

## Data sheet

Sheet No.: VPI01.01 RevA

Date: October 2010

VPI-01

# Valve position A1 indicator for BHH/BHHF actuators



## Versions:

The VPI indicator is available in 3 versions

VPI-V: Visual indication

VPI-E: Visual + electrical open/closed indication (switches)

VPI-C: Visual + electrical analog (potentiometer) indication

## Hydraulic data:

Max. working pressure:	135 bar (1958 PSi)
Test pressure:	205 bar (2973 PSi)
Burst pressure:	> 525 bar (7615 PSi)
Temperature range:	-20° C to 80° C (-4° F to 176° F)
Viscosity range:	15-200cSt
Filtration requirement:	25 µm nominal
Hydraulic medium:	Acid-free hydraulic oil
Max. flow:	100 cm/sec (6 l/min)
Min. flow:	3 cm/sec (0.3 l/min)
Connection face:	DIN 24 340 Cetop-3/ VPI connection
Insulation class:	IP 44/IP 67-on request

## General Description:

Basically the valve position indicator is a precision gear motor with a display indicating the flow of a certain oil volume through the unit.

The gear wheels rotate according to flow and flow direction of the fluid. A built-in mini gear box with a gear ratio chosen to suit the displacement in question transfers the gear motor movement to the indicator shaft. There is no mechanical connection between the gear motor and the indicator shaft. The rotary movement of the hydraulic gear wheels is transferred to the indicator shaft by a magnetic clutch. This eliminates possible external leakage.

An indicator arrow moves within a scale angle which is adjustable between 75° and 200°. A small indicator disc (flow indication) mounted firmly on the indicator shaft serves as leakage indicator.

## Materials:

Housing, top cover and bottom member:	ALMgSi 1.0 Anodized
Screws, sign plates and rivets:	AISI 304, quality 8.8 (on screws 12.9)
Seals and friction elements:	NBR ~ Acrylonitrile Butadiene
Sight glass:	PMMA
Weight:	Approx. 1.2 kg (2.7 lb)
Note:	Hydraulic position indicators in brass/ stainless steel on request.

## Operating restrictions:

Flushing of control lines must never take place through the VPI.

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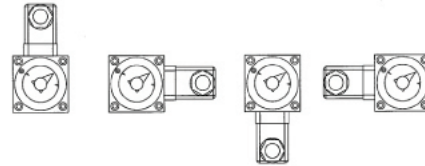
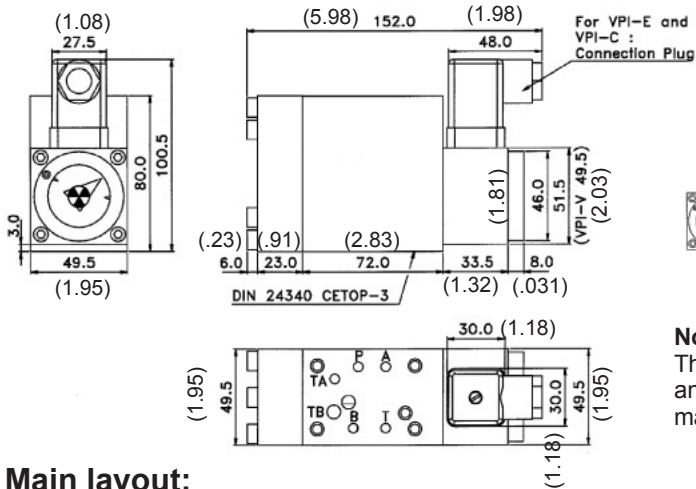
  
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# Data sheet

Sheet No.: VPI01.02 RevA  
Date: October 2010

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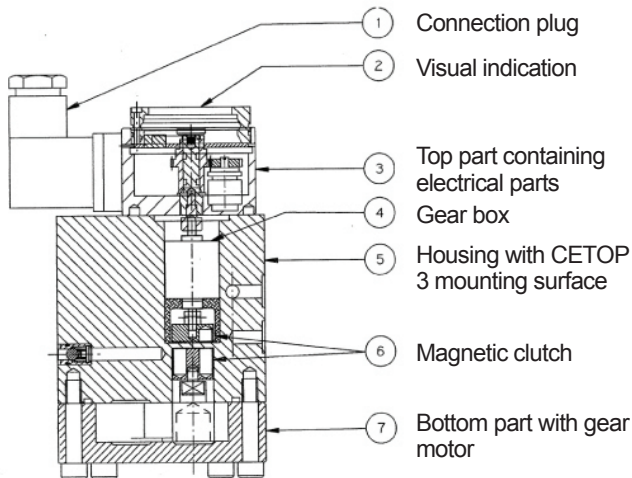
## Main dimensions:



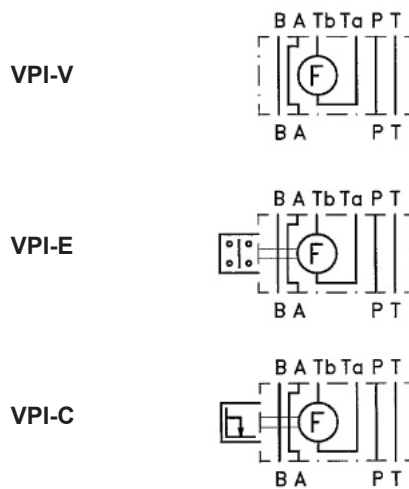
### Note:

The top (indicator) part of the VPI can be mounted in any of 4 possible positions in relation to the main body/mainfold.

## Main layout:



## Hydraulic symbol:



## Choice of gear box:

### Measuring range for VPI-TC:

-Actuator displacement + compression of oil (1-1.5% of pipe volume).

### Measuring range for VPI-PTC:

-Actuator displacement.

Pipe size	Pipe volume each 10 metres		Compression volume each 10 metres	
	cm <sup>3</sup>	in <sup>3</sup>	cm <sup>3</sup>	in <sup>3</sup>
mm	cm <sup>3</sup>	in <sup>3</sup>	cm <sup>3</sup>	in <sup>3</sup>
Ø6	282.7	17.6	4.24	0.26
Ø7	384.8	23.5	5.77	0.35
Ø8	506.6	30.9	7.54	0.46
Ø9	636.0	38.8	9.54	0.58
Ø10	785.0	47.9	11.78	0.72

Measuring range				Gear	
from	cm <sup>3</sup>	up to	from	in <sup>3</sup>	up to
15		25	0.9		1.5
25		40	1.5		2.4
40		70	2.4		4.3
70		100	4.3		6.1
100		170	6.1		10.4
170		260	10.4		15.9
260		430	15.9		26.2
430		700	26.2		42.7
700		1250	42.7		76.3
1250		2200	76.3		134.2
2200		3500	134.2		213.2
3500		5600	213.5		341.6
5600		11000	341.6		671.0
					Ratio 1:
					0015
					0025
					0040
					0060
					0100
					0150
					0250
					0405
					0720
					1280
					2000
					3125
					6103

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## Data sheet

Sheet No.: VPI01.03 RevA

Date: October 2010

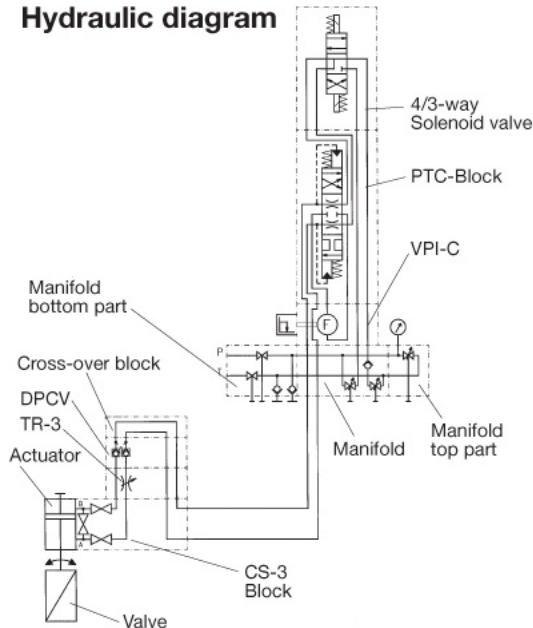
# VPI-01

### Application:

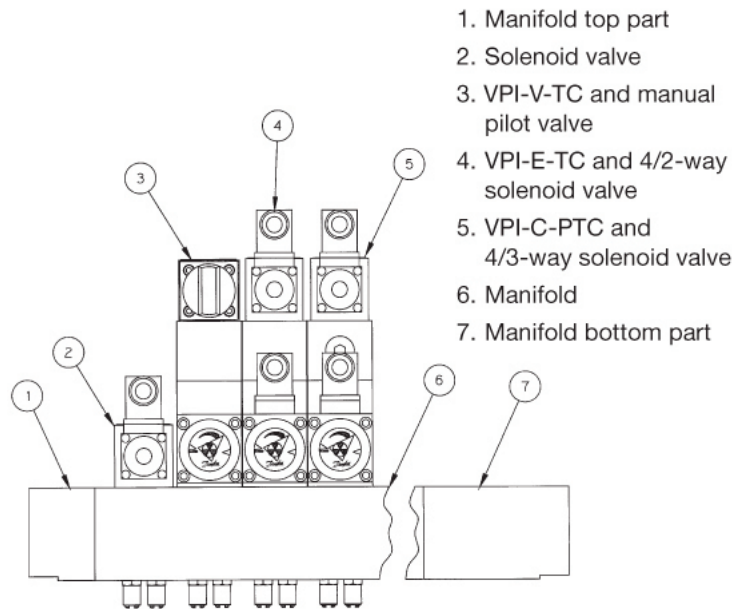
The VPI is designed to indicate the position of hydraulically actuated valves and the indicator arrow in the display will move from fully open to fully closed or vice versa when a volume equal to the actuator displacement passes through the unit. Observe the min. and max. flows when dimensioning a hydraulic system including VPI indicators. Also observe the various factors influencing the accuracy and reliability of this indirect position indication method.

### Typical application:

#### Hydraulic diagram



### VPI combinations on manifold:



### VPI-V:

This indicator is only used for visual indication of the valve position. It is normally used with TC-block and manual pilot valve. VPI-V can be used with PTC-block.

### VPI-E:

This indicator is used for visual and electric (ON/OFF) indication of the end positions of the valve (open/ closed). The VPI-E is normally used with TC-block, but VPI-E can also be used with PTC-block. VPI-E is available with "normally open" switches, but can as a variant be supplied with "normally closed" switches.

### VPI-C:

This indicator is used for visual and continuous indication with analog electric signal (potentiometer). This type is used wherever electric indication of the intermediate position of the valve is required. VPI-C is normally used with PTC-block.

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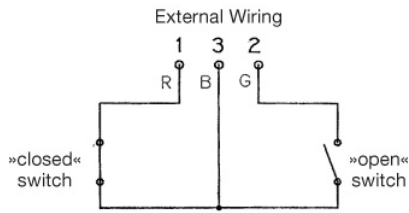
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# Data sheet

Sheet No.: VPI01.04 RevA  
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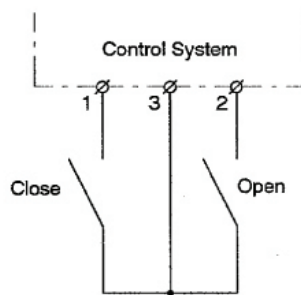
VPI-01

## Terminal layout:



Switches shown in closed valve position.  
Max. cont. load 2.5 W.  
Insulation tested to 1000 V.

## Hook-up:



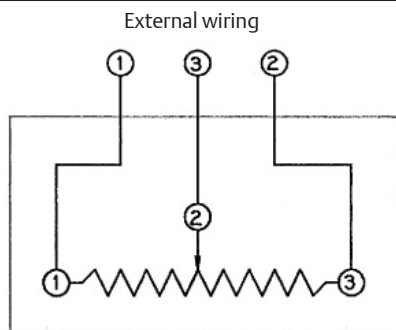
Computer, I.S. control or direct connected lamps or relays.

## Manufacturer's data of micro switches:

Contact material	Gold alloy X-point
Operating force	(g max) 90 g
Electrical rating	100mA 125 VAC
Life expectancy	3 x 10 <sup>6</sup>
Electrical rating	100 mA 30 VDC
Life expectancy	3 x 10 <sup>6</sup>
Max. temp.	85°C (185°F)

# VPI-C

## Terminal layout:



Insulation tested to 1000 V

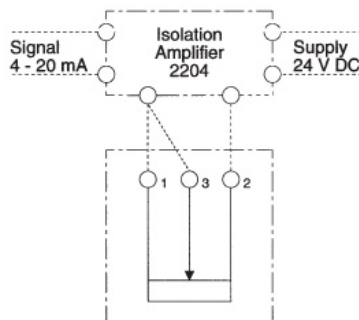
### User data:

Max. continuous load: 0.2 W (VA)  
Max. peak load: 1 W (VA)  
The normal approx. output range is 300Ω in closed position and between 850Ω and 1700Ω in open position.  
The open position signal is dependent on the choice of gear box size.

## Signal processing:

For transforming the resistance signal into a standard 4 - 20 mA signal we recommend the DSH Isolation Amplifier 2204.

## Hook-up:



## Manufacturer's data of potentiometers:

### General specifications:

Standard resistance values	2 K Ω
Total resistance tolerance	+ 10%
Independent linearity tolerance	+ 1.0%
Resolution	essentially infinite
output smoothness	< 0.1%
Insulation resistance	> 1.000MΩ at 500V.D.C.
Dielectric strength	1 min. at 500V.D.C.
Resistance temp. coefficient	+ 400 ppm/° C

### Environmental performances

Operating temp. range	-55° C to +105° C (-67° F to +221° F)
Temp. cycle	5 cycles below-55° C. to +105° C (-67° F to +221° F)
	Total resist. value var. < +10%
Vibration	10Hz to 2,000Hz 15G. Total resist. value var. < +2%
Shock	50G 11mS Total resist. value var. < +1%
Moisture	40° C 95% RH 120 hours
Resistance	total resist. value var. < +10% Insulation resistance > 10MΩ

## Connection plug data:

Cable outer diam. : 6-15 mm (0.24 - 0.59 in)  
Thread : PG 11

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