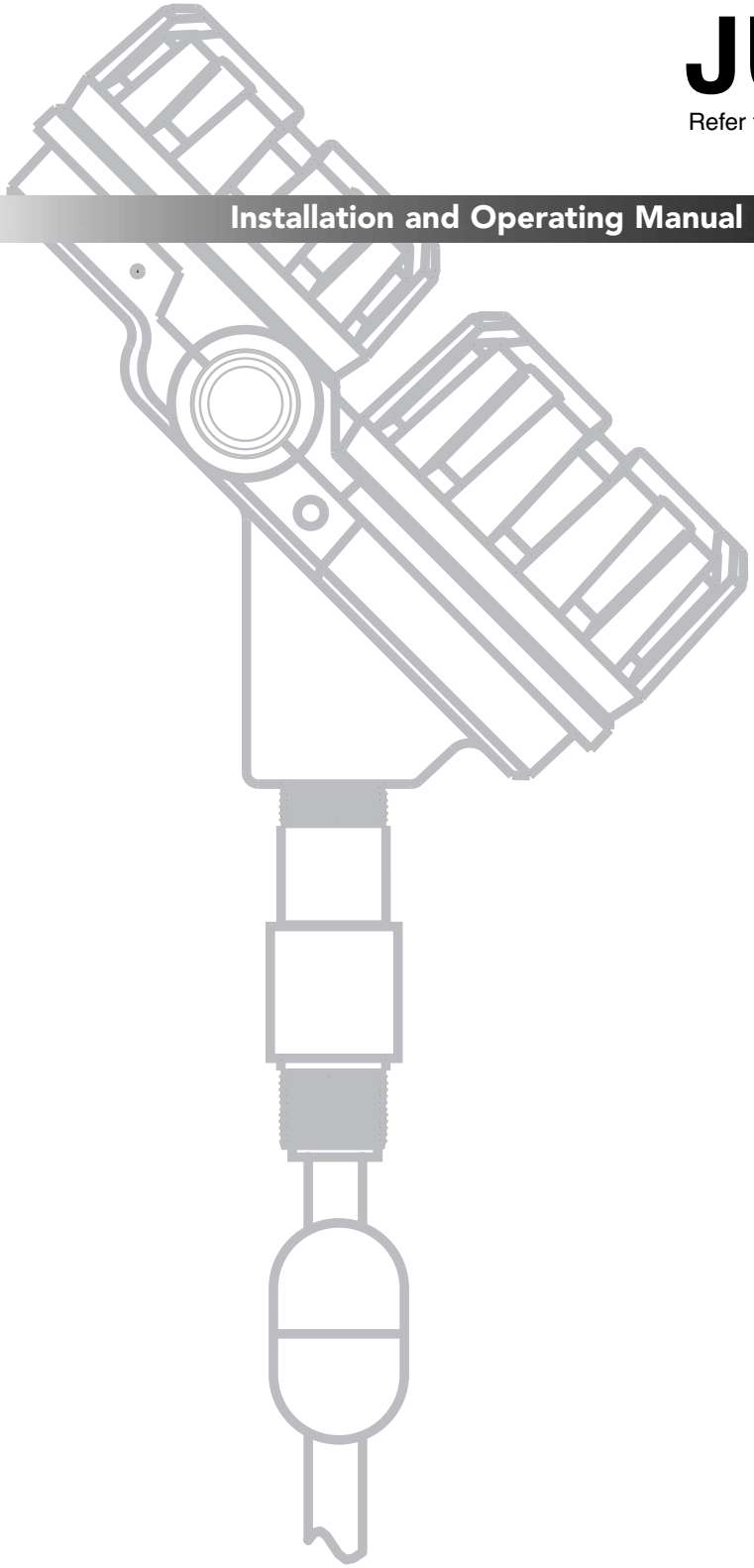
JUPITER® 200

Refer to bulletin 46-649 for Jupiter® 200 with Fieldbus Foundation

Installation and Operating Manual



Magnetostrictive

Level

Transmitter

Magnetrol®

HART® COMMUNICATION PROTOCOL

AMS aware

FDT

PACTware

SAFETY INTEGRITY LEVEL SIL

UNPACKING

Unpack the instrument carefully. Make sure all components have been removed from the foam protection. Inspect all components for damage. Report any concealed damage to the carrier within 24 hours. Check the contents of the carton/crates against the packing slip and report any discrepancies to Magnetrol. Check the nameplate model number to be sure it agrees with the packing slip and purchase order. Check and record the serial number for future reference when ordering parts.

CE 0038 0344

These units are in compliance with:

1. The EMC directive 2004/108/EC. The units have been tested to EN 61326: 1997 + A1 + A2.
2. Directive 94/9/EC for equipment or protective system intended for use in potentially explosive atmospheres. EC-type examination certificate number DEKRA11ATEX0039X or ISSeP11ATEX007X.
3. The PED directive 97/23/EC (pressure equipment directive). Safety accessories per category IV module H1.

SPECIAL CONDITIONS FOR ATEX INTRINSICALLY SAFE USE

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

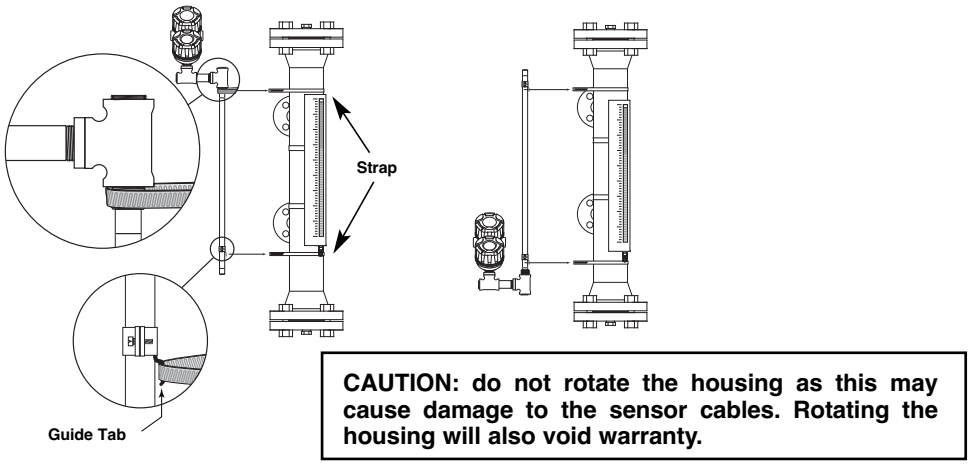
PRINCIPLE OF OPERATION

The Enhanced Jupiter transmitter utilises the engineering principle of magnetostriction and the effect of a magnetic field on the magnetostrictive wire as the basis for operation of the instrument. The primary components are the probe assembly containing the wire and the electronics assembly.

MOUNTING

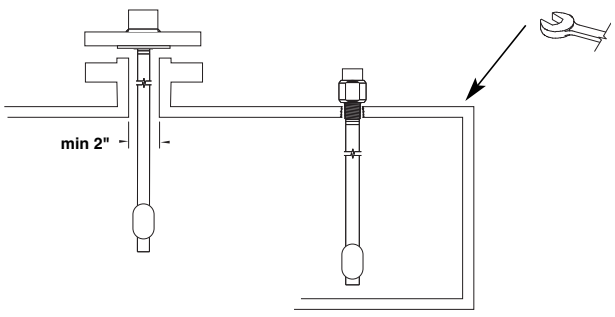
External Mount Model

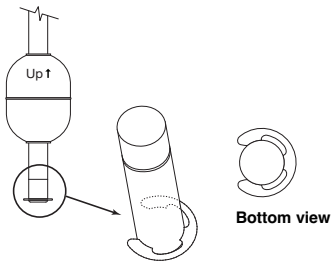
Note: if ordered from the factory with the Magnetic Level Indicator the transmitter will be attached to the gauge and configured for the application.



CAUTION: do not rotate the housing as this may cause damage to the sensor cables. Rotating the housing will also void warranty.

Direct Insertion Model

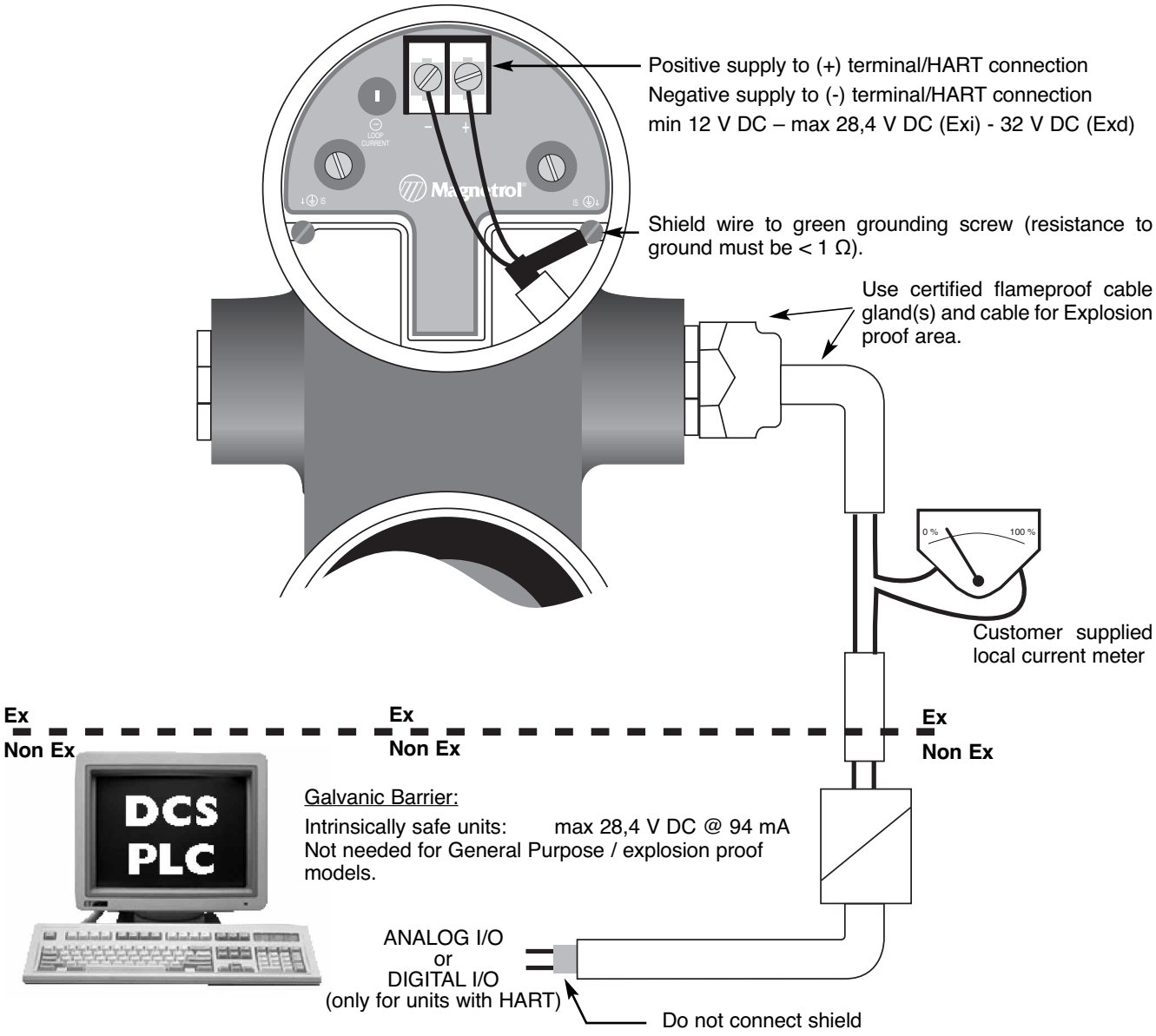




Float attachment detail

WIRING

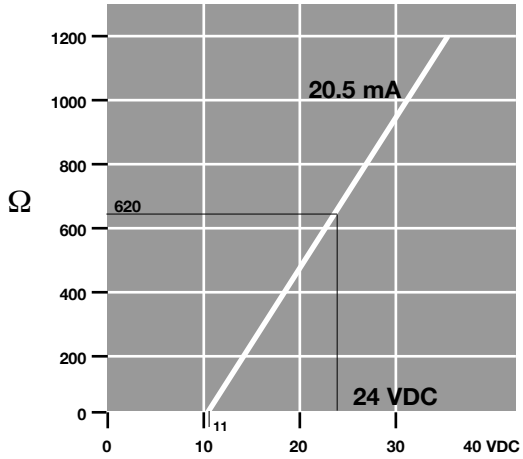
CAUTION: power must be switched OFF before wiring the unit.



IMPORTANT:

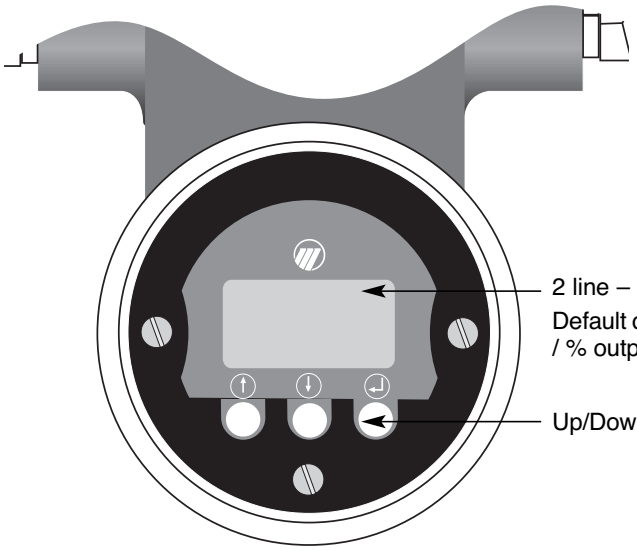
The shield wire should only be grounded at ONE side only. It is recommended to connect the shield to ground in the field (at the transmitter side - as shown above) but connecting in the control room is also allowed.

LOOP RESISTANCE



CONFIGURATION

NOTE: When connected to an approved barrier, the intrinsically safe electronics of the Jupiter® 200 allow to remove the covers with power switched on – even if the area is known to be hazardous



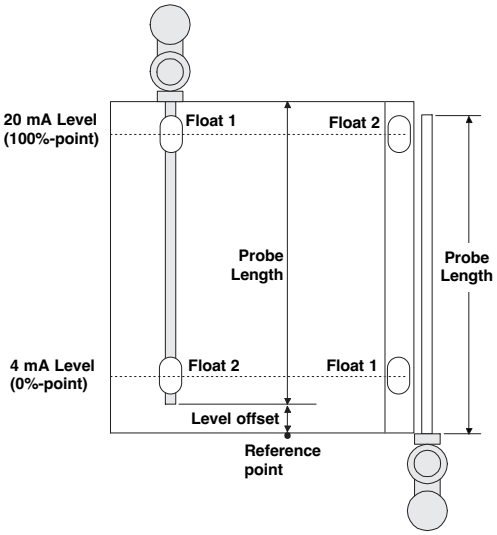
Display	Comment	
Units! cm	Press ↵:	The last character on the first line of the display changes to «!». This sign confirms that the values/choices of the second line can be modified via the ↓ and ↑ push buttons.
Units! **cm**	Press ↑ ↓	* Scroll through the choices or increase/decrease the values on the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

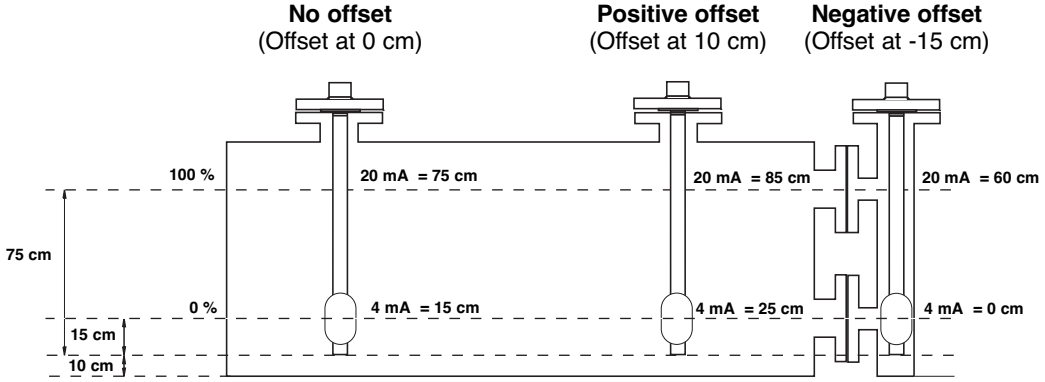


Level Offset = ☐ cm or inches
The offset is the distance between reference point (e.g. bottom of tank) and end of probe. From the reference point both 4 mA and 20 mA levels are calibrated. When offset is set at zero, the end of the probe is the reference point.

4 mA Level = ☐ cm or inches
or zero level point, is measured from the reference point. The unit with SIL enhanced electronics has a diagnostic zone at the bottom of the probe.

20 mA Level = ☐ cm or inches
or 100 % level point, is measured from the reference point.

Probe length = ☐ cm or inches, record the exact probe length as printed on the nameplate: 2xx-xxx-xxM-xxx



BEFORE STARTING

Start from run mode:

1. Select the desired language for configuration: English or Spanish in the language screen (22 or 25) «`language`». Scroll up for quickly reaching the language selection screen.
2. Define type of measurement:
   a. Level only (pages 6 & 7)
   b. Interface only (pages 8 & 9)
   c. Interface and Level (pages 10 & 11)
   d. Level and Interface (pages 11 & 12)
   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 «`Units`», all configuration values will be entered in that engineering unit.
4. Refer to the configuration procedure of the selected type of measurement.
5. Refer to page 14 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 – Jupiter 200: Level only – Loop signal (PV) is Level

		Screen	Action	Comment
Run mode	1	*Status* *Level* *%Output* *Loop*	Transmitter Display	Transmitter default values cycle every 8 seconds. Status «Status», Volume «Volume», % Output «% Output», and Loop «Loop».
	2	Level xxx.xx	Transmitter Display	Transmitter displays Level Value in selected engineering units.
	3	%Output xx.xx	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	MeasType (select)	**Select** the type of measurement	Select level «Lvl only».
	6	Units (select)	**Select** units for level	cm «cm» or inches «inches».
	7	Probe Ln xxx.xx	**Enter** the exact length of probe	Enter as per the 3 last digits of the probe partnumber on the nameplate: From 15 cm up to 999 cm e.g. 242-AD11-1AA-AM-280, enter «280» cm probe length.
	8	Set 4mA xxx.xx	**Enter** the PV for 4 mA	Enter 4 mA level point, measured from reference point in selected level units.
	9	Set 20mA xxx.xx	**Enter** the PV for 20 mA	Enter 20 mA level point, measured from reference point in selected level units.
	10	Lvl Ofst xxx.xx	**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 5 “Terminology”.
	11	Damping xx.x s	**Enter** the damping factor.	A Damping factor (1-25 seconds) may be added to smooth a noisy display and/or output due to turbulence. Below 15 s = 0,1 s increments. Above 15 s = 1 s increments.
	12	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.
	13	Poll Adr xx	Enter HART ID number.	Select a HART poll address (0-15). Enter 0 for a single transmitter installation.

= Quick Start up

MENU: STEP BY STEP PROCEDURE – Jupiter 200: Level only

Diagnostics

	Screen	Action	Comment
⑭	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.
⑮	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.
⑯	Loop Tst xx.x mA	Enter a mA output value.	Set mA Output to any given value to perform loop test.
⑰	Deadband xx.x	None, do not adjust.	Factory setting.
⑱	Snsr Mnt (select)	Select the type of mounting.	«MLI Top» External mount Jupiter – Top mounted Jupiter «MLI Bot» External mount Jupiter – Bottom mounted Jupiter «Dir Near» Direct mount Jupiter – NPT, BSP and Flanged ≤ 600 lbs / PN160 «Dir Ext» Direct mount Jupiter – Flanged ≥ 900 lbs / PN250
⑲	Trim Lvl xx.xx	Enter value to adjust level reading.	Allows to compensate for a fixed level deviation.
⑳	F1 Cnts xxxx	Diagnostic display.	Shows the elapsed time from the start pulse to reflected signal from level.
㉑	New Pass xxx	Enter new password.	Use arrows to select desired value. Values between 0 and 255.
㉒	Language (select)	Select language	Select «English» or «Espagnol».
㉓	JupiterHT Ver 3.0A	None, do not adjust.	Factory setting. «Ver» refers to software version.
㉔	DispFact (select)	Advanced diagnostics.	See page 14.

MENU: STEP BY STEP PROCEDURE – Jupiter 200: Interface only – Loop signal (PV) is Interface Level

		Screen	Action	Comment
Run mode	①	*Status* *IfcLevel* *%Output* *Loop*	Transmitter Display	Transmitter default values cycle every 8 seconds. Status «Status», Volume «Volume», % Output «% Output», and Loop «Loop».
	②	IfcLevel xxx.xx	Transmitter Display	Transmitter displays Interface Value in selected engineering units.
	③	%Output xx.xx	Transmitter Display	Transmitter displays % Output measurement derived from 20 mA span.
	④	Loop xx.xxx mA	Transmitter Display	Transmitter displays Loop measurement (mA).
Configuration	⑤	MeasType (select)	**Select** the type of measurement	Select Interface «Ifc only».
	⑥	Units (select)	**Select** units for level	cm «cm» or inches «inches».
	⑦	Probe Ln xxx.xx	**Enter** the exact length of probe	Enter as per the 3 last digits of the probe partnumber on the nameplate: From 15 cm up to 999 cm e.g. 242-AD11-1AA-AM-280, enter «280» cm probe length.
	⑧	Set 4mA xxx.xx	**Enter** the PV for 4 mA	Enter 4 mA level point, measured from reference point in selected level units.
	⑨	Set 20mA xxx.xx	**Enter** the PV for 20 mA	Enter 20 mA level point, measured from reference point in selected level units.
	⑩	Lvl Ofst xxx.xx	**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 5 “Terminology”.
	⑪	Damping xx.x s	**Enter** the damping factor.	A Damping factor (1-25 seconds) may be added to smooth a noisy display and/or output due to turbulence. Below 15 s = 0,1 s increments. Above 15 s = 1 s increments.
	⑫	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.
	⑬	Poll Adr xx	Enter HART ID number.	Select a HART poll address (0-15). Enter 0 for a single transmitter installation.

= Quick Start up

MENU: STEP BY STEP PROCEDURE – Jupiter 200: Interface only – Loop signal (PV) is Interface Level

	Screen	Action	Comment
Diagnostics	⑭ 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.
	⑮ 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.
	⑯ Loop Tst xx.x mA	Enter a mA output value.	Set mA Output to any given value to perform loop test.
	⑰ Deadband xx.x	None, do not adjust.	Factory setting.
	⑱ Snsr Mnt (select)	Select the type of mounting.	«MLI Top» External mount Jupiter – Top mounted Jupiter «MLI Bot» External mount Jupiter – Bottom mounted Jupiter «Dir Near» Direct mount Jupiter – NPT, BSP and Flanged ≤ 600 lbs / PN160 «Dir Ext» Direct mount Jupiter – Flanged ≥ 900 lbs / PN250
	⑲ Trim Ifc xx.xx	Enter value to adjust interface reading.	Allows to compensate for a fixed level deviation.
	⑳ F1 Cnts xxxx	Diagnostic display.	Shows the elapsed time from the start pulse to reflected signal from level.
	㉑ New Pass xxx	Enter new password.	Use arrows to select desired value. Values between 0 and 255.
	㉒ Language (select)	Select language	Select «English» or «Espagnol».
	㉓ JupiterHT Ver 3.0A	None, do not adjust.	Factory setting. «Ver» refers to software version.
	㉔ DispFact (select)	Advanced diagnostics.	See page 14.

MENU: STEP BY STEP PROCEDURE – Jupiter 200: Interface and Level – Loop signal (PV) is Interface Level

		Screen	Action	Comment
Run mode	1	*Status* *Level* *%Output* *Loop*	Transmitter Display	Transmitter default values cycle every 8 seconds. Status «Status», Volume «Volume», % Output «% Output», and Loop «Loop».
	2	IfcLevel xxx.xx	Transmitter Display	Transmitter displays Interface Level Value in selected engineering units.
	3	%Output xx.xx	Transmitter Display	Transmitter displays % Output measurement derived from 20 mA span.
	4	Loop xx.xx mA	Transmitter Display	Transmitter displays Loop measurement (mA).
	5	Level xxx.xxx	Transmitter Display	Unit displays locally top liquid level.
Configuration	6	MeasType (select)	**Select** the type of measurement	Select Interface and level «Ifc&Lvl».
	7	Units (select)	**Select** units for level	cm «cm» or inches «inches».
	8	Probe Ln xxx.xx	**Enter** the exact length of probe	Enter as per the 3 last digits of the probe partnumber on the name-plate: From 15 cm up to 999 cm e.g. 242-AD11-1AA-AM-280, enter «280» cm probe length.
	9	Set 4mA xxx.xx	**Enter** the PV for 4 mA	Enter 4 mA level point, measured from reference point in selected level units.
	10	Set 20mA xxx.xx	**Enter** the PV for 20 mA	Enter 20 mA level point, measured from reference point in selected level units.
	11	Lvl Ofst xxx.xx	**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 5 “Terminology”.
	12	Damping xx.x s	**Enter** the damping factor.	A Damping factor (1-25 seconds) may be added to smooth a noisy display and/or output due to turbulence. Below 15 s = 0,1 s increments. Above 15 s = 1 s increments.
	13	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.
	14	Poll Adr xx	Enter HART ID number.	Select a HART poll address (0-15). Enter 0 for a single transmitter installation.

= **Quick Start up**

Diagnostics

	Screen	Action	Comment
⑮	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.
⑯	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.
⑰	Loop Tst xx.x mA	Enter a mA output value.	Set mA Output to any given value to perform loop test.
⑱	Deadband xx.x	None, do not adjust.	Factory setting.
⑲	Snsr Mnt (select)	Select the type of mounting.	«MLI Top» External mount Jupiter – Top mounted Jupiter «MLI Bot» External mount Jupiter – Bottom mounted Jupiter «Dir Near» Direct mount Jupiter – NPT, BSP and Flanged ≤ 600 lbs / PN160 «Dir Ext» Direct mount Jupiter – Flanged ≥ 900 lbs / PN250
⑳	Trim Lvl xx.xx	Enter value to adjust level reading.	Allows to compensate for a fixed level deviation.
㉑	Trim Ifc xx.xx	Enter value to adjust interface reading.	Allows to compensate for a fixed level deviation.
㉒	F1 Cnts xxxx	Diagnostic display float 1 (see terminology page 5).	Shows the elapsed time from the start pulse to reflected signal from float 1.
㉓	F2 Cnts xxxx	Diagnostic display float 2 (see terminology page 5).	Shows the elapsed time from the start pulse to reflected signal from float 2.
㉔	New Pass xxx	Enter new password.	Use arrows to select desired value. Values between 0 and 255.
㉕	Language (select)	Select language	Select «English» or «Espagnol».
㉖	JupiterHT Ver 3.0A	None, do not adjust.	Factory setting. «Ver» refers to software version.
㉗	DispFact (select)	Advanced diagnostics.	See page 14.

MENU: STEP BY STEP PROCEDURE – Jupiter 200: Level and Interface – Loop signal (PV) is top liquid level

		Screen	Action	Comment
Run mode	1	*Status* *Level* *%Output* *Loop*	Transmitter Display	Transmitter default values cycle every 8 seconds. Status «Status», Volume «Volume», % Output «% Output», and Loop «Loop».
	2	Level xxx.xx	Transmitter Display	Transmitter displays top liquid value in selected engineering units.
	3	%Output xx.xx	Transmitter Display	Transmitter displays % Output measurement derived from 20 mA span.
	4	Loop xx.xx mA	Transmitter Display	Transmitter displays Loop measurement (mA).
	5	IfcLevel xxx.xxx	Transmitter Display	Unit displays locally interface level.
Configuration	6	MeasType (select)	**Select** the type of measurement	Select Level and Interface «Lvl&Ifc».
	7	Units (select)	**Select** units for level	cm «cm» or inches «inches».
	8	Probe Ln xxx.xx	**Enter** the exact length of probe	Enter as per the 3 last digits of the probe partnumber on the name-plate: From 15 cm up to 999 cm e.g. 242-AD11-1AA-AM-280, enter «280» cm probe length.
	9	Set 4mA xxx.xx	**Enter** the PV for 4 mA	Enter 4 mA level point, measured from reference point in selected level units.
	10	Set 20mA xxx.xx	**Enter** the PV for 20 mA	Enter 20 mA level point, measured from reference point in selected level units.
	11	Lvl Ofst xxx.xx	**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 5 “Terminology”.
	12	Damping xx.x s	**Enter** the damping factor.	A Damping factor (1-25 seconds) may be added to smooth a noisy display and/or output due to turbulence. Below 15 s = 0,1 s increments. Above 15 s = 1 s increments.
	13	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.
	14	Poll Adr xx	Enter HART ID number.	Select a HART poll address (0-15). Enter 0 for a single transmitter installation.

= Quick Start up

Diagnostics

	Screen	Action	Comment
⑮	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.
⑯	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.
⑰	Loop Tst xx.x mA	Enter a mA output value.	Set mA Output to any given value to perform loop test.
⑱	Deadband xx.x	None, do not adjust.	Factory setting.
⑲	Snsr Mnt (select)	Select the type of mounting.	«MLI Top» External mount Jupiter – Top mounted Jupiter «MLI Bot» External mount Jupiter – Bottom mounted Jupiter «Dir Near» Direct mount Jupiter – NPT, BSP and Flanged ≤ 600 lbs / PN160 «Dir Ext» Direct mount Jupiter – Flanged ≥ 900 lbs / PN250
⑳	Trim Lvl xx.xx	Enter value to adjust level reading.	Allows to compensate for a fixed level deviation.
㉑	Trim Ifc xx.xx	Enter value to adjust interface reading.	Allows to compensate for a fixed level deviation.
㉒	F1 Cnts xxxx	Diagnostic display float 1 (see terminology).	Shows the elapsed time from the start pulse to reflected signal from float 1.
㉓	F2 Cnts xxxx	Diagnostic display float 2 (see terminology).	Shows the elapsed time from the start pulse to reflected signal from float 2.
㉔	New Pass xxx	Enter new password.	Use arrows to select desired value. Values between 0 and 255.
㉕	Language (select)	Select language	Select «English» or «Espagnol».
㉖	JupiterHT Ver 3.0A	None, do not adjust.	Factory setting. «Ver» refers to software version.
㉗	DispFact (select)	Advanced diagnostics.	See page 14.

MENU: STEP BY STEP PROCEDURE – Jupiter 200: 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	Conv Fct xxxx	None, do not adjust.	Factory setting.
6	Scl Ofst xxx	None, do not adjust.	Factory setting.
7	F1Tresh	None, do not adjust.	Factory setting.
8	F1 Polar	None, do not adjust.	Factory setting.
9	F2Tresh	None, do not adjust.	Factory setting. Only applicable for "Interface and Level" or “Level and Interface” configuration.
10	F2 Polar	None, do not adjust.	Factory setting. Only applicable for "Interface and Level" or “Level and Interface” configuration.
11	Senstvty xxx	Change cryptic value	Enter a value upward or downward to sense the liquid surface. Allows to fine gain adjustment.
12	Drv Ampl xxx	None, do not adjust.	Factory setting.
13	Min Sep	None, do not adjust.	Factory setting. Only applicable for "Interface and Level" or “Level and Interface” configuration.
14	ElecTemp xxx C	None, do not adjust.	Shows internal housing temperature.
15	Max Temp xxx C	None, do not adjust.	Diagnostic display, shows maximum internal housing temperature recorded.
16	Min Temp xxx C	None, do not adjust.	Diagnostic display, shows minimum internal housing temperature recorded.

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

WHAT IS FDT, PACTware AND DTM

- 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 a device-specific software driver designed to operate within a FDT compatible 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 DTM's—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.

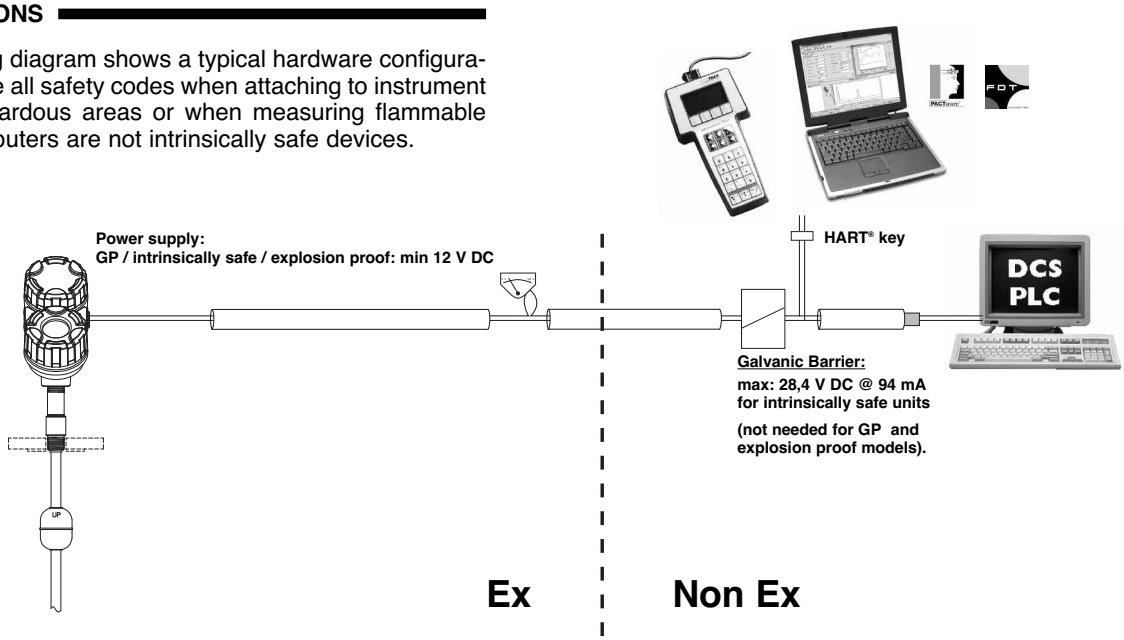
RS232-HART or USB-HART serial interface for point-to-point connection or RS232-RS485 converter for connection to Hart Multiplexer.

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.



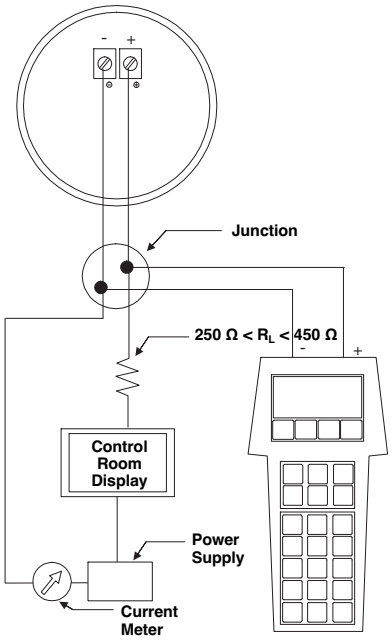
MOST COMMONLY USED SCREENS

- 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.
- Waveform: shows the actual echocurve. The waveform 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 internal 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.
- **WAVEFORM** showing upset/error condition (when possible).
- **ERROR MONITOR** (VIEW/ERROR MONITOR) including upset/error condition.



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.

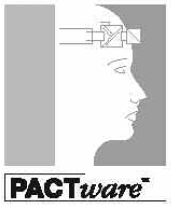
CHECK HART®

Before starting the HART® configuration procedure – check if your HART® communicator is equipped with the proper Jupiter 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	Compatible with software
July 2003	Dev V2 DD V1	Version 2.0A ... 2.0B
July 2006	Dev V3 DD V2	Version 3.0A and later

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



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

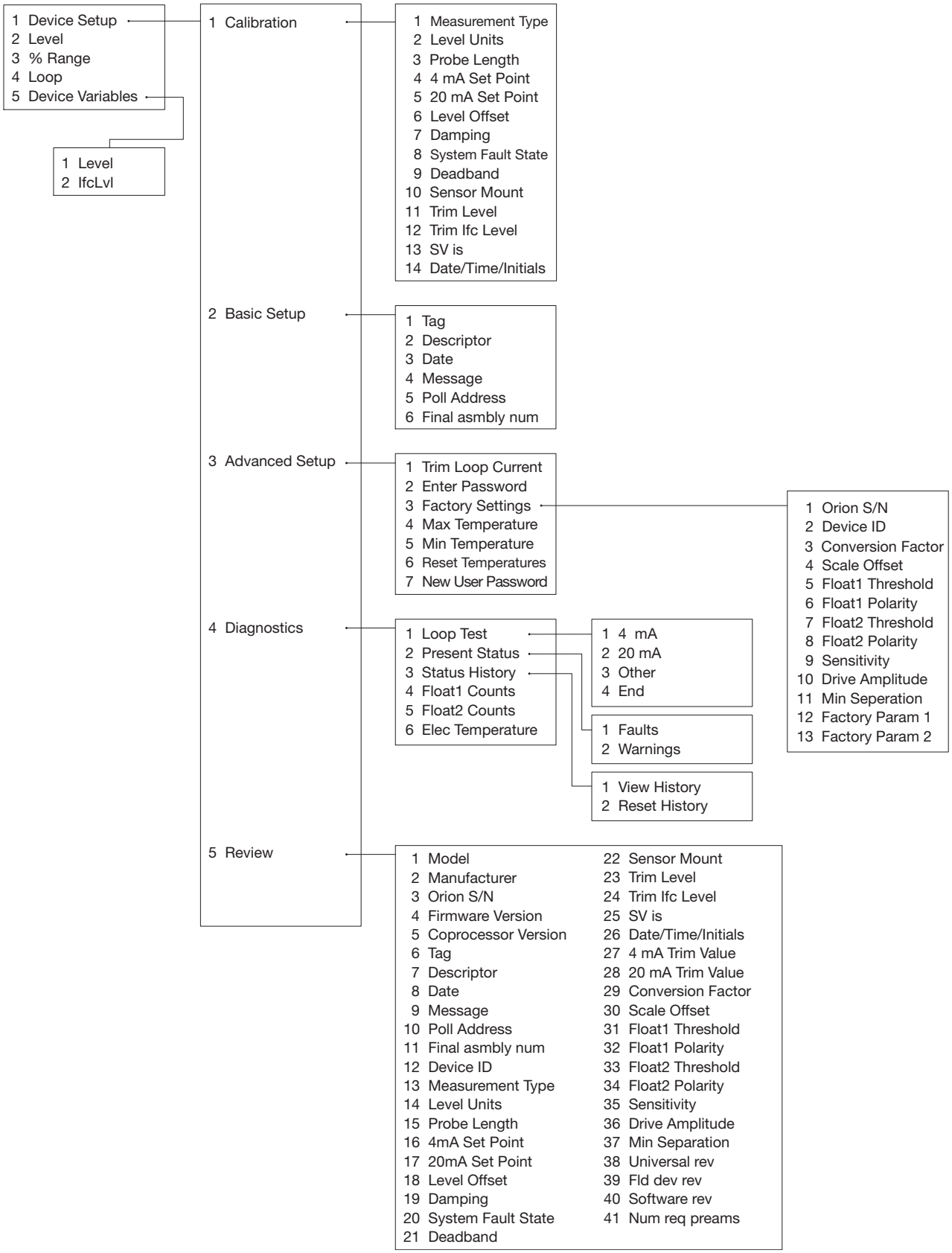
HART MENU

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 8 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

LCD	Class	HART Status	SIL1	SIL2	Description
TrimReqd	Warning	Yes	Yes	Yes	Loop DAC trim values are defaults, loop output inaccurate
Cal Reqd	Warning	Yes	Yes	Yes	Default calibration parameters in use, level reading inaccurate
Lo Temp	Warning	Yes	Yes	Yes	Present temperature in electronics compartment is below -40 °C
Hi Temp	Warning	Yes	Yes	Yes	Present temperature in electronics compartment is above +80 °C
Float 2 Fail	Fault	Yes	Yes	Yes	No level signal detected from Float 2
Float 1 Fail	Fault	Yes	Yes	Yes	No level signal detected from Float 1
No Signal	Fault	Yes	Yes	Yes	No level signal detected from any float
LoopFail	Fault	Yes	Yes	Yes	Loop current differs from the commanded value
Snsr Brd Fail	Fault	Yes	Yes	Yes	Invalid reading from the Analog Board
DfltParm	Fault	Yes	Yes	Yes	Non-volatile parameters have been defaulted


1 Device Setup
2 Level
3 % Range
4 Loop
5 Device Variables
1 Level
2 IfcLvl
1 Calibration
1 Measurement Type
2 Level Units
3 Probe Length
4 4 mA Set Point
5 20 mA Set Point
6 Level Offset
7 Damping
8 System Fault State
9 Deadband
10 Sensor Mount
11 Trim Level
12 Trim Ifc Level
13 SV is
14 Date/Time/Initials
2 Basic Setup
1 Tag
2 Descriptor
3 Date
4 Message
5 Poll Address
6 Final asmbly num
3 Advanced Setup
1 Trim Loop Current
2 Enter Password
3 Factory Settings
4 Max Temperature
5 Min Temperature
6 Reset Temperatures
7 New User Password
1 Orion S/N
2 Device ID
3 Conversion Factor
4 Scale Offset
5 Float1 Threshold
6 Float1 Polarity
7 Float2 Threshold
8 Float2 Polarity
9 Sensitivity
10 Drive Amplitude
11 Min Seperation
12 Factory Param 1
13 Factory Param 2
4 Diagnostics
1 Loop Test
2 Present Status
3 Status History
4 Float1 Counts
5 Float2 Counts
6 Elec Temperature
1 4 mA
2 20 mA
3 Other
4 End
1 Faults
2 Warnings
1 View History
2 Reset History
5 Review
1 Model
2 Manufacturer
3 Orion S/N
4 Firmware Version
5 Coprocessor Version
6 Tag
7 Descriptor
8 Date
9 Message
10 Poll Address
11 Final asmbly num
12 Device ID
13 Measurement Type
14 Level Units
15 Probe Length
16 4mA Set Point
17 20mA Set Point
18 Level Offset
19 Damping
20 System Fault State
21 Deadband
22 Sensor Mount
23 Trim Level
24 Trim Ifc Level
25 SV is
26 Date/Time/Initials
27 4 mA Trim Value
28 20 mA Trim Value
29 Conversion Factor
30 Scale Offset
31 Float1 Threshold
32 Float1 Polarity
33 Float2 Threshold
34 Float2 Polarity
35 Sensitivity
36 Drive Amplitude
37 Min Separation
38 Universal rev
39 Fld dev rev
40 Software rev
41 Num req preams

MAINTENANCE

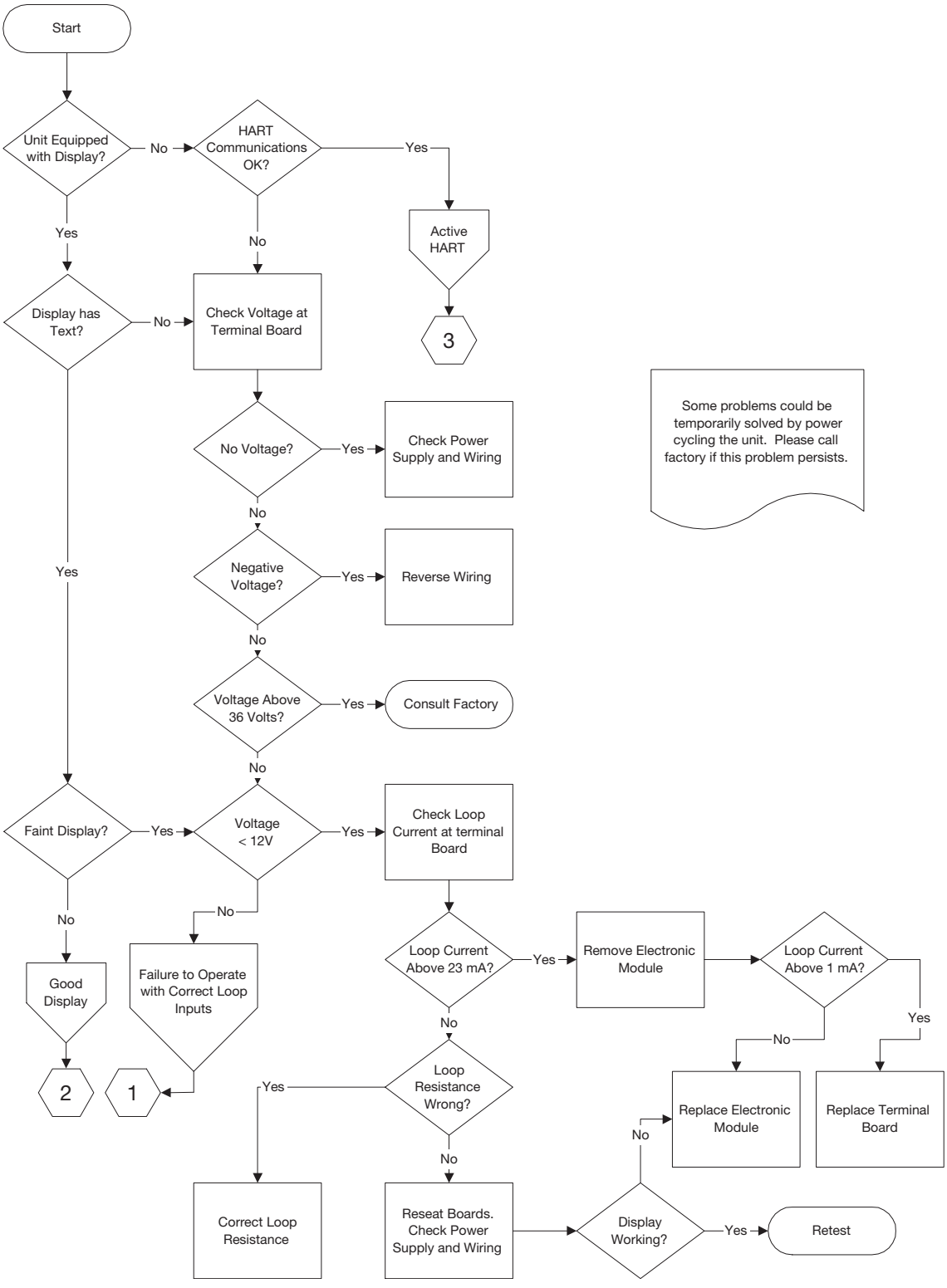
TROUBLESHOOTING

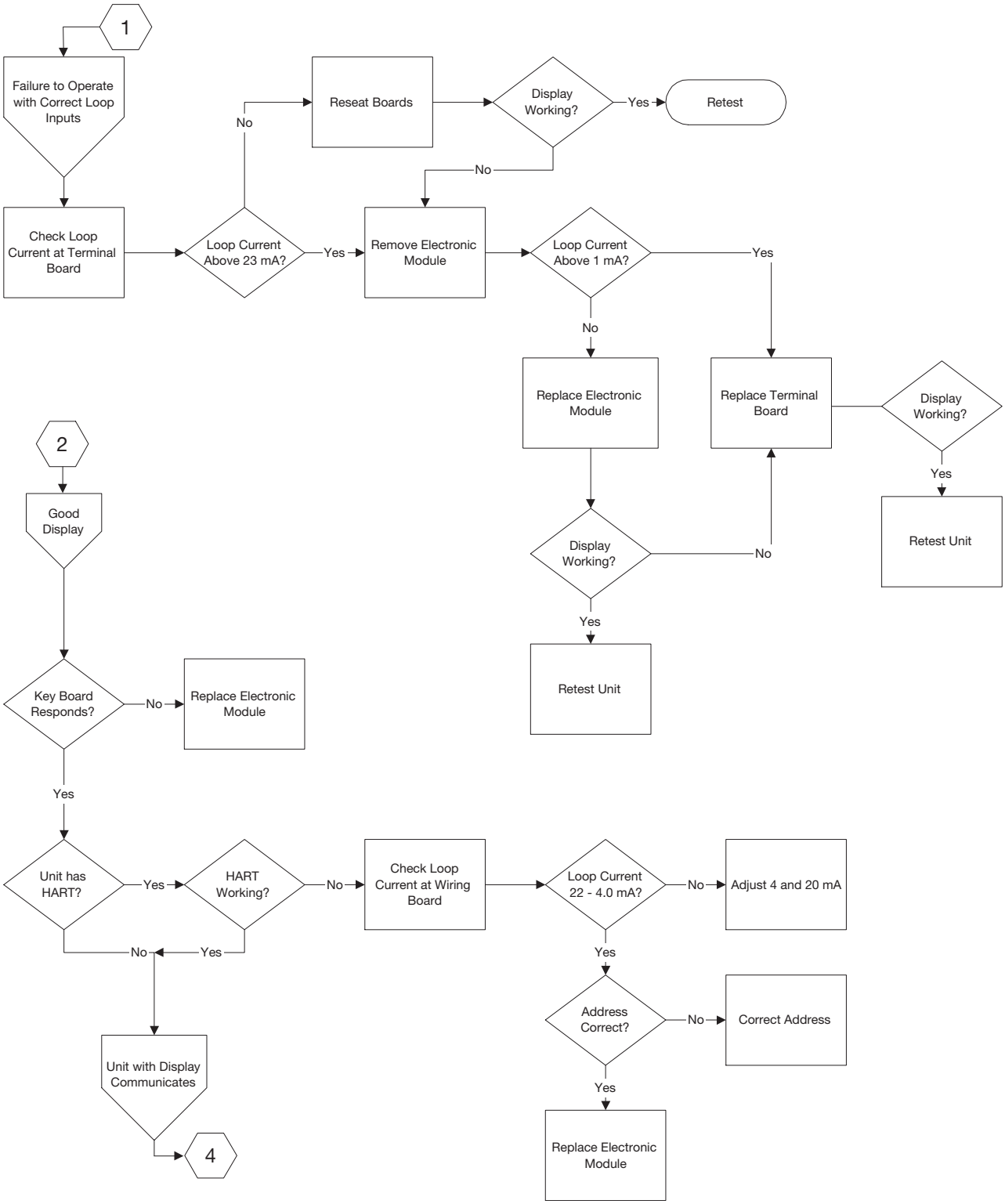
Problem		Solution
Transmitter does not track level	(External Mount)	Remove transmitter from piping column and test with re-alignment magnet. Run magnet from bottom to top of probe. Check zero and span calibration. If no change in output, consult the factory.
	(Direct Insertion)	Float stuck, Probe bent (Chamber)
Float inside the level gauge is moving slow or not at all.		Ensure that the magnetic level indicator is plumb. The process fluid being measured may be too viscous and heat tracing may be required to make the material more fluid. The specific gravity of the process fluid and float weight may need to be reverified. The liquid being measured may contain magnetic particles collecting on the magnetic section of the float causing drag. If this happens magnetic trap assemblies can be purchased from the factory. Visual inspection of the float may be required to see if the float has collapsed.
LEVEL, % OUTPUT, and LOOP values are all inaccurate.		Basic configuration data is questionable. Reconfigure probe length and offset. Ensure the level is accurate. Reconfigure loop values.
LEVEL, % OUTPUT, and LOOP values fluctuate		Turbulence, increase damping factor until readings stabilize.
Level reading on display is correct, but loop value is stuck at 4 mA		Set poll address to zero

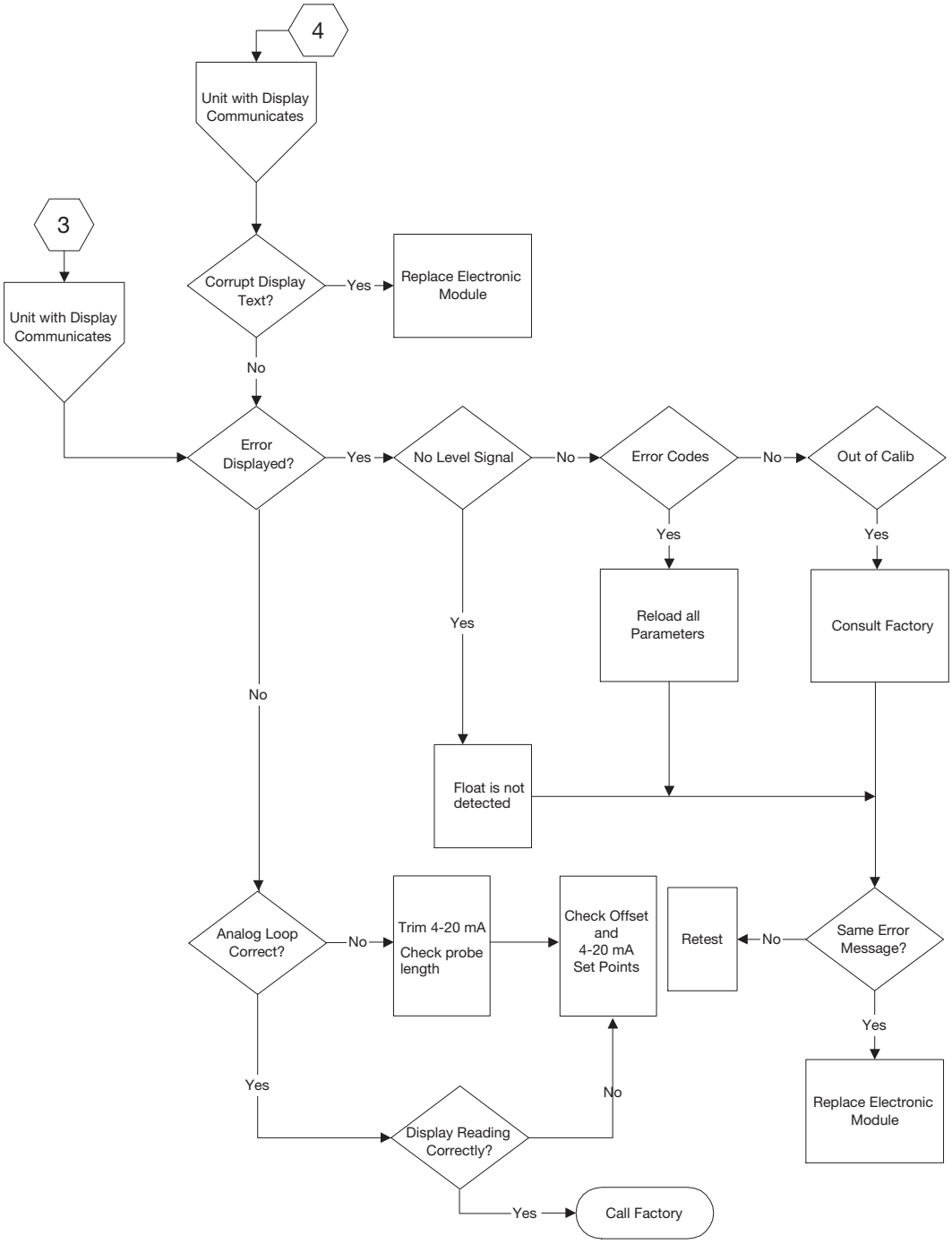
DISPLAY MALFUNCTION

Ambient temp	Symptom
< -20 °C (-5 °F)	Display may temporarily white out
> +70 °C (+160 °F)	Display may temporarily black out
-20 °C up to +70 °C (-5 °F up to +160 °F)	Display will recover without damage

TROUBLESHOOTING FLOWCHART




1
Failure to Operate with Correct Loop Inputs
Check Loop Current at Terminal Board
Loop Current Above 23 mA?
No
Yes
Reseat Boards
Display Working?
Yes
Retest
No
Remove Electronic Module
Loop Current Above 1 mA?
Yes
No
Replace Electronic Module
Display Working?
No
Yes
Retest Unit
Replace Terminal Board
Display Working?
Yes
Retest Unit
2
Good Display
Key Board Responds?
No
Replace Electronic Module
Yes
Unit has HART?
Yes
HART Working?
No
Yes
No
Unit with Display Communicates
4
Check Loop Current at Wiring Board
Loop Current 22 - 4.0 mA?
No
Adjust 4 and 20 mA
Yes
Address Correct?
No
Correct Address
Yes
Replace Electronic Module


4
Unit with Display Communicates
3
Unit with Display Communicates
Corrupt Display Text?
Yes
Replace Electronic Module
No
Error Displayed?
Yes
No Level Signal
No
Error Codes
No
Out of Calib
Yes
Yes
Yes
Reload all Parameters
Consult Factory
Yes
No
Float is not detected
Analog Loop Correct?
No
Trim 4-20 mA
Check probe length
Check Offset and 4-20 mA Set Points
Retest
No
Same Error Message?
Yes
Yes
No
Display Reading Correctly?
Replace Electronic Module
Yes
Call Factory

STATUS/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.
NoSignal	No level signal being detected.	Make sure float is not damaged and within measuring range.
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
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
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
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.
DfltParm	Internal non-volatile parameters have been defaulted	Consult factory
Float 2 Fail	No level signal detected from float 2	Make sure 2 floats are being used, are not damaged, and within measuring range
Float 1 Fail	No level signal detected from float 1	Make sure float is not damaged, and within measuring range
Snsr Brd	Measurement board not responding	Consult factory

PACTware™ PC Program

The JUPITER® 200 series offer the ability to do Trending and Waveform 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.

Free of charge order code: **090-0059-200** (included in each order).

SAFETY INTEGRITY LEVELS 1 & 2

Jupiter® is the only magnetostrictive transmitter to achieve SIL 2 classification as 1oo1 device per IEC 61508. The below table offers the possibility to compare on a one-to-one basis, the SIL performance of Jupiter with other level transmitters.

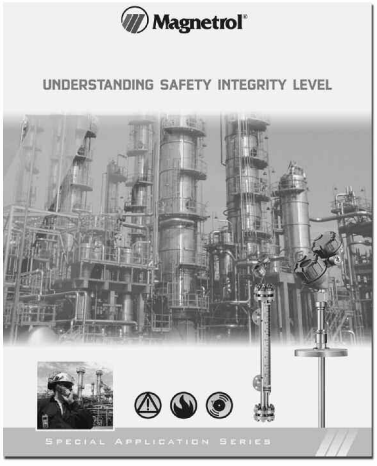
1oo1: One-out-of-one device means the suggested SIL class by the manufacturer is achieved by a single transmitter. The use of 2 transmitters to achieve a higher SIL classification is often stated as 1oo2 (one out of two) devices.

SFF: Safe Failure Fraction is the ratio between detected (safe and dangerous) and undetected (safe) instrument failures versus total failures by the instrument. The % of this ratio is preferably as high as possible.

PFDavg: Average probability of failure on demand. This value is preferably as low as possible.

For more complete information, ask for the Jupiter FMEDA report by Exida.

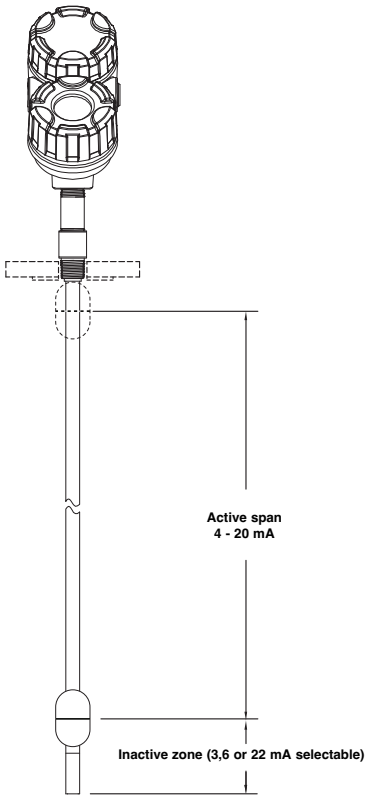
	Standard electronics		**SIL enhanced electronics**	
SIL	1 as 1oo1		2 as 1oo1	
Intrument Type	B		B	
SFF	83,7 %		90,7 %	
PFDavg	9,60E-04		5,45E-04	
	FITS	**Annual**	**FITS**	**Annual**
Fail Dangerous Undetected	218	1,91E-03	123	1,08E-03
Fail Dangerous Detected	698	6,11E-03	793	6,95E-03
Safe	421	3,69E-03	413	3,62E-03



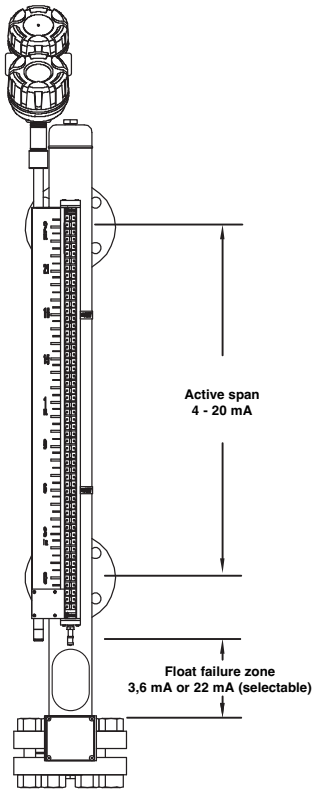
Ask for our SIL manual 41-299

FLOAT FAILURE IDENTIFICATION

The Jupiter® 200 with SIL enhanced electronics is either using a probe with inactive zone or an extended MLI cage to identify a sinking or collapsed float as a float failure. Jupiter® 200 with SIL enhanced electronics are equipped with one float for measuring either the top level or the interface level.

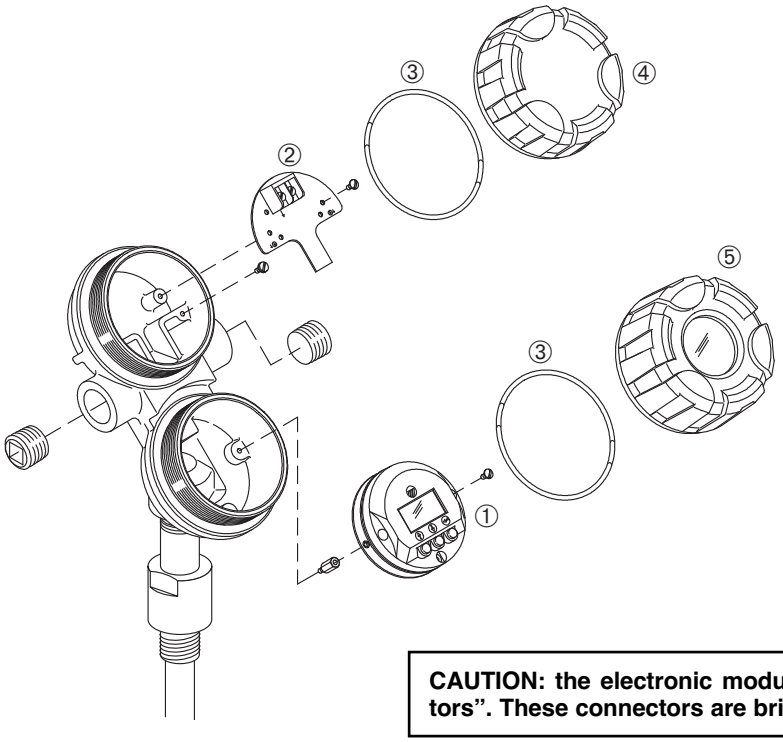


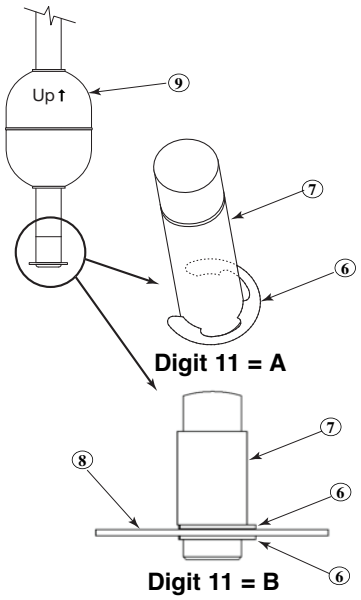
Direct insertion



External mount

REPLACEMENT PARTS





CAUTION: the electronic module connects to the guide tube via 3 connectors". These connectors are brittle and require to be handled very careful.

Partn°:

Digit in partn°:

X	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

X = product with a specific customer requirement

Serial n°:

See nameplate, always provide complete partn° and serial n° when ordering spares.

EXPEDITE SHIP PLAN (ESP)

Several parts are available for quick shipment, within max. 1 week after factory receipt of purchase order, through the Expedite Ship Plan (ESP).
Parts covered by ESP service are conveniently grey coded in the selection tables.

(1) Electronic module	
Digit 2	**Replacement part**
4, 6 or 7	031-2839-001
5 or 8	031-2840-001

(2) Wiring PC board	
Digit 2	**Replacement part**
4, 6 or 7	Z30-9151-001
5 or 8	Z30-9151-004

(3) "O"-ring
Replacement part
012-2201-237

(4) Housing cover	
Digit 3	**Replacement part**
1 or 2	004-9225-002
3 or 4	004-9225-003

(5) Housing cover		
Digit 3	**Digit 4**	**Replacement part**
1 or 2	1, 3, E, K or M	036-4413-001
	A, J or L	036-4410-003
3 or 4	all	036-4413-012

(6) Snap ring		
Digit 5	**Digit 8**	**Replacement part**
D	1 or A	010-5140-001 (*)
	2 or B	010-5140-015 (*)
	3 or C	010-5140-016 (*)

(*) if digit 11 = B then ordering quantity: 2

(7) Float spacer			
Digit 5	**Digit 8**	**Digit 9**	**Replacement part**
D	1 or A	A, B, C, M, N or P	004-7644-001
	2 or B		004-7644-002
	3 or C		004-7644-003
	all	1, 2, 3, 4, 5, 6 or 9	consult factory

(8) Centering disc		
Digit 5	**Digit 11**	**Replacement part**
D	A	not applicable
	B	consult factory

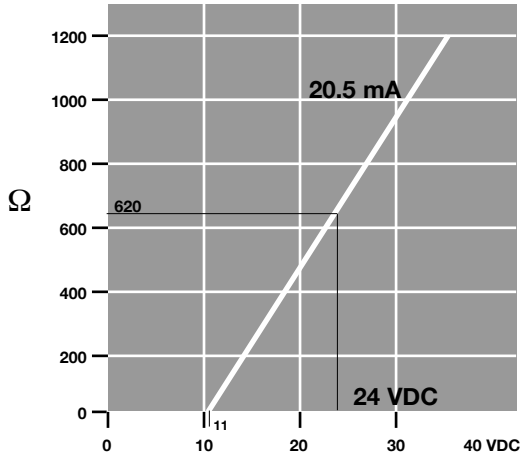
(9) Float	
Digit 5	**Replacement part**
D	consult factory

TRANSMITTER SPECIFICATIONS

FUNCTIONAL/PHYSICAL

Description		*Specification*
Power (at terminals)	HART®	ATEX & IEC flameproof enclosure: 12 to 32 V DC ATEX & IEC intrinsically safe: 12 to 28,4 V DC
	Foundation Fieldbus™	ATEX & IEC flameproof enclosure: 9 to 32 V DC ATEX & IEC FISCO: 9 to 17,5 V DC
Power consumption		0,7 W
Output		4-20 mA with HART®, 3,8 mA to 20,5 mA useable (meets NAMUR NE 43) or Foundation Fieldbus™ H1
Resolution		Analog: 0,01 mA Display: 0,1 units
Loop Resistance (see table below)		620 Ω @ 20,5 mA - 24 V DC
Damping		Adjustable 0-25 s
Diagnostic Alarm		Selectable 3,6 mA, 22 mA or HOLD last output
User Interface		HART® communicator, AMS® or PACT*ware*™, Foundation Fieldbus™ and/or 3-button keypad
Display		2-line x 8-character LCD. Displays level (cm/inches), mA and % of level.
Menu Language		English/Spanish (Foundation Fieldbus™: English)
Housing Material		IP 66/Aluminium A356T6 (< 0.20 % copper) or stainless steel
Approvals		ATEX II 1 G Ex ia IIC T4 Ga, intrinsically safe ATEX II 1 G Ex ia IIC T4 Ga, FISCO - intrinsically safe① ATEX II 1/2 G Ex d IIC T6 Ga/Gb, flameproof enclosure IEC Ex ia IIC T4 Ga, intrinsically safe IEC Ex ia IIC T4 Ga, FISCO - intrinsically safe① IEC Ex d IIC T6, flameproof enclosure LRS - Lloyds Register of Shipping (marine applications) Other approvals are available, consult factory for more details
SIL② (Safety Integrity Level)	Standard electronics	Functional safety to SIL 1 as 1oo1 / SIL 2 as 1oo2 in accordance to IEC 61508 – SFF of 83,7 % – full FMEDA reports and declaration sheets available at request
	Enhanced electronics	Functional safety to SIL 2 as 1oo1 in accordance to IEC 61508 – SFF of 90,7 % – full FMEDA reports and declaration sheets available at request
Electrical Data		Ui = 28,4 V, Ii = 120 mA, Pi = 0,84 W (HART®) Ui = 17,5 V, Ii = 380 mA, Pi = 5,32 W (Foundation Fieldbus™)
Equivalent Data		Ci = 2,2 nF, Li = 3 μH (HART®) Ci = 3 nF, Li = 3 μH (Foundation Fieldbus™)
Environmental protection		EN 60654-1
Drop protection		EN 50178
Surging protection		EN 61326 (1000V)
Net weight	Cast aluminium	2,7 kg (6.0 lbs) – transmitter head / electronics only
	Stainless steel	5,7 kg (12.6 lbs) – transmitter head / electronics only
Foundation Fieldbus™	ITK Version	4.61
	H1 Device Class	Link Master (LAS) – selectable ON/OFF
	Function Blocks	1 x RB(s), 2 x AI (s) and 1 x TB (c)
	Execution time	15 ms
	Quiescent current draw	15 mA
	DD/CFF files	Available at www.fieldbus.org

POWER CONSUMPTION



TRANSMITTER SPECIFICATIONS

PERFORMANCE

Description	*Specification*
Accuracy	± 0,4 mm (0.015")
Repeatability	± 0,005 % of full span or 0,13 mm (0.005") – whichever is greater
Linearity	± 0,020 % of full span or 0,79 mm (0.031") – whichever is greater
Max fill / drain rate	15 cm/second (6"/second)
Response Time	< 0,1 second
Warm-up Time	< 5 seconds
Ambient Temp.	-40 °C to +70 °C (-40 °F to +160 °F) Display: -20 °C to +70 °C (-5 °F to +160 °F)
Humidity	0-99 %, non-condensing
Electromagnetic Compatibility	Meets CE requirements (EN 61326: 1997 + A1 + A2)

PROBE SPECIFICATIONS

Description		*Specification*
Materials	Probe	316/316L (1.4401/1.4404) standard, mechanically polished or electropolished surface finish Hastelloy C® (2.4819) or Monel® (2.4360)
	Float	316/316L (1.4401/1.4404), Titanium or Hastelloy C® (2.4819)
	Process seal	None, welded construction
Probe diameter		16 mm (0.63")
Probe length		Min 30 cm (12") – max 570 cm (224")
Dead band①	Upper	Direct insertion model: 50 mm (2"). External mount model: depending configuration.
	Bottom	76 mm (3") – for units with standard electronics and single float 152 mm (6") – for units with standard electronics and dual floats
Inactive zone - bottom		127 mm (5") – for units with SIL enhanced electronics
Process temperature	Direct insertion	-40 °C to +95 °C (-40 °F to +200 °F) – standard probe -40 °C to +260 °C (-40 °F to +500 °F) – high temperature probe
	External mount	-40 °C to +120 °C (-40 °F to +250 °F) – standard -40 °C to +260 °C (-40 °F to +500 °F) – high temperature without factory insulated MLI -196 °C to +450 °C (-320 °F to +850 °F) – high temperature with factory insulated MLI
Max. process pressure (direct insertion)		117 bar @ +40 °C (1700 psi @ +100 °F), limited to the pressure rating of the selected float and process connection
Vacuum service		Full vacuum

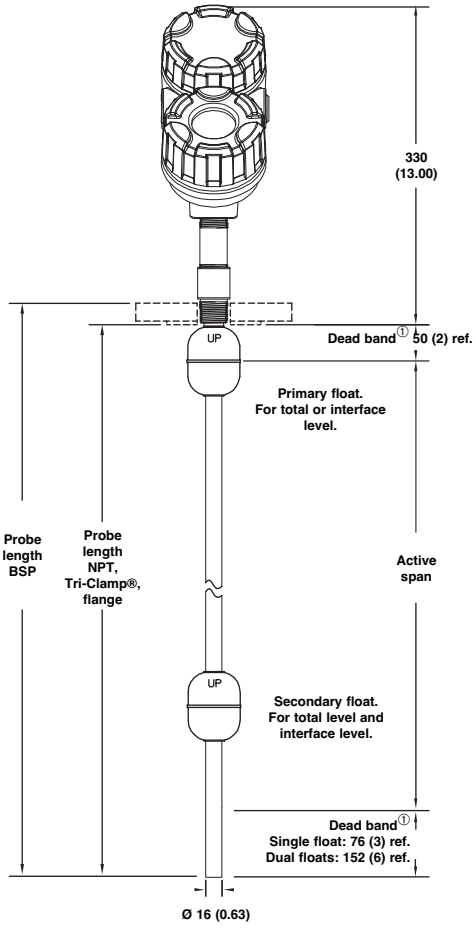
① Values are float dependent and for reference only.

MODEL IDENTIFICATION

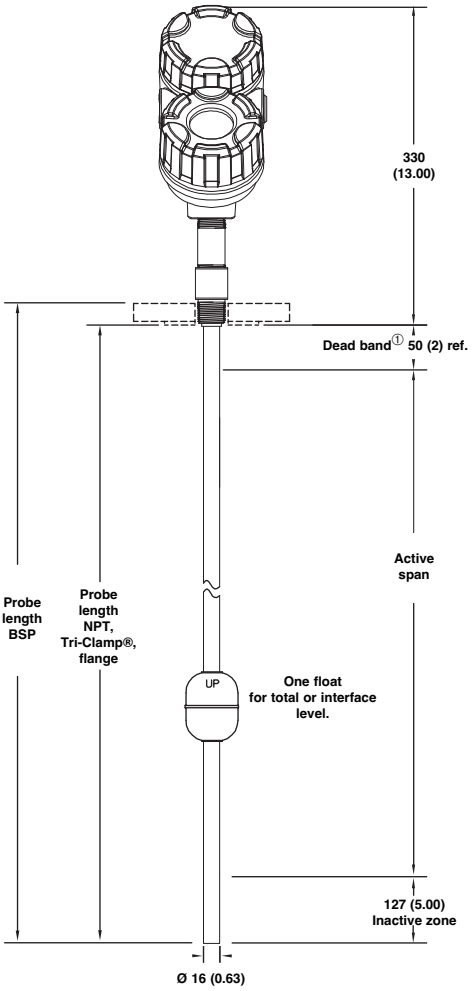
A complete measuring system consists of:

1. Jupiter® 200: transmitter and probe (MLI or cages as shown in this bulletin are not included).
2. OPTION: ATLAS®. Magnetic level indicator for use with Jupiter 200, external mount model. Consult bulletin BE 46-138.
3. Free of charge: Jupiter® 200 DTM (PACT*ware*™) can be downloaded from www.magnetrol.com.
4. OPTION: MACTek Viator USB HART® interface: order code: **070-3004-002**

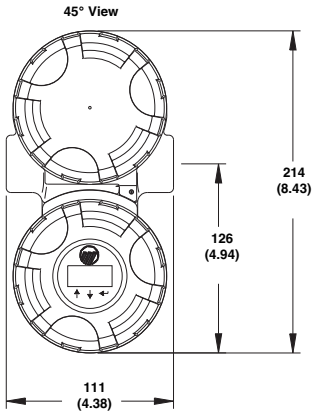
DIMENSIONS in mm (inches)



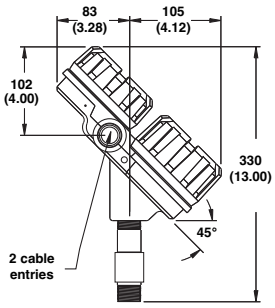
Standard electronics



SIL enhanced electronics



**Jupiter Housing,
(45° View)**



Jupiter Housing

① Values are float dependent and for reference only.

MODEL IDENTIFICATION

1 Code for direct insertion Jupiter® 200

BASIC MODEL NUMBER

2 4	Magnetostrictive transmitter with standard HART® electronics	for total level or interface
2 5	Magnetostrictive transmitter with Foundation Fieldbus electronics	for total level or interface
2 6	Magnetostrictive transmitter with SIL enhanced HART® electronics	for total level or interface
2 7	Magnetostrictive transmitter with standard HART® electronics	for total level and interface①
2 8	Magnetostrictive transmitter with Foundation Fieldbus electronics	for total level and interface①

① Total level and interface measurement requires 2 floats.

HOUSING MATERIAL / MOUNTING / CABLE ENTRY

1	Cast aluminium, integral mount with 3/4" NPT cable entry
2	Cast aluminium, integral mount with M20 x 1,5 cable entry
3	316 SST, integral mount with 3/4" NPT cable entry
4	316 SST, integral mount with M20 x 1,5 cable entry

APPROVAL

1	FM/CSA, intrinsically safe, non-incendive
3	FM/CSA, explosion proof
A	ATEX flameproof enclosure
E	ATEX intrinsically safe (digit 2 = 4, 6 or 7) / ATEX FISCO (digit 2 = 5 or 8)
J	IEC flameproof enclosure
K	IEC intrinsically safe (digit 2 = 4, 6 or 7) / ATEX FISCO (digit 2 = 5 or 8)
L	INMETRO flameproof enclosure
M	INMETRO intrinsically safe (digit 2 = 4, 6 or 7) / ATEX FISCO (digit 2 = 5 or 8)

CONFIGURATION

D	Direct insertion

MOUNTING CONNECTION

Float to be mounted from the inside of the tank for small process connections.

Refer to sizing chart for chambers and stilling wells on the next page.

Threaded

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

Tri-Clamp® ①

5 P	3"	Tri-Clamp®
6 P	4"	Tri-Clamp®

① Only in combination with material code D or E.

ANSI flanges

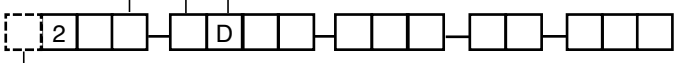
2 3	1"	150 lbs	ANSI RF
2 4	1"	300 lbs	ANSI RF
2 5	1"	600 lbs	ANSI RF
2 7	1"	900/1500 lbs	ANSI RF
3 3	1 1/2"	150 lbs	ANSI RF
3 4	1 1/2"	300 lbs	ANSI RF
3 5	1 1/2"	600 lbs	ANSI RF
3 7	1 1/2"	900/1500 lbs	ANSI RF
4 3	2"	150 lbs	ANSI RF
4 4	2"	300 lbs	ANSI RF
4 5	2"	600 lbs	ANSI RF
4 7	2"	900/1500 lbs	ANSI RF

5 3	3"	150 lbs	ANSI RF
5 4	3"	300 lbs	ANSI RF
5 5	3"	600 lbs	ANSI RF
5 6	3"	900 lbs	ANSI RF
6 3	4"	150 lbs	ANSI RF
6 4	4"	300 lbs	ANSI RF
6 5	4"	600 lbs	ANSI RF
6 6	4"	900 lbs	ANSI RF

EN (DIN) flanges

E A	DN80	PN16	EN 1092-1 Type A
E B	DN80	PN25/40	EN 1092-1 Type A
F A	DN100	PN16	EN 1092-1 Type A
F B	DN100	PN25/40	EN 1092-1 Type A

SEE NEXT PAGE



complete code for JUPITER® 200: direct insertion model

X = product with a specific customer requirement

MODEL IDENTIFICATION

MATERIAL OF CONSTRUCTION

Max Process Temp: +95 °C (+200 °F)

1	316/316L (1.4401/1.4404) SST (standard)
2	Hastelloy® C (2.4819)
3	Monel® (2.4360)

Max Process Temp: +260 °C (+500 °F)

A	316/316L (1.4401/1.4404) SST (standard)
B	Hastelloy® C (2.4819)
C	Monel® (2.4360)
D	Hygienic 316/316L (1.4401/1.4404) SST 0,5 µm Ra (20 Ra) mechanically polished surface finish①
E	Hygienic 316/316L (1.4401/1.4404) SST 0,4 µm Ra (15 Ra) electropolished surface finish①

① Only in combination with hygienic service float and corresponding Ra value.

DIRECT INSERTION FLOAT(S)

See next page for standard floats.
Consult factory regarding floats not listed for your application(s).

INSTALLATION CONSIDERATIONS

A	Transmitter to be mounted in vessel **without** stilling well
B	Transmitter to be mounted in chamber, bridle, or stilling well

UNIT OF MEASUREMENT

M	Insertion length in cm

PROBE LENGTH – Specify per cm (0.39") increment
See page 5 for probe length versus active span

0 3 0	min 30 cm (12")
5 7 0	max 570 cm (224")

2 [ ][ ] D [ ][ ][ ][ ][ ][ ] M [ ][ ][ ]

complete code for JUPITER® 200: direct insertion model

X = product with a specific customer requirement

SIZING CHART FOR CHAMBERS & STILLING WELLS

Reference the chart below to identify an appropriate chamber or stilling well size for your application. Adequate clearance is recommended to ensure proper operation.

Float Diameter mm (inches)	Probe lengths ≤ 366 cm (144")						Probe lengths > 366 cm (144")	
	3" sch. 5/10	3" sch. 40	4" sch. 5/10	4" sch. 40	4" sch. 80	4" sch. 160	4" sch. 10	4" sch. 40
47 (1.85)	•	•	•	•	•	•	•	•
51 (2.0)	•		•	•	•	•	•	•
57 (2.25)			•	•	•		•	
64 (2.5)			•	•				
76 (3.0)								

DIRECT INSERTION FLOATS

The floats listed below are suitable for most applications. Select the appropriate 2-digit float code and place it in the Jupiter® model number (location 9 & 10). Consult factory for custom floats or to consult about your specific application.

Direct insertion total level float (uppermost liquid layer)

Minimum liquid specific gravity	316/316L SST	Titanium	Hastelloy® C	Hygienic service 316/316L SST 0,5 µm Ra (20 Ra)	Hygienic service 316/316L SST 0,4 µm Ra (15 Ra)
≥ 0,86	**AA** Ø 51 mm (2.0")	**BA** Ø 51 mm (2.0")	**CA** Ø 47 mm (1.85")	**DA** Ø 51 mm (2.0")	**FA** Ø 51 mm (2.0")
≥ 0,83	**AA** Ø 51 mm (2.0")	**BA** Ø 51 mm (2.0")	**CB** Ø 57 mm (2.25")	**DA** Ø 51 mm (2.0")	**FA** Ø 51 mm (2.0")
≥ 0,7	**AB** Ø 58 mm (2.3")	**BA** Ø 51 mm (2.0")	**CB** Ø 57 mm (2.25")	**DB** Ø 58 mm (2.3")	**FB** Ø 58 mm (2.3")
≥ 0,68	**AB** Ø 58 mm (2.3")	**BB** Ø 57 mm (2.25")	**99** consult factory	**DB** Ø 58 mm (2.3")	**FB** Ø 58 mm (2.3")
≥ 0,64	**AC** Ø 64 mm (2.5")	**BB** Ø 57 mm (2.25")	**99** consult factory	**DC** Ø 64 mm (2.5")	**FC** Ø 64 mm (2.5")
≥ 0,52	**99** consult factory	**BB** Ø 57 mm (2.25")	**99** consult factory	**99** consult factory	**99** consult factory
< 0,52	**99** consult factory	**99** consult factory	**99** consult factory	**99** consult factory	**99** consult factory

Direct insertion interface level float (lower or middle liquid layer) ①

Minimum liquid specific gravity upper / lower	316/316L SST	Titanium	Hastelloy® C	Hygienic service 316/316L SST 0,5 µm Ra (20 Ra)	Hygienic service 316/316L SST 0,4 µm Ra (15 Ra)
sinks through / floats on **≤ 0,89 / ≥ 1,00**	**MA** Ø 51 mm (2.0")	**NA** Ø 51 mm (2.0")	**PA** Ø 47 mm (1.85")	**QA** Ø 51 mm (2.0")	**RA** Ø 51 mm (2.0")
sinks through / floats on **≤ 1,00 / ≥ 1,12**	**MB** Ø 51 mm (2.0")	**NB** Ø 51 mm (2.0")	**PB** Ø 47 mm (1.85")	**QB** Ø 51 mm (2.0")	**RB** Ø 51 mm (2.0")

① Consult factory for other S.G. values.

PRESSURE/TEMPERATURE RATINGS FOR STANDARD FLOATS

Temp °C (°F)	Pressure rating (includes 1,5 x safety factor) bar (psi)				
	AA, AB, AC, MA, MB, DA, DB, DC, QA, QB, FA, FB, FC, RA, RB	**BA, NA, NB**	**BB**	**CA, PA, PB**	**CB**
20 (70)	30,3 (440)	51,7 (750)	27,6 (400)	23,4 (340)	22,1 (320)
40 (100)	27,8 (403)	49,6 (719)	26,4 (383)	22,7 (329)	21,4 (310)
95 (200)	26,3 (381)	45,2 (656)	24,1 (350)	22,0 (318)	20,6 (299)
120 (250)	25,3 (367)	39,9 (578)	21,2 (308)	21,4 (310)	20,1 (292)
150 (300)	24,3 (352)	34,5 (500)	18,4 (267)	20,9 (303)	19,7 (285)
175 (350)	23,2 (337)	30,7 (445)	16,4 (238)	20,1 (292)	19,0 (275)
200 (400)	22,3 (323)	27,0 (391)	14,3 (208)	19,4 (281)	18,2 (264)
230 (450)	21,7 (315)	24,3 (352)	13,0 (188)	18,8 (273)	17,7 (257)
260 (500)	21,2 (308)	21,6 (313)	11,5 (167)	18,3 (266)	17,2 (250)

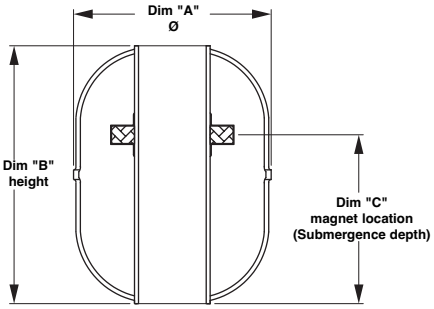
Two floats for total level and interface measurement

Code	Total	Interface
11	AA	MA
12	AB	
13	AC	
21	AA	MB
22	AB	
23	AC	
31	BA	NA

Code	Total	Interface
32	BB	NA
41	BA	NB
42	BB	
51	CA	PA
52	CB	
61	CA	PB
62	CB	

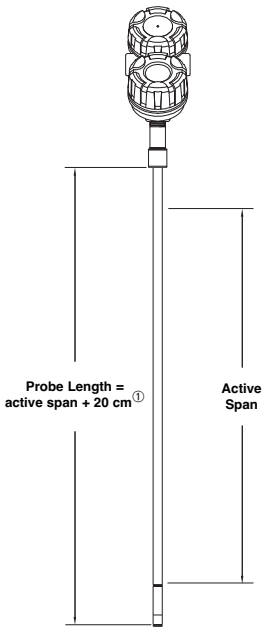
when utilizing two floats to measure total and interface liquid levels, reference the chart on the left to determine the appropriate float code to insert into the Jupiter® model number.

PHYSICAL DIMENSIONS

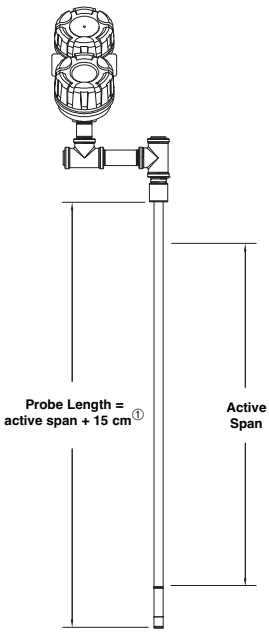


Float Code	Dim. A mm (inch)	Dim. B mm (inch)	Dim. C mm (inch)
AA, DA, FA	51 (2.0)	69 (2.7)	47 (1.84)
AB, DB, FB	58 (2.3)	76 (3.0)	51 (2.0)
AC, DC, FC	64 (2.5)	76 (3.0)	54 (2.14)
BA	51 (2.0)	71 (2.8)	50 (1.98)
BB	57 (2.25)	76 (3.0)	53 (2.08)
CA	47 (1.85)	76 (3.0)	52 (2.06)
CB	57 (2.25)	109 (4.3)	76 (3.01)
MA, QA, RA	51 (2.0)	69 (2.7)	34 (1.35)
MB, QB, RB	51 (2.0)	69 (2.7)	34 (1.35)
NA	51 (2.0)	71 (2.8)	36 (1.4)
NB	51 (2.0)	71 (2.8)	36 (1.4)
PA	47 (1.85)	76 (3.0)	38 (1.5)
PB	47 (1.85)	76 (3.0)	38 (1.5)

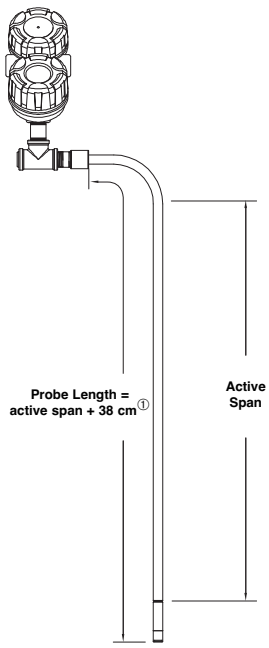
DIMENSIONS in mm (inches)



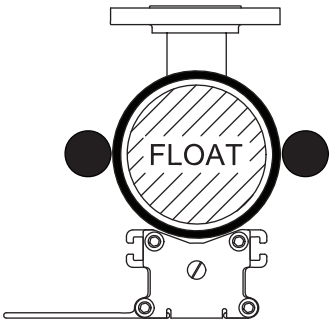
External mount
Top mount



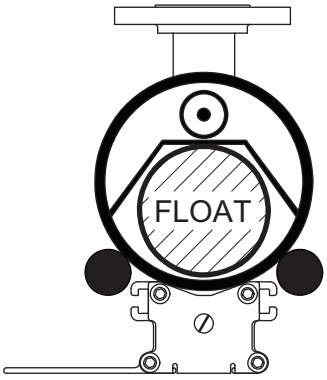
External mount
Top mount with offset



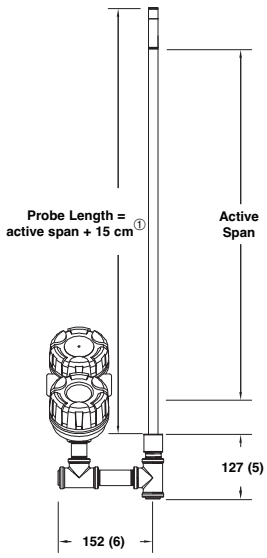
External mount
Top mount - high temp.



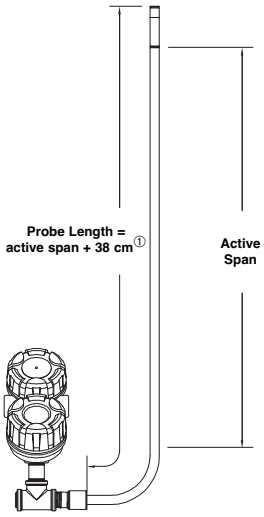
Probe mounting positions on
Atlas™, Stratus™ and Gemini™



Probe mounting positions on
Aurora®



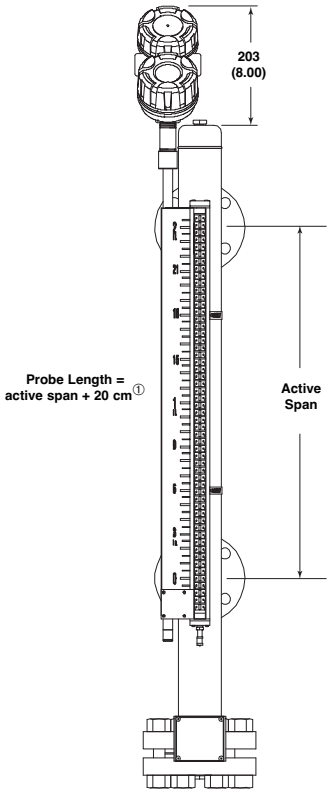
External mount
Bottom mount with offset



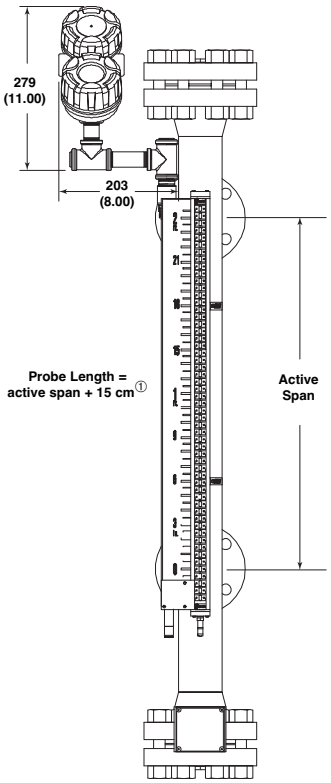
External mount
Bottom mount - high temp.

① Add additional 5 cm for SIL enhanced electronics

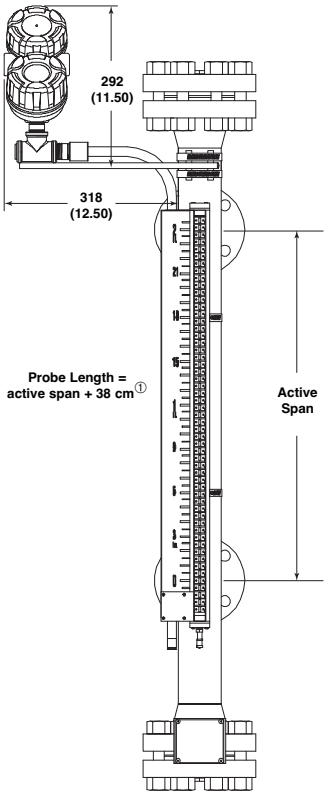
DIMENSIONS in mm (inches)



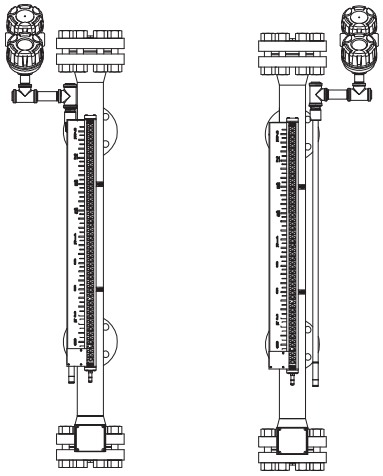
Top mount



Top mount offset

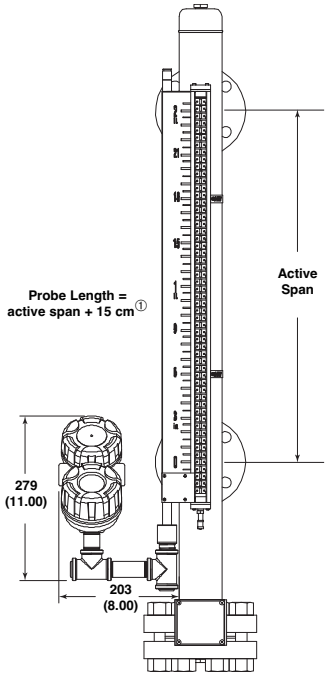


Top mount offset
High temperature bend

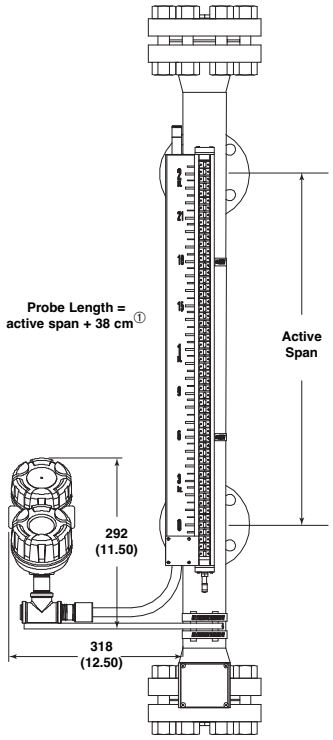


Left side mount (standard)

Right side mount



Bottom mount offset



Bottom mount offset
High temperature bend

Note: When specifying the mounting location, be aware of other accessories that may also mount on the magnetic level indicator (i.e. switches, heat tracing, etc). **Choose left side mount whenever possible.**

① Add additional 5 cm for SIL enhanced electronics

MODEL IDENTIFICATION

1 Code for external mount Jupiter® 200

BASIC MODEL NUMBER

2 4	Magnetostrictive transmitter with standard HART® electronics	for total level or interface
2 5	Magnetostrictive transmitter with Foundation Fieldbus electronics	for total level or interface
2 6	Magnetostrictive transmitter with SIL enhanced HART® electronics	for total level or interface
2 7	Magnetostrictive transmitter with standard HART® electronics	for total level and interface①
2 8	Magnetostrictive transmitter with Foundation Fieldbus electronics	for total level and interface①

① Total level and interface measurement requires 2 floats, consult factory for magnetic level indicator (MLI)

HOUSING MATERIAL / MOUNTING / CABLE ENTRY

1	Cast aluminium, integral mount with 3/4" NPT cable entry
2	Cast aluminium, integral mount with M20 x 1,5 cable entry
3	316 SST, integral mount with 3/4" NPT cable entry
4	316 SST, integral mount with M20 x 1,5 cable entry

APPROVAL

1	FM/CSA, intrinsically safe, non-incendive
3	FM/CSA, explosion proof
A	ATEX flameproof enclosure
E	ATEX intrinsically safe (digit 2 = 4, 6 or 7) / ATEX FISCO (digit 2 = 5 or 8)
J	IEC flameproof enclosure
K	IEC intrinsically safe (digit 2 = 4, 6 or 7) / ATEX FISCO (digit 2 = 5 or 8)
L	INMETRO flameproof enclosure
M	INMETRO intrinsically safe (digit 2 = 4, 6 or 7) / ATEX FISCO (digit 2 = 5 or 8)

CONFIGURATION

E	Top mount, probe material code 1 only
F	Top mount offset, probe material code 1 only
G	Top mount offset, high temperature, probe material code A only
H	Bottom mount offset, probe material code 1 only
J	Bottom mount offset, high temperature, probe material code A only

MOUNTING LOCATION

0 0	External mount on MLI or chamber, left side (standard)
0 1	External mount on MLI or chamber, right side

PROBE MATERIAL OF CONSTRUCTION

1 0 0	316/316L (1.1401/1.4404) stainless steel (standard), +120 °C (+250 °F) maximum
A 0 0	316/316L (1.1401/1.4404) stainless steel (high temp), +260 °C (+500 °F) maximum; +450 °C (+850 °F) with factory-installed fiberglass insulation

CHAMBER MOUNTING CODE

Without high-temp chamber insulation		**With** high-temp chamber insulation	
1	MLI with a 2" ANSI chamber	E	MLI with a 2" ANSI chamber
2	MLI with a 2½" ANSI chamber	F	MLI with a 2½" ANSI chamber
3	MLI with a 3" ANSI chamber	G	MLI with a 3" ANSI chamber
4	MLI with a 4" ANSI chamber	H	MLI with a 4" ANSI chamber
5	MLI is a top mount design	J	MLI is a top mount design
0	None (if clamps already exist)	0	None (if clamps already exist)

UNIT OF MEASUREMENT

M	Probe length in cm

PROBE LENGTH – Specify per cm (0.39") increment
See pages 9 & 10 for probe length versus active span

0 3 0	min 30 cm (12")
5 7 0	max 570 cm (224")

	2					0			0	0		M				

complete code for external mount JUPITER® 200

X = product with a specific customer requirement

JUPITER 200 Magnetostrictive 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 & S.G.					
Tag #					
Serial #					
Probe Serial #				Working Value	Non-Working Value
Level	«Level»				
Interface (optional)	«IfcLvl»				
Sensor Mount	«SnrMount»				
Measurement Type	«MeasType»				
Level Units	«Units»				
Probe Length	«Probe Ln»				
Level Offset	«Lvl Ofst»				
Sensitivity	«Senstvty»				
Loop Control	«LoopCtrl»				
4mA point	«Set 4mA»				
20mA point	«Set 20mA»				
Damping	«Damping»				
Fault Choice	«Fault»				
Threshold	«Treshld»				
HART Poll Address	«Poll Adr»				
Level Trim	«Trim Lvl»				
Trim 4 mA	«Trim 4»				
Trim 20 mA	«Trim 20»				
Deadband	«DeadBand»				
Trim 20 mA	«Trim 20»				
Float 1 Threshold	«F1 Tresh»				
Float 1 Polarity	«F1 Polar»				
Float 2 Threshold	«F2 Tresh»				
Float 2 Polarity	«F2 Polar»				
Drive Amplitude	«Drv Ampl»				
Minimum Separation	«Min Sep»				
# of Counts	«F1 Cnts»				
	«F2 Cnts»				
Conversion Factor	«Conv Fct»				
Electronics temperature	«ElecTemp»				
Max temperature	«Max Temp»				
Min temperature	«Min Temp»				
Software Version					
New Password					
Name					
Date					
Time					

Notes

IMPORTANT

SERVICE POLICY

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

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

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

RETURNED MATERIAL PROCEDURE

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

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

Any unit that was used in a process must be properly cleaned in accordance with the proper health and safety standards applicable by the owner, before it is returned to the factory.
A material Safety Data Sheet (MSDS) must be attached at the outside of the transport crate or box.
All shipments returned to the factory must be by prepaid transportation. Magnetrol ***will not accept*** collect shipments.
All replacements will be shipped Ex Works.

BULLETIN N°: BE 46-648.2
EFFECTIVE: AUGUST 2015
SUPERSEDES: april 2012

Magnetrol®

www.magnetrol.com

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