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E-direct Catalog 2015

High Quality – Low Price

Endress+Hauser
People for Process Automation

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RID14 / RID16

8-channel field indicator with Foundation fieldbus™ or PROFIBUS® PA
- Bright, backlit LC indicator with bar graph, diagnostic symbols and plain text field
- Listener mode for up to 8 analog channels or digital statuses
- Optional aluminum housing for Ex applications

Page 114

$ 949.00
at 11+ pcs.

RID16

RID14

RIA45

Digital Indicator
- 5-digit LCD including bargraph and color alteration
- 1 or 2 channel device with mathematical functionalities
- Intrinsically safe universal inputs
- Wide range power supply
- Linearization, differential pressure calculation
- Log function / memory for alarms as well as for minimum/maximum values

Page 108

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Ecograph T RSG35

Universal Data Manager
- Web server for device configuration and display of measured value curves
- Up to 12 universal inputs, six digital inputs
- 4 mathematics channels

Page 104

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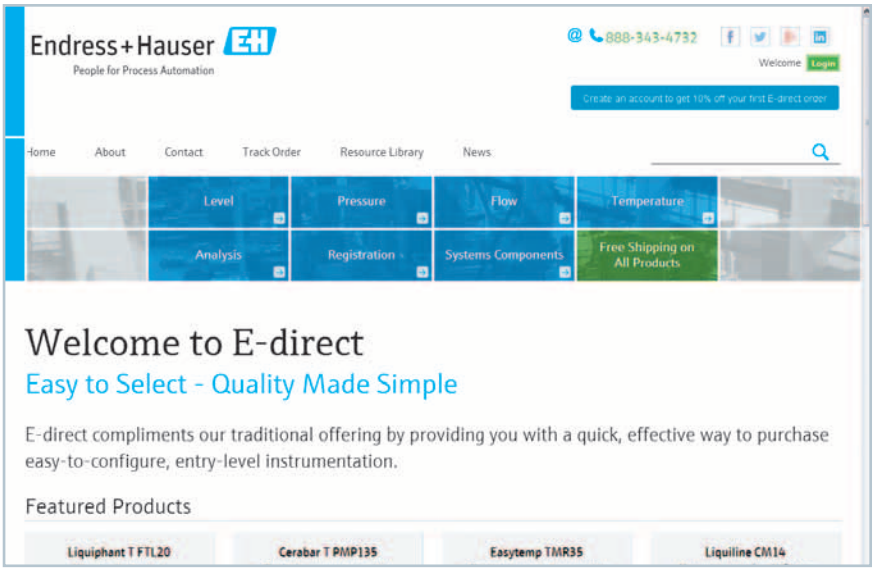
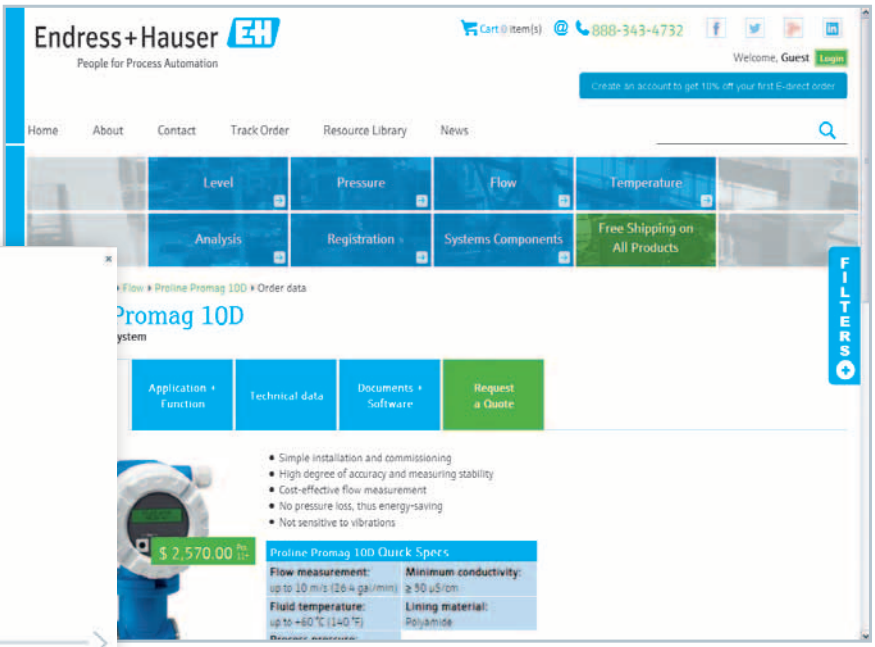


The advantages of online shopping at www.e-direct.us allow you to order safely and fast – saving you time and money. Benefit from the advantages of an online order at E-direct today.



Product details

360° product view
- All product details
- Complete rotation around the product's axis

At a glance
- Important technical data
- Options
- Application limits

Choosing options – made easy
- Pre-configured device options for easy selection
- Differences between devices are clearly displayed
- Easy selection of additional product parameters

Fast and easy order
- Create and save product lists for repeating orders
- Reference numbers allow for a clear identification in your ERP system

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Level

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Registration

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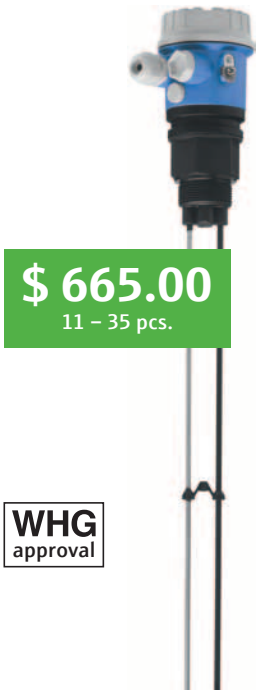
Order form

Two-rod capacitive probe for continuous level measurement in liquids

Liquicap T FMI21



$ 665.00
11 – 35 pcs.

WHG approval

- No calibration needed
- Corrosion resistant materials (carbon fiber, stainless steel)
- Safe operation - regardless of tank geometry

Specs at a glance:

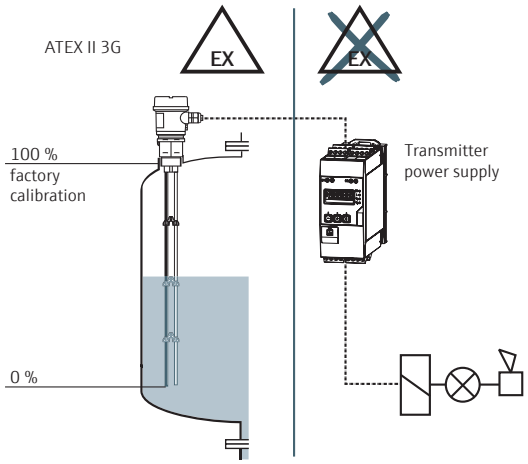
- **Product:** Conductive liquids as of 30 µS/cm
- **Probe length:** 150 to 2500 mm (6 to 98")
- **Process pressure:** –14.5 to 145 psi (–1 to +10 bar)
- **Approval:** ATEX II 3G EEx nA IIC T6
- **Product temperature:** –40 to +212 °F (–40 to +100 °C)
- **Viscosity:** Max. 2000 cSt

Application The Liquicap T FMI21 sensor is used in conductive liquids for continuous level measurement. The Liquicap T FMI21 is particularly suited to small measuring tanks and works independently of the tank's shape or material (plastic, stainless steel, concrete...).
It is resistant to aggressive liquids like acids or alkalis.

Function The probe and medium form an electric capacitor. If the probe is in air, a certain low initial capacitance is measured. When the tank is filled, the capacitance increases the more the probe is covered. The electronic insert of the probe converts the capacitance measured to a 4 to 20 mA signal in proportion to the level.

Complete product information:
www.e-direct.us/fmi21

Application example



The measuring system consists of:
- The Liquicap T FMI21 capacitance probe (the probe rods should never be in contact with the tank) with
- Electronic insert FEI20
- Display and housing cover (optional)
- A transmitter power supply unit RN221N, RMA42, RTA421, RIA45/RIA46 or RIA452

Technical data

Input	
Maximum viscosity	2000 cSt
Measuring range	0 pF to 2000 pF
Probe length	150 to 2500 mm (5.9 to 98.43")
Permitted span	ΔC = 10 pF to 2000 pF
Measuring frequency	250 kHz
Input signal	Probes covered → high capacitance Probes exposed → low capacitance

Output (electronic insert FEI20 / 4 to 20mA)	
Output signal	3.8 to 20.5 mA
Switch-on current	max. 20 mA (<500 ms)
Signal on alarm	>21 mA

Power supply	
Connection voltage	U = 10 to 30 V DC, reverse polarity
Power consumption	P <0.7 W
Current consumption	I <22 mA
Cable entries	M20 × 1.5 (screw connection)

Performance characteristics (with installed electronic insert)	
Reference operating conditions	Ambient temperature 74 °F (23 °C), atmospheric pressure, probe installation vertical from above
Max. measured error	≤1 % of full scale value
Repeatability	0.25 % of full scale value
Start-up settling time	<2 s
Influence of ambient temperature	<0.01 %/K (−40 to +158 °F/−40 to +70 °C) probe length 1 m
Integration time	1 s
Calibration	In an installed state, recalibration is only necessary if: – the 0 % and 100 % value should be adjusted to suit customer specifications – after the probe rods have been shortened

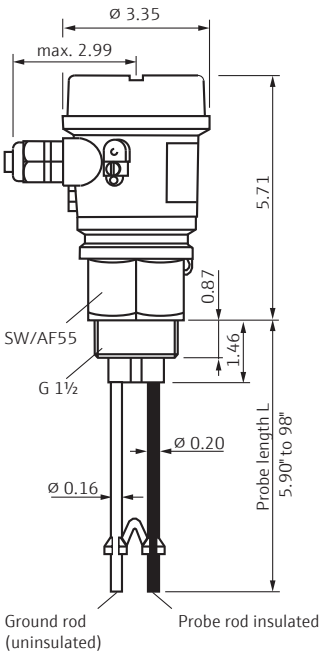
Operating conditions	
Ambient temperature	−40 to +158°F (−40 to +70 °C)
Storage temperature	-40 to +176°F (-40 to +80 °C)
Climate class	Tropicalized as per DIN IEC 68 Part 2-38
Degree of protection	IP 66
Shock resistance	DIN EN 60068-2-27/IEC 68-2-27: 30g
Vibration resistance	DIN EN 60068-2-64/IEC 68-2-64: 20 to 2000 Hz, 1 $(m/s^2)^2$ /Hz (with min. rod length 150 mm)
EMC	Interference emission to EN 61326, electrical equipment class B; Interference immunity to EN 61326, annex A (industrial)
Conductivity of medium	≥30 µS/cm
Process pressure	−14.5 to 145 psi (−1 to +10 bar)
Process temperature	−40 to +212 °F (−40 to +100 °C)
Lateral loading capacity	2 Nm

Materials in contact with medium	
Probe rods	Rod: 1.4404/316L; Optional: carbon fiber CFC; Sealing ring: EPDM; Insulation: PP; Spacer: PP
Process connections	G 1½ A (PPS, DIN ISO 228/I)
Seals	Sealing ring for process connection G 1½ A: Elastomer fiber asbestos-free (resistant to oils, solvents, steam, weak acids and alkalis)

Display	
Green LED	operational status (slow flashing), calibration status (fast flashing)
Red LED	for key enter validation (short flashing), alarm or warning (flashing)
Display for measured value in %	optional

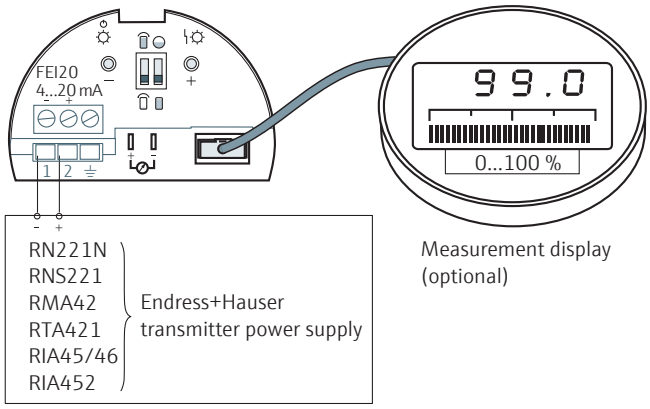
Approvals	
WHG approval	Overspill protection to §19 WHG (Germany)
Ex approval	ATEX II 3G EEx nA IIC T6

Dimensions (in inches) and materials



Installation according to instruction manual.

Electrical connection



Price table

Liquicap T FMI21				Order no.	Price/pcs. in USD		
Zone	Probe rod	Display	Length (inch)		1 to 5	6 to 10	11 to 35
CSA General Purpose, CSA C/US	316L, L = 6" to 40"	With		*	FMI21-D2E2C2	806.00	750.00	709.00
	316L, L = 40" to 100"	With		*	FMI21-D2F2C2	756.00	703.00	665.00

* Please specify sensor length.

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/fmi21

More products to complete your measuring point ...


Process transmitter
RMA42
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Pressure transmitter
Cerabar T PMC131
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Compact thermometer
Easytemp TMR31
page 75

Compact vibronic point level switch for liquids

Liquiphant T FTL20

Complete product information:
www.e-direct.us/ftl20

- 38 mm (1.5") fork/1.4435/316L
- Overspill protection and leakage detection
- AC, DC or AS-i bus connection

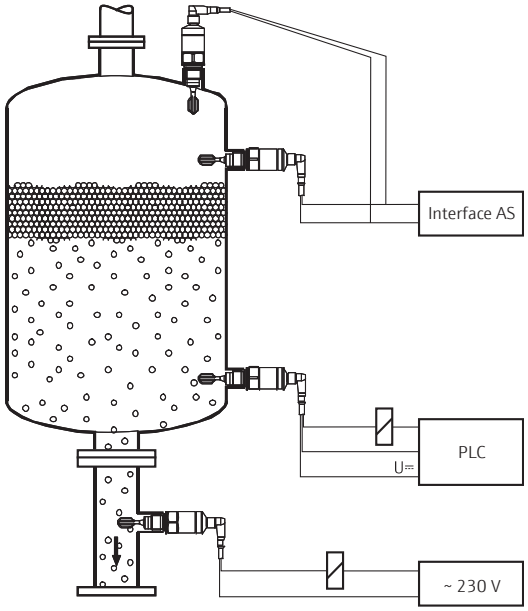
Specs at a glance:

- **Product:**
  Liquids
- **Mounting:**
  Vessels or pipes from DN25
- **Product density:**
  ≥0.7 g/cm³ (0.7 SGU)
- **Product temperature:**
  -40 to +212 °F/+300 °F
  (-40 to +100 °C/+150 °C)
- **Product viscosity:**
  ≤10000 mm²/s (10000 cSt)
- **Process pressure:**
  Max. 580 psi (40 bar)

Application Liquiphant T FTL20 is a reliable point level switch for liquids. Its 38 mm (1.5") fork and its small process connections enable mounting it also in tanks as in very narrow pipes for example as pump protection. The FTL20 is unaffected by build up, bubbles or turbulence and does not rely upon the electrical properties of the liquid.

Function The integrated electronics detect the change in the fork's vibrating frequency when they are covered and uncovered by the liquid. FTL20 can be directly connected to AS-i bus, alternating voltage or to a PLC.

Application example



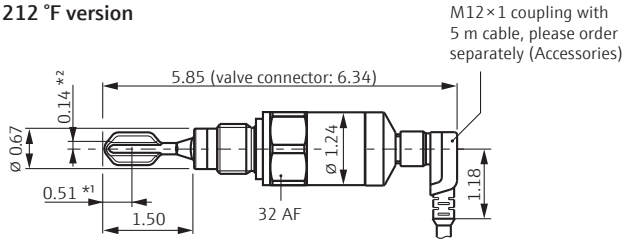
Liquiphant T FTL20: programmable logic controller (PLC), relay, solenoid valve or AS-i bus

Technical data

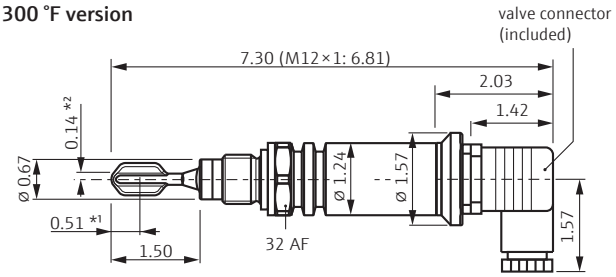
Output AC version	
Power supply	19 to 253 V AC, 50/60 Hz
Connectable load	250 mA (load is checked automatically when connected)
Current consumption	Max. 3.8 mA
Electrical connection	Valve connector
Output DC version	
Power supply	10 to 35 V DC
Connectable load	250 mA (overload resistant)
Current consumption	Max. 15 mA
Electrical connection	Valve connector or M12 × 1
Power supply	
Power supply	24,5 to 31 V DC
Connectable load	To EN 50295
Current consumption	Max. 25 mA
Electrical connection	M12 × 1
Output general	
Switching time	Approx. 0.5 s when covered; approx. 1.0 s when free
Hysteresis	Approx. 2 mm (0.08") with vertical mounting from top
Process connection	G ½", G ¾", G 1" (only with 150 °C / 300 °F)
Operating conditions	
Orientation	As required
Switch point	Vertical installation: 13 mm (0.51") horizontal installation: 3.5 mm (0.14")
Ambient temperature	-40 to +158 °F (-40 to +70 °C), AS-i bus -13 to +158 °F (-25 to +70 °C)
Temperature of product	-40 to +212 °F (-40 to +100 °C), optional +300 °F (+150 °C)
Operating pressure	-14.5 to +580 psi (-1 to +40 bar)
Storage temperature	-40 to +185 °F (-40 to +85 °C)
Climatic protection	IEC 68, part 2-38
Density of product	Min. 0.7 g/cm³ (0.7 SGU)
Viscosity of product	Up to 10000 mm²/s (cSt)
Ingress protection (EN 60529)	IP 65; with connector M12 × 1: IP 67
EMC	Interference emission to EN 61326 Class B; interference immunity to EN 61326 Annex A (industrial) NAMUR NE 21; AS-i to EN 50295
Approvals	
WHG approval	Overspill protection to § 19 WHG (Germany)
Leakage	

Dimensions (in inches)

212 °F version

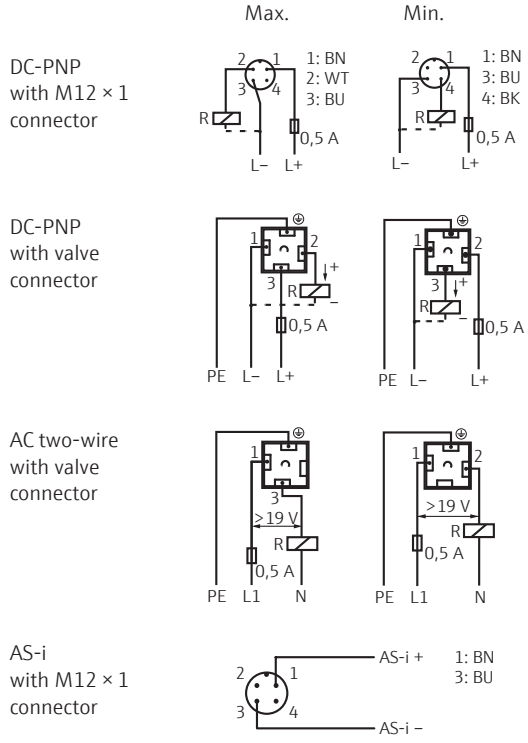


300 °F version



*1 Switch point with vertical installation
*2 Switch point with horizontal installation
Installation according to instruction manual

Electrical connection



Price table

Liquiphant FTL20			Order no.	Price/pcs. in USD		
Switch Output	Application; Cable Entry	Process Connection		1 to 5	6 to 10	11 to 35
2-wire 19-253 V AC	100 °C; plug ISO4400 NPT½, IP65	Thread ISO228 G¾, 316L*	FTL20-3114	174.00	162.00	153.00
		Thread ANSI NPT½, 316L	FTL20-3214	174.00	162.00	153.00
		Thread ANSI NPT¾, 316L	FTL20-3314	174.00	162.00	153.00
3-wire PNP 10-35 V DC	100 °C; plug ISO4400 NPT½, IP65	Thread ISO228 G¾, 316L*	FTL20-3124	174.00	162.00	153.00
		Thread ANSI NPT½, 316L	FTL20-3224	174.00	162.00	153.00
		Thread ANSI NPT¾, 316L	FTL20-3324	174.00	162.00	153.00
	100 °C; plug M12**, IP67	Thread ISO228 G¾, 316L*	FTL20-3125	174.00	162.00	153.00
		Thread ANSI NPT½, 316L	FTL20-3225	174.00	162.00	153.00
		Thread ANSI NPT¾, 316L	FTL20-3325	174.00	162.00	153.00

* Please order accessory weld-in adapter separately.
** Please order cable and plug separately

Accessories	Order no.	Price/pcs. in USD
Socket wrench 32AF	52010156	14.95
Cable 4 × 0.34, box M12, Cu Sn/Ni, 90°, L = 5 m M12 socket for plug. 5 m cable PVC, Cu Sn/Ni lock.	52010285	14.95
Weld-in adapter G¾ d=50, 316L, 3.1	52018765	59.27

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ftl20

More products to complete your measuring point ...

Capacitive probe
Liquicap T FMI21
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Pressure switch
Ceraphant T PTC31
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Paperless recorder
Ecograph T RSG35
page 104

Hygienic vibronic point level switch for liquids

Liquiphant T FTL20H

Complete product information:
www.e-direct.us/ftl20h

- Suitable for hygienic applications
- IP 69K protection
- External test possible using test magnet

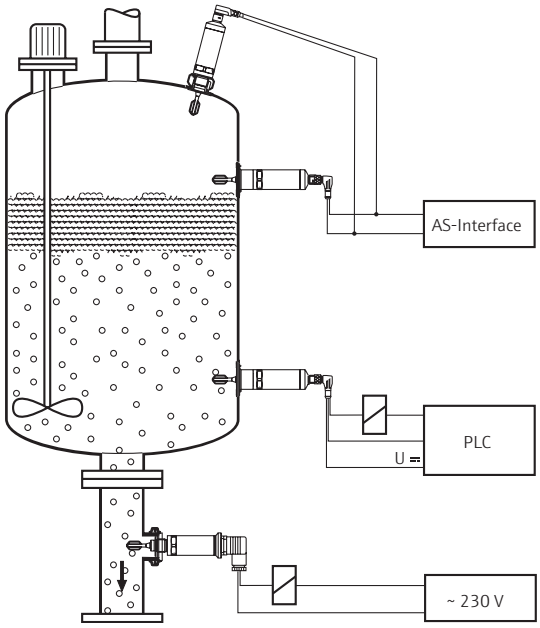
Specs at a glance:

- **Product:**
  Liquids
- **Mounting:**
  Vessels or pipes (from DN25)
- **Product density:**
  ≥0.7 g/cm³ (0.7 SGU)
- **Product temperature:**
  -40 to +300 °F (-40 to +150 °C)
- **Product viscosity:**
  ≤10000 mm²/s (10000 cSt)
- **Process pressure:**
  -14.5 to 580 psi (-1 to +40 bar)

Application Liquiphant T FTL20H is a reliable point level switch for liquids. Its 38 mm (1.5") fork and its small process connections enable mounting it also in tanks as in very narrow pipes for example as pump protection which have to meet particularly high hygienic standards internally and externally. The FTL20H is unaffected by build up, bubbles or turbulence and does not rely upon the electrical properties of the liquid.

Function The integrated electronics detect the change in the fork's vibrating frequency when they are covered and uncovered by the liquid. FTL20H can be directly connected to AS-i bus, alternating voltage or to a PLC.

Application example



Liquiphant T FTL20H: programmable logic controller (PLC), relay, solenoid valve or AS-i bus

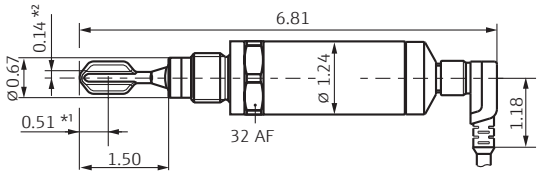
Technical data

Output AC version	
Power supply	19 to 253 V AC, 50/60 Hz
Connectable load	Max.250 mA (load is checked automatically when connected)
Current consumption	Max. 3.8 mA
Electrical connection	Valve connector
Output DC version	
Power supply	10 to 35 V DC
Connectable load	Max. 250 mA
Current consumption	Max. 15 mA
Electrical connection	Valve connector or M12 × 1
AS-i bus	
Power supply	24.5 to 31 V DC
Connectable load	To EN 50295
Current consumption	Max. 25 mA
Electrical connection	M12 × 1
Output general	
Switching time	Approx. 0.5 s when covered; approx. 1.0 s when free
Hysteresis	3 ±0.5 mm (0.12" ±0.02") vertical from top
Process connection	G ¾" flush mounted (for welding 52018765); G 1" flush mounted (for welding 52001051); TRI-CLAMP® ISO 2852 DN40-51 (2"); DIN 11851 DN25 PN40; DIN 11851 DN32 PN40
Operating conditions	
Orientation	As required
Switch point	Vertical orientation: 13 mm (0.51"); horizontal orientation: 3.5 mm (0.14")
Ambient temperature	-40 to +158 °F (-40 to +70 °C)
Temperature of product	-40 to +300 °F (-40 to +150 °C)
Operating pressure	-14.5 to +580 psi (-1 to +40 bar)
Storage temperature	-40 to +185 °F (-40 to +85 °C)
Density of product	Min. 0.7 g/cm³(0.7 SGU)
Viscosity of product	Up to 10000 mm²/s (cSt)
Protection (EN 60529)	IP 65 with valve connector; IP 66/67 with M12 × 1 connector; IP 69K with M12 × 1 metal
Climatic protection	IEC 68, part 2-38
EMC	Interference emission to EN 61326 Class B; interference immunity to EN 61326 Annex A (industrial) NAMUR NE 21; AS-i to EN 50295
Approvals	
WHG approval	Overspill protection to §19 WHG (Germany)
EHEDG	

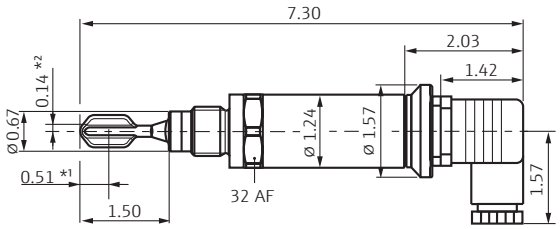
Dimensions (in inches)

General

M12×1



Valve plug

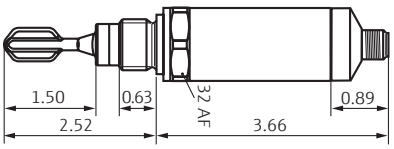


*1 Switch point with vertical installation
*2 Switch point with horizontal installation

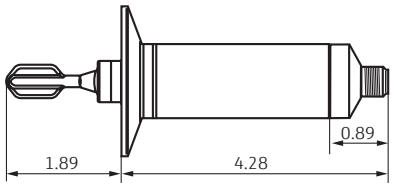
Installation according to instruction manual

Process connections

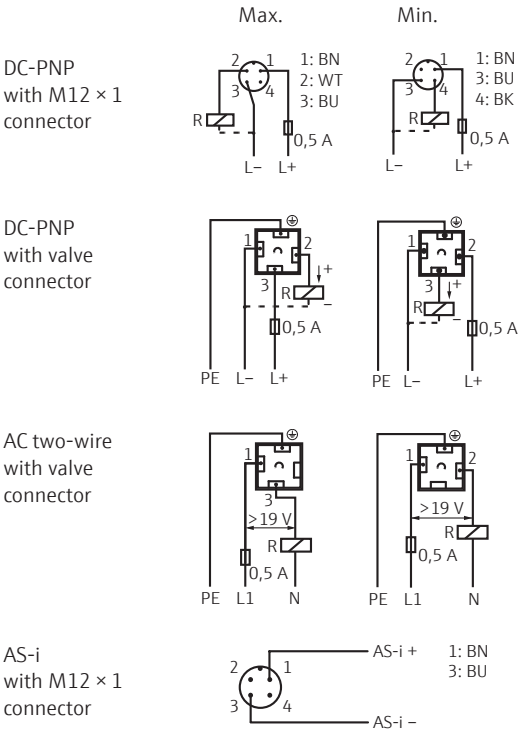
G ¾ (DIN ISO 228/I)



Tri-Clamp (ISO 2852)



Electrical connection



Price table

Liquiphant FTL20H			Order no.	Price/pcs. in USD		
Switch Output	Application; Cable Entry	Process Connection		1 to 5	6 to 10	11 to 35
2-wire 19-253 V AC	150 °C; plug ISO4400 NPT½, IP65	Tri-Clamp ISO2852 DN25-38 (1...1½"), 316L	FTL20H-3TCJ1C	320.00	298.00	282.00
		Tri-Clamp ISO2852 DN40-51 (2"), 316L	FTL20H-3TDJ1C	320.00	298.00	282.00
3-wire PNP 10-35 V DC	150 °C; plug ISO4400 NPT½, IP65	Tri-Clamp ISO2852 DN25-38 (1...1½"), 316L	FTL20H-3TCJ2C	320.00	298.00	282.00
		Tri-Clamp ISO2852 DN40-51 (2"), 316L	FTL20H-3TDJ2C	320.00	298.00	282.00
	150 °C; plug M12**, IP69K	Thread ISO228 G¾, 316L *	FTL20H-3GDJ2F	291.00	270.00	256.00
		Tri-Clamp ISO2852 DN25-38 (1...1½"), 316L	FTL20H-3TCJ2F	348.00	324.00	306.00
		Tri-Clamp ISO2852 DN40-51 (2"), 316L	FTL20H-3TDJ2F	348.00	324.00	306.00

* Please order accessory weld-in adapter separately. ** Please order cable and plug separately

Accessories	Order no.	Price/pcs. in USD
Socket wrench 32AF	52010156	14.95
Cable 4 × 0.34, box M12, Cu Sn/Ni, 90°, L = 5 m M12 socket for plug. 5 m cable PVC, Cu Sn/Ni lock.	52010285	14.95
Weld-in adapter G¾ d=50, 316L, 3.1	52018765	59.27

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ftl20h

More products to complete your measuring point ...

Pressure transmitter
Cerabar T PMP135
page 54

Temperature switch
Thermophant T TTR35
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Compact thermometer
Easytemp TMR35
page 78

Compact universal limit switch for liquids

Liquiphant T FTL260

Complete product information:
www.e-direct.us/ftl260

- Maintenance-free
- Stainless steel (fork 1.4571, housing 1.4404)
- Unaffected by build-up, turbulences and gas bubbles

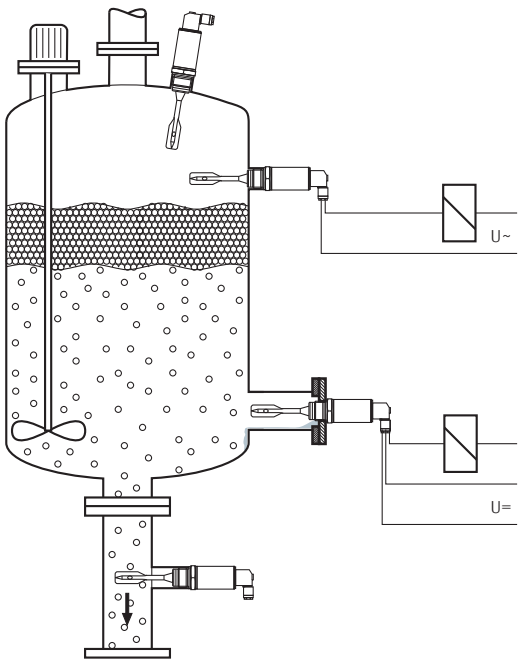
Specs at a glance:

- **Product:**
  Liquids
- **Mounting:**
  Vessels or pipes (from DN50)
- **Product density:**
  ≥0.7 g/cm³ (0.7 SGU)
- **Product temperature:**
  -40 to +300 °F (-40 to +150 °C)
- **Product viscosity:**
  ≤10000 mm²/s (10000 cSt)
- **Process pressure:**
  -14.5 to +580 psi
  (-1 to +40 bar)

Application The Liquiphant T FTL260 is a reliable point level switch for liquids. It can be used in tanks and pipes as pump protection and as an alternative to float switches in storage vessels. The FTL260 is unaffected by build-up, turbulence and gases and does not rely upon the electrical properties of the liquid.

Function The integrated electronics detect the change in the fork's vibrating frequency when they are covered and uncovered by the liquid. The FTL260 can be directly connected to miniature contactors, solenoid valves or to a PLC.

Application example



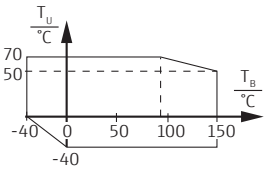
Liquiphant T FTL260: programmable logic controller (PLC), relay, solenoid valve or AS-i bus

Technical data

Output AC version	
Power supply	19 to 253 V AC, 50/60 Hz when blocked
Current consumption	Max. 4 mA (stand-by)
Connectable load	Short-term (40 ms): max. 1.5 A, max. 375 VA at 250 V or max. 36 VA at 24 V (no short-circuit protection); continuous: max. 87 VA at 250 V, max. 8.4 VA at 24 V, min 2.5 VA at 250 V (10 mA), min. 0.5 VA at 24 V (20 mA)
Voltage drop	Across FTL260 max. 12 V
Residual current	Max. 4 mA with open thyristor (stand-by)
Output DC version	
Power supply	10 to 55 V, ripple max. 1.7 V, 0 to 400 Hz
Current consumption	Max. 15 mA, reverse polarity protection
Connectable load	Short-term (1s): max. 1 A, max. 55 V (overload and short-circuit protection); continuous: max. 350 mA
Residual voltage	<3 V (with closed transistor)
Residual current	<0.1 mA (with open transistor)
Operating conditions	
Hysteresis	Approx. 4 mm with vertical mounting from top
Orientation	As required
Ambient temperature	-40 to +158 °F (-40 to +70 °C)
Temperature of product	-40 to +300 °F (-40 to +150 °C)
Operating pressure	-14.5 to +580 psi (-1 to +40 bar)
Density of product	Min. 0.7 g/cm³ (0.7 SGU)
Viscosity of product	Up to 10000 mm²/s (cSt)
Storage temperature	-40 to +185 °F (-40 to +85 °C)
Climatic protection	To IEC 68, part 2-38
Ingress protection	With plug IP 67 with cable (5 m/16 ft) IP 68
General	
Fail-safe mode	Minimum or maximum fail-safe mode, depending on load connection, FTL260/AC never connect without load (contacters, relays etc.)
Power failure	Output closed
Weight	Approx. 0.45 kg (0.99 lbs)
Standard	4-pole plug connection to DIN 43650-A, ISO 4400 with cable gland PG 11, for cable diameters from 6 up to 9 mm (0.24 to 0.35"), max. wire cross section 1.5 mm²
With cable	5 m (16 ft) permanently att. cable, 4 × 0.75 mm²
Switching time	Approx. 0.5 s when covered; 1.0 s when free
Approvals	
WHG approval	Overspill protection to §19 WHG (Germany)

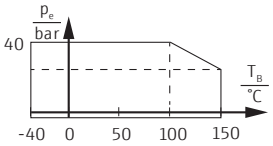
Permissible values for temperature and pressure

Ambient temperature



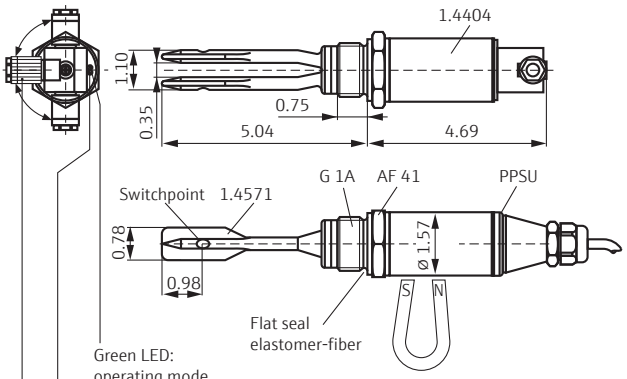
Permissible values for ambient temperature T_U at housing are dependent on the operating temperature T_B in the tank

Operating pressure



Permissible values for operating pressure P_e are dependent on the operating temperature T_B in the tank

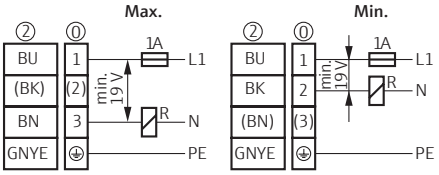
Dimensions (in inches) and material



Installation according to instruction manual

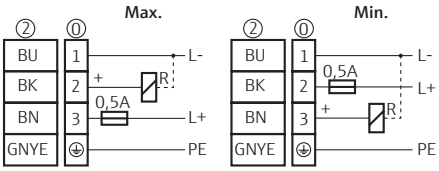
Electrical connection

AC version



FTL260/AC never connect without load!

DC version



Positive signal at the switching output of Liquiphant (PNP)

Max. = maximum safety circuit

Min. = minimum safety circuit

② = cable connection

BU = blue
BK = black
BN = brown
GNYE = green/yellow

⓪ = plug connection

R = external load

Price table

Liquiphant FTL260		Order no.	Price/pcs. in USD		
Cable Entry	Switch Output		1 to 5	6 to 10	11 to 35
Plug ISO4400 NPT½, NEMA4X	2-wire 19-253 V AC	FTL260-3114	341.00	318.00	300.00
	3-wire PNP 10-55 V DC	FTL260-3124	341.00	318.00	300.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ftl260

More products to complete your measuring point ...

Vibronic limit switch
Soliphant T FTM20
page 30

Temperature switch
Thermophant T TTR31
page 69

Digital indicator
RIA46
page 108

Conductivity point level switch for multiple point detection

Liquipoint T FTW31 / FTW32

Complete product information:
www.e-direct.us/ftw31-ftw32

- Detect up to five level limits with one probe
- Flexible instrumentation (compact/ separate)
- No moving parts

Specs at a glance:

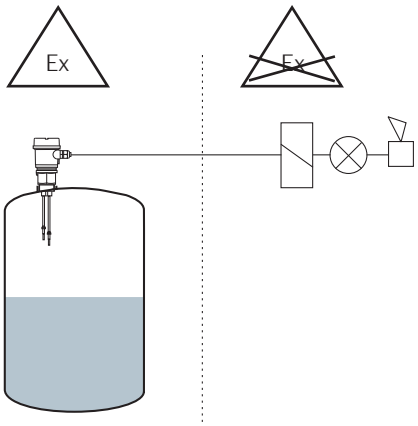
- **Product:** liquids as of 10 µS/cm
- **Approval:** ATEX II 2G EEx ia
- **Measuring points:** up to 4 measuring points with 5 rods or ropes
- **Product temperature:** -40 to + 212 °F (-40 to +100 °C)
- **Process pressure:** -14.5 to +145 psi (-1 to +10 bar)

Application Liquipoint T sensors are used in conductive liquids for determining point levels. Depending on the number of measuring points, measuring tasks such as overspill protection, dry running protection, two-point control of pumps or multiple point detection can be implemented within an existing process connection.

Function An alternating voltage exists between the rod probes in an empty tank. As soon as the conductive liquid in the tank creates a connection between the ground rod probe and the maximum rod probe, for example, a measurable current flows and the Liquipoint T switches. By using alternating voltage, corrosion of the probe ends and electrolytic destruction of the product is avoided. As the system is designed as a closed potential-free circuit between the probe rods and the electronics, the materials used in the tank walls is unimportant and there is no danger if the probe rods are touched during operation.

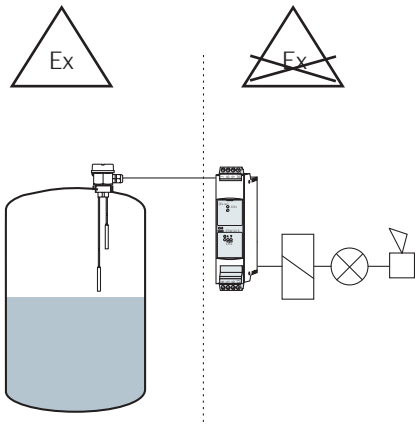
Application example

Probes with integrated electronic insert (compact instrument version)



The measuring system consists of:
- FTW31, FTW32 with two/three rods or ropes and an electronic insert
- Control units, switches or signal transmitters, e.g. process control systems PLC, relays or NAMUR isolating amplifier according to IEC 60947-5-6

Probes without integrated electronic insert (separate instrument version)



The measuring system consists of:
- FTW31, FTW32 with two to five rods or ropes
- Nivotester FTW325 or FTW470 Z
- Control units, switches or signal transmitters, e.g. process control systems PLC, relays, etc.

The number of Nivotester depends on the number of measuring points (e.g. 4 measuring points with 2 Nivotester FTW).

Technical data

General	
Version	**Compact version:** two/three (Always ΔS-mode – only three rod-/rope versions) rods or ropes; **Separate version** (With integrated line monitoring – in combination with level limit switch FTW325): two/three/five rods or ropes
Sensor length	Rod: 100 to 4000 mm (4" to 157"); rope: 250 to 15000 mm (10" to 590")
Minimum conductivity	≥10 µS/cm
Cable specification	Use standard cable (25 Ω per core)

Operating conditions	
Medium temp.	-40 to +212 °F (-40 to +100 °C)
Ambient temp.	-40 to +158 °F (-40 to +70 °C)
Pressure	-14.5 to +145 psi (-1 to +10 bar)
Ingress Protection	IP 66
Process connection	G 1½"

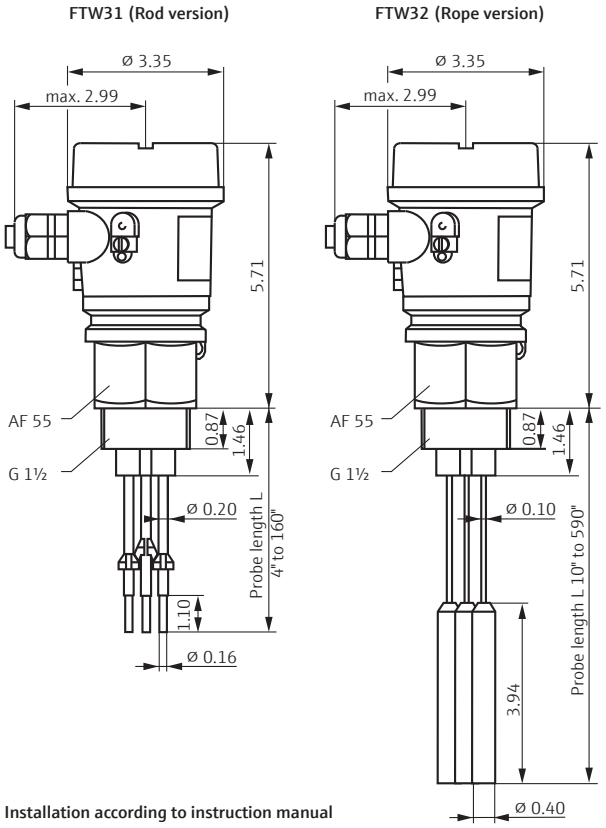
Material	
Electrodes	Rods: 1.4404 (316L)/insulation: PP; ropes: 1.4571 (316TI)/insulation: FEP; weight: 1.4435 (316L)
Process connection	PPS
Housing F16	For compact instrument version; housing: PBT; hat: PPS; adapter: PBT
Housing F24	For separate instrument version; housing: PPS; hat: PBT

Approvals (Compact instrument version)	
Ex approval	ATEX II 2G EEx ia IIC T6 with FEW58
WHG approval	WHG Z-65.40-360 (DIBt)

Approvals (Separate instrument version)	
Ex approval	ATEX II 2G EEx ia IIC T6

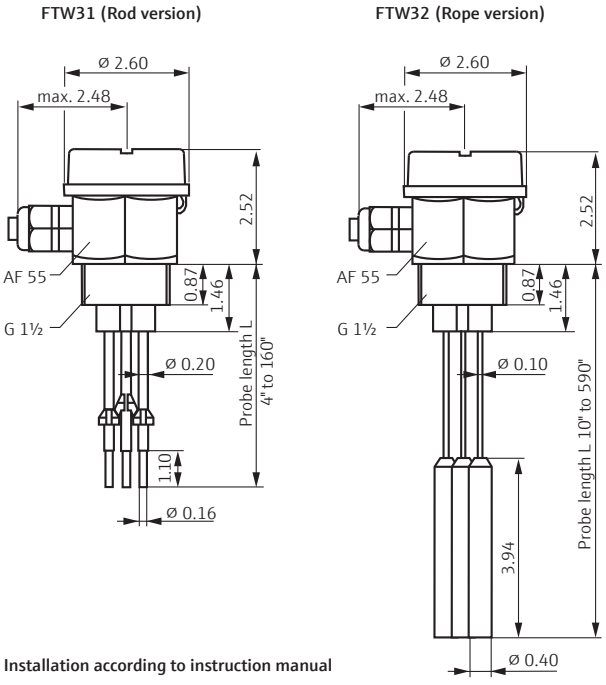
Dimensions (in inches)

Rod and rope version with G 1½"
(compact instrument version with electronic insert)



Installation according to instruction manual

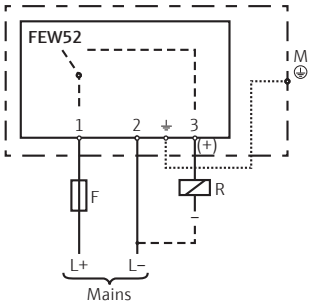
Rod and rope version with G 1½"
(separate instrument version without electronic insert)



Installation according to instruction manual

Electrical connection – Probes with electronic insert (compact instrument version)

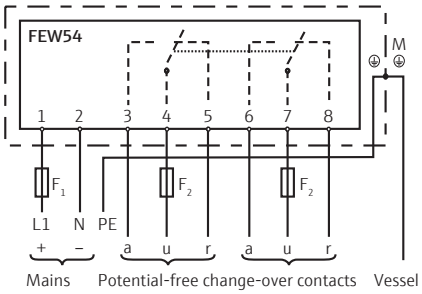
Electronic insert FEW52	
Supply voltage	U = 10.8 to 45 V DC
Current consumption	Max. 25 mA
Load connection	Open collector; PNP
Switching voltage	Max. 45 V
Connectable load	Temporary (max. 1 sec): max. 2 A Continuous: max. 200 mA
Protected against reverse polarity	Yes



Connecting the FEW52 electronic insert

F: Fine-wire fuse, dependent on connected load
R: Connected load, e.g. PLC, PLS, relay
M: Ground connection to protective earth (PE)

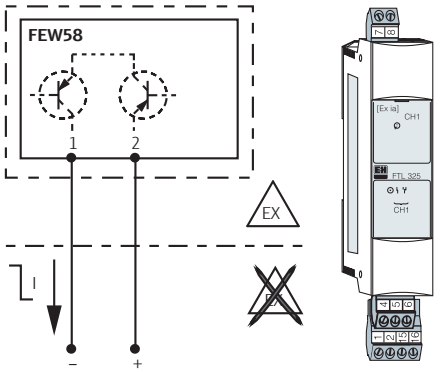
Electronic insert FEW54	
Supply voltage	20 to 55 V DC or 20 to 253 V AC, 50/60 Hz
Current consumption	60 mA
Peak inrush current	Max. 2 A, max. 400 µs
Pulse frequency	Approx. 1.5 s
Output	Two potential-free changeover contacts (DPDT)
Contact load capacity	U~ max. 253 V, I~ max. 4 A, U = 30 V/4 A; 150 V/ 0.2 A
Power consumption	<2.0 W



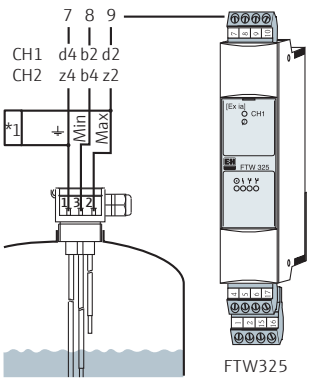
Connecting the FEW52 electronic insert

F1: Fine-wire fuse, 200 mA, semi-time lag
F2: Fine-wire fuse to protect the relay contact, load-dependent
M: Ground connection to PE (protective earth)

Electronic insert FEW58
Supply voltage see Technical data of connected isolating amplifier according to IEC 60947-5-6 (NAMUR).
Use with a separate contactor according to IEC 60947-5-6 (NAMUR); output signal leap of high to low electricity on limit (H-L-flank).
Two-wire signal transfer: H-L-edge 2.2 to 6.5 mA/0.4 to 1.0 mA
Output signal of damaged sensor: <1.0 mA
On access to a multiplexer the cycle time is to adjust on min. 2 sec.



Electrical connection – Probes without integrated electronic insert (separate-instrument version)



For evaluation one or more FTW325 processor units are needed.
Separate instrumentation for three-rod- or rope-probes with cable monitoring.
*1 = Printed circuit board for cable monitoring

Price table

Liquipoint T FTW31			Order no.	Price/pcs. in USD		
Approval	Electronics; Output	Sensing Point		1 to 5	6 to 10	11 to 35
Non-hazardous area	Separate instrumentation	3 × rod, 316L	FTW31-A2A3EB0A	197.00	184.00	174.00
		5 × rod, 316L	FTW31-A2A5EB0A	223.00	208.00	196.00
	FEW54; relay 20-253VAC; 20-55VDC	3 × rod, 316L	FTW31-A2A3EB4A	320.00	298.00	282.00

Liquipoint T FTW32			Order no.	Price/pcs. in USD		
Approval	Electronics; Output	Sensing Point		1 to 5	6 to 10	11 to 35
Non-hazardous area	Separate instrumentation	2 × rope, 316Ti	FTW32-A2D2EB0A	179.00	167.00	158.00
		5 × rope, 316Ti	FTW32-A2D5EB0A	399.00	371.00	351.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ftw31-ftw32

More products to complete your measuring point ...

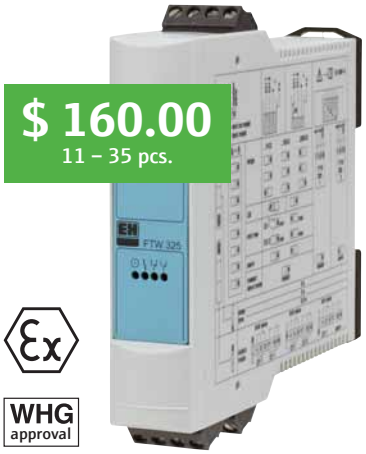
Capacitive probe
Liquicap T FMI21
page 8

Switching unit
Nivotester FTW325
page 24

Temperature switch
Thermophant T TTR31
page 69

Conductivity point level switch for multiple point detection

Nivotester FTW325



$ 160.00
11 – 35 pcs.

WHG approval

Complete product information:
www.e-direct.us/ftw325

- Easy wiring with terminal blocks
- Configurable sensitivity range
- Intrinsically safe signal circuit EEx ia IIC for using sensors in hazardous areas

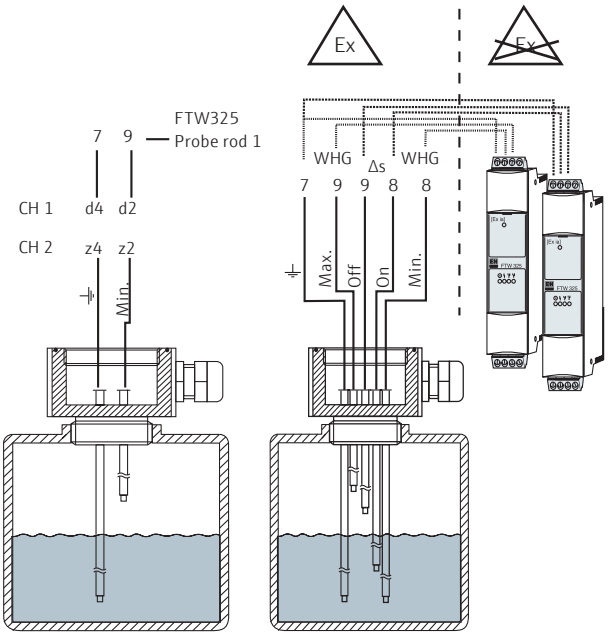
Specs at a glance:

- **Product:**
  Liquids as of 5 µS/cm
- **Approval:**
  ATEX II (1) GD EEx ia
- **Feeding sensors:**
  Conductive rod or rope sensors

Application The Nivotester FTW325 can be used for overspill protection (WHG), pump dry running protection or as a two-point control for pumps. Sensors such as the Liquipoint T FTW31/FTW32 can be connected to the FTW325. Multipoint detection for up to five measuring points is possible by using 3 Nivotester FTW325s.

Function The intrinsically safe signal input of the limit switch Nivotester FTW325 is galvanically isolated from the mains and the output. The Nivotester supplies the conductivity probes with an alternating current via a two or three-wire line and monitors its voltage. If the product reaches the switch point of the probe, the voltage between the probe and Nivotester is reduced. The output relays at the Nivotester switch depending on the set failsafe mode. Two yellow LEDs on the front panel of the Nivotester indicate the relay switch status.

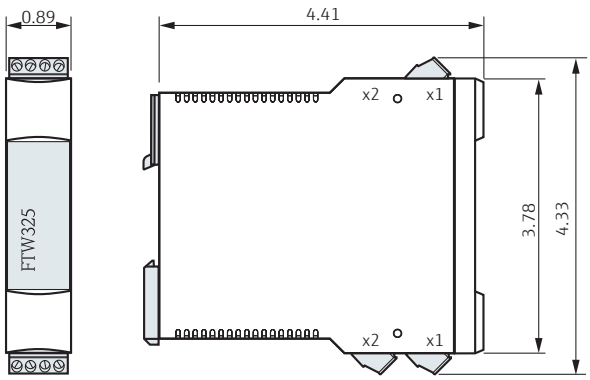
Application example



Technical data

Input	
Measured variable	Depending on the setting selected, the limit signal is triggered at a minimum or maximum level
Measuring range	Three resistance ranges can be set with DIL switches; 0.1 to 1.0 kΩ; 1.0 to 10.0 kΩ; 10.0 to 200.0 kΩ
Input signal	Input galvanically isolated from power supply and output
Type of protection	[EEx ia] IIC
Output	
Output signal	Relay output: one floating changeover contact for the level alarm
Alarm relay	Floating changeover contact for fault reporting, can be switched as second level relay
Switching delay	0.5 s; 2.0 s; 6.0 s when relay energized
Switching power of relay contacts	U~ max. 253 V; I~ max. 2 A; P~ max. 500 VA at cos φ ≥0.7; U– max. 40 V; I– max. 2 A; P– max. 80 W
Function indicators	Light emitting diodes for operation (gn), fault (rd), level alarm 1 (ye) and level alarm 2 (ye) light up when level relay is energized
Power supply	
Supply voltage	85 to 253 V AC, 50/60 Hz; 20 to 30 V AC / 20 to 60 V DC, max. 60 mA
Power consumption	AC-version maximum 4.5 VA DC-version maximum 1.2 VA (at U_{min} 20 V)
Operating conditions	
Ambient temperature	For individual mounting –20 to +60 °C for series mounting without lateral spacing –4 to +122 °F (–20 to +50 °C)
Storage temperature	–13 to +185 °F (–25 to +85 °C) (preferably at +68 °F/+20 °C)
Installation in protective housing	–4 to +104 °F (–20 to +40 °C)
Ingress Protection	IP 20
EMC	Interference emission to EN 61326; electrical equipment Class B; interference immunity to EN 61326; Annex A (industrial) and NAMUR recommendation NE 21 (EMC)
Electrical connection	
Connection line	two core, screening not required
Line resistance	max. 25 Ω per core
Cross-section	max. 1 × 2.5 mm² or 2 × 1.5 mm²
Approvals	
Ex approval	ATEX II (1) GD [EEx ia] IIC
WHG approval	Overspill protection to §19 WHG (Germany)

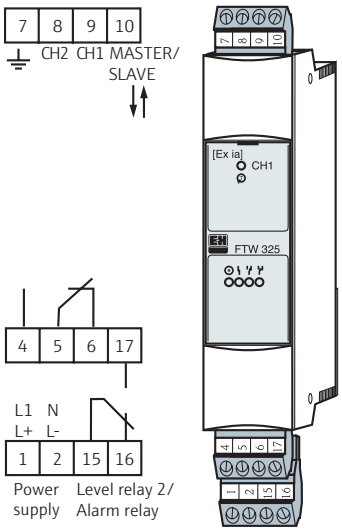
Dimensions (in inches)



Mounting on DIN rail (EN 60715 TH35)

Installation according to instruction manual

Electrical connection



Price table

Nivotester T FTW325		Order no.	Price/pcs. in USD		
Approval	Power Supply		1 to 5	6 to 10	11 to 35
Non-hazardous area	85-253 V AC	FTW325-A2A1A	182.00	170.00	160.00
	20-30 V AC / 20-60 V DC	FTW325-A2B1A	182.00	170.00	160.00

Accessories	Order no.	Price/pcs. in USD
Housing Field, R4 182 × 180 × 165, 5 × M20, PC	52010132	109.60

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ftw325

More products to complete your measuring point ...


Point level switch
Liquipoint T FTW31
page 20


RTD thermometer
Omnigrad T TST187
page 87


Paperless recorder
Ecograph T RSG35
page 104

Capacitive point level switch for solids

Nivector FTC968 / FTC968Z

Complete product information:
www.e-direct.us/ftc968

- No moving parts
- Maintenance-free operation
- No contact with product when using protector

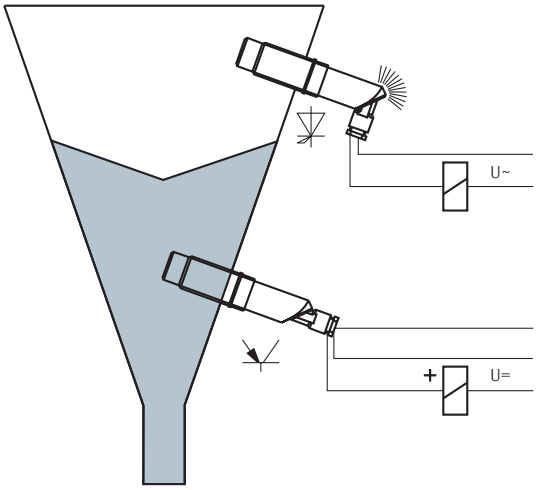
Specs at a glance:

- **Product:**
  Bulk solids ≤10 mm grain size
- **Product dielectric constant:**
  ε_r ≥1.6
- **Approval:**
  Dust-Ex-Zone 10
- **Product temperature:**
  -4 to +176 °F (-20 to +80 °C)
- **Probe length:**
  81 mm (3,19")
- **Process pressure:**
  -15 to +87 psi (-1 to +6 bar)

Application The Nivector capacitive point level switch is suitable for all kinds of powdered and fine-grained solids (e.g. plastic granulates, washing agents and animal feed). Because of its materials of construction, Nivector is also suitable for use with foodstuffs such as grain, sugar, herbs and spices or semolina.

Function The face of the Nivector unit acts as a sensor. If the solids come into contact with the front face, then the electronics change the switching mode. The Nivector can be switched to either min or max fail-safe mode and a LED indicates its switching status. A screen electrode prevents interference through the container walls or lateral solids build-up.

Application example



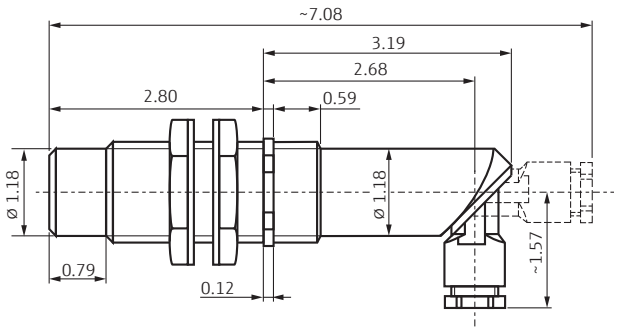
The Nivector FTC968 is a compact point level switch, to which a miniature contactor, a solenoid valve or a programmable logic controller (PLC) may be directly connected.

Technical data

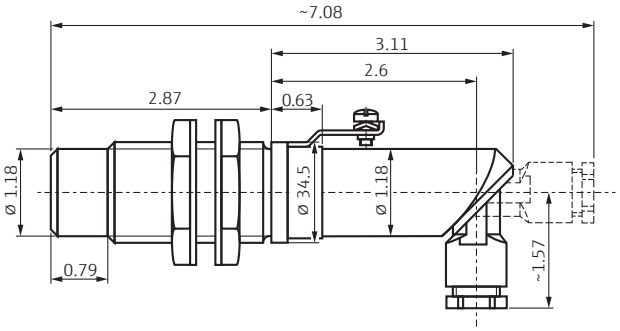
Output	
Safety circuit	Selectable minimum or maximum
Connectable load	**AC:** short duration (40 ms): max. 1.5 A max. 375 VA at 253 V or max. 31.5 VA at 21 V (not protected against short circuit); continuous: max. 87 VA at 253 V, max. 7.4 VA at 21 V, min. 2.5 VA at 253 V (10 mA), min. 0.5 VA at 2.1 V (20 mA) voltage drop max. 12 V, leakage current max. 4 mA **DC:** short duration (50 ms): max. 0.5 A, max. 55 V (clocked overload and short-circuit protection); continuous: max. 350 mA, residual voltage <3 V, leakage current <100 µA
Switching time	Approx. 0.2 s covered/uncovered
Power supply	
AC	21 to 253 V, 50/60 Hz (with FTC968Z max. 250 V)
DC	10 to 55 V
Operating conditions	
Ambient temperature	-4 to +140 °F (-20 to +60 °C)
Material temperature	FTC968: -4 to +176 °F (-20 to + 80 °C) FTC968Z: -4 to +167 °F (-20 to +75 °C)
Operating temperature	-4 to +176 °F (-20 to +80 °C)
Storage temperature	-13 to +185 °F (-25 to +85 °C)
Operating pressure	-14.5 to +87 psi (-1 to +6 bar)
Grain size	Up to 10 mm (0.4")
Relative dielectric constant of measured material	Min. 1.6
Ingress Protection	FTC968: IP 65/IP 67 according to Standard EN 60529; FTC968Z: IP 65
EMC	Interference Emission to EN 61326, Electrical Equipment Class B; Interference Immunity to EN 61326
Mechanical construction	
Process connections	FTC968: Thread G 1 A with two nuts, thread R 1 (DIN 2999) FTC968Z: Thread G 1 A with two nuts Protector: Thread G 1½ A
Electrical connection	Screwed terminals for max. 1.5 mm² wires in cable entry PG 11 (can be rotated as required), for 6 to 8 mm (0.24 to 0.31") cable diameter
User interface	
Display in connection area	Red LED for display of switching mode, visible from the outside
Operation in connection area	Rotary switch for switch-over from minimum to maximum safety mode, potentiometer for switching sensitivity
Approvals	
Ex approval	FTC968Z: ATEX II 1/3 D

Dimensions (in inches) and material

FTC968



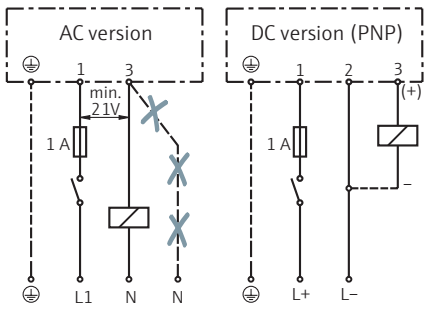
FTC968Z



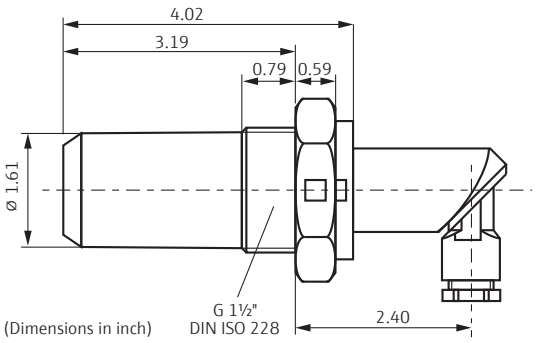
Materials in contact with the material being measured:
FTC968: housing made from blue PC, lock nuts made from black PA
FTC968Z: housing made from white ECFTE, threaded sleeves made from nickel-plated brass, lock nuts made from black PA
Other materials: Connection area: transparent PC

Installation according to instruction manual

Electrical connection



Accessory: Protector



Price table

Nivector FTC968/FTC968Z		Order no.	Price/pcs. in USD		
Approval	Output		1 to 5	6 to 10	11 to 35
Non-hazardous area	2-wire, 21-253 V AC	918098-0000	207.00	192.00	182.00

Accessories	Order no.	Price/pcs. in USD
Protector for Nivector FTC968/FTC968Z	917255-1000	79.25

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ftc968

More products to complete your measuring point ...


Flow switch
Flowphant T DTT31
page 63


Pressure transmitter
Cerabar T PMC131
page 48


Head transmitter
iTemp TMT80
page 93

Vibronic limit switches for bulk solids

Soliphant T FTM20 / FTM21

$ 513.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/ftm20-ftm21

- No calibration: easy commissioning
- Insensitive to build-up
- Sensor material 316L

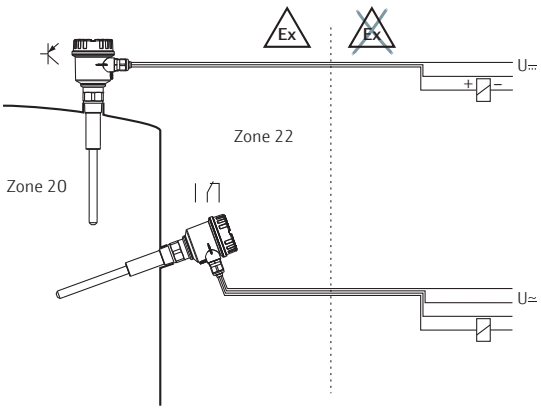
Specs at a glance:

- **Product:**
  Non-fluidized bulk solids
- **Probe length:**
  Compact design:
  225 mm (8.86");
  with extension rod:
  500, 1000 or 1500 mm
  (19.67, 39.37 or 59.06")
- **Product density:**
  ≥200 g/l
- **Process pressure:**
  –14.5 to +363 psi
  (–1 to +25 bar)
- **Product temperature:**
  –40 to +302 °F
  (–40 to +150 °C)

Application The Soliphant T is a robust point level switch for silos containing fine or coarse-grained, non-fluidized bulk solids. Soliphant T works independently from dielectric constant value and conductivity. The various designs that are available means the device has a wide range of applications. Soliphant T is available in 4 lengths and the probe length of extended versions can be easily adjusted using a sliding sleeve (see accessories).

Function A piezoelectric drive excites the vibrating rod of Soliphant T FTM20/FTM21 to its resonance frequency. If medium covers the vibrating rod, the rods vibrating amplitude changes (the vibration is damped). Soliphants electronics compare the actual amplitude with a target value and indicates whether the vibrating rod is vibrating freely or whether it is covered by medium. The process connection is de-coupled from the rods vibration movements and thus is insensitive to vibrations and noise. Control systems, switching units, signalling systems (e.g. lamps, horns, PCS, PLC, etc.) can be directly connected. Minimum/maximum quiescent current safety can be switched at electronic insert.

Application example



The entire measuring system consists of:
- Soliphant T FTM20 or FTM21 with FEM22 or FEM24 electronic insert
- A supply point and
- The connected control systems, switching units, signalling systems (e.g. lamps, horns, PCS, PLC, etc.)

Technical data

Output parameters	
Fail-safe mode	Minimum/maximum quiescent current
Drop-out signal	Output locked
Switching delay	0.5 s when the sensor is covered, 1 s when the sensor is exposed

Accuracy	
Reference operating conditions	Temperature 73 °F (23 °C); medium ABS granules; grain size 2 to 3.5 mm (0.08 to 0.14"); atmospheric pressure; installation: vertical from above or below; horizontal from the side
Measuring frequency	700 to 800 Hz
Measured error	max. ≤5 mm (0.2")
Repeatability	<1 mm (0.04")
Start-up setting time	2 s

Ambient conditions	
Ambient temperature	-40 to +158 °F (-40 to +70 °C)
Storage temperature	-40 to +185 °F (-40 to +85 °C)
Climate class	Tropicalized as per DIN IEC 68 part 2-38
Ingress protection	IP66/IP67
Electrical safety	IEC 61010, CSA 1010.1-92, FM3600
Vibration resistance	DIN 60068-2-27/IEC 68-2-27; shock 30 g; vibration 0.01 g^2/Hz
EMC	Interference emission to EN 61326, Electrical Equipment Class B; Interference immunity

Process conditions	
Measuring range	≥200 g/l within the length of the measuring rod
Density	≥200 g/l, not fluidized
Process pressure	-14.5 to +363 psi (-1 to +25 bar)
Process temperature	-40 to +302 °F (-40 to +150 °C)

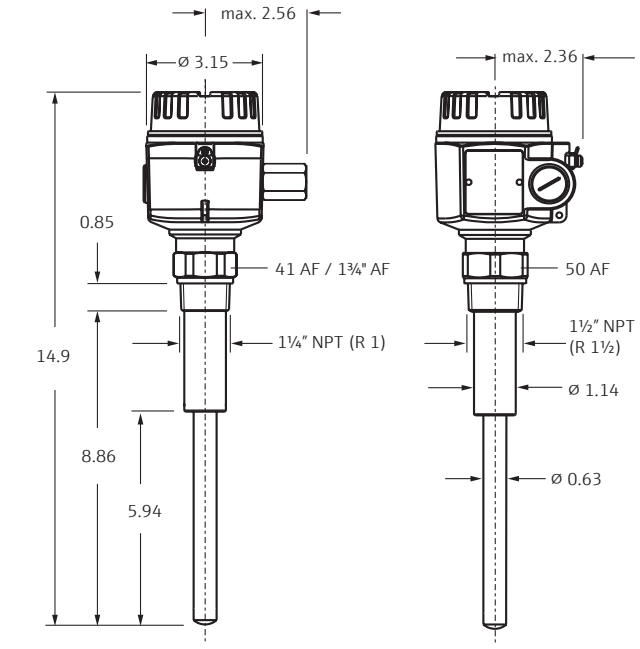
Materials of construction	
Sensor	316L
Process connection	R 1; 1½ (316L)
Housing	F16 (plastics) / F18 (aluminium)

Electrical connection	
Cable specification	Use a usual commercial two-, three- or four-wire cable (25 Ω)
Cable entries	M20 × 1.5

Approvals	
Ex approval	ATEX II 1/3 D

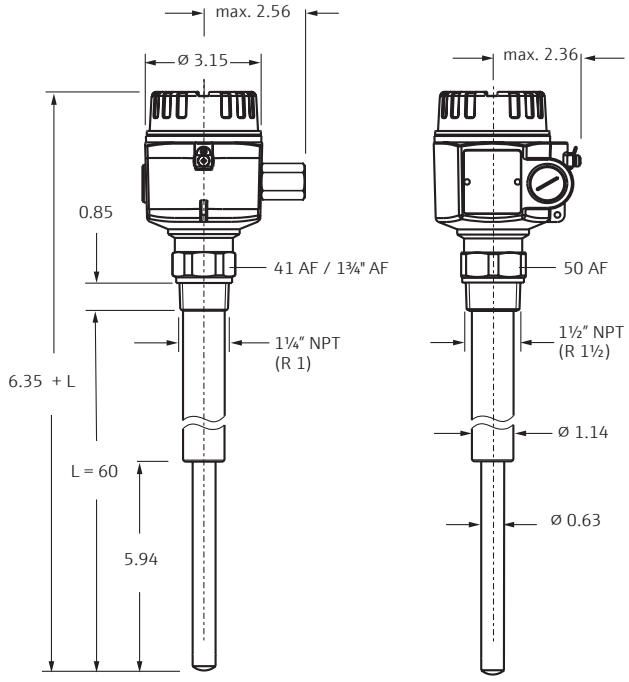
Dimensions (in inches)

FTM20 – compact design as vibrating rod



Installation according to instruction manual

FTM21 – vibrating rod with extension pipe

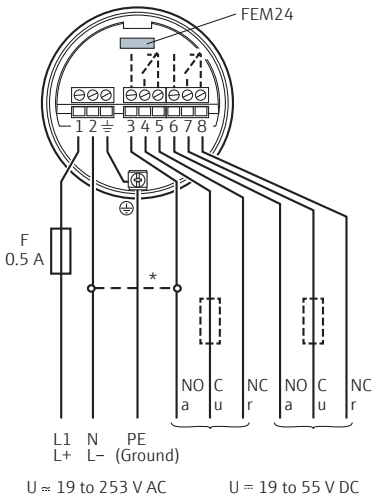


Installation according to instruction manual

Electrical connection

Electronic insert FEM24 (AC/DC with relay output)	
Power supply	19 to 253 V AC 50/60 Hz 19 to 55 V DC
Power consumption	~ 1.3 VA
Output	Loads switched via 2 floating changeover contacts. I~ max. 6 A, U~ max. 253 V; P~ max.1 500 VA, cos φ = 1 P~ max. 750 VA, cos φ >0.7 I– max. 6 A to 30 V I– max. 0.2 A to 125 V
Both relay contacts switch simultaneously.	

Please note the different voltage ranges for direct and alternating current.



* When jumpered, the relay output works with NPN logic.

Price table

Soliphant T FTM20			Order no.	Price/pcs. in USD		
Electronics; Output	Housing; Cable Entry	Approval		1 to 5	6 to 10	11 to 35
FEM24; relay DPDT, 19-253 V AC / 55 V DC	F18 Alu IP66/67 NEMA4X; NPT¾ thread	CSA General Purpose, CSA C/US	FTM20-CM46A	583.00	542.00	513.00
			FTM20-CN46A	583.00	542.00	513.00
		FM DIP+CSA DIP Cl.II,III Div.1+2 Gr.E-G, zone 21,22	FTM20-DM46A	703.00	654.00	619.00
			FTM20-DN46A	703.00	654.00	619.00

Soliphant T FTM21 (Length: 60")			Order no.	Price/pcs. in USD		
Electronics; Output	Housing; Cable Entry	Approval		1 to 5	6 to 10	11 to 35
FEM24; relay DPDT, 19-253 V AC / 55 V DC	F18 Alu IP66/67 NEMA4X; NPT¾ thread	CSA General Purpose, CSA C/US	FTM21-CM846A	951.00	884.00	837.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ftm20-ftm21

More products to complete your measuring point ...

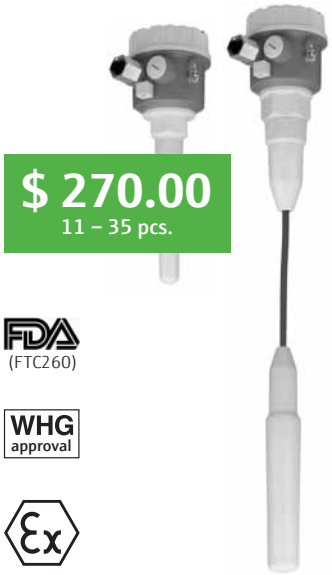

Point level switch
Liquiphant T FTL20
page 11


Pressure transmitter
Cerabar T PMC131
page 48


Flow switch
Flowphant T DTT31
page 63

Capacitive point level switch for bulk solids

Minicap FTC260 / FTC262



$ 270.00
11 – 35 pcs.

FDA (FTC260)

WHG approval

Ex

Complete product information:
www.e-direct.us/ftc260-262

- No calibration required
- Active build-up compensation
- Maintenance-free
- Easily shortened rope version

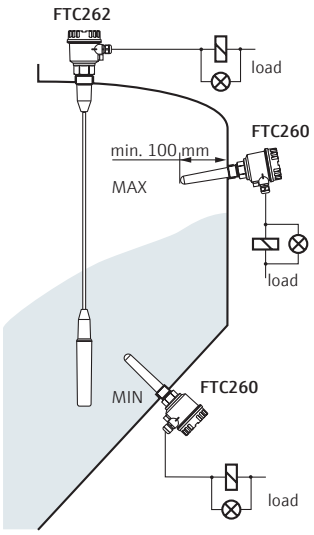
Specs at a glance:

- **Product:**
  Bulk solids
- **Grain size:**
  Diameter ≤30 mm (1.18")
- **Process pressure:**
  –14.5 to +363 psi
  (–1 to +25 bar)
- **Product dielectric constant:**
  ε_r ≥1.6
- **Product temperature:**
  FTC260: –40 to +248°F
  (–40 to +120 °C)
  FTC262/Ex: –40 to +158°F
  (–40 to +70 °C)
- **Probe length:**
  Rod/FTC260: 140 mm (5.51")
  Rope/FTC262:
  1.5; 2.5 and 6 m
  (4.9; 8.2 and 19.69 ft)

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 and is suitable for use in dust explosive areas (ATEX II 1/3 D). The Minicap has two output options:
- Relay output (SPDT) or
- PNP output

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.

Technical data FTC260

Output	
Output signal	**DC-PNP:** I_{max} 200 mA, secure against overload and shorting, residual voltage at transistor at I_{max} <2.9 V **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	**DC-PNP:** <100 µA **AC/DC-SPDT:** relay de-energised
Switching delay	0.5 s upon release/covering

Power supply	
Supply voltage	**DC-PNP:** 10.8 to 45 V DC, short pulse up to 55 V DC, current input 30 mA (max.), reverse polarity protection **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 mm^2 in end sleeves, Electric wire max. 2.5 mm^2

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 +158°F (-40 to +70 °C) (to +140 °F/60 °C Dust Ex)
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 +270 °F (-40 to +130 °C) (to +176 °F/80 °C Dust Ex)
Process pressure	-14 to +363 psi (-1.0 to +25 bar)

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	R 1 DIN 2999/ISO 7
Adapter	Inner thread R1 DIN 2999 ISO 7: for R 1½ DIN 2999/ISO 7 for G 1½ DIN ISO 228

Approvals	
Ex approval	ATEX II 1/3 D
WHG approval	Overspill protection to §19 WHG (Germany)

Sensor material is FDA registered

Technical data FTC262

Output	
Output signal	**DC-PNP:** I_{max} 200 mA, secure against overload and shorting, residual voltage at transistor at I_{max} <2.9 V **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	**DC-PNP:** <100 µA **AC/DC-SPDT:** relay de-energised
Switching delay	0.8 s upon release/covering

Power supply	
Supply voltage	**DC-PNP:** 10.8 to 45 V DC, short pulse up to 55 V DC, current input 30 mA (max.), reverse polarity protection **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 mm^2 in end sleeves, Electric wire max. 2.5 mm^2

Accuracy	
Longterm drift	Vertical ±6 mm (0.24")
Hysteresis	Vertical 5 mm (0.2")
Switch point	Vertical 35 mm (1.38") above probe tip

Operating conditions	
Process temperature	-40 to +158 °F (-40 to +70 °C)
Process pressure	-14.5 to +87 psi (-1.0 to +6 bar)
Ambient temperature	-40 to +158 °F (-40 to +70 °C) (to +140 °F/60 °C Dust Ex)
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)

General	
Medium	Bulk solids, grain size up to 30 mm (≥1.18"), relative dielectric constant ε_r ≥1.6
Tensile strength	Max. 3000 N up to 104 °F (40 °C)
Process connection	R 1½ DIN 2999/ISO 7
Length reduction	Shortening kit

Approvals	
Ex approval	ATEX II 1/3 D

Applications

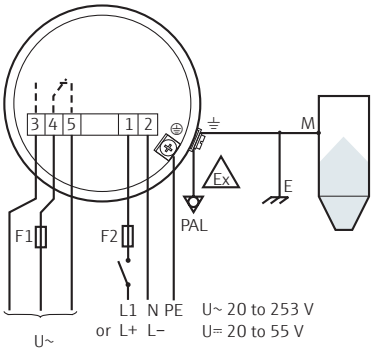
Examples	ρ in g/l (approx.)	ε_r (approx.)	Function
Grain, seed, legumes and their products			
Rice	770	3.0	yes
Cornstarch (packed)	680	2.6	yes
Flour (wheat)	580	2.4	yes
Corn grist	500	2.1	yes
Sunflower seeds	380	1.9	yes
Noodles	370	1.9	yes
Bran (wheat)	250	1.7	yes
Popcorn	30	1.1	no
Minerals, inorganic 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.

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.

Electrical connection

AC/DC-SPDT

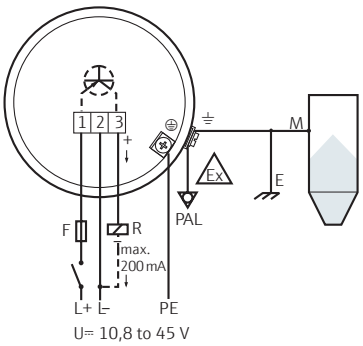


U~
max. 253 V / 4 A
max. 1000 VA, cos φ = 1

U=
max. 30 V / 4 A
max. 253 V / 0,2 A

Minicap FTC260/262 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

DC-PNP

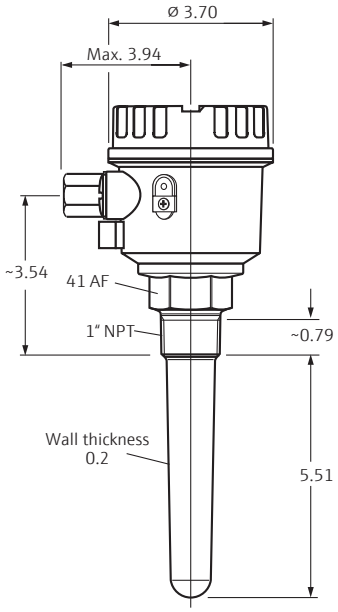


Minicap FTC260/262 with PNP DC connection:
F: fine-wire fuse 500 mA
R: connected load, e.g. stored programme control, programmable logic sequencer, relay
M: earth connection to silo or to metal parts of silo
E: grounding

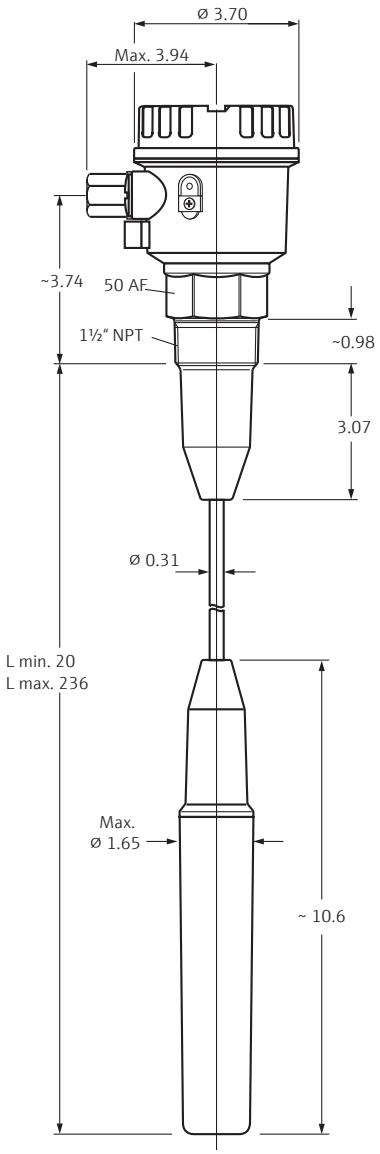
- The Minicap system is protected against reverse polarity.
- If the connections are reversed, then the green light goes out.
- No grounding lines (PE) or potential matching lines (PAL) are required with FTC260.
- The PAL line has to be connected according to local Ex-guidelines

Dimensions (in inches)

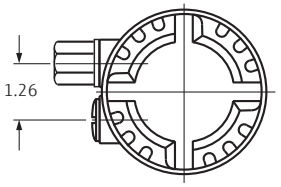
Minicap FTC260



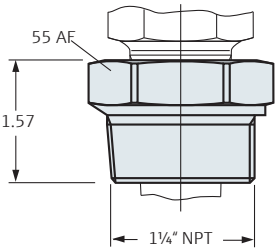
Minicap FTC262



Top view, FTC260 and 262



Adapter for FTC260



Installation according to instruction manual

Price table

Minicap FTC260			Order no.	Price/pcs. in USD		
Probe length	Switch Output	Approval		1 to 5	6 to 10	11 to 35
140 mm	3-wire PNP 10.8-45 V DC	Non-hazardous area	FTC260-AB2B1	307.00	286.00	270.00
		FM DIP Cl.II,III Gr.E-G, T5, zone 21,22	FTC260-JB2B1	353.00	328.00	311.00
	Relay 20-253 V AC / 20-55 V DC	Non-hazardous area	FTC260-AB4B1	340.00	317.00	300.00
		FM DIP Cl.II,III Gr.E-G, T5, zone 21,22	FTC260-JB4B1	386.00	359.00	340.00

Minicap FTC262			Order no.	Price/pcs. in USD		
Probe length	Switch Output	Approval		1 to 5	6 to 10	11 to 35
☐ inch*	Relay 20-253 V AC / 20-55 V DC	CSA General Purpose, CSA C/US	FTM21-CM846A	564.00	524.00	496.00

*Please insert desired length (20-236 inches).

Accessories	Order no.	Price/pcs. in USD
Cover F14 PE, transparent PA	943201-1001	36.79
Rope shortening kit FTC262	52005918	30.17

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ftc260-262

More products to complete your measuring point ...


Point level switch
Liquiphant T FTL20
page 11


Pressure switch
Ceraphant T PTC31
page 41


Digital indicator
RIA45
page 108

Point level switch for granular solids

Soliswitch FTE20

$ 313.00
11 – 35 pcs.

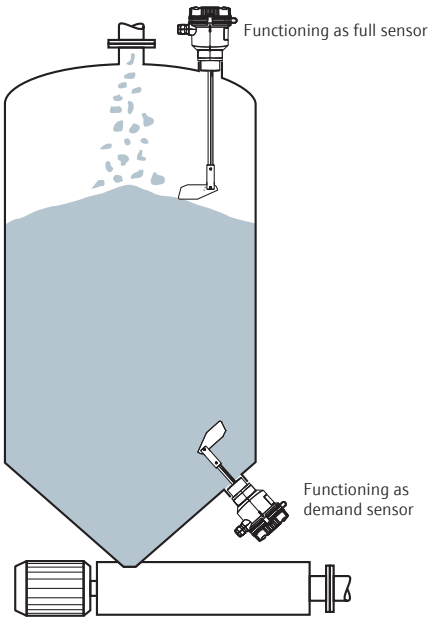
- Easy installation
- Optical and automatic rotation control (optional)
- Weight of solids can be adjusted without the need for tools

Specs at a glance:

- **Medium:**
  Solids weight ≥ 4.99 lb/ft³ (80 g/l)
- **Operating pressure (abs.):**
  7.25 to 26.1 psi (0.5 to 1.8 bar)
- **Medium temperature:**
  –4 to 176 °F (–20 to +80 °C)

Complete product information:
www.e-direct.us/fte20

Application example



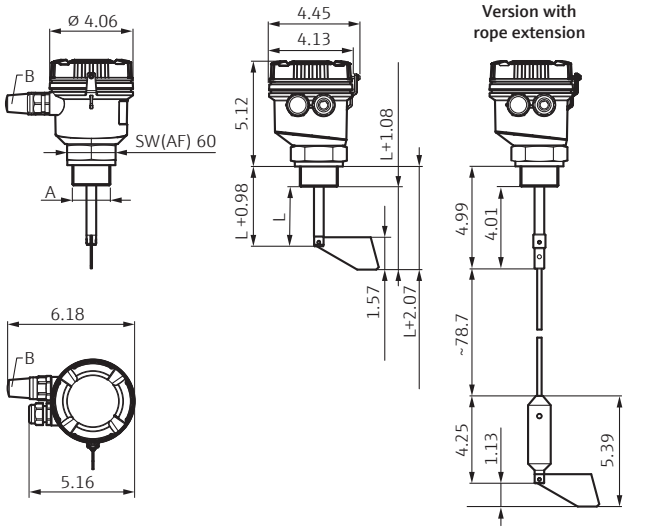
Application The Soliswitch FTE20 is a paddle switch for granular solids. Its robust and compact design makes the point level switch an ideal sensor for detecting the full, empty or refill status in applications with bulk solids, such as in silos containing solids. Typical application areas are point 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.

Technical data

Output	
Output signal	Binary
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
Automatic rotation monitoring (optional)	Detection of blockage or failure of the drive unit
Power supply	
Supply voltage	20 to 28 V DC; 24 V AC; 115 V AC; 230 V AC
Power consumption	Max. 3.5 VA
Cable entries	2 × cable gland, M20 × 1.5 (optionally 1 × cable gland M20 × 1.5 and indicator lamp)
Operating conditions	
Side load on the shaft	Max. 60 N
Load on the rope	Max. 1500 N
Operating pressure (abs.)	7.25 to 26.1 psi (0.5...1.8 bar)
Ambient temperature	–4 to 140 °F(–20 to +60 °C)
Degree of protection	IP 66
Medium temperature	–4 to 176 °F (–20 to +80 °C)
Solids weight	≥80 g/l
Grain size	1.97" (≤50 mm)
Mechanical construction	
Material	Housing: Polycarbonate Captive screw cap: Polyamide Cover seal: EPDM Process seal: Synthetic/organic fiberelastomer sealing (nonasbestos) NPT versions have no process seal and need to be sealed at the thread by the customer Process connections: Stainless steel 303 or PBT
Shaft seal	NBR
Shaft speed	1 min^{-1}
Process connection	NPT1¼"; NPT1½"; 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

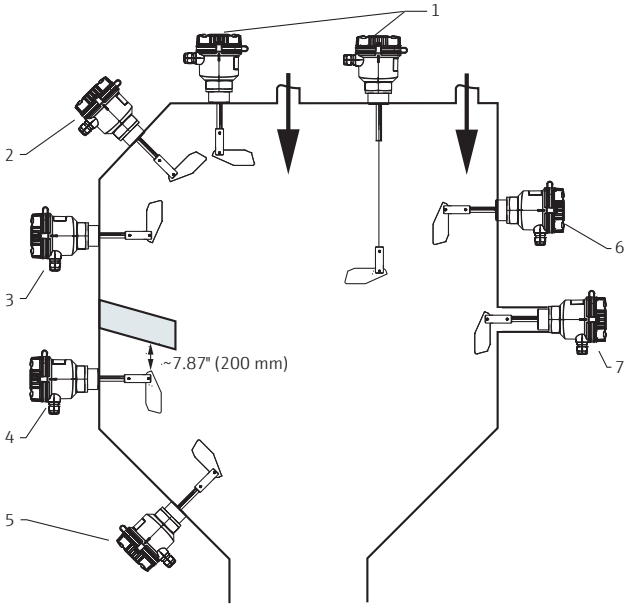
Dimensions (in inches)



A: Process connection NPT 1¼", NPT 1½", G 1½"
B: Indicator light (optional)
L: Length of shaft 2.95" to 11.81"

Installation according to instruction manual.

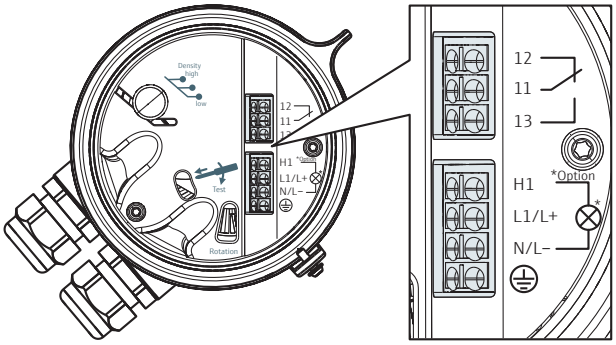
Installation



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

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 (115VAC)				**Order no.**	**Price/pcs. in USD**		
Approval	Process connection	Length	Version		1 to 5	6 to 10	11 to 35
FM DIP/ II, III/1/E-G	Thread NPT1-1/4; 303	300 mm	Shaft	FTE20-FC15AE31	356.00	331.00	313.00
		2000 mm, shortable	Rope	FTE20-FC15AF31	467.00	434.00	411.00
		100mm	Shaft	FTE20-FC15AB31	356.00	331.00	313.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/fte20

More products to complete your measuring point ...

Vibronic limit switch
Soliphant T FTM20
page 30

Digital indicator
RIA46
page 108

RTD thermometer
Omnigrad T TST187
page 87

Pressure switch for absolute and gauge pressures

Ceraphant T PTC31 / PTP31

$ 328.00
11 – 35 pcs.

DESINA compliant

Complete product information:
www.e-direct.us/ptc31-ptp31

- High reproducibility and long-term stability
- Stainless steel housing 316L

Specs at a glance:

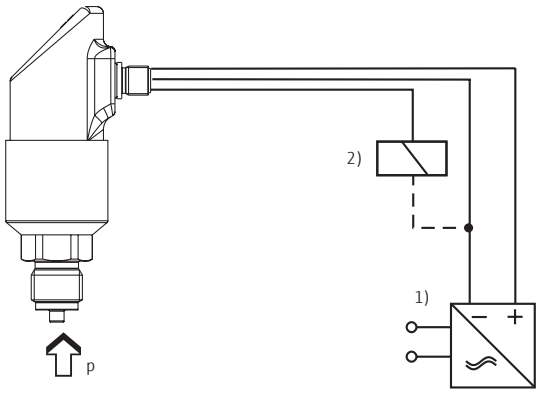
- **Product:**
  Liquids, vapors and gases
- **Accuracy:**
  <0.5 %
- **Outputs:**
  1 or 2 PNP or 1 PNP with 4 to 20 mA
- **Display:**
  4 digit, 14 segments, with color change
- **Product temperature:**
  -40 °F to +212 °F
  (-40 to +100 °C)
- **Measuring range - limits:**
  PTC31:
  0 to 1.5 psi (100 mbar),
  0 to 600 psi (40 bar)
  PTP31:
  0 to 15 psi (1 bar),
  0 to 6000 psi (400 bar)

Application The Ceraphant T is a pressure switch designed for the monitoring and control of absolute and gauge pressures in non-hazardous applications and is available with a wide range of process connections and measuring ranges. You can choose from two kinds of measuring cell technologies:

- Up to 600 psi (40 bar) choose PTC31 with ceramic cell
- Up to 6000 psi (400 bar) choose PTP31 with metallic cell

Function The process pressure acts on the sensor diaphragm and the pressure-dependent change in capacitance of the sensor is measured. A microprocessor evaluates the signal and provides an appropriate output.

Application example



1 × PNP switch output
1) Power supply system
2) Load (e.g. programmable logic controller, process contol system, relay)

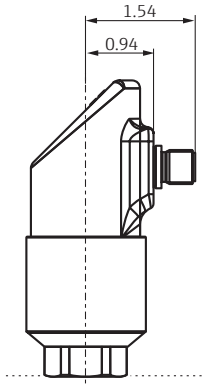
Technical data

Output	
Output signal	1 or 2 × PNP or 1 PNP with 4 to 20 mA
Function	Min., max. window
Voltage drop PNP	≤2 V
Overload protection	Automatic testing of switching current
Power supply U_b	
Supply voltage	12 to 30 V DC
Current consumption	Without load <60 mA, reverse polarity protection
Performance characteristics	
Reference conditions	According to DIN IEC 60770/61003
Measured error	<0.5 %
Long-term drift	≤0.15 % per year
Sensor response time	≤20 ms
Analog output	Non-linearity: ≤0.2 % (limit point method) non-conformity: non-linearity + hysteresis + non-repeatability: ≤0.5 % (limit point method)
Operating conditions	
Medium temperature	-40 to +212 °F (-40 to +100 °C)
Ambient temperature	-40 to 185 °F (-40 to +85 °C)
Storage temperature	-40 to 185 °F (-40 to +85 °C)
Degree of protection	M16 × 1.5 valve plug: IP 65 M12 × 1 connector: IP65 (gauge press.), IP66 (absolute press.) Cable: IP 66
Vibration resistance	20 g to DIN 68-2-6 (10-2000 Hz)
EMC	Interference emission as per EN 61326 class B electrical equipment, interference immunity as per EN 61326 appendix A (industrial use)
Materials	
Process connection	G ½ A to DIN 16288
Housing	AISI 316L, with electronically polished surface R_a ≤0.8 µm
Valve plug	Polyamide (PA)
M12 × 1 connector	Outside 316L
Cable outer covering	Polyurethane (PUR)
Materials in contact with medium	
Process connection	AISI 316L
Coupling nut	AISI 304
Sensor diaphragm	PTC31: Ceramic (99,9 % Al_2O_3) PTP31: AISI 316L
Filling fluid	PTC31: dry ceramic measuring cell PTP31: mineral oil
Seals	FKM Viton EPDM (only PTP31)
Operation	
Operating elements	3 buttons or PC and software
Approvals	
Desina compliant	
Sensors for O_2-applications (only PTC31) or with 3.1. certificate on request.	

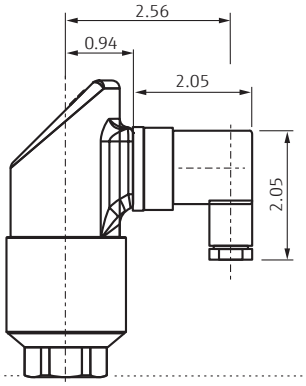
Dimensions (in inches)

Housing

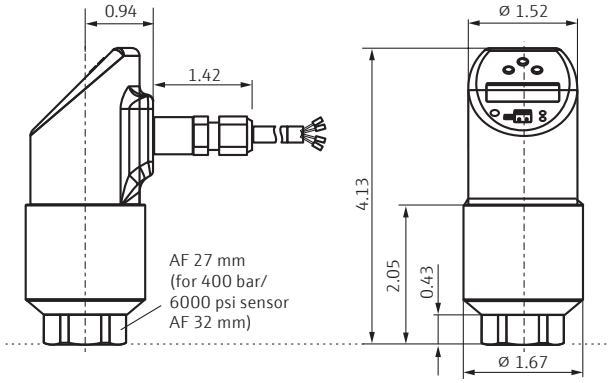
M12 × 1 connector



M16 × 1.5 connector / ½ NPT valve plug



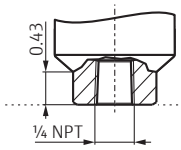
Cable 16.4 ft



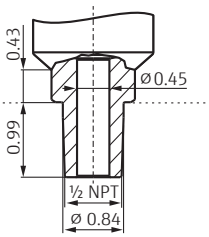
Installation according to instruction manual.

Process connections PTC31

Thread ANSI ¼ FNPT

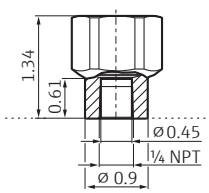


Thread ANSI ½ MNPT

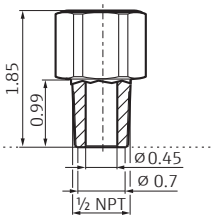


Process connections PTP31

Thread ANSI ¼ FNPT

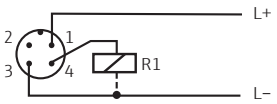


Thread ANSI ½ MNPT

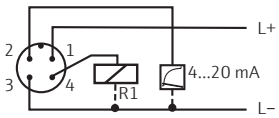


Electrical connection

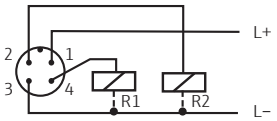
A1



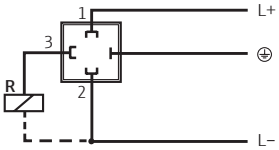
A3



A2



B



DC voltage version with M12 × 1 connector
A1: 1 × PNP switch output
A2: 2 × PNP switch output
A3: PNP switch output with additional analog output

DC voltage version with valve plug M16 × 1.5
B: 1 × PNP switch output

DC voltage version with cable
A1: 1 × PNP switch output
A2: 2 × PNP switch output
A3: PNP switch output with additional analog output

Cable specification: 5-core (5 × 0.22 mm²);
Colors: 1 = brown, 2 = white, 3 = blue, 4 = black, ground = green/yellow

Price table (PTC31)

Measuring Range

Code	Gauge pressure	Overload
1C	0...100 mbar, 0...10 kPa	4 bar
1F	0...400 mbar, 0...40 kPa	6 bar
1H	0...1 bar, 0...100 kPa	10 bar
1M	0...4 bar, 0...400 kPa	24 bar
1P	0...10 bar, 0...1 000 kPa	40 bar
1S	0...40 bar, 0...4 000 kPa	60 bar

Code	Absolute pressure	
2F	0...400 mbar, 0...40 kPa	6 bar
2H	0...1 bar, 0...100 kPa	10 bar
2M	0...4 bar, 0...400 kPa	24 bar
2P	0...10 bar, 0...1 000 kPa	40 bar
2S	0...40 bar, 0...4 000 kPa	60 bar

Process connections

Code	Thread
DA	ANSI ¼ FNPT, 316L
DD	ANSI ½ MNPT, 316L

Ceraphant PTC31: ceramic measuring cell; up to 40 bar		Order no.	Price/pcs. in USD		
Power Supply; Output	Electrical Connection	* **	1 to 5	6 to 10	11 to 35
12-30 V DC; PNP switch 3-wire	Plug M12, IP65 gauge, IP66 absolute	PTC31-A1A1 [ ] 3 [ ] 1A	411.00	382.00	362.00
	Valve plug M16 ISO4400, IP65	PTC31-A2A1 [ ] 3 [ ] 1A	411.00	382.00	362.00
	Cable 5 m, IP66	PTC31-A4A1 [ ] 3 [ ] 1A	451.00	420.00	397.00
12-30 V DC; 2 × PNP switch 4-wire	Plug M12, IP65 gauge, IP66 absolute	PTC31-A1B1 [ ] 3 [ ] 1A	435.00	405.00	383.00
	Cable 5 m, IP66	PTC31-A4B1 [ ] 3 [ ] 1A	475.00	442.00	418.00
12-30 V DC; PNP switch + 4-20 mA 4-wire	Plug M12, IP65 gauge, IP66 absolute	PTC31-A1C1 [ ] 3 [ ] 1A	487.00	453.00	429.00
	Cable 5 m, IP66	PTC31-A4C1 [ ] 3 [ ] 1A	527.00	490.00	464.00

Plug and cable to be ordered as 'accessory'
* Please add code for measuring range.
** Please add code for process connection.

Accessories	Order no.	Price/pcs. in USD
M12 socket for plug. 5m cable PVC, Cu Sn/Ni lock.	52010285	14.95
Configuration kit for PC-programmable devices. Set-up programme + interface cable for PC with USB-Port.	TXU10-AA	219.94
Socket for plug 4p-125V, 4A-M12	52006263	16.87
M12 elbow plug ready for cable, IP67,PG7	51006327	17.19

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ptc31-ptp31

Price table (PTP31)

Measuring Range

Code	Gauge pressure	Overload
3H	0...1 bar, 0...100 kPa	4 bar
3M	0...4 bar, 0...400 kPa	16 bar
3P	0...10 bar, 0...1 000 kPa	40 bar
3S	0...40 bar, 0...4 000 kPa	160 bar
3U	0...100 bar, 0...10 MPa	400 bar
	Negative gauge pressure	
7H	-1...+1 bar, -100...+100 kPa	4 bar
7M	-1...+4 bar, -100...+400 kPa	16 bar
7P	-1...+10 bar, -100...+1 000 kPa	40 bar
	Absolute pressure	
4H	0...1 bar, 0...100 kPa	4 bar a
4M	0...4 bar, 0...400 kPa	16 bar a
4P	0...10 bar, 0...1 000 kPa	40 bar a
4S	0...40 bar, 0...4 000 kPa	160 bar a
4U	0...100 bar, 0...10 000 kPa	400 bar a

Measuring Range for 400 bar sensors [1)]

Code	Gauge pressure	Overload
3Z	0...400 bar, 0...40 MPa	600 bar
	Absolute pressure	
4Z	0...400 bar, 0...40 MPa	600 bar

1) welded, without seal

Process connections

Code	Thread
DA	ANSI ¼ FNPT, 316L
DD	ANSI ½ MNPT, 316L

* ** ***

Ceraphant PTP31: metallic diaphragm; Viton seal; up to 100 bar		Order no.	Price/pcs. in USD		
Power Supply; Output	Electrical Connection		1 to 5	6 to 10	11 to 35
12-30 V DC; PNP switch 3-wire	Plug M12, IP65 gauge, IP66 absolute	PTP31-A1A1 [*] 3 [**] 1A	373.00	346.00	328.00
	Valve plug M16 ISO4400, IP65	PTP31-A2A1 [*] 3 [**] 1A	373.00	346.00	328.00
	Cable 5 m, IP66	PTP31-A4A1 [*] 3 [**] 1A	424.00	394.00	373.00
12-30 V DC; 2 × PNP switch 4-wire	Plug M12, IP65 gauge, IP66 absolute	PTP31-A1B1 [*] 3 [**] 1A	403.00	375.00	355.00
	Cable 5 m, IP66	PTP31-A4B1 [*] 3 [**] 1A	454.00	422.00	400.00
12-30 V DC; PNP switch + 4-20 mA 4-wire	Plug M12, IP65 gauge, IP66 absolute	PTP31-A1C1 [*] 3 [**] 1A	469.00	436.00	413.00
	Cable 5 m, IP66	PTP31-A4C1 [*] 3 [**] 1A	521.00	484.00	458.00

** ***

Ceraphant PTP31: soldered diaphragm; up to 400 bar		Order no.	Price/pcs. in USD		
Power Supply; Output	Electrical Connection		1 to 5	6 to 10	11 to 35
12-30 V DC; PNP switch 3-wire	Plug M12, IP65 gauge, IP66 absolute	PTP31-A1A1 [**] 3 [***] 7A	373.00	346.00	328.00
	Valve plug M16 ISO4400, IP65	PTP31-A2A1 [**] 3 [***] 7A	373.00	346.00	328.00
	Cable 5 m, IP66	PTP31-A4A1 [**] 3 [***] 7A	424.00	394.00	373.00
12-30 V DC; 2 × PNP switch 4-wire	Plug M12, IP65 gauge, IP66 absolute	PTP31-A1B1 [**] 3 [***] 7A	403.00	375.00	355.00
	Cable 5 m, IP66	PTP31-A4B1 [**] 3 [***] 7A	454.00	422.00	400.00
12-30 V DC; PNP switch + 4-20 mA 4-wire	Plug M12, IP65 gauge, IP66 absolute	PTP31-A1C1 [**] 3 [***] 7A	469.00	436.00	413.00
	Cable 5 m, IP66	PTP31-A4C1 [**] 3 [***] 7A	521.00	484.00	458.00

Plug and cable to be ordered as 'accessory'
* Please add code for measuring range. ** Please add code for measuring range for 400 bar sensors. *** Please add code for process connection.

Accessories	Order no.	Price/pcs. in USD
M12 socket for plug. 5m cable PVC, Cu Sn/Ni lock.	52010285	14.95
Configuration kit for PC-programmable devices. Set-up programme + interface cable for PC with USB-Port.	TXU10-AA	219.94
Socket for plug 4p-125V, 4A-M12	52006263	16.87
M12 elbow plug ready for cable, IP67,PG7	51006327	17.19

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ptc31-ptp31

More products to complete your measuring point ...

Point level switch
Liquiphant T FTL20
page 11

Flow switch
Flowphant T DTT31
page 63

Temperature switch
Thermophant T TTR31
page 69

Hygienic pressure switch for absolute and gauge pressures

Ceraphant T PTP35

$ 351.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/ptp35

- Surface finish R_a ≤0.8 µm
- Stainless steel housing 316L
- Exchangeable modular process connections

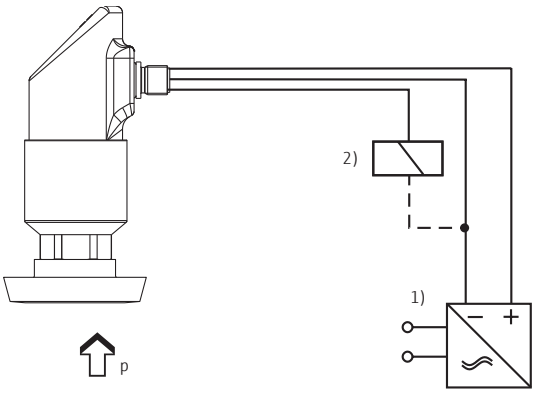
Specs at a glance:

- **Product:**
  Liquids, vapors and gases
- **Measuring range - limits:**
  0 to 15 psi (1 bar),
  0 to 600 psi (40 bar)
- **Accuracy:**
  <0.5 %
- **Filling oil:**
  FDA-conformity
- **Product temperature:**
  -40 to +212 °F; 275 °F max. 1 h
  (-40 to +100 °C;
  135 °C max. 1 h)
- **Outputs:**
  1 or 2 PNP or
  1 PNP with 4 to 20 mA

Application The Ceraphant T PTP35 is a pressure switch designed for the monitoring and control of absolute and gauge pressures in hygienic applications. It is available with a wide range of process connections and is suitable for finely graduated measuring ranges from vacuum to 40 bar (600 psi).

Function The process pressure acts on the metallic sensor diaphragm and the pressure-dependent change in capacitance of the ceramic sensor is measured. A microprocessor evaluates the signal and provides an appropriate output.

Application example



1 × PNP switch output
1) Power supply
2) Load (e. g. programmable logic controller, process contol system, relay)

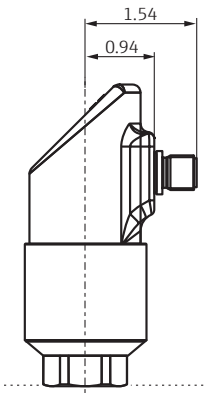
Technical data

Output	
Output signal	1 or 2 × PNP or 1 × PNP with 4 to 20 mA
Voltage drop PNP	≤2 V
Overload protection	Automatic testing of switching current
Power supply U_b	
Supply voltage	12 to 30 V DC
Current consumption	Without load <60 mA, reverse polarity protection
Performance characteristics	
Reference conditions	According to DIN IEC 60770/61003
Measured error	<0.5 %
Long-term drift	≤0.15 % per year
Sensor response time	≤20 ms
Analog output	Non-linearity: ≤0.2 % (limit point method) Non-conformity: non-linearity + hysteresis + non-repeatability: ≤0.5 % (limit point method)
Operating conditions	
Medium temperature	-40 to 212 °F (275 °F max. 1 h) (-40 to +100 °C (+135 °C max. 1 h))
Ambient temperature	-40 to 185 °F (-40 to +85 °C)
Storage temperature	-40 to 185 °F (-40 to +85 °C)
Degree of protection	M16 × 1.5 valve plug: IP 65 M12 × 1 connector: IP65 (gauge press.), IP66 (absolute press.) Cable: IP 66
Vibration resistance	20 g to DIN 68-2-6 (10-2000 Hz)
EMC	Interference emission as per EN 61326 class B electrical equipment, interference immunity as per EN 61326 appendix A (industrial use)
Materials of construction	
Process connection	316L/R_a ≤0.8 µm; housing 316L
Filling fluid	FDA-conform oil
Seals	EPDM, without (DA8, BB8)
Operation	
Operating elements	3 buttons or PC and software
Approvals	
3A	
Desina compliant	
3.1.B certificates on request.	

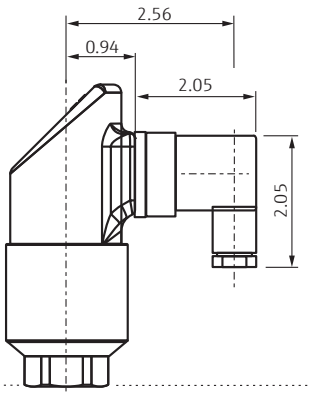
Dimensions (in inches)

Housing

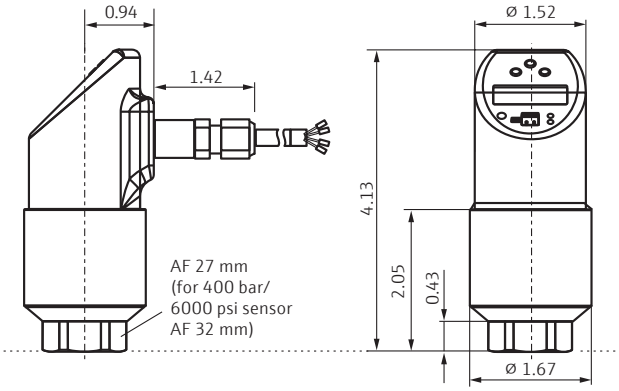
M12 × 1 connector



M16 × 1.5 connector / ½ NPT valve plug



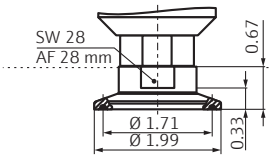
Cable 16.4 ft



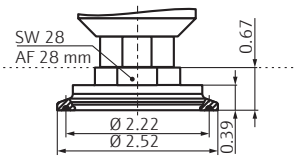
Installation according to instruction manual.

Process connections

Tri-Clamp ISO 2852
DN 25...DN 38 (1"...1½")

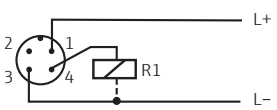


Tri-Clamp ISO 2852
DN 40...DN51 (2")

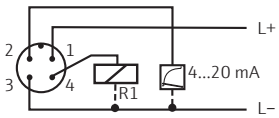


Electrical connection

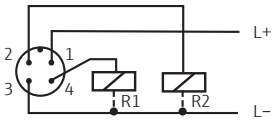
A1



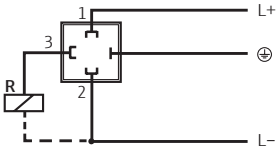
A3



A2



B



DC voltage version with M12 × 1 connector
A1: 1 × PNP switch output
A2: 2 × PNP switch output
A3: PNP switch output with additional analog output

DC voltage version with valve plug M16 × 1.5
B: 1 × PNP switch output

DC voltage version with cable
A1: 1 × PNP switch output
A2: 2 × PNP switch output
A3: PNP switch output with additional analog output

Cable specification: 5-core (5 × 0.22 mm²);
Colors: 1 = brown, 2 = white, 3 = blue, 4 = black, ground = green/yellow

Price table

Measuring Range

Code	Gauge pressure	Overload
3H	0...1 bar, 0...100 kPa	4 bar
3M	0...4 bar, 0...400 kPa	16 bar
3P	0...10 bar, 0...1 000 kPa	40 bar
3S	0...40 bar, 0...4 000 kPa	160 bar
	Negative gauge pressure	
7H	-1...+1 bar, -100...+100 kPa	4 bar
7M	-1...+4 bar, -100...+400 kPa	16 bar
7P	-1...+10 bar, -100...+1 000 kPa	40 bar
	Absolute pressure	
4H	0...1 bar, 0...100 kPa	4 bar
4M	0...4 bar, 0...400 kPa	16 bar
4P	0...10 bar, 0...1 000 kPa	40 bar
4S	0...40 bar, 0...4 000 kPa	160 bar

Process connections

Code	Thread
DB	Tri-Clamp ISO2852 DN25-38 (1...1-1½"), 316L, EHEDG, 3A, DIN32676 DN25-40
DL	Tri-Clamp ISO2852 DN40-51 (2"), 316L, 3A, EHEDG, DIN32676 DN50

Ceraphant PTP35		Order no.	Price/pcs. in USD		
Power Supply; Output	Electrical Connection		1 to 5	6 to 10	11 to 35
12-30 V DC; PNP switch 3-wire	Plug M12, IP65 gauge, IP66 absolute	PTP35-A1A1 [*] 3 [**] 4A	399.00	371.00	351.00
	Valve plug M16 ISO4400, IP65	PTP35-A2A1 [*] 3 [**] 4A	399.00	371.00	351.00
	Cable 5 m, IP66	PTP35-A4A1 [*] 3 [**] 4A	450.00	419.00	396.00
12-30 V DC; 2 × PNP switch 4-wire	Plug M12, IP65 gauge, IP66 absolute	PTP35-A1B1 [*] 3 [**] 4A	429.00	399.00	378.00
	Cable 5 m, IP66	PTP35-A4B1 [*] 3 [**] 4A	480.00	447.00	423.00
12-30 V DC; PNP switch + 4-20 mA 4-wire	Plug M12, IP65 gauge, IP66 absolute	PTP35-A1C1 [*] 3 [**] 4A	496.00	461.00	436.00
	Cable 5 m, IP66	PTP35-A4C1 [*] 3 [**] 4A	547.00	509.00	481.00

Plug and cable to be ordered as 'accessory'
* Please add code for measuring range. ** Please add code for process connection.

Accessories	Order no.	Price/pcs. in USD
Weld-in adapter G1, d=60, 316L Flush mount process connection. Seal: Silicone O-ring.	52001051	95.07
M12 socket for plug. 5 m cable PVC, Cu Sn/Ni lock.	52010285	14.95
Configuration kit for PC-programmable devices. Set-up programme + interface cable for PC with USB-Port.	TXU10-AA	219.94
Socket for plug 4p-125V, 4A-M12	52006263	16.87
M12 elbow plug ready for cable, IP67,PG7	51006327	17.19

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ptp35

More products to complete your measuring point ...

Flow switch
Flowphant T DTT35
page 66

Temperature switch
Thermophant T TTR35
page 72

Compact thermometer
Easytemp TMR35
page 78

Pressure transmitters for absolute and gauge pressure measurement

Cerabar T PMC131

Complete product information:
www.e-direct.us/pmc131

- Reliable with long-term stability
- Vacuum and overload stability
- Will withstand corrosion and abrasion

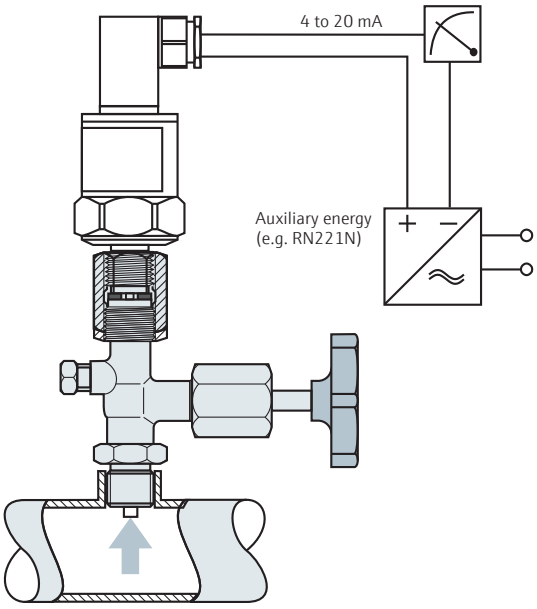
Specs at a glance:

- **Product:**
  Liquids, vapors and gases
- **Measuring cell:**
  Dry (oil-free) ceramic cell
- **Overload stability:**
  Up to factor 40
- **Measuring range (limits):**
  0 to 1.5 psi (100 mbar),
  0 to 600 psi (40 bar)
- **Product temperature:**
  -4 to +212°F (-20 to +100 °C)
- **Accuracy:**
  <0.5 %

Application The Cerabar T PMC131 measures absolute and gauge pressures in liquids, vapours and gases using a highly accurate, overload resilient ceramic capacitance sensor, which offers long-term stability and is resistant to corrosion and abrasion.

Function The measured pressure causes a slight deflection of the sensor diaphragm. The change in proportion to pressure is measured and is converted into a 4 to 20 mA output signal. The pressure transmitter is available with either a DIN 43650/ISO 4400 plug or cable entry for connection to an amplifier supply system such as a RN221N power supply.

Application example



Cerabar T pressure transducer with 4 to 20 mA output and auxiliary power supply, such as RN221N.

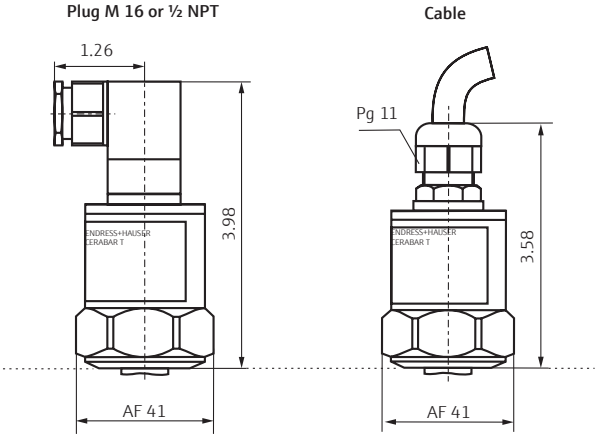
Technical data

General	
Output signal	4 to 20 mA/two-wire
Max. load R_a	R_a [Ω] ≤(U_b -11 V)/0.02 A
Accuracy	
Analog output	Reference conditions according to DIN IEC 770; ≤0.5 % FS[1] (linearity including hysteresis and repeatability)
Effect of ambient temperature	In relation to nominal value; -20 to +85 °C zero point: typ. <1.5 % of URL; range: typ. <1 % of URL
Long-term stability	<0.15 % FS[1] per annum
Response time T_{90}	20 ms
Operating conditions	
Material temperature	-4 to +212°F (-20 to +100 °C)
Ambient temperature	-4 to +185°F (-20 to +85 °C)
Storage temperature	-58 to 212°F (-50 to +100 °C)
Climate class	4K4H according DIN EN 60721-3
Protection	IP 65 plug IP 68 with cable entry (5 m or 25 m (16 ft or 82 ft))
Vibration stability	4M5 according to DIN EN 60721-3
EMC	Interference emission as per EN 61326 electrical device class B; interference immunity as per EN 61326 appendix A (industrial use)
Materials of construction	
Process connection	G ½ A according to DIN 16288, G ½ A according to ISO 228 hole Ø 6 mm or 11 mm (0.24" or 0.43")
Materials in contact with medium	Process connection and housing: 1.4301 Seal (internal location): FPM (Viton)
Process diaphragm	Al_2O_3 (aluminium oxide ceramic)
Electrical connection	4-pole plug connection according to ISO 4400 with cable connection M16 or 5/25 m (16/82 ft) fixed cable
Power supply U_b	
Supply voltage	U_b 11 to 30 V DC at 5 % wave
Special Versions	
Devices for oxygen applications (up to 435 psi (30 bar)) on request	
Approval	
GL-Approval available on demand	

[1] FS = Full Scale = Measuring range

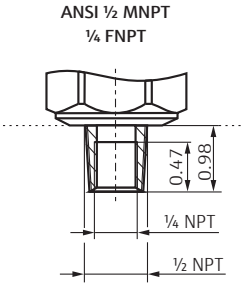
Dimensions (in inches)

Housing



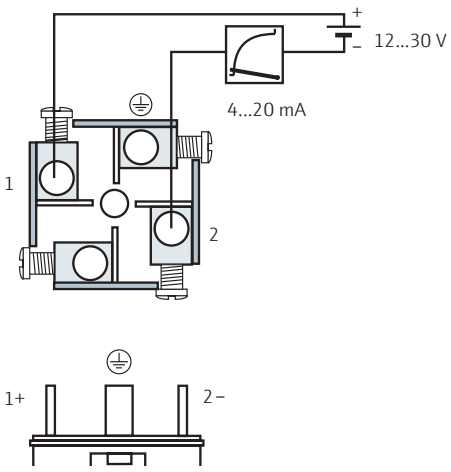
Installation according to instruction manual.

Process connection

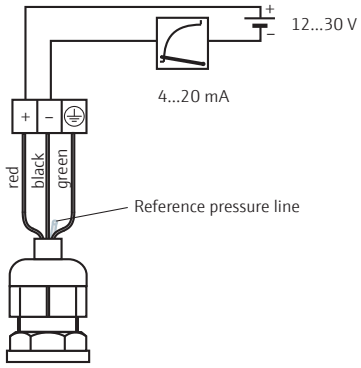


Electrical connection

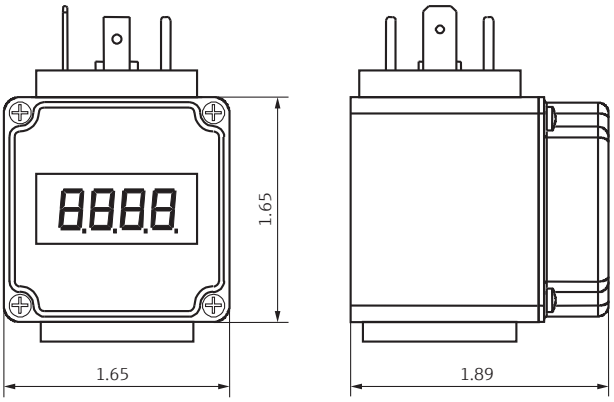
Plug ISO 4400/M16 or ½" NPT



Cable



Accessory: Display PHX20



(Dimensions in inches)

Technical data

Display	4 digits, red LED, loop powered to use in 4 to 20 mA loops, angular connector DIN 43650 7.62 mm (0.3") display height, turnable in angle of 90°
Display range	-1 999 to +9 999, programmable via two keys
Protection class	IP 65
Material	Plastic PA6 GF30, front screen PMMA
Voltage drop	≤5 V (equivalent burden of max. 250 Ω)

Price table

Measuring Range

Code	Gauge pressure	Overload
D10	0 to 100 mbar, 0 to 10 kPa	4 bar
D12	0 to 200 mbar, 0 to 20 kPa	5 bar
D14	0 to 400 mbar, 0 to 40 kPa	8 bar
A1G	0 to 1 bar, 0 to 100 kPa	10 bar
A1K	0 to 2 bar, 0 to 200 kPa	18 bar
A1Q	0 to 4 bar, 0 to 400 kPa	25 bar
A1R	0 to 6 bar, 0 to 600 kPa	40 bar
A1S	0 to 10 bar, 0 to 1 MPa	40 bar
A1T	0 to 16 bar, 0 to 1.6 MPa	40 bar
A1V	0 to 20 bar, 0 to 2 MPa	40 bar
A1W	0 to 25 bar, 0 to 2.5 MPa	60 bar
A1X	0 to 40 bar, 0 to 4 MPa	60 bar
Q4D	0 to 1.5 psi	60 psi
Q4F	0 to 5 psi	120 psi
Q4H	0 to 15 psi	150 psi
Q4K	0 to 30 psi	270 psi
Q4N	0 to 50 ps	375 psi
Q4R	0 to 150 psi	600 psi
Q4S	0 to 300 psi	600 psi
Q4T	0 to 500 psi	900 psi
S4N	0 to 50 in H_2O	75 psi
S4Q	0 to 100 in H_2O	120 psi

Code	Absolute pressure	Overload
D20	0 to 100 mbar, 0 to 10 kPa[1)]	4 bar
D22	0 to 200 mbar, 0 to 20 kPa[1)]	5 bar
D24	0 to 400 mbar, 0 to 40 kPa[1)]	8 bar
A2G	0 to 1 bar, 0 to 100 kPa	10 bar
A2H	0 to 1.6 bar, 0 to 160 kPa	18 bar
A2K	0 to 2 bar, 0 to 200 kPa	18 bar
A2Q	0 to 4 bar, 0 to 400 kPa	25 bar
A2R	0 to 6 bar, 0 to 600 kPa	40 bar
A2S	0 to 10 bar, 0 to 1 MPa	40 bar
A2T	0 to 16 bar, 0 to 1.6 MPa	40 bar
A2V	0 to 20 bar, 0 to 2 MPa	40 bar
A2W	0 to 25 bar, 0 to 2.5 MPa	60 bar
A2X	0 to 40 bar, 0 to 4 MPa	60 bar
R4D	0 to 1.5 psi	75 psi
R4F	0 to 5 psi	120 psi
R4H	0 to 15 psi	150 psi
R4K	0 to 30 psi	270 psi
R4N	0 to 50 psi	375 psi
R4R	0 to 150 psi	600 psi
R4S	0 to 300 psi	600 psi
R4T	0 to 500 psi	900 psi

[1)] FS = 1 bar for this measurement range

Code	Negative gauge pressure	Overload
D3W	-20 to +20 mbar, -2 to +2 kPa	4 bar
D31	-100 to +100 mbar, -10 to +10 kPa	7 bar
D38	-200 to +200 mbar, -20 to +20 kPa	5 bar
D39	-300 to +300 mbar, -30 to +30 kPa	8 bar
A3C	-1 to 0 bar, -100 to 0 kPa	10 bar
A3E	-1 to +1 bar, -100 to +100 kPa	10 bar
A3G	-1 to +3 bar, -100 to +300 kPa	20 bar
A3K	-1 to +9 bar, -0.1 to +0.9 MPa	40 bar
A3N	-1 to +15 bar, -0.1 to +1.5 MPa	40 bar
V6F	-1.5 to 1.5 psi	75 psi
V6N	-15 to 15 psi	150 psi
V6R	-15 to 30 psi	375 psi
V6S	-15 to 60 psi	375 psi
V6V	-15 to 150 psi	600 psi
W6N	-15 to 15 in H_2O	60 psi
W6O	-80 to 80 in H_2O	75 psi
W6R	-15 to 30 in H_2O	75 psi

Cerabar T PMC131 with threaded connection	Order no.	Price/pcs. in USD		
Electrical Connection	*	1 to 5	6 to 10	11 to 35
Plug ISO4400 M16, IP65 NEMA4X	PMC131-A12F1	307.00	286.00	270.00
Cable 5 m, IP68 NEMA6P	PMC131-A32F1	316.00	294.00	278.00
Cable 25 m, IP68 NEMA6P	PMC131-A42F1	341.00	317.00	300.00

Plug and cable to be ordered as 'accessory' * Please add code for measuring range.

Accessories	Order no.	Price/pcs. in USD
Display PHX20	52022914	238.83

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/pmc131

More products to complete your measuring point ...

Point level switch
Liquiphant T FTL20
page 11

Compact thermometer
Easytemp TMR31
page 75

Process transmitter
RMA42
page 123

Pressure transmitters for absolute and gauge pressures up to 6000 psi

Cerabar T PMP131

Complete product information:
www.e-direct.us/pmp131

- Vacuum and overload stability
- Reliable with long-term stability
- Front connected process connection

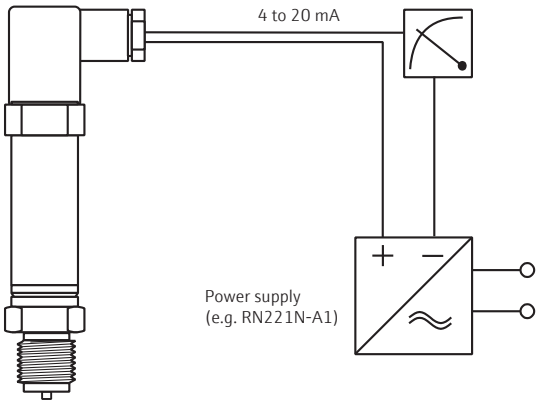
Specs at a glance:

- **Product:**
  liquids, vapors and gases
- **Output:**
  4 to 20 mA
- **Approval:**
  ATEX II 2G EEx ib IIC T6
  ATEX II 1/2G on demand
- **Measuring range - limits:**
  0 to 15 psi (1 bar),
  0 up to 6000 psi (400 bar)
- **Product temperature:**
  -13 to +158 °F (-25 to +70 °C)
- **Accuracy:**
  <0.5 %

Application The Cerabar T PMP131 with its polysilicon sensor provides absolute and gauge pressure measurement in liquids, vapors and gases. The process connection is available with either an internal or flush diaphragm. The flush version is especially suited to highly contaminated or viscous media. For the Cerabar PMP131 both the switch point and hysteresis in the range of 1.5 to 20 % can be adjusted.

Function The measured pressure causes a slight deflection of the sensor diaphragm. The change in proportion to pressure is measured and is converted into a 4 to 20 mA output signal. The pressure transmitter is available with either a DIN 43650/ISO 4400 plug or cable entry for connection to an amplifier supply system such as a RN221N power supply.

Application example



Cerabar T pressure transducer with 4 to 20 mA output and auxiliary power supply, such as RN221N.

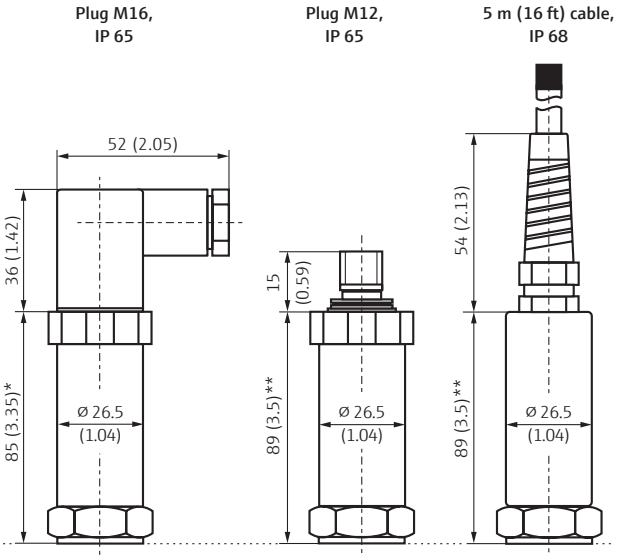
Technical data

Output	
Output signal	4 to 20 mA/two-wire, 0 to 10 V/three-wire
Max. load R_b	R_b [Ω] ≤ (U_b -12 V)/0.02 A
Accuracy	
Analog output	Reference conditions according to DIN IEC 770; 0.6 % FS1) (linearity including hysteresis and repeatability)
Effect of ambient temperature	In relation to nominal value zero point: typ. 0.2 % of URL/10 K; Range: typ. 0.2 % of URL/10 K
Long term stability	<0.15 % FS[1)] per annum
Response time T_{90}	6 ms
Operating conditions	
Material temperature	-13 to +158°F (-25 to +70 °C)
Ambient temperature	-13 to +158°F (-25 to +70 °C), in Ex-area -13 to +149°F (-25 to +65 °C)
Storage temperature	-40 to +185°F (-40 to +85 °C)
Climate class	4K4H according DIN EN 60721-3
Protection	IP 65 with plug; IP 68 with cable entry (5 m)
Vibration stability	4M5 according to DIN EN 60721-3
EMC	According to EN 61326
Mechanical construction	
Process connection	G ½ A according to DIN 16288 or G ½ A according to DIN 3852-A, SS 316L, front connecting
Materials in contact with medium	Process connection and housing: 1.4301 Fluid: Tegiloxan 3 Process diaphragm: 1.4435
Electrical connection	4-pole plug connection according to ISO 4400 with M16 cable connection or 5 m fixed cable
Power supply U_b	
Analog output	Non-Ex: 12...30 V DC at 5 % ripple Ex-version: open-circuit voltage ≤26 V; short circuit current ≤100 mA; power consumption ≤0.8 W
Approvals	
Ex approval	ATEX II 2G EEx ib IIC T6 ATEX II 1/2G on demand
GL-certificated transducer on demand	

[1)] FS = Full Scale = Measuring range

Dimensions (in inches)

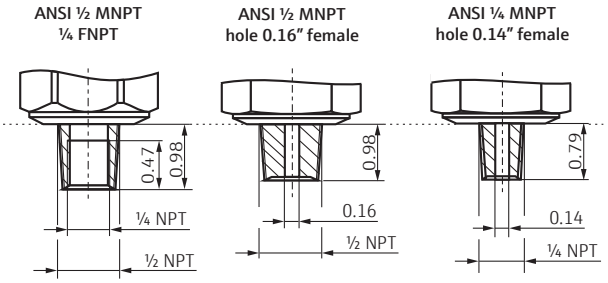
Housing



* + 25 mm (0.98") for sensor range > 100 bar
** + 21 mm (0.83") for sensor range > 100 bar

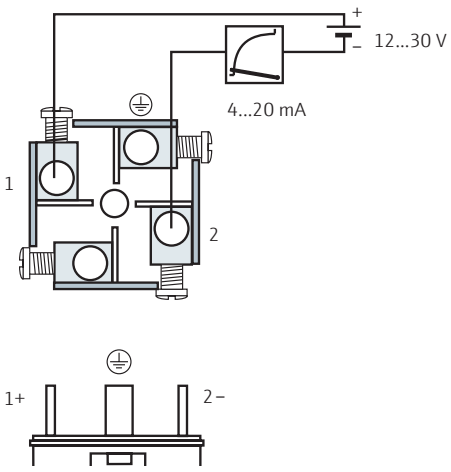
Installation according to instruction manual.

Process connections

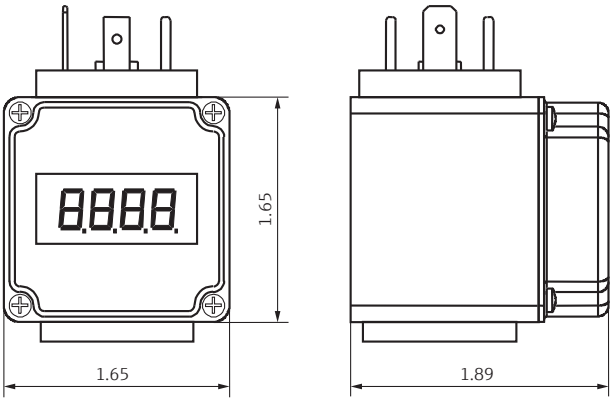


Electrical connection

Plug ISO 4400/M16 or ½" NPT



Accessory: Display PHX20 / PHX21



(Dimensions in inches)

Technical data

Display	4 digits, red LED, loop powered to use in 4 to 20 mA loops, angular connector DIN 43650 7.62 mm (0.3") display height, turnable in angle of 90°
Display range	-1 999 to +9 999, programmable via two keys
Protection class	IP 65
Material	Plastic PA6 GF30, front screen PMMA
Voltage drop	≤5 V (equivalent burden of max. 250 Ω)
Approval	PHX21: ATEX II 2G

Price table

Measuring Range

Code	Gauge pressure	Overload
A1G	0 to 1 bar, 0 to 100 kPa	4 bar, 400 kPa
A1H	0 to 1.6 bar, 0 to 160 kPa	6.4 bar, 640 kPa
A1N	0 to 2.5 bar, 0 to 250 kPa	10 bar, 1 MPa
A1Q	0 to 4 bar, 0 to 400 kPa	16 bar, 1.6 MPa
A1R	0 to 6 bar, 0 to 600 kPa	24 bar, 2.4 MPa
A1S	0 to 10 bar, 0 to 1 MPa	40 bar, 4 MPa
A1T	0 to 16 bar, 0 to 1.6 MPa	64 bar, 6.4 MPa
A1W	0 to 25 bar, 0 to 2.5 MPa	100 bar, 10 MPa
Q4H	0 to 15 psi	60 psi
Q4K	0 to 30 psi	150 psi
Q4N	0 to 50 psi	240 psi
Q4R	0 to 150 psi	600 psi
Q4S	0 to 300 psi	1500 psi

Code	Absolute pressure	Overload
A2G	0 to 1 bar, 0 to 100 kPa	4 bar, 400 kPa
A2H	0 to 1.6 bar, 0 to 160 kPa	6.4 bar, 640 kPa
A2N	0 to 2.5 bar, 0 to 250 kPa	10 bar, 1 MPa
A2Q	0 to 4 bar, 0 to 400 kPa	16 bar, 1.6 MPa
A2R	0 to 6 bar, 0 to 600 kPa	24 bar, 2.4 MPa
A2S	0 to 10 bar, 0 to 1 MPa	40 bar, 4 MPa
A2T	0 to 16 bar, 0 to 1.6 MPa	64 bar, 6.4 MPa
A2W	0 to 25 bar, 0 to 2.5 MPa	100 bar, 10 MPa
R4H	0 to 15 psi	60 psi
R4K	0 to 30 psi	150 psi
R4N	0 to 50 psi	240 psi
R4R	0 to 150 psi	600 psi
R4S	0 to 300 psi	1500 psi

Cerabar T PMP131		Order no.	Price/pcs. in USD		
Process Connection	Output	*	1 to 5	6 to 10	11 to 35
Thread ANSI MNPT½ FNPT¼, 304	4-20mA SIL	PMP131-A2201	297.00	276.00	261.00
	0-10V	PMP131-A2261	314.00	292.00	276.00
Thread ANSI MNPT½ hole, 304	4-20mA SIL	PMP131-A2301	297.00	276.00	261.00
	0-10V	PMP131-A2361	314.00	292.00	276.00
Thread ANSI ¼"MNPT hole, 304	4-20mA SIL	PMP131-A2501	297.00	276.00	261.00
	0-10V	PMP131-A2561	314.00	292.00	276.00

Plug and cable to be ordered as 'accessory'
* Please add code for measuring range.

Accessories	Order no.	Price/pcs. in USD
Display PHX20	52022914	238.83
Display PHX21	52022915	277.42

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/pmp131

More products to complete your measuring point ...

Capacitive probe
Liquicap T FMI21
page 8

RTD thermometer
Omnigrad T TST187
page 87

Process transmitter
RMA42
page 123

Hygienic pressure transmitter

Cerabar T PMP135

$ 417.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/pmp135

- Flush-mounted process connections with metal diaphragm
- FDA compliant fill oil
- Materials in contact with process made of 316L SS with a surface finish of R_a ≤0.8 µm

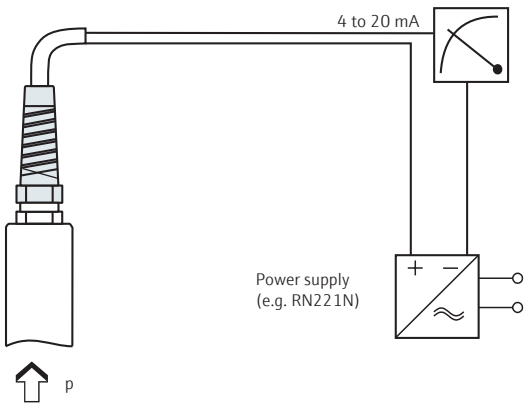
Specs at a glance:

- **Product:**
  Liquids, vapors and gases in the food industry
- **Output:**
  4 to 20 mA
- **Accuracy:**
  <0.5 %
- **Product temperature:**
  -13 to +212 °F
  (-25 to +100 °C),
  +275 °F (135 °C) for 1 h
- **Measuring range (limits):**
  0 to 15 psi (1 bar),
  0 to 600 psi (40 bar)

Application The Cerabar T PMP135 is a pressure transmitter designed for measuring absolute and gauge pressures in hygienic applications within in the food processing and pharmaceutical industries.

Function The process pressure acting on the metallic separating diaphragm of the sensor is transmitted to a resistance bridge via a fill fluid. The change in the output voltage of the bridge is proportional to the pressure and can be measured directly.

Application example



Cerabar T pressure transducer with 4 to 20 mA output and auxiliary power supply, such as RN221N.

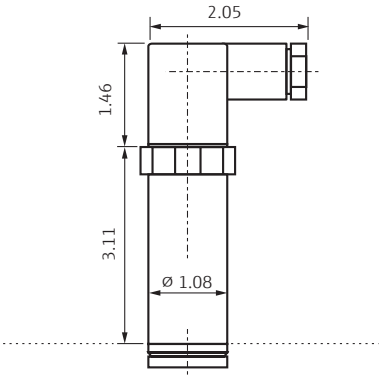
Technical data

Output	
Output signal	4 to 20 mA
Load	$R_B \leq (U_S - 12\ V)/0.02\ A$ (U_S = power supply)
Accuracy	
Non-linearity	≤0.5 % including hysteresis and non-reproducibility
Reference operating conditions	As per DIN IEC 60770, T = 77 °F (25 °C)
Effect of ambient temperature	In relation to nominal value zero point: typ. 0.2 % of URL/10 K; Range: typ. 0.2 % of URL/10 K
Long-term drift	≤0.15 % per year
Operating conditions	
Material temperature	-13 to +212 °F (-25 to +100 °C), +275 °F (135 °C) for 1 h
Ambient temperature	-13 to +158 °F (-25 to +70 °C) Ex i: -13 to +149 °F (-25 to +65 °C)
Storage temperature	-40 to +185 °F (-40 to +85 °C)
Climate class	4 Z: with Z = 158 °F (70 °C) as per VDI/VDE 3540
Mounting position	Any orientation. Orientation dependent zero shift can be corrected using potentiometer adjustments
Degree of protection	Plug PG 11 or ½" NPT: IP 65 Plug M12 × 1 when using gauge pressure sensors: IP 65 Plug M12 × 1 when using absolute pressure sensors: IP 68 (1 m (3.3 ft) water column) Cable: IP 68 (1 m (3.3 ft) water column)
Limiting medium pressure range	Maximum overload resistance, refer to measuring range Vacuum resistance up to 10 $mbar_{abs}$
Vibration resistance	4M5 as per DIN EN 60721-3
EMC	According to EN 61326
Mechanical construction	
Process connection	½", 1" Clamp; G1A with tapered metallic seal or with sealing surface for flush-mounted installation
Materials	Process connections and diaphragm: 316L SS; wetted surface smoothness: R_a ≤0.8 µm; Transmitter housing: 304 SS Cable outer covering: polyurethane (PUR) Fill fluid: Neobee M20
Power supply U_b	
Supply voltage	12 to 30 V DC
Residual ripple	Max. 5 %
Approvals	
Ex approval	ATEX II 1/2 G EEx ib IIC T6 ATEX II 2 G EEx ib IIC T6
3A	

Dimensions (in inches)

Housing

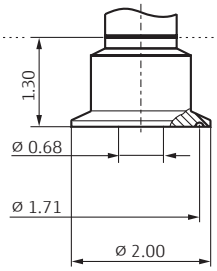
Plug M16, IP 65



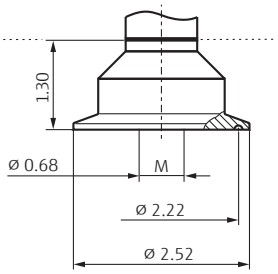
Installation according to instruction manual.

Process connections

Tri-Clamp 1" to 1½" (ISO 2852)

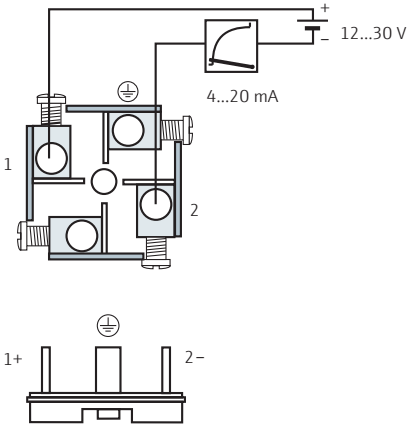


Tri-Clamp 2" (ISO 2852)

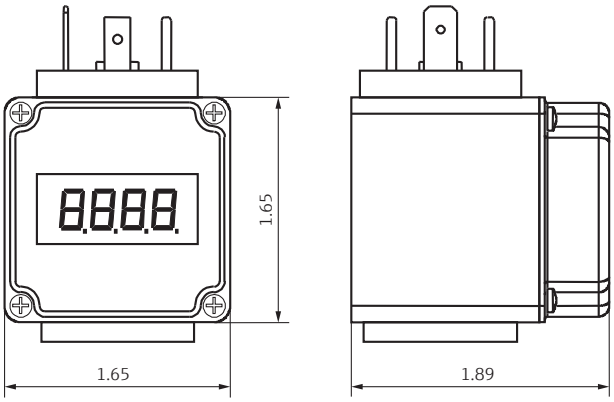


Electrical connection

Plug ISO 4400/M16 or ½" NPT



Accessory: Display PHX20 / PHX21



(Dimensions in inches)

Technical data	
Display	4 digits, red LED, loop powered to use in 4 to 20 mA loops, angular connector DIN 43650 7.62 mm (0.3") display height, turnable in angle of 90°
Display range	-1 999 to +9 999, programmable via two keys
Protection class	IP 65
Material	Plastic PA6 GF30, front screen PMMA
Voltage drop	≤5 V (equivalent burden of max. 250 Ω)
Approval	PHX21: ATEX II 2G

Price table

Measuring Range

Code	Gauge pressure	Overload
A1G	0 to 1 bar, 0 to 100 kPa	4 bar, 400 kPa
A1H	0 to 1.6 bar, 0 to 160 kPa	6.4 bar, 640 kPa
A1N	0 to 2.5 bar, 0 to 250 kPa	10 bar, 1 MPa
A1Q	0 to 4 bar, 0 to 400 kPa	16 bar, 1.6 MPa
A1R	0 to 6 bar, 0 to 600 kPa	24 bar, 2.4 MPa
A1S	0 to 10 bar, 0 to 1 MPa	40 bar, 4 MPa
A1T	0 to 16 bar, 0 to 1.6 MPa	64 bar, 6.4 MPa
A1W	0 to 25 bar, 0 to 2.5 MPa	100 bar, 10 MPa
A1X	0 to 40 bar, 0 to 4 MPa	160 bar, 16 MPa
Q4H	0 to 15 psi	60 psi
Q4K	0 to 30 psi	150 psi
Q4N	0 to 50 psi	240 psi
Q4R	0 to 150 psi	600 psi
Q4S	0 to 300 psi	1500 psi
Q4T	0 to 500 psi	2400 psi

Code	Absolute pressure	Overload
A2G	0 to 1 bar, 0 to 100 kPa	4 bar, 400 kPa
A2H	0 to 1.6 bar, 0 to 160 kPa	6.4 bar, 640 kPa
A2N	0 to 2.5 bar, 0 to 250 kPa	10 bar, 1 MPa
A2Q	0 to 4 bar, 0 to 400 kPa	16 bar, 1.6 MPa
A2R	0 to 6 bar, 0 to 600 kPa	24 bar, 2.4 MPa
A2S	0 to 10 bar, 0 to 1 MPa	40 bar, 4 MPa
A2T	0 to 16 bar, 0 to 1.6 MPa	64 bar, 6.4 MPa
A2W	0 to 25 bar, 0 to 2.5 MPa	100 bar, 10 MPa
A2X	0 to 40 bar, 0 to 4 MPa	160 bar, 16 MPa
R4H	0 to 15 psi	60 psi
R4K	0 to 30 psi	150 psi
R4N	0 to 50 psi	240 psi
R4R	0 to 150 psi	600 psi
R4S	0 to 300 psi	1500 psi
R4T	0 to 500 psi	2400 psi

Cerabar T PMP135; Output: 4-20mA SIL		Order no.	Price/pcs. in USD		
Electrical Connection	Process Connection	*	1 to 5	6 to 10	11 to 35
Plug ISO4400 NPT½, IP65 NEMA4X	Tri-Clamp ISO2852 DN25-38 (1...1½"), 316L, DIN32676 DN25-40, EHEDG, 3A	PMP135-A2G01	474.00	440.00	417.00
	Tri-Clamp ISO2852 DN40-51 (2"), 316L, DIN32676 DN50, EHEDG, 3A	PMP135-A2H01	474.00	440.00	417.00

Plug and cable to be ordered as 'accessory'
* Please add code for measuring range.

Accessories	Order no.	Price/pcs. in USD
Display PHX20	52022914	238.83
Display PHX21	52022915	277.42
Weld-in adapter G1, d=60, 316L	52001051	95.07

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/pmp135

More products to complete your measuring point ...

Point level switch
Liquiphant T FTL20H
page 14

Compact thermometer
Easytemp TMR35
page 78

Field indicator
RIA16
page 111

Electromagnetic flow measuring system

Proline Promag 10D

$ 2570.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/promag-10d

- High degree of accuracy and measuring stability
- No pressure loss, thus energy-saving
- Not sensitive to vibrations

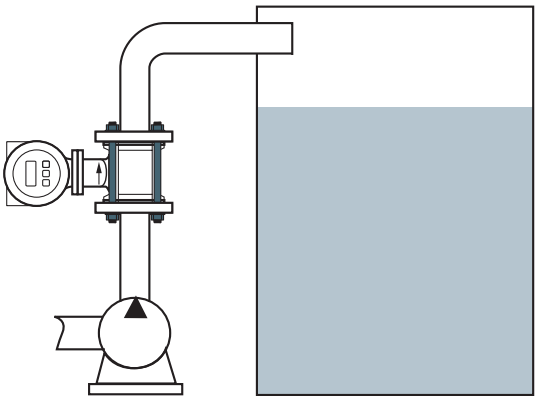
Specs at a glance:

- **Flow measurement:** up to 10 m/s (26.4 gal/min)
- **Minimum conductivity:** ≥50 µS/cm
- **Fluid temperature:** up to +60 °C (140 °F)
- **Lining material:** Polyamide
- **Process pressure:** up to 16 bar (870 psi)

Application Proline Promag 10D is an electromagnetic flowmeter for bidirectional measurement of conductive liquids. It is used for flow measurements in water or service water applications. Due to its easy installation and operation, its robust design and low price it can be used in applications where only limited principles could be used before. Drinking water approvals according to KTW/W270, WRAS BS 6920, ACS and NSF 61 are available.

Function Following Faraday's law of magnetic induction, a voltage is induced in a conductor moving through a magnetic field. In the electromagnetic measuring principle, the flowing fluid is the moving conductor. By measuring the induced voltage, the flow velocity of the medium can be measured. The flow volume is calculated by means of the pipe cross-section area.

Application example



Proline Promag 10D for inflow measurement

Technical data

Input	
Measuring ranges	Typically v = 0.01 to 10 m/s (0.033 to 33 ft/s) with the specified accuracy

Output signal	
Current output	Active: 4 to 20 mA, R_L <700 Ω (for HART®: ≥250 Ω)
Pulse/status output	Passive: 30 V DC/250 mA; Open Collector

Power supply	
Supply voltage	85 to 250 V AC, 45 to 65 Hz; 20 to 28 V AC, 45 to 65 Hz; 11 to 40 V DC
Power consumption (incl. sensor)	85 to 250 V AC: <12 VA; 20 to 28 V AC: <8 VA; 11 to 40 V DC: <6 W

Accuracy	
Reference operating conditions	as per DIN EN 29104 and VDI/VDE 2641
Fluid temperature	+28 °C ±2 K (+82 °F ±2 K)
Ambient temperature	+22 °C ±2 K (+72 °F ±2 K)
Warm-up period	30 minutes
Maximum measured error (Current output)	±0.5% of full scale value add. typically ±5 µA
Maximum measured error (Pulse output)	±0.5% of reading ±2 mm/s
Repeatability	Max. ±0.2% o.r. ±2 mm/s (o.r. = of reading)

Inlet and outlet run	
If possible, install the sensor well clear of assemblies such as valves, T-pieces, elbows, etc.	
Inlet run	5 × DN
Outlet run	≥2 × DN

Operating conditions: Environment	
Ambient temperature	–20 to +60 °C (–4 to +140 °F)
Storage temperature	–20 to +60 °C (–4 to +140 °F)
Degree of protection	IP 67 (NEMA 4X) for transmitter and sensor
Shock and vibration resistance	Acceleration up to 2 g following IEC 600 68-2-6
EMC	As per IEC/EN 61326 and NAMUR Recommendation NE 21; Emission: to limit value for industry EN 55011

Operating conditions: Process	
Medium temperature	0 to +60 °C (32 to 140 °F)
Minimum conductivity	≥50 µS/cm
Medium pressure	PN16
Pressure tightness	Measuring tube: 0 mbar abs (0 psi abs) with a fluid temperature of ≤60 °C (≤140 °F)

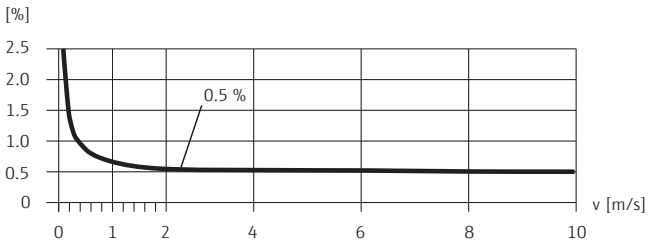
Material	
Ground disks	1.4301/304
Sensor housing	powder-coated die-cast aluminum
Measuring tube	polyamide, O-rings: EPDM
Electrodes	1.4435/316L
Fitted electrodes	Two electrodes made of 1.4435/316L

Mounting kit	
Included	
Contents	Mounting bolts, seals, nuts and washers

Human interface	
Display elements	Liquid crystal display: unilluminated, two-line, 16 characters per line
Display	Display (operating mode) preconfigured: volume flow and totalizer status
Operating elements	Local operation via three keys
Remote operation	Operation via HART® protocol and FieldCare

Approvals
Drinking water approval WRAS BS 6920

Maximum measured error

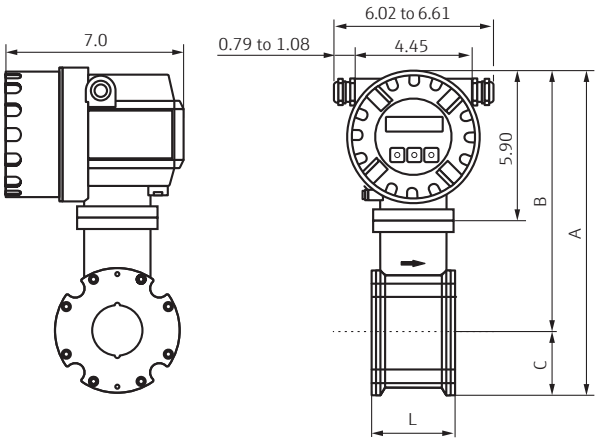


Fluctuations in the supply voltage do not have any effect within the specified range. Max. measured error in % of reading

Flow characteristic values

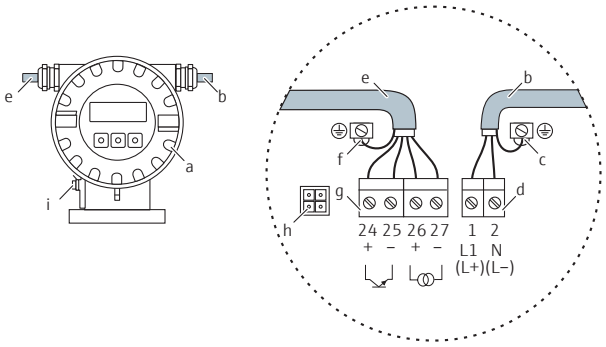
Diameter		Recommended flow	Factory settings		
[mm]	[inches]	min./max. full scale value (v ~ 0.3 or 10 m/s)	Full scale value current output (v ~ 2.5 m/s)	Pulse value (~ 2 Pulse/s)	Low flow cut off (v ~ 0.04 m/s)
25	1"	2.5 to 80 gal/min	18 gal/min	0.20 gal	0.25 gal/min
40	1 ½"	7 to 190 gal/min	50 gal/min	0.50 gal	0.75 gal/min
50	2"	10 to 300 gal/min	75 gal/min	0.50 gal	1.25 gal/min
65	-	16 to 500 gal/min	130 gal/min	1.00 gal	2 gal/min
80	3"	24 to 800 gal/min	200 gal/min	2.00 gal	2.5 gal/min
100	4"	40 to 1250 gal/min	300 gal/min	2.00 gal	4 gal/min

Dimensions (in inches)



DN		L	A	B	C	Weight
EN (DIN)/JIS [mm]	ANSI [inch]	[inch]	[inch]	[inch]	[inch]	[lbs]
25	1"	2.17	11.1	9.45	1.69	6.4
40	1 ½"	2.72	11.9	9.88	2.05	7.7
50	2"	3.27	12.8	10.3	2.44	9.5
65	-	(93 mm)	(342 mm)	(272 mm)	(70 mm)	5.1
80	3"	4.61	13.8	10.9	2.95	13.5
100	4"	5.83	14.9	11.4	3.50	19.4

Electrical connection



Connecting the transmitter, cable cross-section max. 2.5 mm²

a Electronics compartment cover
b Power supply cable
c Ground terminal for protective ground
d Terminal connector for power supply cable
e Signal cable
f Ground terminal for signal cable
g Terminal connector for signal cable
h Service connector
i Ground terminal for potential equalization

Terminal No.:

- 24 (+)/25 (-) = Pulse/status output
- 26 (+)/27 (-) = HART® current output

Functional values see "Output signal"

- 1 (L1/L+)/2 (N/L–) = Power supply

Functional values see "Supply voltage"

Price table

Electromagnetic flowmeter Promag 10D		Order no.	Price/pcs. in USD		
Power Supply; Display	Diameter		1 to 5	6 to 10	11 to 35
85-250 V AC 2-line, push buttons	DN25	10D25-5CGA1AA0A4AA+M1	2921.00	2716.00	2570.00
	DN40	10D40-5CGA1AA0A4AA+M1	2921.00	2716.00	2570.00
	DN50	10D50-5CGA1AA0A4AA+M1	2921.00	2716.00	2570.00
	DN65	10D65-5CGA1AA0A4AA+M1	3128.00	2909.00	2753.00
	DN80	10D80-5CGA1AA0A4AA+M1	3128.00	2909.00	2753.00
	DN100	10D1H-5CGA1AA0A4AA+M1	3316.00	3084.00	2918.00
20-28 V AC / 11-40VDC 2-line, push buttons	DN25	10D25-5CGA1AA0A5AA+M1	2921.00	2716.00	2570.00
	DN40	10D40-5CGA1AA0A5AA+M1	2921.00	2716.00	2570.00
	DN50	10D50-5CGA1AA0A5AA+M1	2921.00	2716.00	2570.00
	DN65	10D65-5CGA1AA0A5AA+M1	3128.00	2909.00	2753.00
	DN80	10D80-5CGA1AA0A5AA+M1	3128.00	2909.00	2753.00
	DN100	10D1H-5CGA1AA0A5AA+M1	3316.00	3084.00	2918.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/promag-10d

More products to complete your measuring point ...


Capacitive probe
Liquicap T FMI21
page 8


Pressure transmitter
Cerabar T PMC131
page 48


Paperless recorder
Ecograph T RSG35
page 104

Flow switch for monitoring of mass flow

Flowphant T DTT31

$ 480.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/dtt31

- On-site display
- High reproducibility and long-term stability
- Large turndown

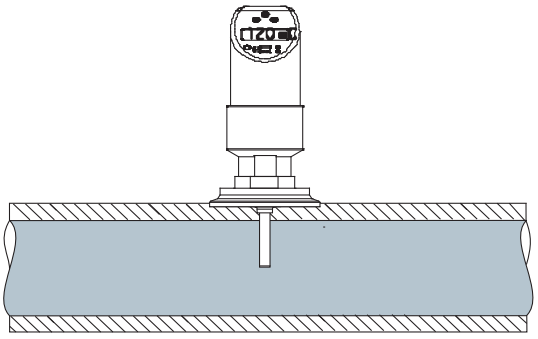
Specs at a glance:

- **Medium:** Liquids
- **Measuring range:** 0.1 to 9.84 ft/s
- **Medium temperature:** -4 to +185 °F
- **Process pressure:** 0 to 1450 psi (at 20 °C)

Application The Flowphant T DTT31 is a flow switch for monitoring, displaying and measuring relative mass flow rates of liquid media in the range from 0.03 to 3 m/s (0.1 to 9.84 ft/s). Application examples include: Monitoring cooling water circulation systems of pumps, turbines, compressors and heat exchangers and monitoring lubrication systems.

Function The device measures the mass flow of a liquid medium with the calorimetric measurement method. The calorimetric measuring principle is based on cooling a heated temperature sensor. Heat is removed from the sensor by forced convection due to medium flowing by. The extent of this heat transfer depends on the medium velocity and the difference in temperature between the sensor and medium (King's law). The higher the velocity or the mass flow of the medium, the greater the temperature sensor cooling.

Application example



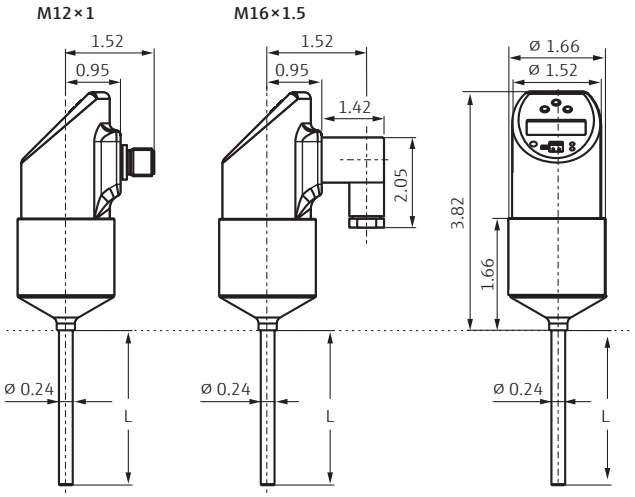
The Flowphant monitors the flow in a cooling circuit and signals when flow drops below a minimum flow rate.

Technical data

Input	
Measurement range	0 to 100 %; resolution 1 % 0.03 to 3 m/s (0.1 to 9.84 ft/s) for liquids
Output	
Output signal	1 × PNP, 2 × PNP or 1 × PNP with analog output for flow and temperature
Voltage drop PNP	≤2 V
Overload protection	Automatic testing
Performance characteristics	
Reference conditions	According to DIN IEC 60770/61003
Measured error	Switch point and display 0.2 %
Long-term drift	≤0.5 % per year under reference operating conditions
Sensor reaction time	6 to 12 s
Response time	Switch output 100 ms
Operating conditions	
Medium temperature	-20 to +85 °C (-4 to +185 °F)
Ambient temperature	-40 to +85 °C (-40 to +185 °F)
Degree of protection	With M16 × 1.5 valve plug: IP 65 with M12 × 1: IP 66
Power supply	
Supply voltage Ub	18 to 30 V DC, reverse polarity protection
Current consumption	Without load <100 mA at 24 V DC
General	
EMC	Interference emission as per IEC 61326 Series, class B electrical equipment; interference immunity as per IEC 61326 Series, appendix A (indust. use) and NAMUR Recomm. NE 21
Operating elements	3 buttons or PC and software
Materials	Process connection, protecting tube and housing 316L
Approvals	
Desina compliant	

Dimensions (in inches)

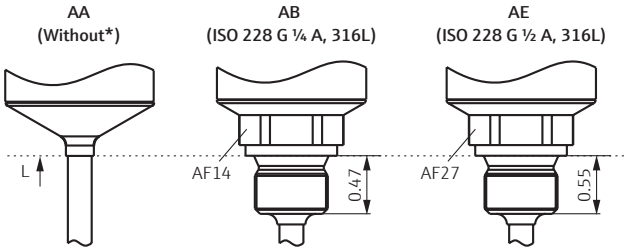
Housing



L = sensor length 1.16", 3.94"

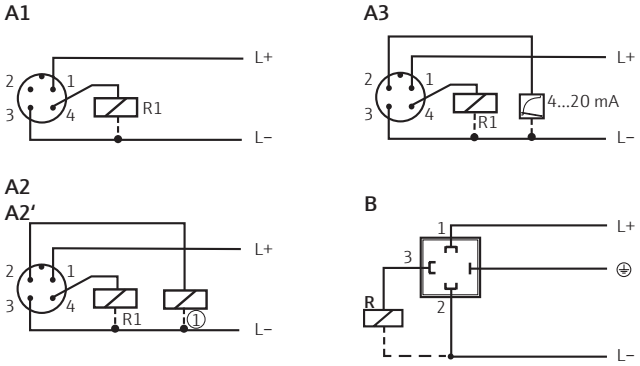
Installation according to instruction manual.

Process connections



* For mounting with welding boss or compression fitting: 3.94"

Electrical connection



DC voltage version with M12 × 1 connector

A1: 1 × PNP switch output
A2: 2 × PNP switch outputs R1 and (1) (R2)
A2': 2 × PNP switch outputs R1 and (1)
(diagnosis/break contact with adjustment „DESINA")
A3: PNP switch output, additional analog output

DC voltage version with valve plug M16 × 1.5

B: 1 × PNP switch output

Price table

Process connections

Code	Thread
A	ANSI NPT ¼", 316L
E	ANSI NPT ½", 316L

Flowphant DTT31			Order no.	Price/pcs. in USD		
Process Connection	Electrical Connection	Power Supply; Output	*	1 to 5	6 to 10	11 to 35
w/o; Compr. fitting, 316L, L=100mm insertion length Compr. fitting, to order separately	Plug M12	18-30VDC; 1 × switch PNP	DTT31-A1A111AA2CAB	546.00	508.00	480.00
		18-30VDC; 2 × switch PNP	DTT31-A1B111AA2CAB	570.00	530.00	502.00
		18-30VDC; switch PNP + 4-20mA	DTT31-A1C111AA2CAB	625.00	581.00	550.00
	Plug ISO4400 M16 × 1.5	18-30VDC; 1 × switch PNP	DTT31-A2A111AA2CAB	570.00	530.00	502.00
	Plug ISO4400 NPT½	18-30VDC; 1 × switch PNP	DTT31-A3A111AA2CAB	570.00	530.00	502.00
With thread ANSI NPT	Plug M12	18-30VDC; 1 × switch PNP	DTT31-A1A111D□2AAB	553.00	515.00	487.00
		18-30VDC; 2 × switch PNP	DTT31-A1B111D□2AAB	577.00	537.00	508.00
		18-30VDC; switch PNP + 4-20mA	DTT31-A1C111D□2AAB	633.00	588.00	557.00
	Plug ISO4400 M16 × 1.5	18-30VDC; 1 × switch PNP	DTT31-A2A111D□2AAB	577.00	537.00	508.00
	Plug ISO4400 NPT½	18-30VDC; 1 × switch PNP	DTT31-A3A111D□2AAB	577.00	537.00	508.00

Plug and cable to be ordered as 'accessory'
* Please add code for process connection.

Accessories	Order no.	Price/pcs. in USD
Compression fitt.kpl. welded d6 PEEK sealed compression fitting	51004751	91.80
Process connection G½" sealed compression fitting	51004753	74.04
Cable M12 × 1 l=5m 5m cable 4 × 0.34 mm², molded PVC angled connector, M12 × 1 connector screw Cu Sn/Ni, IP67.	51005148	21.26
Configuration kit TXU10-for PC-programmable devices. set-up programme+interface cable for PC with USB-Port. 4 pin plug + ReadWin® 2000	TXU10-AA	219.94
Socket for plug 4p-125V, 4A-M12 M12 socket for plug. Self confectionery connection. Usage: Plug M12.	52006263	16.87
M12 elbow plug ready for cable, IP67, PG7	51006327	17.19

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/dtt31

More products to complete your measuring point ...

Pressure switch
Ceraphant T PTC31
page 41

Flow measuring system
Proline Promag 10D
page 59

Temperature switch
Thermophant T TTR31
page 69

Flow switch for monitoring of mass flow in hygienic design

Flowphant T DTT35

$ 501.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/dtt35

- On-site display
- High reproducibility and long-term stability
- Large turndown

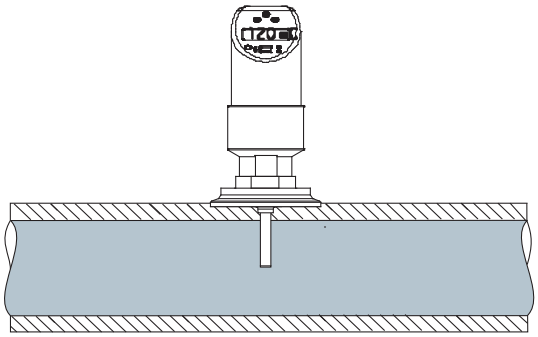
Specs at a glance:

- **Medium:** Liquids
- **Measuring range:** 0.1 to 9.84 ft/s
- **Medium temperature:** -4 to +185 °F
- **Process pressure:** 0 to 1450 psi (at 20 °C)

Application The Flowphant T DTT35 is a flow switch (surface quality R_a ≤0.8 µm) for monitoring, displaying and measuring relative mass flow rates of liquid media in the range from 0.03 to 3 m/s (0.1 to 9.84 ft/s). Application examples include: Monitoring cooling water circulation systems of pumps, turbines, compressors and heat exchangers and filter monitoring in the beverage industry.

Function The device measures the mass flow of a liquid medium with the calorimetric measurement method. The calorimetric measuring principle is based on cooling a heated temperature sensor. Heat is removed from the sensor by forced convection due to medium flowing by. The extent of this heat transfer depends on the medium velocity and the difference in temperature between the sensor and medium (King's law). The higher the velocity or the mass flow of the medium, the greater the temperature sensor cooling.

Application example



The Flowphant monitors the flow in a cooling circuit and signals when flow drops below a minimum flow rate.

Technical data

Input	
Measurement range	0 to 100 %; resol. 1 %; 0.03 to 3 m/s (0.1 to 9.84 ft/s) for liquids

Output	
Output signal	1 × PNP, 2 × PNP or 1 × PNP with analog output for flow and temperature
Voltage drop PNP	≤2 V
Overload protection	Automatic testing

Performance characteristics	
Reference conditions	According to DIN IEC 60770/61003
Measured error	Switch point and display 0.2 %
Long-term drift	≤0.5 % per year under reference operating conditions
Sensor reaction time	6 to 12 s
Response time	switch output 100 ms

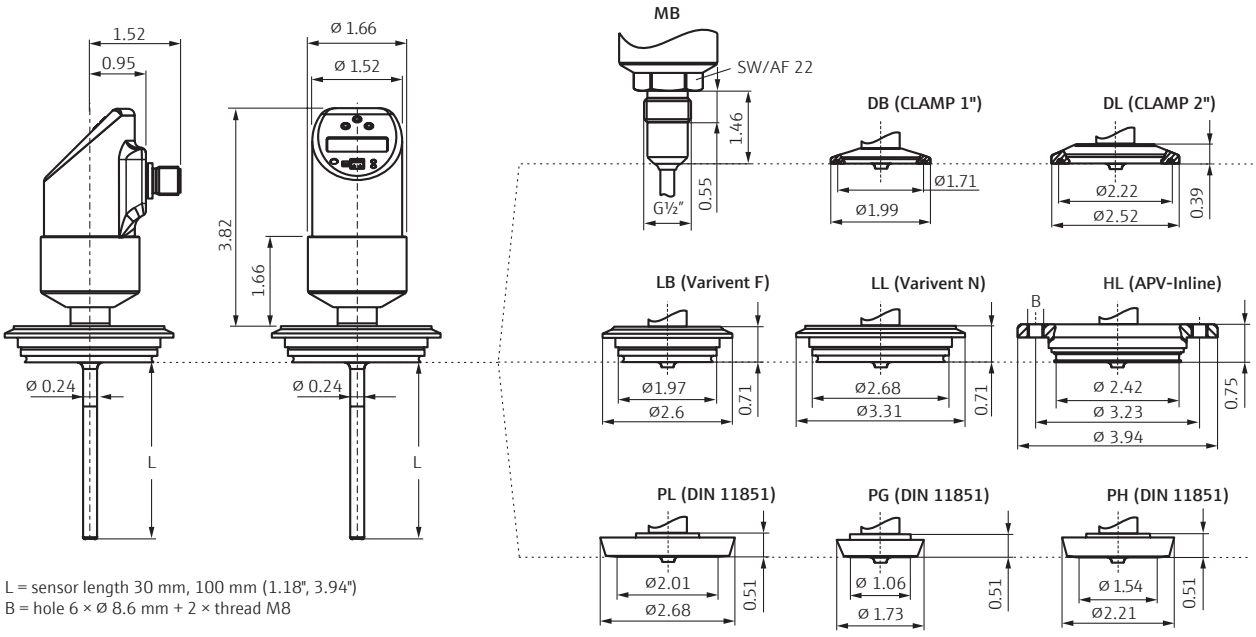
Operating conditions	
Medium temperature	-20 to +85 °C (-4 to +185 °F), 130 °C (266 °F) max. 1h (no measuring at temperatures >85 °C (185 °F))
Ambient temperature	-40 to +85 °C (-40 to +185 °F)
Degree of protection	IP 65 (complete housing)

Power supply	
Supply voltage U_b	18 to 30 V DC, reverse polarity protection
Current consumption	Without load <100 mA at 24 V DC

General	
EMC	Interference emiss. as per IEC 61326 Series, class B electrical equipment, interference immunity as per IEC 61326 Series, app. A (industrial use) and NAMUR Recomm. NE 21
Operating elements	3 buttons or PC and ReadWin® 2000
Materials	316L (process connection, protection tube, housing)
Surface quality	R_a ≤0.8 µm

Approvals
Desina compliant, 3A

Dimensions (in inches)

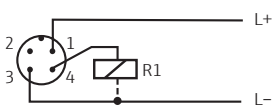


L = sensor length 30 mm, 100 mm (1.18", 3.94")
B = hole 6 × Ø 8.6 mm + 2 × thread M8

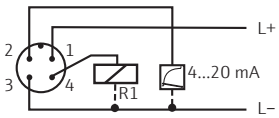
Installation according to instruction manual.

Electrical connection

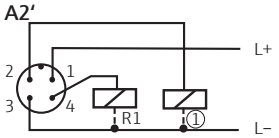
A1



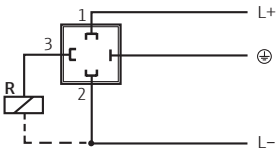
A3



A2
A2‘



B



DC voltage version with M12 × 1 connector
A1: 1 × PNP switch output
A2: 2 × PNP switch outputs R1 and (1) (R2)
A2‘: 2 × PNP switch outputs R1 and (1)
(diagnosis/break contact with adjustment „DESINA“)
A3: PNP switch output, additional analog output

DC voltage version with valve plug M16 × 1.5
B: 1 × PNP switch output

Price table

Process connections

Code	Thread
DB	Clamp ISO2852 DN25-38, 1-1½"
DL	Clamp ISO2852 DN40-51, 2"

*

Flowphant DTT35			Order no.	Price/pcs. in USD		
Length	Electrical Connection	Power Supply; Output		1 to 5	6 to 10	11 to 35
30 mm	Plug M12	18-30 V DC; 1 × switch PNP	DTT35-A1A111 ☐ 2AAB	569.00	529.00	501.00
		18-30 V DC; 2 × switch PNP	DTT35-A1B111 ☐ 2AAB	593.00	551.00	522.00
		18-30 V DC; switch PNP + 4-20mA	DTT35-A1C111 ☐ 2AAB	648.00	603.00	571.00
	Plug ISO4400 M16 × 1.5	18-30 V DC; 1 × switch PNP	DTT35-A2A111 ☐ 2AAB	593.00	551.00	522.00
50 mm	Plug M12	18-30 V DC; 1 × switch PNP	DTT35-A1A111 ☐ 2BAB	569.00	529.00	501.00
		18-30 V DC; 2 × switch PNP	DTT35-A1B111 ☐ 2BAB	593.00	551.00	522.00
		18-30 V DC; switch PNP + 4-20mA	DTT35-A1C111 ☐ 2BAB	648.00	603.00	571.00
	Plug ISO4400 M16 × 1.5	18-30 V DC; 1 × switch PNP	DTT35-A2A111 ☐ 2BAB	593.00	551.00	522.00
100 mm	Plug M12	18-30 V DC; 1 × switch PNP	DTT35-A1A111 ☐ 2CAB	569.00	529.00	501.00
		18-30 V DC; 2 × switch PNP	DTT35-A1B111 ☐ 2CAB	593.00	551.00	522.00
		18-30 V DC; switch PNP + 4-20mA	DTT35-A1C111 ☐ 2CAB	648.00	603.00	571.00
	Plug ISO4400 M16 × 1.5	18-30 V DC; 1 × switch PNP	DTT35-A2A111 ☐ 2CAB	593.00	551.00	522.00

Plug and cable to be ordered as ‘accessory’
* Please add code for process connection.

Accessories	Order no.	Price/pcs. in USD
Cable M12 × 1 l=5m – 5m cable 4 × 0.34 mm², molded PVC angled connector, M12 × 1 connector screw Cu Sn/Ni, IP67.	51005148	21.26
Configuration kit TXU10-for PC-programmable devices. Set-up programme + interface cable for PC with USB-Port. 4 pin plug + ReadWin® 2000	TXU10-AA	219.94
Socket for plug 4p-125V, 4A-M12	52006263	16.87
M12 elbow plug ready for cable, IP67, PG7	51006327	17.19
G½ metal to metal weld in adapter	60021387	50.65

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/dtt35

More products to complete your measuring point ...

Pressure switch
Ceraphant T PTP35
page 45

Pressure transmitter
Cerabar T PMP135
page 56

Temperature switch
Thermophant T TTR35
page 72

Temperature switch for measurement of process temperatures

Thermophant T TTR31

$ 373.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/ttr31

- High reproducibility and long-term stability
- Stainless steel housing 316L
- Fast response times without reduced tip

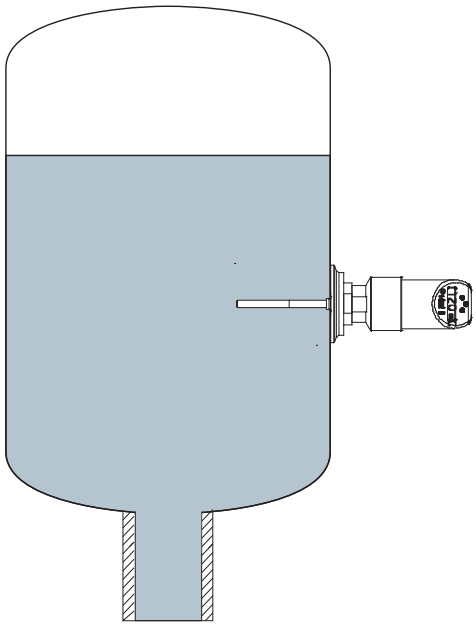
Specs at a glance:

- **Temperature range:**
  -50 to +150 °C (-58 to 302 °F)
- **Display:**
  4 digit, 14 segments display with color change
- **Immersion length:**
  50 mm, 100 mm, 200 mm (1.97", 3.94", 7.87")
- **Response time:**
  <1.0 s (T_{50}); <2.0 s (T_{90})
- **Sensor:**
  Ø 6 mm (0.24")
- **Accuracy:**
  <0.1 %

Application The Thermophant T TTR31 is a temperature switch for the monitoring, display and control of process temperatures and is available with a wide range of process connections.

Function A platinum sensor located at the measuring tip changes its resistance value depending on the temperature. This resistance value is recorded electronically. The conversion of the resistance value into a temperature measurement signal is defined by the international standard IEC 751.

Application example



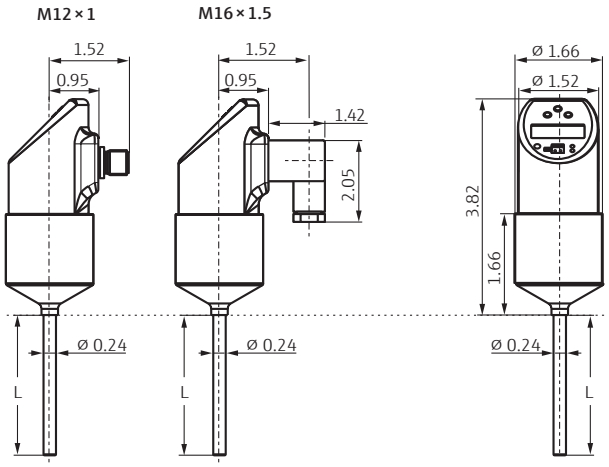
The Thermophant detects the temperature in the vessel and monitors the compliance with limit values.

Technical data

Supply voltage	
Power supply U_b	12 to 30 V DC
Current consumption	Without load <60 mA, reverse polarity protection
Output	
Output signal	1 or 2 × PNP or PNP with 4 to 20 mA
Voltage drop PNP	≤2 V
Overload protection	Automatic testing of switching current
Performance characteristics	
Reference conditions	According to DIN IEC 60770/61003
Measured error	Electronics max. 0.2 K or 0.16 % sensor Class A
Long-term drift	≤0,1 % per year
Sensor response time	T_{50} = <1.0 s; T_{90} = <2.0 s
Analog output	Non-linearity ≤0.2 %
Sensor	
Sensing element	1 × Pt100, four-wire
Tolerance	Class A to IEC 751
Medium temperature	-50 to +150 °C (-58 to 302 °F)
Diameter	6 mm (0.24")
Operating conditions	
Ambient temperature	-40 to +85 °C (-40 to +185 °F)
Protection	IP 65 (complete housing)
EMC	Interference emiss. as per IEC 61326 Series, class B electrical equipment, interference immunity as per IEC 61326 Series, app. A (indust. use) and NAMUR Recomm. NE 21
Materials	
Process connection and protection pipe	316L/R_a ≤0.8 µm; housing 316L
Operation	
Operating elements	3 buttons or PC and software
Approvals	
Desina compliant	

Dimensions (in inches)

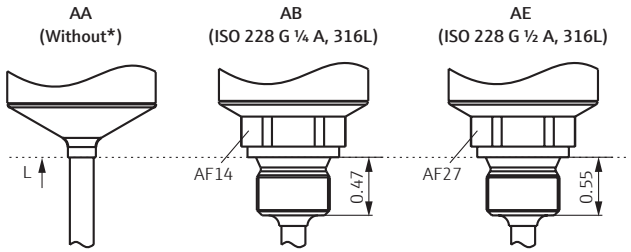
Housing



L = sensor length 1.97"/ 3.94"/ 7.87"

Installation according to instruction manual.

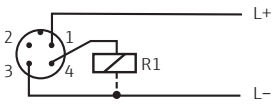
Process connections



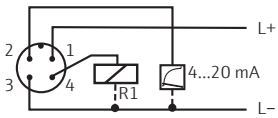
* For mounting with welding boss or compression fitting: 3.94"

Electrical connection

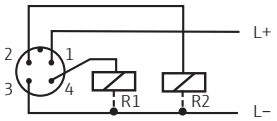
A1



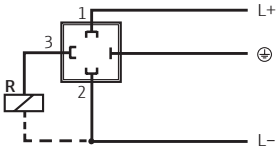
A3



A2



B



DC Voltage version with M12 connector
A1: 1 × PNP switch output
A2: 2 × PNP switch output
A3: PNP switch output with additional analog output

DC Voltage version with M16 × 1.5 connector
B: 1 × PNP switch output

Price table

Thermophant TTR31 with 1 × PNP				Order no.	Price/pcs. in USD		
Power Supply; Output	Electrical Conn.	Process Conn.	Immers. length		1 to 5	6 to 10	11 to 35
12-30 V DC; 1 × switch PNP	Plug ISO4400 NPT ½	Thread ANSI ¼ NPT, 316L	30 mm	TTR31-A3A112DA1AAB	423.00	394.00	373.00
			50 mm	TTR31-A3A112DA1BAB	423.00	394.00	373.00
			100 mm	TTR31-A3A112DA2CAB	423.00	394.00	373.00
			200 mm	TTR31-A3A112DA2EAB	438.00	407.00	385.00
		Thread ANSI ½ NPT, 316L	30 mm	TTR31-A3A112DE1AAB	423.00	394.00	373.00
			50 mm	TTR31-A3A112DE1BAB	423.00	394.00	373.00
			100 mm	TTR31-A3A112DE2CAB	423.00	394.00	373.00
			200 mm	TTR31-A3A112DE2EAB	438.00	407.00	385.00

Plug and cable to be ordered as 'accessory'

Accessories	Order no.	Price/pcs. in USD
Compression fitt.kpl. welded d6 PEEK; sealed compression fitting	51004751	91.80
Process connection G½"; sealed compression fitting	51004753	74.04
Cable M12 × 1, l=5m 5m cable 4 × 0.34 mm², molded PVC angled connector, M12 × 1 connector screw Cu Sn/Ni, IP67.	51005148	21.26
Configuration kit TXU10 – for PC-programmable devices. set-up programme + interface cable for PC with USB-Port. 4 pin plug + ReadWin® 2000	TXU10-AA	219.94
Socket for plug 4p-125V, 4A-M12 M12 socket for plug. Self confectionery connection. Usage: Plug M12.	52006263	16.87
M12 elbow plug ready for cable, IP67, PG7	51006327	17.19

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ttr31

More products to complete your measuring point ...

Point level switch
Liquiphant T FTL20
page 11

Pressure switch
Ceraphant T PTC31
page 41

Flow switch
Flowphant T DTT31
page 63

Hygienic temperature switch for measurement of process temperatures

Thermophant T TTR35

$ 407.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/ttr35

- Hygienic process connections
- Stainless steel housing 316L
- Fast response times without reduced tip

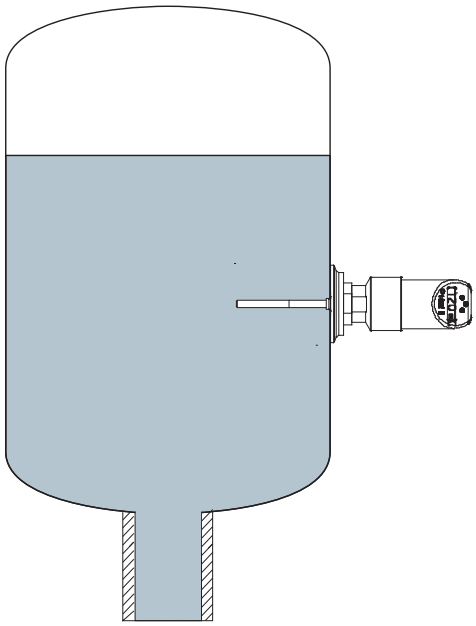
Specs at a glance:

- **Temperature range:**
  -50 to +150 °C (-58 to 302 °F)
- **Display:**
  4 digit, 14 segments display with color change
- **Immersion length (diameter):**
  50 / 100 / 200 mm (Ø 6 mm)
  (1.97", 3.94", 7.87" (Ø 0.24"))
- **Response time:**
  <1.0 s (T_{50}); <2.0 s (T_{90})
- **Surface finishing:**
  R_a ≤0.8 µm
- **Accuracy:**
  <0.1 %

Application The Thermophant T TTR35 is a Desina compliant temperature switch for the monitoring, display and control of process temperatures in hygienic applications.

Function A platinum sensor located at the measuring tip changes its resistance value depending on the temperature. This resistance value is recorded electronically. The conversion of the resistance value into a temperature measurement signal is defined by the international standard IEC 751.

Application example



The Thermophant detects the temperature in the vessel and monitors the compliance with limit values.

Technical data

Supply voltage	
Power supply U_b	12 to 30 V DC
Current consumption	Without load <60 mA, reverse polarity protection

Output	
Output signal	1 or 2 × PNP or PNP with 4 to 20 mA
Voltage drop PNP	≤2 V
Overload protection	Automatic testing of switching current

Performance characteristics	
Reference conditions	According to DIN IEC 60770/61003
Measured error	Electronics 0.2 K or 0.16 %; sensor Class A
Long-term drift	≤0.1 % per year
Sensor response time	T_{50} = <1.0 s; T_{90} = <2.0 s
Analog output	Non-linearity ≤0.2 %

Sensor	
Sensing element	1 × Pt100, four-wire
Tolerance	Class A to IEC 751
Medium temperature	-50 to +150 °C (-58 to 302 °F)
Diameter	6 mm (Ø 0.24")

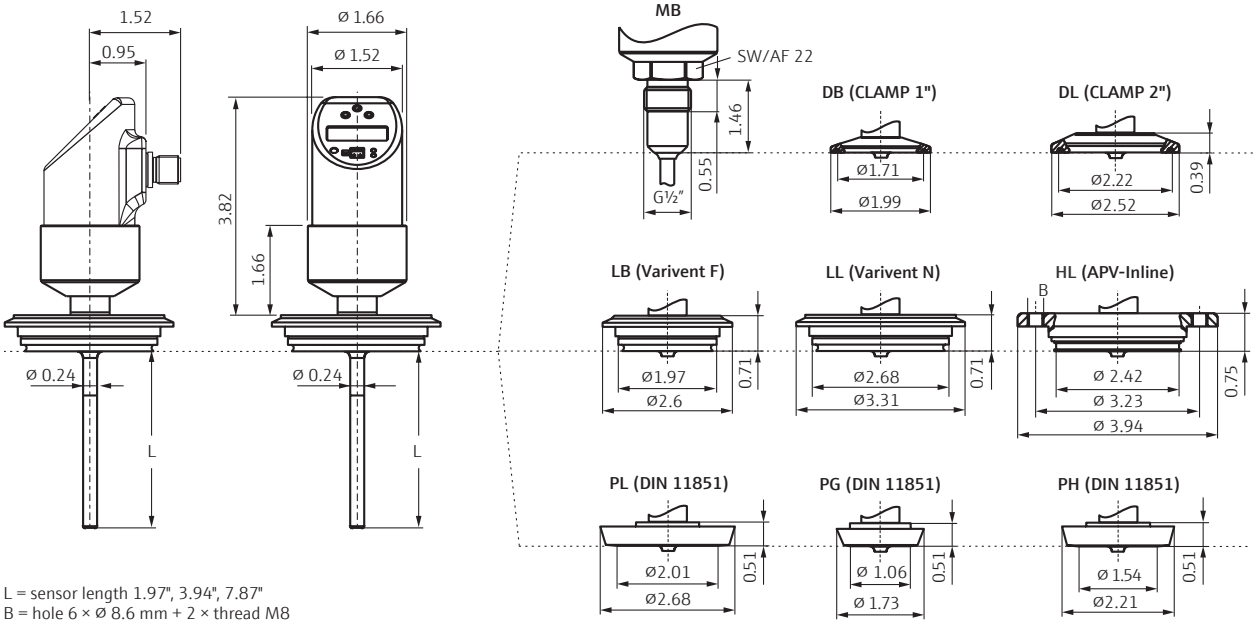
Operating conditions	
Ambient temperature	-40 to +85 °C (-40 to +185 °F)
Degree of Protection	IP 65 (complete housing)
EMC	Interference emission as per IEC 61326 Series, class B electrical equipment, interference immunity as per IEC 61326 Series, app. A (industrial use) and NAMUR Recomm. NE 21

Materials	
Process connection and protection pipe	316L/R_a ≤0.8 µm
Housing	316L

Operation	
Operating elements	3 buttons or PC and software

Approvals
3A
Desina compliant

Dimensions (in inches)

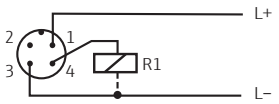


L = sensor length 1.97", 3.94", 7.87"
B = hole 6 × Ø 8.6 mm + 2 × thread M8

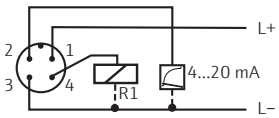
Installation according to instruction manual.

Electrical connection

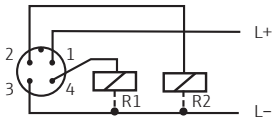
A1



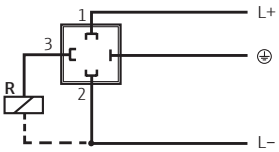
A3



A2



B



DC Voltage version with M12 connector
A1: 1 × PNP switch output
A2: 2 × PNP switch output
A3: PNP switch output with additional analog output

DC Voltage version with M16 × 1.5 connector
B: 1 × PNP switch output

Price table

Thermophant TTR35				Order no.	Price/pcs. in USD		
Power Supply; Output	Electrical Conn.	Process Conn.	Immers. length		1 to 5	6 to 10	11 to 35
12-30 V DC; 1 × switch PNP	Plug ISO4400 NPT ½	Clamp ISO2852 DN25-38, 1...1½"	20 mm	TTR35-A3A112DB1CAB	462.00	430.00	407.00
			50 mm	TTR35-A3A112DB1BAB	462.00	430.00	407.00
			100 mm	TTR35-A3A112DB2CAB	462.00	430.00	407.00
			200 mm	TTR35-A3A112DB2EAB	476.00	443.00	419.00
		Clamp ISO2852 DN40-51, 2",	20 mm	TTR35-A3A112DL1CAB	462.00	430.00	407.00
			50 mm	TTR35-A3A112DL1BAB	462.00	430.00	407.00
			100 mm	TTR35-A3A112DL2CAB	462.00	430.00	407.00
			200 mm	TTR35-A3A112DL2EAB	476.00	443.00	419.00

Plug and cable to be ordered as 'accessory'

Accessories	Order no.	Price/pcs. in USD
Cable M12 × 1, l=5m 5m cable 4 × 0.34 mm², molded PVC angled connector, M12 × 1 connector screw Cu Sn/Ni, IP67.	51005148	21.26
Configuration kit TXU10 – for PC-programmable devices. set-up programme + interface cable for PC with USB-Port. 4 pin plug + ReadWin® 2000	TXU10-AA	219.94
Socket for plug 4p-125V, 4A-M12 M12 socket for plug. Self confectionery connection. Usage: Plug M12.	52006263	16.87
M12 elbow plug ready for cable, IP67, PG7	51006327	17.19
G½ metal to metal weld in adapter	60021387	50.65

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ttr35

More products to complete your measuring point ...


Pressure transmitter
Cerabar T PMP135
page 54


Compact thermometer
Easytemp TMR35
page 78


Paperless recorder
Ecograph T RSG35
page 104

Compact thermometer with M12 plug-in connector, Pt100 or 4 to 20 mA

Easytemp TMR31

$ 149.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/tmr31

- PC programmable transmitter with 4 to 20 mA output or Pt100 sensor
- Fast response times without reduced tip
- Selectable sensor length

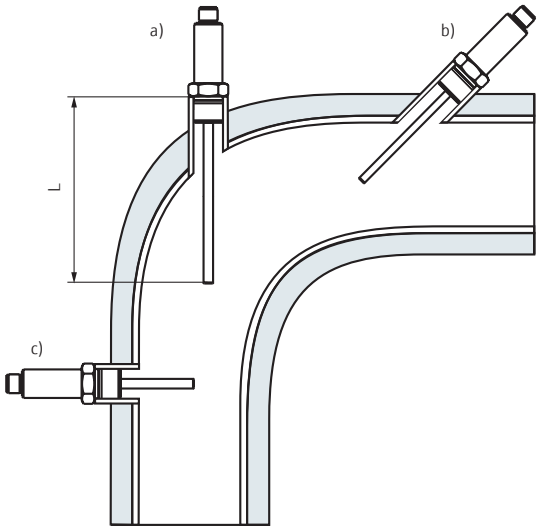
Specs at a glance:

- **Temperature range:** -50 to +200 °C (-58 to 392 °F)
- **Accuracy:** <0.08 %, Pt100 class A
- **Immersion length (diameter):** 40 to 600 mm (Ø 6 mm) (1.6 to 23.6" (Ø 0.24"))
- **Sensor response time:** <1.0 s (T_{50}), <2.0 s (T_{90})

Application The Easytemp TMR31 is a compact cost-effective thermometer that has been designed for use in all general applications across the process industries.

Function The compact thermometer consists of a Pt100 class A sensor, (optional) transducer and housing with process connection. The TMR31 is available without a process connection so that it can be combined with a TW251 thermowell (with compression fitting) for insertion into a process. The built-in electronics can be programmed using a PC and TXU10-BA configuration kit to convert the Pt100 input signal into a temperature linear 4 to 20 mA signal.

Installation instructions



Pipe installation

a) At angle sections, against the direction of flow
b) In smaller pipes, turned against the direction of flow
c) Perpendicular to the direction of flow

L = Insertion length

Technical data

Sensor	
Sensing element	1 × Pt100
Tolerance	Class A to IEC 751
Process temperature	-50 to +150 °C (-58 to 302 °F) (200 °C (392 °F) extension neck)
Material	316L
Diameter	6 mm (Ø 0.24")
Length	40 to 600 mm (1.6 to 23.6") selectable (please specify)
Response time	T_{50} = <1.0 s; T_{90} = <2.0 s
Max. pressure	100 bar / 1500 psi (at 100 mm / 3.94" and 20 °C / 68 °F, depending on process conn.)

Process connection	
Version	G ½", 316L; without (flange welding boss or compression fitting needed)

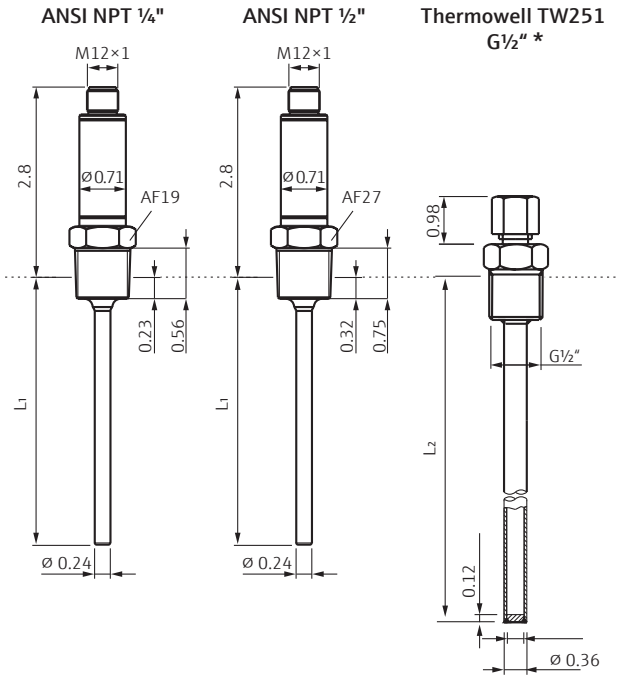
Transmitter housing	
Degree of protection	IP 66
Electrical connection	M12 × 1-plug-in connector
Material	304

Output characteristics	
Output signal	With electronics 4 to 20 mA, 20 to 4 mA without electronics Pt100
Signal on alarm	Under measuring range: linear decrease to 3.8 mA
	Over measuring range: linear increase to 20.5 mA
	Sensor break; Sensor short-circuit: ≤3.6 mA or 21.0 mA
Load	Max. ($U_{power\ supply}$ -10 V)/0.023 A
Induced current requirement	≤3.5 mA
Current limitation	≤23 mA
Switch-on delay	2 s

Power supply	
Supply voltage	U_b = 10 to 35 V DC
Residual ripple	Permitted residual ripple U_{ss} ≤3 V at U_b ≥13 V, f_{max} = 1 kHz
Accuracy	
Transmitter response time	1 s
Reference operating conditions	0 °C (32 °F) (ice bath)
Measuring error	0.1 K (0.18 °F) or 0.08 %
Influence of supply voltage	≤ ±0.01 %/V deviation from 24 V
Influence of ambient temperature (temperature drift)	T_d = ±(15 ppm/K × (full scale value of measuring range + 200) + 50 ppm/K × set measuring range) × Δθ Δθ = deviation of ambient temperature from the reference operating condition
Long term stability	≤0.1 K/year or 0.05 %/year
Influence of load	≤ ±0.02 %/100 Ω

Operating conditions	
Ambient temperature	-40 to +85 °C (-40 to 185 °F)
Storage temperature	-40 to +85 °C (-40 to 185 °F)
Climate class	As per EN 60 654-1, Class C
Condensation	Permitted
Shock resistance	4 g/2 to 150 Hz as per IEC 60068-2-6
EMC	According to IEC 61326 Series and NAMUR NE21

Dimensions (in inches)

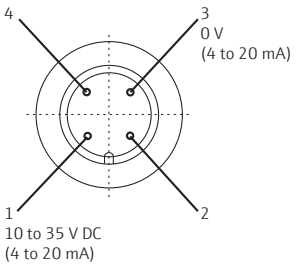


L1 = Insertion length 30 / 50 / 100 / 120 / 150 / 200 / 250 / 300 mm
(1.18" / 1.97" / 3.94" / 4.72" / 5.9" / 7.87" / 9.84" / 11.81")
L2 = 50 / 100 / 150 / 200 mm (1.97" / 3.94" / 5.9" / 7.87")
* The TMR31 has to be at least 50 mm (1.97") longer than L2

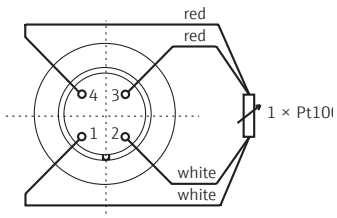
Installation according to operation instructions.

Electrical connection

4 to 20 mA



1 × Pt100



Price table

Easytemp TMR31			Order no.	Price/pcs. in USD		
Output	Process Connection	Insertion Length		1 to 5	6 to 10	11 to 35
Pt100, DIN class A, 4-wire	Thread ANSI ¼NPT, 316L	30 mm (1.18")	TMR31-A11AABAA1AAA	169.00	158.00	149.00
		50 mm (1.97")	TMR31-A11AABAB1AAA	169.00	158.00	149.00
		100 mm (3.94")	TMR31-A11AABAC1AAA	169.00	158.00	149.00
		120 mm (4.72")	TMR31-A11AABAD1AAA	169.00	158.00	149.00
		150 mm (5.9")	TMR31-A11AABAE1AAA	169.00	158.00	149.00
		200 mm (7.87")	TMR31-A11AABAG1AAA	169.00	158.00	149.00
		250 mm (9.84")	TMR31-A11AABAH1AAA	169.00	158.00	149.00
		300 mm (11.81")	TMR31-A11AABAJ1AAA	169.00	158.00	149.00
	Thread ANSI ½NPT, 316L	30 mm (1.18")	TMR31-A11AACAA1AAA	169.00	158.00	149.00
		50 mm (1.97")	TMR31-A11AACAB1AAA	169.00	158.00	149.00
		100 mm (3.94")	TMR31-A11AACAC1AAA	169.00	158.00	149.00
		120 mm (4.72")	TMR31-A11AACAD1AAA	169.00	158.00	149.00
		150 mm (5.9")	TMR31-A11AACAE1AAA	169.00	158.00	149.00
		200 mm (7.87")	TMR31-A11AACAG1AAA	169.00	158.00	149.00
		250 mm (9.84")	TMR31-A11AACAH1AAA	169.00	158.00	149.00
		300 mm (11.81")	TMR31-A11AACAJ1AAA	169.00	158.00	149.00

Accessories	Order no.	Price/pcs. in USD
Compression fitt.kpl. welded d6 PEEK – sealed compression fitting	51004751	91.80
Compression fitt.kpl. welded d6 PEEK	51004752	65.46
Process connection G½" – sealed compression fitting	51004753	74.04
Configuration kit TXU10 – set-up programme+interface cable for PC with USB-Port. 4 pin plug+ReadWin2000+adapter M12	TXU10-BA	250.14
Cable M12 × 1 l=5m	51005148	21.26
Thermowell TW251, immersion length 50 mm (1.97")	TW251-G2BA5S00	104.81
Thermowell TW251, immersion length 100 mm (3.94")	TW251-G2BC5S00	104.81
Thermowell TW251, immersion length 150 mm (5.9")	TW251-G2BE5S00	104.81
Thermowell TW251, immersion length 200 mm (7.87")	TW251-G2BG5S00	104.81

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/tmr31

More products to complete your measuring point ...

Pressure transmitter
Cerabar T PMC131
page 48

Digital indicator
RIA45
page 108

Process transmitter
RMA42
page 123

Hygienic compact thermometer with M12 connector, Pt100 or 4 to 20 mA

Easytemp TMR35

$ 167.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/tmr35

- Hygienic process connections, surface finishing R_a ≤0.8 µm
- Fast response times without reduced tip
- Compact thermometer from stainless steel

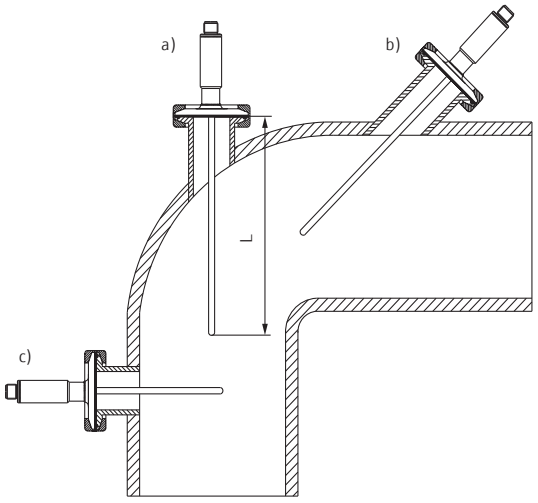
Specs at a glance:

- **Temperature range:** -50 to +200 °C (-58 to 392 °F)
- **Accuracy:** <0.08 %, Pt100 class A
- **Immersion length (diameter):** 40 to 600 mm (Ø 6 mm) (1.6 to 23.6" (Ø 0.24))
- **Sensor response time:** <1.0 s (T_{50}), <2.0 s (T_{90})

Application Characterised by simplicity and compact construction, the Easytemp TMR35 is available with a range of hygienic process connections. It offers good accuracy and response times and has been specifically designed for hygienic applications with 3-A certification.

Function The compact thermometer consists of a Pt100 class A sensor, (optional) transducer and housing with hygienic process connection. The built-in electronics can be programmed using a PC and TXU10-BA configuration kit to convert the Pt100 input signal into a temperature linear 4 to 20 mA signal.

Installation instructions



Pipe installation

a) At angle sections, against the direction of flow
b) In smaller pipes, turned against the direction of flow
c) Perpendicular to the direction of flow

L = Insertion length

Technical data

Sensor	
Sensing element	1 × Pt100
Tolerance	Class A according to IEC 751
Process temperature	-50 to +200 °C
Material	316L
Surface finishing	R_a ≤0.8 µm
Sensor diameter	6 mm (0.24")
Sensor length	40 to 600 mm selectable (please specify)
Response time	T_{50} = ≤1.0 s; T_{90} = ≤2.0 s
Max. pressure	100 bar / 1500 psi (at 100 mm / 3.94" and 20 °C / 68 °F, depending on process connection)

Process connection	
Version	Conical metal-to-metal connection, with G ½"; TRI-CLAMP® flange 1" 1-½", ISO 2852 DN 25/38; Dairy connection DIN 11851 DN 25; Varivent® Ø 68 mm for DN 32/125

Transmitter housing	
Degree of protection	IP 66
Electrical connection	M12 × 1-plug-in connector
Material	304

Output characteristics	
Output signal	4 to 20 mA, 20 to 4 mA / Pt100
Signal on alarm	Sensor break; Sensor short-circuit: ≤3.6 mA or ≥21.0 mA
Load	Max. ($U_{power\ supply}$ -10 V)/0.023 A
Ind. current requirem.	≤3.5 mA
Current limitation	≤23 mA
Switch-on delay	2 s

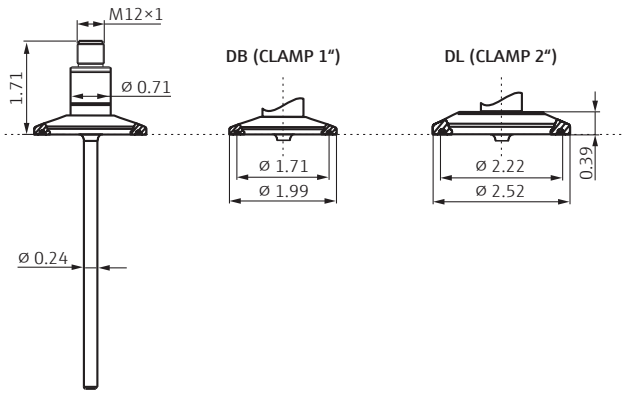
Power supply	
Supply voltage	U_b = 10 to 35 V DC
Residual ripple	Permitted residual ripple U_{ss} ≤3 V at U_b ≥13 V, f_{max} = 1 kHz

Accuracy	
Transmitter response time	1 s
Reference operating conditions	0 °C (32 °F) (ice bath)
Measuring error	0.1 K (0.18 °F) or 0.08 %
Influence of supply voltage	≤ ±0.01 %/V deviation from 24 V
Influence of ambient temperature (temperature drift)	T_d = ±(15 ppm / K × (full scale value of measuring range + 200) + 50 ppm/K × set measuring range) × Δθ Δθ = deviation of ambient temperature from the reference operating condition
Long-term stability	≤0.1 K/year or 0.05 %/year
Influence of load	≤ ±0.02 %/100 Ω

Operating conditions	
Ambient temperature	-40 to +85 °C (-40 to 185 °F)
Storage temperature	-40 to +85 °C (-40 to 185 °F)
Climate class	As per EN 60 654-1, Class C
Shock resistance	4 g/2 to 150 Hz as per IEC 60068-2-6
EMC	According to IEC 61326 Series and NAMUR NE21

Approvals
3A

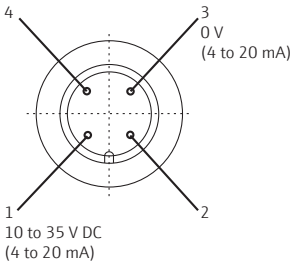
Dimensions (in inches)



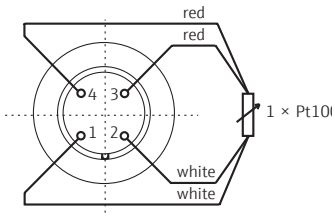
Installation according to operation instructions.

Electrical connection

4 to 20 mA



1 × Pt100



Price table

Easytemp TMR35			Order no.	Price/pcs. in USD		
Output	Process Connection	Length		1 to 5	6 to 10	11 to 35
Pt100, DIN class A, 4-wire	Clamp ISO2852 DN25-38, 1-1½", 316L,3A DIN32676 DN25-40	38 mm (1.57"); 3 mm (0,12"); w/o	TMR35-A11ADBBA1AAA	190.00	176.00	167.00
		82 mm (3.23"); 3 mm (0,12"); w/o	TMR35-A11ADBBB1AAA	190.00	176.00	167.00
		68 mm (2.68"); 3 mm (0,12"); w/o	TMR35-A11ADBBC1AAA	190.00	176.00	167.00
		98 mm (3.86"); 3 mm (0,12"); w/o	TMR35-A11ADBBD1AAA	190.00	176.00	167.00
	Clamp ISO2852 DN40-51, 2", 316L, 3A, DIN32676 DN50	38 mm (1.57"); 3 mm (0,12"); w/o	TMR35-A11ADLBA1AAA	190.00	176.00	167.00
		82 mm (3.23"); 3 mm (0,12"); w/o	TMR35-A11ADLBB1AAA	190.00	176.00	167.00
		68 mm (2.68"); 3 mm (0,12"); w/o	TMR35-A11ADLBC1AAA	172.00	160.00	152.00
		98 mm (3.86"); 3 mm (0,12"); w/o	TMR35-A11ADLBD1AAA	172.00	160.00	152.00

Accessories	Order no.	Price/pcs. in USD
G½ metal to metal weld in adapter	60021387	50.65
Configuration kit TXU10 – set-up programme+interface cable for PC with USB-Port. 4 pin plug+ReadWin2000+adapter M12	TXU10-BA	250.14
Cable M12 × 1 l=5m	51005148	21.26

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/tmr35

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Point level switch
Liquiphant T FTL20H
page 14


Pressure transmitter
Cerabar T PMP135
page 56


Flow measuring system
Proline Promag 10D
page 59

Compact thermometer with screw thread for demanding applications

Easytemp TSM187

$ 317.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/tsm187

- High accuracy sensor and transmitter
- Mineral insulated replaceable inset
- Replaceable electronics

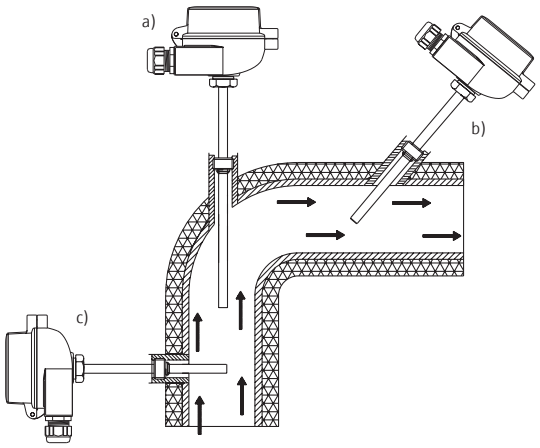
Specs at a glance:

- **Immersion length (diameter):**
  120 / 160 / 250 / 400 mm
  (Ø 9 mm)
  (4.7 / 6.3 / 9.9 / 15.8 inch
  (Ø 0.35"))
- **Temperature range:**
  -30 to +170 °C (-22 to +338 °F),
  0 to 100 °C (32 to 212 °F),
  0 to 200 °C (32 to 392 °F)
- **Pressure:**
  50 bar at +20 °C
  (725 PSI at +68 °F)
  1 bar at +400 °C
  (14.5 PSI at +752 °F)
- **Tolerance:**
  <0.08 %, Pt100 Class A
- **Response time:**
  ≤18 s (T_{50}), ≤55 s (T_{90})

Application The Easytemp TSM187 compact thermometer range covers a wide variety of market needs. Typical applications can be found in the chemical and pharmaceutical industry, pulp and paper, waste water and food industry. It is widely used in vessels and pipes where a reasonable response time is required.

Function TSM187 assembly includes a replaceable inset, in a mineral insulated sheath with a G½" process connection. The head transmitter (DIN 43729 Form B) is thermal decoupled via a extension neck. The integrated electronics convert the resistance value in a linearly temperature 4 to 20 mA signal.

Installation instructions



Pipe installation:

a) At elbows, against the flow
b) In smaller pipes, leant against the flow
c) Perpendicular to the flow

Technical data

Sensor	
Sensing element	Platinum resistance, 1 × Pt100 (100 Ω at 0 °C)
Measurement range	-30 to 170 °C (-22 to 338 °F), 0 to 100 °C (32 to 212 °F), 0 to 200 °C (32 to 392 °F)
Tolerance	Class A to IEC 751: -50 to +250 °C
Wiring	Four-wire connection, mineral insulated cable (MgO)
Insulation resistance	≥100 MΩ, test voltage 250 V at ambient temperature
Sheath diameter	6 mm (0.24")
Response time value	T_{50}/18 s; T_{90}/55 s; according to IEC 751
Operating conditions	50 bar at +20 °C (725 PSI at +68 °F) 1 bar at +400 °C (14.5 PSI at +752 °F)

Protecting tube	
Shape	DIN 43772 form 2G
Diameter	9 mm (0.35")
Material	SS 316Ti/1.4571

Process connection	
Shape	DIN 43772 form 2G
Screw Thread	G½", 1.4571/SS 316TI

Terminal head	
Type	DIN 43729 form B
Protection class	IP 66/68
Electrical connection	M20 × 1.5
Material	Aluminum, polyester powder coated

Output (Transmitter, replaceable)	
Output signal	4 to 20 mA transmission is temperature linear, resistance linear
Max. load	$(V_{power\ supply}$ -8 V)/0.022 A
Input current required	≤3.5 mA
Current limit	≤23 mA
Switch on delay	4 s (during power up I_a = 3.8 mA)
Response time	1 s

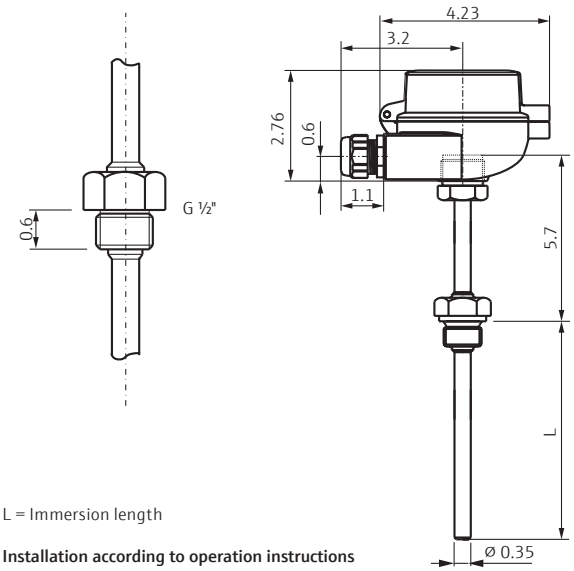
Signal on alarm (Transmitter, replaceable)	
Underranging	Linear drop to 3.8 mA
Overranging	Linear rise to 20.5 mA
Sensor breakage/ Sensor short circuit	≥21.0 mA

Electrical connection (Transmitter, replaceable)	
Power supply	U_b = 8 to 35 V, polarity protected
Galvanic isolation	Û = 3.75 kV
Allowable ripple	U_{ss} ≤5 V at U_b ≥13 V, f_{max} = 1 kHz
Reference conditions	Calibration temp. +23 °C (73 °F) ±5 K (9 °F)

Accuracy (Transmitter, replaceable)	
Influence of power supply	≤ ±0.01 %/V deviation from 24 V
Load influence	≤ ±0.02 %/100 Ω
Temperature drift	T_d = ±(15 ppm/K × max. meas. range + 50 ppm/K × preset meas. range) x Δθ
Pt100	0.2 K or 0.08 %

Operating conditions (Transmitter, replaceable)	
Ambient temperature	-40 to +85 °C (-58 to +185 °F)
Climatic class	As per IEC 60 654-1, Class C
Vibration protection	4 g / 2 to 150 Hz according to IEC 60 068-2-6
EMC	Shock resistance and interference emission as per IEC 61326 and NAMUR NE 21

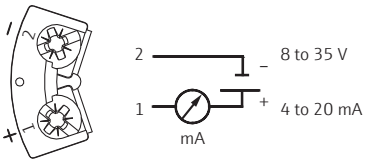
Dimensions (in inches)



L = Immersion length

Installation according to operation instructions

Electrical connection



Power supply and current output

Price table

Easytemp TSM187		Order no.	Price/pcs. in USD		
Measuring Range	Immersion Length L		1 to 5	6 to 10	11 to 35
-30 to +170 °C (-22 to +338 °F)	120 mm (4.7")	TSM187-ADD	361.00	335.00	317.00
	160 mm (6.3")	TSM187-BDD	361.00	335.00	317.00
	250 mm (9.9")	TSM187-CDD	370.00	344.00	326.00
	400 mm (15.8")	TSM187-DDD	379.00	353.00	334.00
0 to +100 °C (32 to 212 °F)	120 mm (4.7")	TSM187-AFE	361.00	335.00	317.00
	160 mm (6.3")	TSM187-BFE	361.00	335.00	317.00
	250 mm (9.9")	TSM187-CFE	370.00	344.00	326.00
	400 mm (15.8")	TSM187-DFE	379.00	353.00	334.00
0 to +200 °C (32 to 392 °F)	120 mm (4.7")	TSM187-AFH	361.00	335.00	317.00
	160 mm (6.3")	TSM187-BFH	361.00	335.00	317.00
	250 mm (9.9")	TSM187-CFH	370.00	344.00	326.00
	400 mm (15.8")	TSM187-DFH	379.00	353.00	334.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/tsm187

More products to complete your measuring point ...

Vibronic limit switch
Soliphant T FTM20
page 30

Pressure transmitter
Cerabar T PMC131
page 48

Barrier
RB223
page 135

Compact thermometer with screw thread for simple applications

Easytemp TSM487

$ 235.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/tsm487

- High accuracy in sensor and transmitter
- Fiberglass insulated replaceable insert
- Replaceable electronics

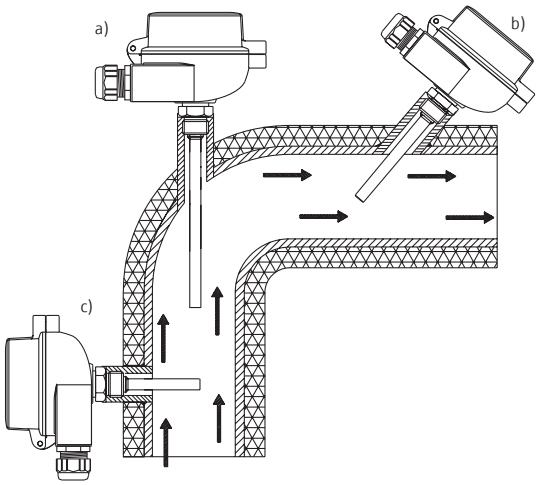
Specs at a glance:

- **Immersion length (diameter):**
  50 / 100 / 150 / 250 mm
  (ø 6 mm)
  2 / 3.9 / 5.9 / 9.8 inch
  (ø 0.24")
- **Temperature range:**
  -30 to +170 °C (-22 to +338 °F),
  0 to 100 °C (32 to 212 °F),
  0 to 200 °C (32 to 392 °F)
- **Pressure:**
  20 bar at +20 °C
  (290 PSI at +68 °F)
- **Tolerance:**
  <0.08 %, Pt100 Class A
- **Response time:**
  ≤3.5 s (T_{50}), ≤8 s (T_{90})

Application The Easytemp TSM487 temperature compact thermometer is widely used in many light or medium duty applications either in vessels or in pipes with low pressures and no extreme temperatures.

Function The fiber isolated inset sits in a protecting tube with process connection G ½" cable. The head transmitter (DIN 43729 form B) is made of aluminium. The integrated electronics convert the resistance value in a linearly temperature 4 to 20 mA signal.

Installation instructions



Pipe installation:

a) At elbows, against the flow
b) In smaller pipes, leant against the flow
c) Perpendicular to the flow

Technical data

Sensor	
Sensing element	Platinum resistance, 1 × Pt100 (100 Ω at 0 °C)
Measurement range	-30 to 170 °C (-22 to 338 °F), 0 to 100 °C (32 to 212 °F), 0 to 200 °C (32 to 392 °F)
Tolerance	Class A acc. to IEC 751: -50 to +250 °C
Wiring	Four-wire connection, fiberglass insulated cable
Insulation resistance	≥100 MΩ, test voltage 250 V at ambient temperature
Maximum pressure	20 bar at 20 °C (290 PSI at +68 °F)
Response time value	T_{50}/3.5 s; T_{90}/8 s; according to IEC 751

Process connection	
Version	DIN 43772 form 2G
Screw thread	G ½", 1.4571/SS 316TI; ½" NPT-M, 1.4404/SS 316 L

Terminal head	
Type	DIN 43729 form B
Protection class	IP 66/68
Electrical connection	M20 × 1.5
Material	Aluminum, polyester powder coated

Output (Transmitter, replaceable)	
Output signal	4 to 20 mA transmission is temperature linear, resistance linear
Maximum load	$(V_{power\ supply}$ -8 V)/0.022 A
Input current required	≤3.5 mA
Current limit	≤23 mA
Switch on delay	4 s (during power up I_a = 3.8 mA)
Response time	1 s

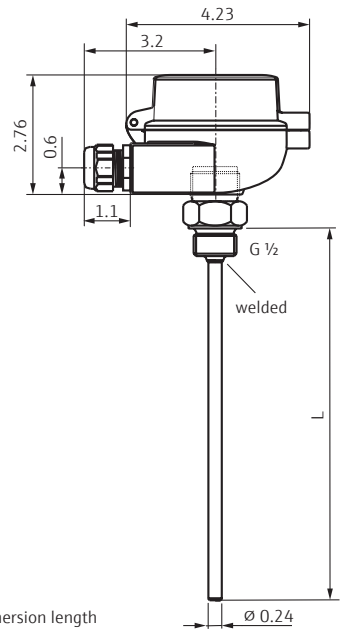
Signal on alarm (Transmitter, replaceable)	
Underranging	Linear drop to 3.8 mA
Overranging	Linear rise to 20.5 mA
Sensor breakage / Sensor short circuit	≥21.0 mA

Electrical connection (Transmitter, replaceable)	
Power supply	U_b = 8 to 35 V, polarity protected
Galvanic isolation	Û = 3.75 kV
Allowable ripple	U_{ss} ≤5 V at U_b ≥13 V, f_{max} = 1 kHz
Reference conditions	Calibration temp. +23 °C (73 °F) ±5 K (9 °F)

Accuracy (Transmitter, replaceable)	
Influence of power supply	≤ ±0.01 %/V deviation from 24 V
Load influence	≤ ±0.02 %/100 Ω
Temperature drift	T_d = ±(15 ppm/K × max. meas. range + 50 ppm/K × preset meas. range) × Δθ
Pt100	0.2 K or 0.08 %

Operating conditions (Transmitter, replaceable)	
Ambient temperature	-40 to +85 °C (-58 to +185 °F)
Climatic class	As per IEC 60 654-1, class C
Vibration protection	4 g / 2 to 150 Hz nach IEC 60 068-2-6
EMC	Shock resistance and interference emission as per IEC 61326 and NAMUR NE 21

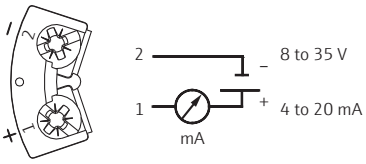
Dimensions (in inches)



L = Immersion length

Installation according to operation instructions

Electrical connection



Power supply and current output

Price table

Easytemp TSM487		Order no.	Price/pcs. in USD		
Measuring Range	Immersion Length L		1 to 5	6 to 10	11 to 35
-30 to +170 °C (-22 to 338 °F)	50 mm (2")	TSM487-ADD	268.00	249.00	235.00
	100 mm (3.9")	TSM487-BDD	268.00	249.00	235.00
	150 mm (5.9")	TSM487-CDD	271.00	252.00	238.00
	250 mm (9.8")	TSM487-DDD	273.00	254.00	240.00
0 to 100 °C (32 to 212 °F)	50 mm (2")	TSM487-AFE	268.00	249.00	235.00
	100 mm (3.9")	TSM487-BFE	268.00	249.00	235.00
	150 mm (5.9")	TSM487-CFE	271.00	252.00	238.00
	250 mm (9.8")	TSM487-DFE	273.00	254.00	240.00
0 to 200 °C (32 to 392 °F)	50 mm (2")	TSM487-AFH	268.00	249.00	235.00
	100 mm (3.9")	TSM487-BFH	268.00	249.00	235.00
	150 mm (5.9")	TSM487-CFH	271.00	252.00	238.00
	250 mm (9.8")	TSM487-DFH	273.00	254.00	240.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/tsm487

More products to complete your measuring point ...

Point level switch
Liquiphant T FTL20
page 11

Pressure switch
Ceraphant T PTC31
page 41

Power supply
RN221N
page 129

RTD thermometer with screw thread for demanding applications

Omnigrad T TST187

$ 239.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/tst187

- Class A accuracy (according to IEC 751 or EN 60751)
- Mineral insulated replaceable insert
- With thermowell, threaded process connection and extension neck

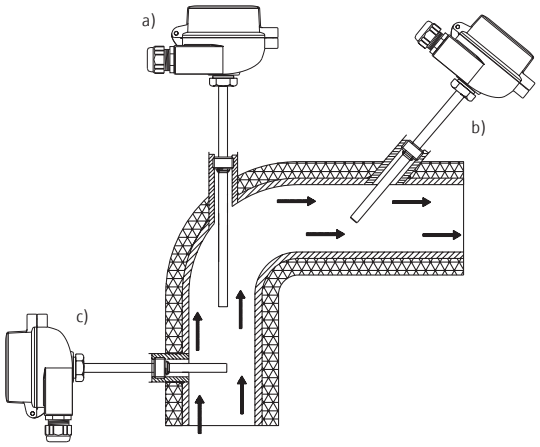
Specs at a glance:

- **Temperature range:**
  -50 to +400 °C (-58 to +752 °F)
- **Tolerance:**
  Pt100 Class A
- **Immersion length (diameter):**
  120 / 160 / 250 / 400 mm
  (Ø 9 mm)
  (4.7" / 6.3" / 9.9" / 15.8"
  (Ø 0.35"))
- **Response time:**
  ≤18 s (T_{50}), ≤55 s (T_{90})

Application The Omnigrad T TST187 RTD thermometer range covers a wide variety of market needs worldwide. Typical applications can be found in the chemical and pharmaceutical industry, pulp and paper, waste water and food industry. It is widely used in vessels and pipes where a reasonable response time is required.

Function The Omnigrad T TST187 RTD thermometer assembly includes a replaceable inset, in mineral insulated sheath with a G½" process connection. The head transmitter (DIN 43729 Form B) is thermal decoupled via a extension neck. The inset is available either with flying leads for head transmitter mounting or with terminal block.

Installation instructions



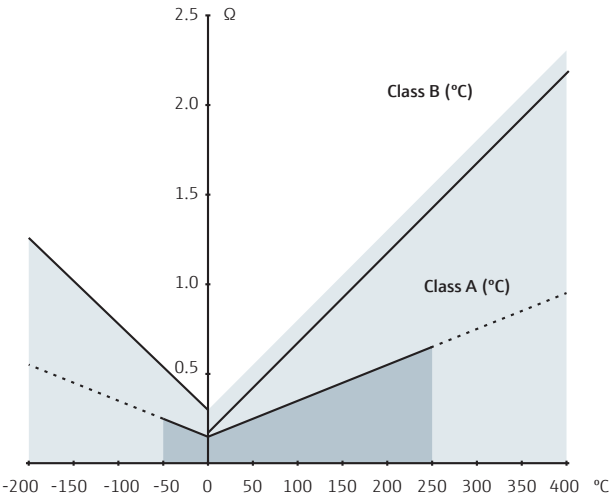
Pipe installation:

a) At elbows, against the flow
b) In smaller pipes, leant against the flow
c) Perpendicular to the flow

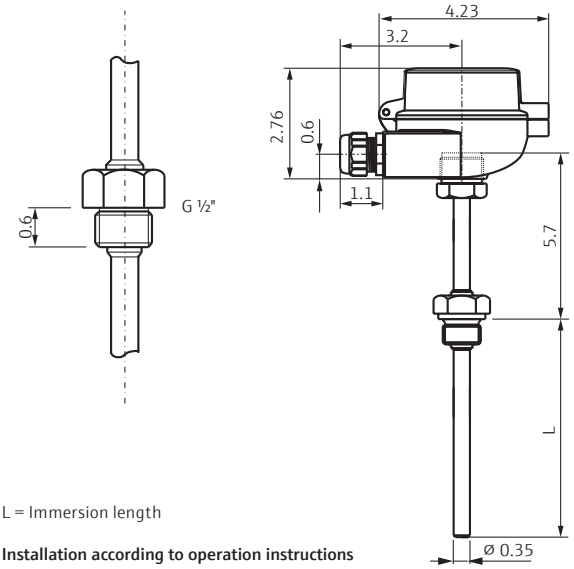
Technical data

Sensor	
Sensing element	Platinum resistance, 1 × Pt100 (100 Ω at 0 °C)
Tolerance	Class A acc. to IEC 751: -50 to +250 °C Class B acc. to IEC 751: 250 to 400 °C
Wiring	Four-wire connection
Insulation resistance	≥100 MΩ, test voltage 250 V at ambient temperature
Electrical connection	Flying leads or terminal block
Sheath diameter	6 mm (0.24")
Operating temperature	-50 to +400 °C (-58 to +752 °F)
Stem	Mineral insulated cable (MgO)
Response time value	T_{50}/18 s; T_{90}/55 s; according to IEC 751, in moving water at 0.4 m/s
Operating conditions	50 bar at +20 °C (725 PSI at +68 °F) 1 bar at +400 °C (14.5 PSI at +752 °F)
Protecting tube	
Shape	DIN 43772 form 2 G
Diameter	9 mm (0.36")
Material	SS 316Ti/1.4571
Process connection	
Shape	DIN 43772 form 2 G
Screw thread	G ½", 1.4571/SS 316TI; ½" NPT-M, 1.4404/SS 316 L
Terminal head	
Type	DIN 43729 form B
Protection class	IP 66/68
Electrical connection	M20 × 1.5, cable gland
Material	Aluminum, polyester powder coated

Tolerance values



Dimensions (in inches)

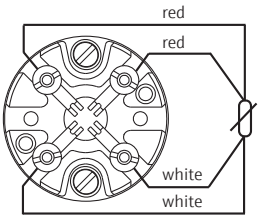


L = Immersion length

Installation according to operation instructions

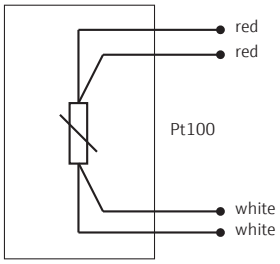
Electrical connection

Terminal block



For direct cable connection

Flying leads



For mounting of head transmitter

Price table

Omnigrad T TST187		Order no.	Price/pcs. in USD		
Terminal Type	Immersion Length L		1 to 5	6 to 10	11 to 35
Flying leads	120 mm (4.7")	TST187-1A2A	272.00	253.00	239.00
	160 mm (6.3")	TST187-1A2B	272.00	253.00	239.00
	250 mm (9.9")	TST187-1A2C	289.00	269.00	255.00
	400 mm (15.8")	TST187-1A2D	289.00	269.00	255.00
Terminal block	120 mm (4.7")	TST187-1A3A	286.00	266.00	252.00
	160 mm (6.3")	TST187-1A3B	286.00	266.00	252.00
	250 mm (9.9")	TST187-1A3C	303.00	282.00	267.00
	400 mm (15.8")	TST187-1A3D	303.00	282.00	267.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/tst187

More products to complete your measuring point ...


Vibronic limit switch
Soliphant T FTM20
page 30


Pressure transmitter
Cerabar T PMC131
page 48


Barrier
RB223
page 135

RTD thermometer with screw thread for simple applications

Omnigrad T TST487

$ 91.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/tst487

- Class A sensor
- Fiberglass insulated inset
- Ø 6 mm (Ø 0.24") protecting tube

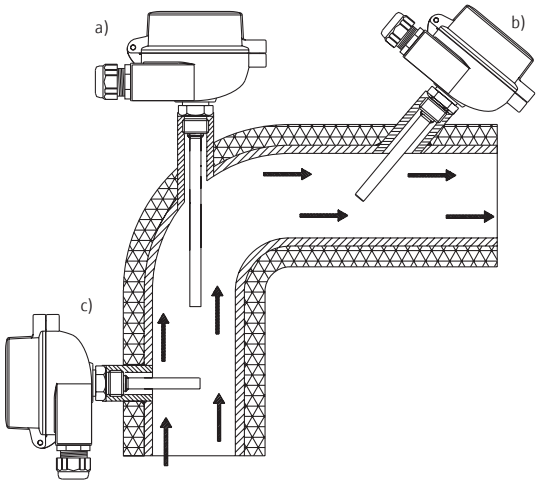
Specs at a glance:

- **Temperature range:**
  -50 to +300 °C
- **Tolerance:**
  Pt100 Class A
- **Immersion length (diameter):**
  50 / 100 / 150 / 250 mm
  (Ø 6 mm)
  2" / 3.9" / 5.9" / 9.8" (Ø 0.24")
- **Response time:**
  ≤3.5 s (T_{50}), ≤8 s (T_{90})

Application The Omnigrad T TST487 is a general purpose RTD thermometer particularly suited to many light and medium duty applications either in vessels or pipes. It can be applied where pressure and temperature are not extreme and where the performance/cost ratio is very important.

Function The Omnigrad T TST487 RTD thermometer assembly includes a single Pt100 insulated probe and a terminal head. The process connection is threaded G ½".
The inset is available either with flying leads for head transmitter mounting or with terminal block.

Installation instructions



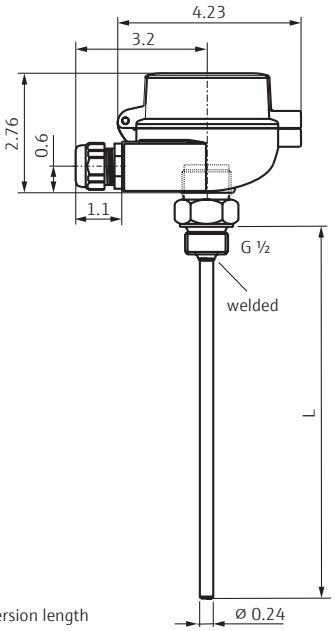
Pipe installation:

a) At elbows, against the flow
b) In smaller pipes, leant against the flow
c) Perpendicular to the flow

Technical data

Sensor	
Sensing element	Platinum resistance, 1 × Pt100 (100 Ω at 0 °C)
Tolerance	Class A acc. to IEC 751: -50 to +250 °C Class B acc. to IEC 751: 250 to 300°C
Wiring	Four-wire connection, fiberglass insulated cable
Insulation resistance	≥100 MΩ, test voltage 250 V at ambient temperature
Electrical connection	Flying leads or terminal block
Sheath diameter	6 mm (0.24")
Operating temperature	-50 to +300 °C (-58 to +572 °F)
Sheath	SS 316L/1.440 4
Response time	T_{50}/3.5 s; T_{90}/8 s; according to IEC 751, in moving water at 0.4 m/s
Ambient temperature	-40 to +100 °C (-40 to +212 °F)
Process connection	
Material	SS 316Ti/1.4571
Connection	G ½"
Terminal head	
Type	DIN 43 729 form B
Protection class	IP 66/68
Electrical connection	M20 × 1.5, cable gland
Material	Aluminum, polyester powder coated

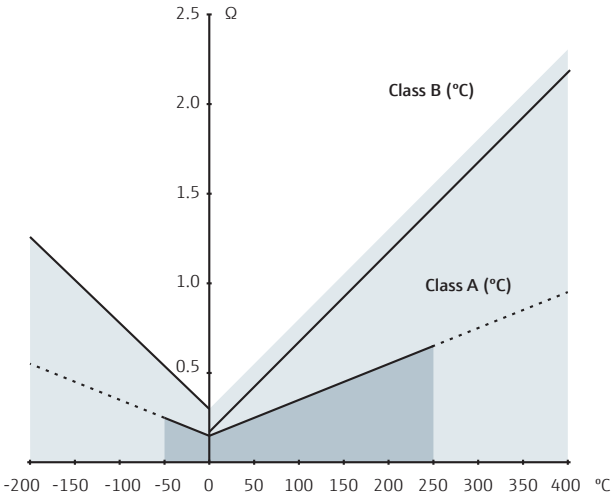
Dimensions (in inches)



L = Immersion length

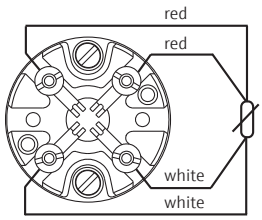
Installation according to operation instructions

Tolerance values



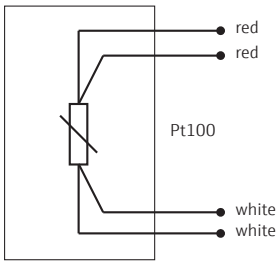
Electrical connection

Terminal block



For direct cable connection

Flying leads



For mounting of head transmitter

Price table

Omnigrad T TST487		Order no.	Price/pcs. in USD		
Terminal Type	Immersion Length L		1 to 5	6 to 10	11 to 35
Flying leads	50 mm (2")	TST487-1A2A	104.00	96.00	91.00
	100 mm (3.9")	TST487-1A2B	104.00	96.00	91.00
	150 mm (5.9")	TST487-1A2C	108.00	100.00	95.00
	250 mm (9.8")	TST487-1A2D	108.00	100.00	95.00
Terminal block	50 mm (2")	TST487-1A3A	113.00	105.00	100.00
	100 mm (3.9")	TST487-1A3B	113.00	105.00	100.00
	150 mm (5.9")	TST487-1A3C	117.00	109.00	103.00
	250 mm (9.8")	TST487-1A3D	117.00	109.00	103.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/tst487

More products to complete your measuring point ...


Vibronic limit switch
Soliphant T FTM20
page 30


Pressure transmitter
Cerabar T PMC131
page 48


Color display
RIA452
page 120

Programmable head transmitter

iTemp TMT80

$ 104.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/tmt80

- Universally programmable via ReadWin® 2000
- NAMUR NE 43
- Galvanic isolation

Specs at a glance:

- **Input:**
  Pt100, Pt1000;
  TC type B, K, N, R, S
- **Accuracy:**
  deviation 0.5 K (Pt100)
- **Measuring range:**
  freely programmable,
  dependent of sensor
- **Installation:**
  suitable for sensor head (form B)

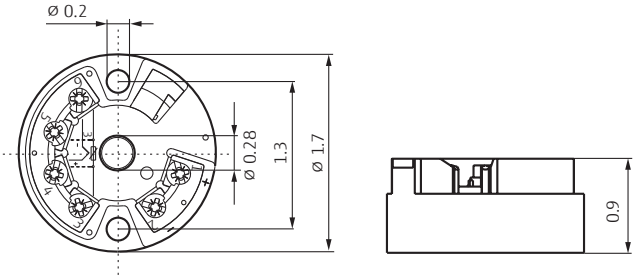
Application The iTemp TMT80 head transmitter can be installed in the form B sensor head. It has a 4 to 20 mA analog output.
The measuring range can be set up freely via ReadWin® 2000 configuration software. TMT80 can be used for resistance thermometers (RTD) as well as for most commonly used thermocouples.

Function The iTemp TMT80 head transmitter converts the input signal into a linear 4 to 20 mA signal. It has measurement input for resistance thermometers (RTD) in 2-, 3- or 4-wire connection and thermocouples.

Technical data

Input	
Input signal	Resistance thermometer: Pt100, Pt1000 to IEC 60751 Thermocouples: type B, K, N, R, S
Measurement range	Dependent of applied sensor element
Output	
Output signal	4 to 20 mA
Failure signal	To NAMUR NE 43
Max. load	$(V_{power\ supply}$ -8 V)/0.025 A
Input current required	≤3.5 mA
Current limit	≤25 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	<3.6 mA or >21 mA can be set up
Electrical connection	
Power supply	U_b = 8 to 35 V
Galvanic isolation	Û = 0.5 kV
Allowable ripple	U_{ss} ≤3 V at U_b ≥15 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: Td = ±(15 ppm/K × (measuring range end value - measuring range start value) + 50 ppm/K × preset measurement range) × Δθ
	TC: Td = ±(50 ppm/K × (Measurement range end value - measurement range start value)) + (50 ppm/K × preset measurement range) × Δθ
	Δθ = Deviation of ambient temperature according to the reference condition +25 °C ±5 K (77 °F ±9 °F)
Measurement accuracy	0.5 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

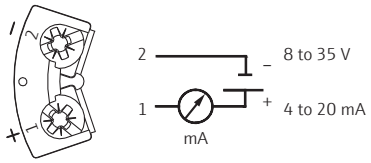
Dimensions (in inches)



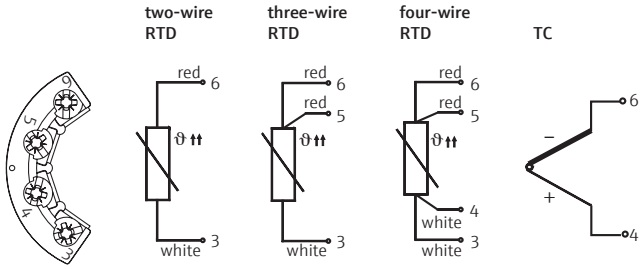
Installation according to operation instructions.

Electrical connection

Power supply and current output



Sensor connection



Price table

iTemp TMT80	Order no.	Price/pcs. in USD		
Approval Type		1 to 5	6 to 10	11 to 35
Non-hazardous area	TMT80-AA	118.00	110.00	104.00

Accessories	Order no.	Price/pcs. in USD
Configuration kit TXU10 – for PC-programmable devices. set-up programme + interface cable for PC with USB-Port. 4 pin plug + ReadWin® 2000	TXU10-AA	219.94

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/tmt80

More products to complete your measuring point ...


Point level switch
Liquiphant T FTL20
page 11


RTD thermometer
Omnigrad T TST487
page 90


Process transmitter
RMA42
page 123

Temperature transmitter for RTD and thermocouples

iTemp TMT127 / 187 and TMT128 / 188

$ 145.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/tmt127_187_128_188

- High accuracy (in total ambient temperature range)
- Fault indication on sensor short or open circuit to NAMUR NE 43
- Galvanic isolation

Specs at a glance:

- **Approval:** ATEX II (1) G EEx ia
- **Accuracy:** <0.08 % (Pt100)
- **Measuring range:** Fixed, selectable
- **RTD sensors:** 3 or 4-wire

Application This range of temperature transmitters are available as either head transmitters (TMT187/188) or as rail mounted devices (TMT127/128). The TMT187/188 head transmitters can be installed in the form B sensor head and have a fixed measurement range as well as a 4 to 20 mA analog output.

Input:
- TMT127/187 resistance thermometer (RTD) or
- TMT128/188 thermoelements (TC)

Function The TMT127/187 RTD temperature transmitter is a two-wire transmitter with an analog output and a three- or four-wire resistance thermometer input.

The TMT128/188 TC temperature transmitter is a two-wire transmitter with an analog output and thermocouple input.

Technical data TMT187 / TMT188

Input	
TMT187 (RTD)	Pt100
TMT188 (TC)	Type J, K, N, R, S, T

Output	
Output signal	4 to 20 mA transmission is linear to temperature and resistance
Maximum load	($V_{power\ supply}$ -8 V)/0.025 A
Input current required	≤3.5 mA
Current limit	≤25 mA
Switch on delay	4 s (during power up I_a = 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	≥21.0 mA

Electrical connection	
Power supply	U_b = 8 to 35 V, reverse polarity protected Ex U_b = 8 to 30 V
Galvanic isolation	U = 2 kV AC
Allowable ripple	U_{ss} ≤5 V at U_b ≥13 V, f_{max} = 1 kHz
Reference conditions	Calibration temperature 23 °C ±5 K (73.4 °F ±9 °F)

Accuracy	
Infl. of power supply	≤ ±0.01 %/V deviation from 24 V
Load influence	≤ ±0.02 %/100 Ω
Temperature drift	Pt100: T_d = ±(15 ppm/K x (max. measuring range + 200) + 50 ppm/K × preset measuring range) × Δθ
	TC: T_d = ±(50 ppm/K × max. measuring range + 50 ppm/K × preset measuring range) × Δθ
	Δθ = Deviation of ambient temperature from the referent working condition (+23 °C ±5 K (73.4 °F ±9 °F))
Pt100	0.2 K or 0.08 %
Thermocouple type	J and K: typ. 0.5 K; N: typ. 1.0 K; S and R: typ. 2.0 K; Influence of the internal reference junction: Pt100 Class B

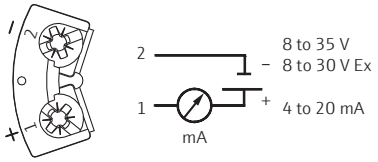
Operating conditions	
Ambient temperature	-40 to +85 °C (-40 to 185 °F)
Storage temperature	-40 to +100 °C (-40 to 212 °F)
Climatic class	According to EN 60 654-1, Class C
Vibration protection	4 g/2 to 150 Hz acc. to IEC 60 068-2-6
EMC	Interference immunity and interference emission according to EN 61 326-1 (IEC 1326) and NAMUR NE 21
Max. ambient temperature	T4 = 85 °C, T5 = 70 °C, T6 = 55 °C (T4 = 185 °F, T5 = 158 °F, T6 = 131 °F)

Approvals			
Ex approval	ATEX II 1G	EEx ia/IIC	EEx ia/IIB
Inductivity and capacity	C_i ≈ 0 F L_i ≈ 0 H	C_0 ≤709 µF L_0 ≤4.5 mH	C_0 ≤1300 µF L_0 ≤100 mH
Max. current	I_i = 100 mA	I_0 = 4.5 mA	
Max. voltage	U_i = 30 V	U_0 = 9.6 V	
Max. power	P_i = 0.75 W	P_0 = 11 mW	

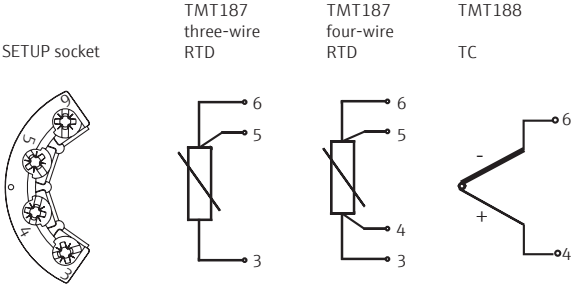
Electrical connection

TMT187 / TMT188

Power supply and current output

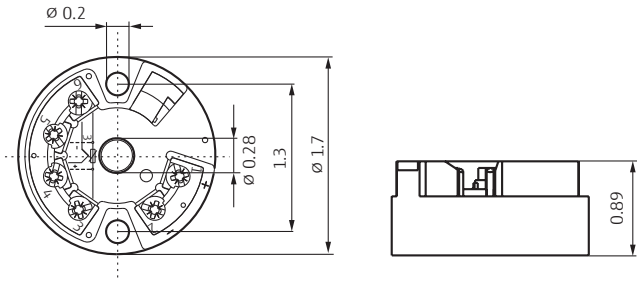


Sensor connection



Dimensions (in inches)

TMT187 / TMT188



Technical data TMT127 / TMT128

Input	
TMT127 (RTD)	Pt100
TMT128 (TC)	Type J, K, N, R, S, T

Output	
Output signal	4 to 20 mA transmission is linear to temperature and resistance
Maximum load	($V_{power\ supply}$ -12 V)/0.022 A
Input current required	≤3.5 mA
Current limit	≤23 mA
Switch on delay	4 s (during power up I_a = 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	≥21.0 mA

Electrical connection	
Power supply	U_b = 12 to 35 V, reverse polarity protected Ex U_b = 12 to 30 V
Galvanic isolation	U = 2 kV AC
Allowable ripple	U_{ss} ≤3 V at U_b ≥15 V, f_{max} = 1 kHz
Reference conditions	Calibration temperature 25 °C ±5 K (77 °F ±9 °F)

Accuracy	
Infl. of power supply	≤ ±0.01 %/V deviation from 24 V
Load influence	≤ ±0.02 %/100 Ω
Temperature drift	Pt100: T_d = ±(15 ppm/K × (max. measuring range + 200) + 50 ppm/K × preset measuring range) × Δθ
	TC: T_d = ±(50 ppm/K × max. measuring range + 50 ppm/K × preset measuring range) × Δθ
	Δθ = Deviation of ambient temperature from the referent working condition (25 °C ±5 K (77 °F ±9 °F))
Pt100	0.2 K or 0.08 %
Thermocouple type	J and K: typ. 0.5 K; N: typ. 1.0 K; S and R: typ. 2.0 K; Influence of the internal reference junction: Pt100 Class B

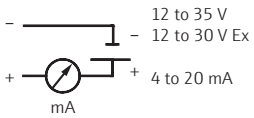
Operating conditions	
Ambient temperature	-40 to +85 °C (-40 to 185 °F)
Storage temperature	-40 to +100 °C (-40 to 212 °F)
Climatic class	According to EN 60 654-1, Class C
Vibration protection	4 g/2 to 150 Hz acc. to IEC 60 068-2-6
EMC	Interference immunity and interference emission according to EN 61 326-1 (IEC 1326) and NAMUR NE 21
Max. ambient temperature	T4 = 85 °C, T5 = 70 °C, T6 = 55 °C (T4 = 185 °F, T5 = 158 °F, T6 = 131 °F)

Approvals			
Ex approval	ATEX II 1G	EEx ia/IIC	EEx ia/IIB
Inductivity and capacity	C_i ≈ 0 F L_i ≈ 0 H	C_0 ≤24 µF L_0 ≤100 mH	C_0 ≤12 µF L_0 ≤8.5 mH
Max. current	I_i = 100 mA	I_0 = 9.6 mA	
Max. voltage	U_i = 30 V	U_0 = 4.4 V	
Max. power	P_i = 0.75 W	P_0 = 11 mW	

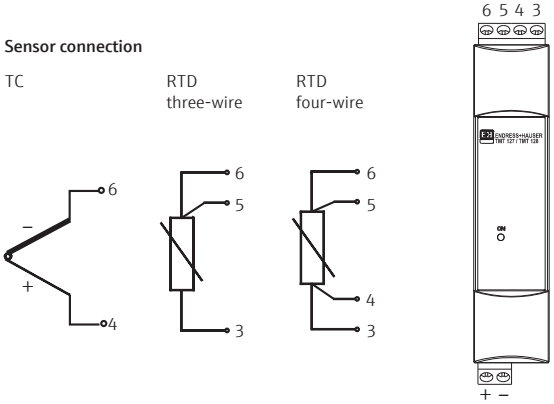
Electrical connection

TMT127 / TMT128

Power supply and current output

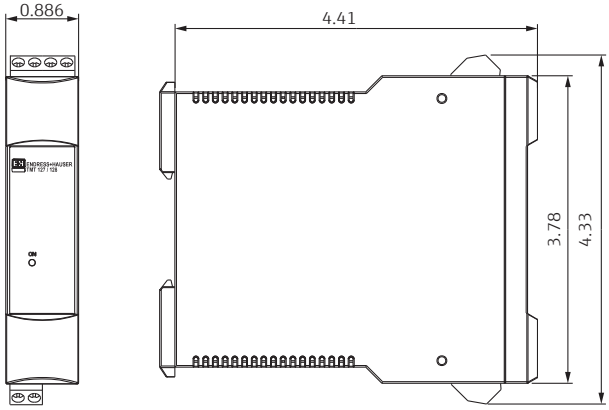


Sensor connection



Dimensions (in inches)

TMT127 / TMT128



Installation according to operation instructions.

Price table

Measuring range for TMT127/187 (RTD) Pt100

Code	
BA	-50...+100 °C
CA	-40...+60 °C
DA	-30...+60 °C
DB	-30...+150 °C
EA	-20...+20 °C
EB	-20...+60 °C
FC	0...+50 °C
FE	0...100 °C
FG	0...150 °C
FH	0...200 °C
FI	0...250 °C
FJ	0...300 °C
FK	0...400 °C
FL	0...500 °C
FN	0...600 °C

Measuring range for TMT128/188 (TC)

Code Type J	0...1 200 °C
JAB	0...150 °C
JAK	0...200 °C
JAC	0...250 °C
JAL	0...300 °C
JAD	0...400 °C
JAE	0...600 °C
JAF	0...900 °C
JAG	0...1 000 °C
JAH	0...1 200 °C

Code Type K	0...1 200 °C
KAB	0...150 °C
KAK	0...200 °C
KAC	0...250 °C
KAL	0...300 °C
KAD	0...400 °C
KAE	0...600 °C
KAF	0...900 °C
KAG	0...1 000 °C
KAH	0...1 200 °C

Code Type N	0...1 200 °C
NAB	0...150 °C
NAK	0...200 °C
NAC	0...250 °C
NAL	0...300 °C
NAD	0...400 °C
NAE	0...600 °C
NAF	0...900 °C
NAG	0...1 000 °C
NAH	0...1 200 °C

Type R	0...1 600° C
RAE	0...600 °C
RAF	0...900 °C
RAG	0...1 000 °C
RAH	0...1 200 °C
RAI	0...1 400 °C
RAJ	0...1 600 °C

Type S	0...1 600° C
SAE	0...600 °C
SAF	0...900 °C
SAG	0...1 000 °C
SAH	0...1 200 °C
SAI	0...1 400 °C
SAJ	0...1 600 °C

Type T	-50...+300 °C
TJA	-50...+200 °C
TAA	0...100 °C
TAB	0...150 °C
TAK	0...200 °C
TAC	0...250 °C
TAL	0...300 °C

iTemp TMT127/128/187/188			Order no.		Price/pcs. in USD		
Approval	Type	Temperature Sensor	*	***	1 to 5	6 to 10	11 to 35
Non-hazardous area	Head transmitter	RTD 3-wire	TMT187-A31 ☐ K		166.00	154.00	146.00
		TC		TMT188-A ☐ K	165.00	154.00	145.00
	Rail mounting transmitter	RTD 3-wire	TMT127-A31 ☐ A		207.00	192.00	182.00
		TC		TMT128-A ☐ A	207.00	192.00	182.00

* Please add measuring range code for Pt100.
** Please add measuring range code for thermocouple.

Accessory (iTemp TMT127 / TMT128)	Order no.	Price/pcs. in USD
Protective housing for max. 4 TMT127/128 (182 × 180 × 165 mm)	52010132	109.60

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/tmt127_187_128_188

More products to complete your measuring point ...


Point level switch
Minicap FTC260
page 33


Paperless recorder
Ecograph T RSG35
page 104


Power supply
RN221N
page 129

Complete measuring point for pH/Redox, conductivity and oxygen with Memosens technology

Analytical measuring point with Liquiline CM14

$ 1426.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/cm14

- Easy calibration
- Use of pre-calibrated sensors
- Second current output for temperature

Specs at a glance:

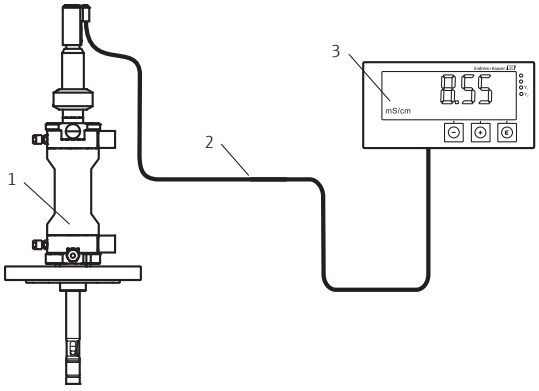
- **Dimensions:** 96 × 48 × 175 mm
- **Input signal:** 1 × Memosens
- **Output:** 2 × relays, 2 × analog, 1 × parameter, 1 × temperature
- **Display:** LCD – 2 lines; black/white/yellow; alarm modus: color alteration into red; toggle function

Application Liquiline CM14 is a 4-wire transmitter with a compact design for mounting in control panels or cabinets. Possible areas of application are wastewater treatment, water preparation and monitoring of drinking water, ion exchangers and surface water monitoring.

Function Sensors for pH/Redox, conductivity and oxygen record the measurement values at the site. These are transmitted digitally to the Liquiline CM14 transmitter using Memosens technology.

The transmitter converts the signal into an 0/4 to 20 mA signal. In addition to this, temperature can be output as a second current signal.

Application example

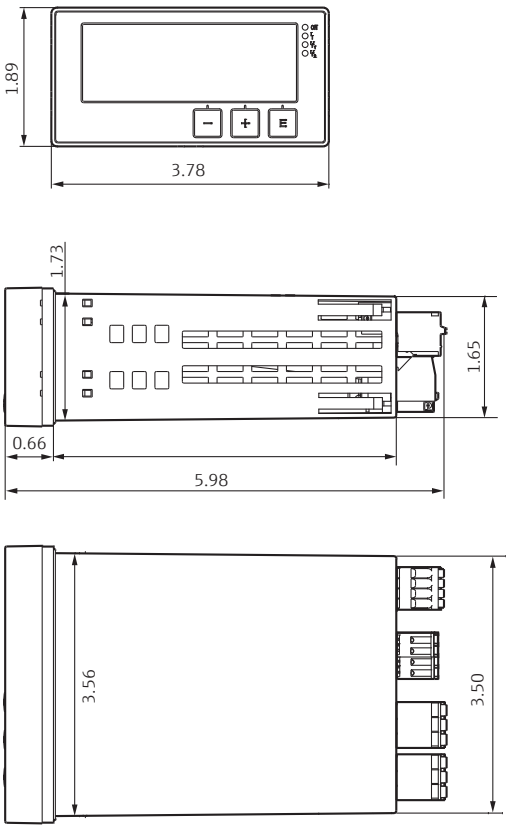


1 Assembly with sensor (please order armature separately)
2 Measuring cable
3 Transmitter Liquiline CM14

Technical data

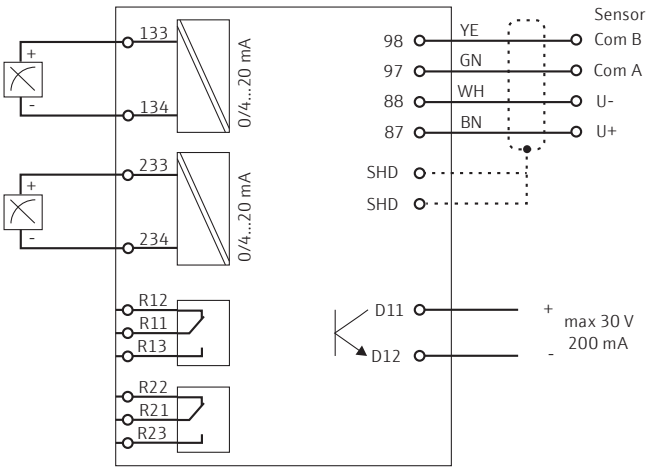
Input	
Input type	Digital sensor input Memosens
Cable type	Memosens data cable CYK10 or sensor fixed cable, each with cable end sleeves or M12 round-pin connector
Cable length	10 m (max. 100 m) / 33 ft (max. 330 ft)
Output	
Output signal	2 × 0/4 to 20 mA active, potentially isolated from one another and from the sensor circuit
Load	Max. 500 Ω
Linearisation/trans-mission behaviour	Linear
Status output	"Open collector"
Relay output	
Relay type	2 changeover contacts
Switching current	Max. 0.5 A @ 24 V DC; max. 0.5 A @ 253 V AC; min. 100 mW (5 V / 10 mA)
Cable cross section	max. 2.5 mm² (14 AWG)
Power supply	
Supply voltage	Wide range power supply 24 to 230 V AC/ DC (-20 % / +10 %) 50/60 Hz
Performance characteristics	
Response time	Current output t_{90} = max. 500 ms for an increase from 0 to 20 mA
Reference temp.	25 °C (77 °F)
Resolution current output	>13 Bit
Installation conditions	
Mounting location	Panel, cutout 92 × 45 mm (3.62 × 1.77") Max. panel thickness 26 mm (1")
Mounting orientation	The mounting orientation is determined by the display readability Max. angle of view +/- 45° of the display center axis in each direction.
Environment	
Ambient temp. range	–10 to +60 °C (14 to 140 °F)
Storage temp. range	–40 to +85 °C (-40 to 185 °F)
Electromagnetic compatibility	Interference emission and interference immunity as per EN 61326-1:2006, class A for industrial use
Ingress protection	Front: IP65 / NEMA 4X Body: Protection against contact IP20
Relative humidity	5 to 85 %, non-condensing
Mechanical construction	
Weight	0.3 kg (0.66 lbs)
Materials	Housing, body: Polycarbonate Front membrane: Polyester, UV resistant
Terminals	max. 2.5 mm² (14 AWG) Mains, relays
Certificates and approvals	
CE mark Declaration of conformity	The product meets the requirements of the harmonized European standards. It thus complies with the legal requirements of the EC directives. The manufacturer confirms successful testing of the product by affixing the CE symbol.

Dimensions (in inches)



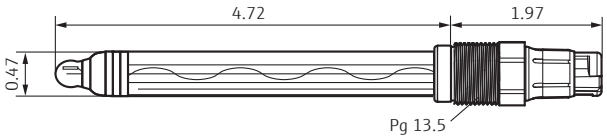
Installation according to instruction manual.

Electrical connection



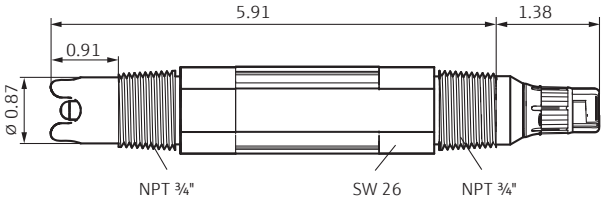
Memosens sensors *

pH measurement – Orbisint CPS11D



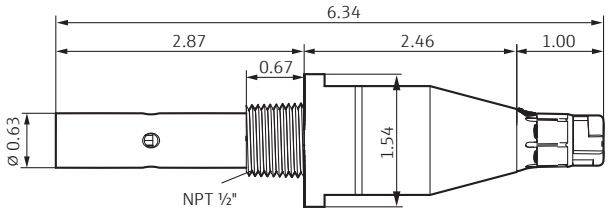
Technical data Orbisint CPS11D (glass electrode)	
Measuring variables	pH value, temperature
Measuring ranges	pH kit 1:1 to 12 pH pH kit 2: 0 to 14 pH
Process temperature	pH kit 1: -15 to 80 °C (5 to 176 °F) pH kit 2: 0 to 135 °C (32 to 275 °F)
Process pressure	pH kit 1: 0 to 6 bar pH kit 2: 0 to 16 bar
Minimum conductivity	Min. 50 µS/cm

pH measurement – Orbipac CPF81D



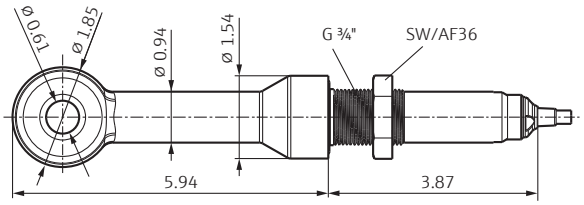
Technical data Orbipac CPF81D (glass electrode)	
Measuring variables	pH value, temperature
Measuring ranges	0 to 14 pH
Process temperature	0 to 80 °C (32 to 176 °F)
Process pressure	0 to 10 bar @ 80 °C (0 to 145 psi @ 176 °F)
Glass impedance	150 MΩ @ 25 °C (77 °F)
Minimum conductivity	Min. 50 µS/cm

Conductivity sensors, conductive – Condumax CLS15D



Technical data Condumax CLS15D	
Measuring variables	Conductivity, temperature
Measuring ranges	Conductivity kit 1: 0.04 to 20 µS/cm, k = 0.01 cm^{-1} Conductivity kit 2: 0.1 to 200 µS/cm, k = 0.1 cm^{-1}
Process temperature	-20 to 120 °C (-4 to 248 °F)
Process pressure	12 bar @ 20 °C (174 psi @ 68 °F)
Maximum measured error	2 % of the measured value
Repeatability	0.2 % of the measured value + 3 nS/cm

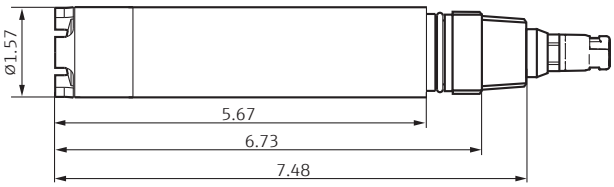
Conductivity sensors, inductive – Indumax CLS50D



Technical data Indumax CLS50D	
Measuring variables	Conductivity, temperature
Measuring ranges	2 µS/cm to 2000 mS/cm (uncompensated)
Process temperature	–20 to 125 °C(-4 to 260 °F)
Process pressure	Max. 20 bar (290 psi)
Maximum measured error	-20 to 100 °C (-4 to 212 °F): ±(5 µS/cm + 0.5 % of the measured value) >100 °C (212 °F): ±(10 µS/cm + 0.5 % of the measured value)
Temperature response time	Approx. 7 min

Memosens sensors *

Oxygen sensors – Oxymax COS51D



Technical Data Oxymax COS51D	
Measuring variables	Dissolved oxygen, temperature
Measuring ranges	0.01 to 100 mg/l; 0.00 to 1000 % SAT 0 to 2000 hPa
Response time	t_{90}: 3 minutes t_{98}: 8 minutes (each @ 20 °C / 68 °F)
Process temperature	–5 to 50 °C (20 to 120 °F)
Process pressure	Max. 10 bar (145 psi) Underpressure operation is not permissible
Maximum measured error	2 % of the measured value
Repeatability	0.2 % of the measured value + 3 nS/cm

* All dimensions in inches.

Price table

Analytical measurement CM14		Order no.	Price/pcs. in USD		
Measuring variables	Kit		1 to 5	6 to 10	11 to 35
pH	pH kit 1 (1...12 pH) (with Orbisint CPS11D-7AA21, sensor cable CYK10-A101)	71136420	1562.00	1452.00	1374.00
	pH kit 2 (0...14 pH) (with Orbisint CPS11D-7BA21, sensor cable CYK10-A101)	71136421	1562.00	1452.00	1374.00
	pH kit 3 (0...11 pH) (with Orbipac CPF81D-7NN11, sensor cable CYK10-A101)	71136419	1802.00	1676.00	1586.00
Conductivity (conductive)	Conductivity kit 1, conductive (K = 0.01 cm^{-1}) (with Condumax W CLS15D-A1A1, sensor cable CYK10-A101)	71136251	2229.00	2073.00	1961.00
	Conductivity kit 2, conductive (K = 0.1 cm^{-1}) (with Condumax W CLS15D-B1A1, sensor cable CYK10-A101)	71136252	2229.00	2073.00	1961.00
Conductivity (inductive)	Conductivity kit, inductive (with Indumax CLS50D-AA1B31)	71136253	3148.00	2928.00	2770.00
Oxygen	Oxygen kit (for aeration) (with Oxymax COS51D-AS800, sensor cable CYK10-A101)	71136585	3070.00	2855.00	2702.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/cm14

More products to complete your measuring point ...


Capacitive probe
Liquicap T FMI21
page 8


Pressure transmitter
Cerabar T PMC131
page 48


Compact thermometer
Easytemp TMR31
page 75

Universal Data Manager

Ecograph T RSG35

$ 1392.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/rsg35

- Web server for device configuration and display of measured value curves
- Up to 12 universal inputs, six digital inputs
- 4 mathematics channels

Specs at a glance:

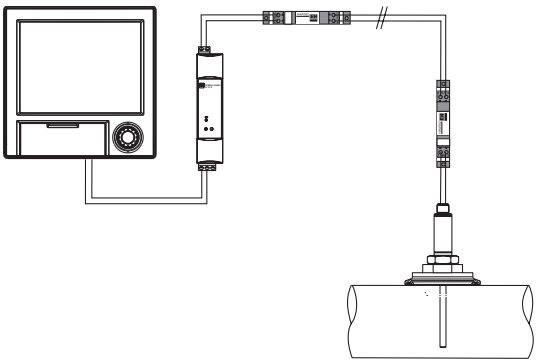
- **Save cycle:** 1 s to 1 h
- **Memory:** 128 MB internal memory, external SD card and USB stick
- **Inputs:** Current, voltage, pulse/ frequency and temperature
- **Interfaces:** Ethernet, RS232/RS485 and USB, Modbus RTU/TCP slave
- **Installation depth:** 158 mm
- **Display:** 5.7″ TFT screen

Application The Ecograph T is the right solution for a wide range of applications such as:

- Quality and quantity monitoring in the water and wastewater industry
- Monitoring of processes in power stations
- Displaying and recording of critical process parameters
- Tank and level monitoring
- Temperature monitoring in metal working

Function Data archiving with internal memory and separate SD card. Up to 30 internal limit values can be freely assigned to the channels. Limit value violations are saved and can additionally be indicated via up to 6 relays. Measured values can be saved in a maximum of four groups with different save cycles. Groups are selected via the jog/shuttle dial and displayed on the multicolored TFT display. The Essential Version of the Field Data Manager software is supplied with the product as standard. This software can be used to export the recorded data, save the data to an SQL database and visualize the data externally.

Application Example



Ecograph T RSG35 records the temperature profile in a pipe.

Technical data

Input values (universal input)	
Number of inputs	0/4/8/12
Measured variables	Current: 0 to 5/20 mA, 4 to 20 mA; Voltage: 0 to 1/5/10 V, 1 to 5 V, ±150 mV, ±1 V, ±10 V, ±30 V; Resistance thermometer (RTD): Pt46, Pt50, Pt100, Pt500, Pt1000, Cu50, Cu53, Cu100; Thermocouples: Type J, K, T, N, L, D, C, B, S, R; Pulse input: max. 13 kHz Frequency input: 0 to 10 kHz
Measured error	±0,1 % oMR (for current, voltage, resistance thermometer); ±0,01 % oMR (for frequency)
Scan rate	All channels within 100 ms
Resolution	24 Bit

Input values (digital input)	
Number of inputs	6
Input frequency	max. 25 Hz
Pulse length	min. 20 ms
Input current	max. 2 mA
Input voltage	max. 30 V
Selectable functions	Control input, ON/OFF message, pulse counter, operating time, message+operating time. Functions of the control input: start recording, screen saver on, external memory cycle, lock setup, time synchronization, limit value monitoring on/off

Output values (auxiliary voltage output)	
Output voltage	24 V DC ±15%
Output current	max. 250 mA, short-circuit proof

Output values (Relay output)	
Alarm relay	1 alarm relay with changeover contact
Standard relay	5 relays with NO contact, e.g. for limit value messages (can be configured as NC contact).
Relay switching capacity	max. 3 A @ 250 V AC or 3 A @ 30 V DC

Power supply	
Supply voltage	100 to 230 V AC (±10%) 50/60Hz; ±24 V AC/DC (–10% / +15%) 50/60Hz
Power consumption	100 to 230 V: max. 35 VA; 24 V: max. 24 VA

Connection data interface/communication	
Standard	USB, Ethernet
Advanced options	Serial RS232/RS485; Modbus RTU/TCP Slave

Operating conditions	
Ambient temp. range	–10 to +50 °C (14 to 122°F)
Storage temperature	–20 to +60 °C (-4 to 140°F)
Climate class	To IEC 60654-1: Class B2
Degree of protection	Front-panel IP 65, NEMA 4; rear-panel IP 20
EMC	Interference immunity: To IEC 61326 (industrial environment) / NAMUR NE 21; Interference emissions: To IEC 61326, Class A

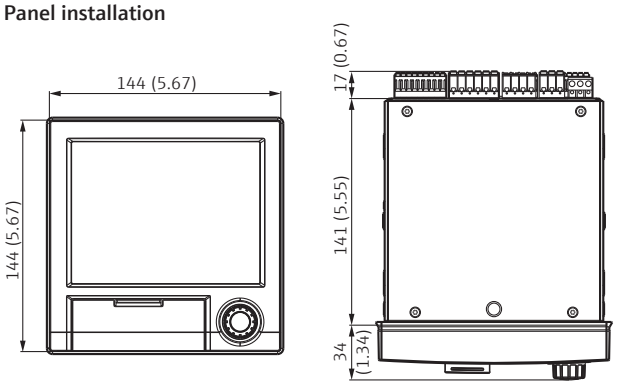
Mechanical construction	
Weight	Panel-mounted version approx. 2.2 kg (4.9 lbs)
Materials	Front frame: Zinc die cast Housing half-panels: sheet steel; Sight glass: Transparent Makrolon plastic

Human interface	
Display	multicolored TFT display (145 mm /5.7")
Languages	German, English, Spanish, French, Italian

Data storage	
Selectable save cycle	1 / 2 / 3 / 4 / 5 / 10 / 15 / 20 / 30 s; 1 / 2 / 3 / 4 / 5 / 10 / 30 min; 1 h
Internal memory	128 MB
Typ. recording length memory cycle 1 min.	4 inputs: 359 weeks 12 inputs: 127 weeks
External memory	supported SD cards: 512 MB up to 32 GB

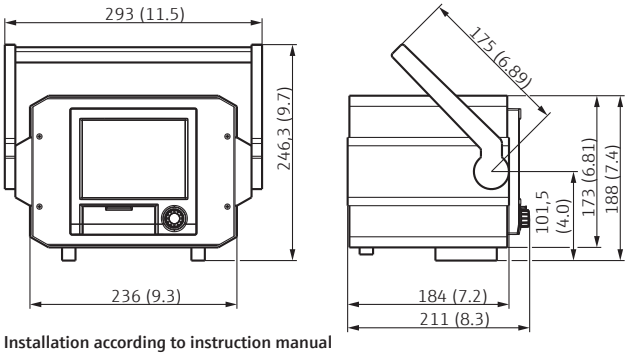
Dimensions in mm (inches)

Panel installation



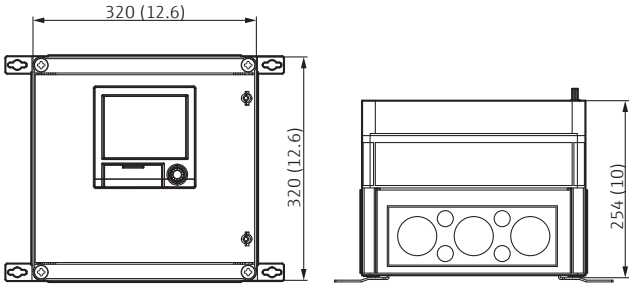
Installation according to instruction manual

Desktop housing



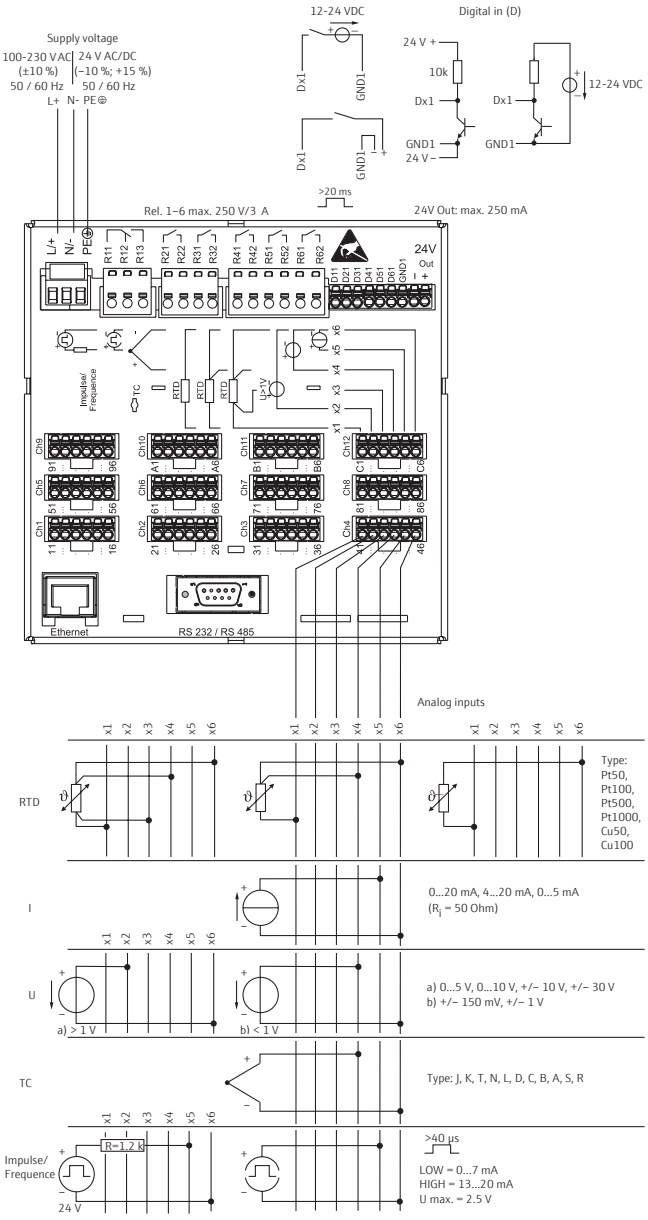
Installation according to instruction manual

Field housing IP65



Installation according to instruction manual

Electrical connection



Price table

Supply voltage

Code	voltage
1	100...230 V AC
2	24 V AC/DC

Ecograph T RSG35			Order No.	Price/pcs. in USD		
Input Signal	Communication	Housing	*	1 to 5	6 to 10	11 to 35
4 × universal	Ethernet + USB	Panel	RSG35-B☐A	1582.00	1471.00	1392.00
		Field	RSG35-B☐A+G1	2231.00	2075.00	1963.00
		Desk top	RSG35-B☐A+G3	2408.00	2240.00	2119.00
	RS232/485 + Ethernet + USB	Panel	RSG35-B☐B	1711.00	1592.00	1506.00
		Field	RSG35-B☐B+G1	2361.00	2196.00	2078.00
		Desk top	RSG35-B☐B+G3	2538.00	2361.00	2234.00
8 × universal	Ethernet + USB	Panel	RSG35-C☐A	1867.00	1737.00	1643.00
		Field	RSG35-C☐A+G1	2517.00	2341.00	2215.00
		Desk top	RSG35-C☐A+G3	2694.00	2506.00	2371.00
	RS232/485 + Ethernet + USB	Panel	RSG35-C☐B	1997.00	1858.00	1758.00
		Field	RSG35-C☐B+G1	2647.00	2462.00	2329.00
		Desk top	RSG35-C☐B+G3	2824.00	2626.00	2485.00

*Please add code for power supply

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/rsg35

More products to complete your measuring point ...


Point level switch
Liquiphant T FTL20
page 11


Pressure switch
Ceraphant T PTC31
page 41


Power supply
RN221N
page 129

Digital indicator with mathematical functionalities and linearization

RIA45 / RIA46

Complete product information:
www.e-direct.us/ria45_46

- 5-digit LCD including bargraph and color alteration
- 1 or 2 channel device with mathematical functionalities
- Wide range power supply

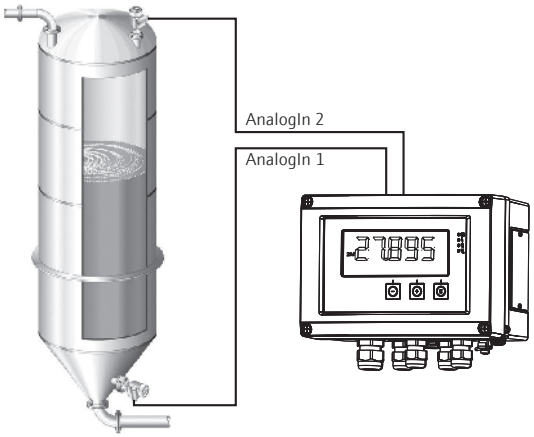
Specs at a glance:

- **Outputs:**
  2 relays, 1/2 analog outputs
- **Display:**
  LCD - 2 lines; black/white/yellow; alarm modus: color alteration into red; toggle function between channels
- **Dimensions:**
  RIA45: 96 × 48 × 175 mm (3.78" × 1.89" × 6.89")
  RIA46: 133 × 199 × 96 mm (5.24" × 7.83" × 3.78")
- **Inputs:**
  1/2 universal inputs measuring current, voltage, resistance, temperature (RTD, TC)
- **Functionalities:**
  Linearization, mathematical calculations (+/-/avg), differential pressure package

Application Equipped with an extensive range of functionalities and approvals the RIA45 and RIA46 indicators suit any application in the process industries. Typical applications include displaying and monitoring process values, such as where overspill protection is required.
As a panel display the RIA45 is ideal for installation in control rooms, switch cabinets or laboratories while the RIA46 field indicator can be installed within hazardous areas.

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	1/2 × 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	1/2 × 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

Operating conditions	
Degree of protection	RIA45: Front: IP65 Back side: IP20 RIA46: IP67/NEMA 4x
Ambient temperature	-20 to +60 °C (-4 to +140 °F)
Storage temperature	-40 to +85 °C (-22 to +185 °F)

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

Structural design	
Front (RIA45)	96 × 48 mm (3.78" × 1.89"), cut-out: 92 × 45 mm (3.62" × 1.77")
Depth (RIA45)	151,8 mm (5.98") (w/o ex frame) 175 mm (6.89") (with mounted ex frame)
Field housing (RIA46)	133 × 199 × 96 mm (5.24" × 7.83" × 3.78") glas reinforced plastic or aluminium
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

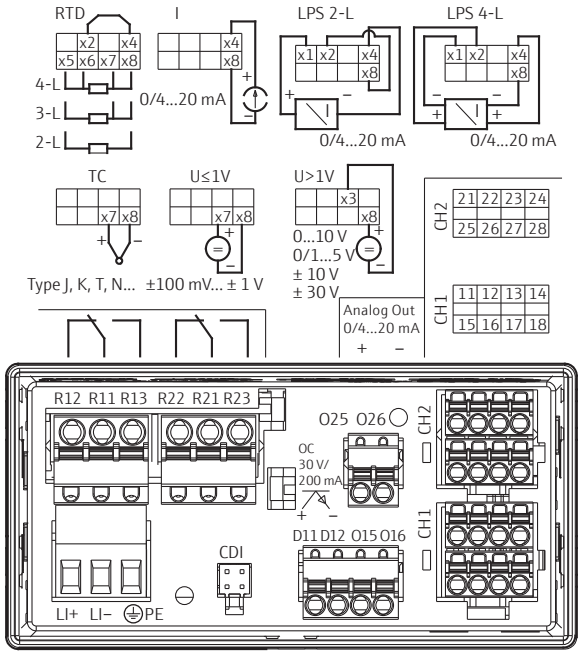
Approvals	
Ex-Approvals	ATEX II(1)GD [Ex ia] IIC; CSA AIS, NI/I/2/ABCDEFG/T4; FM AIS, NI/I/2/ABCDEFG/T4 TIIS [Ex ia] IIC; NEPSI [Ex ia] IIC
Others	WHG; GL (German Lloyd) ship building

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

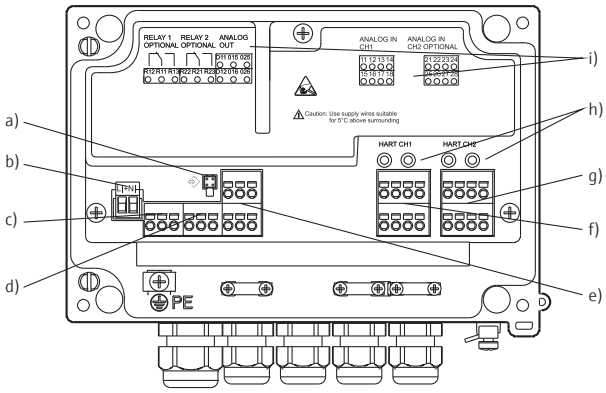
Accessories
Configuration software FieldCare Device Setup
Configuration kit TXU10, USB

Electrical connection

RIA45



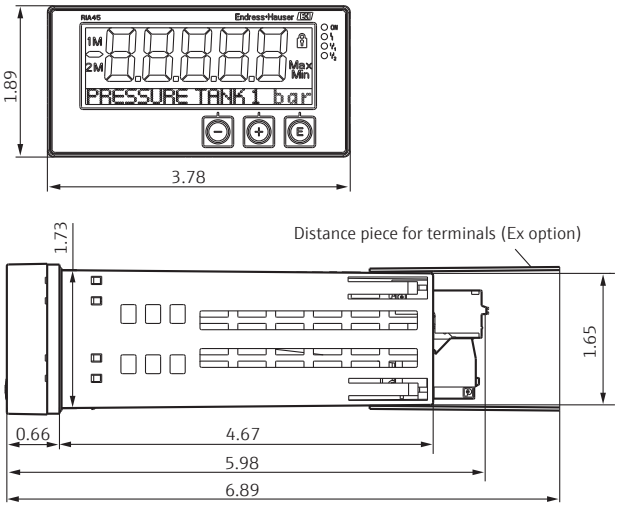
RIA46



a) Connection socket for interface cable
b) Connection supply voltage
c) Connection relay 1 (optional)
d) Connection relay 2 (optional)
e) Connection analog and status output
f) Connection analog input 1
g) Connection analog input 2 (optional)
h) HART® connection sockets
i) Laser labeling of terminal assignment

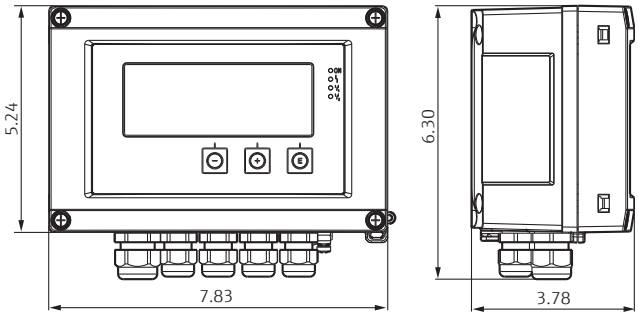
Dimensions (in inches)

RIA45



Installation according to instruction manual.

RIA46



Installation according to instruction manual.

Price table

Process indicator RIA45		Order no.	Price/pcs. in USD		
Approval	Input; Output		1 to 5	6 to 10	11 to 35
Non-hazardous area	1 × Universal; 1 × analog	RIA45-A1A1	478.00	444.00	420.00
	2 × Universal; 2 × analog	RIA45-A1B1	637.00	592.00	561.00
	1 × Universal; 1 × analog + 2 relay	RIA45-A1C1	573.00	533.00	504.00
	2 × Universal; 2 × analog + 2 relay	RIA45-A1D1	731.00	680.00	643.00
ATEX II(1)GD [Ex ia] IIC	1 × Universal; 1 × analog	RIA45-B1A1	542.00	504.00	477.00
	2 × Universal; 2 × analog	RIA45-B1B1	701.00	652.00	617.00
	1 × Universal; 1 × analog + 2 relay	RIA45-B1C1	637.00	592.00	561.00
	2 × Universal; 2 × analog + 2 relay	RIA45-B1D1	795.00	739.00	699.00

Field indicator RIA46		Order no.	Price/pcs. in USD		
Approval Housing	Input; Output		1 to 5	6 to 10	11 to 35
Non-hazardous area Field plastic, glass reinforced	1 × Universal; 1 × analog	RIA46-A1A1A	558.00	519.00	491.00
	2 × Universal; 2 × analog	RIA46-A1B1A	718.00	667.00	631.00
	1 × Universal; 1 × analog + 2 relay	RIA46-A1C1A	653.00	608.00	575.00
	2 × Universal; 2 × analog + 2 relay	RIA46-A1D1A	811.00	754.00	714.00
ATEX II(1)GD [Ex ia] IIC Field, Alu	1 × Universal; 1 × analog	RIA46-B1A2A	748.00	695.00	658.00
	2 × Universal; 2 × analog	RIA46-B1B2A	907.00	844.00	798.00
	1 × Universal; 1 × analog + 2 relay	RIA46-B1C2A	843.00	784.00	742.00
	2 × Universal; 2 × analog + 2 relay	RIA46-B1D2A	1001.00	931.00	881.00

Accessories	Order no.	Price/pcs. in USD
Configuration kit TXU10-for PC-programmable devices. set-up programme+interface cable for PC with USB-Port. 4 pin plug	TXU10-AC	219.94

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ria45_46

More products to complete your measuring point ...

Capacitive probe
Liquicap T FMI21
page 8

Pressure transmitter
Cerabar T PMC131
page 48

RTD thermometer
Omnigrad T TST487
page 90

Loop-powered field indicator

RIA14 / RIA16

Complete product information:
www.e-direct.us/ria14-16

- 5-digit backlit LC display
- One limit value
- Bargraph and units

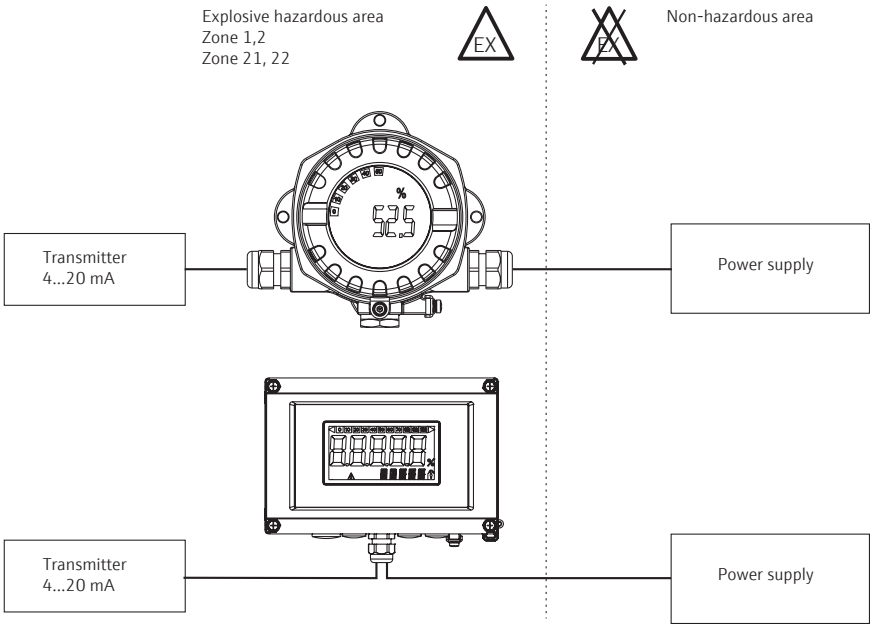
Specs at a glance:

- **Line voltage drop:**
  <4 V at 3 to 22 mA
- **Display:**
  5-digit LC display
- **Degree of protection:**
  IP 67, NEMA 4X
- **Maximum measured error:**
  <0.1 % of scaled display range

Application The RIA14/RIA16 field indicators monitor measurement signals and display them with high resolution and accuracy. The indicators feature one Open Collector output for monitoring a limit value. They permit universal installation and are particularly suitable for use in the field or in mobile rigs.

Function The indicator records an analog measuring signal and shows this on the display. The LC display shows the current measured value digitally and as a bargraph with limit value violation signalling. The indicator is looped into the 4 to 20 mA circuit and obtains the required energy from there.

Application example



Technical data

Input	
Measuring range	4 to 20 mA (reverse polarity protection)
Line voltage drop	<4 V at 3 to 22 mA
Max. line voltage drop	<6 V at max. short-circuit current 200 mA

Output	
Output	Digital limit switch Passive, open collector: Imax = 200 mA, Umax= 35 V, Ulow/max = <2 V at 200 mA Max. reaction time to limit value = 250 ms
Signal on alarm	No measured value visible on the LC display, no background illumination; open collector inactive

Performance characteristics	
Reference operating conditions	T= 25 °C (77 °F)
Max. measured error	<0.1% of scaled display range
Influence of ambient temperature	Effect on the accuracy when ambient temperature changes by 1 K: 0.01%

Operating conditions	
Mounting location	Wall or pipe mounting
Ambient temp. limits	-40 to +80 °C (-40 to +176 °F) (at < -20 °C (< -4 °F) the display can react slowly; at < -30 °C (-22 °F) readability of the display cannot be guaranteed)
Storage temperature	-40 to +80 °C (-40 to +176 °F)
Electrical safety	As per IEC 61010-1, UL61010-1, CSA C22.2 No. 1010.1-92
Climate class	As per IEC 60654-1, Class C
EMC	As per EN 61326 (IEC 61326) and NAMUR (NE21)
Degree of protection	IP 67, NEMA 4X

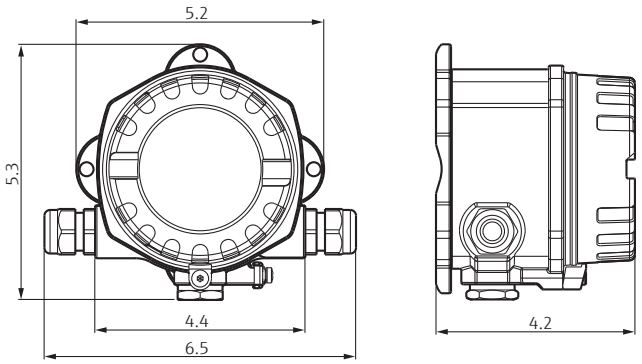
Mechanical construction	
Material	RIA14: housing: die-cast aluminum AlSi10Mg with powder coating on polyester basis; optional: Stainless steel 1.4435 (AISI 316L) RIA16: housing: Fiber-glass reinforced plastic PBT-GF30; optional: Aluminum AlSi12
Weight	RIA14: aluminium housing: approx. 1.6 kg (3.53 lbs) stainless steel housing: approx. 4.2 kg (9.26 lbs) RIA16: plastic housing: approx. 500 g (1.1 lbs) aluminum housing: approx. 1.7 kg (3.75 lbs)
Terminals	Cables/wires up to max. 2.5 mm² (14 AWG) plus ferrule

Human interface	
Display range	-19999 to +99999
Offset	-19999 to +99999
Character height	RIA14: 20.5 mm (0.81") RIA16: 26 mm (1.02")
Signalling	Measuring range overshoot/undershoot
Operating elements	3-key operation (-/+/E) integrated in device, access with housing open
Remote operation	The device is configured with the FieldCare PC operating software

Approvals	
Ex approval	ATEX II2(1)G Ex ib[ia] IIC T6/T5/T4
Ex approval (RIA14)	ATEX II2G Ex d IIC T6/T5/T4; ATEX II2D

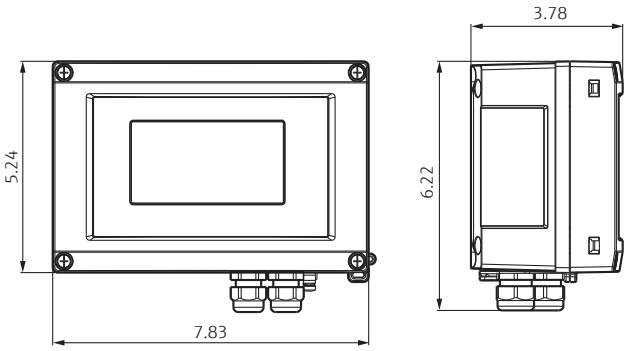
Dimensions (in inches)

RIA14



Installation according to instruction manual

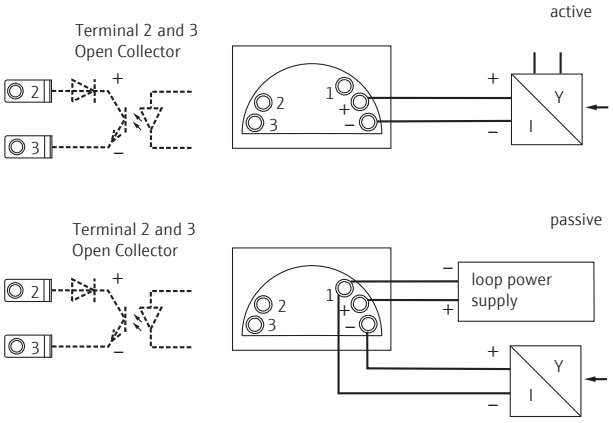
RIA16



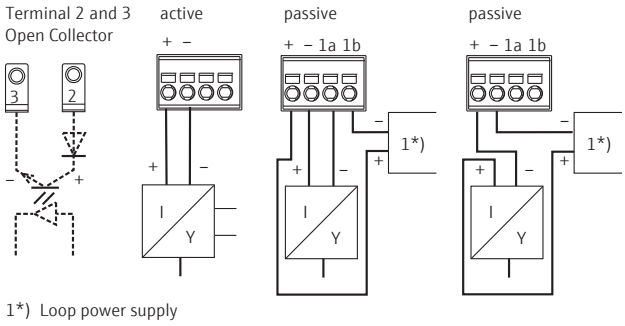
Installation according to instruction manual

Electrical connection

RIA14



RIA16



1*) Loop power supply

Price table

Process indicator RIA14		Order no.	Price/pcs. in USD		
Housing	Approval		1 to 5	6 to 10	11 to 35
Field, alu die cast	Non-hazardous area	RIA14-AA3C	584.00	543.00	514.00
		RIA14-AA3C+I4	640.00	596.00	563.00
	ATEX II2(1)G Ex ib[ia] IIC T6	RIA14-BA3C	652.00	606.00	574.00
		RIA14-BA3C+I4	708.00	659.00	623.00
	ATEX II2G Ex d IIC T6	RIA14-BD3C	731.00	680.00	643.00
		RIA14-BD3C+I4	788.00	732.00	693.00
	ATEX II2D	RIA14-BF3C	731.00	680.00	643.00
		RIA14-BF3C+I4	788.00	732.00	693.00

Field indicator RIA16		Order no.	Price/pcs. in USD		
Housing	Approval		1 to 5	6 to 10	11 to 35
Plastics, glass fiber reinforced	Non-hazardous area	RIA16-AA1A+E1	431.00	401.00	379.00
	Mounting kit wall/tube	RIA16-AA1A+E1I2	542.00	504.00	477.00
Alu	Non-hazardous area	RIA16-AA2A+E1	558.00	519.00	491.00
	Mounting kit wall/tube	RIA16-AA2A+E1I2	669.00	623.00	589.00
	ATEX II2(1)G Ex ib[ia] IIC T6	RIA16-BA2A+E1	640.00	595.00	563.00
	Mounting kit wall/tube	RIA16-BA2A+E1I2	751.00	698.00	661.00

Accessories	Order no.	Price/pcs. in USD
Mounting set wall+pipe (W08)	71089844	90.40
Configuration kit TXU10-for PC-programmable devices. set-up programme+interface cable for PC with USB-Port. 4 pin plug	TXU10-AC	219.94

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ria14-16

More products to complete your measuring point ...

Pressure transmitter
Cerabar T PMC131
page 48

Process transmitter
RMA42
page 123

Point level switch
Liquiphant T FTL20
page 11

8-channel field indicator with FOUNDATION fieldbus™ or PROFIBUS® PA

RID14 / RID16

NEW!

RID16

RID14

FOUNDATION

Complete product information:
www.e-direct.us/rid1x

- Bright, backlit LC indicator with bar graph, diagnostic symbols and plain text field
- Listener mode for up to 8 analog channels or digital statuses
- Optional aluminum housing for Ex applications

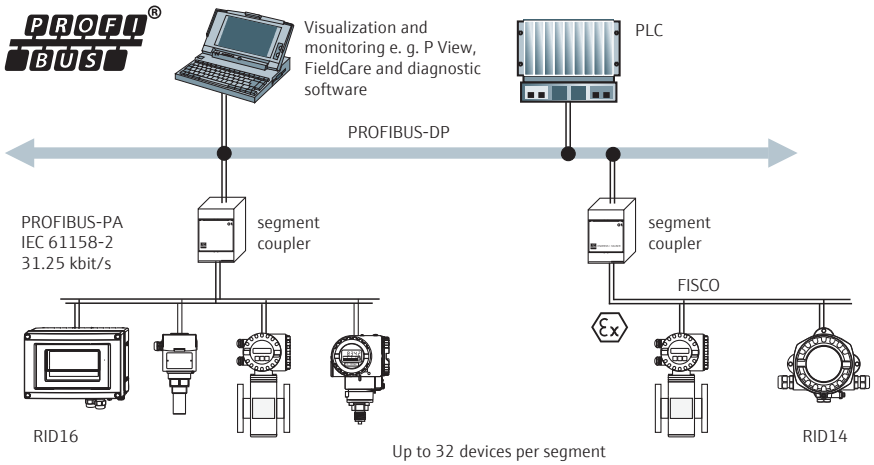
Specs at a glance:

- **Communication and data processing:**
  FOUNDATION fieldbus™ H1, IEC 61158-2 or PROFIBUS® PA in accordance with EN 50170 Volume 2, IEC 61158-2 (MBP)
- **Degree of protection:**
  IP 67, NEMA 4X
- **Approvals:**
  ATEX Ex ia, Ex nA;
  FM IS, NI;
  CSA IS, NI

Application The RID14/RID16 field indicators monitor measurement signals and display them with high resolution and accuracy. Due to the backlit display they permit universal installation and are particularly suitable for use in the field or in mobile rigs.

Function The 8-channel indicator displays the measured values, calculated values and status information of the fieldbus users in a fieldbus network. In the listener mode, the device listens to the set fieldbus addresses and displays their specific values. Furthermore, values available on the bus can also be displayed via function block interconnection in the case of a FOUNDATION fieldbus™ indicator. The process value status is indicated by icons or as plain text on the measured value display. The plain text display makes it possible to display alphanumeric character combinations, such as the TAG. The device is powered by the fieldbus and can be used in hazardous areas up to temperature class T6.

Application example



System integration via PROFIBUS® PA

Technical data

Communication and data processing	
FOUNDATION fieldbus™	FOUNDATION fieldbus™ H1, IEC 61158-2
	FDE (Fault Disconnection Electronic) = 0 mA
	Data transmission rate: supported baud rate = 31.25 kBit/s
	Signal coding = Manchester II
	LAS (link active scheduler), LM (link master) function is supported
	In acc. with IEC 60079-27, FISCO/FNICO
PROFIBUS® PA	PROFIBUS® PA in accordance with EN 50170 Volume 2, IEC 61158-2 (MBP)
	FDE (Fault Disconnection Electronic) = 0 mA
	Data transmission rate: supported baud rate = 31.25 kBit/s
	Signal coding = Manchester II
	Connection data in accordance with IEC 60079-11 FISCO, Entity

Power supply	
Supply voltage	Voltage is supplied via the fieldbus. U = 9 to 32 V DC, polarity-independent (max. voltage U_b = 35 V)
Current consumption	≤11 mA
Cable entry	Thread NPT½ Thread M20 Thread G½ 2 × gland NPT½ + 1 × dummy plug 2 × gland M20 + 1 × dummy plug

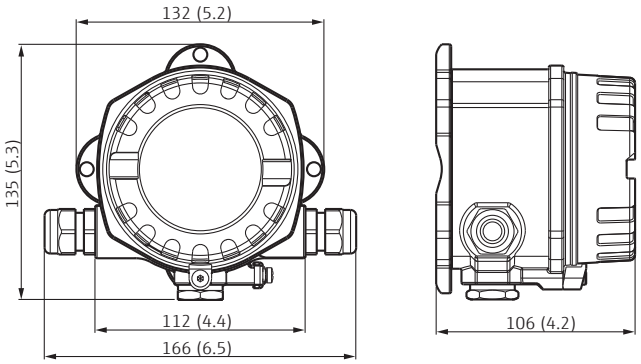
Operating conditions	
Ambient temperature limits	−40 to +80 °C (−40 to 176 °F) The display can react slowly at temperatures < −20 °C (−4 °F). The readability of the display is no longer guaranteed at temperatures < −30 °C (−22 °F).
Storage temperature	−40 to +80 °C (−40 to 176 °F)
Climate class	According to IEC 60654-1, Class C
Degree of protection	IP67. NEMA 4X.

Mechanical construction	
Material	RID14: Housing: Die-cast aluminum AlSi10Mg with powder coating on polyester base; optional: Stainless steel 1.4435 (AISI 316L)
	RID16: Housing: Fiber-glass reinforced plastic PBT-GF30; optional: Aluminum AlSi12
Weight	RID14: Aluminum housing: approx. 1.6 kg (3.5 lb) Stainless steel housing: approx. 4.2 kg (9.3 lb)
	RID16: Plastic housing: approx. 500 g (1.1 lb) Aluminum housing: approx. 1.7 kg (3.75 lb)
Terminals	Screw terminals for cables up to max. 2.5 mm² (14 AWG) plus ferrule

Approvals	
Ex-approval	ATEX Ex ia, Ex nA; FM IS, NI; CSA IS, NI

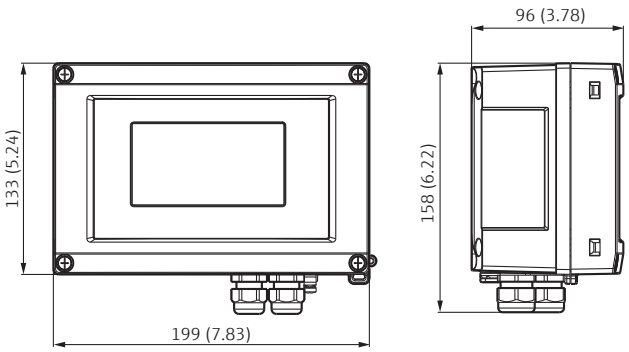
Dimensions in mm (inches)

RID14



Installation according to instruction manual

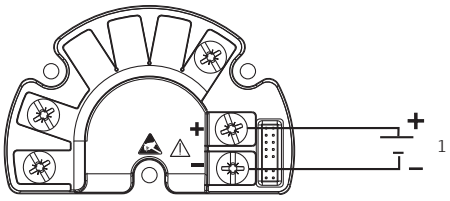
RID16



Installation according to instruction manual

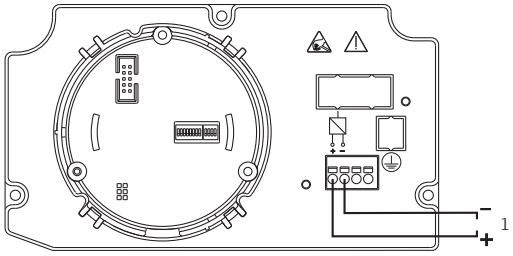
Electrical Connection

RID14



1 Foundation fieldbus™ or PROFIBUS® PA

RID16



1 Foundation fieldbus™ or PROFIBUS® PA

Price table

RID14			Order No.	Price/pcs. in USD		
Approval	Communication	Mounting Accessory		1 to 5	6 to 10	11 to 35
Non-hazardous area	Foundation fieldbus™	Not Included	RID14-AA3B1	1079.00	1003.00	949.00
		Mounting bracket tube 2", 316L	RID14-AA3B1I4	1143.00	1063.00	1006.00
	PROFIBUS® PA	Not Included	RID14-AA3B2	1079.00	1003.00	949.00
		Mounting bracket tube 2", 316L	RID14-AA3B2I4	1143.00	1063.00	1006.00
FM XP,NI, DIP IS, NI I, II, III/1+2/A-G	Foundation fieldbus™	Not Included	RID14-F43B1	1286.00	1196.00	1132.00
		Mounting bracket tube 2", 316L	RID14-F43B1I4	1350.00	1256.00	1188.00
	PROFIBUS® PA	Not Included	RID14-F43B2	1286.00	1196.00	1132.00
		Mounting bracket tube 2", 316L	RID14-F43B2I4	1350.00	1256.00	1188.00

RID16			Order No.	Price/pcs. in USD		
Approval	Communication	Mounting Accessory		1 to 5	6 to 10	11 to 35
Non-hazardous area	FOUNDATION Fieldbus	Not Included	RID16-AA2B1	1103.00	1026.00	971.00
	PROFIBUS PA		RID16-AA2B2	1103.00	1026.00	971.00
	FOUNDATION Fieldbus	Mounting kit wall/tube	RID16-AA2B1I2	1167.00	1085.00	1027.00
	PROFIBUS PA		RID16-AA2B2I2	1167.00	1085.00	1027.00
FM IS, NI I / 1+2/A-D	FOUNDATION Fieldbus	Not Included	RID16-F12B1	1199.00	1115.00	1055.00
	PROFIBUS PA		RID16-F12B2	1199.00	1115.00	1055.00
	FOUNDATION Fieldbus	Mounting kit wall/tube	RID16-F12B1I2	1263.00	1174.00	1111.00
	PROFIBUS PA		RID16-F12B2I2	1263.00	1174.00	1111.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/rid1x

More products to complete your measuring point ...

Point level switch
Liquiphant FTL20H
page 14

Pressure transmitter
Cerabar T PMC131
page 48

Process transmitter
RMA42
page 123

Loop-powered process display unit

RIA15

$ 242.00
11–35 pcs.

Complete product information:
www.e-direct.us/ria15

- 5-digit measured value display with backlighting
- Voltage drop ≤1 V
- Powered directly from 4 to 20 mA current loop

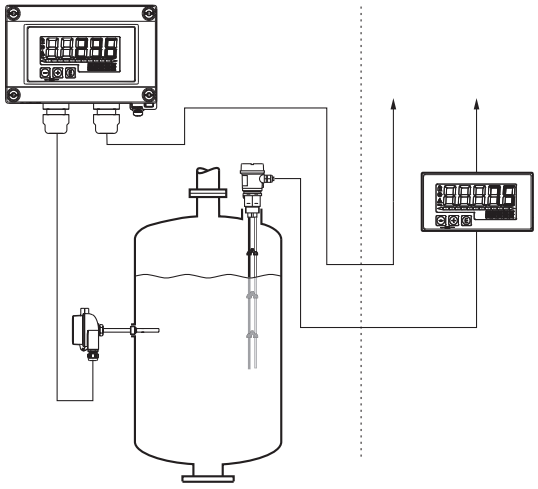
Specs at a glance:

- **Line voltage drop:**
  ≤1 V, display lighting ≤3.9 V
- **Display:**
  5-digit measured value display with dimension
- **Housing:**
  Field or panel housing
- **HART® indicator:**
  up to four HART® values can be indicated in alternation

Application The process indicator RIA15 gathers measurment signals and displays them with high resolution and accuracy. The process indicator is suitable for a wide variety of applications e.g. in switch rooms, cabinets, laboratory instrumentation as well as in plant and apparatus construction.

Function The RIA15 process display unit is looped into the 4 to 20 mA current loop and measures the transmitted current. The parameterization of the measurement range, the decimal point and the offset can easily be done with the help of three keys on the device. The setting can be done during operation. The measured value indication occurs via a five digit 7-segment LC display. With the optional HART® function up to four measured values of one measurement instrument can be indicated.

Application example



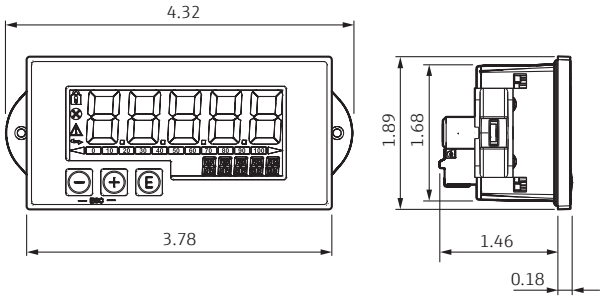
RIA15 as field and panel display

Technical data

Input	
Measuring range	4 to 20 mA (scalable, reverse polarity protection)
Measured variable	4 to 20 mA current signal optional indication of up to four measured values via HART®
Max. input current	200 mA (short-circuit current)
Voltage drop	Standard device: ≤1 V
	Display lighting: ≤3.9 V independent of the measuring signal
	with HART®: ≤2 V
Max. measured error	±0.1 %
Influence of ambient temperature	<0.01 %/K (0.0056 %/°F) of measuring range
Output	
Transfer behavior	HART® signals are not affected
Operating conditions	
Ambient temperature	−40 to +60 °C (−40 to +140 °F) (At temperatures below −25 °C (−13 °F) the readability of the display can no longer be guaranteed)
Storage temperature	−40 to +85 °C (−40 to +185 °F)
Climate class	IEC 60654-1, Class B2
Electromagnetic compatibility	Interference immunity: as per IEC61326 (Industrial Environments)/NAMUR NE 21 Interference emission: as per IEC61326, Class B
Degree of protection	Panel housing: IP65 at front, IP20 at rear
	Field housing: IP66, NEMA4x
Mechanical construction	
Materials	Panel-mount housing: Front: aluminum Rear panel: polycarbonate PC
	Field housing: Aluminum 2 × cable glands M16
Electrical connection	plug-in spring terminals, terminal range 0.14...1.5 mm solid/flexible 0.5 mm² flexible wire with ferrule
Display and user interface	
Display	5-digit display (17 mm digits), display range: -19 999...+99 999, bar graph, 14-segment display for unit/TAG
Local operation	3 operating keys
Power supply	
Supply voltage	Powered directly from 4 to 20 mA current loop
Approvals	
Ex approval	ATEX, IECEx, FM, CSA

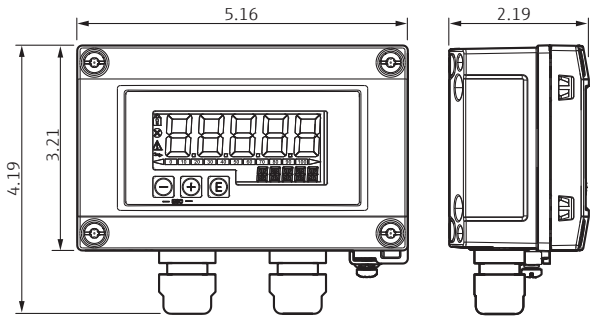
Dimensions (in inches)

Panel housing



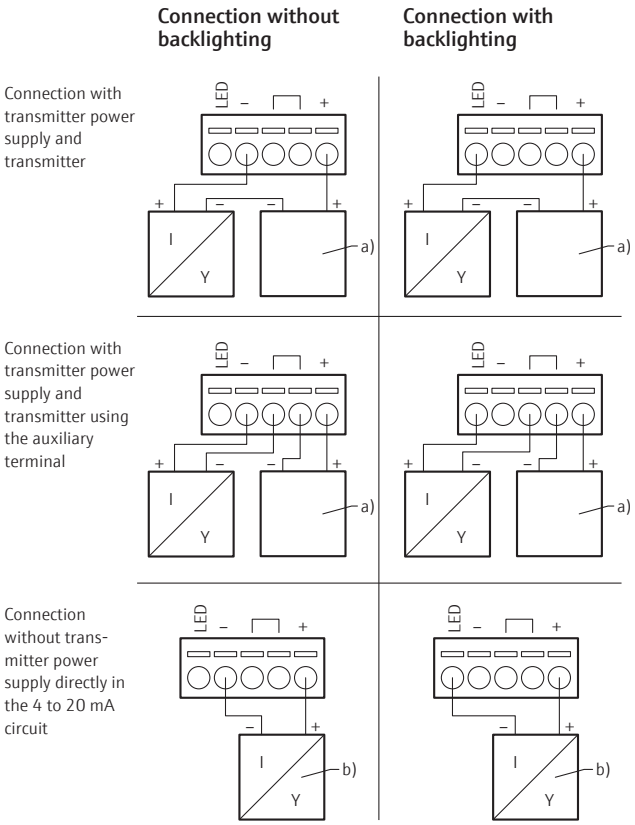
Installation according to instruction manual.

Field Housing



Installation according to instruction manual.

Electrical Connection



a) Transmitter power supply
b) 4 to 20 mA power source

Price table

RIA15			Order No.	Price/pcs. in USD		
Version	Approval	Housing		1 to 5	6 to 10	11 to 35
4...20mA current signal + HART® communication	Non-Ex	Panel housing	RIA15-AAA2	275.00	256.00	242.00
	FM IS, Cl. I, Div. 1, Gr. ABCD	Panel housing	RIA15-F1A2	361.00	336.00	318.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ria15

More products to complete your measuring point ...


Flow measuring system
Proline Promag 10D
page 59


Paperless recorder
Ecograph T RSG35
page 104


Field indicator
RIA16
page 111

Process display with digital output, monitoring and pump control functions

RIA452

$ 700.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/ria452

- Input with two-wire loop power supply and intrinsic safety option
- Pump control function
- Digital output with integration

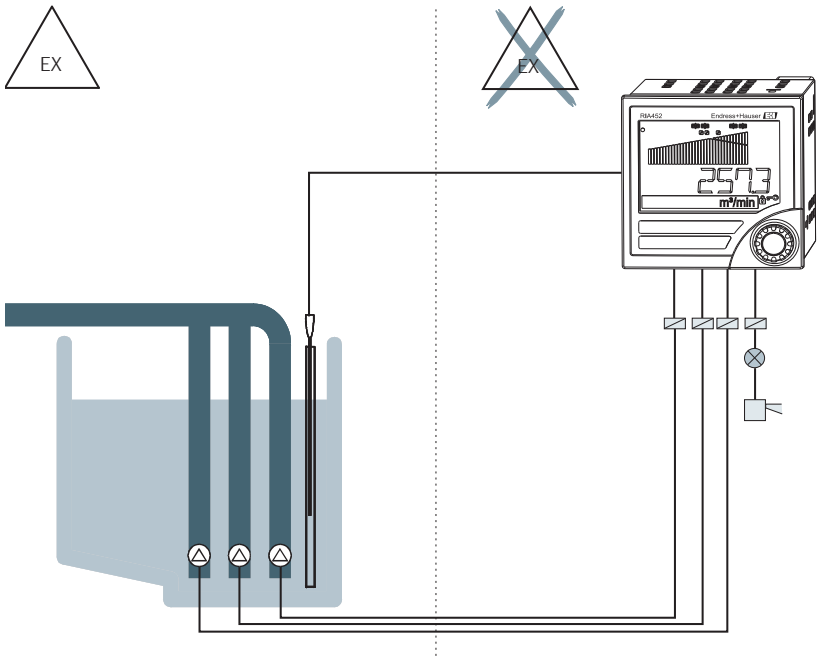
Specs at a glance:

- **Display:** 7-digit/14 segment multicolored
- **Approval:** ATEX II (1) GD [EEx ia] IIC optional
- **Standard Dimensions:** 96 × 96 mm (3.78" × 3.78")
- **Relays:** 4 or 8 (optional)
- **Function:** Linearization, pump control function, integration
- **Output:** Optional 1 × analog output

Application The RIA452 process display interprets and displays process signals with high resolution and accuracy. It can also be used to automate control tasks via limit values or analogue and digital outputs.

Function Up to eight presettable relays monitor the measured value for any infringement (undershooting/ overstepping) of the preset limit values. Further operation modes for the relays are sensor or device errors, batch and pump control functions (e.g. alternating pump control). The scalable analog output offers wide options to transfer the input signal: zoom function, linearization, offset, inverting and signal conversion (conversion in-/output). The optional impuls output offers the possibility to create integrated process values. Simple setting up using a serial interface and PC program or manually using the configurating dial on the front of the unit.

Application example



Technical data

Input	
Analog input	1 × 0/4 to 20 mA (impedance 5 Ω)
Universal input	0/4 to 20 mA, 0 to 5 mA, ±40 mV, ±150 mV, ±600 mV, ±2,5 V, 0 to 10 V, 0 to 5 V, ±10 V, 30 to 3000 Ω thermocouple types J, K, T, N, B, S, R to IEC 584; D, C to ASTM E998; L to DIN 43710, GOST
Digital input	4 ×, max. 10 Hz
Accuracy	0.1 % of the measurement range end value

Output	
Transmitter supply	24 V DC, 250 mA, on option intrinsically safe 1 × 24 V DC, 22 mA in addition
Analog output	1 × 0/4 to 20 mA, 0 to 10 V DC
Output impedance	Max. ≤600 Ω
Digital output	1 × open collector passive 12.5 kHz 4 × relays (changeover contact), 250 V AC/30 V DC, 3A; expandable to 8 relays (option)
Linearity	≤0.1 % of the measurement range end value

Operating conditions	
Ambient temperature	-20 to +60 °C (-4 to 140 °F)
Storage temperature	-30 to +70 °C (-22 to 158 °F)
Climatic class	To IEC 60 654-1 class B2 bedewing is forbidden
EMC	Interference immunity to IEC 61326 (industrial environment) and NAMUR NE 21; interference emissions to IEC 61326 Class A
Ingress protection	Front IP 65, Terminals IP 20

Power supply	
Supply voltage	90 to 250 V AC, 50/60 Hz, 20 to 36 V DC/ 20 to 28 V AC, 50/60 Hz

Mechanical construction	
Electrical connection	Plug on screw terminals, size 1.5 m² solid, 1.0 mm² multi with ferrule
Materials used	Housing front: ABS plastic, electro-plated Housing casing: PC10GF plastic

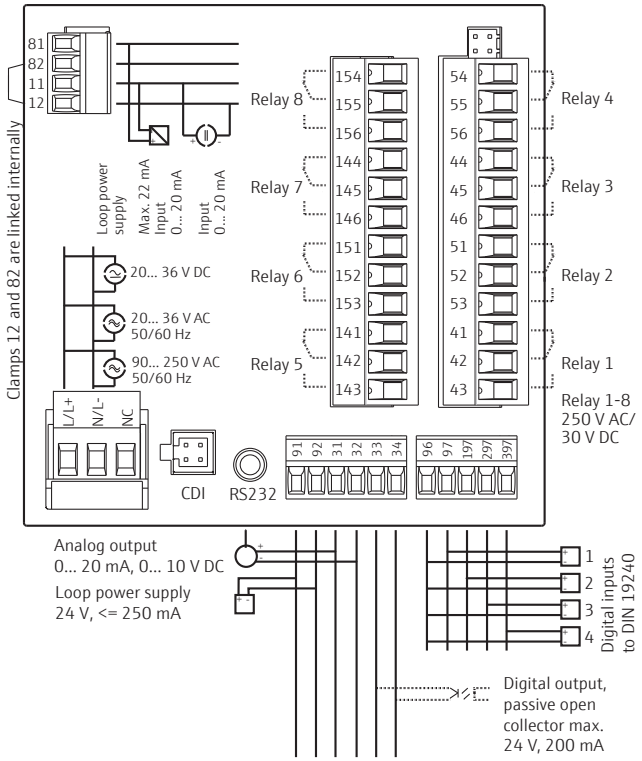
User interface	
Display	7 digit 14-segment LC-display in white (10 mm / 0.39"); engineering unit with 9 × 77 Dot Matrix display; 42-parts bargraph in yellow with over- and under range in red; limit value markings in yellow; status display
Range of display	-99999 to +99999
Operation	via Jog-Shuttle or using RS232 and PC software ReadWin® 2000

Functions	
Features	Linearization with 32 points, elapsed hour indicator, alternating pump control, tendency analysis, batch-function, integration, min/ max value storage

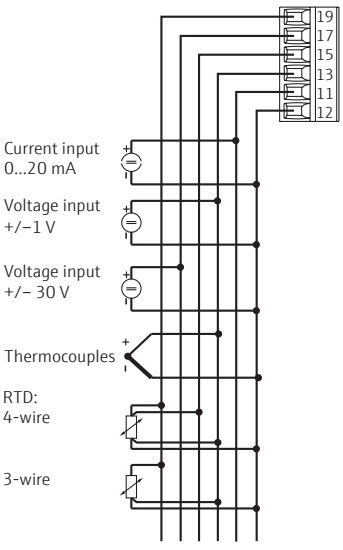
Approvals	
Ex approval	ATEX II (1) GD [EEx ia] IIC

Electrical connection

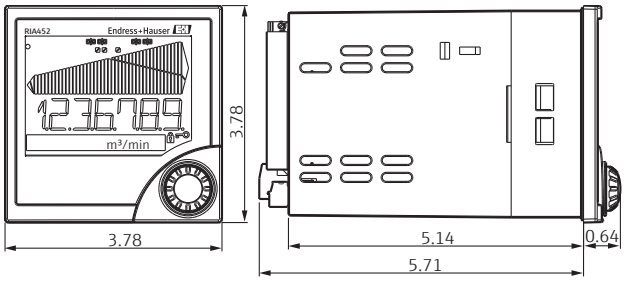
Current input



Universal input



Dimensions (in inches)



Installation according to instruction manual

Price table

Power supply

Code	Thread
1	90 to 250 V AC/DC
2	20 to 36 V DC / 20 to 28 V AC

*

Process indicator RIA452			Order no.	Price/pcs. in USD		
Approval	Measuring Signal	Output		1 to 5	6 to 10	11 to 35
Non-hazardous area	0/4-20mA	4 × relay SPDT limit	RIA452-A□11A11A	795.00	740.00	700.00
		4 × relay SPDT limit + 1 × analogue U,I	RIA452-A□12A11A	854.00	794.00	752.00
		8 × relay SPDT limit + 1 × pulse + integration + linearization for open channel	RIA452-A□13A11A	996.00	926.00	876.00
		8 × relay SPDT limit + 1 × analogue + 1 × pulse + integration + linearization for open channel	RIA452-A□14A11A	1054.00	980.00	927.00
		4 × relay SPDT limit + 1 × pulse + integration + linearization for open channel	RIA452-A□15A11A	925.00	860.00	814.00
	Universal U,I,R,RTD,TC	4 × relay SPDT limit	RIA452-A□21A11A	889.00	827.00	783.00
		4 × relay SPDT limit + 1 × analogue U,I	RIA452-A□22A11A	948.00	882.00	834.00
		8 × relay SPDT limit + 1 × pulse + integration + linearization for open channel	RIA452-A□23A11A	1089.00	1013.00	959.00
		8 × relay SPDT limit + 1 × analogue + 1 × pulse + integration + linearization for open channel	RIA452-A□24A11A	1148.00	1067.00	1010.00
		4 × relay SPDT limit + 1 × pulse + integration + linearization for open channel	RIA452-A□25A11A	1019.00	948.00	897.00
ATEX II(1) GD(EEx ia) IIC	0/4-20mA	4 × relay SPDT limit	RIA452-B□11A11A	860.00	799.00	756.00
		4 × relay SPDT limit + 1 × analogue U,I	RIA452-B□12A11A	918.00	854.00	808.00
		8 × relay SPDT limit + 1 × pulse + integration + linearization for open channel	RIA452-B□13A11A	1060.00	986.00	933.00
		8 × relay SPDT limit + 1 × analogue + 1 × pulse + integration + linearization for open channel	RIA452-B□14A11A	1118.00	1040.00	984.00
		4 × relay SPDT limit + 1 × pulse + integration + linearization for open channel	RIA452-B□15A11A	989.00	920.00	871.00

* Please add code for power supply.

Accessories	Order no.	Price/pcs. in USD
Configuration kit TXU10- for PC-programmable devices. set-up programme+interface cable for PC with USB-Port. 4 pin plug + ReadWin2000	TXU10-AA	219.94
Field housing IP65 RIA452	51009957	300.62

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/ria452

More products to complete your measuring point ...

Pressure transmitter
Cerabar T PMP131
page 52

Flow measuring system
Proline Promag 10D
page 59

Paperless recorder
Ecograph T RSG35
page 104

Universal process transmitter

RMA42

$ 381.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/rma42

- 1 or 2 universal inputs, optional intrinsically safe
- Backlit 5-digit LCD
- 2 limit value relays with additional status output

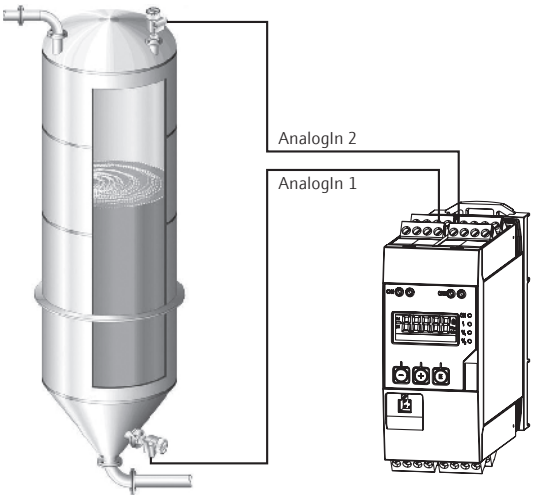
Specs at a glance:

- **Functionalities:**
  Linearization, mathematical calculations, differential pressure package
- **Outputs:**
  2 relays, 1/2 analog outputs
- **Dimensions:**
  45 × 115 × 118 mm
  (1.77" × 4.53" × 4.66")
- **Inputs:**
  1/2 universal inputs measuring current, voltage, resistance, temperature, optional intrinsically safe
- **Display:**
  LCD - 2 lines; black/white/yellow; toggle function between channels

Application Due to its universal design RMA42 is suitable for many industries such as chemical, water and waste water and food and beverages. Typical applications include monitoring of signals for any violation of preset limit values (also to WHG) as well as transmission of signals from hazardous areas, differential pressure applications and signal multiplying. RMA42 can be installed in a switch cabinet or used in a field housing.

Function The RMA42 process transmitter powers the transmitter or sensor and processes the analog signals from those. These signals are monitored, evaluated, calculated, saved, separated, linked, converted and displayed. The signals, intermediate values and the results of calculations and analysis are transmitted by digital or analog means. With the two relays the process can be controlled.

Application example

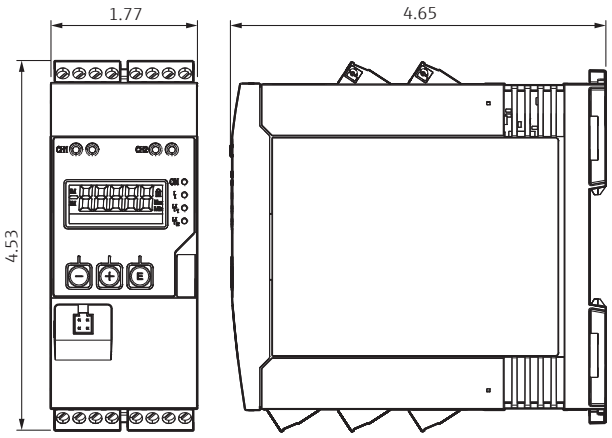


Example of application "differential pressure"

Technical data

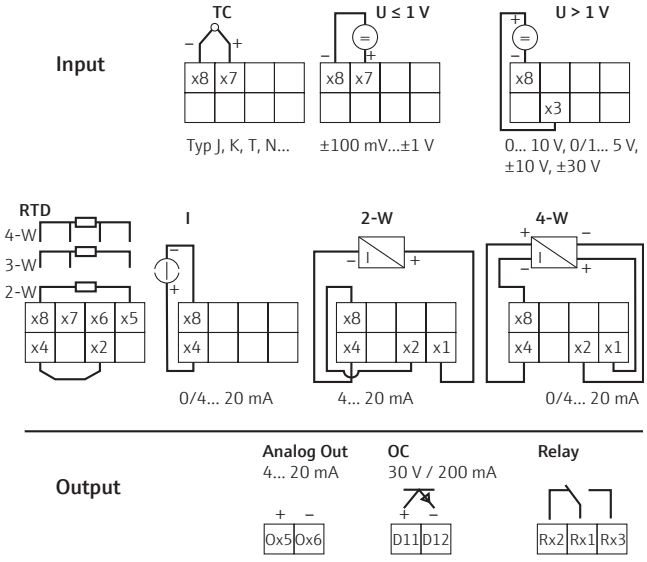
Input parameters	
Input	½× universal input 0 to 20 mA, 4 to 20 mA; Over range: up to 22 mA, 0 to 10 V, 2 to 10 V, 0 to 5 V, 1 to 5 V, ±1 V, ±10 V, ±30 V, ±100 mV, 30 to 3000 Ω; Pt 100 according to IEC60751, GOST, JIS1604, Pt 500 and Pt 1000 according to IEC60751; Cu 100, Cu 50, Pt 50, Pt 46, Cu 53 according to GOST; Ni 100, Ni 1000 according to DIN43760; Type J, K, T, N, B, S, R according to IEC60584; Type U according to DIN43710; Type L according to DIN43710, GOST; Type C, D according to ASTM E998
Linearization	2 Linearization tables of input values (up to 32 linearization points supported)
Output parameters	
Analog output	½ x 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. 30 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
Operating conditions	
Protection Class	DIN rail housing IP20
Ambient temperature	-20 to +50 °C (-4 to 122 °F)
Storage temperature	-40 to +85 °C (-40 to 185 °F)
Power supply	
Wide range power supply	24 V to 230 V AC/DC (-20%/+10%) 50/60 Hz
Structural design	
Housing (W×H×D)	45 × 115 × 118 mm (1.77" × 4.53" × 4.66")
Electrical Connection	Pluggable screw clamps, 2,5 mm²
Display and user interface	
Display	LCD 2-lines; black/white/yellow; toggle function; 1st line: 7 segment, 5-digit; 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
Approvals	
Ex-Approvals	ATEX II(1)GD [Ex ia] IIC
Software functionalities	
Min/Max log function / memory, alarm logging, differential pressure application package, 2 calculation channels: sum, difference, average, linearization	
Accessories	
Configuration software FieldCare Device Setup	
Commubox TXU10 (including FieldCare Device Setup)	

Dimensions (in inches)



Installation according to instruction manual

Electrical connection



Price table

Process transmitter RMA42		Order no.	Price/pcs. in USD		
Approval	Input; Output		1 to 5	6 to 10	11 to 35
Non-hazardous area	1 × universal; 1 × analog	RMA42-AAA	433.00	402.00	381.00
	2 × universal; 2 × analog	RMA42-AAB	577.00	537.00	508.00
	1 × universal; 1 × analog + 2 relay	RMA42-AAC	519.00	483.00	457.00
	2 × universal; 2 × analog + 2 relay	RMA42-AAD	662.00	616.00	583.00
ATEX II(1)GD [Ex ia] IIC	1 × universal; 1 × analog	RMA42-BHA	505.00	470.00	445.00
	2 × universal; 2 × analog	RMA42-BHB	650.00	605.00	572.00
	1 × universal; 1 × analog + 2 relay	RMA42-BHC	592.00	550.00	521.00
	2 × universal; 2 × analog + 2 relay	RMA42-BHD	735.00	684.00	647.00

Accessories	Order no.	Price/pcs. in USD
Configuration kit TXU10-for PC-programmable devices. set-up programme+interface cable for PC with USB-Port. 4 pin plug	TXU10-AC	219.94
Housing Field, R4 182 × 180 × 165, 5 × M20, PC Protection housing Minitec. Synthetic housing + transparent cover. Protection IP66. 4 × 22.5mm / 2 × 45mm.	52010132	109.60

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/rma42

More products to complete your measuring point ...

Capacitive probe
Liquicap T FMI21
page 8

Compact thermometer
Easytemp TMR31
page 75

Head transmitter
iTemp TMT80
page 93

Contactor

RTA421

$ 218.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/rta421

- 2 relays for setpoint monitoring (with changeover contacts)
- LC display for alarm setpoints and bargraph
- Front end setup using 3 push buttons

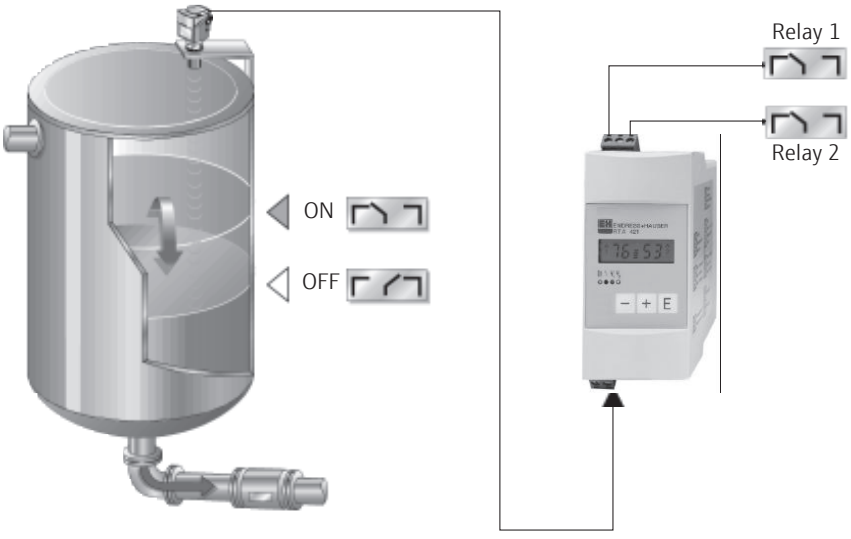
Specs at a glance:

- **Limit function:** 2 relays
- **Input:** Current, voltage
- **Transmitter power supply:** Optional
- **Time delay:** 0 to 99 s

Application The RTA421 contactor is used to monitor and protect industrial processes. The unit has two independent relays which offers a number of cost-effective applications such as pump control in wastewater technology and level monitoring in containers. The quick setup feature allows for changes of limit values and the unit is particularly suited for use in plant and engineering applications as well as switching cabinets.

Function The instrument evaluates current signals (0/4 to 20 mA) and voltage signals (0/2 to 10 V) and switches upon going over or under the predefined limit values. Both limit values are shown on the display. The bargraph displays the connected signal in percentages. A 2-digit bar code is available as an option to prevent entry of limit value.

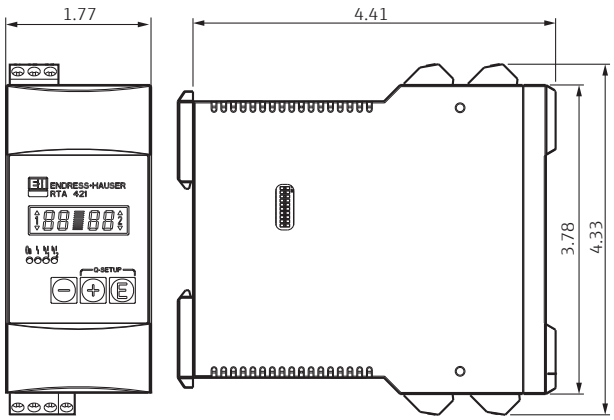
Application example



Technical data

Input	
Input	Current: 0/4 to 20 mA, 20 to 0/4 mA, max. 150 mA, R_i: 5 Ω Voltage: 0/2 to 10 V, 10 to 0/2 V, max. 50 V, R_i: 1 MΩ; Integration time: 4/s
Accuracy	0.5 % FSD
Temperature drift	0.02 %/K ambient temperature
Output	
Output (option)	24 V ±20 %, 30 mA
Output (Relays)	2, binary, switches when alarm setpoint is reached, 1 potential free changeover contact per relay, Contact load ≤250 V AC, 8 A, 30 V DC, 5 A
Mechanical construction	
Housing (W×H×D)	45 × 110 × 112 mm (1.77" × 4.33" × 4.41")
Weight	Approx. 150 g (5.29 oz)
Materials Housing	Plastic PC/ABS, UL 940
Electrical connection	Keyed, plug on screw terminals, core sizes flexible to 1.5 mm²
User interface	
LED	Operation, 1 × green (2 mm/0.08") Fault condition, 1 × red (2 mm/0.08") Alarm setpoint, 2 × yellow (2 mm/0.08")
LC display	Numeric display 4 × 7 segment (6 mm/0.24"); alarm setpoint condition 2 × channel number, 4 × 1 segment; bargraph 10 x 1 segment
Display range	2 × 0 to 99 %
Operation	3 pushbutton operation
Power supply	
Supply voltage	196 to 250 V AC, 50/60 Hz 98 to 126 V AC, 50/60 Hz 20 to 250 V DC/AC, 50/60 Hz
Power consumption	Max. 9 VA

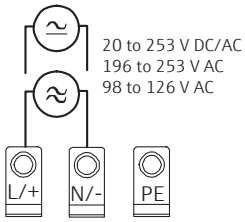
Dimensions (in inches)



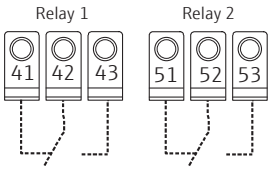
Installation according to instruction manual

Electrical connection

Power supply

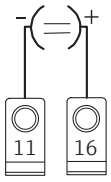


Relays (internal circuit)

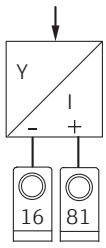


Contact condition shown in alarm or power out

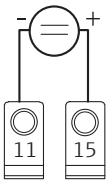
Current input 0/4 to 20 mA



Current input with loop power supply (option) 4 to 20 mA



Voltage input 0/2 to 10 V DC



Price table

Limit switch RTA421		Order no.	Price/pcs. in USD		
Loop Power Supply	Power Supply		1 to 5	6 to 10	11 to 35
without	196-250V AC	RTA421-A11A	248.00	230.00	218.00
	98-126V AC	RTA421-A21A	248.00	230.00	218.00
	20-250V DC/AC	RTA421-A31A	299.00	278.00	263.00
with	196-250 VAC	RTA421-A12A	299.00	278.00	263.00
	98-126V AC	RTA421-A22A	299.00	278.00	263.00
	20-250V DC/AC	RTA421-A32A	350.00	326.00	308.00

Accessories	Order no.	Price/pcs. in USD
Housing Field, R4 182 × 180 × 165, 5 × M20, PC Protection housing Minitec. Synthetic housing + transparent cover. Protection IP66. 4 × 22.5mm / 2 × 45mm.	52010132	109.60

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/rta421

More products to complete your measuring point ...


Flow measuring system
Proline Promag 10D
page 59


Paperless recorder
Ecograph T RSG35
page 104


Field indicator
RIA16
page 111

Power Supply with optional HART diagnostics

RN221N

$ 212.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/rn221n

- Loop power supply, wide range power supply, flexible power source
- Bi-directional HART® transmission with SMART transmitters
- Optional HART® diagnostics

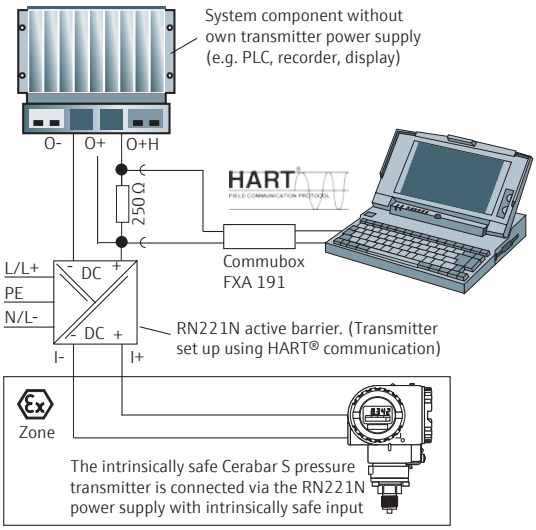
Specs at a glance:

- **Approval:**
  ATEX II (1) GD [EEx ia] IIC
- **HART® signal:**
  Bidirectional
- **Diagnostics:**
  Via HART® status bit or NE43
- **Relay output:**
  Optional for HART® diagnostics

Application The RN221N power supply is used for the galvanic isolation of 4 to 20 mA signal current circuits. It can also be applied for the intrinsically safe operation of 2-wire transmitters and to remove earth loops. The unit offers a sensor monitoring function as an option which monitors the HART® signal or the current loop for faults. The status of the measuring point is reported over an alarm relay.

Function The RN221N active barrier supplies sensors with auxiliary energy and transmits the measuring signal to the output. The optional, intrinsically safe input circuit, conforms to the requirements for ignition classification ATEX II (1) GD.

Application example



Technical data

Input	
Number of inputs	1
Power requirement	16.7 V ±0.2 V (at I = 20 mA)
Open circuit voltage	26 V ±5 %
Short circuit current	≤40 mA
Internal resistance	328 Ω
Over range	10 %
Reference conditions	Calibration temperature at 25 °C (77 °F)
Ambient temperature influence	≤0.1 % in range 0 to 50 °C (32 to 122 °F) ≤0.2 %/10 K in range -20 to 0 °C (-4 to 32 °F)

Intrinsically safe input option	
Open circuit voltage	27.3 V
Short circuit current	87.6 mA
Power consumption	597 mW
Capacitance	86 nF [EEx ia] IIC 683 nF [EEx ia] IIB, [EEx ia] IIA
Inductance	5.2 mH [EEx ia] IIC 18.9 mH [EEx ia] IIB, [EEx ia] IIA

Output	
Number	1
Open circuit voltage	24 V ± 10 %
Over range	10 %
Load (impedance)	0 to 700 Ω (without communication resistance)
Galvanic isolation	To all other current circuits
Relay output	Optional 250 V AC/30 V DC, 3A normally open/normally closed

Power supply	
Power supply	20 to 250 V DC/AC, 50/60 Hz
Power consumption	Without HART® diagnosis max. 2.5 W with HART® diagnosis max. 5.0 W
Current requirement	(Input current limitation) I_{max} /I_n <15
Electrical safety	To EN 61 010-1, protection Class I, over voltage category II, over current protection at installation (fuse) ≤10 A

Performance characteristics	
Linearity	≤0.15 %
Load influence	≤0.1 %

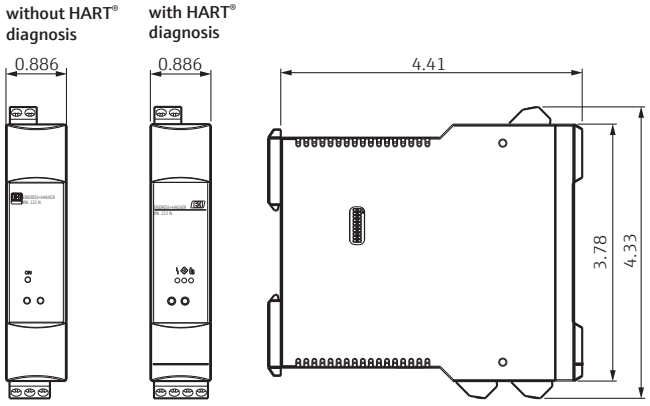
Operating conditions	
Ambient temperature	-20 to +50 °C (-4 to 122 °F)
Storage temperature	-20 to +70 °C (-4 to 158 °F)
Climatic class	To EN 60 654-1 Class B2
Ingress protection	IP 20
EMC	Immunity to EN 61326, Class A

Mechanical construction	
Dimens. (W×H×D)	22.5 × 96 × 112 (0.89" × 3.78" × 4.33") for top hat DIN rail to EN 50 022-35
Housing	PC/ABS, UL 940
Terminals	Keyed plug-on screw terminals, core size 2.5 mm² solid, or strands with ferrules; front mounted communication socket for 2 mm (0.79") jack plugs

Display and operating level	
Display elements	LED yellow in series to current output: Illuminates, when output current circuit is closed
LED current	> 2 mA
Remote communication	HART® communication: Communication signals are transmitted bi-directionally. Communication resistance: Resistance for HART® communication 250 Ω built in. Please take note of voltage drop!

Approvals	
Ex approval	ATEX II (1) GD [EEx ia] IIC

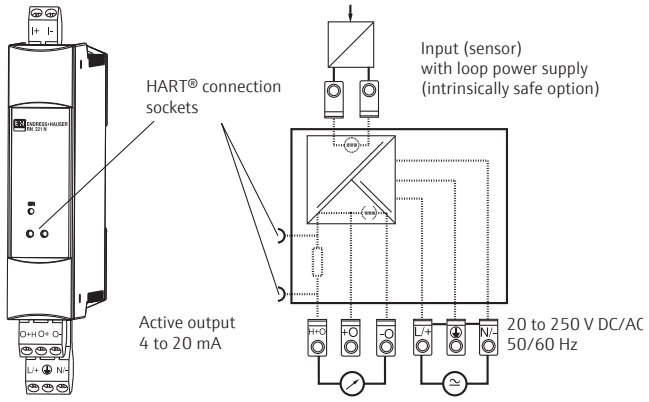
Dimensions (in inches)



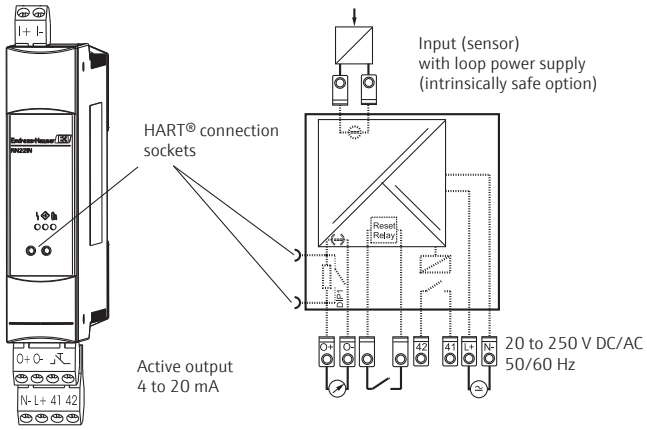
Installation according to instruction manual

Electrical connection

RN221N without HART® diagnostics



RN221N with HART® diagnostics



Price table

Active barrier RN221N		Order no.	Price/pcs. in USD		
Power Supply; Diagnostics	Approval		1 to 5	6 to 10	11 to 35
Standard	Non-hazardous area	RN221N-A1	240.00	224.00	212.00
	ATEX II (1)GD (Ex ia) IIC	RN221N-B1	258.00	240.00	227.00
HART® status monitoring and relay	Non-hazardous area	RN221N-A3	392.00	364.00	345.00
	ATEX II (1)GD (Ex ia) IIC	RN221N-B3	409.00	380.00	360.00

Accessories	Order no.	Price/pcs. in USD
Housing Field, R4 182 × 180 × 165, 5 × M20, PC Protection housing Minitec. Synthetic housing + transparent cover. Protection IP66. 4 × 22.5mm / 2 × 45mm.	52010132	109.60

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/rn221n

More products to complete your measuring point ...


Pressure transmitter
Cerabar T PMC131
page 48


Switching unit
Nivotester FTW325
page 24


Process transmitter
RMA42
page 123

Power supply

RNS221

$ 232.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/rns221

- Two-channel supply for two 2-wire sensors or transmitters
- Galvanic isolation between all circuits
- Wide range power supply, 20 to 250 V AC/DC, 50/60 Hz

Specs at a glance:

- **HART® signal:** Bidirectional
- **Diagnostics:** Via HART® status bit or NE43
- **Relay output:** Optional for HART® diagnostics

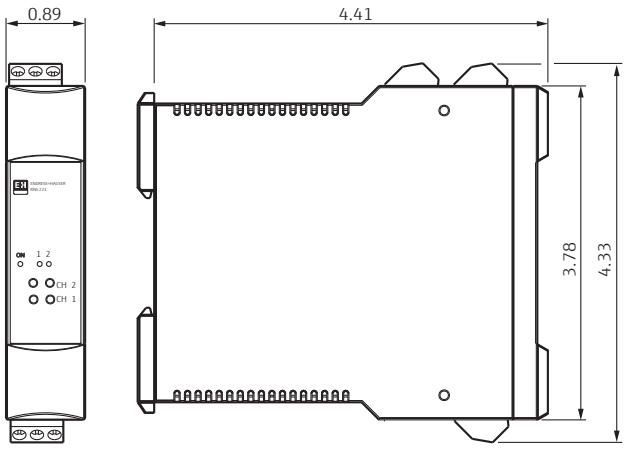
Application The RNS221 power supply supplies two 2-wire sensors or galvanically isolated transmitters. This is only valid for non-hazardous areas. Using the HART® communication sockets allows bi-directional communication to SMART transmitters (for setup, etc.).

Function The power supply has two galvanically isolated outputs for supplying voltage to sensors and transmitters. A built-in communication resistance (R = 250 Ω) enables bi-directional HART® communication with SMART sensors and transmitters.The system includes two channel power supply, 24 V DC, 30 mA, with LED status display for electrical supply of sensors and transmitters. All circuits are galvanically isolated from each other. The unit is constructed of 35 mm top hat DIN rail mounting.

Technical data

Output	
Output signal	Two channels for transmitter power supply, open circuit voltage 24 V ±10 %, with integrated HART® communication resistance R = 250 Ω for each output
Output current circuit	Maximum 30 mA. Short circuit current, both channels are continuously short circuit protected
Galvanic isolation	Between all circuits
Power supply	
Power supply	Wide range power supply, 20 to 250 V AC/DC, 50/60 Hz
Power consumption	P ≤5 W
Current requirement	(Input current limitation) I_{max} /I_n <15
Power failure	To EN 61 000-4-11
Operating conditions	
Ambient temperature	-20 to +60 °C (-4 to +140 °F)
Storage temperature	-30 to +70 °C (-22 to +158 °F)
Climatic class	To EN 60 654-1 Class B2
Ingress protection	NEMA 1
EMC	To IEC 61326, transmission Class A, immunity to IEC 61326 industrial environment
Over voltage protection	To EN 61 010-1, Category II, installation protection fuse ≤10 A
Mechanical construction	
Weight	<1 lb (approximately 0.140 kg)
Housing	PC/ABS, UL 94V0
Terminals	Power and signal connections, keyed plug-on screw terminal, 16 AWG solid wire; 18 AWG for stranded wire with ferrule. Communication connection sockets, 2 mm (0.79") on front panel of unit
Display and operating level	
Display elements	2 yellow illuminated LEDs with connected outputs; 1 green illuminated LED with main power connection
Installation hints	The installation area must be vibration-free; keep within the permitted ambient temperature range; protect the unit from extreme heat sources
Approvals	
CSA approval	CSA General Purpose

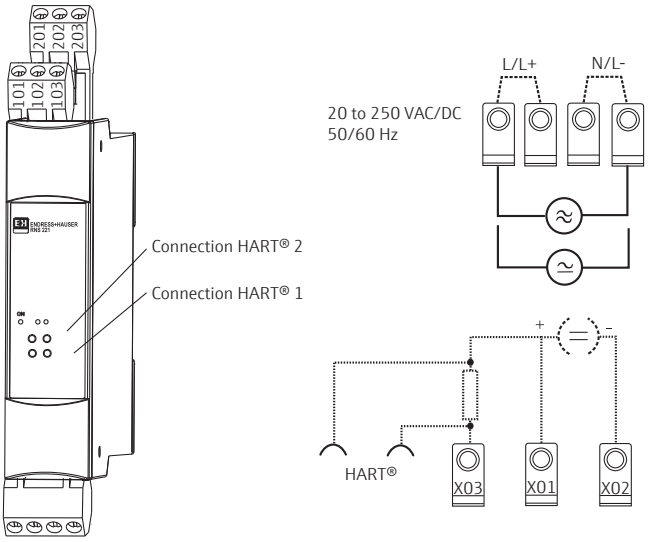
Dimensions (in inches)



Housing for top hat rail mounting according to IEC 60715

Installation according to instruction manual

Electrical connection



	Terminal layout	In and outputs
L/L+	L for AC, L+ for DC	Input for power supply
N/L-	N for AC, L- for DC	
X01	Power supply to transmitter 1 and 2 (+)	Output for transmitter power supply
X02	Power supply to transmitter 1 and 2 (+)	
X03	Power supply to transmitter 1 and 2 with intergrated HART® communication resistance (R = 250 Ω) (+)	
HART®	HART® communication to SMART transmitter	Communication sockets (CH 1, CH 2)

Price table

RNS221		Order no.	Price/pcs. in USD		
Approval	Power Supply		1 to 5	6 to 10	11 to 35
Non-hazardous area	20-250 V DC/AC	RNS221-A1	264.00	245.00	232.00

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/rns221

More products to complete your measuring point ...


Capacitive probe
Liquicap T FMI21
page 8


Pressure transmitter
Cerabar T PMC131
page 48

Compact thermometer
Easytemp TMR31
page 75

1 or 2-channel barrier, without power supply

RB223

$ 242.00
11 – 35 pcs.

Complete product information:
www.e-direct.us/rb223

- Space-saving single/dual channel version
- Can be used up to SIL3
- Bidirectional HART® transmission

Specs at a glance:

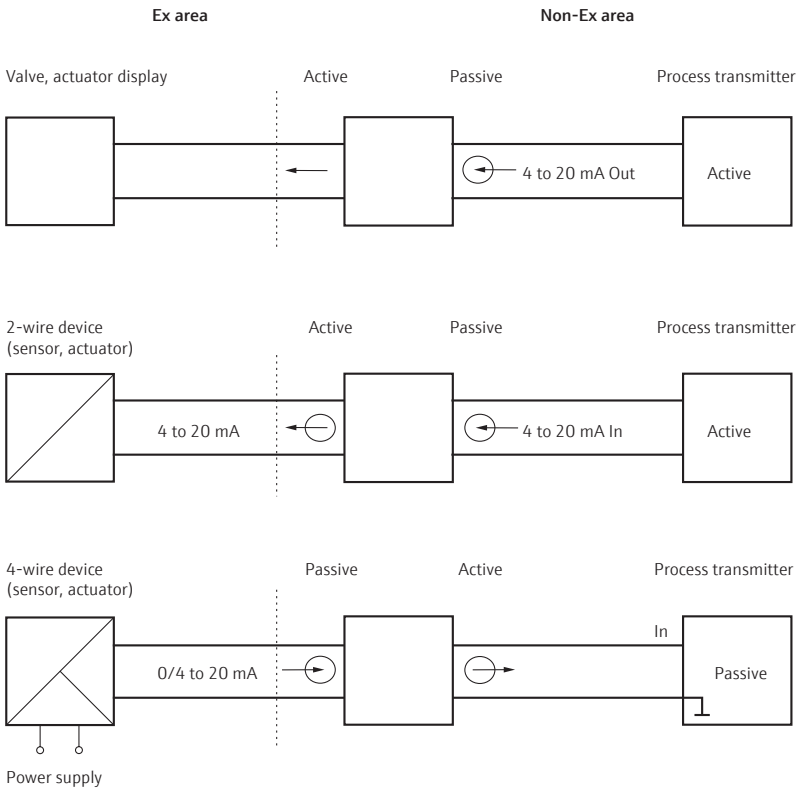
- **Certificates:**
  ATEX II (1) GD EEx ia IIC/IIB
  ATEX II (1) GD EEx ib IIC/IIB
- **HART® communication:**
  Built-in resistance for HART® communication 232 Ω
- **Version:**
  Optional dual-channel version
- **Signal transmission:**
  - From non-Ex to Ex-areas
  - From Ex to non-Ex areas

Application The RB223 isolator can be used to galvanically isolate active signal circuits (0 to 20 mA) in three applications:

- Transmission from non-Ex to Ex areas e.g for active adjusters, controllers or indicators
- Transmission from Ex to non-Ex areas for connection of active, intrinsically safe circuits to the PLC
- Transmission from Ex to non-Ex areas for supply of intrinsically safe transmitters with non-intrinsically safe transmitter power supply

Function The passive isolator transmits signal circuits from the input to the output by galvanic isolation. A HART® signal is also transmitted. The device is optionally available with intrinsically safe input/ output. The device is loop-powered and does not need any additional supply voltage of its own.

Application example



Technical data

Current transmission direction Non-Ex → Ex; Input	
Function range	0 to 40 mA (to 22 mA for specified accuracy)
Effective voltage	Max. <26 V for specified accuracy
Short circuit current	I_{max} = 100 mA
Limiting voltage	U_{max} = 30 V

Current transmission direction Non-Ex → Ex; Output	
Function range	0 to 40 mA (to 22 mA for specified accuracy), max. current depends on load
Load	Load resistance max. 0 to 600 Ω
Type of protection	Intrinsically safe according to ATEX: Max. voltage: U_o ≤28 V Max. current: I_o ≤93 mA Max. power: P_o ≤660 mW

Current transmission direction Ex → Non-Ex; Input	
Function range	0 to 40 mA (to 22 mA for specified accuracy)
Type of protection	Intrinsically safe according to ATEX: Max. voltage: U_i ≤30 V Max. current: I_i ≤100 mA Max. power: P_i ≤750 mW

Current transmission direction Ex → Non-Ex; Output	
Function range	0 to 40 mA (to 22 mA for specified accuracy), max. current depends on load
Load	Load resistance max. 0 to 600 Ω

Galvanic isolation	
Test voltage	>1.5 kV AC between input and output >1.5 kV AC between the channels

Power supply	
Starting current	Own consumption <50 µA
Voltage drop	< (1.9 V + 400 Ω × current loop) for nonEx → Ex < (3.9 V + 120 Ω × current loop) for Ex → nonEx
Power loss	<0.2 W at 20 mA (per channel) without HART® <0.3 W at 20 mA (per channel) with HART®

Accuracy	
Current transmission	< ±10 µA + 0.15 % from measured value
Temperature drift	≤ ±0.01 %/ 10 K

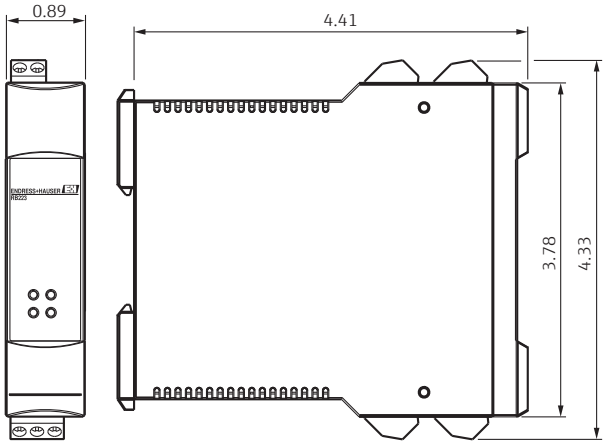
Operating conditions	
Ambient temp.	-20 to +60 °C (-4 to +140 °F)
Storage temperature	-20 to +80 °C (-4 to +176 °F)
Climate class	To IEC 60 654-1 class B2
Relative humidity	<95 % without condensation
EMC	Interference immunity to IEC 61 326 (industry) and NAMUR NE21

Mechanical construction	
Dimens. (W×H×D)	22.5 × 96 × 112 (0.89" × 3.78" × 4.33") for DIN rail to IEC 60 715 TH35
Weight	Approx. 150 g (5.29 oz.)

General	
Communication	HART® protocol: bi-directional possible
Frequency response	650 Hz for 500 Ω load for nonEx → Ex 1300 Hz for 500 Ω load for Ex → nonEx

Approvals	
Ex approvals	ATEX II (1) GD [EEx ia] IIC/IIB ATEX II (1) GD [EEx ib] IIC/IIB
SIL	Can be used up to SIL3

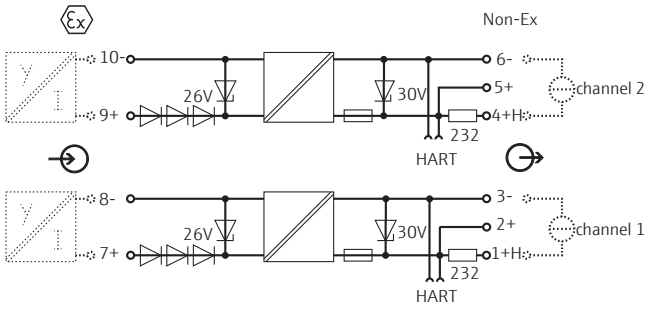
Dimensions (in inches)



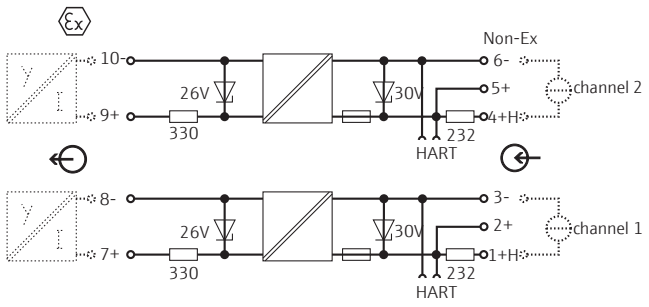
Installation according to instruction manual

Electrical connection

Ex → Non-Ex 2 channel



Non-Ex → Ex 2 channel



Price table

RB223			Order no.	Price/pcs. in USD		
Approval	Channel	Transmission direction		1 to 5	6 to 10	11 to 35
Non-hazardous area	1 ×	In-/Output	RB223-A1A	275.00	256.00	242.00
	2 ×	In-/Output	RB223-A2A	380.00	354.00	335.00
ATEX II(1)GD(Ex ia)IIC	1 ×	LPS hazardous area to non-hazardous area	RB223-B1A	298.00	277.00	263.00
		LPS non-hazardous to hazardous area	RB223-B1B	298.00	277.00	263.00
	2 ×	LPS hazardous area to non-hazardous area	RB223-B2A	404.00	375.00	355.00
		LPS non-hazardous to hazardous area	RB223-B2B	404.00	375.00	355.00

Accessories	Order no.	Price/pcs. in USD
Housing Field, R4 182 × 180 × 165, 5 × M20, PC Protection housing Minitec. Synthetic housing + transparent cover. Protection IP66. 4 × 22.5mm / 2 × 45mm.	52010132	109.60

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

Complete product information:
www.e-direct.us/rb223

More products to complete your measuring point ...


Paperless recorder
Ecograph T RSG35
page 104


Digital indicator
RIA46
page 108


Capacitive probe
Liquicap T FMI21
page 8

Surge arresters

HAW562 / HAW569

HAW562 HAW569

Complete product information:
www.e-direct.us/haw56x

- Field housing version
- Application in Ex areas
- High functional security (SIL2)

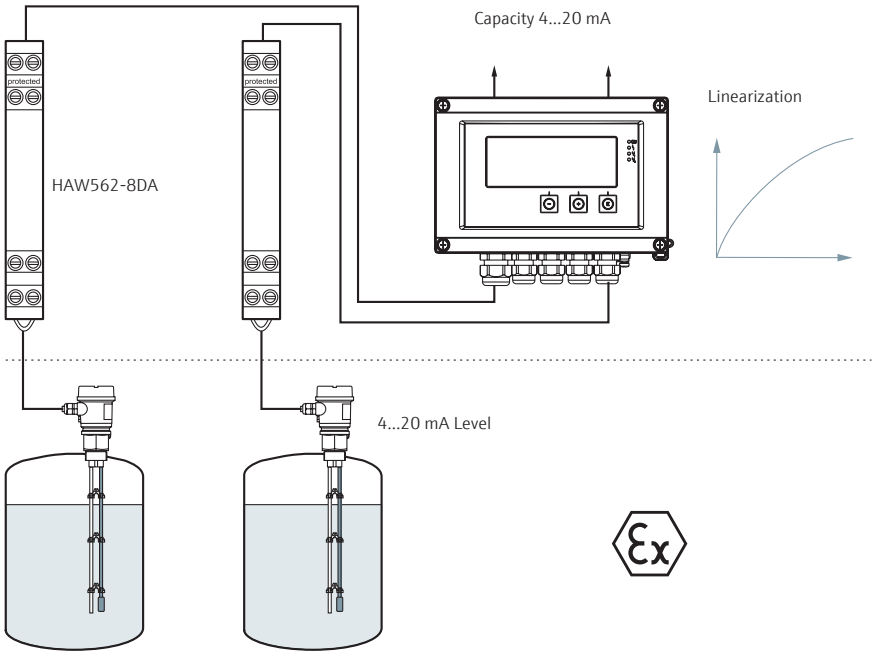
Specs at a glance:

- **Design:**
  DIN rail mountable housing, field housing (HAW569)
- **Approval:**
  ATEX II 2 (1) G
- **Signal:**
  Power supply 24 V DC/AC, 230 V AC, current 0/4 to 20 mA, PROFIBUS PA, RS485, PROFIBUS DP

Application The surge arrester is used for limiting high voltages in signal cables of 0/4 to 20 mA, PROFIBUS PA and PFM signal, for limiting high voltages in bus systems like PROFIBUS DP and RS485, in ultrasonic sensors and low voltage instrumentation supply cables.

Function Protection of supply to instrumentation, signal cables and components from overvoltage surges – created by lightning strikes or switch sequences for example.
Operation of power supply protection units: Using the impedance-free connection of the protection unit interference voltage drops cannot be introduced on the power lines.
Operation of signal cable protection units: protection steps within the unit guarantee high compatibility with the system to be protected.

Application example



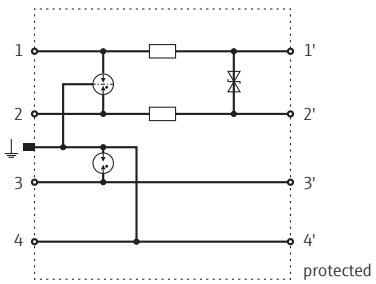
Technical data HAW562

	HAW562-AAA	HAW562-AAB	HAW562-AAC	HAW562-AAD	HAW562-AAE	HAW562-8DA
Supply voltage						
Nominal voltage	24 V	60 V	230 V	5 V	12 V DC[1)] 80 V DC[2)]	24 V
Max. continuous voltage	33 V DC 23.3 V AC	75 V	255 V	6 V DC 4.2 V AC	15 V DC[1)] 180 V DC[2)]	33 V DC 23.3 V AC
Current consumption						
Nominal current [I_L]	1.0 A	25 A	25 A	1.0 A	0.45 A[1)] 3 A[2)]	500 mA at T_{amb} = 80 °C (176 °F)
C2 nominal discharge current [I_n] (8/20) per line	10 kA	2 kA	3 kA	10 kA	10 kA	5 kA
C2 nominal discharge current [I_n] (8/20) total	20 kA	4 kA	5 kA	20 kA	20 kA	10 kA
D1 lightning surge current [I_{imp}] (10/350) per line	2.5 kA	-	-	2.5 kA	2.5 kA	1 kA
D1 lightning surge current [I_{imp}] (10/350) total	9 kA	-	-	9 kA	7.5 kA	2 kA
Voltage protection level						
Line/line	≤52 V at I_{imp}	L-N: ≤400 V	L-N: ≤1250 V	≤25 V	-	≤52 V
Line/PG	≤550 V at I_{imp}	L/N-PE: ≤730 V	L/N-PE: ≤1500 V	≤550 V	≤600 V	≤1400 V
Response times						
Line/line	-	L-N: ≤25 ns	L-N: ≤25 ns	-	≤1 ns	≤1 ns
Line/PG	-	L/N-PE: ≤100 ns	L/N-PE: ≤100 ns	-	≤100 ns	≤100 ns
Capacitance						
Line/line	≤1,0 nF	-	-	≤25 pF	-	≤0.8 nF
Line/PG	≤25 pF	-	-	≤25 pF	-	≤16 pF
General						
SPD class	Type 1 P1	Type 3 P3	Type 3 P3	Type 1 P1	Type 1 P1	Type 1 P1
Limit frequency	7.8 MHz	-	-	100 MHz	2 MHz[1)] 15 MHz[2)]	7.7 MHz (50 Ω) 3.2 MHz (100 Ω)
Series impedance per line	1.0 Ω	-	-	1.0 Ω	1.8 Ω[1)] directly connected[3)]	1.0 Ω
Maximum line side overcurrent protection	-	25 A gL/gG or B 25 A	25 A gL/gG or B 25 A	-	-	-

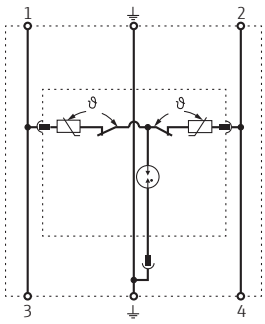
[1)] Terminal 4
[2)] Terminal 2
[3)] Terminal 1+2

Electrical connection

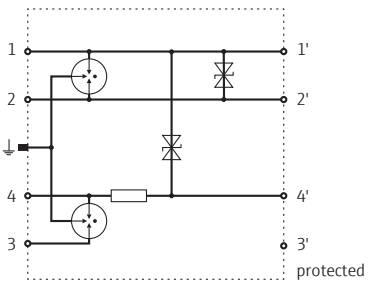
HAW562-AAA, -AAD, -8DA



HAW562-AAB, -AAC



HAW562-AAE

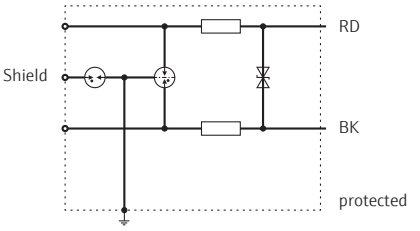


Technical data HAW569

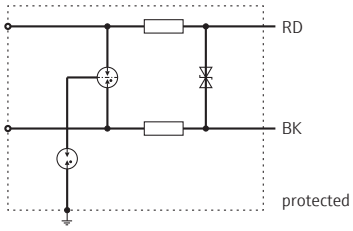
	HAW569-AA2B	HAW569-DA2B	HAW569-CB2C
Supply voltage			
Nominal voltage	24 V	24 V	24 V Signal 120 V / 230 V Power supply
Maximum continuous voltage	24.5 V AC 34.8 V DC	24.5 V AC 34.8 V DC	22.6 V AC Signal 255 V AC Power supply; 32 V DC Signal 255 V DC Power supply
Current consumption			
Nominal current [IL]	0.5 A	0.5 A	0.55 A at 80 °C (176 °F)
C2 nominal discharge current [I_n] (8/20) per line	10 kA	5 kA	-
C2 nominal discharge current [I_n] (8/20) total	10 kA	10 kA	10 kA
C2 nominal discharge current [I_n] (8/20) shielding – PG	20 kA	-	-
Nominal discharge current (8/20) L - N [I_n]	-	-	3 kA
Total discharge current (8/20) L+N - PE [I_{total}]	-	-	5 kA
D1 lightning surge current [I_{imp}] (10/350) line – PG	-	-	1 kA
D1 lightning surge current [I_{imp}] (10/350) total	-	-	-
Voltage protection level			
Line/line at I_n C2	≤65 V	≤55 V	≤58 V
Line/PG at I_n C2	≤650 V	≤1100 V	≤900 V
Shielding/PG at I_n C2	≤650 V	-	-
Line/line at 1 kV/µs C3	≤50 V	≤49 V	≤50 V
Line/PG at 1 kV/µs C3	≤500 V	≤1000 V	≤850 V
Line/line at 1 kV/µs C3	≤600 V	-	-
L - N	-	-	≤1.4 kV
L/N - PE	-	-	≤1.5 kV
Capacitance			
Line/line	≤400 pF	≤850 pF	≤25 pF
Line/PG	≤20 pF	≤15 pF	≤15 pF
General			
SPD class	Type 2 P1	Type 2 P1	Type 2 P2
Limit frequency	14 MHz	7 MHz	-
Series impedance per line	2.2 Ω	1.8 Ω	-
Maximum line side overcurrent protection	-	-	16 A gL/gG or B 16 A

Electrical connection

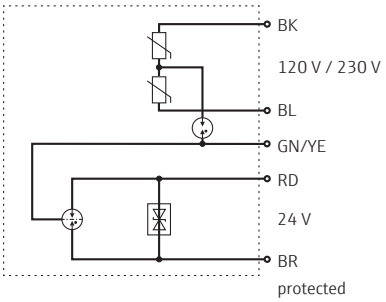
HAW569-AA2B (non-Ex lead-through version)



HAW569-DA2B (Ex ia lead-through version)

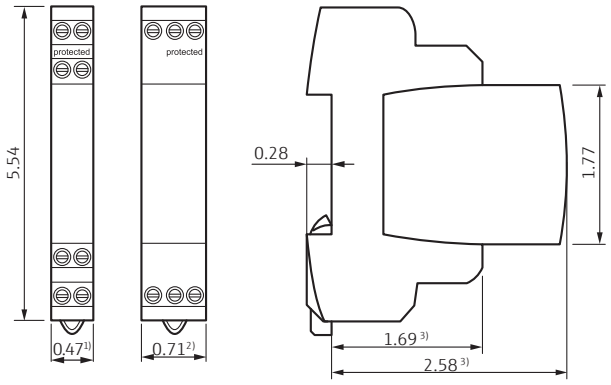


HAW569-CB2C (Ex d screw-in version)



Dimensions (in inches)

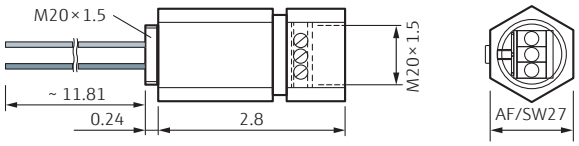
HAW562



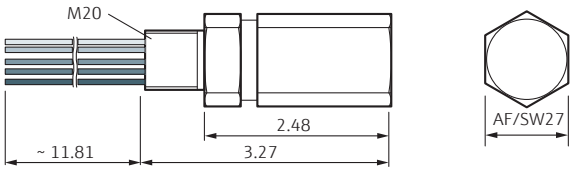
1) HAW562-AAA, -AAD, -AAE, -8DA
2) HAW562-AAB, -AAC
3) HAW562-AAB, -AAC: +0.5 mm

Installation according to instruction manual

HAW569-AA2B, -DA2B (lead-through version)

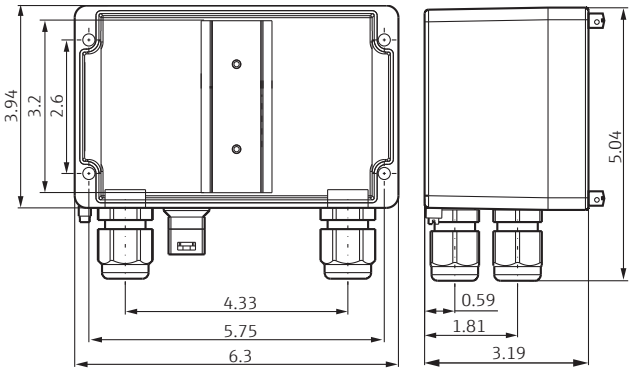


HAW569-CB2C (screw-in version)



Installation according to instruction manual

Accessory: Protective housing



Technical data
With integrated DIN rail for mounting up to four HAW56x units
Integrated DIN top hat rail
ground connection
GORE-TEX® filter
2 lead seal screws and 4 plastic cable glands M20 × 1.5
material: Pressure die cast aluminium, epoxy coated, ingress protection to IP 66/NEMA 4x

Price table

HAW562		Order no.	Price/pcs. in USD		
Approval	Application		1 to 5	6 to 10	11 to 35
Non-hazardous area	Measuring signal 0/4-20mA, PFM,PA,FF	HAW562-AAA	211.00	196.00	186.00
	Supply voltage 10-55V (+/-20%)	HAW562-AAB	126.00	117.00	111.00
	Supply voltage 90-230V (+/-10%)	HAW562-AAC	126.00	117.00	111.00
	Communication RS485, Modbus PROFIBUS DP	HAW562-AAD	242.00	225.00	213.00
	Protection module Prosonic FMU90	HAW562-AAE	246.00	229.00	216.00
ATEX/IECEx II2(1)G Ex ia[ia Ga]IIC T6 Gb	Measuring signal 0/4-20mA, PFM,PA,FF	HAW562-8DA	234.00	217.00	206.00

HAW569			Order no.	Price/pcs. in USD		
Approval	Housing	Application		1 to 5	6 to 10	11 to 35
Non-hazardous area	Lead through version	Measuring signal 0/4 to 20 mA	HAW569-AA2B	296.00	275.00	260.00
ATEX/IECEx II2(1)G Ex ia[ia Ga]IIC T6 G	Lead through version	Measuring signal 0/4 to 20 mA	HAW569-DA2B	319.00	296.00	280.00
ATEX/IECEx II2G Gb Ex d IIC T6	Screw in version cable gland M20	Measuring signal 0/4 to 20 mA and supply voltage 0 to 66 V & 80 to 230 V	HAW569-CB2C	359.00	334.00	316.00

Accessories	Order no.	Price/pcs. in USD
IP 66 protective housing for 4 HAW562	51003750	180.79
Mounting kit for IP 66 housing	51003773	90.40
Earthing ring kit for HAW569	51006420	27.79

Prices valid until 09.30.2015 in U.S. dollars per unit (not including shipping and applicable sales tax).
See Endress+Hauser, Inc. Terms and Conditions of Sale for shipping, tax, and payment terms.

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Power supply
RN221N
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