



ORION
INSTRUMENTS

A Magnetrol Company

**A New Generation in
Magnetic Level Indication**

2.

Introducing the Next Generation of MLI's: It took a whole new company to bring it to you.

Orion Instruments was created with one objective: to devise new standards for quality and operability in Magnetic Level Indicators (MLI).

As a wholly owned subsidiary of Magnetrol International, Orion's products are engineered under the same strict, unyielding standards as those of Magnetrol—a company whose level and flow control products are known worldwide.

Recognizing the need for a world class producer of MLI's, Magnetrol created a completely new company built upon its experience in level instrumentation dating back to 1932. With operations in Baton Rouge, Louisiana—the very heart of North America's petrochemical industry—Orion is well positioned to provide outstanding service to its customers.

Organized in four technology groups, Orion products combine market-tested MLI design principles with advanced level sensing technology. The result is destined to create new standards for MLI's and the process control industry.

At the heart of every Orion MLI is a unique float (patent pending) with built-in safeguards against

typical MLI float limitations. Aurora and Gemini MLI's fuse Magnetic Level Indication with Magnetrol's Eclipse® Guided Wave Radar to extend the parameters of gauge design into a revolutionary instrument with redundant level sensing capabilities.

Our product line has also been structured to offer customers the broadest range of options so that each Orion MLI is engineered to meet the exact measurement and control needs of your process. This includes your requests for special designs, materials of construction, dimensions, and accessories.

Our manufacturing facility is structured for the production and supply of defect-free products of unparalleled quality. We're further dedicated to providing you with total support services for as long as your Orion MLI is in service.

Orion MLI's are designed specifically for the most demanding challenges in level measurement and control. When you're looking for enhanced operability in a Magnetic Level Indicator, see your Orion Instruments Representative. We'll show you the very best that the world has to offer.

**Visit the newest star in the Magnetrol Level Universe at
www.orioninstruments.com**



Atlas

Gemini

Jupiter

Principle of Operation:

The Orion **Magnetic Level Indicator** (MLI) is connected to a process vessel. Within the piping column **1** of the MLI is a float **2** containing an internal group of magnets. A rise or fall of the fluid in the process tank corresponds to a similar change within the piping column. In response to the level movement the float moves up or down accordingly.

Clamped to the piping column in total isolation from the process liquid is a visual indicator housing. It contains the choice of indicator, either a series of flags **3** or a follower **4**.

The individual flags or the follower contain an alignment magnet which couples with the float magnets as the float moves up or down within the piping column. Float movement rotates the flags and changes their color—or, in the case of the follower—moves the follower to the point of level.

The position of the follower, or the point at which the flags change color, represents true level. Level is indicated or “read” by the corresponding point on the measuring scale. ■



Product Overview

Atlas™

- For the most demanding high pressure/temperature liquid level applications. Ideal replacement for sight and gauge glass instruments.
- Wide range of materials available, including 304/304L SS, 316/316L SS, Inconel, Hastelloy, Alloy 20, PVC, CPVC, Kynar and many others.
- Broad range of pressure classes, process connections, styles and sizes. Top and bottom float stop springs are standard.
- Options include flag-type or shuttle indicator, scales, switches and transmitters, blankets, steam or electric heat tracing, and frost extensions.



Aurora™

- Combines Guided Wave Radar and MLI technology into a truly redundant system (patent pending).
- Application-proven Eclipse Guided Wave Radar technology.
- Aurora's chamber houses both the probe for Magnetrol's Eclipse Guided Wave Radar transmitter and the float. The instrument transmits level data accurately and reliably.
- Baffle plate design provides flawless guide for float.



Tank Configurations

Orion MLIs are applicable to a wide range of tank types, media, and services. Atlas is designed for side and top mounting. Gemini and Aurora units are designed for side mounting on vertical, horizontal or spherical vessels. Either level or continuous interface (or both) measurement is available.

Type:
Top Mount

Media:
Chemical
Waste Tank



Type:
Side Mount

Media:
Sodium
Hypochlorite

Accessory:
Continuous
Transmitter



Type:
Top In,
Bottom Out

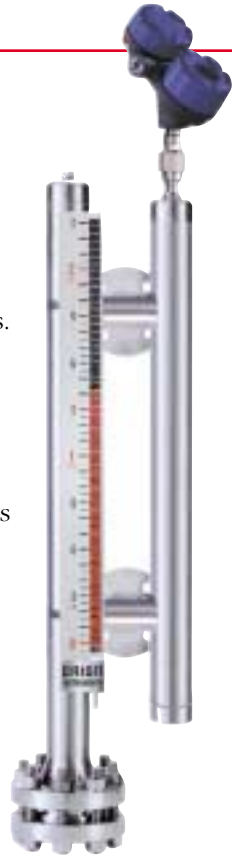
Media:
Liquid
Nitrogen

Accessory:
Cryogenic
Services
Accessories



Gemini™

- Twin-chamber design for use on applications where redundant measurement is critical. Gemini features two separate technologies.
- Either Eclipse or Magnetostrictive transmitters may be installed in the secondary chamber.
- Add electric or pneumatic switches for high, low, or high and low level.
- Perfect solution for precision visual measurement and a highly reliable method for transmitting level data to a remote display, analog input point or controller.



Jupiter™

- A Jupiter transmitter utilizes market-tested, application-proven, magnetostrictive technology.
- Reliable technology senses liquid level or interface.
- Jupiter mounts directly to the side of the MLI gauge.
- Provides a 4-20 mA process signal proportional to level.
- HART® communications protocol is available as an option.
- Transmitter may be top or bottom mounted.



Type:

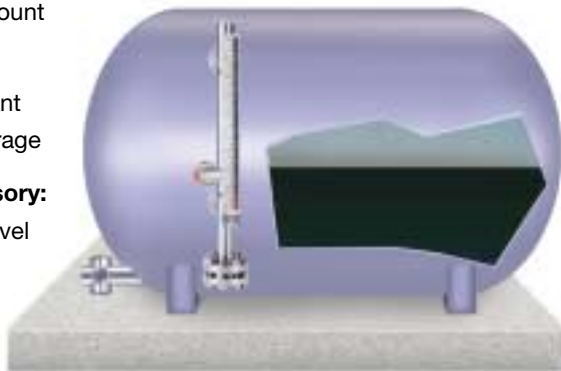
Side Mount

Media:

Lubricant
Oil Storage

Accessory:

Low Level
Switch



Type:

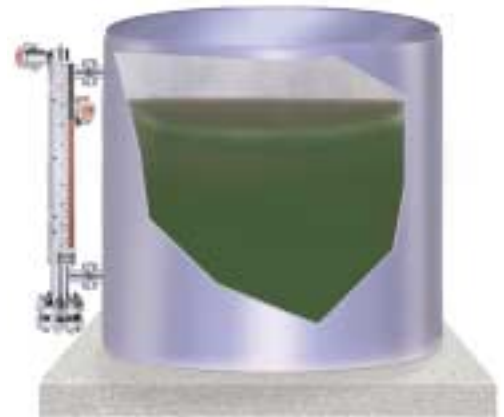
Side Mount

Media:

Hydrochloric
Acid Storage

Accessory:

High Level
Switch &
Continuous
Transmitter



Type:

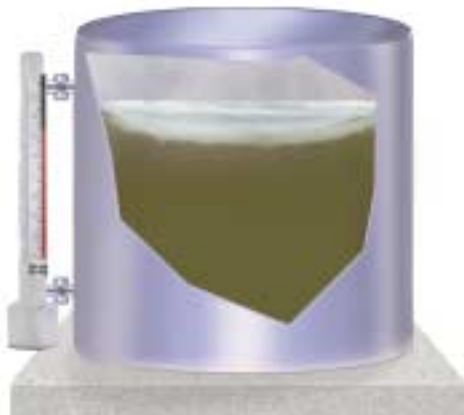
Side Mount

Media:

Sodium
Hydroxide

Accessory:

Chamber
Blanket



Type:

Side Mount

Media:

Interface

Accessory:

High Level
Switch &
Continuous
Transmitter



Design Attributes: Basic Gauge

Basic Gauge Construction

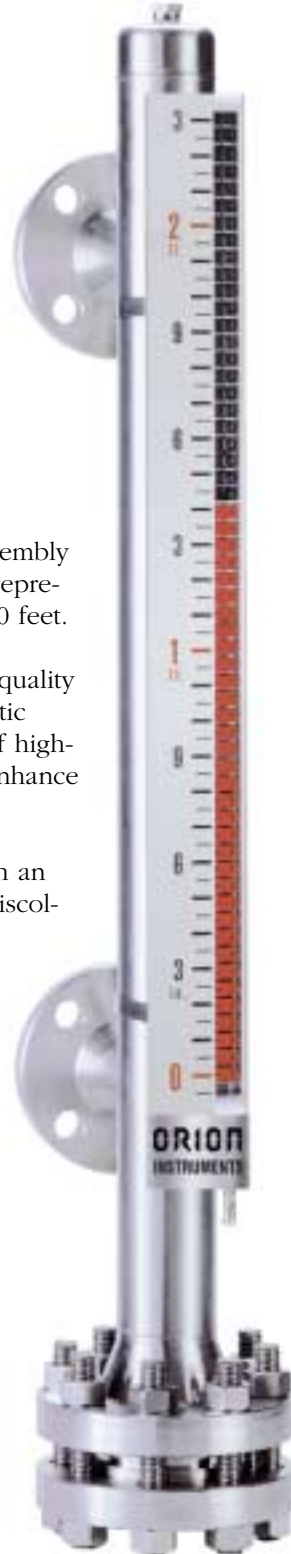
- ASME B31.1 and B31.3.
- 100% full penetration X-ray quality welds are standard.
- NACE MRO 175 requirements.
- CMTR's are available upon request.
- **All** Orion MLI's, including the float are hydro tested prior to shipment.
- CRN compliance available.

Visual Indication

- Orion MLI's are available with either a flag assembly or a shuttle unit designed to provide a visual representation of level visible from a distance of 100 feet.
- Flag version is manufactured with the highest quality metal components. Flags are all metal; no plastic parts are used. Three different combinations of high-visibility fluorescent colors are available and enhance the indicator's readability.
- All Orion MLI scale assemblies are purged with an inert gas to prevent condensate buildup and discoloration due to direct sun exposure.
- Glass flag chamber is sealed with our Insta-seal™ (patent pending) valve method. We are the only MLI manufacturer utilizing this technique.

Process Connections

- Orion will engineer and design any process connections, configurations and special alloy materials. Our goal is to ensure that the exact design and material requirements are fulfilled.
- Side-bottom and top-side process connections are available upon request.



Quality Warranty

Orion Instruments warrants all MLI's to be free of defects in materials and workmanship for a period of **FIVE YEARS** after date of shipment. All electronics are similarly warranted for a period of one year. ■

Measurement Scales

- Standard scales are manufactured in stainless steel with etched and epoxy filled numbers and graduations. Plastic scales are available upon request.
- English or Metric units available and in stock.
- Custom volumetric or percentage scales available upon request.

Switches & Transmitters

- Orion offers the broadest range of switches and transmitters available.
- Customers can specify either reed, snap action, or pneumatic switches for high, low, or high/low level control as well as a dependable analog transmitter for continuous level measurement.
- For applications requiring higher accuracy, the Jupiter magnetostrictive transmitter is available to provide an output with an accuracy of ± 1 mm.
- For applications requiring redundancy and transmitters with no moving parts the Eclipse Guided Wave Radar transmitter is an ideal choice. See Aurora or Gemini models.

Design Attributes: Components



The Orion Float

The Orion float has been engineered to provide the best MLI performance in the world.



Float Features

- Magnetic retainer and flux ring (patent pending) assembly within the float ensures top performance regardless of process conditions.
- The 360-degree vertical placement of the magnets assures proper coupling with the flag or shuttle of the indicator, even as the float turns within the chamber.
- The magnetic assembly creates a constant Gauss rating optimized to ensure reliable performance.
- Float magnets are designed to function at temperatures up to +1000° F for many years of reliable service.
- Special float alloys that are available include Titanium, Hastelloy C-276, Monel, Inconel, Alloy 20, and durable plastics. Consult factory for availability of additional materials.

MLI Indicator Options

- **Flag Assembly** operation is smooth and reliable. Magnetic coupling between the flags ensures “true level” indication even during violent surging or upset conditions within a process vessel.
- **Shuttle** provides an optional visual indicator suitable for most applications except where flashing or extreme turbulence exists. The standard shuttle is fluorescent orange.
- **Flag Color Combinations** include either orange & black or yellow & black. Red & white option is also available.
- **Magnetic** traps are available, per customer specification, for removal of ferrous (magnetic) particles which might interfere with float function.



Flag Type



Shuttle Type

8.



ORION Aurora

Combining Magnetrol's Eclipse Guided Wave Radar with an Orion Magnetic Level Indicator represents Level Measurement's leading-edge.

■ Operating Principle

Orion's Aurora (patent pending) combines the operating system of a conventional float-based MLI with the leading-edge Guided Wave Radar transmitter developed for level measurement applications by Magnetrol International. The result is **true level-measurement redundancy** in a single-chamber design.

Guided Wave Radar combines micropower impulse radar, time domain reflectometry and equivalent time sampling to detect level. Since the signal is carried within the waveguide, process conditions which hamper other measurement technologies have virtually no effect on Eclipse.

■ Features

- Single-chamber redundancy in a compact, precision fabricated chamber.
- An Eclipse coaxial type probe is mounted off center within the chamber permitting the float to rise and fall, unimpeded by the probe, as level changes. True Level Measurement Redundancy results.
- Eclipse is all electronic with no moving parts to wear or deteriorate. Requires no calibration or change in level to set up.
- Because Guided Wave Radar technology measures actual product it is not influenced by process conditions that affect thru-air units.
- Ideal for low specific gravity applications and low-dielectric media such as propane, butane, and hexane.
- HART and Foundation Fieldbus communications with local indication available.
- Eclipse is suitable for a broad media range and is not affected by changing dielectric or changing specific gravity.
- Unique baffle plate design provides flawless guide for float.

Jupiter

With a Jupiter Magnetostrictive Transmitter, an Orion MLI offers high accuracy and high linearity at a reasonable price.



■ Operating Principle

Jupiter utilizes a precision, loop-powered magnetostrictive transmitter. The magnetic field generated by the float magnets interact with the magnetostrictive wire to create a torsional twist in the wire. A sensitive, piezo sensor then detects the return acoustic signal and determines the precise elapsed time from pulse generation to detection of the return signal. A sampling update of ten times per second ensures high-accuracy measurement.

■ Features

- Two-wire, 4-20 mA operation simplifies installation.
- Suitable for continuous level or interface applications.
- Offers excellent linearity, resolution and repeatability.
- Mounting to the chamber is simple and straightforward requiring only supplied clamps to attach the waveguide to the chamber.
- HART protocol available as an option.
- Liquid crystal display with "Fast-Cal" push-button, keypad configuration.
- Jupiter is suitable for high-temperature applications since the waveguide is placed outside the chamber and insulation.
- Magnetostriction technology is inherently highly reliable and more accurate than reed chain type transmitters.
- Transmitter enclosure may be mounted at the top or bottom of the chamber.

Thermal Insulation Blankets

Orion offers high-temperature and low-temperature blankets fabricated specifically for each application. These blankets include:

- Cryogenic insulation from $+32^{\circ}$ to -320° F (0° to -196° C) which is suitable for liquified gases and media that vaporize at ambient temperature, such as liquid natural gas and liquid petroleum gas.
- High-temperature insulation fabricated to specific customer requirements for product media that must be maintained at elevated temperatures up to $+1000^{\circ}$ F ($+538^{\circ}$ C).
- Steam tracing or electrical heat tracing with or without insulation blankets per customer requirements.

Frost Extension

Orion offers custom designed frost extensions engineered to our customers' specifications.

Orion frost extensions are hermetically sealed and engineered to prevent frost accumulation while ensuring the highest degree of readability for the user.

Frost extensions are manufactured from highly durable polymers.



Switches & Transmitters

Model OES-100



Model ORS-300



Model OCT-400

Electro-Magnetic Switch Specifications



Switch Type:	Model OES-100 Magnetically actuated, bi-stable cam drive snap action switch Two SPDT 10.1 amp 125-250 VAC, 1.5 amp 250 VDC	Model ORS-300 Bi-stable reed switch One SPDT 1.0 amp
Maximum Dead Band:	±0.75" float travel	±0.50" float travel
Temperature Range:	-58° to +392° F (-50° to +200° C)	-58° to +482° F (-50° to +250° C)
Enclosure:	NEMA 4X/7/9	NEMA 4X/7/9

Also available Model OPS-200 pneumatic switch

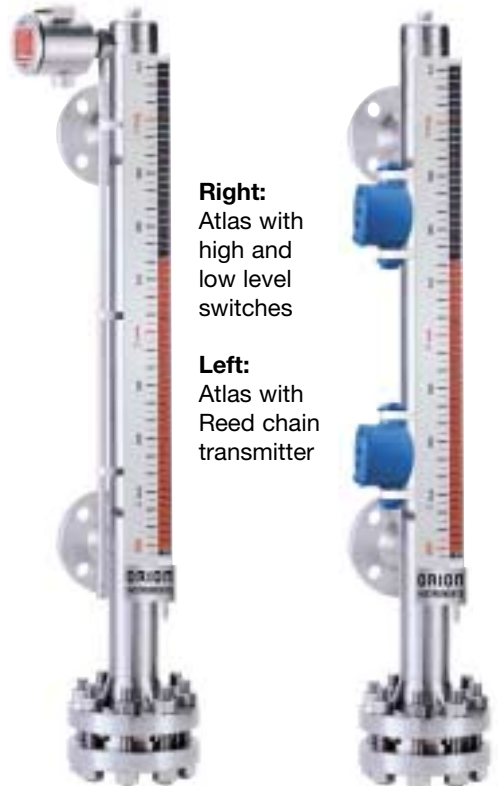
Transmitter Specifications

Model:	OCT-400	Jupiter	Eclipse
Type:	Reed Chain	Magnetostrictive	Guided Wave Radar
Supply Voltage:	24 VDC	24 VDC	24 VDC
Resolution:	±0.50"	±0.015"	±0.1"
Output Signal:	4-20 mA	4-20 mA (HART optional)	4-20 mA (HART optional)
Temperature Range*:	-40° to +158° F (-40° to +70° C)	-40° to +175° F (-40° to +79° C)	-40° to +160° F (-40° to +71° C)
Enclosure:	NEMA 4X/7/9	NEMA 4X/7/9	NEMA 4X/7/9

Higher temperatures possible for Models OCT-4 and Jupiter using insulation. Consult factory.

Agency	Model	Approval Category
Canadian Standards Association 	OES-100E-001	Class I, Div. 1 & 2, Grps B, C, & D Class II, Grps E, F, & G Class III
	ORS-300E-001	Class I, Div. 1, Grps B, C, & D Class I, Div. 2, Grps A, B, C, & D Class II, Grps E, F, & G Class III
	OCT-40xx-xxx	Class I, Div. 1, Grps B, C, & D Class I, Div. 2, Grps A, B, C, & D Class II, Grps E, F, & G Class III
	2xx-100x-xxx	Class I, Div. 1, Grps B, C, & D Class I, Div. 2, Grps A, B, C, & D Class II, Div. 1 & 2, Grps E, F, & G Class III Type 4X
Factory Mutual 	2xx-100x-xxx	Class I, Div. 1, Grps B, C, & D Class I, Div. 2, Grps A, B, C, & D Class II, Div. 1 & 2, Grps E, F, & G Class III Type 4X

Approval files for Electro-Magnetic Switches and Reed Chain Transmitters open at FM. Consult factory for further information.



Right:
Atlas with high and low level switches

Left:
Atlas with Reed chain transmitter

Atlas #1

- side/side connections
- dome cap
- slip-on bottom flange

Shown with a flag-type indicator and magnetostrictive transmitter.

**Atlas #2**

- side/side connections
- slip-on top flange
- bottom cap

Shown with a flag-type indicator.

**Atlas #3**

- side/side connections
- slip-on top and bottom flanges

Shown with a flag-type indicator and magnetostrictive transmitter.

**Atlas #4**

- multiple side/side connections for interface service
- dome cap
- slip-on bottom flange

Shown with a shuttle-type indicator for level/interface service.

**Atlas #5**

- top and bottom flanged connections

Shown with a flag-type indicator.

**Atlas #6**

- top and bottom flanged spool pieces

Shown with a flag-type indicator and magnetostrictive transmitter.

**Atlas #7**

- top mount gauge
- dome cap
- flanged connection

Shown with a flag-type indicator.

**Atlas #8**

- top mount gauge
- flanged connection
- stilling well guide tube

Shown with a flag-type indicator.

**Atlas A**

- side/side connections
- dome cap
- weldneck bottom flange

Shown with a flag-type indicator.

**Atlas B**

- side/side connections
- weldneck top flange
- bottom cap

Shown with a flag-type indicator and magnetostrictive transmitter.

**Atlas C**

- side/side connections
- weldneck top and bottom flanges

Shown with a flag-type indicator.

**Atlas D**

- multiple side/side connections for interface service
- dome cap
- weldneck bottom flange

Shown with a shuttle-type indicator for interface/level service.



Aurora #2

- side/side connections
- slip-on top flange
- bottom cap

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Aurora #3

- side/side connections
- slip-on top and bottom flanges

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Aurora #4

- multiple side/side connections
- slip-on top and bottom flange

Shown with shuttle-type indicator for interface/level service, side mount Magnetostrictive for interface measurement and Eclipse GWR for top level measurement.



Aurora B

- side/side connections
- weldneck top flange
- bottom cap

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Aurora C

- side/side connections
- weldneck top and bottom flanges

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Aurora D

- multiple side/side connections for interface service
- weldneck top and bottom flange

Shown with a shuttle-type indicator for interface/level service and Eclipse GWR level transmitter.



General Gauge Specifications

Standard Measuring

Range: To 50 feet, consult factory for longer lengths

Temperature Range: -320° to +1000° F
(196° to +538° C)

Pressure: Full vacuum to 4,500 psig
(310 Bar)

Specific Gravity: As low as 0.35

Indicators: Metal flag or shuttle type. All indicators are hermetically sealed and assured by the patent pending Orion Insta-seal™ valve methodology.

Visual Indication: Distances up to 100 feet

Thermal Protection: High-temperature and Cryogenic insulation. Electric or steam tracing

Features: Units built to ASME B31.1 and B31.3 by Section IX qualified welders

Floats: Precision manufactured and utilizing Orion's magnetic flux ring

Gemini ■ Instrument Configurations

Gemini # 1

- side/side connections
- dome cap
- slip-on bottom flange
- secondary chamber with top and bottom dome caps

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini # 2

- side/side connections
- slip-on top flange
- bottom cap
- secondary chamber with top and bottom dome caps

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini # 3

- side/side connections
- slip-on top and bottom flanges
- secondary chamber with top and bottom dome caps

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini A

- side/side connections
- dome cap
- weldneck bottom flange
- secondary chamber with top and bottom dome caps

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini B

- side/side connections
- weldneck top flange
- bottom cap
- secondary chamber with top and bottom dome caps

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini C

- side/side connections
- weldneck top and bottom flanges
- secondary chamber with top and bottom dome caps

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini L

- side/side connections
- slip-on top and bottom flanges
- secondary chamber with slip-on top flange and bottom dome cap

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini M

- top and bottom slip-on flange connections
- secondary chamber with slip-on top flange and bottom dome cap

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini N

- top and bottom slip-on flanged spool piece connections
- secondary chamber with slip-on top flange and bottom dome cap

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini #4

- multiple side/side connections
- dome cap
- slip-on bottom flange
- secondary chamber with top and bottom dome caps

Shown with a shuttle-type indicator for interface/level service, and Eclipse GWR level transmitter.



Gemini #5

- top and bottom slip-on flanges
- secondary chamber with top and bottom dome caps

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini #6

- top and bottom slip-on flange spool pieces
- secondary chamber with top and bottom dome caps

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini D

- multiple side/side connections for interface
- dome cap
- weldneck bottom flange
- secondary chamber with top and bottom dome caps

Shown with a shuttle-type indicator for interface /level service, and Eclipse GWR level transmitter.



Gemini J

- side/side connections
- dome cap
- slip-on bottom flange
- secondary chamber with slip-on top flange and bottom dome cap

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini K

- side/side connections
- slip-on top flange
- bottom cap
- secondary chamber with slip-on top flange and bottom dome cap

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini P

- side/side connections
- dome cap
- weldneck bottom flange
- secondary chamber with slip-on top flange and bottom dome cap

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini Q

- side/side connections
- weldneck top flange
- secondary chamber with slip-on top flange and bottom dome cap

Shown with a flag-type indicator and Eclipse GWR level transmitter.



Gemini R

- side/side connections
- weldneck top and bottom flanges
- secondary chamber with slip-on top flange and bottom dome cap

Shown with a flag-type indicator and Eclipse GWR level transmitter.



16. MLI Model Number Origination

IMPORTANT: Operating specific gravity, maximum pressure, and maximum temperature *must* be provided upon placement of order.

Providing information on the liquid, operating pressure, operating temperature, minimum specific gravity, and the quotation number will expedite the processing of your order.

Standard vent & drain connections are 1/2" plugged NPT. Consult factory for options.

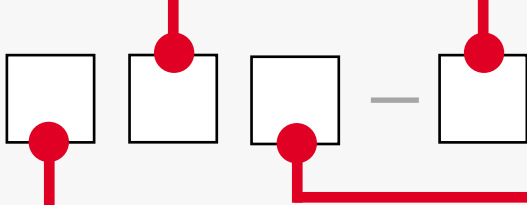
● = Atlas only ■ = Atlas or Gemini only ✱ = Gemini only

Atlas, Aurora chamber or Gemini indicator chamber				Gemini Eclipse chamber	
Process Connections		Top	Bottom	Top	Bottom
1	Side/side	dome cap	RF slip-on w/blind flange	dome cap	dome cap
2	Side/side	RF slip-on w/blind flange	dome cap	dome cap	dome cap
3	Side/side	RF slip-on w/blind flange	RF slip-on w/blind flange	dome cap	dome cap
4	Side/side for interface	dome cap	RF slip-on w/blind flange	dome cap	dome cap
■ 5	Top/bottom	RF slip-on flange	RF slip-on flange	dome cap	dome cap
■ 6	Top/bottom spool pieces	RF slip-on flange	RF slip-on flange	dome cap	dome cap
● 7	Top mounted	n/a	RF slip-on flange	n/a	n/a
● 8	Top mounted w/stilling well	n/a	RF slip-on flange	n/a	n/a
A	Side/side	dome cap	RF weldneck w/blind flange	dome cap	dome cap
B	Side/side	RF weldneck w/blind flange	dome cap	dome cap	dome cap
C	Side/side	RF weldneck w/blind flange	RF weldneck w/blind flange	dome cap	dome cap
D	Side/side for interface	dome cap	RF weldneck w/blind flange	dome cap	dome cap
✱ J	Side/side	dome cap	RF slip-on w/blind flange	RF slip-on flange	dome cap
✱ K	Side/side	RF slip-on w/blind flange	dome cap	RF slip-on flange	dome cap
✱ L	Side/side	RF slip-on w/blind flange	RF slip-on w/blind flange	RF slip-on flange	dome cap
✱ M	Top/bottom	RF slip-on flange	RF slip-on flange	RF slip-on flange	dome cap
✱ N	Top/bottom spool pieces	RF slip-on flange	RF slip-on flange	RF slip-on flange	dome cap
✱ P	Side/side	dome cap	RF weldneck w/blind flange	RF weldneck flange	dome cap
✱ Q	Side/side	RF weldneck w/blind flange	dome cap	RF weldneck flange	dome cap
✱ R	Side/side	RF weldneck w/blind flange	RF weldneck w/blind flange	RF weldneck flange	dome cap

A	150# ANSI class
B	300# ANSI class
C	600# ANSI class
D	900# ANSI class
E	1500# ANSI class
F	2500# ANSI class
M	PN 16 DIN class
N	PN 25/40 DIN class
P	PN 64 DIN class
Q	PN 100 DIN class
R	PN 160 DIN class
S	PN 250 DIN class
T	PN 320 DIN class

CHAMBER PRESSURE RATING

LEVEL INDICATOR CHAMBER MOUNTING CONFIGURATION (CONSULT FACTORY FOR SPECIAL CONFIGURATIONS)



For requirements not specified in the model number selection, add the prefix "X" to the model and describe the special modifications required.

Example: X1AC-3CB3-AAA/060
X = 3/8" NPT vent 180° from upper process connection

Refer to page 17 for continuation of model number selection.

Inches	cm	CHAMBER TYPE
1	A	Atlas
2	B	Aurora (Eclipse internal mount, single 3" or 4" chamber)
3	C	Gemini (Eclipse internal mount, dual chambers, 2" or 3")

CHAMBER MATERIAL OF CONSTRUCTION	
A	316/316L SS
B	316/316L SS w/CS flanges
C	304/304L SS
D	304/304L SS w/CS flanges
F	321 SS
G	Titanium
H	Monel
J	Hastelloy B
K	Hastelloy C-276
L	Inconel 625
M	Incoloy 825
N	Alloy 20
P	Electropolished 316 SS
Q	904L SS
R	347 SS
● 1	Fiberglass
● 2	PVC
● 3	CPVC
● 4	Kynar
● 5	Polypropylene

● = Atlas Only

1	Black/orange flags	No scale
2	Black/orange flags	Height in cm
3	Black/orange flags	Height in feet/inches
4	Black/orange flags	Height in % of span
5	Black/orange flags	Volume in gallons
6	Black/orange flags	Volume in liters
7	Black/orange flags	Height in running inches
H	Black/yellow flags	No scale
J	Black/yellow flags	Height in cm
K	Black/yellow flags	Height in inches
L	Black/yellow flags	Height in % of span
M	Black/yellow flags	Volume in gallons
N	Black/yellow flags	Volume in liters
P	Black/yellow flags	Height in running inches
Q	Red/white flags	No scale
R	Red/white flags	Height in cm
S	Red/white flags	Height in inches
T	Red/white flags	Height in % of span
V	Red/white flags	Volume in gallons
W	Red/white flags	Volume in liters
Y	Red/white flags	Height in running inches
A	Orange shuttle	No scale
B	Orange shuttle	Height in cm
C	Orange shuttle	Height in inches
D	Orange shuttle	Height in % of span
E	Orange shuttle	Volume in gallons
F	Orange shuttle	Volume in liters
G	Orange shuttle	Height in running inches
INDICATOR TYPE		SCALE UNITS

■ = On chamber only
 ● = On chamber and flanges

● A	HT insulation blanket to 500° F
● B	HT insulation blanket to 1000° F
■ C	HT insulation blanket to 500° F
■ D	HT insulation blanket to 1000° F
● N	Cryogenic insulation to -100° F
● P	Cryogenic insulation to -200° F
● Q	Cryogenic insulation to -320° F
R	Steam tracing
S	Steam tracing with blanket
T	Electric heat tracing 40° F & below with insulation blanket
U	Electric heat tracing 40° to 200° F with insulation blanket
V	Electric heat tracing 200° to 500° F with insulation blanket
W	Electric heat tracing 500° to 800° F with insulation blanket
0	None
TEMPERATURE OPTIONS	



SIZE OF PROCESS CONNECTION	
A	½"
B	¾"
C	1"
D	1½"
E	2"
F	2½"
G	3"
H	4"
J	6"
K	8"
L	DN 20
M	DN 25
N	DN 40
P	DN 50
Q	DN 80
R	DN 100
S	DN 150

PROCESS CONNECTION TYPE	
A	Threaded nipple
B	Threaded coupling
C	Plain-end nipple
D	Socketweld coupling
E	Buttweld nipple
F	Weldolet™
G	Sockolet™
T	Threadolet™
H	Slip-on FF flange
J	Slip-on RF flange
K	Slip-on RTJ flange
L	Weld neck RF flange
M	Weld neck RTJ flange
N	Lap joint flange
P	Tri-clamp fitting
Q	Van Stone flange (plastic only)

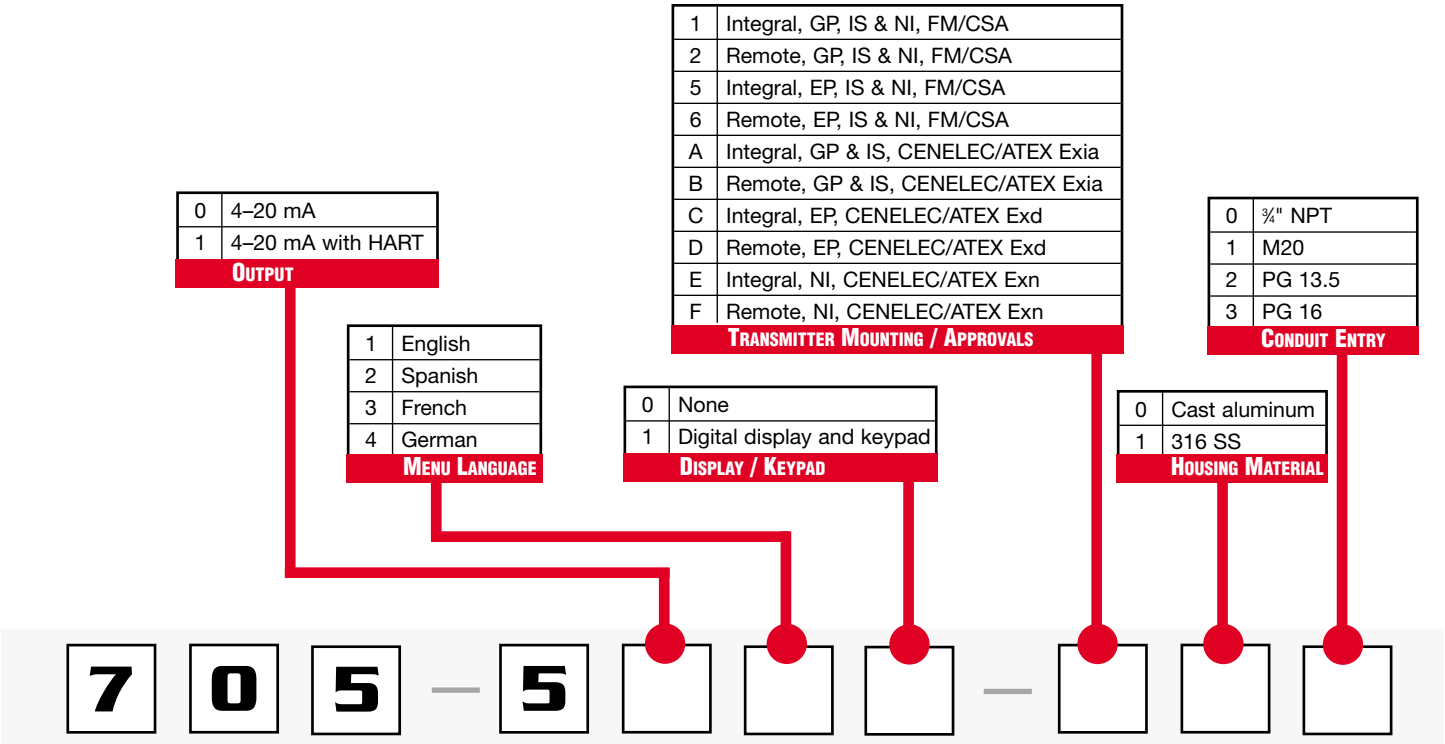
	MIN S.G.	MAXIMUM PRESSURE (psi) @ °F						USED w/MLI
		100	200	300	400	500	600	
A	0.65 to 1.80	950	950	925	925	900	850	Atlas & Gemini
B	0.50 to 0.64	800	800	775	775	775	725	Atlas & Gemini
1	0.65 to 1.80	675	675	650	650	625	600	Aurora
2	0.50 to 0.64	525	525	500	500	500	475	Aurora

Orion capabilities exceed those listed in the above table. Pressures up to 4500 psi and specific gravities as low as 0.35 can be achieved. Consult factory for assistance.

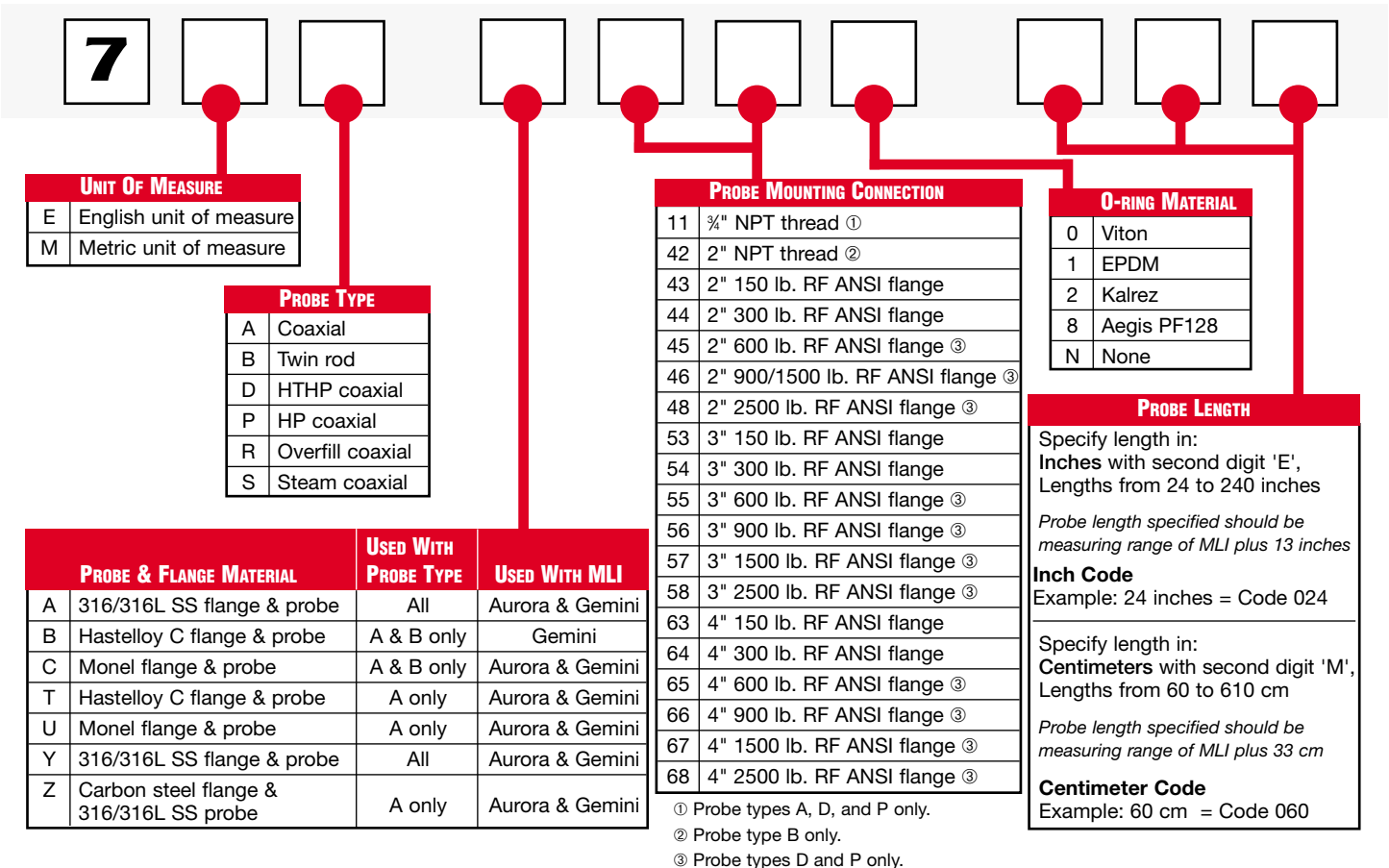
CHAMBER LENGTH
Specify length in Inches when first digit is numeric Lengths from 12 to 600 inches
Inch Code Example: 24 inches = Code 024
Specify length in Centimeters when first digit is alpha Lengths from 30 to 1524 cm
Centimeter Code Example: 60 cm = Code 060

Consult factory for longer or shorter lengths.

18. ECLIPSE® Guided Wave Radar Transmitters



with Eclipse Guided Wave Radar Probe



JUPITER Magnetostrictive Transmitters

2	4-20 mA with LCD
4	4-20 mA with HART & LCD

OUTPUT

*Must be used for temperatures above 250° F or if the top of the MLI is flanged.

1	Top mount, length in inches
2	Top mount offset, length in inches*
3	Bottom mount offset, length in inches
A	Top mount, length in centimeters
B	Top mount offset, length in centimeters*
C	Bottom mount offset, length in centimeters

CONFIGURATION / UNITS OF MEASURE

1	Cast aluminum with 3/4" NPT conduit entry, FM/CSA, EP, NI
3	316 SS with 3/4" NPT conduit entry, FM/CSA, EP, NI

HOUSING MATL / MOUNTING / CONDUIT ENTRY

Specify measuring range in:
Inches when third digit is numeric,
Lengths from 6 to 410 inches

Inch Code

Example: 24 inches = Code 024

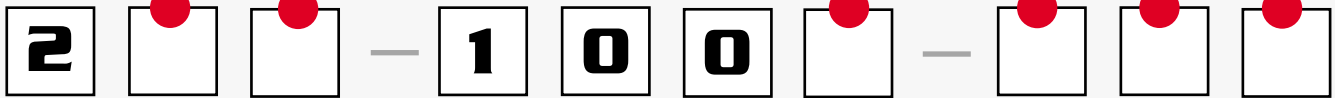
Specify measuring range in:

Centimeters when third digit is alpha
Lengths from 15 to 999 cm

Centimeter Code

Example: 60 cm = Code 060

PROBE LENGTH



REED CHAIN Transmitters

E	English unit of measure
M	Metric unit of measure

UNIT OF MEASURE

0	Top mount
1	Bottom mount

MOUNTING

0	Stainless steel
1	Aluminum

ENCLOSURE

Specify active length in:
Inches when seventh digit 'E',
Active lengths from 6 to 198"

Inch Code

Example: 24 inches = Code 024

Specify active length in:

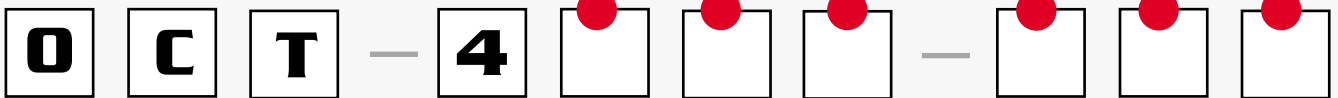
Centimeters when seventh digit 'M',
Active lengths from 15 to 503 cm

Centimeter Code

Example: 50 cm = Code 050

Note: Finished probe length equals
active length plus 8" (20 cm)

PROBE LENGTH



ELECTRIC Switches

OES-1	Electric DPDT snap switch in cast aluminum, clamp mounted housing, NEMA 4X/7/9
ORS-3	Electric bi-stable SPDT reed switch in stainless steel, clamp mounted housing, NEMA 4X/7/9

SWITCH & ENCLOSURE



ORION

A Member of the Magnetrol Instrumentation Group



■ **Innovative Fusion**

Naugatuck, CT

*State-Of-The-Art
Metal Joining*

■ **Innovative Solutions**

Naugatuck, CT

*Creative Solutions
in Fluid Sensing*

■ **Introtek**

Edgewood, New York

*Excellence in
Ultrasonic Technology*

■ **Magnetrol International**

Manufacturing Centers: Downers Grove, IL, USA;
Zelev, Belgium; and Sao Paulo, Brazil

*Worldwide Level
and Flow Solutions*

■ **STI Controls**

Downers Grove, IL

*Municipal Level
and Flow Solutions*



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