



# ATI-6107

## Liquid Leak & Level Monitor Panel

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### INSTRUCTIONS

#### Installation, Operation & Maintenance of the ATI-6107 Liquid Leak & Level Monitor



### IMPORTANT

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

filename:  
ATI.MAN.6107

Revised: 11/17/2011  
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## **1 - WARRANTY**

The ATI-6107 Liquid Leak & Level Monitor 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 LEAK & LEVEL MONITOR

Monitor Serial Number ..... \_\_\_\_\_

Power Supply Requirement ..... 12 to 24 VDC @ 500 mA min.

Operating Temperature ..... -20 to +65 °C (-4 to +149 °F)

Relative Humidity ..... 50% @ 40°C (104°F) max.  
100% @ 25°C (77°F) briefly

Operating Pressure ..... Ambient atmospheric pressure

Environmental Protection ..... Sealed up to NEMA-4X (IP66)

SENSORS						RELAYS	
Zone	Type	N/O	N/C	Part No.	Location	Normal	Latched
1							
2							
3							
4							
5							
6							

**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-6107 is a multi-sensor monitoring system designed to continuously monitor for any liquid leaks and/or levels. It can monitor up to six (6) zones of sensors in any combination.

This monitor is the first of its kind to provide easy setup and complete environmental protection up to level NEMA-4X (IP66).

The monitor features the following, as shown in FIGURES 1 and 2:

### 3.2 - MAIN FEATURES

- |                                     |   |
|-------------------------------------|---|
| 1- MOUNTING HOLES                   | For the convenience of mounting the monitor on any flat surface.  |
| 2- CLEAR FRONT COVER<br>(not shown) | Allows unobstructed viewing of the LED indicators and is sealed to protect against dust and liquids.  |
| 3- POWER SWITCH                     | A slide switch (SPST) is provided to turn the monitor ON or OFF.  |
| 4- POWER ON INDICATOR               | Power is indicated by a Blue LED.   |
| 5- ALARM & RELAY INDICATORS         | Six bi-color LEDs indicate alarm conditions and latched relays for each channel (zone).<br>RED indicates an alarm condition.<br>GREEN indicates a latched relay when an alarm condition is no longer present. |
| 6- AUDIO ALARM INDICATOR            | The buzzer will activate when a liquid leak or level is detected. The buzzer is rated to NEMA-4X.   |
| 7- ACKNOWLEDGE SWITCH               | The sealed "Acknowledge" switch is provided to silence the buzzer during an alarm condition.  |
| 8- RESET SWITCH                     | The sealed "Reset" switch is provided to turn off any latched relays, once the leak has been repaired.  |
| 9- LIQUID SENSOR TERMINALS          | For connection of remote sensors. These terminals are protected by an on-board Intrinsic Safety barrier.  |
| 10- POWER SUPPLY TERMINALS          | For connection of a 12 to 24 VDC power supply.  |
| 11- RELAY CONTACT TERMINALS         | For connection of external devices or alarms to the relay contacts.   |

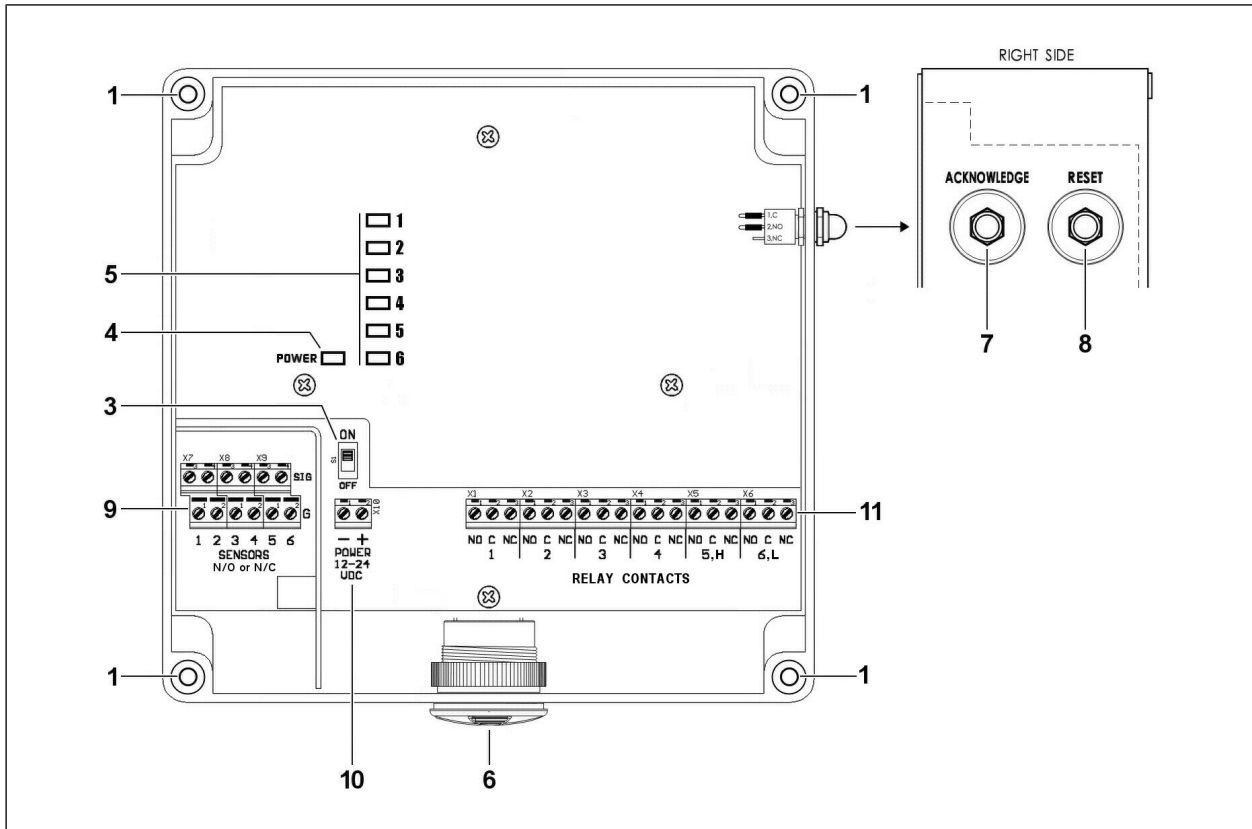


FIGURE 1: Main features of the ATI-6107 monitor.

### 3.3 - INTERNAL FEATURES

- |                          |   |
|--------------------------|---|
| 12- I.S. BARRIER FUSES   | Replaceable 1/8 Amp Nano™ fuses provide additional Intrinsic Safety protection for each sensor.   |
| 13- SENSOR DIP SWITCHES  | Six DIP switches (S2A, S2B) are used to configure each channel for Normally Open or Closed sensors.   |
| 14- BUZZER DIP SWITCHES  | Six DIP switches (S4) are used to configure buzzer activation for each channel (zone).  |
| 15- BUZZER VOLUME SWITCH | A single DIP switch is provided to select the loudness level of the buzzer. Sound frequency is 3kHz.<br>H (high): 88dB @ 60cm (2 ft)<br>L (low): 75dB @ 60cm (2 ft) |
| 16- RELAY DIP SWITCHES   | Six DIP switches (S3A, S3B) are used to configure each relay for Normal operation or Latching.  |
| 17- TEST SWITCH          | The test switch (on the upper edge of the circuit board) is used to test all alarm and relay functions.   |

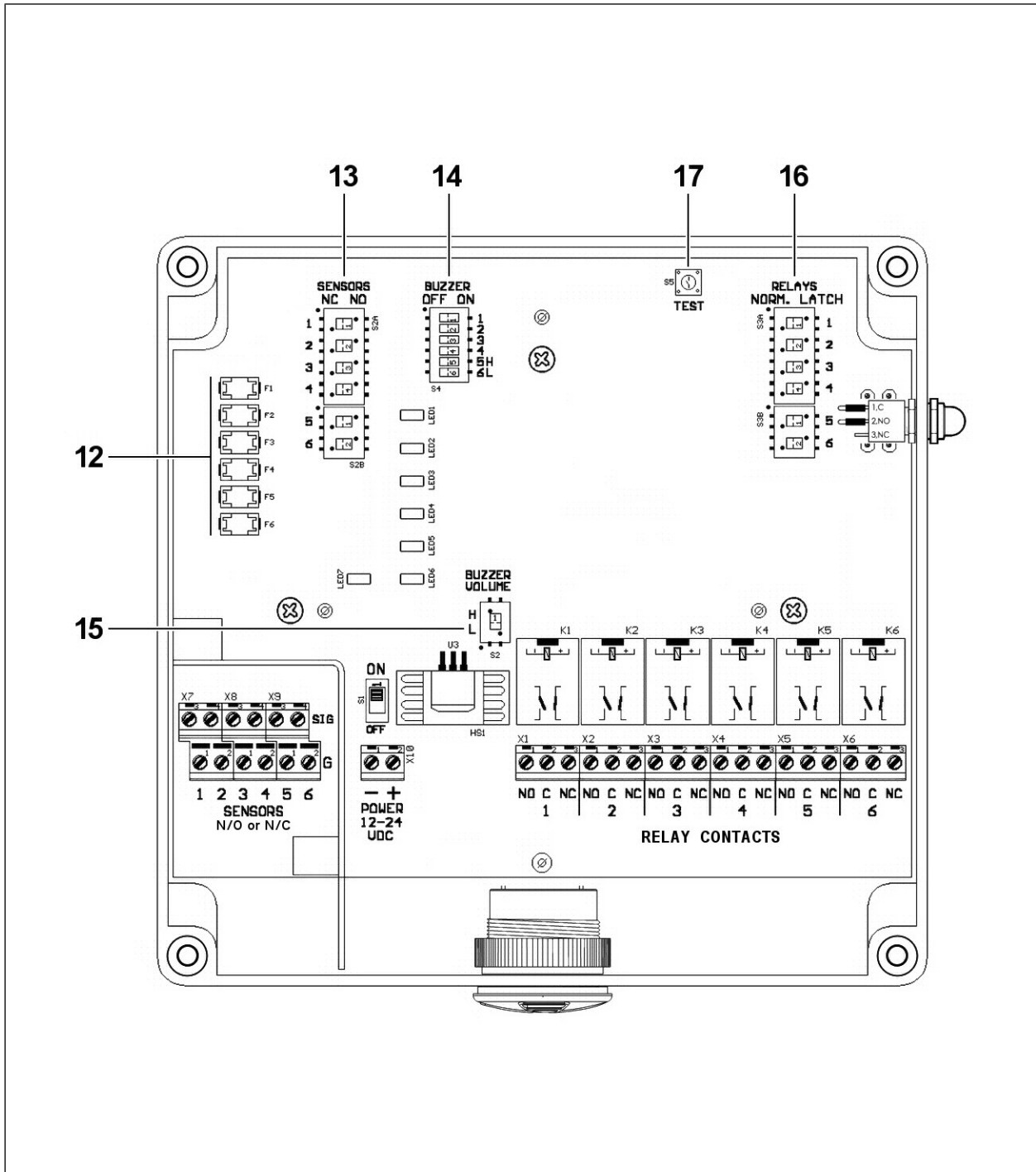


FIGURE 2: Internal features (behind front panel) of the ATI-6107 monitor.

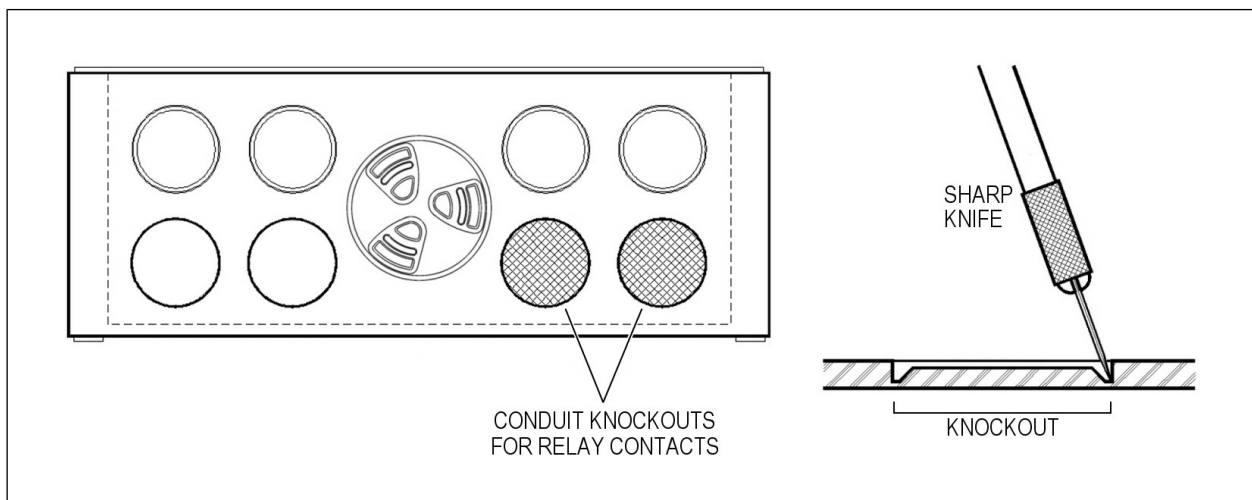
## 4 - INSTALLATION

### 4.1 - LOCATION AND MOUNTING

Before mounting the monitor, if the relay contacts are required, remove the two lower right knockouts (marked with crosshatch in FIGURE 3) on the bottom of the enclosure. Using a sharp knife (i.e.: X-Acto) held at a slight angle, score around the bottom of the circular groove a few times (see FIGURE 3, right image) until the knockout can be pushed out of the hole.

Care should be taken to securely fasten the monitor (via four corner mounting holes provided) to a solid, vertical, non-vibrating surface or structure. A template is provided to locate the mounting holes for drilling. Use the #8 x 1" screws provided to mount the monitor.

**CAUTION:** Be careful **NOT** to over-tighten the four mounting screws when installing the monitor. All cable entry **MUST BE** through the **BOTTOM** of the enclosure only.



**FIGURE 3: Location and removal of knockouts on bottom of enclosure.**

Mount the monitor in a **NON-HAZARDOUS** area (i.e. control room) where the unit can be observed periodically. Mount the sensors in the appropriate locations for the detection of various liquid leaks and/or levels according to the local municipal, provincial, state and/or federal regulations (Refer to the manual supplied with each sensor).

### WARNING

- To retain the NEMA-4X (IP66) rating, install a rubber washer between each conduit adapter and the enclosure. PVC adapters and conduit are recommended.
- **ALL** cables **MUST** pass through conduit seals installed between the hazardous (Class I, Division 1 or 2) and non-hazardous areas, for safety reasons and to comply with the local municipal, provincial, state, or federal electrical regulations.
- For UL only (U.S.) follow the National Electrical Code (NFPA 70) and the automotive & Marine Service Station Code (NFPA 30A).

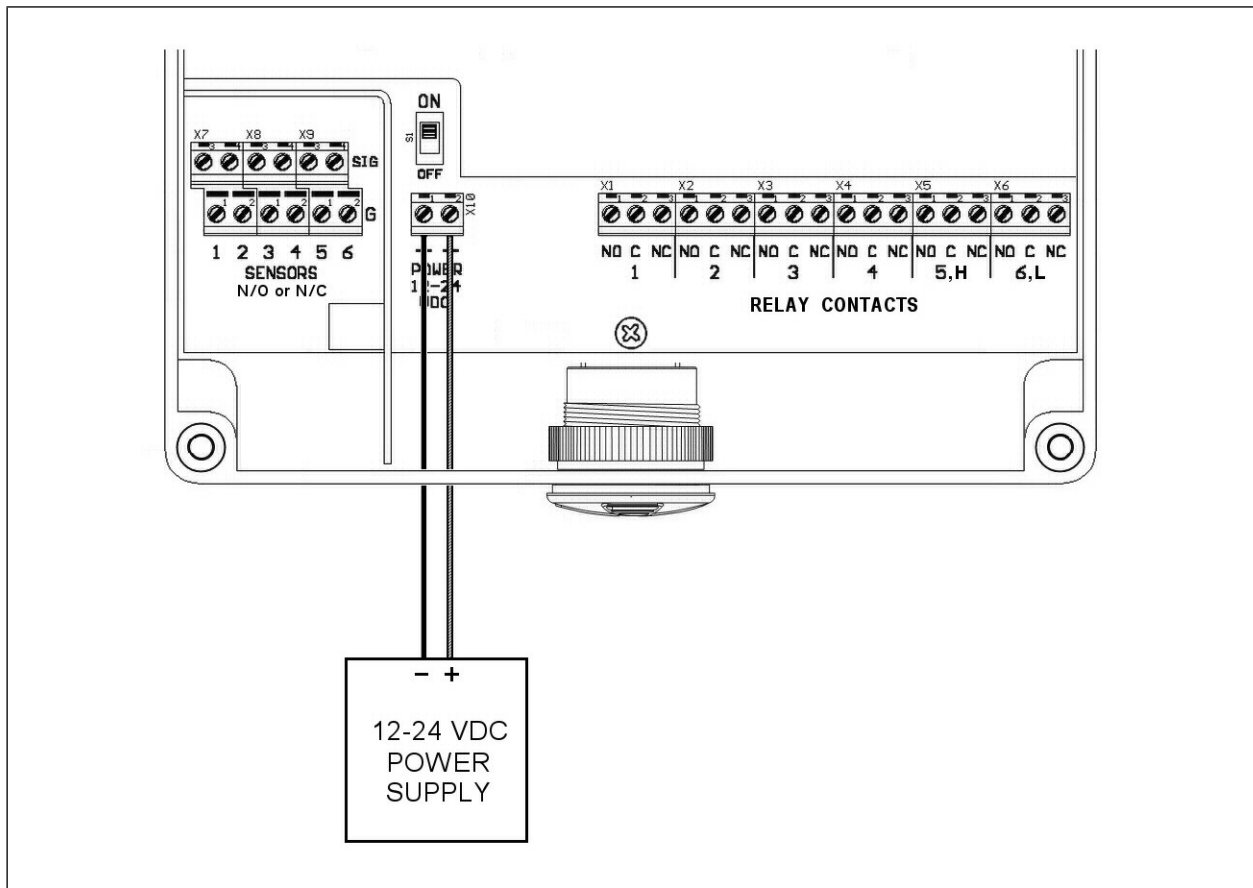
## 4.2 - WIRING THE SYSTEM

All terminals are located along the lower edge of the circuit board (see FIGURE 1). A cable size of 22 AWG is recommended for wiring the sensors.

**POWER SUPPLY** The monitor operates on 12 to 24 VDC. The power supply connects to the power terminal block located inside the monitor, below the ON/OFF switch (see FIGURE 4). A grounding lug is also provided.

**SENSORS** Each liquid sensor connects to intrinsically safe terminals on the liquid sensor terminal block, using a 2 or 4 conductor cable (see FIGURE 5). The six DIP switches on the upper left of the circuit board configure each sensor for OPEN or CLOSED circuit (see FIGURE 7 and section 5.1.1).

**RELAYS** There are six SPDT relays which activate with associated alarms. The six DIP switches (see FIGURE 7 and section 5.1.3) are used to configure each relay for Normal or Latching contacts. Each relay contact is rated up to 8 Amps resistive or 3.5 Amps inductive @ 250 VAC, 30 VDC. External devices connect to the relay contact terminal block, along the lower right half of the circuit board (see FIGURE 1 and section 3.2).



**FIGURE 4: Connections for the 12-24 VDC power supply.**

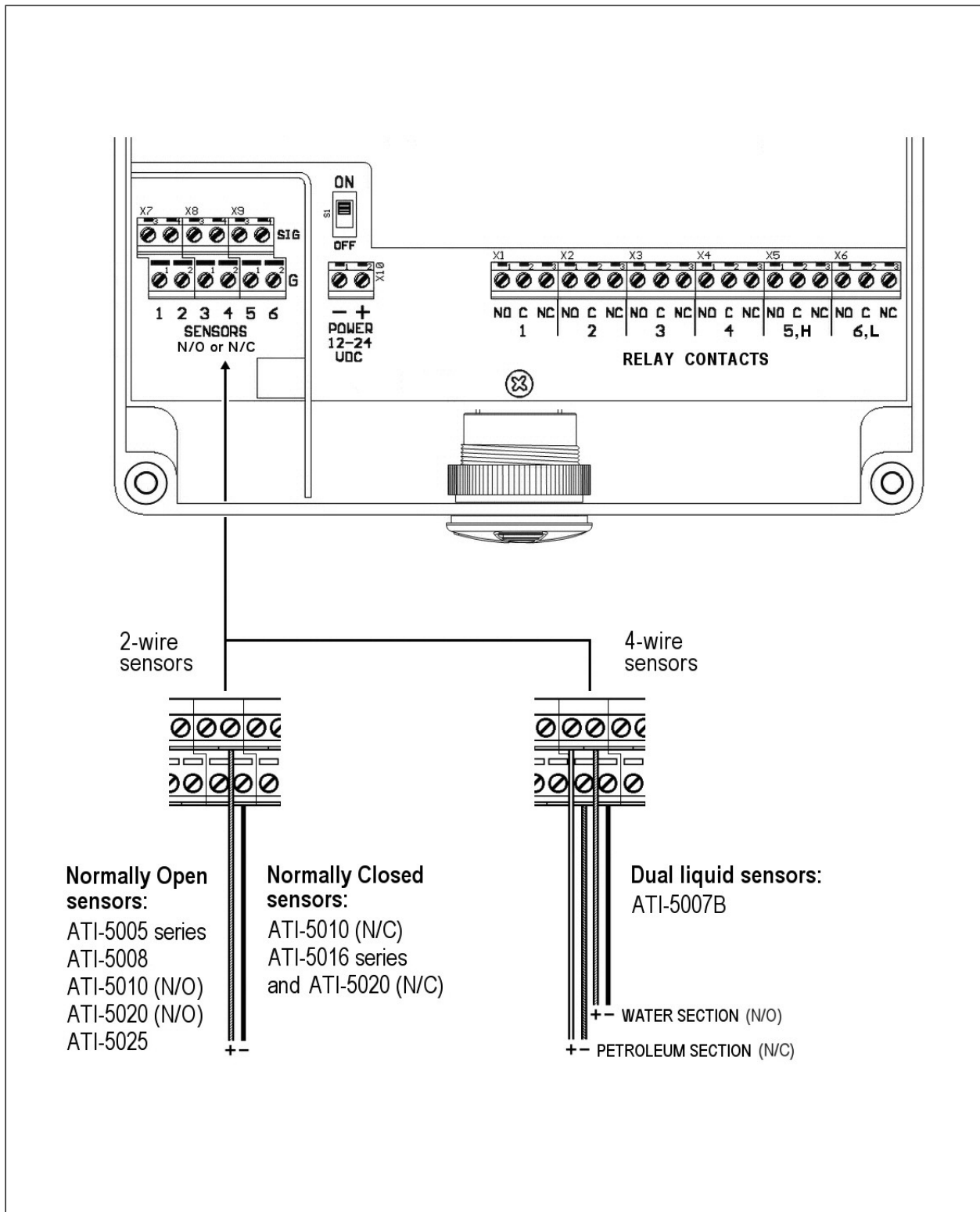


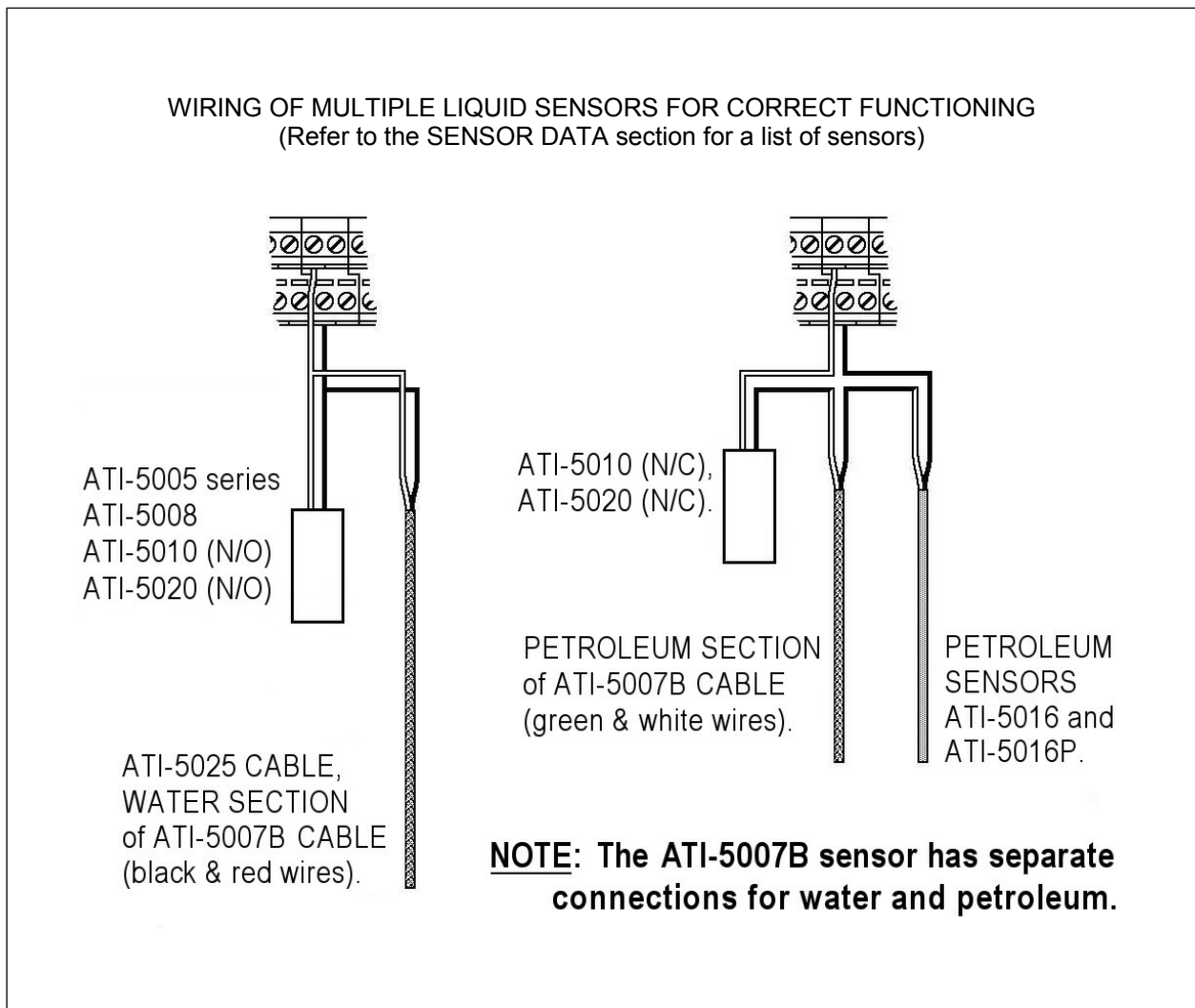
FIGURE 5: Wiring of the liquid sensors to the IS terminal block.

### 4.2.1 - WIRING MULTIPLE SENSORS

On the liquid circuit, more than one liquid sensor can be connected to each channel (zone). Each sensor should be on a separate cable but can be wired through the same conduit.

An unlimited number of Open-circuit sensors may be connected in parallel to one channel on the liquid circuit. Multiple petroleum sensors and sensing cables (Closed-circuit) can only be connected in series (end-to-end) to the terminals of one channel on the liquid circuit for a combined length of no more than 60 feet. Total resistance MUST NOT exceed 3 Meg ohms.

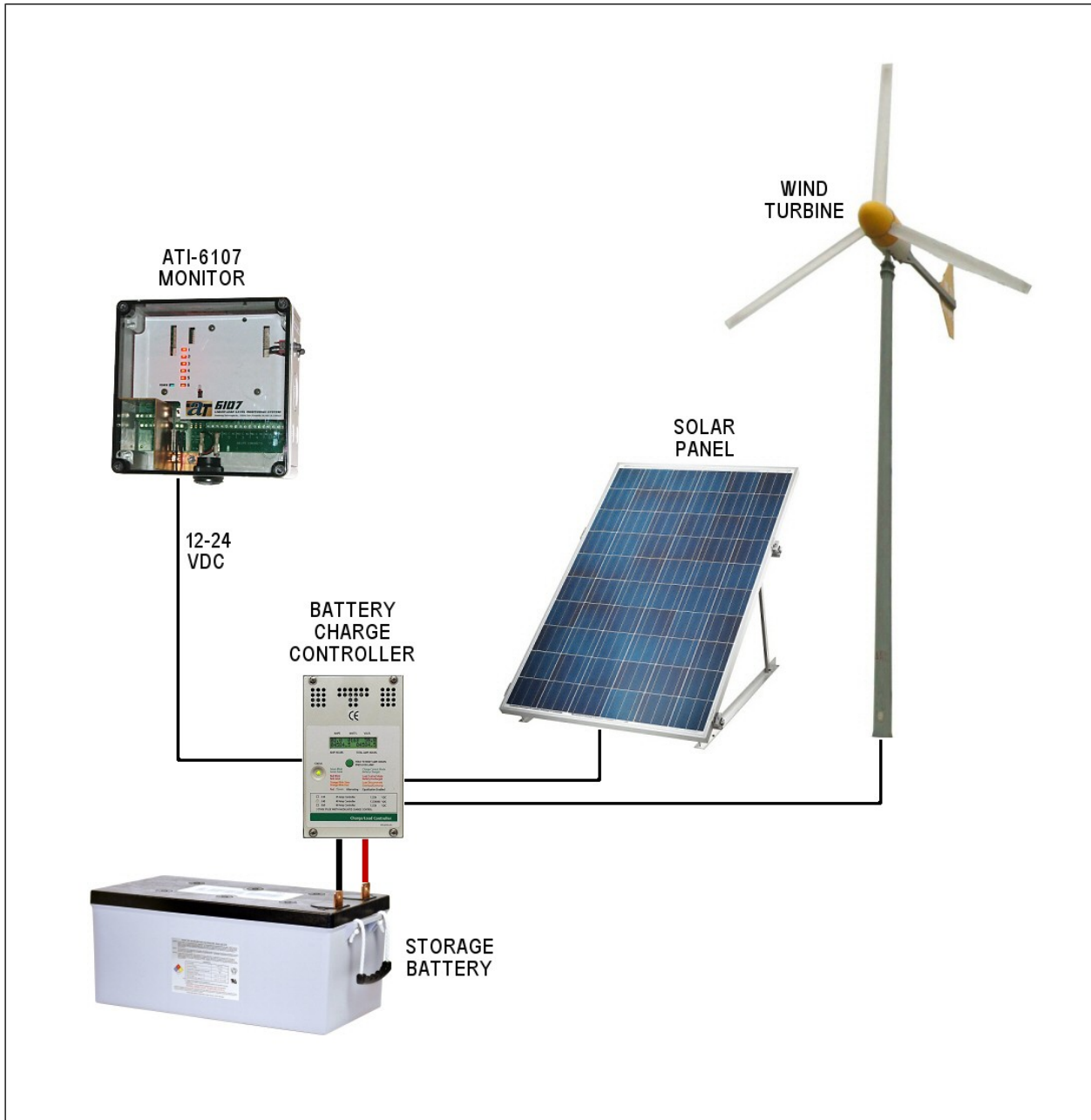
Open-circuit (N/O) and Closed-circuit (N/C) sensors MUST NOT be connected to the same channel. (See FIGURE 6 for wiring multiple liquid sensors.)



**FIGURE 6: Wiring multiple liquid sensors in series or parallel.**

### 4.3 - REMOTE AREA INSTALLATION

With a power requirement of 12 to 24 VDC at less than 1 Amp, the ATI-6107 monitor is ideal for use in remote locations that rely on solar and/or wind power. This monitor is so power efficient that, in an emergency, it can operate for more than a week on just a few 6V lantern batteries connected in series.



**FIGURE 7: Remote installation with solar and/or wind power.**

## 5 - CONFIGURATION & OPERATION

**BEFORE** turning on the power supply, **MAKE SURE** the monitor has been configured correctly and all connections are properly made. Refer to the following sections for configuration of the monitor using the DIP switches.

**CAUTION:** When the transparent cover is removed to add sensors or make changes, make sure the cover is re-installed in the correct orientation to retain NEMA-4X seal. The enclosure width is 7.1", and the height is 7.0".

### 5.1 - CONFIGURATION

Refer to FIGURE 8 for locations and settings of the DIP switches.

#### 5.1.1 - CONFIGURING LIQUID SENSORS

The six DIP switches (S2A and S2B) on the liquid circuit, located at the upper left, are used to configure each channel's input for the non-alarm state of the type of liquid sensor connected to that channel (zone).

**NOTE:** For channels not used, the sensor type DIP switches must be set in the Open-circuit position (NO). This is the factory default setting.

When a water or Open-circuit sensor is connected, that channel's DIP switch should be set to the RIGHT position (NO) for Normally-Open.

If a petroleum or Closed-circuit sensor is connected, set that channel's DIP switch to the LEFT position (NC) for Normally-Closed.

#### 5.1.2 - CONFIGURING BUZZER ACTIVATION & VOLUME

The six DIP switches (S4), located next to the sensor switches, are used to configure alarm buzzer activation for each channel. For the buzzer to activate, set the channel's DIP switch to the RIGHT position (ON) for each channel requiring audio alarm notification. This is the factory default setting. To prevent the buzzer from activating, set the DIP switch to the LEFT (OFF).

There is a single DIP switch (S6), located in the lower middle of the circuit board, to set the loudness of the buzzer. Set the switch DOWN (L) for Low volume, or UP (H) for High volume.

#### 5.1.3 - CONFIGURING RELAYS

Each relay can be independently configured for Normal operation or as Latching contacts.

For Normal operation, a relay is active (ON) as long as an alarm condition is present. The relay will deactivate as soon as the alarm condition goes away. This is the factory default setting with relay DIP switches in the LEFT (NORM.) position.

For Latching contacts, the set relay(s) remain active (ON) even after the alarm condition is gone. To unlatch the relay after a cleared alarm, press the "RESET" switch. To configure the relay(s) for latching, set the appropriate Relay DIP switch(es) to the RIGHT (LATCH) position.

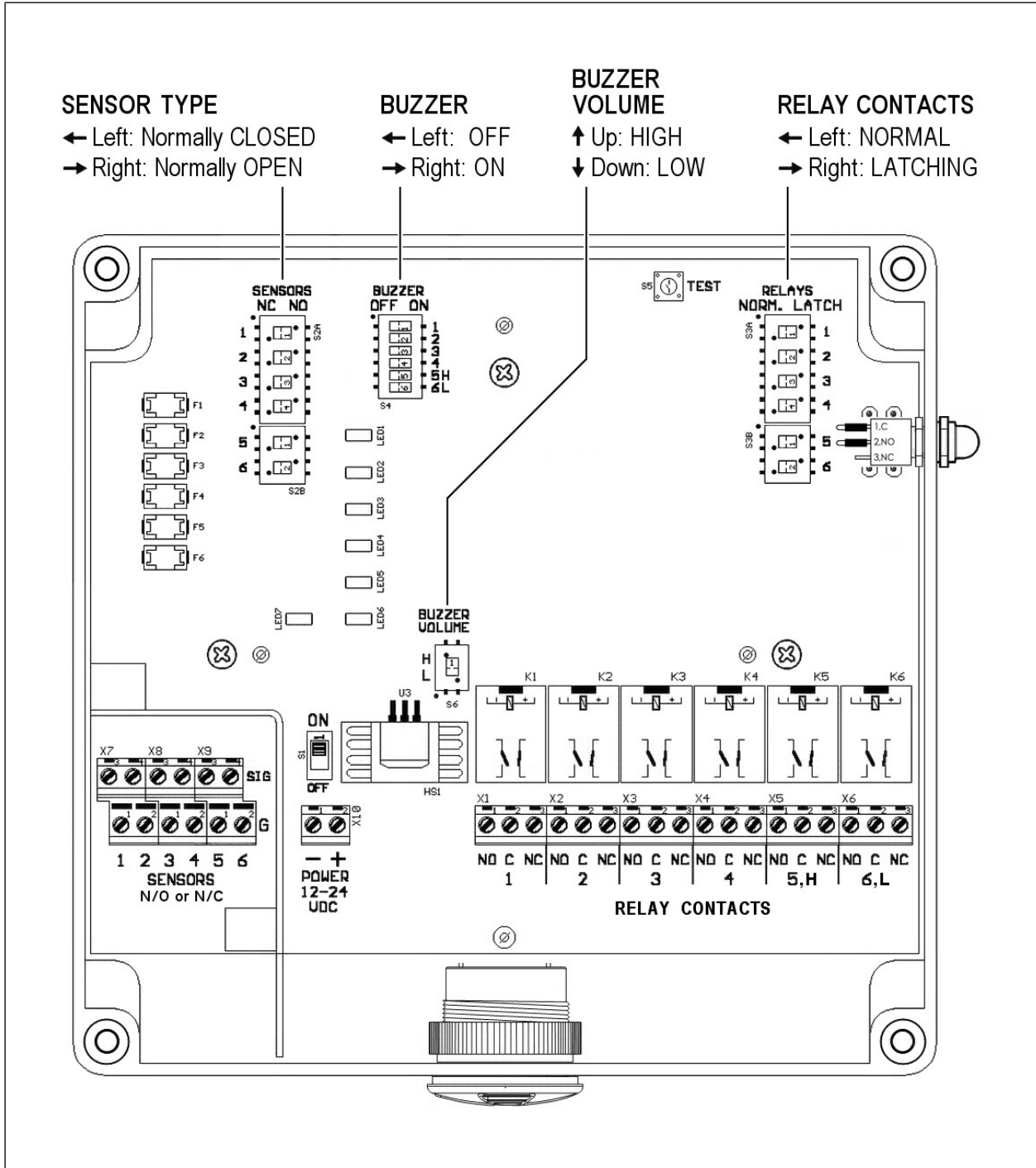


FIGURE 8: Location and configuration of all DIP switches.

## 5.2 - OPERATION

When the monitor is switched ON, the Blue "POWER" LED will light and the monitor will become fully operational. The system can be tested periodically by removing the transparent front cover and pressing the TEST switch (see section 6.1).

### 5.2.1 - ALARM ACTIVATION

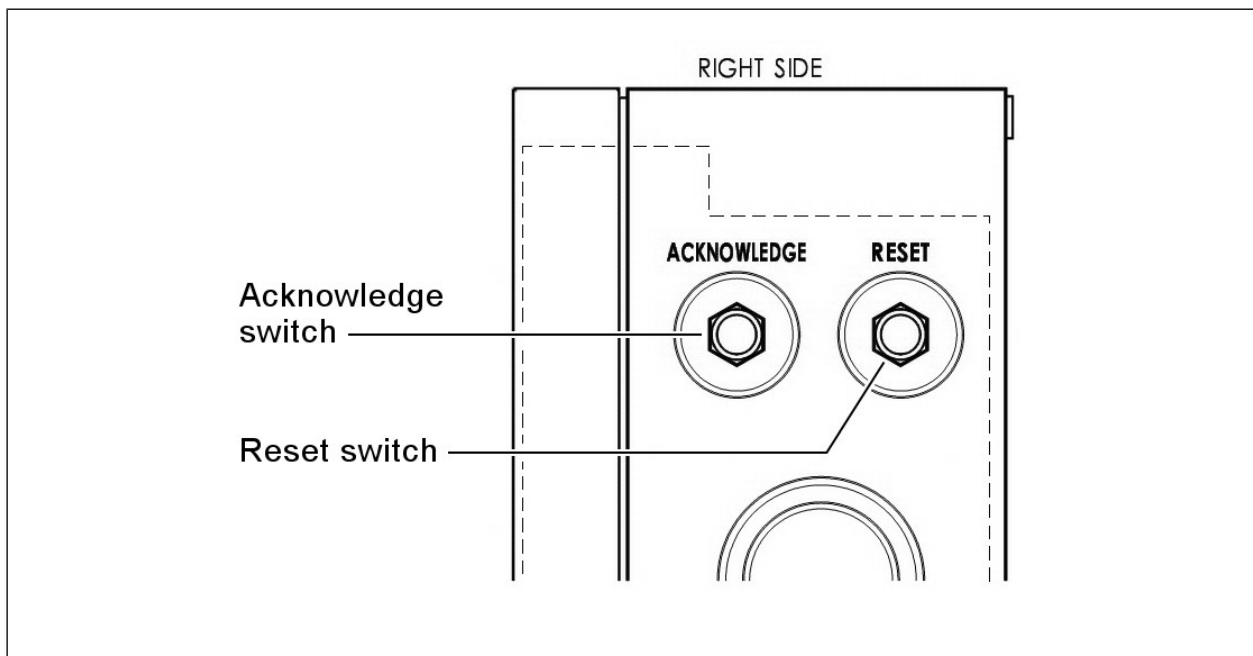
If a liquid leak is detected by a water or petroleum sensor, or if a changing level of liquid activates a sensor, the alarm LED and relay for that channel (zone), and the audio alarm (if set) will be activated. For normal operation, the alarm LED color is RED.

On channels that have the corresponding relay set for Latching, the alarm LED color will change to GREEN when the alarm condition goes away, indicating that the relay is still active. After the alarm condition has been dealt with and is cleared on the monitor, pressing the "RESET" switch (see FIGURE 9) will deactivate the latched relay(s).

### 5.2.2 - AUDIO ALARM SHUTOFF

When an alarm condition occurs, the audio alarm (buzzer) can be shut off by pressing the "ACKNOWLEDGE" switch (see FIGURE 9) on the right side of the monitor. The alarm LED for that channel (zone) will remain ON as long as the alarm condition exists.

If another alarm occurs while the first alarm is still present, the audio alarm will re-activate.



**FIGURE 9: Location of the ACKNOWLEDGE and RESET pushbutton switches.**

## 6 - PREVENTIVE MAINTENANCE

The monitor should be wiped clean only with a damp cloth and mild soap following a regular maintenance program. Avoid strong hose spraying, submersion and extreme conditions that could allow liquid to enter the monitor and cause possible damage to the internal components.

**NOTE:** The enclosure's NEMA-4X (IP66) rating will protect the monitor from normal conditions such as cleaning, dust, rain, and splashing from vehicles.

### 6.1 - VERIFY OPERATION

To verify the operation of the monitor and sensors, make sure that they are responding to contact with liquids and/or changing liquid levels. This test should be performed regularly.

To activate the monitor's "self-test" function, remove the transparent front cover and press the "TEST" switch, located on the upper edge of the circuit board (refer to FIGURE 2 and section 3.3). The self-test lasts as long as the "TEST" switch is pressed. After testing, press the "ACKNOWLEDGE" and "RESET" switches on the right side of the enclosure to deactivate the buzzer and latched relays (if configured).

### 6.2 - TROUBLESHOOTING

#### **BEFORE POWER-UP:**

Check all connections.

#### **WHAT TO DO:**

Verify that the power supply and sensor connections are secure, and that polarity is correct.  
Verify that all the relay connections are properly made.

#### **ON POWER-UP:**

Nothing happens.

#### **WHAT TO DO:**

Verify that the power supply has been switched on.  
Verify that the power switch on the circuit board is in the ON (up) position.

Some Alarm LEDs remain ON.

Make sure that the Sensor DIP switch is properly configured for the type of sensor connected, for each channel in alarm.  
Check sensor location for possible alarm condition.

#### **DURING OPERATION:**

All the LEDs are OFF.

#### **WHAT TO DO:**

Check the power supply to the monitor.  
Check the power switch on the circuit board.

Relays operate auxiliary equipment incorrectly.

Verify that the auxiliary equipment is correctly connected to the relay contacts (N/O or N/C) for the application. (See section 3.2)

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

### 6.2.1- SENSOR DATA

Normal operating (non-alarm) characteristics of all compatible ATI sensors:

<u>MODEL</u>	<u>TYPE</u>	<u>DETECTION</u>	<u>LOOP RESISTANCE</u>
ATI-5005 series	CONDUCTIVITY	Water	Open circuit
ATI-5007	CABLE	Water	Open circuit
		Petroleum	Low resistance ~40K ohms/ft
ATI-5008	VACUUM	Interstitial space	Open circuit
ATI-5010 series	LEVEL	Liquid levels	Open circuit
			Closed circuit (float reversed)
ATI-5016 series	CABLE or SENSOR	Petroleum	Low resistance ~40K ohms/ft
ATI-5020	PROBE	Liquid level	Open circuit
ATI-5025	CABLE	Water on floor (area)	Open circuit

During an alarm condition, the operating characteristics of a sensor will reverse itself. A liquid, vacuum, pressure, or float sensor's open circuit will become a low resistance closed circuit. A float sensor's closed circuit will become an open circuit. A petroleum sensor's low resistance will become a high resistance of more than 10 Meg ohms. Any of these conditions will activate an alarm and relay on the monitor.