



MAGNETROL®

ECHOTEL® 940/941 Ultrasonic level switch

DESCRIPTION

Echotel® 940/941 ultrasonic level controls are compact integral units which utilize pulsed wave technology to detect high or low level alarm in a broad range of viscous to light liquids.

The unit is available in two versions:

- with integrated relay: Echotel® 940
- with 8/16 mA current shift: Echotel® 941

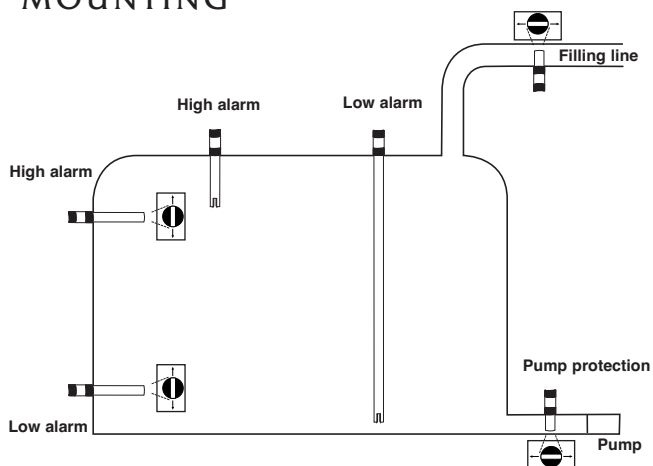
FEATURES

- No calibration required.
- Electronics potted in sensor.
- Compact and easy to install design.
- High or low level detection.
- Max +85 °C @ 138 bar (+185 °F @ 2000 psi).
- IP66, watertight, with flying leads.
- Horseshoe shaped transducer gap.

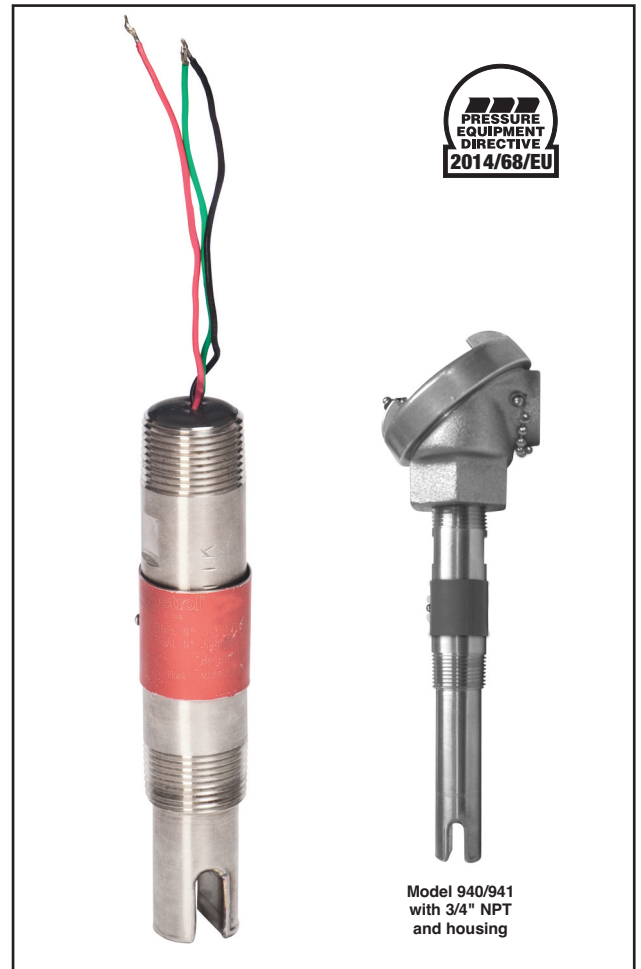
APPLICATIONS

- VESSELS: any mounting position, ideally for filters.
- PROCESS CONDITIONS: unaffected by
 - shifting dielectric, density, or PH
 - presence of foam and visible vapors
 - fast drain/fill rates
 - vacuum conditions.

MOUNTING

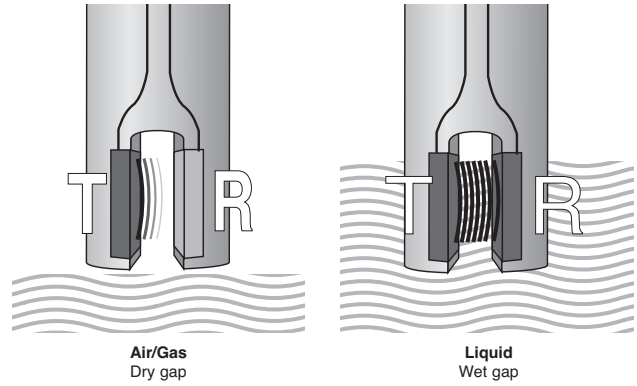


With relay or 8/16 mA output



PRINCIPLE OF OPERATION

The Echotel® 940/941 series operate on a two crystal pulsed or “transmit-receive” principle which applies a high frequency electronic burst to the transmit crystal. The signal is then converted into ultrasonic sound energy and transmitted across the sensing gap toward the receiver crystal. When there is air in the gap, the high frequency sound energy will be attenuated, thereby not allowing the energy to be received. When there is liquid in the gap, the sound energy will propagate across the gap and the output will indicate such a reception of the signal.



SELECTION DATA

A complete measuring system consists of:

1. One order code for electronics and transducer
2. OPTION: Standard cable length is 45 cm (18"). Specify cable length separately when a longer cable is required.
3. OPTION: **052-7012-002**: order code for Echotel 941 cast aluminium housing with terminal block, 3/4" NPT cable entry, IP 65
052-7012-003: order code for Echotel 940 cast aluminium housing with terminal block, 3/4" NPT cable entry, IP 65

BASIC MODEL NUMBER

9 4 0 - N	Echotel® 940 OEM switch with integrated 1 A SPDT relay
9 4 1 - N	Echotel® 941 OEM switch with current shift output 8/16 mA

PROCESS CONNECTION Threaded

1 1 M	3/4" NPT
1 2 M	3/4" BSP (G 3/4")
2 2 M	1" BSP (G 1")

ACTUATION LENGTH – Specify per cm (0.39") increment
 Total insertion length = actuation length + 6 mm (0.25")

0 0 3	Minimum 3 cm (1.2") – for 3/4" NPT
0 0 5	Minimum 5 cm (2.0") – for 3/4" BSP (G 3/4")
0 0 6	Minimum 6 cm (2.4") – for 1" BSP (G 1")
2 5 0	Maximum 250 cm (98.4")

9	4	N	M			
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 complete order code for Echotel 940/941

→ X = product with a specific customer requirement

PERFORMANCE SPECIFICATIONS

Description	Specification
Response time	0,5 s typical
Repeatability	± 2 mm (0.078")
Ambient Temperature	-40 °C up to +85 °C (-40 °F up to +185 °F)
Humidity	0-99 %, non condensing
Electromagnetic Compatibility	Meets CE requirements (EN 61326: 1997 + A1 + A2)

PHYSICAL/FUNCTIONAL SPECIFICATIONS

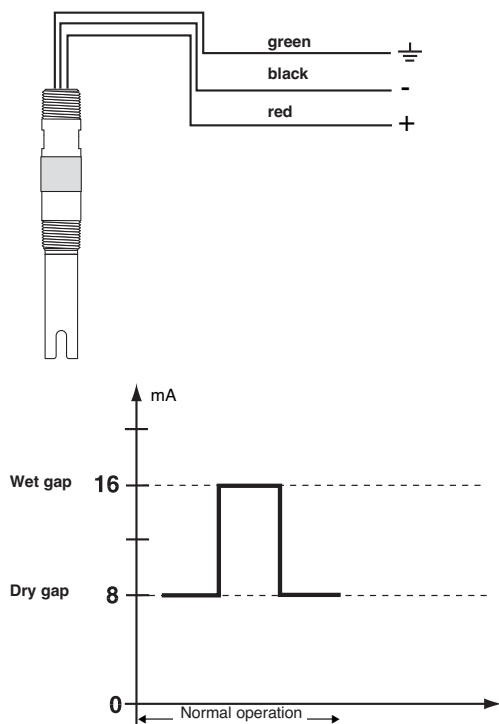
Description	Specification	
Input voltage	12 - 35 V DC	
Power consumption	< 1 W	
Signal output	Current Shift	8 mA (± 1 mA) - dry gap or 16 mA (± 1 mA) - wet gap
	Relay	SPDT: 1 A @ 30 V DC
Potted cable	45 cm (18") flying leads of 18 AWG wires	
Net Weight	510 g (unit with 3/4" NPT transducer and shortest length)	

TRANSDUCER SPECIFICATIONS

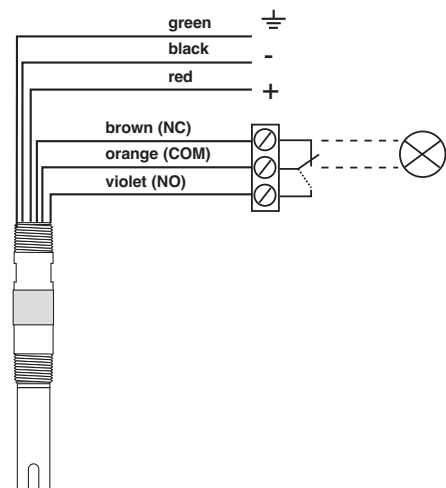
Description	Specification
Material	316/316L SST (1.4401/1.4404)
Mounting	Threaded (NPT/BSP)
Actuation length	From 3 cm up to 250 cm (1.2" up to 98.4")
Operating process temp.	-40 °C up to +85 °C (-40 °F up to +185 °F)
Max pressure	103 bar @ +85 °C (1500 psi @ +185 °F) - transducer length > min. length 138 bar @ +85 °C (2000 psi @ +185 °F) - transducer length = min. length Flanged models are downrated to the design pressure of the selected flange

ELECTRICAL WIRING

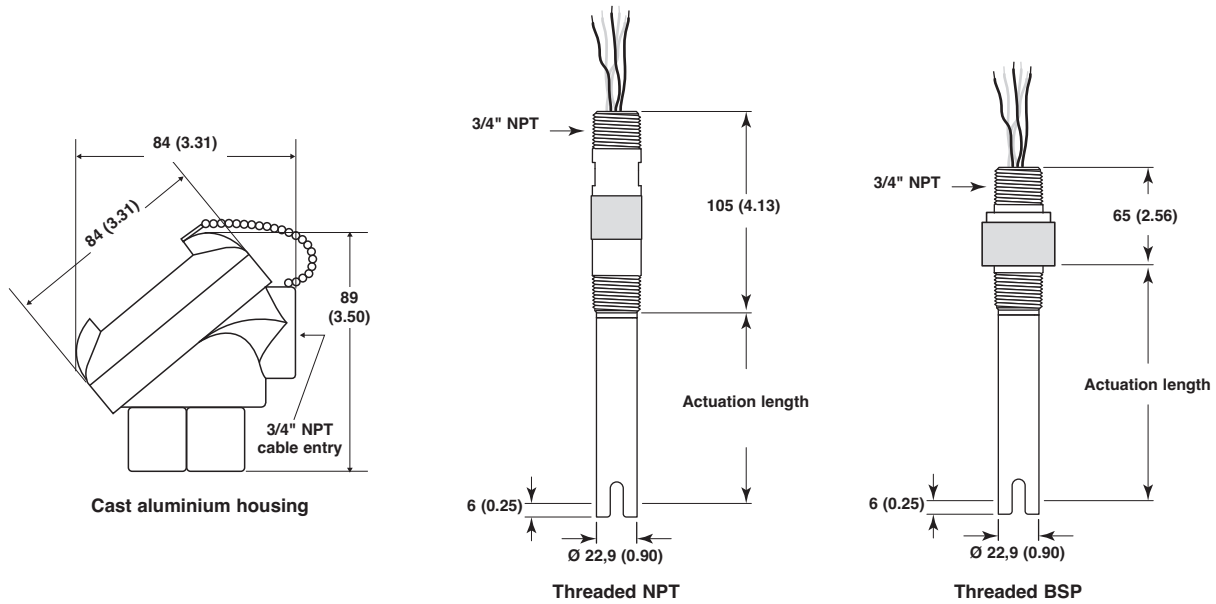
Current shift
8/16 mA – 12 - 35 V DC



Relay version
1A SPDT @ 24 V DC



DIMENSIONS in mm (inches)



QUALITY ASSURANCE - ISO 9001

THE QUALITY ASSURANCE SYSTEM IN PLACE AT MAGNETROL® GUARANTEES THE HIGHEST LEVEL OF QUALITY DURING THE DESIGN, THE CONSTRUCTION AND THE SERVICE OF CONTROLS. OUR QUALITY ASSURANCE SYSTEM IS APPROVED AND CERTIFIED TO ISO 9001 AND OUR TOTAL COMPANY IS COMMITTED TO PROVIDING FULL CUSTOMER SATISFACTION BOTH IN QUALITY PRODUCTS AND QUALITY SERVICE.

PRODUCT WARRANTY

ALL MAGNETROL® ELECTRONIC AND ULTRASONIC LEVEL CONTROLS ARE WARRANTED FREE OF DEFECTS IN MATERIALS AND WORKMANSHIP FOR 18 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® INTERNATIONAL 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 THE EQUIPMENT. THERE ARE NO OTHER WARRANTIES EXPRESSED OR IMPLIED, EXCEPT, SPECIAL WRITTEN WARRANTIES COVERING SOME MAGNETROL® PRODUCTS.

UNDER RESERVE OF MODIFICATIONS

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European Headquarters & Manufacturing Facility

Heikensstraat 6
9240 Zele, Belgium
Tel: +32-(0)52-45.11.11 • Fax: +32-(0)52-45.09.93
e-mail: info@magnetrol.be

www.magnetrol.com

