

## Data sheet

Sheet No.: DPI-C and DPI-E

Date: October 2010

## DPI-C and DPI-E

# 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  $-20^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$  to  $+176^{\circ}\text{F}$ ). The DPI range consists of the DPI-E (ON/OFF/switches), DPI-C (Continuous/potentiometer) and the hydraulic DPI-B (Bypass).

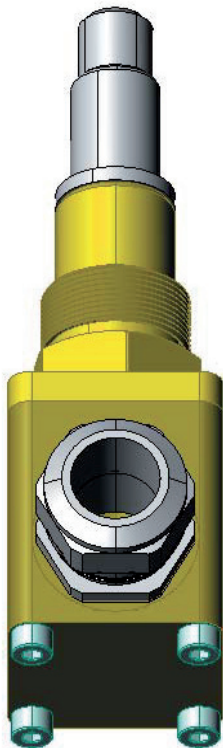
For further information about the DPI-B, please see separate data sheet.

### Basic design:

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

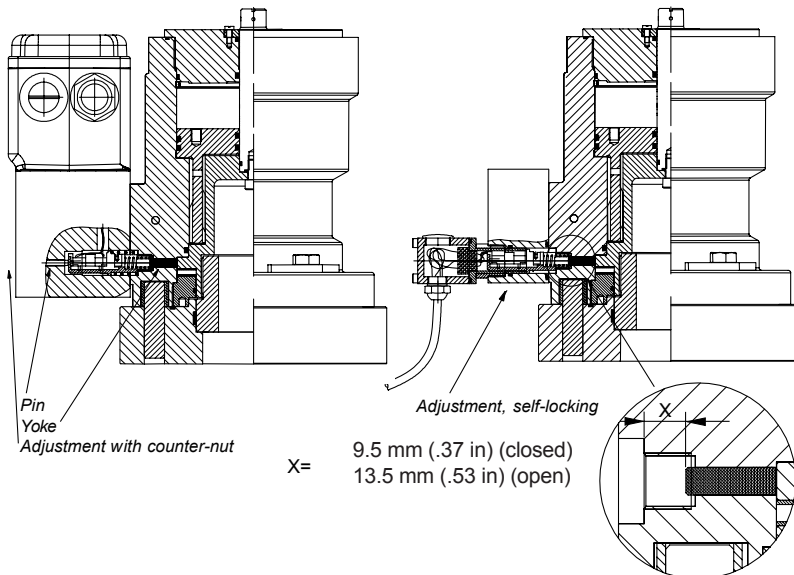
Valve/actuator position is indicated by means of a precision potentiometer or 2 micro-switches. Resistance (commonly used  $\Omega$  output) increases during opening and decreases during closing of the valve/ actuator.

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.



### 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  $300\ \Omega$  ( $1500\ \Omega$ ), or
- DPI-E: CLOSED switch closes (opens if NC configuration), and then adjust the desired overlap ( $1^{\circ}$  -  $5^{\circ}$ ).

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.

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### 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

### Switches:

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

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

24 hours at  $-55^{\circ}\text{C}$  ( $-67^{\circ}\text{F}$ )  
Below  $\pm 5\%$ .

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

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

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

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

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

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

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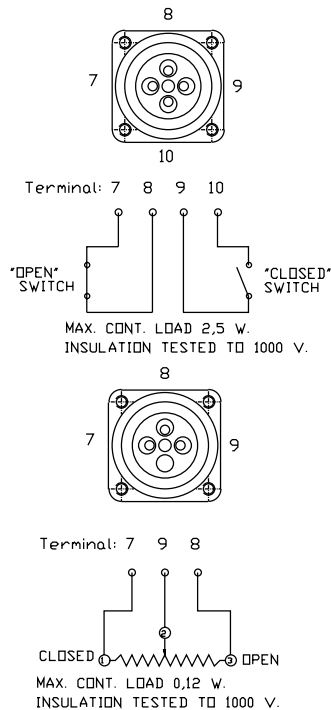
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### Terminal layout:



### 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 k $\Omega$ : 0-500 $\Omega$ for 0-90° rotation*
	2 k $\Omega$ : 300-1400 $\Omega$ for 0-90° rotation*
	10 k $\Omega$ : 1500-7000 $\Omega$ 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: "closed, 1/4, 1/2, 3/4, open".

### Materials:

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

### Cable gland data:

Cable outer diameter:	$\varnothing$ 6-10.5 or $\varnothing$ 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 mm<sup>2</sup> (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.

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