Echotel® Model 961 Ultrasonic Level Switches for Hygienic Applications

DESCRIPTION

Echotel® Model 961 Ultrasonic Level Switches use pulsed signal technology for superior performance in difficult process conditions, and to provide excellent immunity from sources of electrical noise interference. Extensive self-testing of the electronics and transducer make this advanced switch suitable for a wide variety of hygienic level switch applications.

Model 961 is offered with either a 5-amp relay or a current shift electronics. The relay output electronics has a DPDT relay for level detection, and a SPDT malfunction relay. The current shift version indicates 8 mA during normal operation, 16 mA as a level alarm condition and a user-selectable 3.6 or 22 mA malfunction indication.

The Model 961 switches are designed for the stringent requirements of hygienic applications. These switches are offered with a deep-drawn 304 stainless steel housing that is favorable to CIP and SIP procedures. A 20 R_a surface finish is featured with hygienic Model 961 transducers. These transducers are available with 1½" and 2" Tri-Clamp® fittings, and DN65 Varivent® Type N flanges.

FEATURES

- Self-test technology provides unsurpassed reliability and testing of electronics, transducer, piezoelectric crystals, and electromagnetic noise
- 20 R_a surface finish with Tri-Clamp and Varivent fittings
- Adjustable time delay for turbulent aerated liquids
- Tip-sensitive transducer measures level within ¼" of the vessel bottom
- Pulsed signal technology provides superior performance in difficult process conditions

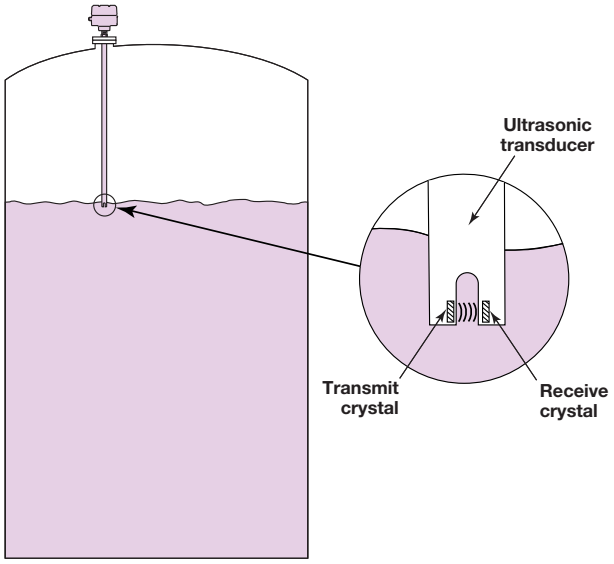
Model 961
(with Varivent® fitting)

Model 961
(with Tri-Clamp® fitting)

PULSED SIGNAL TECHNOLOGY

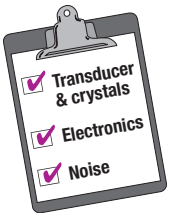
Model 961 switches use pulsed signal technology to detect the presence or absence of liquid in an ultrasonic transducer gap. The transducer uses a pair of piezoelectric crystals that vibrate at a given frequency when subjected to an applied voltage. The transmit crystal converts the applied voltage from the electronics into an ultrasonic signal. When liquid is present in the gap, the receive crystal senses the ultrasonic signal and converts it back into an electrical signal. This signal is sent to the electronics to indicate a wet gap condition. When no liquid is present, the ultrasonic signal is attenuated and is not detected by the receive crystal.

Challenging process conditions like aeration, suspended solids, and high viscosities are overcome by using pulsed signal circuitry in 961 switches. Unlike many tuning forks, pulsed signal ultrasonic switches do not need to be configured for different media densities, making these units the most universally applied level switches on the markey today.



Ultrasonic signal transmission across transducer gap

ADVANCED SELF-TEST AND DIAGNOSTICS



Ultrasonic switches are often used as the last means of detecting whether a process vessel will overflow and cause a spill of potentially hazardous liquids, or empty out and possibly cavitate the pumps. In these critical applications it is desirable to have a method of periodically testing the ultrasonic switch to ensure that it is functioning properly.

Model 961 switches feature an advanced self-test technology that not only tests the electronics, transducer, and piezoelectric crystals, but also tests for the presence of industrial sources of environmental noise. Should the switch detect any problems a malfunction output is generated to alarm the user, and a red LED is lit to indicate an alarm condition.

A microprocessor in the 961 electronics continuously monitors all self-test data. Should a fault occur, the microprocessor can determine whether the malfunction is due to the electronics, transducer, piezoelectric crystals, or the presence of environmental noise. A pushbutton and Fault LED is used to assist in troubleshooting the switch:

- ✳ One flash of the Fault LED indicates a problem with the transducer or piezoelectric crystals
- ✳✳ Two flashes of the Fault LED indicates a problem with one of the electronics boards
- ✳✳✳ Three flashes of the Fault LED indicates excessive levels of environmental noise

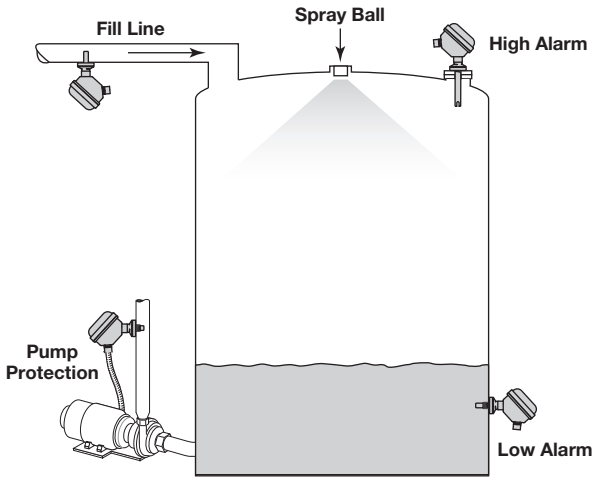
ADJUSTABLE TIME DELAY

Turbulence and splashing can cause some fixed time response switches to produce false level alarms. Model 961 switches overcome this difficulty with an adjustable time delay feature. A potentiometer allows a ½–45-second delay to be set to disregard waves or splashes, and reliably detect the true liquid level.

APPLICATIONS

Model 961 Switches may be used for high or low level alarm, empty pipe detection and pump protection in a wide variety of hygienic applications. Available with a 304 stainless steel electronics housing and a 20 R_a surface finish transducer, typical applications include:

- CIP/SIP day tank point level
- Water for Injection (WFI) storage
- Liquid chromatography skids
- Brewery fill lines
- Condensate receiver tanks



ELECTRONICS SPECIFICATIONS

MODEL 961 WITH RELAY OUTPUT

Supply Voltage		18 to 32 VDC, or 102 to 265 VAC, 50/60 Hz
Relay Outputs		One DPDT level relay and one SPDT malfunction relay
Relay Ratings	DPDT:	5 amps @ 120 VAC, 250 VAC, and 30 VDC, 0.4 amp @ 110 VDC
	SPDT:	5 amps @ 120 VAC, 250 VAC, and 30 VDC, 0.15 amp @ 125 VDC
Fail-safe		Selectable for high or low level
Power Consumption		Less than 3 watts
Ambient Temperature		-40 to +160 °F (-40 to +70 °C)

MODEL 961 WITH CURRENT SHIFT OUTPUT

Supply Voltage	12 to 35 VDC
Current Shift Output	8 mA normal operation, 16 mA level alarm (±1 mA)
	3.6 mA or 22 mA selectable fault signal (±1 mA)
Loop Resistance	104 ohms with 12 VDC input, 1100 ohms with 35 VDC input
Fail-safe	Selectable for high or low level
Power Consumption	Less than 1 watt
Ambient Temperature	-40 to +160 °F (-40 to +70 °C)

TRANSDUCER SPECIFICATIONS

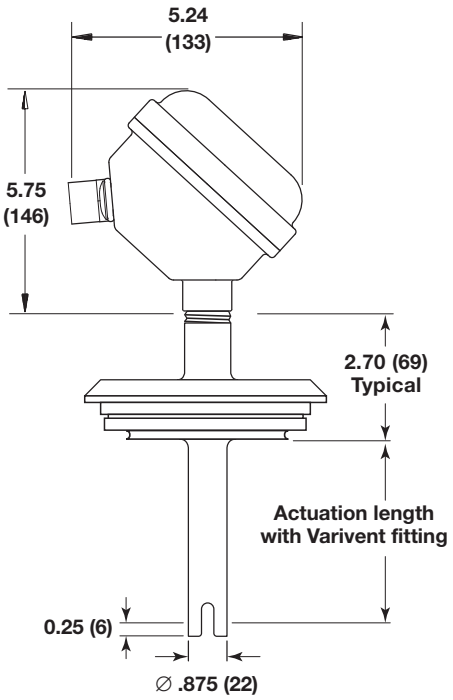
Operating Temperature		-40 to +325 °F (-40 to +163 °C)
Maximum Pressure	1" and 2":	2000 psi (138 bar)
	3" to 130":	1500 psi (103 bar)
Operating Frequency		2 MHz
Surface Finish		20 R_a (when ordered with 4th digit code S)

PERFORMANCE SPECIFICATIONS

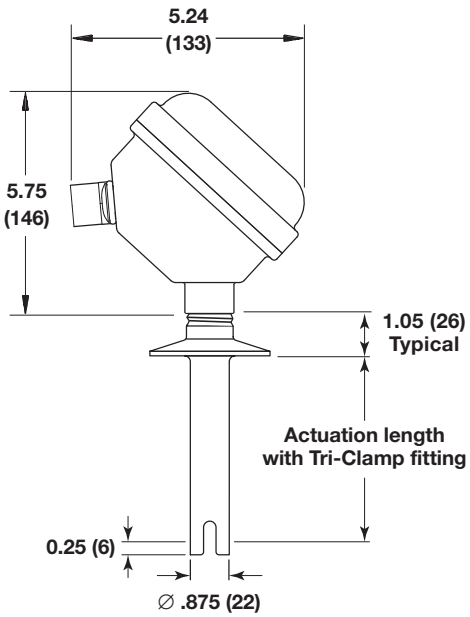
Repeatability		±0.078" (± 2 mm)
Response Time		½ second typical
Time Delay		Variable 0.5 – 45 seconds on rising and falling levels
Self-Test	Automatic:	Continuously verifies operation of electronics, transducer,
		piezoelectric crystals, and electrical noise
	Manual:	Push button verifies operation of electronics, transducer,
		and piezoelectric crystals
Shock Class		ANSI/ISA-S71.03 Class SA1
Vibration Class		ANSI/ISA-S71.03 Class VC2
Humidity		0-99%, non-condensing
Electromagnetic Compatibility		Meets CE requirements EN 61326

DIMENSIONAL SPECIFICATIONS

INCHES (mm)



Model 961
with DN65 Varivent® Flange



Model 961
with Tri-Clamp® fitting

BASIC MODEL NUMBER

961	Relay or current shift electronics

INPUT POWER

2	18–32 VDC line-powered
5	12–35 VDC loop-powered
7	102 to 265 VAC line-powered

OUTPUT SIGNAL

0	mA current shift (available with Input Power code 5)
D	5-amp gold flash relays (available with Input Power codes 2 or 7)

COVER

0	Standard cover
1	Glass window cover

MOUNTING

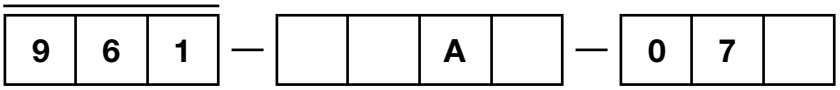
0	Integral

AGENCY APPROVAL

7	FM/CSA Non-incendive (available with Output Signal codes 0, 8 & D and Housing codes 4 & 5)

HOUSING & CONDUIT CONNECTION

4	Deep drawn 304 stainless steel w/ ½" NPT dual conduit entries
5	Deep drawn 304 stainless steel w/M20 dual conduit entries



MODEL NUMBER

961 SINGLE POINT TRANSDUCER

TRANSDUCER UNIT OF LENGTH

A	English (length in inches)
M	Metric (length in centimeters)

MATERIALS OF CONSTRUCTION

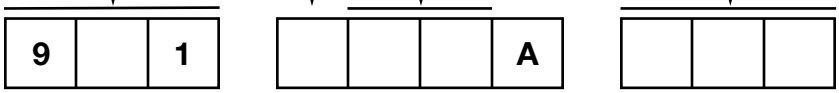
S	316/316L with 20 Ra hygienic finish (use only with Process Connection codes 3T, 4T, or VV)

PROCESS CONNECTIONS

3T	1½" Tri-Clamp® 16 AMP fitting
4T	2" Tri-Clamp® 16 AMP fitting
VV	DN65 – Varivent® Type N flange

ACTUATION LENGTH (unit of length specified in second digit)

2" to 130" in 1" increments Example: 4 inches = 004
5 cm to 330 cm in 1 cm increments Example: 6 centimeters = 006



QUALITY

MAGNETROL REGISTERED TO ISO 9001 Your Assurance of Quality and Service

The quality assurance system in place at Magnetrol® guarantees the highest level of quality throughout the company. MAGNETROL is committed to providing full customer satisfaction both in quality products and quality service.

The MAGNETROL quality assurance system is registered to ISO 9001 affirming its commitment to known international quality standards providing the strongest assurance of product and service quality available.

ESP

Expedite
Ship
Plan

Several ECHOTEL Model 961 units are available for quick shipment, usually within one week after factory receipt of a complete purchase order, through the Expedite Ship Plan (ESP).

To take advantage of ESP, simply match the color coded model number codes (standard dimensions apply).

ESP service may not apply to orders of ten units or more. Contact your local representative for lead times on larger volume orders, as well as other products and options.

WARRANTY

All MAGNETROL electronic level and flow controls are warranted free of defects in materials or workmanship for eighteen months from the date of original factory shipment.

If returned within the warranty period; and, upon factory inspection of the control, the cause of the claim is determined to be covered under the warranty; then, MAGNETROL will repair or replace the control at no cost to the purchaser (or owner) other than transportation.

MAGNETROL shall not be liable for misapplication, labor claims, direct or consequential damage or expense arising from the installation or use of equipment. There are no other warranties expressed or implied, except special written warranties covering some MAGNETROL products.

For additional information, see Instruction Manual 51-646.

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