

LISTEN.
THINK.
SOLVE.®

Solid-State Level Sensors



USER MANUAL

840E

Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid-State Controls (Publication SGI-1.1 available from your local Rockwell Automation sales office or on-line at <http://www.ab.com/manuals/gi>) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc. is prohibited.

Throughout this manual, when necessary we use notes to make you aware of safety considerations.

WARNING



Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

ATTENTION



Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you:

- identify a hazard
 - avoid a hazard
 - recognize the consequence
-

SHOCK HAZARD



Labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.

BURN HAZARD



Labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be dangerous temperatures.

Table of Contents

1	Safety Instructions	2
1.1	Designated Use	2
1.2	Installation, Commissioning, and Operation	2
1.3	Operational Safety	2
1.4	Return	2
2	Product Identification	3
3	Installation	4
3.1	Dimensions	4
3.2	Installation Instructions	6
4	Wiring	10
4.1	DC PNP Version with M12 Connector	10
4.2	AC Version with Valve Connector NPT 1/2	12
4.3	Functional Test	14
5	Technical Data	15
5.1	Power Supply	15
5.2	Performance Characteristics	15
5.3	Operating Conditions	16

1 Safety Instructions

1.1 Designated Use

The Bulletin 840E is a level switch for all kinds of fluids and is used in tanks, containers and pipelines. The device has been safely built with state-of-the-art technology and meets the applicable requirements and EC Directives. It can, however, be a source of danger if used incorrectly or for anything other than the designated use.

1.2 Installation, Commissioning, and Operation

Only personnel familiar with these types of products and associated machinery should plan or implement the installation, start-up, configuration, and subsequent maintenance of the Bulletin 840E level switch.



ATTENTION: Installation and commissioning must be carried out by qualified individuals. Failure to comply may result in personal injury or equipment damage.

1.3 Operational Safety

- Functional safety
The Bulletin 840E level switches were developed according to the standards EN 60068 and EN 61326.
- Hazardous areas
The Bulletin 840E is not approved for use in intrinsic safety (hazardous area) applications.

1.4 Return

Before returning a device to Rockwell Automation, be sure to remove all fluid residue. This is particularly important if the fluid is a health hazard, e.g. flammable, toxic, caustic, carcinogenic, etc.



ATTENTION: Do not return a measuring device if you are not absolutely certain that all traces of hazardous substances have been removed, e.g. substances which have penetrated crevices or diffused through plastic.

2 Product Identification

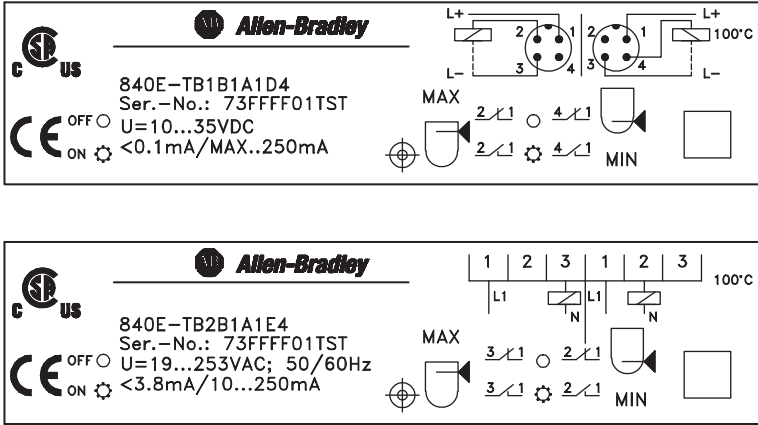


Figure 2.1: Nameplate

Notes:

- Specifications and ratings may differ from those shown in Figure 1, depending on particular model. Refer to product nameplate or catalog for actual ratings and specifications.
- The series number indicates the version of the switch. A change in the series letter does not have any effect on the compatibility.

3 Installation

3.1 Dimensions

3.1.1 1/2 in. NPT and 3/4 NPT Process Connection [mm (in.)]

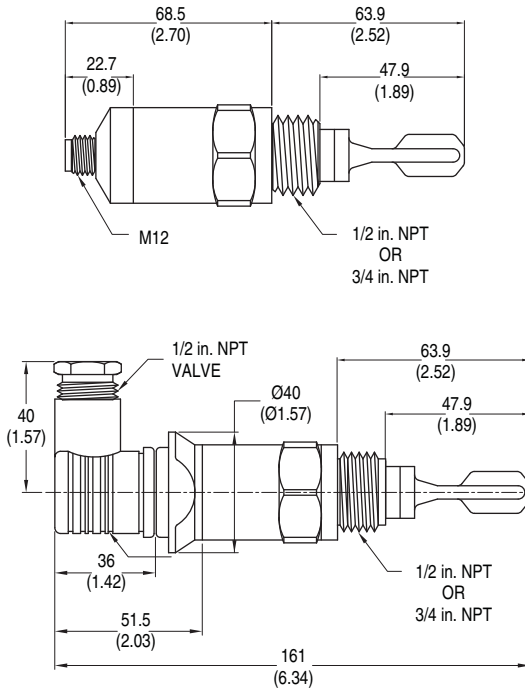


Figure 3.1: NPT Dimensions

3.1.2 G 1/2 Process Connection [mm (in.)]

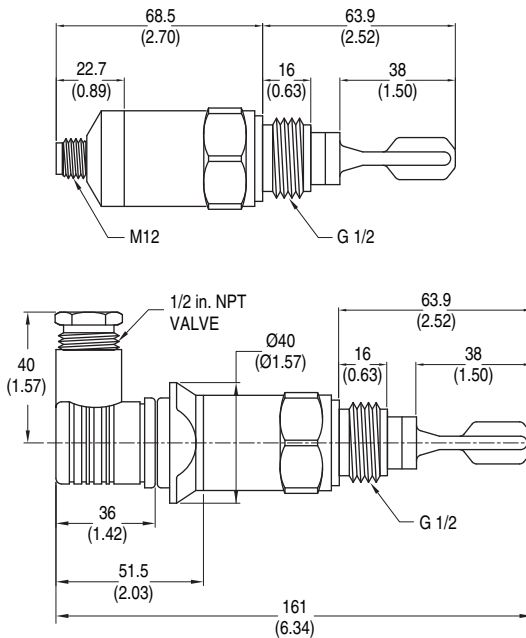


Figure 3.2: G 1/2 Dimensions

3.1.3 Product Selection

Catalog Number	Description				
840E-TB2B3A1E4	G 1/2	2-WIRE	19...253V AC	100 °C	1/2 NPT Valve Connector
840E-TB2B2A1E4	3/4 in. NPT	2-WIRE	19...253V AC	100 °C	1/2 NPT Valve Connector
840E-TB2B1A1E4	1/2 in. NPT	2-WIRE	19...253V AC	100 °C	1/2 NPT Valve Connector
840E-TB1B3A1D4	G 1/2	3-WIRE PNP	10...35V DC	100 °C	M12 Connector
840E-TB1B2A1D4	3/4 in. NPT	3-WIRE PNP	10...35V DC	100 °C	M12 Connector
840E-TB1B1A1D4	1/2 in. NPT	3-WIRE PNP	10...35V DC	100 °C	M12 Connector

3.2 Installation Instructions

3.2.1 Handling

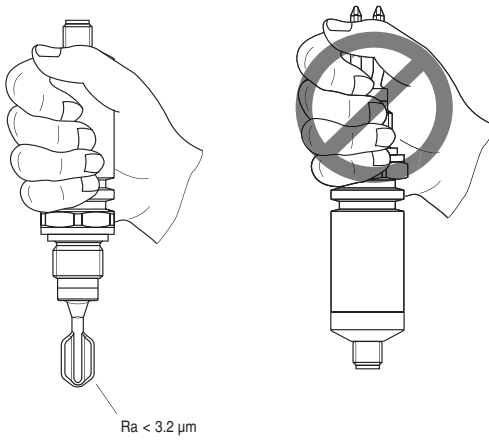


Figure 3.3: Hold by the housing, not by the sensor fork

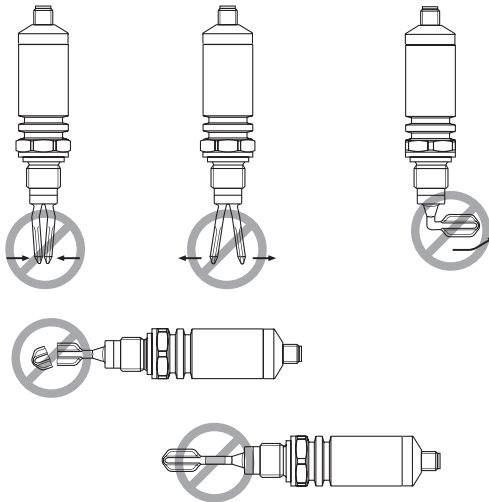


Figure 3.4: Do not bend, shorten or lengthen.

3.2.2 Mounting Examples

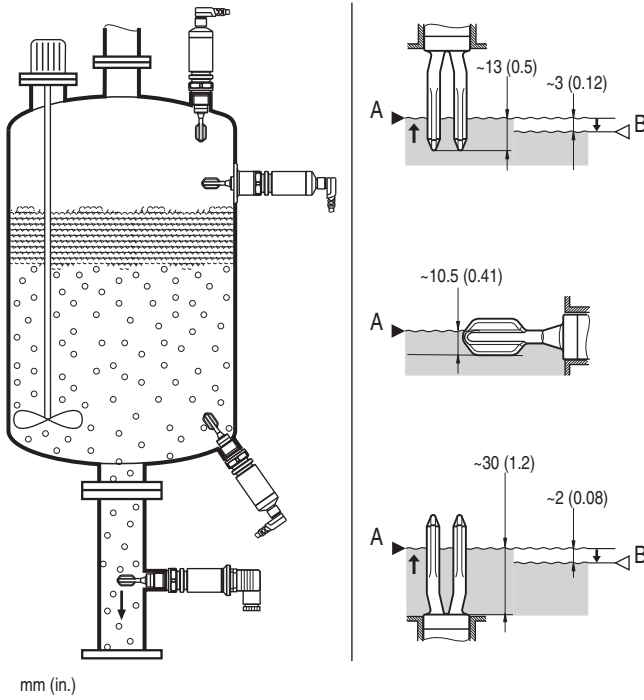


Figure 3.5: A = Switchpoint, B = Switching Hysteresis

3.2.3 Viscosity and Build-up

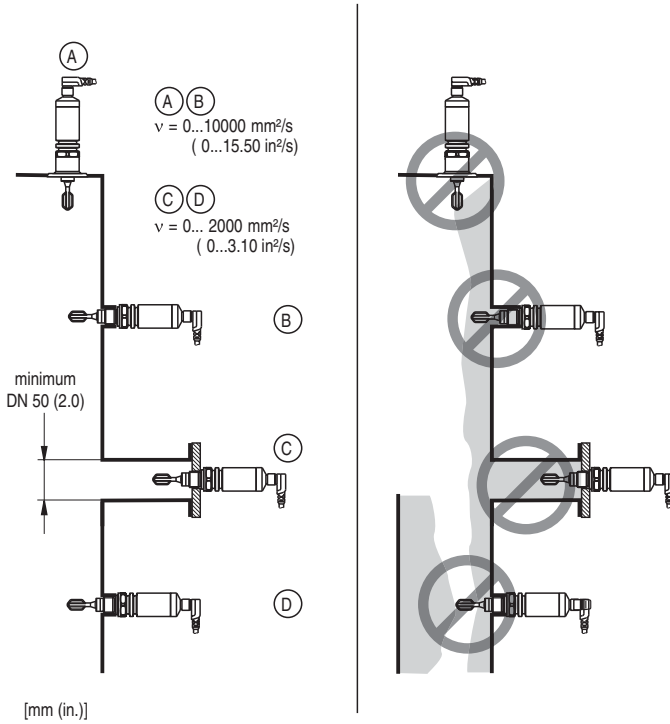


Figure 3.6: Take into account viscosity and build-up.

3.2.4 Sensor Fork Alignment

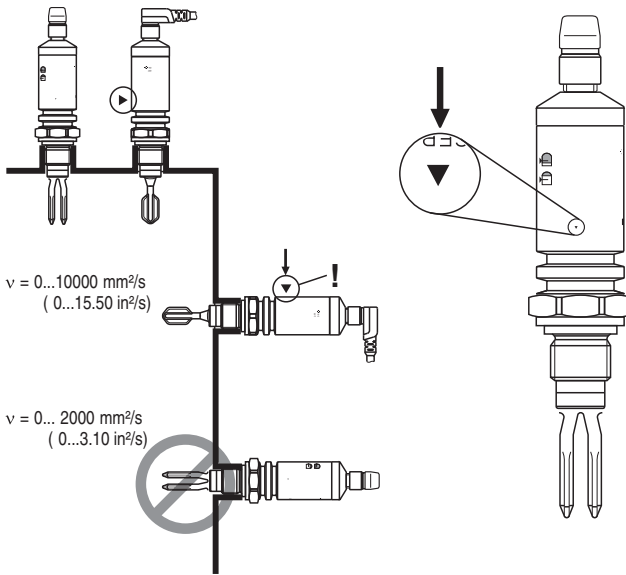


Figure 3.7: Align Sensor Fork (note mark)

4 Wiring

4.1 DC-PNP Version with M12 Connector

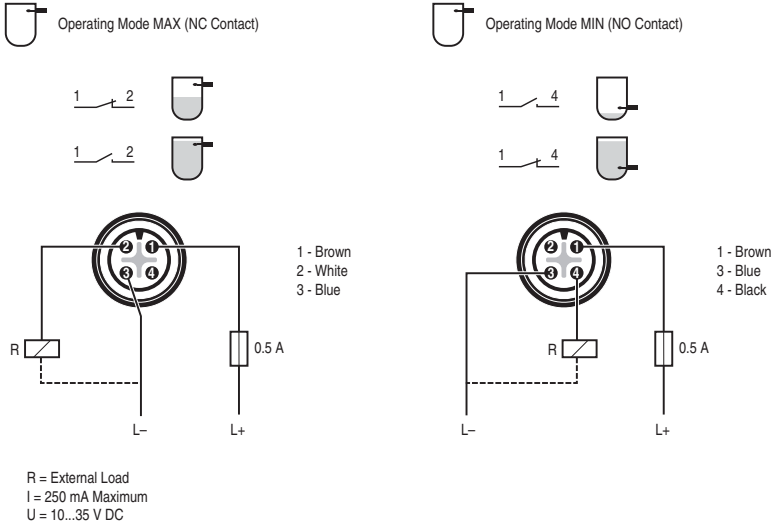
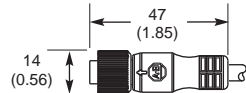


Figure 4.1: DC-PNP Wiring

4.1.1 Mating Cables [mm (in.)]

2 m (6.5 ft) PVC Cable with 4-pin micro (M12x1) connector and ratcheted epoxy-coated zinc coupling nut.

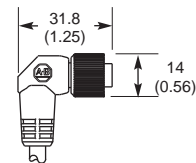
Catalog number: **889D-F4AC-2**



889D-F4AC-2

2 m (6.5 ft) PVC Cable with 4-pin micro (M12x1) right-angle connector and ratcheted epoxy-coated zinc coupling nut.

Catalog number: **889D-R4AC-2**



889D-R4AC-2

Note: Other cable lengths are available and shielded cables may be required for some analog output applications – refer to the On-Machine Connectivity catalog (publication #M115-CA001A-EN-P) for additional information.

4.1.2 DC-PNP Operation

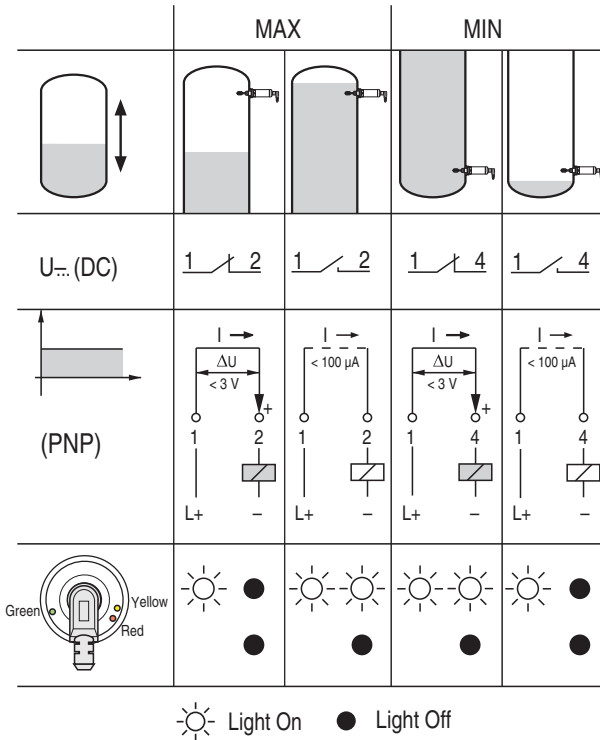


Figure 4.2: DC-PNP Operation

Green light ON:

Sensor is connected to power supply and operational

Yellow light ON:

Sensor is immersed in liquid

Red light ON:

Overload or short-circuit in load circuit

- Rectify the short circuit
- Reduce maximum load current to below 250 mA

Green light OFF:

Error: No power supply

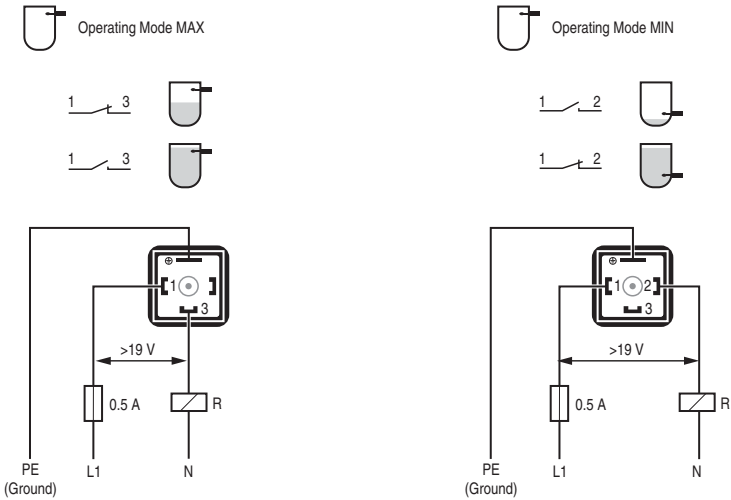
- Check plug, cable and power supply

Red light flashing:

Internal sensor error or sensor corroded

- Replace device

4.2 AC Version with Valve Connector NPT 1/2

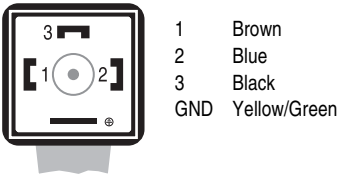


R = External Load
 I = 250 mA Maximum
 U = 19...253V AC

Figure 4.3: AC Wiring.

4.2.1 Mating Cables

Optional cordset 2 m (6.5 ft) DIN valve. Catalog number: **889V-RZ3ABE-2**



4.2.2 AC Operation

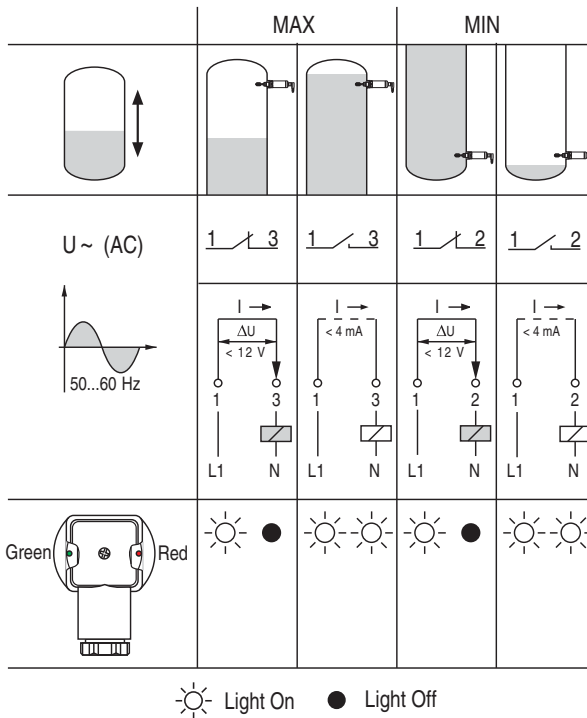


Figure 4.4: AC Operation

Green light ON:

Sensor is connected to power supply and operational

Red light ON:

Mode of operation MAX (overflow protection): sensor is immersed in liquid

Mode of operation MIN (dry running protection): sensor is immersed in liquid

Green light OFF:

Error: No power supply

- Check plug, cable and power supply

Red light flashing:

Error: Overload or short-circuit in load circuit

- Rectify the short circuit
- Reduce maximum load current to below 250 mA

Error: Internal sensor error or sensor corroded

- Replace device

4.3 Functional Test

Use test magnet supplied with the sensor to test level switch functionality.

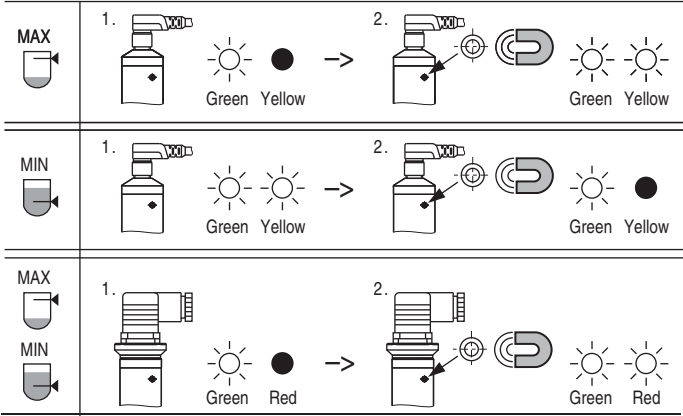


Figure 4.5: Functional Test

5 Technical Data

5.1 Power Supply

DC-PNP with M12 connector

10...35 V DC	Supply voltage
< 825 mW	Power consumption
< 15 mA	Current consumption

AC with NPT 1/2 valve connector

19...253 V AC	Supply voltage
< 810 mW	Power consumption
< 3.8 mA	Current consumption

5.2 Performance characteristics

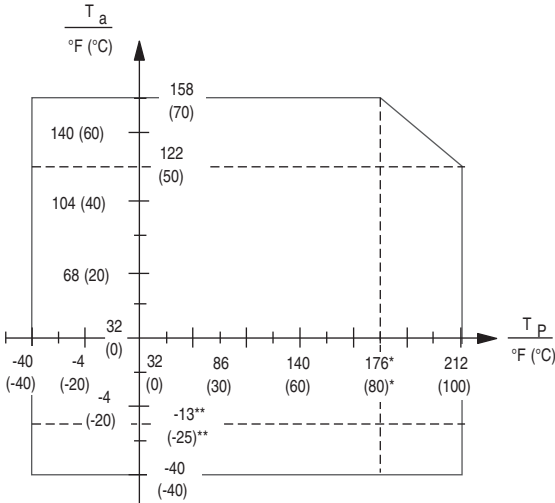
Switching delay	0.5 s when covering 1.0 s when free
Resolution	< 0.5 mm (0.02 in.)
Maximum error	13.0 +/- 1 mm (0.51 in. +/- 0.04 in.)
Repeatability	+/- 0.5 mm (+/- 0.02 in.)
Hysteresis	3.0 +/- 0.5 mm (0.12 in. +/- 0.02 in.)
Settling time	< 2 s

Reference operating conditions

Ambient temperature:	23 °C (73 °F)
Process pressure:	14.5 psi
Medium:	Water
Medium density:	1
Medium temperature:	23 °C (73 °F)
Installation from above	
Density setting:	> 0.7 SGU

5.3 Operating Conditions

Ambient temperature range	-40...+70 °C (-40...+158 °F)
Process temperature range	-40...+100 °C (-40...+212 °F)
Storage temperature range	-40...+85 °C (-40...+185 °F)
Shock resistance	EN 60068-2-27 (30 g)
Vibration resistance	EN 60068-2-64



Process pressure	-14.5...580 psi
Degree of protection	NEMA 4X (IP66/67) DC - M12 connector IP65 AC - Valve connector
Media	Liquid
Density	> 0.7 SGU
Viscosity	1...10 000 cSt
Gas content	Stagnant mineral water
Solids content	< 5 mm(0.20 in.) diameter

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2.663.0600, Fax: (32) 2.663.0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846



Pub. No. 10000061888 Ver 0.0
September 16, 2009

© 2009 Rockwell Automation. Printed in the U.S.A