

ECHOTEL® MODEL 960

Installation and Operating Manual

*Actuator-
Sensor-Interface
(AS-Interface®)
Ultrasonic
Level Switch*



**Model 960
Aluminium housing**



**Model 960
Stainless steel housing**

UNPACKING

Unpack the instrument carefully. Make sure all components have been removed from the foam protection. Inspect all components for damage. Report any concealed damage to the carrier within 24 hours. Check the contents of the carton/crates against the packing slip and report any discrepancies to Magnetrol. Check the nameplate model number to be sure it agrees with the packing slip and purchase order. Check and record the serial number for future reference when ordering parts.



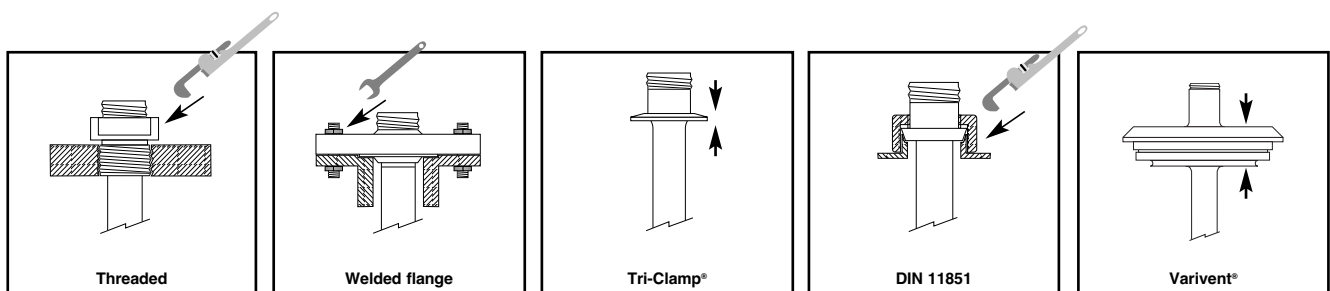
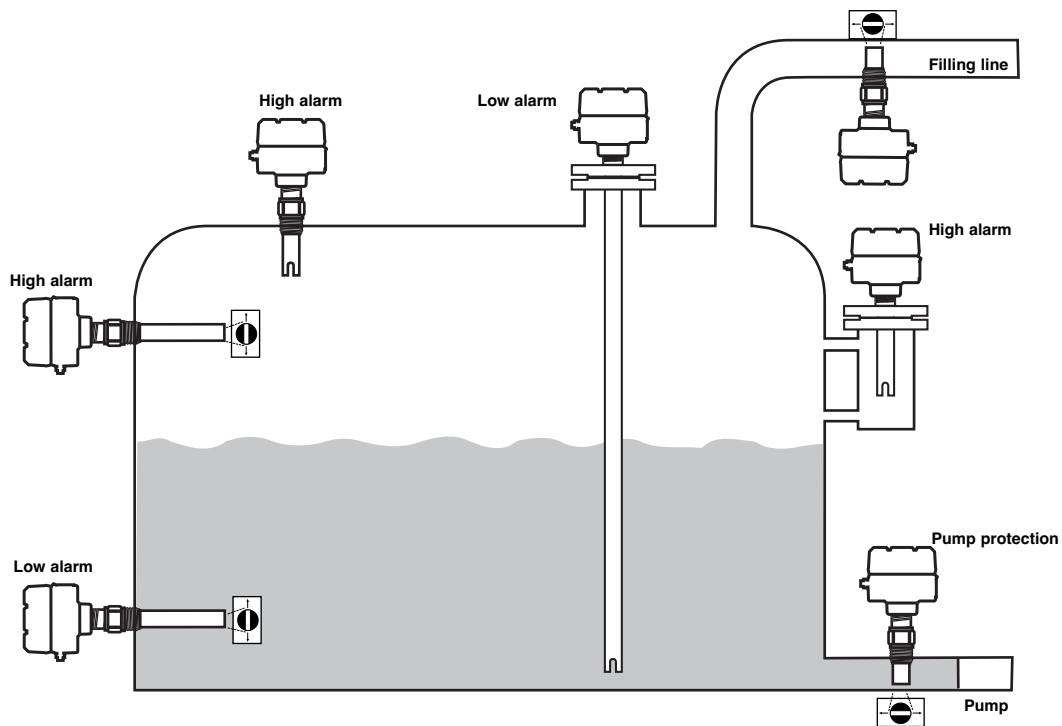
These units are in compliance with:

1. The EMC directive 2004/108/EC. The units have been tested to EN 61326: 1997 + A1 + A2.
2. Directive 94/9/EC for equipment or protective system intended for use in potentially explosive atmospheres. EC-type examination certificate ISSeP06ATEX008 - flameproof enclosure.
3. The PED Directive 97/23/EC (pressure equipment directive). Safety accessories per category IV module H1.

Nameplate:
- part number
- serial n°

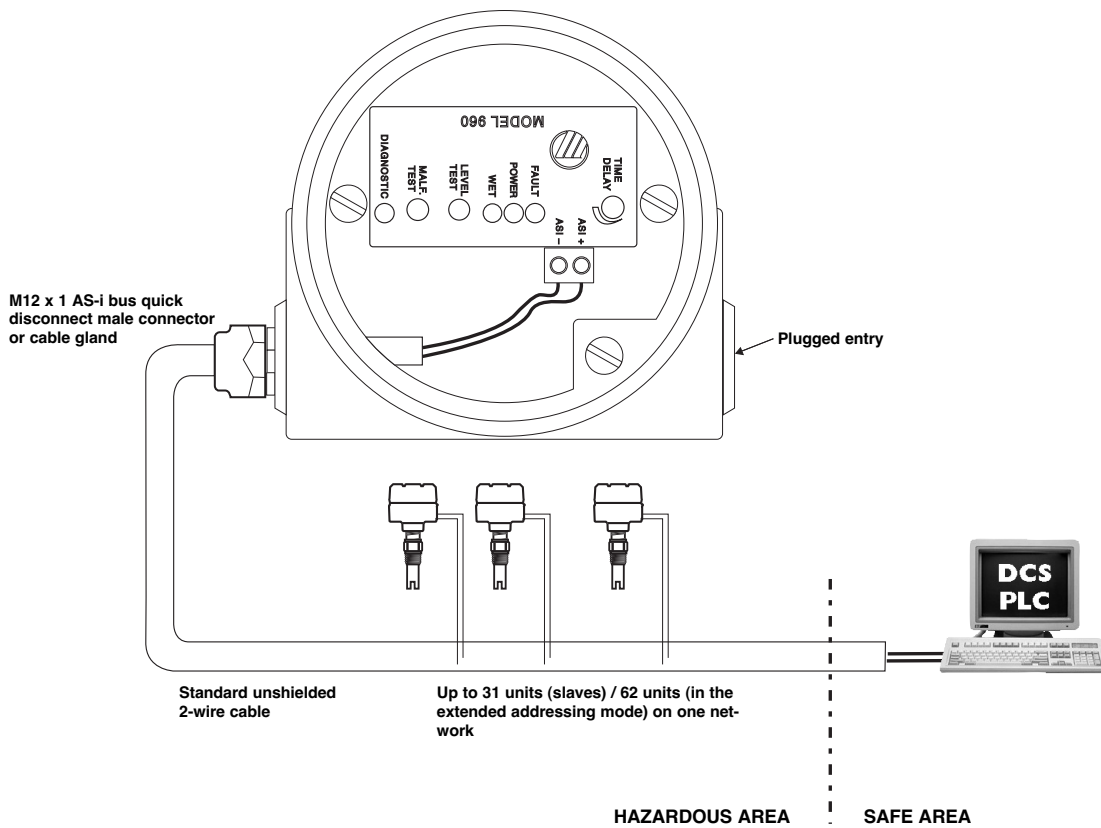


MOUNTING



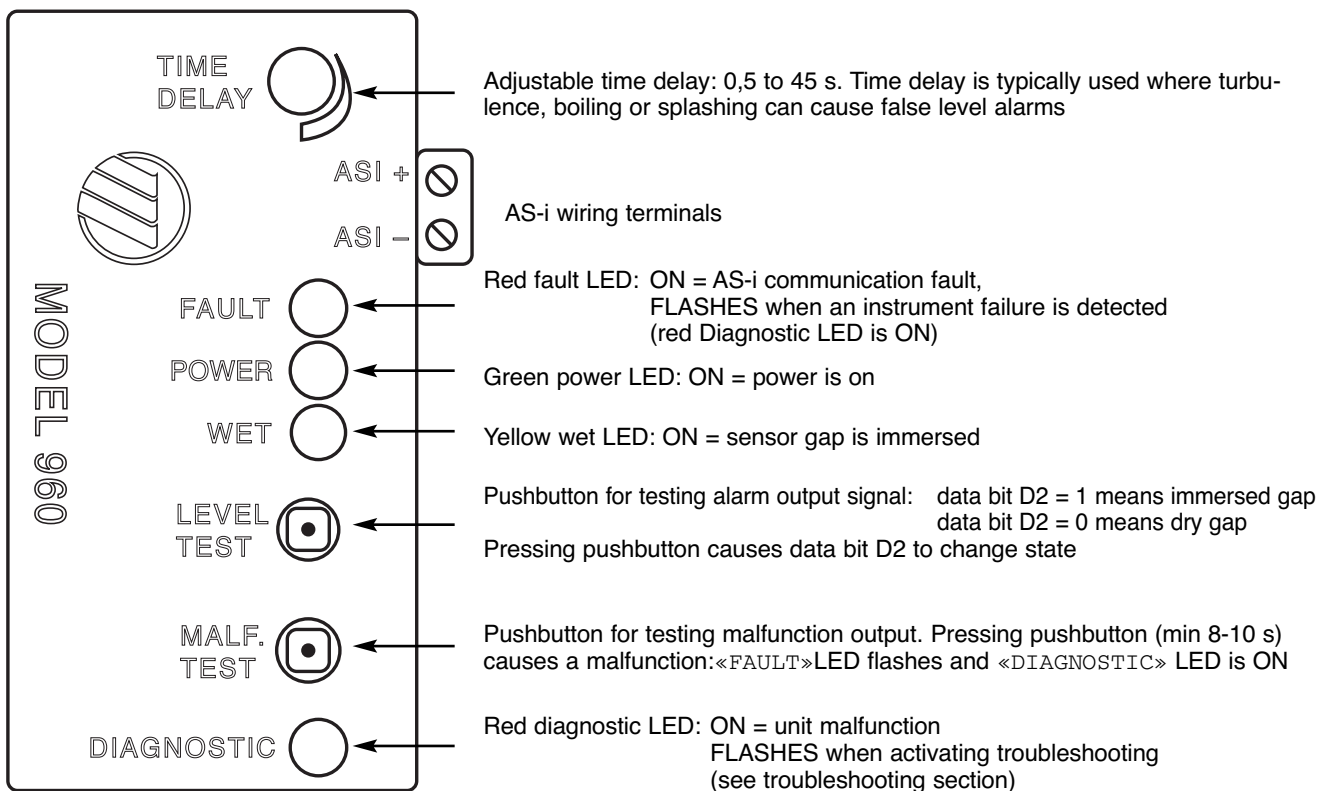
WIRING

Echotel® 960 electronics



Important: In extended addressing mode, the A or B channel select must be programmed as well. Model 960 units are factory configured as unassigned slaves with the address defaulted to 0. The address must be changed by the end user via programming at the PLC or with special handheld addressing devices.

USER INTERFACE



Manual Testing

Level Test:

Pressing the “Level Test” pushbutton, will manually test the AS-i output. The level test forces the data bit D2 output and corresponding LED’s from “1” (wet gap) to “0” (dry gap) data bits or vice versa. The time delay setting is not active during testing.

Fault Test

Pressing the “Fault Test” pushbutton for min 2 s, will manually test the fault output. The fault test simulates a circuit failure and forces the data bit D3 output to “1” data bits. The time delay setting is not active during testing.

Troubleshooting

Problem	Action/Indication	Solution
No power	No LED’s are ON	Check wiring / input power Check for malfunction. See below
No change in output between wet gap / dry gap	Gap may be plugged by solids / dense foam	Clean the transducer
	Gap is out of reach of liquid	Check mounting section on page 2 and relocate the unit or check blocking valves.
Chattering output	Excessive aeration / Turbulence	Introduce a time delay
		Check input power
		Relocate the switch
Fault LED FLASHES Diagnostic LED is OFF	A system fault has been detected	Check input power
	Press «Level Test» pushbutton to identify the problem:	
	* --- * : 1 flash (red LED)	Check wiring between transducer and electronics or replace transducer.
	** --- ** : 2 flashes (red LED)	Replace electronics
	*** --- *** : 3 flashes (red LED)	The unit senses excessive noise interference. Check shield connection or eliminate interference from a walkie-talkie, radio or other nearby source

REPLACEMENT PARTS

Replacing electronics/transducer

Echotel electronics can be removed in the field under process conditions. Follow below steps to exchange electronics/transducer:

Note: Adjust set up of the replacing electronics following the settings of the old electronics (see configuration section)

1. Disconnect power before removing the housing cover
2. Remove power/output wires (a)
3. Remove the 2 bracket screws and slide out electronics (b)
4. Remove the transducer wires (c)
5. Re-assemble following the same procedure in opposite way. Make sure that the tip on the bracket of the electronic block is seated properly in the corresponding recess in the housing base - (d)

Replacement parts

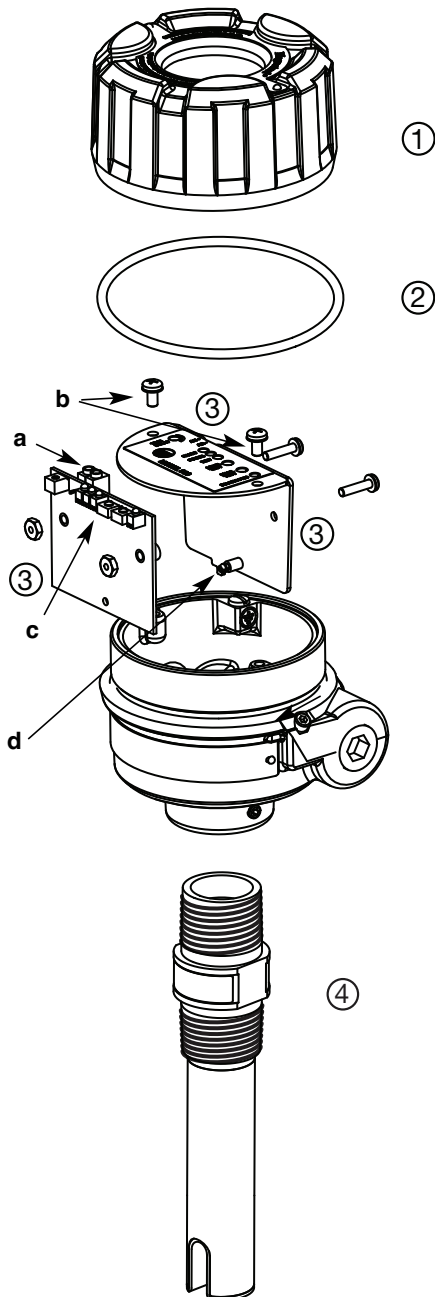
Partn°:

Serial n°:

Digit in partn°:

See nameplate, always provide complete partn° and serial n° when ordering spares.

↳ X = product with a specific customer requirement



(1) Housing cover		
Digit 7	Digit 10	Replacement part
0	0 or 1	004-9193-003
	4 or 5	036-5702-003
1	0 or 1	036-4410-003
	4 or 5	036-5702-002

(2) "O"-ring	
Digit 10	Replacement part
0 or 1	012-2201-237
4 or 5	012-2201-155

(3) Electronic module	
Digit 10	Replacement part
0 or 1	089-7255-002
4 or 5	089-7255-001

(4) Transducer	
Digit 10	Replacement part
	consult factory

MODEL IDENTIFICATION

A complete measuring system consists of:

1. Echotel® electronics
2. Echotel® transducer
3. Option: AS-i quick disconnect male connector M12 x 1: order code: **037-7916-001**

1. Code for Echotel® electronics

9 6 0 - 5 8 A	24 V DC 2-wire loop powered electronics with AS-i bus communication
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ACCESSORIES

0	Blind housing cover
1	Housing cover with glass window

MOUNTING

0	Integral mount electronics
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APPROVALS

Units with aluminium housing

C	ATEX II 1/2 G EEx d IIC T6, flameproof enclosure - except deep drawn SST housing
3	Weatherproof - except deep drawn SST housing
7	Weatherproof - deep drawn SST housing

HOUSING / CABLE ENTRY

1	Cast aluminium housing with M20 x 1,5 cable entry (2 entries – one plugged)
0	Cast aluminium housing with 3/4" NPT cable entry (2 entries – one plugged)
5	Deep drawn 304 stainless steel with M20 x 1,5 cable entry (2 entries – one plugged)
4	Deep drawn 304 stainless steel with 1/2"NPT cable entry (2 entries – one plugged)

9	6	0	5	8	A	0		
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complete code for Echotel® electronics

→ X = product with a specific customer requirement

MODEL IDENTIFICATION

2. Code for Echotel® transducer

BASIC MODEL NUMBER

9	M	1	Echotel® transducer with single setpoint
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TRANSDUCER MATERIALS (use only metal transducers for hazardous area)

A	316/316L (1.4401/1.4404) stainless steel
B	Hastelloy® C (2.4819)
C	Monel® (2.4360)
P	CPVC
R	Kynar® (PVDF)
S	316/316L (1.4401/1.4404) stainless steel with 0,5 µm Ra (20 Ra) surface finish

PROCESS CONNECTION

Threaded (plastic transducers are only available with 3/4" NPT connection)

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

ANSI Flanges for metal transducers

2	3	1"	150 lbs	ANSI RF
2	4	1"	300 lbs	ANSI RF
2	5	1"	600 lbs	ANSI RF
3	3	1 1/2"	150 lbs	ANSI RF
3	4	1 1/2"	300 lbs	ANSI RF
3	5	1 1/2"	600 lbs	ANSI RF
4	3	2"	150 lbs	ANSI RF
4	4	2"	300 lbs	ANSI RF
4	5	2"	600 lbs	ANSI RF

EN (DIN) Flanges for metal transducers

B	B	DN 25	PN 16/25/40	EN 1092-1 Type A
B	C	DN 25	PN 63/100	EN 1092-1 Type B2
C	B	DN 40	PN 16/25/40	EN 1092-1 Type A
C	C	DN 40	PN 63/100	EN 1092-1 Type B2
D	A	DN 50	PN 16	EN 1092-1 Type A
D	B	DN 50	PN 25/40	EN 1092-1 Type A
D	D	DN 50	PN 63	EN 1092-1 Type B2
D	E	DN 50	PN 100	EN 1092-1 Type B2

ANSI Flanges for plastic transducers^①

2	3	1"	150 lbs	ANSI RF ^②
3	3	1 1/2"	150 lbs	ANSI RF ^②
4	3	2"	150 lbs	ANSI RF ^②

EN (DIN) Flanges for plastic transducers^①

B	A	DN 25	PN 16	EN 1092-1 Type A
C	A	DN 40	PN 16	EN 1092-1 Type A
D	A	DN 50	PN 16	EN 1092-1 Type A

- ① CPVC flanges for CPVC transducers, Kynar® clad SST flanges for Kynar® transducers
 ② FF (flat face) flanges for CPVC transducers

Hygienic

3	T	1" - 1 1/2" Tri-clamp®
4	T	2" Tri-clamp®
V	V	DN 65 Varivent®

B	S	DN 25	DIN 11851
C	S	DN 40	DIN 11851
D	S	DN 50	DIN 11851

SENSOR TYPE

A	Standard sensor: min -40 °C / max +165 °C (-40 °F / +325 °F)
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ACTUATION LENGTH – specify per cm (0.39") increment
 Total insertion length = actuation length + 6 mm (0.25")

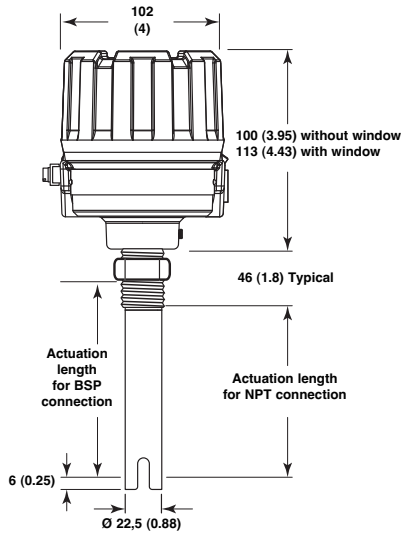
0	0	3	Minimum 3 cm (1.2") – for metal transducers with NPT connections only
0	0	5	Minimum 5 cm (2") – for all other connections
3	3	0	Maximum 330 cm (130")

9	M	1			A		
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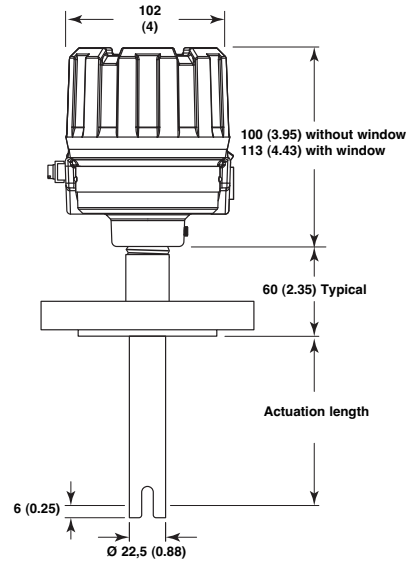
complete code for Echotel® transducer

→ X = product with a specific customer requirement

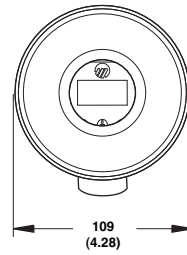
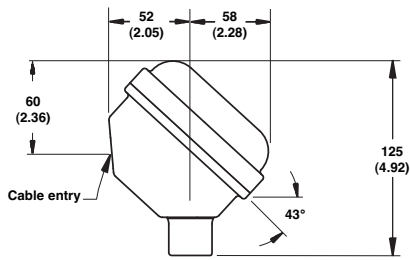
DIMENSIONS IN mm (inches)



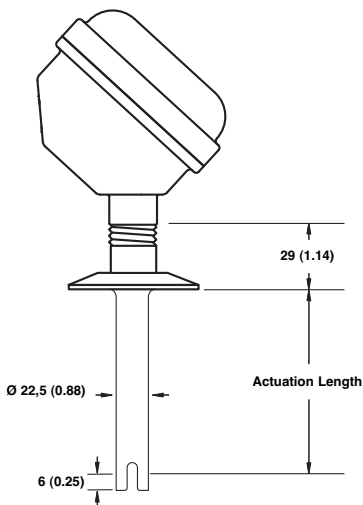
Threaded connection



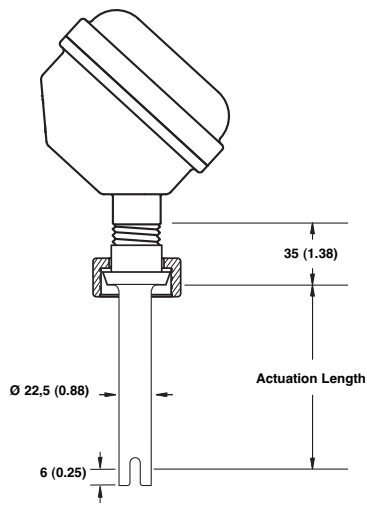
Flanged connection



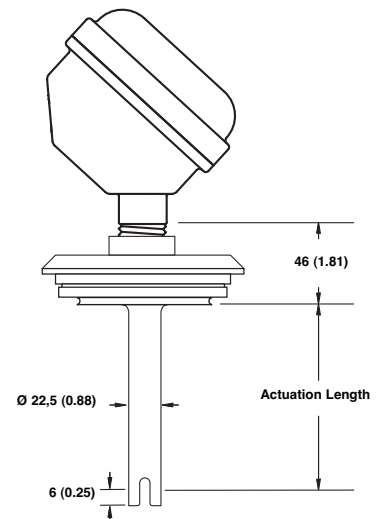
43° View



Tri-Clamp®



DIN 11851



Varivent®

SPECIFICATIONS

Electronics specifications

Description		Specification
Input Voltage		21 - 31 V DC (2-wire)
Power Consumption		< 1 Watt
Output		Data bit D2 = "1" with a wet gap / "0" with a dry gap Data bit D3 = "1" during malfunction / "0" during normal operation
Time delay		0,5 to 45 s adjustable (in addition to transducer response time)
Indication		LED's for malfunction (error of transducer, electronics or electrical noise interference) and wet/dry status of transducer
Selftest	Automatic	Continuously verifies electronics, transducer and noise interference
	Manual	Via pushbutton for checking alarm output and error output/function.
Housing material		IP66, cast aluminium or deep drawn 304 stainless steel (IP 67)
Approvals ^①		ATEX II 1/2 G EEx d IIC T6, flameproof enclosure (units with metal transducers) Other approvals are available, consult factory for more details
Shock/Vibration		ANSI/ISA-S71.03 Class SA1 (shock), ANSI/ISA-S71.03 Class VC2 (vibration)
Net weight		1 kg (2.2 lbs) - electronics only
AS-i bus specifications	AS-i version	V3.0 (AS-i test certificate #76401)
	Slave type	A/B (maximum of 62 nodes)
	Slave profile	S-0.A.E.
	Connectable load	EN 50295 and IEC 62026-2

^① Only available with cast aluminium housings.

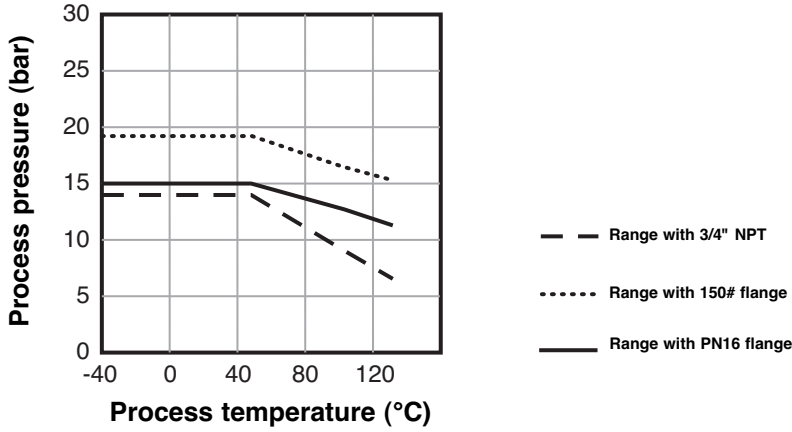
Performance

Description	Specification
Response time	0,5 s typical
Repeatability	± 2 mm (0.078")
Ambient Temperature	-25 °C to +70 °C (-13 °F to +160 °F)
Humidity	0-99 %, non-condensing
Electromagnetic Compatibility	Meets CE requirements (EN 61326: 1997 + A1 + A2)

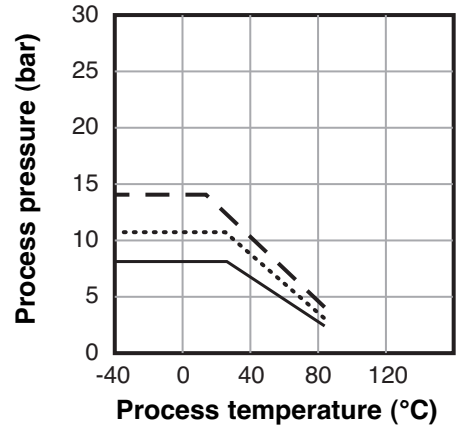
Transducer specifications

Description	Plastic transducers	Metal transducers
Material	CPVC Kynar® (PVDF)	316/316L SST (1.4401/1.4404) Hastelloy® C (2.4819) Monel® (2.4360)
Mounting	Threaded (NPT/BSP) – Flanged (ANSI - EN (DIN)) – Hygienic	
Actuation length	From 5 cm up to 330 cm (2" up to 130")	From 3 cm up to 330 cm (1.2" up to 130")
Process temp. (consult temp/press. graphs)	-40 °C to +120 °C (-40 °F to +250 °F) – PVDF -40 °C to +80 °C (-40 °F to +180 °F) – CPVC	-40 °C to +165 °C (-40 °F to +325 °F)
Max pressure (consult temp/press. graphs)	13,8 bar @ +40 °C (200 psi @ +100 °F) for NPT threaded units	82,8 bar (1200 psi) for Monel transducers Consult temp/press. graphs for other materials
	Flanged models are downrated to the design pressure of the selected flange	
Max viscosity	10.000 cP	

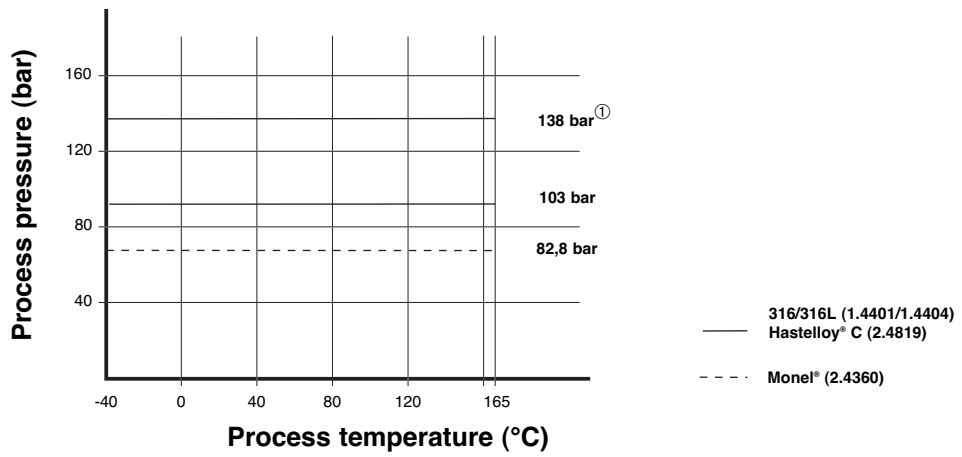
Kynar® Transducer Ratings



CPVC Transducer Ratings



Metal Transducer Ratings



① Only applicable to NPT-connections with actuation length = 3 cm and BSP/ANSI/EN (DIN)-connections with actuation length = 5 cm

IMPORTANT

SERVICE POLICY

Owners of Magnetrol products may request the return of a control; or, any part of a control for complete rebuilding or replacement. They will be rebuilt or replaced promptly. Magnetrol International will repair or replace the control, at no cost to the purchaser, (or owner) **other than transportation cost** if:

- a. Returned within the warranty period; and,
- b. The factory inspection finds the cause of the malfunction to be defective material or workmanship.

If the trouble is the result of conditions beyond our control; or, is **NOT** covered by the warranty, there will be charges for labour and the parts required to rebuild or replace the equipment.

In some cases, it may be expedient to ship replacement parts; or, in extreme cases a complete new control, to replace the original equipment before it is returned. If this is desired, notify the factory of both the model and serial numbers of the control to be replaced. In such cases, credit for the materials returned, will be determined on the basis of the applicability of our warranty.

No claims for misapplication, labour, direct or consequential damage will be allowed.

RETURNED MATERIAL PROCEDURE

So that we may efficiently process any materials that are returned, it is essential that a "Return Material Authorisation" (RMA) form will be obtained from the factory. It is mandatory that this form will be attached to each material returned. This form is available through Magnetrol's local representative or by contacting the factory. Please supply the following information:

1. Purchaser Name
2. Description of Material
3. Serial Number and Ref Number
4. Desired Action
5. Reason for Return
6. Process details

Any unit that was used in a process must be properly cleaned in accordance with the proper health and safety standards applicable by the owner, before it is returned to the factory.

A material Safety Data Sheet (MSDS) must be attached at the outside of the transport crate or box.

All shipments returned to the factory must be by prepaid transportation. Magnetrol **will not accept** collect shipments.

All replacements will be shipped Ex Works.

BULLETIN N°: BE 51-632.1
EFFECTIVE: MAY 2010
SUPERSEDES: July 2007

UNDER RESERVE OF MODIFICATIONS



www.magnetrol.com

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