega$	$U_b < 15$ V : $R_L \geq 10$ kΩ $U_b \geq 15$ V : $R_L \geq 2$ kΩ
Switch contacts	2 pot.-free relay contacts	2 pot.-free semiconductor switches (MOSFET)
Type	1-pin activator	1-pin activator
Function (can be programmed)	Open contact (NO) / break contact (NC)	Open contact (NO) / break contact (NC)
Switching voltage	32 V AC/DC	3…32 V AC/DC
Switching current	2 A	0.25 A
Switching output	64 W (VA)	8 W (VA)
Activation resistance	---	≤ 4 Ω
Display	3.5 character LED	
	Ports	
Process connection	Inner thread G 1/8, cutting ring screw connections for 6 or 8 mm pipes	
electr. connection	2 x round plug connector M12 Connector 1 for supply and analogue output signal (5-pin, male) Connector 2 for switching contacts (4-pin, male)	
	Materials	
Housing	Polyamide PA 6.6 (GL-version: Lexan Resin 940A)	
Media-contacting material	Stainless steel 1.4404, FKM, ceramics (Al2O3, 96%) Stainless steel 1.4571 or brass	
	Assembly	
	Bore-holes on the reverse side for attachment of the assembly panels or wall mounting by means of assembly plate If the device is intended for outdoor use, we recommend permanently protecting the membrane keypad against UV radiation and using a suitable enclosure or at least the erection of a sufficiently dimensioned canopy as a protection measure against constant rain or snow.	

[2]The effective measuring range is the basic measuring range and the set spread (max. 10:1). Therefore, the smallest possible measuring range for the 6 bar basic measuring range is: 0 ...0.6 bar

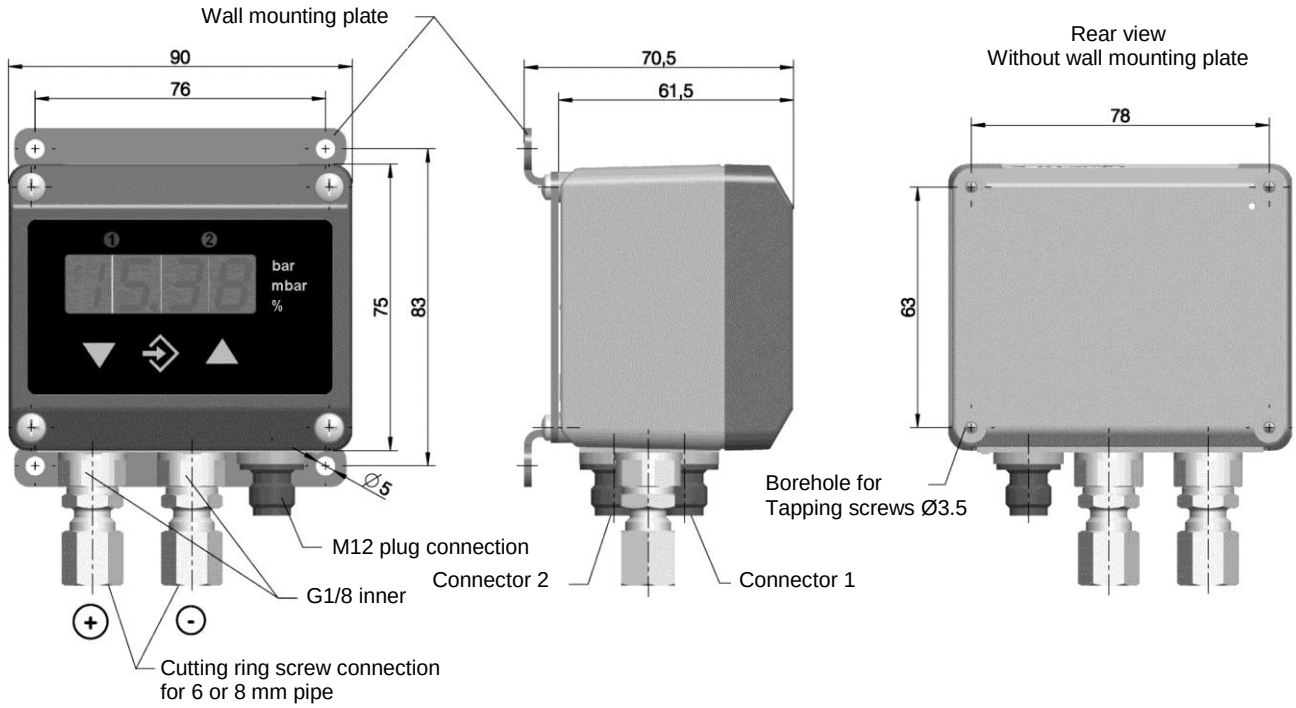
11.1 Programming

Via membrane keypad with menu-controlled operation or transmitter PC Interface EU03 (accessories), can be locked with a password

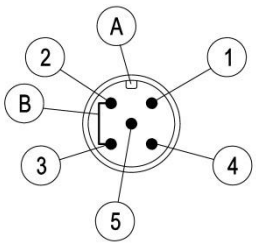
	Setting parameters
Offset	Nulling of the input differential pressure
Pressure display	P1, P2, ΔP (1)
Attenuation	0,0...100,0s (jump response time 10/90%) for signal output, separate also for display
Switching output ❶ ❷	Switch-off point, switch-on point, response time (0...100s), function (NC / NO contact)
Measuring range unit	bar, mbar, % (2)
Start / end of measuring range	can be set anywhere within the basic measuring range (3)
Zero-point stabilising	0…⅓ basic measuring range(4)
Implementation of characteristic curve	linear, square rooted, flat cylindrical tank, 3...30 support points
Password	001 ... 999 (000 = no password protection)

(1): Pressure display P1 and P2 only serve inspection purposes. All configuration parameters refer to ΔP.
(2): Other measuring range units are available on request.
(3): Maximum effective spread 10:1. The output signal, the display range % and the free unit are influenced.
(4): Measuring values (±⅓ basic measuring range around zero) are set to zero (e.g. to suppress creeping quantities).

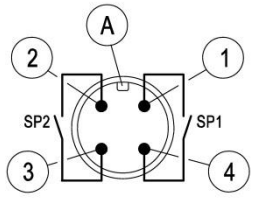
12 Dimensional drawings (all dimensions in mm unless otherwise specified)



12.1 Electrical connection



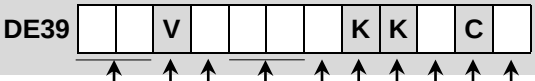
Pin	Signal name		Cable colour
1	Supply	$+U_b$	brown
2	Delivery	-Sig	white
3	Supply	$-U_b$	blue
4	Delivery	+Sig	black
5	n.c.		
A	Coding		
B	Bridge		



Pin	Signal name		Cable colour
1	Switch output 1	SP1	brown
2	Switch output 2	SP2	white
3	Switch output 2	SP2	blue
4	Switch output 1	SP1	black
A	Coding		

13 Order Codes

Digital differential pressure transmitter, with 3 ½-digit LED display



Measuring ranges
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**

Design of the measuring system
Chromium nickel steel 1.4404 ..... > **V**

Approval variants
Standard model ..... > **0**
GL version ..... > **S**

Pressure connection
Inner thread G 1/8 ..... > **0 0**
Cutting ring screw connection made of 1.4571 for 6 mm pipe ..... > **2 4**
Cutting ring screw connection made of 1.4571 for 8 mm pipe ..... > **2 5**
Cutting ring screw connection in brass for 6 mm pipe ..... > **2 8**
Cutting ring screw connection in brass for 8 mm pipe ..... > **2 9**

Electrical output signal
without analogue electrical output signal ..... > **0**
0 - 20 mA 3-wire ..... > **A**
0 - 10 V DC 3-wire ..... > **C**
4 - 20 mA 3-wire ..... > **P**

Operating voltage
24 V DC/AC (12 - 32 V DC/AC) ..... > **K**

Measuring unit
bar, mbar, % ..... > **K**

Measured value display / contact elements
3 1/2 digit LED measuring range display with two potential-free relay contacts ..... > **3**
3 1/2 digit LED measuring range display with two potential-free semi wire switches ..... > **6**

Electrical connection
M12 plug connection ..... > **C**

Assembly option
Standard (attachment boreholes on rear side) ..... > **0**
Wall mounting ..... > **W**

13.1 Accessories

Purchase order number	Designation	No. of Poles	Usage	Length
06401993	Connection cable with M12 connector	4-pole	for switching outputs	2 m
06401994	Connection cable with M12 connector	4-pole	for switching outputs	5 m
06401995	Connection cable with M12 connector	5-pole	for supply / signal	2 m
06401996	Connection cable with M12 connector	5-pole	for supply / signal	5 m
04005144	Wall mounting set			
EU03F300	Transmitter PC interface with PC software			

14 Manufacturer's Declarations and Certificates

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

Digitaler Differenzdrucktransmitter / Digital Differential Pressure Transmitter
mit Drucksensor / with Pressure Sensor

DE39 # # # # # # # # # # #

gemäß gültigem Datenblatt übereinstimmen mit der

specified by the actual data sheet complies with the

EG-Richtlinie

2004/108/EG (EMV)

EC Directive

2004/108/EC (EMC)

Die Produkte wurden entsprechend der folgenden Normen geprüft (Störfestigkeit für Industriebereich, Störaussendung für Wohnbereich):

DIN EN 61326-1:2004-05
DIN EN 61326-2-3
DIN EN 61010-1:2002-08

The instruments have been tested in compliance with the norms (Immunity for industrial environments, emission for residential environments):

DIN EN 61326-1:2004-05
DIN EN 61326-2-3
DIN EN 61010-1:2002-08

Die Geräte werden gekennzeichnet mit:

The gauges are marked with:

CE

Bad Salzuflen, 13.02.08
(Ort, Datum / place, date)

(rechtsverb. Unterschrift / authorized signature)

Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.

Certificate No.	**59 364 - 08 HH**
Company	**Fischer Mess- und Regeltechnik GmbH Bielefelder Straße 37a 32107 Bad Salzuflen, GERMANY**
Product Description	**Digital Differential Pressure Transmitter (with pressure sensor)**
Type	**DE39##WZ###K0#M#**
Environmental Category	**D, H, EMC2**
Technical Data / Range of Application	**Measuring range: 0 ... 6bar, 0 ... 10bar, 0 ... 16bar, 0 ... 25bar, 0 ... 40bar Nominal supply voltage: 24V DC/AC Output signal: 0 ... 20mA, 4 ... 20mA, 0 ... 10V (3-wire) Switching contacts: 2 sets of progammable voltage free relay contacts (NO or NC) Display: 3½ digit LED Electrical connections: Two round-shell multi-pin connectors sockets (M12, male) Connector 1: 5-pin: power input and analaog signal output Connector 2: 4-pin: relay contacts Pressure connections: G 1/8 female threads with optional cutting ring fittings for 6 or 8mm tube Protection class (housing): IP65 Material housing: Lexan Resin 940A Material media contact: stainless steel 1.4305, VITON, ceramic Firmware version: V5.2 (Controller LED-Indicator), V1.3 (Sensorcontroller) Environmental Category "H": Cold test at -10°C**
Test Standard	**Guidelines for the Performance of Type Approvals, Chapter 2, Edition 2003**
Documents	**Test reports: Paconsult no. 08-1951 (15.05.2008), EMV-Labor FH Flensburg no. FischerDE39-2008 (09.05.2008), TÜV Nord no. 05/YEX552550a (13.01.2006), Fischer no. 2633 (26.08.2008); Data sheet DB_D_DE39.fm (28.08.08); User manual BA_D-DE39.fm (28.08.08); Drawings, part lists acc. to submitted file**
Remarks	**None**
Valid until	**2013-09-01**

Page 1 of 1

File No. I.D.01

Type Approval Symbol GL

Hamburg, 2008-09-02

Germanischer Lloyd

i.V. Jürgen Wittburg

i.A. Klaus-Peter Schröder

This certificate is issued on the basis of "Guidelines for the Performance of Type Approvals Part 1, Procedure".

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