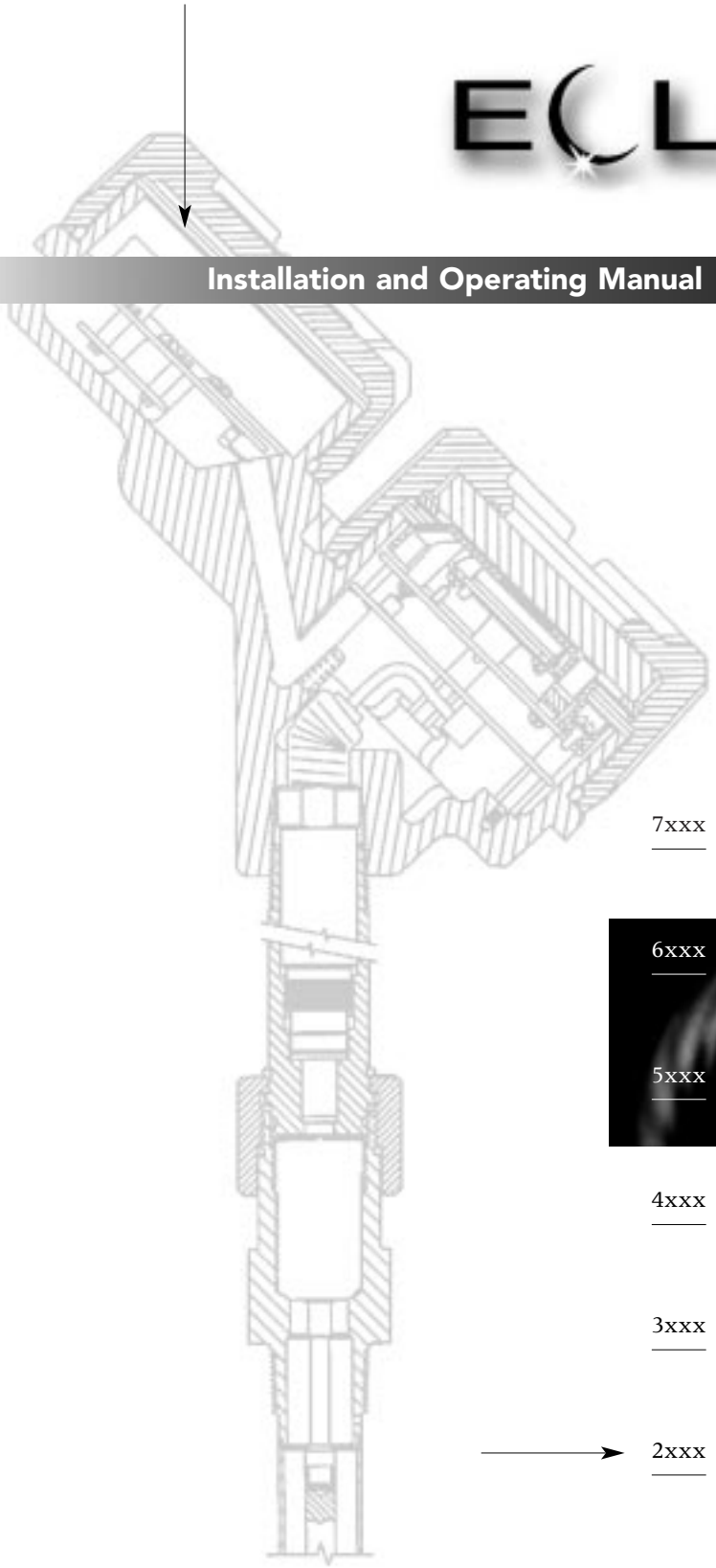
ECLIPSE™ 705

Installation and Operating Manual



Guided Wave

Radar-based

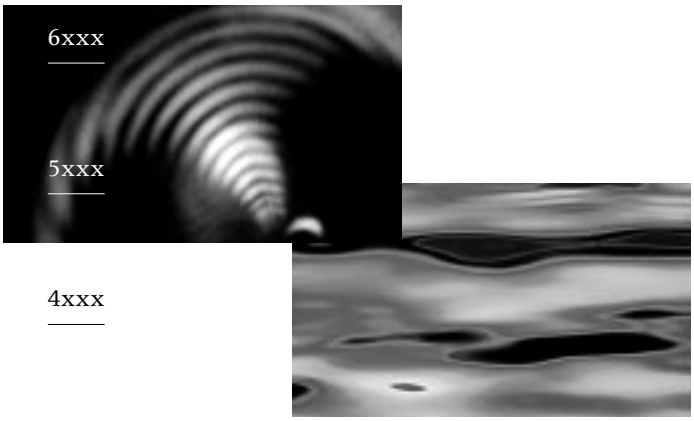
Level

Measurement

7xxx

6xxx

5xxx



4xxx

3xxx

2xxx

1xxx

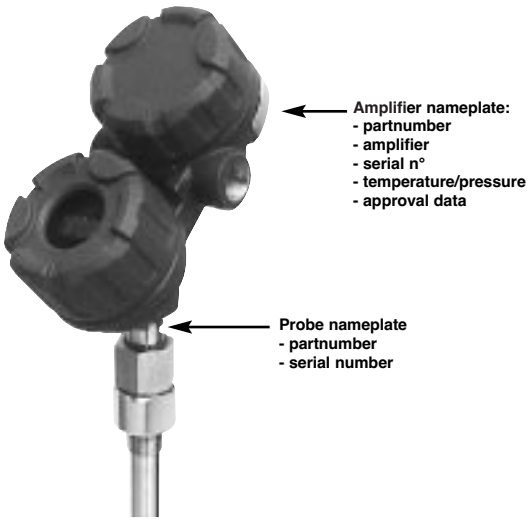
Magnetrol®

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. Check and record the serial number for future reference when ordering parts.

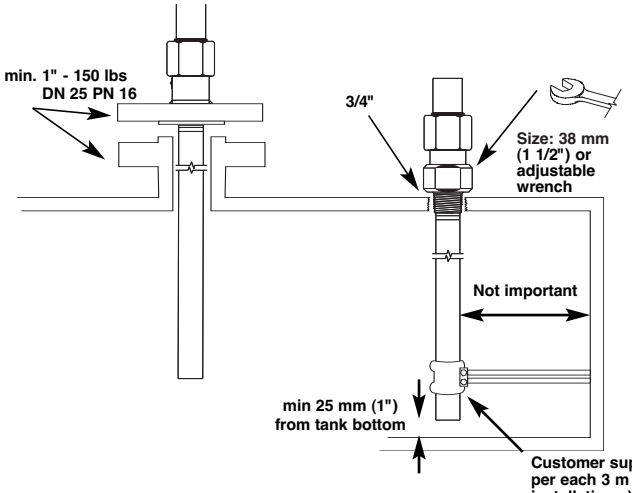
These units are in conformity with the provisions of:

1. The EMC Directive: 89/336/EEC. The units have been tested to EN 61000-6-4/2001 and EN 61000-6-2/2001.
2. Directive 94/9/EC for Equipment or protective system for use in potentially explosive atmospheres. EC-type examination certificate number KEMA99ATEX0518X (intrinsic safe units) or KEMA99ATEX5311 (EEx d units) or KEMA99ATEX5014 (Non sparking units).
3. The PED directive 97/23/EC (pressure equipment directive). Safety accessories per category IV module H1.

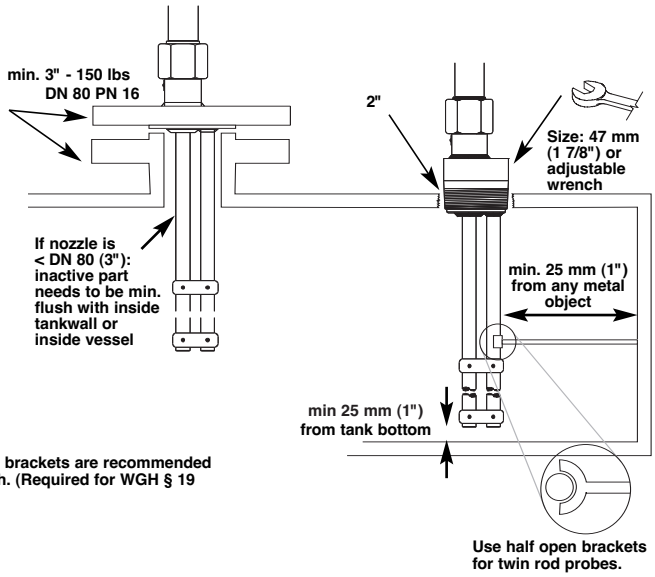


MOUNTING

7MA/7MD/7MR/7MS coaxial GWR probe



7MB Twin Rod GWR probe



IMPORTANT:

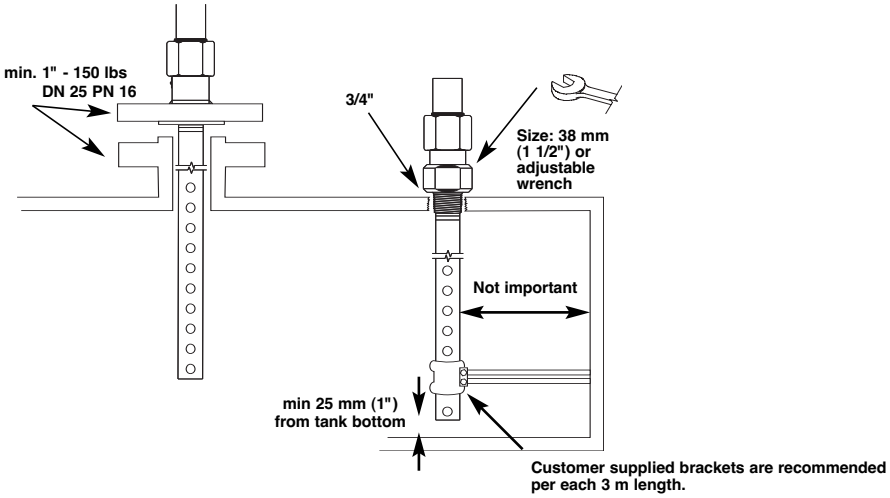
The 7MB GWR probe needs to be installed into a metal tank, stillwell or by-pass cage to meet CE requirements (EN 50081-2, EN 50082-2), electromagnetic compatibility.

High level shutdown/overfill protection

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

MOUNTING

7MT interface



MOUNTING CONSIDERATIONS

Note: mounting considerations for 7M5/7M7 (Twin lead) GWR probes are minimal:
- keep a min spacing of 25 mm (1") between tank wall and any metal part of the tank (wall, pipes, support beams etc...)
- mounting inside external cage/stillwell – min size should be 3"/DN 80
- for 7MF/7M1/7M2 probe can be attached to the tank bottom using the noose or the 13 mm (0.50") Ø hole provided in the TFE weight. Cable tension should not exceed 9 kg (20 lbs).

Metallic (conductive) obstructions in tank

Distance to probe	Acceptable objects
< 150 mm (6")	Continuous, smooth, parallel, conductive surface (e.g. metal tank wall); probe should not touch tank wall
> 150 mm (6")	< 1"/DN25 diameter pipe and beams, ladder rungs
> 300 mm (12")	< 3"/DN80 diameter pipe and beams, concrete walls
> 450 mm (18")	All remaining objects

Non-metallic vessels

For 7MF/7M1/7M2 (single rod/cable)

1. Flange (metal) mounting is recommended for optimum performance.

Metallic obstructions

For 7MF/7M1/7M2 (single rod/cable)
A metal stillwell/cage of max. 6"/DN size or a metal tank wall within 150 mm of the probe mounting will allow the unit operate accurately in media with dielectrics down to ε_r 1,9. Objects in the proximity can cause erroneous readings

For 7M5/7M7 (twin rod/cable)
Mount the probe more than 25 mm (1") from any metallic object/vesselwall.

High level shutdown/overfill protection

Special consideration is necessary in any high level shutdown / overfill protection application where guided wave radar is used. To ensure proper measurement, the guided wave radar probe should be installed in such way that the maximum overfill level is between min 120 mm (4.8") and max 910 mm (36") (blocking distance depending application) below the process connection. Consult factory for further information.

Turbulence

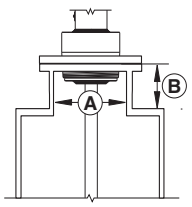
For 7MF/7M1/7M2/7MJ

The bottom of the probe should be stabilized if turbulence will cause a deflection of more than 75 mm at 3 m (3" at 10') of length. The probe should not make contact with a metal tank. A TFE bottom spacer for single rod GWR probes (7MF) or PEEK spacer for 7MJ is optional.

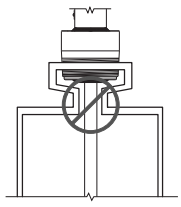
Nozzles: do not restrict the performance by ensuring the following:

For 7MF/7M1/7M2/7MJ (single rod/cable):
1. Nozzle must be 50 mm (2") or larger diameter.
2. Nozzle inside diameter **(A)** should be ≥ to nozzle height **(B)**. If this is not the case, it is recommended to adjust BLOCKING DISTANCE and/or DIELECTRIC/SENSITIVITY settings.

For 7M5/7M7 (twin rod/cable):
1. Nozzle should be DN80 (3") diameter or larger.
2. For nozzles < DN80 (3") diameter, the bottom of the inactive section of the probe should be flush with the bottom of the nozzle or extend into the vessel.



Correct installation



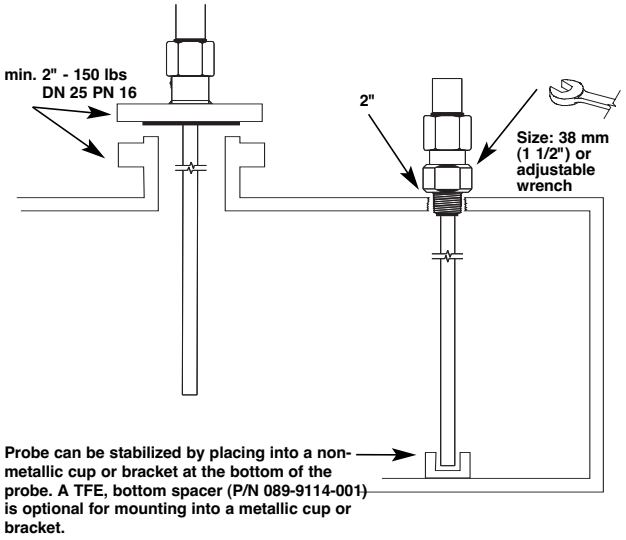
Pipe reducers should not be used

Blocking distance «BlockDis»**:** should be > 2 x nozzle length. Some nozzles will require greater deadband; increase deadband if «EOP High» message appears; Do not allow liquid into the deadband-improper level reading or Error message may occur.

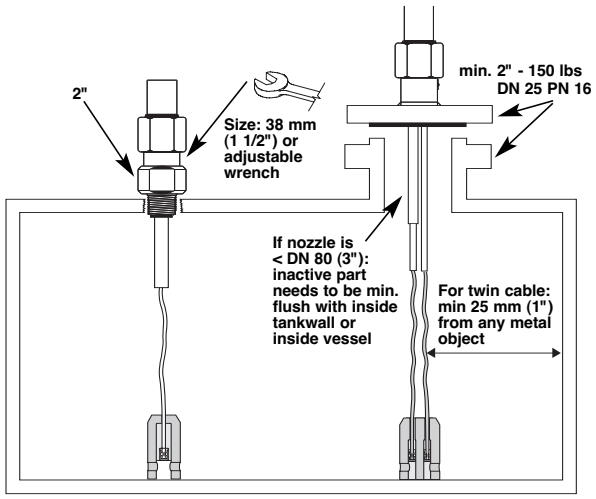
Sensitivity «Senstvty»**:** The sensitivity is the amount of amplification added to level signal (0-255); decrease sensitivity if objects close to the probe are causing inaccurate measurement.

MOUNTING

7MF/7MJ single rod GWR probe

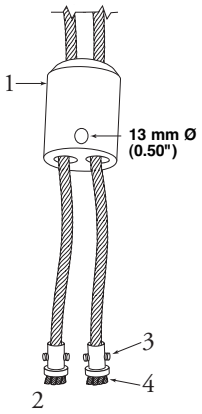


7M1/7M2/7M5/7M7 flexible GWR probe



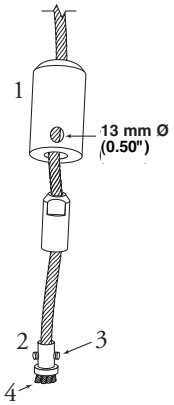
7M7/7M5 probe can be shortened in field.

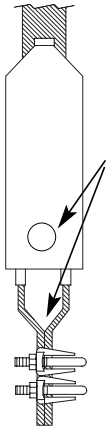
a. raise The weight (1) to expose the two securing devices (2)
b. loosen the two #10-32 set screws (3) on both securing devices using a 2.5 mm (3/32") hex wrench and slide the securing devices off of the probe
c. slide the TFE weight off of the probe.
d. cut and remove the required cable (4) length
e. remove 90 mm (3 1/2") of the rib between the two cables
f. strip 16 mm (5/8") of coating from the two cables.
g. slide the TFE weight back on to the probe.
h. enter new probe length (cm or inches) in software (See page 6, Item 8)



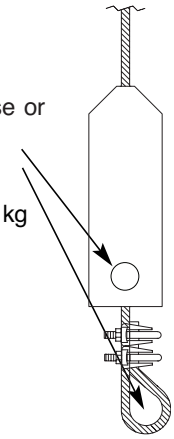
7M1/7M2 probe can be shortened in field.

a. raise TFE weight (1) exposing securing device (2)
b. loosen both #10-32 set screws (3) using 2.5 mm (3/32") hex wrench and remove securing device
c. cut and remove needed cable length (4)
d. re-attach securing device (2) and tighten screws
e. enter new probe length (cm or inches) in software (See page 6, Item 8)





Note: Probe can be attached to the tank bottom using the noose or the 13 mm Ø (0.50") hole provided in the TFE weight.
7M1/7M7 GWR probes: cable tension should not exceed 89 N (20 lbs).
7M2/7M5 GWR probes: pull down force should not exceed 1360 kg (3000 lbs)

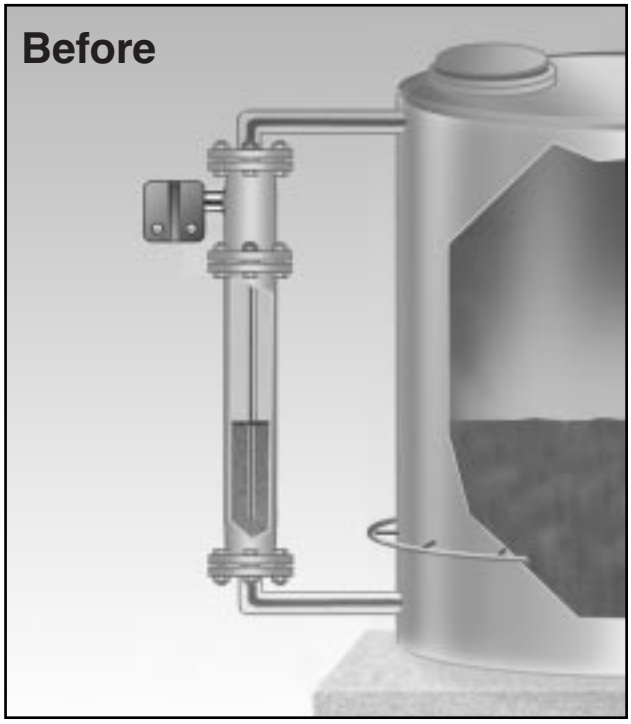


Twin flexible GWR probe

Single cable GWR probe

Top/Bottom GWR probe

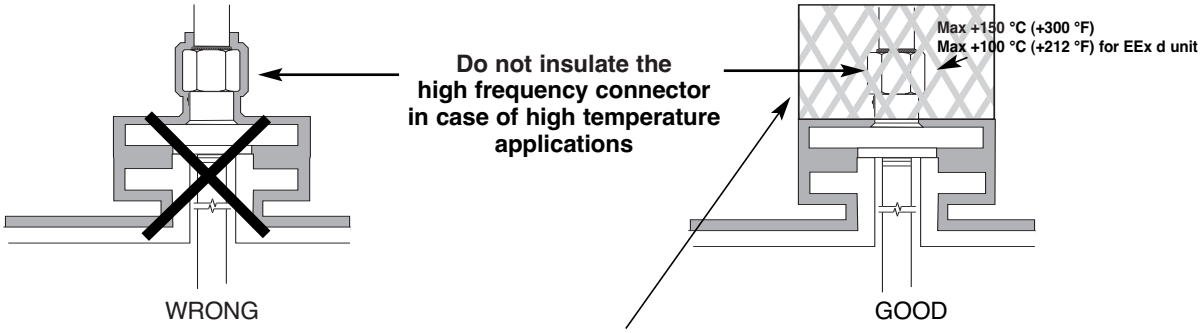
In addition to Magnetrol's Torque Tube Cage Flange options, the Eclipse® 705 transmitter and 7EK GWR probe/cage can also be used in replacing existing Top/Bottom and Top/Side torque tube installations.
After removal of the existing torque tube cage assembly (transmitter, controller, and cage), Eclipse Guided Wave Radar may then be installed directly in its place. Several models are available for some of the major torque tube displacer transmitter manufacturers. Because the Model 7EK probe/cage mounting dimensions and measuring ranges match the original manufacturer's specification, no re-piping is necessary.



Typical Torque Tube Transmitter in Top/Bottom Configuration

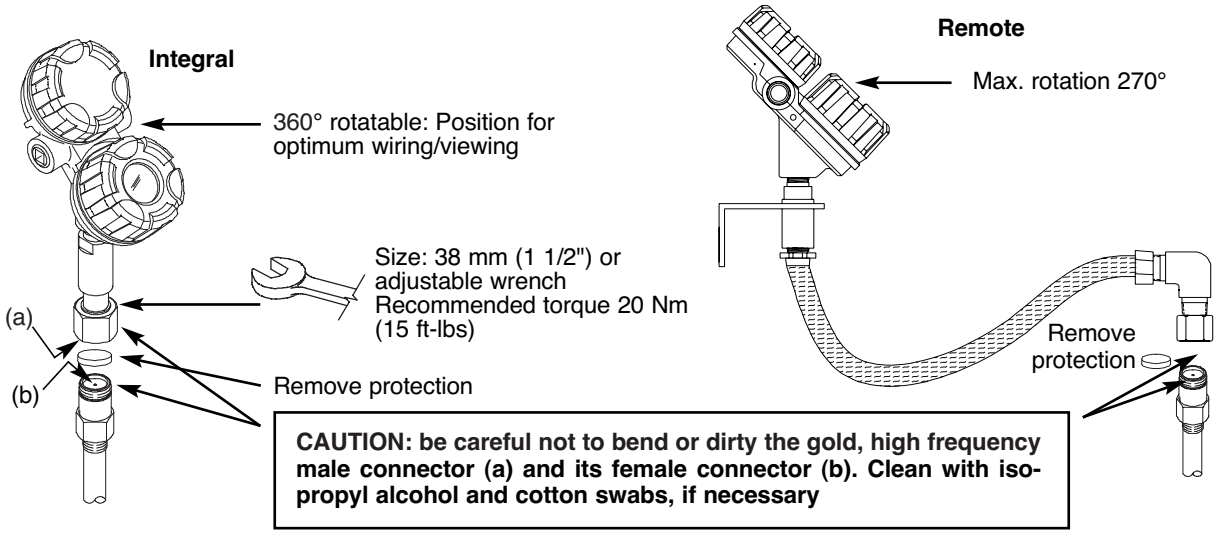
Eclipse Guided Wave Radar Transmitter in Top/Bottom Configuration

Insulation



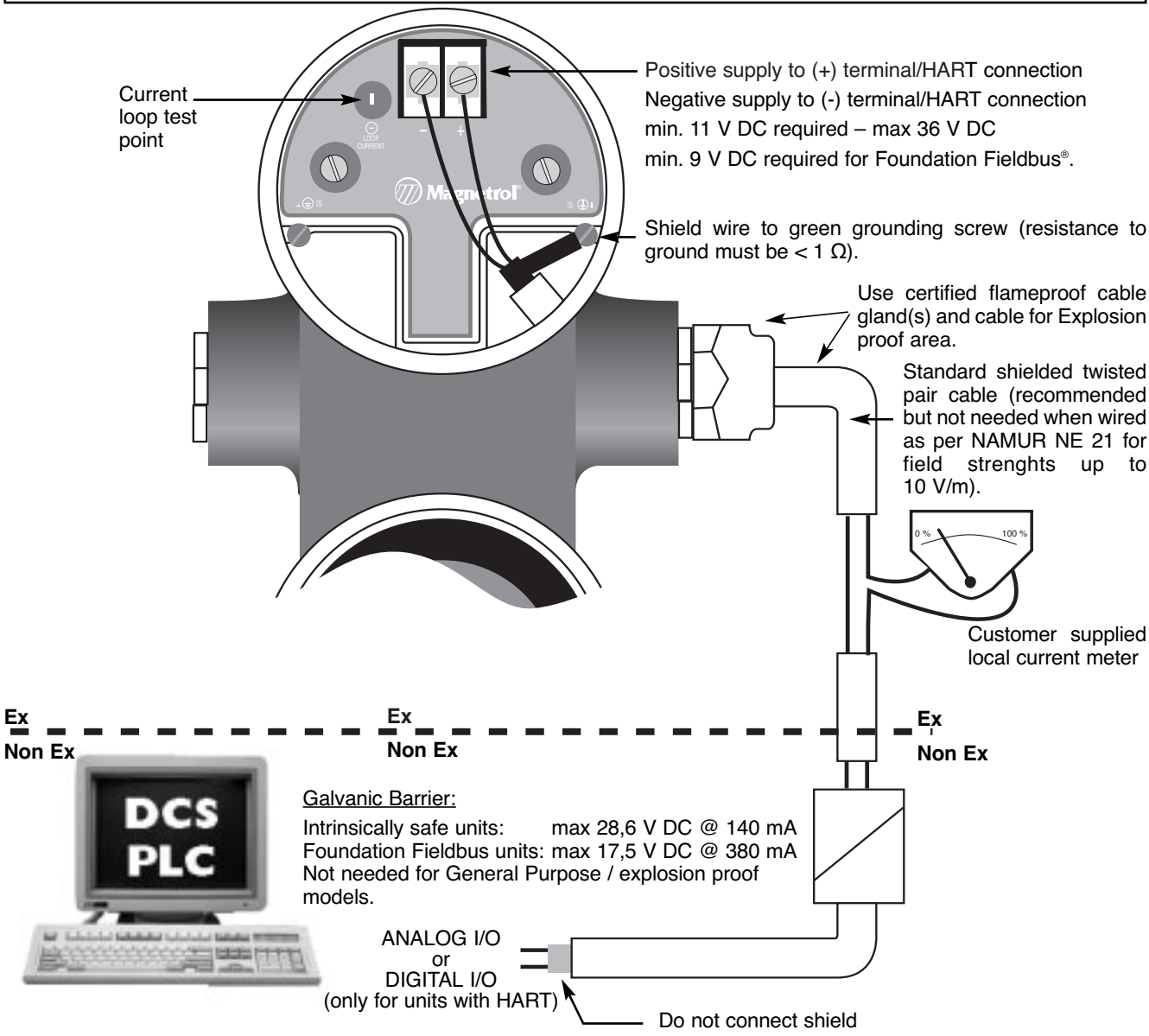
On high or low temperature applications, install a vented protection around the probe/housing.

Transmitter



WIRING

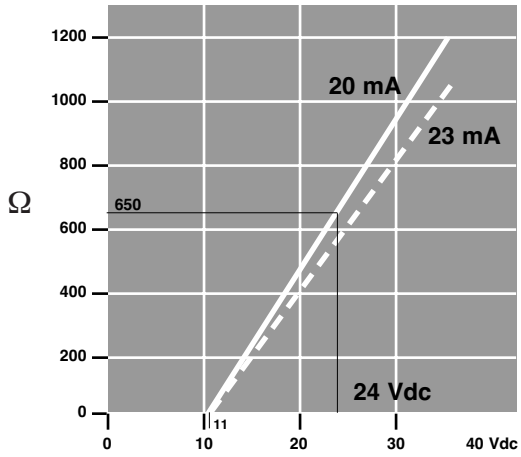
CAUTION: power must be switched OFF before wiring the unit.



IMPORTANT:

The shield wire should only be grounded at ONE side only. It is recommended to connect the shield to ground in the field (at the transmitter side - as shown above) but connecting in the control room is also allowed.

LOOP RESISTANCE

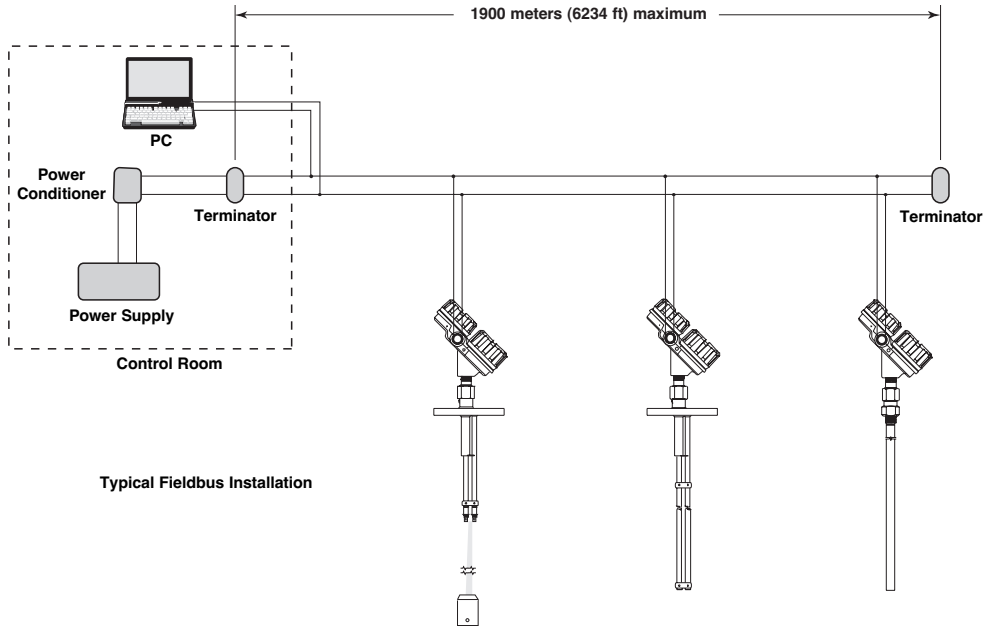


WIRING

Unlike 4–20 mA analog installations in which the two wires carry a single variable (the varying 4–20 mA current), a digital communications scheme such as Fieldbus considers the two wires as a network. The network can carry many process variables as well as other information. The Eclipse Model 705FF transmitter is a Foundation Fieldbus registered device that communicates with the H1 Foundation Fieldbus protocol operating at 31.25 kbits/sec. The H1 physical layer is an approved IEC 61158 standard. The figure shows a typical Fieldbus installation.

An IEC61158 shielded twisted pair wire segment can be as long as 1900 meters (6234 feet) without a repeater. Up to 4 repeaters per segment can be used to extend the distance. The maximum number of devices allowed on a Fieldbus segment is 32 although this depends on the current draw of the devices on any given segment.

Details regarding cable specifications, grounding, termination, and other network information can be found in IEC 61158 or at www.fieldbus.org.



Typical Fieldbus Installation

NOTE: All Foundation Fieldbus devices must be tested for interoperability by the Fieldbus Foundation. Magnetrol Model 705FF device registration information can be found at www.fieldbus.org.

DEVICE CONFIGURATION

Device Descriptions

The function of a Fieldbus device is determined by the arrangement of a system of blocks defined by the Fieldbus Foundation. The types of blocks used in a typical User Application are described as follows:

Resource Block describes the characteristics of the Fieldbus device such as the device name, manufacturer, and serial number.

Function Blocks are built into the Fieldbus devices as needed to provide the desired control system behavior. The input and output parameters of function blocks can be linked over the Fieldbus. There can be numerous function blocks in a single User Application.

Transducer Blocks contain information such as calibration date and sensor type. They are used to connect the sensor to the input function blocks.

An important requirement of Fieldbus devices is the interoperability concept mentioned above. Device Description (DD) technology is used to achieve this interoperability. The DD provides extended descriptions for each object and provides pertinent information needed by the host system.

DDs are similar to the drivers that your personal computer (PC) uses to operate peripheral devices connected to it. Any Fieldbus host system can operate with a device if it has the proper DDs for that device.

The most recent DD and Common File Format (CFF) files can be found on Magnetrol's web site at magnetrol.com or at fieldbus.org.

INTRINSICALLY SAFE

H1 supports Intrinsic Safety (IS) applications with bus powered devices. To accomplish this, an IS barrier is placed between the power supply in the safe area and the device in the hazardous area.

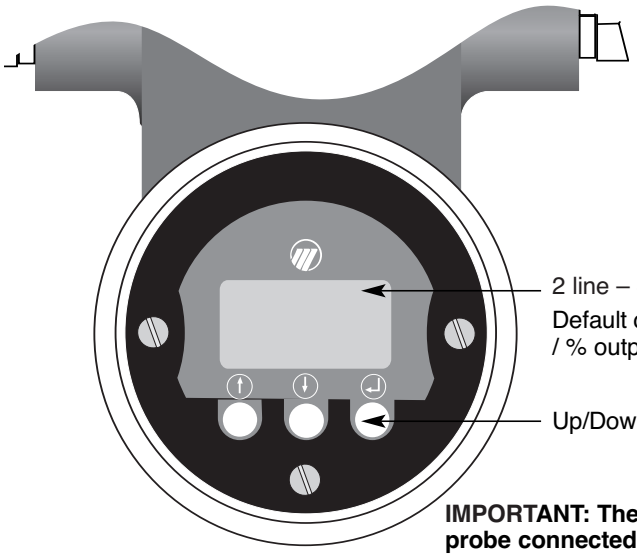
H1 also supports the Fieldbus Intrinsically Safe Concept (FISCO) model which allows more field devices in a network. The FISCO model considers the capacitance and inductance of the wiring to be distributed along its entire length. The stored energy during a fault will be less and more devices are permitted on a pair of wires. Instead of the conservative entity model, which only allows about 90 mA of current, the FISCO model allows a maximum of 110 mA for Class II C installations and 240 mA for Class II B installations.

FISCO certifying agencies have limited the maximum segment length to 1000 meters because the FISCO model does not rely on standardized ignition curves.

The Eclipse Model 705 is available with an entity IS, FISCO IS, and explosion proof approvals.

CONFIGURATION

NOTE: When connected to an approved barrier, the intrinsically safe electronics of the Eclipse allow to remove the covers with power switched on – even if the area is known to be hazardous



2 line – 8 characters LCD

Default display cycles every 5 s through Status «STATUS» / Level «LEVEL» / % output «% OUTPUT» / Loop «LOOP». Level not displayd for FF units.

Up/Down and Enter pushbuttons

IMPORTANT: The Eclipse amplifier can be bench configured without GWR probe connected. Ignore the start up message «No Level Signal» / «STATUS» / «WeakSgnl» **in this case.**

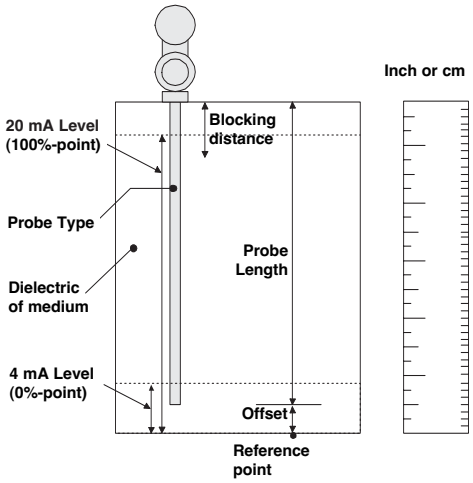
Display	Comment	
Units! cm	Press ↵:	The last character on the first line of the display changes to «!». This sign confirms that the values/choices of the second line can be modified via the ↓ and ↑ push buttons.
Units! **cm**	Press ↑ ↓	* Scroll through the choices or increase/decrease the values on the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

PASSWORD

DISPLAY	ACTION/	COMMENT/
Ent Pass 0	Display shows «0»	Factory default setting Data is not protected
Ent Pass! 1	Press ↵ and last character changes into «!» Enter your personal password with ↑ and ↓ (any value between 1 and 255) Press ↵ to confirm	Setting password
	Press ↵ and enter old password Press ↵ and last character changes into «!» Enter your new password with ↑ and ↓ (any value between 1 and 255) Press ↵ to confirm	Changing password
New Pass 4096	Display shows an encrypted value, enter your password or call Magnetrol for assistance to recoop your password if necessary	Data is protected by a valid Password

NOTE: Password protection is activated when after 5 minutes no keystrokes are sensed.

TERMINOLOGY



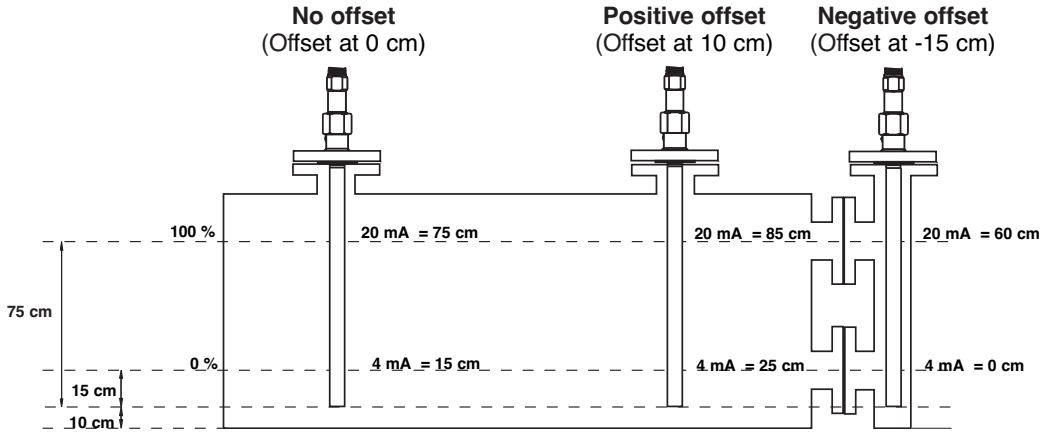
Offset = ☐ cm or inches
The offset is the distance between reference point (e.g. bottom of tank) and end of probe. From the reference point both 4 mA and 20 mA levels are calibrated. When offset is set at zero, the end of the probe is the reference point.

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:
εr = 2.0: 150 mm (6") + Offset
εr = 80: 25 mm (1") + 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 16.

Probe length = ☐ cm or inches, record the exact probe length as printed on the nameplate: 705-xxxx-xxx / 7Mx-xxx-xxx

Dielectric Select the dielectric scale of the media to measure: **1.4–1.7** or **1.7–3** or **3–10** 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.



BEFORE STARTING

Start from run mode:

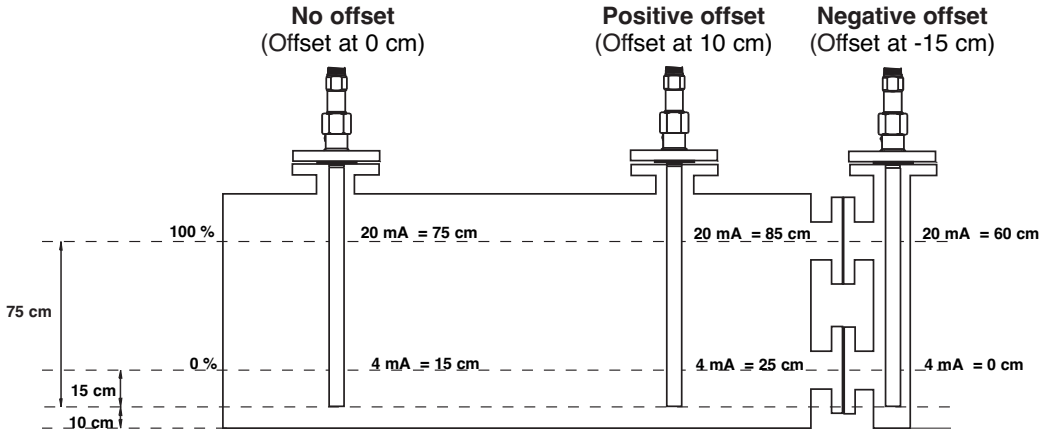
1. Select the desired language for configuration: English, French, German or Spanish in the language screen (32) «`language`». Scroll up for quickly reaching the language selection screen.
2. Define type of measurement:
   a. Level only (pages 10 & 11)
   b. Level and Volume (pages 12 & 13)
   c. Interface only (pages 14 & 15)
   d. Interface and Volume (pages 16 & 17)
   Scroll down until the screen reads «`MeasType`». The unit will now show only the applicable screens for the selected type of measurement.
3. Scroll one screen down and select the applicable engineering unit in «`LvlUnits`», all configuration values will be entered in that engineering unit.
4. Move to the loop control screen «`LoopCtrl`», select the loop control in function of the type of measurement «`MeasType`» selected.
5. Refer to the configuration procedure of the selected type of measurement.
6. Refer to page 18 for all hidden diagnostic screens. These screens allow the advanced user to configure the unit for special applications or to troubleshoot the unit in the field. It is NOT recommended to access this toolset without proper guidance or having followed proper training.

MENU: STEP BY STEP PROCEDURE – Eclipse 705: Level only

		Screen	Action	Comment
Run mode	①	*Status* *Level* *%Output* *Loop*	Transmitter Display	Transmitter default values cycle every 5 seconds. Status «Status», Level «Level», % Output «% Output», and Loop «Loop».
	②	Level xx.x	Transmitter Display	Transmitter displays level value in selected engineering units.
	③	%Output xx.x%	Transmitter Display	Transmitter displays % Output measurement derived from 20 mA span.
	④	Loop xx.xx mA	Transmitter Display	Transmitter displays Loop measurement (mA).
Configuration	⑤	PrbModel (select)	**Select** the type of probe	Select as per the 3 first digits of the probe partnumber. The partnumber is shown on the nameplate: e.g. 705-510A-A11/7MR-A230-218, select 7xR-x from the list.
	⑥	PrbMount (select)	**Select** the type of probe mounting.	Select NPT «NPT», BSP «BSP» or Flange «Flange». (consult factory when a «7xK» GWR probe is used)
	⑦	MeasType (select)	**Select** the type of measurement	Select level «Levl Only».
	⑧	LvlUnits (select)	**Select** units for level	cm «cm», m «m», inches «inches» or feet «feet».
	⑨	Probe Ln xxx.x	**Enter** the exact length of probe.	Enter as per the 3 last digits of the probe partnumber on the nameplate: - rigid probes, enter value cm or inches, - flexible probes, enter value in meters or feet e.g. 705-510A-A11/7MR-A230-280, enter «218» cm probe length.
	⑩	Lvl Ofst xxx.x	**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) or at the probe (negative offset). See page 9 “Terminology”.
	⑪	Dielctrc (Select)	**Enter** the dielectric range value of the media	Select: «1.4–1.7»; «1.7–3» or «10–100»
	⑫	Senstvty xxx	Change cryptic value	Probe length is printed on the nameplate and order information. It is the last three digits of the model number. (consult factory when a «7xK» GWR probe is used)
	⑬	Loop Ctrl (Select)	**Select** primary variable (PV)	Primary variable is the loop controlling parameter. Select level «Lvl only»
	⑭	Set 4mA xxx.x	**Enter** the level value for the 4 mA point.	A transition zone may exist at the bottom of the probe. See Functional Specifications Probe, See pages 30, 31 and 32.
	⑮	Set 20mA xxx.x	**Enter** the level value for the 20 mA point.	A transition zone / blocking distance may exist at the top of the probe. See Functional Specifications Probe See pages 30, 31 and 32.
	⑯	Damping xx sec	**Enter** the damping factor.	A Damping factor (1-10 seconds) may be added to smooth a noisy display and/or output due to turbulence.
	⑰	Fault (Select)	**Enter** the value for error.	Select «3.6 mA», «22 mA» or hold last value «HOLD». In case of loop failure, error signal will follow the failing trend; meaning the unit will show 3.6 mA when the reviewed loop current by the device is found too low. The unit will show 22 mA in case the reviewed loop current is found too high.

= **Quick Start up**

	Screen	Action	Comment
Diagnostics	⑱ BlockDis xx.x	**Enter** distance in selected level units	Allows to ignore level measurements near the top of the probe, caused by e.g. condensation, crystalization. Make sure that the liquid level does NOT enter this zone. Consult factory or the 'Troubleshooting' section before entering any value. Normaly to be used with single rod probe.
	⑲ SZ Fault (select)	Select the safety zone fault.	Select «None» (None), «3.6mA», «22mA», «Latch 3.6mA» or «Latch 22mA». When either «Latch 3.6 / 22mA» signals is selected, the loop current remains in alarm until it is manually cleared with the «SZAlarm» screen (for safety zone explanation see Terminology - page 9).
	⑳ SZHeight xx.x	Select the safety zone value	Enter safety zone in cm or inches (see Terminology - page 9).
	㉑ SZ Alarm Reset	Reset safety zone latch fault	Clear a latched safety zone alarm «SZFault».
	㉒ Threshld (select)	Select the type of threshold	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** «Dielctrc» of upper material. Adjustment of **Trim Level** «Trim Lvl» may be necessary when threshold is changed.
	㉓ Poll Adr xx	Enter HART ID number.	Select a HART poll address (0-15). Enter 0 for a single transmitter installation.
	㉔ Trim Lvl xx.x	Enter value to adjust level reading.	Allows to compensate for a fixed level deviation.
	㉕ Trim 4 xxxx	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.
	㉖ Trim 20 xxxx	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.
	㉗ Loop Tst xx.x mA	Enter a mA output value.	Set mA Output to any given value to perform loop test .
	㉘ LvlTicks xxxxx	Diagnostic display.	Shows time of flight from fiducial pulse to reflected signal from level.
	㉙ New Pass xxx	Enter new password.	Use arrows to select desired value. Values between 0 and 255.
	㉚ Language	Select language	Select «English», «Français», «Deutsch» or «Espagnol».
	㉛ Mdl705HT Ver xx.xx	None, do not adjust.	Factory setting. «Ver» refers to software version.
	㉜ DispFact (select)	Advanced diagnostics.	See page 18.



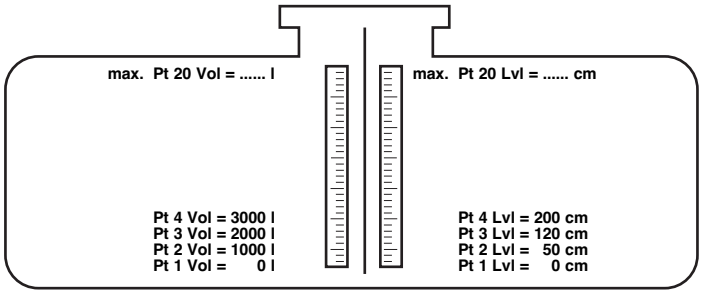
MENU: STEP BY STEP PROCEDURE – Eclipse 705: Level & Volume

		Screen	Action	Comment
Run mode	①	*Status* *Volume* *%Output* *Loop*	Transmitter Display	Transmitter default values cycle every 5 seconds. Status «Status», Volume «Volume», % Output «% Output», and Loop «Loop».
	②	Volume xxx	Transmitter Display	Transmitter displays Volume Value in selected engineering units.
	③	%Output xx.x%	Transmitter Display	Transmitter displays % Output measurement derived from 20 mA span.
	④	Loop xx.xx mA	Transmitter Display	Transmitter displays Loop measurement (mA).
Configuration	⑤	Level xxx	Transmitter Display	Transmitter displays level in selected volume units «LvlUnits».
	⑥	PrbModel (select)	**Select** the type of probe	Select as per the 3 first digits of the probe partnumber. The partnumber is shown on the nameplate: e.g. 705-510A-A11/7MR-A230-218, select 7xR-x from the list.
	⑦	PrbMount (select)	**Select** the type of probe mounting.	Select NPT «NPT», BSP «BSP» or Flange «Flange». (consult factory when a «7xK» GWR probe is used)
	⑧	MeasType (select)	**Select** the type of measurement	Select level and volume «Lvl&Vol».
	⑨	LvlUnits (select)	**Select** units for level	cm «cm», m «m», inches «inches» or feet «feet».
	⑩	Probe Ln xxx.x	**Enter** the exact length of probe.	Enter as per the 3 last digits of the probe partnumber on the nameplate: - rigid probes, enter value cm or inches, - flexible probes, enter value in meters or feet e.g. 705-510A-A11/7MR-A230-280, enter «218» cm probe length.
	⑪	Lvl Ofst xxx.x	**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) or at the probe (negative offset). See page 9 “Terminology”.
	⑫	VolUnits (select)	**Select** units for volume	Liters «l» or gallons «g».
	⑬	StrapTbl xx pnts	**Enter** level/volume pairs in max 20 steps	Liters «l» or gallons «g».
	⑭	Dielctrc (Select)	**Enter** the dielectric range value of the media	Select: «1.4–1.7»; «1.7–3» or «10–100»
	⑮	Senstvty xxx	**Enter** sensitivity value	Enter a value upward or downward to sense the liquid surface. Allows fine gain adjustment.
	⑯	Loop Ctrl (Select)	**Select** primary variable (PV)	Primary variable is the loop controlling parameter. Select level «Lvl only»
	⑰	Set 4mA xxx.x	**Enter** the level value for the 4 mA point.	A transition zone may exist at the bottom of the probe. See Functional Specifications Probe, See page XX.
	⑱	Set 20mA xxx.x	**Enter** the level value for the 20 mA point.	A transition zone / blocking distance may exist at the top of the probe. See Functional Specifications Probe See page XX.
	⑲	Damping xx sec	**Enter** the damping factor.	A Damping factor (1-10 seconds) may be added to smooth a noisy display and/or output due to turbulence.
	⑳	Fault (Select)	**Enter** the value for error.	Select «3.6 mA», «22 mA» or hold last value «HOLD». In case of loop failure, error signal will follow the failing trend; meaning the unit will show 3.6 mA when the reviewed loop current by the device is found too low. The unit will show 22 mA in case the reviewed loop current is found too high.

= **Quick Start up**

	Screen	Action	Comment
Diagnostics	㉑ BlockDis x.x	**Enter** distance in selected level units	Allows to ignore level measurements near the top of the probe, caused by e.g. condensation, crystalization. Make sure that the liquid level does NOT enter this zone. Consult factory or the 'Troubleshooting' section before entering any value. Normaly to be used with single rod probe.
	㉒ SZ Fault (select)	Select the safety zone fault.	Select «None» (None), «3.6mA», «22mA», «Latch 3.6mA» or «Latch 22mA». When either «Latch 3.6 / 22mA» signals is selected, the loop current remains in alarm until it is manually cleared with the «SZAlarm» screen (for safety zone explanation see Terminology - page 9).
	㉓ SZHeight xx.x	Select the safety zone value	Enter safety zone in cm or inches (see Terminology - page 9).
	㉔ SZ Alarm Reset	Reset safety zone latch fault	Select «Reset» «No» or «Yes» to reset alam when either «Latch 3.6mA» or «Latch 22mA» was selected in «SZFault».
	㉕ Threshld (select)	Select the type of threshold	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** «Dielctrc» of upper material. Adjustment of **Trim Level** «Trim Lvl» may be necessary when threshold is changed.
	㉖ Poll Adr xx	Enter HART ID number.	Select a HART poll address (0-15). Enter 0 for a single transmitter installation.
	㉗ Trim Lvl xx.x	Enter value to adjust level reading.	Allows to compensate for a fixed level deviation.
	㉘ Trim 4 xxxx	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.
	㉙ Trim 20 xxxx	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.
	㉚ Loop Tst xx.x mA	Enter a mA output value.	Set mA Output to any given value to perform loop test .
	㉛ LvlTicks xxxxx	Diagnostic display.	Shows time of flight from fiducial pulse to reflected signal from level.
	㉜ New Pass xxx	Enter new password.	Use arrows to select desired value. Values between 0 and 255.
	㉝ Language	Select language	Select «English», «Français», «Deutsch» or «Espagnol».
	㉞ Mdl705HT Ver xx.xx	None, do not adjust.	Factory setting. «Ver» refers to software version.
	㉟ DispFact (select)	Advanced diagnostics.	See page 18.

Strapping table

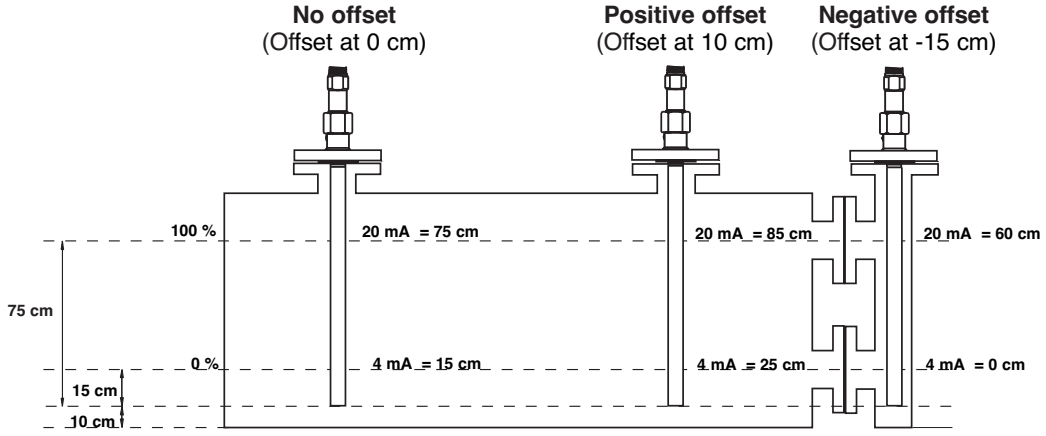


MENU: STEP BY STEP PROCEDURE – Eclipse 705: Interface

		Screen	Action	Comment
Run mode	1	*Status* *IfcLevel* *%Output* *Loop*	Transmitter Display	Transmitter default values cycle every 5 seconds. Status «Status», Interface level «Ifclevel», % Output «% Output», and Loop «Loop».
	2	IfcLevel xx.x	Transmitter Display	Transmitter displays interface level in selected engineering units.
	3	%Output xx.x%	Transmitter Display	Transmitter displays % Output measurement derived from 20 mA span.
	4	Loop xx.xx mA	Transmitter Display	Transmitter displays Loop measurement (mA).
Configuration	5	Level xxx	Transmitter Display	Transmitter displays interface level in selected level units «LvlUnits».
	6	PrbModel (select)	**Select** the type of probe	Select as per the 3 first digits of the probe partnumber. The partnumber is shown on the nameplate: e.g. 705-510A-A11/7MR-A230-218, select 7xR-x from the list.
	7	PrbMount (select)	**Select** the type of probe mounting.	Select NPT «NPT», BSP «BSP» or Flange «Flange». (consult factory when a «7xK» GWR probe is used)
	8	MeasType (select)	**Select** the type of measurement	Select interface «Interface».
	9	LvlUnits (select)	**Select** units for level	cm «cm», m «m», inches «inches» or feet «feet».
	10	Probe Ln xxx.x	**Enter** the exact length of probe.	Enter as per the 3 last digits of the probe partnumber on the nameplate: - rigid probes, enter value cm or inches, - flexible probes, enter value in meters or feet e.g. 705-510A-A11/7MR-A230-280, enter «218» cm probe length.
	11	Lvl Ofst xxx.x	**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) or at the probe (negative offset). See page 9 “Terminology”.
	12	Upr Diel (Select)	**Enter** the dielectric range value of the upper media.	Enter the dielectrics of the upper layer liquid (between 1,4 and 5,0) – only upper layer dielectrics need to be entered.
	13	Dielctrc (Select)	**Select** the dielectric range value of the lower media	Select: «10–100»
	14	Senstvty xxx	**Enter** sensitivity value	Enter a value upward or downward to sense the liquid surface. Allows fine gain adjustment.
	15	Loop Ctrl (Select)	**Select** primary variable (PV)	Primary variable is the loop controlling parameter. Select interface level «Ifc Level» only
	16	Set 4mA xxx.x	**Enter** the level value for the 4 mA point.	A transition zone may exist at the bottom of the probe. See Functional Specifications Probe, See pages 30, 31 and 32.
	17	Set 20mA xxx.x	**Enter** the level value for the 20 mA point.	A transition zone / blocking distance may exist at the top of the probe. See Functional Specifications Probe See pages 30, 31 and 32.
	18	Damping xx sec	**Enter** the damping factor.	A Damping factor (1-10 seconds) may be added to smooth a noisy display and/or output due to turbulence.
	19	Fault (Select)	**Enter** the value for error.	Select «3.6 mA», «22 mA» or hold last value «HOLD». In case of loop failure, error signal will follow the failing trend; meaning the unit will show 3.6 mA when the reviewed loop current by the device is found too low. The unit will show 22 mA in case the reviewed loop current is found too high.

= **Quick Start up**

	Screen	Action	Comment
Diagnostics	⑳ BlockDis x.x	**Enter** distance in selected level units	Allows to ignore level measurements near the top of the probe, caused by e.g. condensation, crystalization. Make sure that the liquid level does NOT enter this zone. Consult factory or the 'Troubleshooting' section before entering any value. Normaly to be used with single rod probe.
	㉑ SZ Fault (select)	Select the safety zone fault.	Select «None» (None), «3.6mA», «22mA», «Latch 3.6mA» or «Latch 22mA». When either «Latch 3.6 / 22mA» signals is selected, the loop current remains in alarm until it is manually cleared with the «SZAlarm» screen (for safety zone explanation see Terminology - page 9).
	㉒ SZHeight xx.x	Select the safety zone value	Enter safety zone in cm or inches (see Terminology - page 9).
	㉓ SZ Alarm Reset	Reset safety zone latch fault	Clear a latched safety zone alarm «SZFault».
	㉔ Threshld	Select top level threshold.	Default selection is «Fixed». For most common applications.
	㉕ IfcThrs (select)	Select interface threshold.	Default selection is «CFD», in case the unit does not track the correct interface layer, select «Fixed». For most common applications.
	㉖ Poll Adr xx	Enter HART ID number.	Select a HART poll address (0-15). Enter 0 for a single transmitter installation.
	㉗ Trim Lvl xx.x	Enter value to adjust level reading.	Allows to compensate for a fixed level deviation.
	㉘ Trim 4 xxxx	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.
	㉙ Trim 20 xxxx	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.
	㉚ Loop Tst xx.x mA	Enter a mA output value.	Set mA Output to any given value to perform loop test .
	㉛ LvlTicks xxxxx	Diagnostic display.	Shows time of flight from fiducial pulse to reflected signal from level.
	㉜ IfcTicks xxxx	Diagnostic display.	Shows time of flight through the upper liquid layer.
	㉝ Medium	Diagnostic display.	Shows type of detected upper liquid; unknown «Unknown» oil only «Oil Only», thin oil layer «Thin Oil» or no level «Dry Probe».
	㉞ New Pass xxx	Enter new password.	Use arrows to select desired value. Values between 0 and 255.
	㉟ Language	Select language	Select «English», «Français», «Deutsch» or «Espagnol».
	㊱ Mdl705HT Ver xx.xx	None, do not adjust.	Factory setting. «Ver» refers to software version.
	㊲ DispFact (select)	Advanced diagnostics.	See page 18.



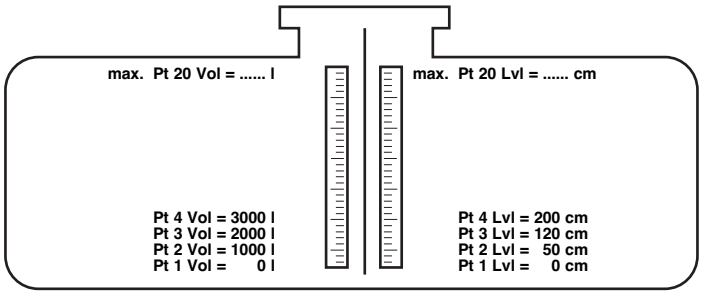
MENU: STEP BY STEP PROCEDURE – Eclipse 705: Interface & Volume

	Screen	Action	Comment
Run mode	① *Status* *IfcVol* *%Output* *Loop*	Transmitter Display	Transmitter default values cycle every 5 seconds. Status «Status», Interface volume «IfcVolume», % Output «% Output», and Loop «Loop».
	② IfcLevel or Ifc Vol	Transmitter Display	Transmitter displays Interface volume or Interface level in selected engineering units (depending selection in Loop control «Loop Ctrl»
	③ %Output xx.x%	Transmitter Display	Transmitter displays % Output measurement derived from 20 mA span.
	④ Loop xx.xx mA	Transmitter Display	Transmitter displays Loop measurement (mA).
Configuration	⑤ IfcLvl xxxx	Transmitter Display	Transmitter displays interface level in selected level units «LvlUnits».
	⑥ Volume xx.x	Transmitter Display	Transmitter displays volume in selected volume units «VollUnits».
	⑦ Level xxxx	Transmitter Display	Transmitter displays level in selected level units «LvlUnits».
	⑧ PrbModel (select)	**Select** the type of probe	Select as per the 3 first digits of the probe partnumber. The partnumber is shown on the nameplate: e.g. 705-510A-A11/7MR-A230-218, select 7xR-x from the list.
	⑨ PrbMount (select)	**Select** the type of probe mounting.	Select NPT «NPT», BSP «BSP» or Flange «Flange». (consult factory when a «7xK» GWR probe is used)
	⑩ MeasType (select)	**Select** the type of measurement	Select level «Levl Only».
	⑪ LvlUnits (select)	**Select** units for level	cm «cm», m «m», inches «inches» or feet «feet».
	⑫ Probe Ln xxx.x	**Enter** the exact length of probe.	Enter as per the 3 last digits of the probe partnumber on the nameplate: - rigid probes, enter value cm or inches, - flexible probes, enter value in meters or feet e.g. 705-510A-A11/7MR-A230-280, enter «218» cm probe length.
	⑬ Lvl Ofst xxx.x	**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) or at the probe (negative offset). See page 9 “Terminology”.
	⑭ VolUnits	**Select** units for volume.	Liters «l» or gallons «g».
	⑮ StrapTbl xx pnts	**Enter** level/volume pairs in max 20 steps	Liters «l» or gallons «g».
	⑯ Upr Diel (Select)	**Enter** the dielectric range value of the upper media.	Enter the dielectrics of the upper layer liquid (between 1,4 and 5,0) – only upper layer dielectrics need to be entered.
	⑰ Dielctrc (Select)	**Select** the dielectric range value of the lower media	Select: «10–100»
	⑱ Senstvty xxx	Change cryptic value	Probe length is printed on the nameplate and order information. It is the last three digits of the model number. (consult factory when a «7xK» GWR probe is used)
	⑲ Loop Ctrl (Select)	**Select** primary variable (PV)	Primary variable is the loop controlling parameter. Select interface level «IfcLevel» or interface volume «Ifc Vol»
	⑳ Set 4mA xxx.x	**Enter** the level value for the 4 mA point.	A transition zone may exist at the bottom of the probe. See Functional Specifications Probe, See pages 30, 31 and 32.
	㉑ Set 20mA xxx.x	**Enter** the level value for the 20 mA point.	A transition zone / blocking distance may exist at the top of the probe. See Functional Specifications Probe See pages 30, 31 and 32.
	㉒ Damping xx sec	**Enter** the damping factor.	A Damping factor (1-10 seconds) may be added to smooth a noisy display and/or output due to turbulence.
	㉓ Fault (Select)	**Enter** the value for error.	Select «3.6 mA», «22 mA» or hold last value «HOLD». In case of loop failure, error signal will follow the failing trend; meaning the unit will show 3.6 mA when the reviewed loop current by the device is found too low. The unit will show 22 mA in case the reviewed loop current is found too high.

= **Quick Start up**

	Screen	Action	Comment
Diagnostics	㉔ BlockDis x.x	**Enter** distance in selected level units	Allows to ignore level measurements near the top of the probe, caused by e.g. condensation, crystalization. Make sure that the liquid level does NOT enter this zone. Consult factory or the 'Troubleshooting' section before entering any value. Normaly to be used with single rod probe.
	㉕ SZ Fault (select)	Select the safety zone fault.	Select «None» (None), «3.6mA», «22mA», «Latch 3.6mA» or «Latch 22mA». When either «Latch 3.6 / 22mA» signals is selected, the loop current remains in alarm until it is manually cleared with the «SZAlarm» screen (for safety zone explanation see Terminology - page 9).
	㉖ SZHeight xx.x	Select the safety zone value	Enter safety zone in cm or inches (see Terminology - page 9).
	㉗ SZ Alarm Reset	Reset safety zone latch fault	Clear a latched safety zone alarm «SZFault».
	㉘ Threshld	Select top level threshold.	Default selection is «Fixed» for most common applications.
	㉙ IfcThrsh (select)	Select interface threshold.	Default selection is «CFD», for most common applications.
	㉚ Poll Adr xx	Enter HART ID number.	Select a HART poll address (0-15). Enter 0 for a single transmitter installation.
	㉛ Trim Lvl xx.x	Enter value to adjust level reading.	Allows to compensate for a fixed level deviation.
	㉜ Trim 4 xxxx	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.
	㉝ Trim 20 xxxx	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.
	㉞ Loop Tst xx.x mA	Enter a mA output value.	Set mA Output to any given value to perform loop test .
	㉟ LvlTicks xxxxx	Diagnostic display.	Shows time of flight from fiducial pulse to reflected signal from level.
	㊱ IfcTicks xxxx	Diagnostic display.	Shows time of flight through the upper liquid layer.
	㊲ Medium	Diagnostic display.	Shows type of detected upper liquid; unknown «Unknown» oil only «Oil Only», thin oil layer «Thin Oil» or no level «Dry Probe».
	㊳ New Pass xxx	Enter new password.	Use arrows to select desired value. Values between 0 and 255.
	㊴ Language	Select language	Select «English», «Français», «Deutsch» or «Espagnol».
	㊵ Mdl705HT Ver xx.xx	None, do not adjust.	Factory setting. «Ver» refers to software version.
	㊶ DispFact (select)	Advanced diagnostics.	See page 18.

Strapping table



MENU: STEP BY STEP PROCEDURE: ADVANCED CONFIGURATION

Hidden diagnostic screens. Do not acces without assistance or having followed advanced training.

Diagnostics

	Screen	Action	Comment
1	DispFact Select	Review factory parameters	Select «YES» to reveal Factory parameters; «NO» to hide.
2	History (current status)	Review Diagnostic messages.	A cumulative review of all diagnostic messages. Press the enter button twice to clear.
3	Run time Xx h	Display mode.	Shows time in hours that unit is in operation since last power on.
4	History Reset	Diagnostic display.	Select «YES» to clear «History».
5	Sys Code x	Diagnostic display.	Cryptic value for firmware information.
6	FidTicks xxxx	Diagnostic display.	Shows time of flight from electronics to fiducial pulse. Value should remain stable within ± 10 ticks.
7	FidSprd X	Diagnostic display.	Value represents the variation of fiducial ticks – a value indicates that unit is OK, a problematic spread results into an error message.
8	Fid Type (select)	Select fiducial pulse type. Requires additional password.	«positive» or «negative» (selection only allowed for some probes). Consult factory before changing status.
9	Fid Gain xxx	Change gain.	Value represents the # of gain applied to the fiducial signal.
10	Window xxx	None, do not adjust.	Factory setting.
11	Conv Fct xxxx	None, do not adjust.	Factory setting.
12	Scl Ofst xxx	None, do not adjust.	Factory setting.
13	Neg Ampl xxx	Enter new value. Requires additional password.	Negative amplitude treshold.
14	Pos Ampl xxx	Enter new value. Requires additional password.	Positive amplitude treshold.
15	Signal xxx	Diagnostic display.	Indication of signal strength.
16	Compensate (select)	Access compensation screens. Requires additional password.	«None» default. The selection of «Manual» or «Auto» activates the screens 16 through 20 for 7MS probes.
17	DrateFct Xxxx	None, do not adjust.	Diagnostic display if «Compsate» is on «Auto». Shows velocity derating factor.
18	Targ Ampl Xxxx	None, do not adjust.	Diagnostic display if «Compsate» is on «Auto». Shows amplitude of steam reference target.
19	Targ Tks Xxxx		Diagnostic display if «Compsate» is on «Auto». Shows # of ticks from fiducial to steam reference target.
20	Targ Cal Xxxx	None, do not adjust.	Diagnostic display if «Compsate» is on «Auto». Shows the calibrated # of ticks at ambient temperature.
21	OperMode (select)	Select operating mode.	Selection screen if «Compsate» is on «Auto». Select run automatically «Run», calibrate «Cal», deactivate «Off».
22	7xKCorr xxx	Enter a value. Requires additional password.	Distance in mm (regardless .«LvlUnits») from fiducial to user reference point. Only for 7EK (top/bottom) probe.
23	ElecTemp xxx C	None, do not adjust.	Shows internal housing temperature.
24	Max Temp xxx C	None, do not adjust.	Diagnostic display, shows maximum internal housing temperature recorded.
25	Min Temp xxx C	None, do not adjust.	Diagnostic display, shows minimum internal housing temperature recorded.
26	SZ Hyst xx.x	None, do not adjust.	Safety zone Hysterisis, diagnostic factory setting

For more details about the use of PACT*ware* and FDT, refer to instruction manual 59-601

WHAT IS FDT, PACTware AND FDT

- FDT (Field Device Tool) is a new interface code that describes the standardization between frame programs (e.g., PACT*ware*) and DTMs (Device Type Manager).
- PACT*ware* (Process Automation Configuration Tool) is a frame program. It is a device-independent software program that communicates with all approved DTMs.
- DTM (Device Type Manager) is not a stand-alone program but a device-specific software driver designed to operate within a frame program such as PACTware. It includes all special information needed to communicate with a specific device (e.g., Pulsar RX5). There are two basic categories of DTMs—Communication (HART, Fieldbus®, Profibus®, etc.) and Field Device (e.g. Pulsar RX5 Radar transmitter).

MINIMUM SYSTEM REQUIREMENTS

Following are general requirements for proper operation of this program:

Pentium® II 500 MHz processor.

128 MB RAM.

120 MB free hard disk space.

Windows® XP/2000 (Service Pack 1) / NT 4.0 (Service Pack 6).

Graphic Resolution 1024x768 (16-bit color).

Internet Explorer 5.0.

RS232 serial interface.

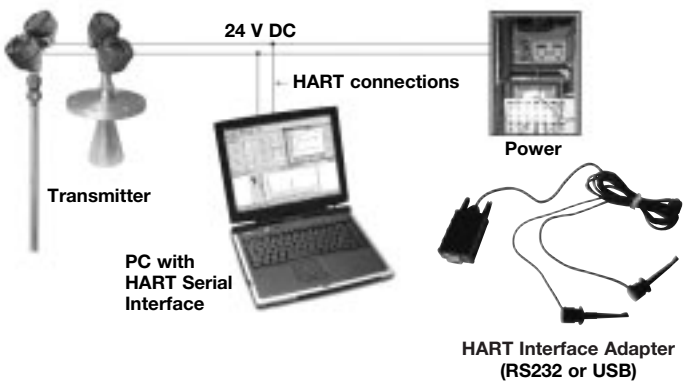
RS232-HART or USB-HART serial interface for point-to-point connection or RS232-RS485 converter for connection to Hart Multiplexer.

HART communication DTM.

Transmitter with current HART revision.

CONNECTIONS

The following diagram shows a typical hardware configuration. Observe all safety codes when attaching to instrument loops in hazardous areas or when measuring flammable media. Computers are not intrinsically safe devices.



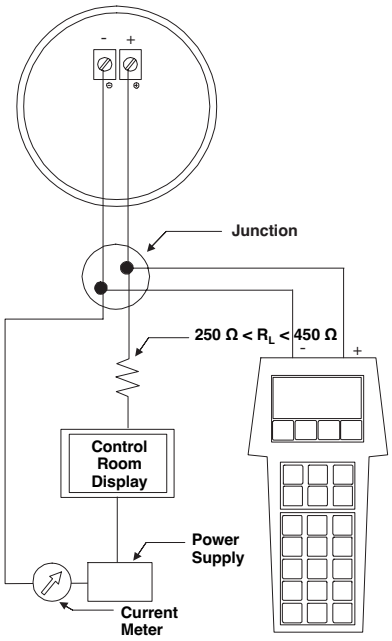
MOST COMMONLY USED SCREENS

- Online parameterization: allows the user to configure the unit online.
- Offline parameterization: allows the user to configure the unit offline.
- Tank view: displays a common operating window graphically showing % output of level.
- Echo curve: shows the actual waveform. The echocurve is an extremely useful tool for advanced configuration and troubleshooting.
- Process trend: all key data (Level, % Output, Loop) can be trended and saved, scales can be adapted.
- Device/diagnosis: the diagnosis: the diagnosis screen allows examination of all faults, warnings and international messages.

TROUBLESHOOTING

This program offers a wealth of information critical to effective troubleshooting. If a problem should arise and factory assistance is necessary for analysis, be prepared to save and email the following files:

- **ONLINE PARAMETERS:** the complete list of configuration data.
- **PROCESS TREND** information that includes the time of upset/error condition.
- **ECHO CURVE** showing upset/error condition (when possible).
- **ERROR MONITOR** (VIEW/ERROR MONITOR) including upset/error condition.



For easy PACT*ware* set up, consult instruction manual 59-600

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 is equipped with the proper Eclipse Device Descriptors (DD's).

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

HCF Release Date	HART Version	Model	Compatible with software
July 1998	Dev V1 DD V1	705	Version 1.2B & earlier
November 1998	Dev V1 DD V2	705	Version 1.2C ... 1.3D
April 1999	Dev V3 DD V1	705	Version 1.4A ... 1.4C
October 1999	Dev V4 DD V1	705a	Version 1.5 and later
June 2000	Dev V1 DD V2 Dev V1 DD V1	705 2.x 708	Version 2.0A ... 2.2C & earlier Version 1.0A ... 1.1B
October 2001	Dev V1 DD V2 Dev V2 DD V1	705 2.x 708	Version 2.3A ... 2.3E & earlier Version 1.2A ... 1.2C
September 2003	Dev V3 DD V1 Dev V3 DD V1 Dev V3 DD V1	705 2.x 708 707	Version 2.4A ... 2.2B & earlier Version 1.3A ... 1.3C Version 1.x and later
April 2004	Dev V4 DD V1 Dev V4 DD V1	705 2.x 708	Version 2.5 and later Version 1.4A and later
June 2005	Dev V1 DD V1	705 3.x	Version 3.x & and later

When the proper software version is not found, consult your local HART® Service Center to load the correct Eclipse DD's.

HART MENU

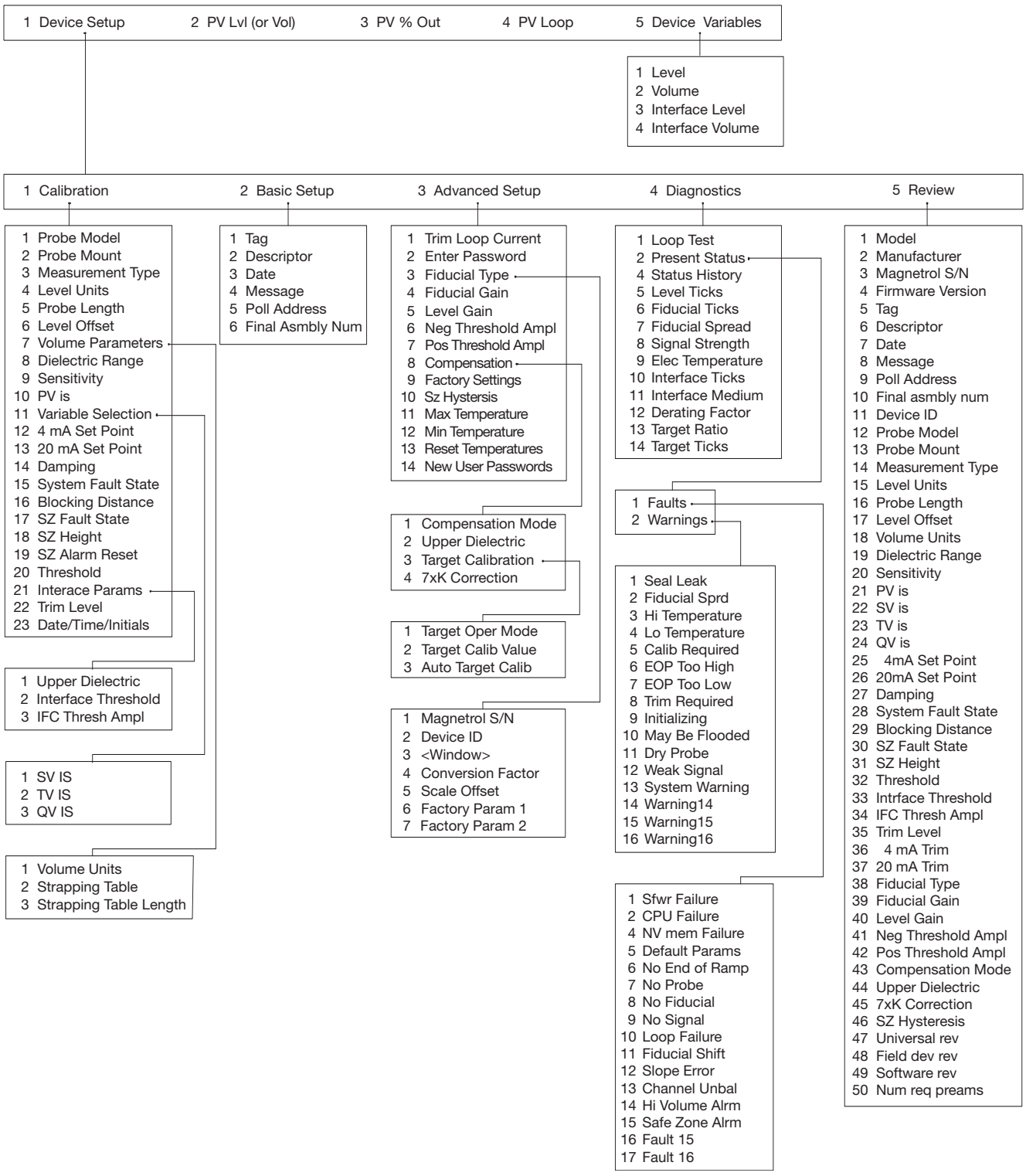
I/O Start up the device
1 Enter Device Set Up «DEVICE SET UP»
Press one of the following alphanumeric keys (if no key is sensed after 5 s, the unit will automatically jump to RUN mode and alternatively show Level/% Output and Loop signal

1 for entering Calibration «CALIBRATION» (see page 11 for additional information)
2 for entering Basic Set Up «BASIC SET UP» – general HART
3 for Advanced Set Up «ADVANCED SET UP» (see page 11 for additional information)
4 for entering Diagnostics «DIAGNOSTICS» (see page 11 for additional information)
5 for entering Review «REVIEW» to review all settings.

HART ERROR MESSAGES

Error	Screen	Displayed status
Faults	Enlists possible error messages.	OFF: safe status ON: highlighted error is occurring – see page 24-25
Warnings	Enlists warning messages.	All warnings should show OFF – if not, consult factory.
Display Event Log	Built in log of the last 26 error messages.	Consult page 24-25.

CONFIGURATION USING HART®



MENU: STEP BY STEP PROCEDURE – Foundation Fieldbus® Eclipse 705

		Screen	Action	Comment
Run mode	①	*Level* *%Output* *Loop*	Transmitter Display	Transmitter default display. Level «Level» and % Output «%Output» values cycle every 5 seconds.
	②	Level xx.x cm	Transmitter Display	Transmitter displays Level measurement in cm or in.
	③	%Output xx.x%	Transmitter Display	Transmitter displays % Output measurement.
	④	Status OK	Transmitter Display	Transmitter displays.
Configuration	⑤	PrbModel (select)	**Select** the type of probe used.	Select as per the 3 first digits of the probe partnumber. The partnumber is shown on the nameplate: e.g. 705-510A-A11/7MR-A230-218, select 7xR-x from the list.
	⑥	Prb Mount (select)	**Select** the type of probe mounting.	Select NPT «NPT», Flange «Flange» or BSP «BSP».
	⑦	Probe Ln xxx.x	**Enter** the exact length of probe.	Enter as per the 3 last digits of the probe partnumber on the nameplate: - rigid probes, enter value cm or inches, - flexible probes, enter value in meters or feet e.g. 705-510A-A11/7MR-A230-280, enter «218» cm probe length.
	⑧	Offset xxx.x	**Enter** the offset value.	See drawing on page ?
	⑨	Dielctrc (select)	**Enter** the dielectric range value of the media.	Select: «1.4–1.7»; «1.7–3» or «10–100»
Diagnostics	⑩	0% Set xxx.x	None: level value for the 0 % point (EU_0%)	A small transition zone may exist at the top/bottom of the probe. See probe specifications pages 30, 31 and 32.
	⑪	100% Set xxx.x	None: level value for the 100 % point (EU_100%)	A small transition zone may exist at the top/bottom of the probe. See probe specifications pages 30, 31 and 32.
	⑫	FF Addr xxxx	None: Fieldbus Device Service	Fieldbus Address, set in Control Room.
	⑬	Fid Tick	None, do not adjust.	Diagnostic, factory setting.
	⑭	<Window> xxx	None, do not adjust.	Diagnostic, factory setting.
	⑮	Range xxx	None, do not adjust.	Diagnostic, factory setting.
	⑯	Gain xxx	None, do not adjust.	Diagnostic, factory setting.
	⑰	Cal Method	**Enter** the calibration method	
	⑱	Conv Fct xx.xxx	None, do not adjust.	Diagnostic, factory setting.
	⑲	Scl Offs xx.x	None, do not adjust.	Diagnostic, factory setting.
	⑳	# Ticks xxxx	None, do not adjust.	Diagnostic, factory setting.
	㉑	Threshold (select)	**Enter** CFD «CFD». **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** «Dielctrc» of upper material. Adjustment of **Offset** «Offset» may be necessary when threshold is changed.
	㉒	Model 705 Ver xx.xx	None, do not adjust.	Factory setting. «Ver» refers to software version.
	㉓	New Pass xxx	**Enter** new password.	Use arrows to select desired value. Values between 0 and 255.

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». Check also the Probe Model «Prb Model» / Probe Mount «Prb Mount» 1) Ensure the Level is accurate. 2) Reconfigure Loop values.
	Interface level has significant emulsion.	Examine process to reduce/eliminate emulsion layer.
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.	Ensure proper probe length «Prb Ln» & probe Model «Prb Model». Adjust trim level value by the amount of noted inaccuracy.
LEVEL, % OUTPUT and LOOP values fluctuate.	Turbulence.	Increase the Damping «Damping» factor until the readings stabilize.
	High frequency connection.	Check Fiducial Spread «FidSprd» (should be stable within ± 10 counts.
LEVEL, % OUTPUT and LOOP values all reading low vs. actual (level or volume applications).	Lower dielectric material over higher dielectric material, e.g. oil over water.	Select Fixed Threshold option «Fixed» and/or select dielectric range from top layer.
	Coating, clumping or buildup on probe.	Expected inaccuracies due to affect on pulse propagation.
	Dense, water based foam.	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 20)
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. Check for condensation in probe connection. Add Blocking Distance.
LEVEL, % OUTPUT and LOOP values all at maximum level.	Possible configuration issue with single rod probe	1) Increase Blocking Distance 2) Increase Dielectric Range
LEVEL, % OUTPUT and LOOP values all reading high vs. actual.	Possible obstruction in tank affecting single rod probe.	1) Increase Dielectric Range until obstruction is ignored. 2) Relocate probe away from obstruction.
LEVEL value reading high when should be zero.	Transmitter loose or disconnected from probe.	Ensure transmitter connected securely to probe.

ERROR MESSAGES

Display Message	Action	Comment
OK	None	Normal operating mode
Initial	None	Program is Initializing, level reading held at 4 mA set point. This is a transient condition.
DryProbe	None	Normal message for a dry probe. End of probe signal is being detected.
EOP Low	End of Probe signal is out of range	1) Ensure probe length is entered correctly 2) Set transmitter to a lower dielectric range 3) Consult factory
EOP High	End of Probe signal is out of range	1) Ensure probe length is entered correctly 2) Consult factory
WeakSgnl	None. Signal amplitude is lower than desired.	1) Set transmitter to lower dielectric range 2) Increase sensitivity
Flooded?	Loss of level signal possibly due to flooding, twin rod probes only	1) Decrease level in vessel 2) Set transmitter to lower dielectric range 3) Replace with Model 7MR Overfill probe
NoSignal	No level signal being detected.	1) Ensure dielectric setting is correct for measured medium 2) Increase sensitivity 3) Confirm that the probe type is proper for the dielectric of the medium 4) Consult factory
No Fid	Fiducial signal is not being detected	1) Check connection between probe and transmitter 2) Check for moisture on top of probe 3) Check for damaged gold pin on the high frequency connector 4) Consult factory
FidShift	FidTicks shifted from expected value	1) Check connection between probe and transmitter 2) Check for moisture on top of probe 3) Check for damaged gold pin on the high frequency connector 4) Consult factory
Fid Sprd*	Fiducial Ticks variation is excessive.	1) Check connection between probe and transmitter 2) Check for moisture on top of probe 3) Consult factory
No Probe	Electronics does not sense that a probe is attached	1) Ensure proper connection between probe and transmitter 2) Check for damaged gold pin on the high frequency connector
SZ Alarm	Safety Zone alarm has been tripped, loop current fixed at SZ Fault	Decrease level in vessel
Hi Temp	Present temperature in electronics compartment is above +80° C	1) Transmitter may need to be moved to ensure ambient temperature is within specification 2) Change to remote mount transmitter

ERROR MESSAGES

Display Message	Action	Comment
Lo Temp	Present temperature in electronics compartment is below -40° C.	1) Transmitter may need to be moved to ensure ambient temperature is within specification 2) Change to remote mount transmitter
HiVolAlm	Level more than 5% above highest point in strapping table.	Verify strapping table is entered correctly.None. Signal amplitude is lower than desired.
Sys Warn	Unexpected but non-fatal software event	Consult factory
TrimReqd	Factory set Loop values are defaults, loop output may be inaccurate	Consult factory
Cal Reqd	Factory set default calibration parameters are in use, level reading may be inaccurate	Consult factory
SlopeErr	Ramp circuit generating improper voltage	Consult factory
LoopFail	Loop current differs from expected value	Consult factory **Note:** In case of loop failure, error signal will follow the failing trend; meaning the unit will show 3.6 mA when the reviewed loop current by the device is found too low. The unit will show 22 mA in case the reviewed loop current is found too high.
No Ramp	No End-of-Ramp signal detected	Consult factory
DfltParm	Internal non-volatile parameters have been defaulted	Consult factory
EE Fail	EEPROM error allowing watch-dog timer to expire	Consult factory
CPU Fail	A-D converter time out allowing watchdog timer to expire	Consult factory
SfwrFail	A fatal software error allowing watchdog timer to expire	Consult factory

PACTware™ PC Program

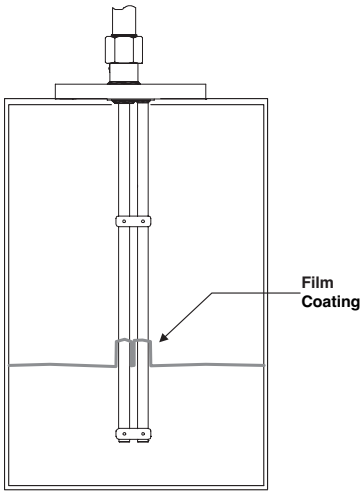
The Eclipse Model 705 offers the ability to do Trending and Echo Curve analysis using a PACTware DTM. This is a powerful troubleshooting tool that can aid in the resolution of some of the Error Messages shown above.

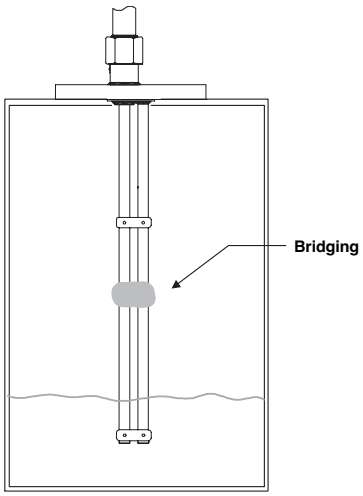
Refer to Bulletins 59-101 and 59-601 for more information.

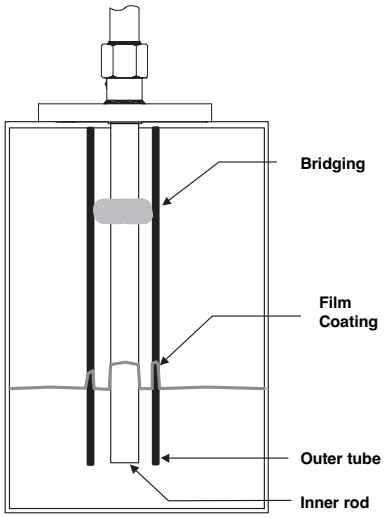
TROUBLESHOOTING APPLICATIONS: Level

Most frequent application problems that may occur, media buildup on the probe and stratification, are covered here. Media buildup on the probe is not a problem in most cases–Eclipse circuitry typically works very effectively. Media buildup should be viewed as two types – Film Coating and Bridging.
A twin rod probe should always be chosen if media buildup is minor. For more extreme buildup, single rod GWR probes should be used.

- **Continuous Film Coating**
  The most typical of coating problems where the media forms a continuous coating on the probe. Eclipse will continue to measure effectively with some small degradation in performance. A problem can develop if the product begins to buildup 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 Eclipse 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 if the net level of the low dielectric medium becomes small enough (a few inches) to cause the electronics to trigger on the high dielectric medium that lies beneath it. Select the Fixed Threshold option to read the upper medium.

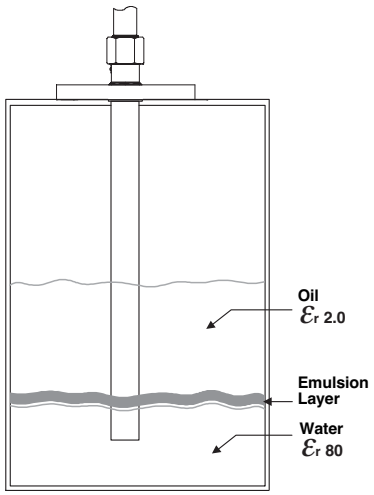






TROUBLESHOOTING APPLICATIONS: Interface

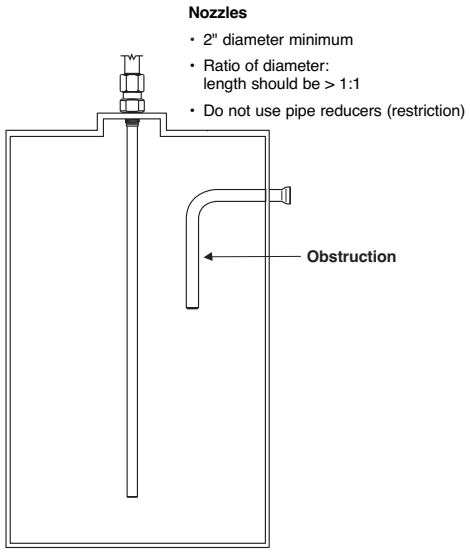
It is not uncommon for interface applications to have an emulsion layer form between the two media. This emulsion layer may pose problems for Guided Wave Radar as it may decrease the strength of the reflected signal. Since the properties of this emulsion layer are difficult to quantify, applications with emulsion layer should be avoided with Eclipse.



TROUBLESHOOTING APPLICATIONS: Single Rod type GWR probe

Most frequent application problems that may occur, media buildup on the probe and stratification, are covered here. Significant buildup on the probe is not a problem in most cases–Eclipse circuitry typically works very effectively.

- **Nozzles** (only for 7MF/7M1/7M2/7MJ)
  Nozzles can create false echoes that can cause diagnostic messages and/or errors in measurement. If bad calibration parameters «BAD CAL PARAMTRS» is displayed when first configuring the instrument:
  1. Ensure the probe length «Prb Ln» as entered in the software is equal to the actual probe length (see page 10). This value must be changed if the probe is cut shorter from the original length.
  2. Increase the blocking distance «BlockDis» value until the message is eliminated; 20 mA point may need to be lowered.
  3. Increase the dielectric range a small amount to aid in reducing echoes in nozzle. Increasing the dielectric settings may cause instrument to lose level of lower dielectric media; consult factory.

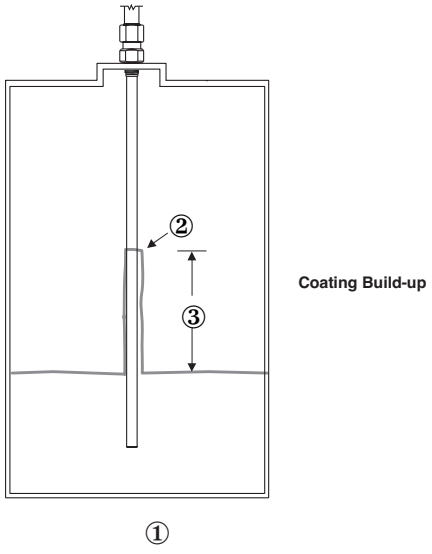


- **Obstructions** (only for 7MF/7M1/7M2/7MJ)
  If the level reading repeatedly locks on to a specific level higher than the current level, it may be caused by a metallic obstruction. Obstructions in the vessel (e.g. pipes, ladders) that are located close to the probe may cause the instrument to show them as level.
  1. Refer to the Probe Clearance Table
  2. Increase the dielectric range a small amount to aid in reducing echoes in nozzle. Increasing the dielectric settings may cause instrument to lose level of lower dielectric media; consult factory.

Probe clearance table

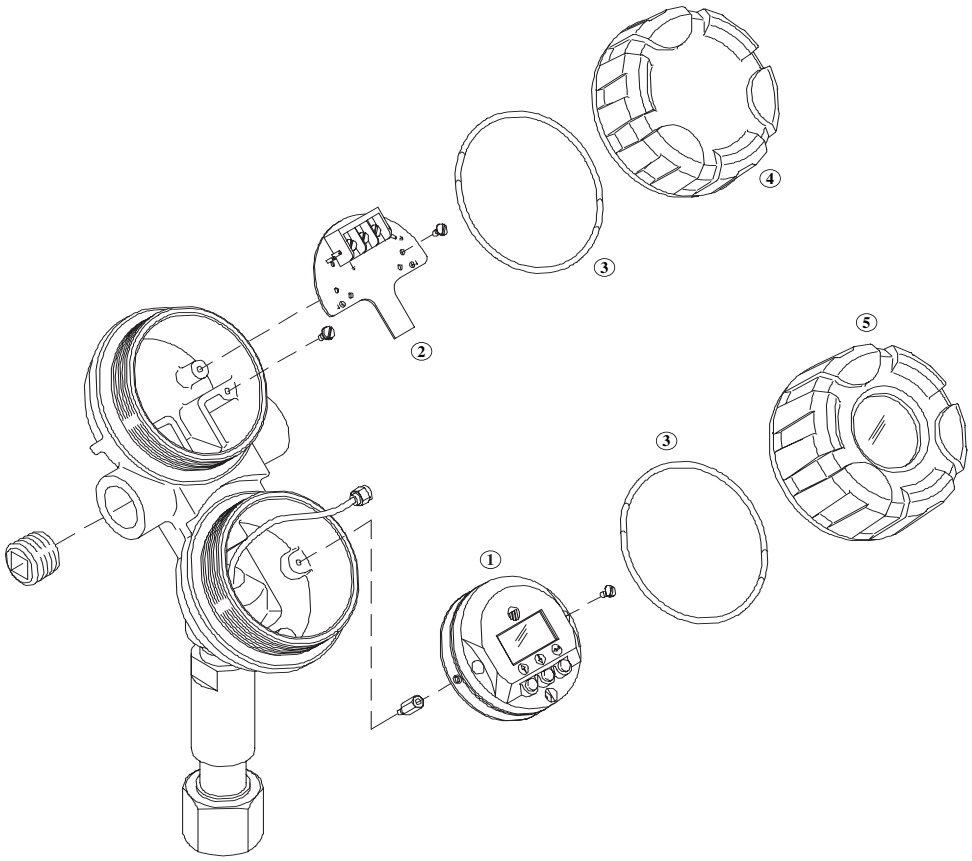
Distance to probe	Acceptable objects
< 150 mm (6")	Continuous, smooth, parallel, conductive surface (e.g. metal tank wall); probe should not touch tank wall
> 150 mm (6")	< 1"/DN25 diameter pipe and beams, ladder rungs
> 300 mm (12")	< 3"/DN80 diameter pipe and beams, concrete walls
> 450 mm (18")	All remaining objects

- **Coating/build-up** (only for 7MF/7M1/7M2/7MJ)
  The Eclipse® 705 wih Single Rod Probe was designed to operate effectively in the presence of media building up. Some expected error may be generated based upon the following factors:
  ① Dielectric of the media that created the coating
  ② Thickness of the coating
  ③ Length of the coating above the present level
- **Coating/build-up** (only for 7M7/7M5)
  Continuous film coating is where the media forms a thin continuous coating on the probe. Eclipse® will continue to measure effectively with some degradation in performance. The degradation is proportional to the dielectric of the media and the thickness of the coating up to a degree that the unit will see coating as a level. Higher dielectric media (eg. water based) will show sooner as a level at the location of the build up.

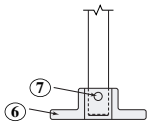


Coating Build-up

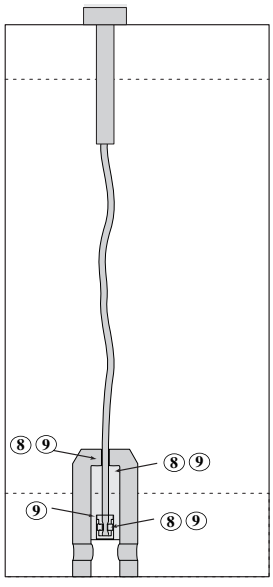
REPLACEMENT PARTS



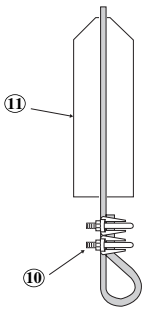
CAUTION: the electronic module connects to the antenna via the "High frequency connector". This part is extremely sensitive and brittle and requires to be handled very careful. It is recommended to exchange complete amplifier heads instead of electronic modules in the field.



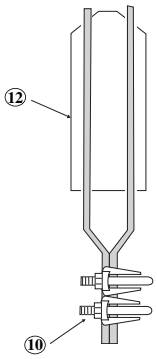
7MF/7MJ Single rod rigid for liquids



7M1 Single flexible cable
7M7 Dual flexible cable



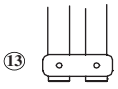
7M2 Single flexible cable for solids



7M5 dual flexible cable for solids

No.	Description	Part Number
1	Electronic module Display and HART® Foundation Fieldbus	 031-2835-001 031-2836-001
2	Terminal board General Purpose (GP, Exi and Exd) Foundation Fieldbus	 030-9551-001 030-9151-003
3	"O"-Ring (neoprene)	012-2201-237
4	Housing cover without glass ①	004-9193-003
5	Housing cover with glass (GP/IS and Dust Ex)① Housing cover with glass (XP)①	036-4410-001 036-4410-003
6 - 7	TFE spacer & set pin – 7MF-A PEEK spacer & set pin – 7MJ-A TFE spacer & set pin – 7MF-B TFE spacer & set pin – 7MF-C PEEK spacer & set pin – 7MJ-B PEEK spacer & set pin – 7MJ-C	089-9114-001 089-9114-005 089-9114-002 089-9114-003 089-9114-006 089-9114-007
8	7M1 cable weight assembly	089-9120-001
9	7M7 cable weight assembly	089-9121-001
10	7M2/7M5 cable rope clip (Qty 2 required)	010-1731-001
11	7M2 316 (1.4401) SST cable weight	004-8778-001
12	7M5 316 (1.4401) SST cable weight	004-8778-002
13	7MB probe spacer kit extra wide 7MB spacer	consult factory 004-7787-001

① For stainless steel housing covers – consult factory.



TRANSMITTER SPECIFICATIONS

FUNCTIONAL/PHYSICAL

Description		Specification
Power (at terminals)		General Purpose / ATEX Intrinsically Safe: 11 to 28,6 V DC ATEX Explosion Proof (with Intrinsically Safe probe) 11 to 36 V DC Foundation Fieldbus (FISCO ATEX Exi): 9 to 17,5 V DC Foundation Fieldbus (General purpose & Exd): 9 to 32 V DC
Signal Output		4-20 mA with HART®, 3,8 mA to 20,5 mA useable (meets NAMUR NE 43) or Foundation Fieldbus H1 (ITK Ver. 4)
Span	Rigid probes	150 to 6100 mm (6 to 240") except 7MS: max 4500 mm (177")
	Flexible probes	15 cm to 2285 cm (6 to 75')
Resolution		Analog: 0,01 mA Display: 0,1 cm (inch)
Loop Resistance (see tables at page 12)		630 Ω @ 20,5 mA - 24 V DC
Damping		Adjustable 0-10 s
Diagnostic Alarm		Adjustable 3,6 mA, 22 mA, HOLD
User Interface		3-button keypad and/or HART® communicator, Foundation Fieldbus, AMS® or PACTware®
Display		2-line x 8-character LCD
Menu Language		English/Spanish/French/German
Housing Material		IP 66/Aluminium A356T6 (< 0.20 % copper) or stainless steel
Approvals		ATEX II 1 G EEx ia II C T4, intrinsically safe – for non Foundation Fieldbus units FISCO ATEX, intrinsically safe - for Foundation Fieldbus units ATEX II 1/2 G D EEx d[ia] II C T6 - T85 °C, explosion proof for all units① ATEX II 3 G EEx nA II T6, non sparking – for non Foundation Fieldbus units FM and CSA, Non incendive, intrinsically safe (FISCO) and explosion proof STOOMWEZEN – Secondary level safety device for steamdrums TÜV – WHG § 19, VLAREM II 5.17-7 LRS – Lloyds Register of Shipping (marine applications) GOST-K/GGTN-K – ROSTECH/FSTS – Russian Authorisation Standards
SIL (Safety Integrity Level)	Standard electronics	Functional safety to SIL 1 / SIL 2 in accordance to 61508 – SFF > 85 % – full FMEDA reports and declaration sheets available at request
	Enhanced electronics	Functional safety to SIL 2 / SIL 3 in accordance to 61508 – SFF > 91 % – full FMEDA reports and declaration sheets available at request
Electrical Data		Ui = 28,4 V, Ii = 94 mA, Pi = 1 W Ui = 17,5 V, Ii = 380 mA, Pi = 5,32 W (Foundation Fieldbus)
Equivalent Data		Ci = 2,2 nF, Li = 3 µH Ci = 0,24 nF, Li = 3 µH (Foundation Fieldbus)
Shock/Vibration Class		ANSI/ISA-571.03 SA1 (Shock), ANSI/ISA-571.03 VC2 (Vibration)
Net and Gross Weight	Cast aluminium	2,70 kg net; 3,20 kg gross – amplifier only
	Stainless steel	5,70 kg net; 6,20 kg gross – amplifier only
Overall Dimensions		H 214 mm (8.43") x W 111 mm (4.38") x D 188 m

① ATEX, explosion proof units use EEx d bushing material STYCAST 2057 FR

PERFORMANCE

Description		Specification
Reference Conditions with a 1,8 m (72") coaxial type GWR probe		Reflection from liquid, with dielectric in center of selected range, at +20 °C (70 °F) with CFD threshold①
Linearity②	Coaxial/twin lead probes	< 0,1 % of probe length or 2,5 mm (0.1"), whichever is greater
	Single lead probes	< 0,3 % of probe length or 8 mm (0.3"), whichever is greater
Accuracy②	Coaxial/twin lead probes	< 0,1 % of probe length or 2,5 mm (0.1"), whichever is greater
	Single lead probes	± 0,5 % of probe length or 13 mm (0.5"), whichever is greater
	7MT interface	± 25 mm (1")
Resolution		± 2,5 mm (0.1")
Repeatability		< 2,5 mm (0.1")
Hysteresis		< 2,5 mm (0.1")
Response Time		< 1 second
Warm-up Time		< 5 seconds
Ambient Temp.		-40 °C to +80 °C (-40 °F to +175 °F) – blind transmitter -20 °C to +70 °C (-5 °F to +160 °F) – with digital display -40 °C to +70 °C (-40 °F to +160 °F) – for EEx ia and EEx d[ia] with blind transmitter -20 °C to +70 °C (-5 °F to +160 °F) – for EEx ia and EEx d[ia] with digital display
Process Dielectric Effect		< 7,5 mm (0.3") within selected range
Operating Temp. Effect		Approx. +0,02 % of probe length/°C for probes ≥ 2,5 m (8')③
Humidity		0-99 %, non-condensing
Electromagnetic Compatibility		Meets CE requirements (EN-61000-6-4, EN 61000-6-2) and NAMUR NE 21 (Single and Twin-Rod probe must be used in metallic vessel or stillwell)

① May degrade for 7MD probe or with fixed threshold.
② Top 600 mm (24") of twin rod probe: 30 mm (1.18").
Top 1220 mm (48") of single rod: application dependant.
③ Accuracy may degrade slightly < 2,5 m (8')

PROBE SPECIFICATIONS

Description		7MR: overfill protection coaxial probe	7MA: coaxial GWR probe
Materials	Probe	316/316L (1.4401/1.4404) with TFE spacers Hastelloy C® (2.4819) or Monel® (2.4360) with TFE spacers	
	Process seal	TFE with Viton® GFLT, EPDM or Kalrez 4079 (Consult factory for alternatives)	
Probe diameter		Standard: inside rod 8 mm (0.31") – outer tube 22 mm (0.87") Optional: inside tube 16 mm (0.63) – outer tube 45 mm (1.75")	
Mounting		In-tank mounting / external cage mounting (WHG approved)	In-tank mounting only
Process Connection		Threaded: 3/4" NPT or 1" BSP (G1) – except for larger Ø probe Flanged: Various ANSI, DIN or torque tube mating flanges	
Probe length (selectable per 1 cm)		From 60 cm to 610 cm (24 to 240"), selectable per 10 mm	
Transition Zone①	Top	0 mm (0")	εr: 1,4 = 25 mm (1")/εr: 80 = 150 mm (6")
	Bottom	εr: 1,4 = 150 mm (6")/εr: 80 = 25 mm (1")	εr: 1,4 = 150 mm (6")/εr: 80 = 25 mm (1")
Max. Process Temp.③	Max	+200 °C @ 18 bar (+400 °F @ 270 psi)	+150 °C @ 27 bar (+300 °F @ 400 psi)
	Min	-40 °C @ 50 bar (-40 °F @ 750 psi)	
Max. Process Pressure③		70 bar @ +20 °C (1000 psi @ +70 °F)	
Dielectric Range – Max. Viscosity		1,4 to 100 – 500 cP	

Description		7MD: high pressure/high temperature GWR probe	7MS: saturated steam GWR probe
Materials	Probe	316/316L (1.4401/1.4404)	
	Process seal	Borosilicate/inconel X750	High Temp PEEK with Aegis PF 128
	Spacers	Ceramic (7MD-A) – Teflon (7MD-W) – PEEK (7MD-V)	High Temp PEEK
Probe diameter		Standard: inside rod 8 mm (0.31") – outer tube 22 mm (0.87") Optional: inside tube 16 mm (0.63) – outer tube 45 mm (1.75")	
Mounting		In-tank mounting / external cage mounting (7MD – WHG / 7MS – Stoomwezen approved)	
Process Connection		Threaded: 3/4" NPT or 1" BSP (G1) – except for larger Ø probe Flanged: Various ANSI, DIN or "proprietary" mating flanges	
Probe length (selectable per 1 cm)		From 60 cm to 610 cm (24 to 240")	From 60 cm to 450 cm (24 to 177")
Transition Zone①	Top	25 mm (1")	
	Bottom	εr: 1,4 = 150 mm (6") / εr: 80 = 25 mm (1")	εr ≥ 10 = 25 mm (1")
MaxProcess Temp.③	Max	+400 °C @ 135 bar (+750 °F @ 2000 psi) +345 °C (+650 °F) for 7MD-V +200 °C (+400 °F) for 7MD-W	+345 °C @ 155 bar (+650 °F @ 2250 psi)
	Min	-196 °C @ 135 bar (-320 °F @ 2000 psi)	-15 °C @ 205 bar (0 °F @ 3000 psi)
Max. Process Pressure③		345 bar @ +20 °C (5000 psig @ +70 °F)	155 bar @ +345 °C (2250 psi @ +650 °F)
Max. Viscosity		500 cP	
Dielectric Range		2 to 100 – 1,7 (7MD-V) – 1,4 (7MD-W)	10 to 100
Vacuum service		Full vacuum (Helium leak < 10^{-8} cc/s @ 1 atmosphere vacuum)	Negative pressure but not up to full vacuum

Description		7MT: interface GWR probe	7MB: standard twin rod GWR probe
Materials	Probe	316/316L (1.4401/1.4404) Hastelloy C® (2.4819) or Monel® (2.4360)	
	Process seal	TFE with Viton® GFLT, EPDM or Kalrez 4079 (Consult factory for alternatives)	
	Spacers	Teflon	
Probe diameter		Standard: inside rod 8 mm (0.31") – outer tube 22 mm (0.87") Optional: inside tube 16 mm (0.63) – outer tube 45 mm (1.75")	Two 13 mm (0.5") Ø rods – 22 mm (0.875") ℄ to ℄
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 (G1) – except for larger Ø probe Flanged: Various ANSI, DIN or "proprietary" mating flanges	Threaded: 2" NPT or 2" BSP (G2) Flanged: Various ANSI, DIN or "proprietary" mating flanges
Probe length (selectable per 1 cm)		From 60 cm to 610 cm (24 to 240"), selectable per 10 mm	
Transition Zone①	Top	0 mm (0")	εr ≥ 1,9 = 150 mm (6")
	Bottom	εr: 1,4 = 150 mm (6")/εr: 80 = 50 mm (2")	εr: 1,9 = 150 mm (6")/εr: 80 = 25 mm (1")
Process Temp.③	Max	+200 °C @ 18 bar (+400 °F @ 270 psi)	+150 °C @ 20 bar (+300 °F @ 300 psi) / +200 °C (+400 °F) with max ambient temp. of +30 °C (+86 °F)
	Min	-40 °C @ 50 bar (-40 °F @ 750 psi)	
Max. Process Pressure③		70 bar @ +20 °C (1000 psig @ +70 °F)	50 bar @ +20 °C (750 psi @ +70 °F)
Dielectric Range – Max. Viscosity		Upper liquid: ≥ 1,4 and ≤ 5 Lower liquid: ≥ 15	1,9 to 100 – 1500 cP
Vacuum service		Negative pressure but not up to full vacuum	
Media coating		In case of media coating, select larger Ø probe.	Film: 3% error of coated length, bridging not recommended②

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

② Bridging is defined as continuous accumulation of material between the probe elements.

③ See tables at page 23.

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PROBE SPECIFICATIONS

Description		7MF: standard single rod	7MJ: HTHP single rod
Materials	Probe	316/316L (1.4401/1.4404), Monel® (2.4360), Hastelloy C® (2.4819) or PFA insulated 316/316L (1.4401/1.4404)	316/316L (1.4401/1.4404), Monel® (2.4360) or Hastelloy C® (2.4819)
	Process seal	TFE with Viton® GFLT, EPDM or Kalrez 4079 (Consult factory for alternatives)	PEEK with Aegis PF 128
Probe diameter		Bare: 13 mm (0.50") - PFA coated: 16 mm (0.625")	Bare: 13 mm (0.50")
Mounting		See mounting considerations on page 15	
Process Connection		Threaded: 2" NPT or 2" BSP (G2) – Flanged: Various ANSI, EN/DIN or sanitary	
Probe length		From 600 mm to 6100 mm (24" to 240") (selectable per 1 cm)	
Blocking distance (top)		120 mm up to 910 mm (4.8" up to 36") - depending probe length (adjustable)	
Transition Zone① (bottom)		$\varepsilon_r \geq 10$: 25 mm (1")	305 mm (12")
Process Temp.	Max	+150 °C @ 20 bar (+300 °F @ 300 psi) ambient	+315 °C @ 110 bar (+600 °F @ 1600 psi)
	Min	-40 °C @ 50 bar (-40 °F @ 750 psi) – 13,7 bar (200 psi) for 7MF-F	
Max Process Pressure		70 bar @ +20 °C (1000 psig @ +70 °F) – All except 7MF-E / 7MF-F 5 bar @ +150 °C (73 psig @ +300 °F) – 7MF-E 13,7 bar @ +40 °C (200 psi @ +40 °F) – 7MF-F	207 bar @ +20 °C (3000 psi @ +70 °C)
Max Viscosity		10.000 cP – consult factory in case of agitation/turbulence	
Dielectric Range		ε_r 10-100 (depending installation conditions, down to $\varepsilon_r \geq 1,9$) – liquids	
Mechanical load		Not applicable	
Pulldown force		Not applicable	
Media coating		Max error of 10 % of coated length. % Error is related to dielectric of medium, thickness of coating and coated probe length above level.	

① Transition Zone (zone with reduced accuracy) is dielectric dependent; ε_r = dielectric permitivity. It is recommended to set 4-20 mA signal outside the transition zone / blocking distance.

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Description		7M1 (liquids) / 7M2 (solids): single flexible	7M5 (solids) /7M7 (liquids): twin flexible
Materials	Probe	316 SST (1.4401)	7M7: FEP coated 316 SST (1.4401) 7M5: TFE coated 316 SST (1.4401)
	Process seal	TFE with Viton® GFLT, EPDM or Kalrez 4079 (Consult factory for alternatives)	
Probe diameter		7M1: 5 mm (0.19") 7M2: 6 mm (0.25")	6 mm (0.25")
Mounting		See mounting considerations on page 15	< 25 mm (1") from any surface or construction
Process Connection		Threaded: 2" NPT or 2" BSP (G2) – Flanged: Various ANSI, EN/DIN or sanitary	
Probe length		From 1 m (3') (7M1) - 2 m (6') (7M2, 7M5, 7M7) to max 22 m (75') (selectable per 1 cm)	
Blocking distance (top)		120 mm up to 910 mm (4.8" up to 36") - depending probe length (adjustable)	300 mm to 500 mm (12" to 20")
Transition Zone① (bottom)		305 mm (12")	
Max Process Temp.		+150 °C @ 27 bar (300 °F @ 400 psi) – 7M2/7M5: Ambient	
Max Process Pressure		7M1/7M7: 70 bar @ +20 °C (1000 psi @ +70 °F) 7M2/7M5: 3.4 bar (50 psi)	
Max Viscosity		10.000 cP – consult factory in case of agitation/turbulence	1500 cP
Dielectric Range		ε_r 10-100 (depending installation conditions down to $\varepsilon_r \geq 1,9$) – liquids ε_r 4-100 – solids	ε_r 1,9-100
Mechanical load		89 N (20 lbs) – 7M1	
Pulldown force		1360 kg (3000 lbs) – 7M2	1360 kg (3000 lbs) – 7M5
Media coating		Max error of 10 % of coated length. % Error is related to dielectric of medium, thickness of coating and coated probe length above level.	Film: 3 % max error of coated length with conductive media – Bridging not recommended

① Transition Zone (zone with reduced accuracy) is dielectric dependent; ε_r = dielectric permitivity. It is recommended to set 4-20 mA signal outside the transition zone / blocking distance.

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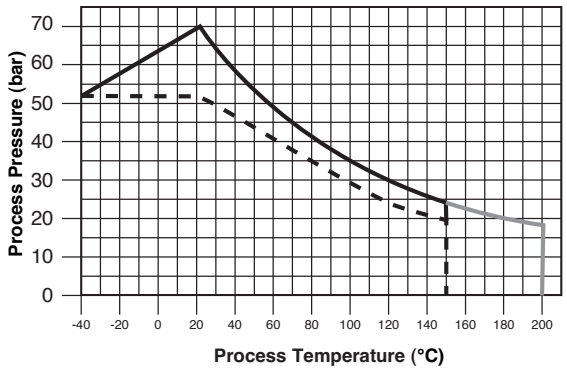
PROBE SPECIFICATIONS

Description		7EK: Top/Bottom GWR probe min ε_r 1,4 - max +260 °C	7EK: Top/Bottom GWR probe min ε_r 10 - max +315 °C
Materials	Probe	316/316L (1.4401/1.4404)	
	Process seal	PEEK and TFE with Aegis PF 128	PEEK and Alumina with Aegis PF 128
	Bottom spacer	TFE	PEEK
Probe diameter		Inside tube: max 22 mm (0.875")	
Cage		2" - Sch 80 Top/Bottom cage	
Process Connection		Threaded: 1 1/2" NPT or 2" NPT Welded: 2" socket weld Flanged: Various ANSI, DIN or “proprietary” mating flanges	
Measuring range		min 356 mm (14") Std. – max 6,1 m (240")	
Process Temp.	Max	+260 °C @ 120 bar (+500 °F @ 1700 psi)	+320 °C @ 110 bar (+605 °F @ 1585 psi)
	Min	-15 °C @ 205 bar (0 °F @ 3000 psi)	
Max. Process Pressure		205 bar @ -15 °C (3000 psi @ +0 °F)	
Max. Viscosity		10.000 cP	
Dielectric Range		1,4 to 10 - Non conductive media	10 to 100 - Conductive media
Vacuum service		Negative pressure but not up to full vacuum	

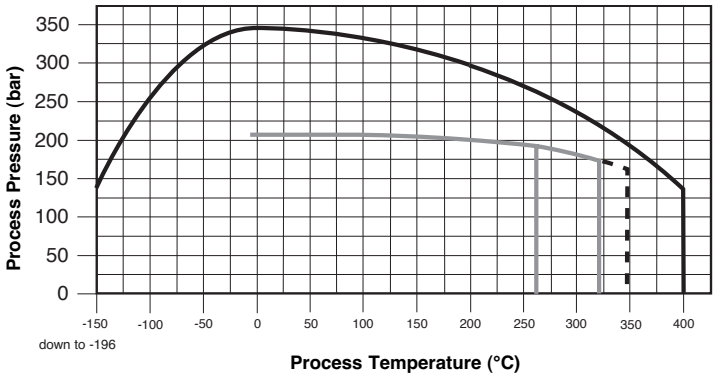
TEMPERATURE_PRESSURE RATING FOR ECLIPSE PROBE SEAL



7MA/7M1/7M7/7MF GWR probes

7MB GWR probes

7MR/7MT GWR probes



7MD GWR probe

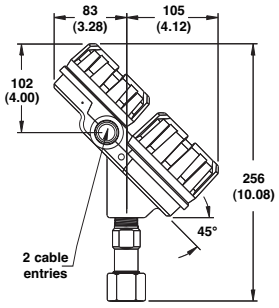
7MS/7MJ GWR probes (7MJ max +315 °C)

7EK: top/bottom GWR probe:
- max +320 °C for conductive liquids
- max +260 °C for non conductive liquids

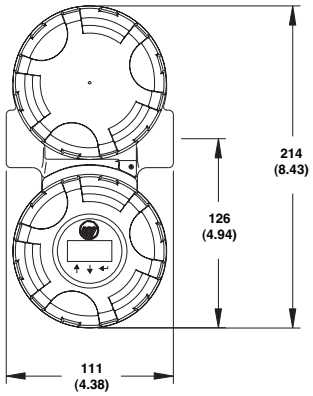
"O" RING SPECIFICATIONS – Not suited for Ammonia/Chlorine applications

"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, steam, 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, steam, hot water
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	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

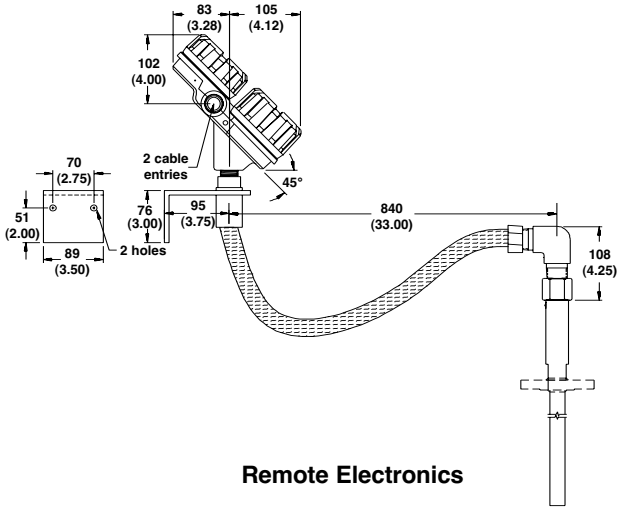
DIMENSIONS in mm (inches)



Internal Electronics

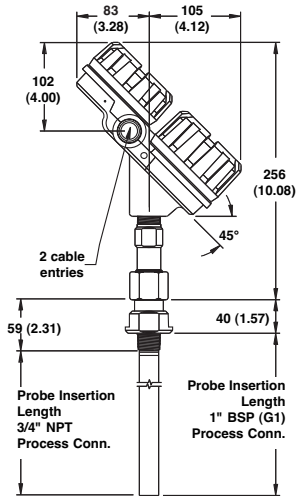


Eclipse Housing, (45° View)

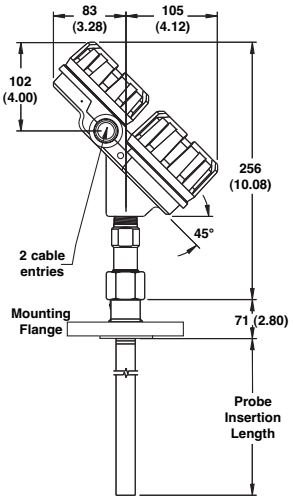


Remote Electronics

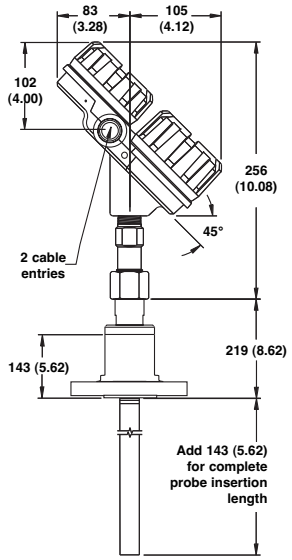
DIMENSIONS in mm (inches)



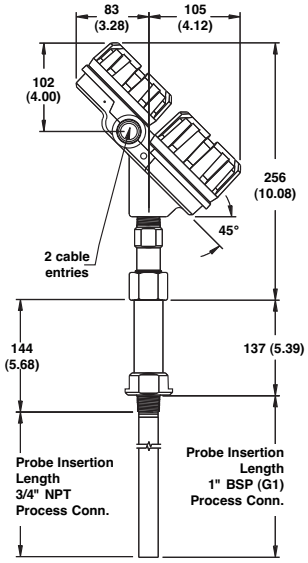
7MA with threaded connection



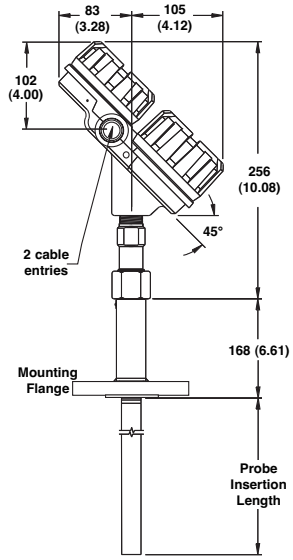
7MA with flanged connection



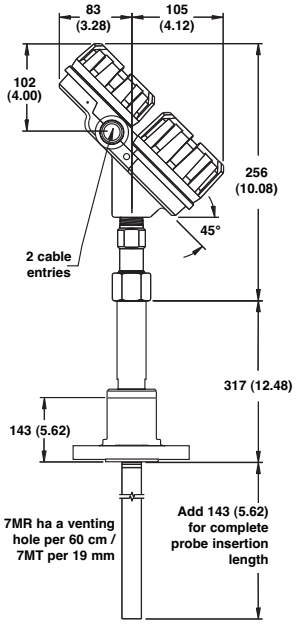
7MA with top hat flanged connection



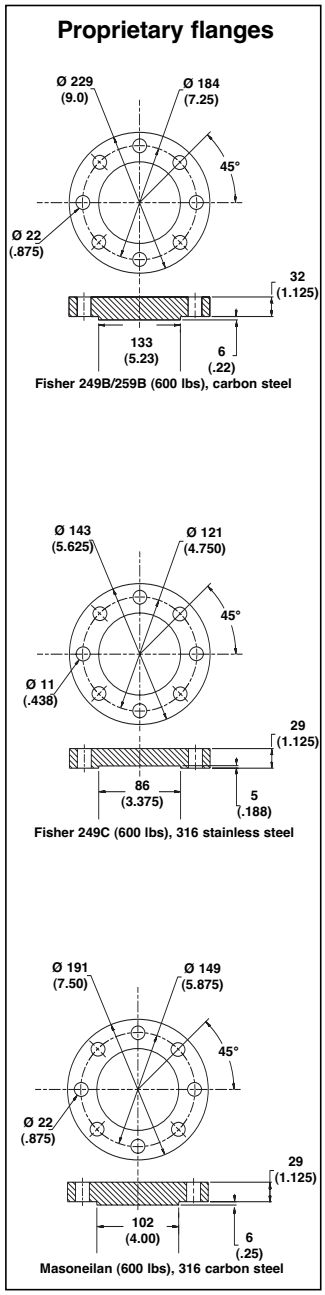
7MR / 7MT with threaded connection

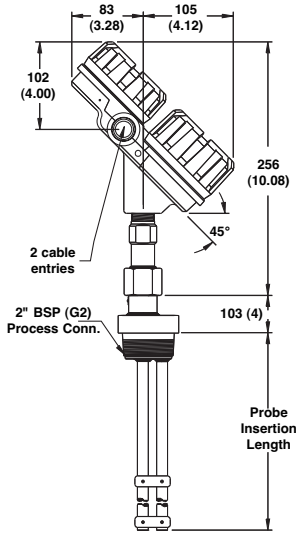


7MR / 7MT with flanged connection

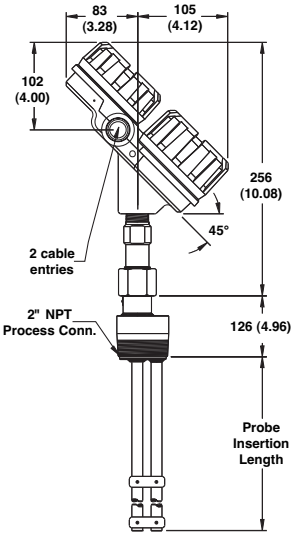


7MR / 7MT with top hat flanged connection

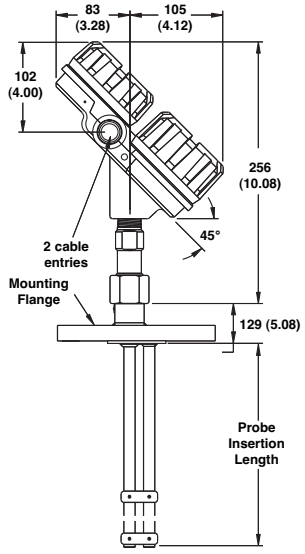




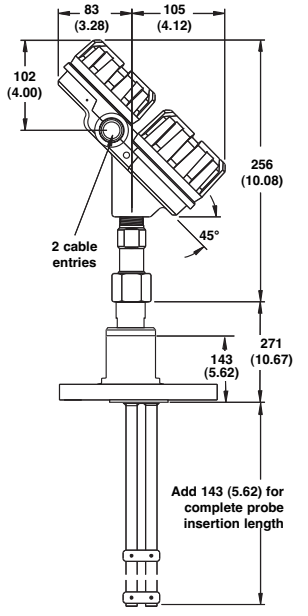
7MB with threaded 2" BSP (G2) connection



7MB with threaded 2" NPT connection

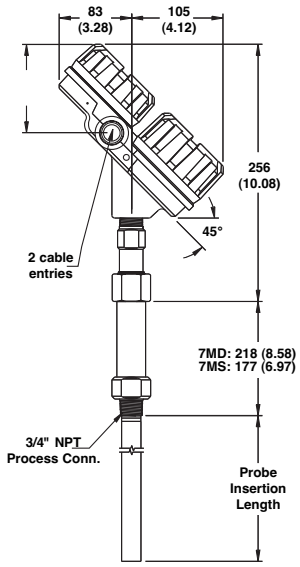


7MB with flanged connection

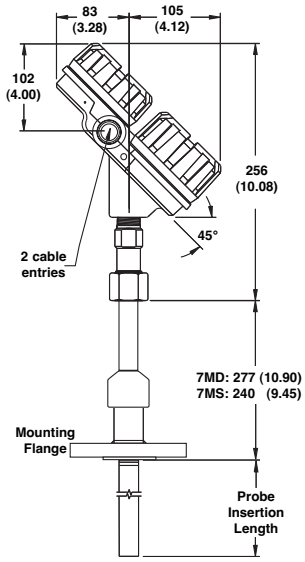


7MB with top hat flanged connection

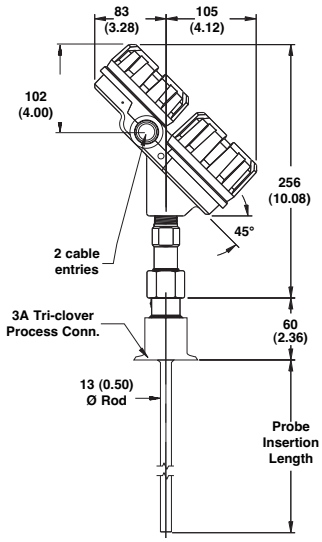
DIMENSIONS in mm (inches)



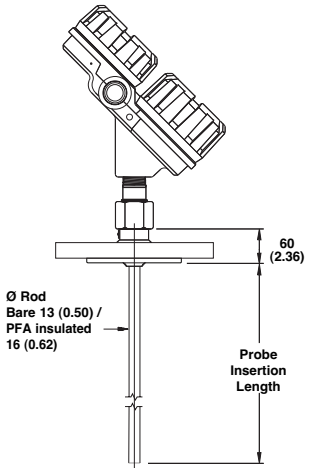
7MD/7MS
with threaded
3/4" NPT Connection



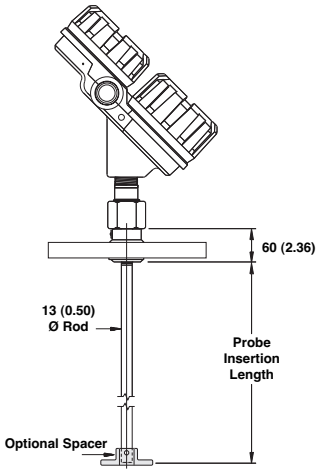
7MD/7MS
with flanged connection



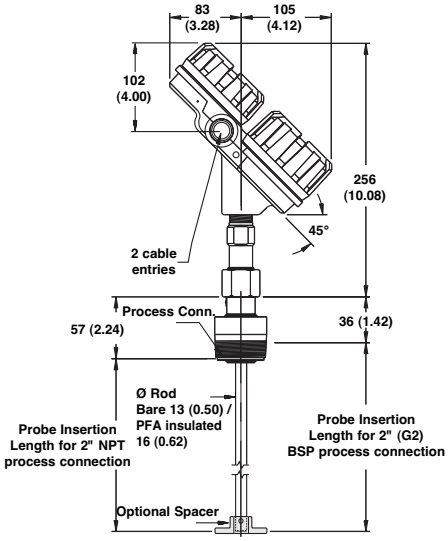
7MF-E
with sanitary
Tri-clover connection
max. 6 m (240")



7MF-F
with faced-flanged
connection
max. 6 m (240")

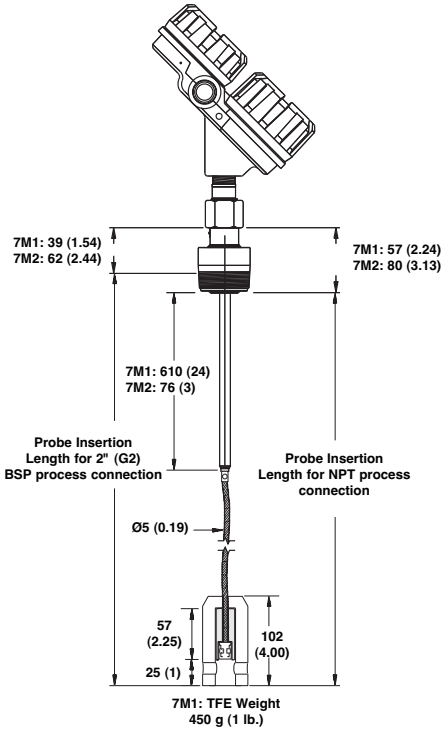


7MF/7MJ
with flanged connection
max. 6 m (240")

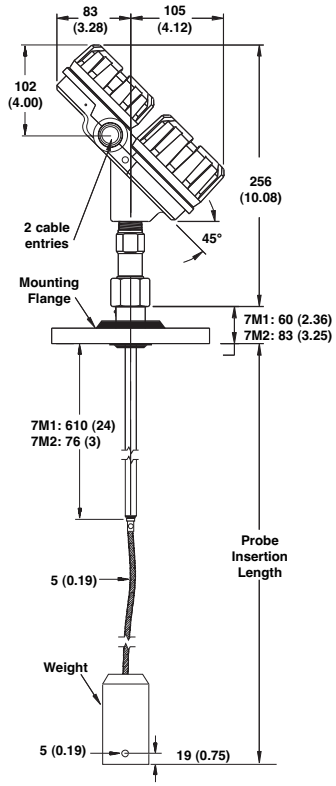


7MF/7MJ
with threaded connection
max. 6 m (240")

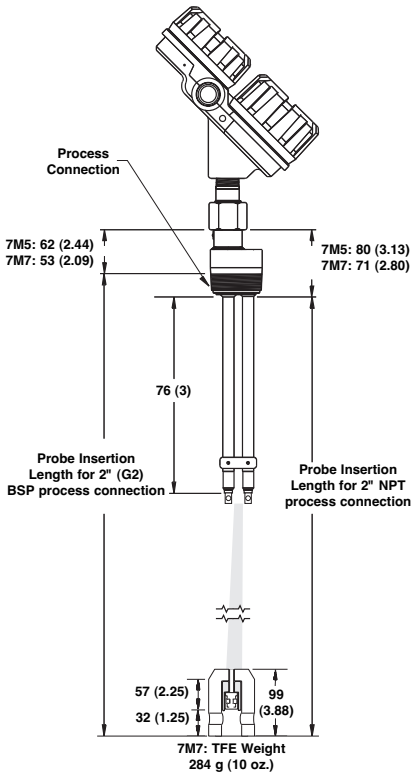
DIMENSIONS in mm (inches)



7M1/7M2 with threaded connection max. 22 m (75')



7M1/7M2 with flanged connection max. 22 m (75')



7M5/7M7
with threaded connection
max. 22 m (75')

MODEL IDENTIFICATION

A complete measuring system consists of:

1. Eclipse transmitter head/electronics
2. Eclipse 705 GWR probe
3. OPTION: Eclipse DTM (PACTWARE®) - order code: **070-3001-001**
4. OPTION:
   - TFE spacer for single rod metal GWR probes; order code: **089-9114-001** (7MF-A), **089-9114-002** (7MF-B), **089-9114-003** (7MF-C)
   - PEEK spacer for single rod 7MJ GWR probe; order code: **089-9114-005** (7MJ-A), **089-9114-006** (7MJ-B), **089-9114-007** (7MJ-C)
   - Additional weight for 7M1 GWR probe; order code: **089-9120-001**
   - Additional weight for 7M7 GWR probe; order code: **089-9121-001**
   - Additional weight for 7M2 GWR probe; order code: **004-8778-001** (requires 2 x **010-1731-001**: cable clamps)
   - Additional weight for 7M5 GWR probe; order code: **004-8778-002** (requires 2 x **010-1731-001**: cable clamps)
5. OPTION: For 1 3/4" dia. size coaxial type GWR probe, use "X" description. Valid for 7MR - 7MD - 7MT GWR probes
6. OPTION: HART® communicator: for more details, consult factory

1. Code for ECLIPSE 705 transmitter head/electronics

BASIC MODEL NUMBER

7 0 5	Eclipse 705 guided wave radar transmitter

POWER

5	24 V DC, two wire loop powered

SIGNAL OUTPUT

1	4-20 mA with HART® communication (multilingual: English, French, German, Spanish)
2	Foundation Fieldbus® communication (in English language)

ELECTRONICS

0	Standard electronics (suitable for SIL1 / SIL2 loops: SFF > 85 %)
A	Enhanced electronics for Safety Instrumented Loops (suitable for SIL 2 / SIL 3 loops: SFF > 91 %)

ACCESSORIES

A	Digital display and keypad
0	Blind transmitter (no display/keypad)

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

1	Integral, General Purpose (& I.S. FM/CSA)
2	Remote, General Purpose (& I.S. FM/CSA)
A	Integral, ATEX II 1 G EEx ia IIC T4 – FISCO ATEX, intrinsically safe for units with Fieldbus Foundation
B	Remote, ATEX II 1 G EEx ia IIC T4 – FISCO ATEX, intrinsically safe for units with Fieldbus Foundation
C	Integral, ATEX II 1/2 G D EEx d[ia] IIC T6 T85 °C
D	Remote, ATEX II 1/2 G D EEx d[ia] IIC T6 T85 °C
E	Integral, ATEX II 3 G EEx nA II T6
F	Remote, ATEX II 3 G EEx nA II T6

MATERIAL OF CONSTRUCTION

1	Cast aluminium dual compartiment housing
2	Stainless steel dual compartiment housing

CABLE ENTRY

1	M20 x 1.5 (2 entries - one plugged)
0	3/4" NPT (2 entries - one plugged)

7	0	5	–	5				–			

complete code for ECLIPSE 705 transmitter head/electronics

MODEL IDENTIFICATION

BASIC MODEL NUMBER

7 M A	Coaxial GWR probe for level (dielectric range: ≥ 1,4)
7 M B	Twin Rod GWR probe for Eclipse transmitter (dielectric range: ≥ 1,9) – WHG approved
7 M D	High Temp / High Pressure (HTHP) Coaxial GWR probe – overfill safe / WHG approved
7 M F	Standard single rod GWR probe (dielectric range: ≥ 1,9/10)
7 M J	High temperature / high pressure single rod GWR probe (dielectric range: ≥ 1,9/10)
7 M R	Overfill safe Coaxial GWR probe for level (dielectric range: ≥ 1,4) – WHG approved
7 M S	Saturated steam – Coaxial GWR probe – overfill safe / Stoomwezen approved
7 M T	Overfill safe Coaxial GWR probe for interface (dielectric upper liquid: ≥ 1,4 and ≤ 5 / lower liquid ≥ 15)
7 M 1	Single cable GWR probe in 316 stainless steel (1.4401) (dielectric range: ≥ 1,9/10) – liquids
7 M 2	Single cable GWR probe in 316 stainless steel (1.4401) (dielectric range: ≥ 4,0) – solids
7 M 5	Twin cable GWR probe in TFE coated 316 SST (1.4401) (dielectric range: ≥ 1,9) – solids
7 M 7	Twin cable GWR probe in FEP coated 316 SST (1.4401) (dielectric range: ≥ 1,9) – liquids

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

A	316/316L (1.4401/1.4404) stainless steel
B	Hastelloy C (2.4819)
C	Monel (2.4360)
E	316/316L (1.4401/1.4404) stainless steel (dielectric range: ≥ 1.9/10)
F	PFA insulated 316/316L (1.4401/1.4404) GWR probe (dielectric range: ≥ 1,9/10)
4	PFA insulated 316/316L (1.4401/1.4404) SST for 7MF
V	316/316L (1.4401/1.4404) stainless steel with High Temp PEEK® spacers (min. dielectrics: ≥ 1,7)
W	316/316L (1.4401/1.4404) stainless steel with Teflon® spacers (min. dielectrics: ≥ 1,4)

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

Threaded

1 1	3/4" NPT thread
2 2	1" BSP (G1) thread
4 1	2" NPT thread
4 2	2" BSP (G2) thread

ANSI flanges

2 3	1"	150 lbs. ANSI RF
2 4	1"	300 lbs. ANSI RF
2 5	1"	600 lbs. ANSI RF
2 K	1"	600 lbs. ANSI RJ
2 L	1"	900 lbs. ANSI RJ
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
3 K	1 1/2"	600 lbs. ANSI RJ
3 M	1 1/2"	900/1500 lbs. ANSI RJ
3 N	1 1/2"	2500 lbs. ANSI RJ
4 3	2"	150 lbs. ANSI RF
4 4	2"	300 lbs. ANSI RF
4 5	2"	600 lbs. ANSI RF
4 K	2"	600 lbs. ANSI RJ
4 M	2"	900/1500 lbs. ANSI RJ
4 N	2"	2500 lbs. ANSI RJ
5 3	3"	150 lbs. ANSI RF
5 4	3"	300 lbs. ANSI RF
5 5	3"	600 lbs. ANSI RF
5 K	3"	600 lbs. ANSI RJ
5 L	3"	900 lbs. ANSI RJ
5 M	3"	1500 lbs. ANSI RJ
5 N	3"	2500 lbs. ANSI RJ
6 3	4"	150 lbs. ANSI RF
6 4	4"	300 lbs. ANSI RF
6 5	4"	600 lbs. ANSI RF
6 K	4"	600 lbs. ANSI RJ
6 L	4"	900 lbs. ANSI RJ
6 M	4"	1500 lbs. ANSI RJ
6 N	4"	2500 lbs. ANSI RJ

EN/DIN flanges

B A	DN 25, PN 16	EN 1092-1 Type A
B B	DN 25, PN 25/40	EN 1092-1 Type A
B C	DN 25, PN 63/100	EN 1092-1 Type B2
B F	DN 25, PN 160	DIN 2527 form E
C A	DN 40, PN 16	EN 1092-1 Type A
C B	DN 40, PN 25/40	EN 1092-1 Type A
C C	DN 40, PN 63/100	EN 1092-1 Type B2
C F	DN 40, PN 160	DIN 2527 form E
C G	DN 40, PN 250	DIN 2527 form E
C H	DN 40, PN 320	DIN 2527 form E
C J	DN 40, PN 400	DIN 2527 form E
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
D F	DN 50, PN 160	DIN 2527 form E
D G	DN 50, PN 250	DIN 2527 form E
D H	DN 50, PN 320	DIN 2527 form E
D J	DN 50, PN 400	DIN 2527 form E
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
E F	DN 80, PN 160	DIN 2527 form E
E G	DN 80, PN 250	DIN 2527 form E
E H	DN 80, PN 320	DIN 2527 form E
E J	DN 80, PN 400	DIN 2527 form E
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
F F	DN 100, PN 160	DIN 2527 form E
F G	DN 100, PN 250	DIN 2527 form E
F H	DN 100, PN 320	DIN 2527 form E
F J	DN 100, PN 400	DIN 2527 form E

7 M | | | | | | | | | | **complete code for ECLIPSE 705 GWR probe**

SEE PAGE 38

PROCESS CONNECTION - SIZE/TYPE

Sanitary

4 P	2" - 3A Tri-clover compatible 16 AMP fitting
5 P	3" - 3A Tri-clover compatible 16 AMP fitting
6 P	4" - 3A Tri-clover compatible 16 AMP fitting

Top Hat (Modulevel type) flanges in carbon steel

5 R	3"	150 lbs ANSI Raised Face flange
5 S	3"	300 lbs ANSI Raised Face flange

Top Hat (Modulevel type) flanges in stainless steel

5 W	3"	150 lbs ANSI Raised Face flange
5 Y	3"	300 lbs ANSI Raised Face flange

Torque tube mating flanges with top hat

T V	600 lbs Fisher (249B/259B) with top hat in carbon steel
T W	600 lbs Fisher (249C) with top hat in stainless steel
U V	600 lbs Masoneilan flange with top hat in carbon steel
U W	600 lbs Masoneilan flange with top hat in stainless steel

Torque tube mating flanges

T T	600 lbs Fisher (249B/259B) in carbon steel
T U	600 lbs Fisher (249C) in stainless steel
U T	600 lbs Masoneilan flange in carbon steel
U U	600 lbs Masoneilan flange in stainless steel

PROCESS SEAL - MATERIAL

0	Viton GFLT seal - for universal use / steam applications	-40 °C (-40 °F) / +200 °C (+400 °F)
1	EPDM (Ethylene Propylene) - for e.g. caustic soda applications	-50 °C (-60 °F) / +125 °C (+250 °F)
2	Kalrez 4079 seal - for aggressive media	-40 °C (-40 °F) / +200 °C (+400 °F)
8	PEEK seal - for high temperature / high pressure	-15 °C (0 °F) / +315 °C (+600 °F)
N	Borosilicate seal – for non steam applications (7MD)	-196 °C (-320 °F) / +400 °C (+750 °F)

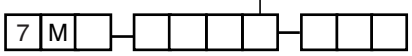
INSERTION LENGTH

Rigid GWR probes: specify per 1 cm (0,39") increments

0 6 0	min 60 cm (24") insertion length
6 1 0	max 610 cm (240") insertion length

Flexible GWR probes: specify per 1 m (3,28') increments

0 0 1	min 1 m (3,28') insertion length
0 2 2	max 22 m (75') insertion length



complete order code for ECLIPSE 705 GWR probe

2. Code for Eclipse® 705 Top/Bottom GWR probe and cage

In order to re-assure that no incorrect dimensions are provided, please specify with your order the following dimensions (see drawings at bottom of page):

- Dimension A: top of process connection up to 20 mA range
- Dimension B: bottom of process connection up to 4 mA range
- Level Range, if different from 356 mm (14")

Code for modified models or adders: put an "X" in front of the closest matching code and specify the modifications/adders separately.
e.g: X7EK-K33A-010
X = measuring range of 500 mm.

BASIC MODEL NUMBER

GWR probe suited for in-line external cage mounting

7 E K	Top/Bottom GWR probe and cage

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

	Cage and Flanges	GWR probe
K	316/316L (1.4401/1.4404)	316/316L (1.4401/1.4404)
M	Carbon steel	

PROCESS CONNECTION - SIZE/TYPE

Threaded

3 1	1 1/2" NPT thread
4 1	2" NPT thread

Welded

3 9	1 1/2" socket weld

ANSI flanges

3 3	1 1/2"	150 lbs. ANSI raised face flange
3 4	1 1/2"	300 lbs. ANSI raised face flange
3 5	1 1/2"	600 lbs. ANSI raised face flange
4 3	2"	150 lbs. ANSI raised face flange
4 4	2"	300 lbs. ANSI raised face flange
4 5	2"	600 lbs. ANSI raised face flange

LEVEL RANGE

A	356 mm (14")

OPTIONS

0	None
2	Sight glass connections (sight glass not included)

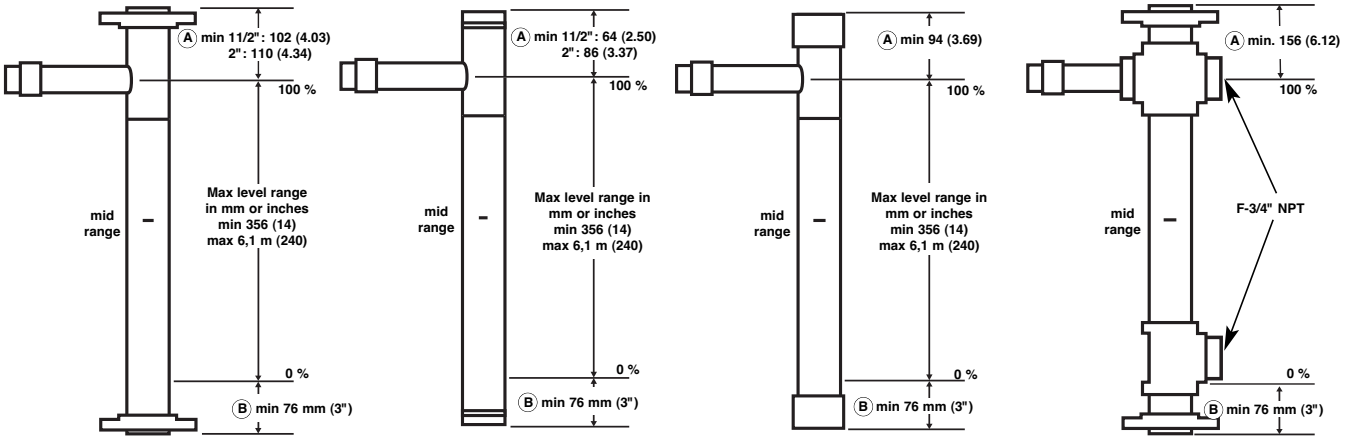
LIQUID TYPE / OPERATING TEMPERATURE

1 0	Conductive liquids (min Er ≥ 10) –	max +315 °C (+600 °F)
2 0	Non conductive liquids (min Er ≥ 1.4) –	max +260 °C (+500 °F)

7	E	K				A			0

complete code for ECLIPSE 705 with Top/Bottom GWR probe and cage

DIMENSIONS in mm (inches)



Flanged 7EK | **Threaded 7EK** | **Welded 7EK** | **Optional sight glass connections**

705 Eclipse Guided Wave Radar Transmitter

Configuration Data Sheet

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

Item	Screen	Value	Value	TROUBLESHOOTING	
Vessel Name					
Vessel #					
Process Medium					
Tag #					
Electronics Serial #					
Probe Serial #				Working Value	Non-Working Value
Level	«Level»				
Volume (optional)	«Volume»				
Interface (optional)	«IfcLvl»				
Interface Volume (opt.)	«IfcVol»				
Probe Model	«PrbModel»				
Probe Mount	«PrbMount»				
Measurement Type	«MeasType»				
Level Units	«LvlUnits»				
Probe Length	«Probe Ln»				
Level Offset	«Lvl Ofst»				
Volume Units (opt.)	«VolUnits»				
Strapping Table (opt.) (Make a separate list for each level and its corresponding volume	«StrapTbl»				
	«Pt1..20»				
Dielectric	«Dielectrc»				
Sensitivity	«Senstvty»				
Loop Control	«LoopCtrl»				
4mA point	«Set 4mA»				
20mA point	«Set 20mA»				
Damping	«Damping»				
Blocking Distance	«BlockDis»				
Safety Zone Fault	«Sz Fault»				
Safety Zone Height	«SzHeight»				
Safety Zone Alarm	«Sz Alarm Reset»				
Fault Choice	«Fault»				
Threshold	«Treshld»				
Interface Threshold	«IfcThrs»				
HART Poll Address	«Poll Adr»				
Level Trim	«Trim Lvl»				
Trim 4 mA	«Trim 4»				
Trim 20 mA	«Trim 20»				
Level Ticks	«LvlTicks»				
Interface Ticks (opt.)	«IfcTicks»				

705 Eclipse Guided Wave Radar Transmitter

Configuration Data Sheet – additional Advanced Diagnostic

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

Item	Screen	Value	Value	TROUBLESHOOTING	
				Correct Value	Incorrect Value
# of Fiducial Ticks	«FidTicks»				
Fiducial Spread	«Fid Sprd»				
Sys Code	«Sys Code»				
Fiducial Type	«Fid Type»				
Fiducial Gain	«Fid Gain»				
Window	«Window»				
Conversion Factor	«Conv Fct»				
Scale Offset	«Scl Ofst»				
Negative Amplitude	«Neg Ampl»				
Positive Amplitude	«Pos Ampl»				
Signal	«Signal»				
Compensate	«Compensate»				
Derating Factor	«DrateFct»				
Target Amplitude (7MS)	«TargAmpl»				
Target Ticks (7MS)	«Targ Tks»				
Target Calibration (7MS)	«Targ Cal»				
Operating Mode	«OperMode»				
7EK Correction	«7xK Corr»				
Electronics temperature	«ElecTemp»				
Max temperature	«Max Temp»				
Min temperature	«Min Temp»				
Safety Zone Hysterisis	«SZ Hyst»				

705FF Eclipse Guided Wave Radar Transmitter
Configuration Data Sheet

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

Item	Screen	Value	Value	TROUBLESHOOTING	
Vessel Name					
Vessel #					
Media & Dielectric					
Tag #					
Electronics Serial #					
Probe Serial #				**Correct Value**	**Incorrect Value**
Level					
Probe Model					
Probe Mount					
Probe Length					
Offset					
Dielectric					
0% point					
100% point					
Fieldbus Address					
Fiducial Tick					
<Window>					
Range					
Gain					
Conversion Factor					
Scale Offset					
# of Ticks					
Threshold					
Software Version					
New Password					
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

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 57-600.11
EFFECTIVE: OCTOBER 2005
SUPERSEDES: June 2005

Magnetrol®

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