Damcos®

Data sheet

VPI Valve Position Indicator A1

Versions:

The VPI indicator is available in 3 versions
VPI-V: Visual indication
VPI-E: Visual + electrical open/closed indication (switces)
VPI-C: Visual + electrical analog (potentiometer) indiction

Hydraulic Data:

Max. working pressure:	135 bar ~ 1958 lbf/in²
Test pressure:	205 bar ~ 2973 lbf/in²
Burst pressure:	> 525 bar ~ 7615 lbf/in²
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 cm³/sec ~ 6 l/min
Min. flow:	3 cm³/sec ~ 0.3 l/min
Connection face:	DIN 24 340 Cetop-3 / VPI connection
Insulation class:	IP 44/IP 67-on request

VPI-C

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 leakages.

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.

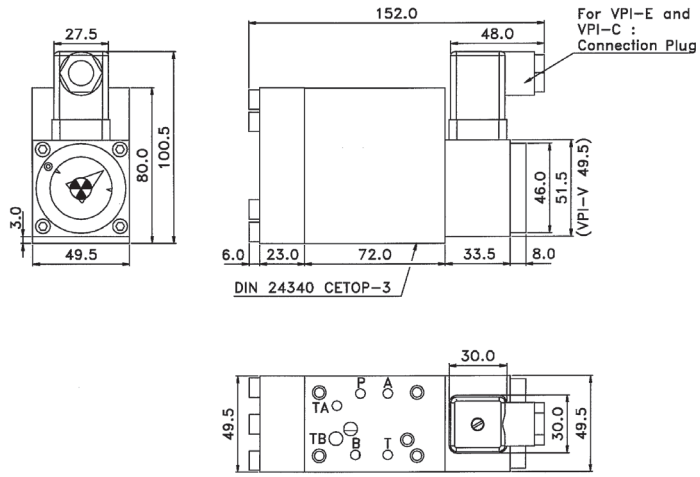
Materials:

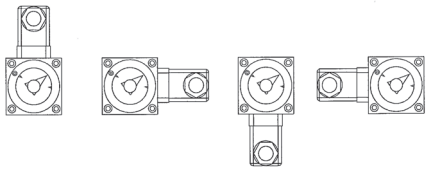
Housing, top cover and bottom member ... ALMgSi 1.0 Anodized
Screws, sign plates and rivets.....AISI 304, quality 8.8 (on screws 12.9)
Seals and friction elements .....NBR ~ Acrylonitrile Butadiene
Sight glass .....PMMA
Weight.....Approx. 1.2 kg ~ 2.7 lb
Note .....Hydraulic position indicators in brass/stainless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

Operating Restrictions:

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

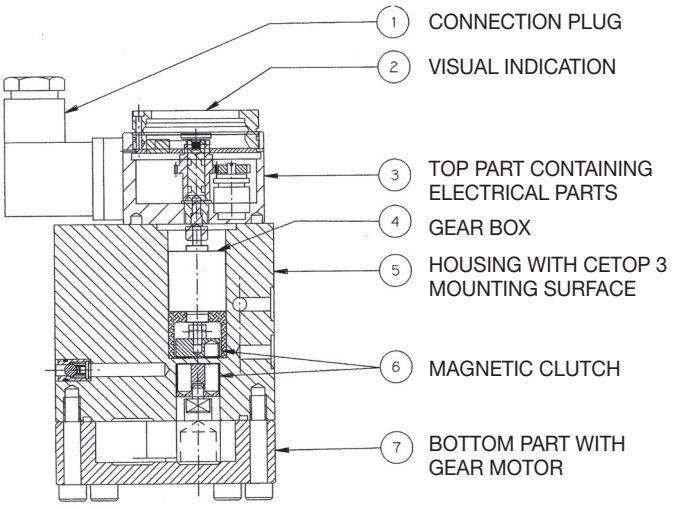
Main Dimensions:





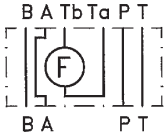
Note:
The top (indicator) part of the VPI can be mounted in any of 4 possible positions in relation to the main body/manifold.

Main Layout:

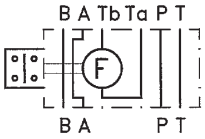


Hydraulic Symbol:

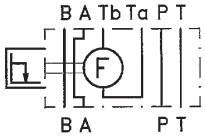
VPI-V



VPI-E



VPI-C



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.

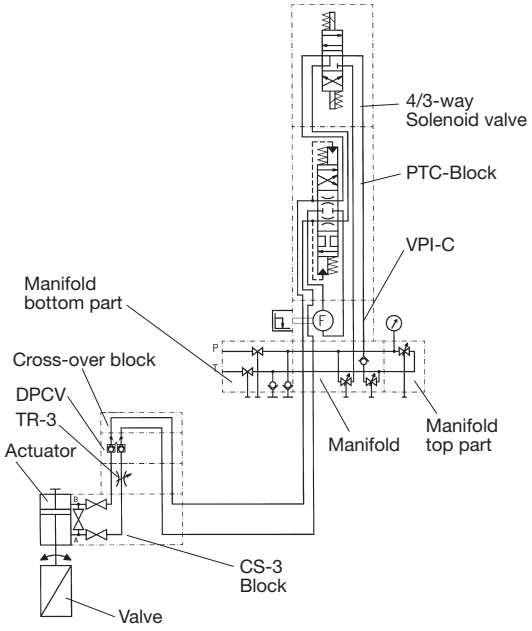
Pipe size	Pipe volume each 10 metres		Compression volume each 10 metres	
mm	cm³	in³	cm³	in³
Ø6	282.7	17.6	4.24	0.26
Ø7	384.8	23.5	5.77	0.35
Ø8	506.6	30.9	7.54	0.46
Ø9	636.0	38.8	9.54	0.58
Ø10	785.0	47.9	11.78	0.72

Measuring range				Gear
cm³		in³		
From	Up to	From	Up to	Ratio 1:
15	25	0.9	1.5	0015
25	40	1.5	2.4	0025
40	70	2.4	4.3	0040
70	100	4.3	6.1	0060
100	170	6.1	10.4	0100
170	260	10.4	15.9	0150
260	430	15.9	26.2	0250
430	700	26.2	42.7	0405
700	1250	42.7	76.3	0720
1250	2200	76.3	134.2	1280
2200	3500	134.2	213.2	2000
3500	5600	213.5	341.6	3125
5600	11000	341.6	671.0	6103

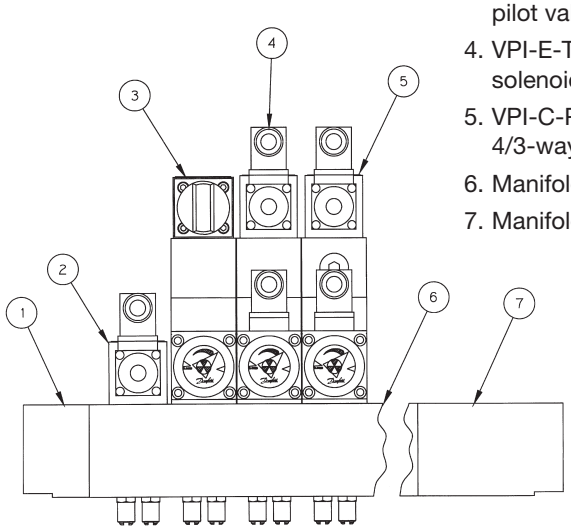
Application:

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:



1. Manifold top part
2. Solenoid valve
3. VPI-V-TC and manual pilot valve
4. VPI-E-TC and 4/2-way solenoid valve
5. VPI-C-PTC and 4/3-way solenoid valve
6. Manifold
7. Manifold bottom part

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:

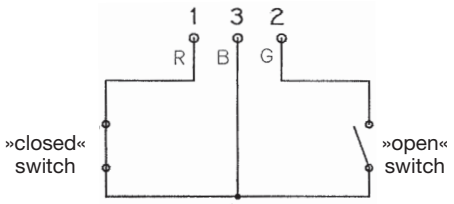
This indicator is used for visual and electric (ON/OFF) indication of the end positions of the valve (open/closed). The VPI-E is normally used with TC-block, but VPI-E can also be used with PTC-block. VPI-E is available with »normally open« switches, but can as a variant be supplied with »normally closed«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

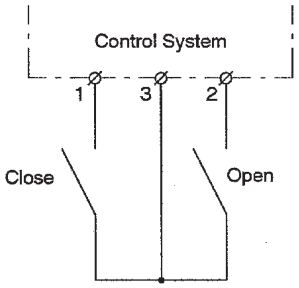
Terminal Layout

External Wiring



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.

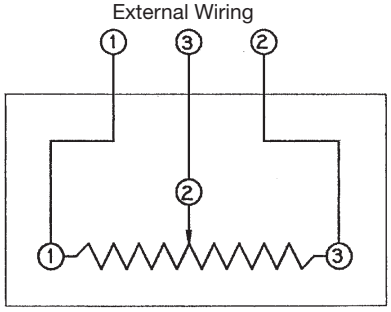
Manufacturer's data of micro-switches:

Contact material	Gold alloy X-point
Operating force (g max)	90 g
Electrical rating	100mA 125 VAC
Life expectancy	3×10^6
Electrical rating	100 mA 30 VDC
Life expectancy	3×10^6
Max. temp.	85°C.

VPI-C

Terminal Layout

External Wiring



Insulation tested to 1000 V

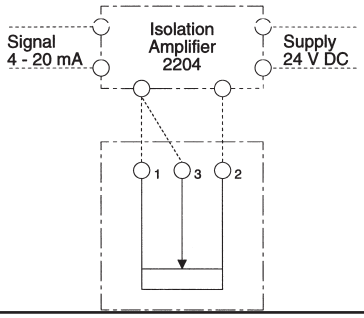
User data:

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
Temp. Cycle	5 cycles below-55°C. to +105°C 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 Resistance	40°C 95% RH 120 hours 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