Horizon™ Model 704 Guided Wave Radar Level Transmitter

DESCRIPTION

The Horizon Model 704 Transmitter is an intermediately priced 24 VDC, loop-powered, liquid level transmitter based upon Guided Wave Radar (GWR) technology.

The transmitter is designed to provide all of the performance advantages of GWR. Available in a non-rotatable, single compartment plastic or aluminum housing, this transmitter offers simple configuration with three push buttons and a 2-line × 8 character liquid crystal display. The Model 704 covers a broad application range by utilizing coaxial, twin rod, and single rod probes.

TECHNOLOGY

Horizon Guided Wave Radar is based upon Time Domain Reflectometry (TDR). TDR utilizes pulses of high frequency electromagnetic energy transmitted down a probe. When a pulse reaches a surface that has a higher dielectric than the vapor space in which it is traveling, the pulse is reflected. High-speed timing circuitry precisely measures the total transit time and provides an accurate measure of the liquid level.

APPLICATIONS

MEDIA: Liquids or slurries; hydrocarbons to water-based media (dielectric constants from 1.7 to 100)

VESSELS: Most process or storage vessels up to rated probe temperature and pressure

CONDITIONS: Virtually all level measurement and control applications including those process conditions exhibiting visible vapors, foam, coating/build-up, turbulence and varying dielectric media or specific gravity

FEATURES

- Two-wire, 24 VDC, loop-powered transmitter
- HART® communications (optional)
- Varying dielectric constant or specific gravity will have minimal effect on performance
- Probe designs up to +400° F (+200° C), 1000 psig (70 bar)
- Available with coaxial, twin rod, and single rod probes
- No calibration or level movement required
- 16 foot (4.8 meter) measuring range
- Valox® or Cast aluminum housings
- IS, XP, and Non-Incendive approvals
- Optional 2-line × 8 character LCD and 3-button keypad

TRANSMITTER SPECIFICATIONS

FUNCTIONAL/PHYSICAL

		Model 704
Signal output		4–20 mA (3.8 to 20.5 mA useable)
Span		6 to 192 inches (15 to 488 cm)
Resolution	Analog Display	0.01 mA 0.10 inch or 0.1 cm
Loop resistance		550 Ω @ 24 VDC (20.5 mA)
Damping		0 to 10 seconds
Diagnostic alarm ①		3.6 mA, 22 mA, Hold
User interface		3-button keypad and/or HART communicator (HART communicator Magnetrol P/N 89-5213-XXX sold separately)
Display		2-line × 8-character LCD
Power (at terminals)		12 to 28.6 VDC
Menu language		English, German, French or Spanish
Housing material		Aluminum A356T6 (< 0.2% copper) Valox, UL94-V0 rating
Net/Gross weight	Aluminum Valox	3.5 lbs (1.59 kg) 1.5 lbs (.68 kg)
Overall dimensions		H 6.91" (175 mm) x W 3.75" (95 mm)

① 3.6 mA fault output not available with both HART output and LCD.

PERFORMANCE

Use with probes		7XA, 7XB, 7XF, 7XF-4, 7XF-E, 7XF-F, 7XF-P, 7XR
Reference conditions		Reflection from water at +70° F (+20° C) with 72" (183 mm) probe
Linearity	7XA/7XR probe 7XB probe 7XF probe	±0.25 inch (6.3 mm) ±0.50 inch (12.7 mm) ±0.75 inch (19 mm)
Resolution		±0.15 inch (3.8 mm)
Repeatability		0.15 inch (3.8 mm)
Hysteresis		0.15 inch (3.8 mm)
Response time		< 1 second
Warm-up time		< 5 seconds
Operating temperature range	Aluminum housing Plastic housing LCD	 -40° to +175° F (-40° to +80° C) -40° to +160° F (-40° to +70° C) -5° to +160° F (-20° to +70° C)
Operating temperature effect		Approximately ±0.03% of probe length / °C
Process dielectric effect		< 0.5 inch (12.7 mm)
Humidity		0–99%, non-condensing
Electromagnetic compatibility		Meets CE requirements (EN 61000-6-2/2001, EN 61000-6-4/2001) (Single and Twin Rod probes must be used in metallic vessel or stillwell to maintain CE compliance)

AGENCY APPROVALS

AGENCY	MODEL	PROTECTION METHOD	AREA CLASSIFICATION
FM	704-5XXX-14X	Intrinsically Safe	Class I, Div. 1; Groups A, B, C, & D Class II, Div. 1; Groups E, F, & G Class III, IP67 Entity
	704-5XXX-54X	Explosion Proof	Class I, Div. 1; Groups B, C & D Class II, Div. 1; Groups F, & G Class III; Type 4X; IP67
	704-5XXX-14X 704-5XXX-54X	Non-Incendive, suitable for: ①	Class I, Div. 2; Groups A, B, C, & D Class II, Div. 2; Groups F & G Class III; Type 4X; IP67
CSA	704-5XXX-14X	Intrinsically Safe	Class I, Div. 1; Groups A, B, C, & D Class II, Div. 1; Group G Class III, Type 4X; IP66/67 Entity
	704-5XXX-54X	Explosion Proof	Class I, Div. 1; Groups C & D Class II, Div. 1; Groups G Class III, Type 4X; IP 66/67
	704-5XXX-14X 704-5XXX-54X	Non-Incendive, suitable for: ①	Class I, Div. 2; Groups A, B, C, & D Class II, Div. 2; Group G Class III, Type 4X; IP66/67
ATEX	704-5XXX-A4X	Intrinsically Safe	Ex II 1G, EEx ia IIC T4

① Measured media inside vessel must be non-flammable only.

CE 0344

These units are in conformity of:

1. The EMC Directive: 89/336/EEC. The units have been tested to EN 61000-6-2/2001 and EN 61000-6-4/2001.
2. Directive 94/9/EC for equipment or protective system for use in potentially explosive atmospheres (8th digit "A" only).

PROBE OVERVIEW

Choosing the proper Guided Wave Radar (GWR) probe is the most important decision in the application process. The probe configuration establishes fundamental performance characteristics. Coaxial, twin element (rod or cable) and single element (rod or cable) are the three basic configurations used today; each with specific strengths and weaknesses.

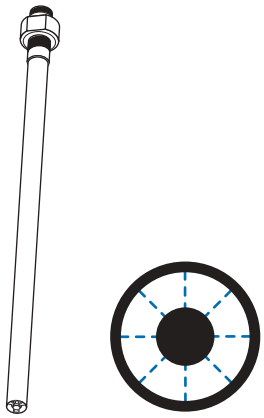


Figure 1
Coaxial Probe

COAXIAL PROBES

The Coaxial probe is the most efficient of all probe configurations and should be the first consideration in all applications. Analogous to the efficiency of modern, coaxial cable, coaxial probes allow almost unimpeded movement of the high frequency pulses throughout its length.

The electromagnetic field that develops between the inner rod and outer tube is completely contained. See Figure 1. The efficiency and sensitivity of a coaxial configuration yields robust signal strength even in extremely low dielectric (ε_r > 1.7) applications. The sensitivity of this "closed" design, however, also makes it more susceptible to measurement error in applications of coating and build-up.

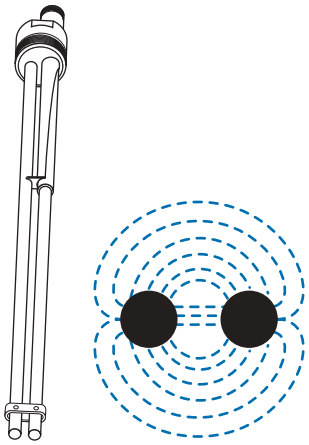


Figure 2
Twin Rod Probe

TWIN ROD PROBES

The relationship of the Twin Rod probe to a coaxial is similar to that of older, twin-lead, antenna lead-in to modern, coaxial cable. 300 ohm twin-lead cable simply does not have the efficiency of 75 ohm coax. The parallel conductor design is less sensitive than the concentric coaxial. See Figure 2. This translates to Twin Rod GWR probes measuring dielectrics of only ε_r > 2.5.

The "open" design also allows more accurate measurement where coating/build-up are possible. A film coating has little effect on performance. However, bridging of material between the rods or build-up on the spacers can cause improper measurement and should be avoided. Figure 2 also shows that the electromagnetic field develops not only between the rods, it also expands outward making it more sensitive to proximity effects of objects located immediately around it.

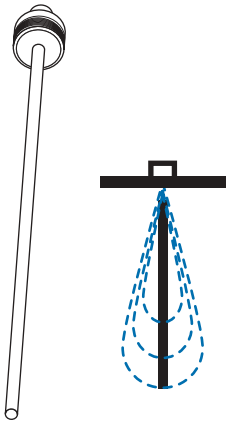


Figure 3
Single Rod Probe

SINGLE ROD PROBES

Single element GWR probes act quite differently from coaxial and twin element designs. The pulses of energy develop between the center rod and the mounting nut or flange; the pulse propagates down the rod as it references its ground at the top of the tank. The efficiency of the pulse "launch" is directly related to how much metallic surface exists around it at the top of the vessel.

Figure 3 shows the single element design and how the pulse expands into a teardrop shape as it propagates away from the top of the tank (ground reference). This Single element configuration is the least efficient of the three with minimum dielectric detection approximately ε_r > 10. This dielectric performance improves considerably ($\varepsilon_r \approx 3.0$) when the probe is installed between 3–6" (80–150 mm) of a metal tank wall or in a cage/bridle. Because the design is the most "open", it exhibits two strong tendencies. First, it is the most forgiving of coating and build-up. The PFA-insulated probe is the best choice for severe coating. Secondly, it is most affected by proximity issues. It is important to note that a parallel metal wall INCREASES its performance, while a singular, metal object protruding near the probe may be improperly detected as a liquid level.

NOZZLES

The 7XF/7X1 Single Rod and 7XB Twin Rod probes are the most susceptible to objects that are in close proximity. The following rules should be followed for proper application:

7XF Single Rod

1. Nozzle must be 2" (50 mm) diameter (A) or larger.
2. Ratio of diameter (A) to length (B) is 1:1 or greater. Any ratio < 1:1 (e.g. a 2" × 6" nozzle = 1:3) can be used but may increase the DEADBAND of the instrument. See Figure 4.
3. Pipe reducers that create restriction should not be used. See Figure 5.

7XB Twin Rod

1. Nozzle should be 3" (80 mm) diameter or larger.
2. For nozzles < 3" (80 mm) diameter, the bottom of the inactive section of the probe should be flush with the bottom of the nozzle or extend into the vessel.

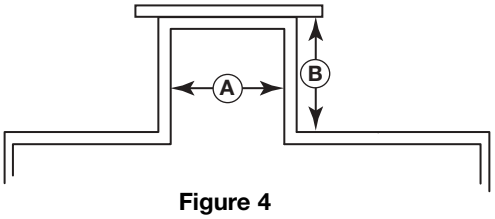


Figure 4

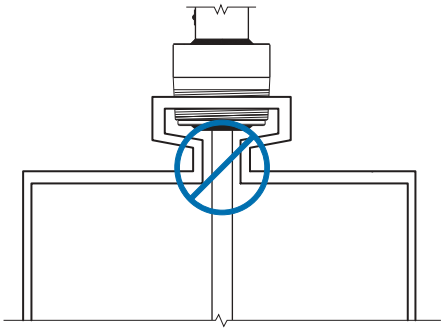


Figure 5

OBSTRUCTIONS (METALLIC)

1. Objects in proximity to the 7XF Single Rod probe can cause erroneous readings. See Figure 6.
2. 7XB Twin Rod probes should be installed so the active rod (below the 4" (100 mm) inactive sheath) is > 1" (25 mm) from metallic objects such as pipes, ladders, etc. Bare tank walls parallel to the probe are acceptable.

Obstructions (Metallic)

Distance to probe	Acceptable objects
< 6" (150 mm)	Continuous, smooth, parallel, conductive surface (e.g. tank wall); probe should not touch tank wall
> 6" (150 mm)	< 1" (25 mm) diameter pipe and beams, ladder rungs
> 12" (300 mm)	< 3" (80 mm) diameter pipe and beams, concrete walls
> 18" (450 mm)	All remaining objects

Figure 6

TURBULENCE

The bottom of the probe should be stabilized if turbulence will cause a deflection of more than 3 inches (80 mm) at 10 feet (3 m) of length. The probe should not make contact with a metal tank. A TFE bottom spacer (P/N 89-9114-001) is available for Model 7XF single rod probe.

COAXIAL PROBE MATRIX

		7XA Standard	7XR Overfill
Recommended for		General purpose; clean low viscosity liquids < 300° F (150° C)	Overfill, temps +300° to +400° F (+150° to +200° C); clean, low viscosity liquids
Not recommended for		Coating and build-up, foam	
Materials/Wetted parts		316L SS, TFE, Viton® GFLT	
	Optional	Hastelloy C, Monel	
Process seal		Viton® GFLT O-ring ①	
Spacers		TFE	
Diameter		∅ .3125" (8 mm) rod ∅ .875" (22 mm) tube	
Process connection thread		¾" NPT, 1" BSP	
Flange ANSI (DIN)		1" to 4" (DN25 to 100)	
Length		24 to 192 inches (60 to 488 cm)	
Transition zone ②	Top	1" (25 mm) @ ε_r = 1.7 6" (150 mm) @ ε_r = 80	None
	Bottom	6" (150 mm) @ ε_r = 1.7 1" (25 mm) @ ε_r = 80	
Process temperature ③	Maximum	+300° F @ 400 psig (+150° C @ 27 bar)	+400° F @ 270 psig (+200° C @ 18 bar)
	Minimum/cryogenic	-40° F @ 750 psig (-40° C @ 50 bar)	
Process pressure	Maximum	1000 psig @ 70° F (70 bar @ 20° C)	
	Minimum/vacuum service	Yes, not hermetic	
Dielectric range		≥ 1.7	
Maximum viscosity (cP)		500	
Mounting effects		None	
Coating/Build-up		No	
Foam		No	
Corrosives		Yes	
Sanitary		No	
Overfill		No	
Approvals	FM CSA ATEX OTHER	Yes Yes Yes No	

① Refer to Selection Chart on page 12 for optional O-rings.

② Transition Zone is dielectric dependent: ε_r = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone.

③ Refer to Ambient Temperature vs. Process Temperature graph on page 12.

SINGLE ROD PROBE MATRIX

		7XF-X Standard, Bare	7XF-4 Insulated
Recommended for		Coating and build-up, foam	Excessive coating and build-up, foam
Not recommended for		Low dielectric media (ε_r < 10); stratifying liquids when upper fluid has ε_r < 10	Low dielectric media (ε_r < 10); stratifying liquids when upper fluid has ε_r < 10
Materials/Wetted parts		316L SS, TFE, Viton® GFLT	316L SS, PFA, Viton® GFLT
	Optional	Hastelloy C, Monel	N/A
Process seal		Viton® GFLT O-ring ①	Viton® GFLT O-ring ①
Spacers		Optional TFE bottom spacer	None
Diameter		∅ .50" (13 mm) rod	∅ .50" (13 mm) rod ∅ .625" (16 mm) insulation
Process connection thread		2" NPT, 2" BSP	2" NPT, 2" BSP
Flange ANSI (DIN) ②		2 to 4" (DN50 to 100)	2" to 4" (DN50 to 100)
Length		24 to 192 inches (60 to 488 cm)	24 to 192" (60 to 488 cm)
Transition zone ③	**Top** **Bottom**	See Deadband 1" (25 mm) @ ε_r > 10	See Deadband 1" (25 mm) @ ε_r > 10
Deadband	**Top**	12" (30 cm) minimum	12" (30 cm) minimum
Process temperature ④	**Maximum**	+300° F @ 400 psig (+150° C @ 27 bar)	+300° F @ 400 psig (+150° C @ 27 bar)
	Minimum (cryogenic)	-40° F @ 750 psig (-40° C @ 50 bar)	-40° F @ 750 psig (-40° C @ 50 bar)
Process pressure	**Maximum**	1000 psig @ +70° F (70 bar @ +20° C)	1000 psig @ +70° F (70 bar @ +20° C)
	Minimum (vacuum service)	N/A	N/A
Dielectric range		≥ 3 ⑤	≥ 3 ⑤
Maximum viscosity (cP)		10,000 (consult factory if severe agitation/turbulence)	
Mounting effects		See Nozzle and Obstruction notes (page 5)	
Coating/Build-up		Yes; maximum error 10% of coated length; % error related to dielectric of media, thickness of coating and coated probe length above media	
Foam		Yes	Yes
Corrosives		Yes	Yes
Sanitary		No	No
Overfill		No	No
Approvals	**FM** **CSA** **ATEX** **OTHER**	Yes Yes Yes No	Yes Yes Yes No

① Refer to Selection Chart on page 12 for optional O-rings.

② Single rod probes must be ordered with a flange when used with the Horizon Series Transmitters.

③ Transition Zone is dielectric dependent: ε_r = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone.

④ Refer to Ambient Temperature vs. Process Temperature graph on page 12.

⑤ ε_r 3.0–10.0 must be mounted between 3–6" (75–150 mm) of metal tank wall or in chamber/bridle.

SINGLE ROD PROBE MATRIX

7XF-E Sanitary	7XF-F Insulated, Faced-Flange	7XF-P Paint Probe
Applications demanding sanitary specs such as 3A	Extreme corrosives, coating/build-up, foam	Automotive paint kitchen applications only
Low dielectric media (ε_r < 10); stratifying liquids when upper fluid has ε_r < 10	Low dielectric media (ε_r < 10); stratifying liquids when upper fluid has ε_r < 10	General Purpose
316L stainless steel, TFE, < 20 R_a	All PFA-wetted surfaces	316L stainless steel, TFE
N/A	N/A	N/A
316L stainless steel, TFE No O-ring	PFA No O-ring	TFE
None	None	None
∅ .50" (13 mm) rod	∅ .50" (13 mm) rod ∅ .625" (16 mm) insulation	∅ .3125" (6 mm) rod
N/A	N/A	¾" NPT, 1" BSP
2" to 4" (25 to 100 cm); Triclover-style 16 AMP fitting	2" to 4" (DN50 to 100)	N/A
24 to 192 inches (60 to 488 cm)	24 to 192 inches (60 to 488 cm)	24 to 72 inches (60 to 180 cm)
See Deadband 1" (25 mm) @ ε_r > 10	See Deadband 1" (25 mm) @ ε_r > 10	See Deadband 1" (25 mm) @ ε_r > 10
12" (30 cm) minimum	12" (30 cm) minimum	12" (30 cm) minimum
+300° F @ 75 psig (+150° C @ 5.1 bar)	+300° F @ 400 psig (+150° C @ 27 bar)	+160° F (+70° C)
Consult factory	-40° F @ 200 psig (-40° C @ 13.7 bar)	N/A
75 psig @ +300° F (5.1 bar @ +150° C)	1000 psig @ +70° F (70 bar @ +20° C)	Atmospheric
N/A	N/A	N/A
≥ 3 ④	≥ 3 ④	≥ 3 ④
10,000 (consult factory if severe agitation/turbulence)		2000
See Nozzle and Obstruction notes	See Nozzle and Obstruction notes	See Nozzle and Obstruction notes
Yes; maximum error 10% of coated length; % error related to dielectric of media, thickness of coating and coated probe length above media		
Yes	Yes	Yes
No	Yes	No
Yes	No	No
No	No	No
Yes Yes Yes 3A	Yes Yes Yes No	No No No No

TWIN ROD PROBE

		7XB Twin Rod-Rigid
Recommended for		General purpose, foam, minor film coating
Not recommended for		Media bridging between rods or building up on spacers
Materials/Wetted parts		316L stainless steel, TFE, Viton® GFLT
	Optional	Hastelloy C, Monel
Process seal		Viton® GFLT O-ring ①
Spacers		TFE
Diameter		Two, ∅ .50" (13 mm) rod; .875" (22 mm) C_L to C_L
Process connection thread		2" NPT, 2" BSP
Flange ANSI (DIN)		2" to 4" (DN50 to 100)
Length		24 to 192 inches (60 to 488 cm)
Transition zone ②	Top	1" (25 mm) @ ε_r > 10, 8" (200 mm) @ ε_r < 10 (+4" (100 mm) inactive)
	Bottom	6" (150 mm) @ ε_r = 2.5 1" (25 mm) @ ε_r = 80
Deadband	Top	4"(+4" inactive section)
Process temperature ③	Maximum	+400° F @ 200 psig (+200° C @ 13 bar)
	Minimum/cryogenic	-40° F @ 750 psig (-40° C @ 50 bar)
Process pressure	Maximum	750 psig @ +70° F (50 bar @ +20° C)
	Minimum/vacuum service	Yes, not hermetic
Dielectric range		≥ 2.5
Maximum viscosity (cP)		1500
Mounting effects ④		Active rod > 1" from any obstruction
Coating/Build-up ⑤		Film: 3% max. error of coated length with conductive media Bridging not recommended
Foam		Yes
Corrosives		Yes
Sanitary		No
Overfill		No
Approvals	FM CSA ATEX OTHER	Yes Yes Yes No

① Refer to Selection Chart on page 12 for optional O-rings.

② Transition Zone is dielectric dependent: ε_r = dielectric permittivity.
Unit will function but accuracy will decrease in Transition Zone.
NOTE: Output may go to Fault mode when medium is within top 7 inches of probe and ε_r <20.

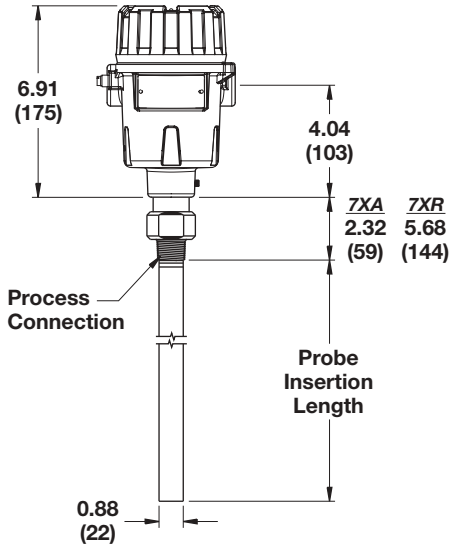
③ Refer to Ambient Temperature vs. Process Temperature graph on page 12.

④ Minimum stillwell diameter for Twin Rod probe is 3 inch (80 mm).

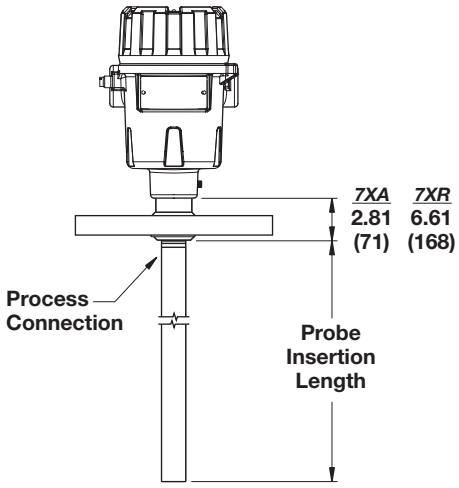
⑤ Bridging is defined as continuous accumulation of material between the probe elements.

DIMENSIONAL SPECIFICATIONS

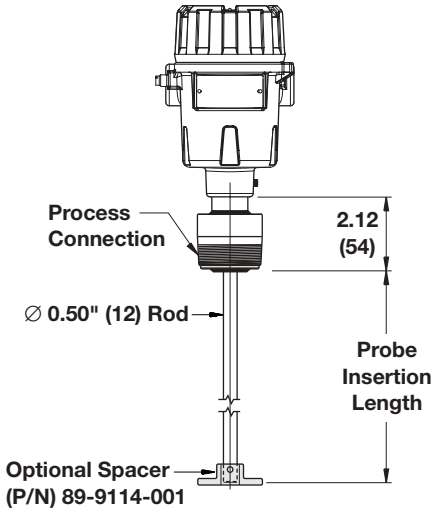
INCHES (MM)



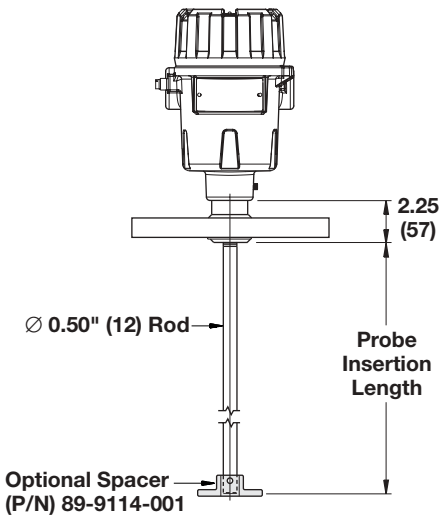
Horizon Model 7XA/7XR Probe
NPT Threaded Connection



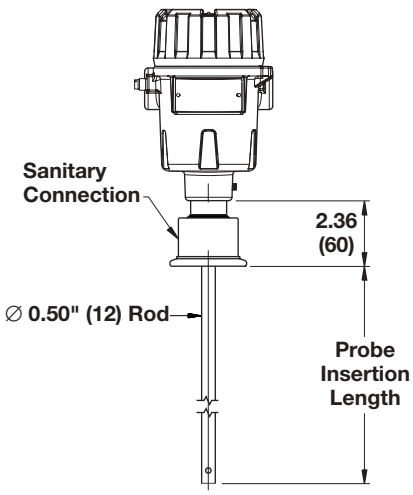
Horizon Model 7XA/7XR Probe
Flanged Connection



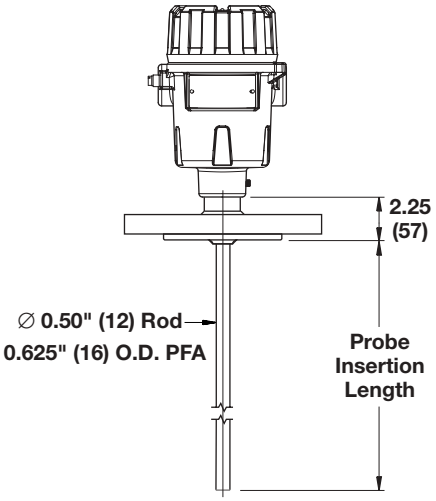
Horizon Model 7XF Probe
NPT Threaded Connection



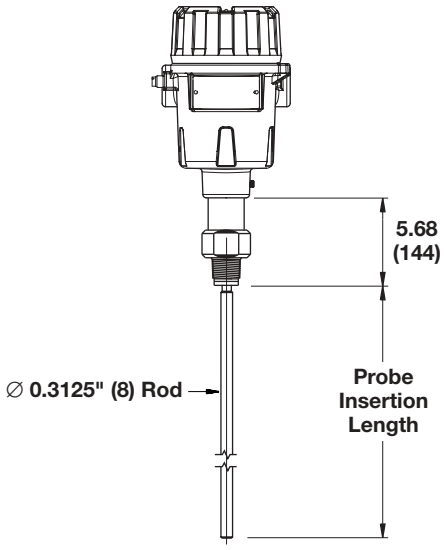
Horizon Model 7XF Probe
Flanged Connection



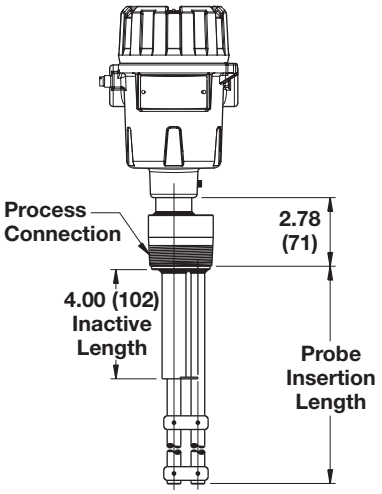
Horizon Model 7XF-E Probe
Sanitary Connection



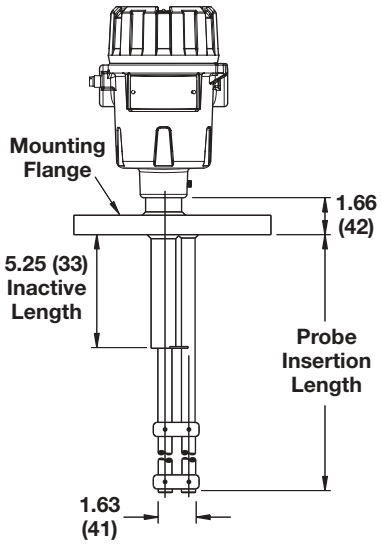
Horizon Model 7XF-F Probe
Faced-Flange Connection



Horizon Model 7XF-P
Paint Probe



Horizon Model 7XB Twin Rod Probe
NPT Threaded Connection

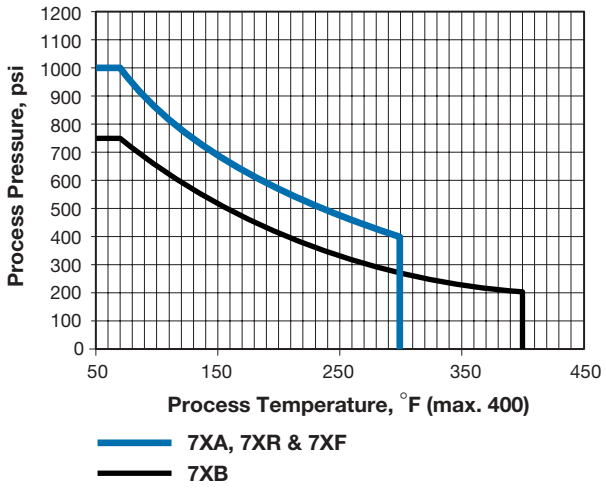


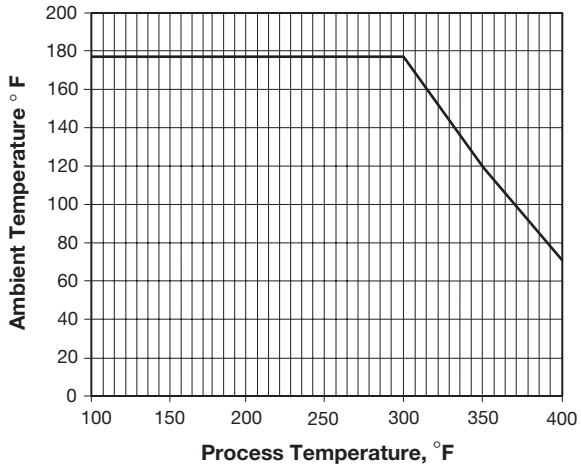
Horizon Model 7XB Twin Rod Probe
Flanged Connection

O-RING (SEAL) SELECTION CHART

Material	Code	Maximum Temperature	Maximum Pressure	Min. Temp.	Recommended For Use In	Not Recommended For Use In
Viton® GFLT	0	+400° F @ 232 psig (+200° C @ 16 bar)	1000 psig @ +70° F (70 bar @ +20° C)	-40° F (-40° C)	General purpose, steam, ethylene	Ketones (MEK, acetone), skydrol fluids, amines, anhydrous ammonia, low molecular weight esters and ethers, hot hydro-fluoric or chlorosulfuric acids, sour HCs
EPDM	1	+250° F @ 200 psig (+125° C @ 14 bar)	1000 psig @ +70° F (70 bar @ +20° C)	-60° F (-50° C)	Acetone, MEK, skydrol fluids	Petroleum oils, di-ester base lubricants, propane, steam
Kalrez (4079)	2	+400° F @ 232 psig (+200° C @ 16 bar)	1000 psig @ +70° F (70 bar @ +20° C)	-40° F (-40° C)	Inorganic and organic acids (including HF and nitric) aldehydes, ethylene, glycols, organic oils, silicone oils, vinegar, sour HCs	Black liquor, hot water/steam, hot aliphatic amines, ethylene oxide, propylene oxide, molten sodium, molten potassium
Aegis PF128	8	+400° F @ 232 psig +(200° C @ 16 bar)	1000 psig @ +70° F (70 bar @ +20° C)	-4° F (-20° C)	Inorganic and organic acids (including HF and nitric) aldehydes, ethylene, glycols, organic oils, silicone oils, vinegar, sour HCs, steam, amines, ethylene oxide, propylene oxide	Black liquor, Freon 43, Freon 75, Galden, KEL-F liquid, molten sodium, molten potassium

TEMPERATURE/PRESSURE CHARTS





Ambient Temperature vs Process Temperature - 7XA, 7XR, 7XB & 7XF

TRANSMITTER

MODEL NUMBER

Models available for quick shipment, usually within one week after factory receipt of a purchase order, through the Expedite Ship Plan (ESP).

BASIC MODEL NUMBER

704	Horizon Guided Wave Radar Level Transmitter for use with probe models 7XA, 7XB, 7XF, 7XR and 7X1 only

POWER

5	24 VDC, Two-wire

SIGNAL OUTPUT

0	4–20 mA only, without HART (must be ordered with Accessory Code A)
1	4–20 mA with HART (HART communicator Magnetrol P/N 89-5213-XXX sold separately)

MENU LANGUAGE

1	English
2	Spanish
3	French
4	German

ACCESSORIES

0	No digital display and keypad (must be ordered with Signal Output Code 1)
A	Digital display and keypad

MOUNTING/CLASSIFICATION

1	Integral, General Purpose & Intrinsically Safe (FM & CSA), Non-Incendive (Class I, Div. 2)
5	Integral, Explosion Proof (FM & CSA) (must be ordered with Housing Code 4)
A	Integral, General Purpose & Intrinsically Safe (ATEX EEx ia IIC T4)

HOUSING

3	Valox, single compartment
4	Cast aluminum, single compartment

CONDUIT CONNECTION

0	¾" NPT
1	M20

7	0	4	—	5				—			

PROBE

MODEL NUMBER

BASIC MODEL NUMBER

7E	Horizon GWR probe, English unit of measure
7M	Horizon GWR probe, Metric unit of measure

CONFIGURATION/STYLE

A	Coaxial, ¾" process connection or larger	(Dielectric range ≥ 1.7)
B	Twin Rod, 2" NPT or 3" flanged process connection or larger	(Dielectric range ≥ 2.5)
F	Single Rod, Rigid, 2" process connection or larger	(Dielectric range ≥ 3.0)
R	Coaxial, Overfill ¾" process connection or larger	(Dielectric range ≥ 1.7)

MATERIAL OF CONSTRUCTION

A	316/316L stainless steel
B	Hastelloy C
C	Monel
E	Sanitary, 316/316L stainless steel (20 R_a finish), Configuration/Style code F only, Process connections codes 4P, 5P, and 6P only
F	PFA faced flange, 2" to 4", 150# to 300#, Configuration/Style code F only, Process connection codes 43, 44, 53, 54, 63, 64, DA, DB, EA, EB, FA, and FB only
P	Paint Probe, 316/316L stainless steel ¾" process connection or larger Configuration/Style code F only: maximum length 72"
4	PFA insulated rod, 2" NPT process connection or larger, Configuration/Style code F only

PROCESS CONNECTION SIZE/TYPE

Refer to page 15 for selections

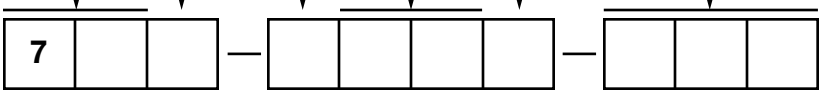
O-RINGS

0	Viton® GFLT
1	EPDM (Ethylene Propylene Rubber)
2	Kalrez 4079
8	Aegis PF128
N	None (Use with probes 7XF-E, 7XF-F, 7XF-P)

LENGTH – PROBE MODELS 7XA, 7XB, 7XF & 7XR

24 to 192 inches (60 to 488 cm)
(unit of measure is determined by second digit of Model Number)

Examples: 24 inches = 024; 60 centimeters = 060

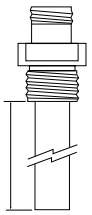


MODEL NUMBER

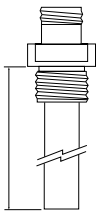
PROCESS CONNECTION SIZE/TYPE

THREADED CONNECTIONS

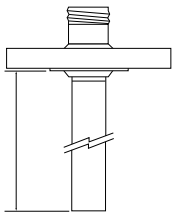
11	¾" NPT Thread ①
22	1" BSP Thread ①
41	2" NPT Thread ②
42	2" BSP Thread ②



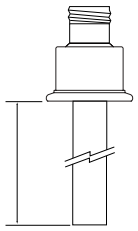
Insertion Length NPT Process Connection



Insertion Length BSP Process Connection



Insertion Length ANSI or DIN Welded Flange



Insertion Length Sanitary Flange

ANSI RAISED FACE FLANGE CONNECTIONS

23	1" 150#	ANSI Raised Face Flange ①
24	1" 300#	ANSI Raised Face Flange ①
25	1" 600#	ANSI Raised Face Flange ①
33	1½" 150#	ANSI Raised Face Flange ①
34	1½" 300#	ANSI Raised Face Flange ①
35	1½" 600#	ANSI Raised Face Flange ①
43	2" 150#	ANSI Raised Face Flange ①
44	2" 300#	ANSI Raised Face Flange ①

45	2" 600#	ANSI Raised Face Flange ①
53	3" 150#	ANSI Raised Face Flange
54	3" 300#	ANSI Raised Face Flange
55	3" 600#	ANSI Raised Face Flange ①
63	4" 150#	ANSI Raised Face Flange
64	4" 300#	ANSI Raised Face Flange
65	4" 600#	ANSI Raised Face Flange ①

ANSI RING JOINT FLANGE CONNECTIONS

3K	1½" 600#	ANSI Ring Joint Flange ①
4K	2" 600#	ANSI Ring Joint Flange ①
5K	3" 600#	ANSI Ring Joint Flange ①
6K	4" 600#	ANSI Ring Joint Flange ①

SANITARY FLANGE CONNECTIONS

3P	1½" Triclover® type, 16 AMP Sanitary Flange
4P	2" Triclover® type, 16 AMP Sanitary Flange
5P	3" Triclover type, 16 AMP Sanitary Flange
6P	4" Triclover type, 16 AMP Sanitary Flange

DIN FLANGE CONNECTIONS

BA	DN 25,	PN 16	DIN 2527 Form B Flange ①
BB	DN 25,	PN 25/40	DIN 2527 Form B Flange ①
BC	DN 25,	PN 64/100	DIN 2527 Form E Flange ①
CA	DN 40,	PN 16	DIN 2527 Form B Flange ①
CB	DN 40,	PN 25/40	DIN 2527 Form B Flange ①
CC	DN 40,	PN 64/100	DIN 2527 Form E Flange ①
DA	DN 50,	PN 16	DIN 2527 Form B Flange
DB	DN 50,	PN 25/40	DIN 2527 Form B Flange
DD	DN 50,	PN 64	DIN 2527 Form E Flange ①

DE	DN 50,	PN 100	DIN 2527 Form E Flange ①
EA	DN 80,	PN 16	DIN 2527 Form B Flange
EB	DN 80,	PN 25/40	DIN 2527 Form B Flange
ED	DN 80,	PN 64	DIN 2527 Form E Flange ①
EE	DN 80,	PN 100	DIN 2527 Form E Flange ①
FA	DN 100,	PN 16	DIN 2527 Form B Flange
FB	DN 100,	PN 25/40	DIN 2527 Form B Flange
FD	DN 100,	PN 64	DIN 2527 Form E Flange ①
FE	DN 100,	PN 100	DIN 2527 Form E Flange ①

① Configuration/Style Codes A only.
② Configuration/Style Codes B & F only.

7			—					—			

QUALITY

MAGNETROL
REGISTERED TO
ISO 9001
Your Assurance of
Quality and Service

The quality assurance system in place at Magnetrol guarantees the highest level of quality throughout the company. Magnetrol is committed to providing full customer satisfaction both in quality products and quality service.

Magnetrol's quality assurance system is registered to ISO 9001 affirming its commitment to known international quality standards providing the strongest assurance of product/service quality available.

ESP

Expedite
Ship
Plan

Several Models of Horizon Guided Wave Radar Transmitters are available for quick shipment, usually within one week after factory receipt of a purchase order, through the Expedite Ship Plan (ESP).

Models covered by ESP service are color coded in the selection data charts.

To take advantage of ESP, simply match the color coded model number codes (standard dimensions apply).

ESP service may not apply to orders of ten units or more. Contact your local representative for lead times on larger volume orders, as well as other products and options.

WARRANTY

All Magnetrol electronic level and flow controls are warranted free of defects in materials or workmanship for one full year from the date of original factory shipment.

If returned within the warranty period; and, upon factory inspection of the control, the cause of the claim is determined to be covered under the warranty; then, Magnetrol will repair or replace the control at no cost to the purchaser (or owner) other than transportation.

Magnetrol shall not be liable for misapplication, labor claims, direct or consequential damage or expense arising from the installation or use of equipment. There are no other warranties expressed or implied, except special written warranties covering some Magnetrol products.

For additional information, see Instruction Manual 57-603.

Magnetrol

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