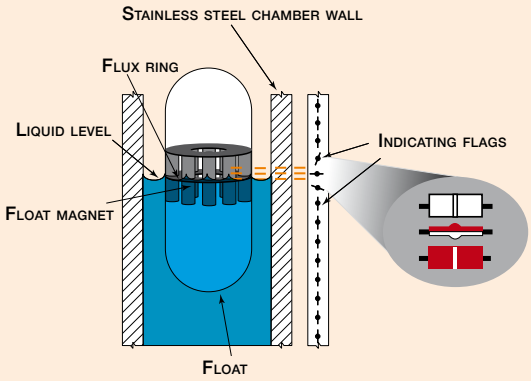
MAGNETIC LEVEL INDICATORS

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-colored 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 colored side. The same electromagnetic 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

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 VDC liquid level transmitter utilizing 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
- Two-wire loop-powered intrinsically safe level transmitter
- HART®, AMS®, FOUNDATION fieldbus™ and PACT*ware*™ communication protocol
- Up to 6.1 m (240") 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
- ECLIPSE 706 transmitter SIL 2/3 certified
- 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

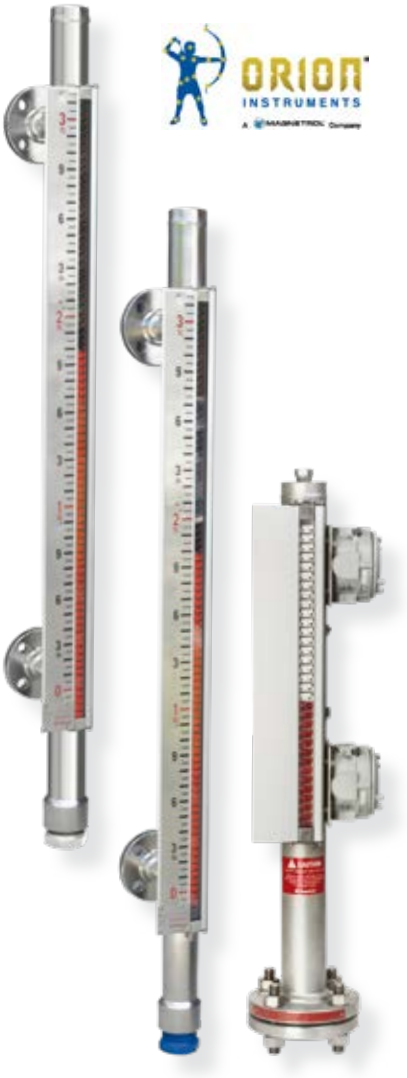
CONDITIONS: All level measurement and control applications including process conditions exhibiting visible vapors, foam, surface agitation, bubbling or boiling, high fill/empty rates, low level and varying dielectric media.

AGENCY APPROVALS (for ECLIPSE 706 GWR)

	Ex d	Ex ia	Ex n	Ex t	XP	IS	NI	Other
ATEX	•	•	•	•				
CCOE	•	•						
CSA					•	•	•	
FM					•	•	•	
EAC (GOST)	•	•	•	•				Metrology
IEC	•	•	•	•				
Inmetro	•	•	•	•				
Marine	Lloyd's Register of Shipping (LRS)							
SIL	SIL 2 / SIL 3 certified							
Steam Drum	Lloyds EN 12952-11 (water tube boilers) Lloyds EN 12953-9 (shell boilers)							
TÜV/DIBt	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 custom
  - 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", 2½", 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 aluminum or stainless steel (optional) indication rail
- ½" NPT vent and drain (other options available)
- Max. hydro-test 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 0.25 kg/dm³ (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. ≥ 0.25 kg/dm³ including aggressive, toxic and flammable liquids/ liquefied gases.

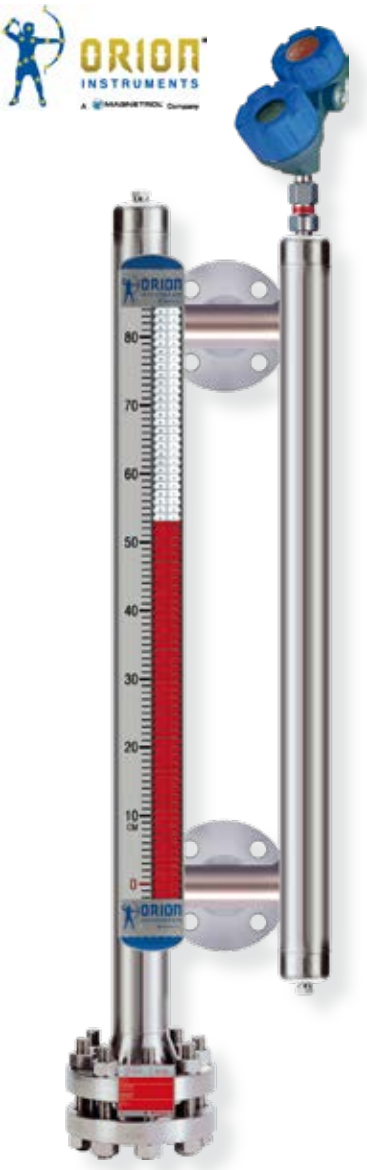
VESSELS: Most process and storage tanks up to rated operating pressure and process temperature.

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 aluminum or stainless steel (optional) indication rail
- ½" NPT vent and drain.
- Max. hydro-test 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, 25 kg/dm³ (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. ≥ 0.25 kg/dm³ including aggressive, toxic and flammable liquids/ liquefied 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 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 VDC 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

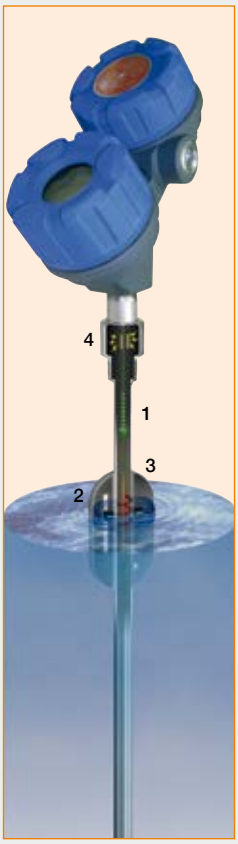
- Scales available: meter/cm, feet/inches, percent, and custom volumetric
- Construction: anodized aluminum enclosure
- Est. LED Lifespan: 100.000 hours

MAGNETOSTRICTIVE

ORION INSTRUMENTS
A MAGNETROL Company

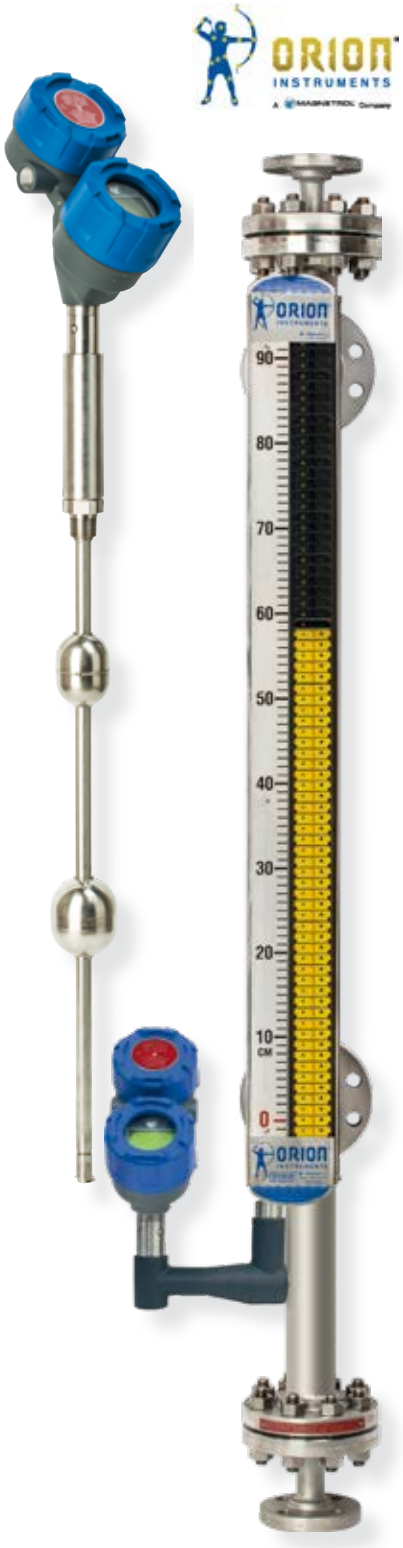
Jupiter® magnetostrictive transmitter utilizes the effect of a magnetic field on a magnetostrictive wire as the basis for operation of the instrument. The primary components are the probe assembly containing the wire and the electronics assembly.

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.



HART COMMUNICATION PROTOCOL

JUPITER® JM4
Magnetostrictive level transmitter



DESCRIPTION

Jupiter® liquid level transmitter is a loop-powered 24 VDC 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: ± 0.01% full scale or ± 1.27 mm (0.05"), whichever is greater
  - repeatability: ± 0.005% of full span or ± 0.36 mm (0.014"), whichever is greater
- Easy bench configuration – no need for level simulation
- Auto-configuration option – configuration settings contained within probe
- Rotatable housing can be dismantled without depressurizing the vessel via "Quick connect/disconnect" probe coupling.
- Two-wire loop-powered intrinsically safe level transmitter
- Dual compartment with separate housing for wiring and electronics
- Four-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):
  - External Mount: -196 °C (-320 °F) to +450 °C (+850 °F)
  - Direct Insertion: -196 °C (-320 °F) 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 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 while 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 2 (1oo1)							

Other approvals are available; consult factory for more details.