

Ultrasonic level transmitter, non-contact



- Compact for level measurement up to 5 m
- 4...20 mA/Hart - 2 wires
- Suitable for solids
- ATEX approvals Ex

Type 8176 can be combined with...



Type 8611

PI-controller on a valve



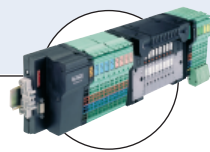
Type 8635

SideControl EEx



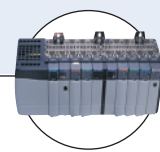
Type 2712 (8630)

Continuous TopControl system



Type 8644

Valve islands with electronic I/O



PLC

The Type 8176 is a non-contact ultrasonic level transmitter, designed for continuous level measurement in open or closed vessels. The unit is suitable for liquids, but also for solids, in virtually all industries, particularly in water and waste water management.

General data

Materials

Housing	PBT, Stainless steel 316L (1.4435)
Cover	PC
Seal ring	NBR
Ground terminal	Stainless steel 316Ti/316L (1.4571/1.4435)
Wetted parts	
Process fitting, transducer	PVDF
Process seal	EPDM

Display

LCD in full dot matrix

Process fitting

Thread G1 1/2" A, NPT 1 1/2"

Max. torque mounting boss

25 Nm

Electrical connections

Cable gland M20 x 1.5

Measuring type

Distance between lower edge of the transducer and product surface

Dead zone

0.25 m

Measuring range

0.25 up to 5 m (for liquids)
0.25 up to 2 m (for solids)

Process temperature

-40 up to 80°C (-40 to 176°F)

Vessel pressure

-0.2 up to 2.0 bar (-2.9 to 29.02 PSI) (-20...200 kPa)

Vibration resistance

Mechanical vibrations with 4.g and 5...100 Hz

Temperature coefficient

0.06%/10K (Average temperature coefficient of the zero signal - temperature error)

Resolution

max. 1 mm

Ultrasonic frequency

70 kHz

Interval

> 2 s (dependent on the parameter adjustment)

Beam angle at - 3 db

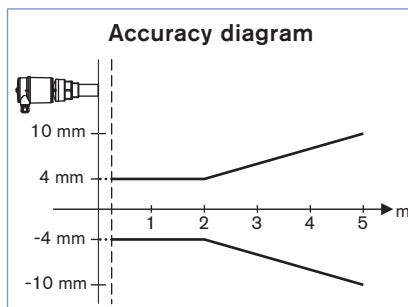
11 degrees

Adjustment time¹⁾

> 3 s (dependent on the parameter adjustment)

Accuracy

< 0.2% or \pm 4 mm (see diagram)



¹⁾ Time to output the correct level (with max. 10% deviation) after a sudden level change.

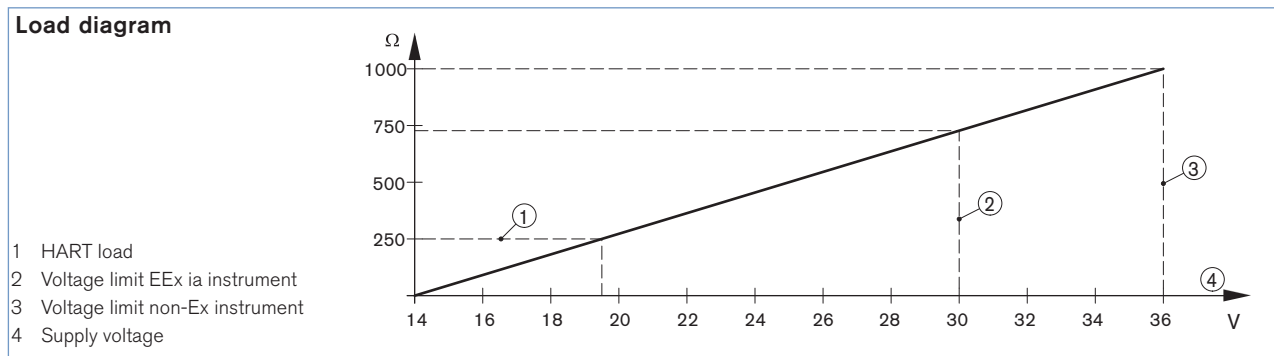
Electrical data	
Power supply	14 to 36 V DC or 14 to 30 V DC (EEx ia instrument)
Permissible residual ripple	< 100 Hz: $U_{ss} < 1 \text{ V}$ 100 Hz...10 kHz: $U_{ss} < 10 \text{ mV}$
Output signal	4...20 mA/HART
Resolution	1.6 μA
Fault signal	current output unchanged; 20.5 mA; 22 mA < 3.6 mA (adjustable)
Current limitation	22 mA
Load	see load diagram
Integration time (63% of the input variable)	0...999 s, adjustable
Fulfilled NAMUR recommendation	NE 43

Environment	
Ambient temperature with display, adjustment elements	-20 to +70°C (-4 to 158°F) (operation and storage)
Relative humidity	45-75 %; without condensation

Standards and approvals	
Protection	IP66/IP67 with M20 x 1.5 gland mounted and tightened
Overvoltage category	III
Protection class	II
Standard	
EMC	EN61326
Security	EN61010-1
ATEX	EN50014; EN50020; EN50284
NAMUR	NE 21; NE 43

Specifications EEx	
Ⓢ - Protection	Categories 1/2 G or 2G
Ⓢ - Certification	EEx ia IIC T6
Conformity specifications²⁾	
Power supply U_i	30 V
Short circuit rating I_i	131 mA
Power limitation P_i	983 mW
Ambient temperature	-20 up to +41°C (-4 to 105.8°F) (depend on categories)
Internal capacity C_i	negligible
Internal inductivity L_i	negligible

²⁾ homologation certificate PTB 07 ATEX 2003 X

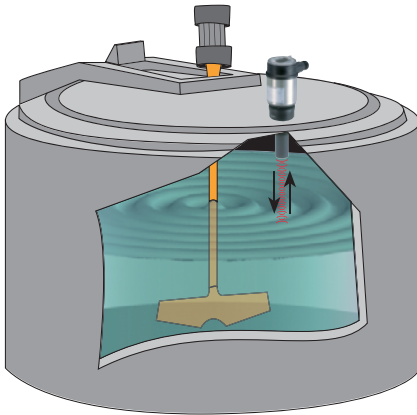


Principle of operation

The transducer of the ultrasonic sensor emits short ultrasonic pulses, at 70 kHz to the measured product. These pulses are reflected by the product surface and received by the transducer as echoes. The running time of the ultrasonic pulses from emission to reception is proportional to the distance and hence to the level. An integrated temperature sensor detects the temperature in the vessel and compensates the influence of temperature on the signal running time. The determined level is converted into an output signal and transmitted as a measured value.

Target applications with Type 8176

- Continuous level measuring for fluids and solids.

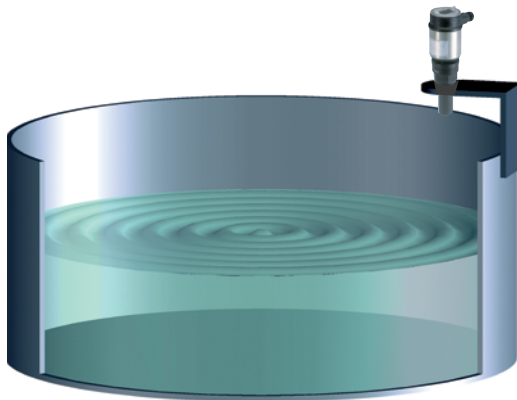


- Distance measuring.



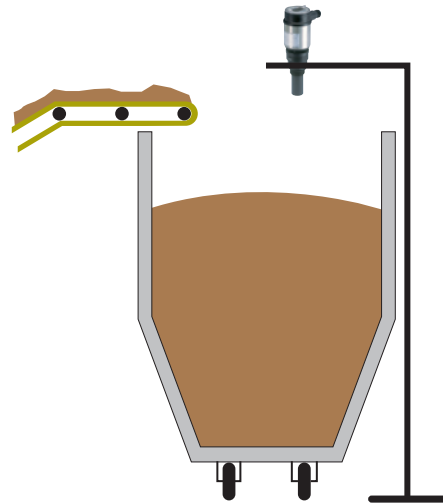
Open basins

A typical application for the 8176 ultrasonic transmitter is level measurement in open basins. Products such as rain water or sewage water, i.e. with impurities. Here is where the advantages of non-contact measurement with the 8176 come into their own: simple and maintenance-free. The degree of pollution of water or an accumulation of mud in the basin is not important, because the 8176 transmitter measures the surface.

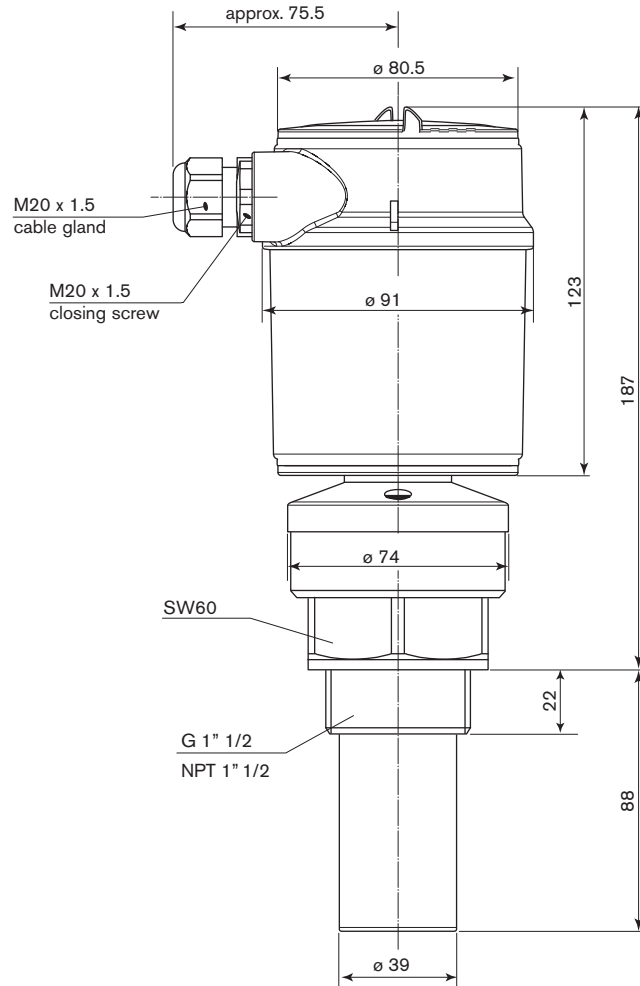


Sludge container

In sewage treatment plants, the accumulated sludge is dewatered and transported via conveyor belts to containers. The 8176 transmitter measures the filling of the container. An empty container can thus be readied in good time before the max. level is reached.



Dimensions [mm]



Ordering chart for compact transmitter Type 8176

Specifications	Voltage supply	Output	Electrical connection	Item no.	
				with program module and display	without program module no display
G 1"1/2 mounting thread	14-36 V DC	4-20 mA/HART (2 wires)	Cable gland M 20 x 1.5	558 220	559 240
NPT 1"1/2 mounting thread	14-36 V DC	4-20 mA/HART (2 wires)	Cable gland M 20 x 1.5	558 221	559 241
EEx version - ATEX approval G 1"1/2 mounting thread	14-30 V DC	4-20 mA/HART (2 wires)	Cable gland M 20 x 1.5	558 222	559 242

 Further versions on request


Port connection
Clamp 2"; 3"; 3"1/2; 4"

Ordering chart accessories

Description	Item no.
Set with 2 reductions M20 x 1.5 / NPT1/2" + 2 neoprene flat seals for cable gland + 2 screw-plugs M20 x 1.5	551 782
Set with a display and programming module, a transparent cover and a seal ring	559 279
Set with a transparent cover and a seal ring	561 006

