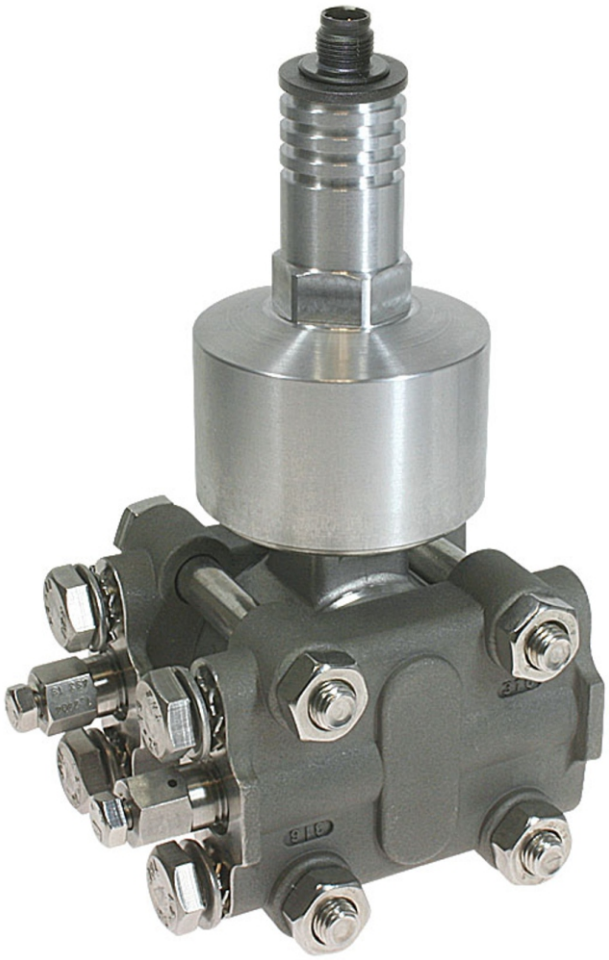
Data Sheet

MKDS



Content

Characteristics

- Input:	differential pressure (measuring range: 10 mbar up to 100 bar)
- Output:	4...20 mA current loop (12...45 VDC), HART-protocol
- Turn down:	up to 100:1
- Accuracy:	0,075%, 0,1% of range (URL, LRL)
- Electrical connection:	several options (see page 5)
- Configuration:	with software
- Material enclosure:	stainless steel (degree of protection: IP65)
- Process connection:	1/4-18 NTP (pressurized parts: stainless steel 1.4435)
- Temperature medium:	-40...+104°C

Applications

The pressure sensor is suitable to measure differential pressure. From this can be derived: flow rate (volumetric- and mass flow) and level (level, volume, mass). Typical areas of use are chemical industry and process engineering.

Technical Data

Input

Differential pressure:	10 mbar / 60 mbar / 400 mbar / 2,5 bar / 20 bar / 100 bar
Static pressure:	160 bar / 400 bar (see pressure table, data sheet page 3)

Output

Analog:	4...20 mA, 2-wire, with superimposed communication signal (HART-protocol)
Signal range:	3,6...22,8 mA
Signal failure:	3,6 mA

Accuracy

Type 10 mbar / 60 mbar:
- 0,1% of FS up to turn down 5:1
- ±(0,1+0,01*URL/URV) for turn down 5:1 to 50:1

Types 400 mbar / 2,5 bar / 20 bar / 100 bar:
- 0,075% of FS up to turn down 10:1
- ±(0,0751+0,00751*URL/URV) for turn down 10:1 to 100:1

Influences:

Static pressure:	zero: ±0,1%/70 bar - range: ±0,2%/70 bar
Supply:	<0,005% of nominal range/1V
Vibration:	<0,01% of nominal range/g at 200 Hz
Fitting position:	zero drift, to compensate
Span drift:	without
Temperature:	<0,45%/55°C
Stability:	±0,1% of nominal range / 1 year

Settings

Rise-delay time:	5 s
Cycle time, update:	0,25 s
Damping:	200 ms (without consideration of electronic damping)
Filter adjustment:	0...160µA

Supply

Voltage:	12...45 VDC (current loop)
Insulation resistance:	>250 MΩ
Short-circuit strength:	Permanent
Reverse voltage protection:	Yes (no function, no damage)
Overvoltage protection:	500V

Environmental Conditions

Operating temperature:	-40...+85°C
Ambient temperature:	-40...+85°C
Temperature medium:	-40...+104°C
Storage temperature:	-40...+85°C
Humidity:	5...98% relative humidity

Technical Data (Continued)

Mechanics

Material:

Electronics casing:	Stainless steel 1.4571
Electrical connection:	PTB GF30 (insert)
Measuring membrane:	Stainless steel 1.4435 / Option: Hastelloy
Vent valve:	Stainless steel 1.4435
Joint pieces:	Stainless steel 1.4435
O-ring:	Viton (FKM, FPM), in contact with medium
Flange screws:	Plain carbon steel, zinc coated
Process connection:	1/4-18 NPT
Dimensions:	see page 7
Protection class:	IP65
Weight:	approx. 3,3 kg
Electrical connection:	several plugs, cable (see page 5)
Principle of measurement:	Capacitive
Standards:	EMC directive 2014/30/EU / Pressure equipment directive 2014/68/EU

Input

Measurand: differential pressure
derived from this: flow rate (volumetric- and mass flow)
level (level, volume, mass)

Measuring ranges: 10 mbar up to 100 bar

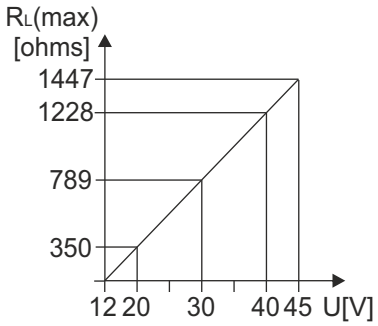
nominal range [mbar]	range limit lower (LRL) [mbar]	range limit upper (URL) [mbar]	working range smallest adjustable [mbar]	overload limit [bar]
10	-10	+10	0,2	160
60	-60	+60	0,6	160
400	-400	+400	4	160
2500	-2500	+2500	25	160
20000	-20000	+20000	200	400
100000	-100000	+100000	1000	400

Output

Output signal: 4...20 mA, 2-wire connection
with superimposed communication signal for HART protocol

Signal range: 3,6...22,8 mA

Load: R_{Lmax} = (U - 12 V) / 0,0228 A



Voltage supply: 12...45 VDC

R_{Lmax}: maximum load resistance
U: Voltage supply

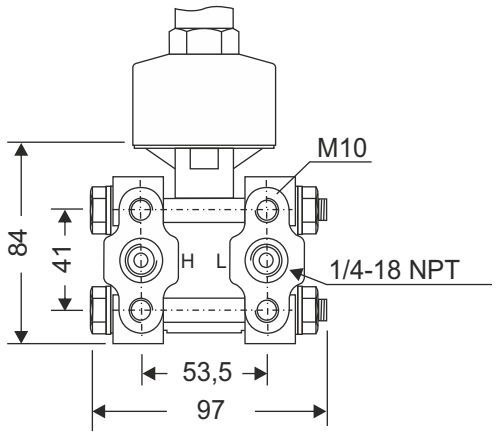
Please note: When using communication via HART modem, a communication resistance of 250 Ω has to be taken into account.

Resolution: current output: 16 bit

Read cycle time: HART commands all 200 ms.

Damping: continuously adjustable from 0 to 160 µA via hand-held equipment or PC-software.
Factory configuration: 0 µA

Process Connection



Pressure connection:
1/4-18 NPT AISI 316L (1.4435)

Measuring membrane:
stainless steel 1.4435

Mounting:
M10

Supplied accessories:
2 vent valves AISI 316L (1.4435)
Holder for wall and tube mounting

Electrical Connection

M12x1	Super Seal	Deutsch	Deutsch	Bajonett	Valve[1)]	Cable
						
4-pole 5-pole 8-pole	3-pole	3-pole	4-pole	4-pole	4-pole	2-pole 5-pole

1) Accoding EN 175301-803, type A

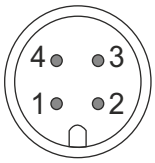
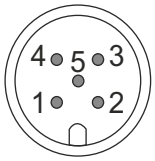
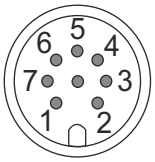
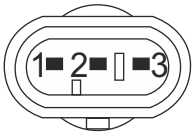
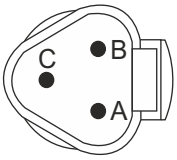
The device has a protective system against overvoltage peaks, RF interferences and wrong polarity.
Voltage supply: between 12 ....45 VDC
Residual ripple: no influence on mA-signal up to 5% within nominal voltage range
Influence supplied power: <0,005% of nominal range / 1V
Recommended cable: shielded and twisted 2-wire

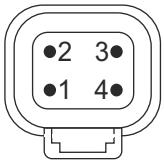
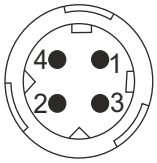
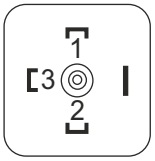
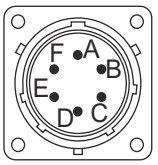
Pin assignment

Connection	Current loop 4...20 mA (HART) U+	U-
M12, 4-pole	1	3
M12, 5-pole	1	3
M12, 8-pole	1	3
Super Seal, 3-pole	1	3
Deutsch DT04, 3-pole	A	B
Deutsch DT04, 4-pole	1	3

Connection	Current loop 4...20 mA (HART) U+	U-
Bayonet DIN, 4-pole	1	2
Valve (L-plug), 4-pole	1	2
Cable, 4-pole	yellow	white
Cable, 6-pole	yellow	white
MIL, 6-pole	A	C

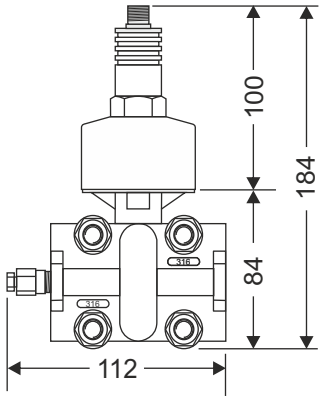
View: plug pins of male connector

M12, 4-pole	M12, 5-pole	M12, 8-pole	Super Seal, 3-pole	Deutsch DT04, 3-pole
				

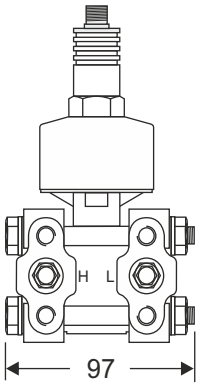
Deutsch DT04, 4-pole	Bayonet DIN, 4-pole	Valve (L-plug), 4-pole	MIL, 6-pole	Cable, 4-, 6-pole
				LIYCY 4 or 6x0,25 mm² grey

Dimensions (in mm)

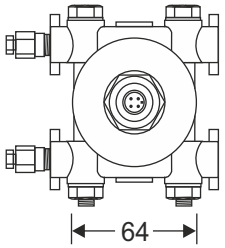
Example for plug M12x1



view front

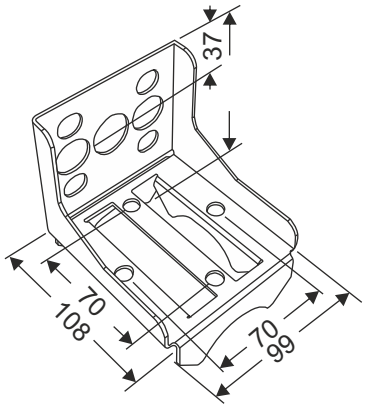


view side



view top

Mounting



Dimensions in mm

A steel wall mount (zinc coated) is supplied with the device.

Supplied parts: Wall mount, fixing clamp with nuts and washers.

A stainless steel mount can be selected as an option (additional price).

HART Communication and Configuration

The HART-Tool is a graphical user interface for the ME series with menu-driven program for configuration. It can be used for start-up, configuration, signal analysis, data backup and device documentation. Operating systems: Windows 2000, Windows XP, Windows 7, Windows 8, Windows 10
Connection via HART interface (modem) with USB interface of a PC or hand-held HART communicator

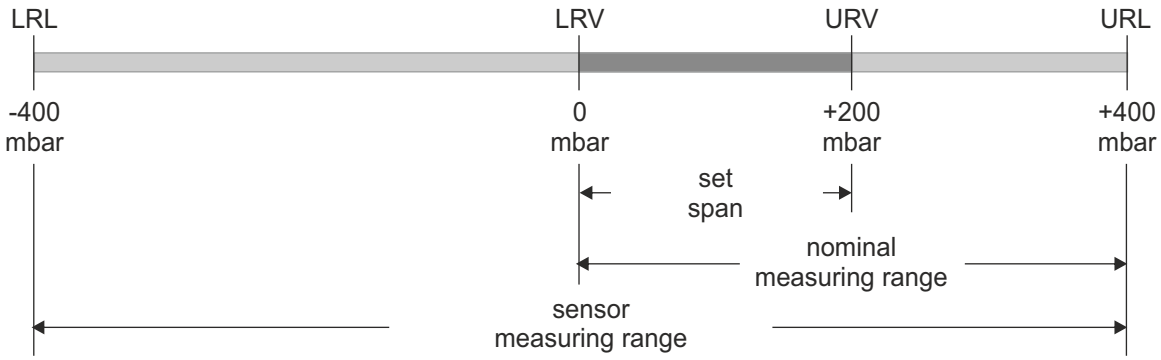
Settings:
- Adjustment of output current
- Limits of measuring range
- HART TAG number
- 11-point calibration (linearization)
- Simulation of output current
- Linear / square root output signal
- 2-point calibration
- Filter function
- HART address

Please note: When using communication via HART modem, a communication resistance of 250 Ω has to be taken into account.

Definitions

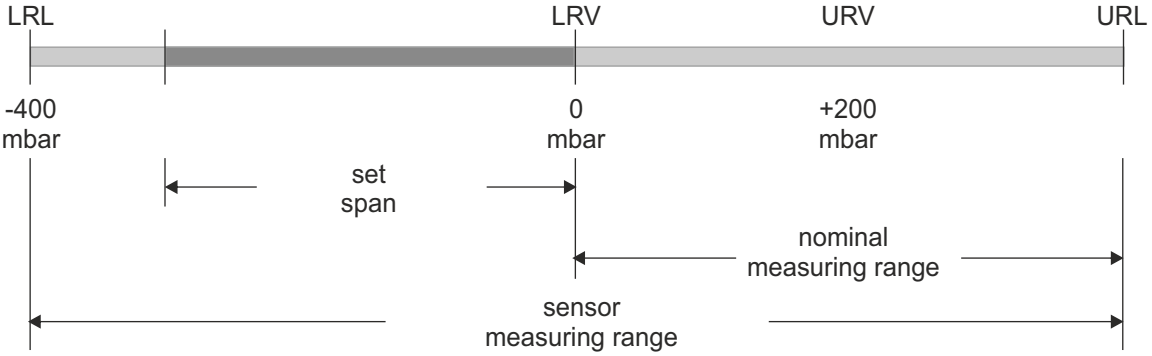
LRL: lower range limit
LRV: lower range value
URL: upper range limit
URV: upper range value

Example 1



|LRV| < |URV|	lower range value (LRV) = 0 mbar upper range limit (URL) = 400 mbar	upper range value (URV) = 200 mbar
Turn down:	URL / |URV| = 400 mbar / 200 mbar	Turn down = 2 : 1
Set span:	URV - LRV = 200 mbar - 0 mbar (The span is based on the zero point)	set span = 200 mbar

Example 2



|LRV| > |URV|	lower range value (LRV) = -300 mbar upper range limit (URL) = 400 mbar	upper range value (URV) = 0 mbar
Turn down:	URL / |LRV| = 400 mbar / 300 mbar	Turn down = 1,33 : 1
Set span	URV - LRV = 0 mbar - (-300 mbar) (The span is based on zero point)	set span = 300 mbar

Order Code

M	P	X	X	X	X	X	X	-	X	X	X

Output:	4...20 mA (HART)	0
	CANopen	1
Electrical connection:	M12, 4-pole	0
	M12, 5-pole	1
	M12, 8-pole	2
	Deutsch DT04, 3-pole	3
	Deutsch DT04, 4-pole	4
	Super Seal 1.5, 3-pole	5
	bayonet (DIN), 4-pole	6
	valve plug, 4-pole	7
	cable, 2 m	8
ΔP-range:	0...10 mbar (turn down 50:1)	6
	0...60 mbar (turn down 100:1)	7
	0...400 mbar (turn down 100:1)	8
	0...2,5 bar (turn down 100:1)	9
	0...20 bar (turn down 100:1)	A
	0...100 bar (turn down 100:1)	B
Membrane:	stainless steel 1.4435	0
	Hastelloy (on request)	1
Process connection:	1/4-18 NPT 1.4435 (316L)	0
Seal:	Viton (FKM)	0
Configuration:	factory configuration with output signal linear[1)]	0
	customized configuration (please indicate)[2)]	1
	factory configuration with square root output signal[1)]	2
Wall / tube mount:	Made of steel	0
	Made of stainless steel (additional price)[3)]	1
Other / accessories:	special model	0

1) Zero: 4,000 mA / span: 20,000 mA / zero offset compensation: without / turn down: without / calibration points: 2 / damping: without / output on alarm: 3,6 mA / fixed output: without
2) The possibilities which are specified in the technical data can be selected. For not given values the details of factory-set are used.
3) As standard, the differential pressure transmitter is supplied with a steel mount (zinc coated). For an additional price, a stainless steel wall mount can be selected

Accessories:

Interface HART, USB, software — Order No.:

Subject to change, version 43-448