ECLIPSE® AURORA™

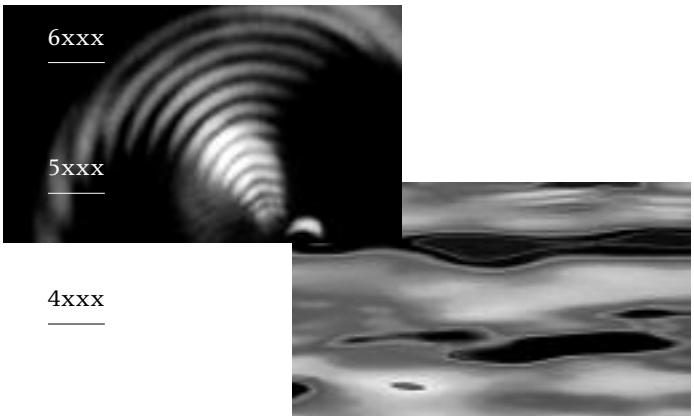
Installation and Operating Manual

For the Magnetic Level Indicator (MLI) and Level Switches

Guided Wave Radar
and
Magnetic Level Indication
for
Redundant Level
Measurement

7xxx

6xxx



5xxx

4xxx

3xxx

2xxx

1xxx

Magnetrol®

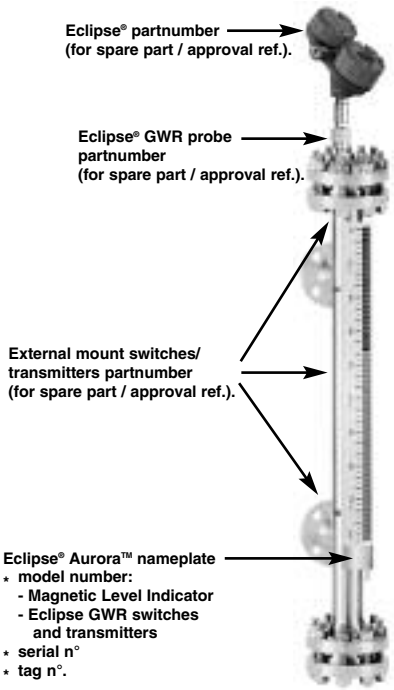
UNPACKING

Unpack the instrument carefully. Make sure all components have been removed from the foam protection. Inspect all components for damage. Report any concealed damage to the carrier within 24 hours. Check the contents of the carton/crates against the packing slip and report any discrepancies to Magnetrol. Check the nameplate model number (Model number/approvals as per inserted separate sheet) to be sure it agrees with the packing slip and purchase order.

The Eclipse® Aurora™ model number defines:
- The Magnetic Level Indicator.
- The Eclipse® Guided Wave Radar transmitter and switches/transmitters: each of these components have their own modelnumber that refers to their own approvals / instruction manuals (as per separate inserted documents).

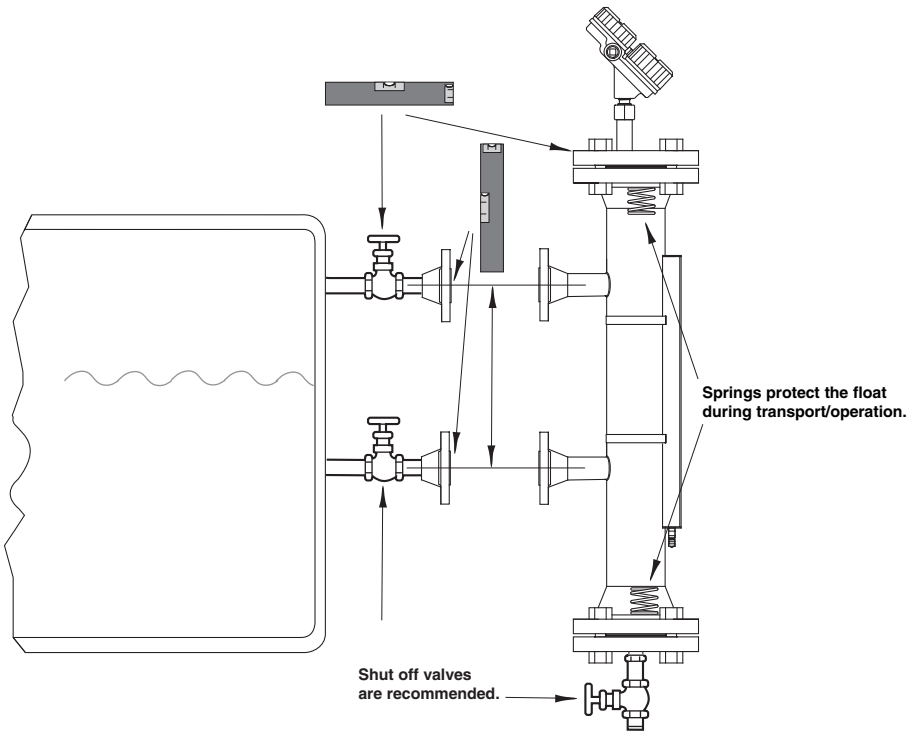
Check and record the Eclipse® Aurora™ serial number for future reference when ordering parts.

Pre-installation checklist:
- Verify if the units' center to center distance equals the center to center distance of the vessel.
- Locate the external mounted switches/transmitters. These are seperately packed (for proper mounting/installation; see included instruction manuals).
- Locate the Eclipse® amplifier head (for proper mounting/installation – see Eclipse® instruction manual).



CAUTION: When handling longer units, assure that these are supportered over the entire length to avoid bowing causing deformation / glass breakage.

MOUNTING – Magnetic Level Indicator



Note: The float and the guided wave radar probe are pre-mounted into the magnetic level indicator. The float is protected against transport damage and operational conditions by means of internal springs.

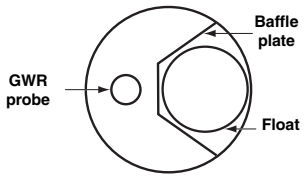
CAUTION: In case shut off valves are used, care must be taken when opening the valves to prevent a surge of fluid and gases through the chamber. A surge can cause the float to be propelled to the far end of the chamber, and float damage could result.

MOUNTING – Magnetic Level Indicator

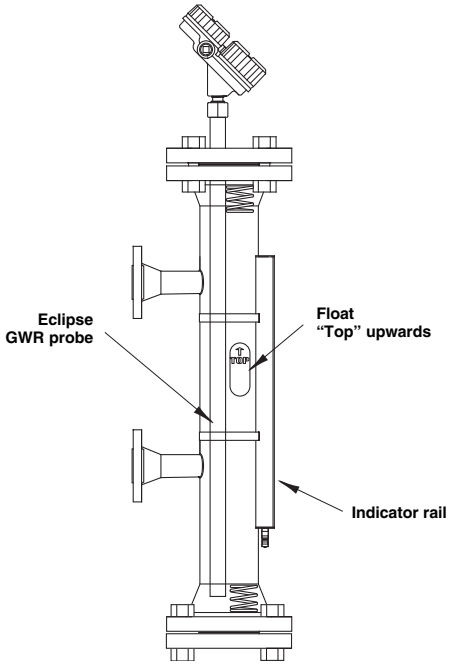
Reassembly guidelines

Reassembly guidelines for the float / GWR probe in case these need to be dismantled for eg. cleaning of the cage:

- Verify that the “TOP” marking on the float is pointing upwards when re-installing.
- Make sure that the float is positioned in between the cage wall and the baffle plate, when re-installing.
- Verify that the GWR probe is installed the farthest away from the flapper rail.
- Assure proper sealing of the gaskets.

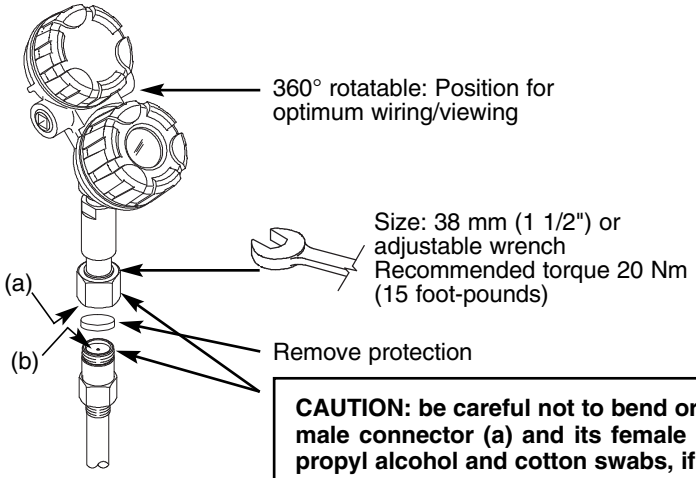


Top View



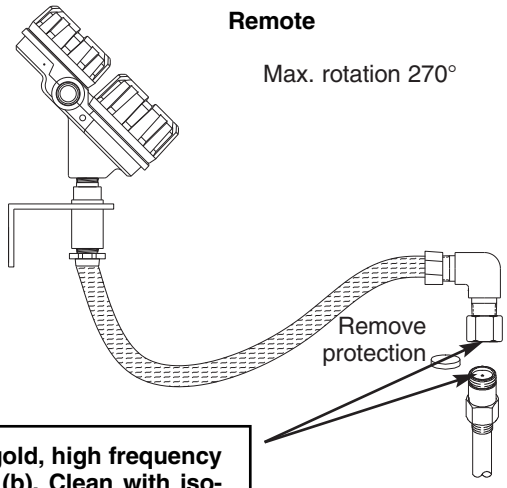
CAUTION: Do not reposition the indicator rail from its original delivered position. Repositioning of the rail may disrupt the magnetic coupling between the float’s magnet and the flappers in the indicator rail (and any other magnetic coupled equipment with the float e.g. external mount switches).

MOUNTING – Eclipse amplifier



Remote

Max. rotation 270°



CAUTION: be careful not to bend or dirty the gold, high frequency male connector (a) and its female connector (b). Clean with iso-propyl alcohol and cotton swabs, if necessary

TROUBLESHOOTING

Problem	Solution
Flags do not rotate with level change.	Test flags with a magnet from bottom to top (magnet not included). If flags test O.K, check for float obstruction (see maintenance).
Switch does not actuate with level change.	Check micro switch for continuity. Replace if damaged, if O.K, remove switch from piping column and test switch magnet assembly with re-alignment magnet, by moving magnet over the housing face. If the switch magnet assembly fails to respond, replace the switch. If the switch checks O.K, check float travel.
Reed transmitter does not track level.	Remove transmitter assembly from piping column and test with re-alignment magnet. Run magnet from bottom to top of reed chain. Check zero and span calibration. If no change in output, replace.
Flags rotate at different height than actual level.	Float selected for different specific gravity. Replace float with a float with correct specific gravity rating. Confirm correctness of float orientation. Top is up.
Float inside the level gauge is moving slow or not at all.	Make sure the MLI is level vertically. The process fluid being measured may be too viscous and heat tracing may be required to make the material more fluid. Heat tracing can be purchased from the factory. The specific gravity of the process fluid and the float weight may need to be reverified. The liquid being measured may contain magnetic particles collecting on the magnetic section of the float causing drag. If this happens, magnetic trap assemblies can be purchased from the factory. Visual inspection of the float may be required to see if the float has collapsed.
Scale is at zero to the center of the bottom proces connection, but the indicator is above or below zero.	The scale assembly is mounted to the chamber using stainless steel gear clamps. It can be easily adjusted in the field using a screwdriver. make sure the scale zero is in line with the center of the process connection. The float stop spring at each end of the chamber is there to cushion as well as position the float assembly to the center of the process connection. Make sure top or bottom float stop springs are not bent or broken.
Indicator has uncoupled and fallen to the bottom of the glass tube.	In some “flashing” applications, the float may rise or fall quickly. Consult factory for suggestions to help avoid this. To re-couple the indicator to the float, simply use a small magnet and run it along the length of the chamber to locate the float. Mark the location of the float on the outside chamber. Use the small magnet to couple with the indicator and pull the indicator up to meet and couple with the float. Make sure all stainless steel gear clamps are tight. The scale channel must be tight against the chamber. ** Assure unit installation is level.*

MAINTENANCE

If the process liquid is clean (no solids or deposits), the MLI should require minimum maintenance. If the process liquid is dirty (solids and deposits), it is recommended the external cage be isolated from the process and flushed periodically. For complete cleaning, after draining the unit, remove the bottom flange and float, inspect cage and float for build up and clean if required.

Magnetic traps are available to prevent magnetic particulate travel from the vessel to the chamber.

REPLACEMENT PARTS

For the magnetic level indicator: consult factory.
For the Eclipse Guided Wave Radar: consult instruction manual BE 57-600

MAGNETIC LEVEL INDICATOR – SPECIFICATIONS

Measured value		Liquid level (consult factory for liquid-liquid interface)
Measuring range		From 300 mm (11.81") up to 5700 mm (224")
Indicators		Metal flag (red/white) – all indicators are hermetically sealed and assured by the “Insta-Seal” technology
Scale		In cm or % of span
Specific gravity		As low as 0.5 kg/dm^3
Visual indication		Visible from a distance up to 30 m (100 feet)
Float	Type	With magnetic flux ring – assembly – see page 2
	Materials	316 SST (1.4401), Titanium, others at request
Cage	Materials	316/316L SST (1.4401/1.4404), others at request
	Size	3" or 4" depending configuration
	Rating	Up to 2500 lbs / PN 320 class ratings
	Configuration	Side/side connection with 1/2" NPT plugged vent and drain
Insulation material		Weather resistant silicone cloth (high temperature application) Polyurethane + aluminium jacket with polymeric frost extension for flag-rail (cryogenic application)
Process connections		Threaded, socket welded or flanged
Design		All cages are designed to meet the European PED (Pressure Equipment Directives) 97/23 EC guidelines
Constructions		Standard commercial design NACE construction Others at request: eg. IBR, ASME - ANSI B31.3

MODEL IDENTIFICATION – GUIDED WAVE RADAR TRANSMITTER

TRANSMITTER

	Type ①	Signal output	Power
7 3	Eclipse - blind transmitter	4-20 mA with HART® communication	24 V DC 2-wire loop powered
7 4	Eclipse - transmitter with digital display and keypad	4-20 mA with HART® communication	
7 5	Eclipse - blind transmitter	Foundation Fieldbus® communication	
7 6	Eclipse - transmitter with digital display and keypad	Foundation Fieldbus® communication	

① Standard electronics: SFF > 85 %. Consult factory for SIL enhanced electronics: SFF > 91 %

MOUNTING/CLASSIFICATION (Consult factory for FM/CSA approvals)

1	Integral, General purpose (&IS: FM/CSA)
2	Remote, General purpose (&IS: FM/CSA)
A	Integral, ATEX II 1 G EEx ia II C T4 - FISCO ATEX, intrinsically safe for units with Fieldbus Foundation
B	Integral, ATEX II 1 G EEx ia II C T4 - FISCO ATEX, intrinsically safe for units with Fieldbus Foundation
C	Integral, ATEX II 1/2 G D EEx d[ia] II C T6
D	Remote, ATEX II 1/2 G D EEx d[ia] II C T6
E	Integral, ATEX II 3 G EEx nA II T6
F	Remote, ATEX II 3 G EEx nA II T6

HOUSING

1	Cast aluminium dual compartiment, 3/4" NPT cable entry (2 entries – one plugged)
2	Cast aluminium dual compartiment, M20 x 1,5 cable entry (2 entries – one plugged)
3	Stainless steel dual compartiment, 3/4" NPT cable entry (2 entries – one plugged)
4	Stainless steel dual compartiment, M20 x 1,5 cable entry (2 entries – one plugged)

PROBE TYPE - all coaxial type, overfill safe GWR probes

R	7MR - Overfill safe GWR probe	(dielectric range ≥ 1,4) - WHG approved
D	7MD - High Temp / High Pressure (HTHP) GWR probe	(dielectric range ≥ 2,0) - WHG approved
S	7MS - Saturated steam GWR probe	(dielectric range ≥ 10,0) - Stoomwezen approved

PROBE MATERIAL

A	316 / 316 L (1.4401/1.4404) stainless steel	
B	Hastelloy C (2.4819)	not for “S” probe (7MS)
C	Monel (2.4360)	not for “S” probe (7MS)

PROCESS SEAL-MATERIAL ①
For the 7MR GWR probe ②

0	Viton® GFLT - for universal use / steam applications	min -40°C (-40 °F) / max +200 °C (+400 °F)
1	EPDM (Ethylene Propylene) - for e.g. caustic soda applications	min -50°C (-60 °F) / max +125 °C (+250 °F)
2	Kalrez 4079 - for aggressive media	min -40°C (-40 °F) / max +200 °C (+400 °F)

① Consult factory for alternative seal materials

② For ammonia/chlorine applications use the 7MD GWR probe.

For the 7MD GWR probe

N	Borosilicate - for non condensing applications	min -195 °C (-320 °F) / max +400 °C (+750 °F)

For the 7MS GWR probe

8	PEEK - for saturated steam applications	min -40 °C (-40 °F) / max +345 °C (+650 °F)

MEASURING RANGE (Select the same measuring range as per page 6)
English ranges (dimensions as per specified inch dimension)

0 0 A	14" / 356 mm
0 0 B	32" / 813 mm
0 0 C	48" / 1219 mm
0 0 D	60" / 1524 mm
0 0 E	72" / 1829 mm

0 0 F	84" / 2134 mm
0 0 G	96" / 2438 mm
0 0 H	108" / 2743 mm
0 0 I	120" / 3048 mm

Metric ranges (specify per cm increments)

0 3 0	minimum 30 cm (11.81")
4 1 0	maximum 410 cm (161") - for 7MS
5 7 0	maximum 570 cm (224") - for 7MD/7MR

7 _ _ – _ _ _ _ – _ _ _ **complete order code for the Aurora - Eclipse 705 Guided Wave Radar transmitter**

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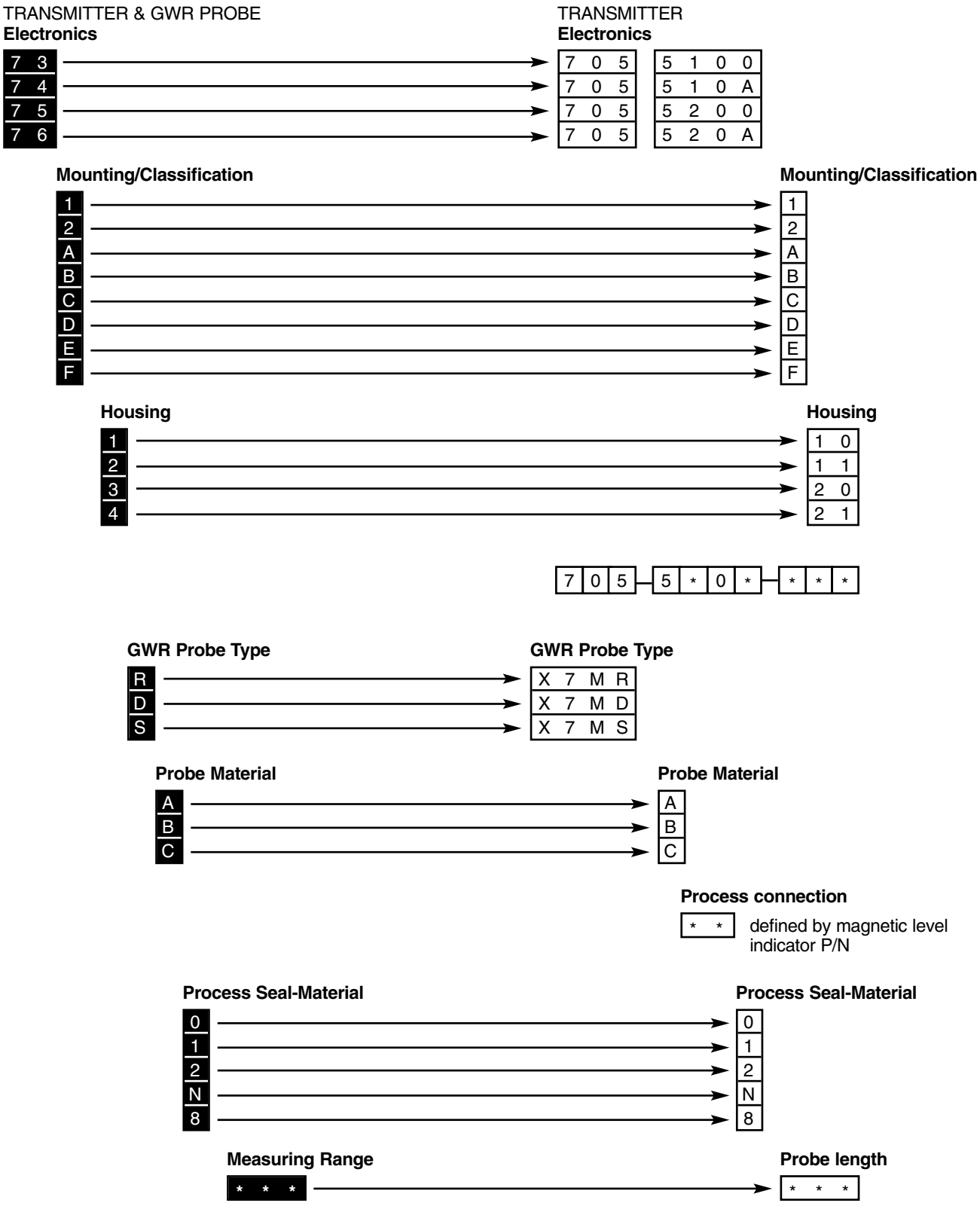
MODEL IDENTIFICATION – CROSS REFERRENCE PARTNUMBERS ECLIPSE AURORA

The Eclipse Aurora partnumber defines the Eclipse transmitter and the GWR probe partnumbers into one model code. The original model code of the Eclipse electronics should be used for approval and spare part referrence of the electronics. This number is available on the nameplate of the Eclipse transmitter (see page 2) or you can use the below cross refererence part-number to rebuild the equivalent Eclipse partnumber from the Eclipse Aurora partnumber.



MODEL IDENTIFICATION – MAGNETIC LEVEL INDICATOR

BASIC MODEL NUMBER

Code	Min. S.G.	Pressure rating in bar (psi)				float mat.	cage size
		40 °C (100 °F)	200 °C (400 °F)	315 °C (600 °F)	400 °C (750 °F)		
B G A	0,75	27,6 (400)	26,6 (386)	23,4 (340)	22,2 (322)	316 SST	3"
B G B	0,65	41,3 (600)	24,3 (352)	18,1 (262)	4,1 (60)	Titanium	3"
B G C	0,50	55,2 (800)	32,3 (469)	24,1 (349)	5,5 (80)	Titanium	4"
B G D	0,76	41,3 (600)	39,9 (579)	35,2 (510)	33,3 (483)	316 SST	3"
B G E	0,76	51,7 (750)	49,9 (723)	43,9 (637)	41,6 (603)	316 SST(*)	3"
B G F	0,65	75,8 (1100)	44,5 (645)	33,1 (480)	7,6 (110)	Titanium	3"
B G G	0,50	75,8 (1100)	44,5 (645)	33,1 (480)	7,6 (110)	Titanium	4"
B G H	0,75	62,0 (900)	59,9 (868)	52,8 (765)	49,9 (724)	316 SST(*)	4"
B G J	0,65	103 (1500)	60,7 (880)	45,2 (655)	10,3 (150)	Titanium(*)	4"
B G K	0,50	103 (1500)	60,7 (880)	45,2 (655)	10,3 (150)	Titanium(*)	4"

(*) pressurised float

MATERIALS OF CONSTRUCTION

Code flags only	Code with scale in cm	Code with scale in % of span	Flanges	Cage	Indication rail
A	B	C	Carbon steel	316/316L SST (1.4401/1.4404)	Aluminium
D	E	F	316/316L SST (1.4401/1.4404)		
G	H	J	Carbon steel		316 SST (1.4401)
K	L	M	316/316L SST (1.4401/1.4404)		

CAGE AND FLANGE RATING

A	150 lbs
B	300 lbs
C	600 lbs
D	900 lbs
E	1500 lbs
F	2500 lbs (max 345 bar (5000 psi))

1	PN 16	EN 1092-1 Type B1
2	PN 25/40	EN 1092-1 Type B1
3	PN 63	EN 1092-1 Type B2
4	PN 100	EN 1092-1 Type B2
5	PN 160	DIN 2638 Form E
6	PN 250	DIN 2628 Form E
7	PN 320	DIN 2629 Form E

PROCESS CONNECTION – SIZE

2	1"
3	1 1/2"
4	2"

B	DN 25
C	DN 40
D	DN 50

DIN sizes only in combination with flanged process conn.

PROCESS CONNECTION - TYPE

A	Threaded NPT-F
B	Socket weld
D	ANSI RF Slip on flanges up to 600 lbs rating
F	ANSI RJ Weld Neck flanges for 600 lbs up to 2500 lbs rating
1	EN/DIN Weld Neck flanges

MEASURING RANGE (center-to-center)
English ranges (dimensions as per specified inch dimension)

0 0 A	14" / 356 mm
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Metric ranges (specify per cm increments)

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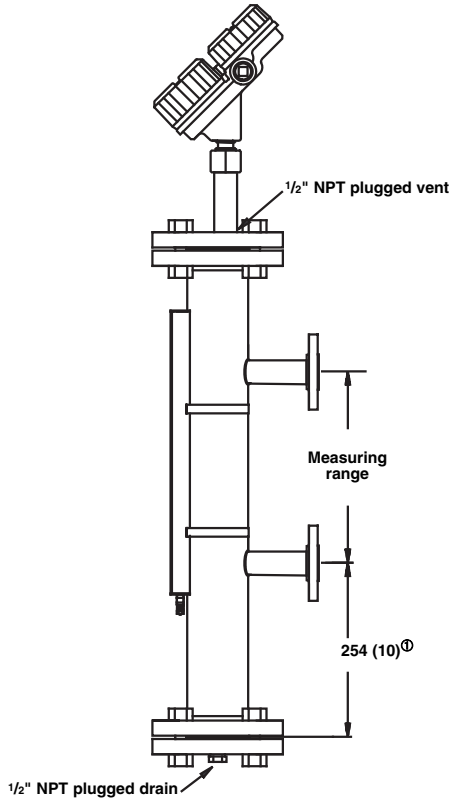
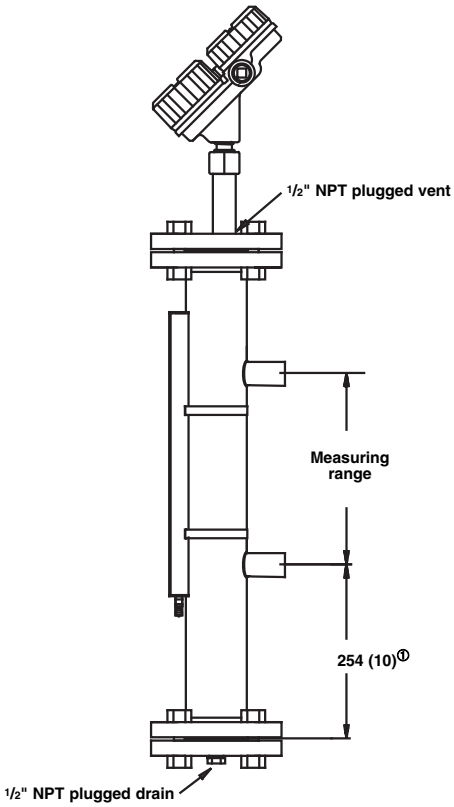
B	G									

complete order code for the Aurora - Magnetic Level Indicator

DIMENSIONS in mm (inches)

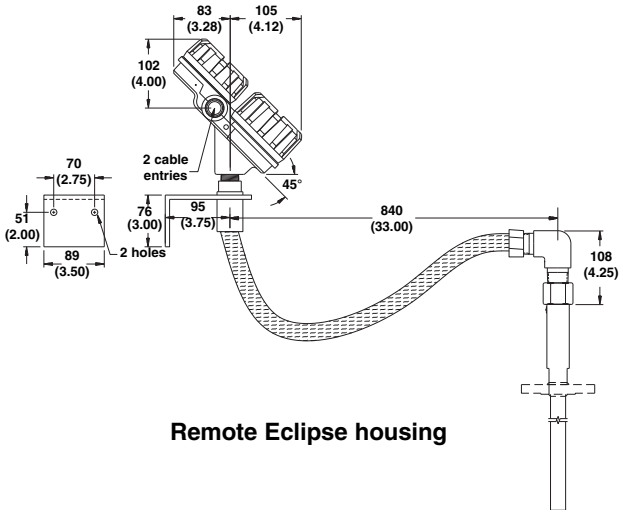


Flanged

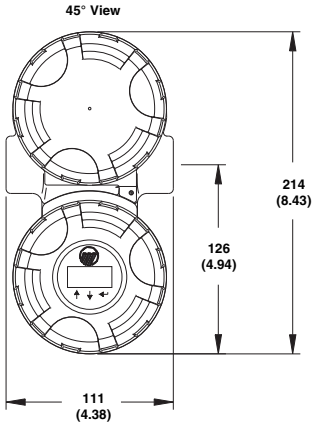


Threaded/Welded

① For S.G. < 0.8 and/or flange rating > 1500 lbs / PN 250, dimension will increase



Remote Eclipse housing



Eclipse Housing, (45° View)

NOTES

NOTES

IMPORTANT

SERVICE POLICY

Owners of Magnetrol products may request the return of a control; or, any part of a control for complete rebuilding or replacement. They will be rebuilt or replaced promptly. Magnetrol International will repair or replace the control, at no cost to the purchaser, (or owner) ***other than transportation cost*** if:

a. Returned within the warranty period; and,
b. The factory inspection finds the cause of the malfunction to be defective material or workmanship.

If the trouble is the result of conditions beyond our control; or, is **NOT** covered by the warranty, there will be charges for labour and the parts required to rebuild or replace the equipment.
In some cases, it may be expedient to ship replacement parts; or, in extreme cases a complete new control, to replace the original equipment before it is returned. If this is desired, notify the factory of both the model and serial numbers of the control to be replaced. In such cases, credit for the materials returned, will be determined on the basis of the applicability of our warranty.
No claims for misapplication, labour, direct or consequential damage will be allowed.

RETURNED MATERIAL PROCEDURE

So that we may efficiently process any materials that are returned, it is essential that a “Return Material Authorisation” (RMA) form will be obtained from the factory. It is mandatory that this form will be attached to each material returned. This form is available through Magnetrol’s local representative or by contacting the factory. Please supply the following information:

1. Purchaser Name
2. Description of Material
3. Serial Number and Ref Number
4. Desired Action
5. Reason for Return
6. Process details

All shipments returned to the factory must be by prepaid transportation. Magnetrol ***will not accept*** collect shipments.

All replacements will be shipped FOB factory.

BULLETIN N°: BE 57-638.2
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Magnetrol®

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