



# ATI-5029

## Liquid Level Measurement Probe

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### INSTRUCTIONS

#### Installation, Calibration & Maintenance of the Explosion-Proof ATI-5029 Adjustable Level Measurement Probe



### IMPORTANT

Please read these installation and operating instructions completely and carefully before starting. Failure to do so will void warranty.

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A.T.Monitors, a division of Armstrong Technologies Inc.  
14 Birch Drive, Kemptville, Ontario, K0G 1J0, CANADA  
Tel: 613-258-5225 • Fax: 613-258-2698  
E-mail: [info@atmonitors.com](mailto:info@atmonitors.com) • Internet: [www.atmonitors.com](http://www.atmonitors.com)

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## **1 - WARRANTY**

The ATI-5029 Level Measurement Probe is warranted against defects in material and workmanship for a period of one (1) year from date of shipment. During the warranty period, *Armstrong Technologies Inc. (ATI)* will repair or replace components that prove to be defective in the opinion of ATI. ATI is not liable for auxiliary interfaced equipment, or consequential damage. This warranty shall not apply to any product, which has been modified in any way, which has been repaired by any other party other than a qualified technician or authorized ATI representative, or when such failure is due to misuse or conditions of use.

### **1.1 - LIABILITY**

All ATI products must be installed and maintained according to instructions. Only qualified technicians should install and maintain the equipment. ATI shall have no liability arising from auxiliary interfaced equipment, for consequential damage, or the installation and operation of this equipment. ATI shall have no liability for labour or freight costs, or any other costs or charges in excess of the amount of the invoice for the products.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND SPECIFICALLY THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE THEREOF.

### **1.2 - MODIFICATIONS AND SUBSTITUTIONS**

Due to an ongoing development program, ATI reserves the right to substitute components and change specifications at any time without incurring any obligations.

### **1.3 - PRODUCT RETURN**

All products returned for warranty service will be by prepaid freight and they will only be accepted with an R.G.A. number issued by ATI. All products returned to the client will be freight collect.

### **WARNING**

<p><b>USING ELECTRICALLY OPERATED EQUIPMENT NEAR GASOLINE OR OTHER COMBUSTIBLE VAPOURS MAY RESULT IN FIRE OR EXPLOSION, CAUSING PERSONAL INJURY AND PROPERTY DAMAGE. CHECK TO ASSURE THE WORKING AREA IS FREE FROM SUCH HAZARDS DURING INSTALLATION OR WHEN PERFORMING MAINTENANCE, AND USE PROPER PRECAUTIONS.</b></p>
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## 2 - PRODUCT INFORMATION

**NOTE:** This page must be filled-in at site by client, contractor or installer and this manual returned to the owner or manager.

### 2.1 - Level Measurement Probe

Sensor Probe Serial Number .....	_____
Sensor Warranty Period .....	1 year
Power Supply Requirement .....	12 VDC
Operating Temperature .....	-40* to +60 °C (-40* to +140 °F) * Depends on freezing point or "pour-point" rating of liquid (i.e.: P-30 liquid freezes below -30°)
Operating Pressure .....	Ambient atmospheric pressure

### 2.2 - FACTORY CONFIGURATION OF PROBE

Manufactured Probe Length .....	_____	<input type="checkbox"/> inches	<input type="checkbox"/> cm
Bottom Clearance (probe tip to tank bottom) .....	_____	<input type="checkbox"/> inch(es)	<input type="checkbox"/> cm
Probe Tip Measurement Start Point .....	_____	<input type="checkbox"/> inches	<input type="checkbox"/> cm
		From probe tip to middle of float at lowest liquid level.	
Probe Resolution (increments) .....		<input type="checkbox"/> 1 inch	<input type="checkbox"/> 2 cm
<b>High Calibration Level</b> (from tank bottom) .....	_____	@ 20 mA	
<b>Low Calibration Level</b> (from tank bottom) .....	_____	@ 4 mA	

#### Note:

<p><b>All <i>Armstrong Technologies Inc.</i> products must be installed and maintained according to instructions, to ensure proper operation. Only qualified technicians should install and maintain the equipment.</b></p>
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## 3 - PRODUCT DESCRIPTION

### 3.1 - GENERAL DESCRIPTION

The ATI-5029 Level Measurement Probe is designed to detect the liquid level in tanks or reservoirs up to 10 feet in depth. It is CSA certified for use in Class I, Group D hazardous locations such as fuel storage tanks. The probe is designed to operate with ATI digital display modules and is available with a 4-20 mA output.

To produce the liquid level output, the probe features a magnetic float which moves up and down the stainless-steel probe tube following the liquid's level as it changes (see FIGURE 1). The probe is available in standard calibration increments of 1 inch or 2 centimeters, but custom calibration increments may be requested. The plastic cap at the bottom end of the probe has been factory installed and should not be removed. The compression fitting near the top of the probe allows the installer to adjust the height of the probe at the required distance from the bottom of the tank. The compression fitting is installed into a reducer fitting which threads into the tank. A wiring elbow with removable cover is located at the top of the probe to access the wiring and the sensor level adjustment trimmers.

#### 3.1.1 - SENSOR SPECIFICATIONS

MEASUREMENT PROPERTY	Levels of most liquids (non-viscous).
DEPTH	Probes available in lengths of up to 10 feet, 7 inches.
APPROVALS	CSA certified for Class I, Group D, explosion-proof.
POWER	12 VDC.
INSTALLATION WIRING	Shielded 2-conductor cable, 18 to 22 AWG.
SIGNAL OUTPUT	4 to 20 mA.
CALIBRATION	Factory calibrated (as specified by client).
RESOLUTION	1 inch or 2 centimeters (as specified by client).
FULL-SCALE ACCURACY	3% or better @ 20°C.
STORAGE	5 years.
OPERATING TEMPERATURE	-40* to +60 °C (-40* to +140 °F). * Depends on freezing point or "pour-point" rating of the liquid (i.e.: P-30 liquid freezes below -30°).

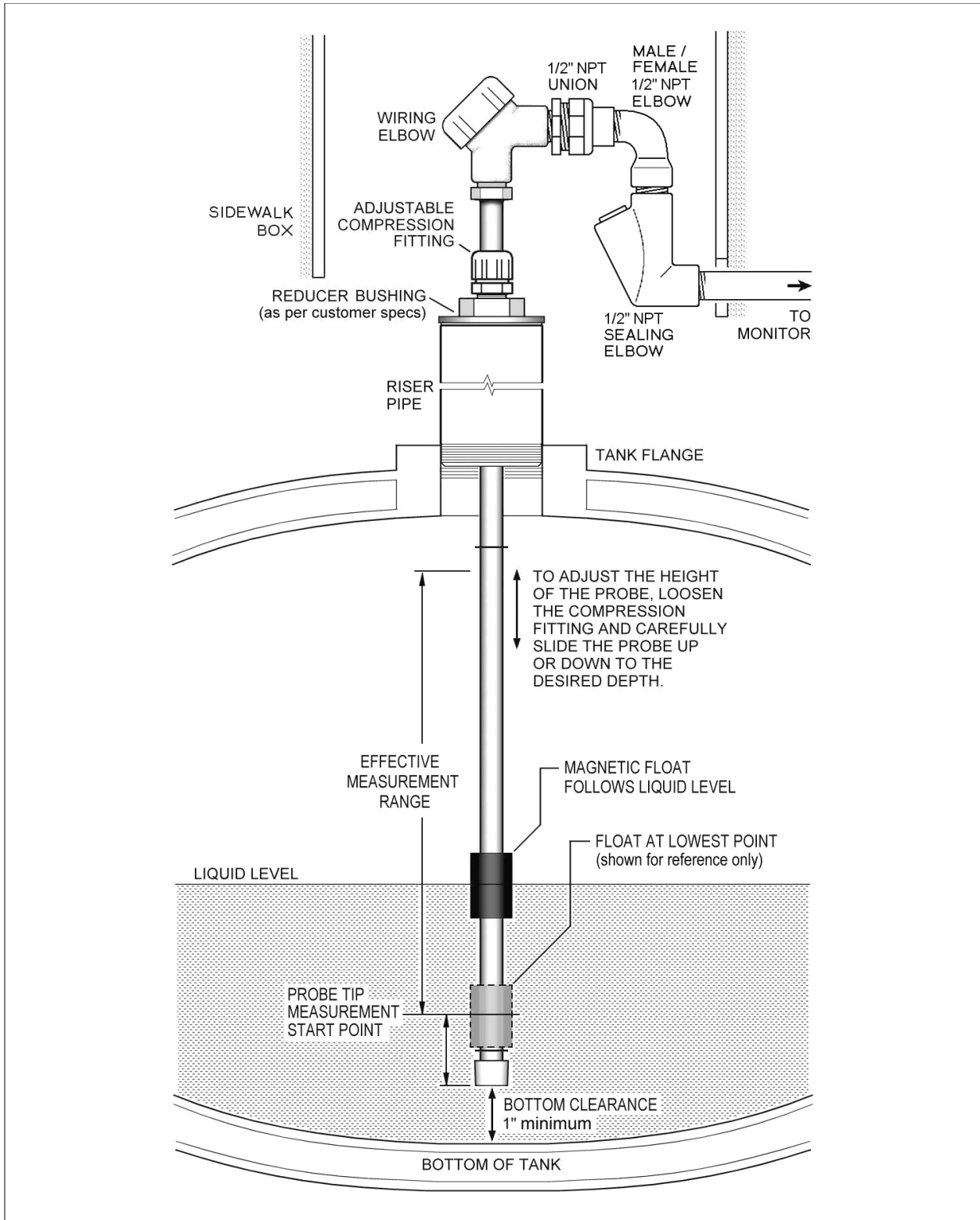


FIGURE 1: Level Measurement Probe installed in tank.

## 4 - INSTALLATION

Follow the guidelines in this section for proper locations and installation of the ATI-5029 Level Measurement Probe. Although different practices can be followed, the proper method of installation and use of approved mounting hardware and sealing fittings is highly recommended to ensure sound and durable installation.

### 4.1 - LOCATION AND MOUNTING

#### CAUTION

**If anti-seize compound is to be used on the threads, apply it to the probe's REDUCER FITTING only. Be VERY careful not to get any on the probe tube or float(s).**

The ATI-5029 Level Measurement Probe should be installed in an unused tank flange in the top of a storage tank or container. The probe features a compression fitting to adjust the initial probe tip to bottom clearance. Installation of the ATI-5029 Level Measurement Probe requires a probe tip clearance of at least one inch (1") from the bottom of the tank. This clearance will prevent the probe tip from puncturing the tank due to thermal expansion and contraction once the probe body has been locked in place. The probe tip should not be set too far from the tank bottom as this would increase the blind region which the probe would not measure (see FIGURE 1).

**NOTE: After the probe height is adjusted, securely tighten the compression fitting.**

#### WARNING

**To comply with the local municipal, provincial state or federal electrical regulations and for safety reasons, ALL cables MUST pass through conduit seals installed between hazardous and non-hazardous areas.**

### 4.2 - WIRING TO MONITOR

The ATI-5029 Level Measurement Probe is a 2-wire device that can be wired to the ATI-DM335 display module (see FIGURE 2). The ATI-5029 can also be wired to a 3rd party monitor or computer that accepts a 4 to 20 mA input. Note that no IS barrier is required as the ATI-5029 is CSA certified as explosion-proof for Class I, Group D locations.

Each ATI-5029 Level Measurement Probe should be on a separate cable but more than one cable can be run through the same conduit.. The cabling must be installed through conduit and conduit sealing fittings. Consult with Armstrong Technologies Inc for allowable distances and required cable sizes.

**NOTE: Turn off the power supply before removing or replacing the probe.**

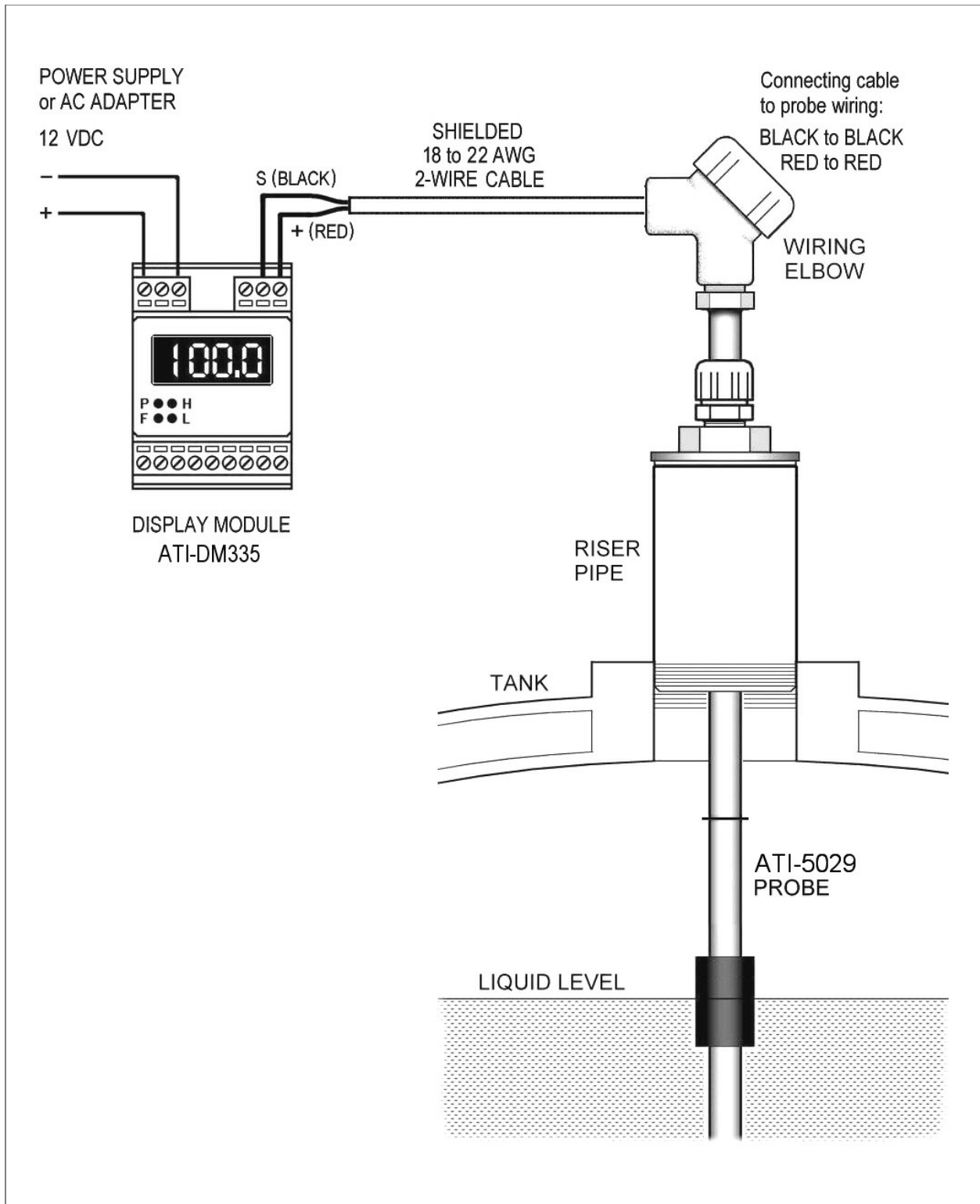


FIGURE 2: Wiring of ATI-5029 probe to ATI-DM335 display module.



## 5 - CALIBRATION

### 5.1 - ATI FACTORY CALIBRATION

The probes are normally calibrated at the factory, according to customer specifications. Several parameters affect the calibration of the ATI-5029 Level Measurement Probe. (Refer to section 2.2 FACTORY CONFIGURATION for items in ***bold italic.***)

The ***bottom measurement start point*** is the distance from the bottom tip of the probe to the point on the float at which the liquid begins to lift the float (normally 2" to 3"). This value may vary from probe to probe and is listed in section 2.2 FACTORY CONFIGURATION. The probe should never be installed with the probe tip resting on the tank bottom as this may cause damage to the probe or tank bottom once the probe is locked in place due to possible thermal expansion and contraction of the tank.

The ***bottom clearance*** should be greater than the tank's known thermal expansion/contraction. Allow a safety margin so that the probe does not touch the tank bottom under all environmental conditions (minimum 1" or 2.5cm). The ***low calibration level (Zero)*** is the sum of the ***probe tip to measurement start point*** (2" to 3") plus the ***bottom clearance*** (1").

The transmitter of the ATI-5029 Level Measurement Probe is factory calibrated to output 4mA at the ***low calibration level (Zero)*** with the float at the bottom, and 20mA at the ***high calibration level (Span)*** with the float near the top (95% depth). This sets the ratio between the current output and the depth measured. This is listed in section 2.2 FACTORY CONFIGURATION.

The display module receives the signal from the probe transmitter and is factory calibrated to display depth in inches or centimeters. The module features a Zero (4mA) and a Span (20mA) adjustment, along with the optional Low and High alarm calibration settings. These are listed in the PRODUCT INFORMATION section of the display module's manual.

### 5.2 - STANDARD USER ADJUSTMENT

The customer can perform the installation adjustment of the ATI-5029 Level Measurement Probe as the design incorporates mechanical depth adjustability. To perform the standard adjustment, the tank liquid level should be over 10" deep. It is preferable that the tank be at least 1/3 full. After adjustment, the display module should read the actual liquid depth.

#### 5.2.1 - STANDARD ADJUSTMENT PROCEDURE

1. Loosen the compression nut on the compression fitting.
2. Carefully lower the probe until the probe tip touches the tank bottom.
3. For reference, mark a line using a marker or place a piece of tape on the probe tube right where it exits the compression fitting.
4. Slowly raise the probe until there is 1" between the top of the compression fitting and the reference mark, then tighten the compression ring to lock the probe in place.

## 5.3 - ADVANCED USER CALIBRATION

In certain applications the customer may wish to position the probe tip at a tank bottom clearance greater than one inch (1"). To facilitate this, the SPAN trimmer, colored in red and located at the top of the probe, may be adjusted to electronically add a few inches as required. This procedure should be done only when the tank is at least 1/2 full or more.

### WARNING

**If the probe is positioned so that the tip is more than 3" from the bottom, the SPAN may be restricted to a maximum output of less than 20mA.**

### 5.3.1 - ADVANCED CALIBRATION PROCEDURE

1. Measure and record the liquid level in the tank with a measurement dipstick.
2. Loosen the compression nut on the compression fitting.
3. Carefully raise the probe to the required additional height from the tank bottom.  
**NOTE: The display module will now show a lower reading than the measurement taken with the dipstick.**
4. Tighten the probe in place with the compression nut.
5. Remove the cover cap from the probe's electrical wiring elbow and adjust the SPAN trimmer (colored red) until the reading on the display module corresponds to the recorded dipstick measurement (see FIGURE 2).

## **6 - PREVENTIVE MAINTENANCE**

### **WARNING**

- When removing the sensor for verification or replacement, always unscrew the complete assembly with the first reducer fitting below the compression fitting.
- Never unscrew the compression fitting only, or else the probe will get damaged when pulled out of the tank.

### **6.1 - VERIFICATION OF OPERATION**

Verification of operation and calibration should be done at least once every 6 months for accuracy and safety reasons. For highly demanding applications, monthly verification is recommended.

### **6.2 - SENSOR REPLACEMENT**

The sensor should be repaired or replaced when the Amber LED (F) on the front of the display module turns ON while the unit is powered, or when the sensor no longer adequately responds to the liquid levels.