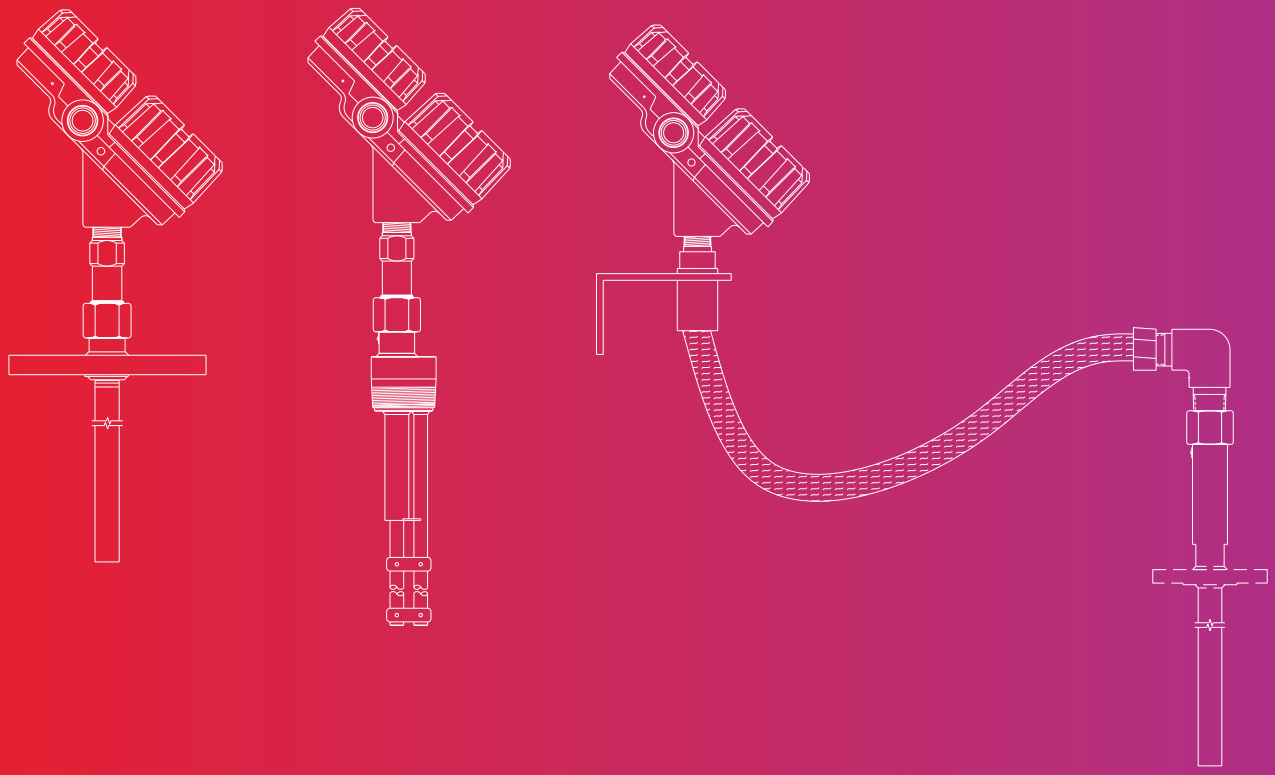
ECLIPSE® GUIDED WAVE RADAR

Magnetrol®

Worldwide Level and Flow Solutions℠

The Total Spectrum of Solutions

Magnetrol's products employ a number of technologies to meet the challenges of level and flow control. Eclipse transmitters utilize Guided Wave Radar for accurate and reliable level control.



MAGNETROL

ECLIPSE GUIDED WAVE RADAR

ECLIPSE
GUIDED WAVE RADAR

Magnetrol International—a world leader in level and flow control technology—designs, manufactures, markets and services level and flow instrumentation worldwide.

Magnetrol's product groups are based upon these technologies:

- Air Sonar
- Buoyancy
- Contact Ultrasound
- Guided Wave Radar
- Pulse Burst Radar
- RF Capacitance
- Thermal Dispersion
- Vibration
- Visual Indicators

The industries we serve include:

- Petroleum Production
- Petroleum Refining
- Power Generation
- Petrochemical
- Chemical
- Water & Wastewater
- Pulp & Paper
- Food & Beverage
- Pharmaceutical

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An Introduction To Eclipse Guided Wave Radar

Eclipse transmitters utilize Guided Wave Radar (GWR) technology for unsurpassed accuracy and reliability in monitoring both liquid and bulk solid levels. Though GWR technology was first employed for the detection of underground cable breaks as early as the 1930s, Magnetrol pioneered its use for liquid level measurement with the introduction of the Eclipse Model 705 transmitter in 1998. No other level measurement technology has captured the attention of the process control industry the way Eclipse has.

HOW GUIDED WAVE RADAR WORKS

Pulses Generated

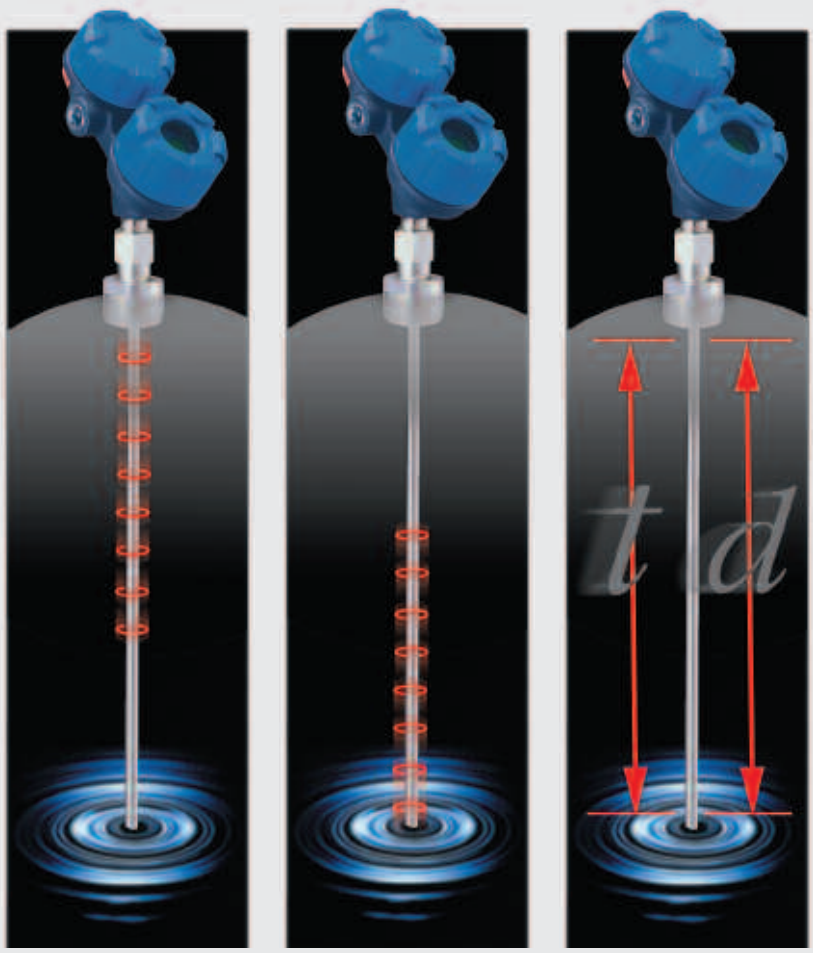
Eclipse transmitters generate pulses of electromagnetic energy that are transmitted down the probe, or waveguide.

Pulses Reflected

When they reach a liquid surface that has a higher dielectric than the air or vapor in which they travel, the pulses are reflected.

Time Converted to Distance

The pulses' transit time to and from the surface is measured, converted to distance, then displayed on the LCD as a level reading.



Principle of Operation

Guided Wave Radar functions according to the principle of Time Domain Reflectometry (TDR). As shown at left, a generated pulse of electromagnetic energy travels down the probe. Upon reaching the liquid surface the pulse is reflected. Sophisticated circuitry captures these signals in real time (nanoseconds) and reconstructs them in equivalent time (milliseconds) to make level measurement a practical reality.

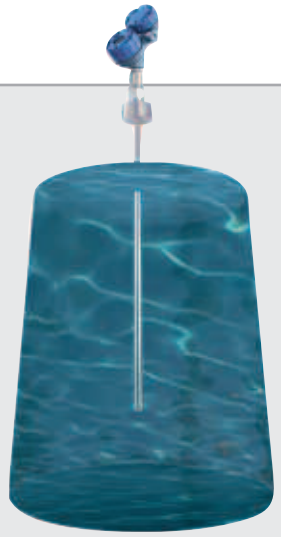
Unlike conventional radar, which launches its signal into free air, Eclipse launches its signal within the sealed path of its probe (wave guide) which is in direct contact with the process media. This direct contact makes the signal less vulnerable to distortion brought on by process conditions that might thwart through-air technologies.

Eclipse transmitters have also been designed for easy setup and configuration. A compact instrument that is easy to handle and install, Eclipse's innovative housing makes measurement data easy to read.

Eclipse Transmitters

Eclipse has demonstrated an ability to provide accurate and reliable measurement at a performance level that surpasses many traditional technologies. This is due to the efficiency of Guided Wave Radar technology and to Magnetrol's broad range of sensing probes designed to meet the special demands of temperature, pressure, viscosity, liquid interface, vessel depth and other variables discussed ahead.

Eclipse accurately measures liquids, slurries, and bulk solids with a dielectric range of 1.4 to 100, from hydrocarbons to water-based media. The transmitters perform in all conventional process and storage vessels, bridles and bypass chambers whose temperatures and pressures are rated to the capabilities of the particular probe used. There is a probe for virtually every application, from routine water storage to vessels exhibiting corrosive vapors, foam, steam, coating and buildup, surface agitation, bubbling or boiling, high fill/empty rates, low level and varying dielectric or specific gravity.



Process Connected

Because the Guided Wave Radar signal is transmitted via the waveguide directly into the process media, it is not distorted by tank atmospheres, process conditions, tank obstructions or false echoes.

Eclipse is at work worldwide in the most demanding applications, including those in petroleum refining, electric power generation, chemical manufacturing, water and wastewater, pulp and paper, food and beverage, and pharmaceutical processing. Eclipse also serves as the ideal retrofit transmitter made possible by Magnetrol's wide range of adaptation hardware for easy and affordable replacement of antiquated level measurement technology.

Total Guided Wave

Eclipse transmitters have been engineered to provide users with the *total* range of measurement solutions in Guided Wave Radar. With user-friendly transmitters and an extensive line of dedicated coaxial, single and twin rod probes, Eclipse has emerged as the premier measurement instrument for today's liquid level challenges. ■

Eclipse 705

A full-featured GWR transmitter which utilizes general-purpose and special-purpose coaxial and twin rod probes.

Probe-Specific Transmitters for Process-Specific Solutions

7XA 7XR 7XP 7XD 7XB 7XT 7X5 7XF 7X1 7XF-4 7XF-E 7XF-F

Model 705 Transmitter

Advanced GWR Transmitters for Level Measurement

High Performance, Low Power

Eclipse transmitter Model 705 is an advanced two-wire, 24 VDC, loop-powered transmitter. A microprocessor controls the measurement engine, and provides an analog 4–20 mA signal with HART Communication or a digital FOUNDATION fieldbus™ signal.

As a Guided Wave Radar instrument, Eclipse's measurement performance is not process-dependent, so changing specific gravity and dielectric have little or no effect on measurement accuracy. The measurement engine of Eclipse is optimized under software control to provide continuous and reliable level detection. Even significant amounts of media buildup on a single rod probe will not affect accurate detection of liquid level.

Eclipse Models 705 utilizes many special purpose probes. Eclipse probes include high-temperature (to +750° F / +400° C), high-pressure (to 5000 psig / 345 bar) and ultra-low dielectric (≥ 1.4), and bulk solids with 3000 lb. pulldown capability.

Dual-Compartment Design

Eclipse's innovative dual-compartment enclosures orient separate wiring and electronics compartments on the same plane and angle for convenient wiring, configuration and data display. The wiring compartment at the top of the transmitter isolates the power/signal conductors from the electronics compartment beneath it by way of an environmentally sealed feed-through. The electronics are surge and transient protected and are angled at 45° for convenient setup and data display. All Eclipse models have received Intrinsically Safe, Explosion Proof, and Non-Incendive approvals.

A quick-disconnect probe coupling eases installation and servicing needs on all Eclipse models. Probes may be installed without concern for their orientation to the transmitter head. To orient the transmitter, the user simply selects the desired position, tightens the coupling, then completes the wire terminations.

As an added convenience on all Eclipse models, a level change is not required for configuration and no field calibration is necessary. ■

Model 705 GENERAL SPECIFICATIONS ①

Signal Output		4–20 mA or 4–20 mA with HART (optional)
		3.8 to 20.5 mA useable (meets NAMUR NE 43)
		FOUNDATION fieldbus™
Span	Model 705:	6 inches to 75 feet (15 cm to 23 meters)
Resolution	Analog:	0.01 mA
	Display:	0.1 inch
Loop Resistance		General Purpose/Intrinsically Safe: 620 Ω @ 24 VDC (20.5 mA)
		Explosion Proof
		(with Intrinsically Safe electronics): 500 Ω @ 24 VDC (20.5 mA)
Damping		Adjustable 0–10 seconds
Diagnostic Alarm		Adjustable 3.6 mA, 22 mA, HOLD
User Interface		3-button keypad with optional HART communications or
		3-button keypad with optional FOUNDATION fieldbus™
Display		2-line × 8-character LCD
Power at Terminals		General Purpose/Intrinsically Safe: 11 to 28.6 VDC
		Explosion Proof: 11 to 28.6 VDC
		FOUNDATION fieldbus™: 9–30 VDC (17 mA current draw)
Menu Language		English, German, French or Spanish
Housing Material		Standard: Aluminum A356T6 (< .25% copper) Optional: 316 SS
Net and Gross Weight		7 lbs.
Overall Dimensions		H 8.43" (214 mm) × W 4.38" (111 mm) × D 7.40" (188 mm)

① Consult Eclipse product bulletins for specific hazardous location approvals.

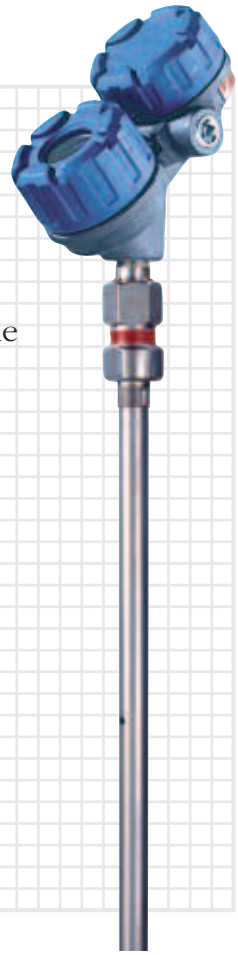
Model 705 PERFORMANCE SPECIFICATIONS

Reference Conditions ②		Reflection from liquid of selected dielectric at +70° F (+20° C)
		with a 72" coaxial probe (with CFD threshold).
Linearity ③	Coaxial/Twin Rod:	< 0.1% of probe length or 0.1 inch (whichever is greater)
	Interface:	< 0.5 inch (13 mm)
	Single Rod Probe:	< 0.3% of probe length or 0.3 inch (whichever is greater)
Measured Error ③	Coax./Twin Rod:	±0.1% probe length or 0.1 inch (whichever is greater)
	Interface:	1" (upper and lower liquid layer)
	Single Rod:	±0.5% probe length or 0.5 inch maximum
Resolution		±0.1 inch
Repeatability		< 0.1 inch (707: ±0.5 inch [13 mm])
Hysteresis		< 0.1 inch (707: ±0.5 inch [13 mm])
Response Time		< 1 second
Warm-up Time		< 5 seconds
Operating Temp. Range		-40° to +175° F (-40° to +80° C)
LCD Temp. Range		-5° to +160° F (-20° to +70° C)
Operating Temp. Effect		Approximately +0.02% of probe length/ ° C
Process Dielectric Effect		< 0.3 inch within selected range
Humidity		0–99%, non-condensing
Electromagnetic Compatibility ④		Meets CE requirements (EN61000-6-2/2001, EN61000-6-4/2001)

② Specifications will degrade with twin rod, HTHP probe and fixed threshold configuration.
③ Top 24 inches of twin rod probe: 1.2 inches
④ Single and twin rod probes must be used in metallic vessel or stillwell to maintain CE requirement

COAXIAL 7XA

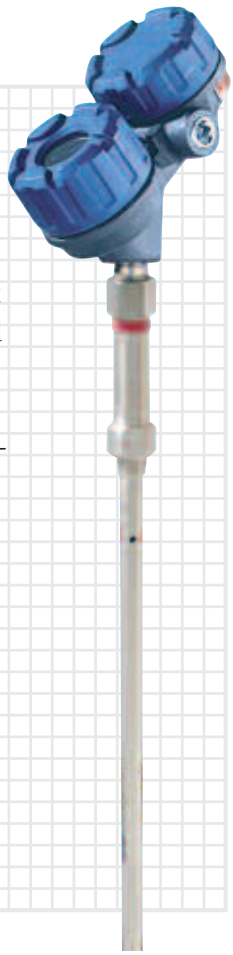
STANDARD COAXIAL



- Coaxial design is the most efficient probe in the Guided Wave Radar line
- Recommended for general purpose applications with clean, low viscosity liquids
- Suitable for media with dielectric as low as 1.4
- FM, CSA and ATEX and safety approvals

COAXIAL 7XR

OVERFILL



- Provides accurate measurement to the 100% full point of a tank or chamber. Level can be accurately and repeatedly measured to the very top of the vessel—No transition zone
- Recommended for clean, low viscosity liquids
- Suitable for media with a dielectric as low as 1.4

Model 7XA Standard Coaxial Probe

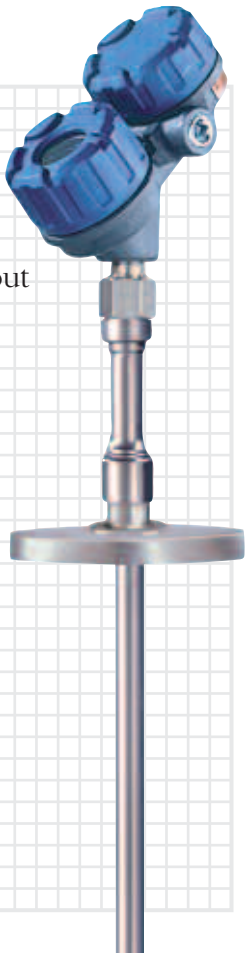
Materials/Wetted Parts		316/316L SS (Hastelloy® C and Monel® optional), TFE spacers, Viton® O-rings
Diameter:	Standard	.3125" (8 mm) ∅ rod
		.875" (22 mm) ∅ tube
	Enlarged	.60" (15 mm) ∅ rod
		1.75" (44 mm) ∅ tube
Process Connection		¾" NPT and 1" BSP (Various ANSI or DIN flanges)
Length		24 to 240 inches (60 to 610 cm)
Transition Zone		Top: 1" ε_r = 1.4; 6" ε_r = 80 Bottom: 6" ε_r = 1.4; 1" ε_r = 80
Max. Process Temp.		+300° F @ 300 psig (+150° C @ 20 bar)
Max. Process Pressure		1000 psig @ +70° F (70 bar @ +20° C)
Max. Viscosity		500 cp
Dielectric Range		≥ 1.4
Mounting Effects		None
Media Coating		Not recommended

Model 7XR Overfill Coaxial Probe

Materials/Wetted Parts		316/316L SS (Hastelloy C and Monel optional), TFE spacers, Viton® GFLT O-rings
Diameter:	Standard	.3125" (8 mm) ∅ rod
		.875" (22 mm) ∅ tube
	Enlarged	.60" (15 mm) ∅ rod
		1.75" (44 mm) ∅ tube
Process Connection		¾" NPT and 1" BSP (Various ANSI or DIN flanges)
Length		24 to 240 inches (60 to 610 cm)
Transition Zone		Top: Not applicable Bottom: 6" ε_r = 1.4; 1" ε_r = 80
Max. Process Temp.		+400° F @ 270 psig (+200° C @ 18 bar)
Max. Process Pressure		1000 psig @ +70° F (70 bar @ +20° C)
Max. Viscosity		500 cp
Dielectric Range		≥ 1.4
Mounting Effects		None
Media Coating		Not recommended

COAXIAL 7XP

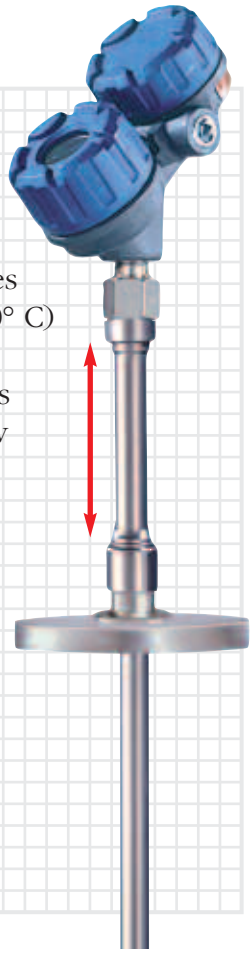
HIGH PRESSURE



- Recommended for clean, high-pressure liquids without high temperatures
- Withstands pressures of up to 5000 psig @ +70° F (345 bar at +20° C)
- High-integrity seal design withstands toxic media and fugitive emissions
- Suitable for full-vacuum applications

COAXIAL 7XD

HTHP



- Withstands pressures to 2000 psig and temperatures to +750° F (133 bar @ +400° C)
- A heat extension dissipates high temperatures to allow integral mounting of the transmitter
- Recommended for clean, high-pressure, high-temperature liquids

Model 7XP High Pressure Coaxial Probe

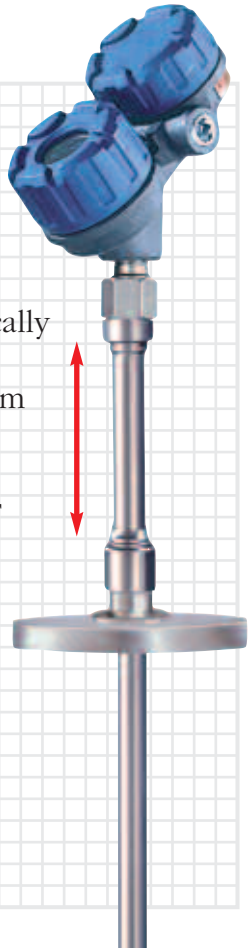
Materials/Wetted Parts		316/316L SS, Inconel® X750, Borosilicate seal, TFE spacers
Diameter:	Standard	.3125" (8 mm) ∅ rod .875" (22 mm) ∅ tube
	Enlarged	.60" (15 mm) ∅ rod 1.75" (44 mm) ∅ tube
Process Connection		¾" NPT and 1" BSP (Various ANSI or DIN flanges)
Length		24 to 240 inches (60 to 610 cm)
Transition Zone		Top: 1" ε_r = 1.7; 6" ε_r = 80 Bottom: 6" ε_r = 1.7; 1" ε_r = 80
Max. Process Temp.		+400° F @ 4250 psig (+200° C @ 290 bar)
Max. Process Pressure		5000 psig @ +70° F (345 bar @ +20° C)
Max. Viscosity		500 cp
Dielectric Range		≥ 1.4
Mounting Effects		None
Media Coating		Not recommended
Hermeticity		Helium leak rate < 10^{-8} cc/sec @ 1 atmosphere

Model 7XD HTHP Coaxial Probe

Materials/Wetted Parts		316/316L SS, Inconel X750, Borosilicate seal, ceramic spacers
Diameter:	Standard	.3125" (8 mm) ∅ rod .875" (22 mm) ∅ tube
	Enlarged	.60" (15 mm) ∅ rod 1.75" (44 mm) ∅ tube
Process Connection		¾" NPT and 1" BSP (ANSI or DIN flanges)
Heat Dissipation		6½", integral heat extension
Length		24 to 240 inches (60 to 610 cm)
Transition Zone		Top: Not applicable Bottom: 6" ε_r = 2.0; 1" ε_r = 80
Max. Process Temp.		+750° F @ 2000 psig (+400° C @ 135 bar)
Max. Process Pressure		5000 psig @ +70° F (345 bar @ +20° C)
Max. Viscosity		500 cp
Dielectric Range		≥ 1.4
Mounting Effects		None
Media Coating		Not recommended
Hermeticity		Helium leak rate <10^{-8} cc/sec @ 1 atmosphere

COAXIAL 7XS

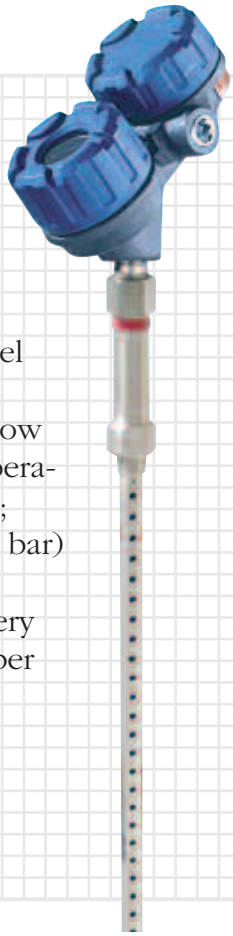
STEAM



- A high-pressure, high-temperature probe specifically designed for trouble-free operation in saturated steam environments
- Rated 2400 psig @ +650° F (165 bar @ +343° C)
- Ideal for boiler, separator, deaerator and feedwater heater applications

COAXIAL 7XT

INTERFACE



- The 7XT probe measures both an upper liquid level and an interface liquid level
- Recommended for clean, low viscosity liquids with temperatures to +400° F (+200° C); pressures to 1000 psig (70 bar)
- Measures reliably to the very top of the vessel or chamber

Model 7XS Coaxial Steam Probe

Materials/Wetted Parts	316/316L SS, PEEK®
	Aegis O-ring, ceramic spacers
Diameter	.3125" (8 mm) ∅ rod
	.875" (22 mm) ∅ tube
Process Connection	¾" NPT and 1" BSP
	(ANSI or DIN flanges)
Heat Dissipation	6½", integral heat extension
Length	24 to 180 inches (60 to 457 cm)
Transition Zone	Top: 0"
	Bottom: 1"
Max. Process Temp.	+650° F @ 2400 psig
	(+343° C @ 165 bar)
Max. Viscosity	500 cp
Dielectric Range	≥ 10
Mounting Effects	None
Media Coating	Not recommended

Model 7XT Interface Coaxial Probe

Materials/Wetted Parts		316/316L SS, TFE spacers,
		Viton® GFLT O-rings
Diameter:	Standard	.3125" (8 mm) ∅ rod
		.875" (22 mm) ∅ tube
	Enlarged	.60" (15 mm) ∅ rod
		1.75" (44 mm) ∅ tube
Process Connection		¾" NPT and 1" BSP
		(Various ANSI or DIN flanges)
Length		24 to 144 inches (60 to 366 cm)
Transition Zone		Top: none
		Bottom: 6" $\varepsilon_r = 1.4$; 1" $\varepsilon_r = 80$
Max. Process Temp.		+400° F @ 270 psig
		(+200° C @ 18 bar)
Max. Process Pressure		1000 psig @ +70° F
		(70 bar @ +20° C)
Max. Viscosity		500 cp
Dielectric Range		1.4–5 (upper layer)
		15–100 (lower layer)
Mounting Effects		None
Media Coating		Not recommended

TWIN ROD 7XB

STANDARD TWIN ROD

- Recommended for higher viscosity applications of up to 1500 cp
- Build-up of thick or dirty media on the probe is well managed by the twin rod design
- Available in threaded or flanged connections
- For dielectric ≥ 1.9

TWIN FLEXIBLE 7X7

EXTENDED RANGE

- Recommended for extended tank depths of up to 60 feet (18 meters)
- Twin cable design effectively measures dirty, viscous or low-dielectric media
- Can be used where insufficient tank headroom or overhead obstructions might exclude the use of a rigid probe

Model 7XB Standard Twin Rod Probe

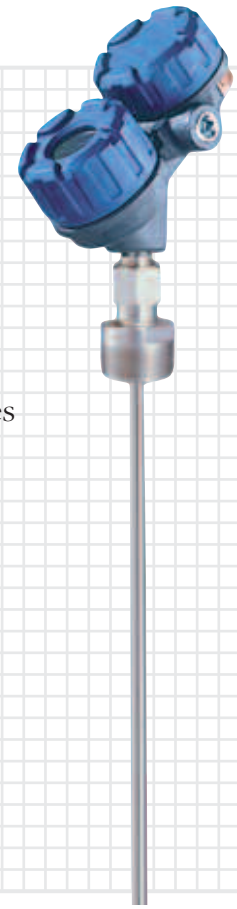
Materials/Wetted Parts	316/316L SS (Hastelloy C and Monel optional), TFE spacers, Viton® GFLT O-rings
Diameter	Two .5" (13 mm) ∅ rods .875" (22 mm) C_L to C_L
Process Connection	2" NPT (Various ANSI or DIN flanges)
Length	24 to 240 inches (60 to 610 cm)
Transition Zone	Top: 1" $\varepsilon_r \geq 2.0$ Bottom: 6" $\varepsilon_r = 2.0$; 1" $\varepsilon_r = 80$
Max. Process Temp.	+400° F @ 200 psig (+200° C @ 13 bar)
Max. Process Pressure	1000 psig @ +70° F (70 bar @ +20° C)
Max. Viscosity	1500 cp
Dielectric Range	≥ 1.9
Mounting Effects	Active Rod > 1" from any surface or obstruction
Media Coating	Film: 3% max. error of coated length with conductive media Bridging: Not recommended

Model 7X7 Extended Range Twin Rod Flexible Probe

Materials/Wetted Parts	316 SS cables FEP (Fluorinated Ethylene Polypropylene) Teflon® coated
Diameter	Two 0.25" cables (with insulation) .875" (22 mm) C_L to C_L
Process Connection	2" NPT (Various ANSI or DIN flanges)
Length	6 to 75 feet (2 to 22.5 meters)
Transition Zone	Top: 12" Bottom: 12"
Max. Process Temp.	+400° F @ 200 psig (+200° C @ 13 bar)
Max. Process Pressure	1000 psig @ +70° F (70 bar @ +20° C)
Max. Viscosity	1500 cp
Dielectric Range	≥ 1.9
Mounting Effects	Active Rod > 1" from any surface or obstruction
Media Coating	Film: 3% max. error of coated length with conductive media Bridging: Not recommended

SINGLE ROD 7XF

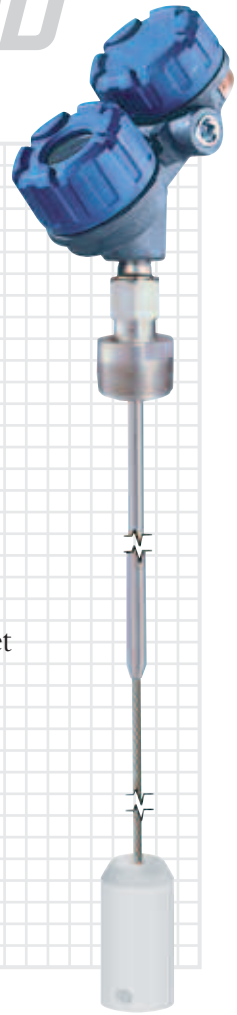
RIGID SINGLE ROD



- Ideal for water based media such as paints or slurries with a dielectric greater than 10
- Bare probe design tolerates significant probe coating and buildup
- Designed for use in applications that include plant tanks, sumps, wells, pits, and open channels

SINGLE ROD 7X1

FLEXIBLE



- Unparalleled performance in applications with severe coating and buildup
- Recommended for general purpose applications in virtually all water based liquid media
- Probe lengths of up to 60 feet (18 meters)

Model 7XF Rigid Single Rod Probe

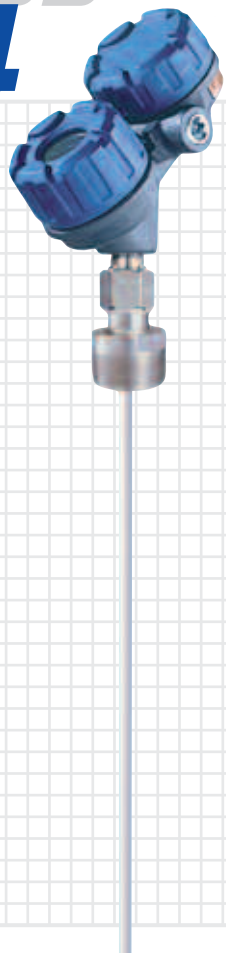
Materials/Wetted Parts	316/316L SS (Hastelloy C and Monel optional), TFE spacers, Viton® GFLT O-rings
Diameter	.5" (13 mm) ∅ rod
Process Connection	2" NPT or larger (Various ANSI or DIN flanges)
Length	24 to 240 inches (60 to 610 cm)
Transition Zone	Top: Not applicable Bottom: 1" $\varepsilon_r > 10$
Deadband	Top: 4.8 to 36" (12 to 91 cm) probe length dependent (adjustable)
Max. Process Temp.	+300° F @ 400 psig (+150° C @ 27 bar)
Max. Process Pressure	1000 psig @ +70° F (70 bar @ +20° C)
Max. Viscosity	Not applicable
Dielectric Range	≥ 1.9
Media Coating	Maximum error 10% of coated length; % error related to dielectric of media, thickness of coating, and coated probe length above level

Model 7X1 Flexible Single Rod Probe

Materials/Wetted Parts	316 SS, TFE spacers, Viton® GFLT O-rings
Diameter	.25" (6 mm) ∅ cable
Process Connection	2" NPT or larger (Various ANSI or DIN flanges)
Length	6 to 75 feet (2 to 22.5 meters)
Transition Zone	Top: Not applicable Bottom: 12"
Deadband	Top: 4.8 to 36" (12 to 91 cm) probe length dependent (adjustable)
Max. Process Temp.	+300° F @ 400 psig (+150° C @ 27 bar)
Max. Process Pressure	1000 psig @ +70° F (70 bar @ +20° C)
Max. Viscosity	Not applicable
Dielectric Range	≥ 1.9
Media Coating	Maximum error 10% of coated length; % error related to dielectric of media, thickness of coating, and coated probe length above level

SINGLE ROD 7XF-4

NON-STICK



- PFA "self-lubricating" Teflon® insulation covers the 316 SS probe
- Recommended for high-viscosity liquids such as slurries, latex paints and adhesives
- Suitable for a broad range of water based media applications

SINGLE ROD 7XF-E

SANITARY

- Engineered for the food & beverage, pharmaceutical, biotech and semiconductor industries
- Probe and Tri-Clover® process connection are free of crevices and structural intricacies where bacteria may harbor and grow
- All wetted surfaces are polished to a 20 R_a rating
- 3-A Authorized for sanitary use

Model 7XF-4 Non-Stick Single Rod Probe

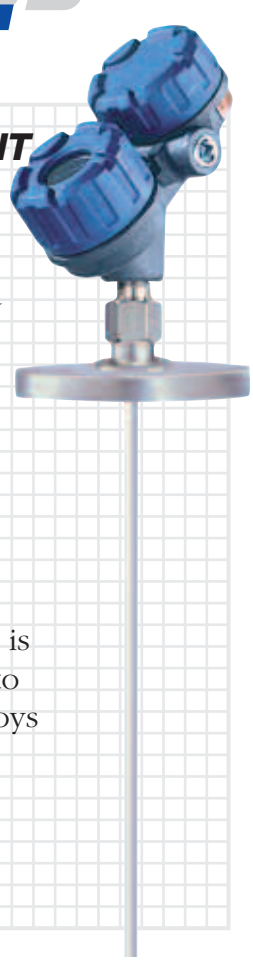
Materials/Wetted Parts	Teflon® coated 316/316L SS (Hastelloy C and Monel optional), TFE spacers, Viton® GFLT O-rings
Diameter	.5" (13 mm) ∅ rod
Process Connection	2" NPT or larger (Various ANSI or DIN flanges)
Length	24 to 240 inches (60 to 610 cm)
Transition Zone	Top: Not applicable Bottom: 1" $\varepsilon_r > 10$
Deadband	Top: 4.8 to 36" (12 to 91 cm) probe length dependent (adjustable)
Max. Process Temp.	+300° F @ 400 psig (+150° C @ 27 bar)
Max. Process Pressure	1000 psig @ +70° F (70 bar @ +20° C)
Max. Viscosity	Not applicable
Dielectric Range	≥ 1.9
Media Coating	Maximum error 10% of coated length; error related to media dielectric, thickness of coating, coated probe length above level

Model 7XF-E Sanitary Single Rod Probe

Materials/Wetted Parts	316/316L SS with a 20 R_a surface finish(Hastelloy C, Monel optional), TFE spacers, Viton® O-rings
Diameter	.5" (13 mm) ∅ rod
Process Connection	¾", 2", 3" and 4" Tri-Clover style, 16 AMP sanitary fitting
Length	24 to 240 inches (60 to 610 cm)
Transition Zone	Top: Not applicable Bottom: 1" $\varepsilon_r > 10$
Deadband	Top: 4.8 to 36" (12 to 91 cm) probe length dependent (adjustable)
Max. Process Temp.	+300° F @ 75 psig (+150° C @ 5 bar)
Max. Process Pressure	75 psig @ +70° F (5 bar @ +20° C) Not suitable for vacuum application
Max. Viscosity	Not applicable
Dielectric Range	≥ 10
Media Coating	Maximum error 10% of coated length; % error related to dielectric of media, thickness of coating, and coated probe length above level

SINGLE ROD 7XF-F

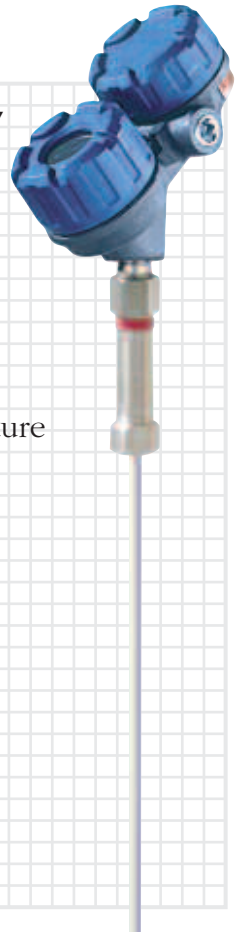
CORROSION RESISTANT



- Measures acids, caustics and other aggressive media cost-effectively
- Faced-flange design creates a vapor barrier that protects the metal process connection and all wetted parts
- PFA Teflon® covered probe is a cost-effective alternative to expensive acid-resistant alloys

SINGLE ROD 7XJ

HIGH TEMPERATURE / HIGH PRESSURE



- High temperature, high pressure bare probe design tolerates significant probe coating and buildup
- Designed for high temperature applications that are too viscous for a coaxial probe

Model 7XF-F Corrosion Resistant Single Rod Probe

Materials/Wetted Parts	PFA Teflon® coated 316/316L SS
	(Hastelloy C and Monel optional),
	TFE spacers, Viton® O-rings
Diameter	.5" (13 mm) ∅ rod
Process Connection	2" NPT or larger
	(Various ANSI or DIN flanges)
Length	24 to 240 inches (60 to 610 cm)
Transition Zone	Top: Not applicable
	Bottom: 1" $\varepsilon_r > 10$
Deadband	Top: 4.8 to 36" (12 to 91 cm) probe
	length dependent (adjustable)
Max. Process Temp.	+300° F @ 400 psig
	(+150° C @ 27 bar)
Max. Process Pressure	1000 psig @ +70° F
	(70 bar @ +20° C)
Max. Viscosity	Not applicable
Dielectric Range	≥ 1.9
Media Coating	Maximum error 10% of coated
	length; % error related to dielectric
	of media, thickness of coating, and
	coated probe length above level

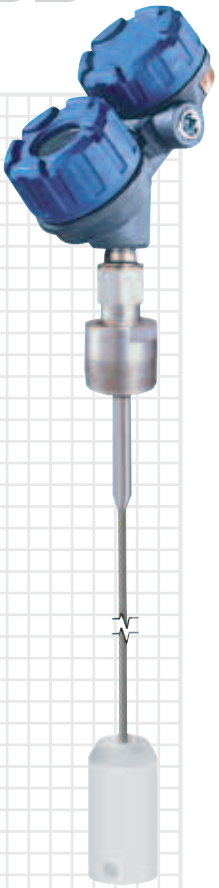
Model 7XJ High Temperature/High Pressure Single Rod Probe

Materials/Wetted Parts	316/316L SS
	PEEK®
	Aegis O-rings
Diameter	.5" (13 mm) ∅ rod
Process Connection	2" NPT or larger
	(Various ANSI or DIN flanges)
Length	24 to 240 inches (60 to 610 cm)
Transition Zone	Top: Not applicable
	Bottom: 1" $\varepsilon_r > 10$
Deadband	Top: 4.8 to 36" (12 to 91 cm) probe
	length dependent (adjustable)
Max. Process Temp.	+600° F @ 2500 psig
	(+315° C @ 172 bar)
Max. Process Pressure	3000 psig @ +70° F
	(207 bar @ +20° C)
Max. Viscosity	Not applicable
Dielectric Range	≥ 1.9
Media Coating	Maximum error 10% of coated
	length; % error related to dielectric
	of media, thickness of coating, and
	coated probe length above level

BULK SOLIDS

7X2

FLEXIBLE SINGLE ROD



- Recommended for bulk solids applications for tank heights of up to 75 feet (22.9 meters)
- Single cable design effectively measures grains, powders, and other low-dielectric solids down to a dielectric constant of 4
- Capable of withstanding a 3000 lb. pulldown force

BULK SOLIDS

7X5

FLEXIBLE TWIN ROD

- Recommended for bulk solids applications for tank heights of up to 75 feet (22.9 meters)
- Twin cable design effectively measures grains, powders, and other low-dielectric solids down to a dielectric constant of 1.9
- Capable of withstanding a 3000 lb. pulldown force

Model 7X2 Flexible Single Rod Bulk Solids Probe

Materials/Wetted Parts	316L SS, TFE, Viton® GFLT
Diameter	∅ 0.25" (6 mm) cable
Process Connection	2" NPT, 2" BSP
Length	6 to 25 feet (2 to 22.5 meters)
Transition Zone	Top: Not applicable
	Bottom: 12"
Max. Process Temp.	+150° F (+66° C)
Max. Process Pressure	Ambient
Max. Viscosity	Not Applicable
Dielectric Range	4 to 100
Media Coating	Maximum error 10% of coated
	length; % error related to dielectric
	of media, thickness of coating, and
	coated probe length above level

Model 7X5 Flexible Twin Rod Bulk Solids Probe

Materials/Wetted Parts	316L SS, TFE, Viton® GFLT
Diameter	Two: ∅ 0.25" (6 mm) cables
	.875" (22 mm) C_L to C_L
Process Connection	2" NPT, 2" BSP
Length	6 to 75 feet (2 to 22.5 meters)
Transition Zone	Top: 12"
	Bottom: 12"
Max. Process Temp.	+150° F (+66° C)
Max. Process Pressure	50 psig (3.4 bar)
Max. Viscosity	1500 cp
Dielectric Range	1.9 to 100
Mounting Effects	Active Rod > 1" from any
	surface or obstruction
Media Coating	Film: 3% max. error of coated
	length with conductive media
	Bridging: Not recommended

Magnetrol®

Worldwide Level and Flow Solutions℠

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