Signet Level / Ultrasonic Level

	2250 Hydrostatic	2260 Ultrasonic	2270 Ultrasonic	2280 Vibration Forks
Point or Continuous Level	Continuous	Continuous	Continuous	Point
Range (From Sensor Tip)	0 to 10 psig (0-23 ft) 0 to 50 psig (0-115ft)	0.2 to 4 m (0.65 to 13 ft) 0.25 to 6 m (0.82 to 20 ft) 0.45 to 15 m (1.5 to 49 ft)	0.2 to 4 m (0.65 to 13 ft) 0.25 to 6 m (0.82 to 20 ft)	N/A
Output Type	(S^3L) or 4 to 20 mA	4 to 20 mA (HART/ Relay-Optional)	4 to 20 mA / HART	2-wire AC; 3-wire PNP-NPN, 1 SPDT relay
Power Requirement	5 to 6.5 VDC (S^3L), 12-24 VDC (4 to 20 mA)	12 to 36 VDC	12 to 36 VDC	12 to 55 V DC or 20 to 255 V AC, 50/60 Hz, 20 to 255 V AC and 20 to 60 V DC
Tank Top	No	Yes	Yes	Yes
Submersible	Yes	No	No	Yes
Tank Side Mount	Yes	No	No	Yes
Open Channel (Flow)	No	Yes	Yes	No
Process Connection	½ in. union male thread	1½ in. 2 in., or 5"ANSI Flange	1½ in. or 2 in.	1 in.
ATEX (Intrinsically Safe)	No	Optional	No	Optional
Body Material	PVDF, Ceramic, FKM	PP/EPDM or PVDF/FKM	PP/EPDM or PVDF/FKM	Stainless Steel DIN 1.4571

Specification Matrix






	2281 Conductive Multipoint	2282 Guided Float	2284 Ultrasonic Gap (PPS)	2285 Float Switch	2290 Unguided Radar	2291 Guided Wave Radar
Point or Continuous Level	Point	Point	Point	Point	Continuous	Continuous
Range (From Sensor Tip)	20 in., 40 in., 59 in." (72 in., 108 in. on request)	N/A	N/A	Cable Length 5 m (16.5 ft) 10 m (33 ft) 20 m (66 ft)	0.2 m – 18 m (0.65 – 59 ft) (depending on εr of the process liquid)	Cable 6 m (19.6 ft) Rod 2 m (6.56 ft) Both customer adjustable
Output Type	SPDT (1-4 outputs, optional)	Reed Contact	Single pole, center off / switch with stable, contactless middle position	Microswitch (SPDT)	4 to 20 mA / HART	
Power Requirement	24 VAC or VDC	N/A	18 to 30 VDC / AC	N/A	20 V ...36 V DC	18 V... 35 V DC
Tank Top	Yes	No	Yes	No	Yes	Yes
Submersible	No	Yes	Yes	Yes	No	Cable/ rod only
Tank Side Mount	No	Yes	Yes	No	No	No
Open Channel (Flow)	No	No	No	No	No	No
Process Connection	1½ in.	½ in.	¾ in. or 1 in.	N/A	1½ in.	1 in.
ATEX (Intrinsically Safe)	No	No	No	No	Optional	Optional
Body Material	PBT/PP (Enclosure), Stainless Steel (probes)	PP or PVDF	PPS	PP (body), PVC (cable)	Horn: Stainless Steel; enclosure: PP, PTFE	Rod/Cable - 316 SS Special order coated versions available

Signet Level / Ultrasonic Level Application Matrix




	2250 Hydrostatic	2260 Ultrasonic	2270 Ultrasonic	2280 Vibration
Point Level	-	-	-	+
Continuous Level	+	+	+	-
Volume Measurement	+	+	+	-
Flow Measurement	-	+	+	-
Submersible	+	-	-	-
Tank Side Mount	+	-	-	+
Non Contacting	-	+	+	-
Vapors / Density Changes	+	o	o	+
Clean Fluid	+	+	+	+
Solids in Fluid	o	+	+	o
Residues	o	+	+	o
Some Surface Agitation	+	o	o	o
High Surface Agitation	o	-	-	-
Light Surface Foam	+	o	o	o
Dense Surface Foam	+	-	-	-
Intrinsically Safe	-	*	-	*

Chart Key	
+	Recommended
o	Conditionally Suitable
-	Not Recommended
*	Specific Part Number




	2281 Conductive Multipoint	2282 Guided Float	2284 Ultrasonic Gap (PPS)	2285 Float Switch
Point Level	+	+	+	+
Continuous Level	-	-	-	-
Volume Measurement	-	-	-	-
Flow Measurement	-	-	-	-
Submersible	o	+	+	+
Tank Side Mount	-	+	+	-
Non Contacting	-	-	-	-
Vapors / Density Changes	o	+	+	+
Clean Fluid	+	+	+	+
Solids in Fluid	o	-	+	+
Residues	-	-	+	+
Some Surface Agitation	+	o	o	+
High Surface Agitation	o	-	-	+
Light Surface Foam	o	-	-	+
Dense Surface Foam	-	-	-	+
Intrinsically Safe	-	-	-	-

Signet 2250 Submersible Hydrostatic Pressure Sensor For Level and Depth Control

Blind Transmitter or Digital (S^3L) Sensor

The Signet 2250 Hydrostatic Level Sensor for level and depth control has a one-piece injection molded PVDF body and ceramic diaphragm for superior compatibility in corrosive liquids. Utilizing hydrostatic pressure, the 2250 disregards false level signals from steam vapors, foam or any other debris on the liquid surface. Two pressure ranges allow for optimal resolution matched to your sensing needs. Solid state circuitry eliminates drift (no internal potentiometers).

These sensors are available with a proprietary digital (S^3L) output, or 4 to 20 mA output. The extended cable and capillary tubing with the union connection and a customer supplied conduit, allow submersion in process vessels.

Features

- **Level and depth measurement**
- **4 to 20 mA or digital (S^3L) output**
- **Flush ceramic diaphragm**
- **Easy submersible installation**
- **Choice of two pressure ranges**
- **Standard union connection and extended cable and capillary tubing (10 m)**

Applications

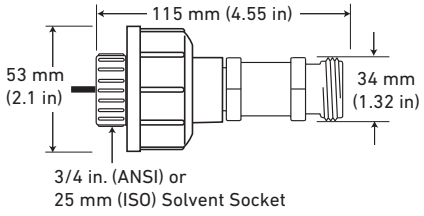
- **Inventory Management**
- **Storage Tank Monitoring**
- **Neutralization Tanks**
- **Plating Lines**
- **Waste Sumps**
- **Clarifiers**
- **Overflow Protection**

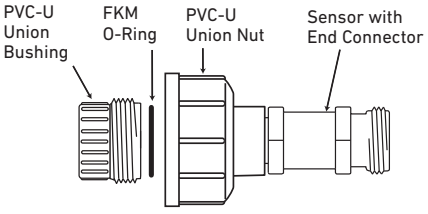
Specifications

General			
Output		Digital (S³L) or 4 to 20 mA	
Accuracy for all pressure ranges		±1% of full scale	
Resolution	-XU	0.001 psi	
	-XL	0.01 psi	
Response Time		< 100 ms	
Wetted Materials			
Union and Union Bushing		PVC-U	
Sensor Housing		PVDF	
Diaphragm		Ceramic	
Diaphragm Seal		FKM	
Electrical			
Power Requirements			
	Digital (S³L)	5 to 6.5 VDC <1.5 mA (power supplied by the 8900, 9900, 9950 and 0486)	
	4 to 20 mA	12 to 24 VDC ±10%, regulated	
Cable Length		10 m (32.8 ft)	
Cable Type		3 cond. plus shield, 22 AWG, PVC jacketed, Blk/Red/White/Shld with capillary tube	
Digital (S³L) Output		Serial ASCII, TTL level 9600 bps.	
		Reverse polarity and short circuit protected.	
4 to 20 mA Output			
Accuracy		±32 µA	
Resolution		< 5 µA	
Span		4 to 20 mA factory calibrated to operating ranges shown below	
Maximum Loop Impedance		100 Ω @ 12 V	
		325 Ω @ 18 V	
		600 Ω @ 24 V	
Maximum Temperature/Pressure Rating			
Operating Temperature		-15 ˚C to 85 ˚C	5 ˚F to 185 ˚F
Storage Temperature		-20 ˚C to 100 ˚C	-4 ˚F to 212 ˚F
Operating Pressure		-XU: 0 to 0.7 bar (0 to 10 psig)	
		-XL: 0 to 3.4 bar (0 to 50 psig)	
Proof Pressure		-XU: 1.4 bar (20 psig)	
		-XL: 5.2 bar (75 psig)	
Shipping Weight			
		0.560 kg	1.23 lb
Standards and Approvals			
		CE, FCC	
		RoHS compliant, China RoHS	
		Manufactured under ISO 9001 for Quality and ISO 14001 for Environmental Management and OHSAS 18001 for Occupational Health and Safety	

See Temperature and Pressure graphs for more information.

Dimensions





Submersible Installation

System Overview

Pipe, Tank, Wall Mount	4 to 20 mA Output	Automation System
Signet Instruments - 9900-1P with Rear Enclosure Signet Instruments with 3-8050-1 Universal Mount Kit or 3-8052-1 Integral Mount Kit - 8900 - 9900 Signet Instruments with 3-8050-1 Universal Mount Kit or 3-8052-1 Integral Mount Kit - 9950	- 3-8050-1 Universal Mount Kit or 3-8052-1 Integral Mount Kit with - Customer Supplied Programmable Logic Controller	- 3-8050 Universal Mount Kit or 3-8052 Integral Mount Kit with - 0486 Profibus Concentrator and Customer Supplied Programmable Logic Controller or Programmable Automation Controller
Customer supplied pipe extension or conduit with pipe assembly*		
Signet 2250 Submersible Hydrostatic Pressure Sensor with union connection, extended cable and capillary tubing (10 m)**		

All sold separately

*Refer to the Signet Submersion Kit brochure (3-0000.707) located on our website for installation suggestions and options.
** Cable must be exposed to the atmosphere

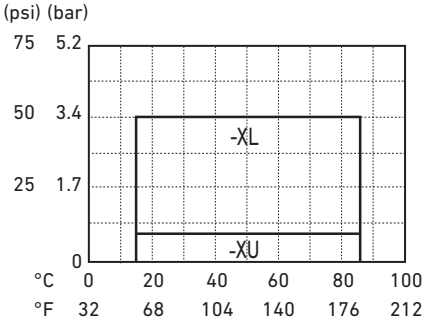
Ordering Notes

1) Instrument is sold separately. The following instrument part numbers are compatible with the 2250: 8900, 9900 and 9950 transmitters and 0486 Profibus Concentrator.
2) Union mount installs into pipe w/end connector and union nut.
3) Refer to the Signet Submersion Kit brochure (3-0000.707) located on our website for installation suggestions and options.

Pressure/Level ranges*	
3-2250-XU	0 to 10 psi = 0 to 7.03 m = 0 to 23.06 ft
3-2250-XL	0 to 50 psi = 0 to 35.15 m = 0 to 115.32 ft

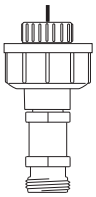
*Ranges calculated using specific gravity of water. Maximum ranges depending on its specific gravity.

Temperature/Pressure Graphs



Please refer to Wiring, Installation, and Accessories sections for more information.

Ordering Information



Mfr. Part No.	Code	Sensor Output	Operating Pressure	Level Range
Hydrostatic Level Sensor with ½ in. Union Connector and 10 m (32.8 ft) Cable				
PVC-U Union Connection - ¾ in. Pipe Connection				
3-2250-11L	**159 001 241**	NPT, digital (S^3L)	0 - 3.4 bar (0-50 psi)	35 m (115 ft)
3-2250-11U	**159 001 242**	NPT, digital (S^3L)	0 - 0.7 bar (0-10 psi)	7 m (23 ft)
3-2250-21L	**159 001 247**	NPT, current loop (4 to 20 mA)	0 - 3.4 bar (0-50 psi)	35 m (115 ft)
3-2250-21U	**159 001 248**	NPT, current loop (4 to 20 mA)	0 - 0.7 bar (0-10 psi)	7 m (25 ft)
PVC-U Union Connection - Metric Pipe Connector				
3-2250-11U-1	**159 001 478**	ISO, digital (S^3L)	0 - 0.7 bar (0-10 psi)	7 m (23 ft)
3-2250-11L-1	**159 001 479**	ISO, digital (S^3L)	0 - 3.4 bar (0-50 psi)	35 m (115 ft)
3-2250-21U-1	**159 001 482**	ISO, current (4 to 20 mA)	0 - 0.7 bar (0-10 psi)	7 m (23 ft)
3-2250-21L-1	**159 001 483**	ISO, current (4 to 20 mA)	0 - 3.4 bar (0-50 psi)	35 m (115 ft)

Accessories and Replacement Parts

Mfr. Part No.	Code	Description
3-8052	**159 000 188**	¾ in. Integral Mounting Kit
3-8052-1	**159 000 755**	¾ in. NPT mount junction box with one liquid tight connector and cap with junction terminals
3-8050	**159 000 184**	Universal Mount Kit
3-8050-1	**159 000 753**	Universal Mount Junction Box
3-9000.392-1	**159 000 839**	Liquid Tight Connector Kit, NPT (1 connector)
3-9000.392-2	**159 000 841**	Liquid Tight Connector Kit, PG 13.5 (1 connector)
3-0252	**159 001 808**	Configuration Tool

2260 Ultrasonic Level Transmitters

The type 2260 is a rugged, high performance ultrasonic level measurement transmitter, having transducer and processing electronics and a display/ programming unit incorporated in one single housing.

All type 2260 Level Transmitters are using established high end pulse echo transducers, which provide narrow beam angles and reliable measurement ranges up to a distance of 15 meters.

For small, stand alone tanks the transmitter provides a simple 2-wire 4 to 20 mA output, with additional power relay contacts. It can be programmed using push buttons and the large, graphic display. For large and/or multiple tank applications versions with HART interface are recommended, communicating directly with a panel mount controller or PLC. The HART protocol can easily be used for programming these versions.

Features

- **2-wire compact transmitters**
- **Non-contact level metering**
- **Narrow 5° beam angle**
- **Level, volume and open channel flow**
- **Fully temperature compensated electronics**
- **Outstanding signal processing software providing highly accurate measuring results**
- **PP or PVDF sensor body provides best chemical resistance**
- **Quick-set menu for efficient installation**
- **Plug-in keypad and display**
- **Switching relay for high / low alarm**
- **4 to 20 mA / HART interface (Optional)**
- **Secondary lightning protection**
- **Intrinsically safe (Optional)**
- **32-point linearization**

CE

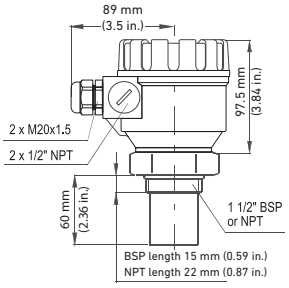
Applications

- **River water**
- **Seawater**
- **Potable water**
- **Demineralized water**
- **Treated water**

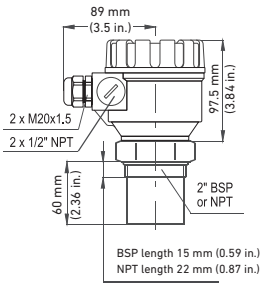
Dimensions (mm)

2-wire level transmitters

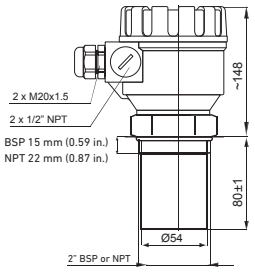
2260-Y-YYY-4



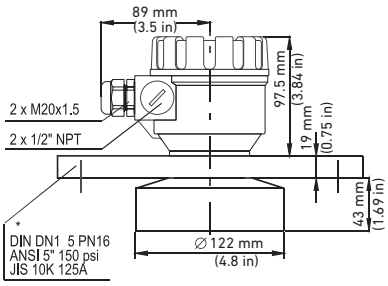
2260-Y-YYY-6



2260-Y-YYY-8



2260-Y-YYY-15

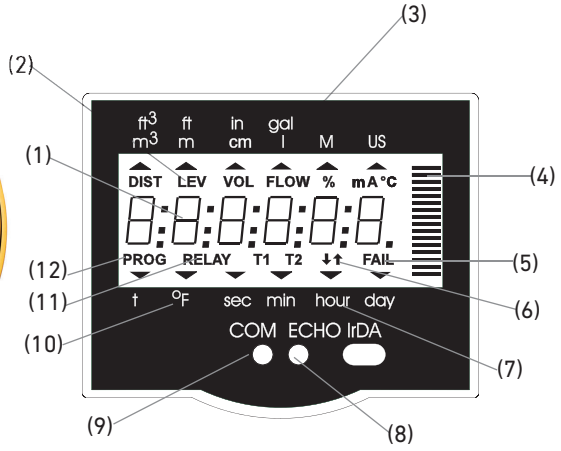


Specifications

General					
Type		2260-Y-YYY-4	2260-Y-YYY-6	2260-Y-YYY-8	2260-Y-YYY-15
Range		0.2 to 4 m / 0.65 to 13 ft	0.25 to 6 m / 0.82 to 20 ft	0.35 to 8 m / 1.1 to 26 ft	0.45 to 15 m / 1.5 to 49 ft
Measuring Frequency		80 kHz	80 kHz	50 kHz	40 kHz
Total Beam Angle		6°	5°	7°	5°
Accuracy *		± (0.2 % of measured distance plus 0.05 % of range)			
Resolution		<2 m (6.6 ft): 1 mm (0.04 in.), 2 to 5 m (6.6 to 16.4 ft), 2 mm (0.08 in.), 5 to 10 m (16.4 to 32.8 ft): 5 mm (0.2 in.), >10 m (32.8 ft): 10 mm (0.39 in.)			
Environmental					
Process Temperature		-30 °C to +90 °C (-22 °F to + 194 °F)			
Ambient Temperature		-25 °C to +70 °C (-13 °F to + 158 °F)			
Process Pressure (absolute)		0.03 to 0.3 MPa (0.3 to 3 bar) 4.35 psi - 43.5 psi			
Enclosure					
Enclosure Material					
	Sensor Body	PP or PVDF			
	Housing	PBT			
Ingress Protection					
	Sensor	IP68			
	Housing	IP67			
Process Connection		1½ in. BSP / NPT	2 in. BSP / NPT	2 in. BSP / NPT	DN125 / 5 in. flange
Sealing					
	PP sensor	EPDM			
	PVDF sensor	FKM (Viton)			
Electrical					
Outputs		2-wire 4–20 mA , max. 600 Ohm; HART interface, Rt >/= 250 Ohm Ω			
Relay		(SPDT) 250V AC, 3A AC1			
Power Supply		12 to 36 V DC / 44 to 800 mW			
Power Consumption		DC 3.6 W, AC 4 VA			
Connection		2 x M20x1,5 plastic cable gland: Cable: Ø6 ... 12 mm			
Standards and Approvals					
General Approvals		CE, RoHS			

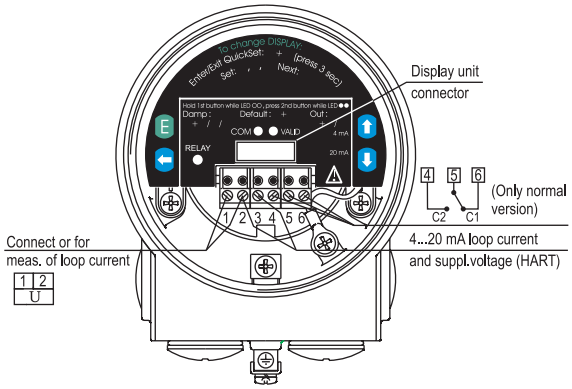
* Under optimal circumstances of reflection and stabilized transducer temperature

Display Unit

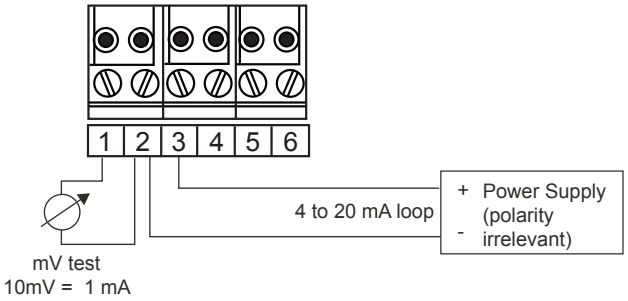


(1) Primary measured value
(2) Measurement mode
(3) Measurement unit / Standard
(4) Bar graph trend indication
(5) Measurement error indication
(6) Liquid movement direction
(7) Time unit
(8) Presence of valid echo
(9) HART communication
(10) Temperature unit
(11) Relay status indication
(12) Programming mode indication

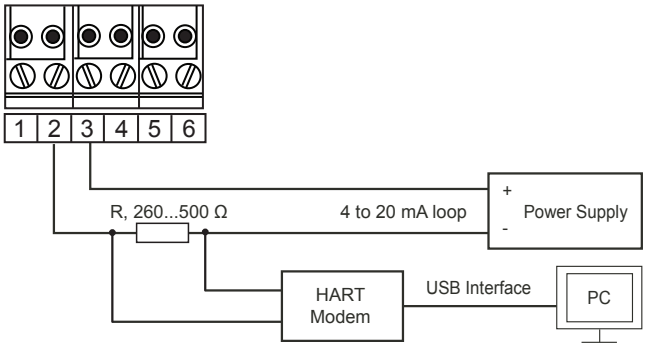
2260 Transmitter Terminals



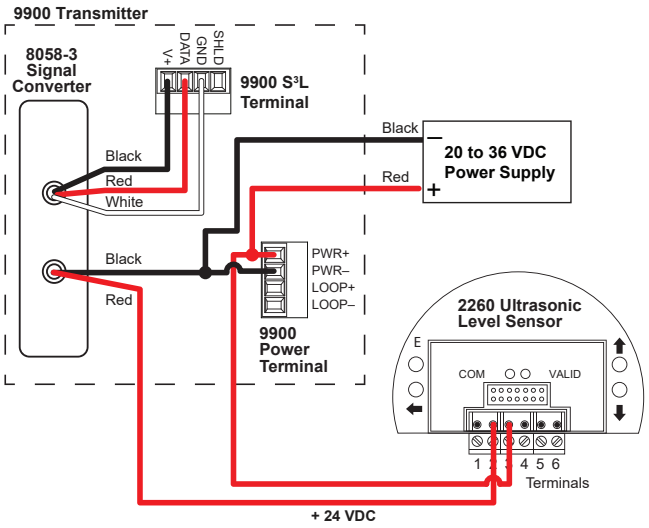
4 to 20 mA Loop Wiring



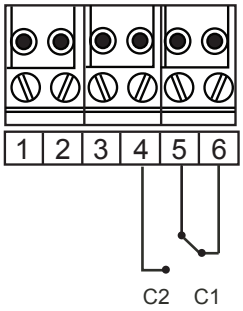
HART Interface Wiring



Wiring to 9900 Universal Transmitter

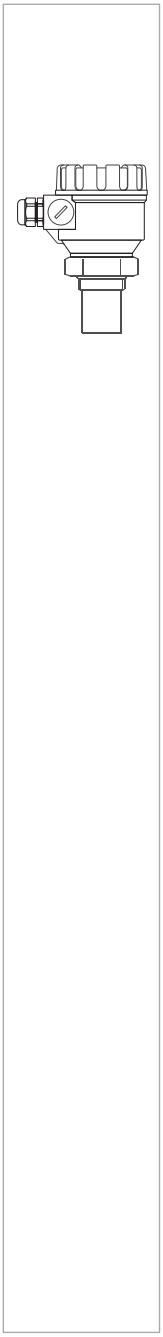


Relay Output Wiring



Pin No.	Assignment
1	mV Test, 10 mV → 1mA
2	4 to 20 mA current + supply
3	4 to 20 mA current + supply Polarity irrelevant
4	Relay NO terminal
5	Relay common terminal
6	Relay NC terminal

Ordering Information



Mfr. Part No	Code	Description
2260-P-0DN-4	**159 300 120**	Range 4 m (13.1 ft), PP body, 4..20 mA 2-wire, NPT thread
2260-P-2DN-4	**159 300 121**	Range 4 m (13.1 ft), PP body, 4..20 mA 2-wire/relay/HART, NPT thread
2260-P-0DN-6	**159 300 122**	Range 6 m (19.7 ft), PP body, 4..20 mA 2-wire, NPT thread
2260-P-2DN-6	**159 300 123**	Range 6 m (19.7 ft), PP body, 4..20 mA 2-wire/relay/HART, NPT thread
2260-P-0DN-8	**159 300 109**	Range 8 m (26.2 ft), PP body, 4..20 mA 2-wire, NPT thread
2260-P-0DA-15	**159 300 124**	Range 15 m (49.2 ft), PP body, 4..20 mA 2-wire, ANSI Flange 5 in.
2260-P-2DA-15	**159 300 125**	Range 15 m (49.2 ft), PP body, 4..20 mA 2-wire/relay/HART, ANSI Flange 5 in.
2260-V-0DN-4	**159 300 131**	Range 4 m (13.1 ft), PVDF body, 4..20 mA 2-wire, NPT thread
2260-V-2DN-4	**159 300 132**	Range 4 m (13.1 ft), PVDF body, 4..20 mA 2-wire/relay/HART, NPT thread
2260-V-0DN-6	**159 300 133**	Range 6 m (19.7 ft), PVDF body, 4..20 mA 2-wire, NPT thread
2260-V-2DN-6	**159 300 134**	Range 6 m (19.7 ft), PVDF body, 4..20 mA 2-wire/relay/HART, NPT thread
2260-V-0DN-8	**159 300 110**	Range 8 m (26.2 ft), PVDF body, 4..20 mA 2-wire, NPT thread
2260-V-0DA-15	**159 300 135**	Range 15 m (49.2 ft), PVDF body, 4..20 mA 2-wire, ANSI Flange 5 in.
2260-V-2DA-15	**159 300 136**	Range 15 m (49.2 ft), PVDF body, 4..20 mA 2-wire/relay/HART, ANSI Flange 5 in.
Versions with NPT thread / ANSI flange		
2260-V-1DNX-4	**159 300 142**	Range 4 m (13.1 ft), PVDF body, 4..20 mA 2-wire/HART, ATEX, NPT thread
2260-V-1DNX-6	**159 300 143**	Range 6 m (19.7 ft), PVDF body, 4..20 mA 2-wire/HART, ATEX, NPT thread
2260-V-1DAX-15	**159 300 144**	Range 15 m (49.2 ft), PVDF body, 4..20 mA 2-wire/HART, ATEX, ANSI Flange 5 in.
Versions with BSP thread / DIN flange		
2260-P-0DB-4	**159 300 090**	Range 4 m (13.1 ft), PP body, 4..20 mA 2-wire, BSP thread
2260-P-2DB-4	**159 300 091**	Range 4 m (13.1 ft), PP body, 4..20 mA 2-wire/relay/HART, BSP thread
2260-P-0DB-6	**159 300 092**	Range 6 m (19.7 ft), PP body, 4..20 mA 2-wire, BSP thread
2260-P-2DB-6	**159 300 093**	Range 6 m (19.7 ft), PP body, 4..20 mA 2-wire/relay/HART, BSP thread
2260-P-0DB-8	**159 300 107**	Range 8 m (26.2 ft), PP body, 4..20 mA 2-wire, BSP thread
2260-P-0DF-15	**159 300 094**	Range 15 m (49.2 ft), PP body, 4..20 mA 2-wire, DIN Flange DN125
2260-P-2DF-15	**159 300 095**	Range 15 m (49.2 ft), PP body, 4..20 mA 2-wire/relay/HART, DIN Flange DN125
2260-V-0DB-4	**159 300 101**	Range 4 m (13.1 ft), PVDF body, 4..20 mA 2-wire, BSP thread
2260-V-2DB-4	**159 300 102**	Range 4 m (13.1 ft), PVDF body, 4..20 mA 2-wire/relay /HART, BSP thread
2260-V-0DB-6	**159 300 103**	Range 6 m (19.7 ft), PVDF body, 4..20 mA 2-wire, BSP thread
2260-V-2DB-6	**159 300 104**	Range 6 m (19.7 ft), PVDF body, 4..20 mA 2-wire/relay /HART, BSP thread
2260-V-0DB-8	**159 300 108**	Range 8 m (26.2 ft), PVDF body, 4..20 mA 2-wire, BSP thread
2260-V-0DF-15	**159 300 105**	Range 15 m (49.2 ft), PVDF body, 4..20 mA 2-wire, DIN Flange DN125
2260-V-2DF-15	**159 300 106**	Range 15 m (49.2 ft), PVDF body, 4..20 mA 2-wire/relay/HART, DIN Flange DN125

Ordering Information

Mfr. Part No	Code	Description
Versions with BSP thread / DIN flange		
2260-V-1DBX-4	**159 300 112**	Range 4 m (13.1 ft), PVDF body, 4 to 20 mA 2-wire/HART, ATEX, BSP thread
2260-V-1DBX-6	**159 300 113**	Range 6 m (19.7 ft), PVDF body, 4 to 20 mA 2-wire/HART, ATEX, BSP thread
2260-V-1DFX-15	**159 300 114**	Range 15 m (49.2 ft), PVDF body, 4 to 20 mA 2-wire/HART, ATEX, DIN Flange DN125

Accessories

Code	Description
159 300 181	HART - USB Modem
159 300 182	HART - USB Modem, DIN Rail
159 300 183	HART - USB Modem, DIN Rail, ATEX
159 300 180	Display unit for type 2260 Transmitter

2260 Ultrasonic Level Transmitters with Ex Approval

The type 2260 is a rugged, high performance ultrasonic level measurement transmitter, having transducer and processing electronics and a display/ programming unit incorporated in one single housing.

All type 2260 Level Transmitters are using established high end pulse echo transducers, which provide narrow beam angles and reliable measurement ranges up to a distance of 15 meters (49.2 ft).

For small, stand alone tanks the transmitter provides a simple 2-wire 4 to 20 mA output, with additional power relay contacts. It can be programmed using push buttons and the large, graphic display. For large and/or multiple tank applications versions with HART interface are recommended, communicating directly with a panel mount controller or PLC. The HART protocol can easily be used for programming these versions.

For hazardous areas the type 2260 Level Transmitters are available with explosion proof approvals.

Features

- **2-wire compact transmitters**
- **Non-contact level metering**
- **Narrow 5° beam angle**
- **Level, volume and open channel flow**
- **Fully temperature compensated electronics**
- **Outstanding signal processing software providing highly accurate measuring results**
- **PP or PVDF sensor body provides best chemical resistance**
- **Quick-set menu for efficient installation**
- **Plug-in keypad and display**
- **4 to 20 mA / HART interface (Optional)**
- **Secondary lightning protection**
- **Intrinsically safe (Optional)**
- **32-point linearization**

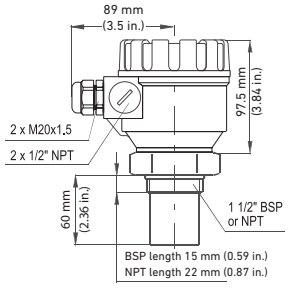
Applications

- **River water**
- **Seawater**
- **Potable water**
- **Demineralized water**
- **Treated water**

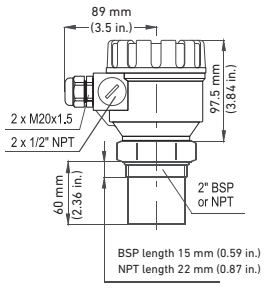
Dimensions (mm)

2-wire level transmitters

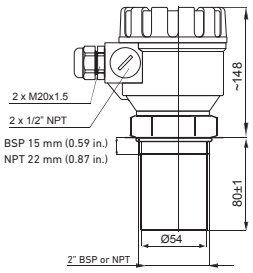
2260-Y-YYY-4



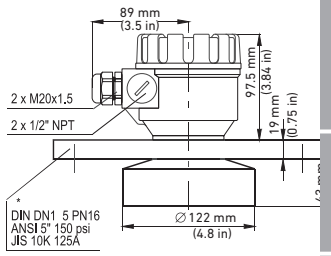
2260-Y-YYY-6



2260-Y-YYY-8



2260-Y-YYY-15

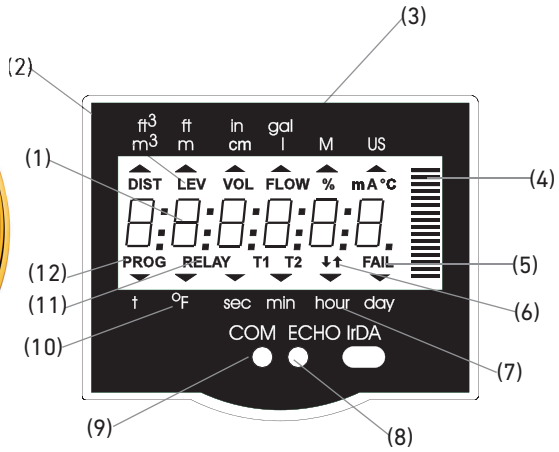


Specifications

General					
Type		2260-Y-YYYX-4	2260-Y-YYYX-6	2260-Y-YYY-8	2260-Y-YYYX-15
Range		0.2 to 4 m (0.65 to 13 ft)	0.25 to 6 m (0.82 to 20 ft)	0.35 to 8 m (1.1 to 26 ft)	0.45 to 15 m (1.5 to 49 ft)
Measuring Frequency		80 kHz	80 kHz	50 kHz	40 kHz
Total Beam Angle		6°	5°	7°	5°
Accuracy *		± (0.2 % of measured distance plus 0.05 % of range)			
Resolution		<2 m (6.6 ft): 1 mm (0.04 in.), 2 to 5 m (6.6 to 16.4 ft), 2 mm (0.08 in.), 5 to 10 m (16.4 to 32.8 ft): 5 mm (0.2 in.), >10 m (32.8 ft): 10 mm (0.39 in.)			
Environmental					
Process Temperature					
	PP sensor	-20 °C to +70 °C (-4 °F to 158 °F)			
	PVDF sensor	-20 °C to +80 °C (-4 °F to 176 °F)			
Ambient Temperature		-20 °C to +60 °C (-4 °F to 140 °F)			
Process Pressure (absolute)		0.03 to 0.3 MPa (0.3 to 3 bar) 4.35 psi - 43.5 psi			
Enclosure					
Enclosure Material					
	Sensor Body	PP or PVDF			
	Housing	PBT			
Ingress Protection					
	Sensor	IP68, NEMA 6P			
	Housing	IP67, NEMA 6P			
Process Connection		1½ in. BSP / NPT	2 in. BSP / NPT		DN125 / 5 in. Flange
Sealing					
	PP sensor	EPDM			
	PVDF sensor	FKM (Viton)			
Electrical					
Outputs		2- wire 4–20 mA , HART interface, Rt >/= 250 Ω			
Power Supply		12 to 30 V DC, Note: Ex-devices must be powered by EEx ia power supplies			
Power Supply Loading		U_o < 30 V, I_o < 140 mA, P_o < 1 W, R_t max = (Us - 12 V) / 0,02 A			
Intrinsically safety data		C_i </= 15 nF, L_i </= 200 µH, U_i </= 30V, I_i </= 140 mA, P_i </= 1 W			
Connection		2 x M20x1,5 metal cable gland: Cable: Ø7 ... 13 mm			
Standards and Approvals					
General Approvals		CE, RoHS			
ATEX Approval		ATEX II 1 G EEx ia IIB T6, IP68, NEMA 6P			

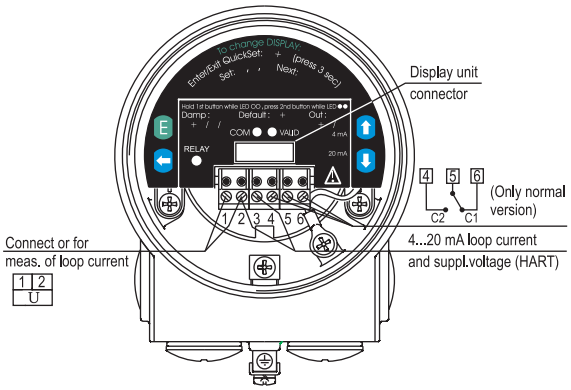
* Under optimal circumstances of reflection and stabilized transducer temperature

Display Unit

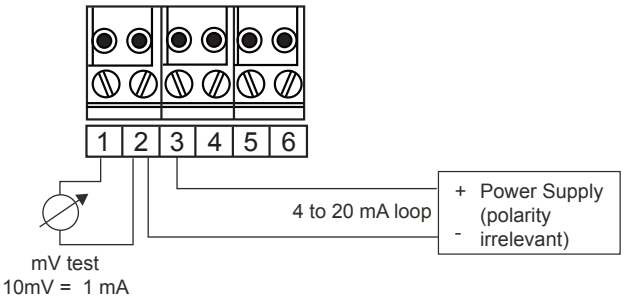


(1) Primary measured value
(2) Measurement mode
(3) Measurement unit / Standard
(4) Bar graph trend indication
(5) Measurement error indication
(6) Liquid movement direction
(7) Time unit
(8) Presence of valid echo
(9) HART communication
(10) Temperature unit
(11) Relay status indication
(12) Programming mode indication

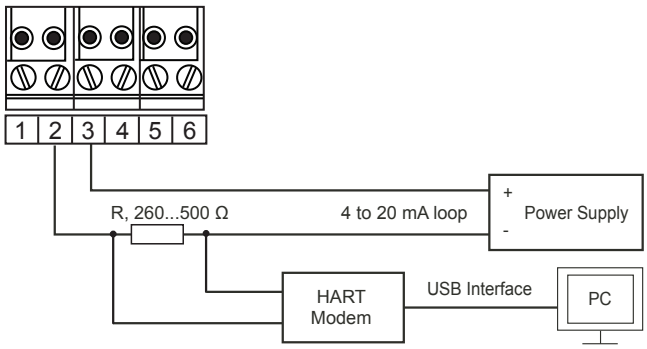
2260 Transmitter Terminals



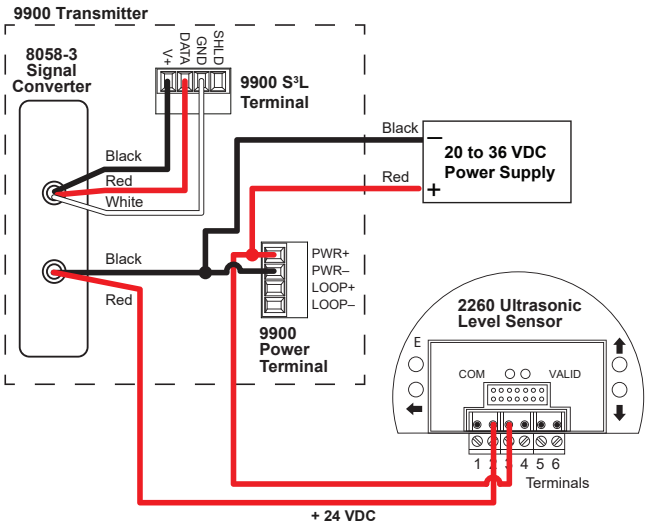
4 to 20 mA Loop Wiring



HART Interface Wiring

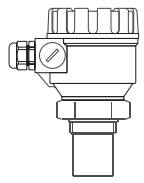


Wiring to 9900 Universal Transmitter



Pin No.	Assignment
1	mV Test, 10 mV → 1mA
2	4 to 20 mA current + supply
3	4 to 20 mA current + supply Polarity irrelevant
4	Relay NO terminal
5	Relay common terminal
6	Relay NC terminal

Ordering Information



Mfr. Part No	Code	Description
2260-P-0DN-4	**159 300 120**	Range 4 m (13.1 ft), PP body, 4..20 mA 2-wire, NPT thread
2260-P-2DN-4	**159 300 121**	Range 4 m (13.1 ft), PP body, 4..20 mA 2-wire/relay/HART, NPT thread
2260-P-0DN-6	**159 300 122**	Range 6 m (19.7 ft), PP body, 4..20 mA 2-wire, NPT thread
2260-P-2DN-6	**159 300 123**	Range 6 m (19.7 ft), PP body, 4..20 mA 2-wire/relay/HART, NPT thread
2260-P-0DN-8	**159 300 109**	Range 8 m (26.2 ft), PP body, 4..20 mA 2-wire, NPT thread
2260-P-0DA-15	**159 300 124**	Range 15 m (49.2 ft), PP body, 4..20 mA 2-wire, ANSI Flange 5 in.
2260-P-2DA-15	**159 300 125**	Range 15 m (49.2 ft), PP body, 4..20 mA 2-wire/relay/HART, ANSI Flange 5 in.
2260-V-0DN-4	**159 300 131**	Range 4 m (13.1 ft), PVDF body, 4..20 mA 2-wire, NPT thread
2260-V-2DN-4	**159 300 132**	Range 4 m (13.1 ft), PVDF body, 4..20 mA 2-wire/relay/HART, NPT thread
2260-V-0DN-6	**159 300 133**	Range 6 m (19.7 ft), PVDF body, 4..20 mA 2-wire, NPT thread
2260-V-2DN-6	**159 300 134**	Range 6 m (19.7 ft), PVDF body, 4..20 mA 2-wire/relay/HART, NPT thread
2260-V-0DN-8	**159 300 110**	Range 8 m (26.2 ft), PVDF body, 4..20 mA 2-wire, NPT thread
2260-V-0DA-15	**159 300 135**	Range 15 m (49.2 ft), PVDF body, 4..20 mA 2-wire, ANSI Flange 5 in.
2260-V-2DA-15	**159 300 136**	Range 15 m (49.2 ft), PVDF body, 4..20 mA 2-wire/relay/HART, ANSI Flange 5 in.
Versions with NPT thread / ANSI flange		
2260-V-1DNX-4	**159 300 142**	Range 4 m (13.1 ft), PVDF body, 4..20 mA 2-wire/HART, ATEX, NPT thread
2260-V-1DNX-6	**159 300 143**	Range 6 m (19.7 ft), PVDF body, 4..20 mA 2-wire/HART, ATEX, NPT thread
2260-V-1DAX-15	**159 300 144**	Range 15 m (49.2 ft), PVDF body, 4..20 mA 2-wire/HART, ATEX, ANSI Flange 5 in.
Versions with BSP thread / DIN flange		
2260-P-0DB-4	**159 300 090**	Range 4 m (13.1 ft), PP body, 4..20 mA 2-wire, BSP thread
2260-P-2DB-4	**159 300 091**	Range 4 m (13.1 ft), PP body, 4..20 mA 2-wire/relay/HART, BSP thread
2260-P-0DB-6	**159 300 092**	Range 6 m (19.7 ft), PP body, 4..20 mA 2-wire, BSP thread
2260-P-2DB-6	**159 300 093**	Range 6 m (19.7 ft), PP body, 4..20 mA 2-wire/relay/HART, BSP thread
2260-P-0DB-8	**159 300 107**	Range 8 m (26.2 ft), PP body, 4..20 mA 2-wire, BSP thread
2260-P-0DF-15	**159 300 094**	Range 15 m (49.2 ft), PP body, 4..20 mA 2-wire, DIN Flange DN125
2260-P-2DF-15	**159 300 095**	Range 15 m (49.2 ft), PP body, 4..20 mA 2-wire/relay/HART, DIN Flange DN125
2260-V-0DB-4	**159 300 101**	Range 4 m (13.1 ft), PVDF body, 4..20 mA 2-wire, BSP thread
2260-V-2DB-4	**159 300 102**	Range 4 m (13.1 ft), PVDF body, 4..20 mA 2-wire/relay /HART, BSP thread
2260-V-0DB-6	**159 300 103**	Range 6 m (19.7 ft), PVDF body, 4..20 mA 2-wire, BSP thread
2260-V-2DB-6	**159 300 104**	Range 6 m (19.7 ft), PVDF body, 4..20 mA 2-wire/relay /HART, BSP thread
2260-V-0DB-8	**159 300 108**	Range 8 m (26.2 ft), PVDF body, 4..20 mA 2-wire, BSP thread
2260-V-0DF-15	**159 300 105**	Range 15 m (49.2 ft), PVDF body, 4..20 mA 2-wire, DIN Flange DN125
2260-V-2DF-15	**159 300 106**	Range 15 m (49.2 ft), PVDF body, 4..20 mA 2-wire/relay/HART, DIN Flange DN125

Ordering Information

Mfr. Part No	Code	Description
Versions with BSP thread / DIN flange		
2260-V-1DBX-4	**159 300 112**	Range 4 m (13.1 ft), PVDF body, 4 to 20 mA 2-wire/HART, ATEX, BSP thread
2260-V-1DBX-6	**159 300 113**	Range 6 m (19.7 ft), PVDF body, 4 to 20 mA 2-wire/HART, ATEX, BSP thread
2260-V-1DFX-15	**159 300 114**	Range 15 m (49.2 ft), PVDF body, 4 to 20 mA 2-wire/HART, ATEX, DIN Flange DN125

Accessories

Code	Description
159 300 181	HART - USB Modem
159 300 182	HART - USB Modem, DIN Rail
159 300 183	HART - USB Modem, DIN Rail, ATEX
159 300 180	Display unit for type 2260 Transmitter

2270 Ultrasonic Level Sensor

The type 2270 is a rugged, high performance ultrasonic level measurement sensor, having transducer and processing electronics incorporated in one single housing. It provides all the sophisticated echo detection features of the well accepted 2260 Ultrasonic Level Transmitters.

For single and multiple tank applications 2-wire sensors are recommended using either HART protocol or 4 to 20 mA for the direct communication with a panel mount controller or a PLC.

Either for liquid level measurement in sumps or tanks, for tank contents measurement, or open channel flow measurement, the 2270 Level Sensors provide the answer. Sensing ranges up to 6 m (19.7 ft) are available. PP and PVDF sensor bodies provide best chemical resistance in applications where concentrated chemical shall be detected.

Features

- **2 wire compact sensor**
- **Compatible with 9900 transmitter (optional signal converter)**
- **Non-contact level measuring**
- **Narrow 5° beam angle**
- **Level, volume and open channel flow**
- **Compact housing**
- **32 points of linearization**
- **Fully temperature compensated electronics**
- **Outstanding signal processing software providing highly accurate measuring results**
- **PP or PVDF sensor body provides best chemical resistance**
- **Secondary lightning protection**
- **4 to 20 mA / HART interface**

CE

Applications

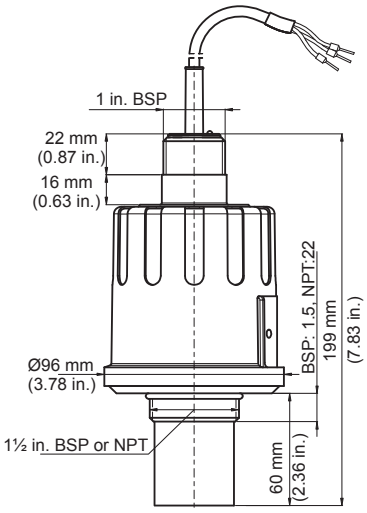
- **River water**
- **Seawater**
- **Potable water**
- **Demineralized water**
- **Treated water**

Specifications (Type 2270-X-XX-4)

General		
Range		0.2 to 4 m (0.65 to 13 ft)
Total Beam Angle		6°
Measuring Frequency		80 kHz
Accuracy *		± (0.2 % of measured distance plus 0.05 % of range)
Resolution		<2 m (6.6 ft): 1 mm (0.04 in.), 2 to 4 m (6.6 to 13.1 ft): 2 mm (0.08 in.)
Environmental		
Process Temperature		–30 °C to +90 °C (–22 °F to +194°F)
Ambient Temperature		–30 °C to +80 °C (–22 °F to +176°F)
Process Pressure (absolute)		0.05 to 0.3 MPa (0.5 to 3 bar) 7.25 psi to 43.5 psi
Enclosure		
Enclosure and Sensor Material		PP or PVDF
Cable Material		Cable sealing: EPDM, cable isolation: PVC
Ingress Protection		IP68 / NEMA 6P
Process Connection		1½ in. BSP / NPT
Sealing		
	PP sensor	EPDM
	PVDF sensor	FKM
Electrical		
Outputs		2-wire 4–20 mA , max. 600 Ohm; HART interface, Rt >/= 250 Ohm
Power Supply		DC 12 to 36 V
Power Consumption		max. 720 mW, overload protected
Connecting		6 x 0,5 mm² shielded cable; Ø 6 mm x 5 m (30 m max.)
Electric shock protection		Class III, low voltage
Standard and Approvals		
General Approvals		CE

* Under optimal circumstances of reflection and stabilized transducer temperature

Dimensions

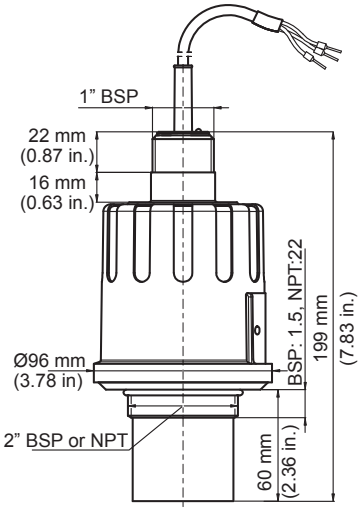


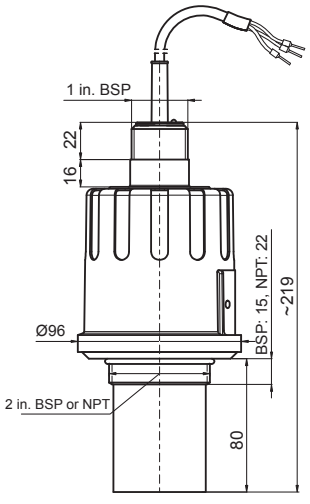
Specifications (Type 2270-X-XX-6 / 2270-X-XX-8)

General			
Type		2270-X-XX-6	2270-X-XX-8
Range		0.25 to 6 m (0.82 to 20 ft)	0.35 to 8 m
Total Beam Angle		5°	7°
Measuring Frequency		80 kHz	50 kHz
Accuracy *		± (0.2 % of measured distance plus 0.05 % of range)	
Resolution		<2 m (6.6 ft): 1 mm (0.04 in.); 2 to 5 m (6.6 to 16.4 ft): 2 mm (0.08 in.); 6 m (19.7): 5 mm (0.2 in.)	
Environmental			
Process Temperature		–30 °C to +90 °C (–22 °F to +194 °F)	
Ambient Temperature		–30 °C to +80 °C (–22 °F to +176 °F)	
Process Pressure (absolute)		0.05 to 0.3 MPa (0.5 to 3 bar) 7.25 psi to 43.5 psi	
Enclosure			
Enclosure and Sensor Material		PP or PVDF	
Cable Material		Cable sealing: EPDM, cable isolation: PVC	
Ingress Protection		IP68 / NEMA 6P	
Process Connection		2 in. BSP / NPT	
Sealing			
	PP sensor	EPDM	
	PVDF sensor	FKM (Viton)	
Electrical			
Outputs		2-wire 4–20 mA , max. 600 Ohm; HART interface, Rt >/= 250 Ohm	
Power Supply		DC 12 to 36 V	
Power Consumption		max. 720 mW, overload protected	
Connecting		6 x 0,5 mm² shielded cable; Ø 6 mm x 5 m (30 m max.)	
Electric Shock Protection		Class III, low voltage	
Standard and Approvals			
General Approvals		CE	

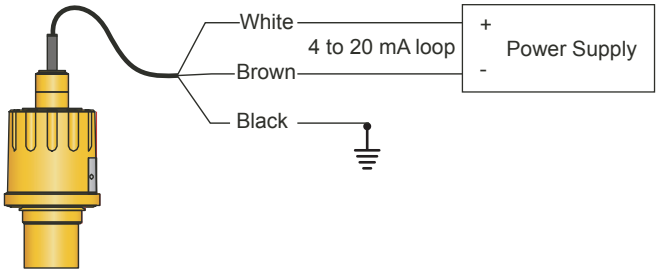
* Under optimal circumstances of reflection and stabilized transducer temperature

Dimensions

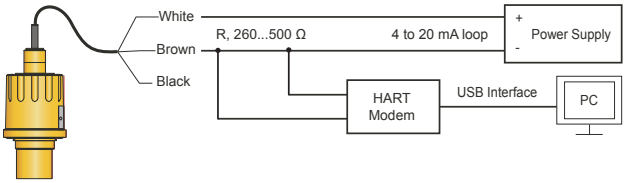




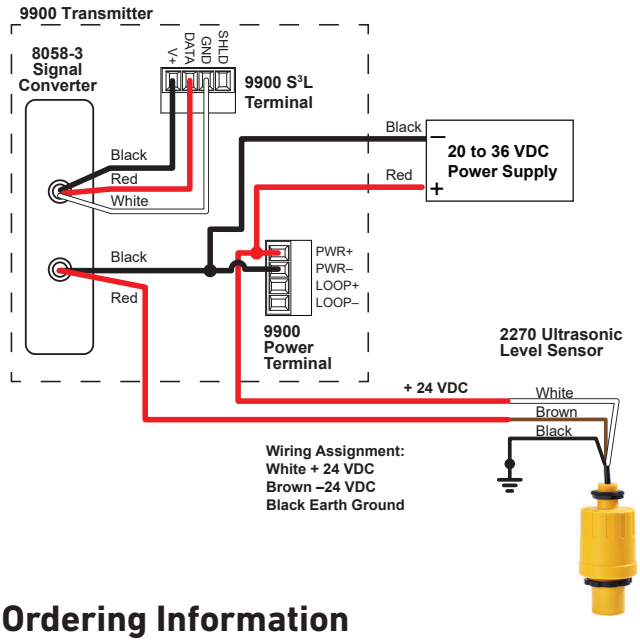
4 to 20 mA Loop Wiring



HART Interface Wiring



Wiring to 9900 Universal Transmitter



Ordering Information

Mfr. Part No.	Code	Description
Versions with NPT thread		
2270-P-1N-4	**159 300 169**	Range 4 m (13.1 ft), PP body, 4 to 20 mA 2-wire/HART, NPT thread
2270-P-1N-6	**159 300 170**	Range 6 m (19.7 ft), PP body, 4 to 20 mA 2-wire/HART, NPT thread
2270-P-1N-8	**159 300 116**	Range 8 m (26.2 ft), PP body, 4 to 20 mA 2-wire/HART, NPT thread
2270-V-1N-4	**159 300 176**	Range 4 m (13.1 ft), PVDF body, 4 to 20 mA 2-wire/HART, NPT thread
2270-V-1N-6	**159 300 177**	Range 6 m (19.7 ft), PVDF body, 4 to 20 mA 2-wire/HART, NPT thread
2270-V-1N-8	**159 300 117**	Range 8 m (26.2 ft), PVDF body, 4 to 20 mA 2-wire/HART, NPT thread
Versions with BSP thread		
2270-P-1B-4	**159 300 155**	Range 4 m (13.1 ft), PP body, 4 to 20 mA 2-wire/HART, BSP thread
2270-P-1B-6	**159 300 156**	Range 6 m (19.7 ft), PP body, 4 to 20 mA 2-wire/HART, BSP thread
2270-P-1B-8	**159 300 111**	Range 8 m (26.2 ft), PP body, 4 to 20 mA 2-wire/HART, BSP thread
2270-V-1B-4	**159 300 162**	Range 4 m (13.1 ft), PVDF body, 4 to 20 mA 2-wire/HART, BSP thread
2270-V-1B-6	**159 300 163**	Range 6 m (19.7 ft), PVDF body, 4 to 20 mA 2-wire/HART, BSP thread
2270-V-1B-8	**159 300 115**	Range 8 m (26.2 ft), PVDF body, 4 to 20 mA 2-wire/HART, BSP thread

Accessories

Code	Description
159 300 181	HART - USB Modem
159 300 182	HART - USB Modem, DIN Rail
159 300 183	HART - USB Modem, DIN Rail, ATEX

2280 Tuning Forks

Type 2280 Tuning Forks are suitable for level detection of liquids or granular, powdered solids. Mounted on tanks filling/emptying can be controlled using these devices just as well they can generate fail-safe alarms providing overfill or dry run protection.

The operation principle is based on the electronic circuit exciting the fork probe making it vibrate. As the medium reaches and covers the fork its vibration changes. The electronics senses the change of vibration and gives output signal after a selected delay.

Features

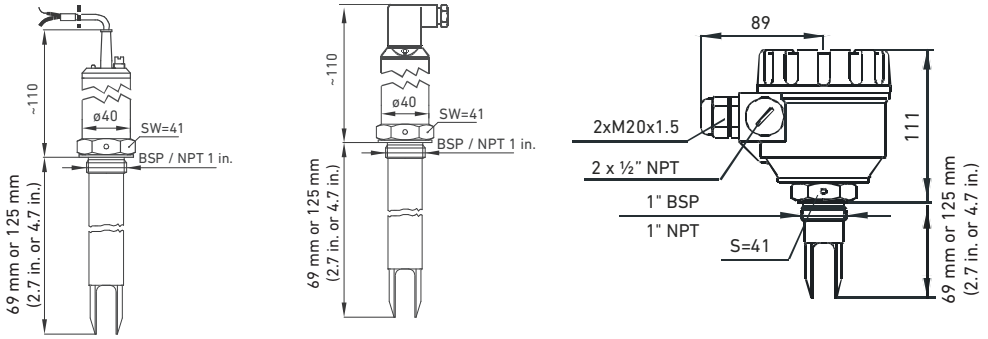
- **Maintenance free vibrating principle**
- **Independent of the liquid conductivity, dielectric constant, viscosity, pressure and temperature**
- **Selectable sensitivity**
- **Relay or electronic output**
- **Temperatures up to 130 degrees**
- **ATEX and WHG approvals**
- **IP67, 65/68 protection**

CE, WHG, ATEX

Applications

- **Potable Water**
- **River Water**
- **Cooling Water**
- **Demineralized Water**
- **Water/Glycol Solutions**
- **Chemicals**

Dimensions

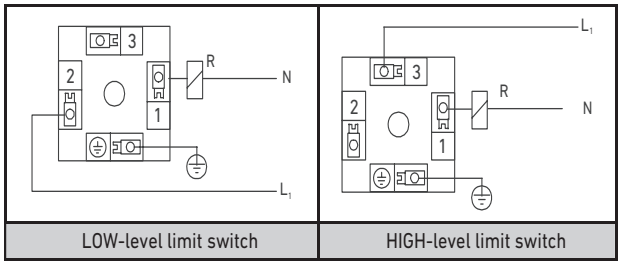


Specifications

General			
Type	2280-Y-YYYC-Y	2280-Y-YYYO-Y	2280-Y-YYYT-Y
Probe Length	69 mm or 125 mm (2.7 in. or 4.9 in.)		
Operation mode indicator	Bi-color LED		
Environmental			
Process Temperature	–40 °C to +130 °C (-40 °F to +266 °F)		
Ambient Temperature	-40 °C to +70 °C (-40 °F to +158 °F) / -30 °C to +70 °C (-22 °F to +158 °F)		
Process Pressure (absolute)	4 MPa (40 bar) 580 psi		
Minimum Medium Density Maximum Medium Viscosity	≥ 0.7 kg/dm^3 ≤10'000 mm^2/s (cSt)		
Enclosure			
Sensor	Stainless Steel DIN 1.4571		
Housing	Stainless Steel DIN 1.4571		PBT
Ingress protection	IP67		
Process Connection	1 in. BSP / NPT		
Electrical			
Switching Function	2-wire AC; 3-wire PNP-NPN		1 SPDT relay
Output Voltage / -Current	AC 9mA free, 14 mA immersed 3-wire max. 350mA, <4.5V (on)		250V AC, 8A AC1
Power Supply	12...55 V DC or 20		20 ... 255 V AC and 20 ... 60 V DC
Response Time	≤ 0.5 s		
Power Consumption	0.6 W		AC: 1.2 ... 17 VA; DC: <3 W
Connection	Cable PVC 5x0.5mm^2, 3m	DIN Connector	Terminal
Protection	Class III		Class I
Standards and Approvals			
ATEX Approval	ATEX II 1 G Ex ia IIC T6, IP68		
General Approvals	CE, RoHS		

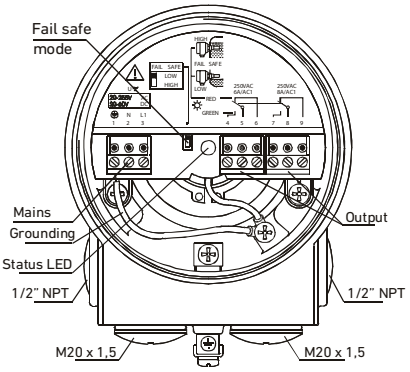
Wiring

DIN Connector 3 Wire DC Version:



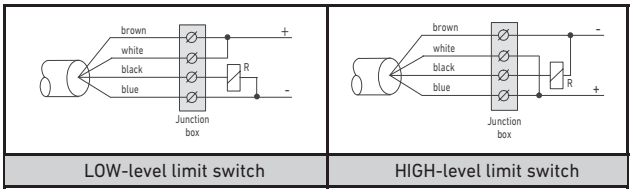
LOW-level limit switch	HIGH-level limit switch

PBT Enclosure Version:



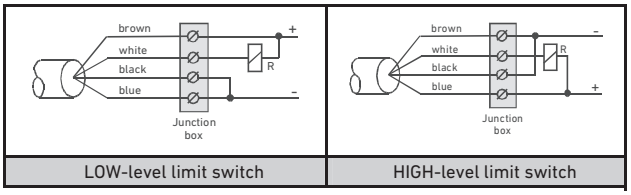
DC Cable Version 3 Wire DC:

PNP-wiring



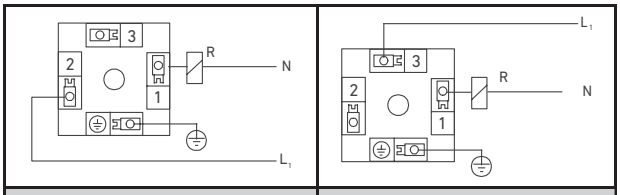
LOW-level limit switch	HIGH-level limit switch

NPN-wiring



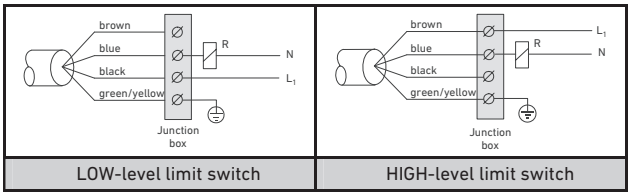
LOW-level limit switch	HIGH-level limit switch

DIN Connector 2 Wire AC Version:



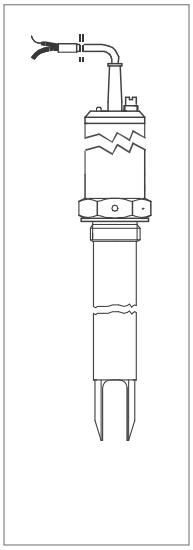
LOW-level limit switch	HIGH-level limit switch

AC Cable Version 2 Wire AC:



LOW-level limit switch	HIGH-level limit switch

Ordering Information



Mfr. Part No.	Code	Description
2280-S-5WBO-1	**159 300 200**	Length 69 mm (2.72 in.), Stainless Steel, Output 3-wire PNP-NPN, DIN connector, BSP thread
2280-S-5WBC-1	**159 300 201**	Length 69 mm (2.72 in.), Stainless Steel, Output 3-wire PNP-NPN, cable, BSP thread
2280-S-5WBO-2	**159 300 202**	Length 125 mm (4.92 in.), Stainless Steel, Output 3-wire PNP-NPN, DIN connector, BSP thread
2280-S-5WBC-2	**159 300 203**	Length 125 mm (4.92 in.), Stainless Steel, Output 3-wire PNP-NPN, cable, BSP thread
2280-S-5XWBO-1	**159 300 210**	Length 69 mm (2.72 in.), Stainless Steel, Output 2-wire AC, DIN connector, BSP thread, ATEX
2280-S-5XWBC-1	**159 300 211**	Length 69 mm (2.72 in.), Stainless Steel, Output 2-wire AC, cable, BSP thread, ATEX
2280-S-5XWBO-2	**159 300 212**	Length 125 mm (4.92 in.), Stainless Steel, Output 2-wire AC, DIN connector, BSP thread, ATEX
2280-S-5XWBC-2	**159 300 213**	Length 125 mm (4.92 in.), Stainless Steel, Output 2-wire AC, cable, BSP thread, ATEX
2280-S-5WNO-1	**159 300 220**	Length 69 mm (2.72 in.), Stainless Steel, Output 3-wire PNP-NPN, DIN connector, NPT thread
2280-S-5WNC-1	**159 300 221**	Length 69 mm (2.72 in.), Stainless Steel, Output 3-wire PNP-NPN, cable, NPT thread
2280-S-5WNO-2	**159 300 222**	Length 125 mm (4.92 in.), Stainless Steel, Output 3-wire PNP-NPN, DIN connector, NPT thread
2280-S-5WNC-2	**159 300 223**	Length 125 mm (4.92 in.), Stainless Steel, Output 3-wire PNP-NPN, cable, NPT thread
2280-S-5XWNO-1	**159 300 230**	Length 69 mm (2.72 in.), Stainless Steel, Output 2-wire AC, DIN connector, NPT thread, ATEX
2280-S-5XWNC-1	**159 300 231**	Length 69 mm (2.72 in.), Stainless Steel, Output 2-wire AC, cable, NPT Gewinde, ATEX
2280-S-5XWNO-2	**159 300 232**	Length 125 mm (4.92 in.), Stainless Steel, Output 2-wire AC, DIN connector, NPT thread, ATEX
2280-S-5XWNC-2	**159 300 233**	Length 125 mm (4.92 in.), Stainless Steel, Output 2-wire AC, cable, NPT thread, ATEX
2280-S-5WBT-1	**159 300 240**	Length 69 mm (2.72 in.), Stainless Steel, PBT enclosure, 1 SPDT relay, BSP thread
2280-S-5WBT-2	**159 300 241**	Length 125 mm (4.92 in.), Stainless Steel, PBT enclosure, 1 SPDT relay, BSP thread
2280-S-5WNT-1	**159 300 242**	Length 69 mm (2.72 in.), Stainless Steel, PBT enclosure, 1 SPDT relay, NPT thread
2280-S-5WNT-2	**159 300 243**	Length 125 mm (4.92 in.), Stainless Steel, PBT enclosure, 1 SPDT relay, NPT thread

2281 Multipoint Switch

The Multipoint Switch is based on the conductivity principle and can be applied to liquids with conductivity higher than 10 µS/cm.

The probes have to be placed into the tank for level detection. The probe length should be in accordance with the level to be detected. Filling liquid in the tank will change the electrical conductivity between the reference probe and the outer probes. The established connection will be converted and activate a relay providing the output.

Features

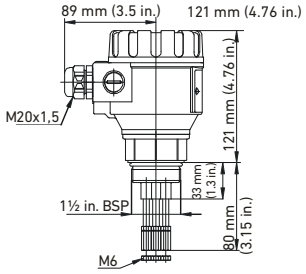
- **Easy on site probe length configuration**
- **Fast installation due to 2 to 4 individual switching points integrated in one sensor**
- **Up to 4 relays for pump and valve control**
- **Adjustable sensitivity**
- **Adjustable delay time**

CE

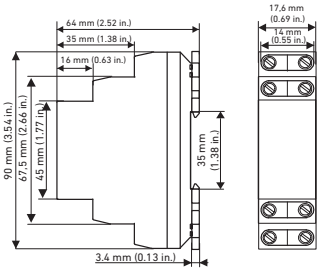
Applications

- **Potable Water**
- **Cooling Water**
- **Chemicals**
- **Pump Control**

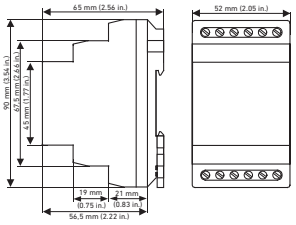
Dimensions



Multiprobe sockets:
2281-S-BT-2; 2 electrodes
2281-S-BT-3; 3 electrodes
2281-S-BT-4; 4 electrodes



Conductive Level Control
Switch Type 2281-1-Relay;
1 SPDT Relay

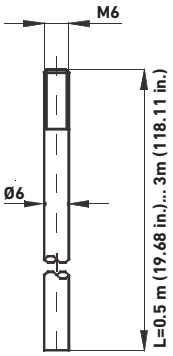


Conductive Level Control
Switch Type 2281-2-Relay;
2 SPDT Relay

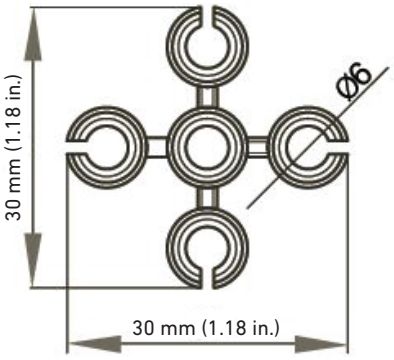
Specifications

General			
Type	2281-Y-YY-Y	2281-1-Relay	2281-2-Relay
Probes	2, 3, 4		
Environmental			
Process Temperature	max. +80 °C (176 °F)		
Ambient Temperature	-20 °C to +50 °C (-4 °F to +122 °F)		
Process Pressure (absolute)	0.1 MPa (1 bar) 14.5 psi		
Enclosure			
Enclosure Material	PBT		
Process connection Material	PP		
Probe Socket Material	Stainless Steel 1.4571		
Ingress Protection	IP65, NEMA 4	IP20, NEMA 1	
Process Connection	1½ in.		
Probes			
Material	Stainless Steel 1.4571		
Standards Lengths Available	0.5 m (19.69 in.), 1.0 m (39.37 in.), 1.5 m (59.06 in.) (72 in., 108 in. on request)		
Please contact GF for special lengths up to 3 m			
Probe separator			
Material	PP		
Electrical			
Probe Voltage		3.5 V AC	5 V AC
Probe Current		< 0.2 mA AC	< 1mA AC
Response		max. 400 ms	
Delay		Adjustable: 0.5...10 s	
Relay Output		1x SPDT	2x SPDT
Switching Voltage		250 V AC1, 24 V DC	
Switching Current		8 A AC1	16 A AC1
Switching Power		2500 VA AC1, 240 W DC	4000 VA AC1, 384 W DC
Power Supply		24 V...240 V AC / DC	24 V AC / DC
Mechanical Connection		DIN EN 60715 rail	
Electrical Connection		Class II	Class III
Standards and Approvals			
General Approvals	CE, RoHS		

Accessories



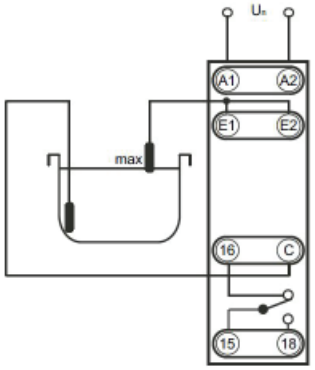
Probe dimension



Probe separator 2281-5 spacer, to be used every 0.5 m (19.69 in.)

Wiring

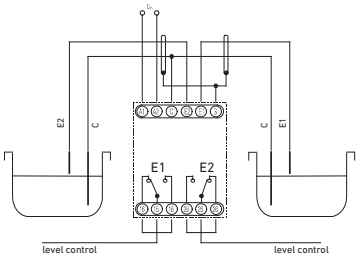
1 SPDT Relay: Type 2281-1-Relay
Part No.: 159 300 258

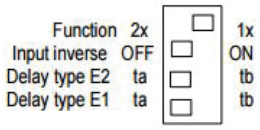


A1, A2 - power supply
C - reference probe
E1 - upper level probe
E2 - bottom level probe
S - shielding
15, 16, 18 - 1. relay output
25, 26, 28 - 2. relay output

Single Level Monitoring

2 SPDT Relay: Type 2281-2-Relay
Part No.: 159 300 259

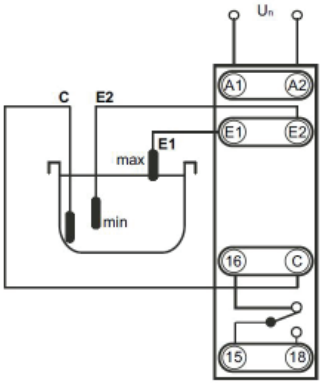




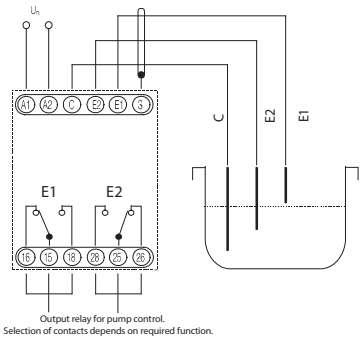
Device Settings

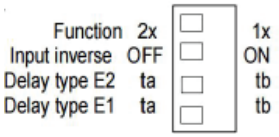
To detect two independent levels in one or two separate tanks

One Tank



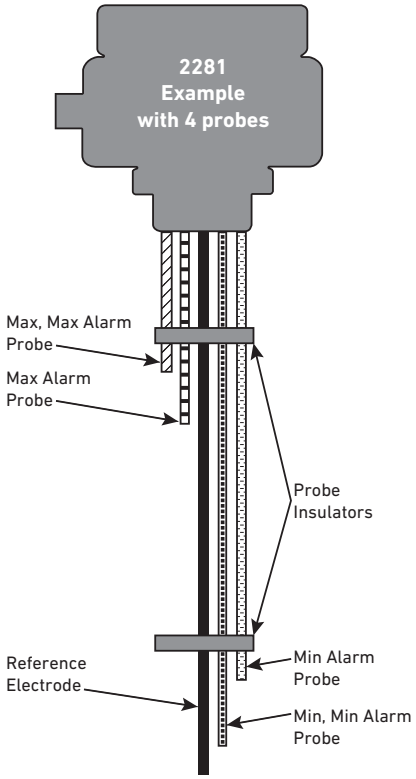
Level Control





Device Settings

Level Control - Two levels in one tank



How to Order

The 2281 can be utilized for alarming 2-4 level set-points, any combination of LO or HI levels. The 2281 housing must always remain out of the fluid being measured.

Step 1 - Select Multiprobe Enclosure based upon the quantity of desired alarms 2, 3, or 4.

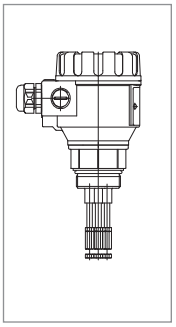
Step 2 - Select one stainless steel rod to serve as the reference electrodes. Choose either a 19.69 in., 39.37 in., or 59.06 in., the length should be longer than any of the alarm probes. Note: The rod can be cut shorter onsite with a hack saw for a precise fit.

Step 3 - Select one stainless steel rod for each alarm set-point (up to four rods). For each length choose either a 19.69 in., 39.37 in., or 59.06 in. Note: The rod can be cut shorter onsite with a hack saw for a precise dimension.

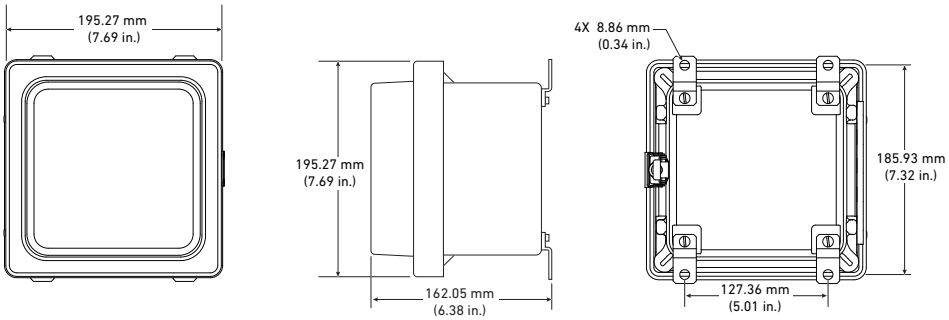
Step 4 - Select probe insulator, a minimum of one is required. It's suggested to add one more for every additional 20 in. of assembly length (maximum 3).

Step 5 - Select the amount of alarm relays to match the amount of alarm set-points. Choose either 2 or 1 and 2=3, or 2 and 2=4.

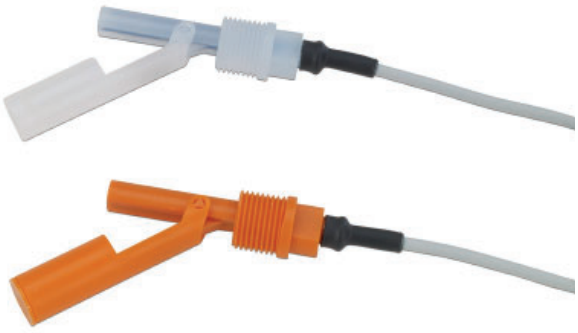
Ordering Information



	Mfr. Part No.	Code	Description
Step 1	2281-S-BT-2	**159 300 250**	Multiprobe Enclosure, 2 probes + reference probe, PBT enclosure, 1½ in. BSP thread
	2281-S-BT-3	**159 300 251**	Multiprobe Enclosure, 3 probes + reference probe, PBT enclosure, 1½ in. BSP thread
	2281-S-BT-4	**159 300 252**	Multiprobe Enclosure, 4 probes + reference probe, PBT enclosure, 1½ in. BSP thread
Step 2 &3	2281-E-205	**159 300 253**	Stainless Steel Electrode, 0.5 m (19.69 in.)
	2281-E-210	**159 300 254**	Stainless Steel Electrode, 1.0 m (39.37 in.)
	2281-E-215	**159 300 255**	Stainless Steel Electrode, 1.5 m (59.06 in.)
Step 4	2281-5-Spacer	**159 300 257**	Probe Separator for Conductive Level Switch
Step 5	2281-1-Relay	**159 300 258**	Conductive Level Control Switch, 1 SPDT relay, 24 - 240 V AC/DC
	2281-2-Relay	**159 300 259**	Conductive Level Control Switch, 2 SPDT relay, 24V AC/DC
Options			Enclosure NEMA 4A, Fiberglass with SS hardware, 7.69 in. L x 7.69 in. W x 6.38 in. D
	6205-0002	**159 000 858**	1 meter length DIN Rail
	6205-0003	**159 000 859**	End Clip for DIN Rail



2282 Guided Float Switch



The Guided Float Switch 2282 is designed for economical control of liquids in tanks. The switch is remarkable for its maintenance-free compact design. The reed contacts have high switch capacity.

The reed contact in the sensor body is switched with a magnet. The switching function (N/O contact and N/C contact) is determined by the installation position. The function can be changed by simply turning 180°.

Function
The 2282 level switch is specially suited for simple, mechanical monitoring of highest and lowest fill levels. Its compact construction allows it to be installed into very small tanks.

With its housing made of PP or PVDF, the 2282 is especially resistant to a number of chemicals.

Features

- **Optimized chemical compatibility**
- **Very compact design**
- **PP and PVDF version available**
- **For small tanks**

CE RoHS

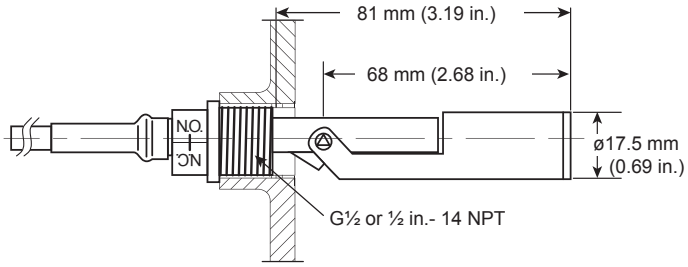
Applications

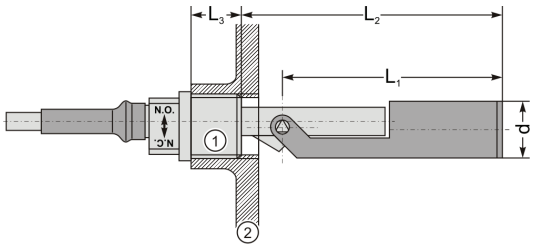
- **Cooling Water**
- **Demineralized Water**
- **Water/Glycol Solutions**
- **Chemicals**
- **Especially fit for small tanks**

Specifications

General	
Type	2282-Y-YY-Y
Environmental	
Max. Temperature	-65 °C to +100 °C (-85 °F to +212 °F)
Max. Pressure	1 MPa (10 bar) 145 psi
Medium Density	>0.6 g/cm3
Enclosure	
Enclosure/Float material	PP or PVDF
Cable Material	PVC
Protection Rating	IP 68
Process Connection	½ in. BSP, NPT
Electrical	
Output	Dry reed contact
Contact Resistance	Max. 120 mΩ
Maximum Nominal Voltage	230 V AC/DC
Maximum Nominal Current	2 A / 40 VA
Cable Type	AWG 20, 2-wire, PVC, 1 m
Switching Contact	N/O or N/C depending on the installation
Standard and Approvals	
General Approvals	CE, RoHS

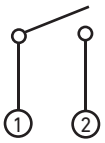
Dimensions





Wiring

Connection Configuration

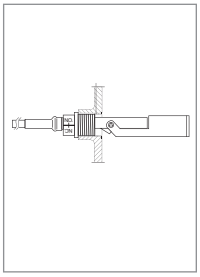


No.	Data
1	Brown
2	Black

Max. 230 V 2A contact rating

No.	Data
L1	68 mm
L2	81 mm
L3	15 mm
d	Ø 17,5 mm
1	G ½" or ½" - 14 NPT
2	Container Wall

Ordering Information



Mfr. Part No.	Code	Description
Versions with BSP Thread		
2282-P-6CB	**159 300 261**	PP Housing, cable, ½ in. BSP thread
2282-V-6CB	**159 300 263**	PVDF Housing, cable, ½ in. BSP thread
Versions with NPT Thread		
2282-P-6CN	**159 300 265**	PP Housing, cable, ½ in. NPT thread
2282-V-6CN	**159 300 267**	PVDF Housing, cable, ½ in. NPT thread

2284 Ultrasonic Gap Switch

The Ultrasonic Gap Switch consists of Polyphenylene Sulphide (PPS) and is high corrosion resistant in most liquids. The gap switch is designed for high or low level alarm in different tank applications as well as pump control. However, if there is a liquid present, the signal will be transmitted across the gap and the integral electronics will switch the output circuitry to signal the presence of a liquid.

It can be mounted in any position in a tank using a ¾ in. or 1 in. thread available in BSP and NPT thread forms.

Features

- **Relay output**
- **Corrosion resistant PPS body**
- **1 in. and ¾ in. threaded mounting**
- **Small in-tank dimensions**
- **Compact sensor for narrow spaces**
- **Self contained full plastic body**
- **No moving parts**

CE

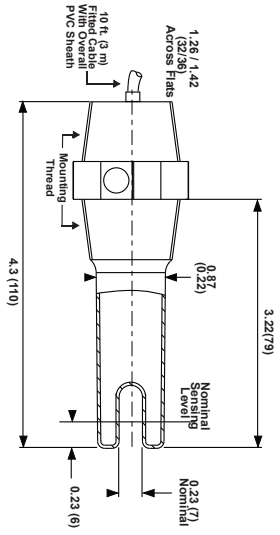
Applications

- **Cooling Water**
- **Demineralized Water**
- **Water/Glycol Solutions**
- **Chemicals**
- **Pump Control**

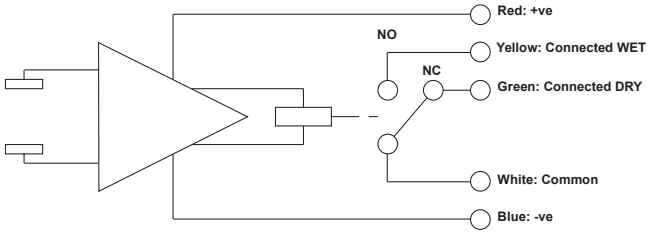
Specifications

General	
Type	2284-Y-YYY
Repeatability	±2 mm (0.08 in.)
Environmental	
Process Temperature	-20 °C to +70°C (-4 °F to +158 °F)
Ambient Temperature	-20 °C to +70°C (-4 °F to +158 °F)
Process Pressure (absolute)	72.5 psi (5 bar)
Maximum Viscosity	5000 cSt at 20 C° (68 °F)
Enclosure	
Enclosure Material	PPS
Cable Material	PVC
Probe socket material	Stainless Steel 1.4571
Ingress Protection	IP 66/IP68 (3 m) / NEMA 6P (10 ft)
Process Connection	¾ in. or 1 in. BSP / NPT
Electrical	
Power Supply	18 to 30 VDC / AC
Power Consumption	≥ 25 mA
Maximum Voltage Rating	30 VDC / AC
Maximum Current Rating	1 A at 30 V residual 0.25 A at 30V inductive
Response Time	50 ms wet-dry, 0.5s dry-wet
Cable Type	5 core 7/0.2mm, 3m
Switching Function	SPCO relay No/Nc
Standards and Approvals	
General Approvals	CE, RoHS

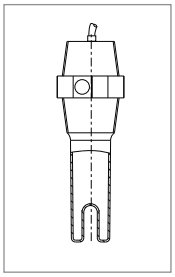
Dimensions



Wiring



Ordering Information



Mfr. Part No.	Code	Description
Versions with BSP Thread		
2284-Q-4BC	**159 300 270**	Body PPS, BSP ¾ in., cable 3 m
2284-Q-4BC	**159 300 274**	Body PPS, BSP 1 in., cable 3 m
Versions with NPT Thread		
2284-Q-4NC	**159 300 272**	Body PPS, NPT 1 in., cable 3 m

2285 Level Float Switch

The 2285 Level Float Switch is suitable for level switching of various liquids, sewage in shafts, tanks, basins or cisterns. The double-chambered float is made of injection molded tough polypropylene that ensures good waterproof protection.

The contacting microswitch is incorporated in the float. The cable of the level switch is absolutely waterproof and PVC insulated. Different control tasks such as liquid level monitoring and pump control can be realized. It is a mercury-free contact and suitable for level switching of drinking water, raw water or polluted liquids with low solid content.

The level switching is done when the contact reaches the ±45° switching angle. The switching differential of the level switch is adjustable by the position of the counterweight on the cable. The level switches should be arranged appropriately in case of multi-level switching tasks to avoid undesired tangling of the cables.

Features

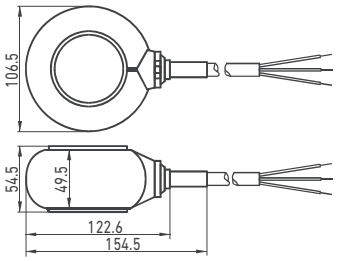
- **Hermetically molded, double chamber**
- **Mercury free operated micro switch**
- **Use for drinking and wastewater**

CE

Applications

- **Tap water**
- **River water**
- **Sump shafts**

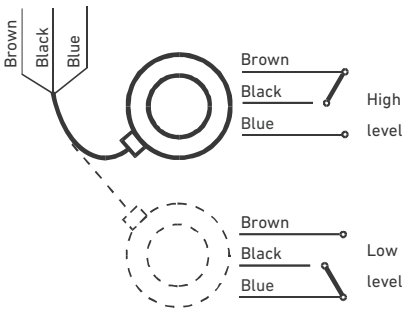
Dimensions



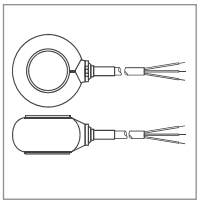
Specifications

	Float Switch	Counterweight
General		
Type	2285-P-6C-Y	
Cable Length	5 m (16.5 ft), 10 m (33 ft), 20 m (66 ft)	
Switching Angle	± 45°	
Mass	250 g (0.55 lb), without cable	
Environmental		
Medium Temperature	0 °C to +50 °C (+32 °F to +122 °F)	
Medium Density	min. 0,8g/cm3	
Medium Pressure	0.1 Mpa (1 bar g - 14.5 psi g)	
Enclosure		
Enclosure material	PP	PP
Cable Material	Neoprene	
Ingress Protection	IP 68, NEMA 6P	IP 68, NEMA 6P
Electrical		
Microswitch	10(4) A, 250 V AC, AC1	
Cable	9 mm (0.35 inch) / 3 x 1 mm2 (AWG 17)	
Standards & Approvals		
General Approvals	CE, RoHS	

Wiring

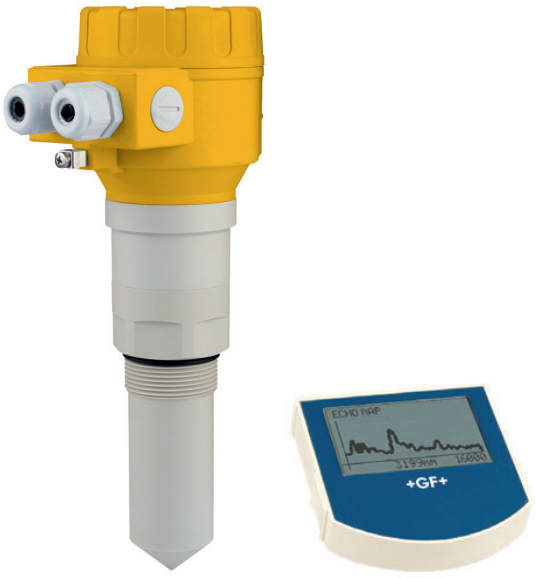


Ordering Information



Mfr. Part No.	Code	Description
2285-P-6C-5	**159 300 280**	Level Float, PP, cable neoprene 5 m (16.5 ft), microswitch NO/NC
2285-P-6C-10	**159 300 281**	Level Float, PP, cable neoprene 10 m (33 ft), microswitch NO/NC
2285-P-6C-20	**159 300 282**	Level Float, PP, cable neoprene 20 m (66 ft), microswitch NO/NC
2285-P-weight	**159 300 289**	Counterweight for 2285 float

2290 Non-contact Radar Level Transmitter



PP

The 25 GHz (K-band) 2290 Pulse Radars are the most progressive non-contact level transmitter technology for industrial processes. With an excellent accuracy, compact antennas and a user-friendly set-up the 2290 is an effective, simple, low cost choice for demanding level applications. GF's new K-band radar featuring ±3 mm (±0.1 in.) accuracy and short dead band excels with its full plastic housing. Its antenna range incorporates a stainless steel horn and enclosed plastic tube choices.

The enclosed antenna versions can be replaced without removing the antenna enclosure from the process. Local programming of type 2290 is aided by a plug-in display module. The signal processing algorithm of the 2290 is based on years of experience with non-contact level measurement making it an excellent choice for applications simple and challenging alike.

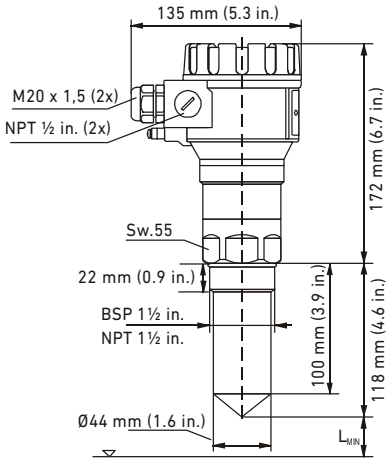
Features

- **19° beam angle**
- **Tank mapping function**
- **Large dot matrix LCD display**
- **Predefinded tank shapes**
- **Works with fumes, condensation, and light foam layers**

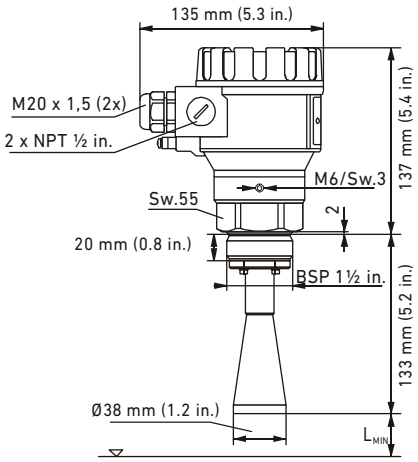
Applications

- **Bulk Storage Tanks**
- **Day Tanks**
- **Process Vessels for Mixing and Batching**
  - **Buffer Tanks**
  - **Conditioning Vessels**
  - **Metal or Plastic**

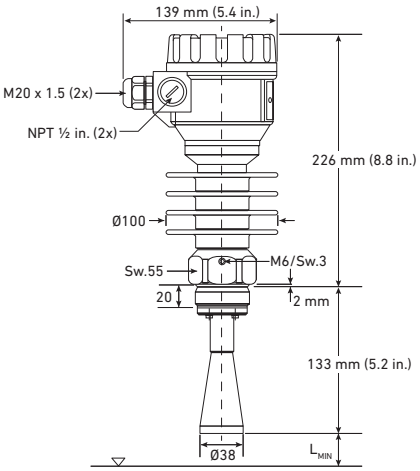
Dimensions



PP horn antenna
Lmin: 200 mm (7.9 in.)



Stainless Steel 316 Ti horn antenna
Lmin: 200 mm (7.9 in.)

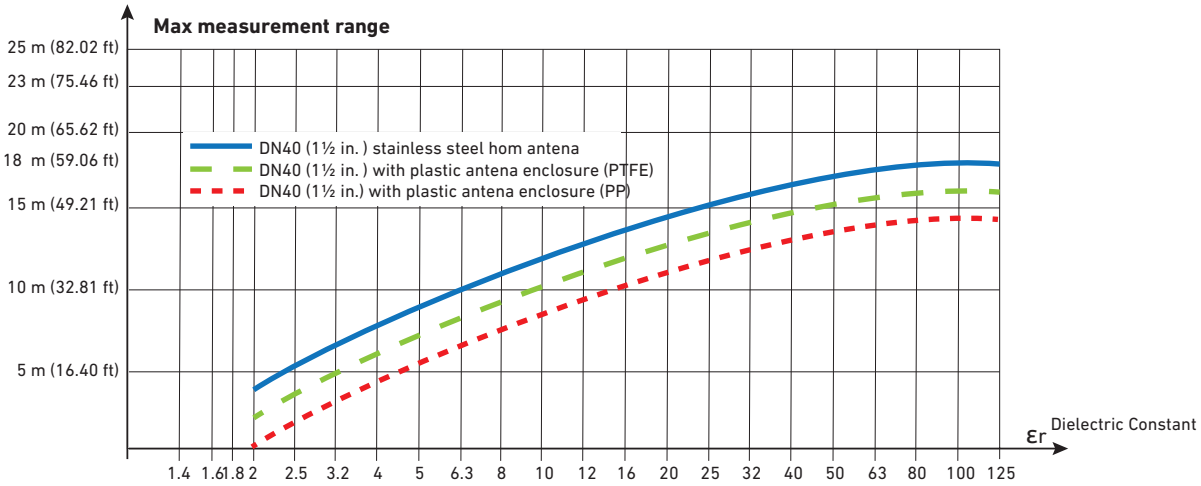


Stainless Steel 316 Ti horn antenna & temperature isolater
Lmin: 200 mm (7.9 in.)

Specifications

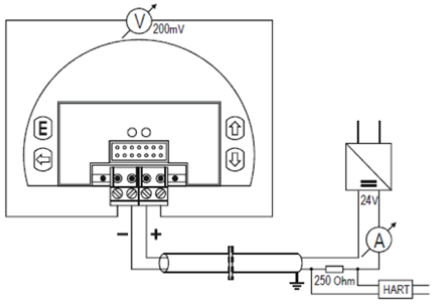
General		
Measured Values		Level, Distance; Calculated values: Volume, Mass
Wetted Parts	Horn Antenna	Stainless Steel 316 Ti
	Antenna Enclosure	PTFE, PP
Frequency of the Measuring Signal		~25 GHz (K-band)
Measuring Range		0.2 m – 18 m (0.65 – 59 ft) (depending on εr of the process liquid)
Accuracy		±3 mm (0.1 inch)
Linearity Error (as per EN 61298-2)		< 0.5 m: ±25 mm (< 1.6 ft: ±0.9 in.); 0.5 – 1 m: ±15 mm (1.6 – 3.2 ft: ±0.6 in.); 1 – 1.5 m: ±10 mm (3.2 – 4.9 ft: ±0.4 in.); 1.5 – 8 m: ±3 mm (4.9 – 26.3 ft: ±0.1 in.); > 8 m: ±0.04% (> 26.3 ft: ±0.04%) of the measured distance
Beam Angle		Minimum 19°
Minimum dielectric constant ε_r of the Medium		1.9 (refer to range diagram below)
Resolution		1 mm (0.04 in.)
Temperature Error (as per EN 61298-3)		0.05% FSK / 10 °C (50 °F) -20 °C... +60 °C (-68 °F... +140 °F)
Power Supply Voltage		20 V ...36 V DC
Output Digital Communication		4 – 20 mA + HART
Output Display		64 x 128 Dot Matrix LCD Graphical display unit
Measuring Frequency		10...60 sec as per the application settings
Antenna Diameter		38 mm (1½ in.)
Antenna Material		Horn: Stainless Steel; enclosure: PP, PTFE
Medium Process Temperature		-30 °C... +100 °C (-22 °F - 212 °F), (up to 120 °C (248 °F) for max. 2 min); with PP antenna enclosure: max.: 80 °C (176 °F)
		2290 HT (high-temperature, SS316 horn antenna): -30°C ... +180°C (-22°F ... + 356 °F)
Maximal Medium Pressure		25 bar at 120 °C (248 °F); with plastic antenna enclosure: 3 bar at 25 °C (77 °F)
Ambient Temperature		-20 °C... +60 °C (-4 °F - 140 °F)
Process Connection		DN 40 / 1½ in. BSP, 1½ in. NPT thread
Ingress Protection		IP 67
Electrical Connection		2x M 20 x 1.5 cable glands + internal thread for 2x ½ in. NPT cable protective pipe, cable outer diameter: Ø 7 ... Ø 13 mm (0.3 ... 0.5 inch), wire cross section: max. 1.5 mm² (AWG 15), wire cross section: max. 1.5 mm²
Electrical Protection		Class III
Housing Material		Plastic (/PBT)
Sealing		FKM
Communication Certifications		R&TTE, FCC
EX-Approvals		ATEX (ia): II 1/2 G Ex ia IIB T6...T5 Ga/Gb ICEX (ia): EX ia IIB T6...T5 Ga/Gb CE, FCC

Measurement range diagram*

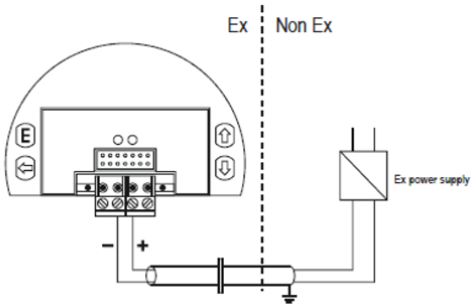


Under reference conditions of reflection (as per EN 61298-3, moreover in case of interface-free environment, from min. 10 m² target surface) and stabilized temperature.

Connections / Wiring

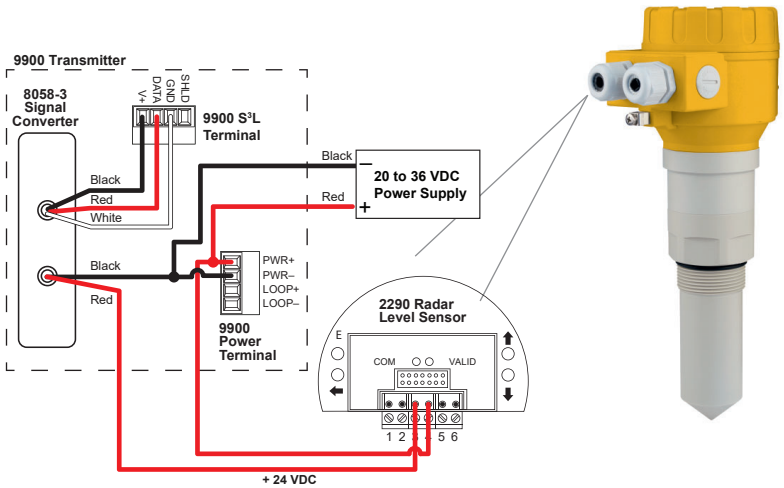


Standard wiring & connection of HART-Modem



Wiring in an EX-enviroment

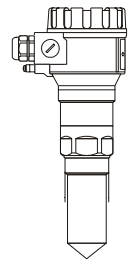
To iGo Converter – (S³L) / 4 to 20 mA

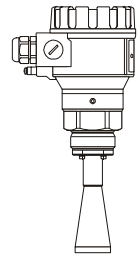


2290 Housing must be grounded, use screw terminal on housing (EP) to earth ground.

Pin No.	Assignment
1	Not Assigned
2	(+) Voltage measuring connector (200 mV)
3	(-) 4-20 mA loop current + supply (HART)
4	(+) 4-20 mA loop current + supply (HART)
5	(-) Voltage measuring connector (200 mV)
6	Not Assigned

Ordering Information





Mfr. Part No.	Code	Description
2290-P-1DB2-18	**159 300 184**	2290 Radar Level Transmitter, LCD, PP/PBT housing, 1½ in. BSP
2290-P-1DN2-18	**159 300 185**	2290 Radar Level Transmitter, LCD, PP/ PBT housing, 1½ in. NPT
2290-S-DB2-18	**159 300 186**	2290 Radar Level Transmitter, LCD, PBT housing/SS316 Ti antenna, 1½ in. BSP
2290-S-DN2-18	**159 300 187**	2290 Radar Level Transmitter, LCD, PBT housing/SS316 Ti antenna, 1½ in. NPT
2290-F-DB2-18	**159 300 206**	2290 Radar Level Transmitter, LCD, PBT housing / PTFE antenna, 1½ in. BSP
2290-F-DN2-18	**159 300 207**	2290 Radar Level Transmitter, LCD, PBT housing/ PTFE antenna, 1½ in. NPT
2290-P-1DB2X-18	**159 300 194**	2290 EX Radar Level Transmitter, LCD, PP/PBT housing, 1½ in. BSP
2290-P-1DN2X-18	**159 300 195**	2290 EX Radar Level Transmitter, LCD, PP/ PBT housing, 1½ in. NPT
2290-S-DB2X-18	**159 300 196**	2290 EX Radar Level Transmitter, LCD, PBT housing/SS316 Ti antenna, 1½ in. BSP
2290-S-DN2X-18	**159 300 197**	2290 EX Radar Level Transmitter, LCD, PBT housing/SS316 Ti antenna, 1½ in. NPT
2290-F-DB2-18	**159 300 188**	PTFE Antenna Enclosure, 1½ in. BSP
2290-F-ENC-N2	**159 300 189**	PTFE Antenna Enclosure, 1½ in. NPT
On Request	**2290-S-DB2-18-HT**	2290 High Temperature Radar Level Transmitter, LCD, Aluminium housing/SS316 Ti antenna, 1½ in. " BSP
On Request	**2290-S-DN2-18-HT**	2290 High Temperature Radar Level Transmitter, LCD, Aluminium housing/SS316 Ti antenna, 1½ in. NPT

Accessories

Mfr. Part No.	Code	Description
	159 300 181	HART - USB Modem
3-8058-3	**Special Order**	Wire-mount Signet i-Go Signal (4 to 20 mA /S^{3}L) Converter to connect 2290 to 9900 Transmitter, 8900 Multi-Parameter Controller. Single input
3-8058-2	**159 000 967**	DIN Rail Mount Signet i-Go Signal (4 to 20 mA /S^{3}L) Converter to connect 2290 to 9900 Transmitter, 8900 Multi-Parameter Controller. Two inputs
3-9900-1P	**159 001 695**	9900 Transmitter - Panel Mount
3-9900-1	**159 001 696**	9900 Transmitter - Field Mount
3-9950-1	**159 001 841**	9950 Base Unit – Two Channel Multi-Parameter inputs, two 4 to 20 mA outputs, panel mount, DC Power
3-9950-2	**159 001 842**	9950 Base Unit – Two Channel Multi-Parameter inputs, two 4 to 20 mA outputs, panel mount, AC or DC Power

2291 Guided Wave Radar Level Transmitter

The 2291 Guided Wave Radar level transmitter is designed for continuous level measuring of conductive or non-conductive liquids, pulps and solids. The 2291 level gauge operates based on the well-known TDR (Time Domain Reflectometry) principle. Micropulses are sent along a probe guide at the speed of light. As soon as the impulse reaches the surface of the medium, it is reflected back to the electronic module. Level distance is directly proportional to the flight time of the impulse.

The reflected signal is dependent on the dielectric constant of the material; the feasibility of the measurement is $\varepsilon_r \geq 1.9$. The TDR technology is unaffected by the properties of the medium as well as that of the space above it. Measurement is also unaffected by the change in the physical properties of the materials such as temperature, pressure, dielectric constant.

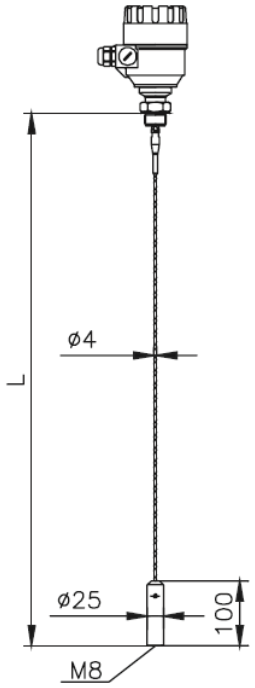
Features

- **Measuring range up to 6 m (19.6 ft)**
- **Accuracy: ± 5 mm (0.2 in.)**
- **PP / PFA coated probes available on request**
- **Rod & cable versions available**
- **Minimum ε_r 1.9**
- **2-wire version**
- **Graphic LCD display**
- **4 to 20 mA + HART output**
- **Medium temperature range: -30 °C to +90°C (-22 °F to +194 °F)**
- **Maximum process pressure: 40 bar (580 psi)**
- **IP67 protection**

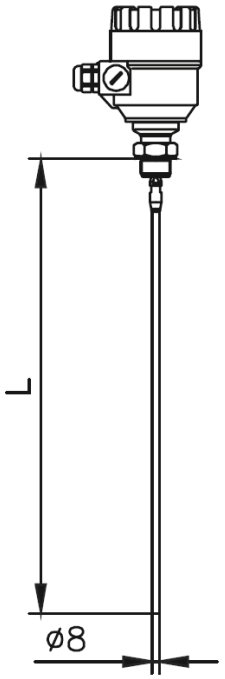
Applications

- **Inventory Tanks**
- **Day Tanks**
- **Process Vessels for Mixing & Batching**
- **Bypass Applications (requires calibration)**
- **Stilling-wells**
- **Powders**
- **Slightly Conductive Foams**
- **Low Dielectric Constant Liquids**

Dimensions



Type 2291 Cable Version
L = 6 m (19.69 ft)



Type 2291 Rod Version
L = 2 m (6.56 ft)

Specifications

General	
Measured Values	Level, Distance; Calculated values: Volume, Mass
Measuring Range	Depends on the probe type and dielectric constant (ε_r) of the measured medium
Probe Types	Mono cable, mono rod
Accuracy: Linearity Error[1]	For liquids: ± 5 mm (0.2 in.), if probe length ± 10 m (32 ft): ± 0.05 % of the probe length
Accuracy: Resolution	± 3 µA
Minimal ε_r of the Medium	1.9
Power Supply	18 V... 35 V DC
Output: Digital Communication	4 to 20 mA + HART
Output: Display	Graphical LCD display unit
Medium Temperature	-30 °C... +90 °C (-22 °F... +194 °F),
Maximum Medium Pressure	4 MPa (40 bar g/ 580 psi g); with plastic lined flange: max. 2.5 MPa (25 bar g/ 363 psi g)
Ambient Temperature	-20 °C... +60 °C (-4 °F... +140 °F)
Process Connection	1 in. BSP, 1 in. NPT Thread
Ingress Protection	IP 67
Electrical Connection	2x M20x1.5 cable glands + internal thread for 2x ½ in. NPT cable protective pipe, cable outer diameter: Ø 7 ... Ø 13 mm (0.3 ... 0.5 in.), wire cross section: max. 1.5 mm2 (AWG 15)
Electrical Protection	Class III
Housing Material	Plastic (PBT)
Sealing	FKM, On request: FFKM, EPDM
Mass (head unit)	1.5 kg (3.3 lb)
EX-Approvals	ATEX (ia): II 1/2 G Ex ia IIB T6...T5 Ga/Gb ICEX (ia): EX ia IIB T6...T5 Ga/Gb

[1] Under reference conditions and stabilized temperature

Probe specifications*

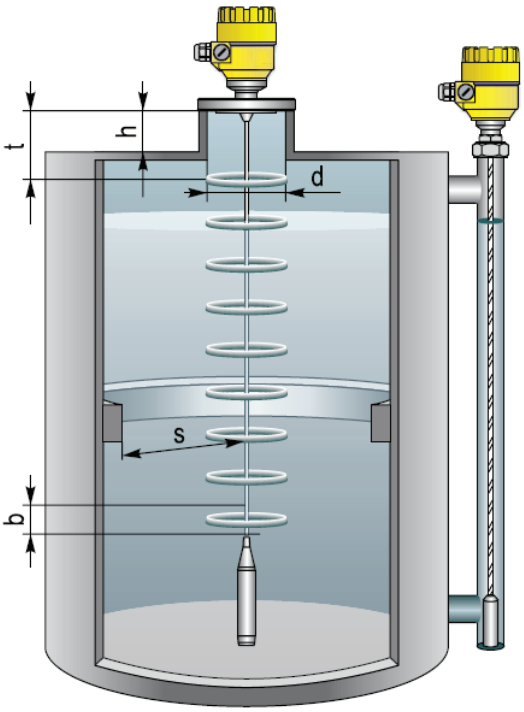
Probe Type	Max. Measuring Range	Dead-zone[2]		Process Connection	ε_r min.
		Upper (t) /lower (b) ε_r = 80	Upper (t) /lower (b) ε_r = 2.4		
Mono cable Ø 4 mm (0.15 in.)	6 m (19.6 ft)	300 /20 mm (12 / 0.75 in.)	400 / 100 mm (16 / 4 in.)	1 in.	1.9
Mono rod Ø 8 mm (0.3 in.)	2 m (6.56 ft)	300 /20 mm (12 / 0.75 in.)	400 / 100 mm (16 / 4 in.)	1 in.	1.9

*The unmeasurable upper and lower part of the tank. The lower dead zone is extended by the length of the counterweight (cable versions only).

Technical data of the probes		
	Cable	Rod
Max. meas. dist.	24 m (80 ft)	3 m (10 ft)
Min. meas. Dist. (ε_r = 80 / ε_r = 2.4)	0.3 m / 0.4 m (1 ft / 1.3 ft)	
Minimal medium ε_r	1.9	
Sensing space around the probe	Ø 600 mm (2 ft)	
Process connection	1 in. BSP, 1 in. NPT	
Probe material	1.4401 (316)	1.4571 (316 Ti)
Probe nominal Ø	4 mm (0.15 in.)	8 mm (0.3 in.)
Mass	0.12 kg/m (0.08 lb/ft)	0.4 kg/m (0.25 lb/ft)
Counterweight dimensions	Ø 25x100 mm (1x4 inch)	-
Counterweight material	1.4571 (316 Ti)	-

[2] The unmeasurable upper and lower part of the tank, the lower dead-zone is extended with the length of the counterweight (cable version)

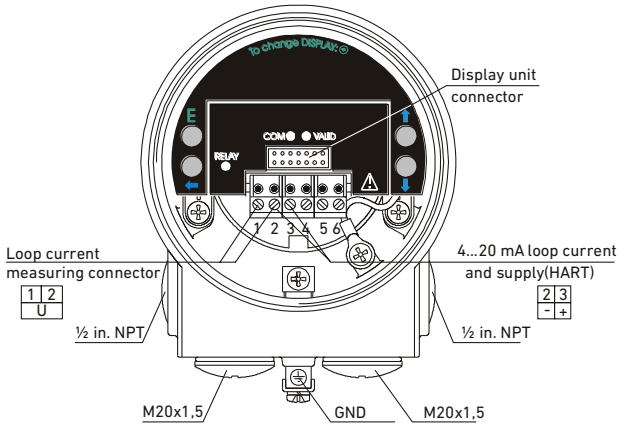
Installation



The probes can be removed from the head unit by the user.

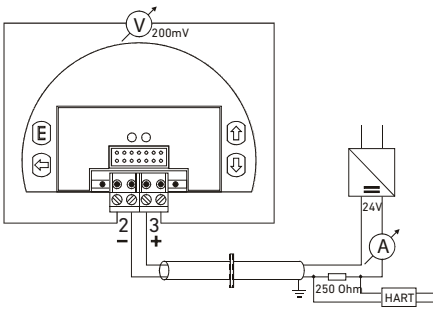
s = Minimum distance from the internal disturbing objects. Objects that are parallel to the probe do not disturb the measurement. s > 300 mm (12 in.), h ≤ d, t

Wiring

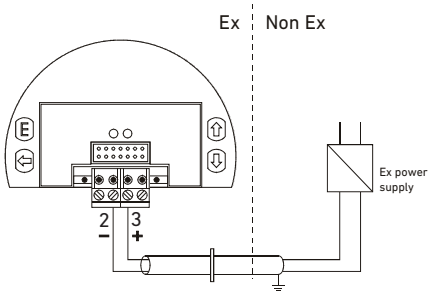


To Power Supply / HART Modem

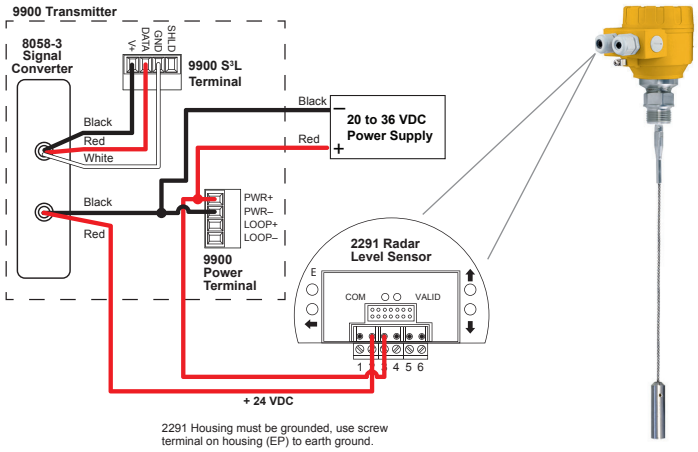
Standard wiring & connection of HART-Modem



Wiring in an EX-environment

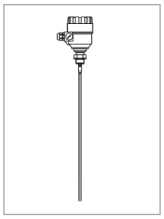


To i-Go Converter - S³L / 4 to 20 mA



Pin No.	Assignment
1	mV Test, 10mV → 1mA
2	4-20 mA current + supply (HART) any polarity
3	4-20 mA current + supply (HART) any polarity
4	Not Assigned
5	Not Assigned
6	Not Assigned

Ordering Information



Mfr. Part No.	Code	Description
2291-S-1DB1-6-R	**159 300 190**	LCD, PBT Housing, 1 in. BSP, 6m cable Ø 4mm, SS316 Ti
2291-S-1DN1-6-R	**159 300 191**	LCD, PBT Housing, 1 in. NPT, 6m cable Ø 4mm, SS316 Ti
2291-S-1DB1-2-D	**159 300 192**	LCD, PBT Housing, 1 in. BSP, 2m rod Ø 8mm, SS316 Ti
2291-S-1DN1-2-D	**159 300 193**	LCD, PBT Housing, 1 in. NPT, 2m rod Ø 8mm, SS316 Ti

Accessories

Mfr. Part No.	Code	Description
	159 300 181	HART - USB Modem
3-8058-3	**Special Order**	Wire-mount Signet i-Go signal (4 to 20 mA /S³L) converter to connect 2290 to 9900 Smart Pro, 8900 Multi-Parameter Controller. Single input.
3-8058-2	**159 000 967**	DIN rail mount Signet i-Go (4 to 20 mA/S³L) converter to connect 2290 to 9900 SmartPro, 8900 Multi-Parameter Controller. Two inputs.
3-9900-1P	**159 001 695**	9900 Transmitter - Panel Mount
3-9900-1	**159 001 696**	9900 Transmitter - Field Mount
3-9950-1	**159 001 841**	9950 Base Unit – Two Channel Multi-Parameter inputs, two 4 to 20 mA outputs, panel mount, DC Power
3-9950-2	**159 001 842**	9950 Base Unit – Two Channel Multi-Parameter inputs, two 4 to 20 mA outputs, panel mount, AC or DC Power

Signet 2350 Temperature Sensor

Blind Transmitter or Digital (S^3L) Sensor

The Signet 2350 Temperature Sensor has a one piece injection molded PVDF body that is ideal for use in high purity applications. It also outlasts metal sensors in aggressive liquids and eliminates the need for costly custom thermowells. These sensors are available with a proprietary digital (S^3L) output or field-scaleable 4 to 20 mA output.

Dual threaded ends (¾ in. NPT) allow submersion in process vessels, or in-line installation with conduit connection. An integral adapter kit (sold separately) may be used to create a compact assembly with field mount versions of the Signet 9900 Transmitter.

Features

- **4 to 20 mA or digital (S^3L) output**
- **Standard ¾ in. NPT process connection**
- **One-piece injection molded PVDF body**
- **Pt1000 platinum RTD in extended tip for quick response**
- **Easy installation**
- **Threaded for in-line or submersible installation**

Applications

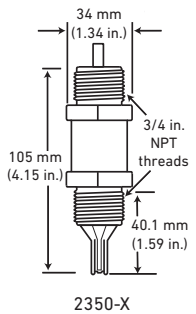
- **Plating Bath Temperature Control**
- **Heat Exchange Monitor**
- **R.O. and D.I. System Monitor**
- **Hot/Cold Mixing System Monitor**
- **Data Acquisition**
- **Cooling Loops**
- **Effluent Monitoring**
- **HVAC**
- **Chemical Processing**

Specifications

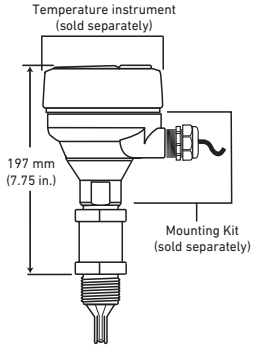
General			
Output		Digital (S³L) output or 4 to 20 mA	
Accuracy		±0.5 °C (±0.9 °F)	
Response Time, τ		10 seconds	
Repeatability		±0.1 °C (±0.2 °F)	
Resolution		0.01 °C (0.02 °F)	
Sensing End Connection		¾ in. NPT male thread	
Cable End Connection		¾ in. NPT male thread	
Wetted Materials			
Sensor Housing		PVDF	
Electrical			
Power Requirements			
	Digital (S³L)	5 to 6.5 VDC ±10%, < 1 .5 mA	
	4 to 20 mA	12 to 24 VDC ±10%, regulated	
Cable Length		4.6 m (15 ft) cable length can also be extended up to 121 m (400 ft)	
Cable Type		PVC jacketed, 3-conductor with shield 22 AWG, Blk/Red/White/Shld	
Digital (S³L) Output		Serial ASCII, TTL Level 9600 bps.	
		Reverse polarity and short circuit protected.	
4 to 20 mA Output			
Accuracy		±32 µA	
Resolution		< 5 µA	
Span		4 to 20 mA factory calibrated 0 °C to 100 °C (32 °F to 212 °F)	
Maximum Loop Impedance		50 Ω @ 12 V	
		325 Ω @ 18 V	
		600 Ω @ 24 V	
Update Rate		< 100 ms	
Maximum Temperature/Pressure Rating			
Operating Temperature			
In-line Mounting		-10 °C @ 16 bar to 100 °C @ 7.5 bar	14 °F @ 232 psi to 212 °F @ 108 psi
Submersible Mounting		-10 °C @ 16 bar to 85 °C @ 7.5 bar	14 °F @ 232 psi to 185 °F @ 108 psi
Storage Temperature		-55 °C to 100 °C	-67 °F to 212 °F
Relative Humidity		0 to 95% non-condensing	
Shipping Weight			
		0.22 kg	0.5 lb
Standards and Approvals			
		CE, FCC	
		RoHS compliant, China RoHS	
		Manufactured under ISO 9001 for Quality and ISO 14001 for Environmental Management and OHSAS 18001 for Occupational Health and Safety	

See Temperature and Pressure graphs for more information.

Dimensions



2350-X



System Overview

In-Line Installation

Panel Mount	Pipe, Tank, Wall Mount	Field (Integral) Mount	4 to 20 mA Output	Automation System
Signet Instruments - 8900 - 9900 - 9950	Signet Instruments* - 9900-1P with Rear Enclosure - 9900-1 with 3-8050 Universal Mount Kit*	Signet Instruments with 3-8052 Integral Mount Kit - 9900	- Customer Supplied Chart Recorder Programmable Logic Controller or - Programmable Automation Controller	- 0486 Profibus Concentrator and Customer Supplied Programmable Logic Controller or - Programmable Automation Controller

Signet 2350 Temperature Sensor

In-Line Installation - Fittings Customer Supplied — All sold separately

Submersible Installation

Panel Mount	Pipe, Tank, Wall Mount	4 to 20 mA Output	Automation System
Signet Instruments - 8900 - 9900 - 9950	Signet Instruments* - 9900-1P with Rear Enclosure - 9900-1 with 3-8050 Universal Mount Kit or 3-8052 Integral Mount Kit and Pipe Extension or Conduit with 3/4 in. FNPT Threads**	- Customer Supplied Chart Recorder Programmable Logic Controller or - Programmable Automation Controller	- 0486 Profibus Concentrator and Customer Supplied Programmable Logic Controller or - Programmable Automation Controller

Signet 2350 Temperature Sensor

All sold separately

*For tank or wall mount installations, user must use the Universal Adapter Kit (3-8050)

**Refer to the Signet Submersion Kit brochure (3-0000.707) located on our website for installation suggestions and options.

Ordering Notes

3-2350-X sensor can be mounted with an instrument in an integral configuration by doing the following:

1) Order Integral adapter kit 3-8052 (sold separately) to connect the instrument (sold separately) directly onto the sensor.
2) Order an instrument (sold separately). The following instrument part number is compatible with the 2350 for integral mounting: 3-9900-1.
3) Refer to the Signet Submersion Kit brochure (3-0000.707) located on our website for installation suggestions and options.

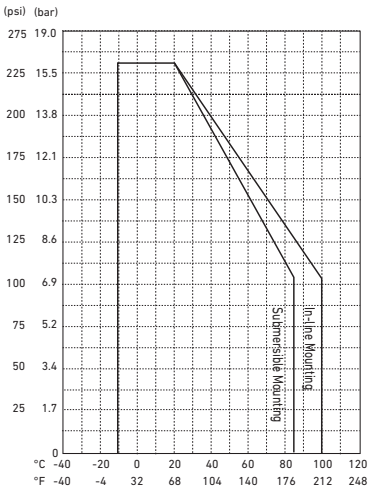
Application Tips

- For submersible sensor mounting, always use a water tight conduit and a cable gland to prevent moisture intrusion.
- To extend the cable, use a 3-conductor shielded cable and junction box.
- Sensors with extended cables available, contact Special Order products.

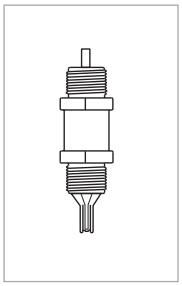
Temperature/Pressure Graphs

Note:

The pressure/temperature graphs are specifically for the Signet sensor. During system design the specifications of all components must be considered. In the case of a metal piping system, a plastic sensor will reduce the system specification. When using a PVDF sensor in a PVC piping system, the fitting will reduce the system specification.



Ordering Information



Mfr. Part No.	Code	Output and Cable Length
Temperature Sensor		
3-2350-1	**159 000 021**	Digital (S^3L) and 4.6 m (15 ft) cable
3-2350-3	**159 000 920**	Current (4 to 20 mA) and 4.6 m (15 ft) cable

Accessories and Replacement Parts

Mfr. Part No.	Code	Description
5523-0322	**159 000 761**	Sensor Cable (per ft), 3 cond. plus shield, 22 AWG
3-8052	**159 000 188**	¾ in. Integral Mounting Kit
3-8052-1	**159 000 755**	¾ in. NPT Mount Junction Box with one liquid tight connector and cap with junction terminals
3-9000.392-1	**159 000 839**	Liquid Tight Connector Kit, NPT (1 connector)
3-9000.392-2	**159 000 841**	Liquid Tight Connector Kit, PG 13.5 (1 connector)
3-0252	**159 001 808**	Configuration Tool
	Contact Factory	Custom Cable Length Available

Please refer to Wiring, Installation, and Accessories sections for more information.