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MEASUREMENT AND CONTROL

Ultrasonic Point Level Switches

Ultrasonic point level switches

are a cost-effective solution for your applications. Installation requires mounting the sensor (threaded or flanged) to the vessel, connecting the power and control wires, and applying power. There is no additional set-up or calibration required. Since it is an electronic instrument with no moving parts, preventive maintenance is limited to an annual visual inspection. The only recommended spare part is the "board" at a quantity of one board for every 10 units. A technician with basic electrical skills (wiring) can service the instrument.

Why use an ultrasonic switch over other level technologies? Depending upon your application, there may be three or four technologies equally suited for your application; however; only one will be the best choice when considering its features and benefits.



701 Single Point



711 Single Point



722 Dual Point

Features & Benefits

Cost

- In addition to the price of the instrument, you must consider the cost of installation, set-up and calibration.

Maintenance

- You need to factor in the frequency of preventative maintenance. Also, consider the cost of keeping key "spare parts" on the shelf.

Skill

- What "skill" level is required of your maintenance personnel to service the instrument.

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Ultrasonic switches are simple to apply and use. There are only a few limitations to their use:

- The media must be liquid
- Process temperature between -40 and 250°F (-40 to 121°C)
- The media must have less than 5% suspended solids
- No aeration in fluids with a viscosity of 100cP (30W motor oil) or greater

The following chart will assist you in selecting the right product for your application.

Single-Point Sensing	**Line Power**		**Loop Power**
Integral Mount Electronics	701 Pages 4-5	711 Pages 6-7	701 Pages 4-5
Integral Mount Electronics with Sensor Monitor (Self-Test)	721 Pages 8-9		721 Pages 8-9
Remote Mount Electronics	701 Pages 4-5	711 Pages 6-7	701 Pages 4-5
Remote Mount Electronics with Sensor Monitor (Self-Test)	721 Pages 8-9		721 Pages 8-9
Dual-Point Sensing	**Line Power**		**Loop Power**
Alarm or Pump Control	712 Pages 10-11		N/A
Alarm or Pump Control with Sensor Monitor (Self-Test)	722 Pages 12-13		N/A

Principle

An ultrasonic switch is a device that uses inaudible high-frequency sound (ultrasound) to detect the presence or absence of a liquid at a designated point. The device consists of an electronic control unit and a sensor.

Ultrasonic level switches use the properties of sound transmission in vapor and liquids to detect liquid level. When sound travels in air, it loses a great deal of signal strength. When traveling in liquid, sound retains almost all of its signal strength.

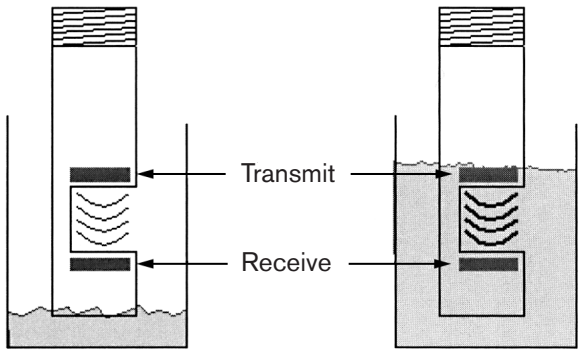
To detect liquid level, we must determine if there is a liquid or gas (air) in the gap. Since liquids have a higher density than gasses, it is easier to transmit sound through them. One side of the sensor gap transmits sound, the other side detects it. When liquid is present, a high amount of sound is received at the detection side. When gas (air) is present, a small amount of sound is received. The electronics detect this difference and switch a relay accordingly.

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Ultrasonic switch sensors contain two piezoelectric crystals, one transmits sound and one receives sound. Each crystal is mounted on one side of a gap in the metal sensor. The transmit crystal generates high frequency sound (1MHz to 3 MHz) that is directed across the gap to the receiver crystal. The receiver crystal converts the sound energy received into an electric signal, which is processed by the electronics to determine if the gap has liquid or air in it.

The drawing below shows the basic construction of an ultrasonic level switch sensor. An electrical signal is sent to the “transmit” crystal, which causes it to vibrate and produce high frequency sound. The “receive” crystal converts the high frequency sound that strikes it to another electrical signal, which is sent back to the electronics for processing. The sound energy that makes it across the sensor gap is very weak in air, and becomes very strong in liquid.



Application Conditions

Ultrasonic level switches can be used in a wide variety of applications without any calibration or setup. However, there are limitations to the types of process they will work in. The factors below must be taken into consideration before selecting an ultrasonic level switch for your application.

- Liquids only - the process media must be a liquid. The ultrasonic level switch cannot detect the difference between two gases or a gas and a solid. The even density of a liquid is required for proper detection.
- Clean liquids only - a liquid that has too high a percentage of solids will not transmit sound well enough to allow detection. Typically 5% suspended solids are the maximum amount allowed.
- The liquid must flow - an application where the liquid cannot drain out of the sensor gap will cause false alarms. If a liquid is too viscous to flow out of a 3/4” gap then the unit will not operate properly. Sometimes this can be solved by different mounting, but some liquids are just too viscous.
- No (or few) bubbles - especially in fluids with a viscosity higher than 100cP (30W motor oil). Large bubbles in thick fluids will block the sound signal from crossing the gap. Low viscosity fluids can have a fairly large amounts of bubbles as they tend to be very small (Alka-Seltzer in water).

If these guidelines are properly observed, the ultrasonic level switches will provide trouble-free operation without any calibration or periodic adjustment.

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The 701 tip-sensitive ultrasonic switch is a single-point device designed for economical detection of clean liquids. There are no moving parts and no calibration. The 701 is available either integral or remote mounted. An optional time delay can be used to eliminate false alarms due to turbulence in the process. An optional field selectable fail-safe switch is also available. The standard unit is set to High-level Failsafe (HLFS)



701 Single Point

Features

- No calibration required
- 10A DPDT relay output
- FM Approved or CSA Certified for hazardous locations
- Line and loop powered versions
- Rostechnadzor (RTN) standard certificate (available upon request)

Product Specifications

Input Power	
Line	120 VAC, 50/60 Hz
	240 VAC, 50/60 Hz
	24 VDC
Loop	11-36 VDC Intrinsically Safe
Fuses	Field replaceable (line power only)
Output Type	
Line	10A DPDT, 250 VAC
	10A DPDT, 30 VDC
	DC rating shown for resistive loads
Loop	8mA (dry),
	16 mA (Wet)-Standard
Loop Resistance	765 ohms maximum @ 24 VDC
Repeatability	0.078" (2mm)
Failsafe	HLFS-Standard; field selectable is optional

Maximum Current Draw (Line Power)	
24 VDC	100 mA
120 VAC	35 mA
240 VAC	18 mA
Response Time	
On	0 second
Off	1 second
Enclosure Environmental Rating	NEMA 4X; IP65
Conduit Connection	3/4" NPT
Maximum Remote Distance from Sensor	50 feet (15.2 meters)
Ambient Temperature Range	-40 to 160°F (-40 to 71°C)
Process Temperature Range	-40 to 250°F (-40 to 121°C)
Maximum Process Pressure	2000 psig (138 bar)
Weight*	2.5 lbs. (1.2 kg)

* See page 23 for sensor weights.

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Model Number System

701-K1-U-P7-C-FS

The 701 is comprised of two parts. The first is the electronics and housing; the second is the sensor. Select the electronics and housings on this page and refer to page 18 for the sensor model number. The housing dimensions can be seen on pages 14 & 15. When ordering a remote housing, order remote cable part number 300-XX-S (XX = length in feet). Orders must have complete model numbers, i.e. each component must have a designator.

* Match sensor approvals to electronics approvals to maintain the agency listingintegrity.

3 Accessories

AI	CSA Certified Intrinsically Safe* (9 power only) (K4 housings only)
BK	Remote electronics flat surface mounting bracket (R housings only) (see pages 14 & 15)
CV	Canadian Registration Number (CRN) Process ratings may be affected. Consult the factory for details
FI	FM Approved Intrinsically Safe* (9 power only) (K4 housings only)
FM	FM Approved Explosion Proof*
FS	Field selectable Failsafe switch (6, 7, 8 power only)
OD	On delay time (6, 7, 8 power only) (specify time from chart on page 16)
OF	Off delay timer (6, 7, 8 power only) (specify time from chart on page 16)
PK	Pipe mounting kit, BK accessory required (R housing only) (see page 17)
PP	Fiber tag with customer specified tag information
PY	Powder coat epoxy coating applied to housing exterior
RG	Gold-contact relay (6, 7, 8 power only)
RR	316SS nameplate wired to the unit with customer specified tag information
TT	316SS nameplate permanently affixed to housing with customer specified tag information
VV	Fungicidal varnish applied to housing exterior
YY	Epoxy coating applied to housing exterior (200 hours - salt spray)

2 Power Supply

24 VDC (K1 and R1 housings only)	6
120 VAC (K1 and R1 housings only)	7
240 VAC (K1 and R1 housings only)	8
24 VDC (Loop) (K4 and R4 housings only)	9

1 Electrical Housing

Integral	K1
Remote	R1
Integral (9 Power Only)	K4
Remote (9 Power Only)	R

(order remote cable part number 300-XX-S, XX = length in feet - max 50 feet)

701 K1 U P7 C FS ← Model Number

Agency Approval

Agency	Safety Method	Approval	Model(s)
FM	Explosion Proof	Class I, Groups C, D; Class II, Groups E, F, G; Class III, Division 1	701xx-U-Px-FM
	Intrinsically Safe	Class I, Groups C, D; Class II, Groups E, F, G; Class III, Division 1	701K4-U-P9-FI
CSA	Intrinsically Safe	Class I, Groups C, D Class II, Groups E, F, G; Class III, Division 1	701K4-U-P9-AI

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The 711 ultrasonic switch is a versatile single-point device designed for the detection of clean liquids. The 711 is available with a variety of sensor types to meet most process conditions. It is available integral or remote mounted and comes standard with field-selectable failsafe.

Features

- No calibration required
- Can be used with notch type sensors
- FM Approved and CSA Certified, for hazardous locations
- Field-selectable failsafe
- Rostechnadzor (RTN) standard certificate (available upon request)



711 Single Point

Product Specifications

Input Power	120 VAC, 50/60 Hz 240 VAC, 50/60 Hz 24 VDC
Output Type	10A DPDT, 250 VAC 10A DPDT, 30 VDC DC rating shown for resistive loads
Repeatability	0.078" (2mm)
Failsafe	Field-selectable
Maximum Current Draw (Line Power)	
24 VDC	140 mA
120 VAC	60 mA
240 VAC	30 mA

Response Time	
On	250 mSec
Off	250 mSec
Enclosure Environmental Rating	NEMA 4X; IP65
Conduit Connection	3/4" NPT
Maximum Remote Distance from Sensor	50 ft. (15.2 m)
Ambient Temperature Range	-40 to 160°F (-40 to 71°C)
Process Temperature Range	-40 to 250°F (-40 to 121°C)
Maximum Process Pressure	2000 psig (138 bar)
Weight*	2.5 lbs. (1.2 kg)

*See page 23 for sensor weights.

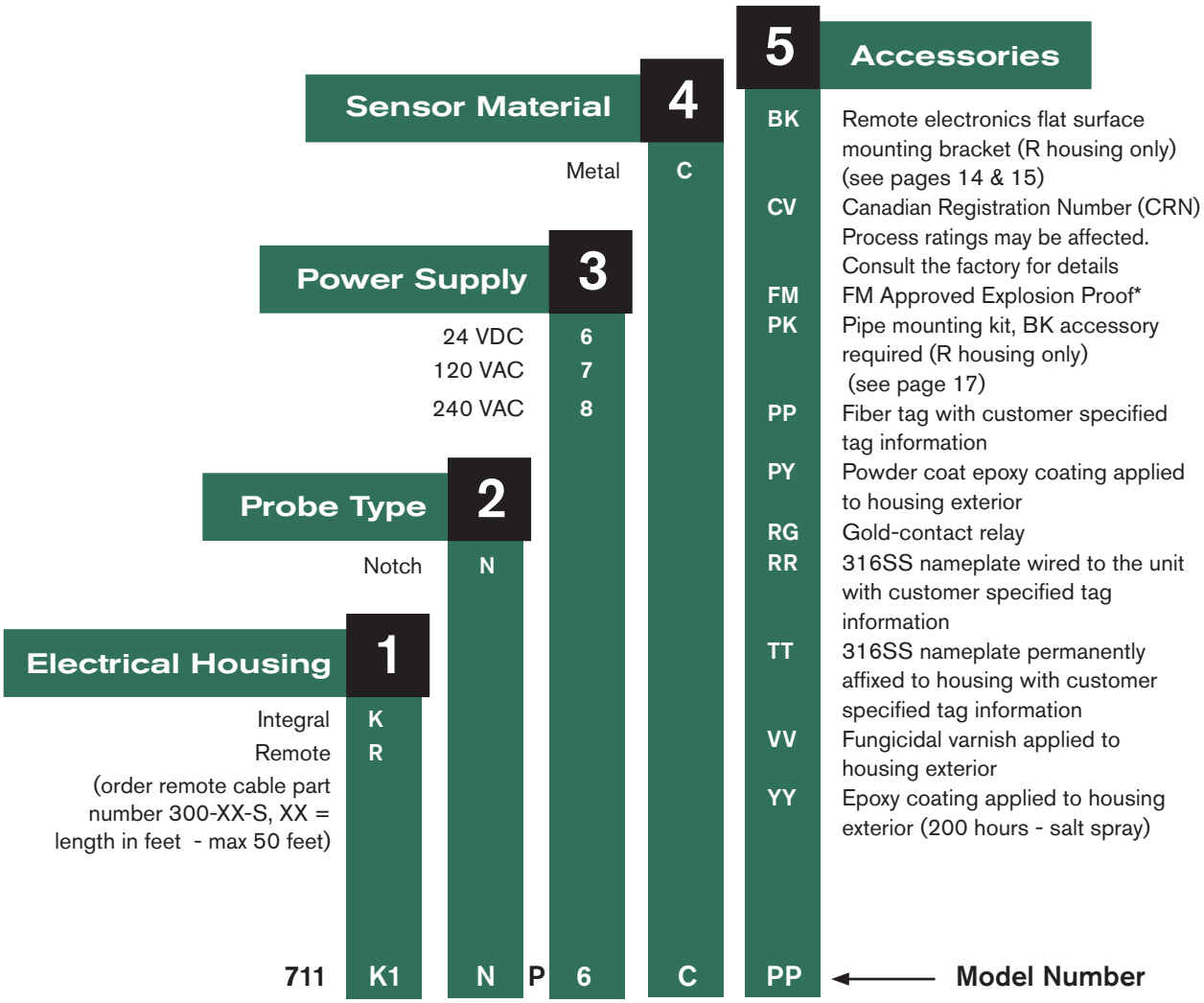
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Model Number System

711-K1-N-P6-C-PP

The 711 is comprised of two parts. The first is the electronics and housing; the second is the sensor. Select the electronics and housings on this page and refer to page 18 for the sensor model number. The housing dimensions can be seen on pages 14 & 15. When ordering a remote housing, order remote cable part number 300-XX-S (XX = length in feet). Orders must have complete model numbers, i.e. each component must have a designator.



* Match sensor approvals to electronics approvals to maintain the agency listing integrity.

Agency Approvals

Agency	Safety Method	Approval	Model(s)
FM	Explosion Proof	Class I, Groups C, D; Class II, Groups E, F, G; Class III, Division 1	711x1-N-Px-FM

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Ultrasonic Switches

Single Point

The 721 ultrasonic switch is an advanced single-point device designed to meet your needs for overfill protection. In addition to the features of the 711, the 721 includes a "Sensor Monitor." This circuit continuously tests the functionality of the electronics and sensor. The "Sensor Monitor Relay" de-energizes if a fault is detected. The 721 is available with a variety of sensor types to meet most process conditions. It is available integral or remote mounted and comes standard with field-selectable failsafe.



721 Single Point

Features

- No calibration required
- Continuous self-test (sensor monitor) verifies operation
- FM or CSA Certified for hazardous locations
- Field-selectable failsafe
- On/Off time delay is standard
- Rostechnadzor (RTN) standard certificate (available upon request)

Product Specifications

Input Power	
Line	120 VAC, 50/60 Hz 240 VAC, 50/60 Hz 24 VDC
Loop	11-36 VDC (Intrinsically safe)
Output Type	
Line	
Alarm	10A DPDT, 250 VAC 10A DPDT, 30 VDC DC rating shown for resistive loads
Sensor Monitor	10A DPDT, 250 VAC 10A DPDT, 30 VDC DC rating shown for resistive loads
Loop	
Alarm	8 mA (Dry), 16 mA (Wet)
Sensor Monitor	5 mA or 19 mA; Field selectable
Loop Resistance	650 ohms maximum @ 24 VDC
Repeatability	0.078" (2mm)
Failsafe	Field-selectable

Maximum Current Draw (Line Power)	
24 VDC	220 mA
120 VAC	60 mA
240 VAC	30 mA
Response Time (Line Power)	
On	250 mSec
Off	250 mSec
Response Time (Loop Power)	
On	0.5 seconds
Off	5 seconds
Time Delay	0-30 seconds
Enclosure Environmental Rating	NEMA 4X; IP65
Conduit Connection	3/4" NPT
Maximum Remote Distance from Sensor	50 ft. (15.2 m)
Ambient Temperature Range	-40 to 160°F (-40 to 71°C)
Process Temperature Range	-40 to 250°F (-40 to 121°C)
Maximum Process Pressure	2000 psig (138 bar)
Weight*	3 lbs. (1.4 kg)

*See page 23 for sensor weights.

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Model Number System

721R2-N-P7-C-FM

The 721 is comprised of two parts. The first is the electronics and housing; the second is the sensor. Select the electronics and housings on this page and refer to page 18 for the sensor model number. The housing dimensions can be seen on pages 14 & 15. When ordering a remote housing, order remote cable part number 300-XX-S (XX = length in feet). Orders must have complete model numbers, i.e. each component must have a designator.

1 Electrical Housing

Integral	K
Remote (order remote cable part number 300-XX-S, XX = length in feet - max 50 feet)	R

2 Probe Type

Notch	N

3 Power Supply

24 VDC	6
120 VAC	7
240 VAC	8
24 VDC (Loop)	9

4 Sensor Material

Metal	C

5 Accessories

AI	CSA Certified Intrinsically Safe* (9 power only) (K housing only)
BK	Remote electronics flat surface mounting bracket (R housing only) (see pages 14 & 15)
CV	Canadian Registration Number (CRN) Process ratings may be affected. Consult the factory for details
FI	FM Approved Intrinsically Safe* (9 power only) (K housing only)
FM	FM Approved Explosion Proof*
PK	Pipe mounting kit, BK accessory required (R housing only) (see page 17)
PP	Fiber tag with customer specified tag information
PY	Powder coat epoxy coating applied to housing exterior
RG	Gold-contact relay (6, 7, 8 power only)
RR	316SS nameplate wired to the unit with customer specified tag information
TT	316SS nameplate permanently affixed to housing with customer specified tag information
VV	Fungicidal varnish applied to housing exterior
YY	Epoxy coating applied to housing exterior (200 hours - salt spray)

721	R	2	N	P	7	C	FM	← Model Number

*Match sensor approvals to electronics approvals to maintain the agency listing integrity

Agency Approvals

Agency	Safety Method	Approval	Model(s)
FM	Explosion Proof	Class I, Groups C, D; Class II, Groups E, F, G; Class III, Division 1	721x2-N-Px-FM
	Intrinsically Safe	Class I, Groups C, D; Class II, Groups E, F, G; Class III, Division 1	721K2-N-P9-FI
CSA	Intrinsically Safe	Class I, Groups C, D Class II, Groups E, F, G; Class III, Division 1	721K2-N-P9-AI

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Ultrasonic Switches

Dual Point (Without Self-Test)

The 712 ultrasonic switch is a versatile dual-point designed for the detection of clean liquids. The dual-output can be used as independent alarm points or used in tandem to provide pump control. It is available integral or remote mounted and comes standard with field-selectable failsafe.



712 Dual Point

Features

- No calibration required
- Optional pump control logic available
- FM and CSA Certified for hazardous locations
- Field-selectable failsafe

Product Specifications

Input Power	
Line	120 VAC, 50/60 Hz 240 VAC, 50/60 Hz 24 VDC
Output Type	(2) 10A DPDT, 250VAC (2) 10A DPDT, 30VDC DC rating shown for resistive loads
Repeatability	0.078" (2mm)
Failsafe	Field-selectable
Maximum Current Draw	
24 VDC	280 mA
120 VAC	120 mA
240 VAC	60 mA
Response Time (Line Power)	
On	250 mSec
Off	250 mSec

Enclosure Environmental Rating	NEMA 4X; IP65
Conduit Connection	1" NPT
Maximum Remote Distance from Sensor	50 ft. (15.2 m)
Ambient Temperature Range	-40 to 160°F (-40 to 71°C)
Process Temperature Range	-40 to 250°F (-40 to 121°C)
Maximum Process Pressure	2000 psig (138 bar)
Weight*	7 lbs. (3.2 kg) + 10.5 lbs. (4.8 kg) for cast iron housing + 2 lbs. (1 kg) for remote

*See page 23 for sensor weights.

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Model Number System

712K3-N-P6-C-YY

712 ultrasonic switch with integral housing, 240VAC power supply, with optional epoxy coating.

The 712 is comprised of two parts. The first is the electronics and housing; the second is the sensor. Refer to page 19 for the sensor model number.

3 Accessories

BK	Remote electronics flat surface mounting bracket (R housing only)(see page 19)
CV	Canadian Registration Number (CRN) Process ratings may be affected. Consult the factory for details
FM	FM Approved Explosion Proof* (except L3 housing)
PK	Pipe mounting kit, BK accessory required (R housing only)(see page 17)
PL	Pump logic (see page 16 for function and ratings)
PP	Fiber tag with customer specified tag information
PY	Powder coat epoxy coating applied to housing exterior
RG	Gold-contact relay (6, 7, 8 power only)
RR	316SS nameplate wired to the unit with customer specified tag information
TT	316SS nameplate permanently affixed to housing with customer specified tag information
VV	Fungicidal varnish applied to housing exterior
YY	Epoxy coating applied to housing exterior (200 hours - salt spray)

Power Supply 2

24 VDC	6
120 VAC	7
240 VAC	8

Electrical Housing 1

Integral (Aluminum)	K
Integral (Cast Iron)	L
Remote (Aluminum)	R

(order remote cable part number 300-XX-D, XX = length in feet - max 50 feet)

712	K	3NP	6	C	YY	← Model Number

Agency Approvals

Agency	Safety Method	Approval	Model(s)
FM	Explosion Proof	Class I, Groups B, C, D; Class II, Groups E, F, G; Class III, Division 1	712K3-N-Px-FM
	Intrinsically Safe	Class I, Groups C, D; Class II, Groups E, F, G; Class III, Division 1	712R3-N-Px-FM
CSA	Intrinsically Safe	Class I, Groups C, D Class II, Groups E, F, G; Class III, Division 1	712R3-N-Px-CS

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Ultrasonic Switches

Dual Point

The 722 ultrasonic switch is an advanced dual-point device designed to meet your needs for sump/pump control. In addition to the features of the 712, the 722 includes a "Sensor Monitor." This circuit continuously tests the functionality of the electronics and sensor (both gaps). The "Sensor Monitor Relay" de-energizes if a fault is detected. It is available integral or remote mounted and comes standard with field-selectable failsafe and time delay.



722 Dual Point

Features

- No calibration required
- Continuous self-test (sensor monitor) verifies operation of the unit
- FM and CSA Certified for hazardous locations
- Field-selectable failsafe
- On/Off time delay is standard
- Rostechnadzor (RTN) standard certificate (available upon request)

Product Specifications

Input Power	
Line	120 VAC, 50/60 Hz 240 VAC, 50/60 Hz 24 VDC
Output Type	
Alarm	(2) 10A DPDT, 250 VAC (2) 10A DPDT, 30 VDC DC rating shown for resistive loads
Sensor Monitor	(2) 10A DPDT, 250 VAC (2) 10A DPDT, 30 VDC DC rating shown for resistive loads
Repeatability	0.078" (2mm)
Failsafe	Field-selectable
Maximum Current Draw (Line Power)	
24 VDC	440 mA
120 VAC	120 mA
240 VAC	60 mA

Response Time	
On	250 mSec
Off	250 mSec
Time Delay	0-30 seconds
Enclosure Environmental Rating	NEMA 4X; IP65
Conduit Connection	1" NPT
Maximum Remote Distance from Sensor	50 ft. (15.2 m)
Ambient Temperature Range	-40 to 160°F (-40 to 71°C)
Process Temperature Range	-40 to 250°F (-40 to 121°C)
Maximum Process Pressure	2000 psig (138 bar)
Weight*	7 lbs. (3.2 kg) + 10.5 lbs. (4.8 kg) for cast iron housing + 2 lbs. (1 kg) for remote.

*See page 23 for sensor weights.

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Model Number System

722K3-N-P6-C-PL

722 ultrasonic switch with integral housing copper-free aluminum, 24VDC power supply, with optional pump logic

The 722 is comprised of two parts. The first is the electronics and housing; the second is the sensor. Refer to page 19 for the sensor model number.

Electrical Housing — 1

Integral (Aluminum)	K
Integral (Cast Iron)	L
Remote (Aluminum)	R

(order remote cable part number 300-XX-D, XX = length in feet - max 50 feet)

Power Supply — 2

24 VDC	6
120 VAC	7
240 VAC	8

3 Accessories

BK	Remote electronics flat surface mounting bracket (R housing only) (see pages 14 & 15)
CV	Canadian Registration Number (CRN) Process ratings may be affected. Consult the factory for details
FM	FM Approved Explosion Proof* (except L3 housing)
PK	Pipe mounting kit, BK accessory required (R housing only)(see page 17)
PL	Pump logic (see page 16 for function and ratings)
PP	Fiber tag with customer specified tag information
PY	Powder coat epoxy coating applied to housing exterior
RG	Gold-contact relay (6, 7, 8 power only)
RR	316SS nameplate wired to the unit with customer specified tag information
TT	316SS nameplate permanently affixed to housing with customer specified tag information
YY	Epoxy coating applied to housing exterior

722 K 3NP 6 C PL ← Model Number

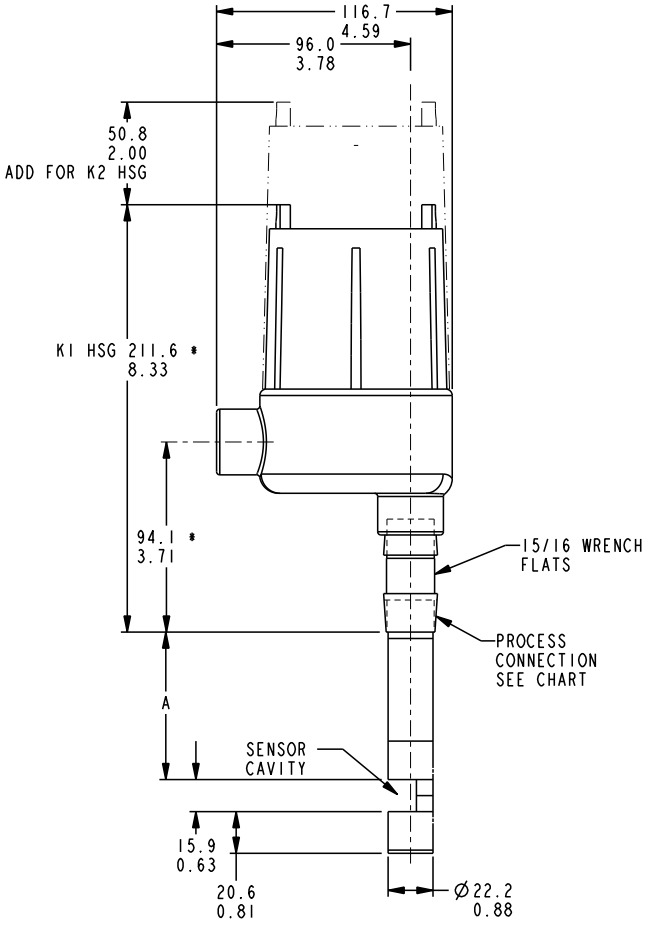
Agency Approvals

Agency	Safety Method	Approval	Model(s)
FM	Explosion Proof	Class I, Groups B, C, D; Class II, Groups E, F, G; Class III, Division 1	722K3-N-Px-FM
	Intrinsically Safe	Class I, Groups C, D; Class II, Groups E, F, G; Class III, Division 1	722R3-N-Px-FM
CSA	Intrinsically Safe	Class I, Groups C, D Class II, Groups E, F, G; Class III, Division 1	722R3-N-Px-CS

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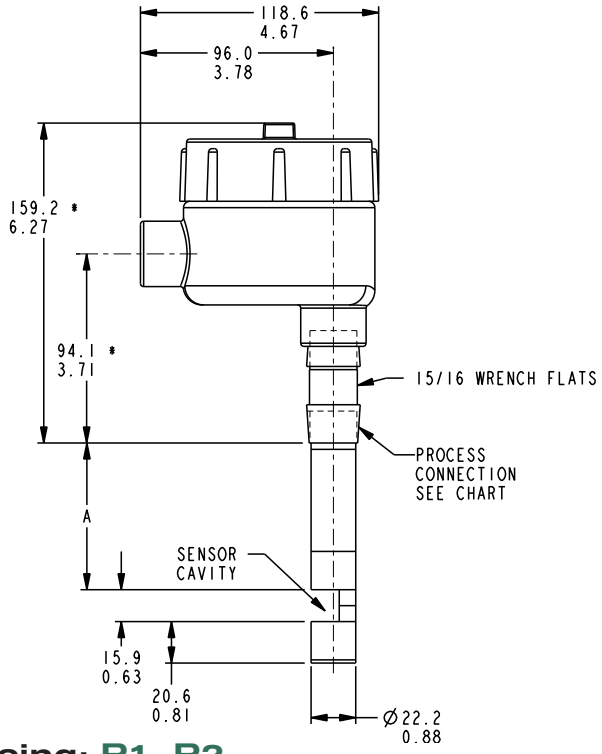
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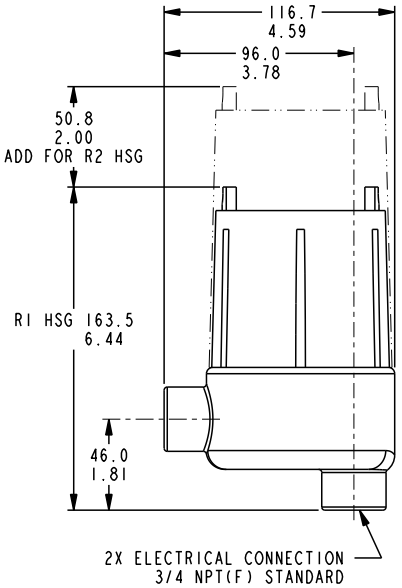
Housing: K1, K2

Drawing 0390000



Housing: R1, R2

Drawing 0390034

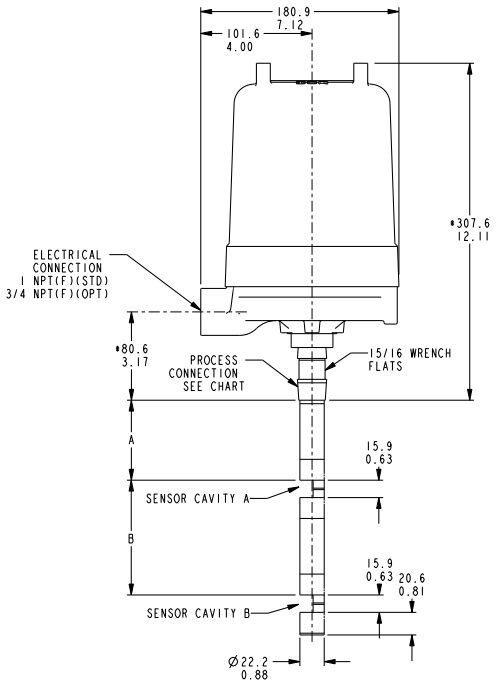


Process Connection	*Add to Length
3/4" NPT(M)	Shown
1" NPT(M)	Add 8.0 .313
1-1/2" NPT(M) 2" NPT(M)	Add 9.5 .375

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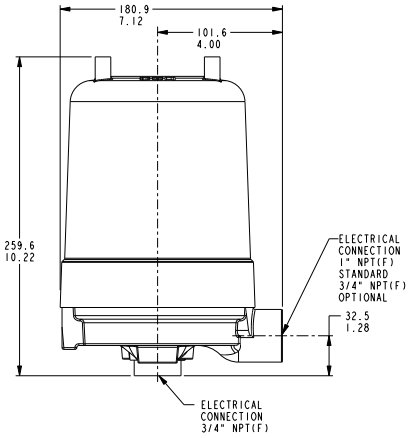
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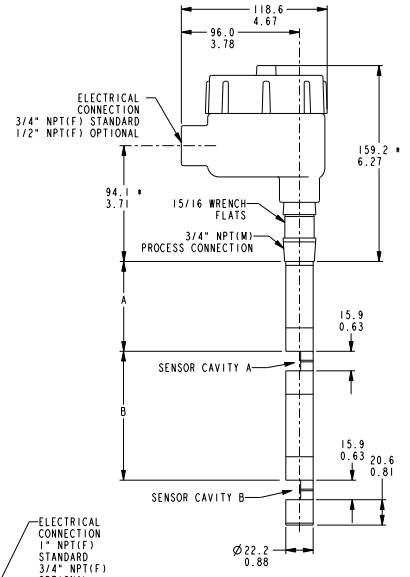
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Housing: K3, L3

Drawing 0390029

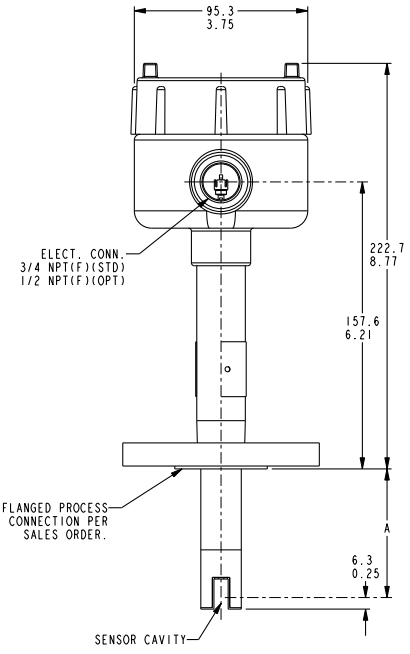




Housing: R3

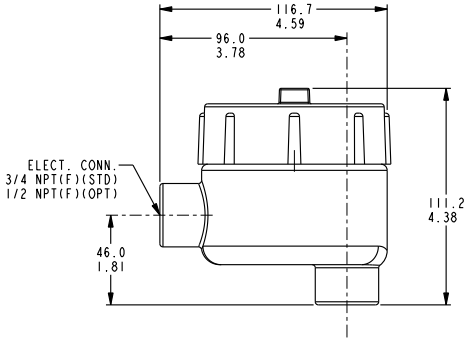
Drawing 0390040

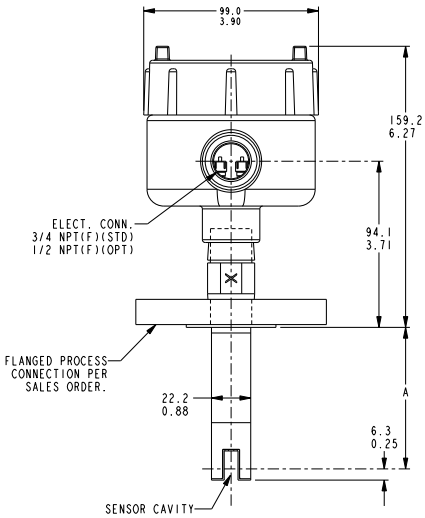
Process Connection	*Add to Length
3/4" NPT(M)	Shown
1" NPT(M)	Add 8.0 / .313
1-1/2" NPT(M) 2" NPT(M)	Add 9.5 / .375



Housing: K4

Drawing 0390530





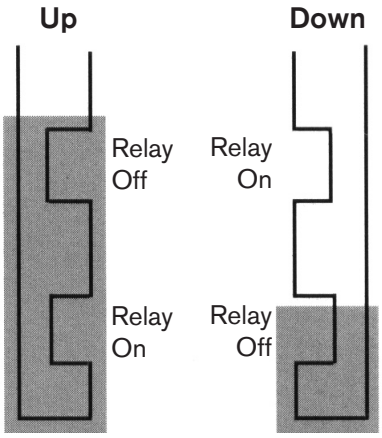
Housing: R4

Drawing 0390529

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Two point ultrasonic level switches can be supplied with an on-board DPDT relay for pump control. The relay is rated 5 amp, 250 VAC; 5 amp, 30 VDC (resistive) and it can be field wet to pump up (left diagram) or pump down (right diagram).



Adding the pump logic (PL) accessory to the end of a model number changes level indication relays to SPDT and changes current requirements according to the table shown:

Supply Voltage	Maximum Current Draw
24 VDC	350 mA
120 VAC	120 mA
240 VAC	50 mA

Time Delay

When using time delay accessory OD or OF, choose a standard time delay from the chart below. Include the time delay after the model number.
For example: 701K1-U-P6-C-OD
OD = 60 seconds.

Time Delay in Seconds (choose one)		
1	35	100
5	50	120
15	60	150
25	70	190

Approximate Weights*

Actual shipping weights may vary from charted values because of product material, configurations and packaging requirements. For remote electrical housing add 2 lbs. (1kg) to total weight.

Ultrasonic Series	Weight (lbs.)	(kgs)	Additional Weights
701, 711	2.5	1.2	---
721	3	1.4	---
712, 722	7	3.2	10.5 lbs. (4.8 kg) for cast iron housing

*See page 23 for sensor weights.

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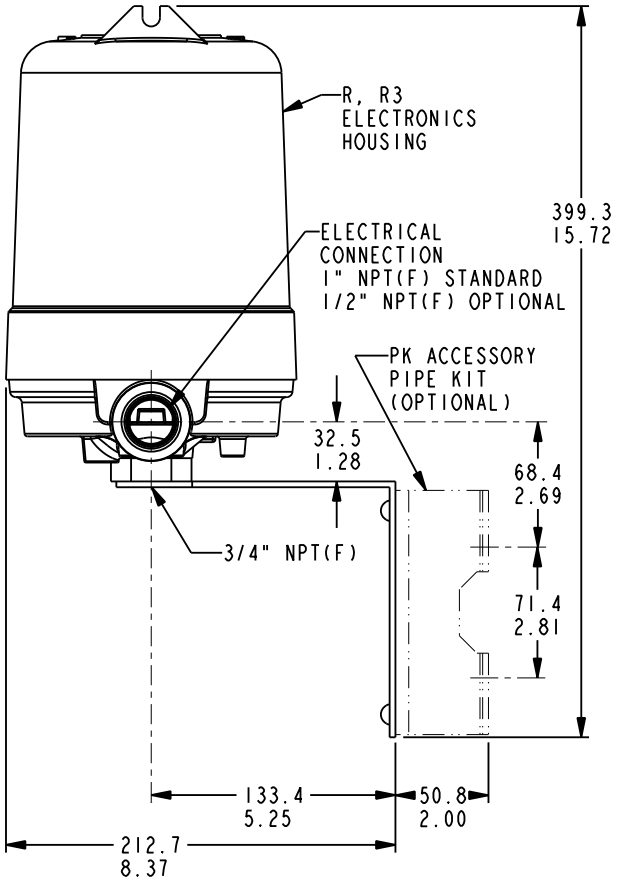
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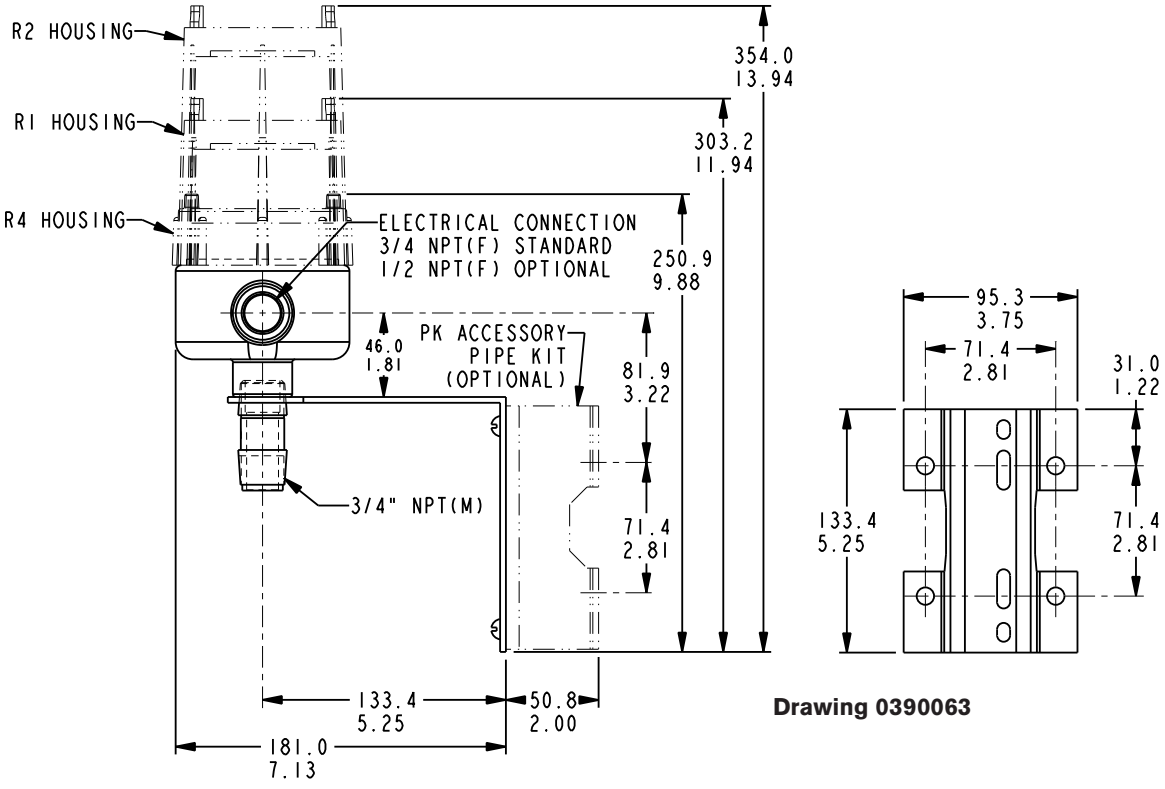
Remote electronic housings are supplied for line mounting as a standard. Optional brackets are available for flat surface or pipe mounting.

The basic BK bracket can be adapted for mounting onto 1-1/2" to 2" pipe or stanchion by adding designator PK after BK.

For the basic flat surface mounting bracket, add designator BK to the end of any model number from the controls section in the front of this catalog. Linear = mm/in.

Drawing 0390062





Drawing 0390063

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Model Number System

371-U 2-C 3A-RR

The 371 sensor is designed for use with all single-point ultrasonic electronic unit.

4 Process Connection

3A	3/4" NPT
4A	1" NPT
5A	1-1/2" NPT
6A	2" NPT
3D	1" 150# ANSI RF Flange
3E	1-1/2" 150# ANSI RF Flange
3F	2" 150# ANSI RF Flange
3G	3" 150# ANSI RF Flange
3H	4" 150# ANSI RF Flange
3K	1" 300# ANSI RF Flange
3L	1-1/2" 300# ANSI RF Flange
3M	2" 300# ANSI RF Flange
3N	3" 300# ANSI RF Flange
3P	4" 300# ANSI RF Flange

Sensor Material 3

316SS (standard)	C
Monel (N type sensor)	A
Carpenter 20 (N type sensor)	L
Hastelloy C (N type sensor)	J

Insertion Length 2

Enter the required probe length, "A", in inches (as a decimal, up to five characters including the decimal, leading zeroes not required. Max. two digits after decimal point).

Probe Length in Decimal Form

Probe Description	Allowable Lengths
"U" Sensor (Vertical Gap 701)	1.16"-180" (30-4572mm)
"U" Sensor with Flanged Connection (Vertical Gap 701)	3"-180" (77-4572mm)
"N" Sensor with "A", "L", "J" or "C" Material (Horizontal Gap 711, 721)	2"-180" (77-4572mm)

5 Accessories

AI	CSA Certified Intrinsically Safe*
CV	Canadian Registration Number (CRN) Process ratings may be affected Consult the factory for details
FI	FM Approved Intrinsically Safe*
FM	FM Approved Explosion Proof*
PP	Fiber tag with customer specified tag information
RR	316SS nameplate wired to the unit with customer specified tag information
TT	316SS nameplate permanently affixed to housing with customer specified tag information

Sensor Type 1

Vertical Gap (701)	U
Horizontal (Notch) Gap (711, 721)	N

371 U 2 C 3A RR ← Model Number

*Match sensor approvals to electronics approvals to maintain the agency listing integrity.

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Model Number System

372-N 12-C3A-FM

The 372 sensor is designed for use with all dual-point ultrasonic electronic units.

1 Insertion Length A

Enter the required probe length, "A", in inches (as a decimal, up to five characters including the decimal; leading zeros not required). Maximum two digits after decimal point, minimum 3" maximum 180".

Probe Length in Decimal Form

2 Insertion Length B

Enter the required probe length, "B" in inches (as a decimal, up to five characters including the decimal, leading zeroes not required.) Maximum two digits after decimal point. Minimum 3". Maximum 48".

Probe Length in Decimal Form

3 Sensor Material

316SS (standard)	C
Monel	A
Carpenter 20	L
Hastelloy C	J

4 Process Connection

3A	3/4" NPT
4A	1" NPT
5A	1-1/2" NPT
6A	2" NPT
3D	1" 150# ANSI RF Flange
3E	1-1/2" 150# ANSI RF Flange
3F	2" 150# ANSI RF Flange
3G	3" 150# ANSI RF Flange
3H	4" 150# ANSI RF Flange
3K	1" 300# ANSI RF Flange
3L	1-1/2" 300# ANSI RF Flange
3M	2" 300# ANSI RF Flange
3N	3" 300# ANSI RF Flange
3P	4" 300# ANSI RF Flange

5 Accessories

CV	Canadian Registration Number (CRN). Process ratings may be affected. Consult the factory for details
FM	FM Approved Explosion Proof*
PP	Fiber tag with customer specified tag information
RR	316SS tag wired to probe with customer specified tag information
TT	316SS nameplate permanently affixed to housing with customer specified tag information

372	N	1	2	C	3A	FM	← Model Number

See page 23 for flange weights.

*Match sensor approvals to electronics approvals to maintain the agency listing integrity.

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Electronics

Certificates	Loop Power (P9)	Line Power (P6, P7, P8)	All Sensors
Calibration C1	◆	◆	
Hydrostatic Pressure Test C2			◆
Inspection Report C3	◆	◆	
Compliance / Conformance C4	◆	◆	
Insulation Resistance C6		◆	

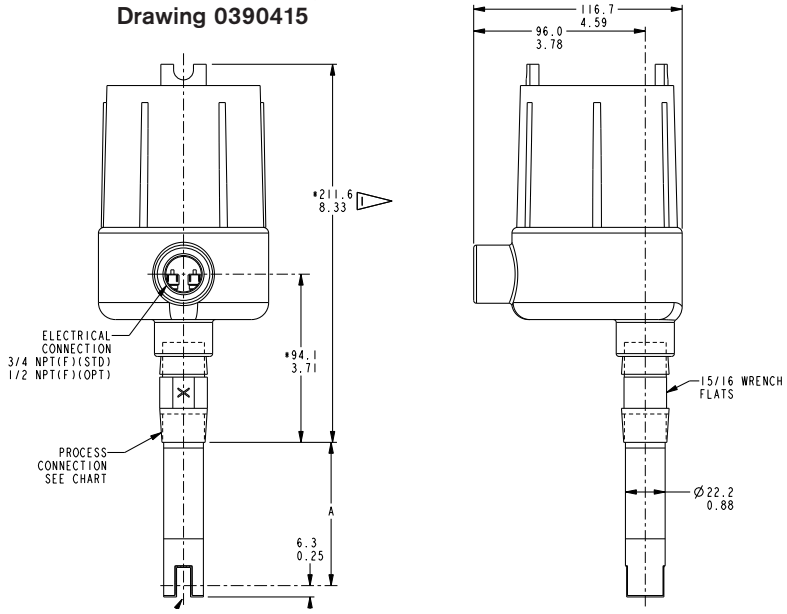
Sensor Dimensions

Dimensions shown are for reference only. Contact the factory for certified dimension drawings.
Linear = mm/in.

Process Connection	*Add to Length
3/4" NPT(M)	Shown
1" NPT(M)	Add 8.0 / .313
1-1/2" NPT(M) 2" NPT(M)	Add 9.5 / .375

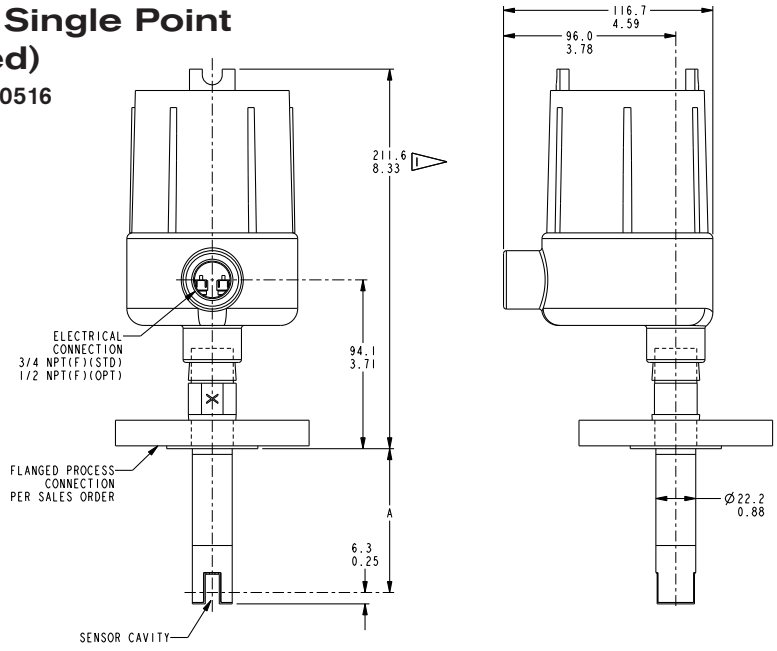
Type U Single Point (Threaded)

Drawing 0390415



Type U Single Point (Flanged)

Drawing 0390516



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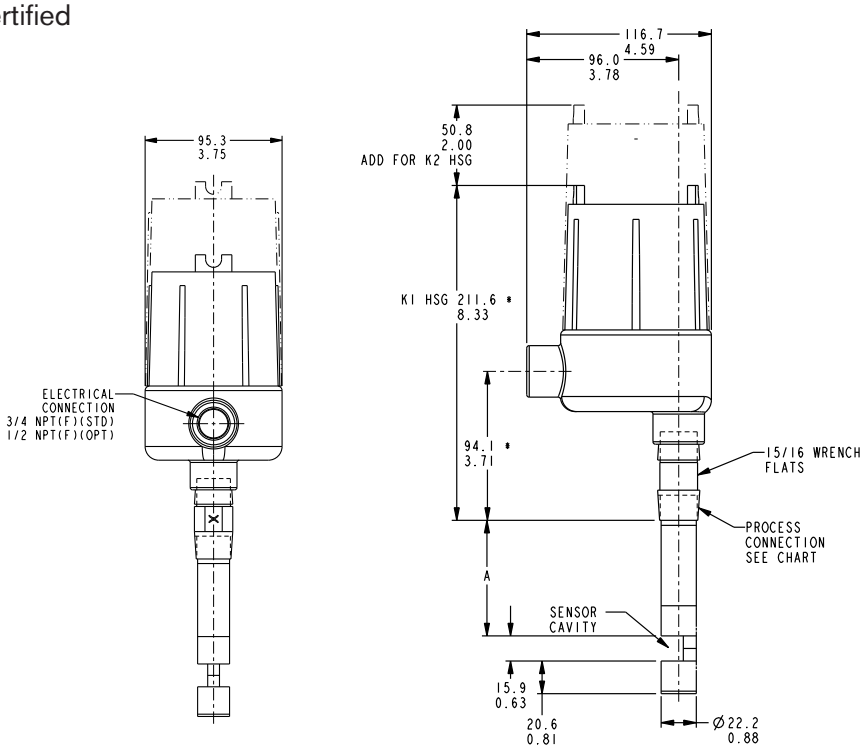
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Linear = mm/in.

Process Connection	*Add to Length
3/4" NPT(M)	Shown
1" NPT(M)	Add 8.0 .313
1-1/2" NPT(M) 2" NPT(M)	Add 9.5 .375

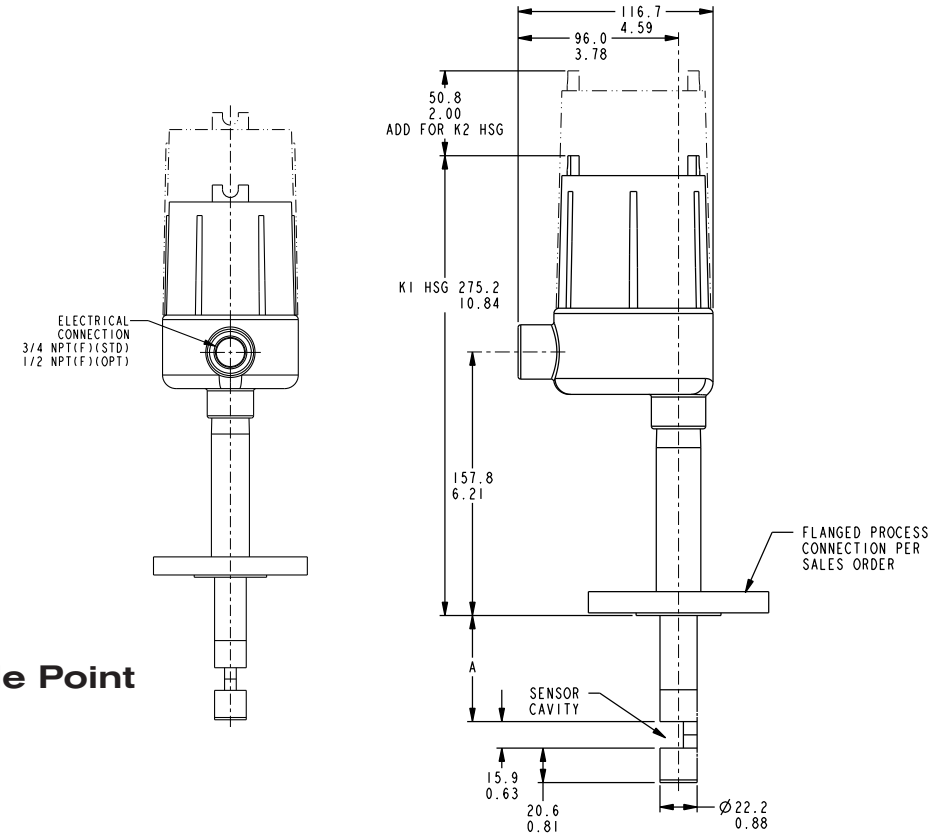
Type N Single Point (Threaded)

Drawing 0390000



Type N Single Point (Flanged)

Drawing 0390025



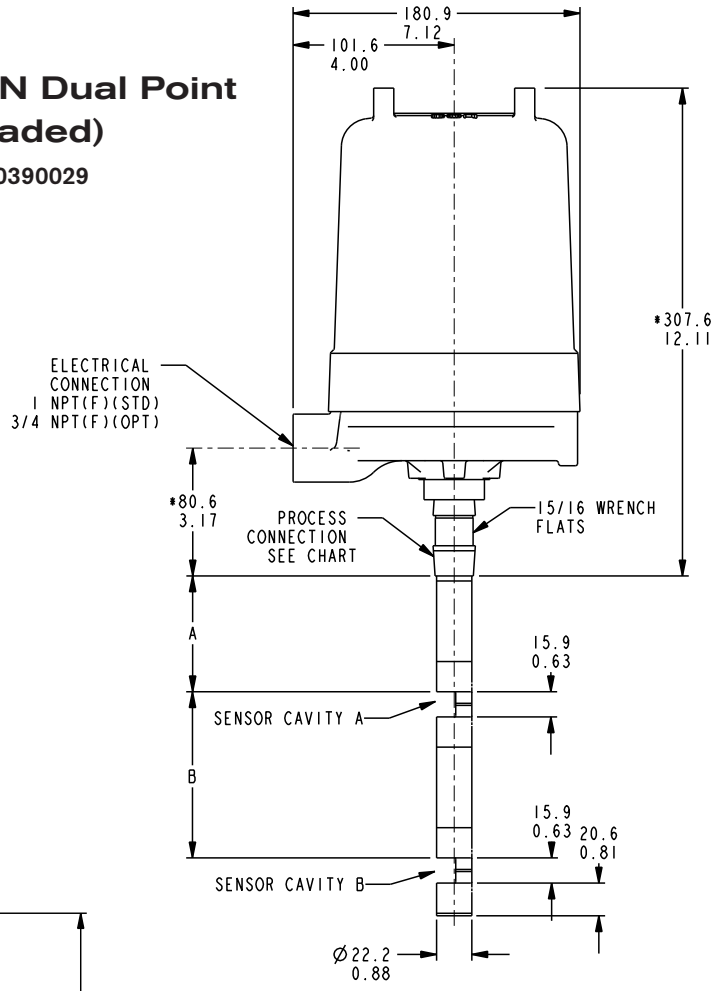
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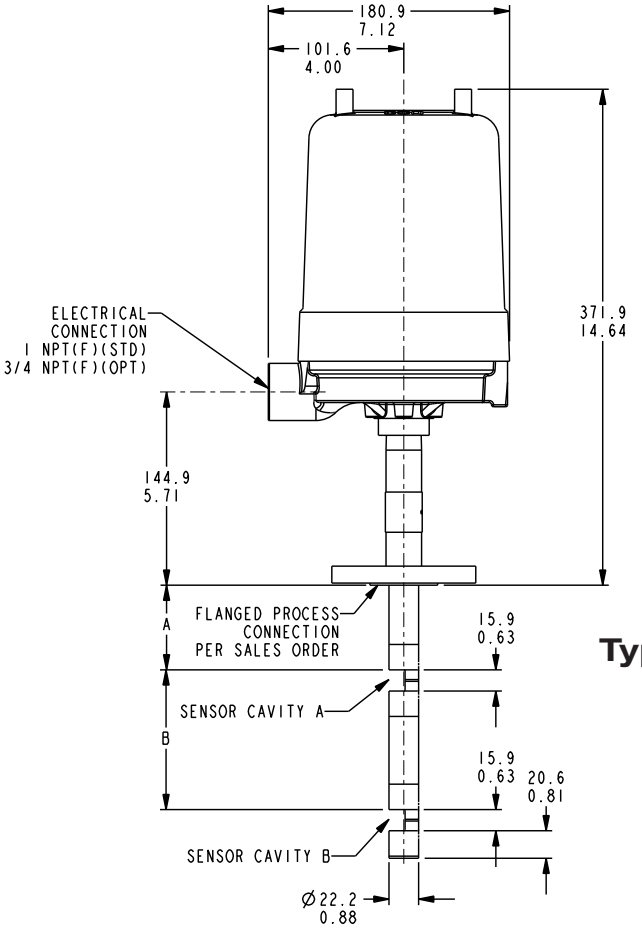
Type N Dual Point (Threaded)

Drawing 0390029



Type N Dual Point (Flanged)

Drawing 0390030



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Sensor Style	Weight
Types U & N	0.5 lbs. for first 6” 1 lb. (0.5 kg) for each additional 12”

Flange Weight and Pressure Rating

Process Connection	Add to Weight		Maximum Pressure Rating
	lbs.	kg	
3D	2	1.0	275 psig (19 bar)
3E	4	1.8	
3F	5	2.3	
3G	9	4	
3H	17	8	
3K	3	1.5	720 psig (50 bar)
3L	6	2.7	
3M	8	3.6	
3N	16	7.5	
3P	27	12.5	

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