



# ATI-5020

**Liquid Level Probe**

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## INSTRUCTIONS

**Installation and Maintenance of the  
Explosion-Proof ATI-5020 Liquid Level Probe**



### IMPORTANT

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

filename:  
ATI.MAN.5020

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## 1 - WARRANTY

The ATI-5020 Liquid Level 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 - LIQUID LEVEL PROBE

Sensor Probe Serial Number .....

Operating Temperature ..... -40\* to +60 °C (-40\* to +140 °F)  
 \* Depends on freezing point and/or "pour-point" rating of liquid (i.e.: P-30 liquid freezes below -30°)

Operating Pressure ..... Ambient atmospheric pressure

Manufactured Probe Length ..... \_\_\_\_\_  inches  cm

Bottom Clearance (probe tip to tank bottom) ..... \_\_\_\_\_  inches  cm

Number of Level Sensors .....  1  2  3  4

Number of Floats .....  1  2  3  4

#### 2.1.1 - FACTORY CONFIGURATION OF PROBE

Sensor Level # (see section 3.1.1.1)	Wire Pair Colour	Float ID (F#)	Trip Point Distance in <input type="checkbox"/> inches or <input type="checkbox"/> cm from Tank's Inside <input type="checkbox"/> Top or <input type="checkbox"/> Bottom	Float Travel Direction to Close Sensor	Level Function According to Customer
<input type="checkbox"/> S1	Black	F1		<input type="checkbox"/> Up <input type="checkbox"/> Down	
<input type="checkbox"/> S2	Red			<input type="checkbox"/> Up <input type="checkbox"/> Down	
<input type="checkbox"/> S3	Green			<input type="checkbox"/> Up <input type="checkbox"/> Down	
<input type="checkbox"/> S4	Yellow			<input type="checkbox"/> Up <input type="checkbox"/> Down	

#### 2.1.2 - INSTALLATION CONFIGURATION OF PROBE

Probe Location:		Monitor ID:			
Level Sensor ID	Lead Cable Wire Colours	Level Function	Monitor Channel	Monitor Relay N/O	Monitor Relay N/C
S1					
S2					
S3					
S4					

#### Note:

**All *Armstrong Technologies Inc.* products must be installed and maintained according to instructions, to ensure proper operation. Only qualified technicians should install and maintain the equipment.**

## 3 - PRODUCT DESCRIPTION

### 3.1 - GENERAL DESCRIPTION

The ATI-5020 Liquid Level Probe provides incremental level monitoring for most liquids. Operating principle: A change in the level of liquid (in a tank, vat, well, pond, sewer, etc...) moves the float(s) up or down the probe tube, tripping an internal sensor at each level and activating a corresponding indicator and/or alarm on the monitor.

The ATI-5020 Liquid Level Probe features:

- ◆ Permanent use
- ◆ Instant response
- ◆ CSA certified explosion-proof, Class I, Groups C & D

#### 3.1.1 - SENSOR SPECIFICATIONS

MEASURABLE LIQUIDS	Water, waste liquids, mild acids, gasoline, diesel, waste oil, and other petroleum and non-petroleum products. (Contact factory for more information if required)
PROBE	Stainless steel with moving float which activates internal level sensor contacts. Maximum rating: 100mA DC @ 24VDC/VAC.
INSTALLATION WIRING	Multi-conductor cable, 18 to 20 AWG. The number of conductors depends on the number of levels on the probe, with 2 conductors per level. i.e.: A 3-level probe would have 6 conductors.
OPERATING TEMPERATURE	Water: 0 to +60 °C (+32 to +140 °F) Petroleum: -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°)

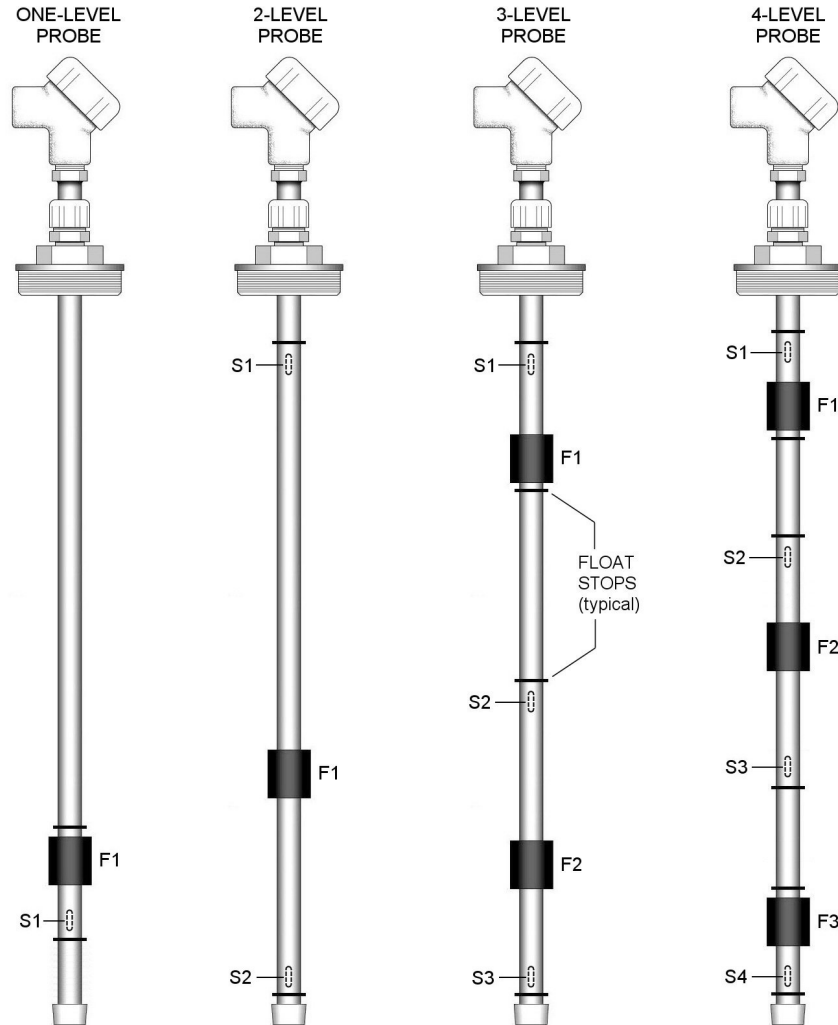
##### 3.1.1.1 - FLOAT & SENSOR IDENTIFICATION

The level sensors inside the probe are labeled S1 to S4, starting from the top of the probe. The floats are labeled F1 to F4, again starting from the top of the probe.

In normal configurations, a single float may activate one (1) or 2 level sensors, but only one at a time (not simultaneously). **NOTE: A level sensor can only be activated by one float.**

When a float comes in close proximity to a level sensor, it will cause that sensor to close. If the sensor is ABOVE a float which is moving toward it, we say the sensor closes going UP. If the sensor is BELOW the float, we say the sensor closes going DOWN.

Following are a few examples of typical ATI-5020 Liquid Sensor Probe configurations showing the positioning of the internal level sensors and locations of floats. Each sensor probe can be custom manufactured to the customer's requirements for levels and function.



### 3.1.2 - APPLICATIONS

See enclosed application drawings for more details.

APPLICATION	TYPE	MONITORED PRODUCT
Underground Storage Tanks	Steel Single Wall	Levels of most liquids, petroleum products, mild acids and water
	Steel / F.R.P. Double Wall	
Above-ground Storage Tanks	Single / Double Wall	
Ponds	Settling pond	Waste water and other liquid waste products
Sewers	Sanitary and/or storm sewer	

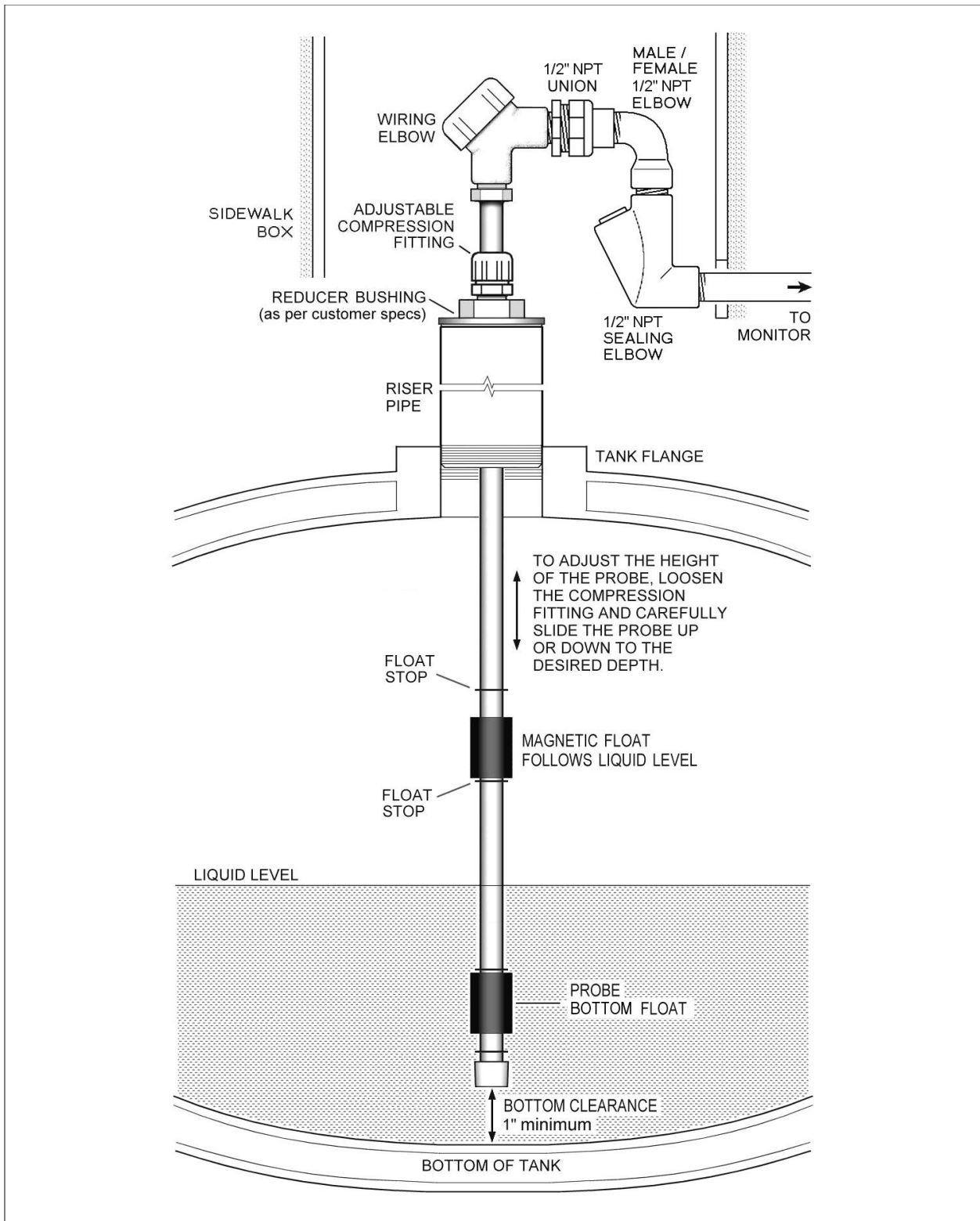


FIGURE 1: Liquid level probe installed in tank (2-level probe shown).

## 4 - INSTALLATION

Follow the guidelines in this section for proper locations and installation of the ATI-5020 Liquid Level 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.

**NOTE: The probe has float stop rings positioned above and below each float's detection range to prevent the float from going beyond the sensing limits. The float stops are factory set and should not be moved.**

### 4.1 - PROBE VERIFICATION

For verifying the liquid probe, connect a digital multimeter (set for resistance) to each wire pair (see wire colour chart in Section 4.3). The resistance should read as an open circuit. Next, using your fingers, move the selected float to the level point you have selected to test, and observe the reading. It should drop to a very low resistance, typically less than 100 ohms.

**MAKE SURE TO VERIFY THE INTEGRITY OF EACH SENSOR PROBE'S INDIVIDUAL LEVEL POINT(S) DURING INSTALLATION.**

### 4.2 - 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-5020 Liquid Level 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-5020 Liquid Level Probe requires a probe tip clearance of one inch (1") or more from the bottom of the tank (see FIGURE 1). 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.

**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.**

### 4.3 - WIRING TO MONITOR

Each ATI-5020 Liquid Level 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.

#### CAUTION

**All cable entry must be through the bottom of the monitor enclosure only. Other entry locations will allow foreign materials to enter the enclosure, possibly causing damage to the internal components.**

**NOTE: Turn off the monitor's power supply before removing or replacing the sensor.**

A typical ATI-5020 sensor wiring layout and jumper programming for ATI-5100 and ATI-5107 monitors is shown in Figure 2. For an ATI-1503 annunciator, refer to the appropriate instruction manual. The reed switch wire pairs must be connected in the order shown (also refer to the following reed switch/wire colour chart) beginning with the TOP reed switch. For more details on liquid sensor wiring and programming, please refer to the instruction manual for your listed monitor. Because the ATI-5020 is rated as explosion proof it does not require an I.S. barrier.

REED SWITCH / WIRE COLOUR CHART		
Monitor	Probe Level	Wire Pair Colours
Channel 1	S1: Top Reed Switch #1	Black
Channel 2	S2: Switch #2 from Top	Red
Channel 3	S3: Switch #3 from Top	Green
Channel 4	S4: Switch #4 from Top	Yellow

#### EXAMPLES:

1. A single 3-level probe would have the Black pair of leads connected to Channel 1 for the high level, Red pair on Channel 2 for the middle level, and Green pair on Channel 3 for the low level.
2. Two separate 3-level probes connected to 6 channels of a monitor would have probe "A" connected to channels 1/2/3 (S1 to channel 1, S2 to channel 2, S3 to channel 3), and probe "B" to channels 4/5/6 (S1-ch.4, S2-ch.5, S3-ch.6).

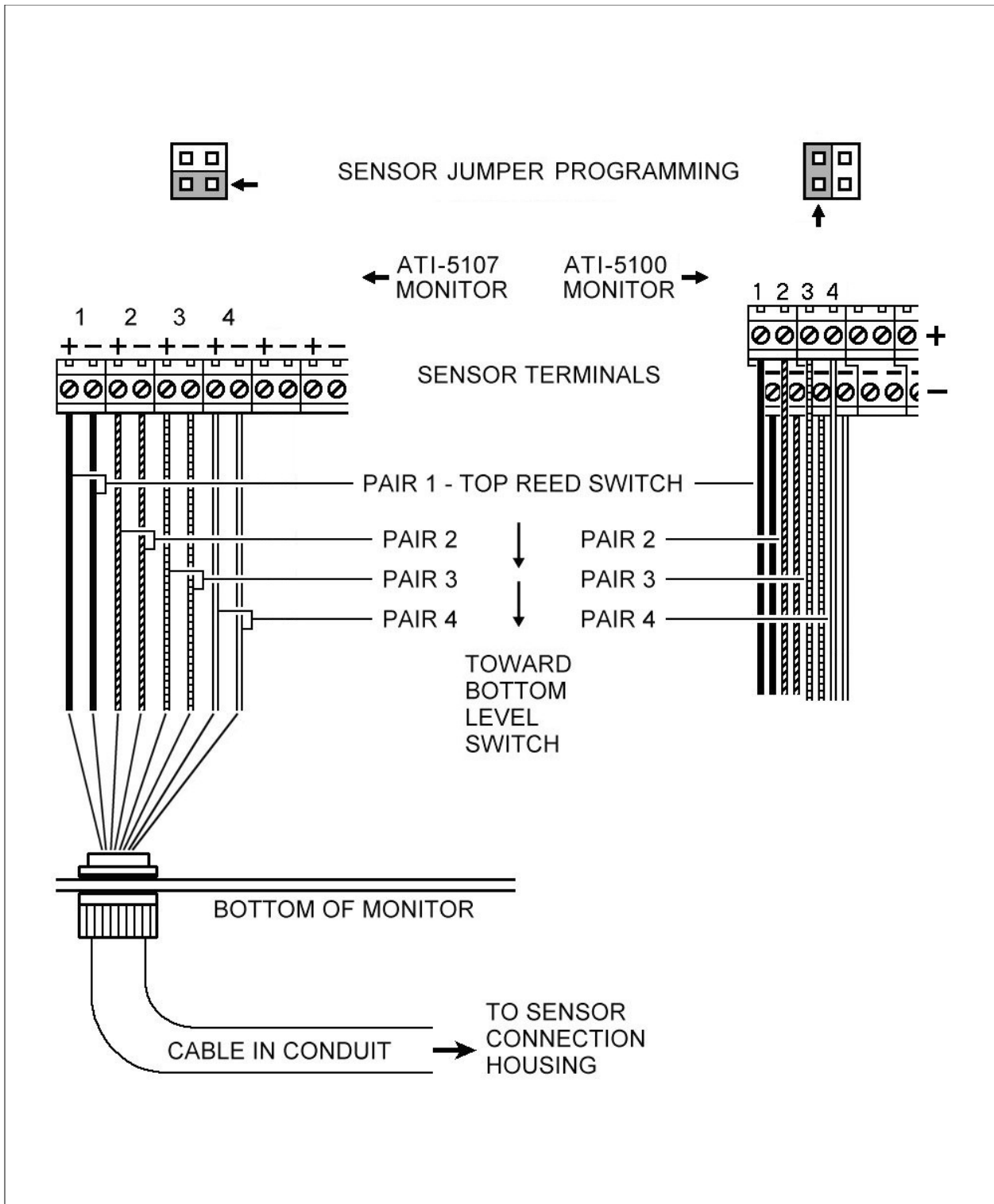


FIGURE 2: Wiring of ATI-5020 probe to an ATI-5100 or 5107 monitor.

## **5 - PREVENTIVE MAINTENANCE**

### **5.1 - TROUBLESHOOTING**

If any unusual multimeter readings are obtained (other than those described in the Sensor Verification section), some wires may be shorted or the sensor may have been damaged during installation. Remember to use caution when installing each ATI-5020 liquid probe.

When verifying each level point of the sensor with a digital multimeter, make sure the readings obtained agree with the following level sensing data.

#### **5.1.1 - LEVEL SENSOR DATA**

Normal status:   Circuit open (N/O)

Level detect:     Circuit closed (N/C) when float is located near switch.  
                    Low resistance < 100 ohms  
                    Max DC switching current 100 Ma, Max voltage 24 VDC/VAC.

IF YOU HAVE ANY OTHER UNEXPLAINED PROBLEMS, PLEASE CONTACT THE CUSTOMER SERVICE DEPARTMENT AT THE ATI FACTORY.