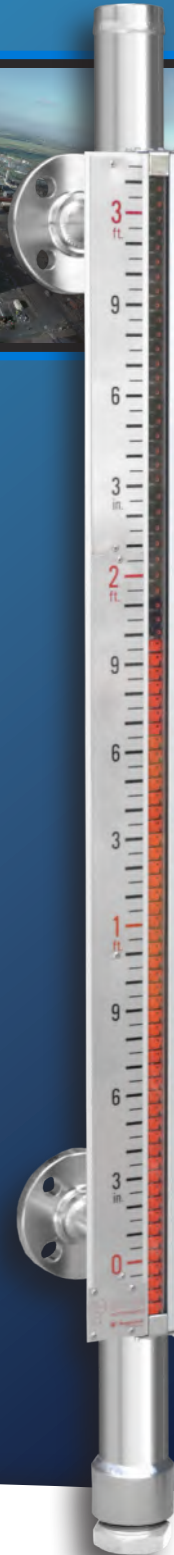
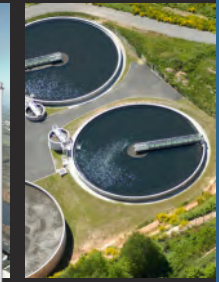


VECTOR™

MAGNETIC LEVEL INDICATOR



ORION®
INSTRUMENTS
A  **Magnetrol®** Company



Magnetrol®

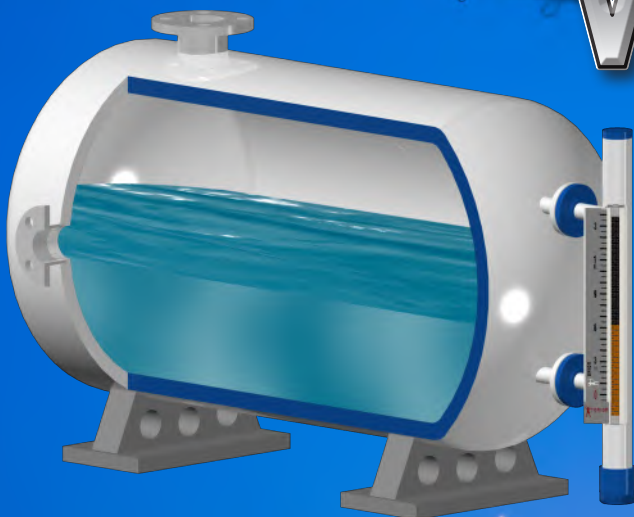
Worldwide Level and Flow SolutionsSM

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 glass indicators and are increasingly used in new applications. Optional switches and transmitters are available to provide various output signals for level control.



VECTOR™



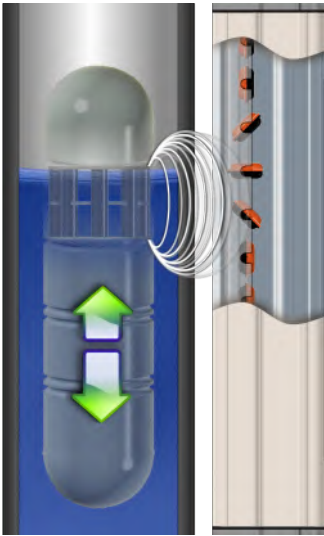
- Feedwater heaters
- Oil/water separators
- Flash drums
- Surge tanks
- Gas chillers
- Deaerators
- Blowdown flash tanks
- Hot wells
- Vacuum tower bottoms
- Alkylation units
- Propane vessels
- Storage tanks

...and many others



Principle of Operation

A float travels up and down in a chamber that is mounted to a liquid-containing vessel. The float contains a magnetic assembly that interacts with an externally-mounted visual indicator. As the float follows the liquid surface or liquid-liquid interface, the magnetic field causes highly contrasting flags in the visual indicator to rotate. The result is a clearly defined representation of the liquid level in the vessel.



Features

- Rugged, industrial-grade construction
- Field adjustable visual indicator for convenient viewing
- Continuous measuring range up to 500 cm (197")
- Compatible with electronic point switches and continuous level transmitters
- Media specific gravity as low as 0,55
- Shatter-resistant viewing window
- Single magnet per flag to enhance float coupling effect and self-alignment



The Vector™ float contains high-strength alloy magnets that facilitate a strong coupling with the externally-mounted visual indication, as well as any switches or transmitters.

Every float is manufactured specifically for each application. Process pressure, temperature, and media specific gravity are all factored into the custom design.

The Vector™ high-visibility visual indicator is constructed with quality materials and engineered for reliable performance.

Each flag contains an alloy magnet that maximizes coupling with the float. The flags are mechanically limited to a half-rotation, which eliminates the possibility of over-rotation common with other magnetic level indicators.



16 CHAMBER MODIFICATION FOR MOUNTING OF OPTIONAL TRANSMITTER

Vector can be combined with various externally mounted accessories, including switches and transmitters. For Jupiter transmitter, refer to digit 17 for temperature limitations and possible mounting configurations. Match up the Jupiter model code with the MLI model codes 16 and 17.

If SIL enhanced Jupiter transmitter is required then use model Atlas with float diagnostics indicator instead of model Vector.

All transmitters and switches must be ordered separately.
Refer to pages 6 & 7 for additional information regarding accessories.

N	No transmitter added
1	Jupiter transmitter top mount without offset ① max. 190 °C (375 °F) with insulation (digit 17 = K)
2	Jupiter transmitter top mount offset, high temperature bend (matches external mount Jupiter with model code digit 5 = G)
3	Jupiter transmitter bottom mount offset, high temperature bend (matches external mount Jupiter with model code digit 5 = J)

① Only available in combination with digit 3 = A or 1.

17 INSULATION OPTIONS

N	None	Indicator with plastic flags: max 110 °C (230 °F) Indicator with metal flags: max 190 °C (375 °F) Jupiter transmitter without offset: max 110 °C (230 °F) Jupiter transmitter, high temperature bend: max 190 °C (375 °F)
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Insulation pad for indicator and/or transmitter			
E	Indicator only ①	digit 16 = N	190 °C (375 °F) < T ≤ 260 °C (500 °F)
K	Jupiter only ①②	digit 16 = 1	110 °C (230 °F) < T ≤ 190 °C (375 °F)
M	Indicator & Jupiter ①③	digit 16 = 2, 3	190 °C (375 °F) < T ≤ 260 °C (500 °F)

① Only available in combination with metal flags.

② Matches external mount Jupiter with model code digit 5 = E.

③ Matches external mount Jupiter with model code digit 5 = G, J.

18 MEASUREMENT TYPE & INDICATION STYLE

Total level

2	Yellow / black plastic flags
3	Red / white plastic flags (standard)
4	Red / silver metal flags

① Use with digit 21 = 9 and digit 22 = 9.

Interface level ①

6	Yellow / black plastic flags
7	Red / white plastic flags (standard)
8	Red / silver metal flags

19 MEASURING SCALE

N	No scale
1	Feet / inches
2	Meters / Millimeters

3	Running inches
4	Percent (markings in increments of 5 %)

20 CHAMBER CODE

Code listed is valid for metallic construction (refer to digit 5). Consult factory for plastic construction.

1	2" S10
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21-22 FLOAT CODE

Codes listed are valid for metallic construction (refer to digit 5). Consult factory for plastic construction.

Total level measurement

Float types 2 and B (digit 21) cover full 150 # rating of carbon steel and 316/316L SST flanges up to 260 °C (500 °F).
 Float type D (digit 21) covers full 300 # rating of 316/316L SST flanges up to 260 °C (500 °F) and of carbon steel flanges up to 200 °C (400 °F).
 Pressure rating of float type D: max. 74.7 bar @ 40 °C (1083 psi @ 100 °F), max. 35.8 bar @ 260 °C (519 psi @ 500 °F);
 hydrotest pressure: 89.6 bar @ 40 °C (1300 psi @ 100 °F).

Chamber rating	150 #		300 #
Float material	316 SST	Ti	Ti
Oper. S.G.	Code ①	Code ①	Code ①
0,55 - 0,64	—	BE	—
0,65 - 0,74	2E	BC	DE
0,75 - 0,84	2C	BB	DC
0,85 - 0,94	2B	BB	DB
0,95 - 1,04	2A	BA	DA

① Code 99 is used for special float. Depending on the application a factory assigned code different from the listed ones is possible.

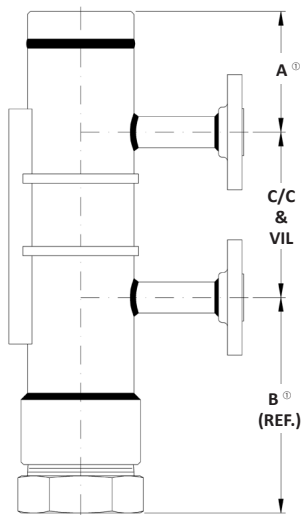
Interface level measurement

99	Special float
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23-25 CENTER-TO-CENTER & VISUAL INDICATION LENGTH - per cm (0.39") increment

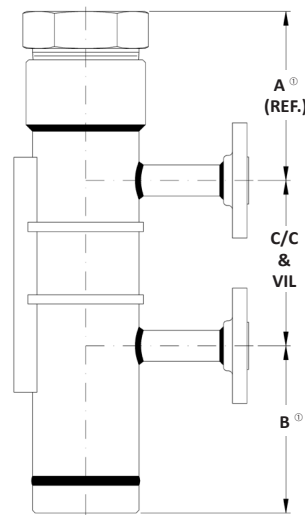
030	Min 30 cm (12")
500	Max 500 cm (197")

DIMENSIONS in mm (inches) – only for PED construction (digit 6 = A)



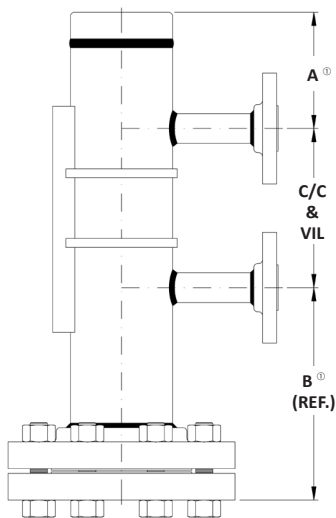
Digit 16	Dim. 'A'
N, 3	120 (4.72)
1	180 (7.09)
2	210 (8.27)

Digit 3 = A



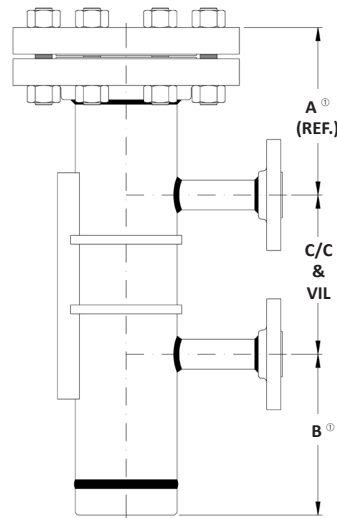
Digit 16	Dim. 'A'
N, 3	170 (6.69)
2	270 (10.63)

Digit 3 = B



Digit 16	Dim. 'A'
N, 3	120 (4.72)
1	180 (7.09)
2	210 (8.27)

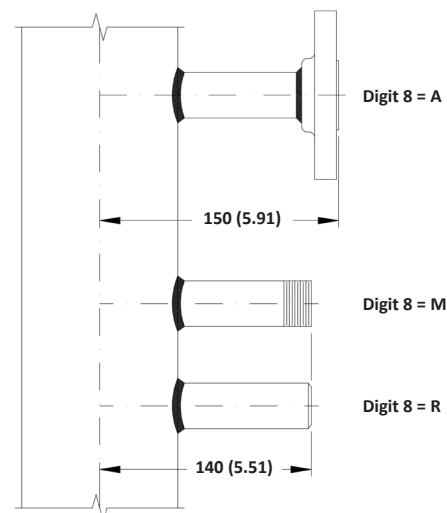
Digit 3 = 1



Digit 16	Dim. 'A'
N, 3	150 (5.91)
2	250 (9.84)

Digit 3 = 2

Dim. 'B'		
Digit 22	Digit 16 = N, 1, 2	Digit 16 = 3
A	245 (9.65)	330 (12.99)
B	290 (11.42)	330 (12.99)
C	330 (12.99)	
D	375 (14.76)	
E	415 (16.34)	



^① Dimension varies if an interface float is used.

SPECIFICATIONS | VECTOR™ MAGNETIC LEVEL INDICATOR

Product name	Vector™
Materials of construction – Chamber	316/316L stainless steel, 304/304L stainless steel
	Carbon steel process connections and fittings available
– Rail & window	Aluminium rail with polycarbonate window
– Float	316 stainless steel and titanium - <i>varies depending on process conditions</i>
Construction grade	Industrial PED (metallic) or non-PED (plastic)
Approvals	Industrial PED units: ATEX II 1 G c T6 (non-electrical equipment)
Certified material test report (CMTR)	Available upon request
Pressure class ratings	ANSI 150# & 300#
Process connection sizes	1/2" 3/4" 1" 1 1/2" 2"
Process connection types	Raised face slip-on style flange, threaded nipple, butt weld nipple
Measuring range	30 cm to 500 cm (12" to 197")
Temperature range	-40 °C to +260 °C (-40 °F to +500 °F)
Pressure range	Full vacuum to 51,0 bar (740 psi)
	<i>All chambers are hydrostatically tested at 1,5x design pressure</i>
Specific gravity	Min 0,55
Visual indicators	Magnetically actuated flag assembly in contrasting yellow/black, red/white or red/silver colours
Maximum viewing distance	Approximately 30 m (100 ft)
Measuring scale	Feet/inches, meters/millimeters, running inches, %
Switch options	Model OES electric cam operated snap action switch (refer to bulletin BE 46-138) Model ORS electric reed switch (refer to bulletin BE 46-138)
Transmitter options	Model 2xx Jupiter magnetostrictive transmitter (refer to bulletin BE 46-148)
High temperature insulation	Fibreglass material

ACCESSORIES

Electric point level switches

Model: OES
10 A DPDT snap action switch

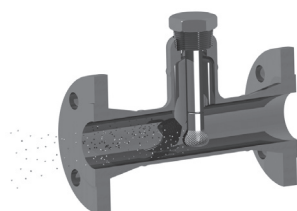


Model: ORS
1 A SPDT reed switch



Magnetic particle trap

Ideal for process media containing ferrous particles. These particles can enter the MLI chamber and coat the magnetic float rendering it inoperable. The trap will collect these particles so that they can be periodically removed.



Continuous level transmitters

Model: Jupiter
Magnetostrictive transmitter





Atlas™

Magnetic Level Indicator (MLI)



Aurora®

MLI with integral
guided wave radar



Gemini™

Dual-chamber MLI



Jupiter®

Magnetostrictive transmitter

EXPEDITE SHIP PLAN (ESP)

Several models are available for quick shipment, within max. 4 weeks after factory receipt of purchase order, through the Expedite Ship Plan (ESP).

Models covered by ESP service are conveniently colour coded in the selection data charts.

To take advantage of ESP, simply match the colour coded model number codes (standard dimensions apply).

ESP service may not apply to orders of five units or more. Contact your local representative for lead times on larger volume orders, as well as other products and options.



QUALITY ASSURANCE - ISO 9001:2008
THE QUALITY ASSURANCE SYSTEM IN PLACE AT MAGNETROL GUARANTEES THE HIGHEST LEVEL OF QUALITY DURING THE DESIGN, THE CONSTRUCTION AND THE SERVICE OF CONTROLS.
OUR QUALITY ASSURANCE SYSTEM IS APPROVED AND CERTIFIED TO ISO 9001:2008 AND OUR TOTAL COMPANY IS COMMITTED TO PROVIDING FULL CUSTOMER SATISFACTION BOTH IN QUALITY PRODUCTS AND QUALITY SERVICE.

PRODUCT WARRANTY

ALL MAGNETIC LEVEL INDICATORS ARE WARRANTED FREE OF DEFECTS IN MATERIALS AND WORKMANSHIP FOR FIVE FULL YEARS (MECHANICAL PARTS) / 18 MONTHS (ELECTRONIC PARTS) FROM THE DATE OF ORIGINAL FACTORY SHIPMENT.

IF RETURNED WITHIN THE WARRANTY PERIOD; AND, UPON FACTORY INSPECTION OF THE CONTROL, THE CAUSE OF THE CLAIM IS DETERMINED TO BE COVERED UNDER THE WARRANTY; THEN, MAGNETROL INTERNATIONAL WILL REPAIR OR REPLACE THE CONTROL AT NO COST TO THE PURCHASER (OR OWNER) OTHER THAN TRANSPORTATION.

MAGNETROL SHALL NOT BE LIABLE FOR MISAPPLICATION, LABOR CLAIMS, DIRECT OR CONSEQUENTIAL DAMAGE OR EXPENSE ARISING FROM THE INSTALLATION OR USE OF THE EQUIPMENT. THERE ARE NO OTHER WARRANTIES EXPRESSED OR IMPLIED, EXCEPT, SPECIAL WRITTEN WARRANTIES COVERING SOME MAGNETROL PRODUCTS.



UNDER RESERVE OF MODIFICATIONS

BULLETIN N°: BE 46-140.3
EFFECTIVE: JUNE 2016
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