OUR PRODUCTS

The majority of the devices manufactured by Magnetrol® International are designed and tailor-made to the specifications and requests of our customers. Over the years a great expertise has been gained in different fields.

Below is a list, not limitative and depending on the device type, of metals with which we have gained experience:

- 321 stainless steel
- 304/304L stainless steel
- 316/316L stainless steel
- (Low temperature) Carbon steel and carbon steel
- Chrome Molybdenum steel
- (Super) Duplex stainless steel
- Monel
- Hastelloy
- Incolloy and Inconel types
- ….

Working with these various metals has resulted in over 130 in-house welding procedures being established.

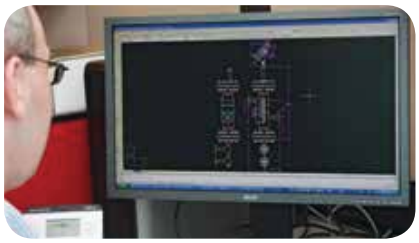
A similar experience has been gained with respect to possible process connections:

- ANSI flanges
- EN (DIN) flanges
- Tri-clamp hygienic connections
- Proprietary flanges enabling compatibility with existing connections
- Threaded connections such as NPT and BSP
- …

Although our standard colours are blue (up to 240 °C (464 °F)) and a grey type (temperatures higher than 240 °C (464 °F)) we can supply nearly any colour upon customer request.

So, if you have any specific request please do not hesitate to contact us.

TECHNOLOGY	PRODUCT FAMILY	PAGE	Detection liquid level	Detection interface	Detection flow	Detection solids	Density control	Measurement liquid level	Measurement solids level	Measurement interface	Measurement Flow
Guided Wave Radar	Eclipse® – Horizon™	6						•	•	•	•
Pulse Burst Radar	Pulsar® - Model R82	20						•			•
Ultrasonic Contact	Echotel® 9XX	24	•								
Ultrasonic Non-Contact	Echotel® 3X5	30						•			•
Thermal Dispersion	Thermatel®	34	•	•	•						•
Vibrating Rod	Solitel®	40				•					
RF Capacitance	Kotron®	42						•	•	•	
Magnetostrictive	Jupiter®	46						•		•	
Magnetic Level Indicator	Aurora®/Vector™/Atlas™/Gemini™	48						•		•	
Displacer Transmitter	Modulevel®	54					•	•		•	
Buoyancy	Mechanicals	58	•	•							
Mechanical Flow	Mechanicals	66			•						



Magnetrol® level and flow controls use state-of-the-art technology and are produced under strict quality procedures of ISO 9001 - PED 2014/68/EU. MAGNETROL quality is achieved by using fully traceable materials, ASME IX qualified welders and the capability to work with standard as well as exotic materials. MAGNETROL builds standard and custom equipment for all industries. The integration of SIL (Safety Integrity Level) philosophy into the basic concept design results in reliable controls that self-test for proper operation and report any possible malfunctions. MAGNETROL is devoted to optimizing the design of level controls for minimal cost of ownership by durability.

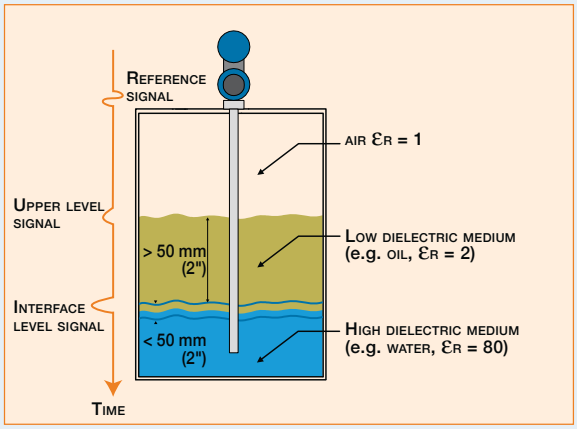
Full details on MAGNETROL products can be found on our website www.magnetrol.com and in our respective sales bulletins.

GUIDED WAVE RADAR

Guided Wave Radar is based upon the principle of Time Domain Reflectometry (TDR). TDR utilises 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/vapour 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.



eclipse.magnetrol.com

HART COMMUNICATION PROTOCOL

ECLIPSE® 706
Guided wave radar level transmitter

DESCRIPTION

Eclipse® Model 706 is an advanced two wire loop powered, 24 V DC 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 maximise ease of wiring, configuration, set-up and data display.

FEATURES

- "Real Level", measurement not affected by media variables eg. dielectrics, pressure, density, pH, viscosity, ...
- Easy bench configuration - no need for level movement.
- 2-wire loop powered intrinsically safe level transmitter.
- 360° rotatable housing can be dismantled without depressurising 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 @ +345 °C (2250 psi @ +650 °F).
- Cryogenic applications down to -196 °C (-320 °F).
- Integral or remote mount electronics.
- SIL 2 / SIL 3 capable 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 pro-active build-up 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 vapours, 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 (1oo1)							
Marine	Lloyd's Register of Shipping (LRS)							
TÜV	WHG § 63, overfill prevention							

Other approvals are available, consult factory for more details

ECLIPSE® 706
PROBE SELECTION
Coaxial GWR probes - liquides

Application/Type	7yT	7yP	7yD	7yS
Function	Level - Interface Standard temp	Level - Interface High pressure	Level - Interface HTHP	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 / +345 °C (-58 / +650 °F)	No	No	Yes	Yes
saturated steam	No [2]	No	No	Yes
Max pressure				
70 bar (1000 psi)	Yes	Yes	Yes	Yes
88 bar (1275 psi)	No	Yes	Yes	Yes
431 bar (6250 psi)	No	Yes	Yes	No
Dielectrics [1]				
≥ 1.4	Yes	Yes	Yes	No
≥ 1.7	Yes	Yes	Yes	No
≥ 4	Yes	Yes	Yes	No
≥ 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	3/4"	3/4"	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,...).
[4] Outer probe ø 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
Caged GWR probes - liquides

Application/Type	7yG	7yL	7yJ
Function	Level - Interface Standard temp	Level - Interface High pressure	Level - Interface HTHP
Overfill safe	Yes	Yes	Yes
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
Max pressure			
70 bar (1000 psi)	Yes	Yes	Yes
88 bar (1275 psi)	No	Yes	Yes
431 bar (6250 psi)	No	Yes	Yes
Dielectrics [1]			
≥ 1.4	Yes [2]	Yes [2]	Yes [2]
≥ 1.7	Yes	Yes	Yes
≥ 4	Yes	Yes	Yes
≥ 10	Yes	Yes	Yes
Available probe length	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")
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	No	No	No
Process seal type	Teflon® TFE with Viton® o-rings [3] [4]	Hermetic glass ceramic, Inconel	Hermetic glass ceramic, Inconel
Vacuum service	Negative pressure, but no hermetic seal	Full vacuum	Full vacuum
Viscosity cP (mPa.s)	10000	10000	10000
Liquid			
Clean	Yes	Yes	Yes
Film coating	Yes	Yes	Yes
Moderate build-up	Yes	Yes	Yes
Strong build-up	Yes	Yes	Yes
Min req. process conn.	2"	2"	2"

[1] 1.2 min dielectric when end of probe analysis can be enabled.
[2] When installed in the proper chamber/cage/stilling well.
[3] Other o-ring materials available (Kalrez®, Aegis,...).
[4] Special HF acid probe available upon request.

ECLIPSE® 706
PROBE SELECTION
Single rod rigid GWR probes - liquides

Application/Type	7yF	7yM	7yN
Function	Level Standard temp	Level High pressure	Level HTHP
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
Max pressure			
70 bar (1000 psi)	Yes	Yes	Yes
88 bar (1275 psi)	No	Yes	Yes
431 bar (6250 psi)	No	Yes	Yes
Dielectrics [1]			
≥ 1.4	No	No	No
≥ 1.7	Yes	Yes	Yes
≥ 4	Yes	Yes	Yes
≥ 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 no hermetic seal	Full vacuum	Full vacuum
Viscosity cP (mPa.s)	10000	10000	10000
Liquid			
Clean	Yes	Yes	Yes
Film coating	Yes	Yes	Yes
Moderate build-up	Yes	Yes	Yes
Strong build-up	Yes	Yes	Yes
Min req. process conn.	2" [4]	2" [4]	2"

[1] 1.2 min 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,...).
[4] 1" threaded connection available.

ECLIPSE® 706
PROBE SELECTION
Flexible GWR probes - liquides

Application/Type	7y1	7y3	7y6	7y7
Function	Level Single flexible Standard temp	Level Single flexible HP	Level - Interface Single flexible HTHP	Level - Interface Twin flexible Standard temp
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
Max 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]				
≥ 1.4	No	No	Yes [3]	No
≥ 1.7	Yes [4]	Yes [4]	Yes	Yes [4]
≥ 4	Yes	Yes	Yes	Yes
≥ 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 no hermetic seal	Full vacuum	Full vacuum	Negative pressure, but no hermetic seal
Viscosity cP (mPa.s)	10000	10000	10000	1500
Liquid				
Clean	Yes	Yes	Yes	Yes
Film coating	Yes	Yes	Yes	Yes
Moderate build-up	Yes	Yes	Yes	No
Strong build-up	Yes	Yes	Yes	No
Min req. process conn.	2"	2"	2"	2"

[1] 1.2 min 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,...).

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
Max pressure	Atmos	Atmos
Dielectrics [1]		
≥ 1.4	No	No
≥ 1.7	No	Yes [3]
≥ 4	Yes	Yes
≥ 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 no hermetic seal	Negative pressure, but no hermetic seal
Viscosity cP (mPa.s)	10000	1500
Liquid		
Clean	Yes	Yes
Film coating	Yes	Yes
Moderate build-up	Yes	No
Strong build-up	Yes	No
Min req. process conn.	2" min	2" min

[1] 1.2 min 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.

ECLIPSE® 705
Guided wave radar level transmitter

DESCRIPTION

Eclipse® 705 Transmitter is a loop-powered, 24 V DC liquid-level transmitter based on the revolutionary Guided Wave Radar (GWR) technology. Encompassing a number of significant engineering accomplishments, this leading edge level transmitter is designed to provide measurement performance well beyond that of many traditional technologies, as well as "through-air" radars.

The innovative enclosure is a first in the industry, orienting dual compartments (wiring and electronics) in the same plane, and angled to maximise ease of wiring, configuration, set-up and data display.

This single transmitter can be used with all probe types and offers enhanced reliability, for use in SIL2 / SIL 3 loops.

FEATURES

- "Real Level", measurement not affected by media variables eg. dielectrics, pressure, density, pH, viscosity, ...
- Easy bench configuration - no need for level simulation.
- 2-wire loop powered intrinsically safe level transmitter.
- 20-point custom strapping table for volumetric output.
- 360° rotatable housing can be dismantled without depressurising the vessel via "Quick connect/disconnect" probe coupling.
- 2-line x 8-characters display and 3-button keypad.
- Probe designs: up to +425 °C / 430 bar (+800 °F / 6250 psi).
- Saturated steam applications up to 155 bar @ +345 °C (2250 psi @ +650 °F).
- Cryogenic applications down to -196 °C (-320 °F).
- Integral or remote electronics.
- Suited for SIL 1 or SIL 2 Loops (full FMEDA report available).
- Suited for SIL 3 Loops (EXIDA Certificate available).

APPLICATIONS

MEDIA: Liquids or slurries; hydrocarbons to water-based media (dielectric 1,4 - 100) and solids (dielectric 1,9 - 100).

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 vapours, 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	•	•						
Korea	•	•						
NEPSI								CPA

Marine	Lloyd's Register of Shipping (LRS)
SIL	SIL1/2 (1oo1)
Steam Drum	Lloyds EN 12952-11 (water tube boilers) Lloyds EN 12953-9 (shell boilers)
TÜV	WHG § 63, overfill prevention

Other approvals are available, consult factory for more details

ECLIPSE® 705 HEAVY DUTY

Guided wave radar probes for heavy duty applications

DESCRIPTION

Eclipse® 705 Transmitter is a loop-powered, 24 V DC liquid-level transmitter based on the revolutionary Guided Wave Radar (GWR) technology. Encompassing a number of significant engineering accomplishments, this leading edge level transmitter is designed to provide measurement performance well beyond that of many traditional technologies, as well as "through-air" radars.

The innovative enclosure is a first in the industry, orienting dual compartments (wiring and electronics) in the same plane, and angled to maximise ease of wiring, configuration, set-up and data display.

This single transmitter can be used with all probe types and offers enhanced reliability, for use in SIL 2 / SIL 3 loops.

FEATURES

- "Real Level", measurement not affected by media variables eg. dielectrics, pressure, density, pH, viscosity, ...
- Easy bench configuration - no need for level simulation.
- 2-wire loop powered intrinsically safe level transmitter.
- 20-point custom strapping table for volumetric output.
- 360° rotatable housing can be removed without depressurising the vessel via "Quick connect/ disconnect" probe coupling.
- 2-line x 8 characters display and 3-button keypad.
- Probe designs: up to +425 °C / 430 bar (+800 °F / 6250 psi).
- Saturated steam applications up to 155 bar @ +345 °C (2250 psi @ +650 °F).
- Cryogenic applications down to -196 °C (-320 °F).
- Integral or remote electronics.
- Suited for SIL 1 or SIL 2 Loops (full FMEDA report available).
- Suited for SIL 3 Loops (EXIDA Certificate available).

APPLICATIONS

MEDIA: Liquids or slurries; hydrocarbons to water-based media (dielectric 1,4 - 100), up to 10.000 cP.

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 vapours, 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	•	•						
Korea	•	•						
NEPSI								CPA

Marine	Lloyd's Register of Shipping (LRS)
SIL	SIL1/2 (1oo1)
Steam Drum	Lloyds EN 12952-11 (water tube boilers) Lloyds EN 12953-9 (shell boilers)
TÜV	WHG § 63, overfill prevention

Other approvals are available, consult factory for more details

ECLIPSE® 705
PROBE SELECTION
Coaxial style GWR probes

Application/Type	7MR-7MM (coax)	7MD-7ML (coax)	7MS /7MQ (coax)	7MT-7MN (coax)	7MG (single rod) [2]
Function	Level	HTHP[1]	Steam	Level - Interface	Level - Interface
Temperature					
-40 / +150 °C (-40 / +300 °F)	Yes	Yes	No	Yes	Yes
-40 / +200 °C (-40 / +400 °F)	Yes	Yes	No	Yes	Yes
-196 / +425 °C (-320 / +800 °F)	No	Yes	No	No	No
Up to +300 °C (+575 °F)	No	No	Saturated steam: 7MS: < 300 °C (575 °F) 7MQ: > 300 °C (575 °F)	No	No
Pressure					
0 to 50 bar (0 to 750 psi)	Yes	Yes	Yes	Yes	Yes
0 to 70 bar (0 to 1000 psi)	Yes	Yes	Yes	Yes	Yes
0 to 155 bar (0 to 2250 psi)	No	Yes	Yes	No	No
Vacuum to 430 bar (6250 psi)	No	Yes	No	No	No
Min. dielectrics		Level: 1.4 or 1.7 to 100 Interface: Upper liquid: 1.4 or 1.7 to 5.0 Lower liquid: 15 to 100		Level: 1.4 or 1.7 to 100 Interface: Upper liquid: 1.4 to 5.0 Lower liquid: 15 to 100	Level: 1.4 or 1.7 to 100 Interface: Upper liquid: 1.4 to 5.0 Lower liquid: 15 to 100
≥ 1.4	Yes		No		
≥ 1.7	Yes		No		
≥ 1.9	Yes		No		
≥ 10	Yes		Yes		
Available probe length	6,1 m (240")	6,1 m (240")	4,5 m (177")	6,1 m (240")	6,1 m (240")
Wetted materials					
316/316L	Yes	Yes	Yes	Yes	Yes
Hastelloy® C	Yes	Yes	No	Yes	Yes
Monel®	Yes	Yes	No	Yes	Yes
Seal type	"O"ring type with various materials	Borosilicate seal (Full vacuum)	Dynamic steam seal with HT PEEK / Aegis	"O"ring type with various materials	"O"ring type with various materials
Liquid					
Clean	Yes	Yes	Yes	Yes	Yes
Film coating	Yes	Yes	Yes	Yes	Yes
Weak build-up	Yes	Yes	Yes	Yes	Yes
Strong build-up	Use Ø 45 mm (1.75") (7MM)	Use Ø 45 mm (1.75") (7ML)	No	Use Ø 45 mm (1.75") (7MN)	Yes
aggressive	Yes	Yes	No	Yes	Yes
Probe Ø/section	Ø 22,5 (7MR) - 45 (7MM) mm (0.88 - 1.75")	Ø 22,5 (7MD) - 45 (7ML) mm (0.88 - 1.75")	Ø 22,5 mm (0.88")	Ø 22,5 (7MT) - 45 (7MN) mm (0.88 - 1.75")	Ø 13, 19 or 25 mm (0.5, 0.75 or 1")

[1] High Temperature / High Pressure (HTHP) GWR probes with multi venting holes are suitable for level and liquid-liquid interface measurement.
[2] Caged single rod probe with the same performance as a coax set up.

ECLIPSE® 705
PROBE SELECTION
Single and dual lead GWR probes

Application/Type	7MF-A (single rod)	7MF-F (single rod)	7MJ (single rod)	7M1/7M2 (single cable)	7MB (twin rod)	7M7/7M5 (twin flex)	7MF-X / 7MH (single rod)
Function	Level liquids	PFA coated	HTHP	Liquids / Solids	Level - Interface	Liquids / Solids	Hygienic use
Temperature							
-40 / +150 °C (-40 / +300 °F)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
-40 / +200 °C (-40 / +400 °F)	No	No	Yes	Yes (7M1 only)	Yes	Yes (7M7) - ambient (7M5)	No
-40 / +315 °C (-40 / +600 °F)	No	No	Yes	As "X"(1)	No	No	No
Pressure							
0 to 70 bar (0 to 1000 psi)	Yes	Yes	Yes	Yes	Yes	Yes	No
0 to 245 bar (0 to 3550 psi)	No	No	Yes	As "X"(1)	No	No	No
Min. dielectrics							
≥ 1.4	No	No	No	7M1: ≥ 1.9	No	No	No
≥ 1.9	Yes	Yes	Yes	7M2: ≥ 4.0	Yes	Yes	Yes
≥ 10	Yes	Yes	Yes		Yes	Yes	Yes
Available probe length	6,1 m (240")	6,1 m (240")	6,1 m (240")	22 m (72.18')	6,1 m (240")	22 m (72.18')	6,1 m (240")
Wetted materials							
316/316L	Yes	Yes	Yes	Yes	Yes	Yes - FEP insul.	Yes
Hastelloy® C	No	No	Yes	No	Yes	No	Yes
Monel®	No	No	Yes	No	Yes	No	No
AL-6XN	No	No	No	No	No	No	Yes
Seal type	"O"ring type with Viton®/EPDM/Kalrez® 4079/PEEK materials (not for use with ammonia, use only 7MD)						Hygienic
Liquid							
Clean	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Film coating	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Weak build-up	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strong build-up	Yes	Yes	Yes	Yes	Yes	No	Yes
aggressive	No	Yes	Yes	No	Yes	No	No
Probe Ø/section	Ø 13 mm (0.5")	Ø 16 mm (0,6")	Ø 13 mm (0.5")	Ø 5 mm (0.2")	2 x Ø 13 mm (0.5")	2 x Ø 6 mm (0.2")	Ø 13 mm (0.5")

Remote transmitter head
available as an option

(1) As "X" = optionally available.

ECLIPSE® 705 HYGIENIC

Guided wave radar level transmitter for hygienic use

BPE

DESCRIPTION

Eclipse® 705 Transmitter is a loop-powered, 24 V DC liquid-level transmitter based on the revolutionary Guided Wave Radar (GWR) technology. Encompassing a number of significant engineering accomplishments, this leading edge level transmitter is designed to provide measurement performance well beyond that of many traditional technologies, including "through-air" radar.

Typical for these devices is that the probe can be bended (upon request) to follow the shape of the vessel. This way mixing blades can be avoided and measurement can be carried out to the last drop present.

ECLIPSE 705 offers enhanced reliability, as demonstrated by a Safe Failure Fraction of 91 %.

FEATURES

- "Real Level", measurement not affected by media variables eg. dielectrics, pressure, density, pH, viscosity, ...
- 2-wire loop powered intrinsically safe level transmitter.
- 20-point custom strapping table for volumetric output.
- Housing can be removed without depressurising the vessel.
- 2-line x 8 characters display and 3-button keypad.
- Suitable design for CIP/SIP cleaning.
- Integral or remote electronics.
- Suited for SIL 1 or SIL 2 Loops (full FMEDA report available).

APPLICATIONS

MEDIA: From non-conductive liquids up to water-based media (dielectric 1,9 - 100).

VESSELS: Most process or storage vessels.

CONDITIONS: All level measurement and control applications including process conditions exhibiting visible vapours, 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		•						
SIL	SIL1/2 (1oo1)							
TNO	EHEDG TYPE EL CLASS I							

Other approvals are available, consult factory for more details

HORIZON™ 704
Guided wave radar level transmitter

DESCRIPTION

Horizon™ 704 is a loop-powered, 24 V DC liquid-level transmitter based on the revolutionary Guided Wave Radar (GWR) technology. The electronics of the HORIZON 704 is integral mount on the GWR probe and allows local configuration via a 3-button keypad / display. HORIZON 704 electronics are compatible with different types of GWR probes each encompassing different application challenges (coaxial or twin rod types). The aluminium or Lexan® housing can be removed for service under process conditions.

FEATURES

- "Real Level", measurement not affected by changing media variables eg. dielectrics, pressure, density, pH, viscosity, ...
- Easy bench configuration - no need for level simulation.
- 2-line x 8 characters display / 3-button keypad or blind transmitter.
- 2-wire loop powered intrinsically safe level transmitter.
- Housing can be easily removed without depressurising the vessel.
- HART®/AMS® digital communication.
- Max process temperature: +205 °C (+400 °F).
- Max process pressure: 70 bar (1000 psi).
- 4-20 mA output (meets NAMUR NE 43).
- Integral mount electronics.

APPLICATIONS

MEDIA: Liquids or slurries; hydrocarbons to water-based media (dielectric 1,7 - 100).

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 vapours, foam, coating / build-up, surface agitation, turbulence and varying dielectric media or specific gravity.

AGENCY APPROVALS

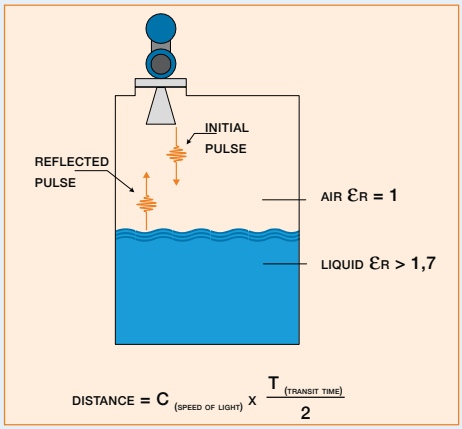
	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX		•						
CSA					•	•	•	
FM					•	•	•	

Other approvals are available, consult factory for more details

PULSE BURST RADAR

Pulse Burst Radar emits short bursts of energy to a liquid surface. Ultra-high-speed timing circuitry measures the time of the signal reflected off the liquid surface.

Sophisticated signal processing filters out false reflections and other background noises. The exact level is then calculated, by factoring in tank height and other configuration information. The circuitry is extremely energy efficient so no duty cycling is needed as with other radar devices. This allows the device to track high rates of level changes up to 4,5 m/minute (180"/min).



PULSAR® R86

Pulse burst radar level transmitter

DESCRIPTION

Pulsar® Model R86 Radar transmitter is the latest generation of an advanced loop-powered 4–20 mA level transmitter with proactive diagnostics provides accurate measurement even in shifting dielectric and varying media.

FEATURES

- 26 GHz frequency offers smaller beam angle and improved resolution.
- 2-wire loop powered intrinsically safe level transmitter.
- 360° rotatable housing can be dismantled without depressurising the vessel via “Quick connect/disconnect” antenna coupling.
- 4-button user interface and graphical LCD display provide enhanced depth of data, indicating on-screen waveforms and troubleshooting tips.
- Wide range of HTHP antennas, with extensions.
- Coated Isolation antennas for corrosive applications (future).
- False target setup is simple, intuitive and effective.
- Unique commissioning and optimization wizards.
- Proactive diagnostics.
- Full vacuum to 160 bar (2320 psi); -70 °C to +400 °C (-100 °F to +750 °F).
- Measuring range up to 40 m (130 Feet).
- Suited for SIL 1 and SIL 2 loops (full FMEDA report available).
- Can be programmed to automatically capture waveform data by time or by event occurrence.
- Potted electronics.

APPLICATIONS

Liquids and slurries, hydrocarbons to water-based media, high temperature/high pressure process or storage vessels.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•	•					
CSA					•	•	•	
FM					•	•	•	
IEC	•	•	•					
SIL	SIL 2 (1oo1)							

Other approvals are available, consult factory for more details

PULSAR® R96

Pulse burst radar level transmitter

DESCRIPTION

Pulsar® Radar transmitter is a loop-powered, 24 V DC, level transmitter. It has low power consumption, fast response time and is easy to use.

PULSAR is designed to provide unparalleled performance and ease of use. PULSAR non-contact radar is the perfect complement to the Magnetrol® Eclipse® Guided Wave Radar. These transmitters offer the ultimate solution to the vast majority of process level applications.

FEATURES

- 6 GHz operating frequency offers superior performance in the tougher applications of turbulence, foam, and heavy vapours.
- 2-wire loop powered intrinsically safe level transmitter.
- 360° rotatable housing can be dismantled without depressurising the vessel via "Quick connect/disconnect" antenna coupling.
- 4-button user interface and graphical LCD display provide enhanced depth of data, indicating on-screen waveforms and troubleshooting tips.
- 2 antenna styles up to +200 °C / 51,7 bar (+400 °F / 750 psi):
  - horn antenna: 3", 4" and 6"
  - dielectric rod antenna: Polypropylene and TFE.
- Measuring range up to 40 m (130 Feet).
- False target setup is simple, intuitive and effective.
- Will reliably track extremely rapid rate of change up to 4,5 m (180") / minute.
- Suited for SIL 1 and SIL 2 loops (full FMEDA report available).
- Can be programmed to automatically capture waveform data by time or by event occurrence.
- Potted electronics.

APPLICATIONS

MEDIA: Liquids or slurries; hydrocarbons to water-based media (dielectric 1,7 - 100).

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

CONDITIONS: Virtually all level measurement and control applications including process conditions exhibiting visible vapours, some 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	•	•	•					
CSA					•	•	•	
FM					•	•	•	
IEC	•	•	•					
SIL	SIL 2 (1oo1)							

Other approvals are available, consult factory for more details

MODEL R82

Non-contact radar level transmitter for level, volume and open channel flow applications

DESCRIPTION

Model R82 is an economical, loop powered radar transmitter bringing radar to everyday applications. Ultrasonic devices, frequently used in daily applications, can now be replaced using radar technology with its superior performance.

The electronics are housed in a single compartment cast aluminium or Lexan® housing. R82 measures effectively even when atmospheres above the liquid are saturated with vapour. Pulse Burst technology and advanced signal processing manage common disturbances such as false echoes caused by obstructions, multi-path reflections from tank sidewalls or turbulence caused by agitators, aggressive chemicals, or aerators.

FEATURES

- 2-wire loop powered intrinsically safe transmitter.
- 26 GHz frequency.
- Fast and easy configuration via 2-line x 16 characters display and 4-button keypad.
- Intuitive false target profiling.
- Rotatable microwave beam for optimised operation.
- Encapsulated PP or Tefzel® antennas in lengths of 50 mm (2") and 200 mm (8").
- Process
  - temperature: -40 °C to +93 °C (-40 °F to +200 °F)
  - pressure: vacuum to 13,8 bar (200 psi)
  - dielectric: 1,7 – 100.
- Suited for SIL 1 loops (full FMEDA report available).

APPLICATIONS

- Open channel flow flumes and weirs.
- Paint, ink and solvent tanks.
- Chemical storage.
- Thick and viscous media.
- Batch and day tanks.

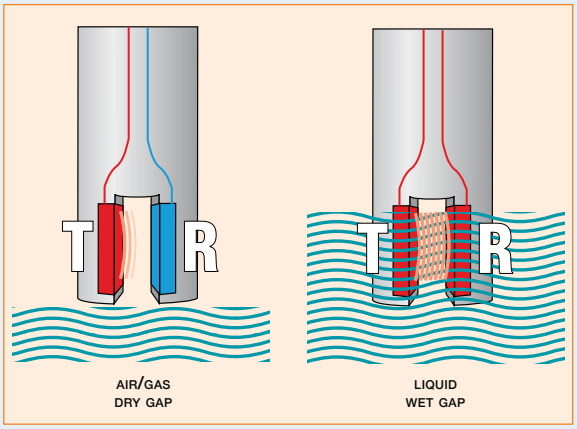
AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX		•						
CCOE		•						
cFMus						•	•	
EAC (GOST)		•						Metrology
IEC		•						
Inmetro		•						
SIL	SIL 1 (1oo1)							

Other approvals are available, consult factory for more details

ULTRASONIC CONTACT

Echotel® ultrasonic contact operates on a two crystal pulsed or “transmit-receive” principle which applies a high frequency electronic burst to the transmit crystal. The signal is then converted into ultrasonic energy and transmitted across the sensing gap towards the receiver crystal. When there is air in the gap, the high frequency ultrasonic energy will be attenuated, thereby not allowing the energy to be received. When there is liquid in the gap, the ultrasonic energy will propagate across the gap and the current shift or relay output will indicate a reception of the signal.



echotel.magnetrol.com

ECHOTEL® 961/962
Ultrasonic level switch

DESCRIPTION

Echotel® 961/962 series are used to detect high or low level alarm(s) in a broad range of liquids. Pulsed signal technology provides superior performance in applications suffering from foam, aeration, heavy turbulence and suspensions containing solids.

ECHOTEL 961 has a tip sensitive setpoint and is ideally used as high or low level alarm.

ECHOTEL 962 offers 2 setpoints on the same transducer, a tip sensitive setpoint and a second setpoint via a flow-through upper gap. The unit is used for level alarm or to control a pump in an auto fill/empty mode.

ECHOTEL 961/962 is equipped with advanced diagnostics that continuously check the transducer and electronics. The diagnostics also alarm for electrical noise interference from external sources.

FEATURES

- No calibration required.
- 2-wire loop powered with mA output or AC/DC line powered with integrated relay(s).
- Continuous selftest with selectable error output.
- LED identification for:
  - process alarm
  - error of transducer, electronics or electrical noise interference
  - wet/dry status of transducer.
- Push buttons for manual testing of alarm and error signals.
- Adjustable time delay up to 45 s.
- Process temperature from -80 °C to +165 °C (-110 °F to +325 °F) depending on used materials.
- Process pressure up to 138 bar (2000 psi).
- Metal and plastic transducers.
- Suited for SIL 1 and SIL 2 loops (full FMEDA report available).
- Remote electronics.

APPLICATIONS

VESSELS: Any mounting position.

CONDITIONS: Unaffected by

- shifting dielectric, density or pH
- presence of foam, turbulence, visible vapours
- fast drain/fill rates
- transducer coating and air bubbles
- vacuum conditions.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•						
CCOE	•	•						
CSA					•	•	•	
FM					•	•	•	
EAC (GOST)	•	•						
IEC	•							
Inmetro	•	•						
SIL	SIL 2 (1oo1)							

Other approvals are available, consult factory for more details

ECHOTEL® 961

Ultrasonic level switch for hygienic use

3A® BPE

DESCRIPTION

Echotel® 961 ultrasonic level switches require no calibration to detect the presence of any liquid in less than 1s. Foam is ignored by this technology, so that the unit only detects the presence or absence of liquid. The pulsed wave technology permits the unit to resist turbulence, aeration, suspended solids and build-up.

ECHOTEL 961 has both 3A and EHEDG approval for use in hygienic applications.

ECHOTEL 961 offers either current shift or relay output.

FEATURES

- No calibration required.
- 2-wire loop powered with mA output, AC/DC line powered with integrated relays.
- Continuous selftest with selectable error output.
- Process temperature from -40 °C to +165 °C (-40 °F to +325 °F).
- Process pressure up to 103 bar (1500 psi).
- LED identification for:
  - process alarm
  - error of transducer, electronics or electrical noise interference
  - wet/dry status of transducer.
- Push buttons for manual testing of alarm and error signals.
- Adjustable time delay up to 45 s.
- Suitable sensor design for CIP/SIP cleaning.
- Suited for SIL 1 and SIL 2 loops (full FMEDA report available).
- Hygienic connections.

APPLICATIONS

MEDIA: Any liquid.

VESSELS: Any mounting position.

CONDITIONS: Unaffected by

- shifting dielectric, density or pH
- presence of foam, turbulence, visible vapours
- fast drain/fill rates
- vacuum conditions.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
CSA						•	•	
FM						•	•	

SIL	SIL 2 (1oo1)
TNO	Hygienic Machinery Directive 98/37/EC annex 1, section 2,1 EN 1672 part 2, Hygienic requirements EHEDG doc. 2 (second edit. March 2000) and doc. 8 (July 1993)

Other approvals are available, consult factory for more details

ECHOTEL® 910
Ultrasonic tip sensitive level control

DESCRIPTION

Echotel® 910 is an integral mounted ultrasonic tip sensitive level switch with integrated DPDT relay. ECHOTEL 910 is ideally suited for seal pots, OEMs, overflow prevention, high or low level alarm in clean liquid applications with or without foam.

FEATURES

- No calibration required.
- Dual electrical entries and various housings are standard available.
- A built-in averaging circuit ensures no false alarms due to most effervescence or turbulences.
- Actuation is determined by the length of the transducer and is available in lengths between 3 cm (1") and 254 cm (96").
- Process pressure/temperature: 55,2 bar at -40 °C to +120 °C (800 psi at -40°F to +250 °F).
- All materials exposed to process in 316/316L SST (1.4401/1.4404).
- Field selectable high/low level failsafe.
- Optional universal nameplate.

APPLICATIONS

LIQUIDS: Any clean liquids.

VESSELS: Any mounting position.

PROCESS CONDITIONS: Unaffected by

- shifting dielectric, density or pH
- presence of foam, turbulence, visible vapours
- fast drain/fill rates
- transducer coating and air bubbles
- vacuum conditions.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•							
CCOE	•							
CSA					•		•	
FM					•		•	
EAC (GOST)	•							

Other approvals are available, consult factory for more details

ECHOTEL® 940/941
Ultrasonic level switch

DESCRIPTION

Echotel® 940/941 ultrasonic level controls are compact integral units which utilise pulsed wave technology to detect high or low level alarm in a broad range of viscous to light liquids.

The unit is available in two versions:
- with integrated relay: ECHOTEL 940
- with 8/16 mA current shift: ECHOTEL 941.

FEATURES

- No calibration required.
- Electronics potted in sensor.
- Compact and easy to install design.
- High or low level detection.
- Max +85 °C at 138 bar (+185 °F at 2000 psi).
- IP66, watertight, with flying leads.
- Horseshoe shaped transducer gap.

APPLICATIONS

VESSELS: Any mounting position, ideally suited for filters.

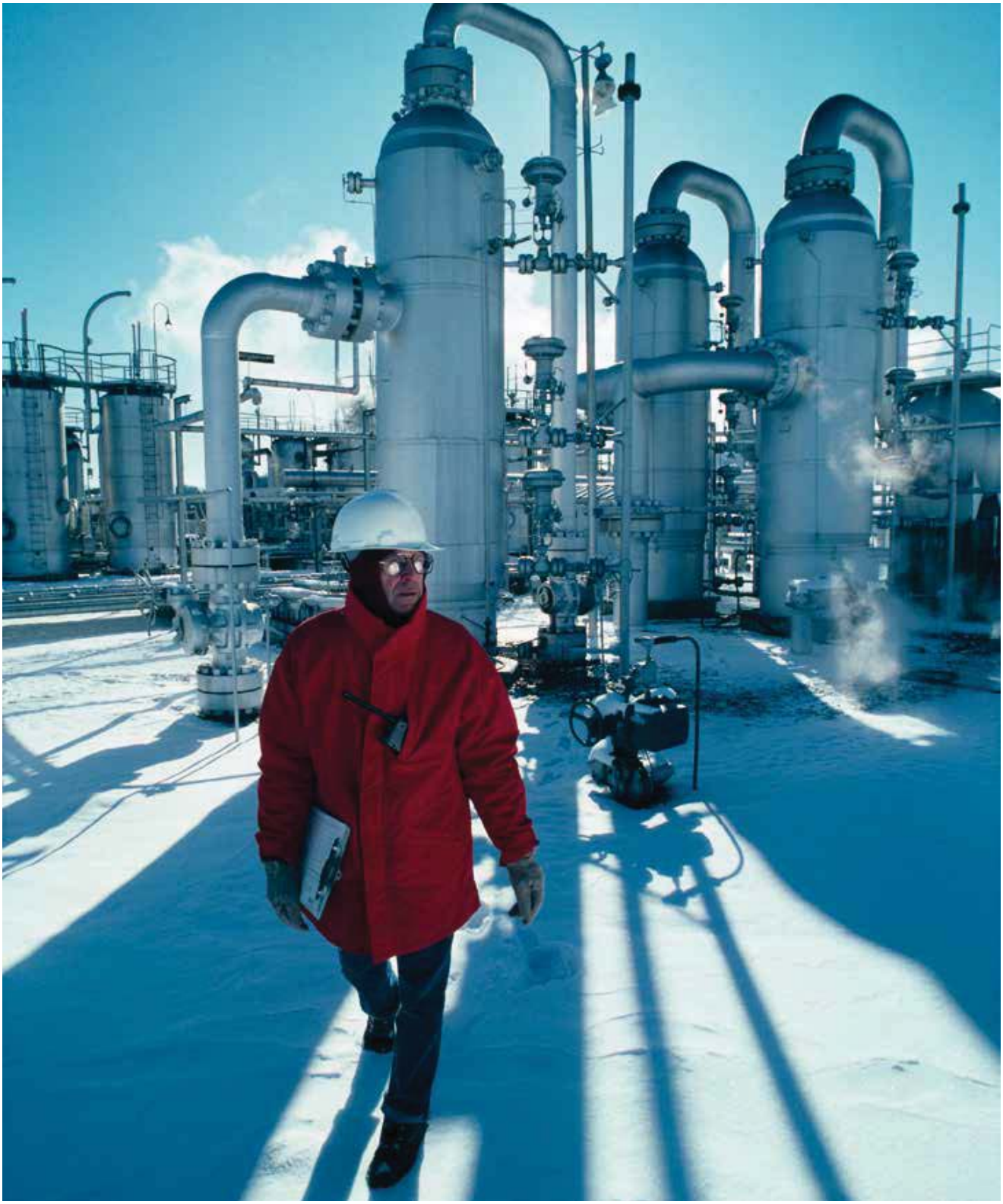
CONDITIONS: Unaffected by

- shifting dielectric, density or pH
- presence of foam, turbulence, visible vapours
- fast drain/fill rates
- vacuum conditions.

AGENCY APPROVALS

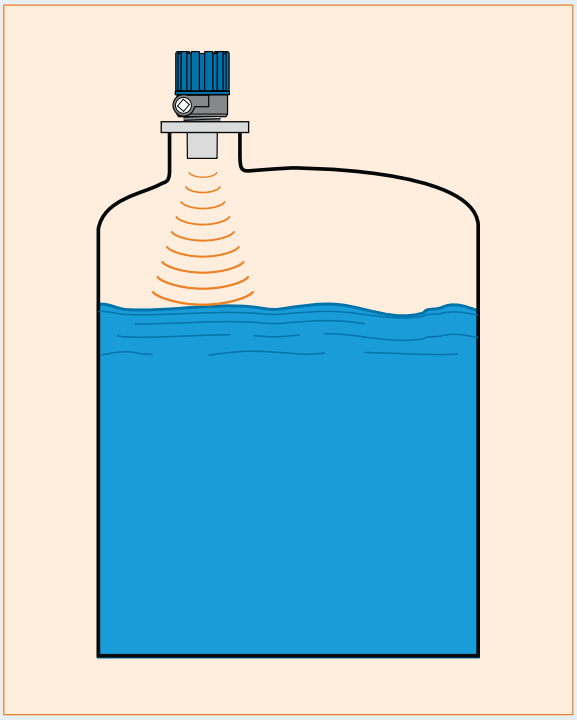
	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
CSA						•	•	
FM						•	•	

Other approvals are available, consult factory for more details



ULTRASONIC NON-CONTACT

The level measurement is accomplished by emitting an ultrasonic pulse from the transducer face and measuring the elapsed time between sending this pulse and its reflected echo from the liquid surface. Since the speed of sound is temperature dependant, the transducer also measures ambient temperature to compensate for the changing velocity.



ECHOTEL® 355

Ultrasonic non-contact transmitter for level, volume or open channel flow

DESCRIPTION

Echotel® 355 is an integral mount, high performance ultrasonic non-contact transmitter for liquid level, volume and open channel flow measurement.

The electronics are housed in a single compartment cast aluminium or Lexan® housing. The intelligent electronics analyse the ultrasonic echo profile, apply temperature compensation, reject echoes from false targets, and then processes the true echo from the liquid surface. This results in an extremely reliable measurement even when application difficulties like turbulence and false echoes exist.

FEATURES

- 2-wire loop powered intrinsically safe transmitter.
- Fast and easy configuration via 2-line x 16 characters display and 4-button keypad.
- False target rejection identifies true echo from liquid surface.
- Common tank shapes and 20-point custom table for volume calculations.
- Flume/weir primary elements and generic equation for open channel flow.
- Process temperature from -40 °C to +80 °C (-40 °F to +175 °F).
- Process pressure max 3 bar (43,5 psi).
- Two 7-digit totalizers for flow:
  - resettable
  - continuous totalizer.
- Suited for SIL 1 loops (full FMEDA report available).

APPLICATIONS

- Open channel flow flumes and weirs.
- Paint, ink and solvent tanks.
- Chemical storage.
- Thick and viscous media.
- Batch and day tanks.
- Sumps.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•						
CCOE		•						
cFMus						•	•	
Inmetro	•	•						
SIL	SIL 1 (1oo1)							

Other approvals are available, consult factory for more details

ECHOTEL® 335

Ultrasonic non-contact transmitter for level, volume or open channel flow

DESCRIPTION

Echotel® 335 is an integral mount, high performance ultrasonic non-contact transmitter for liquid level, volume and open channel flow measurement.

The electronics are housed in a dual compartment housing seperating field wiring from user interface electronics.

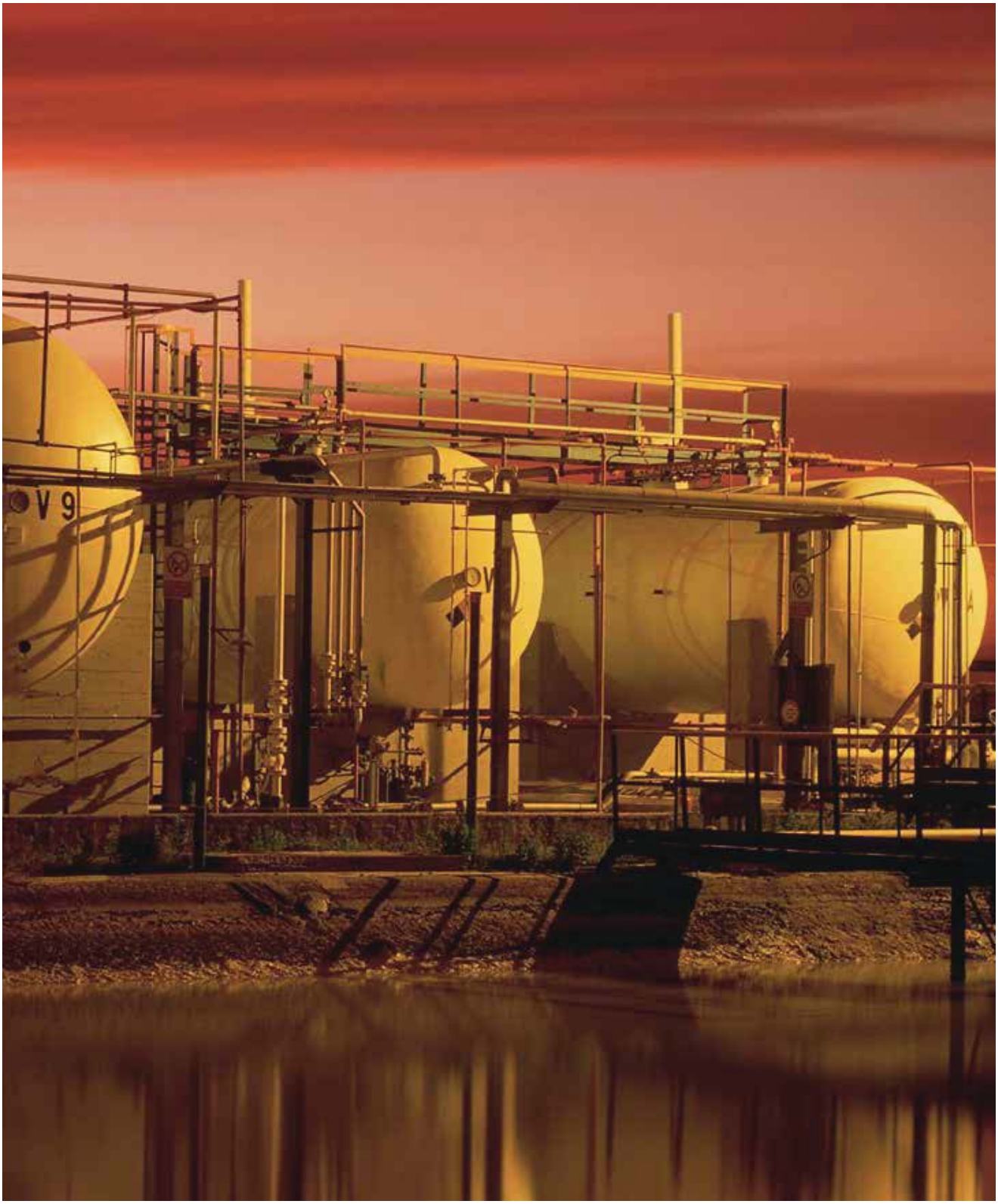
Advanced digital signal processing routines enable the 335 to perform in applications involving in-tank obstructions, light foam and agitation.

FEATURES

- Fast and easy calibration via 4 and 20 mA magnetic touch points.
- LED indication for
  - echo validity
  - relay status (energised/de-energised).
- Plug in custom / 6 digit display module (optional)
  - for easy set up
  - with bar graph display for liquid level % or echo strength.
- Process temperature from -30 °C to +90 °C (-22 °F to +195 °F).
- IP 67, dual compartment (field wiring / user interface electronics) in cast aluminium.
- Signal output: linearised 4-20 mA and separate relay for level alarm or echo loss tracking.
- 2 separate totalisers for flow:
  - daily resettable
  - continuous totaliser.
- Max level range: 8 m (26 ft).

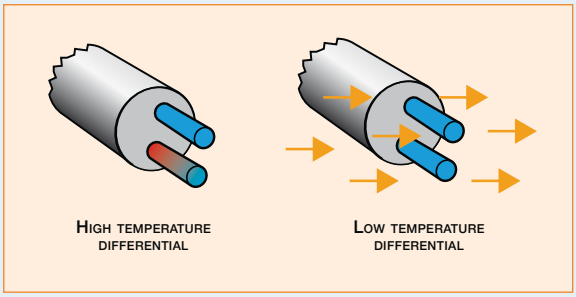
APPLICATIONS

- Water and waste water: tank - open channel flow measurement.
- Paper and pulp.
- Paint, ink and solvent tanks.
- General industry.
- Oil and chemical storage.
- Thick and viscous media.
- Food and beverage.
- Batch and day tanks.



THERMAL DISPERSION

The thermal switches are based on heat transfer. One sensor is at the process temperature and the other is being heated by a constant power. As the flow rate increases, the temperature difference between the sensors decreases. A set point is established so when that specific temperature difference is reached the relay changes state. This can be on either increasing or decreasing flow or flow/no flow. When used in a level or interface application it is primarily the thermal conductivity of the fluid that will provide the difference in heat transfer.



flow.magnetrol.com

THERMATEL® TG1/TG2

Thermal dispersion switch

DESCRIPTION

Thermatel® TG1/TG2 switches consist of electronics in a DIN rail housing and a remote sensor with aluminium or stainless steel sensor housing (max 500 m (1640 ft) away from electronics).

TG1/TG2 switches can easily be adjusted to detect flow (gases and liquids), level or liquid-liquid interface. Both units are 2-wire 24 V DC powered and intrinsically safe approved.

TG1 offers standard LED flow indication, TG2 offers LED flow indication per NAMUR NE 44.

FEATURES

- Easy field calibration – pre-calibration from factory on request.
- Variable flow or flow / no flow detection of gases and liquids.
- Excellent low flow sensitivity.
- Continuous diagnostics detect sensor fault.
- Continuous monitoring of flow rate versus setpoint via LED.
- mA output provides repeatable indication of flow rate and fault detection.
- Optional retractable fitting for dismantling under process conditions.
- Unique spherical tip design option ideal for liquids or high viscosity applications.
- Process conditions up to +450 °C (+850 °F) and 413 bar (6000 psi).
- Suited for SIL1 and SIL2 loops (full FMEDA report available).

APPLICATIONS

Pump protection, low or high flow indication, high viscosity level, high temperature/pressure, interface detection.

MEDIA: All types of gases and liquids.

VESSELS: Pipe sizes down to 1/4". Max sensor length up to 3,3 m (10,8 ft). Can be installed at any angle vertically/horizontally.

CONDITIONS: Can be used on conductive and non conductive media, very light density to heavy viscous media. Can be set to ignore foam, aeration, turbulence, and cavitation.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX		•						
EAC (GOST)		•						
SIL	SIL 1 (1oo1)							

Other approvals are available, consult factory for more details

THERMATEL® TD1/TD2
Thermal dispersion switch

DESCRIPTION

Thermatel® TD1/TD2 switches can easily be adjusted to detect flow (gases and liquids), level or liquid-liquid interface. TD1 is a line powered 24 V DC unit with integral electronics and a built-in DPDT relay. TD2 is either V DC or V AC line powered, has integral or remote electronics and offers additional LED indication, time delay and mA output for diagnostics and trending.

With continuous diagnostics, automatic temperature compensation, narrow hysteresis and fast response time, TD1/TD2 bring you the latest in thermal dispersion technology.

FEATURES

- Easy field calibration – pre-calibration from factory on request.
- Variable flow or flow / no flow detection of gases and liquids.
- Excellent low flow sensitivity.
- Automatic temperature compensation for repeatable alarm under varying process temperatures.
- Continuous diagnostics detect sensor fault.
- Continuous monitoring of flow rate versus setpoint via LED (TD2).
- mA output provides repeatable indication of flow rate and fault detection (TD2).
- Set point / alarm can be measured over test points (TD2).
- Optional retractable fitting for dismantling under process conditions.
- Unique spherical tip design option ideal for liquids or high viscosity applications.
- Process conditions up to +450 °C (+850 °F) and 413 bar (6000 psi).
- Integral or remote electronics up to 150 m (500 ft).
- Suited for SIL1 and SIL2 loops (full FMEDA report available).

APPLICATIONS

Pump protection, low or high flow indication, high viscosity level, high temperature/pressure, interface detection.

MEDIA: All types of gases and liquids.

VESSELS: Pipe sizes down to 1/4". Max sensor length up to 3,3 m (10,8 ft). Can be installed at any angle vertically/horizontally, flanged, threaded or with compression fitting with or without hot or cold tap.

CONDITIONS: Can be used on conductive and non conductive media, very light density to heavy viscous media. Can be set to ignore foam, aeration, turbulence, and cavitation.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•							Ex d+ib
CCOE	•							
CSA					•		•	
FM					•		•	
EAC (GOST)	•							
IEC	•							Ex d+ib
Inmetro	•							Ex d+ib
Korea	•							
SIL	SIL 1 (1oo1)							

Other approvals are available, consult factory for more details

THERMATEL® TD2

Thermal dispersion switch for hygienic use

3A® BPE

DESCRIPTION

Thermatel® TD2 switches can easily be adjusted to detect flow (gases and liquids), level or liquid-liquid interface. TD2 is either V DC or V AC line powered and offers additional LED indication, time delay and mA output for diagnostics and trending.

The unit has both 3A and EHEDG approval for use in hygienic applications.

FEATURES

- Easy field calibration – pre-calibration from factory on request.
- Variable flow or flow / no flow detection of gases and liquids.
- Excellent low flow sensitivity.
- Automatic temperature compensation for repeatable alarm under varying process temperatures.
- Continuous diagnostics detect sensor fault.
- Continuous monitoring of flow rate versus setpoint via LED.
- mA output provides repeatable indication of flow rate and fault detection.
- Set point / alarm can be measured over test points.
- Suited for SIL1 loops (full FMEDA report available).
- Hycienic process connections.

APPLICATIONS

Pump protection, low or high flow indication, high viscosity level, high temperature/pressure, interface detection.

MEDIA: All types of gases and liquids.

VESSELS: Max sensor length up to 3,3 m (10,8 ft). Can be installed at any angle vertically/horizontally.

CONDITIONS: Can be used on conductive and non conductive media, very light density to heavy viscous media. Can be set to ignore foam, aeration, turbulence, and cavitation.

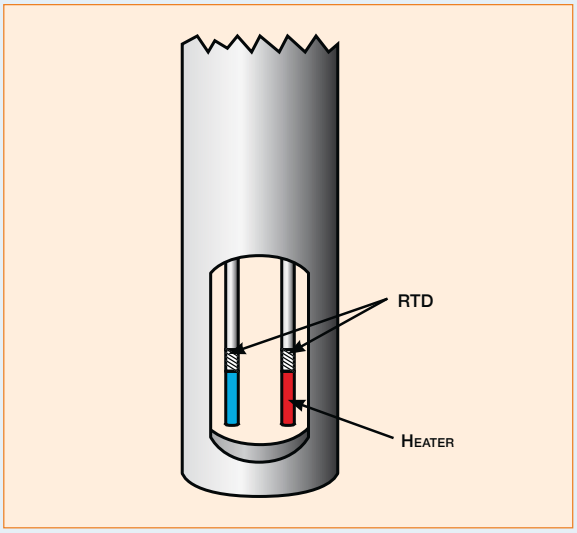
AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
SIL	SIL 1 (1oo1)							
TNO	Hygienic Machinery Directive 98/37/EC annex 1, section 2,1 EN 1672 part 2, Hygienic requirements EHEDG doc. 2 (second edit. March 2000) and doc. 8 (July 1993)							

Other approvals are available, consult factory for more details

THERMAL DISPERSION
Mass Flow Measurement

Thermal flow meters are primarily used in air and gas flow measurement applications. The meters consist of a transmitter and probe with temperature sensors (RTDs) located in the pins at the bottom of the probe. One sensor measures the process temperature and the other sensor is heated to a specific temperature above this. As the flow rate increases heat gets taken away from the heated sensor. Some manufacturers use a variable power operation to keep the temperature difference constant, while others keep the power constant and measure the temperature difference. The Magnetrol® Model TA2 measures the power it takes to maintain a constant temperature difference between the sensors. This relationship between power and mass flow rate is established during calibration.



flow.magnetrol.com

THERMATEL®
ENHANCED MODEL TA2
Thermal mass flow meter

DESCRIPTION

Enhanced Model TA2 Thermal Mass Flow Meter provides reliable mass measurement for air and gas flow applications. The powerful, yet easy to use, electronics are contained in a compact flameproof enclosure. TA2 is available with both insertion probes as well as flow body design for smaller pipe sizes. TA2 offers excellent performance at an exceptional value.

FEATURES

- Direct mass flow measurement of air and gases.
- No need for temperature/pressure correction.
- High turndown ratio 100:1.
- Excellent low flow sensitivity.
- Low pressure drop.
- NIST traceable calibrations.
- Flow, temperature and totalised flow available over HART®.
- Advanced diagnostics check condition of probe, electronics, and wiring.
- Rotatable plug-in display module provides display of flow rate, temperature, totalised flow, plus diagnostic messages.
- Process temperatures up to +205 °C (+400 °F).
- Pressure rating up to 103 bar (1500 psi) dependent upon process connections.
- Probe can be field replaced.
- Calibration verification in the field.
- Optional: - retractable probe assembly or valve with compression fitting
  - flow body for ½" to 4" pipe sizes
  - flow conditioning plate for flow bodies 1½" and higher.
- Accepts both AC and DC power input.
- Optional pulse output plus second mA output which can be used for temperature or different flow range (passive output only).
- 2-line x 16 characters backlit display with 4- button keypad for ease of configuration.
- Calibration for two different gases.
- Auto switching for extended turndown.
- Language selections of English, German, French, Spanish and Russian.
- Rotatable housing in aluminium or stainless steel.
- Suited for SIL 1 and SIL 2 loops (full FMEDA report available).

APPLICATIONS

Compressed air, combustion air, aeration air, natural gas, flare gas, digester/biogas/landfill gas, hydrogen cooling, nitrogen tank blanketing.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•							Ex d+ib
CCOE	•							
cFMus					•		•	
EAC (GOST)	•							Metrology
IEC	•							
Inmetro	•							
Korea	•							
SIL	SIL 1 (1oo1)							

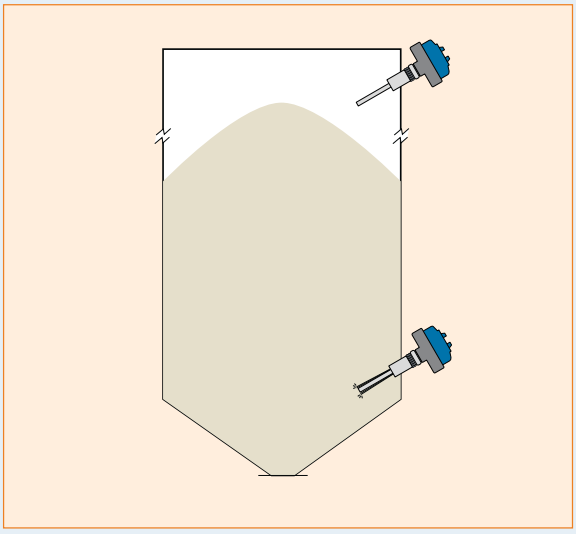
Other approvals are available, consult factory for more details

VIBRATING ROD

An invasive rod vibrates at 350 Hz frequency.

When in contact with the medium, the vibration will be dampened.

The attenuation of the vibration will be detected by the integral mount electronics, thus changing the status of the output.



SOLITEL®
Vibrating Rod Level Switch

DESCRIPTION

Solitel® Vibrating Rod Level Switches provide reliable level detection of powders and bulk solids. This compact, integral switch is suitable for high or low level detection in hoppers or silos. It may also be used for plugged chute detection.

The single-piece probe and the unique self-clean cycle avoid problems of buildup. Sensitivity of the instrument can be adjusted to detect a variety of solid materials ranging from heavy granular materials to light powders with bulk densities less than one pound per cubic foot.

FEATURES

- Single rod design eliminates clogging
- High temperature version up to +160 °C (+320 °F)
- Self-clean cycle and polished probe minimize solids buildup
- Adjustable sensitivity allows easy calibration for various bulk densities
- Extended rigid probes up to 2540 mm (100")
- Extended flexible lengths to 20 m (65')

APPLICATIONS

Powders and bulk solids with maximum particle size of 10 mm (1⁄2") including:

- Plastic powders and pellets
- Wood chips and sawdust
- Pulverized coal
- Fly ash
- Cement, lime
- Perlite
- Aerosil® (fume silica)

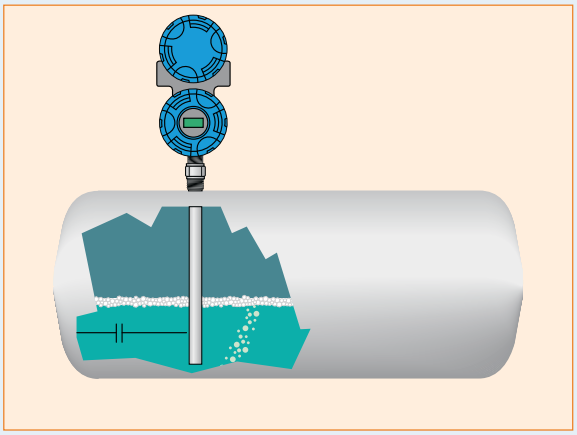
AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
CSA					•	•	•	

Other approvals are available, consult factory for more details

RF CAPACITANCE

The liquid acts as an isolator between two conductors (probe and tank wall). When level rises, there is more gain of capacity into an analog or digital signal.



HART COMMUNICATION PROTOCOL

KOTRON® 805
Smart RF level transmitter

DESCRIPTION

Kotron® series 805 is an economical but "full function" 2-wire loop-powered 24 V DC, smart RF transmitter. The microprocessor based electronics allow the user to calibrate the 805 with only one small level change. The electronics are housed in an ergonomical dual compartment housing which is directly mounted on top of the probe.

FEATURES

- Transmitter with local keypad/display.
- Calibration using HART®, or locally via a 2-line x 8 characters display and a 3-button keypad.
- Continuous local display of level, % and loop signal.
- Fault identification via FAULT message on display.
- Other Features:
  - Ergonomical - 45° angle, dual compartment housing isolates terminal board from electronics.
  - Transmitter head can be removed from probe without depressurising the vessel.
  - Process temperature max +540 °C at 35 bar (+1000 °F at 500 psi).
  - Process pressure max 345 bar at +40 °C (5000 psi at +100 °F).
  - Compatible with over 50 application oriented KOTRON® probes (see bulletin BE 50-125).

APPLICATIONS

- Hydrocarbons & solvents.
- Corrosives, acids and caustics.
- Powders & granulars.
- High temperature/pressure liquids.
- Interface.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX		•						
CSA					•	•	•	
FM						•	•	

Other approvals are available, consult factory for more details

KOTRON® 82
Level transmitter

DESCRIPTION

Kotron® 82 2-Wire RF capacitance transmitter is one of the most cost effective level transmitters available today.

Compact in size, it employs state of the art technology for a stable, accurate signal in a wide range of materials.

FEATURES

- Uses state of the art technology to provide a stable, more accurate signal.
- 4-20 mA isolated output signal.
- Utilises a 24 V DC current loop for power source and signal transmission.
- Input voltage of 14 to 40 V DC at transmitter terminals.
- Potted electronics are vibration resistant, protect electronics from the environment and allow easy wiring.
- Has integral metering points to allow the local measurement of 4-20 mA loop current without breaking the two-wire circuit loop.
- Power indicator LED varies in brightness with level changes.
- Available with a full range of rigid and flexible sensing probes to 345 bar (5000 psi) and +540 °C (+1000 °F).

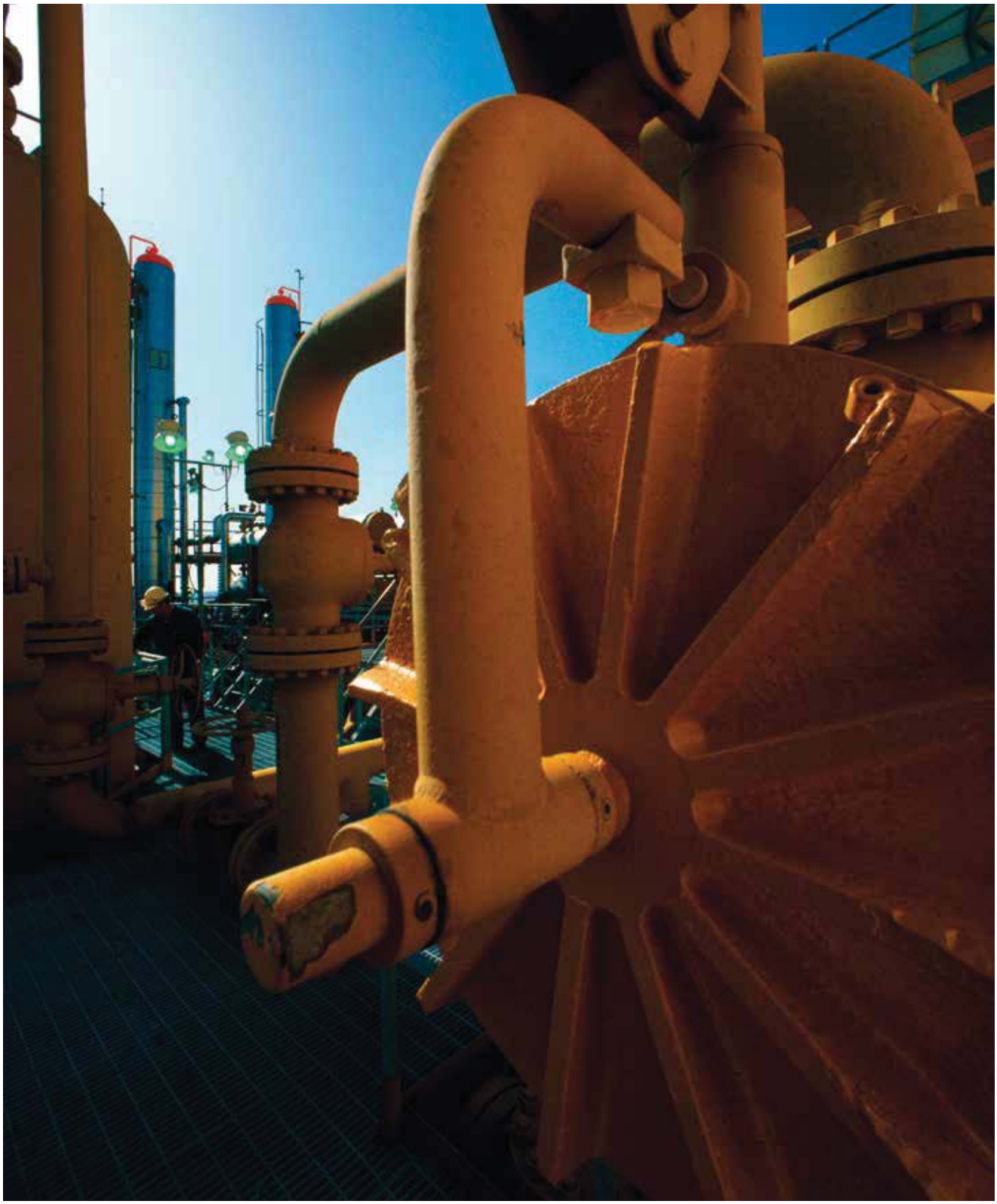
APPLICATIONS

- Clean or dirty liquids.
- Viscous liquids.
- Light slurries.
- Corrosive liquids.
- High temperature liquids.
- Chemicals.
- Hydrocarbons & solvents.
- Food & beverage.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
CSA					•	•	•	
FM						•	•	
EAC (GOST)		•						

Other approvals are available, consult factory for more details

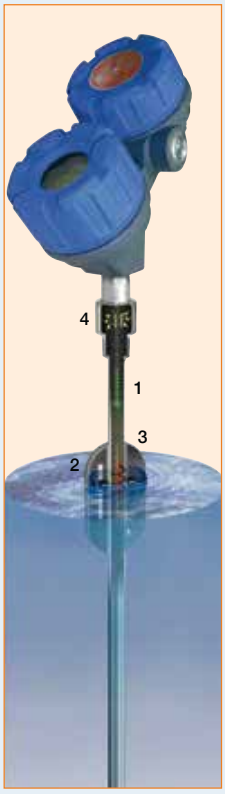


MAGNETOSTRICTIVE

ORION INSTRUMENTS
A Magnetrol Company

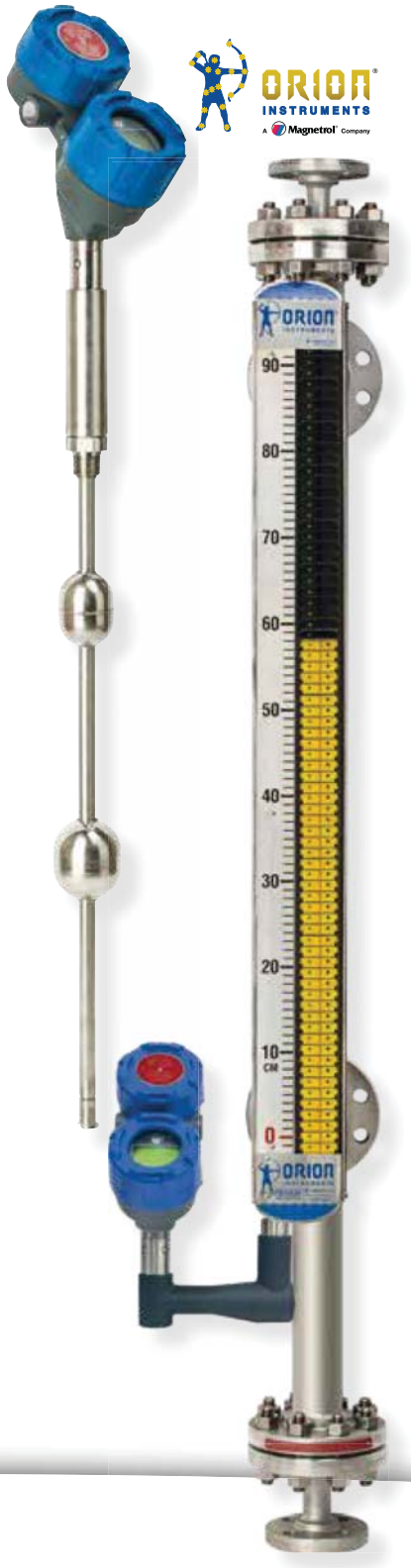
Jupiter® magnetostrictive transmitter utilises the effect of a magnetic field on a magnetostrictive wire as the basis for operation of the instrument. The primary components are the probe assembly containing the wire and the electronics assembly.

1. A low energy pulse which is generated by the electronics travels the length of the magnetostrictive wire.
2. A return signal is generated from the precise location where the magnetic field of the float intersects the wire.
3. Interaction between the magnetic field, electrical pulse and magnetostrictive wire cause a slight mechanical disturbance in the wire that travels back up the probe at the speed of sound.
4. A timer precisely measures the elapsed time between the generation of the pulse and the return of the mechanical or acoustic signal. This is detected by the acoustic sensor located below the electronics housing. The software is set up to measure the time-of-flight data and to display and convert to level and/or liquid-liquid interface measurement.



SIL SAFETY INTEGRITY LEVEL
Ex
HART COMMUNICATION PROTOCOL
AMS Device Link
PACTware
FDT Connected
FOUNDATION

JUPITER® JM4
Magnetostrictive level transmitter



DESCRIPTION

Jupiter® liquid level transmitter is a loop-powered 24 V DC liquid-level transmitter and is available as a direct insertion transmitter or as an external mounted transmitter onto a Magnetic Level Indicator. The unit can be designed for liquid level and/or liquid-liquid interface measurement.

The innovative enclosure is a first in the industry, orienting dual compartments (wiring and electronics) in the same plane and angled to maximize ease of wiring, configuration, set-up and data display.

The high safety level of JUPITER is demonstrated by a Safe Failure Fraction > 90 %.

FEATURES

- High precision and repeatable level measurement:
  - accuracy up to ± 1,27 mm (0.05")
  - repeatability of ± 0,36 mm (0.014").
- Easy bench configuration – no need for level simulation.
- Auto-configuration option – configuration settings contained within probe.
- Rotatable housing can be dismantled without depressurising the vessel via "Quick connect/disconnect" probe coupling.
- 2-wire loop powered intrinsically safe level transmitter.
- Dual compartment with separate housing for wiring and electronics.
- 4-button user interface and graphical LCD display provide enhanced depth of data, indicating on-screen waveforms and troubleshooting tips.
- Process temperature up to +425 °C (+800 °F).
- Process pressure up to 207 bar (3000 psi)
- Probe lengths up to 10,7 m (35 ft).
- Float failure reporting.
- IP 67 Enclosure Rating.
- Suited for SIL 1 or SIL 2 loops (full FMEDA report available).

APPLICATIONS

MEDIA: Highly recommended for use in liquids with enhanced foam development. Interface measurement where the upper liquid layer has a higher dielectric than the lower liquid layer.

CONDITIONS: Suited for use in a turbulent liquid environment as the float remains in contact with the liquid surface whilst emitting its signal.

AGENCY APPROVALS

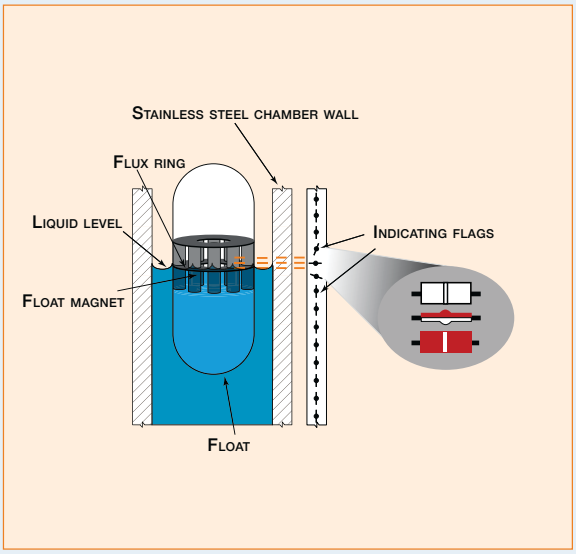
	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•	•					
CCOE								
CSA					•	•	•	
FM					•	•	•	
EAC (GOST)	•	•						Metrology
IEC	•	•	•					
SIL	SIL 1/2 (1oo1)							

Other approvals are available, consult factory for more details

MAGNETIC LEVEL INDICATORS

ORION INSTRUMENTS
A Magnetrol Company

The Magnetic Level Indicator (MLI) consists of a sealed bypass cage, a float containing a magnet and a visual indicator rail with bi-coloured flags that individually contain a magnet. The indicator rail is external mount on the cage and its flags are magnetically coupled/aligned with the magnet of the float. As the level changes, the float will follow and its magnet will attract the magnets in the flags. This will cause the flags to rotate showing their opposite coloured side. The same electro-magnetic coupling will activate/deactivate switches or change the output of an externally clamped-on magnetostrictive transmitter.



AURORA®

Guided wave radar level transmitter and magnetic level indicator

ORION INSTRUMENTS
A Magnetrol Company

DESCRIPTION

Aurora® combines the operation of a conventional float operated magnetic level indicator with the leading edge technology of Guided Wave Radar. The result is a true level measurement redundancy in a single 3" or 4" chamber design. Eclipse® Guided Wave Radar is a 2-wire loop powered 24 V DC liquid level transmitter utilising Time Domain Reflectometry technology (TDR) to perform level measurement independent from media characteristics and process conditions. AURORA is a completely self-contained unit for side mounting to a tank or vessel with threaded or flanged pipe connections.

FEATURES

- Complete redundant system whereby the measuring results of ECLIPSE can be continuously checked against the level indication of the Magnetic Level Indicator.
- Pro-active maintenance can be planned ahead of time based upon the comparison of the measuring results of the two systems.
- No calibration required on either measuring system.
- 2-wire loop powered intrinsically safe level transmitter.
- HART®, AMS®, Foundation Fieldbus™ and PACT*ware*™ communication protocol.
- Up to 5,7 m (224") measuring range.
- Up to 103 bar (1500 psi) – optional up to 310 bar (4500 psi).
- Up to +450 °C (+850 °F) process temperature for non-condensing applications (depending rail material).
- Up to 155 bar @ +345 °C (2250 psi @ +650 °F) for saturated steam applications.
- Suited for SIL 1 and SIL 2 loops (full FMEDA report available for ECLIPSE transmitter) – optional SIL 2/3.
- ECLIPSE 705 transmitter SIL 3 certified (EXIDA certificate available).
- Several cage designs are available, consult factory for more details.

APPLICATIONS

MEDIA: Clean liquids; hydrocarbons to water-based media (dielectric 1.4-100).

INTERFACE: Consult factory.

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 vapours, foam, surface agitation, bubbling or boiling, high fill/empty rates, low level and varying dielectric media.

AGENCY APPROVALS (for ECLIPSE 705 GWR)

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•	•	•				
CCOE	•	•						
CSA					•	•	•	
FM					•	•	•	
EAC (GOST)	•	•						Metrology
IEC	•	•						
Inmetro	•	•						
Korea	•	•						
NEPSI								CPA

Marine	Lloyd's Register of Shipping (LRS)
SIL	SIL 1/2 (1oo1)
Steam Drum	Lloyds EN 12952-11 (water tube boilers) Lloyds EN 12953-9 (shell boilers)
TÜV	WHG § 63, overfill prevention

Other approvals are available, consult factory for more details

VECTOR™
Magnetic level indicators

DESCRIPTION

Vector™ is a rugged, reliable and cost-effective Magnetic Level Indicator (MLI). Suitable for a variety of installations, VECTOR has many basic features and is precision-engineered and manufactured to ensure a long service life.

MLIs are widely used to replace high-maintenance sight and gauge class indicators and are increasingly used in new applications. Optional switches and transmitters are available to provide various output signals for level control.

FEATURES

- Rugged, industrial grade construction.
- Rail can be rotated to obtain better viewing position.
- Immediate and accurate response to level changes.
- Max process pressure of the float 85 bar (1230 psi).
- Max process temp. +260 °C (+500 °F).
- Min process temp. -40 °C (-40 °F).
- Measuring range up to 5,5 m (18 ft).
- Standard S.G. range from 0,54 - 1,50 kg/dm^3.
- Floats are not vented nor gas filled.
- Options:
  - scale in cm or tailor made
  - reed type bi-stable switches
  - reed chain transmitter with 4-20 mA output.

APPLICATIONS

MEDIA: Clean liquids.

VESSELS: Most process and storage tanks up to rated operating pressure and process temperature.

FUNCTION: Continuous liquid level or liquid-liquid interface indication.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX								Ex c
EAC (GOST)								Ex c

ATLAS™
Magnetic Level Indicator

DESCRIPTION

Atlas™ is our standard high-performance magnetic level indicator. ATLAS is a single chamber design with either a 2", 2 ½", or 3" chamber diameter, as required by the application. There are twelve basic configuration styles including top mount models.

ATLAS MLIs are produced in a wide range of materials, including exotic alloys and plastics. We also offer the most complete selection of process connection types and sizes in the industry.

ATLAS can be equipped with a variety of level transmitters and switches as well as flag and shuttle indicators with or without stainless steel scales. This enables ATLAS to be a complete level and monitoring control.

ATLAS may be equipped with the external mount Jupiter®, magnetostrictive transmitter, or with an Eclipse® Guided Wave radar in an enlarged cage.

FEATURES

- Precision manufactured float with multiple magnets and flux ring for an optimum Gauss rating.
- Viewing window made of shatter-resistant polycarbonate.
- Viewing window filled with dry nitrogen gas to eliminate condensation and allow for maintained visibility.
- Double O-ring seal prevents contaminants from entering the viewing window.
- Flags are designed with mechanical stop for stable indication of fast varying level changes.
- Shuttle followers for level and interface indication.
- Stainless steel flags in aluminium or stainless steel (optional) indication rail.
- 1/2" NPT vent and drain (other options available).
- Max hydrotest pressure of the float: 62 bar (900 psi) - higher pressure (up to 310 bar (4500 psi)) on request.
- Min operating process temperature: -50 °C (-60 °F) standard, down to -196 °C (-320 °F) on request.
- Max operating process temperature up to + 540 °C (up to +1000 °F) with factory supplied insulation.
- S.G. range as low as 0,49 kg/dm^3 (lower S.G. on request).
- Bottom and top spring protection of the float avoids float damage during transport, maintenance and surging/ flashing conditions.
- Options:
  - high and low temperature options
  - stainless steel scale for level or volume
  - JUPITER magnetostrictive transmitter.
- Several cage designs are available, consult factory for more details.

APPLICATIONS

MEDIA: Clean liquids with a S.G. ≥ 0,49 kg/dm^3 incl. aggressive, toxic and flammable liquids / liquified gases.

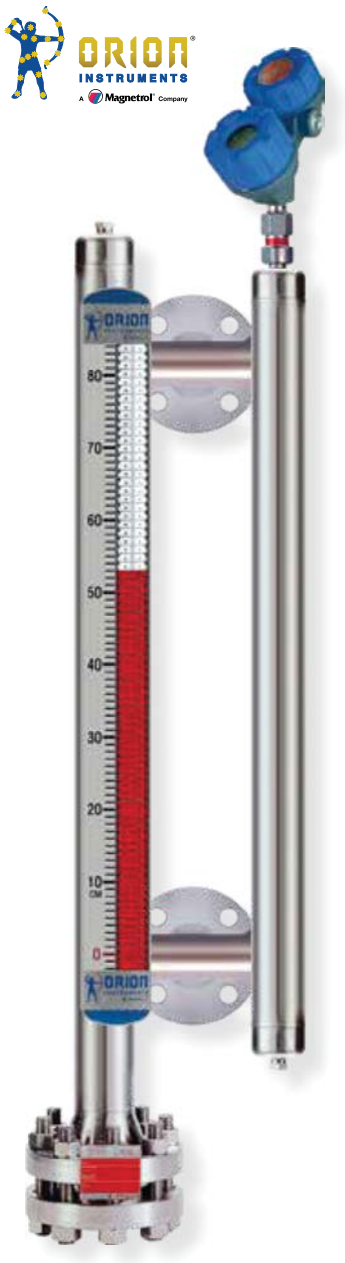
VESSELS: Most process and storage tanks up to rated operating pressure and process temperature.

FUNCTION: Continuous liquid level or liquid-liquid interface indication.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX								Ex c
EAC (GOST)								Ex c
Marine	Lloyd's Register of Shipping (LRS)							

GEMINI™
Magnetic Level Indicator



DESCRIPTION

This twin chamber design is unique to the Magnetic level gauge industry. Countless unique configuration styles are available with Gemini™. It can be produced in the same metal material selections as Atlas™.

The second chamber facilitates the installation of any of a wide selection of transmitters to provide continuous level monitoring in addition to the indication provided by the primary chamber. Eclipse® guided wave radar or direct insertion Jupiter® magnetostrictive level transmitters can be mounted in the secondary chamber to provide totally redundant indication with continuous level output. The primary chamber, which houses the float, can be fitted with clamp-on switches or transmitters for additional level control.

FEATURES

- Precision manufactured float with multiple magnets and flux ring for an optimum Gauss rating.
- Viewing window made of shatter-resistant polycarbonate.
- Viewing window filled with dry nitrogen gas to eliminate condensation and allow for maintained visibility.
- Double O-ring seal prevents contaminants from entering the viewing window.
- Flags are designed with mechanical stop for stable indication of fast varying level changes.
- Shuttle followers for level and interface indication.
- Stainless steel flags in aluminium or stainless steel (optional) indication rail.
- 1/2" NPT vent and drain.
- Max hydrotest pressure of the float: 62 bar (900 psi) - higher pressure (up to 310 bar (4500 psi)) on request.
- Min operating process temperature: -50 °C (-60 °F) standard, down to -196 °C (-320 °F) on request.
- Max operating process temperature up to + 540 °C (up to +1000 °F) with factory supplied insulation.
- S.G. range as low as 0, 49 kg/dm^3 (lower S.G. on request).
- Bottom and top spring protection of the float avoids float damage during transport, maintenance and surging/ flashing conditions.
- Options:
  - Eclipse® guided wave radar transmitter.
  - Jupiter® magnetostrictive transmitter.
  - E3 Modulevel® displacer transmitter.
  - Kotron® RF capacitance transmitter.
  - Valves for isolation.
  - Display options: level, volume, or percent. Custom scale and dual scale options available.
  - High and low temperature options.
- Several cage designs are available, consult factory for more details.

APPLICATIONS

MEDIA: Clean liquids with a S.G. ≥ 0,49 kg/dm^3 incl. aggressive, toxic and flammable liquids / liquified gases.

VESSELS: Most process and storage tanks up to rated operating pressure and process temperature.

FUNCTION: Continuous liquid level or liquid-liquid interface indication.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX								Ex c
EAC (GOST)								Ex c

OPTIX™
LED visual Indicator

DESCRIPTION

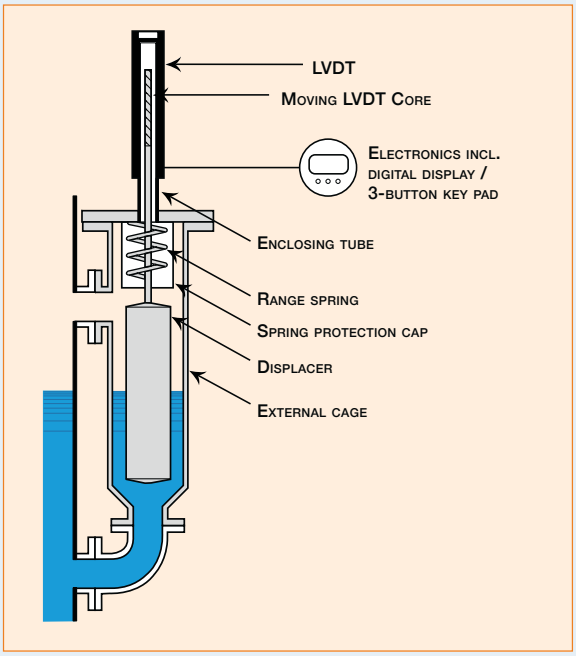
The new Optix™ LED indicator is engineered to provide local illuminated visual indication. This two-wire device can be installed on any Magnetic Level Indicator, greatly enhancing low-light performance. OPTIX can be powered using a separate, dedicated 24 V DC power source, or as part of an existing two-wire 4-20 mA loop without interfering with the analog output of an existing device. A DC-powered solution eliminates the need for costly copper wiring normally required with competing AC-powered LED-based products.

FEATURES

- Scales available: meter/cm, feet/inches, percent, and custom volumetric.
- Construction: anodized aluminum enclosure.
- Est. LED Lifespan: 100.000 hours.

DISPLACER TRANSMITTER

The buoyancy force works on the displacer which will vertically move in (increasing liquid level) and out (decreasing liquid level) the linear differential transformer (LVDT). Due to this movement voltages are induced in the secondary windings of the LVDT. These signals are then processed in the electronic circuitry and used to control the output signal.



e3modulevel.magnetrol.com

HART COMMUNICATION PROTOCOL

E3 MODULEVEL®
Displacer operated level transmitter

DESCRIPTION

E3 Modulevel® is a 2-wire, loop-powered level transmitters utilising the buoyancy principle to detect and convert liquid level changes into a stable output signal.

The linkage between the level sensing element and output electronics greatly simplifies mechanical design and construction. The in-line vertical design of the transmitter reduces instrument weight and the effects of process vibration on electronic circuitry components while simplifying installation.

FEATURES

Operation functions include:
- interface measurement and detection
- continuous level measurement
- density measurement.

2-line x 8 characters display LCD and 3-button keypad.

Easy bench configuration. No need for level simulation.

2-wire loop powered intrinsically safe level transmitter.

360° rotatable housing can be dismantled without depressurising the vessel.

Special options, materials and custom engineered features.

SIL 2 / SIL 3 capable certified.

Several cage designs are available, consult factory for more details.

APPLICATIONS

MEDIA: Liquids with a S.G. as low as 0,23 and up to 2,2 kg/dm^3 and interfaces with a minimum density difference of 0,10 kg/dm^3.

VESSELS: Most process vessels up to +450 °C (+850 °F) for non-condensing and +425 °C (+800 °F) for condensing process temperature and pressures up to 355 bar (5150 psi) or storage vessels e.g:

- feedwater heaters
- condensate drip pots
- scrubbers
- separators
- receivers
- flash tanks
- knock-out drums
- boilers.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•						
CCOE	•							
CSA					•	•	•	
FM					•	•	•	
EAC (GOST)	•	•						Metrology
IEC	•	•						
Inmetro	•	•						
Korea		•						
NEPSI								CPA

Marine	Lloyd's Register of Shipping (LRS)
SIL	SIL 2 (1oo1)

Other approvals are available, consult factory for more details

PNEUMATIC MODULEVEL®

Liquid level control

DESCRIPTION

Pneumatic Modulevel® controls are displacement actuated level sensors. They provide output signals in direct proportion to changes in liquid level.

Simple, modular design and proven magnetic coupling make MODULEVEL controls versatile, highly stable, vibration resistant and adaptable to extremes of temperature and pressure.

FEATURES

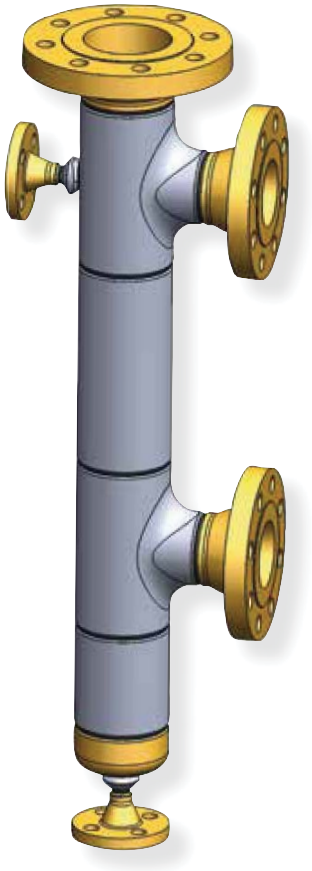
- Standard models handle service temperatures from -100 °C to +370 °C (-150 °F to +700 °F) and pressure to 294 bar (4265 psi).
- Stable output signal is unaffected by surface turbulence. Prevents control valve "hunting" and extends valve life.
- Controller head may be removed and bench calibrated without dismantling or even depressurising the tank.
- Accurate output signal provided over a wide specific gravity range.
- 316 SS displacer and trim.
- Easy field calibration without moving tank liquid level, reducing installation time and cost.
- Controller head rotates 360°, simplifies pneumatic piping hookup.
- Pilot relay provides a 4 to 1 amplification of pilot pressure signal to speed valve response.
- Built-in visual level indicator is independent of air supply.
- Optional pneumatic to current interface transducer for use in electronic control applications.
- Optional proportional plus integral control.
- Optional differential gap (on-off) control.
- Optional Hi-Lo electronic alarm signal provides inexpensive backup alarm.

APPLICATIONS

Pneumatic MODULEVEL liquid level controls are widely used in utility power generation, chemical and petroleum processing operations, such as:

- steam generator feedwater heater regulation
- fractionating column level transmitter
- ethanolamine level transmitter
- vent gas scrubber level control
- drip pot condensate level control
- flash tank level transmitter.

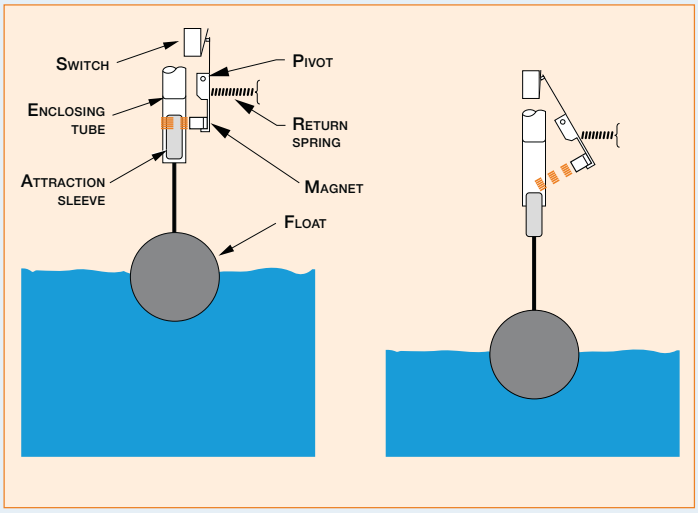
EXTERNAL CAGES
for electronic devices



Several devices such as Eclipse®, Modulevel®,… are mounted in (custom designed) external cages. Depending on process connection, process condition, customer specification,… several possibilities are possible. Below are some typical examples. Many other designs are possible, consult the factory for more details.

BUOYANCY

A permanent magnet is attached to a pivoted switch actuator. As the float/displacer rises following the liquid level, it raises the attraction sleeve into the field of the magnet, which then snaps against the non-magnetic enclosing tube, actuating the switch. The enclosing tube provides a static pressure boundary between the switch mechanism and the process. On a falling level, the float/displacer deactivates the switch.



T20 - T21
Liquid float level switch

DESCRIPTION

T20 and T21 units are user friendly, reliable float switches designed for top mounting to tanks or vessels. T20 units utilise a single switch mechanism and float. T21 units utilise two switch mechanisms and two separate floats when widely spaced actuating levels are required. T20 and T21 models are available for any type of open or closed vessel with either threaded or flanged type mounting and actuating depths up to 1219 mm (48 inches).

FEATURES

- Carbon or stainless steel process connection materials (other materials available on request).
- Flanged and threaded process connections.
- Process temperature up to +540 °C (+1000 °F).
- Up to 2 switch levels (T21).
- S.G. as low as 0,60 kg/dm^3.
- Process pressure up to 41,3 bar (600 psi).
- Standard anti-corrosive protection.
- Optional:
  - NACE construction (MR-01-75)
  - interface calibration
  - special actuating levels
  - special tank connections
  - extreme temperature modifications
  - class 1, Group B explosion proof electrical enclosure
  - special exterior surface preparation and finish.
- Suited for SIL 2 loops (DPDT switch) (full FMEDA report available).

APPLICATIONS

- Day tanks.
- Condensate receivers.
- Fuel storage tanks.
- Cooling towers.
- Flash tanks.
- Interface.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•						
CCOE	•							
CSA					•			
FM					•			
EAC (GOST)	•	•						
IEC	•							
Inmetro	•							
Korea	•							
NEPSI	•							

Marine	Lloyd's Register of Shipping (LRS)
SIL	SIL 2 (1oo1)

Other approvals are available, consult factory for more details

A10/15 - B10/15 - C10/15
Liquid displacer level switch

DESCRIPTION

Magnetrol® displacement type level switches offer the industrial user a wide choice of alarm and control configurations. Each unit utilises a simple buoyancy principle and is well suited for simple or complex applications, such as foaming or surging liquids or agitated fluids, and usually costs less than other types of level switches.

FEATURES

- Narrow or wide level ranges achieved through multiple switch mechanism capability.
- Maximum process temperature: +260 °C (500 °F).
- Maximum process pressure: 55,1 bar (800 psi).
- S.G. as low as 0.4 kg/dm^3.
- Displacers adjustable at any point along the suspension cable.
- Anti-surge design eliminates the possibility of switch short cycling.
- Standard 3 m (10 ft) of suspension cable, included for all models.
- Field adjustable set point and switch differential.
- Wide choice of displacer materials.
- Wide choice of housings and switch mechanisms
- Standard anti-corrosive protection.
- Optional:
  - NACE construction (MR-01-75)
  - proof-er® ground check
  - floating roof models
  - high pressure models
  - models for interface.
- Suited for SIL 2 loops (DPDT switch) (full FMEDA report available).

APPLICATIONS

Foaming or surging liquids – Paints – Agitated fluids – Varnishes – Sewage handling – Heavy oils – Dirty liquids – Liquids with solids

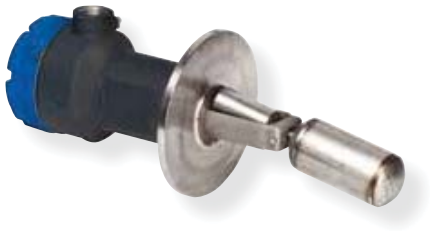
AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•						
CCOE	•							
CSA					•			
FM					•			
EAC (GOST)	•	•						
IEC	•							
Inmetro	•							
Korea	•							
NEPSI	•							

Marine	Lloyd's Register of Shipping (LRS)
SIL	SIL 2 (1oo1)
TÜV	WHG § 63, overfill prevention

Other approvals are available, consult factory for more details

TUFFY® T3
Side mounting level control



DESCRIPTION

Tuffy® liquid level switches are float actuated devices designed for horizontal mounting in a tank or vessel through threaded or flanged pipe connections. The compact size allows for installation in small vessels, while its many features provide a variety of application uses. The single switch mechanism is available in SPDT or DPDT forms on units designed for adjustable, narrow or wide differential and interface service.

FEATURES

- Maximum process temperature: +400 °C (+750 °F).
- Minimum process temperature: -55 °C (-65 °F).
- Maximum process pressure: 181 bar (2630 psi).
- S.G. as low as 0.4 kg/dm^3.
- Wetted parts in 316/316L (1.4401/1.4404) or Hastelloy C (2.4819).
- Available as:
  - flanged
  - threaded
  - flanged or sealed cage mounted.
- Suited for SIL 2 loops (DPDT switch) (full FMEDA report available).

MODELS

- Narrow differential switch (for alarm functions):
  - standard pressure (up to 50 bar (720 psi))
  - high pressure (up to 150 bar (2160 psi)).
- Wide adjustable differential switch (for control functions).
- Interface switch (detection of interface level between liquids).
- External cages.
- Compact versions:
  - pneumatic narrow differential switch
  - electric narrow differential switch.

APPLICATIONS

- Sour service (NACE).
- High/low alarm.
- Single pump control.
- Day storage tanks.
- Corrosive processes.
- Process vessels.
- Boiler low water cut-off.
- Interface level.
- Installations in hazardous area.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•						
CSA					•			
FM					•			
EAC (GOST)	•	•						
IEC	•							
NEPSI	•							
SIL	SIL 2 (1oo1)							
TÜV	WHG § 63, overfill prevention							

Other approvals are available, consult factory for more details

T62 - T64 - T67
Side mounting liquid float level switch

DESCRIPTION

Side mounting controls mount horizontally to any tank or vessel through a threaded or flanged pipe connection. Standard models are normally equipped with a single switch mechanism for high or low level alarm or control applications. Tandem models with two switch mechanisms are available for two level stage applications, providing the operating functions of two separate instruments such as high and low level alarm.

FEATURES

- Carbon or stainless steel body materials (other materials available on request).
- Flanged and threaded process connections.
- Process temperature up to +400 °C (+750 °F).
- Up to 2 switch levels (T67).
- S.G. as low as 0,40 kg/dm^3.
- Process pressure up to 82,7 bar (1200 psi).
- Field adjustable level differentials from 32 mm (1.25") up to 409 mm (16.12").
- Standard anti-corrosive protection.
- Optional:
  - NACE construction (MR-01-75)
  - interface calibration
  - special actuating levels
  - code compliance construction
  - special tank connections
  - extreme temperature modifications
  - Class 1, Group B explosion proof electrical enclosure
  - special exterior surface preparation and finish.

APPLICATIONS

- Foaming or surging liquids.
- Varnishes.
- Sewage handling.
- Heavy oils.
- Paints.
- Liquids with solids.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•						
CCOE	•							
CSA					•			
FM					•			
EAC (GOST)	•	•						
IEC	•							
Inmetro	•							
Korea	•							
NEPSI	•							

Other approvals are available, consult factory for more details

B40
High pressure / high temperature liquid float level switch

DESCRIPTION

B40 liquid level switch is specifically designed and constructed for high pressure, high temperature service conditions. These type level switches are completely self-contained units designed for side mounting to a tank or vessel with welded or flanged pipe connections.

FEATURES

- Cr Mo (Chrome - molybdenum), carbon steel or stainless steel welded float cages.
- Process temperature up to +540 °C (+1000 °F).
- Single switch level.
- S.G. as low as 0,65 kg/dm^3.
- Process pressure up to 207 bar @ +370 °C (3000 psi @ +700 °F).
- Standard anti-corrosive protection.
- Optional:
  - special tank connections
  - extreme temperature modifications
  - Class 1, Group B explosion proof electrical enclosure.
- Suited for SIL 2 loops (DPDT switch) (full FMEDA report available).

APPLICATIONS

- Accumulators.
- Flash tanks.
- Receivers.
- Knock-out drums.
- Flare pots.
- Storage tanks.
- Scrubbers.
- Separators.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•							
CCOE	•							
CSA					•			
FM					•			
EAC (GOST)	•	•						
IEC	•							
Inmetro	•							
Korea	•							
NEPSI	•							
SIL	SIL 2 (1oo1)							

Other approvals are available, consult factory for more details

EXTERNAL CAGE
Liquid float / displacer level switch

DESCRIPTION

External cage type level switches are completely self-contained units designed for side mounting to a tank or vessel with threaded or flanged pipe connections. These switches are engineered to customer specifications.

FEATURES

- Carbon or stainless steel welded float cages (other materials available on request).
- Process temperature up to +400 °C (+750 °F).
- Up to 3 switch levels.
- Standard anti-corrosive protection.
- Sealed/Flanged cages:
  - S.G. as low as 0,34 kg/dm^3
  - process pressure up to 138 bar (2000 psi) for floats
  - process pressure up to 345 bar (5000 psi) for displacers.
- Optional:
  - NACE construction (MR-01-75)
  - interface calibration
  - customised installation dimensions
  - special actuating levels
  - code compliance construction
  - special tank connections
  - extreme temperature modifications
  - Class 1, Group B explosion proof electrical enclosure
  - special exterior surface preparation and finish.
- SIL 2 suitable (full FMEDA report available).

APPLICATIONS

Foaming or surging liquids – Paints – Agitated fluids – Varnishes – Sewage handling – Heavy oils – Dirty liquids – Liquids with solids.

AGENCY APPROVALS

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•						
CCOE	•							
CSA					•			
FM					•			
EAC (GOST)	•	•						
IEC	•							
Inmetro	•							
Korea	•							
NEPSI	•							
Marine	Lloyd's Register of Shipping (LRS)							
SIL	SIL 2 (1oo1)							

Other approvals are available, consult factory for more details

EXTERNAL CAGES
for buoyancy devices

As with our electronic products our buoyancy products can also be mounted in (custom designed) external cages. It will again depend on process connection, process condition, customer specification, … how the external cage will be designed. Below are some typical examples. Many other designs are possible, consult the factory for more details.

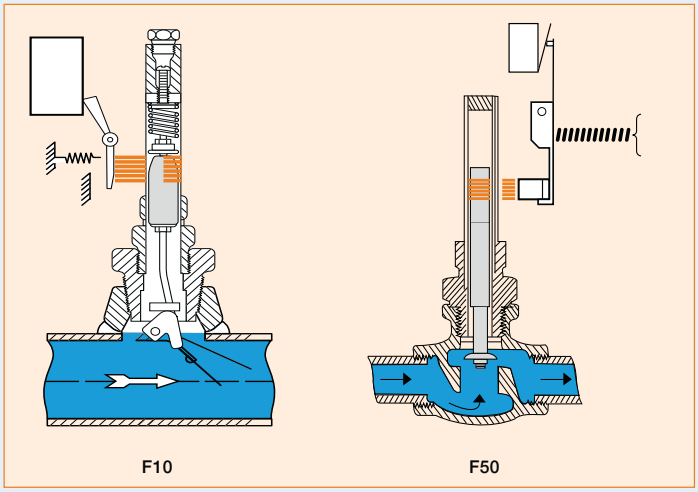
MECHANICAL FLOW

F10

The actuating vane is magnetically linked to a pivoted electric (or pneumatic) switch, which is isolated from the process by a non-magnetic barrier tube. As the actuating vane moves with an increase in flow, it drives a magnetic sleeve into the field of a permanent magnet located outside the barrier tube which trips the switch. As flow decreases, the actuating vane returns to a vertical position, allowing the magnet and switch assembly to return to the “No Flow” position.

F50

The rate of flow through the valve body raises or lowers the disc. This in turn raises or lowers the magnetic sleeve, within its sealed non-magnetic barrier tube. On an increasing flow rate, the magnetic sleeve rises into the field of the permanent magnet, located outside the barrier tube, actuating the attached switch mechanism. When the flow rate drops, below the rate for which the flow disc is calibrated, a reversal of this action occurs.



Distributed by | Distribuido por :

ANYTHING FLOWS™

INFO@ANYTHINGFLOWS.COM

WWW.ANYTHINGFLOWS.COM

Flow Control , our passion ®

Life Flows on ™

SCAN ME