

ABB Commissioning Checklist

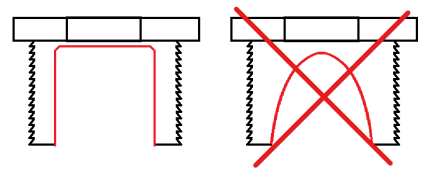
1- Review the installation

Power

- HART version: 15.5 to 42 VDC at the instrument terminals (if using HART communication with a resistor, minimum voltage is 21 VDC).
- MODBUS version: 10.5 to 28.5 VDC at the instrument terminals.
- Check for proper grounding.

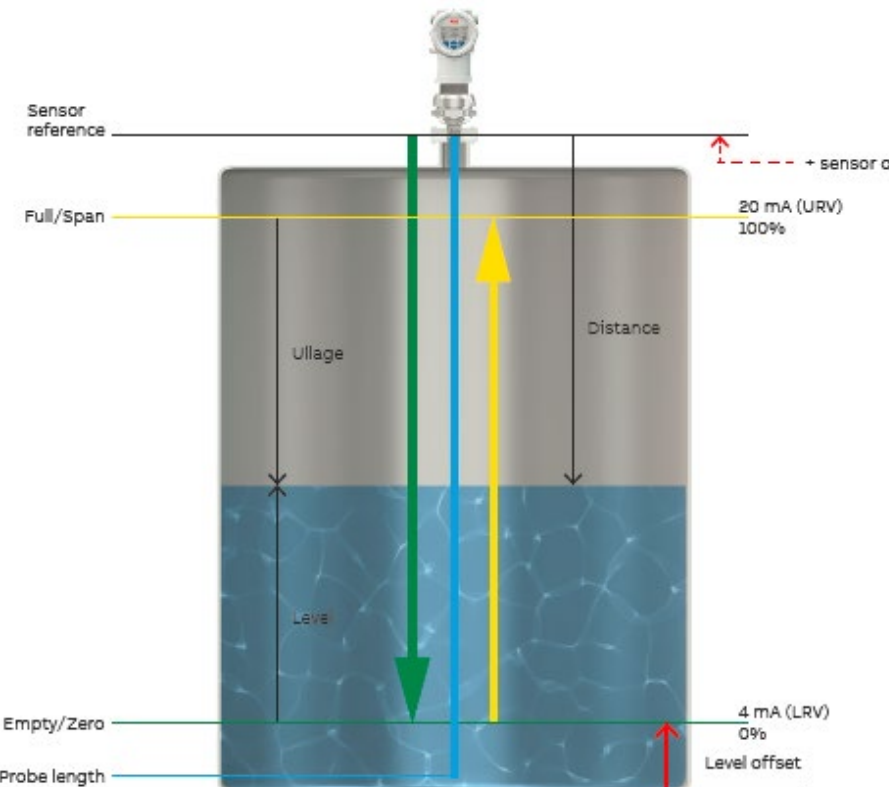
Physical installation

- Mounting position
 - Avoid turbulence. If impossible, probe may be anchored to the bottom (avoid using Rod probes in that case).
 - Avoid contact between probe and filling stream.
 - Do not mount too close (>6") to the side of the tank (particularly for concrete and plastic tanks)
 - Do not mount too close (>6") to disturbing objects (inlay pipes, ladder, fittings, etc.)
 - Probe should not be in contact with the nozzle, tank walls or other objects in the tank.
 - Installation in external chamber/stilling well
 - Use a centering disk to prevent contacts with the wall.
 - Process connection
 - Flange connection
 - Avoid long nozzles.
 - Avoid nozzles with reducers or irregular shapes.
 - Avoid nozzle with inner section inside the tank.
 - Threaded connection ("bushings")
 - Avoid the use of a stack of bushing
 - 3/4" to 3" and 3/4" to 4" bushings are available through ABB.
 - Be sure to provide a good electrical connection between the coupler and the tank (if metallic).
 - Remove rust and corrosion from the threads.
 - Limit the use of Teflon tape on the threads.
 - Bushings should have flat internal walls.
- Plastic/fiber glass tanks
 - Coupler must be mounted on a metal flange/metal sheet with a diameter >6" or using a bushing with a diameter >= 3".
 - Probe should be at least 12" away from the walls.
 - If impossible, use a coaxial probe.
- Concrete tank
 - Concrete nozzle: Use *Distance Offset Calibration* to compensate.
 - Concrete wall: Keep probe 20" away from the wall or use *Distance slope Calibration* to compensate.
- End of probe close to the bottom of the tank
 - Respect min. distances: Cable >15 cm, Rod >10 cm, Coax >1 cm.
 - Use centering disk for rods.

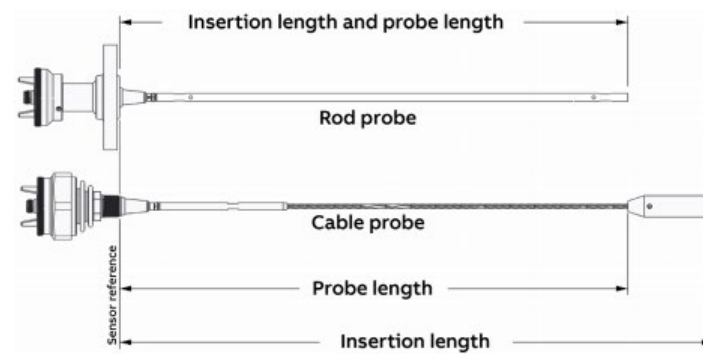


Settings

- Measurement mode
 - Set according to customer preferences, unless:
 - False echoes stronger than the level echo and past the *blocking distance*, or large echo amplitude variations -> Use *Movement Mode*.
 - Very little movement in the process, or need to set and test instrument before movement is detected -> Use *Threshold Mode*.
- Correct dimensions



Probe length



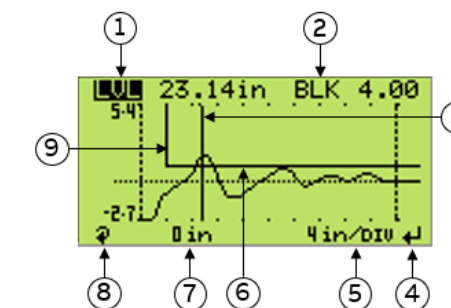
- Filters
 - *Max level rate*: >= real process speed, do not use filter.
 - *Damping and median filter*: as needed to smoothen readings and remove spikes.
 - *Amplitude threshold*: > 200, < 400 and < *level/Interface amplitude thresholds*.
- Application category: according to process media DC.
- Algo parameters setup
 - If using *Threshold Mode*, review *Level Amp. Threshold* and *Int. Amp. Threshold*.
- Static overflow
 - On separator tanks with weir, set as distance between sensor reference and top of weir.
- Interface application
 - Application category = *Interface*
 - Set *Upper media DC*
 - Review *Int. Amp. Threshold*
 - Review interface requirements
 - 1.4 < *Upper media DC* < 5
 - Lower media DC > 15
 - Upper media thickness >3" (>4" if emulsion is present)
 - Emulsion thickness <3"
- Application setup
 - Review *Probe type*, *Tank type* and *End-of-probe mode*.
 - Check all applicable *process conditions*.
- Safety settings
 - Set blocking distance:
 - Chose value to cover all false echoes in the upper zone (caused by the mounting/nozzle/bushing/fitting/tees...)
 - May need to be increased further for nozzles protruding inside the tank.
 - Always refer to the waveform to adjust adequately.
 - Choose *Echo lost period* and *Echo lost reaction*.
 - Adjust *Alarm delay* to filter glitches if needed.

2- Use troubleshooting Tools

Waveform

Use the waveform to:

- Adjust *level and interface amplitude thresholds*.
- Adjust *blocking distance* past the false echoes.
- Identify and localize any false echoes:
 - Modify the installation to get rid of what causes them.
- Verify signal and level echo strength:
 - Fix installation/mounting if signal is too weak.
- Confirm position of selected level echo.
- Launch signal analysis.
- Use with *Level Echo Selector* to manually select another echo representing the echo from the level.

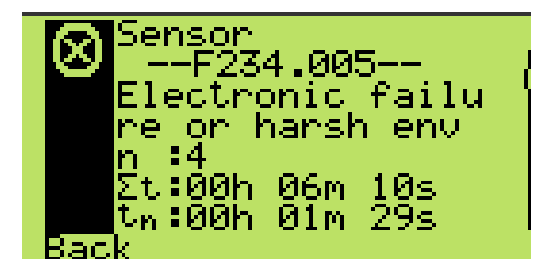


1	Display Level (LVL), Distance (DIS), Ullage (ULL) or Interface (INT) value
2	Display Blocking distance (BLK), Safety distance (SFD), Level amplitude threshold (LAT) or Interface amplitude threshold (IAT)
3	Level or Interface marker
4	Exit or Edit indicator
5	Zoom factor
6	Level amplitude threshold (LAT) [or interface amplitude threshold (IAT), if INT selected in (1)] marker
7	Reference distance
8	Display value indicator
9	Blocking distance (BLK) [or Safety distance (SFD), if SFD selected in (2)] marker

Diagnostic history

Use the diagnostic history to:

- See current and past alarms and warnings.
- Identify errors occurring with the instrument.
- Determine the number of occurrences, total duration, and last occurrence time of every error.
- Refer to the Event code tables in the manual to get recommendations on how to fix the issue.

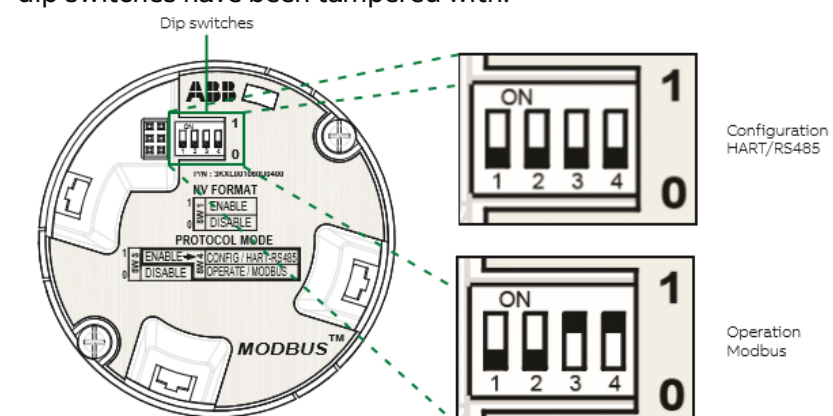


For each error, you have:

- The 6-digits error code (2nd line);
- A short description (3rd and 4th lines);
- The "n" value, which is the number of occurrences of the error (5th line);
- The "Σt" value, which is the total cumulated time the error was active (6th line);
- The "tn" value, which is the elapsed time since the error was last activated (7th line).

3- Check communications

- Device Mode (MODBUS version only)
 - Determines how the device can be used.
 - Select between:
 - *Configuration* (to set the instrument);
 - *Modbus Operation* (to get measurements from the instrument through regular Modbus communication);
 - *LevelMaster Operation* (to get measurements from the instrument while it is connected in a loop with a LevelMaster instrument).
 - Select using the HMI whenever possible. If not working, verify if the dip switches have been tampered with.



- On HART version, device is always ready for both configuration and operation:
 - Make sure you have a 250 ohms resistor in series in the power loop to allow HART communication.
 - HART modem can be connected on each side of the transmitter or at each side of the resistor.