



2700 Series Ultrasonic Point Level Switches

General Instructions

The Ultrasonic Point Level Switch indicates liquid presence/absence within a sensor cavity. Two piezoelectric crystals face each other across the sensor cavity. One crystal transmits an ultrasonic signal; the other crystal receives the signal.

When the sensor cavity is empty, the receiver detects a weak signal because air is a poor conductor of ultrasonic waves. When process liquid fills the sensor cavity, the receiver detects a strong signal because liquids are good conductors of ultrasonic waves.

The 2700 is comprised of two parts. The first is the electronics; the second is the sensor.

These instructions provide information for installation, process connection, electrical connection, configuration, operation and troubleshooting of the 2700 Series Ultrasonic Level Switch.



2700 Single
Point with "U"
gap style sensor



2700 Single Point
with "N" notch
style sensor



2700 Dual Point
Flange with
"N" notch
style sensor

NOTE: If you suspect that a product is defective, contact the factory or the SOR® Representative in your area for a return authorization number (RMA). This product should only be installed by trained and competent personnel.

Table of Contents

Installation	2
Remote Cable Connection	4
Sensor Cable Connections	5
Electrical Connection	6
Interface Board Arrangement	8
LEDs	9
Failsafe Switch	10
Time Delay	11
Pump Logic	12
Self Test	14
Troubleshooting	15
Calibration	17
Sensor Test Procedure	20
Control Drawings	21
Dimensions	22

*Design and
specifications are
subject to change
without notice.*

*For latest revision,
go to **sorinc.com***

Installation

NOTE: *This product is not intended for use in applications that utilize ultrasonic equipment for cleaning or other uses that propagate ultrasonic waves through the process liquid being measured.*

Ultrasonic Level Sensors can be mounted by inserting the sensor through a fitting in a vessel, or the sensor may be suspended over an open sump or basin.

Keep the sensor cavity out of the direct flow of liquid fill to prevent false readings. Install a baffle to divert liquid flow if necessary.

Avoid installation of sensor in turbulent areas such as pump discharge or suction. Air pockets may be present in these areas which may cause false indication.



DO NOT weld any part of this instrument.

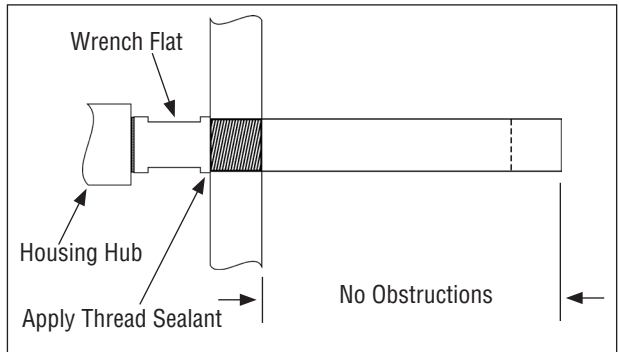
Tank or Vessel

Make sure that the sensor can be fully inserted and tightened without interference from obstructions inside the tank or vessel. The sensor must project through a tank fitting so that the sensor cavity is at least 1" (25.4mm) beyond the inner wall of the tank.

Apply suitable sealant to the process connection to prevent process leakage.

Use an open-end wrench to tighten the sensor into the process connection.

Do not use the housing hub as a handle to tighten the process connection.



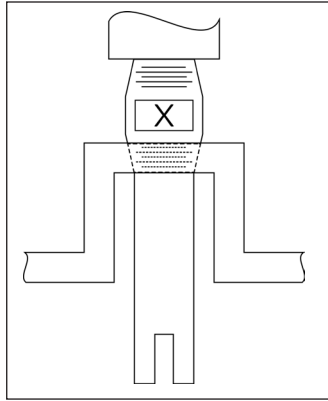
Horizontal Mounting

Horizontal mounting is recommended for use in highly viscous liquids, or liquids containing sludge and debris. When tightened securely, the sensor cavity must be perpendicular to the liquid surface for optimum drainage when process liquid level drops below the sensor cavity.

An alignment mark X stamped on the wrench flat (or on the dry face of the flange below the housing) shows sensor cavity orientation.

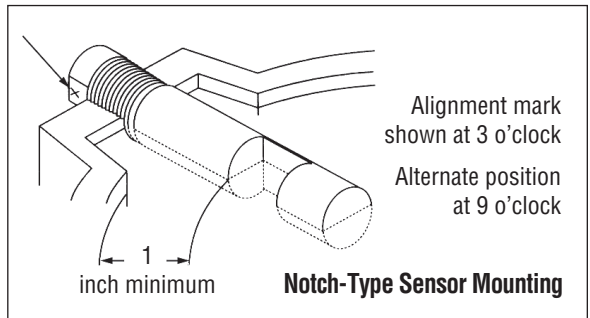
Vertical Gap-Type Sensor (Series 371-U)

Optimum drainage occurs when the X mark is located at 6 or 12 o'clock.



Horizontal Notch-Type Sensor (Series 371-N & 372-N)

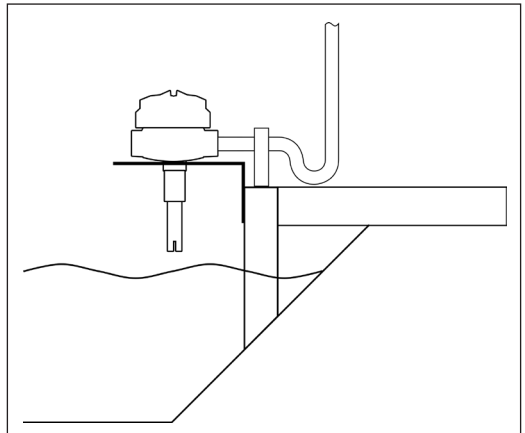
Optimum drainage occurs when the X mark is located at 3 or 9 o'clock.



Open Sump or Basin

Do not suspend the unit by rigid conduit installed in the electrical hub. When installing the unit over an open sump or basin use a suitable bracket to support the instrument.

NOTE: The instrument must be positioned so that overflow does not flood the electrical housing.



Remote Cable Connection

(Applies to remote units only – RM Sensor Accessory)



Electrical power must be disconnected from explosion proof models before the cover is removed. Failure to do so could result in severe personal injury or substantial property damage

Conduit must be installed between the sensor base and electronics housing to provide a raceway for sensor extension cables. The sensor base and the electronics housing are suitable for use in Class I, Groups C, D; Class II, Groups E, F, G; Class III, Division 1 Hazardous Locations. All conduit and fittings used for the installation must meet or exceed this rating to maintain the explosion proof integrity of the assembly.

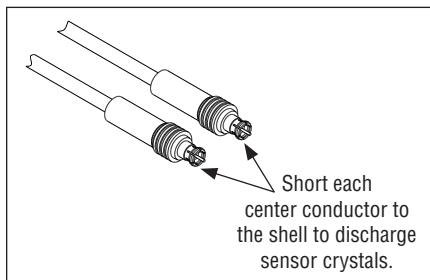
Ensure that wiring conforms to all applicable local and national electrical codes and install unit(s) according to relevant national and local safety codes.

Single point sensors (Series 371-U & 371-N) with the RM accessory are supplied with two coax sensor extension cables attached to the sensor. Dual point sensors (Series 372-N) with the RM accessory are supplied with three coax sensor extension cables attached to the sensor. One end of the cables is terminated and labeled at the factory.

There is no secondary housing required for remote mount units.

Discharge the Sensor

Temperature changes which occur during shipment may result in a small electrical charge inside the sensor crystals. This charge is harmless to humans but may result in damage to the electronics if the sensor is plugged in before it is discharged. To discharge the sensor, touch a wire to each sensor connector so that the center conductor and outside shell make contact.



Fishing the Sensor Extension Cables

Use care to avoid damaging the factory installed MCX plugs while fishing the sensor extension cables through the conduit. Pull cables from the sensor base so that the free ends follow the fish through the conduit.

Sensor Cable Connections (Applies to all units)

Sensor Connections Inside Electronics Housing

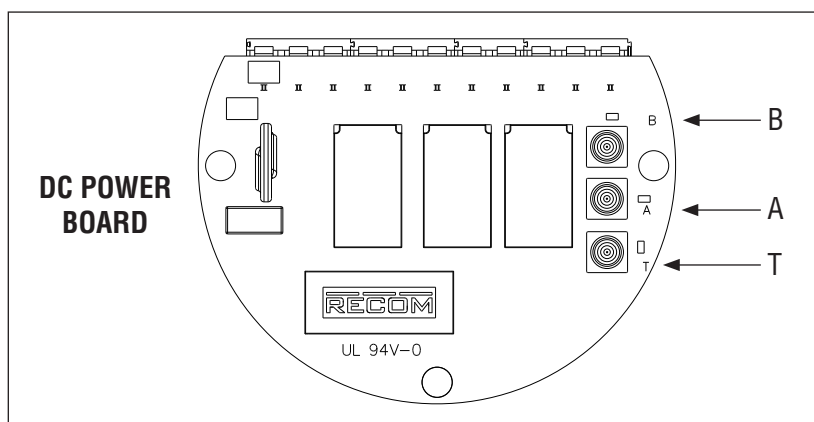
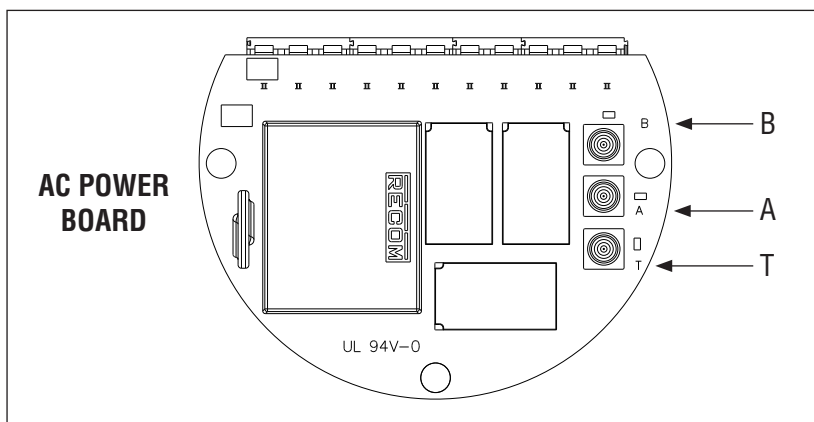
Inside the electronics housing are the interface board and power board which are secured with screws. Remove the screws and lift the board assembly out of the housing to access the back side of the power board.

The plug end of the sensor cables have been labeled at the factory. The connector labels appear on the power board itself and can also be seen in the drawings below.

- 1 Connect Cable A to A Connector (Sensor Cavity A/Upper Gap)
- 2 Connect Cable B to B Connector (Sensor Cavity B/Lower Gap)

NOTE: Cable B and B Connector are only supplied on dual point sensors.

- 3 Connect Cable T to T Connector



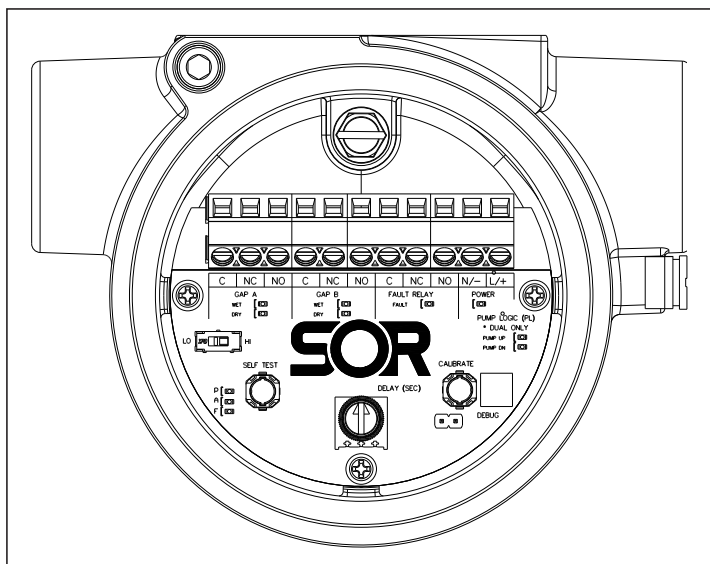
Electrical Connection



Electrical power must be disconnected from explosion proof models before the cover is removed. Failure to do so could result in severe personal injury or substantial property damage.

Ensure that wiring conforms to all applicable local and national electrical codes and install unit(s) according to relevant national and local safety codes.

An eleven-position terminal strip provides connections for SPDT Liquid Level Relay Contacts, SPDT Fault Relay Contacts, and Line Power. Terminal positions are labeled on the interface board. Grounding screws are located on the housing exterior and interior. Terminal strip allows for 12-16 Gauge wires.



Liquid Level Relay Contact Terminals

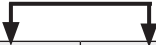
Before making connections to the Liquid Level Relay Contact Terminals on the eleven-position terminal strip, review the tables below to understand how the device will operate and to determine the failsafe mode best suited for the application. Further information on the failsafe, its positions and continuity charts can be found on Page 10.

Sensor Type	Failsafe Switch Position	Gap A	Relay A	Fault Relay
Single Point 371-U or 371-N	LO	DRY	C-NO	C-NO
	LO	WET	C-NC	C-NO
	HI	DRY	C-NC	C-NO
	HI	WET	C-NO	C-NO
	NO POWER	X	C-NC	C-NC

Sensor Type	Failsafe Switch Position	Gap A	Relay A (Upper)	Gap B	Relay B (Lower)	Fault Relay
Dual Point 372-N	LO	DRY	C-NO	DRY	C-NO	C-NO
	LO	DRY	C-NO	WET	C-NC	C-NO
	LO	WET	C-NC	WET	C-NC	C-NO
	HI	DRY	C-NC	DRY	C-NC	C-NO
	HI	DRY	C-NC	WET	C-NO	C-NO
	HI	WET	C-NO	WET	C-NO	C-NO
	NO POWER	X	C-NC	X	C-NC	C-NC

Fault Relay Contact Terminals

An SPDT Fault Relay comes standard on all units. The relay is energized with power supplied to the normally open contacts when there are no system faults. If there is a loss of power or fault in the physical/electrical integrity of the device, the relay de-energizes and the normally open contacts cease being powered.

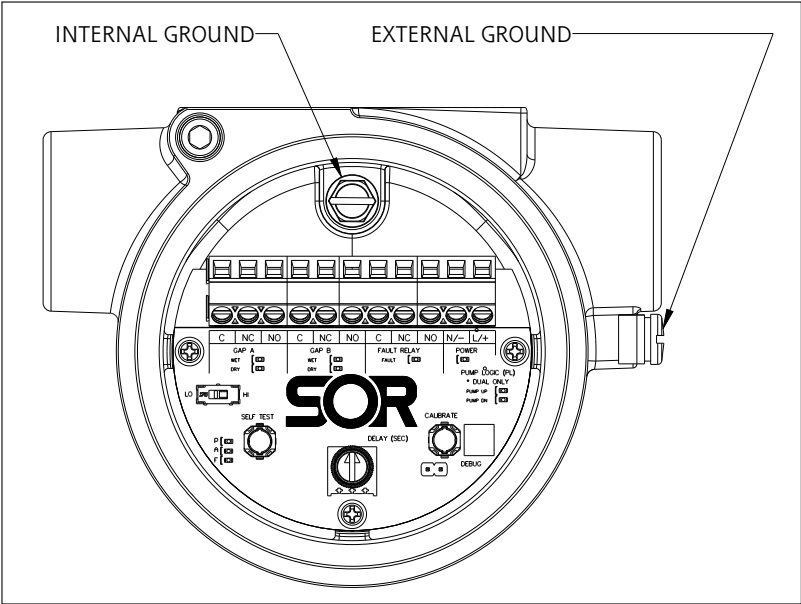
Device Status	Fault Relay Contact Continuity Chart		
Functioning			
	C	NC	NO
	FAULT RELAY		
	Relay Energized		
Sensor/Electronics Malfuction Loss of Power Supply			
	C	NC	NO
	FAULT RELAY		
	Relay De-energized		

Line Power Terminals

Terminals are provided for incoming power leads on the eleven-position terminal strip. Supply voltage for each unit is printed on the nameplate. Make sure that the available line voltage is suitable for the device’s power supply.

Ground Terminals

Ground (earth) screws are supplied on both the base of the housing interior and on the exterior of the housing.

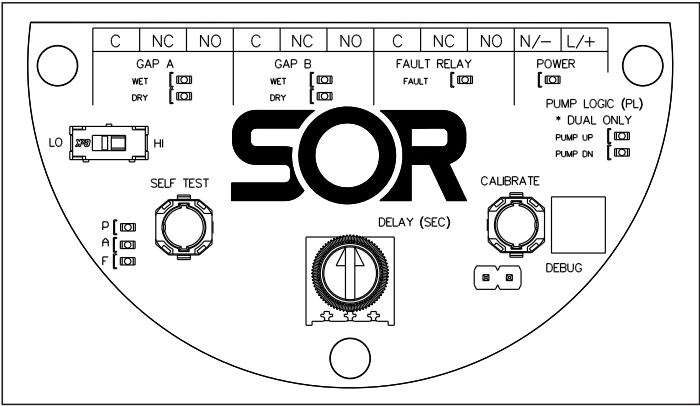


Interface Board Arrangement

Below is a drawing of the interface board showing the locations of the LEDs and other features (such as Time Delay, Pump Logic, etc.) referenced in these instructions.



Units in Hazardous Locations – ensure the work area is declassified before removing the explosion proof cover to access the interface board. Failure to do so could result in severe personal injury or substantial property damage.



LEDs

The table below describes the LEDs on the interface board and how they behave during normal operation.

LED	Color	Normal Operating Status	Unit Type
Gap A - WET	Blue	On when liquid is present in Gap A	Applies to all units
Gap A - DRY	Amber	On when no liquid is present in Gap A	
Gap B - WET	Blue	On when liquid is present in Gap B	Dual point units only
Gap B - DRY	Amber	On when no liquid is present in Gap B	
Fault	Red	Off - see Troubleshooting section if the Fault LED is on or flashing	Applies to all units
Power	Green	On when device is receiving proper supply power	
Self Test - P	Green	Off - used during the Self Test to indicate unit passed	
Self Test - A	Amber	Off - flashes one time upon initiating the Self Test	
Self Test - F	Red	Off - used during the Self Test to indicate unit failed	
Pump Up	Blue	Off	Single point units
		On when unit is set to Pump Up mode	Dual point units only
		Flashing when Pump Up mode operation is engaged	
		Off when unit is set to Pump Down mode or when Pump Logic is disabled	
Pump Down	Amber	Off	Single point units
		On when unit is set to Pump Down mode	Dual point units only
		Flashing when Pump Down mode operation is engaged	
		Off when unit is set to Pump Up mode or when Pump Logic is disabled	

Failsafe Switch

A field-selectable failsafe switch comes standard on all units which reverses the relay actuation. Units shipped from the factory are set to the HI position as default.

With the sensor cavity/cavities empty and the failsafe switch in the HI position, the normally open relay contacts remain open and the WET LED(s) are off.

With the sensor cavity/cavities filled and the failsafe switch in the HI position, the normally open relay contacts are closed and the WET LED(s) are on.

NOTE: The WET LED is on only when the relay is energized.

Refer to the continuity charts below for how the device will operate depending on the position of the failsafe switch.

Single Point Units (Series 371-N & 371-U)

Failsafe Switch Position	Sensor Condition	Liquid Level Relay Contacts
HI Position Relay energized on high level	Liquid above sensor	 C NC NO
		RELAY A
		Relay Energized
	Liquid below sensor	 C NC NO
		RELAY A
		Relay De-energized
LO Position Relay energized on low level	Liquid above sensor	 C NC NO
		RELAY A
		Relay De-energized
	Liquid below sensor	 C NC NO
		RELAY A
		Relay Energized

Dual Point Units (Series 372-N)

Failsafe Switch Position	Sensor Condition	Liquid Level Relay Contacts Continuity Chart						
HI Position	Liquid above sensor							
		C	NC	NO	C	NC	NO	
		RELAY A			RELAY B			
	Relay Energized							
	Relay energized on high level	Liquid below sensor						
			C	NC	NO	C	NC	NO
RELAY A			RELAY B					
Relay De-energized								
LO Position	Liquid above sensor							
		C	NC	NO	C	NC	NO	
		RELAY A			RELAY B			
	Relay De-energized							
	Relay energized on low level	Liquid below sensor						
			C	NC	NO	C	NC	NO
RELAY A			RELAY B					
Relay Energized								

Time Delay

All units include an adjustable time delay, which is set using the dial on the interface board. It is an integral timer which starts when liquid level is either detected in or removed from a sensor cavity. If the sensor cavity reverts to its prior state before the timer completes its cycle, the timer resets until the sensor cavity changes state again. When the timer completes its cycle, the liquid level relays will change state.

Turning the dial fully in the counterclockwise direction corresponds to a 0 second delay; when turned fully in the clockwise direction, the time delay is approximately 30 seconds.

NOTE: For dual point units using Pump Logic, the Time Delay setting is inactive while in Pump Up or Pump Down mode.

Pump Logic

(Applies to dual point units only - Series 372-N)

Devices configured to use a dual point sensor can be set to operate in Pump Logic mode.

In the standard operating mode (Pump Logic disabled), Relays A and B actuate independently when liquid level is detected in each sensor cavity. With Pump Logic enabled, Relays A and B work in conjunction with each other.

While in Pump Up mode, relays A and B are energized when liquid level is not detected in both the upper (A) and lower (B) sensor cavities. As the liquid level rises, once it reaches the upper sensor cavity (A), the relays de-energize and remain in this state until liquid level is once again no longer detected in both sensor cavities.

While in Pump Down mode, relays A and B are energized when liquid level is detected in both the upper (A) and lower (B) sensor cavities. After the liquid level falls and is not detected in both sensor cavities, the relays de-energize and remain in this state until liquid level is once again detected in both sensor cavities.

Pump Logic Mode	Sensor Condition (GAP A & B)	Liquid Level Relay Contacts Continuity Chart					
Pump Up Mode	WET						
		C	NC	NO	C	NC	NO
		RELAY A			RELAY B		
	Relay De-energized						
	DRY						
		C	NC	NO	C	NC	NO
RELAY A			RELAY B				
Relay Energized							
Pump Down Mode	WET						
		C	NC	NO	C	NC	NO
		RELAY A			RELAY B		
	Relay Energized						
	DRY						
		C	NC	NO	C	NC	NO
RELAY A			RELAY B				
Relay De-energized							

NOTE: While in Pump Up or Pump Down Mode, the Time Delay setting is inactive.

With the device powered on, the Pump UP and Pump DOWN LEDs indicate the Pump Logic mode the device is currently configured to.

Pump Logic Mode	Pump UP LED	Pump DOWN LED
Standard (Pump Logic Disabled)	Off	Off
Pump Up Mode	On	Off
Pump Down Mode	Off	On

To configure the Pump Logic mode:

- ➊ Press and release the Calibrate button twice to access the Pump Logic mode setting. This will turn the Gap A and Gap B LEDs off and the Pump UP and Pump DOWN LEDs will begin flashing.

NOTE: After 10 seconds of inactivity, the device will exit the Pump Logic mode setting without saving any changes and return to the normal operating state.

- ➋ While in this setting, the Pump UP and Pump DOWN LEDs indicate which Pump Logic mode is selected.

Pump Logic Mode Selection	Pump UP LED	Pump DOWN LED
Standard (Pump Logic Disabled)	Flashing	Flashing
Pump Up Mode	Flashing	Off
Pump Down Mode	Off	Flashing

- ➌ To select the next Pump Logic mode, press and release the Self Test button. The Pump UP and Pump DOWN LEDs will change accordingly based on the table above.
- ➍ Once the desired Pump Logic mode is selected, press and hold the Self Test button to save the updated configuration.
- ➎ After holding the Self Test button for approximately 5 seconds, all the LEDs will begin flashing rapidly, indicating the Self Test button can be released.
- ➏ The updated Pump Logic mode has now been saved, and the device will return to the normal operating state.

After returning to the normal operating state, the status of the Pump UP and Pump DOWN LEDs can be used to verify the desired Pump Logic mode updated correctly.

Self Test Button

A Self Test button comes standard on all units. The Self Test button can be used to manually change the state of the relays to check that the 2700 Ultrasonic Level Switch is properly connected to the control system. The Self Test button also performs a check for continuity between the Electronics and Sensor and verifies the transmit and receive crystals are operating correctly.

- 1 Press and hold the Self Test button. The relays will engage and change state while the button is being held. Release the button to disengage the relays and they will return to their normal state.
- 2 Simultaneously, when the button is pressed, the device will check the connections between the Electronics and Sensor and the operation of the transmit and receive crystals.

If there are no issues:

- 3 The green Self Test P LED will flash on and off 5 times and then remain off.
- 4 The self test has completed, and the device will return to the normal operating state.

If there is a failure:

- 5 The red Self Test F LED will flash on and off 5 times then remain off.
- 6 Afterwards, the Gap A and Gap B WET/DRY and Fault LEDs will begin flashing. The specific combination of flashing LEDs indicates the source of the failure, which are found in the tables below.

NOTE: The failures in the tables below are listed by priority. The flashing LEDs indicating the failure source follow this ranking sequence. If there are multiple failures, the LEDs will always reflect the highest priority failure until it has been corrected. After resolving the highest priority failure and restarting the self test process, if there is still an issue the LEDs will then reflect the next highest priority failure.

Single Point Units (Series 371-N & 371-U)

Priority	Failure	Gap A WET LED	Gap A DRY LED	Gap B WET LED	Gap B DRY LED	Fault LED
1	T cable disconnected or T crystal damaged	Flashing	Off	Flashing	Off	Flashing
2	A cable disconnected or A crystal damaged	Off	Flashing	Off	Off	Flashing

Dual Point Units (Series 372-N)

Priority	Failure	Gap A WET LED	Gap A DRY LED	Gap B WET LED	Gap B DRY LED	Fault LED
1	T cable disconnected or T crystal damaged	Flashing	Off	Flashing	Off	Flashing
2	A cable disconnected or A crystal damaged	Off	Flashing	Off	Off	Flashing
3	B cable disconnected or B crystal damaged	Off	Off	Off	Flashing	Flashing

- 7 After identifying the failure source, power the device off.
- 8 Unscrew the interface board from the housing to access the back side of the power board.
- 9 Check the sensor cable identified as the failure source. Ensure it is plugged in to the proper connector on the power board.
- 10 Restore power to the device and restart the self test process. Repeat the self test process until all failures are resolved.
- 11 If a failure still exists after verifying the sensor cables are plugged into the correct connectors, there may be damage to the sensor crystals. Please contact the factory for assistance.

Troubleshooting

Symptom	Possible Causes	Solutions
Fault relay de-energized	No power to the unit.	Check terminal strip wiring. Verify the supply voltage matches the information on the nameplate. Restore power to the device.
	Internal/external damage to the device.	If the other solution does not resolve the issue, there may be internal/external damage to the device. Contact the factory for assistance.
No response to liquid level	Unit needs recalibration.	Perform both a dry and wet calibration (See Page 17).
	Sensor connection error.	Perform a self test using the Self Test button (See Page 20). If there is a failure with the sensor connections, this process will identify which cables/connections should be reviewed. Check the A, B (dual point units only), and T sensor cables and verify they are plugged into the proper connector on the power board.
	Internal/external damage to the device.	If the other solutions do not resolve the issue, there may be internal/external damage to the device. Contact the factory for assistance.
Relay(s) not changing state	Low voltage to the unit.	Check terminal strip wiring. Verify the supply voltage matches the information on the nameplate.
	Relay contacts are wired incorrectly.	Check terminal strip wiring.
	Sensor connection error.	Perform a self test using the Self Test button (See Page 20). If there is a failure with the sensor connections, this process will identify which cables/connections should be reviewed. Check the A, B (dual point units only), and T sensor cables and verify they are plugged into the proper connector on the power board.
	Internal/external damage to the device.	If the other solutions do not resolve the issue, there may be internal/external damage to the device. Contact the factory for assistance.

Troubleshooting *(continued)*

Symptom	Possible Causes	Solutions
Power and Fault LEDs are on with Gap A and Gap B WET and DRY LEDs flashing	Sensorless calibration required.	Perform the sensorless calibration procedure (See page 17). Ensure the Sensor is disconnected from the Electronics before beginning the calibration process.
Power and Fault LEDs are on with Gap A and Gap B DRY LEDs flashing	Dry calibration required.	Perform the dry calibration procedure (See page 18). Ensure the Sensor cavity/cavities are completely dry with no liquids present before beginning the calibration process.
Power and Fault LEDs are on with Gap A and Gap B WET LEDs flashing	Wet calibration required.	Perform the wet calibration procedure (See Page 19). Ensure the Sensor cavity/cavities are completely filled with the process media before beginning the calibration process.
Fault LED on	Sensor connection error.	Perform a self test using the Self Test button (See page 17). If there is a failure with the sensor connections, this process will identify which cables/connections should be reviewed. Check the A, B (dual point units only), and T sensor cables and verify they are plugged into the proper connector on the power board.
	Internal/external damage to the device.	If the other solutions do not resolve the issue there may be internal/external damage to the device. Contact the factory for assistance.
Power LED is on and Fault LED flashing	System configuration error.	This issue cannot be resolved by the user. Please contact the factory for assistance.

Calibration

Each unit includes the capability to perform a sensorless, dry, and wet calibration. All 3 calibration procedures may be required during troubleshooting.

NOTE: Improper calibration can cause a unit to no longer operate correctly.

Sensorless Calibration

- ❶ Ensure the sensor is disconnected from the Electronics.
- ❷ Apply power to the device and allow it to boot up.
- ❸ Verify there is no fault state before proceeding.
- ❹ Press and hold the Calibrate button.
- ❺ After holding the button for approximately 3 seconds, all the LEDs will begin flashing on and off repeatedly.
- ❻ Release the Calibrate button. The Gap A and Gap B WET and DRY LEDs will begin flashing on and off repeatedly.
- ❼ The device is now in the calibration selection mode with the sensorless calibration selected (indicated by both WET and DRY LEDs flashing on and off repeatedly).

NOTE: After 10 seconds of inactivity, the device will exit the calibration selection mode and return to the normal operating state.

- ❸ To initiate the sensorless calibration process, press and hold the Calibrate button.
- ❹ After holding the button for approximately 3 seconds, all the LEDs will begin flashing on and off repeatedly.
- ❺ Release the Calibrate button. At this point, the sensorless calibration cycle will proceed without requiring further input from the user.
- ❻ At the beginning of the calibration cycle, the Gap A and Gap B WET and DRY LEDs will be flashing rapidly but will flash slower as the calibration proceeds.
- ❼ When the calibration cycle is complete, Gap A and Gap B WET and DRY LEDs will flash in the following pattern:
 - a. Gap A and Gap B WET and DRY LEDs will rapidly flash on and off 5 times.
 - b. Gap A and Gap B WET and DRY LEDs will flash on for 1 second and then turn off.
 - c. This sequence will be repeated 3 times.

NOTE: If any errors occur during the calibration cycle, the Fault LED will remain lit for this entire sequence.

- ❻ After the flashing LED sequence has completed, the unit will return to the normal operating state.

Calibration *(continued)*

Dry Calibration

- ❶ Connect the sensor to the electronics.
- ❷ Apply power to the device and allow it to boot up.
- ❸ Verify there is no fault state before proceeding.
- ❹ Ensure that the sensor cavity/cavities are completely dry with no liquid present.
- ❺ Press and hold the Calibrate button.
- ❻ After holding the button for approximately 3 seconds, all the LEDs will begin flashing on and off repeatedly.
- ❼ Release the Calibrate button. The Gap A and Gap B WET and DRY LEDs will begin flashing on and off repeatedly.
- ❽ The device is now in the calibration selection mode with the sensorless calibration selected (indicated by both WET and DRY LEDs flashing on and off repeatedly).

NOTE: *After 10 seconds of inactivity, the device will exit the calibration selection mode and return to the normal operating state.*

- ❾ Press and release the Calibrate button once.
- ❿ The LEDs will change to have only the Gap A and Gap B DRY LEDs flashing on and off repeatedly. This indicates the dry calibration mode is currently selected.
- ⓫ To initiate the dry calibration process, press and hold the Calibrate button.
- ⓬ After holding the button for approximately 3 seconds, all the LEDs will begin flashing on and off repeatedly.
- ⓭ Release the Calibrate button. At this point, the dry calibration cycle will proceed without requiring further input from the user.
- ⓮ At the beginning of the calibration cycle, the Gap A and Gap B DRY LEDs will be flashing rapidly but will flash slower as the calibration proceeds.
- ⓯ When the calibration cycle is complete, Gap A and Gap B DRY LEDs will flash in the following pattern:
 - a. Gap A and Gap B DRY LEDs will rapidly flash on and off 5 times.
 - b. Gap A and Gap B DRY LEDs will flash on for 1 second and then turn off.
 - c. This sequence will be repeated 3 times.

NOTE: *If any errors occur during the calibration cycle, the Fault LED will remain lit for this entire sequence.*

- ⓰ After the flashing LED sequence has completed, the unit will return to the normal operating state.

Calibration *(continued)*

Wet Calibration

- ❶ Connect the sensor to the electronics.
- ❷ Apply power to the device and allow it to boot up.
- ❸ Verify there is no fault state before proceeding.
- ❹ Submerge sensor into the process media, ensuring that the sensor cavity/ cavities are completely filled with liquid.
- ❺ Press and hold the Calibrate button.
- ❻ After holding the button for approximately 3 seconds, all the LEDs will begin flashing on and off repeatedly.
- ❼ Release the Calibrate button. The Gap A and Gap B WET and DRY LEDs will begin flashing on and off repeatedly.
- ❽ The device is now in the calibration selection mode with the sensorless calibration selected (indicated by both WET and DRY LEDs flashing on and off repeatedly).

NOTE: *After 10 seconds of inactivity, the device will exit the calibration selection mode and return to the normal operating state.*

- ❾ Press and release the Calibrate button once.
- ❿ The LEDs will change to have only the Gap A and Gap B DRY LEDs flashing on and off repeatedly. This indicates the dry calibration mode is currently select.
- ⓫ Press and release the Calibrate button once.
- ⓬ The LEDs will change to only the Gap A and Gap B WET LEDs flashing on and off repeatedly. This indicates the wet calibration mode is currently selected.
- ⓭ To initiate the wet calibration process, press and hold the Calibrate button.
- ⓮ After holding the button for approximately 3 seconds, all the LEDs will begin flashing on and off repeatedly.
- ⓯ Release the Calibrate button. At this point, the wet calibration cycle will proceed without requiring further input from the user.
- ⓰ The Gap A and Gap B WET LEDs will begin flashing rapidly at the beginning of the calibration cycle but will flash slower as the calibration proceeds.
- ⓱ When the calibration cycle is complete, Gap A and Gap B WET LEDs will flash in the following pattern:
 - a. Gap A and Gap B WET LEDs will rapidly flash on and off 5 times.
 - b. Gap A and Gap B WET LEDs will flash on for 1 second and then turn off.
 - c. This sequence will be repeated 3 times.

NOTE: *If any errors occur during the calibration cycle, the Fault LED will remain lit for this entire sequence.*

- ⓲ After the flashing LED sequence has completed, the unit will return to the normal operating state.

Sensor Test Procedure

Older generations of SOR ultrasonic level switches used the sensor test procedure during troubleshooting to evaluate the sensor condition and determine if it was usable, needed to be returned to the factory or replaced completely. These older sensors were built with outdated cable connectors whose style made measuring the capacitance easier when performing the sensor test procedure.

The current generation of 2700 ultrasonic level switches utilize modern connector styles with a compact footprint which makes the sensor test procedure incredibly challenging to perform even with the use of a very fine tipped meter lead and clip.

Rather than using the sensor test procedure for troubleshooting, the Self Test feature should be used instead. It provides the same utility as the sensor test procedure but eliminates the need to measure the capacitance across the shell and pin of the connector.

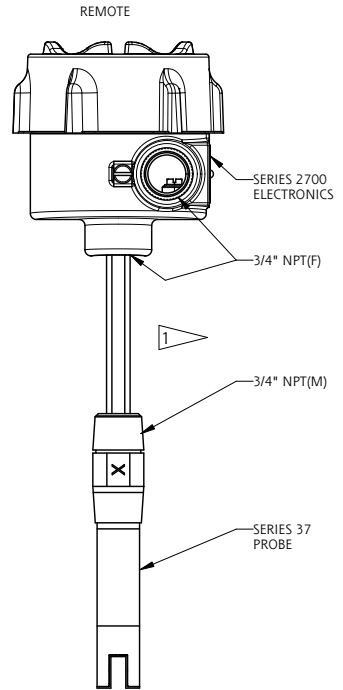
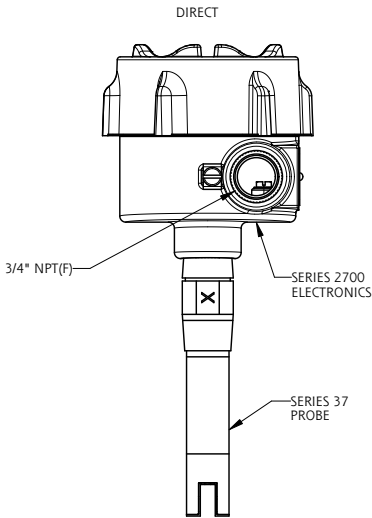
Although not recommended, the sensor test procedure can still be performed per the instructions below.

Vertical Gap-Type Sensors (Series 371-U)

- ❶ Disconnect a sensor cable from the back of the power board. Measure capacitance across the shell and pin of the connector.
 - a. Capacitance from 2,000 to 3,000 pF indicates the sensor is okay. Plug the sensor cable back into the power board. Go to Step 2.
 - b. Capacitance lower than 2,000 pF or higher than 3,000 pF indicates the sensor is bad. Go to Step 3.
- ❷ Repeat Step 1 for the other sensor cable.
- ❸ If the sensor is bad, please contact the factory for assistance.

Horizontal Notch-Type Sensors (Series 371-N & 372-N)

- ❶ Disconnect a sensor cable from the back of the power board. Measure capacitance across the shell and pin of the connector.
 - a. Capacitance from 600 to 1,500 pF indicates the sensor is okay. Plug the sensor cable back into the power board. Go to Step 2.
 - b. Capacitance lower than 600 pF and higher than 1,500 pF indicates the sensor is bad. Go to Step 3.
- ❷ Repeat Step 1 for the other sensor cables.
- ❸ If the sensor is bad, please contact the factory for assistance.



NOTES:

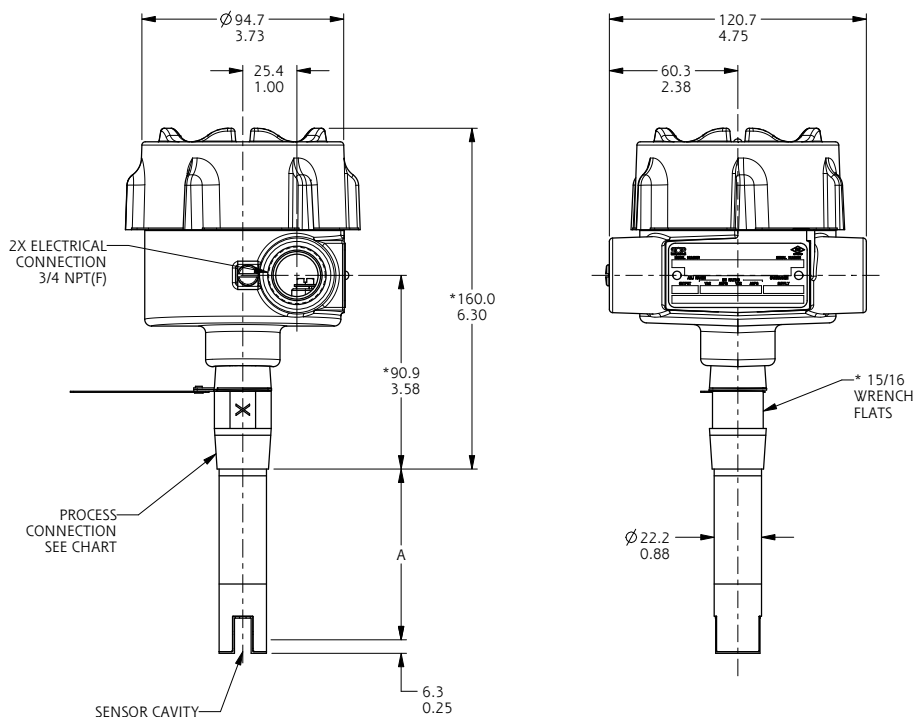
1. WIRING SHALL BE INSTALLED IN COMPLIANCE WITH THE NATIONAL ELECTRIC CODE FOR HAZARDOUS (CLASSIFIED) LOCATIONS. SUITABLE LISTED SEAL FITTINGS SHALL BE INSTALLED WITHIN 18" OF EACH ELECTRICAL CONNECTION.
2. A MINIMUM OF 5 FULL THREAD ENGAGEMENT BETWEEN ALL NPT THREAD JOINTS AND BETWEEN PROBE AND HOUSING CONNECTIONS IS REQUIRED PER NEC.

Dimensions

Type U Single Point - Threaded

Linear = mm/inches

Drawing 0390072

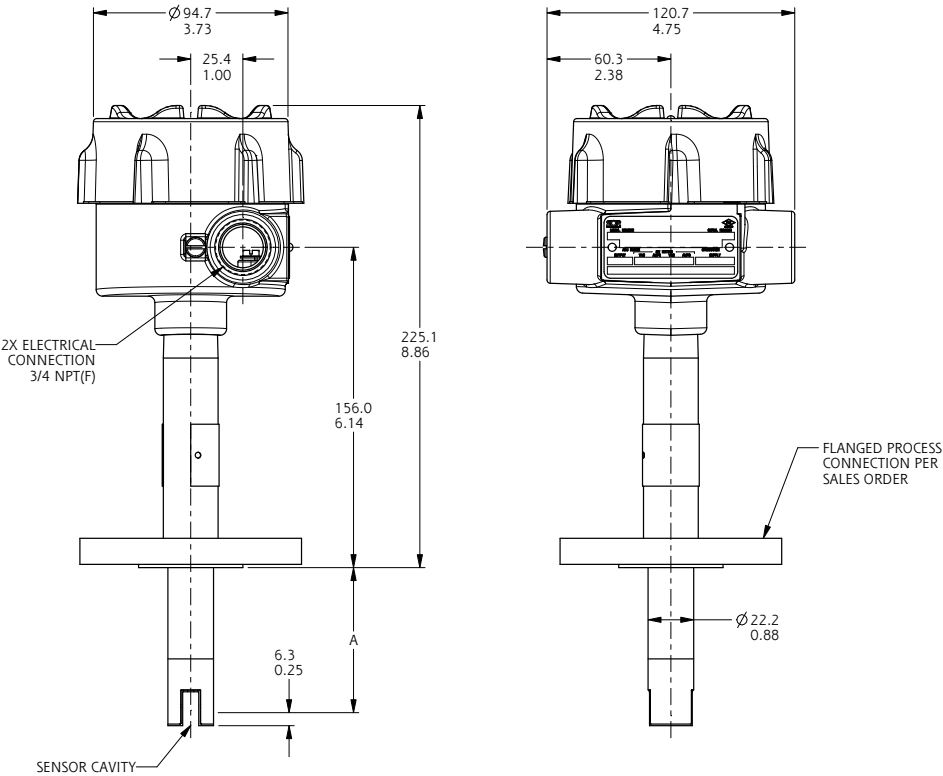


*Dimensions are for reference only.
Contact the factory for certified drawings
for a particular model number.*

PROCESS CONN SIZE	* LENGTH	* WRENCH FLATS
3/4 NPTM	SHOWN	SHOWN
1 NPTM	ADD 8.0 0.31	1-3/16
1-1/2 NPTM	ADD 9.5 0.38	1-3/4
2 NPTM	ADD 9.5 0.38	2-1/4

Type U Single Point - Flanged

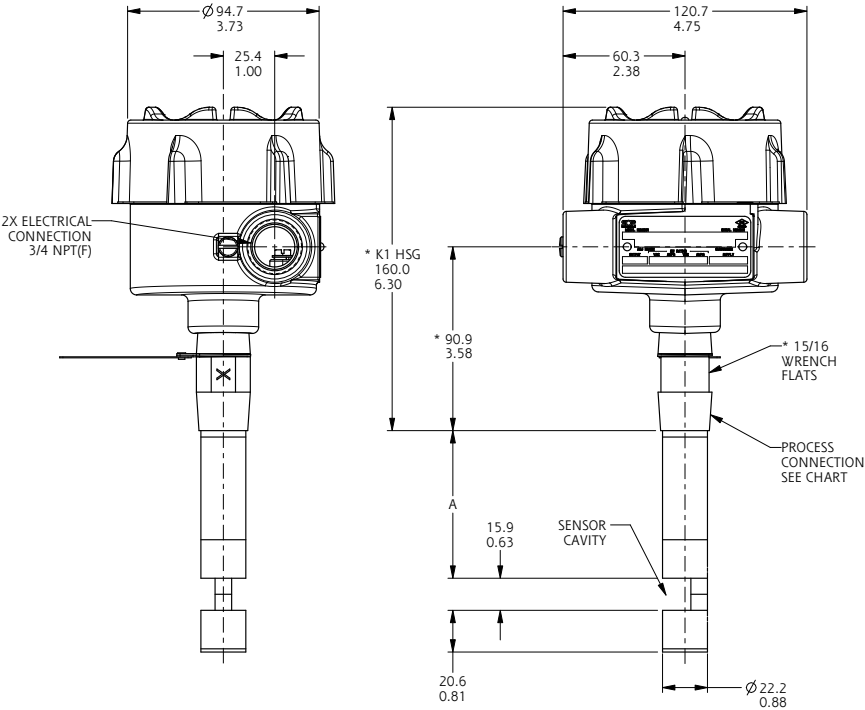
Linear = mm/inches
Drawing 0390073



*Dimensions are for reference only.
Contact the factory for certified drawings
for a particular model number.*

Type N Single Point - Threaded

Linear = mm/inches
Drawing 0390070

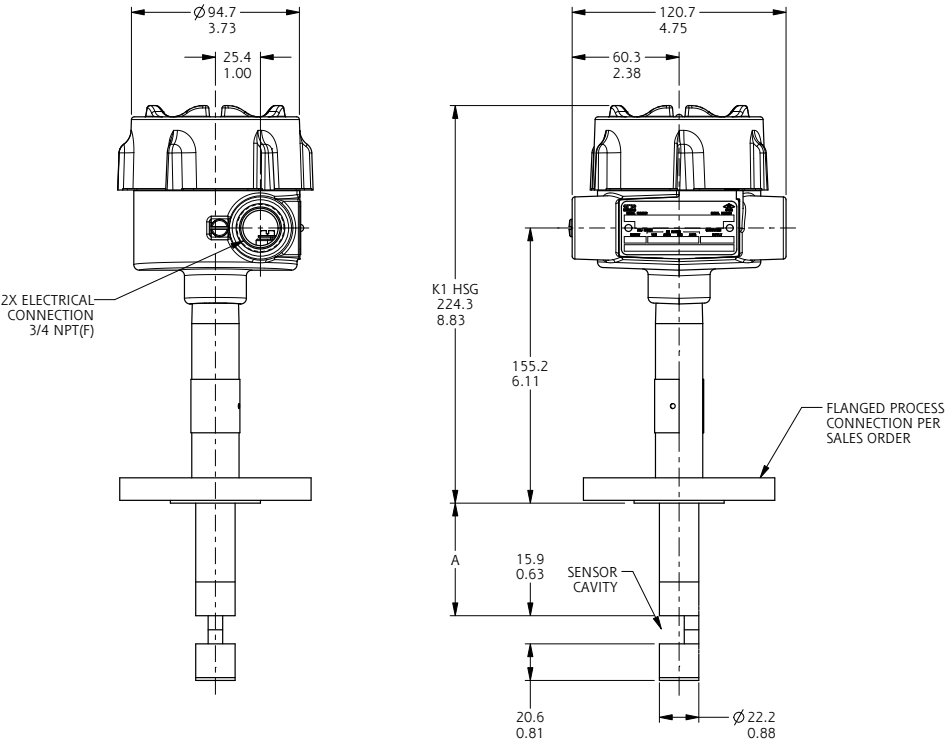


Dimensions are for reference only.
Contact the factory for certified drawings
for a particular model number.

PROCESS CONN SIZE	* LENGTH	* WRENCH FLATS
3/4 NPTM	SHOWN	SHOWN
1 NPTM	ADD 8.0 0.31	1-3/16
1-1/2 NPTM	ADD 9.5 0.38	1-3/4
2 NPTM	ADD 9.5 0.38	2-1/4

Type N Single Point - Flanged

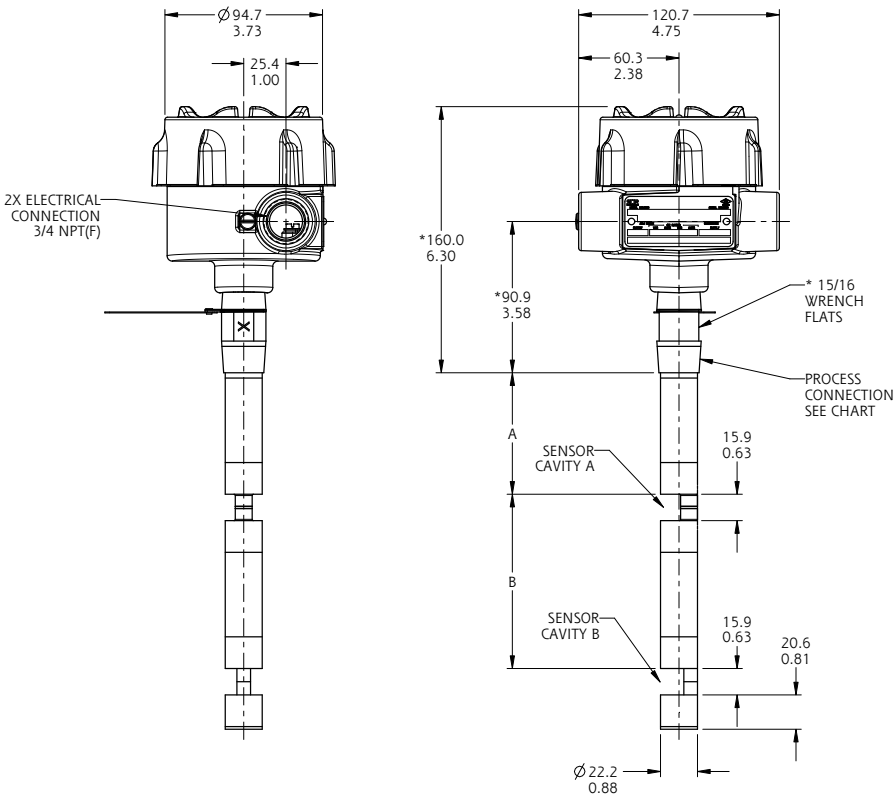
Linear = mm/inches
Drawing 0390071



*Dimensions are for reference only.
Contact the factory for certified drawings
for a particular model number.*

Type N Dual Point - Threaded

Linear = mm/inches
Drawing 0390074

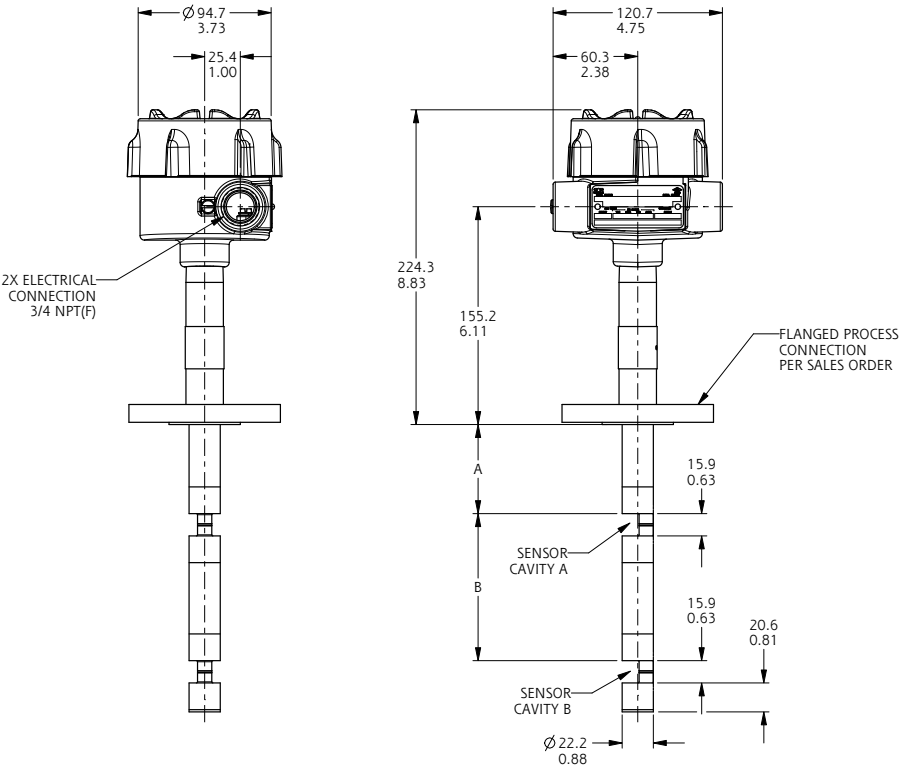


*Dimensions are for reference only.
Contact the factory for certified drawings
for a particular model number.*

PROCESS CONN SIZE	* LENGTH	* WRENCH FLATS
3/4 NPTM	SHOWN	SHOWN
1 NPTM	ADD 8.0 0.31	1-3/16
1-1/2 NPTM	ADD 9.5 0.38	1-3/4
2 NPTM	ADD 9.5 0.38	2-1/4

Type N Dual Point - Flanged

Linear = mm/inches
Drawing 0390075



*Dimensions are for reference only.
Contact the factory for certified drawings
for a particular model number.*



14685 West 105th Street, Lenexa, KS 66215 ■ 913-888-2630 ■ 800-676-6794 USA ■ SORInc.com