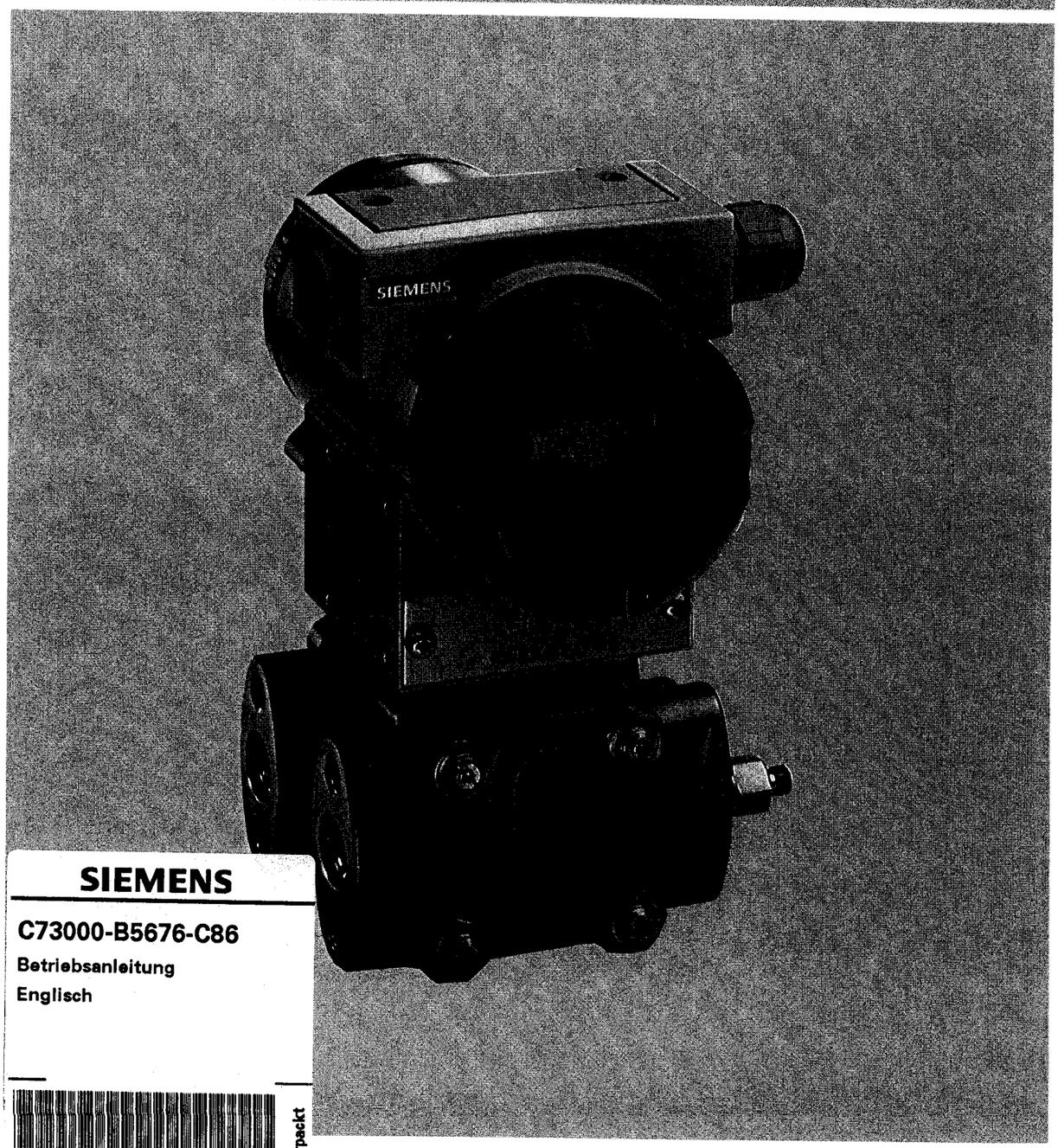
SIEMENS

SITRANS® P

Differential pressure and flow transmitter, DS series (Smart)

7MF4432 and 7MF4532

Operating Instructions Order No.: C73000—B5676—C86—1



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Note

These instructions do not claim to cover all details or variations in equipment, nor to provide for every possible contingency that may arise during installation, operation or maintenance.

Should further information be desired or should particular problems arise that are not covered sufficiently for the Purchaser's purposes, the matter should be referred to the local Siemens Sales Office.

The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The Sales Contract contains the entire obligations of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

WARNING

This equipment should only be installed and operated after qualified personnel have ensured that suitable power supplies are available. These personnel must ensure that the equipment is not subjected to any hazardous voltages during normal operation or when a defect occurs in the system.

This equipment may be used under high pressure and with aggressive media. Improper use of this equipment may therefore result in severe personal injury or extensive damage to property.

The successful and safe operation of this equipment is dependent upon its proper handling, installation, operation and maintenance.

Qualified person

For the purposes of this manual, a qualified person is one who is familiar with the installation, commissioning and operation of this equipment. In addition, the person must be:

- ☞ Trained and authorised to operate and service equipment/systems in accordance with established safety procedures relating to electrical circuits, high pressures and aggressive media.
- ☞ Trained in the proper care and use of protective equipment in accordance with established safety practices.
- ☞ Trained in rendering first aid.

1 Technical description

1.1 Application

The Smart version of the SITRANS P transmitter measures

- the differential pressure, e.g. effective pressure,
- small positive or negative gauge pressures
  or
- the rate of flow $q \sim \sqrt{\Delta p}$ (in conjunction with a restrictor)

of non–aggressive and aggressive gases, steam and liquids.

Measuring spans of between 1 mbar and 30 bar are possible. The output signal is a load–independent direct current 4 to 20 mA.

Transmitters conforming to protection type "Intrinsic safety" and "Flame–proof enclosure" may be installed within potentially explosive areas (zone 1). The conformance certificates correspond to the European standard (CENELEC).

Transmitters fitted with various types of chemical seal are available for special applications, e.g. measuring highly viscous media.

1.2 How it works

Differential pressure is transmitted to a silicone pressure sensor (4, see Figure 1.1) through a diaphragm (6) and a liquid filling (7). If the pressure is too high, the overload diaphragm (5) is distorted until one of the diaphragms touches the body of the measuring cell (3), thus protecting the sensor (4) from overloads.

The differential pressure causes the sensor's measuring diaphragm to distort. The resistance of four piezo–resistors in a bridge circuit in the measuring diaphragm changes. This change in resistance generates an output voltage in the bridge circuit that is proportional to the differential pressure. This voltage is converted into a periodic signal by an amplifier (11) into a voltage/frequency converter (12). A microcontroller (13) evaluates the signal, corrects it with respect to linearity and temperature before passing it on to a digital/analogue converter (14), which converts it into a 4 – 20 mA output current.

Data specific to the measuring cell and transmitter parameters are stored in non–volatile memory (EEPROM).

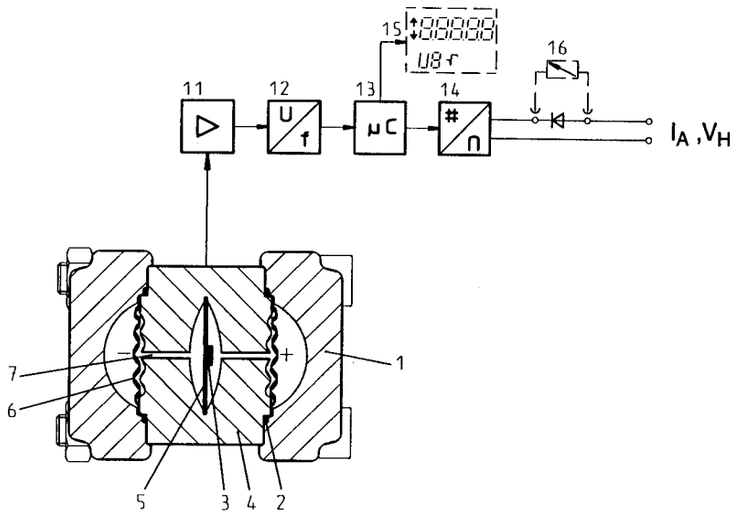
The cable termination point and the electronics are arranged opposite one another.

Calibration of the transmitter is performed using a PC/laptop or HART® Communicator. The PC/Laptop is connected to the two–wire circuit of the transmitter through a HART® modem. The communication signals required by revision 5.1 of the HART® protocol are superimposed on the output current by the FSK (Frequency Shift Keying) method.

The following parameters can be set or their current settings interrogated:

- measuring point number
- measuring point description
- text
- upper limit of output signal
- limits of measuring range
- transmitter design (e.g. type of material)
- measuring range*
- engineering unit*
- measured value in mA, % or engineering units*
- linear or square–root characteristic*
- cut–off point of square–root characteristic*
- damping*
- "loop check" function*
- output current when errors occur*
- disabling of pushbuttons and/or functions*

As well as calibrating the transmitter from a PC/laptop or HART® Communicator, the start of scale and full scale values can also be set on the transmitter by three pushbuttons. By means of a digital indicator (optional) the parameter marked by * can be adjusted directly on the transmitter without opening the housing.



I_A	output current
V_H	auxiliary power
+ / −	input variable, differential pressure
1	process cover
2	O−ring
3	cell body
4	silicone pressure sensor
5	overload diaphragm
6	diaphragm
7	filling (liquid)
11	measuring amplifier
12	voltage/frequency converter
13	microcontroller
14	digital/analogue converter
15	digital indicator (optional)
16	analogue indicator (optional)

Figure 1.1 SITRANS P differential pressure and flow transmitter, function diagram

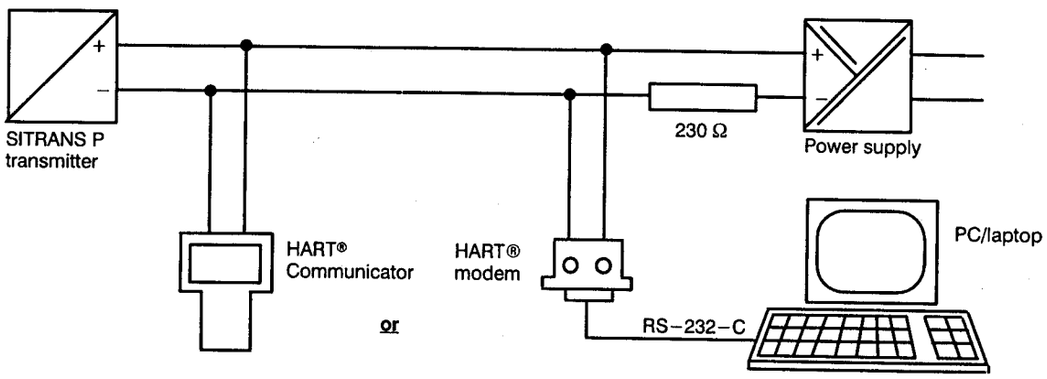


Figure 1.2 Communication between PC/laptop or HART® Communicator and SITRANS P transmitter

1.3 Technical data

Functional data

Rated pressure and measuring spans

Rated pressure	Variable measuring spans								
PN 32	1	to	20	mbar	/	0.1	to	2	kPa
PN 160[1)]	2	to	60	mbar	/	0.2	to	6	kPa
PN 160[1)]	8.3	to	250	mbar	/	0.83	to	25	kPa
or	20	to	600	mbar	/	2	to	60	kPa
PN 420[2)3)]	53	to	1600	mbar	/	5.3	to	160	kPa
	160	to	5000	mbar	/	16	to	500	kPa
	1000	to	30000	mbar	/	100	to	3000	kPa

Minimum static pressure

Measuring cell

silicone oil filling — 30 mbar (absolute)

fluorolube filling — atmospheric pressure

Overrange limits — applied to one side −1 bar and rated pressure

Measuring limits

Differential pressure — −100 and +100 % of measuring span;
30 bar measuring cell
−33 and 100 % of max. measuring span;

Flow — 0 and 100 % of max. measuring span

Start of scale

Differential pressure — anywhere between the measuring limits

Flow — 0 mbar

Auxiliary power

terminal voltage on transmitter — 11 to 45 V DC,
11 to 30 V DC certified intrinsic safety

ripple — $U_{pp} \leq 0.2$ V (47 to 125 Hz)

noise — $U_{eff} \leq 1.2$ mV (0.5 to 10 kHz)

Output signal — 4 to 20 mA

lower limit — 3.84 mA

upper limit — 20.0 to 22.0 mA[4)]

in error situation — 3.6 mA or 22.8 mA

ripple — $I_{pp} \leq 0.5$ % of maximum output current

Characteristic — rising linear, falling linear or square root (cut−off point of square root characteristic anywhere between 5 % and 15 % of max. flow, optional for linear or cut−off below this point; factory setting is 9.4 % with cut−off position)

Load — $R \leq \frac{V_H - 11\ V}{0.023\ A}\ in\ \Omega$,
V_H: auxiliary power in V
230 Ω to 500 Ω for communication with PC/laptop
230 Ω to 1100 Ω for communication with HART® Communicator

Electrical damping

variable time constant — 0.1 to 100.0 s

Current source — Adjustable, 3.6 mA to 22.8 mA

1) With oxygen measurement 80 bar max.
2) Measuring cell filling only with silicone oil
3) With process cover screws of stainless steel, PN315 only
4) Adjustable with PC/laptop or HART® Communicator. The factory setting is 20.5 mA

Ambient temperature

Measuring cell for measuring span filled with	≤5 bar	30 bar
silicone oil	−40 °C to +85 °C	−20 °C to +85 °C
fluorolube	−10 °C to +85 °C	−10 °C to +85 °C

Digital indicator (optional) −20 °C to +85 °C
observe temperature classes in hazardous areas!

Temperature of medium

Measuring cell for measuring span filled with	≤5 bar	30 bar
silicone oil	−40 °C to +100 °C	−20 °C to +85 °C
fluorolube	−10 °C to +100 °C	−10 °C to +85 °C
with oxygen measurement	−10 °C to +85 °C	−10 °C to +85 °C

Storage temperature −50 °C to +85 °C

Condensation permitted

Output characteristic
Linear rising, start of scale 0 bar and filling of silicone oil.
All figures relate to the output span.

Measurement error when calibrating fixed point (incl. hysteresis and repeatability) ≤0.1 % [5] (with square root characteristic where q > 50 %, ≤0.2 %[5] where 25 % ≤ q ≤ 50 %)

Time constant T_{63} at 20 °C (no electrical damping) approx. 0.2 s
approx. 0.3 s with 20 mbar and 60 mbar measuring cell

Long−term drift ≤0.1 % every 6 months at max. measuring span;
20 mbar measuring cell: double this value

Effect of ambient temperature
on start of scale
from −10 °C to +60 °C ≤0.05 %/10 K at max. measuring span
from −40 °C to −10 °C
and +60 °C to +85 °C ≤0.1 %/10 K at max. measuring span;
20 mbar measuring cell: double these values

on measuring span
from −10 °C to +60 °C ≤0.1 % [5]/10 K
from −40 °C to −10 °C
and +60 °C to +85 °C ≤0.15 % [5]/10 K;
20 mbar measuring cell: double these values

Effect of static pressure
on start of scale ≤0.15 % per 100 bar at max. measuring span;
20 mbar measuring cell: per 32 bar

on the measuring span ≤0.2 %/100 bar;
20 mbar measuring cell: per 32 bar

Effect of auxiliary power ≤0.005 % for each 1 V change in voltage

Electro−magnetic compatibility conforms to IEC 801/NAMUR recommendations

Effect of installation from vertical ≤0.7 mbar per 10° of deviation

[5] Double this value if selected measuring span <10 % of max. measuring span

Instrument design

Electrical connection	screw–type terminals or Han 7 D connector[6) 7)] cable inlet in the case of screw–type terminals via Pg 13.5 compression gland[6) 7)] or M20 × 1.5 female thread[7)] or $^1/_2$ – 14 NPT female thread
Degree of protection to EN 60529	IP65
Process connection	$^1/_4$ – 18 NPT female thread and flange connection to DIN 19213 with M10 thread (PN $\leq$ 160), M12 (PN 420) or $^7/_{16}$ –20 UNF
Material of components that come into contact with the medium	
diaphragm	stainless steel, 316L or Hastelloy C276,
process covers	stainless steel, 316
vent valve	stainless steel, 316
parts of measuring cell	stainless steel, 316
O–ring	FPM(Viton) or PTFE (Teflon)
Measuring cell filling	silicone oil or fluorolube (PN32 and PN160 only)
Housing for electronics	die–cast aluminium with low copper content GD–AlSi 12, polyester based lacquer, stainless steel rating plate
Screws for process covers	galvanised, yellow–passivated steel, or stainless steel (limited to PN315 with PN420 model)
Mounting bracket (optional)	galvanised, yellow–passivated steel, or stainless steel
Indicator (optional)	analogue indicator with linear scale 0 to 100 % or to customer's specification or digital indicator
Weight	approx. 4 kg (without options)

6) Not available for protection type "Flame–proof enclosure"

7) Not available for protection type FM exp/CSA exp

Explosion protection
to DIN EN 50 014, DIN EN 50 018 and DIN EN 50 020 (CENELEC)

Intrinsic safety "i"	
Identification	EEx ia IIC T4 or T5 or T6
Conformance certificate	PTB Nr. Ex–94.C.2090
Max. ambient temperature	+85 °C (temperature class T4) +75 °C (temperature class T5) +60 °C (temperature class T6)
Connection	to certified intrinsically safe circuits with the following maxium values: V_o = 30 V, I_k = 100 mA, P = 750 mW
Effective internal inductance	$L_i \leq$ 0.6 mH
Effective internal capacitance	$C_i \leq$ 8 nF
Flame–proof enclosure "d"	
Identification	EEx d IIC T5 or T6
Conformance certificate	PTB Nr. Ex–94.C.1021
Max. ambient temperature	+85 °C (temperature class T5) +75 °C (temperature class T6)

Communication (PC/laptop or HART® Communicator to SITRANS P transmitter)

Load, with connection of	
HART® modem	230 to 500 Ω
HART® Communicator	230 to 1100 Ω
Cable	screened 2–core: $\leq$ 3.0 km screened multicore: $\leq$ 1.5 km
Protocol	HART®, revision 5.1
PC/laptop requirements	IBM or compatible $\geq$4 MByte memory Hard disk RS–232–C interface VGA graphics
Software	Windows 3.1 and SIPROM P

1.4 Ordering data

Description	Order no.
SITRANS P differential pressure and flow transmitter, DS series PN 32 and PN 160[1] 2-wire system, Smart version	**7MF4432** – □□□□□ – 1□□□
Measuring cell filling / **Cleaning of measuring cell**	
Silicone oil Fluorolube[1] / Normal Grease-free	1 3
Rated pressure / **Measuring span**	
PN 32 / 1 mbar to 20 mbar	B
PN 160 [1] / 2 mbar to 60 mbar	C
8.3 mbar to 250 mbar	D
20 mbar to 600 mbar	E
53 mbar to 1600 mbar	F
160 mbar to 5000 mbar	G
1000 mbar to 30000 mbar	H
Material of components that come into contact with the medium	
Diaphragm / **Parts of measuring cell** / **Process covers**	
Stainless steel / Stainless steel / Stainless steel	A
Hastelloy / Stainless steel / Stainless steel	B
Version with chemical seal	Y
Process connection	
Female thread $^1/_4$–18 NPT and flange connection to DIN 19 213 with	
Venting valves / **Thread**	
opposite the process connection / M 10	0
opposite the process connection / $^7/_{16}$–20 UNF	2
at the side of the process covers / M10	4
at the side of the process covers / $^7/_{16}$–20 UNF	6
Material of components that do not come into contact with the medium	
Screws of process covers / **Electronics housing**	
Steel / Die-cast aluminium	0
Stainless steel / Die-cast aluminium	2
Explosion protection	
None	A
CENELEC Intrinsic safety	B
CENELEC Flame-proof enclosure	D
FM is (intrinsic safety) (applied for)	F
FM exp (explosion-proof) (applied for)	G
CSA is (intrinsic safety) (applied for)	J
CSA exp (explosion-proof) (applied for)	K
Electrical connection/cable inlets	
Pg 13.5 compression gland [2] [3]	A
Female thread M20 x 1.5 [3]	B
Female thread $^1/_2$–14 NPT	C
Han 7 D connector [2] [3]	D
Indicator	
None	1
With analogue indicator, scale 0 to 100 %, linear	3
With analogue indicator, scale as specified (Y20 code required)	5
With digital indicator	6

[1] With oxygen measurement 80 bar max.
[2] Not available for protection type "Explosion-proof enclosure"
[3] Not available for protection type FM exp/CSA exp

Other versions
Add "–Z" suffix and code to order no.

Description	Code
Transmitter with mounting bracket of steel stainless steel	 A01 A02
O–rings for process covers made of PTFE (FPM by default)	 A20
Operating instructions and description of the plate (German by default) English French Spanish Italian	 B11 B12 B13 B14
Manufacturer's test certificate M as specified in DIN 55350, Part 18 and ISO 8402 Acceptance certificate B as specified in DIN 50049, section 3.1, and EN 10204	 C11 C12

Additional information
Add "–Z" suffix and code to order no. and specify in writing

Description	Code
Required measuring range (max. 26 characters), specify in plain text, with linear characteristic: **Y01: ... to ... mbar, bar, kPa, MPa, ...** with square root characteric: **Y02: ... to ... mbar, bar, kPa, MPa, ...**	 **Y01** **Y02**
Measuring range for level measurement without chemical seal: The measuring range (Δp) has to be calculated. When ordering, complete and return the "Hydrostatic level measurement" questionnaire.	 **Y06**
Measuring point identification: Number of measuring point (max. 16 characters), specify in plain text: **Y15: .....**	 **Y15**
Description of measuring point (max. 27 characters), specify in plain text: **Y16: .....**	 **Y16**
Customer specified scale for analogue indicator (max. 26 characters), specify in plain text: **Y20: ... to ... mbar, bar, kPa, MPa, ...**	 **Y20**

Accessories

Description	Order No.
HART® modem and SIPROM P software German English French	 **7MF4998–8DD** **7MF4998–8DE** **7MF4998–8DF**
HART® Communicator with a accumulator, battery charger for 230 V AC and case, Type of protection intrinsically safe EEX ia II C T4 German English	 **7MF4998–8KF** **7MF4998–8KT**

Description	Order no.
SITRANS P differential pressure and flow transmitter, DS series PN 420 [1] 2-wire system, Smart version	**7MF4532** – 1□□□□ – 1□□□
Rated pressure PN 420 [1] — Measuring span: 25 mbar to 250 mbar 20 mbar to 600 mbar 53 mbar to 1600 mbar 160 mbar to 5000 mbar 1000 mbar to 30000 mbar	D E F G H
Material of components that come into contact with the medium Diaphragm / Parts of measuring cell / Process covers: Stainless steel / Stainless steel / Stainless steel Hastelloy / Stainless steel / Stainless steel	A B
Process connection Female thread $^1/_4$–18 NPT and flange connection to DIN 19 213 with Venting valves: opposite the process connection; Thread: M 12 / 7/16–20 UNF	0 2
Material of components that do not come into contact with the medium Screws of process covers / Electronics housing: Steel / Die-cast aluminium Stainless steel [1] / Die-cast aluminium	0 2
Explosion protection None CENELEC Intrinisic safety CENELEC Flame-proof enclosure FM is (intrinsic safety) (applied for) FM exp (explosion-proof) (applied for) CSA is (intrinsic safety) (applied for) CSA exp (explosion-proof) (applied for)	A B D F G J K
Electrical connection/cable inlets Pg 13.5 compression gland [2] [3] Female thread M20 x 1.5 [3] Female thread $^1/_2$–14 NPT Han 7 D connection [2] [3]	A B C D
Indicator None With analogue indicator scale 0 to 100 %, linear scale as specified (Y20 code required) digital indicator	1 3 5 6

1) For the version with process covers screws of stainless steel, PN 315 only
2) Not available for protection type "Flame-proof enclosure"
3) Not available for protection type FM exp/CSA exp

Other versions
Add "–Z" suffix and code to order no.

Description	Code
Transmitter with mounting bracket of steel stainless steel	 A01 A02
Operating instructions and description of the plate (German by default) English French Spanish Italian	 B11 B12 B13 B14
Manufacturer's test certificate M as specified in DIN 55350, Part 18 and ISO 8402 Acceptance certificate B as specified in DIN 50049, section 3.1, and EN 10204	C11 C12

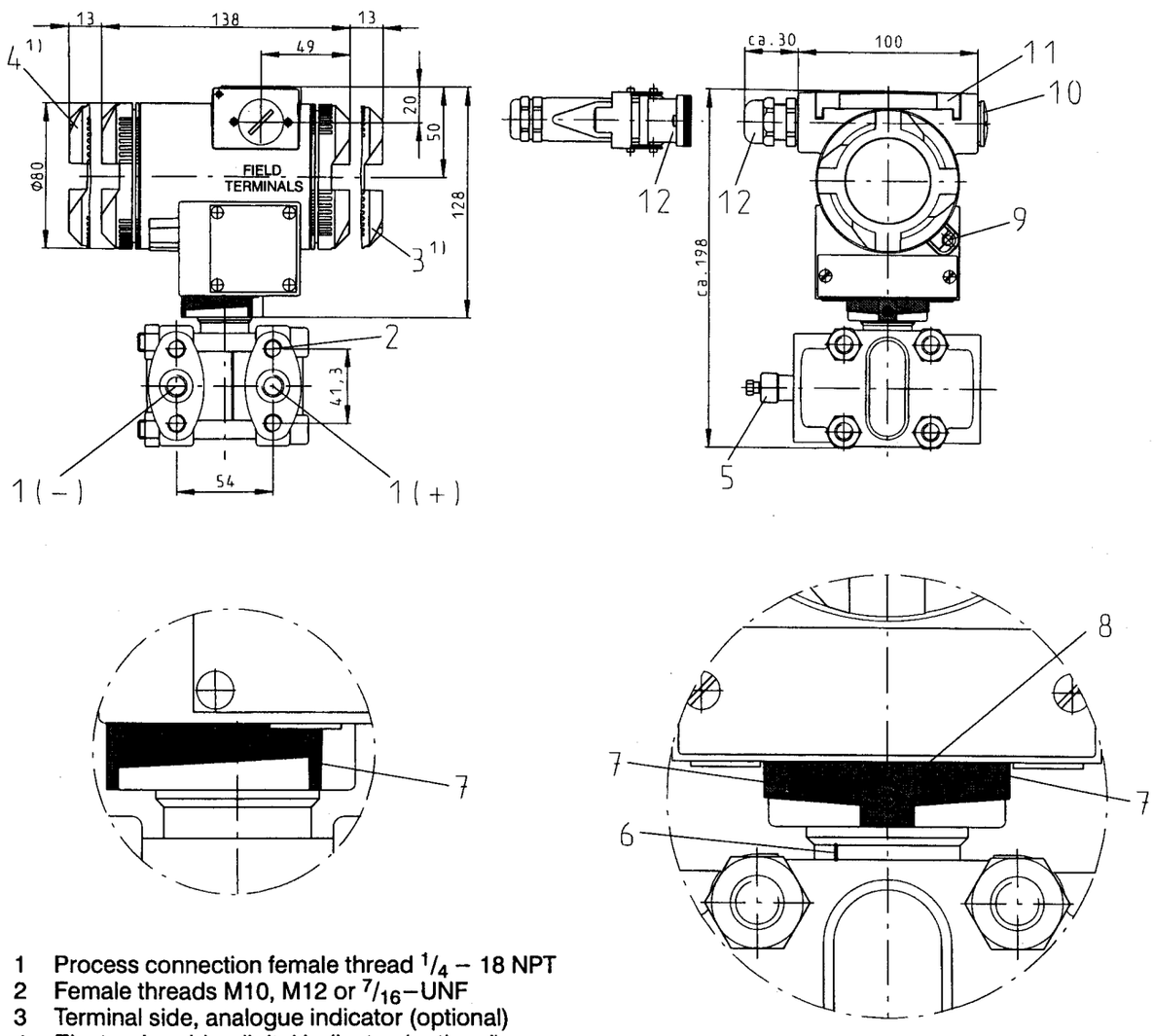
Additional information
Add "–Z" suffix and code to order no. and specify in writing

Description	Code
Required measuring range (max. 26 characters), specify in plain text, with linear characteristic: **Y01: ... to ... mbar, bar, kPa, MPa, ...** with square root characteric: **Y02: ... to ... mbar, bar, kPa, MPa, ...**	 **Y01** **Y02**
Measuring range for level measurement without chemical seal: The measuring range (Δp) has to be calculated. When ordering, complete and return the "Hydrostatic level measurement" questionnaire.	**Y06**
Measuring point identification: Number of measuring point (max. 16 characters), specify in plain text: **Y15: .....**	 **Y15**
Description of measuring point (max. 27 characters), specify in plain text: **Y16: .....**	 **Y16**
Customer specified scale for analogue indicator (max. 26 characters), specify in plain text: **Y20: ... to ... mbar, bar, kPa, MPa, ...**	 **Y20**

Accessories

Description	Order No.
HART® modem and SIPROM P software German English French	 **7MF4998–8DD** **7MF4998–8DE** **7MF4998–8DF**
HART® Communicator with a accumulator, battery charger for 230 V AC and case, Type of protection intrinsically safe EEX ia II C T4 German English	 **7MF4998–8KF** **7MF4998–8KT**

1.5 Dimensions



1 Process connection female thread $^1/_4$ – 18 NPT
2 Female threads M10, M12 or $^7/_{16}$–UNF
3 Terminal side, analogue indicator (optional)
4 Electronics side, digital indicator (optional)
5 Outlet valve
6 Rotation reference mark (see section 2.1.2)
7 Permitted range of rotation, hatched in drawing (see section 2.1.2)
8 Locking screw (see section 2.1.2)
9 Safety angle for housing cover, not displayed in drawing (only with protection type "Flame–proof enclosure")
10 Blanking plug (only with Pg 13,5 and Han 7D)
11 Protective cover for keys
12 Electrical connection:
Pg 13.5 compression gland[2) 3)] or
Female thread M20 x 1.5[3)] or
Female thread $^1/_2$ – 14 NPT or
Han 7 D Connector[2) 3)]

1) Take into consideration the addition of about 20 mm for thread length
2) Not available for protection type "Flame–proof enclosure"
3) Not available for protection type FM exp/CSA exp

Figure 1.3 SITRANS P differential pressure and flow transmitter, Dimension

2 Installation

2.1 Where to install

The transmitter can be installed above or below the pressure tapping point.
When measuring gases, we recommend the transmitter be installed above the pressure tapping point and the pressure pipe be laid so it runs down to the pressure tap. This will permit any condensation in the pipe to drain off and not affect the measurement.
When measuring liquids, the transmitter should be installed below the pressure tapping point and the pipe laid so it rises up to the pressure tap, thus enabling any gas in the pipe to be dispersed.

The point of installation should be easily accessible, preferably close to the measuring point and free from vibration. The permitted ambient temperature limits must not be violated. Protect the transmitter from direct heat sources Before installing the transmitter, compare the process data against the data on the rating plate. Keep the transmitter closed during the installation process.

The transmitter can be fitted directly to the valve manifold or secured with a mounting bracket.

2.1.1 Fixing with a mounting bracket

The mounting bracket is fixed to either

- a wall or mounting frame using 2 screws,
  or
- to a vertical or horizontal mounting pipe (50 to 60 mm in diameter) using a U–bolt.

The transmitter is fastened to the mounting bracket using the four screws supplied.

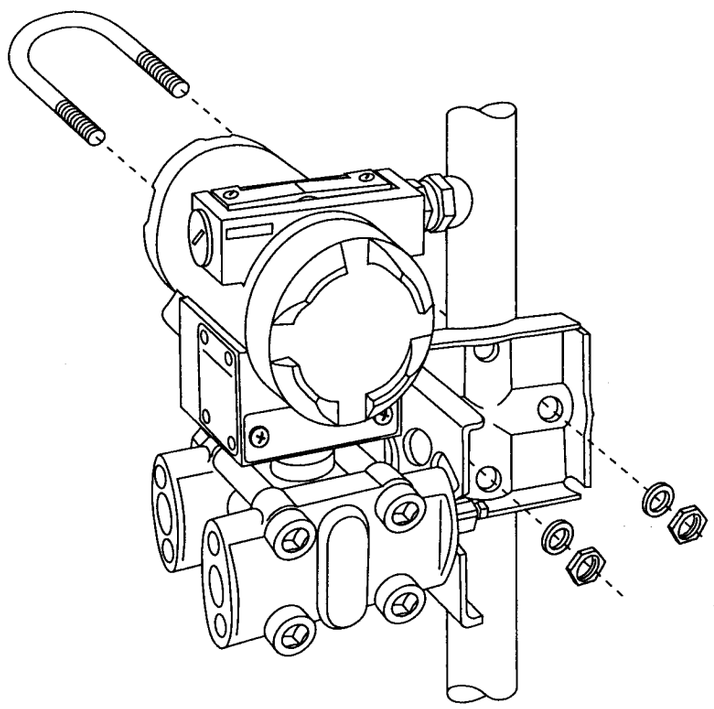


Figure 2.1 Fixing the SITRANS P transmitter using a mounting bracket (horizontal pressure pipes)

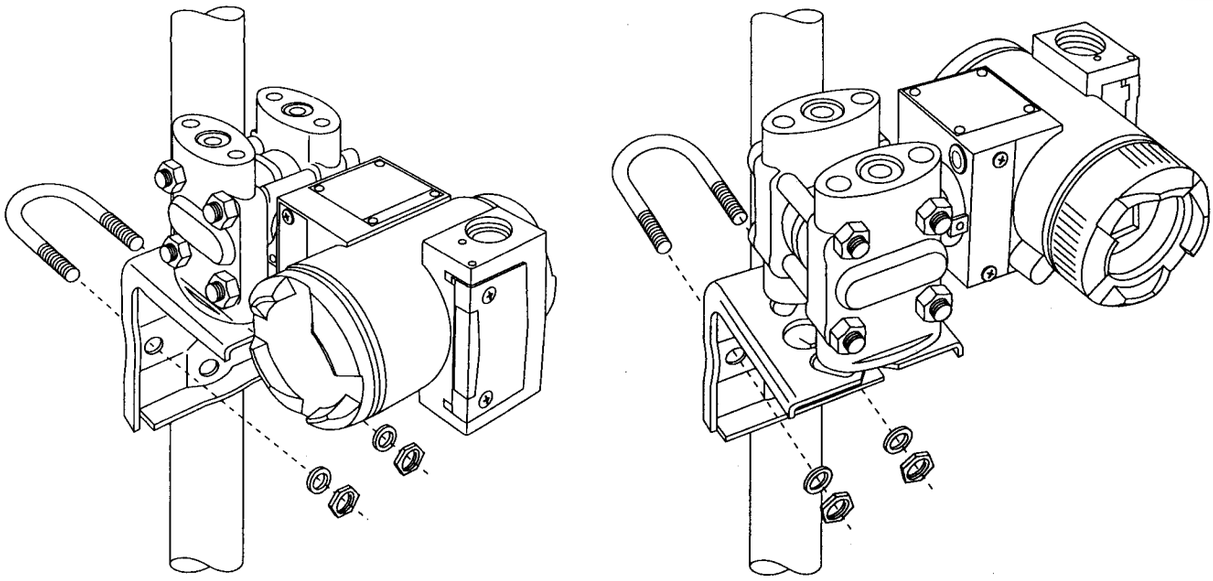


Figure 2.2 Fixing the SITRANS P transmitter using a mounting bracket (vertical pressure pipes)

2.1.2 Rotating the measuring unit in relation to the housing

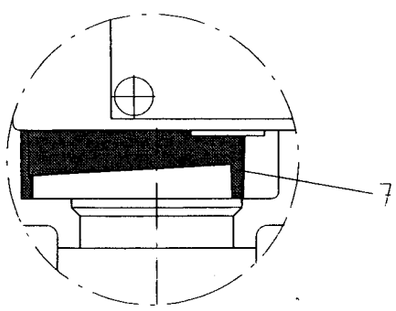
If required, the measuring unit of the transmitter SITRANS P can be rotated in relation to the electronics housing, either

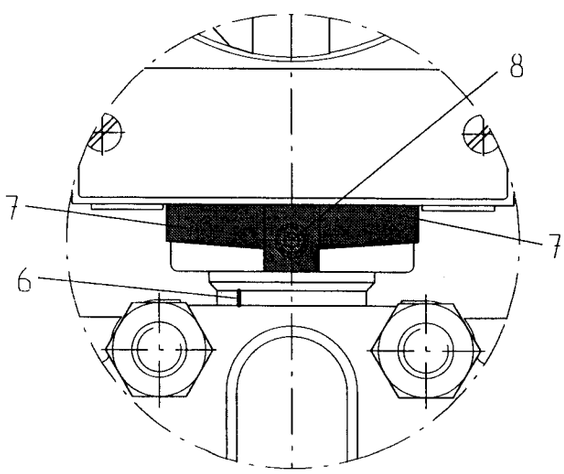
- to reverse the process terminals
  and/or
- to rotate the electronics side (with digital indicator) to a visible position

Only a limited rotation is permitted!

The range of rotation (7) is marked at the bottom of the electronics housing. At the neck of the electronics housing there is a reverence mark which must always be within the marked range when rotated.

- undo the locking screw (8)
- rotate the housing within the marked range (7)
- tighten locking screw (torque $3.4^{+0.2}$ Nm)





2.2 Electrical connection

WARNING

Observe the relevant regulations during the electrical installation; in hazardous areas, pay particular attention to:

- ☞ the regulations governing electrical systems in hazardous areas (Elex V)
- ☞ the specifications regarding the installation of electrical systems in hazardous areas (VDE 0165) and
- ☞ the conformance certificate

Check that the auxiliary power supply matches that specified on the rating plate.

The transmitter should be powered from a SELV (safety extra–low voltage) source. If other power sources are to be used, we recommend that the transmitter housing be earthed. The earth terminal in the terminal housing is connected to the external earth terminal.

Note

- The sealing caps in the cable entries have to be replaced by relevant cable glands or blanking plugs which must be certified when using transmitters conforming to protection type "Flame–proof enclosure".
- The terminal strip (Fig. 2.4) can be screwed on to four different positions (±90° or ±180°rotation possible). Please notice that the rotation is limited to ±180° (proceeding from the fixed positon as on delivery).
- The following general guidelines apply when laying terminal (max. cross section 1.5 mm²)/signal cables:
  - lay the signal cable separately from cables carrying voltages > 60 V
  - use twisted–pair cables
  - do not lay the cables close to large electrical systems, or use screened cable
  - full specifications in accordance with HART® 5.1 only with screened cable

❑ Connection to screw–type terminals

- remove housing cover of the electronics side (marked "FIELD TERMINALS" on housing)
- remove analogue indicator (if fitted)
- feed cable in through cable gland
- connect to "+" and "–" terminals, observing polarity!
- replace analogue indicator (if applicable)
- replace housing cover

Note

- With transmitters conforming to protection type "Flame–proof enclosure" the housing cover has to be secured with the safety angle.

❑ Connection using a plug connector (not available for protection type "Flame–proof enclosure")

The contacts for the connector are supplied in a bag with the instrument.

- slide sleeve and gland on to the cable
- remove about 8 mm of insulation from the end of the cable
- crimp or solder the contacts to the cable ends
- assemble connector

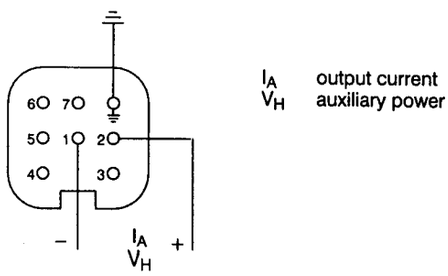


Figure 2.3 Connection using plug connector

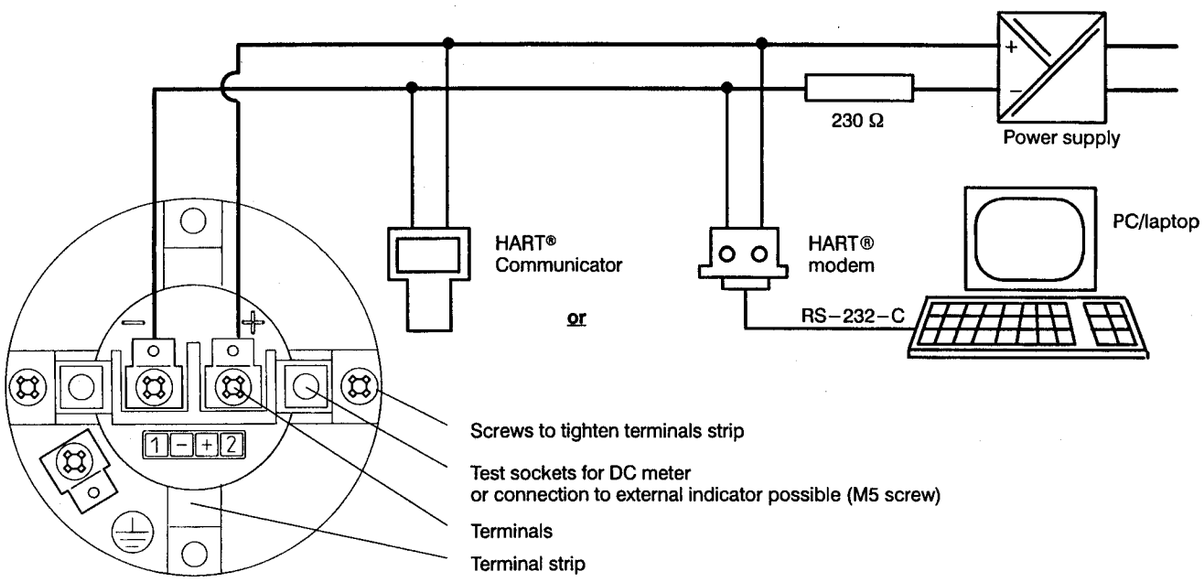


Figure 2.4 Electrical connection schematic

A faultless communication requires at least a load of 230 Ω within the signal circuit (see Fig. 2.4), when using power supply isolators for Smart transmitters, e.g. Siemens 7NG4021, a load has already been assembled (see Fig. 2.5). The power supply isolator with intrinsic safe input circuit (transmitter circuit) also separates safely between intrinsically safe and not–intrinsically safe circuit. The HART® modem or the HART® Communicator can be connected to the jacks marked HK (see Fig. 2.5).

WARNING

☞ The HART® modem must not be installed in hazardous locations and not connected to intrinsically safe current circuits.

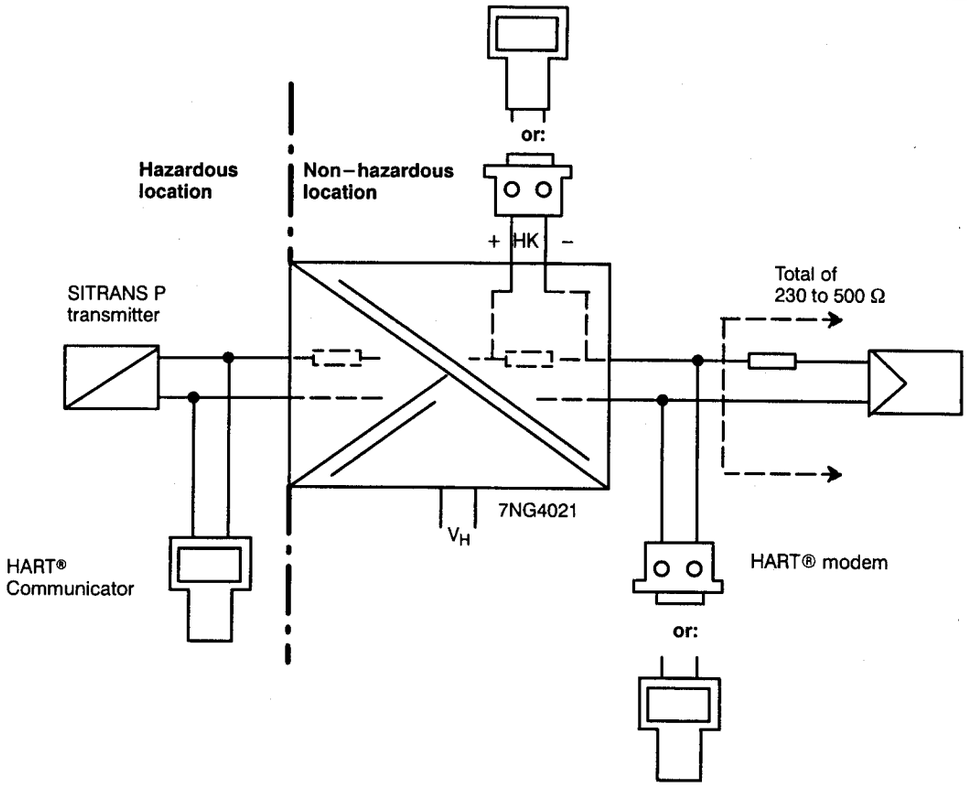


Figure 2.5 Electrical connection with power supply isolator for Smart transmitters

2.3 Installing the analogue indicator

- Remove the housing cover of the terminal side (marked "FIELD TERMINALS" on housing)
- Plug analogue indicator into the test sockets
  Depending on the transmitter position the analogue indicator can be plugged–in to four different positions (±90° or ±180° rotation possible).
- Replace cover with viewing window

2.4 Installing the digital indicator

- Remove the housing cover of the electronics side
- Plug–in the digital indicator
  Depending on the transmitter position the LCD can be plugged–in to four different positions (±90° or ±180° rotation possible).
- Replace cover with viewing window

3 Commissioning

The process data must correspond to that on the rating plate. The transmitter functions as soon as the power is turned on.

WARNING

Severe personal injury or damage to property may result if

- ☞ the venting valve and/or the screw plug are missing or not fitted properly and/or
- ☞ the valves are improperly or incorrectly operated.

When working with a hot medium, the individual steps described below must be performed in quick succession, otherwise the valves and transmitter may overheat and be damaged.

❑ Measuring gases

The isolating valves should be operated in the following sequence:

Initial setting: all valves closed

- Open both isolating valves (5) at the pressure tapping points.
- Open the equalizing valve (2).
- Open the pressure inlet valve (3A or 3B).
- Check the zero point (4 mA) at start of scale 0 and correct if necessary.
- Close equalizing valve (2).
- Open the other pressure inlet valve (3B or 3A).

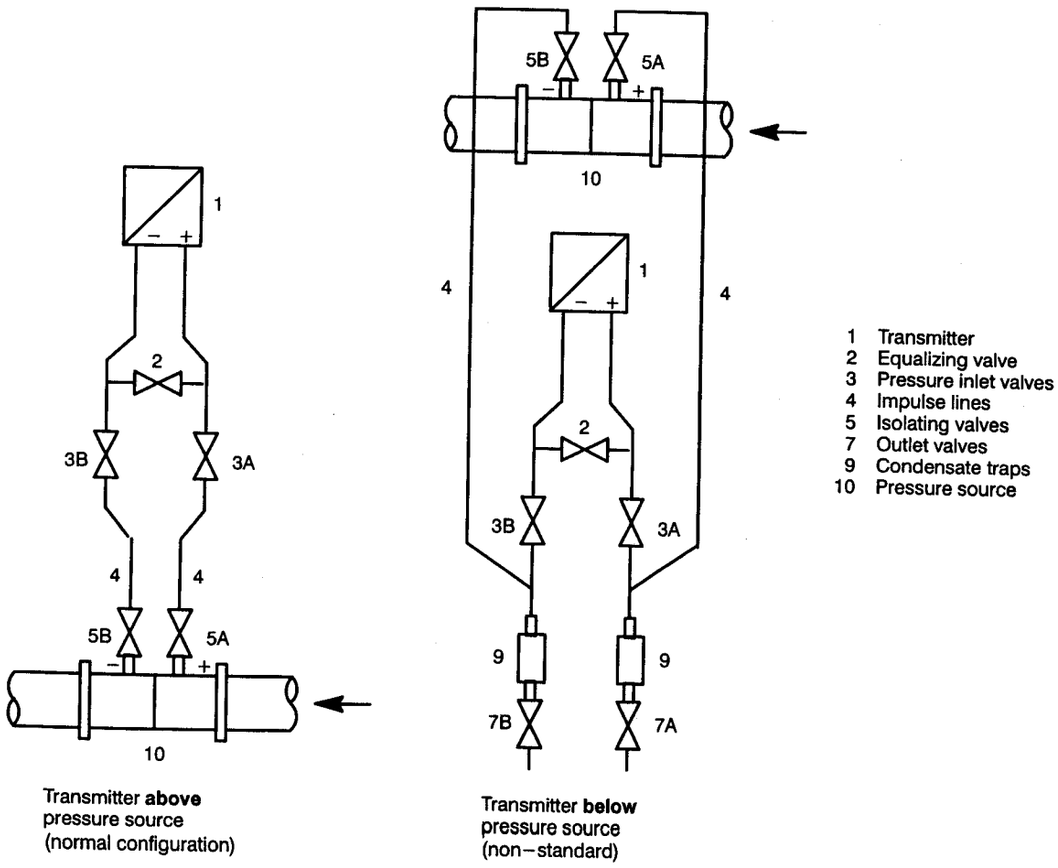


Figure 3.1 Measuring gases

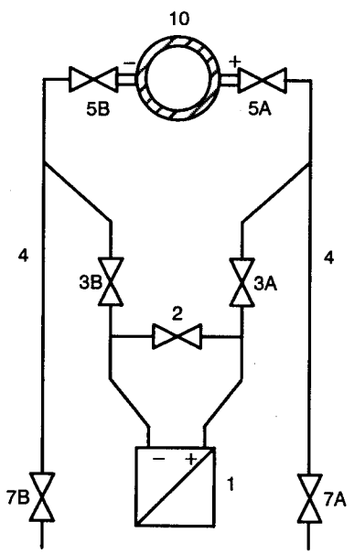
❑ Measuring liquids

The isolating valves should be operated in the following sequence:

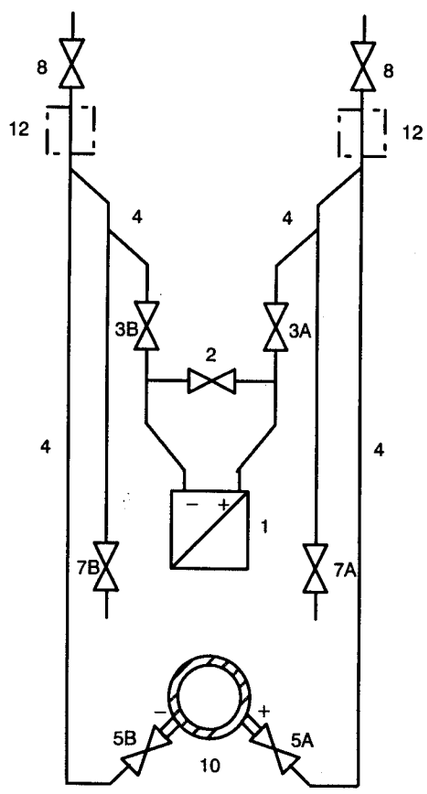
Initial setting: all valves closed

- Open both isolating valves (5) at the pressure tapping points
- Open the equalizing valve (2).
- If the transmitter is below the pressure source:
  open both outlet valves (7) slightly, one after the other, until no more air escapes.
- If the transmitter is above the pressure source:
  open both venting valves (8) slightly, one after the other, until no more air escapes.
- Close both outlet (7) or venting valves (8).
- Open the pressure inlet valve (3A) and venting valve on the positive leg of the transmitter (1) slightly until no more air escapes.
- Close the venting valve.
- Open the venting valve on the negative leg of the transmitter slightly until no more air escapes.
- Close pressure inlet valve (3A).
- Open the pressure inlet valve (3B) slightly until no more air escapes, close after.
- Close the venting valve on the negative leg of the transmitter (1).
- Open the pressure inlet valve (3A) ½ a rotation.
- Check the zero point (4 mA) against start of scale 0 and correct if necessary.
- Close equalizing valve (2).
- Open pressure inlet valves (3A and 3B) fully.

1 Transmitter
2 Equalizing valve
3 Pressure inlet valves
4 Impulse lines
5 Isolating valves
7 Outlet valves
8 Venting valves
10 Pressure source
12 Gas trap



Transmitter **below** pressure source (normal configuration)



Transmitter **above** pressure source (non-standard)

Figure 3.2 Measuring liquids

❑ Measuring steam

The isolating valves should be operated in the following sequence:

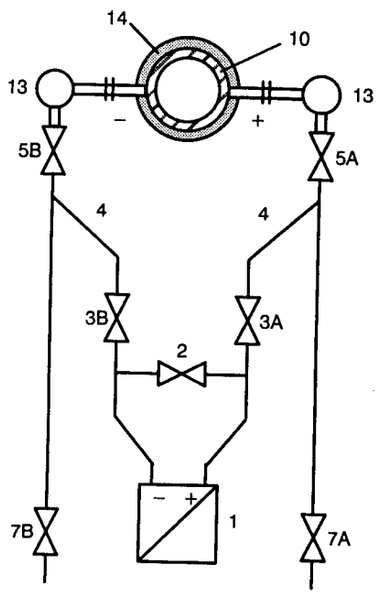
Initial setting: all valves closed

- Open both isolating valves (5) at the pressure tapping points
- Open the equalizing valve (2).
- Wait until the steam in the impulse line (4) and in the condensate reservoirs (13) has condensed.
- Open the pressure inlet valve (3A) and venting valve on the positive leg of the transmitter slightly until no more air escapes.
- Close the venting valve.
- Open the venting valve on the negative leg of the transmitter slightly until no more air escapes.
- Close pressure inlet valve (3A).
- Open the pressure inlet valve (3B) slightly until no more air escapes.
- Close the venting valve on the negative leg of the transmitter.
- Open the pressure inlet valve (3A) ½ a rotation.
- Check the zero point (4 mA) against start of scale 0 and correct if necessary.
- Close equalizing valve (2).
- Open pressure inlet valves (3A and 3B) fully.

Caution!

The result will only be correct when the impulse lines (4) contain an identical head of condensate at identical temperatures. Zero point calibration should be repeated, if necessary, when this condition is satisifed.

The flow of steam may damage the transmitter if the equalizing valve (2) is opened when both the isolating valves (5) and pressure inlet valves (3) are open!



1 Transmitter
2 Equalizing valve
3 Pressure inlet valves
4 Impulse lines
5 Isolating valves
7 Outlet valves
10 Pressure source
13 Condensate reservoir
14 Jacket

Figure 3.3 Measuring steam

4 Operation

4.1 Operating from a PC/Laptop

For the parametrization of the SITRANS P transmitter with the PC/laptop the software SIPROM P is necessary (see also technical data, section 1.3).

Please take service notes from the software description.

4.2 Operating from a HART® Communicator

The HART®–Communicator must be connected to the transmitter (see Fig. 2.4 and 2.5).

Action keys

Use the key to turn the HART® Communicator on and off. When the communicator is turned on the communication with the transmitter starts automatically. The online menu appears on the display.

Turning off the HART® Communicator is not possible in certain operations (e.g. when essential parameters have not been sent to the transmitter). In this case a message will be put out on the display.

Use the key to move the cursor up through a menu. The selected menuline will be marked.

Use the key to move the cursor down through a menu. The selected menuline will be marked.

Use the key to move the cursor to the right or to select menu options. The name of the selected menu will be displayed at the top.

Use the key to move the cursor to the left or to back out of a menu.

Use the key (hot key) to call–in directly the menu zero or span, also with turned off HART® Communicator.

Function keys

Below the LCD there are the function keys F1 to F4. The different function of the keys depend on the menus and will be displayed at the bottom of the LCD.

Alphanumeric and shift keys

These keys are used for data entry. The function as a number– or letter key depends on the respective menu. Letters are selected when the relevant shift key is used before.

Please take all other information for operating and technical data from the operating instructions of the HART® Communicator.

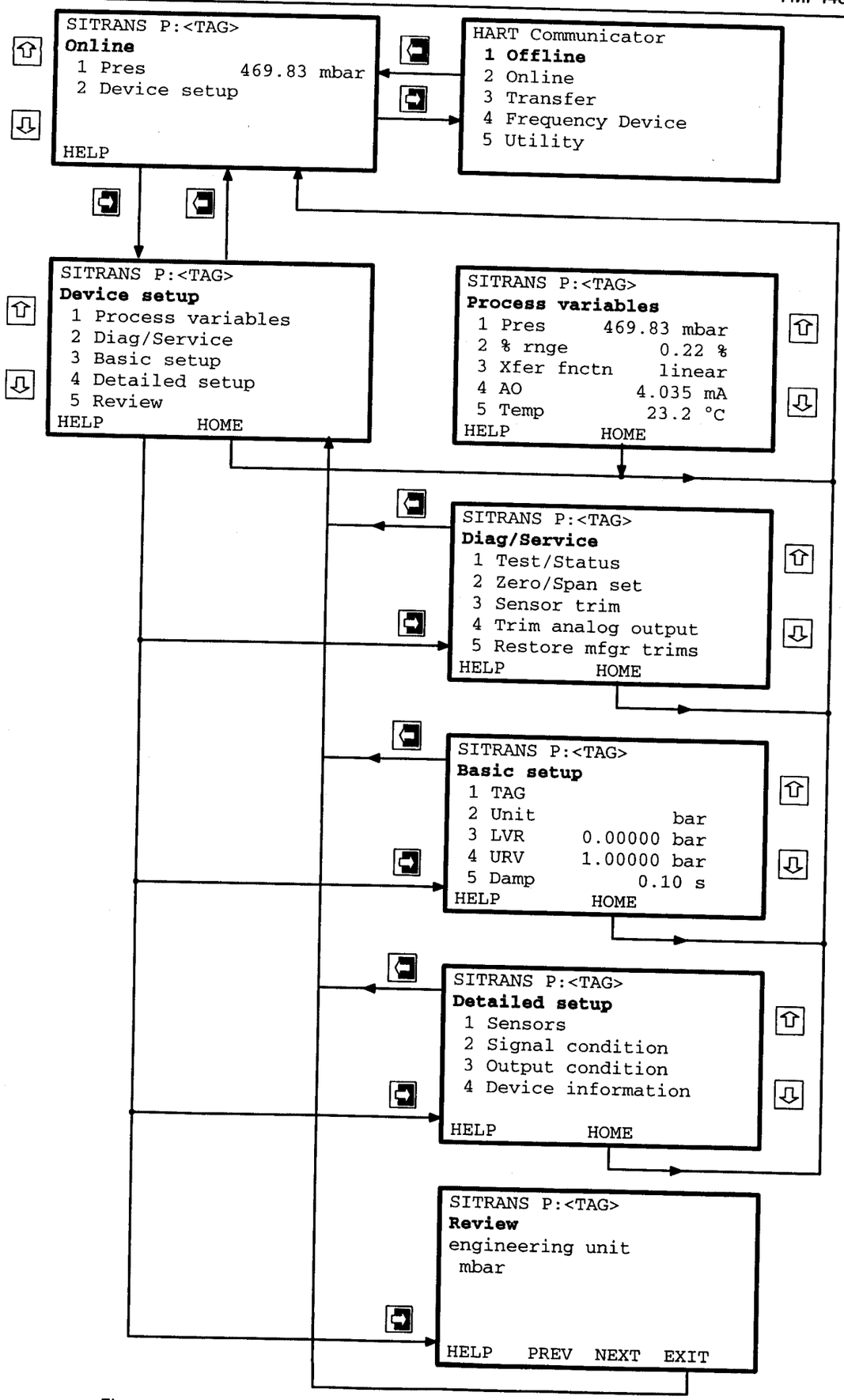


Figure 4.1 Menu

4.3 Operation on the transmitter

4.3.1 General

The SITRANS P differential pressure and flow transmitter can also be adjusted in the field by three pushbuttons, located on the outside of the instrument, with which the start of scale and full scale values are "set" or adjusted. By means of the digital indicator (optional) additional parameters can be adjusted. The pushbuttons can be accessed by undoing the two screws holding the protective cover in place, which can then be moved out of the way.

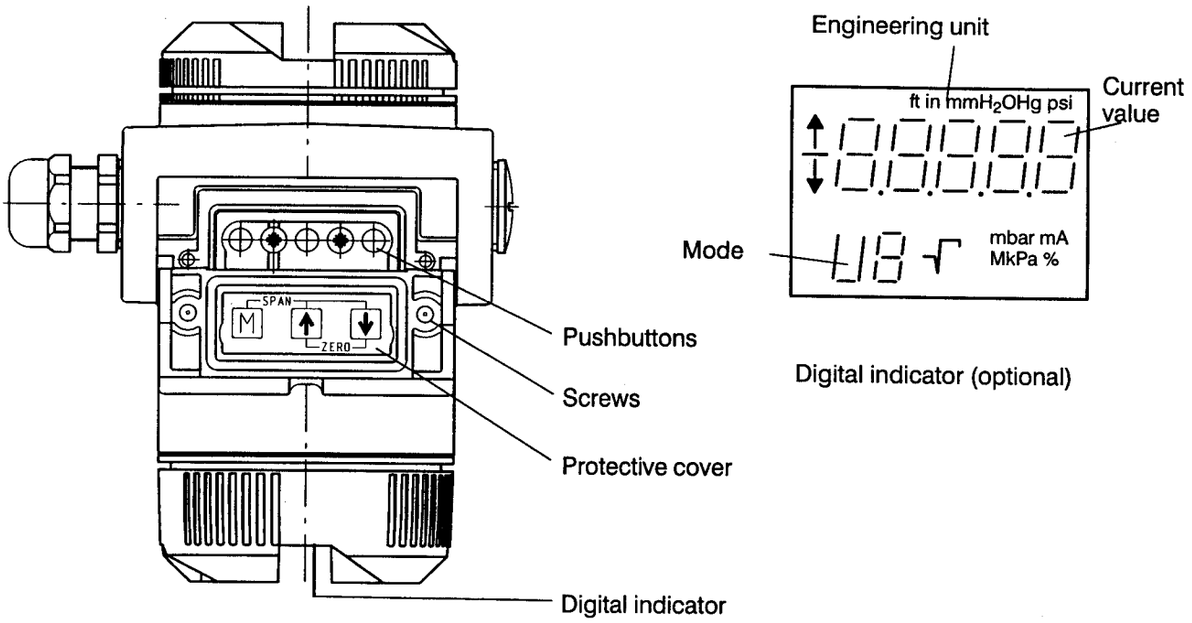


Figure 4.2 SITRANS P transmitter controls and displays

With the fitted digital indicator as an option all functions of table 4.1 are selected using the [M] key. When pressing the [M] key (Modus) 2 appears bottom left on the LCD. Every additional key press increases the mode by one. The parameters, the current value or the engineering unit can be modified using the [↑] and [↓] keys. In the case of error situations *Error* is displayed on the LCD, (see section 4.3.3.6). The transmitter changes to function "Measured value", if mode 14 is passed by pressing the [M] key or if 2 minutes elapse without a key being pressed (except in mode 8: loop check").

Note

- If the input pressure is displayed, selected in mode 13 (see section 4.3.3.8), and the square root characteristic in mode 11 (see section 4.3.3.10) the differential pressure corresponding to the flow and additionally the sign √ is displayed on the LCD.
- If there is an LCD overflow then 9.9.9.9.9 appears (with small engineering units like e.g. Pa)
- If an *L* is displayed on the LCD, then the transmitter parameters are protected against overwriting (see section 4.4) and the keys are locked.
- If a *C* is displayed on the LCD, the transmitter, operating with a PC/laptop or HART®Communicator, works in the "loop check" function mode or multidrop operation. The output current is independent of the applied differential pressure. The keys are locked.
- It applies to all modes (except 7 and 8):
  A set new value is only stored, when the mode has been changed or when the transmitter reverts automatically to the "Measured value" function approximately 2 minutes after last pressing the keys.

4.3.2 Setting start of scale and full scale without LCD

Note

- The start of scale and measuring span are non–interactive.
  (Measuring span = full scale minus start of scale)
- Pushbuttons may be disabled! (see Section 4.4)

– Undo the two screws holding the protective cover in place, which can then be moved out of the way.

Set start of scale (4 mA) and full scale (20 mA)

Assuming the pushbuttons are pressed as described below, the transmitter sets the start of scale to 4 mA and the full scale to 20 mA. An ammeter is not required.

❑ Start of scale

– Apply a differential pressure corresponding to the start of scale to the transmitter. When the start of scale is 0 bar, compensate the pressure between positive and negative leg of the transmitter.

– Press [↑] and [↓] keys together for about 2 s

❑ Full scale

– Apply a differential pressure corresponding to the full scale to the transmitter.

– Press all three keys, making sure you press the [M] key first, hold it, and press both the other.

Calibrate start of scale and full scale

If the output current is not to be set but freely adjusted:

- Connect a DC meter to the output circuit or the test sockets (see Fig. 2.4)

WARNING

☞ For intrinsic safe current circuits only certified current meters are permitted.

☞ It is forbidden to screw off the transmitter cover when working in hazardous locations and using transmitters conforming to protection type "Flame–proof enclosure" (Explosion–proof).

Measuring at test sockets:

- Clean the transmitter to prevent the ingress of dirt
- Open the housing cover of the terminal side
- Remove the analogue indicator (if fitted)
- Connect DC meter

❑ Start of scale

- Apply a differential pressure corresponding to the start of scale to the transmitter.When the start of scale is 0 bar, compensate the pressure between positive and negative leg of the transmitter.
- Set the output current for start of scale using the [↑] and [↓] keys

❑ Full scale

- Apply a differential pressure corresponding to the full scale to the transmitter
- Set the output current for full scale using the [M] key **and** the [↑] key or the [M] key **and** the [↓] key. Always press the [M] key first, hold it, and press either the [↑] key or the [↓] key.

• On completion of calibration

- Replace the analogue indicator (if applicable)
- Screw housing cover back on
- Replace protective cover and tighten both screws

Function	Mode [1]	Key [1]			Display, Description	Section
		↑	↓	↑ a.↓ [2]		
Measured value					Output current in mA or % or input pressure in engineering units	4.3.3.8
Error display					Error, when transmitter is disturbed	4.3.3.6
Start of scale	2	increase	decrease	set to 4 mA [2]	Output current in mA	4.3.3.1
Full scale	3	increase	decrease	set to 20 mA [2]	Output current in mA	4.3.3.1
Electrical damping	4	increase	decrease		Time constant T_{63} in s Range: 0.1 to 100.0	4.3.3.4
Start of scale "blind" calibration	5	increase	decrease	set to start of scale [2]	Start of scale in selected engineering units	4.3.3.2
Full scale "blind" calibration	6	increase	decrease	set to upper range limit [2]	Full scale in selected engineering units	4.3.3.2
Set zero point "blind" calibration	7	--	--	execute	Compensate pressure between positive and negative leg. (Start of scale does not change). Measuring value in engineering units	4.3.3.3
"Loop check" function	8	increase	decrease	initiate	Constant output current in mA 3.6 4.0 12.0 20.0 22.8 Terminate using M key	4.3.3.5
Output current in error situation	9	toggles between the two values			Selected output current Either 22.8 or 3.6 mA	4.3.3.6
Disable pushbuttons and/or functions	10	toggles between the four functions			0 = none LA = locked all LO = locked all accept start of scale LS = locked all accept start of scale and full scale	4.3.3.7
Characteristic	11	toggles between the three functions			Lin = linear SrLin = square-root (linear below transition point) SroFF = square-root (cut-off below transition point)	4.3.3.10
Transition point of square-root characteristic	12	increase	decrease		Adjusting range for transition point 5 to 15 % rate of flow	4.3.3.11
Measured value display	13	change			Engineering units (input variable) or output current in mA or %	4.3.3.8
Engineering units	14	change			Engineering units	4.3.3.9

1) If an L is displayed on the LCD, then the transmitter parameters are protected against overwriting (see section 4.4) and the keys are locked.
If a C is displayed on the LCD, the transmitter, operating with a PC/laptop or HART®Communicator, works in the "loop check" function mode or multidrop operation. The output current is independent of the applied differential pressure. The keys are locked.

2) Press ↑ and ↓ keys simultaneously for about 2 s. The display goes blank and the current value is displayed after about 2 s.

3) If the sign ↑↓ is displayed at the left, the measuring range limits have been violated.

Table 4.1 SITRANS P transmitter functions

4.3.3 Operation with LCD

Note: • The start of scale and measuring span are non–interactive.
(Measuring span = full scale minus start of scale)

- Pushbuttons and or functions may be disabled!
See table 4.1, mode 10, section 4.3.3.7 and 4.4
- Depending on the transmitter position the LCD can be plugged–in to four different positions.

– Undo the two screws holding the protective cover in place, which can then be moved out of the way.

• On completion of calibration

– Replace protective cover and tighten both screws

4.3.3.1 Setting start of scale and full scale

Note: If no pressure source is available,

the start of scale can be set in mode 5 and
the full scale in mode 6.

Both are specified in the selected engineering unit, see section 4.3.3.2.

❑ Set start of scale

– Apply a differential pressure corresponding to the start of scale to the transmitter. When the start of scale is 0 bar, compensate the pressure between positive and negative leg of the transmitter.

– Select mode 2 using the [M] key.

– Set the output current corresponding to the start of scale using the [↑] and [↓] keys.

or

Set output current to 4 mA:

– Press the [↑] and [↓] keys simultaneously for about 2 s.

If the sign ↑↓ is displayed at the left, the measuring range limits have been violated.
The original value remains **unchanged**.

❑ Set full scale

– Apply a differential pressure corresponding to the full scale to the transmitter.

– Select mode 3 using the [M] key.

– Set the output current corresponding to full scale using the [↑] and [↓] keys.

or

Set output current to 20 mA:

– Press the [↑] and [↓] keys simultaneously for about 2 s.

If the sign ↑↓ is displayed at the left, the measuring range limits have been violated.
The original value remains **unchanged**.

If the sign ↑↓ -.-.-.-.- is displayed the selected measuring span is more than twice the maximum measuring span. When pressing [↑] and [↓] keys simultaneously for about 2 s the full scale is set to 0.0000.

4.3.3.2 Setting start of scale and full scale without a pressure source

It is possible to set the start of scale and full scale of the SITRANS P transmitter even if there is no pressure line connected or pressure source available ("blind" calibration).

❑ To set start of scale

- Select mode 14 using the [M] key.
- Use the [↑] or [↓] key to select engineering unit
- Select mode 5 using the [M] key.
- Use the [↑] or [↓] key to set the start of scale in the selected engineering unit
- When pressing both [↑] and [↓] keys simultaneously for about 2 s, the start of scale is set to zero (in the selected engineering unit)

❑ To set the full scale

- Select mode 6 using the [M] key.
- Use the [↑] or [↓] key to set the full scale in the selected engineering unit
- When pressing both [↑] and [↓] keys simultaneously for about 2 s, the full scale is set to the upper measuring limit (in the selected engineering unit)

Example 1

A transmitter with a maximum measuring span of 5 bar is to be calibrated to a measuring range of 0 to 3.52 bar to correspond to 4 to 20 mA.

- Select engineering unit "bar" in mode 14
- For the start of scale, set the value "0.0000" in mode 5.
- For the full scale, set the value "3.5200" in mode 6.

Example 2

A transmitter with a maximum measuring span of 1.6 bar is to be calibrated to a measuring range of +456.70 to −123.40 mm Hg to correspond to 4 to 20 mA.

- Select engineering unit "mm Hg" in mode 14
- For the start of scale, set the value "+456.7" in mode 5.
- For the full scale, set the value "−123.4" in mode 6.

Example 3

A transmitter with a maximum measuring span of 250 mbar is calibrated for a measuring range of 0 to 200 mbar to correspond to 4 to 20 mA.
The measuring range is to be changed to a setting of 100 to 240 mbar.

- For the start of scale, set the value "100.00" in mode 5.
- Select mode 6 using [M] key; the full scale "300.00 mbar" is displayed
- When trying to decrease the value using the [↓] key, the error note ↑↓ is displayed additionally to the (not changeable) value
  (Explanation: If the start of scale is changed the measuring span remains unchanged. The full scale 300 mbar violates the measuring range limits.)
- Press the [↑] and [↓] keys simultaneously for about 2 s. Then the full scale is set to 250.00 mbar.
- Use the [↓] key to set the full scale to 240.00 mbar.

4.3.3.3 Correction of zero point

If the transmitter is installed and operational, external influences such as angle of installation, ambient temperature, or installation dependent pressure effects (e.g. head of liquid in the impulse pipe line to the transmitter) may cause an offset in the transmitter's zero point. This offset (max. 5 % of the max. measuring span) can be corrected in the SITRANS P transmitter without modifying the start of scale and full scale settings in modes 5 and 6 (correction of zero point).

- Compensate the pressure between the positive and negative leg of the transmitter (see section 4.3.3.1)
- Select mode 7 using the [M] key.
- Press the [↑] and [↓] keys simultaneously for about 2 s.

The value 0 or 0.0 etc. to 0.0000 is displayed on the LCD, depending on the maximum measuring span of the transmitter and the selected engineering unit.

Example

A transmitter with a maximum measuring span of 1.6 bar is calibrated for a measuring range of 200 to 800 mbar (4 to 20 mA), i.e. start of scale 200 (mbar) in mode 5, full scale 800 (mbar) in mode 6 and engineering unit "mbar" in mode 14. The transmitter is, however, being used in hotter conditions, which is causing an offset (200.3 mbar) in the original zero point.

This offset is to be corrected.

- Compensate the pressure.
- Press the [↑] and [↓] keys simultaneously for about 2 s in mode 7. The value of "0.0 mbar" is displayed.
- Apply the original differential pressure; "200.0 mbar" is displayed

The start of scale and full scale of 200 (mbar) and 800 (mbar) set in modes 5 and 6 respectively remain unchanged.

4.3.3.4 Setting electrical damping

Note: The time response of the SITRANS P transmitter is determined by the dead time, the time constant T_{63} (see section 1.3), and the electrical damping value.

The SITRANS P transmitter is supplied with a damping value of 0.1 s. Values of 0.1 to 100.0 s in increments of 0.1 s are permitted.

- Select mode 4 using the [M] key.
- Use the [↑] and [↓] keys to change the damping value.

4.3.3.5 "Loop check" function

The following output current constants can be set to check the output signal loop, e.g. during commissioning, irrespective of the pressure:

3.6 mA 4.0 mA 12.0 mA 20.0 mA 22.8 mA

- Select mode 8 using the [M] key.
- Press the [↑] and [↓] keys simultaneously for about 2 s. This activates the "loop check" function. An output current of 4.0 mA is displayed.
- Use the [↑] and [↓] keys to select the required current.

Changing the mode disables the "loop check" function.

4.3.3.6 Output current in error situations

The pressure sensor and electronics are monitored continuously. If a defect occurs *Error* is displayed. The output current is set to 3.6 or 22.8 mA, neither of which are possible under normal conditions. The value set is determined using mode 9. The factory setting is 22.8 mA.

- Select mode 9 using the [M] key.
- Use the [↑] or [↓] key to select either 3.6 mA or 22.8 mA.

Changing the mode causes the selected value to be stored.

4.3.3.7 Disable pushbuttons and/or functions

The pushbuttons located under the protective cover can be protected together with their functions against accidental or unauthorised use.

- Select mode 10 using the [M] key.
- Use the [↑] or [↓] key to select one out of four functions

0 → no pushbuttons or functions disabled (operation see section 4.3.3)

LA → all pushbuttons and functions disabled

L0 → all functions disabled except start of scale (to set or adjust start of scale see section 4.3.2)

L5 → all functions disabled except start of scale and full scale (to set or adjust start of scale or full scale see section 4.3.2)

Changing the mode causes the selected locking to be stored. The disabling of pushbuttons and/or functions is displayed. It is cancelled when the [M] key is pressed more than 5 s.

Note:
- When selecting lock *L0* or *L5* the measured value display current in mA or % should be chosen beforehand in mode 13 (see section 4.3.3.8). Otherwise a change of the output value is not noticeable when the [↑] and [↓] keys are pressed.
- If an *L* is displayed on the LCD, then the transmitter parameters are protected against overwriting (see section 4.4)

4.3.3.8 Select display (current, %, pressure)

It can be displayed either the input variable pressure in the selected unit in mode 14 or the output variable current in mA or %.

- Select mode 13 using the [M] key
- Use the [↑] or [↓] key to select the required variable

4.3.3.9 Select engineering units

The following engineering units can be chosen from:

bar mbar in H_2O*) in Hg ft H_2O*) mm H_2O*) mm Hg psi Pa kPa MPa

- Select mode 14 using the [M] key
- Use the [↑] or [↓] key to select the engineering units

Note:
- If there is an LCD overflow then *9.9.9.9.9* appears (with small engineering units like e.g. Pa)

*) Reference temperature 20 °C

4.3.3.10 Select characteristic (linear/square–root)

The output characteristic is selected as follows:

- linear (proportional to differential pressure)
- square–root (proportional to rate of flow)

– below the transition point of the square root characteristic

- linear
- cut–off

– Select mode 11 using the [M] key

– Use the [↑] or [↓] key to select either:

- *Lin* for linear characteristic
- *SrLin* for square–root characteristic (linear up to the transition point)
- *SroFF* for square–root characteristic (cut–off up to the transition point)

Changing the mode causes the selected characteristic to be stored.

In the case of a square–root characteristic, the transition point can be specified (see section 4.3.3.11), in all modes the sign √ is displayed. The SITRANS P transmitter for flow measurement will be delivered with the factory setting *SroFF*.

Note

- If the input pressure is displayed, selected in mode 13 (see section 4.3.3.8) and the square root characteristic in mode 11 the differential pressure corresponding to the flow and additionally the sign √ is displayed on the LCD.

4.3.3.11 Transition point of square–root characteristic

When measuring rate of flow with a pressure source, the transition point of the square–root characteristic can be set between 5 % and 15 % of the rate of flow. The output characteristic is linear (see Fig. 4 (a)) below this point or cut–off (b).

- Select mode 12 using the [M] key.
- Use the [↑] or [↓] key to select the transition point of the square–root characteristic.

Changing the mode causes the selected transition point to be stored.

Note

- If the input pressure is displayed, selected in mode 13 (see section 4.3.3.8) and the square root characteristic in mode 11 (see section 4.3.3.10) the differential pressure corresponding to the flow and additionally the sign √ is displayed on the LCD.

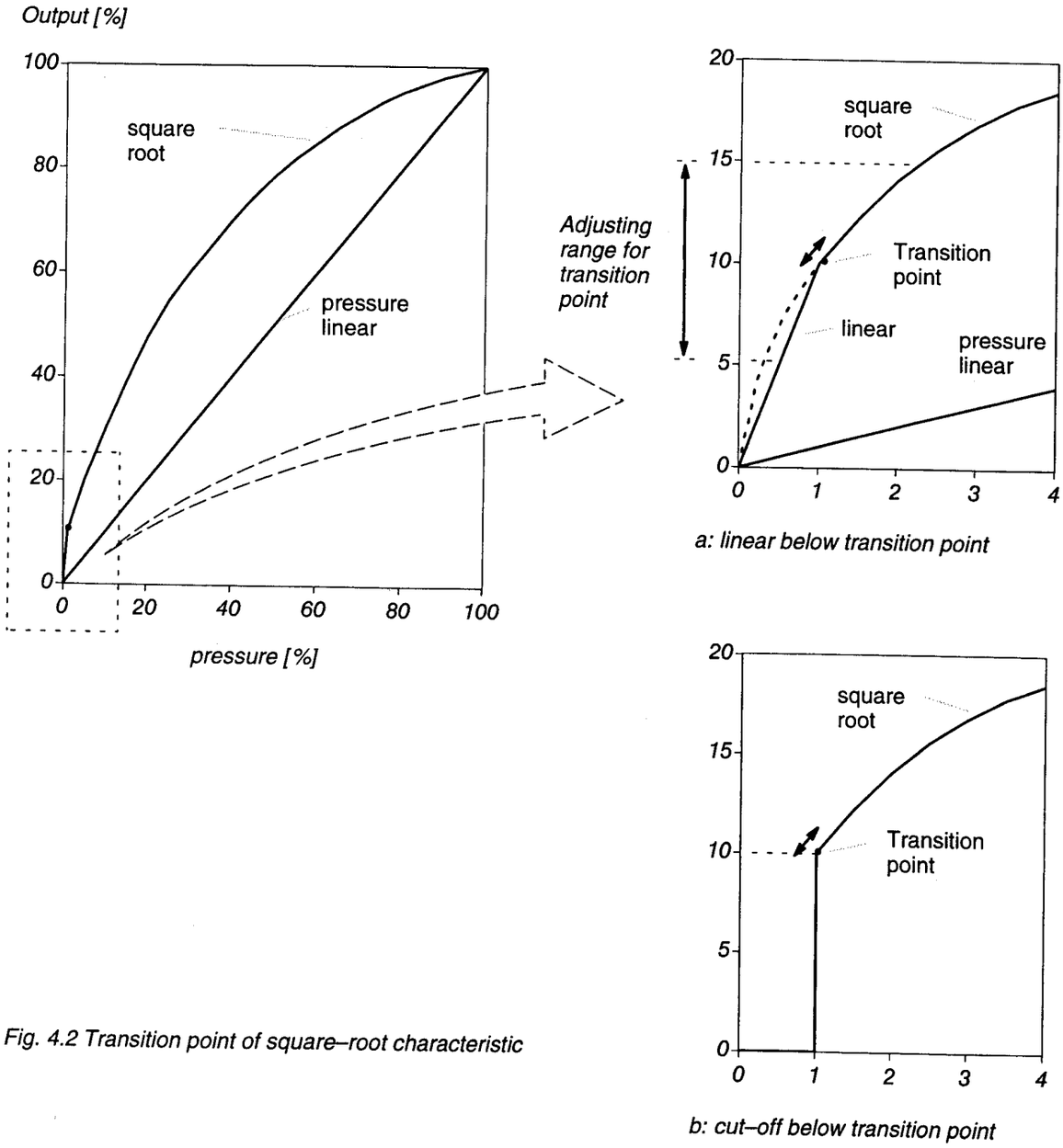
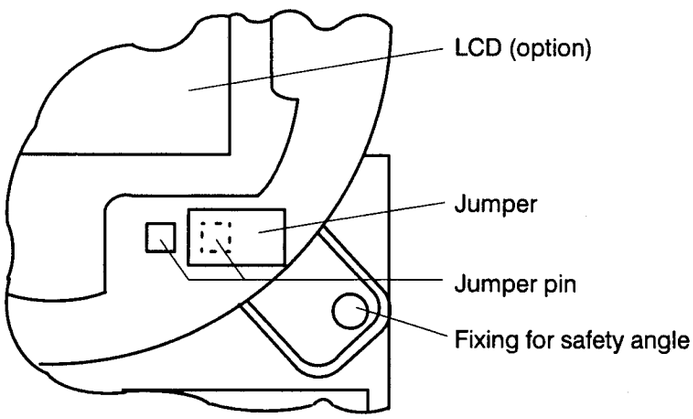


Fig. 4.2 Transition point of square–root characteristic

4.4 Write protection for HART® Communication

The transmitter parameters can be protected against accidental or unauthorised overwriting. The write protection prevents changing the parameters using the keys or PC/laptop or HART® Communicator. But they can be read out by PC/Laptop or HART® Communicator.

- Clean the transmitter before opening it to prevent the ingress of dirt
- Switch off the voltage for transmitters conforming to protection type "Flame–proof enclosure" when using in hazardous location, undo the screw holding the safety angle on the electronics side (if fitted)
- Move angle out of the way
- Screw off housing cover of the electronics side
- Pull off jumper.
- On the LCD (optional) is displayed the letter *L*
- Secure jumper against losing: push jumper horizontal*) on the right jumper pin



- Screw on housing cover
- Fix safety angle (if applicable) and switch on the voltage

*) Proceeding from the normal position (see Fig. 1.3 and note 4.3.3)

5 Maintenance

The transmitter requires no maintenance.

Check the transmitter's start of scale value occasionally.

If an error occurs:

- the output current is set to 22.8 mA or 3.6 mA, depending on selection (see section 4.3.3.6)
- using SIPROM P an appropriate message is displayed in the "Measured values" field
- *Error* is displayed on LCD (optional)

6 Conformance Certificates

Physikalisch-Technische Bundesanstalt

(1) KONFORMITÄTSBESCHEINIGUNG

(2) **PTB Nr. Ex-94.C.1021**

(3) Diese Bescheinigung gilt für das elektrische Betriebsmittel

Meßumformer SITRANS P Typen 7MF4***.*++**-*D+*

(4) der Firma Siemens AG
D-Karlsruhe

(5) Die Bauart dieses elektrischen Betriebsmittels sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Konformitätsbescheinigung festgelegt.

(6) Die Physikalisch-Technische Bundesanstalt bescheinigt als Prüfstelle nach Artikel 14 der Richtlinie des Rates der Europäischen Gemeinschaften vom 18. Dezember 1975 (76/117/EWG) die Übereinstimmung dieses elektrischen Betriebsmittels mit den harmonisierten Europäischen Normen

Elektrische Betriebsmittel für explosionsgefährdete Bereiche

EN 50 014:1977 + A1...A5 (VDE 0170/0171 Teil 1/1.87) Allgemeine Bestimmungen
EN 50 018:1977 + A1...A3 (VDE 0170/0171 Teil 5/1.87) Druckfeste Kapselung "d"

nachdem das Betriebsmittel mit Erfolg einer Bauartprüfung unterzogen wurde. Die Ergebnisse dieser Bauartprüfung sind in einem vertraulichen Prüfprotokoll festgelegt.

(7) Das Betriebsmittel ist mit dem folgenden Kennzeichen zu versehen:

EEx d IIC T5 bzw. EEx d IIC T6

(8) Der Hersteller ist dafür verantwortlich, daß jedes derart gekennzeichnete Betriebsmittel in seiner Bauart mit den in der Anlage zu dieser Bescheinigung aufgeführten Prüfungsunterlagen übereinstimmt und daß die vorgeschriebenen Stückprüfungen erfolgreich durchgeführt wurden.

(9) Das elektrische Betriebsmittel darf mit dem hier abgedruckten gemeinschaftlichen Unterscheidungszeichen gemäß Anhang II der Richtlinie des Rates vom 6. Februar 1979 (79/196/EWG) gekennzeichnet werden.

Im Auftrag
Dipl.-Ing. R. Kaps

Braunschweig, 25.04.1994

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 11

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EEx ia IIC T6

(8) Der Hersteller ist dafür verantwortlich, daß jedes derart gekennzeichnete Betriebsmittel in seiner Bauart mit den in der Anlage zu dieser Bescheinigung aufgeführten Prüfungsunterlagen übereinstimmt und daß die vorgeschriebenen Stückprüfungen erfolgreich durchgeführt wurden.

(9) Das elektrische Betriebsmittel darf mit dem hier abgedruckten gemeinschaftlichen Unterscheidungszeichen gemäß Anhang II der Richtlinie des Rates vom 6. Februar 1979 (79/196/EWG) gekennzeichnet werden.

Im Auftrag
Dipl.-Ing. W. Hetzel

Braunschweig, 15.08.1994

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