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People for Process Automation

Point level switch for liquids

Liquiphant FTL31

MYR 630
> 10 pcs

Complete product information:
www.my.endress.com/ftl31

- Robust tuning fork technology for universal application
- External function test with test magnet
- Onsite function check possible thanks to LED indication

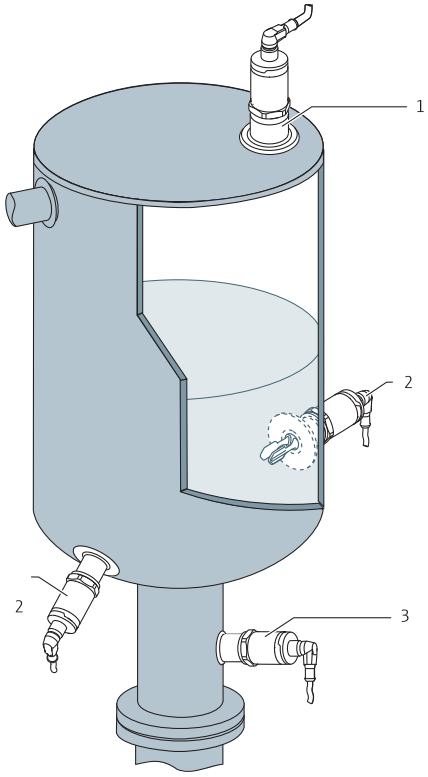
Specs at a glance:

- **Product:**
  Liquids
- **Mounting:**
  Vessels and pipes (>DN50)
- **Product density:**
  >0.7 g/cm³ (>0.5 g/cm³ as option)
- **Product temperature:**
  –40...+100 °C (–40 to +212 °F)/
- **Product viscosity:**
  ≤10 000 mm²/s (cSt)
- **Process pressure:**
  Max. 40 bar (580 psi)

Application The Liquiphant FTL31 is a point level switch for liquids and is used in tanks, vessels and pipes.
It is used for overfill prevention or pump protection in cleaning and filter systems as well as in cooling and lubrication vessels, for instance.
Ideal for applications in which float switches or conductive, capacitance and optical sensors have been used up to now. The Liquiphant FTL31 also works in areas where these measuring principles are not suitable due to conductivity, buildup, turbulence, flow conditions or air bubbles.

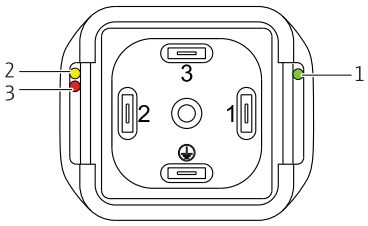
Function A piezoelectric drive causes the tuning fork of the Liquiphant FTL31 to vibrate at its resonance frequency. When the tuning fork is immersed in a liquid, its intrinsic frequency changes due to the change in density of the surrounding medium. The electronics system in the point level switch monitors the resonance frequency and indicates whether the tuning fork is vibrating in air or is covered by liquid. A signal is output via the DC-PNP.

Application example



The point level switch can be installed in any position in a vessel, pipe or tank, e.g., as overfill prevention or upper level detection (1), lower level detection (2) or dry running protection for pump (3)

Operability of LED display



1 Green LED (gn) Lit - Device is operational
2 Yellow LED (ye) Lit - Indicates the switching state:
- MAX operating mode (overfill prevention): sensor is not covered by liquid
- MIN operating mode (dry running protection): the sensor is covered by liquid

3 Red LED (rd) Flashing Lit - Warning/fault
Fault can be remedied, e.g. incorrect wiring; protective function if test magnet is held against the sensor for longer than 30 s. Fault/device failure: error cannot be rectified, e.g. electronic error.

Technical data

DC-PNP version	
Supply voltage	10 to 30 V DC, 3-wire
Switching capacity	200 mA
Current consumption	<15 mA
Electrical connection	Valve plug M16

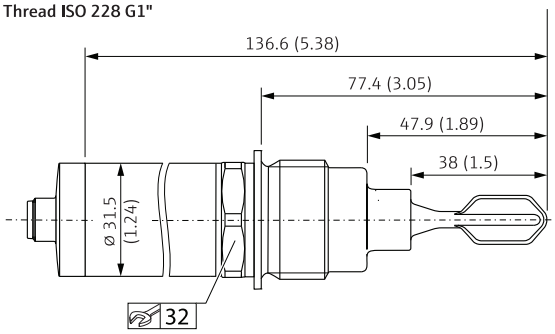
Output general	
Switching delay	0.5 s when tuning fork is covered 1.0 s when tuning fork is uncovered
Hysteresis	max. 3 mm (0.12 in)
Process connections	Thread ISO 228 G1"

Operating conditions	
Orientation	As required
Switch point	Vertical installation: 13 mm (0.51 in)±1 mm horizontal installation: 10.5 mm (0.4) (water +25 °C (+77 °F), 1 bar (14.5 psi))
Pipe extension	103 mm (4.05)
Surface roughness	Metallic surface in contact with process: $R_a \leq 3.2$ µm (126 µin)
Ambient temperature	–40 to +70 °C (–40 to +158 °F)
Process temperature	–40 to +100 °C (-40 to +212 °F),
Process pressure	–1 to +40 bar (–14.5 to +580 psi)
Storage temperature	–40 to +85 °C (–40 to +185 °F)
Climate class	DIN EN 60068-2-38/IEC 68-2-38: test Z/AD
Density	>0.7 g/cm³ (optionally available: >0.5 g/cm³)
Viscosity	1 to 10 000 mPa·s, dynamic viscosity
Degree of protection	IP65 NEMA Type 4X Enclosure (valve plug)
Electromagnetic compatibility	Electromagnetic compatibility in accordance with all relevant requirements of the EN 61326 series and NAMUR recommendation EMC (NE21). For details, refer to the EC Declaration of Conformity.

Dimensions in mm (inches)

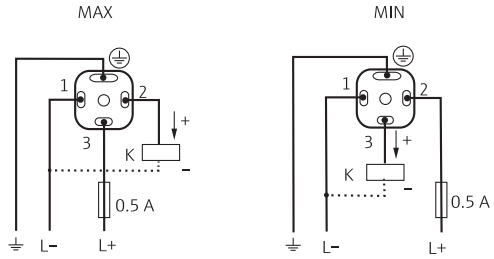
Compact version

Thread ISO 228 G1"

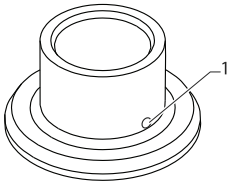


Installation according to instruction manual

Electrical connection



Accessories (Weld-in adapter G1")



1 Leakage hole

ø53 pipe installation
(ordercode: 71258358)
ø60 vessel installation
(ordercode:52001051)

Price table

Liquiphant FTL31-AA4U2AAWSJ (10 to 30 V DC, 3-wire PNP) [Old model: FTL260-0020]				Price/pcs. in MYR		
Fork design	Process temperature	Electrical connection	Process connection	1 to 5	6 to 10	> 10
Compact version	max. 100 °C	Valve plug ISO 4400 M16 (IP65)	Thread ISO 228 G1"	700.00	665.00	630.00

Accessories	Order no.	Price/pcs. in MYR
Weld-in adapter G1", d=53, 316L (pipe installation)	71258358	220.00
Weld-in adapter G1", d=60, 316L (vessel installation)	52001051	220.00

Prices are exclude GST and valid until 30/09/2017.

Hygienic level switch for liquids

Liquiphant FTL33

Complete product information:
www.my.endress.com/ftl33

- Robust stainless steel housing with LED indication
- External function test with test magnet
- CIP and SIP cleanability guaranteed up to 150 °C

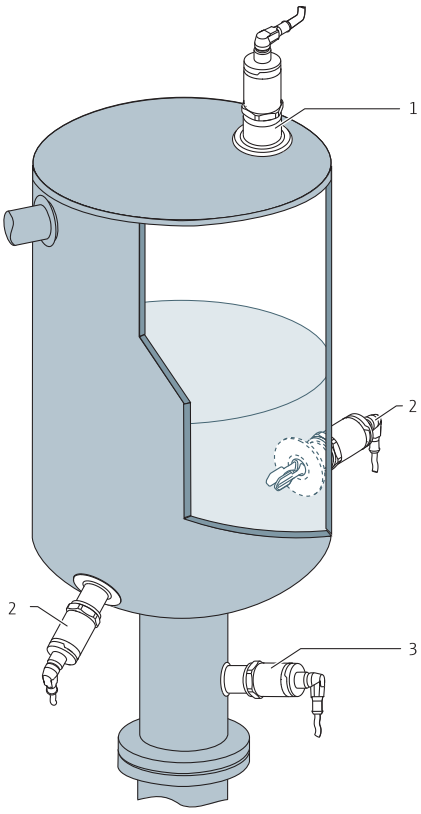
Specs at a glance:

- **Product:**
  Liquids
- **Mounting:**
  Vessels and pipes (>DN50)
- **Product density:**
  >0.7 g/cm³ (opt. >0.5 g/cm³)
- **Product temperature:**
  –40 to +150 °C
  (–40 to +302 °F)
- **Viscosity:**
  to 10 000 mm²/s (cSt)
- **Process pressure:**
  Max. 40 bar (580 psi)

Application The Liquiphant FTL33 is a point level switch for universal use in all liquids. It is used preferably in storage tanks, mixing vessels and pipes, where the internal and external hygiene requirements are particularly stringent. The reliable switching function works independently from product characteristics such as conductivity and dielectric constant value.

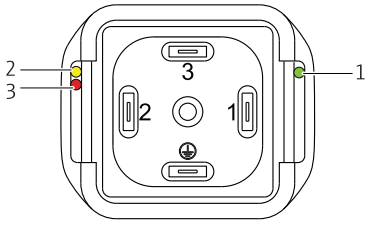
Function A piezoelectric drive causes the tuning fork of the Liquiphant FTL33 to vibrate at its resonance frequency. When the tuning fork is immersed in a liquid, its intrinsic frequency changes due to the change in density of the surrounding medium. The electronics system in the point level switch monitors the resonance frequency and indicates whether the tuning fork is vibrating in air or is covered by liquid. A signal is output via the DC-PNP.

Application example



The point level switch can be installed in any position in a vessel, pipe or tank, e.g., as overfill prevention or upper level detection (1), lower level detection (2) or dry running protection for pump (3)

Operability of LED display



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2 Yellow LED (ye) Lit - Indicates the switching state:
- MAX operating mode (overfill prevention): sensor is not covered by liquid
- MIN operating mode (dry running protection): the sensor is covered by liquid

3 Red LED (rd) Flashing Lit - Warning/fault
Fault can be remedied, e.g. incorrect wiring; protective function if test magnet is held against the sensor for longer than 30 s. Fault/device failure: error cannot be rectified, e.g. electronic error.

Technical data

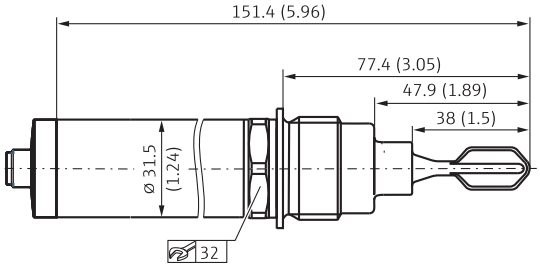
DC-PNP version	
Supply voltage	10 to 30 V DC, 3-wire
Switching capacity	200 mA
Current consumption	<15 mA
Electrical connection	Valve plug M16

Output general	
Switching delay	0.5 s when tuning fork is covered 1.0 s when tuning fork is uncovered
Hysteresis	max. 3 mm
Process connections	Thread ISO 228 G1" for flush-mounted installation in weld-in adapter

Operating conditions	
Orientation	As required
Switch point	Vertical orientation: 13 mm (0.5) horizontal orientation: 10.5 mm (0.4) (water +25 °C (+77 °F), 1 bar (14.5 psi)
Pipe extension	Length depending on the selected process connection
Surface roughness	Metallic surface in contact with process: R_a ≤1.5 µm (59 µin), EHEDG R_a ≤0.76 µm (30 µin), EHEDG, 3-A
Ambient temperature	–40 to +70 °C (–40 to +158 °F)
Process temperature	–40 to +150 °C (–40 to +302 °F),
Process pressure	–1 to +40 bar (–14.5 to +580 psi)
Storage temperature	–40 to +85 °C (–40 to +185 °F)
Climate class	DIN EN 60068-2-38/IEC 68-2-38: test Z/AD
Density	> 0.7 g/cm³ (optionally: > 0.5 g/cm³)
Viscosity	1...10 000 mPa·s, dynamische Viskosität
Degree of protection	IP65 NEMA Type 4X Enclosure (valve plug)
Electromagnetic compatibility	Electromagnetic compatibility in accordance with all relevant requirements of the EN 61326 series and NAMUR recommendation EMC (NE21). For details, refer to the EC Declaration of Conformity

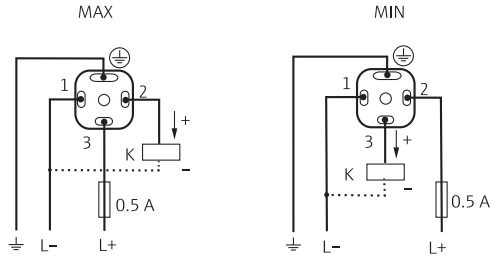
Dimensions in mm (inches)

Thread ISO 228 G1" for flush-mounted installation in weld-in adapter

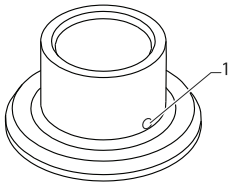


Installation according to instruction manual

Electrical connection



Accessories (Weld-in adapter G1")



1 Leakage hole

ø53 pipe installation
(ordercode: 71258358)
ø60 vessel installation
(ordercode:52001051)

Price table

Liquiphant FTL33-AA4U3ABWSJ (10 to 30 V DC, 3-wire PNP) [Old model: FTL20H-0GEJ2B]

Fork design	Process temperature	Electrical connection	Process connection	Price/pcs. in MYR 1 to 5	6 to 10	> 10
Compact version	max. 150 °C	Valve plug ISO 4400 M16 (IP65)	Thread ISO 228 G1", flush-mounted*	1,100.00	1,045.00	990.00

* for installation in weld-in adapter

Accessories	Order no.	Price/pcs. in MYR
Weld-in adapter G1", d=53, 316L (pipe installation)	71258358	220.00
Weld-in adapter G1", d=60, 316L (vessel installation)	52001051	220.00

Prices are exclude GST and valid until 30/09/2017.

Point level switch for liquids
in the food and beverage industry

Liquipoint FTW23

MYR 540
>10 pcs.

- Individual adjustment to each medium not necessary
- Function test of the switch output with test magnet

Specs at a glance:

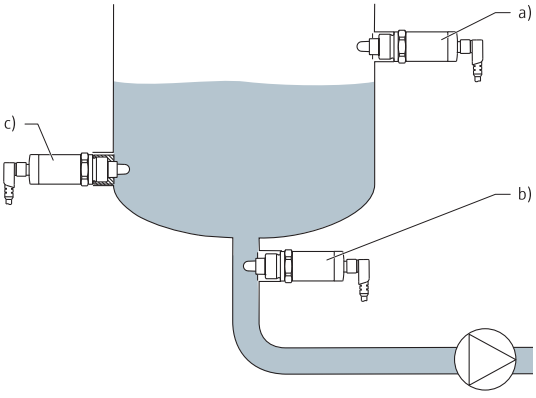
- **Product:**
  Water-based medium (DC > 20)
- **Installation:**
  Vessels and pipes
- **Process temperature range:**
  −20 to +100 °C (−4 to +212 °F)
  (For 1 hour: +135 °C (+275 °F))
- **Process pressure range:**
  −1 to +16 bar
  (−14.5 to +232 psi)

Complete product information:
www.my.endress.com/ftw23

Application The Liquipoint FTW23 is a point level switch for water-based liquids. It is used preferably in storage tanks, mixing vessels and pipes. Developed and built for the food and beverage industry, the Liquipoint FTW23 meets international hygienic requirements.
The Liquipoint FTW23 can be used permanently in process temperatures up to 100 °C (212 °F) and in cleaning and sterilization processes to 135 °C (275 °F) for 60 minutes.

Function The capacitance at the tip of the sensor, and therefore the dielectric value of the medium, is determined using an electrical field. Given that the dielectric value of air and a water-based liquid differ, the Liquipoint FTW23 can differentiate between the two states, i.e. covered and uncovered.

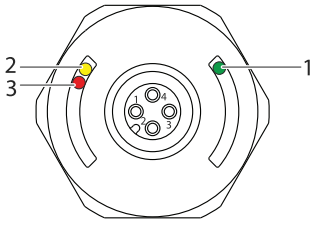
Application example



The measuring system consists of a Liquipoint FTW23 point level switch, e.g. for connection to programmable logic controllers (PLC).

a) Overfill protection or upper level detection (MAX)
b) Pump dry running protection (MIN)
c) Lower level detection (MIN)

Operability of LED display



1 Green LED (gn) Lit - Device is operational
2 Yellow LED (ye) Lit - Indicates the state of the sensor
3 Red LED (rd) Flashing/Lit - Warning/fault
Fault can be remedied, e.g. incorrect wiring; protective function if test magnet is held against the sensor for longer than 30 s. Fault/device failure: error cannot be rectified, e.g. electronic error.

Technical data

Output	
Function	3-wire DC-PNP Positive voltage signal at the switch output of the electronics
Connectable load	200 mA (short-circuit proof)
Residual voltage	<3 V
Residual current	<100 µA
Supply voltage	(10 to 30 V DC, 3-wire PNP)
Power consumption	<1.2 W (at max. load: 200 mA)
Current consumption	<40 mA
Cable specification	IEC 60947-5-2
Connecting cable length	Max. 25 Ω/core, total capacity <100 nF

Performance characteristics	
Reference operating conditions	Horizontal orientation: – Ambient temperature: 20 °C (68 °F) ±5 °C – Medium temperature: 20 °C (68 °F) ±5 °C – Process pressure: 1 bar (14.5 psi) – Medium: water
Switching accuracy	±2 mm (0.08 in) in accordance with DIN 61298-2
Hysteresis	Typically ±1 mm (0.04 in)
Non-repeatability	±1 mm (0.04 in) in accordance with DIN 61298-2
Switching delay	0.5 s when sensor is covered 1.0 s when sensor is uncovered
Switch-on delay	<2 s (previously not through-connected))
Orientation	any position

Environment	
Ambient temperature range	–20 to +70 °C (–4 to +158 °F) (at $T_{Process}$ ≤ 80 °C (176 °F)), –20 to +35 °C (–4 to +95 °F) (at $T_{Process}$ = 135 °C (275 °F))
Storage temperature	–40 to +85 °C (–40 to +185 °F)
Climate class	DIN EN 60068-2-38/IEC 68-2-38: test Z/AD
Degree of protection	P65/67 NEMA Type 4X Enclosure (M12 connector for plastic housing cover)
Short-circuit protection	Overload protection/short-circuit protection at I > 200 mA; the sensor is not destroyed. Intelligent monitoring: check for overload approx. every 1.5 s; normal mode follows once the cause of the overload/short-circuit is corrected

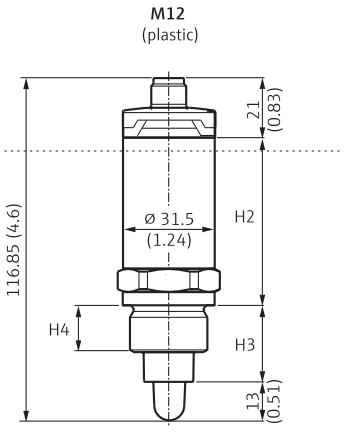
Process	
Process temperature range	–20 to +100 °C (–4 to +212 °F) (For 1 hour: +135 °C (+275 °F))
Process pressure range	–1 to +16 bar (–14.5 to +232 psi)
Process fluid	Water-based medium (dielectric constant >20)

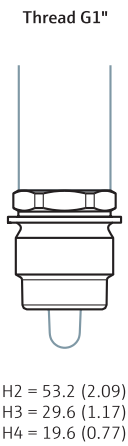
Mechanical construction	
Weight	Max. 300 g (10.58 oz)
Materials in contact with process	– Sensor: 316L (1.4404), PEEK The material PEEK meets the requirements of EU 1935/2004, 10/2011, 2023/2006 and FDA 21 CFR 177.2415 Process connection: 316L (1.4404/1.4435)
Materials not in contact with process	Housing covers: M12 plastic: PPSU; Design ring: PBT/PC Housing: 316L (1.4404)
Surface	R_a ≤ 0.76 µm (30 µin)

Dimensions in mm (inches)

Housing, electrical connection

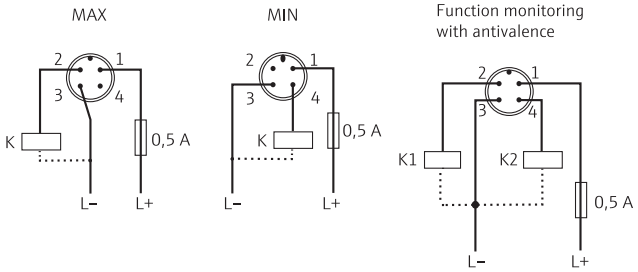
Process connections



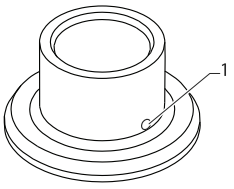


Installation according to instruction manual

Electrical connection



Accessories (Weld-in adapter G1")



1 Leakage hole

ø53 pipe installation
(ordercode: 71258358)
ø60 vessel installation
(ordercode:52001051)

Price table

Liquipoint FTW23-AA4MWSJ (10 to 30 V DC, 3-wire PNP)		Price/pcs. in MYR		
Electrical connection	Process connection	1 to 5	6 to 10	> 10
M12 connector, IP65/67 NEMA Type 4 Enclosure	Thread ISO228 G1"	600.00	570.00	540.00

Accessories	Order no.	Price/pcs. in MYR
Plug connector M12 90deg - Self confectionery connection. Usage: plug M12.	71114212	70.00
Weld-in adapter G1", d=53, 316L (pipe installation)	71258358	220.00
Weld-in adapter G1", d=60, 316L (vessel installation)	52001051	220.00

Prices are exclude GST and valid until 30/09/2017.

Point level switch for liquid, pasty and sticky media in the food and beverage industry

Liquipoint FTW33

MYR 1,260
> 10 pcs.

Complete product information:
www.my.endress.com/ftw33

- Flush-mounted installation, pipes remain piggable
- For water and oil-based media
- Reliable switching function due to compensation even in the case of heavy buildup

Specs at a glance:

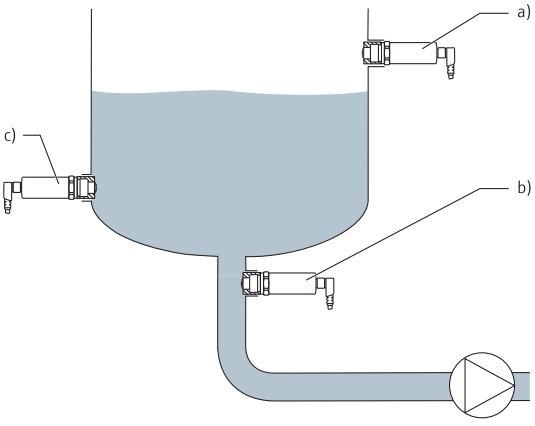
- **Product:**
  Liquid, pasty and sticky media (DC ≥ 2)
- **Installation:**
  Vessels and pipes
- **Process temperature range:**
  –20 to +100 °C (–4 to +212 °F)
  (For 1 hour: +150 °C (+302 °F))
- **Process pressure range:**
  –1 to +25 bar
  (–14.5 to +362.5 psi)

Suitable process media
Water, yogurt (natural)
Milk/creme, beer, soda
Edible oil
Mustard, mayonnaise, ketchup, fruit pieces
Tooth paste, chocolate spread

Application The Liquipoint FTW33 is a point level switch for liquid and pasty media. It is used preferably in storage tanks, mixing vessels and pipes. Developed and built for the food and beverage industry, the Liquipoint FTW33 meets international hygienic requirements. It is particularly suited to applications where flush-mounting is necessary.
The Liquipoint FTW33 can be used permanently in process temperatures up to 100 °C (212 °F) and for 60 minutes in cleaning and sterilization processes up to 150 °C (302 °F). The Liquipoint FTW33 can also be used for detecting the foam that commonly occurs within the food and beverage industry.

Function A low, galvanically isolated AC voltage is applied at the electrode in contact with the process. If liquid or pasty media come in contact with the electrode, a measurable current flows and the Liquipoint FTW33 switches. Active buildup compensation ensures reliable switching of the measuring device even if buildup occurs on the sensor.

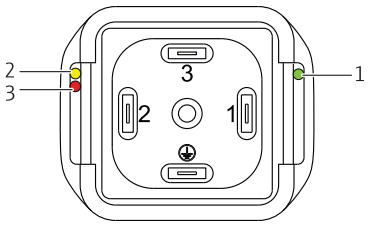
Application example



The measuring system consists of a Liquipoint FTW33 point level switch, e.g. for connection to programmable logic controllers (PLC).

a) Overfill protection or upper level detection (MAX)
b) Pump dry running protection (MIN)
c) Lower level detection (MIN)

Operability of LED display



1 Green LED (gn) Lit - Device is operational
2 Yellow LED (ye) Lit - Indicates the switching state:
- MAX operating mode (overfill prevention): sensor is not covered by liquid
- MIN operating mode (dry running protection): the sensor is covered by liquid

3 Red LED (rd) Flashing Lit - Warning/fault
Fault can be remedied, e.g. incorrect wiring; protective function if test magnet is held against the sensor for longer than 30 s. Fault/device failure: error cannot be rectified, e.g. electronic error.

Technical data

Output	
Function	3-wire DC-PNP Positive voltage signal at the switch output of the electronics
Connectable load	200 mA (short-circuit proof)
Residual voltage	<3 V
Residual current	<100 µA
Supply voltage	10 to 30 V DC
Power consumption	<1 W (at max. load: 200 mA)
Current consumption	<15 mA
Cable specification	Valve plug: Cable cross-section ≤1.5 mm² (16 AWG); Ø 3.5...6.5 mm
Connecting cable length	max. 25 Ω/core, total capacitance < 100 nF

Performance characteristics	
Reference operating conditions	Horizontal orientation: – Ambient temperature: 20 °C (68 °F) ±5 °C – Medium temperature: 20 °C (68 °F) ±5 °C – Process pressure: 1 bar (14.5 psi) – Medium: water Conductivity: approx. 200 µS/cm
Measured error	±1 mm (0.04 in) in accordance with DIN 61298-2
Hysteresis	max. 1 mm (0.04 in)
Non-repeatability	±0.5 mm (0.02 in) in accordance with DIN 61298-2
Switching delay	0.5 s when sensor is covered; 1.0 s when sensor is uncovered
Switch-on delay	<1 s (no defined switching status before this)
Orientation	any position

Environment	
Ambient temperature range	–40 to +70 °C (–40 to +158 °F) (at $T_{Process}$ ≤ 90 °C (194 °F)), –40 to +45 °C (–40 to +113 °F) (at $T_{Process}$ = 150 °C (302 °F))
Storage temperature	–40 to +85 °C (–40 to +185 °F)
Climate class	DIN EN 60068-2-38/IEC 68-2-38: test Z/AD
Degree of protection	IP65 (valve plug)
Cleaning	Resistant to typical cleaning agents from the outside, in accordance with Ecolab test.
Electromagnetic compatibility	In accordance with EN 61326-Serie series and NAMUR Recommendation EMV (NE 21).
Short-circuit protection	Overload protection/short-circuit protection at I > 250 mA; the sensor is not destroyed. Intelligent monitoring: Testing for overload at intervals of approx. 1.5 s; normal operation resumes once the overload/ short-circuit has been rectified

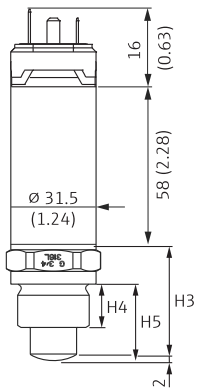
Process	
Process temperature range	–20 to +100 °C (–4 to +212 °F) (For 1 hour: +150 °C (+302 °F))
Process pressure range	–1 to +25 bar (–14.5 to +362.5 psi)
Standard	The following settings can be made on the device using the test magnet: – Standard: For water or alcohol-based media (DC ≥ 10)

Mechanical construction	
Weight	approx. 300 g (10.58 oz)
Materials in contact with process	– Sensor: 316L (1.4404), PEEK The material PEEK meets the requirements of EU 1935/2004, 10/2011 as well as 2023/2006 and FDA 21 CFR 177.2415 – Process connection: 316L (1.4404/1.4435)
Materials not in contact with process	Housing covers: Valve connector, plastic: PPSU
Surface	Ra ≤ 0.76 µm (30 µin)

Dimensions in mm (inches)

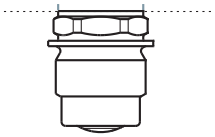
Housing, Electrical connection

Plastic valve plug



Process connections

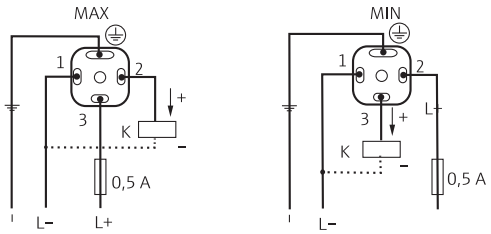
Thread G1"



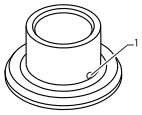
H3 = 43 (1.69)
H4 = 19 (0.75)
H5 = 32 (1.3)

Installation according to instruction manual

Electrical connection



Accessories (Weld-in adapter G1")



1 Leakage hole

ø53 pipe installation
(ordercode: 71258358)

ø60 vessel installation
(ordercode:52001051)

Price table

Liquipoint FTW33-AA4UWSJ (10 to 30 V DC, 3-wire PNP)		**Price/pcs. in MYR**		
Electrical connection	Process connection	1 to 5	6 to 10	> 10
Valve plug ISO4400 M16, IP65 NEMA Type 4 Encl.	Thread ISO228 G1"	1,400.00	1,330.00	1,260.00

Accessories	Order no.	Price/pcs. in MYR
Weld-in adapter G1", d=53, 316L (pipe installation)	71258358	220.00
Weld-in adapter G1", d=60, 316L (vessel installation)	52001051	220.00

Prices are exclude GST and valid until 30/09/2017.

Capacitive point level switch for bulk solids

Minicap FTC260

MYR 882
> 10 pcs.

Complete product information:
www.my.endress.com/ftc260

- No calibration required
- Active buildup compensation
- Maintenance-free

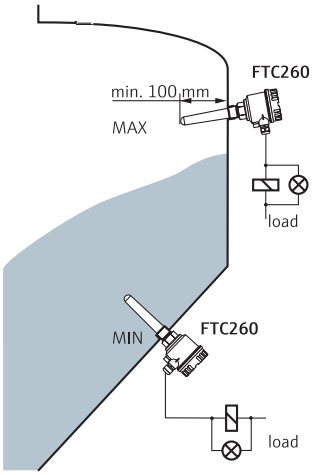
Specs at a glance:

- **Product:**
  Bulk solids
- **Grain size:**
  Diameter ≤30 mm (1.18″)
- **Process pressure:**
  −1 to +25 bar
  (−14.5 to +363 psi)
- **Product dielectric constant:**
  ε_r ≥1.6
- **Product temperature:**
  −40 to +120 °C
  (−40 to +248°F)
- **Probe length:**
  140 mm (5.51″)

Application The Minicap is suitable for the level detection of powdery and fine-grain bulk solids, such as grain, flour, powdered milk, mixed feed, cement, chalk or gypsum.

Function The Minicap is an electronic switch. When the limit is exceeded or the load falls below the limit, a switching signal is output. A switch housing or signal output device (e.g. lights, horns, programmable logic sequencer, stored program control, etc.) can be connected to the Minicap. It has an in-built switch-over facility for minimum/ maximum safety. It detects the formation of deposits on the probe, and compensates for the effects of this so that the switching point is maintained. The Minicap comes with factory settings. Other sensitivity adjustments can be made on the housing.

Application Example



Level detection in silos with bulk goods. The silos can be made of various materials (e.g. metal, plastic, concrete), as these do not affect measurement.
The filling stream should not be directed onto the probe.

In general: If the dielectric constant of the solid is not known, then the density of the solid is a deciding factor. Under normal conditions the Minicap functions in foodstuffs with a density of 250 g/l and above or in plastic or mineral materials with a density of 600 g/l and above.

Applications

Examples	ρ in g/l (approx.)	ε_r (approx.)	Function
Grain, seed, legumes and their products			
Rice	770	3.0	yes
Cornstarch (packed)	680	2.6	yes
Flour (wheat)	580	2.4	yes
Corn grist	500	2.1	yes
Sunflower seeds	380	1.9	yes
Noodles	370	1.9	yes
Bran (wheat)	250	1.7	yes
Popcorn	30	1.1	no
Minerals, inorganic materials			
Cement	1050	2.2	yes
Plaster	730	1.8	yes
Chalk (packed)	540	1.6	(yes)
Chalk (loose)	360	1.4	no
Plastics			
ABS granulate	630	1.7	yes
PA granulate	620	1.7	yes
PE granulate	560	1.5	no
PVC powder	550	1.4	no
PU dust	80	1.1	no

Grey background:
Application limits of Minicap exceeded.

Technical data

Output	
Output signal	**AC/DC-SPDT:** AC: I_{max} = 4 A, I_{min} = 1 mA, U_{min} = 6 V, U_{max} = 253 V, P_{max} = 1000 VA DC: I_{max} 4 A up to 30 V, I_{max} 0.2 A up to 253 V
Malfunction signal	Relay de-energised
Switching delay	0.5 s upon release/covering

Power supply	
Supply voltage	**AC/DC-SPDT (relay contact):** 20 to 253 V AC or 20 to 55 V DC, max. current input: 130 mA
Terminal compartment	Stranded wires max. 1.5 mm² in end sleeves, Electric wire max. 2.5 mm²

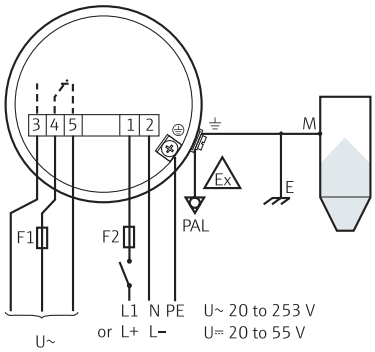
Accuracy	
Long-term drift	Horizontal ±3 mm (±0.12"), vertical ±6 mm (±0.24")
Hysteresis	Horizontal 4 mm (0.16"), vertical 7 mm (0.28")
Switchpoint	Horizontal at centre of probe –5 mm (–0.2"), vertical 40 mm (1.58") above probe tip

Operating conditions	
Ambient temperature	–40 to +70 °C (–40 to +158°F)
Climate class	As per standard DIN-IEC 68, part 2-38
Protection system	IP 66
EMC	Interference Emission to EN 61326, Electrical Equipment Class B; Interference Immunity to EN 61326, Annex A (Industrial) and NAMUR Recommendation NE 21 (EMC)
Process temperature	–40 to +130 °C (–40 to +270 °F) (to +80 °C/176 °F Dust Ex)
Process pressure	–1.0 to +25 bar (–14 to +363 psi)

General	
Medium	Bulk solids with grain size up to 30 mm (1.18"), relative dielectric constant ε_r ≥1.6
Flexural strength	1400 N (at tip of probe)
Process connection	R1 DIN 2999/ISO 7
Adapter	Inner thread R1 DIN 2999 ISO 7: for R1½ DIN 2999/ISO 7 for G1½ DIN ISO 228

Electrical connection

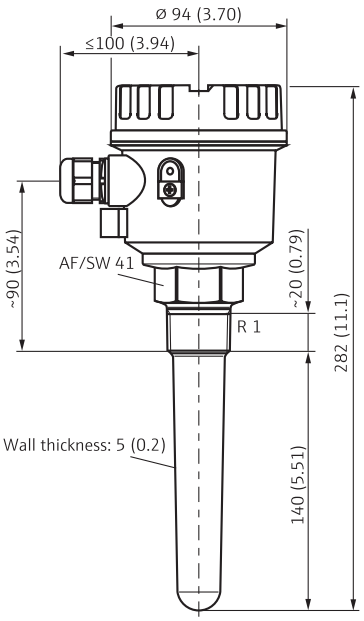
AC/DC-SPDT



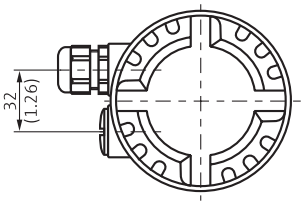
Minicap FTC260 with AC or DC connection and relay output (SPDT)
F1: fine-wire fuse for protection of relay contact depending on the connected load
F2: fine-wire fuse, 500 mA
M: earth connection to silo or to metal parts of silo
E: earthing

Dimensions in mm (inches)

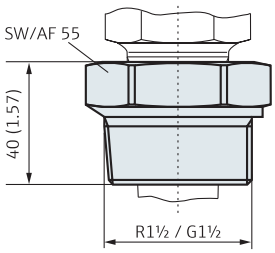
Minicap FTC260



Top view, FTC260



Adapter for FTC260



Installation according to instruction manual

Price table

Minicap FTC260-AA4D1 (Rod version) (Relay 20-253 V AC/20-55 V DC)				**Price/pcs. in MYR**		
Approval	Process connection	Probe Length	Housing; Cable Entry	1 to 5	6 to 10	> 10
Non-Ex	Thread EN10226 R1, PPS	140 mm (5.51")	F14 Polyester IP66; gland M20	980.00	931.00	882.00

Accessories	Order no.	Price/pcs. in MYR
Adapter G 1½ for Minicap FTC260	943 215-1021	50.00

Prices are exclude GST and valid until 30/09/2017.

Point level switch for granular solids

Soliswitch FTE20

MYR 810
> 10 pcs.

Complete product information:
www.my.endress.com/fte20

- Easy installation
- Optical and automatic rotation control (optional)
- Weight of solids can be adjusted without the need for tools

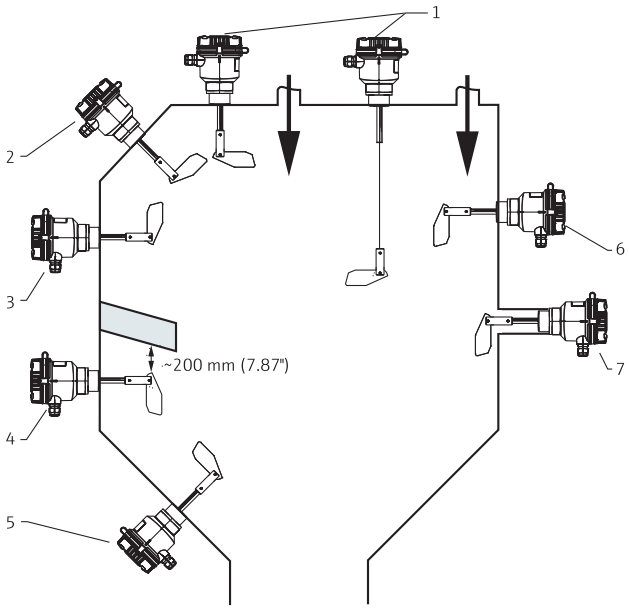
Specs at a glance:

- **Medium:**
  Solids weight ≥80 g/l
  (4.99 lb/ft³)
- **Operating pressure (abs.):**
  0.5 to 2.5 bar
  (7.25 to 36.3 psi)
- **Medium temperature:**
  −20 to +80 °C (−4 to 176 °F)

Application The Soliswitch FTE20 is a paddle switch for granular solids. Its robust and compact design makes the point level switch an ideal sensor for detecting the full, empty or refill status in applications with bulk solids, such as in silos containing solids. Typical application areas are point level detection in e.g. cereals, sugar, cacao, animal feeds, washing powders, chalk, dry plaster, cement, granulates and wood chips.

Function The shaft and paddle are driven using a reduction gear and synchronous motor. If the paddle is stopped by material covering it, the hinged motor in the housing moves from the rest to the switch position. This movement operates two switch contacts; the first is for external level indication and the second switches off the power to the motor.
The paddle starts to rotate once the medium level falls below the paddle, the hinged motor returns to its rest position and the two contacts switch to normal operation. Intermittent loads that operate against or even in the same direction of rotation are evened out by a slip clutch.

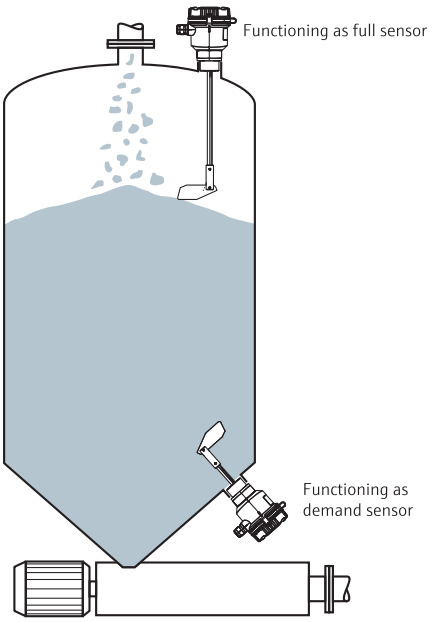
Installation



Correct installation positions of the device:
1: Vertical from the top
2: Angled from the top
3: From the side
4: From the side with protective cover against falling solids
5: From below

Incorrect installation positions of the device:
6: In direction of solids flow
7: Installation coupling too long

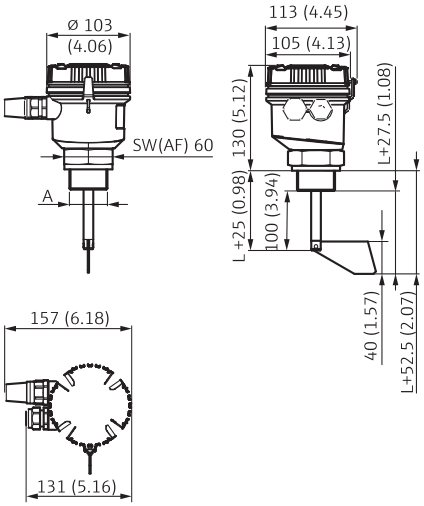
Application example



Technical data

Output	
Output signal	Binary
Response time	From standstill of the paddle until output of the switching signal: 20°, corresponds to 3.5 s
Switching capacity relay	EN 61058: 250 V AC 5E4, 6(2) A; L 1054: 125 to 250 V AC, 5 A; 30 V DC, 8 A; Min. switching load 300 mW (5 V/5 mA)
Function	Detection of full or refill status
Power supply	
Supply voltage	230 V AC
Power consumption	Max. 3.5 VA
Cable entries	2 × cable gland, M20 × 1.5
Operating conditions	
Side load on the shaft	Max. 60 N
Load on the rope	Max. 1500 N
Operating pressure (abs.)	0.5 to 2.5 bar (7.25 to 36.3 psi)
Ambient temperature	−20 to +60 °C (−4 to 140 °F)
Degree of protection	IP 66
Shock resistance	as per EN 60068-2-27: 30g
Vibration resistance	as per EN 60068-2-64: 0,01g²/Hz
Medium temperature	−20 to +80 °C (−4 to 176 °F)
Solids weight	≥80 g/l
Grain size	≤50 mm (1.97")
Mechanical construction	
Material	– Housing: Polycarbonate – Captive screw cap: Polyamide – Cover seal: Silicone – Shaft / Rope extension / Paddle: Stainless steel – Process seal: Synthetic/organic fiberelastomer sealing (nonasbestos) – Process connections: PBT
Shaft seal	NBR
Shaft speed	1 min^{-1}
Process connection	G1½"
Electrical connection	Terminals with spring terminal design, Permitted cable cross-sections 2.5 mm^2 solid, 1.5 mm^2 flexible with wire end ferrule with plastic ferrule

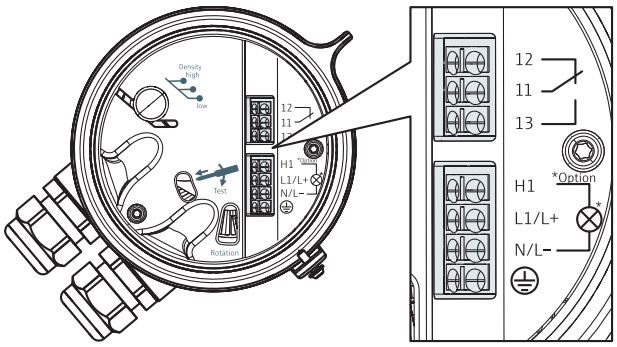
Dimensions in mm (inches)



A: Process connection G 1½"

Installation according to instruction manual.

Electrical connection



⏚	Protective ground
N (AC), L– (DC):	Power connection
L1 (AC), L+ (DC):	Power connection
H1, N/L–:	Connection for signaling empty/full status detection (optional)
11:	Changeover contact
12:	Normally closed contact
13:	Normally open contact

Price table

Soliswitch FTE20-AA13AB41 (230 V AC) [Old model: FTE30-AAA1]

Approval	Process connection	Length	Power supply	Price/pcs. in MYR 1 to 5	6 to 10	> 10
Non Ex	Thread G1½; PBT	100 mm (3.94")	230 V AC	900.00	855.00	810.00

Prices are exclude GST and valid until 30/09/2017.

Pressure transducer with metal sensors

Cerabar PMP11

MYR 594
> 10 pcs.

Complete product information:
www.my.endress.com/pmp11

- High reproducibility and long-term stability

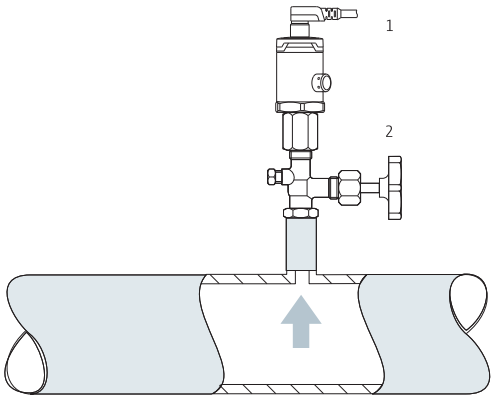
Specs at a glance:

- **Media:**
  Gases, vapors, liquids and dust
- **Output:**
  4 to 20 mA
- **Process temperature:**
  –25 to +85 °C (–13 to +185 °F)
- **Measuring ranges:**
  From –400 to +400 mbar (–6 to +6 psi) to –1 to +40 bar (–15 to +600 psi)
- **Reference accuracy:**
  ±0,5 %

Application The Cerabar is a pressure transducer for the measurement of gauge pressure in gases, vapors, liquids and dust. The Cerabar can be used in versatile applications thanks to a wide range of process connections.

Function The process pressure deflects the metal process isolating diaphragm of the sensor and a fill fluid transfers the pressure to a Wheatstone bridge (semiconductor technology). The pressure-dependent change in the bridge output voltage is measured and evaluated.

Application example



Pressure transducer Cerabar PMP11 (1) with the shutoff device (2) in pipelines

Technical data

Output	
Output signal	4...20 mA (two-wire)
Signal range 4 to 20 mA	3,8...20,5 mA
Load 4 to 20 mA	$R_{Lmax} \leq (U_B - 6,5\ V) / 22\ mA$ [1]
Load resistance (for 0 to 10 V devices)	The load resistance must be ≥ 5 [kΩ]
Signal on alarm 4 to 20 mA	max. alarm >21 mA
Dynamic behavior	Time constant (T_{90}) 15 ms

[1] R_{Lmax}: maximum load resistance; U_B: supply voltage

Power supply	
Supply voltage	4...20 mA output: 10...30 V DC
Current consumption	two-wire: ≤ 26 mA;
Degree of protection	IP65 NEMA Type 4X Enclosure
Influence of power supply	≤0,005% for URL/1 V
Residual ripple	±5 %

Performance characteristics	
Reference accuracy	±0,5 %
Thermal change of the zerooutput and the output span	<1 bar: <1 % ≥1 bar: <0,8 %
Long-term stability	1 year: ±0,2 %; 5 years: ±0,4 %
Switch-on time	≤2 s

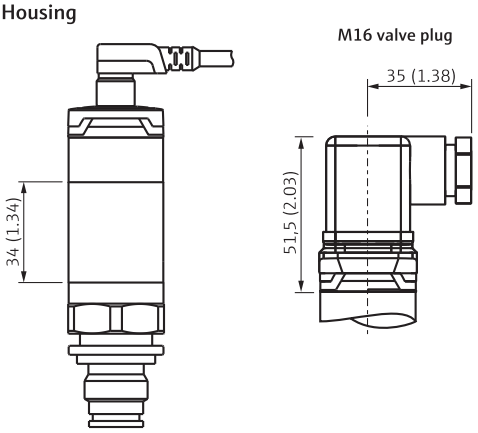
Environment	
Ambient temperature range	–40 to +70 °C (–40 to +158 °F)
Storage temperature range	–40 to +85 °C (–40 to +185 °F)
Climate class	Class 3K5
Electromagnetic compatibility	- Interference emission as per EN 61326 equipment B - Interference immunity as per EN 61326 appendix A (industrial sector) - NAMUR recommendation EMC (NE21)

Process	
Process temperature range	–25 to +85 °C (–13 to +185 °F)
TSE Certificate of Suitability	To all device components in contact with the process
Process isolating diaphragm	AISI 316L DIN/EN material number 1.4435

Materials	
Materials not in contact with process:	Housing: Stainless steel 316L Filling oil: NSF-H1 synthetic oil in accordance with FDA 21 CFR 178.3570
Materials in contact with process:	Process connections: 316L metal process isolating diaphragm: AISI 316L TSE Certificate of Suitability for all device components in contact with the process

Dimensions in mm (inches)

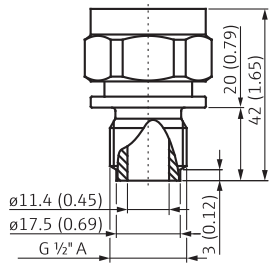
Housing



Installation according to instruction manual.

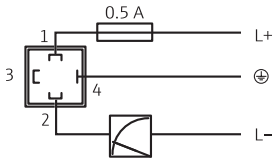
Process connections with internal process isolating diaphragm

Thread ISO 228 G ½", bore 11.4 mm (0.45 in)



Electrical connection

4...20 mA output



Price table

Cerabar PMP11-AA1U1PBWWJ (4...20 mA) [Old model: PMP131-A1101A1S]

Electrical connection	Process connection	Sensor range	Calibration, unit	Price/pcs. in MYR		
				1 to 5	6 to 10	> 10
Valve plug M16	Thread ISO 228 G½", bore 11.4 mm	10bar/1MPa, overload: 40bar/4MPa	Sensor range; mbar/bar	660.00	627.00	594.00

Prices are exclude GST and valid until 30/09/2017.

Multifunctional process meters with display and control unit

RIA45

MYR 1,260
>10 pcs.

Complete product information:
www.my.endress.com/ria45

- 5-digit LCD including bargraph and color alteration
- 1 channel device with mathematical functionalities
- Wide range power supply

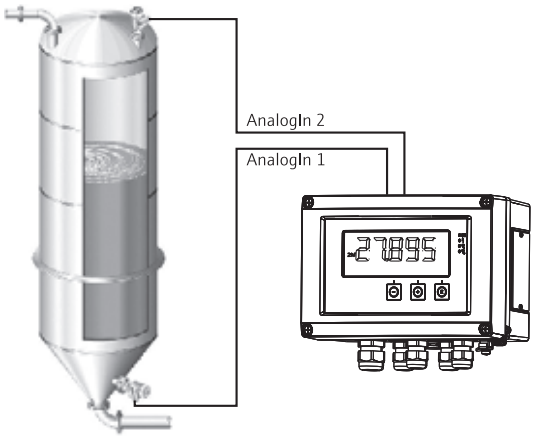
Specs at a glance:

- **Inputs:**
  1 universal inputs measuring current, voltage, resistance, temperature (RTD, TC)
- **Outputs:**
  2 relays + 1 analog outputs
- **Display:**
  LCD – 2 lines; black/white/yellow; alarm modus: color alteration into red; toggle function between channels
- **Functionalities:**
  Linearization, mathematical calculations (+/–/avg), differential pressure package
- **Dimensions:**
  96 × 48 × 175 mm
  (3.78" × 1.89" × 6.89")

Application Equipped with an extensive range of functionalities and approvals the RIA45 indicators suit any application in the process industries. Typical applications include displaying and monitoring process values, e.g. where overspill protection is required.
As a panel display the RIA45 is ideal for installation in control rooms, switch cabinets or laboratories.

Function The indicator detects, evaluates and displays analogue process values. The integrated loop power supply provides power supply to two-wire sensors. Universal inputs allow measuring of current and voltage as well as providing a direct connection to RTDs and thermocouples. For purposes of process control, limit points can be monitored and corresponding integrated relays can be activated. The dual line LC display has been developed especially for the process industries and provides a wide range of information which is programmable. Upon pushing the quick information button the display manually or automatically switches through the various values (process, calculated or memory-values). In the event of a failure the colour of the display alternates to signal an alarm, which is easily visible from distance. The integrated application package "differential pressure" allows a quick, convenient and easy initiation in differential pressure applications.

Application example



Example of application "differential pressure"

Technical data

Input parameters	
Input	1× universal input 0 to 20 mA, 4 to 20 mA; Over range: up to 22 mA, 0 to 10 V, 2 to 10 V, 0 to 5 V, 1 to 5 V, ±1 V, ±10 V, ±30 V, ±100 mV, ±150 mV, 30 to 3000 Ω; Pt 100 according to IEC751, GOST, JIS1604, Pt 500 and Pt 1000 according to IEC751; Cu 100, Cu 50, Pt 50, Pt 46, Cu 53 according to GOST; Ni 100, Ni 1000 according to DIN43760; Type J, K, T, N, B, S, R according to IEC584; Type U according to DIN43710; Type L according to DIN43710, GOST; Type C, D according to ASTM E998
Linearization	Linearization of input and calculated values (up to 32 linearization points supported)
Tolerance current	0.05 % of measurement range

Output parameters	
Analog output	1× analog output, 0 to 20 mA, 4 to 20 mA; 0 to 10 V, 2 to 10 V, 0 to 5 V; short-circuit proof, I_{max} < 25 mA
Loop power supply	24 V DC (+15%/−5%), max. 25 mA; short-circuit proof and overload proof; galvanically isolated from system and outputs
Status Output	Open collector to monitor device status as well as cable open circuit
Relay	2 changers with function modes: min., max., gradient, alarm, out-band, in-band
Limit function	Max. contact burden DC 30 V / 3 A (permanent state, without destruction of the input) Max. contact burden AC 250 V / 3 A (permanent state, without destruction of the input) Min. contact load 500 mW (12 V/10 mA)

Power supply	
Power supply	24 V to 230 V AC/DC

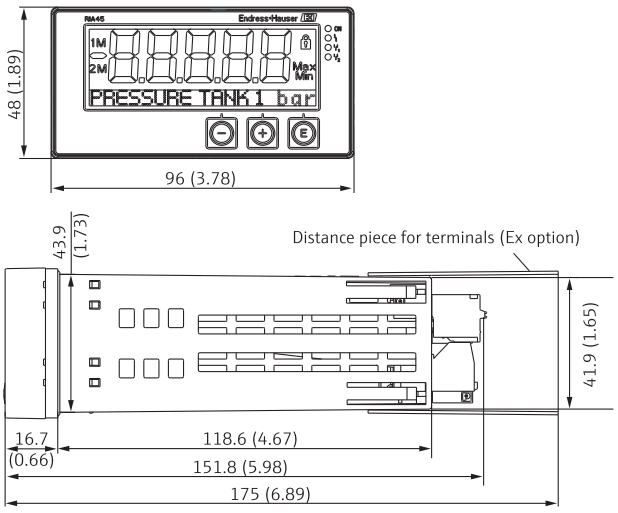
Structural design	
Front	96 × 48 mm (3.78" × 1.89"), cut-out: 92 × 45 mm (3.62" × 1.77")
Depth	151,8 mm (5.98") (w/o ex frame)
Electrical connection	Coded, pluggable spring clip, 2,5 mm²; power supply with screw clamp

Display and user Interface	
Display	LCD 2-lines; black/white/yellow; alarm mode: color alteration into red; toggle function; 1st line: 7 segment, 5-digit, 17 mm (0.67") high; 2nd line: Dot-Matrix free programmable for Bargraph, TAG, unit
LED	2 × Device status; 2 × Relay status
Operation	using three buttons and/or via configuration software FieldCare Device Setup

Operating conditions	
Degree of protection	Front: IP65 Back side: IP20
Ambient temperature	−20 to +60 °C (−4 to +140 °F)
Storage temperature	−40 to +85 °C (−22 to +185 °F)

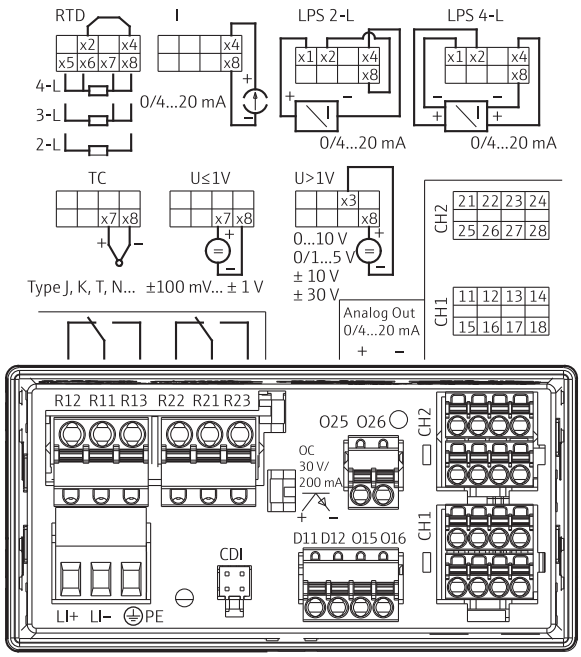
Software functionalities
Min/max log function / memory, alarm logging, differential pressure application package, 2 calculation channels: sum, difference, average, linearization

Dimensions in mm (inches)



Installation according to instruction manual.

Electrical connection



Price table

Process indicator RIA45-A1C1 (24 V to 230 V AC/DC)		Price/pcs. in MYR		
Approval	Input; Output	1 to 5	6 to 10	>10
Non-Ex	1 × Universal; 1 × analog + 2 relay	1,400.00	1,330.00	1,260.00

Prices are exclude GST and valid until 30/09/2017.

Surge arrester

HAW569

MYR 468
> 10 pcs.

Specs at a glance:

- **Design:**
  Field housing
- **Signal:**
  Current 0/4 to 20 mA, PFM, PROFIBUS PA, FOUNDATION Fieldbus

Application The surge arrester is used for limiting high voltages in signal cables of 0/4 to 20 mA, PROFIBUS PA, FOUNDATION Fieldbus and PFM signal.

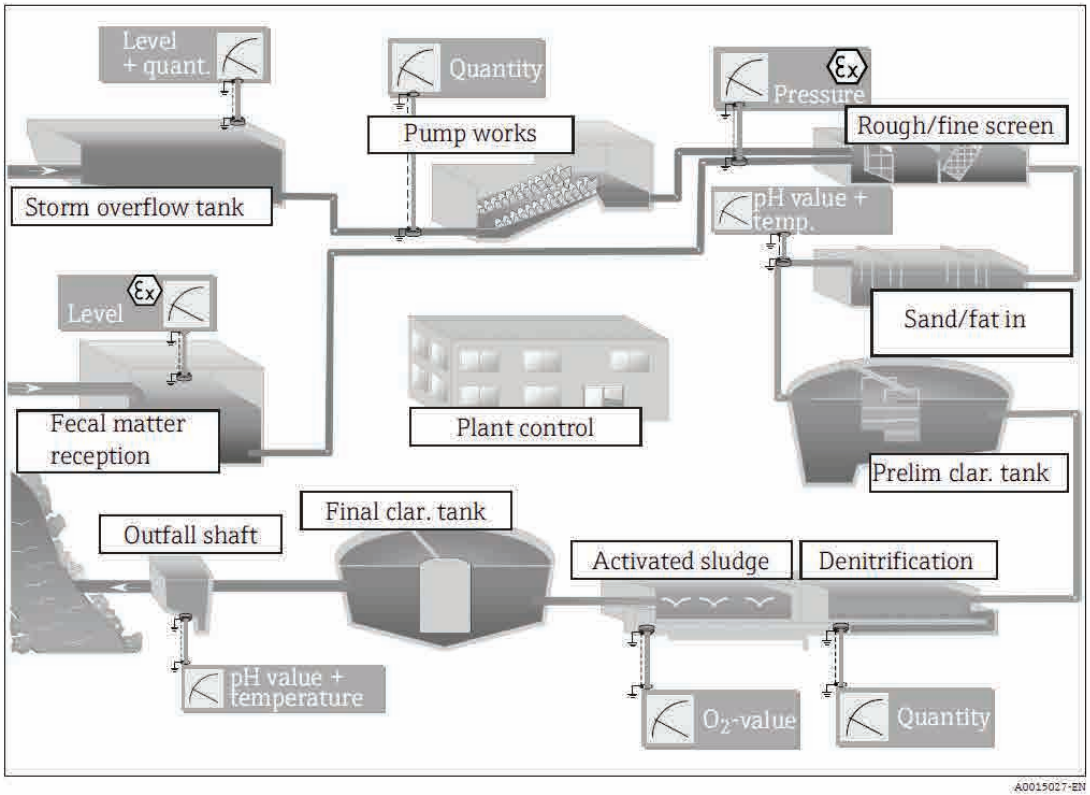
Function The surge arrester is used to protect electronic components from being destroyed. It ensures that overvoltage surges which occur in signal cables (e.g. 4 to 20 mA) and in communication lines (Field buses).

Operation of signal cable protection units: protection steps within the unit guarantee high compatibility with the system to be protected.

Complete product information:
www.my.endress.com/haw569

Application example

Surge protection of various measurement instrumentation seen in the example of a water treatment plant.

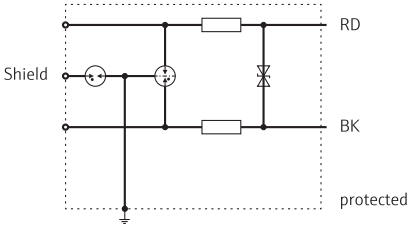


Technical data

Supply voltage	
Nominal voltage	24 V
Maximum continuous voltage	24.5 V AC 34.8 V DC
Current consumption	
Nominal current [I_L]	0.5 A
C2 nominal discharge current [I_n] (8/20) per line	10 kA
C2 nominal discharge current [I_n] (8/20) total	10 kA
C2 nominal discharge current [I_n] (8/20) shielding – PG	20 kA
Nominal discharge current (8/20) L – N [I_n]	–
Total discharge current (8/20) L+N – PE [I_{total}]	–
D1 lightning surge current [I_{imp}] (10/350) line – PG	–
D1 lightning surge current [I_{imp}] (10/350) total	–
Voltage protection level	
Line/line at I_n C2	≤65 V
Line/PG at I_n C2	≤650 V
Shielding/PG at I_n C2	≤650 V
Line/line at 1 kV/µs C3	≤50 V
Line/PG at 1 kV/µs C3	≤500 V
Line/line at 1 kV/µs C3	≤600 V
Capacitance	
Line/line	≤400 pF
Line/PG	≤20 pF
General	
SPD class	Type 2 P1
Limit frequency	14 MHz
Series impedance per line	2.2 Ω
Maximum line side overcurrent protection	–

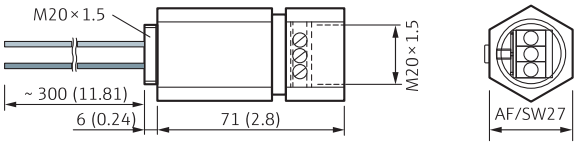
Electrical connection

HAW569-AA2B (non-Ex lead-through version)



Dimensions in mm (inches)

(lead-through version)



Installation according to instruction manual

Price table

Surge Arrester HAW569-AA2B (24 V)			**Price/pcs. in MYR**		
Approval	Housing	Application	1 to 5	6 to 10	>10
Non-Ex	Lead through version	Measuring signal 0/4-20mA,PFM, PROFIBUS PA, FOUNDATION Fieldbus	520.00	494.00	468.00

Prices are exclude GST and valid until 30/09/2017.

Temperature head transmitter for resistance thermometers Pt100

iTemp TMT180

MYR 234
> 10 pcs.

Complete product information:
www.my.endress.com/tmt180

- High level of accuracy over the entire operating temperature range
- Fault signal in the event of sensor break or sensor short circuit,
- Presettable to NAMUR NE 43
- EMC according to IEC 61 326, CE
- Online configuration during operation with SETUP connector
- Customer-specific measuring range setting

Specs at a glance:

- **Input:**
  Pt100
- **Output:**
  4 to 20 mA
- **Accuracy:**
  deviation 0.2 K (Pt100)
- **Measuring ranges:**
  freely programmable, dependent of sensor
- **Installation:**
  suitable for sensor head (form B)

Application PC programmable (PCP) temperature head transmitter for converting a Pt100 input signal into a scalable 4 to 20 mA analog output signal. The measuring range can be configured using PC with using a configuration kit and the ReadWin 2000 operating software which is free-of-charge.

Function The transmitter is designed for the transformation of an RTD Pt100 sensor signal. The iTEMP TMT180 temperature head transmitter is a 2-wire transmitter with an analog output and measurement input for Pt100 in 3-wire connection.

Technical data

Input	
Input signal	Resistance thermometer: Pt100, IEC 60751
Measurement range	Can be set up freely via ReadWin® 2000 configuration software from −200 to +650 °C (−328 to +1202 °F) upon request

Output	
Output signal	Analog 4 to 20 mA
Failure signal	To NAMUR NE 43
Max. load	$(V_{power\ supply} - 10\ V)/0.022\ A$
Input current required	≤3.5 mA
Current limit	≤23 mA
Switch on delay	4 s (during power up $I_a \approx 3.8$ mA)
Response time	1 s

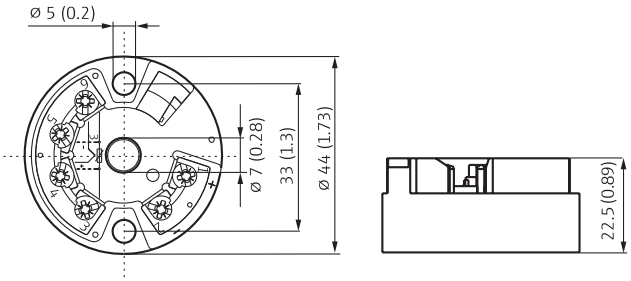
Signal on alarm	
Underranging	Linear drop to 3.8 mA
Overranging	Linear rise to 20.5 mA
Sensor breakage; sensor short circuit [1]	<3.6 mA or >21 mA (if setting is ≥ 21.0 mA an output current ≥ 21.5 mA is guaranteed)

Electrical connection	
Power supply	U_b = 10 to 35 V DC, reverse polarity protection
Allowable ripple	U_{ss} ≤3 V at U_b ≥13 V, f_{max} = 1 kHz
Reference conditions	Calibration temperature 25 °C ±5 K

Accuracy	
Influence of power supply	≤ ±0.01 %/V deviation from 24 V
Load influence	≤ ±0.02 %/100 Ω
Temperature drift	Pt100: $T_d = \pm[(15\ ppm/K \times (\text{measuring range end value} - \text{measuring range start value})) + (50\ ppm/K \times \text{preset measurement range})] \times \Delta\theta$ $\Delta\theta$ = Deviation of ambient temperature according to the reference condition +25 °C ± 5 K (77 °F ± 9 °F)
Measurement accuracy	0.2 K (Pt100)

Application conditions	
Ambient temperature	−40 to +85 °C
Storage temperature	−40 to +100 °C
Climatic class	to EN 60654-1, Class C
Vibration resistance	4 g/2 to 150 Hz to IEC 60 068-2-6
EMC	Interference immunity and interference emission according to IEC 61326 and NAMUR NE 21
Housing	To DIN 50446 form B

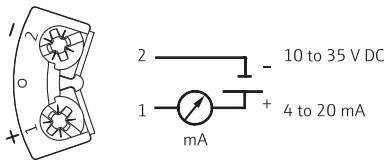
Dimensions in mm (inches)



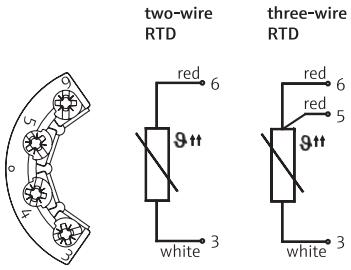
Installation according to operation instructions.

Electrical connection

Power supply and current output



Sensor connection



Price table

Temperature head transmitter iTEMP TMT180-A133ABA (4...20 mA)			Price/pcs. in MYR		
Approval	Housing	Measuring range	1 to 5	6 to 10	> 10
Non-Ex	Standard - DIN mounting set	Can be set up freely via ReadWin® 2000 configuration software from −200 to +650 °C (−328 to +1202 °F) upon request	260.00**	247.00	234.00

**Minimum order quantity: 2 pieces

Prices are exclude GST and valid until 30/09/2017.