TI00460G/00/EN/04.24-00
71666999
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Technical Information
Analog transmitter AT1000 AT1

Potentiometer type

Application

AT1000 AT1 is a transmitter that can be mounted on LT and LTC series level gauges and converts instructions from the level gauge into a remote transmission current analog signal. Since it can also be equipped with a maximum of six alarm contact signals, valves and pumps can be controlled easily with just one transmitter while it handles remote transmission of the level at the same time. Even if you are already using an Endress+Hauser level gauge, you can still mount a transmitter for easy remote transmission and control.

As an analog remote transmitter of levels of various liquids, such as those in water tanks, water treatment-related, heavy oil, and in liquid agent storage tanks, as well as raw materials in the crude oil purification industry, in product inventory tanks, foods, acids, in the alkali industry, paints, fats and oils, and in the organic chemical industry, AT1000 AT1 is used in a wide range of fields and industries together with on-site instructions of level gauges.

Your benefits

- Transmits the tank level by analog signals.
- Easy maintenance due to simple mechanism.

Endress+Hauser
People for Process Automation

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Document information

Document function

These Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal.

These instructions provide all the information required for use of the software: from the product description, installation and use to system integration, operation, diagnostics and troubleshooting to software updates and disposal.

These instructions contain all the information needed to install and update the software.

The document is part of the Operating Instructions and serves as a reference for parameters, providing a detailed explanation of each individual parameter of the operating menu.

The document serves as a reference for parameters, providing a detailed explanation of each individual parameter of the operating menu including service parameters.

The document provides basic information on application problems, how to identify and eliminate them as well as specific background knowledge on the devices and their functionalities.

Symbols used

Safety symbols

⚠ DANGER
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

⚠ WARNING
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

⚠ CAUTION
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE
This symbol contains information on procedures and other facts which do not result in personal injury.

Electrical symbols

Alternating current

Direct current and alternating current

Direct current

Ground connection

A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.

Protective earth (PE)

Ground terminals that must be connected to ground prior to establishing any other connections.

The ground terminals are located on the interior and exterior of the device:
- Interior ground terminal: protective earth is connected to the mains supply.
- Exterior ground terminal: device is connected to the plant grounding system.

Tool symbols

Phillips head screwdriver

Flat blade screwdriver

Torx screwdriver


Allen key


Open-ended wrench

Symbols for certain types of information and graphics

Permitted
Procedures, processes or actions that are permitted

Preferred
Procedures, processes or actions that are preferred

Forbidden
Procedures, processes or actions that are forbidden

Tip
Indicates additional information


Reference to documentation


Reference to graphic

▶
Notice or individual step to be observed

1., 2., 3.
Series of steps


Result of a step


Visual inspection


Operation via operating tool


Write-protected parameter

1, 2, 3, ...
Item numbers

A, B, C, ...
Views

⚠ → **Safety instructions**
Observe the safety instructions contained in the associated Operating Instructions


Temperature resistance of the connection cables
Specifies the minimum value of the temperature resistance of the connection cables

Documentation

The following documentation types are available in the Downloads area of the Endress+Hauser website (www.endress.com/downloads).

For an overview of the scope of the associated Technical Documentation, refer to the following: *W@M Device Viewer* (www.endress.com/deviceviewer): Enter the serial number on the nameplate.

Technical Information (TI)

Planning aid
The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.

Brief Operating Instructions (KA)

Guide that takes you quickly to the first measured value
The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

Operating Instructions (BA)

The Operating Instructions contain all the information that is required in various phases of the life cycle of the device: from product identification, incoming acceptance, and storage, to mounting, connection, operation, and commissioning, through to troubleshooting, maintenance, and disposal.

Safety Instructions (XA)

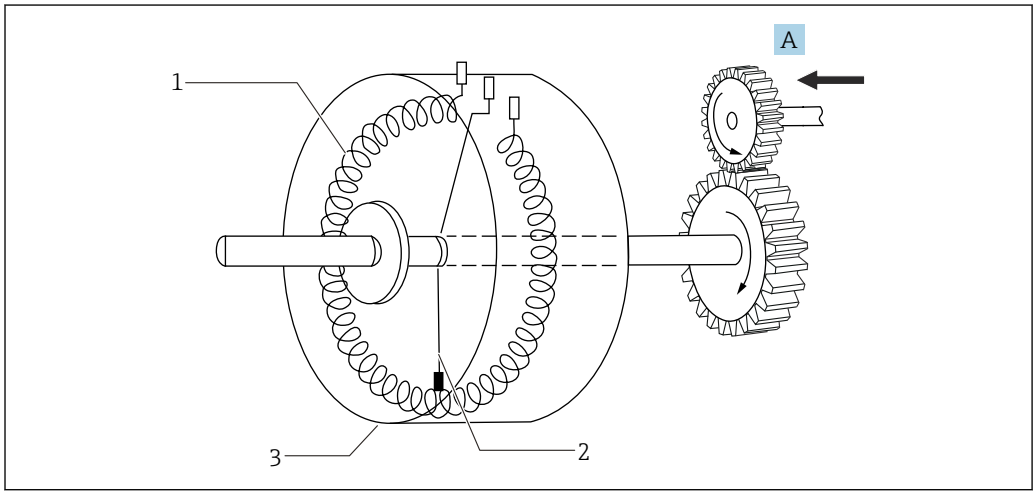
Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions.

The nameplate indicates the Safety Instructions (XA) that are relevant to the device.

Function and system design

Operating principles

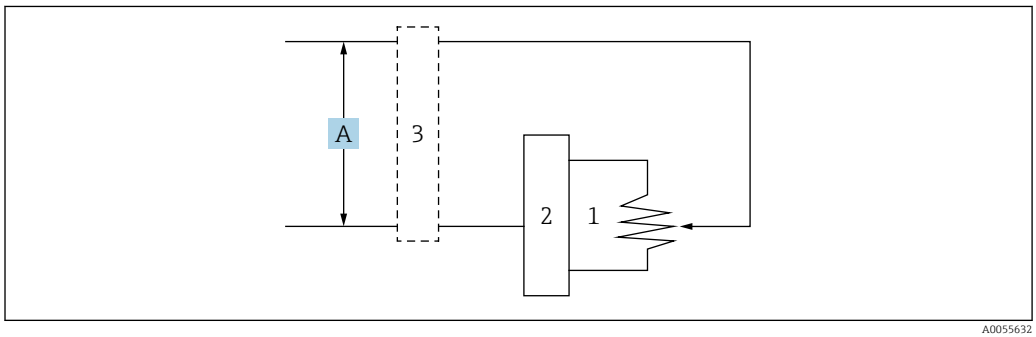
The remote signal is produced by the rotation angle of the brush on the potentiometer, as indicated in the figure below. The brush on the potentiometer rotates in proportion to the liquid level, converting it to a resistance value that corresponds to the brush position.



1 *Potentiometer*

A Level gauge
1 Wiper resistor
2 Variable wiper (brush)
3 Potentiometer (wiper resistor type)

It is possible to apply a direct current to this potentiometer as indicated in the figure below. The resistance value is converted to direct current or direct voltage and is output.



2 *Current output of potentiometer*

A Direct current output
1 Potentiometer
2 Direct current power supply
3 Current conversion

Performance characteristics

Technical specifications for the standard specifications are shown below.

Output

4 to 20 mA

Accuracy

Analog output	4 to 20 mA: ± 0.5 %
Alarm contact output	± 0.5 % (for full span)

Power supply

24 V_{DC} (valid for 20 to 40 V_{DC}), 100 V_{AC} / 110 V_{AC} / 200 V_{AC} / 220 V_{AC} ± 10 %, 50 /60 Hz

Power consumption

Approx. 5 VA

Load impedance

	Voltage	**20 V_{DC}**	**24 V_{DC}**	**40 V_{DC}**	**100 V_{AC} 110 V_{AC} 200 V_{AC} 220 V_{AC}**
Current output (max. impedance)	4 to 20 mA	200 Ω	400 Ω	1 100 Ω	630 Ω

Allowable ambient temperature

Weather-proof type	−20 to 60 °C (4 to 140 °F) (accuracy coverage: 0 to 40 °C (32 to 104 °F))
Ex d type	−10 to 40 °C (14 to 104 °F) (accuracy coverage: 0 to 40 °C (32 to 104 °F))

Storage temperature

−20 to 60 °C (4 to 140 °F)

Measuring range

0 to 1.5 m (0 to 4.92 ft), 2.5 m (8.2 ft), 3 m (9.84 ft), 3.5 m (11.48 ft), 4 m (13.12 ft), 5 m (16.4 ft), 6 m (19.68 ft), 8 m (26.25 ft), 10 m (32.8 ft), 12 m (39.37 ft), 14 m (45.93 ft), 16 m (52.49 ft), 20 m (65.62 ft), 25 m (82.02 ft), 30 m (98.43 ft)

Hysteresis

Within 2 % of measuring range

Cable entry (hub diameter)

Ex d type (B)	G 1 TF22-15, G 3/4 TF16-11,G 1-1/4 TF28-20 (with cable gland)
Ex d type (E)	G 3/4, G 1-1/2
Weather-proof type (W)	G 3/4, G 1-1/2, NPT 3/4, NPT1, M25

Transmission line

DC power supply	2 lines
AC power supply	4 lines

Alarm contacts

2, 4, 6 points using micro-switch (SPDT)

Select any of the following contacts (only the selected contact may be used)
- Contact A (normally open)
- Contact B (normally closed)
- Contact C (transfer contact)

Contact rating

TIIS Ex d rating	250 V, 4.2 A, 1050 V_{AC}, DC 180W

Allowable contact capacity

Alarm 2 points (Contact A, B, C)	220 V_{AC}2.8 A, 125 V_{DC}0.5 A
Alarm 4 points (Contact A, B)	220 V_{AC}2.8 A, 125 V_{DC}0.5 A

Alarm 4 points (Contact C)	220 V_{AC}2.2 A, 125 V_{DC}0.5 A
Alarm 6 points (Contact A, B, C)	220 V_{AC}2.2 A, 125 V_{DC}0.5 A

Protection class

Weather proof	IP65
Ex d	d2G4

Color

Silver

Weight

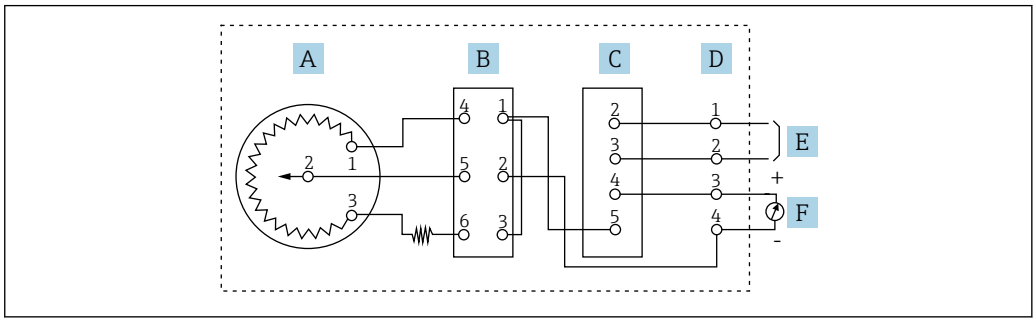
Weather proof	Approx. 7 kg (15.43 lb)
Ex d	Approx. 13 kg (28.66 lb)

Electrical connection

Wiring

To maintain a certain precision of AT1 and the receiver, it is important to regulate the transmission line-related parameters. Keep a close eye on line resistance and load impedance.

For AC power supply (4 to 20 mA)

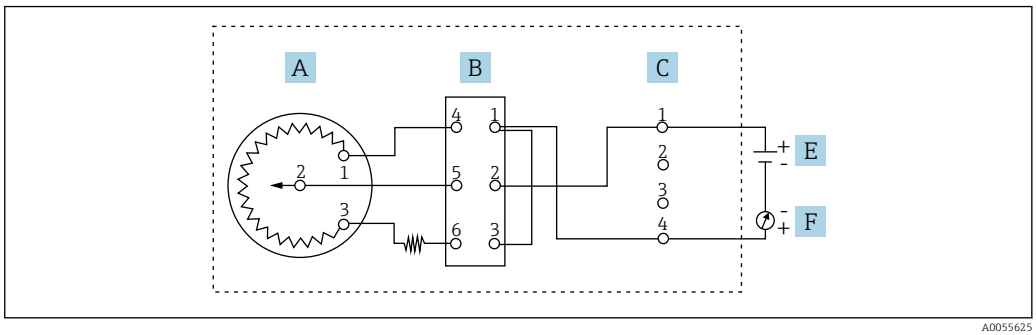


3 *AC power supply*

A Potentiometer
B Converter
C Power supply unit
D Connection terminal
E AC power supply
F Indicator

Refer to → 10 for models equipped with alarm contacts.

For DC power supply (4 to 20 mA)



4 *DC power supply*

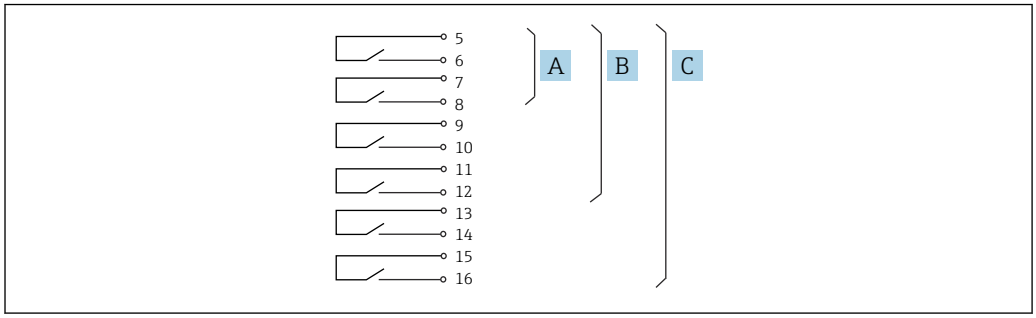
A Potentiometer
B Converter
C Power supply unit
E DC power supply
F Indicator

Refer to → 10 for models equipped with alarm contacts.

Models with alarm contacts

The following circuit is added for models with contact points using AC power supply (4 to 20 mA) and DC power supply (4 to 20 mA).

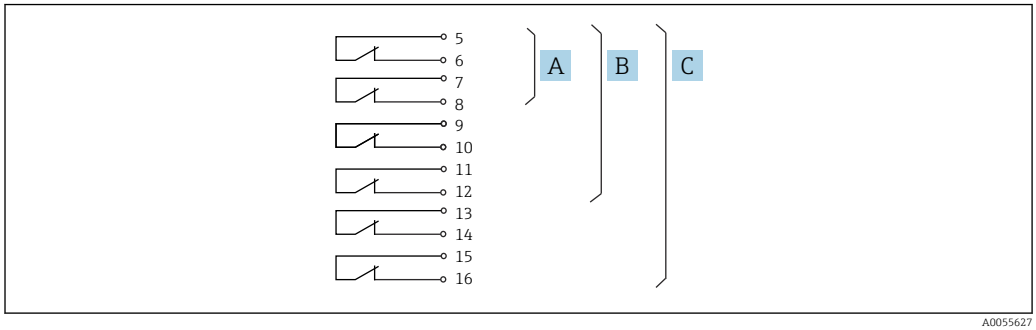
Contact point A: Normally open



5 Contact point A

A For 2 points
B For 4 points
C For 6 points

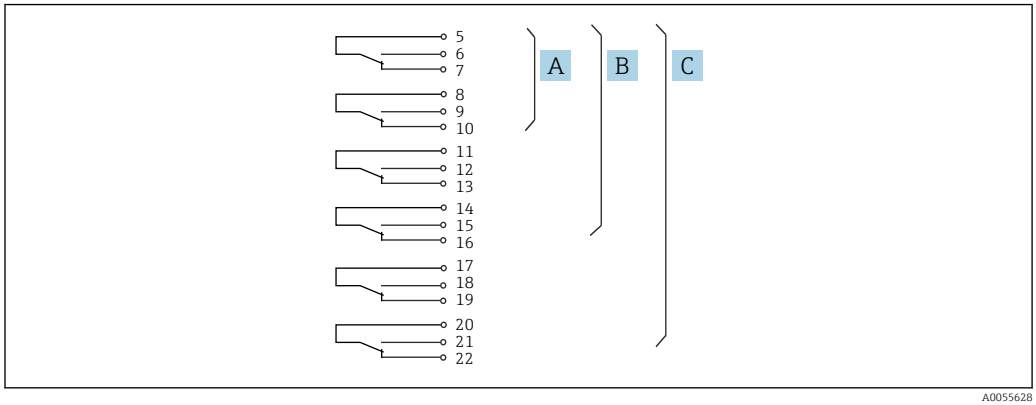
Contact point B: Normally closed



6 Contact point B

A For 2 points
B For 4 points
C For 6 points

Contact point C: Transfer contact point



7 Contact point C

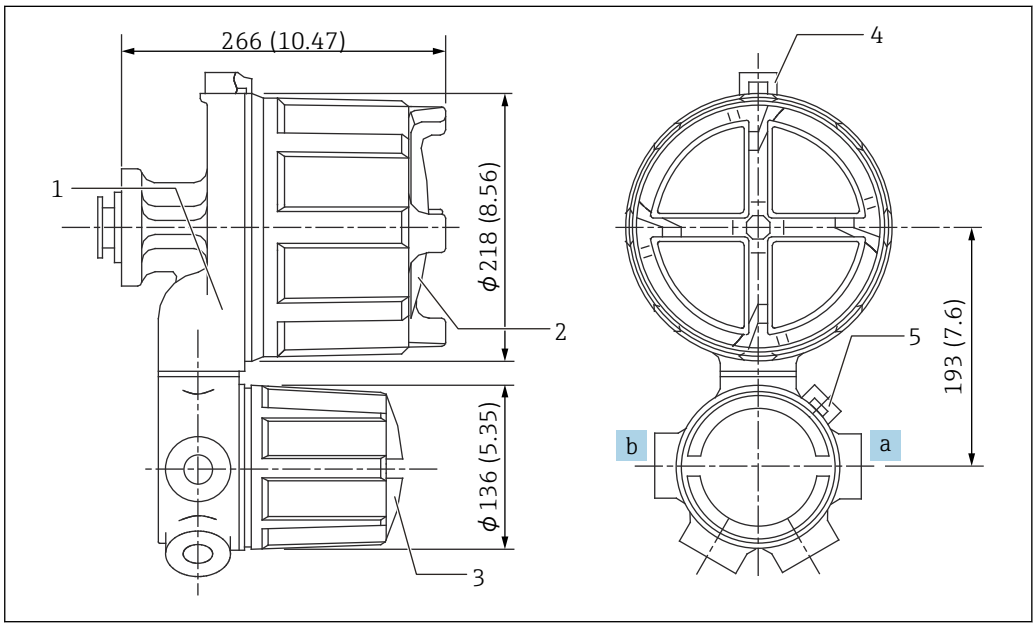
A For 2 points
B For 4 points
C For 6 points

Mechanical construction

External dimensions

Ex d type AT1

Alarm points: For 0, 2, 4. 6 points

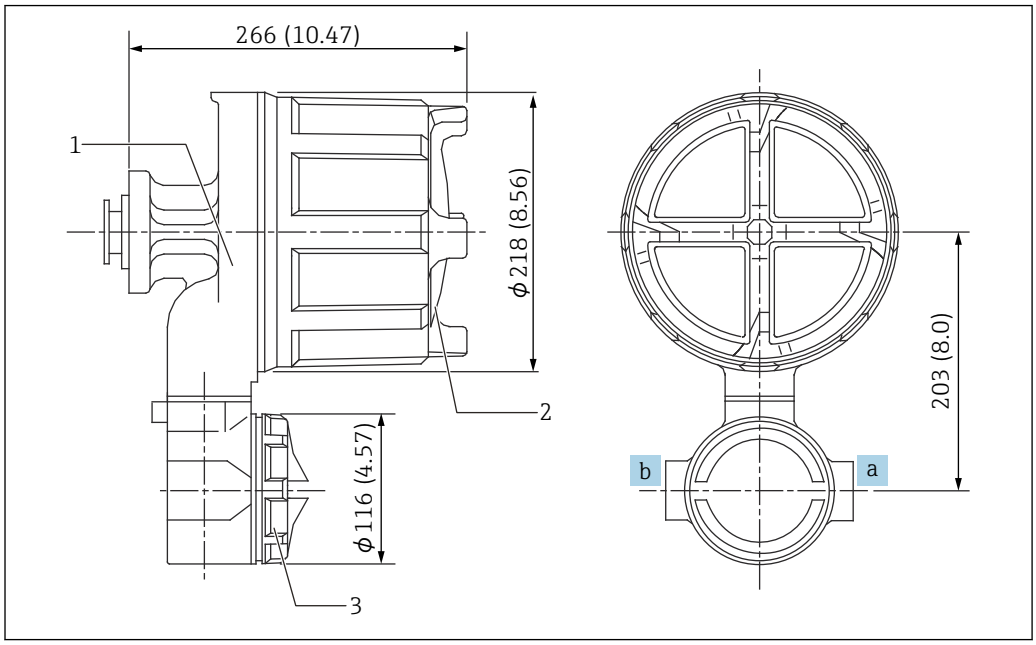


8 *External dimensions of AT1: Ex d type*

1 AT1 main unit
2 Main unit cover
3 Terminal box cover (large)
4 Locking fitting 1
5 Locking fitting 2
a Cable entry (refer to the table below for more details)
b Cable entry (refer to the table below for more details)

Weather-proof type AT1

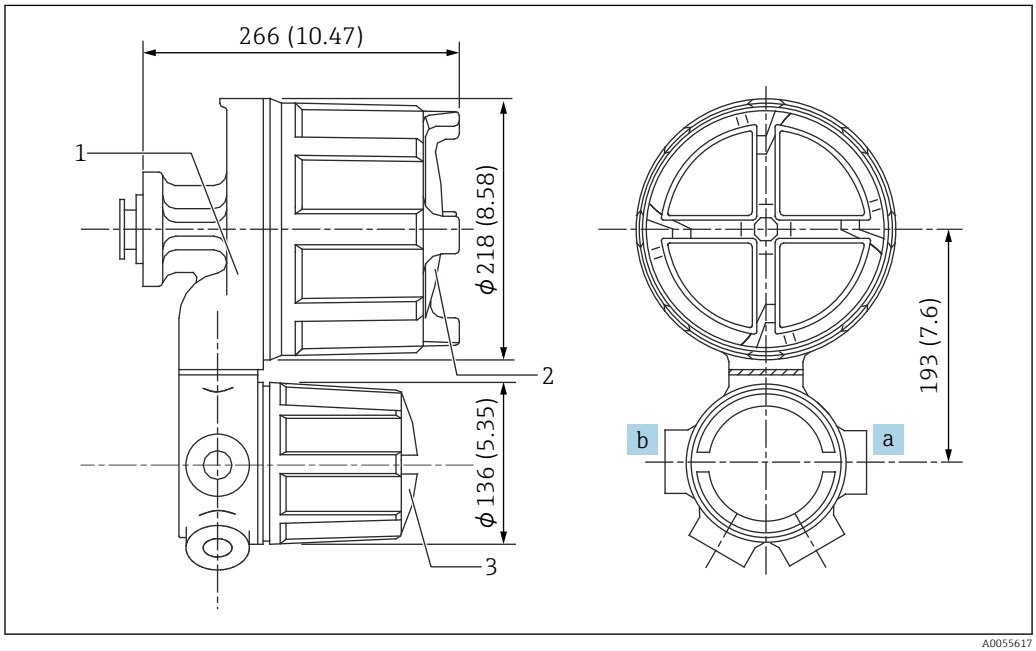
Alarm points: For 0, 2 points



9 *External dimensions of AT1: Weather-proof type 1*

1 AT1 main unit
2 Main unit cover
3 Terminal box cover (small)
a Cable entry (refer to the table below for more details)
b Cable entry (refer to the table below for more details)

Alarm points: 0, 2, 4. 6



10 *External dimensions of AT1: Weather-proof type 2*

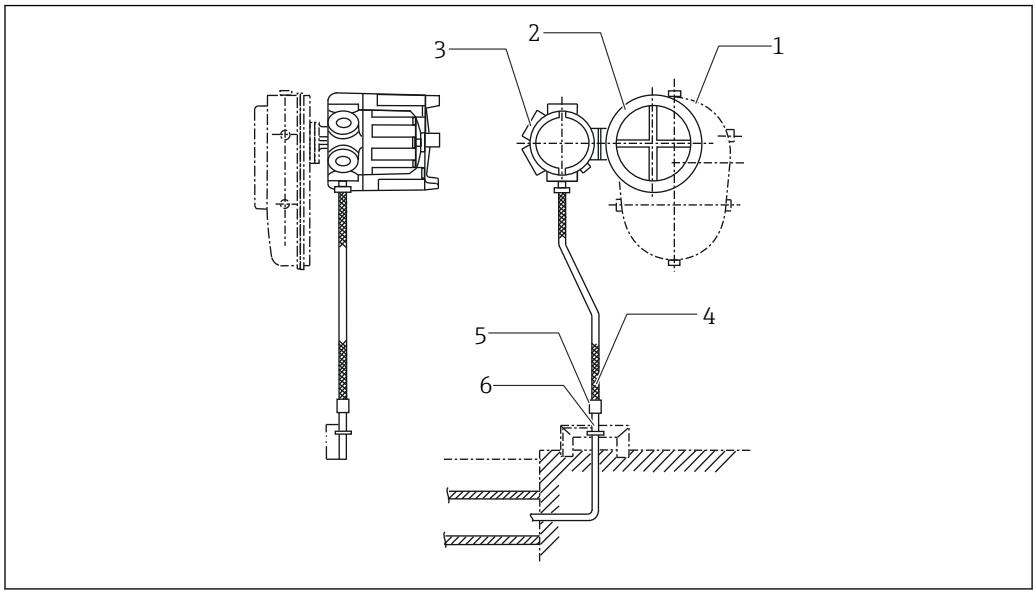
1 AT1 main unit
2 Main unit cover
3 Terminal box cover (small)
a Cable entry (refer to the table below for more details)
b Cable entry (refer to the table below for more details)

Cable entry list

070: Cable entry	a	b	070: Cable entry	a	b
A	Screw G 3/4		G	Gland G1 TF 22-15	
B	Screw G 3/4	Screw G 3/4	H	Screw NPT1	
C	Screw G 1-1/2		K	Screw M25	
D	Screw G 1-1/2	Screw G 3/4	M	Gland G1-1/4 TF28-20	Gland G 3/4 TF16-11
E	Gland G 3/4 TF16-11		Q	Screw NPT 3/4	
F	Gland G 3/4 TF16-11	Gland G 3/4 TF16-11	R	Screw NPT 3/4	Screw NPT 3/4

Installation of transmitter to float tank gauge

If using a cable gland for the installation, always use the cable gland that is included with the device. Use the seventh digit of the order code to select a device with a cable gland.



11 Combining with a level gauge

1 Level gauge
2 AT1 transmitter
3 Terminal box
4 Flexible fitting (see below)
5 Universal fitting
6 Thick steel conduit tube

Flexible fitting comes with M-type union on both ends. For sizes, → 13

Certificates and approvals

Ex approval

TIIS + with cable gland	TIIS d2G4
TIIS (cable entry connection)	TIIS d2G4

Protection class

IP65

Ordering information

Detailed ordering information is available from the following sources:

- Product configurator on the Endress+Hauser website: www.endress.com -> Click "Corporate" -> Select country -> Click "Product" -> Use the filters and search field to select a product -> Display the product page -> Click the "Device specifications selection" button on the right side of the product image to display the product configurator.
- From your nearest Endress+Hauser sales organization: www.addresses.endress.com

Product Configurator - the tool for individual product configuration

- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format
- Ability to order directly in the Endress+Hauser Online Shop

www.addresses.endress.com

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