



Electronic pressure measurement

Process transmitters



Smart in sensing

Versatile in application

Process transmitters are suitable for many industrial measuring requirements in the widest variety of applications.

They monitor pumps, detect the level in vessels or calculate quantities for flow measurement in pipelines.

The measured value can be read on-site as well as being transmitted to a process control system, a controller or a terminal.

The data transfer is achieved using an analogue 4 ... 20 mA signal or via a bus protocol. With the HART®, PROFIBUS® PA or FOUNDATION™ Fieldbus bus systems, there is the possibility to transmit further information from the process and/or measuring instrument, in addition to the primary current signals, such as the operating hours or the sensor temperature.

Furthermore, specific commands can be sent to the measuring instrument to change the parameters in the device. Thus, the process can be adapted optimally without service personnel having to attend on-site.

The communication between instruments using the fieldbus protocols enables rapid transmission of data. Test reports give information at any time about the status of the built-in components.

High flexibility

The transmitters can be fitted in a wide number of ways. The ability for the position of the display heads to be adjusted in relation to the process connection and the possibility of 'snapping' the display into one of four directions makes its mounting easier and guarantees the readability will always be good. The large number of process connections and the possibility of choosing between metal and ceramic measuring cells enables use in all industries.

Applications

- Process engineering
- Machine building and plant construction
- Pharmaceutical industry
- Food and beverage industry



Process transmitters from WIKA

Special features

- High measurement accuracy
- Freely scalable measuring ranges
- Wetted parts from stainless steel or special materials
- Different Ex approvals
- Wide range of Ex approvals
- 4 ... 20 mA, 4 ... 20 mA HART® or bus signals
- Special materials or surface coatings possible

The internal digital signal processing, combined with proven sensors, guarantees high accuracy and the best long-term stability.

Primary and secondary circuits

Electronic differential pressure measurement with two process transmitters

Level monitoring by measuring differential pressure has reached a new dimension: a system with two process transmitters in a primary and secondary circuits. Compared to conventional measurement solutions, this set-up has the advantage of easier installation, a reduced temperature error and higher accuracy.

In closed vessels where diaphragm seal assemblies in combination with differential pressure transmitters are used, undesired effects on the measuring result often occur due to temperature changes in the process or in the environment. The reason for this usually lies in the distance between the connections and the measuring instrument. In conventional differential pressure measurement, this distance is bridged with the aid of pressure capillaries. Although the vessel content remains the same, changes in the measuring result occur due to changed ambient temperatures.

With a master-slave pressure measurement, this influence is completely eliminated, since the existing distances between the connection points are bridged by an electric signal cable, so that temperature fluctuations do not have any effect on the measuring result.

Level measurement for special requirements

Measurement in vessels is one of the most varied tasks in sensor technology. For the measurement of filling height, level, concentration of specific substances, density, layer separation or volume, there are a whole range of different measuring methods and sensors available.

Instruments within vessels or instruments mounted on the vessel cover are not suitable, for example, with aggressive or strongly foaming media. Process transmitters lend themselves to these measurements.



Pharmaceutical water treatment

DPT-20 with two 990.27 flange-type diaphragm seals assembled via capillaries





UPT-20 in an electrically conductive plastic case with display and G 1/2 process connection



UPT-20 in electropolished stainless steel case with display and process connection G 1 Hygienic design

Wide range of applications

This measuring instrument is as suited to machine building and plant construction as it is for the traditional areas for process transmitters. The UPT also finds its place in chemical plants, especially in the Ex ia version (intrinsically safe design).

With flush process connections and polished surfaces, the requirements of the hygienic, pharmaceutical and food industries are also fulfilled. The instrument is available with analogue output signal or with HART® protocol to the latest HART® v7 revision.

Excellent readability

The case of the UPT is rotatable around the connection so that the ideal orientation towards the viewer can be made, even after mounting to the process. The electrical installation is possible on-site without the aid of tools. The instrument has a high-contrast, clear and particularly large display. With a 58 mm diameter, it is the largest on the market. The digits of the main display, with a character height of 14 mm, can be read easily from a distance. With a tilt angle for the display of 45°, reading from both the front and from above are equally possible without needing any modification to the display.

Universal process transmitters

Model UPT-20, with pressure port
Model UPT-21, with flush diaphragm

Specifications

Measuring ranges:

Absolute pressure 0 ... 0.4 bar to 0 ... 40 bar
Gauge pressure 0 ... 0.4 bar to 0 ... 4,000 bar (600 bar for UPT-21)
Vacuum ranges -0.2 ... +0.2 bar to -1 ... +40 bar

Output signals:

4 ... 20 mA
4 ... 20 mA with HART® signal

Measurement accuracy:

0.15 % (standard)
0.1 %
0.2 %

Turndown:

Up to 5:1, if the data sheet specifications are maintained
Recommended up to 30:1 with restricted basic accuracy

Process connection:

Standard model UPT-20: G ½ B, ½ NPT, M20 x 1.5, ½ NPT female
Flush model UPT-21: G ½ B, G 1B, G 1 with hygienic connection

Display:

With 4 ½-digit LC display (optional without display)

Communication:

DD, EDD, DTM* in download area of www.wika.de

Wetted parts:

Stainless steel
Model UPT-21: Sealings from NBR, EPDM, FKM

Case material:

Precision-cast stainless steel, optional with electropolished surface

Approvals*:

ATEX II 1/2G Ex ia IIC T3..T6, for further approvals see data sheet

Data sheet:

PE 86.05

Robust case

With its stainless steel case, and particularly also due to its surface, the UPT is optimally suited for use in hazardous areas. Through its specific protection against dusts and liquids, with IP66 (splash-proof) and IP67 (temporary immersion), the instrument is ideal for outdoor applications.



IPT-21 with flange connection and electropolished stainless steel case



IPT-20 with aluminium double chamber case

Large variety of cases

The IPT industrial process transmitter and the CPT transmitter with ceramic measuring cell are available in seven case variants. The choice of case materials is between plastic, aluminium and stainless steel.

In particular, the requirements on explosion-proof cases for explosion protection is catered for here with two case variants (aluminium and stainless steel castings).

Plastic, single or double chamber case



Aluminium, single or double chamber case



Electropolished stainless steel



Precision-cast stainless steel, single or double chamber case



Industrial process transmitter

Models IPT-20, IPT-21 with metal measuring cell

Models CPT-20, CPT-21 with ceramic measuring cell

Specifications

Measuring ranges:

Absolute pressure 0 ... 0.1 bar to 0 ... 60 bar
Gauge pressure 0 ... 0.1 bar to 0 ... 4,000 bar (600 bar for IPT-11)
Vacuum ranges -0.05 ... +0,05 bar to -1 ... +60 bar

Output signals:

4 ... 20 mA
4 ... 20 mA with HART® signal
4 ... 20 mA / HART® with SIL 2 qualification
FOUNDATION™ Fieldbus
PROFIBUS® PA

Measurement accuracy:

0.05 % with ceramic measuring cell
0.075 % with metal measuring cell

Turndown:

Up to 5:1, if the data sheet specifications are maintained
Recommended up to 30:1 with restricted basic accuracy

Process connection:

IPT-20 and CPT-20: G ½ B, ½ NPT, ½ NPT female, M20 x 1.5, M16 x 1.5 female, 9/16-18 UNF female
IPT-21 and CPT-21: G ½, G 1, G 1 ½, G 1 hygienic to 150 °C and many further connections

Display:

With 5-digit LC display (optional without display)

Communication:

DD, EDD, DTM* in download area of www.wika.de

Wetted parts:

Stainless steel
Hastelloy
Elgiloy
Oxide ceramic for ceramic cells
Various sealing materials

Case material:

Plastic
Aluminium
Electropolished stainless steel
Precision-cast stainless steel

Approvals:

ATEX II 1G, 1/2G, 2G Ex ia IIC T6
ATEX II 1/2G, 2G Ex d ia IIC T6
ATEX II 1/2D, 2D IP66/67 T

Data sheet:

PE 86.06 and PE 86.07

Electronics

The electronics are available in four variants with an analogue output and three bus variants. In this way, all standard output signals in the process industry are covered.

HART
COMMUNICATION PROTOCOL


FOUNDATION

PROFI
BUS

Sensors

For the optimal match to the customer's process, there is a choice between three different sensor types. For the piezo and thin-film sensors, the wetted surfaces are from stainless steel or Hastelloy. These two sensor types are welded on the process side, so that no sealing is required at the sensor. The advantage of the ceramic measuring cell lies in the high overload safety, the low abrasion characteristics and the higher accuracy.

Piezo



Thin film



Ceramic





DPT-20 with two 990.27 flange-type diaphragm seals assembled via capillaries



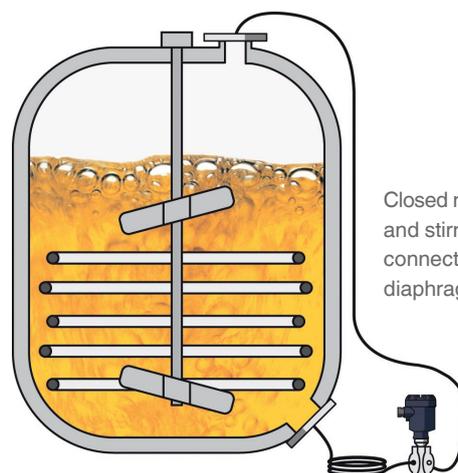
DPT-20 with aluminium double chamber case in Ex d design

While the models UPT and IPT can be used for relative and absolute pressure measurements, the model DPT-20 is available for differential pressure measurements. Typical applications are pump and filter monitoring and also level and flow measurement.

Level measurement

A common application is the monitoring of a closed vessel, in which the overlying gaseous phase must be subtracted from the hydrostatic pressure of the vessel contents. This is the only way (along with the information about the density of the contents) to get the correct filling height.

Furthermore, if the vessel's geometry is known, then even the volume can be calculated. This information can also be entered into the transmitter as a parameter. The transmitter can calculate user-defined tank geometries and indicate the volume directly on the display.



Closed reactor with heating and stirrer, DPT-20 connected via flanged diaphragm seals

Differential pressure transmitter

Model DPT-20

Specifications

Measuring ranges:

Differential pressure -10 ... +10 mbar to -16 ... +16 bar
Maximum working pressure (static pressure):
Overload on one side 160 bar or 400 bar

Output signals:

4 ... 20 mA
4 ... 20 mA with HART® signal
4 ... 20 mA / HART® with SIL2 qualification
PROFIBUS® PA
FOUNDATION™ Fieldbus

Measurement accuracy:

0.065 % with measuring ranges > 0.03 bar
0.1 % with measuring ranges ≤ 0.03 bar

Turndown:

Up to 5:1, if the data sheet specifications are maintained
Recommended up to 30:1 with restricted basic accuracy

Process connection:

¼-18 NPT per IEC 61518

Display:

With 5-digit LC display (optional without display)

Communication:

DD, EDD, DTM* in download area of www.wika.de

Wetted parts:

Process connection: Stainless steel (optional Hastelloy)
Diaphragm: Stainless steel, optional Hastelloy, tantalum, gold-rhodium-coated Hastelloy, Monel 400®
Sealings: FKM/FPM, NBR, EPDM, copper

Case material:

Plastic
Aluminium
Electropolished stainless steel
Precision-cast stainless steel

Approvals:

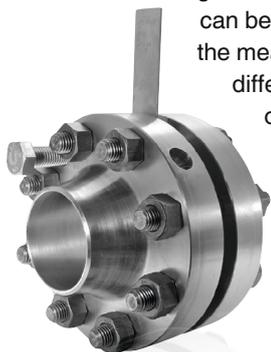
ATEX II 1G, 1/2G, 2G Ex ia IIC T6
ATEX II 1/2G, 2G Ex d ia IIC T6

Data sheet:

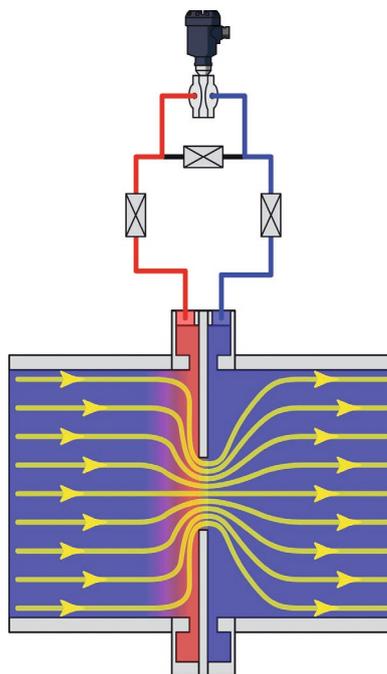
PE 86.22

Flow measurement

The combination of the model DPT-20 with primary flow elements makes it possible to measure the flow in pipes. It is important to design the assembly so that the orifice geometries generate a differential pressure that can be optimally converted into a flow value by the measuring instrument. The resulting pressure differential is measured before and after the orifice with a DPT-20 which is connected via a 3-way valve. Primary flow elements are also part of the WIKA product portfolio.



Orifice with flanged welding sockets



Pipe cross-section with flow of a gas through a defined constriction (orifice)



Fieldbus systems in process control technology

Process Control Systems (PCS) are observing units that fully monitor, manage and control industrial plants (for example). All parameters and measured data related to the process are transmitted to a central point and evaluated according to a defined algorithm.

A purely analogue output signal only enables the communication from the measuring instrument for control. With process transmitters with fieldbus interfaces, further possibilities are offered. The digital bus signal, or also the HART® protocol, enables bidirectional communication. The operator thus has the possibility to request specific parameters and, if necessary, also to change them. Therefore, for example, the measuring span of a process transmitter can be matched to the process without needing any service personnel.

A bus instrument offers a further sizeable advantage: Through the scalability in the process or in the laboratory, a measuring instrument can be exchanged when it malfunctions and the stored data easily transferred to the new instrument. Through the reduction in service time and downtime connected with this, the operating costs can clearly be optimised.

Freely scalable

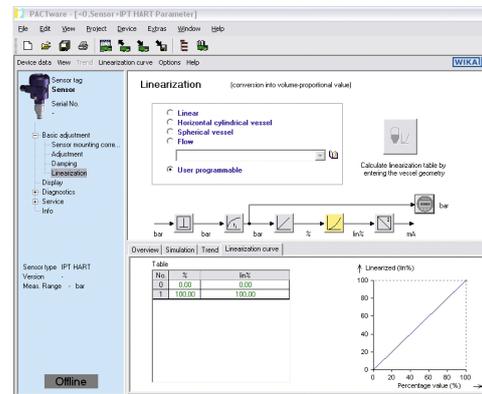
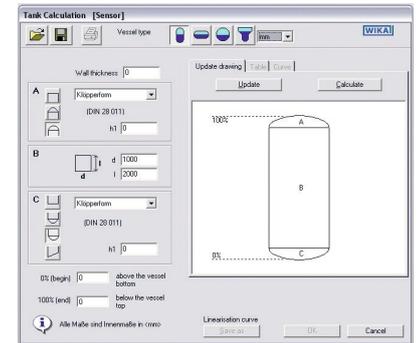
For the WIKA UPT, IPT and DPT process transmitters, we recommend turndown values of up to 30:1. The stated basic accuracy is maintained to a max. of 5:1. Through clever selection of stock, this enables several applications to be covered with the same basic measuring range.

DTMs (Device Type Managers)

Alongside the primary value (PV), the digital bus instruments also enable further values to be passed on to the instruments that relate to the same data loop. This therefore offers the possibility, for example, to react to a rising temperature value in a sensor. Likewise, the instrument can output already calculated values such as level in units of length and volume in litres (for example). This requires a continuous input of process data and the possibility to be able to change the instrument parameters easily.

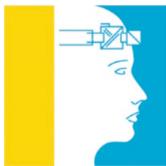
Such possibilities are offered by DTMs (Device Type Managers), which are specially programmed for this and specifically matched to the WIKA instruments. If there is no process control system available, it is enough for the user to have an FDT program (Field Device Tool) such as PACTware on their laptop. By loading the DTM, users can communicate with the instrument in the full scope of their application.

However, the communication capability of the WIKA process transmitters is also ensured with other process control systems. A data description (DD, EDD), which – comparable to a printer driver in PC systems – is needed in order to operate the instrument with any process control system, can be found in the download area of www.wika.de.



Pactware with the WIKA DTM for IPT, page for adjustment of the linearisation function, the top illustration shows the tank data calculation program

Pactware



PACTware™

Open, manufacturer-independent and fieldbus-independent user interface for operation and parameterisation of fieldbus devices.

HART® modem



For communication between PC or notebook and the process transmitter via the HART® interface (USB, RS232, Bluetooth).

External loop-powered indicator, model DIH-52



For communication over the HART® loop, for parameterisation of the measuring instruments, etc.

Accessories

For WIKA process transmitters, there is a comprehensive array of accessories available.

Accessories for all models



External display and operating module

Indicator with operator function, can be mounted remotely from the measuring instrument.



Display and operating unit

For simple retrofitting, exchangeable without tools.



Overvoltage protection

To balance voltage fluctuations.



Repeater power supply

For explosion-protected applications, HART® capable

Accessories for DPT-20



Oval flange adapter

To connect a measuring instrument to a pipeline system.



Set of screw-in adapters

Adapter with ½ NPT thread on the instrument side and female or male thread on the process side.



Sealing plugs/vent valves

For venting during the assembly or to permanently close the venting holes.



Shut-off valves

For shut-off and venting. As 3-valve or 5-valve manifold.

Mounting accessories



Instrument mounting bracket

For wall or 2" pipe mounting.



Syphons

For protection from pulsations in the medium and from excessive heating.



Welding socket in hygienic design

Is welded flush with the inner wall in the vessel. For a dead-space free measuring instrument connection.



Barstock valves

For shut-off and venting of the measuring line.



In this short video we show the turndown function with process transmitters.



Smart in sensing

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