



ASSURED QUALITY &
SERVICE COST LESS
ISO 9001

ECHOTEL® Series 91S/92S

Ultrasonic Level Controls
With Continuous Self-Test

The 91S/92S ultrasonically detects liquid level over a broad spectrum of liquids.

The single point unit (91S) has one control relay and one dedicated malfunction or self-test relay contact closure. The dual point relay design (92S) has two control relays and one dedicated malfunction relay.

Both versions also incorporate a unique, continuous self-testing feature which automatically verifies the integrity of the unit, including the crystal bond.

FEATURES

- * No calibration required.
- * Single tip design or dual point transducer in a sturdy machined body design.
- * Unique continuous self-test checks crystal bond, sensor, and circuit integrity with or without liquid in the gap.
- * Relay contacts with separate malfunction indication.
- * New electronic windowing signal technique.
- * Transducer lengths from 30 - 3300 mm.
- * Circuitry designed and tested to meet all applicable IEC 801 EMC requirements.
- * CENELEC certified explosion proof.
- * Field selectable fail-safe.
- * Integral or remote mount electronics.

APPLICATIONS

- High level alarm
- Low level alarm
- Overfill protection
- Pump protection
- Seal pot level
- Pump control

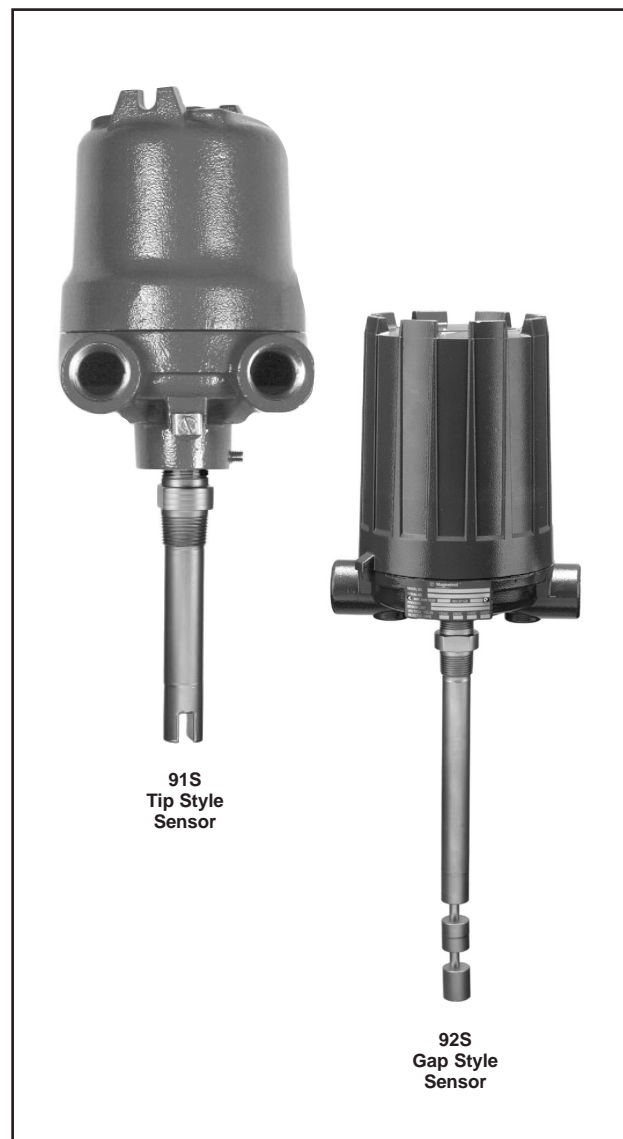
INDUSTRIES

- Chemical
- Petrochemical
- Pulp and Paper
- Food and pharmaceutical
- Power
- Industrial water treatment

SENSITIVES

- Excessive aeration
- Dried coating
- Suspended solids in excess of 40%
- Foam

Series 91S/92S with integrated alarm relay(s) and selftest relay



AGENCY APPROVALS

Agency	Approval
CENELEC	EEx d II C T6, explosion proof
FM/CSA®	Explosion proof Class I, Div. 1, Groups B, C & D Class II, III, Div. 1, Groups E, F & G

® Consult factory for correct model numbers

SELECTION DATA

A complete measuring system consists of:

1. ECHOTEL® 91S/92S electronics
2. ECHOTEL® 91S/92S sensor
3. Actuation length upper set point - dimension B (see page 5), specify separately for ECHOTEL® 92S sensor
min: 67 mm (2.62")
max: 560 mm (22")
4. Connecting cable (for remote mount units only)
5. Optional: order code for non welded mounting flanges

1. Order code for ECHOTEL® electronics

ELECTRONICS

9 1 S	Electronics for 9D1/9F1 sensors with 1 set point
9 2 S	Electronics for 9D2/9F2 sensors with 2 set points

OUTPUT SIGNAL

A 1 A	10 A DPDT (sealed relay)
L 1 H	Optically-isolated

INPUT POWER

1	240 V AC
2	24 V DC
0	120 V AC
3	12 V DC

91S - CENELEC (IP 65), EXPLOSION PROOF HOUSING

V	3/4" NPT dual cable entry, anti-corrosive coated aluminium
W	M20 x 1.5 dual cable entry, anti-corrosive coated aluminium
U	PG 13.5 dual cable entry, anti-corrosive coated aluminium
S	PG 16 dual cable entry, anti-corrosive coated aluminium
6	3/4" NPT single cable entry, stainless steel housing

92S - CENELEC (IP 65), EXPLOSION PROOF HOUSING

N	1" NPT dual cable entry, anti-corrosive coated aluminium,
G	PG 16 dual cable entry, anti-corrosive coated aluminium
B	M20 x 1.5 dual cable entry, anti-corrosive coated aluminium

MOUNTING

0	Integral
1	Remote



complete order code for ECHOTEL® 91S/92S electronics

2. Order code for ECHOTEL® 91S/92S transducer

SENSOR TYPE

9 D 1	91S sensor for Stainless Steel sensors - 1 set point
9 F 1	91S sensor for Monel/Hastelloy C sensors - 1 set point
9 D 2	92S sensor for all materials - 2 set points

PROCESS CONNECTION

1	Threaded 3/4" NPT connection (for separate flanges, see page 4)
2	Threaded 1" NPT connection
9	Threaded 1" BSP (G1) connection (minimum length transducer = 50 mm (2"))
B	ANSI flange - 1" - 150 lbs, raised face flange
C	ANSI flange - 1 1/2" - 150 lbs, raised face flange
D	ANSI flange - 2" - 150 lbs, raised face flange
E	ANSI flange - 1" - 300 lbs, raised face flange
F	ANSI flange - 1 1/2" - 300 lbs, raised face flange
G	ANSI flange - 2" - 300 lbs, raised face flange
H	ANSI flange - 1" - 600 lbs, raised face flange
J	ANSI flange - 2" - 600 lbs, raised face flange
K	DIN flange - DN 25/PN 16, DIN 2527 FORM B
L	DIN flange - DN 40/PN 16, DIN 2527 FORM B
M	DIN flange - DN 50/PN 16, DIN 2527 FORM B
N	DIN flange - DN 25/PN 25, DIN 2527 FORM B
P	DIN flange - DN 40/PN 25, DIN 2527 FORM B
Q	DIN flange - DN 50/PN 25, DIN 2527 FORM B
R	DIN flange - DN 25/PN 40, DIN 2527 FORM B
S	DIN flange - DN 40/PN 40, DIN 2527 FORM B
T	DIN flange - DN 50/PN 40, DIN 2527 FORM B
U	DIN flange - DN 25/PN 64, DIN 2527 FORM E
V	DIN flange - DN 40/PN 64, DIN 2527 FORM E
W	DIN flange - DN 50/PN 64, DIN 2527 FORM E
X	DIN flange - DN 25/PN 100, DIN 2527 FORM E
Y	DIN flange - DN 40/PN 100, DIN 2527 FORM E
Z	DIN flange - DN 50/PN 100, DIN 2527 FORM E

SENSOR MATERIALS

2 2	316/316L (1.4401/1.4404) Stainless Steel for 9D1/9D2 sensors
2 3	316 TI Stainless Steel (1.4571) for 9D1/9D2 sensors
M M	Monel (2.4360) for 9F1 sensors
H C	Hastelloy C (2.4819) for 9F1 sensors

ACTUATION LENGTH(*) - Specify per 1 cm (0,39") increments

0 0 3	min 30 mm (1.2") – for 9D1/9F1 sensors with 3/4" NPT threaded connection
0 0 5	min 50 mm (2.0") – for 9D1/9F1 sensors with 1" BSP (G1) or flanged connection
0 1 0	min 100 mm (3.9") – for 9D2 sensors with 3/4" NPT threaded connection
0 1 3	min 130 mm (5.0") – for 9D2 sensors with 1" BSP (G1) or flanged connection
3 3 0	max 3300 mm (130") – for all sensors

(*) For 9D2 sensors: Actuation length specifies the lowest set point - specify the higher set point separately
min 67 mm (2.62") - max 560 mm (22")

Note: Transducer lengths are measured in accordance with process connection style.
– Consult dimensional drawings on page 6.



complete order code for Echotel 91S/92S sensor

3. Actuation length upper set point - dimension B (see page 5), specify separately for ECHOTEL® 92S sensor
 min: 67 mm (2.62") - max: 560 mm (22")

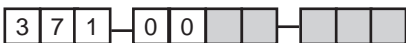
4. Order code for connecting cable

CABLE TYPE

A 1	RG 178 (Single Point), 1 m - 15 m (3 - 50') max. length
A 2	RG 178 (Dual Point), 1 m - 15 m (3 - 50') max. length
B 1	RG 58 (Single Point), 15 - 90 m (51 - 300') max. length
B 2	RG 58 (Dual Point), 15 - 90 m (51 - 300') max. length

SPECIFIC CABLE SPECIFICATION per 1 m increments

0 0 1	min 1 m
0 9 0	max 90 m



complete order code connecting cable

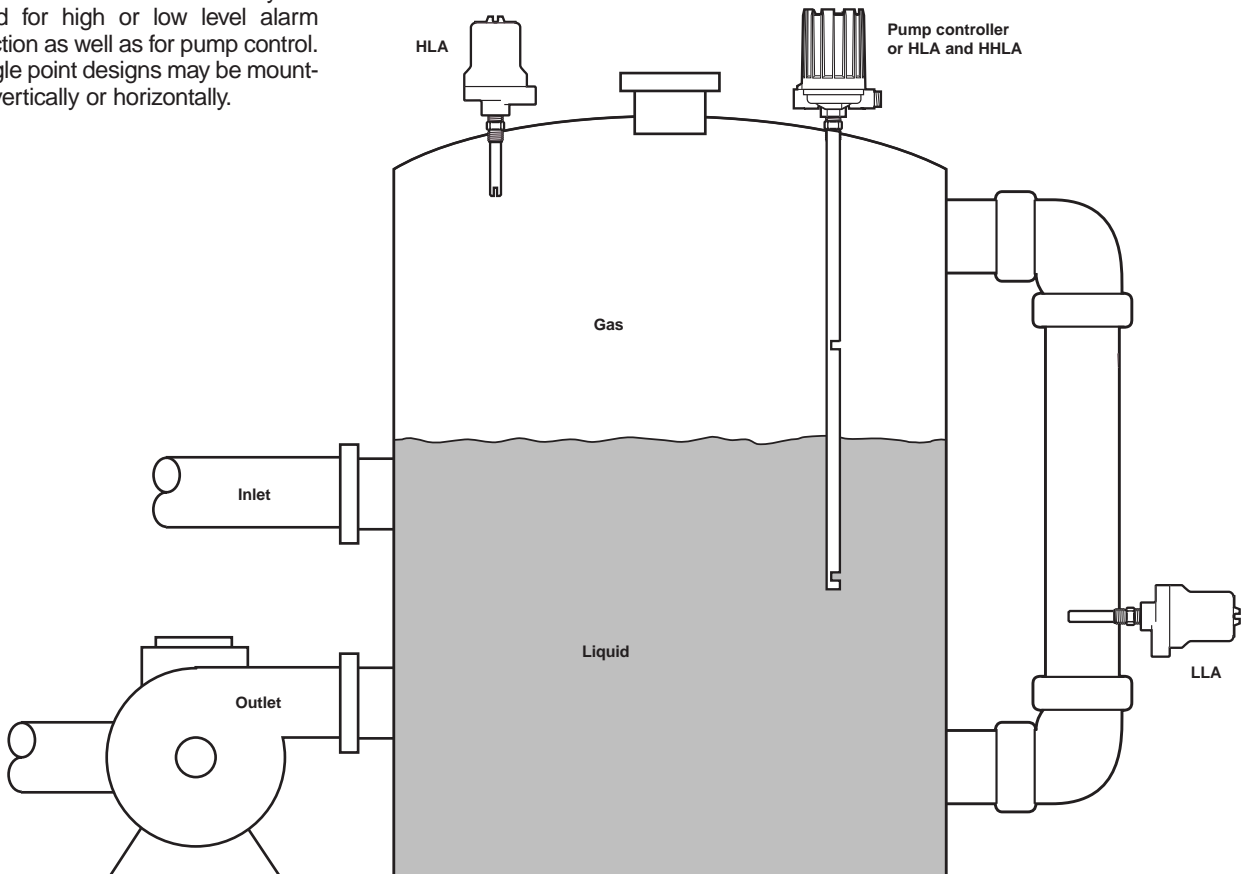
PRINCIPLE OF OPERATION

The Series 91S/92S operates 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 relay output will indicate such a reception of the signal. Self-testing is accomplished without additional crystals and a minimum of additional circuitry. The electronics detection circuit looks for low amplitude signals that pass between the crystals through the frame of the sensor. This allows the entire sensor, including the bond between the crystals and the sensor face, to be tested along with the electronics.

TYPICAL APPLICATION

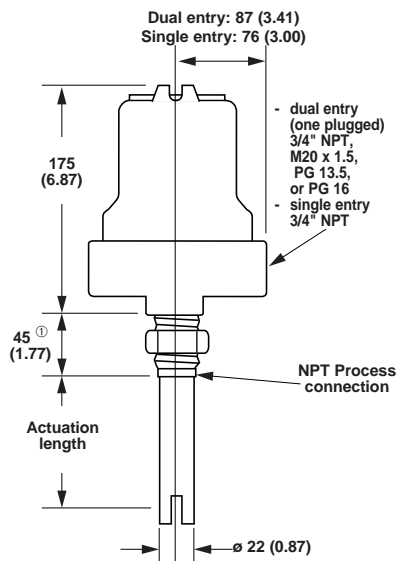
Series controls 91S/92S may be used for high or low level alarm function as well as for pump control. Single point designs may be mounted vertically or horizontally.



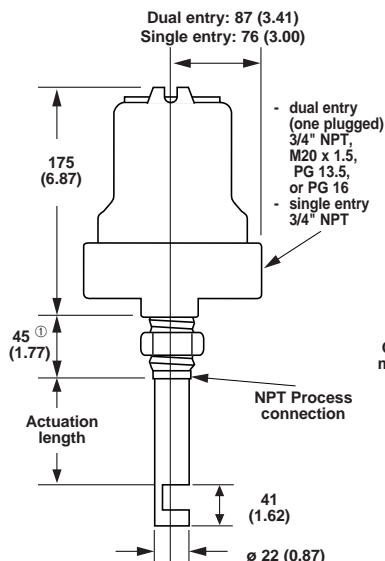
5. Order code for non welded mounting flanges (DIN flanges see bulletin GE 51-126)

ANSI Flange		Part Number			
Size	Rating	316/316L	Hastelloy C	304 SS	Carbon Steel
11/2"	150 lbs	04-5895-001	04-5867-031	04-5867-011	04-5867-021
2"		04-5895-002	04-5867-032	04-5867-012	04-5867-022
3"		04-5895-003	04-5867-033	04-5867-013	04-5867-023
4"		04-5895-004	04-5867-034	04-5867-014	04-5867-024
6"		04-5895-009	04-5867-035	04-5867-015	04-5867-025
11/2"	300 lbs	04-5895-005	04-5867-036	04-5867-016	04-5867-026
2"		04-5895-006	04-5867-037	04-5867-017	04-5867-027
3"		04-5895-007	04-5867-038	04-5867-018	04-5867-028
4"		04-5895-008	04-5867-039	04-5867-019	04-5867-029
6"		04-5895-010	C/F	04-5867-020	04-5867-030
11/2"	600 lbs	C/F	C/F	C/F	04-5867-046

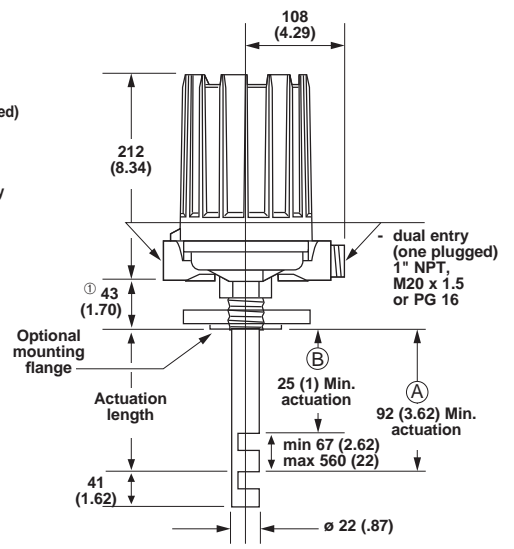
DIMENSIONS IN mm (inches)



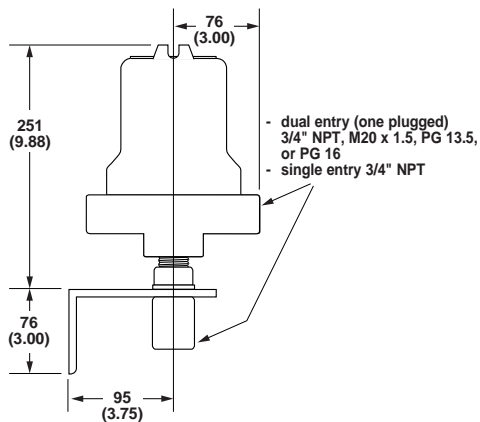
INTEGRAL ELECTRONICS 91S WITH 9D1 SENSOR



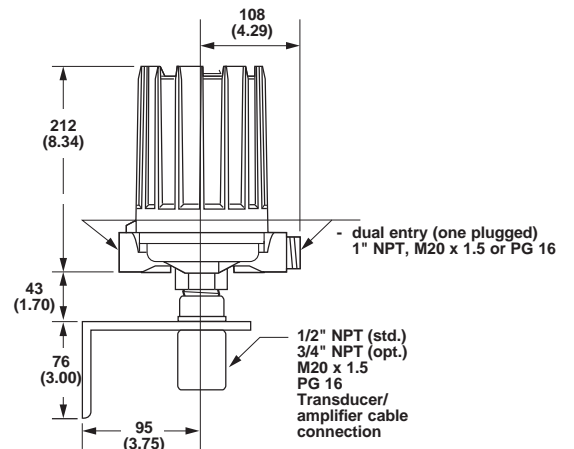
INTEGRAL ELECTRONICS 91S WITH 9D1 SENSOR



INTEGRAL ELECTRONICS 92S



REMOTE ELECTRONICS 91S



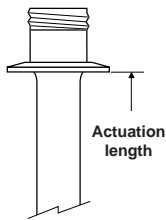
REMOTE ELECTRONICS 92S

Ⓞ Dimension changes from 15 mm (.59) minimum to 60 mm (2.36) maximum depending connection style (see page 6)

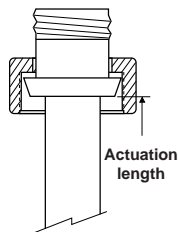
ELECTRICAL SPECIFICATIONS

Description	Specification
Supply voltage	12 or 24 V DC 120 or 240 V AC, 50/60 Hz
91S	10 A DPDT alarm relay + 10 A SPDT malfunction relay
92S	2 x 10 A DPDT alarm relays – independant or joint interaction via a field selectable jumper + 10 A SPDT malfunction relay
Self-test (Automatic and Manual)	Continuous: Verifies operation of electronics, transducer, and crystal bond integrity. Also, a local, on-demand self-test to force a malfunction condition.
Time delay	Variable potentiometer 0.5–30 seconds on rising and/or falling level
Failsafe	Field selectable—high or low level
Repeatability	± 2 mm (0.078")
Power consumption	2.50 VA nominal
Electronics temp.	-40° C to +70° C (-40° F to +160° F)
Transducer temp. (metallic materials)	-40° C to +160° C (-40° F to +325° F)
Pressure (operational)	103 BAR @ -40° C to +160° C (1500 PSIG @ -40° F to +325° F)

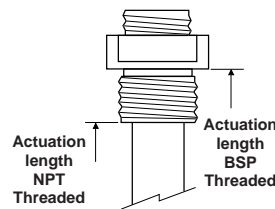
CONNECTIONS



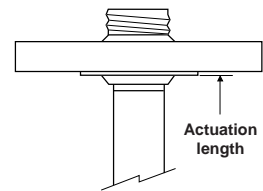
Sanitary 3A



Sanitary DIN 11851



Threaded



Welded flange ANSI / DIN



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 ONE FULL YEAR 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.

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OUR NEAREST REPRESENTATIVE

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