

DPI-C and DPI-E position indicators for BHH/BHHF actuators

Description:

The DPI is designed to fit Bettis quarter-turn valve actuators BHH and BHHF for use within the temperature range from -20° C to +80° C (-4° F to +176° F). The DPI range consists of the DPI-E (ON/OFF/

switches), DPI-C (Continuous/potentiometer) and the hydraulic DPI-B (Bypass). For further information about the DPI-B, please see separate data sheet.

Basic design:

The DPI-C and -E can be mounted in different mounting blocks or in LPU, with only internal wiring.

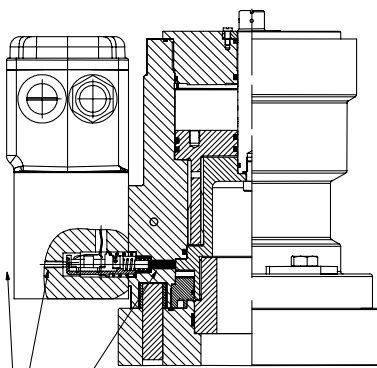
Valve/actuator position is indicated by means of a precision potentiometer or 2 microswitches. Resistance (commonly

used Ω output) increases during opening and decreases during closing the valve/actuator.

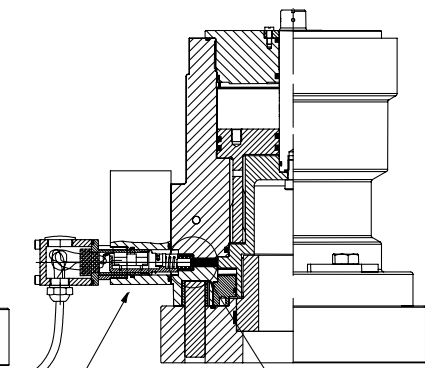
Set point adjustment is performed without dismantling the DPI or cable from the LPU or block.



DPI mounted in LPU on BHH actuator.



DPI mounted on BHH actuator.



X= 9.5 mm (.37 in) (closed)
13.5 mm (.53 in) (open)

Mounting and adjustments:

When mounting the DPI-C/-E be sure not to press the DPI too far towards the actuator. Several misadjustments of the DPI may cause destruction of the DPI.

When the valve/actuator is closed you may adjust the DPI by screwing it towards the actuator until the...

- DPI-C: potentiometer reaches the desired 300 Ω (1500 Ω), or
- DPI-E: CLOSED switch closes (opens if NC configuration), and then adjust the desired overlap (1° - 5°).

Check the indicator signal in open position.

When DPI is mounted in a block, make sure that the locking screw is tightened sufficiently to prevent the DPI from turning.

When mounted in LPU remember to tighten the counter-nut.

If correct adjustment is not possible - check the yoke distance "X" (see enlargement), and the presence of the yoke.

DPI-C and DPI-E

Potentiometer:

Standard resistance values:
 Total resistance tolerance:
 Independent linearity tolerance:
 Resolution:
 Output smoothness:
 Insulation resistance:
 Dielectric strength:
 Resistance temperature coefficient:
 Operating temperature range:
 Temperature cycle:

- Total resistance value variation:
 - No mechanical damage

Exposure at low temperature:
 - Total resistance value variation
 - No mechanical damage

Exposure at high temperature:
 - Total resistance value variation
 - No mechanical and electrical damage

Vibration:
 - Total resistance value variation
 - No mechanical and electrical damage

Shock:
 - Total resistance value variation
 - No mechanical and electrical damage

Moisture resistance:
 - Total resistance value variation
 - Insulation resistance

Life expectancy:
 Total resistance value variation

1k Ω , 2k Ω , 10k Ω
 Precision class $\pm 20\%$
 Precision class $\pm 5\%$
 Essentially infinite
 Below 0.1% against input voltage
 Over 50 M Ω at 500 V DC
 1 minute at 500 V AC
 ± 400 p.p.m./ $^{\circ}\text{C}$
 -55°C to $+125^{\circ}\text{C}$
 5 cycles under -55°C to 125°C
 (-67°F to $+257^{\circ}\text{F}$)
 Below $\pm 10\%$.

24 hours at -55°C (-67°F)
 Below $\pm 5\%$.

1,000 hours at 105°C ($+221^{\circ}\text{F}$)
 Below $\pm 10\%$.

10 Hz to 2,000 Hz 20 G
 Below $\pm 2\%$.

50 G 7 mS
 Below $\pm 1\%$

40°C ($+104^{\circ}\text{F}$) 95% RH 120 hours
 Below $\pm 10\%$
 Over 10 M Ω

500,000 cycles
 Below $\pm 10\%$ against initial value

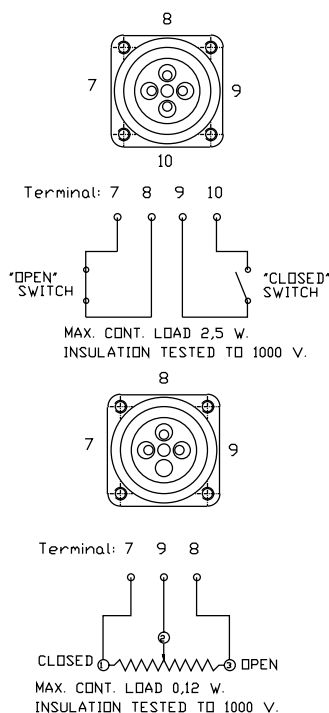
Switches:

Contact resistance:
 Switching current:
 Dielectric strength:
 Life expectancy: Min.
 Insulation resistance:
 Humidity:

Max. 100 m Ω
 Max. 100 mA at 30 V DC resistive load
 1500 V AC to ground 1 minute
 100,000 operations
 100 M Ω at 500 V DC
 Max. 85%

DPI-C and DPI-E

Terminal layout:



Enclosure rating:

When mounted in block, cavity seals are designed to fulfill demands of enclosure rating IP 68.

Note: In case of installation where a larger enclosure rating than IP 67 is required,

the connection house should be filled with silicone after wire mounting and test of function. With each actuator comes a yoke, fit to transfer the mechanical signal from the actuator to the DPI.

Potentiometer:

The potentiometer incorporated in the DPI-C is a high quality potentiometer that

is extremely reliable as long as the following ratings are observed:

Max. continuous load:

0.12 W (VA)

Max. peak load:

1 W(VA)

The normal output range is at

1 kΩ: 0-500 Ω for 0-90° rotation *

2 kΩ: 300-1400 Ω for 0-90° rotation *

10 kΩ: 1500-7000 Ω for 0-90° rotation *

* Approx. adjustment for open (1400/7000) and close (300/1500) set point.

Analogue signal processing:

LPU is equipped with signal conditioning, with a 2-wire 4 - 20 mA signal output.

When DPI-C is block mounted we recommend the Bettis isolation amplifier 2204 for transforming the resistance

signal into a standard 4-20 mA signal.

The output can be displayed visually by means of the Bettis meter PQ 48 measuring

48 x 48 mm and scaled:

Materials:

| | |
|----------|-------------------------------|
| Housing: | Brass, MS 58 (CuZn39Pb3) |
| Screws: | AISI 304 (Stainless) |
| Seals: | NBR ~ Acrylonitrile Butadiene |
| Fixture: | PPS |

Cable gland data:

| | |
|-----------------------|---|
| Cable outer diameter: | ø 6-10.5 or ø 8-15 mm (.24-.39 or .31 - .59 in) |
| Ingress protection: | IP 68 |
| Thread: | M 16 or M 20 |
| Material: | Nickel plated brass |
| Seal material: | Perbunan and NBR (Rubber) |

Cable quality/connection:

Wiring to the terminal: Cross sections 0.5-1.5 mm² (AWG 22 - 16).

Observe that water intrusion into the terminal housing can take place through the

cable - even through each individual wire.

The IP tightness is based on correct and careful mounting.

Note: Not Certified dimensional drawings. Such drawings are available on request. Contact factory with correct model designation and serial number.

Important: Due to Emerson's continuing commitment to engineered product advancement, data presented herein is subject to change.

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