

BETTIS

INSTALLATION INSTRUCTIONS

FOR SUBMERGED ACTUATORS

PART NUMBER: 074814

REVISION "A"

RELEASE DATE: DECEMBER 14, 1988

ER/ECN	DATE	REV LTR		By *	Date
74814	11/07/88	A	Compiled	JRA	12-14-88
			Checked	BSC	12-14-88
			Approved	RTU	12-14-88
			Approved		

1.0 PURPOSE

These instructions describe Bettis actuator preparation and mounting techniques for submerged service applications.

Actuators and mounting adaptation for submerged service must be protected from external pressure and ingress of sea water due to head (depth) of submergence.

2.0 ACTUATOR CONFIGURATION

Actuator should be modified to accommodate the following requirements:

- A. Attachment of a pressure equalizing device (per BSK-2592).
- B. A continuous pressure path from inside the actuator housing, around the upper yoke trunion (upper yoke trunion seal removed).
- C. Pressure relief device (Bettis snubber or relief valve) to provide over-pressure venting in the event of seal failure.
- D. A watertight cover over the yoke (with or without an external indicator device - sealed to top of yoke).

3.0 MOUNTING ADAPTATION

Mounting bracket(s) should include the following features:

- A. Water-tight seals at all interfaces between valve, actuator and mounting bracket(s).
- B. Fill and drain ports connecting to highest and lowest areas of mounting adaptation.
- C. Pressure relief device (Bettis snubber or relief valve) to provide over-pressure venting in the event of valve stem packing failure.

4.0 PRESSURE EQUALIZATION

Pressure equalizer should meet following requirements:

- A. Volume should be a minimum of twice the volume required to accommodate the differential volume due to actuator stroke.
- B. Utilize a flexible, water-tight membrane suitable for separation of oil and water.
- C. Materials suitable for use in particular environment.

5.0 FILLING INSTRUCTIONS

A. **DOUBLE ACTING ACTUATOR**

1. Adjust actuator travel stops and set actuator level.
2. Remove snubber/relief valve, housing drain plug and pressure equalizer fill/bleed plug.
3. Connect a source of hydraulic fluid to the housing drain port.
4. Pump fluid into housing until fluid fills housing, pressure equalizer and connecting tubing.
5. Install equalizer plug and snubber/relief valve and move actuator into various attitudes to allow any trapped air into the upper most part of actuator.
6. Remove the snubber/relief valve and pump in fluid until housing is full.
7. Replace snubber/relief valve and pump fluid into housing until clear fluid is emitted thru snubber/relief valve.
8. Turn actuator over, remove fluid line and install plug.

ACTUATOR FILLING IS COMPLETE

B. **SPRING RETURN ACTUATOR**

1. Adjust actuator travel stops and set actuator level.
2. Remove snubber/relief valve, housing drain plug and pressure equalizer fill/bleed plug.
3. If spring portion of cylinder is equipped with fill/bleed/drain plugs or fittings, remove or open upper most device.
4. If actuator is pneumatic and "non-pressurized" side of power cylinder is to be compensated, remove upper most fill plug or open bleed fitting as applicable.
5. Connect a source of hydraulic fluid to housing drain port.
6. Pump fluid into housing until fluid fills housing, pressure equalizer and connecting tubing.
7. Continue pumping while installing/closing the plugs, bleed fillings or snubber/relief valve as applicable until port/device has been plugged/closed.

8. Move actuator into various attitudes to allow trapped air into the upper most part of the actuator.
9. Open or remove the upper most fitting and pump fluid until actuator is filled.
10. Install fitting and pump fluid until clear fluid is emitted from snubber/relief valve.
11. Turn actuator over, remove fluid line and install plug.

ACTUATOR FILLING IS COMPLETE

C. POWER CYLINDER - HYDRAULIC ACTUATOR

1. Connect a source of hydraulic fluid to power cylinder port and open bleed valve.
2. Fill cylinder until clear, air free fluid is emitted from bleed plug.
3. Position actuator such that the hydraulic line connection is highest part of power cylinder.
4. Remove line and install plug.
5. If actuator is double-acting, repeat procedure for other end of cylinder.

6.0 ACTUATOR MOUNTING

A. IN SHOP

1. Prepare actuator as described in 5.0.
2. Install actuator portion of mounting bracket as applicable.
3. Install valve portion of mounting bracket as applicable.
4. Install actuator onto valve and securely tighten all mounting bolts.
5. Adjust actuator stops as required.
6. Place actuator/valve assembly in such a position that the mounting bracket fill/drain plug and snubber/relief valve point up.
7. Remove the fill/drain plug and snubber/relief valve and connect a source of fluid to one of the ports.
8. Fill mounting bracket with fluid and replace fill/drain plug and snubber/relief valve.

B. ONTO A SUBMERGED VALVE

1. Prepare actuator as described in 5.0.
2. Install actuator portion of mounting bracket as applicable and fill yoke bore with light grease.
3. Remove all devices from valve topworks and install valve portion of mounting bracket as applicable and remove fill/bleed and snubber/relief valve fittings.
4. If a source of hydraulic fluid is available to purge mounting bracket, continue. If not, proceed to 11.
5. Install actuator onto valve and securely tighten all mounting bolts.
6. Attach fluid source to upper most port in mounting bracket.
7. Fill bracket cavity with fluid until clear fluid runs out lower port.
8. Install plug in lower port.
9. Remove fluid line and install snubber/relief valve.
10. Adjust actuator stops as necessary.

MOUNTING IS COMPLETE

11. When a source of hydraulic fluid is not available for purging, proceed as follows:
12. Fill valve portion of mounting bracket with light grease.
13. Install snubber/relief valve in the upper mounting bracket port.
14. Install actuator onto valve, securely fastening all mounting bolts.
15. Install plug into bottom mounting bracket port.
16. Adjust actuator stops as necessary.

MOUNTING IS COMPLETED

7.0 POWER OPERATING SYSTEM

GENERAL

An arrangement of flexible hoses to connect the power supply with the submerged actuator is preferred. This arrangement makes it possible to connect all power piping to the actuator prior to submergence, thus eliminating any possibility of water entering the power cylinder. Should this arrangement not be possible, proceed with the following instructions.

A. HYDRAULIC ACTUATORS

1. Remove plug in cylinder port and connect supply line to cylinder as quickly as possible to limit entry of water into cylinder.
2. While applying pressure to the cylinder, open the bleed fitting.
3. When stream of fluid is clear and free of air and/or water, close bleed fitting.

B. PNEUMATIC ACTUATORS

1. Remove plug in cylinder port and connect supply line to cylinder as quickly as possible to prevent entry of water into cylinder
2. Purging of any water in cylinder is not possible.

8.0 RECOMMENDATIONS

- A. For actuators that must be connected to the power source while submerged, recommend the following:
 1. Pressure port connection(s) to cylinder to be equipped with a manual 3 way, 2 position ball valve which allows any water to be purged from the valve by the power source before being applied to power cylinder.

World Area Configuration Centers (WACC) offer sales support, service, inventory and commissioning to our global customers. Choose the WACC or sales office nearest you:

NORTH & SOUTH AMERICA

19200 Northwest Freeway
Houston, TX 77065
USA
T +1 281 477 4100
F +1 281 477 2809

Av. Hollingsworth,
325, Iporanga Sorocaba
SP 18087-105
Brazil
T +55 15 3238 3788
F +55 15 3228 3300

ASIA PACIFIC

No. 9 Gul Road
#01-02 Singapore 629361
T +65 6501 4600
F +65 6268 0028

No.1 Lai Yuan Road
Wuqing Development Area
Tianjin 301700
P.R.China
T +86 22 8212 3300
F +86 22 8212 3308

MIDDLE EAST & AFRICA

P. O. Box 17033
Dubai
United Arab Emirates
T +971 4 811 8100
F +971 4 886 5465

P. O. Box 10305
Jubail 31961
Saudi Arabia
T +966 3 340 8650
F +966 3 340 8790

24 Angus Crescent
Longmeadow Business Estate
East P.O. Box 6908; Greenstone
1616 Modderfontein, Extension 5
South Africa
T +27 11 451 3700
F +27 11 451 3800

EUROPE

Berenyi u. 72- 100
Videoton Industry Park,
Building #230
Székesfehérvár 8000
Hungary
T +36 22 530 950
F +36 22 543 700

For complete list of sales and manufacturing sites, please visit
www.emersonprocess.com/valveautomationlocations
Or contact us at info.valveautomation@emerson.com

www.emersonprocess.com/bettis

©2016 Emerson Process Management. All rights reserved.

The Emerson logo is a trademark and service mark of Emerson Electric Co. Bettis is a mark of one of the Emerson Process Management family of companies. All other marks are property of their respective owners.

The contents of this publication are presented for information purposes only, and while every effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available on request. We reserve the right to modify or improve the designs or specifications of our products at any time without notice.

BETTIS™



EMERSON™
Process Management