

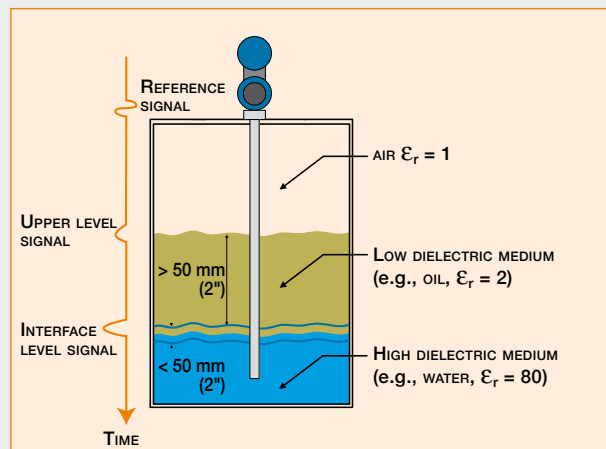
GUIDED WAVE RADAR



Guided Wave Radar is based upon the principle of Time Domain Reflectometry (TDR). TDR utilizes pulses of electromagnetic energy, which are transmitted down a probe. When a pulse reaches a liquid surface that has a higher dielectric than the air/vapor in which it is traveling, the pulse is reflected.

An ultra high-speed timing circuit precisely measures the transit time and provides an accurate measurement of the liquid level or the liquid-liquid interface.

Many of these devices are overfill safe due to the fact that the reference signal is generated above the process seal.



radar.magnetrol.com



ECLIPSE® 706**Guided wave radar
level transmitter****DESCRIPTION**

The Eclipse® Model 706 is an advanced two-wire, loop-powered, 24 VDC guided wave radar transmitter with a superior signal strength to take on a broad range of challenging high pressure/high temperature applications. An extensive line of dedicated coaxial, caged coaxial, single and twin rod probes delivers accurate and reliable level control.

The innovative dual compartment enclosure positions wiring and electronics in the same plane, and angled to maximize ease of wiring, configuration, set-up and data display.

FEATURES

"Real Level" measurement not affected by media variables (e.g., dielectrics, pressure, density, pH, viscosity)

Easy bench configuration — no need for level movement

Two-wire, loop-powered intrinsically safe level transmitter

360° rotatable housing can be dismantled without depressurizing the vessel via "quick connect/disconnect" probe coupling

Probe designs: up to +450 °C / 430 bar (+850 °F / 6250 psi)

Saturated steam applications up to 155 bar @ +400 °C (2250 psi @ +750 °F)

Cryogenic applications down to -196 °C (-320 °F)

Integral or remote mount electronics

SIL 2 / SIL 3 certified

Unique overfill feature

Higher pulse amplitude and superior signal-to-noise ratio (SNR)

4-button user interface and graphical LCD display provide enhanced depth of data, indicating on-screen waveforms and troubleshooting tips.

Can be programmed to automatically capture waveform data by time or by event occurrence

Contains proactive buildup diagnostics

Potted electronics

APPLICATIONS

MEDIA: Liquids or slurries; hydrocarbons to water-based media (dielectric 1.4 – 100) and solids (dielectric 1.9 – 100). Open channel flow flumes and weirs.

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

CONDITIONS: All level measurement and control applications including process conditions exhibiting visible vapors, foam, surface agitation, bubbling or boiling, high fill/empty rates, low level and varying dielectric media or specific gravity.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•	•	•				
CCOE	•	•						
CSA					•	•	•	
FM					•	•	•	
EAC (GOST)	•	•	•	•				Metrology
IEC	•	•	•	•				
Inmetro	•	•	•	•				
SIL	SIL 2 / SIL 3 certified							
Marine	Lloyd's Register of Shipping (LRS)							
TÜV/DIBt	WHG § 63, overfill prevention							
Other approvals are available; consult factory for more details.								

ECLIPSE® 706 PROBE SELECTION

Coaxial GWR probes - liquids

Application/Type	7yT	7yP	7yD	7yS
Function	Level - Interface Standard temp. probe	Level - Interface High pressure probe	Level - Interface HTHP probe	Saturated steam Steam probe
Overfill safe	Yes	Yes	Yes	No
Temperature				
-40 / +65 °C (-40 / +150 °F)	Yes	Yes	Yes	Yes
-40 / +200 °C (-40 / +400 °F)	Yes	Yes	Yes	Yes
-196 / +200 °C (-320 / +400 °F)	No	Yes	Yes	No
-196 / +450 °C (-320 / +850 °F)	No	No	Yes	No
-50 / +400 °C (-58 / +750 °F)	No	No	Yes	Yes
saturated steam	No ⁽²⁾	No	No	Yes
Maximum pressure				
70 bar (1000 psi)	Yes	Yes	Yes	Yes
155 bar (2248 psi)	No	Yes	Yes	Yes
431 bar (6250 psi)	No	Yes	Yes	No
Dielectrics ⁽¹⁾				
ϵ_r 1.4	Yes	Yes	Yes	No
$\epsilon_r \geq 1.7$	Yes	Yes	Yes	No
ϵ_r 4	Yes	Yes	Yes	No
ϵ_r 10	Yes	Yes	Yes	Yes
Available probe length				
Standard	0.3 to 6.1 m (12 to 240")	0.3 to 6.1 m (12 to 240")	0.3 to 6.1 m (12 to 240")	0.6 to 6.1 m (24 to 240")
Enlarged	9 m (30')	9 m (30')	9 m (30')	N/A
Material of construction				
316/316L (1.4401/1.4404)	Yes	Yes	Yes	Yes
Hastelloy® C (2.4819)	Yes	Yes	Yes	Yes
Monel® (2.4360)	Yes	Yes	Yes	No
PFA insulated 316/316L rod	No	No	No	No
Process seal type	Teflon® TFE with Viton® o-rings ^{(3) (5)}	Hermetic glass ceramic, Inconel	Hermetic glass ceramic, Inconel	Hermetic glass ceramic, PEEK HT, Inconel
Vacuum service	Negative pressure, but no hermetic seal	Full vacuum	Full vacuum	Full vacuum
Viscosity cP (mPa.s)	500/2000	500/2000	500/2000	500
Liquid	small enlarged	small enlarged	small enlarged	
Clean	Yes Yes	Yes Yes	Yes Yes	Yes
Film coating	Yes Yes	Yes Yes	Yes Yes	Yes
Moderate build-up	No Yes	No Yes	No Yes	No
Strong build-up	No No	No No	No No	No
Min req. process conn.				
Small	¾"	¾"	2"	2"
Enlarged	3" ⁽⁴⁾	3" ⁽⁴⁾	3" ⁽⁴⁾	N/A

⁽¹⁾ 1.2 min dielectric when end of probe analysis can be enabled.

⁽²⁾ Acceptable up to 150 °C (300 °F) max with Aegis o-rings

⁽³⁾ Other o-ring materials available (Kalrez®, Aegis, etc.)

⁽⁴⁾ Outer probe $\varnothing$ 45 mm (1.75") (SST) or 49 mm (1.90") (exotic material) or 64 mm (2.50") (segmented)

⁽⁵⁾ Special HF acid probe available upon request.

ECLIPSE® 706 PROBE SELECTION

Single rod rigid GWR probes - liquids

Application/Type	7yF	7yM	7yN
Function	Level Standard temp. probe	Level High pressure probe	Level HTHP probe
Overfill safe	No ⁽²⁾	No ⁽²⁾	No ⁽²⁾
Temperature			
-40 / +65 °C (-40 / +150 °F)	Yes	Yes	Yes
-40 / +200 °C (-40 / +400 °F)	Yes	Yes	Yes
-196 / +200 °C (-320 / +400 °F)	No	Yes	Yes
-196 / +450 °C (-320 / +850 °F)	No	No	Yes
-50 / +300 °C (-58 / +575 °F)	No	No	Yes
saturated steam	No	No	No
Maximum pressure			
70 bar (1000 psi)	Yes	Yes	Yes
88 bar (1275 psi)	No	Yes	Yes
431 bar (6250 psi)	No	Yes	Yes
Dielectrics ⁽¹⁾			
ϵ_r 1.4	No	No	No
ϵ_r 1.7	Yes	Yes	Yes
ϵ_r 4	Yes	Yes	Yes
ϵ_r 10	Yes	Yes	Yes
Available probe length	0.6 to 7.32 m (24 to 288")	0.6 to 7.32 m (24 to 288")	0.6 to 7.32 m (24 to 288")
Material of construction			
316/316L (1.4401/1.4404)	Yes	Yes	Yes
Hastelloy® C (2.4819)	Yes	Yes	Yes
Monel® (2.4360)	Yes	Yes	Yes
PFA insulated 316/316L rod	Yes	No	No
Process seal type	Teflon® TFE with Viton® o-rings ⁽³⁾	Hermetic glass ceramic, Inconel	Hermetic glass ceramic, Inconel
Vacuum service	Negative pressure, but without hermetic seal	Full vacuum	Full vacuum
Viscosity cP (mPa.s)	10000	10000	10000
Liquid			
Clean	Yes	Yes	Yes
Film coating	Yes	Yes	Yes
Moderate buildup	Yes	Yes	Yes
Strong buildup	Yes	Yes	Yes
Min req. process conn.	2" ⁽⁴⁾	2" ⁽⁴⁾	2"

⁽¹⁾ 1.2 minimum dielectric when end-of-probe analysis can be enabled.

⁽²⁾ Overfill capability can be achieved via software.

⁽³⁾ Other o-ring materials available (Kalrez®, Aegis, etc.).

⁽⁴⁾ 1" threaded connection available.

ECLIPSE® 706 PROBE SELECTION

Flexible GWR probes - liquids

Application/Type	7y1	7y3	7y6	7y7
Function	Level Single flexible Standard temp. probe	Level Single flexible HP probe	Level - Interface Single flexible HTHP probe	Level - Interface Twin flexible Standard temp. probe
Overfill safe	No ⁽²⁾	No ⁽²⁾	No ⁽²⁾	No ⁽²⁾
Temperature				
-40 / +65 °C (-40 / +150 °F)	Yes	Yes	Yes	Yes
-40 / +200 °C (-40 / +400 °F)	Yes	Yes	Yes	Yes
-196 / +200 °C (-320 / +400 °F)	No	Yes	Yes	No
-196 / +450 °C (-320 / +850 °F)	No	Yes	Yes	No
-50 / +300 °C (-58 / +575 °F)	No	Yes	Yes	No
saturated steam	No	No	No	No
Maximum pressure				
70 bar (1000 psi)	Yes	Yes	Yes	Yes
88 bar (1275 psi)	No	Yes	Yes	No
431 bar (6250 psi)	No	Yes	Yes	No
Dielectrics ⁽¹⁾				
ϵ_r 1.4	No	No	Yes ⁽³⁾	No
ϵ_r 1.7	Yes ⁽⁴⁾	Yes ⁽⁴⁾	Yes	Yes ⁽⁴⁾
ϵ_r 4	Yes	Yes	Yes	Yes
ϵ_r 10	Yes	Yes	Yes	Yes
Available probe length	1 to 30 m (3 to 100')	1 to 30 m (3 to 100')	1 to 30 m (3 to 100')	1 to 30 m (3 to 100')
Material of construction				
316/316L (1.4401/1.4404)	Yes	Yes	Yes	Yes
Hastelloy® C (2.4819)	No	No	No	No
Monel® (2.4360)	No	No	No	No
PFA insulated 316/316L cable	Yes	No	No	No
Process seal type	Teflon® TFE with Viton® o-rings ⁽⁵⁾	Hermetic glass ceramic	Hermetic glass ceramic	Teflon® TFE with Viton® o-rings ⁽⁵⁾
Vacuum service	Negative pressure, but without hermetic seal	Full vacuum	Full vacuum	Negative pressure, but without hermetic seal
Viscosity cP (mPa.s)	10000	10000	10000	1500
Liquid				
Clean	Yes	Yes	Yes	Yes
Film coating	Yes	Yes	Yes	Yes
Moderate buildup	Yes	Yes	Yes	No
Strong buildup	Yes	Yes	Yes	No
Min req. process conn.	2"	2"	2"	2"

⁽¹⁾ 1.2 minimum dielectric when end-of-probe analysis can be enabled.

⁽²⁾ Overfill capability can be achieved via software.

⁽³⁾ When installed in the proper chamber/cage/stilling well.

⁽⁴⁾ May increase with probe length >10 m (30').

⁽⁵⁾ Other o-ring materials available (Kalrez®, Aegis, etc.).

ECLIPSE® 706 PROBE SELECTION

Flexible GWR probes - solids

Application/Type	7y2	7y5
Function	Level Single flexible Standard temp	Level Twin flexible Standard temp
Overfill safe	No ⁽²⁾	No ⁽²⁾
Temperature		
-40 / +65 °C (-40 / +150 °F)	Yes	Yes
-40 / +200 °C (-40 / +400 °F)	No	No
-196 / +200 °C (-320 / +400 °F)	No	No
-196 / +450 °C (-320 / +850 °F)	No	No
-50 / +300 °C (-58 / +575 °F)	No	No
saturated steam	No	No
Maximum pressure	Atmos	Atmos
Dielectrics ⁽¹⁾		
ϵ_r 1.4	No	No
ϵ_r 1.7	No	Yes ⁽³⁾
ϵ_r 4	Yes	Yes
ϵ_r 10	Yes	Yes
Available probe length	1 to 30 m (3 to 100')	1 to 30 m (3 to 100')
Material of construction		
316/316L (1.4401/1.4404)	Yes	Yes
Hastelloy® C (2.4819)	No	No
Monel® (2.4360)	No	No
PFA insulated 316/316L rod	No	No
Process seal type	Teflon® / PEI ⁽⁴⁾	Teflon® / PEI ⁽⁴⁾
Vacuum service	Negative pressure, but without hermetic seal	Negative pressure, but without hermetic seal
Viscosity cP (mPa.s)	10000	1500
Liquid		
Clean	Yes	Yes
Film coating	Yes	Yes
Moderate buildup	Yes	No
Strong buildup	Yes	No
Min req. process conn.	2" min	2" min

⁽¹⁾ 1.2 minimum dielectric when end-of-probe analysis can be enabled.

⁽²⁾ Overfill capability can be achieved via software.

⁽³⁾ May increase with probe length >10 m (30').

⁽⁴⁾ PEI = Ultem™ 1000.