

HORIZON™

Model 704

Installation and Operating Manual



*Guided Wave Radar
Level Transmitter*


Magnetrol®

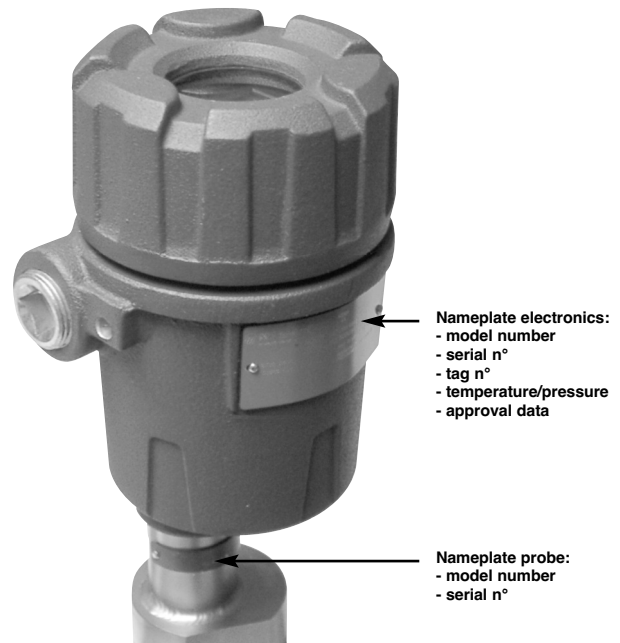
UNPACKING

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 to be sure it agrees with the packing slip and purchase order. Check and record the serial number for future reference when ordering parts.



These units are in conformity with the provisions of:

1. The EMC Directive: 2004/108/EC.
The units have been tested to EN 61326: 1997 + A1 + A2.
2. Directive 94/9/EC for Equipment or protective system for use in potentially explosive atmospheres. EC-type examination certificate number ISSeP13ATEX021X (intrinsic safe units). Standards applied: EN 60079-0: 2012, EN 60079-11: 2012, EN 60079-26: 2007
3. The PED directive 97/23/EC (pressure equipment directive). Safety accessories per category IV module H1.

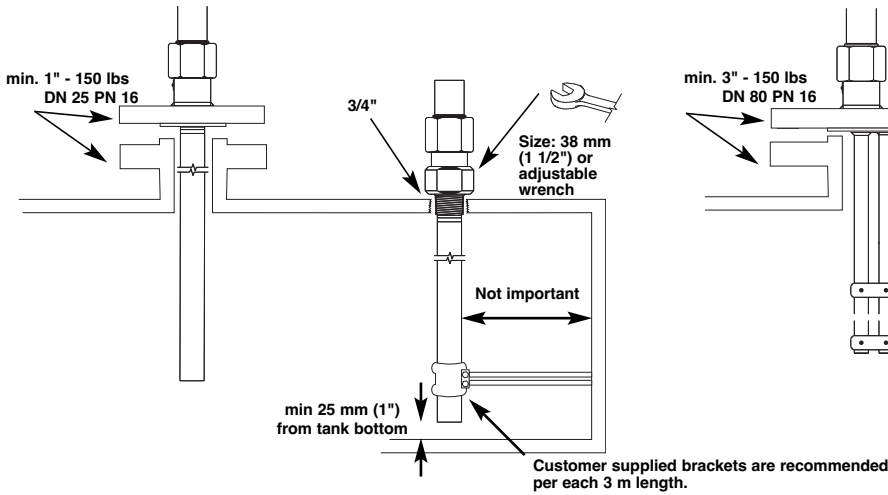


SPECIAL CONDITIONS FOR ATEX INTRINSICALLY SAFE USE

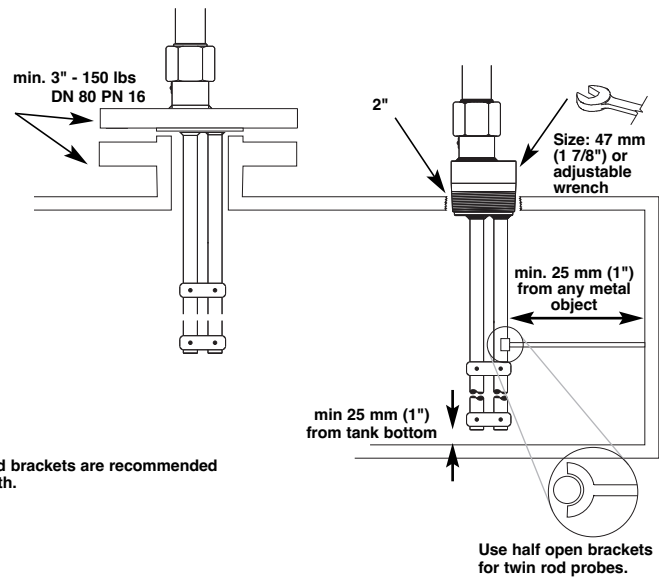
Materials marked as Category 1 equipment and used in hazardous areas requiring this category, shall be installed in such a way that, even in the event of rare incidents, the aluminium enclosure cannot be an ignition source due to impact or friction.

MOUNTING

Coaxial GWR probe



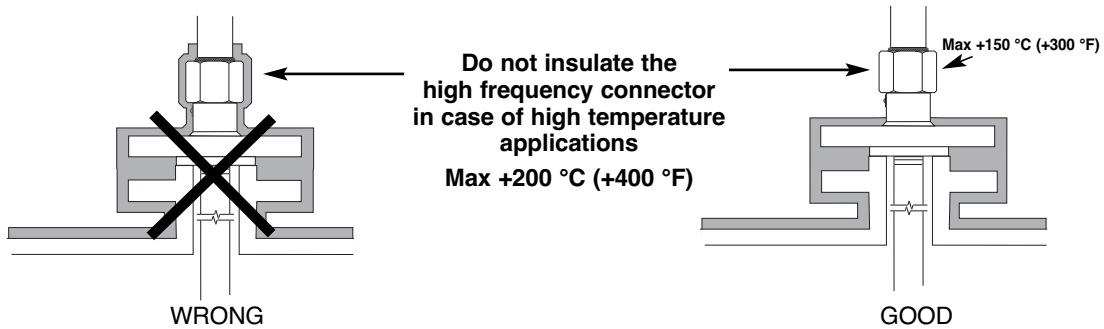
Twin Rod GWR probe



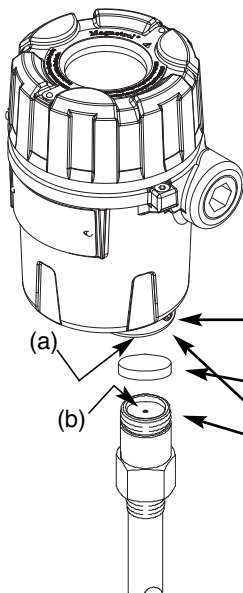
High level shutdown/overflow protection

Special consideration is necessary in any application where Guided Wave Radar is to be used for high level shutdown/overflow protection. To ensure proper measurement, the Guided Wave Radar probe should be installed so the maximum overflow level is a minimum of 150 mm (6") (for 7MB only) below the process connection. This may include utilizing a nozzle or spool piece to raise the probe. No special precautions are required for the 7MR probe. Consult factory for further information.

Insulation



Transmitter



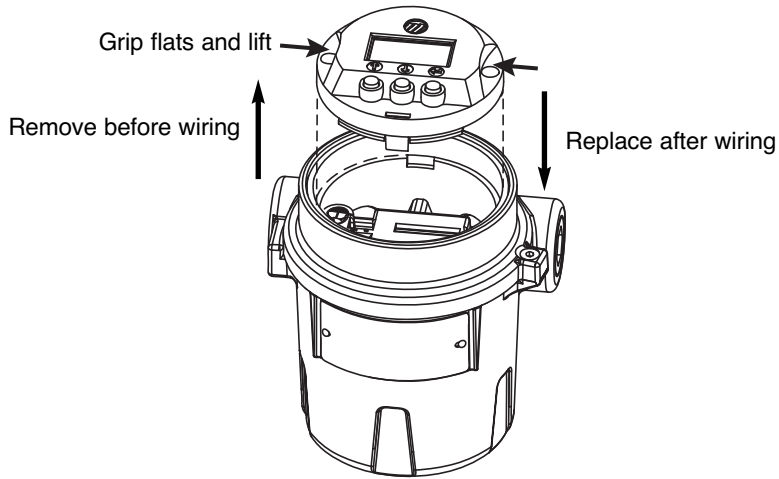
NOTE: Horizon® transmitters may not show an error and indicate a Level value > 0 when disconnected from GWR probe.

handtighten securely

Remove protection

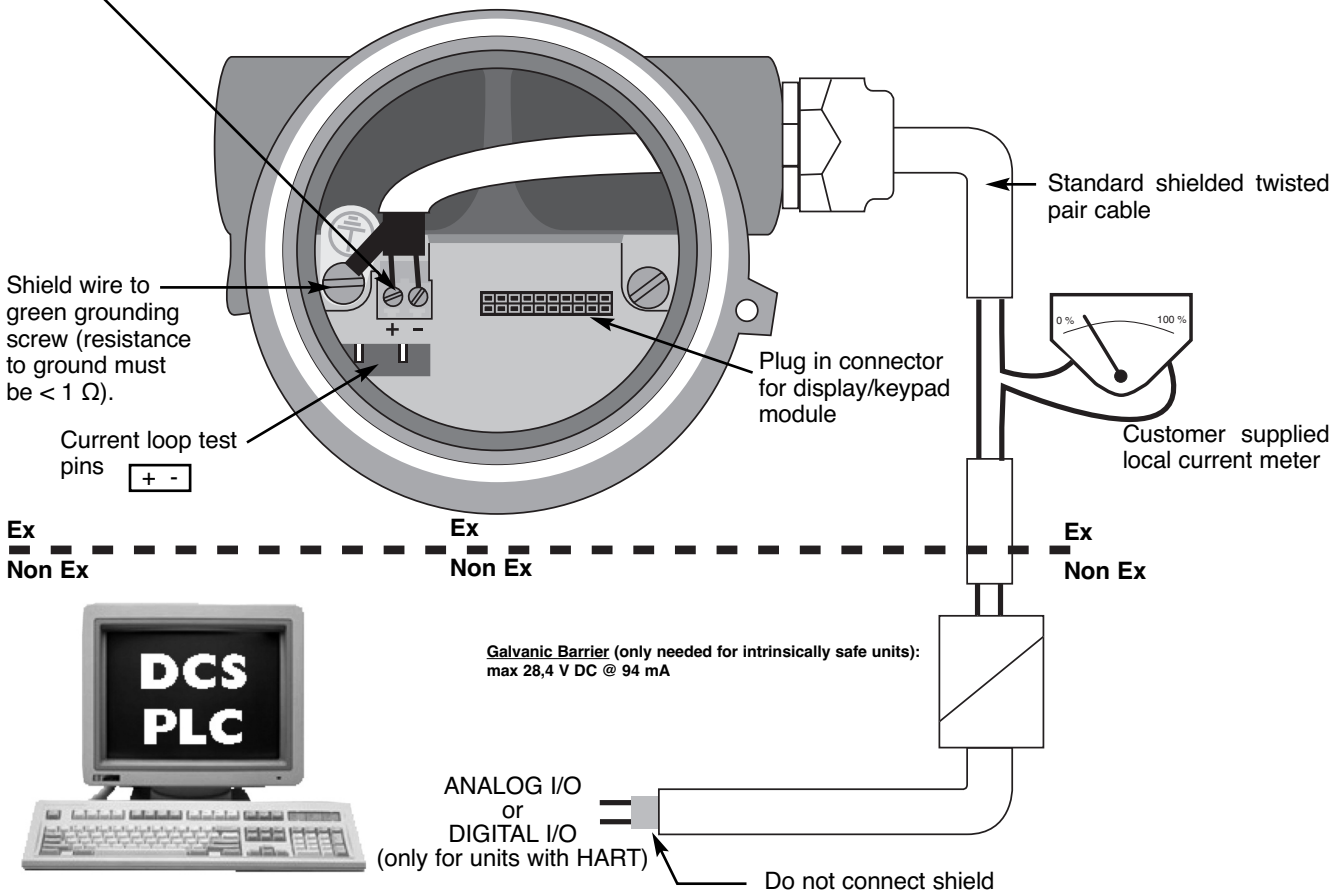
CAUTION: be careful not to bend or dirty the gold, high frequency male connector (a) and its female connector (b). Clean with isopropyl alcohol and cotton swabs, if necessary

WIRING



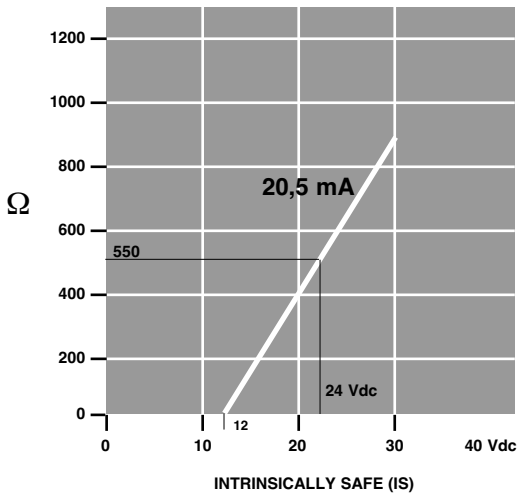
CAUTION: power must be switched OFF before wiring the unit.

Positive supply to (+) terminal/HART connection
 Negative supply to (-) terminal/HART connection
 min. 12 V DC required



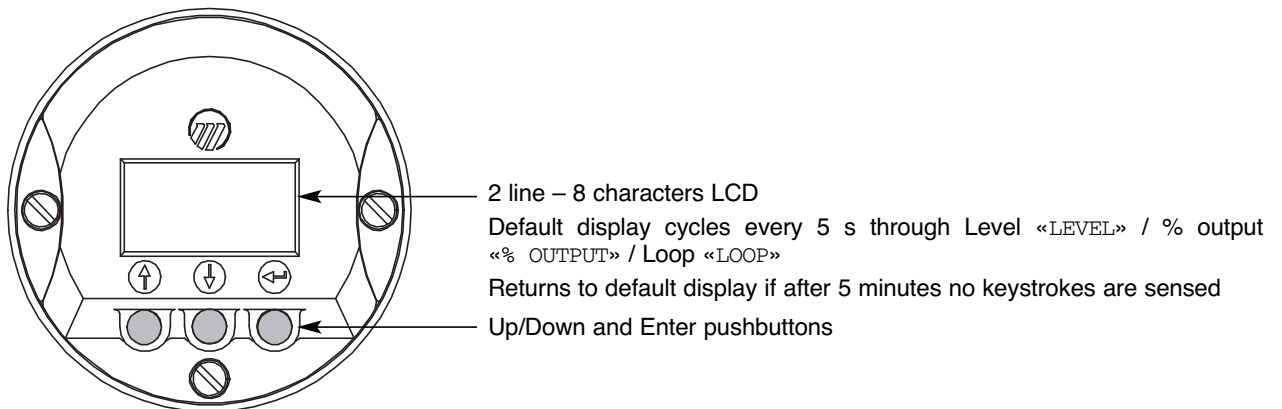
WIRING

LOOP RESISTANCE



CONFIGURATION

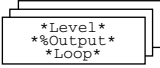
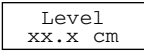
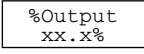
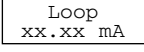
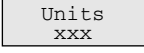
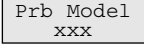
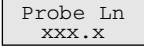
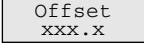
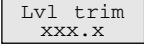
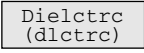
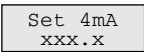
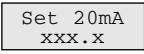
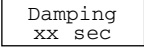
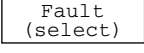
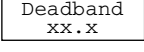
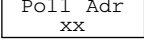
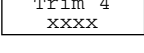
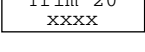
NOTE: When connected to an approved barrier, the intrinsically safe electronics of the Horizon[®] 704 allow to remove the cover with power switched on – even if the area is known to be hazardous




IMPORTANT: The Horizon electronics can be bench configured without GWR probe connected. Ignore the start up message in this case.

Display	Comment
Units! cm	Press ↵: The last character on the first line of the display changes to «!». This sign confirms that the values/choices of the second line can be modified via the ↓ and ↑ push buttons.
Units! cm	Press ↑ ↓ * Scroll through the choices or increase/decrease the values on the second line of the display by ↓ and ↑ pushbuttons. * Accept values/choices as selected by ↵ pushbutton.
Units cm	Press ↑ ↓ Scroll through the menu.

MENU: STEP BY STEP PROCEDURE

Screen	Action	Comment
Run mode	① 	Transmitter Display Transmitter default display. Level «Level», % Output «%Output», and Loop «Loop» values cycle every 5 seconds.
	② 	Transmitter Display Transmitter displays Level measurement in cm or inches.
	③ 	Transmitter Display Transmitter displays % Output measurement derived from 20 mA span.
	④ 	Transmitter Display Transmitter displays Loop measurement (mA).
Configuration	⑤ 	Select units for level measurement readout. cm «cm» or inches «inches».
	⑥ 	Select the type of probe used. Select as per the first digits of the partnumber (see nameplate GWR probe. «7xA»: standard coaxial GWR probe «7xB»: standard twin rod GWR probe
	⑦ 	Enter the exact length of probe. Probe length is printed on the nameplate and order information. It is the last three digits of the model number.
	⑧ 	Enter the offset value. When entering configuration values from the end of the probe is cumbersome, an offset can be introduced to determine a new reference point. This reference point can be either below the probe (positive offset: max +490 cm (192")) or at the probe (negative offset: max -60 cm (24")). See terminology, page 7.
	⑨ 	Enter the level trim value. Level trim may be necessary to account for installation variances.
	⑩ 	Enter the dielectric range value of the media. «1.7-10»; «10-100»
	⑪ 	Enter the level value for the 4 mA point. A small transition zone (0-150 mm (0-6")) may exist at the bottom of the probe. See Functional Specifications Probe, See page 13.
	⑫ 	Enter the level value for the 20 mA point. A small transition zone (0-150 mm (0-6")) may exist at the top of the probe. Top 100 mm (4") of 7xB Twin Rod Probe is inactive. See Functional Specifications Probe, See page 13.
	⑬ 	Enter the damping factor. A Damping factor (1-10 seconds) may be added to smooth a noisy display and/or output due to turbulence.
	⑭ 	Enter the fault value. Select «3.6 mA», «22 mA» or Hold last value «HOLD». 3.6 mA is not valid if unit includes <u>both</u> digital display <u>and</u> HART.
	⑮ 	Enter the deadband value. Deadband may have to be adjusted for installation variances.
	⑯ 	Enter HART ID number. Select a HART poll address (0-15). Enter 0 for a single transmitter installation.
	⑰ 	Fine tune the 4 mA point. Attach a mA meter to the output. If the output does not equal 4.0 mA, adjust the value on the display to equal 4.00 mA.
	⑱ 	Fine tune the 20 mA point. Attach a mA meter to the output. If the output does not equal 20.0 mA, adjust the value on the display to equal 20.00 mA.

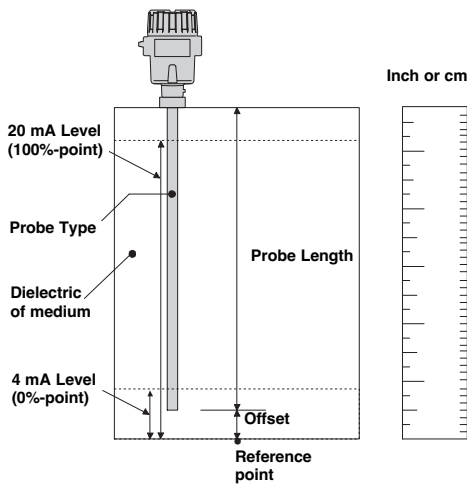
 = min. required configuration

MENU: STEP BY STEP PROCEDURE

Diagnostics

Screen	Action	Comment
19 Loop Tst xx.x mA	Enter a mA Output value.	Set mA Output to any given value to perform loop test.
20 Fid Tick	None, do not adjust.	Diagnostic, factory setting.
21 Conv Fct xx.xxx	None, do not adjust.	Diagnostic, factory setting.
22 Scl Offs xx.x	None, do not adjust.	Diagnostic, factory setting.
23 # Ticks xxxx	None, do not adjust.	Diagnostic, factory setting.
24 Threshld xxx	Enter CFD «CFD» or Enter Fixed «Fixed».	Unit default CFD «CFD». Only select Fixed «Fixed» in application with low dielectric material over higher dielectric material and unit is reading incorrect level. Example: oil over water. Select Dielectric Range «Dielectrc» of upper material. Adjustment of level trim «Lvl Trim» may be necessary when threshold is changed.
25 Model 704 Ver xxx	None, do not adjust.	Factory setting. «Ver» refers to software version.

TERMINOLOGY



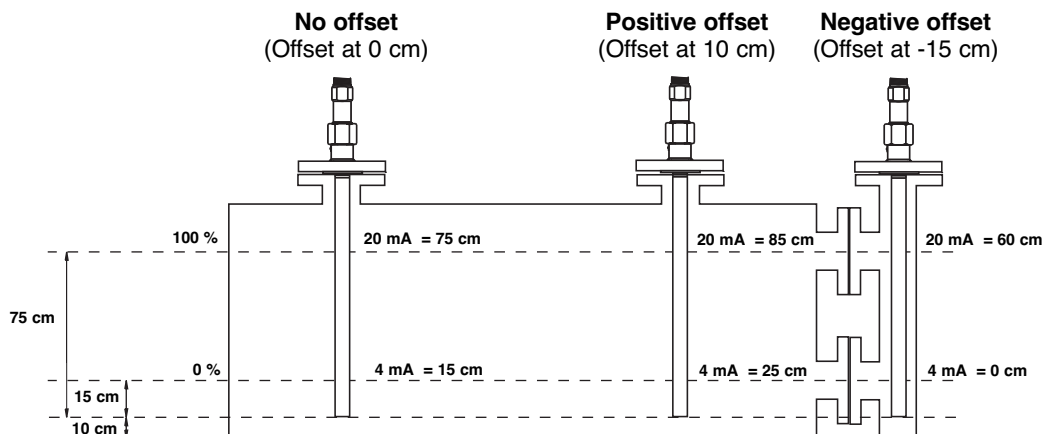
Offset = cm or inches
 The offset is the distance between reference point (e.g. bottom of tank) and end of probe. From the reference point both 4 mA and 20 mA levels are calibrated. When offset is set at zero, the end of the probe is the reference point.

4 mA Level = cm or inches
 or zero level point, is measured from the reference point. The unit has a transition zone at the bottom of the probe. Min. level to enter for media with:
 $\epsilon_r = 2.0: 150 \text{ mm } (6") + \text{Offset}$
 $\epsilon_r = 80: 25 \text{ mm } (1") + \text{Offset}$

20 mA Level = cm or inches
 or 100 % level point, is measured from the reference point. The unit has a transition zone at the top of the probe. Transition zone varies depending on probe type and media: see probe specifications page 13.

Probe length = cm or inches, record the exact probe length as printed on the nameplate

Dielectric
 Select the dielectric scale of the media to measure: **1.7–10** or **10–100**. When the dielectric is known, it will enhance the overall accuracy of the unit but select the dielectric scale ALWAYS to the lowest expected dielectricum.



CONNECTIONS

Connection of your Hart communicator:

- at power terminals (+) and (-) in wiring compartment
- at first junction box between unit and control room.

IMPORTANT: The digital HART® communication is superimposed on the 4-20 mA loop and requires a min. load resistance of 250 Ω and a max load resistance of 450 Ω.

CHECK HART®

Before starting the HART® configuration procedure – check if your HART® communicator (Rosemount Model 275) is equipped with the proper Horizon Device Descriptors (DD's).

I/O	start up the communicator
Select NO:	go offline
Select 4:	utility
Select 5:	simulation
Check manufacturer:	Magnetrol

Communicator	Horizon software (see “MENU: STEP BY STEP PROCEDURE” – page 7, item 25)
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Model 704	Ver. 1.x
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When the proper software version is not found, consult your local HART® Service Center to load the correct Horizon DD's.

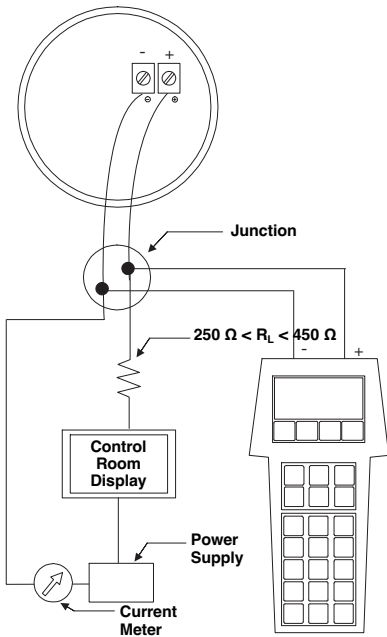
HART MENU

I/O Start up the device

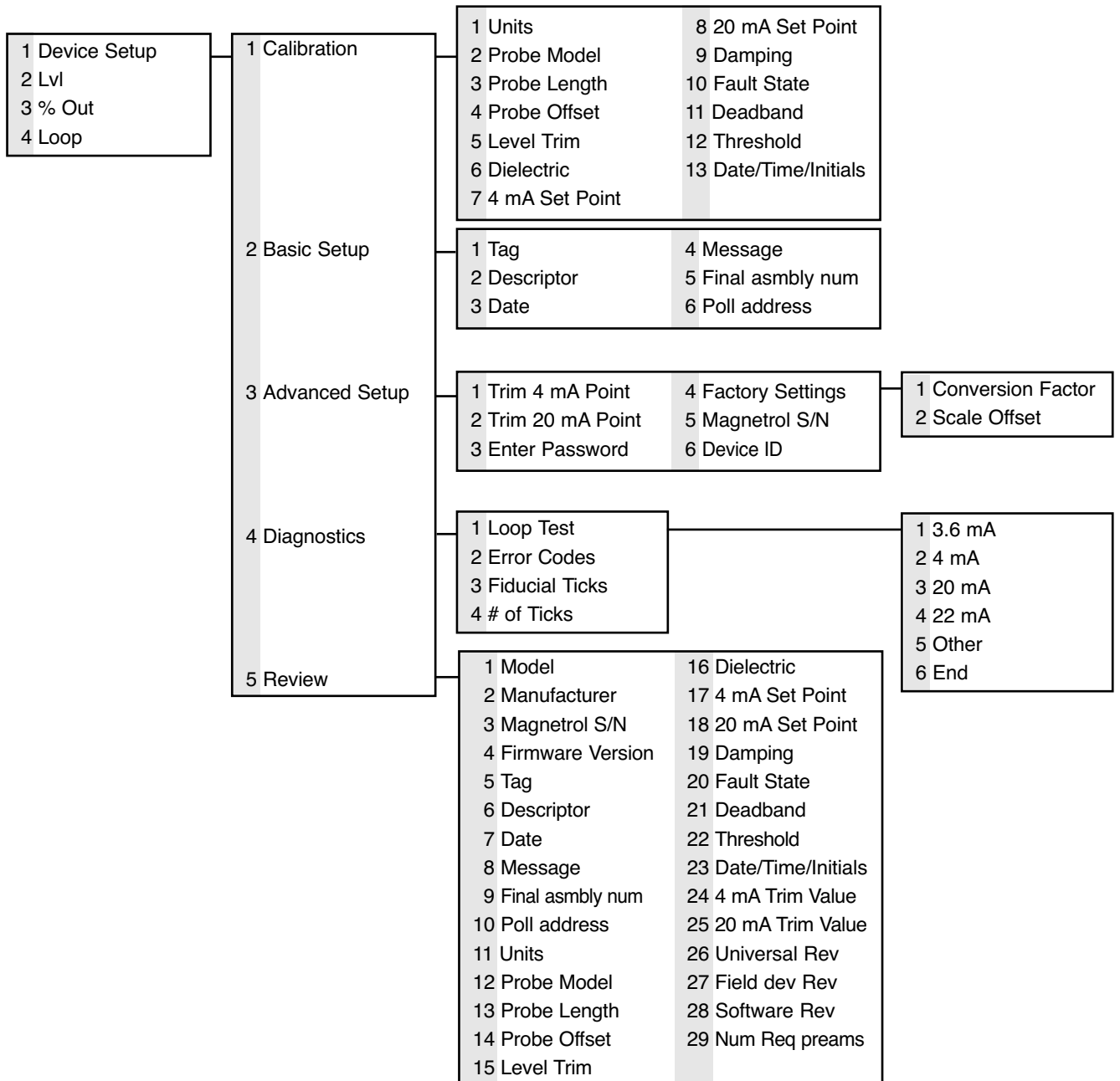
1 Enter Device Set Up «DEVICE SET UP»

Press one of the following alphanumeric keys (if no key is sensed after 5 s, the unit will automatically jump to RUN mode and alternatively show Level/% Output and Loop signal)

- 1 for entering Calibration «CALIBRATION» (see page 6 for additional information)
- 2 for entering Basic Set Up «BASIC SET UP» – general HART
- 3 for Advanced Set Up «ADVANCED SET UP» (see page 6 for additional information)
- 4 for entering Diagnostics «DIAGNOSTICS» (see page 7 for additional information)
- 5 for entering Review «REVIEW» to review all settings.



Model 704 1.X



MAINTENANCE

TROUBLESHOOTING SYSTEM PROBLEMS

Symptom	Problem	Solution
LEVEL, % OUTPUT and LOOP values are all inaccurate.	Basic configuration data is questionable.	Reconfigure the Probe Length «Prb Ln» and Offset «Offset». <ol style="list-style-type: none"> 1) Ensure the Level is accurate. 2) Reconfigure Loop values.
LEVEL readings are repeatable but consistently high or low from actual by a fixed amount.	Configuration data does not accurately match probe length or tank height. Installation Variance	Ensure proper probe length «Prb Ln» & probe Model «Prb Model».
LEVEL, % OUTPUT and LOOP values fluctuate.	Turbulence. High frequency connection.	Increase the Damping «Damping» factor until the readings stabilize. Check Fiducial Ticks «Fid Ticks» (should be stable within ± 10 counts.)
LEVEL, % OUTPUT and LOOP values all reading low vs. actual.	Lower dielectric material over higher dielectric material, e.g. oil over water. Coating, clumping or buildup on probe. Dense, water based foam.	Select Fixed Threshold: «Threshld», Expected inaccuracies due to affect on pulse propagation. Expected inaccuracies due to affect on pulse propagation.
LEVEL reading on Display is correct but LOOP is stuck on 4 mA	Basic configuration data is questionable.	Set Hart poll address «POLL ADR» to «0», if not using HART® multi drop
HART device only: handheld will only read Universal Commands.	Most current Device Descriptors (DDs) are not installed in handheld.	Contact local HART service center for the latest DD's. (see page 8)
LEVEL reading on display is stuck at full scale, LOOP is stuck at 20,5 mA.	Software believes probe is flooded (level near very top of probe).	Check actual level. If probe is not flooded, check for build up or obstructions near top of probe. Select higher dielectric range.
LEVEL, % OUTPUT and LOOP values all at maximum level.	Possible configuration issue.	Increase Deadband «Deadband»
LEVEL, % OUTPUT and LOOP values all reading high vs. actual.	Possible obstruction in tank.	Relocate probe away from obstruction.
LEVEL value reading high when should be zero.	Transmitter loose or disconnected from probe. Installation variance.	Ensure transmitter connected securely to probe. Adjust Level Trim «Lvl Trim».

ERROR MESSAGES

Symptom	Problem	Solution
«NO FIDUCIAL» (HART error code = 0x80)	Poor circuit board/cable/probe connection or malfunctioning cable between electronics and probe.	Check all of the connections from the electronics to the probe. Consult factory.
«NO LEVEL SIGNAL» (HART error code = 0x40)	Dielectric too low Level within Deadband. Mounted too close to concrete wall. Malfunctioning analog board.	Select lower dielectric range «Dielctrc». Decrease Level. Mount probe > 300 mm (12") from concrete wall (for single element probe). Replace electronic module. Consult Factory
«BAD CAL PARAMTRS» (HART error code = 0x20)	Possible nozzle issues, Deadband too small Incorrect probe length entered.	Increase Deadband «Deadband». Reconfigure proper probe length.
«CORRUPT PARAMTRS» (HART error code = 0x10)	Internal parameters corrupted.	Check all Configuration parameters. Verify Probe Model «Prb Model» and
«OUT OF CALIB» (not a fault)	Displayed when at least one parameter has been modified after corruption.	Consult factory. Recalibration may be required.

NOTE: When consulting the factory concerning improper operation, use the table on page 19. Enter all data when the transmitter is working correctly and incorrectly.

MAINTENANCE

TROUBLESHOOTING APPLICATIONS FOR 7MR & 7MB GWR PROBES

Most frequent application problems that may occur, media buildup on the probe and stratification, are covered here. Media build-up on the probe is not a problem in most cases— Horizon® circuitry typically works very effectively. Media buildup should be viewed as two types – Film Coating and Bridging.

A twin rod probe should be chosen if media build-up is a possibility.

- **Continuous Film Coating**

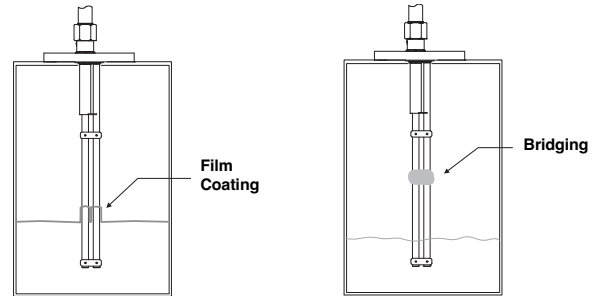
The most typical of coating problems where the media forms a continuous coating on the probe. Horizon® will continue to measure effectively with some small degradation in performance. A problem can develop if the product begins to build-up on the spacers that separate the probe elements. High dielectric media (e.g. water-based) will cause the greatest error.

- **Bridging**

Media that is viscous or solid enough to form a clog, or bridge, between the elements causes the greatest degradation in performance. High dielectric media (eg. water-based) will show as level at the location of the bridging.

- **Stratification/Interface**

The Horizon® transmitter is designed to measure the first air/media interface it detects. It will not measure further liquid/liquid interfaces. However, a low dielectric over a high dielectric application can cause a measurement problem and cause the electronics to trigger on the high dielectric medium that lies beneath it. Select in Threshold «Threshld» option «Fixed» to read the upper medium.



REPLACEMENT PARTS

Partn°:

7	0	4					
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Serial n°:

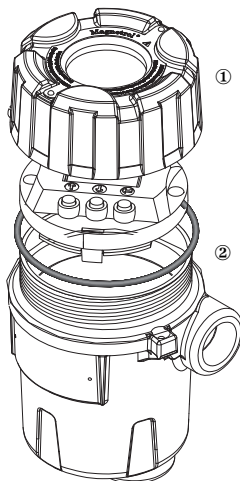
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Digit in partn°:

X	1	2	3	4	5	6	7	8	9	10
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See nameplate, always provide complete partn° and serial n° when ordering spares.

↳ X = product with a specific customer requirement



(1) Housing cover

Digit 7	Digit 8	Digit 9	Replacement part
0	1 or A	3	003-1226-001
		4	004-9193-003
	5	3	not applicable
A	1 or A	4	004-9193-003
		3	003-1226-003
	5	3	not applicable
		4	036-4410-003

(2) "O"-ring

Digit 9	Replacement part
3	012-2616-237
4	012-2201-237

TRANSMITTER SPECIFICATIONS

FUNCTIONAL/PHYSICAL

<i>Description</i>	<i>Specification</i>
Power (at terminals)	12 to 28,4 V DC
Output	4-20 mA or 4-20 mA with HART® 3,8 to 20,5 mA useable (meets NAMUR NE 43)
Span	150 to 4900 mm (6 to 192")
Resolution	Analog: 0,01 mA Display: 0,1 cm (inch)
Loop Resistance (see graph at page 5)	550 Ω @ 24 V DC (20,5 mA)
Damping	Adjustable 0-10 s
Diagnostic Alarm	Adjustable 3,6 mA, 22 mA, HOLD last output (3,6 mA is not valid if unit includes both digital display and HART®)
User Interface	3-button keypad and/or HART® communicator
Display	2-line x 8-character LCD
Menu Language	English/Spanish/French/German
Housing Material	IP 67/Aluminium A356T6 (< 0,20 % copper) or Lexan® thermoplastic
Approvals	ATEX II 1 G Ex ia IIC T4 Ga Other approvals are available, consult factory for more details
Electrical Data	U _i = 28,4 V, I _i = 94 mA, P _i = 0,67 W
Equivalent Data	C _i = 20 nF, L _i = 400 μH
Shock/Vibration Class	ANSI/ISA-571.03 SA1 (Shock), ANSI/ISA-571.03 VC2 (Vibration)
Net weight	Aluminium: 1,6 kg (3.5 lbs) – electronics only Lexan®: 0,7 kg (1.5 lbs) – electronics only
Overall Dimensions	Aluminium (blind): H 166 mm (6.54") x W 99 mm (3.90") x Ø 115 mm (4.53") Aluminium (with display): H 175 mm (6.91") x W 99 mm (3.90") x Ø 115 mm (4.53") Lexan®: H 153 mm (6") x W 95 mm (3.75") x Ø 115 mm (4.53")

PERFORMANCE

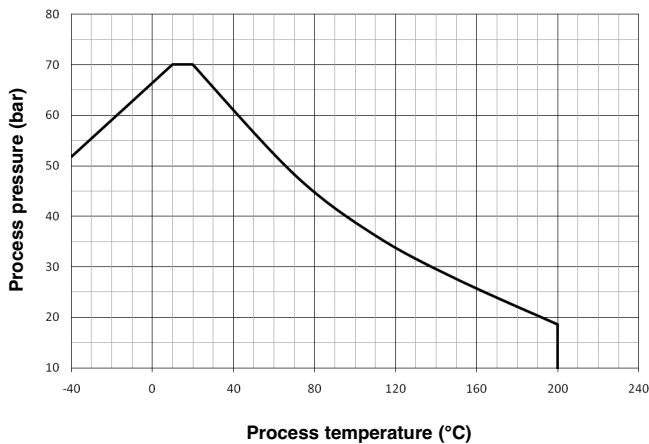
<i>Description</i>	<i>Specification</i>
Reference Conditions	Reflection from water at +20 °C (+70 °F) with 183 cm (72") coaxial GWR probe
Linearity	7MR GWR probe: ± 6,3 mm (0,25") 7MB GWR probe: ± 12,7 mm (0,50")
Resolution	± 4 mm (0.15")
Repeatability	< 4 mm (0.15")
Hysteresis	< 4 mm (0.15")
Response Time	< 1 second
Warm-up Time	< 5 seconds
Ambient Temp.	blind transmitters -40 °C to +80 °C (-40 °F to +175 °F) – Aluminium housing -40 °C to +70 °C (-40 °F to +160 °F) – Lexan® housing transmitters with LCD -20 °C to +70 °C (-5 °F to +160 °F)
Process Dielectric Effect	< 13 mm (0.5") within selected range
Operating Temp. Effect	Approx. ± 0,03 % of probe length/°C for probes ≥ 2,5 m (8')
Humidity	0-99 %, non-condensing
Electromagnetic Compatibility	Meets CE requirements (EN-61326: 1997 + A1 + A2) (twin-rod probe must be used in metallic vessel or stillwell)

PROBE SPECIFICATIONS

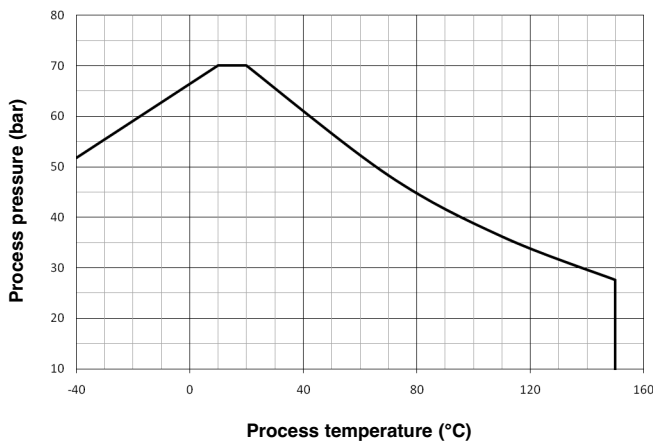
Description		7MR: coaxial GWR probe	7MB: twin rod GWR probe
Materials	Probe	316/316L (1.4401/1.4404), Hastelloy® C (2.4819) or Monel® (2.4360)	
	Process seal	Teflon® with Viton® GFLT or Aegis PF 128 (Consult factory for alternatives)	
Probe diameter		Inside rod: 8 mm (0.315") – Outer tube: 22,5 mm (0.88")	Two 13 mm (0,5") Ø rods – 22,2 mm (0.875") \varnothing to \varnothing
Mounting		External cage and/or in-tank mounting	In-tank mounting only. Twin rod probe must be used in metallic vessel or stillwell > 25 mm (1") from any surface or obstruction.
Process Connection		Threaded: 3/4" NPT or 1" BSP (G 1") Flanged: Various ANSI or EN (DIN) flanges	Threaded: 2" NPT or 2" BSP (G 2") Flanged: Various ANSI or EN (DIN) flanges
Probe length		From 60 cm to 490 cm (24 to 192")	
Transition Zone ^①	Top	0 mm (0")	$\epsilon_r \geq 2,5 = 150 \text{ mm (6")}$
	Bottom	$\epsilon_r: 2,0 = 150 \text{ mm (6")} / \epsilon_r: 80 = 25 \text{ mm (1")}$	$\epsilon_r: 2,5 = 150 \text{ mm (6")} / \epsilon_r: 80 = 25 \text{ mm (1")}$
Process Temp. ^②	Max	+200 °C @ 18,6 bar (+400 °F @ 270 psi)	+150 °C @ 27,6 bar (+300 °F @ 400 psi)
	Min	-40 °C @ 51,7 bar (-40 °F @ 750 psi)	
Max Process Pressure ^②		70 bar @ +20 °C (1000 psi @ +70 °F)	
Max Viscosity		500 cP	1500 cP
Dielectric Range		1,7 to 100	2,5 to 100
Vacuum service		Negative pressure but not hermetic seal	
Media coating		Not recommended in case of media coating	Film: 3% error of coated length, bridging not recommended ^③

PRESSURE/TEMPERATURE RATING – PROBE SEALS

7MR probes



7MB probes



^① Transition Zone (zone with reduced accuracy) is dielectric dependent; ϵ_r = dielectric permittivity. It is recommended to set 4-20 mA signal outside transition zones.

^② See graphs.

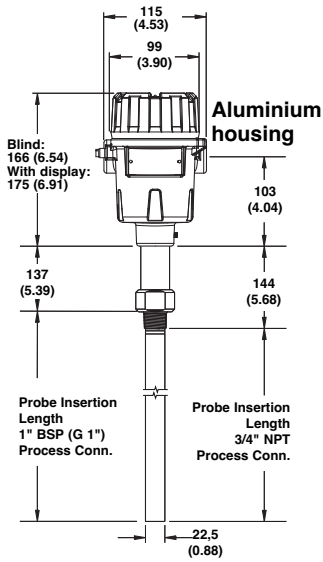
^③ Bridging is defined as continuous accumulation of material between the probe elements.

"O"-RING (SEAL) SPECIFICATIONS

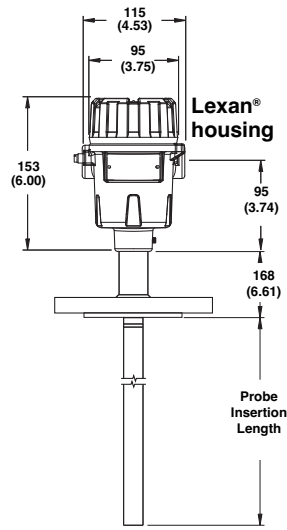
"O"-ring material	max process temperature	min process temperature	max process pressure	not recommended for applications	recommended for applications
Viton® GFLT	200°C @ 16 bar (400 °F @ 230 psi)	-40 °C (-40 °F)	70 bar @ 20 °C (1000 psi @ 70 °F)	ketones (MEK, acetone), skydrol fluids, amines, anhydrous ammonia, low molecular weight esters and ethers, hot hydrofluoric or chlorosulfonic acids, sour hydrocarbons	general purpose, ethylene
Neoprene	150 °C @ 20 bar (300 °F @ 290 psi)	-55 °C (-65 °F)	70 bar @ 20 °C (1000 psi @ 70 °F)	phosphate ester fluids, ketones (MEK, acetone)	refrigerants, high anline point petroleum oils, silicate ester lubricants
EPDM	125 °C @ 14 bar (250 °F @ 200 psi)	-50 °C (-60 °F)	70 bar @ 20 °C (1000 psi @ 70 °F)	petroleum oils, di-ester base lubricant, steam	acetone, MEK, skydrol fluids
Kalrez 4079	200 °C @ 16 bar (400 °F @ 232 psi)	-40 °C (-40 °F)	70 bar @ 20 °C (1000 psi @ 70 °F)	hot water/steam, hot aliphatic amines, ethylene oxide, propylene oxide	inorganic and organic acids (including hydro fluids and nitric), aldehydes, ethylene, organic oils, glycols, silicone oils, vinegar, sour hydrocarbons
Chemraz 505	200 °C @ 14 bar (400 °F @ 200 psi)	-30 °C (-20 °F)	70 bar @ 20 °C (1000 psi @ 70 °F)	acetaldehyde, ammonia + lithium metal solution, butyraldehyde, di-water, freon, ethylene oxide, liquors, isobutyraldehyde	inorganic and organic acids, alkalines, ketones, esters, aldehydes, fuels
Buna-N	135 °C @ 22 bar (275 °F @ 320 psi)	-20 °C (-4 °F)	70 bar @ 20 °C (1000 psi @ 70 °F)	halogenated hydrocarbons, nitro hydrocarbons, phosphate ester hydraulic fluids, ketones (MEK, acetone), strong acids, ozone, automotive brake fluid	general purpose sealing, petroleum oils and fluids, cold water, silicone greases and oils, di-ester base lubricants, ethylene glycol base fluids
Polyurethane	95 °C @ 29 bar (200 °F @ 420 psi)	-55 °C (-65 °F)	70 bar @ 20 °C (1000 psi @ 70 °F)	acids, ketones, chlorinated hydrocarbons	hydraulic systems, petroleum oils, hydrocarbon fuel, oxygen, ozone
HSN (Highly Saturated Nitrile)	135 °C @ 22 bar (275 °F @ 320 psi)	-20 °C (-4 °F)	70 bar @ 20 °C (1000 psi @ 70 °F)	halogenated hydrocarbons, nitro hydrocarbons, phosphate ester hydraulic fluids, ketones (MEK, acetone), strong acids, ozone, automotive brake fluid, steam	NACE applications
Aegis PF128^①	200 °C @ 16 bar (400 °F @ 232 psi)	-20 °C (-4 °F)	70 bar @ 20 °C (1000 psi @ 70 °F)	black liquor, freon 43, freon 75, galden, KEL-F liquid, molten potassium, molten sodium	inorganic and organic acids (including hydro fluids and nitric), aldehydes, ethylene, organic oils, glycols, silicone oils, vinegar, sour hydrocarbons, steam, amines, ethylene oxide, propylene oxide, NACE applications

① Max +150 °C (+300 °F) for use on steam.

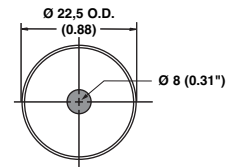
DIMENSIONS in mm (inches)



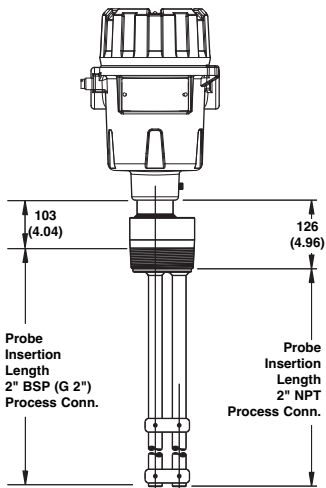
Horizon 7MR with threaded connection



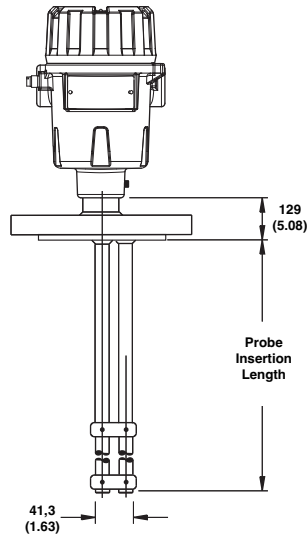
Horizon 7MR with flanged connection



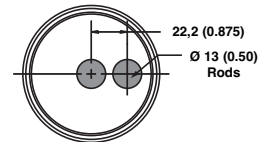
Coaxial GWR Probe, End View



Horizon 7MB with threaded connection



Horizon 7MB with flanged connection



Twin Rod GWR Probe, End View

MODEL IDENTIFICATION

A complete measuring system consists of:

1. Horizon® 704 transmitter head/electronics
2. Horizon® 704 GWR probe

1. Code for HORIZON 704 transmitter head/electronics

BASIC MODEL NUMBER

7 0 4	Horizon 704 guided wave radar transmitter
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POWER

5	24 V DC, two wire
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SIGNAL OUTPUT

1	4-20 mA with HART® communication
0	4-20 mA only (requires local display and keypad - Accessories code A)

MENU LANGUAGE (Hart® communication is only available in English language)

1	English
2	Spanish
3	French
4	German

ACCESSORIES

A	Plug in digital display and keypad
0	Blind transmitter (no display/keypad) – only available for units with HART® communication

MOUNTING/APPROVAL

1	Integral mount, Weatherproof
A	Integral mount, ATEX II 1 G Ex ia IIC T4 Ga (needs cast aluminium housing)

HOUSING / CABLE ENTRY

3 0	Lexan® plastic, 3/4" NPT cable entry (2 entries - cable gland and plug incl.)
4 1	Cast aluminium, M20 x 1,5 cable entry (2 entries - 1 plugged)
4 0	Cast aluminium, 3/4" NPT cable entry (2 entries - 1 plugged)

7	0	4	5						
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 complete code for HORIZON 704 transmitter head/electronics

→ X = product with a specific customer requirement

2. Code for HORIZON 704 Coaxial or Twin rod GWR probe

BASIC MODEL NUMBER

7 M R	Overfill safe coaxial GWR probe	(dielectric range: ≥ 1,7)
7 M B	Twin rod GWR probe	(dielectric range: ≥ 2,5)

MATERIAL OF CONSTRUCTION - wetted parts (including process connection flange when applicable)

A	316/316L (1.4401/1.4404) stainless steel with Teflon® spacers
B	Hastelloy C (2.4819) with Teflon® spacers
C	Monel (2.4360) with Teflon® spacers

PROCESS CONNECTION - SIZE/TYPE (consult factory for other process connections)

7MR – Threaded

1 1	3/4" NPT
2 2	1" BSP (G 1")

7MB – Threaded

4 1	2" NPT
4 2	2" BSP (G 2")

7MR – ANSI flanges

2 3	1" 150 lbs ANSI RF
2 4	1" 300 lbs ANSI RF
2 5	1" 600 lbs ANSI RF
3 3	1 1/2" 150 lbs ANSI RF
3 4	1 1/2" 300 lbs ANSI RF
3 5	1 1/2" 600 lbs ANSI RF
4 3	2" 150 lbs ANSI RF
4 4	2" 300 lbs ANSI RF
4 5	2" 600 lbs ANSI RF

7MR/7MB – ANSI flanges

5 3	3" 150 lbs ANSI RF
5 4	3" 300 lbs ANSI RF
5 5	3" 600 lbs ANSI RF
6 3	4" 150 lbs ANSI RF
6 4	4" 300 lbs ANSI RF
6 5	4" 600 lbs ANSI RF

7MR – EN (DIN) flanges

B B	DN 25 PN 16/25/40 EN 1092-1 Type A
B C	DN 25 PN 63/100 EN 1092-1 Type B2
C B	DN 40 PN 16/25/40 EN 1092-1 Type A
C C	DN 40 PN 63/100 EN 1092-1 Type B2
D A	DN 50 PN 16 EN 1092-1 Type A
D B	DN 50 PN 25/40 EN 1092-1 Type A
D D	DN 50 PN 63 EN 1092-1 Type B2
D E	DN 50 PN 100 EN 1092-1 Type B2

7MR/7MB – EN (DIN) flanges

E A	DN 80 PN 16 EN 1092-1 Type A
E B	DN 80 PN 25/40 EN 1092-1 Type A
E D	DN 80 PN 63 EN 1092-1 Type B2
E E	DN 80 PN 100 EN 1092-1 Type B2
F A	DN 100 PN 16 EN 1092-1 Type A
F B	DN 100 PN 25/40 EN 1092-1 Type A
F D	DN 100 PN 63 EN 1092-1 Type B2
F E	DN 100 PN 100 EN 1092-1 Type B2

PROCESS SEAL - MATERIAL ①

0	Viton® GFLT seal - for universal use	Min. -40 °C (-40 °F) / +200 °C (+400 °F)
8	Aegis PF 128 seal - for aggressive media / steam®	Min. -20 °C (-4 °F) / +200 °C (+400 °F)

- ① Consult factory for alternative seal materials
- ① Max +150 °C (+300 °F) for use on steam

INSERTION LENGTH – Specify per cm (0.39") increment

0 6 0	min 60 cm (24")
4 9 0	max 490 cm (192")



complete code for HORIZON 704 Coaxial or Twin Rod GWR probe

X = product with a specific customer requirement



Horizon 704 Guided Wave Radar Transmitter Configuration Data Sheet

Copy blank page and store calibration data for future reference and troubleshooting.

Item	Screen	Value	Value		
Vessel Name					
Vessel #					
Media & Dielectric					
Tag #					
Electronics Serial #				TROUBLESHOOTING	
Probe Serial #				Correct Value	Incorrect Value
Level	«Level»				
Units	«Units»				
Probe Model	«PrbModel»				
Probe Length	«Prb Ln»				
Offset	«Offset»				
Level Trim	«Lvl Trim»				
Dielectric	«Dielctrc»				
4mA point	«Set 4mA»				
20mA point	«Set 20mA»				
Damping	«Damping»				
Fault Choice	«Fault»				
Deadband	«Deadband»				
HART Poll Address	«Poll Adr»				
Trim 4mA	«Trim 4»				
Trim 20mA	«Trim 20»				
Loop test	«Loop Tst»				
Fiducial Tick	«Fid tick»				
Conversion Factor	«Conv Fct»				
Scale Offset	«Scl Offs»				
# of Ticks	«# Ticks»				
Threshold	«Threshld»				
Software Version	«Model 704»				
Name					
Date					
Time					

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

Any unit that was used in a process must be properly cleaned in accordance with the proper health and safety standards applicable by the owner, before it is returned to the factory.

A material Safety Data Sheet (MSDS) must be attached at the outside of the transport crate or box.

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

All replacements will be shipped Ex Works.

UNDER RESERVE OF MODIFICATIONS

BULLETIN N°: BE 57-604.4
EFFECTIVE: OCTOBER 2013
SUPERSEDES: September 2010



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