ULTRASOUND LIQUID LEVEL SWITCHES

Ultrasonic liquid level switches are used in a wide variety of applications to detect the location of level in a process or storage vessel. These switches can be used in virtually any liquid. A complete offering of materials and mounting configurations are available to meet your application needs.

FEATURES

- No calibration necessary
- Remote Self-Test Feature
- No moving parts
- Vibration Resistant
- LED Relay Status Indicator
- Time Delay to avoid false trip

APPLICATIONS:

- Solvents
- Water
- Acids
- Caustics
- Pump protection
- Compressors
- Storage Tanks
- Pipelines
- Paints
- Condensate
- Clean Liquids
- Crude Oil
- Boiler Water Cutoff
- Hydraulic Supply Lines
- Sewage Systems
- Food Processing
- Alkalies
- Alcohols
- Fuels
- Hydrocarbons

INDUSTRIES

- Chemical
- Petroleum
- Water / Wastewater
- Pharmaceutical
- Pulp & Paper
- Power
- Aerospace

PRINCIPLE OF OPERATION

Ultrasonic switches use piezoelectric crystals to transform electrical energy into mechanical motion (sound). The Transmit Crystal sends a pulse of sound through the space between the crystals to the Receive Crystal. If the space is filled with air, gas, or vacuum, the Receive Crystal does not detect the sound pulse. However, if the space is filled with liquid, the pulse is detected by the Receive Crystal and the switch output changes.

The KUST and KUSG ultrasonic switches have an electronics module mounted inside a NEMA 4/7 enclosure. The electronics module options are a 4-20mA current loop or a 10A DPDT relay. The 10A DPDT relay electronics module has a Fail-Safe two-position switch that allows the user to change the state of the internal relay, an LED Relay Status indicator that allows the user to visually observe the state of the relay, and a Self-Test push button to test the operation of the relay when no liquid is present. An Interface Gain Adjust is also provided for applications that require a reduction in the sensitivity of the ultrasonic sensor.

The KUSO ultrasonic switches are a low-cost alternative for applications not requiring hazardous area certification. With integrated electronics, it is a direct replacement for Float Switches, Capacitance and Optical Detectors.

MODEL KUST / KUSO

(Tip Style Probe)
Ideal for vertical installation in pipeline tees, tight spaces and applications where the switch actuation point needs to be at the lowest possible level.

MODEL KUSG

(Gap Style Probe)
Can be mounted vertically or horizontally. The larger crystals work well in liquids that attenuate sound and the large gap between the crystals is ideal for viscous liquids.
# PRODUCT SPECIFICATIONS

## MODEL KUST

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Power</strong></td>
<td></td>
</tr>
<tr>
<td>AC</td>
<td>90-240VAC</td>
</tr>
<tr>
<td>DC</td>
<td>24VDC</td>
</tr>
<tr>
<td>DC (Loop Power)</td>
<td>9-30VDC</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
</tr>
<tr>
<td>Relay</td>
<td>10A DPDT</td>
</tr>
<tr>
<td>Loop Power</td>
<td>4-20mA</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td></td>
</tr>
<tr>
<td>Electronics</td>
<td>-20° F to 158° F (-28.9° C to 70° C)</td>
</tr>
<tr>
<td>Sensor (316L Stainless Steel)</td>
<td>-4° F to 302° F (-20° C to 150° C)</td>
</tr>
<tr>
<td>Sensor (CPVC)</td>
<td>32° F to 180° F (0° C to 82.2° C)</td>
</tr>
<tr>
<td><strong>Pressure Range</strong></td>
<td></td>
</tr>
<tr>
<td>316L Stainless Steel</td>
<td>Vacuum to 1000 PSIG</td>
</tr>
<tr>
<td>CPVC</td>
<td>Vacuum to 150 PSIG</td>
</tr>
<tr>
<td><strong>Sensitivity (Signal-to-Noise Ratio)</strong></td>
<td>±0.079” (±2 mm)</td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>0.5 Second Fixed (Delay Available)</td>
</tr>
<tr>
<td><strong>Response Time</strong></td>
<td></td>
</tr>
</tbody>
</table>

## MODEL KUSG

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<tr>
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<tbody>
<tr>
<td><strong>Input Power</strong></td>
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<tr>
<td>AC</td>
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<td>DC (Loop Power)</td>
<td>9-30VDC</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
</tr>
<tr>
<td>Relay</td>
<td>10A DPDT</td>
</tr>
<tr>
<td>Loop Power</td>
<td>4-20mA</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td></td>
</tr>
<tr>
<td>Electronics</td>
<td>-20° F to 158° F (-28.9° C to 70° C)</td>
</tr>
<tr>
<td>Sensor (316L SS / Monel / Titanium)</td>
<td>-4° F to 350° F (-20° C to 176.7° C)</td>
</tr>
<tr>
<td>Sensor (CPVC / Kynar)</td>
<td>32° F to 180° F (0° C to 82.2° C)</td>
</tr>
<tr>
<td><strong>Pressure Range</strong></td>
<td></td>
</tr>
<tr>
<td>316L Stainless Steel / Monel / Titanium</td>
<td>Vacuum to 1000 PSIG</td>
</tr>
<tr>
<td>CPVC / Kynar</td>
<td>Vacuum to 150 PSIG</td>
</tr>
<tr>
<td><strong>Sensitivity (Signal-to-Noise Ratio)</strong></td>
<td>1000:1 (Wet to Dry)</td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>±0.079” (±2 mm)</td>
</tr>
<tr>
<td><strong>Response Time</strong></td>
<td>0.5 Second Fixed (Delay Available)</td>
</tr>
</tbody>
</table>

## MODEL KUSO

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<tr>
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</tr>
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<tbody>
<tr>
<td><strong>Input Power</strong></td>
<td></td>
</tr>
<tr>
<td>DC (Relay, Loop Power)</td>
<td>9-30VDC</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
</tr>
<tr>
<td>Relay</td>
<td>1A SPDT</td>
</tr>
<tr>
<td>Loop Power</td>
<td>4-20mA</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td></td>
</tr>
<tr>
<td>Sensor</td>
<td>-4° F to 212° F (-20° C to 100° C)</td>
</tr>
<tr>
<td><strong>Pressure Range</strong></td>
<td></td>
</tr>
<tr>
<td>1/4” MNPT</td>
<td>Vacuum to 100 PSIG</td>
</tr>
<tr>
<td>1/2” &amp; 3/4” MNPT</td>
<td>Vacuum to 500 PSIG</td>
</tr>
<tr>
<td><strong>Sensitivity (Signal-to-Noise Ratio)</strong></td>
<td>500:1 (Wet to Dry)</td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>±0.079” (±2 mm)</td>
</tr>
<tr>
<td><strong>Response Time</strong></td>
<td>0.5 Second Fixed (Delay Available)</td>
</tr>
</tbody>
</table>
**ORDERING GUIDES**

REQUESTED BY: ______________ COMPANY: ______________
ADDRESS: ______________ CITY: ______________ STATE: ______________ ZIP: ______________
PHONE: ______________ FAX: ______________ EMAIL : ______________

**MODEL KUSG / KUST**

Switch Series
KUSG = Gap Style Probe
KUST = Tip Style Probe

Input Power
1 = 90-240VAC
2 = 24VDC
3 = 9-30VDC (Loop Power)

Output
1 = 10A DPDT (Relay)
2 = 4-20mA (Loop Power)

Switch Mounting
1 = Integral
2 = Remote
(In parenthesis, designate Cable Length in Feet)

Sensor Material
S = 316L Stainless Steel
P = CPVC
K = Kynar (KUSG Only)
M = Monel (KUSG Only)
J = Titanium (KUSG Only)

Actuation Point
00 = Standard
(1.00” on KUSG)
(1.25” on KUST)
XX = Custom Length in Inches
(Upto 99.00”)

Process Connection
1 = 3/4” MNPT
F = 150 LB. R.F. ANSI Flange
H = 300 LB. R.F. ANSI Flange
J = 600 LB. R.F. ANSI Flange
S = Sanitary Flange

Flange Material
Blank = None
A = Carbon Steel
S = 316 Stainless Steel
P = CPVC
K = Kynar (KUSG Only)
M = Monel (KUSG Only)
J = Titanium (KUSG Only)

Contact Kenco for other available connection types.

• Example Order Number: KUST-3-2-1-5-00-1

**MODEL KUSO**

KUSO

Switch Series
KUSO = Tip Style Probe with Connection Wires

Process Connection / Output
0 = 1/4” MNPT / Loop Power, NPN & PNP
1 = 1/4” MNPT / 1A SPDT Relay
4 = 1/2” MNPT / Loop Power, NPN & PNP
5 = 1/2” MNPT / 1A SPDT Relay
6 = 3/4” MNPT / Loop Power, NPN & PNP
7 = 3/4” MNPT / 1A SPDT Relay

Process Connection Notes:
• 1/4” MNPT probes are constructed from 316 stainless steel with an epoxy tip.
• 1/2” MNPT & 3/4” MNPT probes are constructed from 316 stainless steel.
• Contact Kenco for other available connection types.

Actuation Point
00 = Standard
(9/16” on 1/4” MNPT)
(1-1/4” on 1/2” MNPT & 3/4” MNPT)
XX = Custom Length in Inches
(1/4” MNPT up to 36.00”)
(1/2” MNPT & 3/4” MNPT up to 96.00”)

Cable Length
0 = Standard (1’)
XX = Custom Length in Feet

Input Power
0 = 9-30VDC Relay, Loop Power, NPN & PNP

Contact Kenco for other available connection types.

• Example Order Number: KUSO-4-0-00-0
Dimensional Note: All dimensions are for reference purposes only and are subject to change at any time without notice.

KUST

KUST & KUSG
24VDC Input Power / 10ADPDT Output Electronics Module Shown

KUSG

KUSO-0 & KUSO-1

KUSO-4 & KUSO-5

KUSO-6 & KUSO-7

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