

# HPR 01, 02, 03

## IP 44

# Hydraulic Position Indicators

A1

### Versions:

The HPR is available in 3 versions

- HPR 01: Visual indication
- HPR 02: Visual + electrical open/closed indication (switches)
- HPR 03: Visual + electrical analog (potentiometer) indication

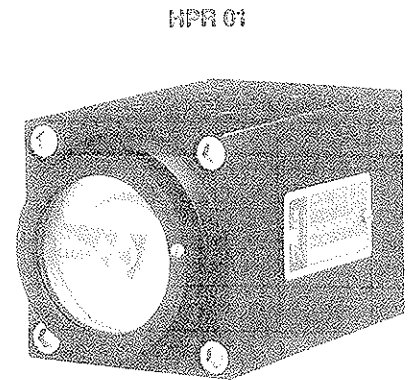
Note: On request the HPR can be delivered in sea-water resistant brass MS 58.

### Hydraulic Data:

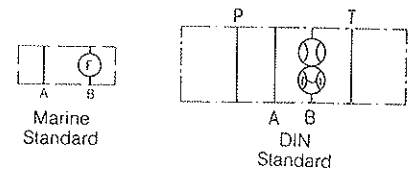
Max. working pressure:	115 bar ~ 1667 lbf/in <sup>2</sup>
Test pressure:	190 bar ~ 2756 lbf/in <sup>2</sup>
Burst pressure:	495 bar ~ 7175 lbf/in <sup>2</sup>
Temperature range:	-20°C to 80°C ~ -4°F to 176°F
Viscosity range:	15-200cSt
Filtration requirement:	30 µm nominal
Hydraulic medium:	Acid-free hydraulic oil
Max. flow:	100 cm <sup>3</sup> /sec ~ 6.1 in <sup>3</sup> /sec, (6 l/min)
Min. flow:	5 cm <sup>3</sup> /sec ~ 0.3 in <sup>3</sup> /sec, (0.3 l/min)
Connection face:	DIN 24340 Cetop 3

### Materials: (excl. cable gland)

Housing, top cover and bottom member:	ALMgSi 0.5, anodized
Screws, sign plates and rivets:	AISI 304
Connection housing (HPR 02/03):	ALMgSi 0.5, anodized
Seals and friction elements:	NBR ~ Acrylonitrile Butadiene
Sight glass:	PMMA



### Hydraulic Symbol:



### General Description:

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

The gear wheels rotate according to flow and flow direction of the passing fluid. A built-in mini-gearbox with a gear ratio chosen to suit the displacement in question transforms gear motor movement to the indicator shaft. An indicator arrow is mounted on the indicator shaft by means of a friction clutch in order to obtain automatic end stop correction.

The arrow moves within a scale angle that is adjustable between 75° and 185° (volume indication).

A small indicator disc (flow indication) mounted firmly on the indicator shaft serves as leakage indicator.

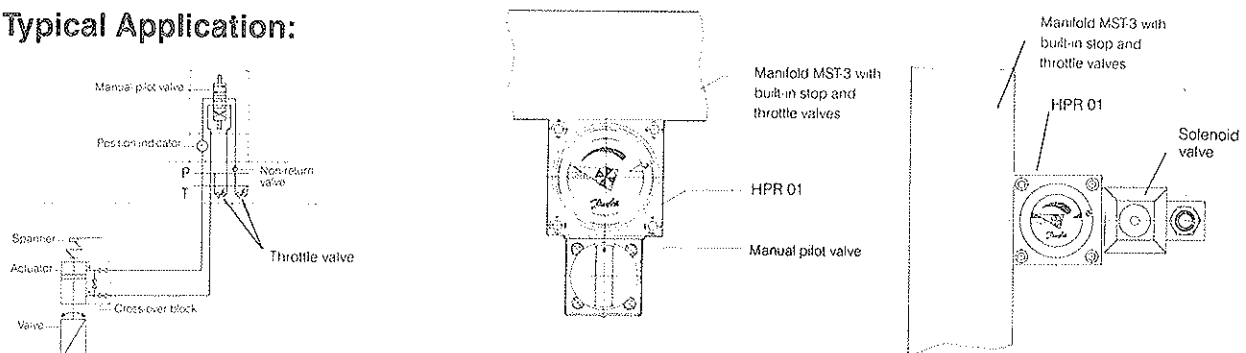
### Application:

The HPR is designed to indicate the position of hydraulically actuated valves and ideally its indicator arrow should 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 an HPR.

Also observe the various factors influencing the accuracy and reliability of this indirect position indication method. The compression of the hydraulic medium during operation of the actuator is the most important of these factors that are described in technical sheet no. SD 4000 - 3E01.

### Typical Application:



**Operating Restrictions:** Flushing of control lines must never take place through the HPR.

The company policy aims at continuous improvement of the products and therefore all rights to change the specifications without notice are reserved.

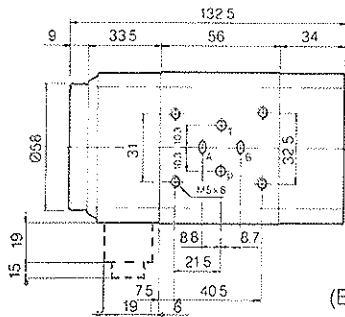
# HPR 01, 02, 03

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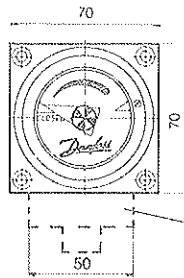
# Hydraulic Position Indicators

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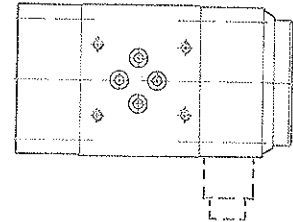
### Main Dimensions:



(B port = measuring port)



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



For HPR 02 & 03:  
Connection housing  
Cable gland

Total dry weight: HPR 01 = 1.6 kg  
HPR 02 = 1.8 kg  
HPR 03 = 2.0 kg

**HPR 02**

### Terminal Layout

External wiring

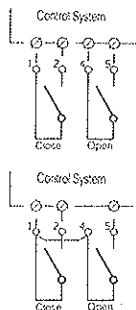
Close pos. Count pos.

### User data

Max. continuous load: 5A 30 VDC  
Max. peak load: 5A 30 VDC

### Hook up

Computer or I.S. Control



Direct connected to lamps or relays

### Manufacturer's data for microswitches

Contact material silver (inlay)  
Operation force (g max) 140 g  
Electrical rating 5A 250 VAC  
Life expectancy min. 100.000  
Electrical rating 5A 30 VDC  
Life expectancy min. 200.000

**HPR 03**

### Terminal Layout

External wiring

Jumper

Internal wiring

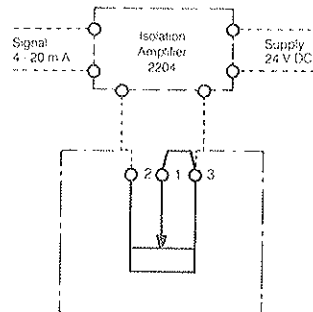
### User data

Max. continuous load: 0.2 W (VA)  
Max. peak load: 1 W (VA)  
The normal approx. output range is 100 Ω in closed position and between 850Ω and 1950Ω in open position.  
The open position signal is dependent on the choice of gearbox 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 for potentiometers

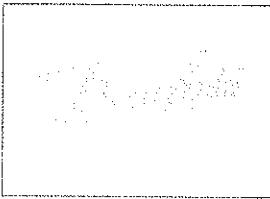
General Specifications	
Standard Resistance Values	2 K Ω
Total Resistance Tolerance	± 10%
Independent Linearity Tolerance	± 1.0%
Resolution	Essentially infinite
Output smoothness	< 0.1%
Insulation Resistance	> 1,000MΩ at 500V.D.C.
Dielectric Strength	1 min. at 500V.D.C.
Resistance Temp. Coefficient	± 400 ppm/°C
Environmental Performances	
Operating Temp. Range	-55°C to +105°C
Temp. Cycle	5 cycles under -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

### Cable Gland Data:

Cable outside dia. : 7 - 10 mm  
Insulation class : IP 65  
Thread : PG 9  
Material : Nickel-plated brass  
Seal material : NBR

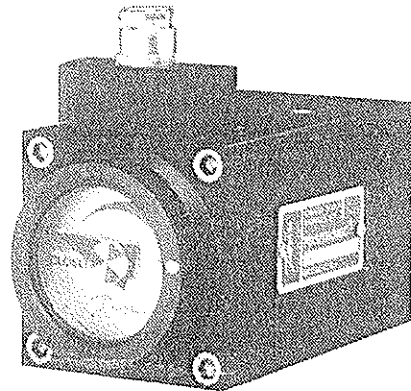
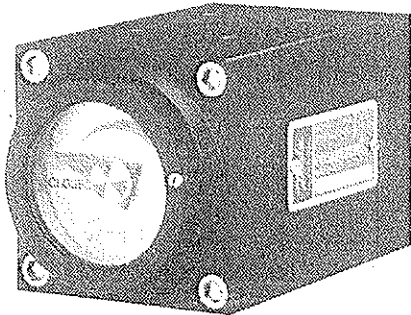


SERVICE & REPAIR MANUAL  
FOR  
DSH HYDRAULIC POSITION INDICATORS



- Types:
- HPR 01 - Visual indication
  - HPR 02 - Visual + electrical open/closed indication (switches)<sup>1</sup>
  - HPR 03 - Visual + electrical analog (potentiometer) indication

Version A1 (Anodized aluminium body - for use in solenoid valve cabinets and control consoles)



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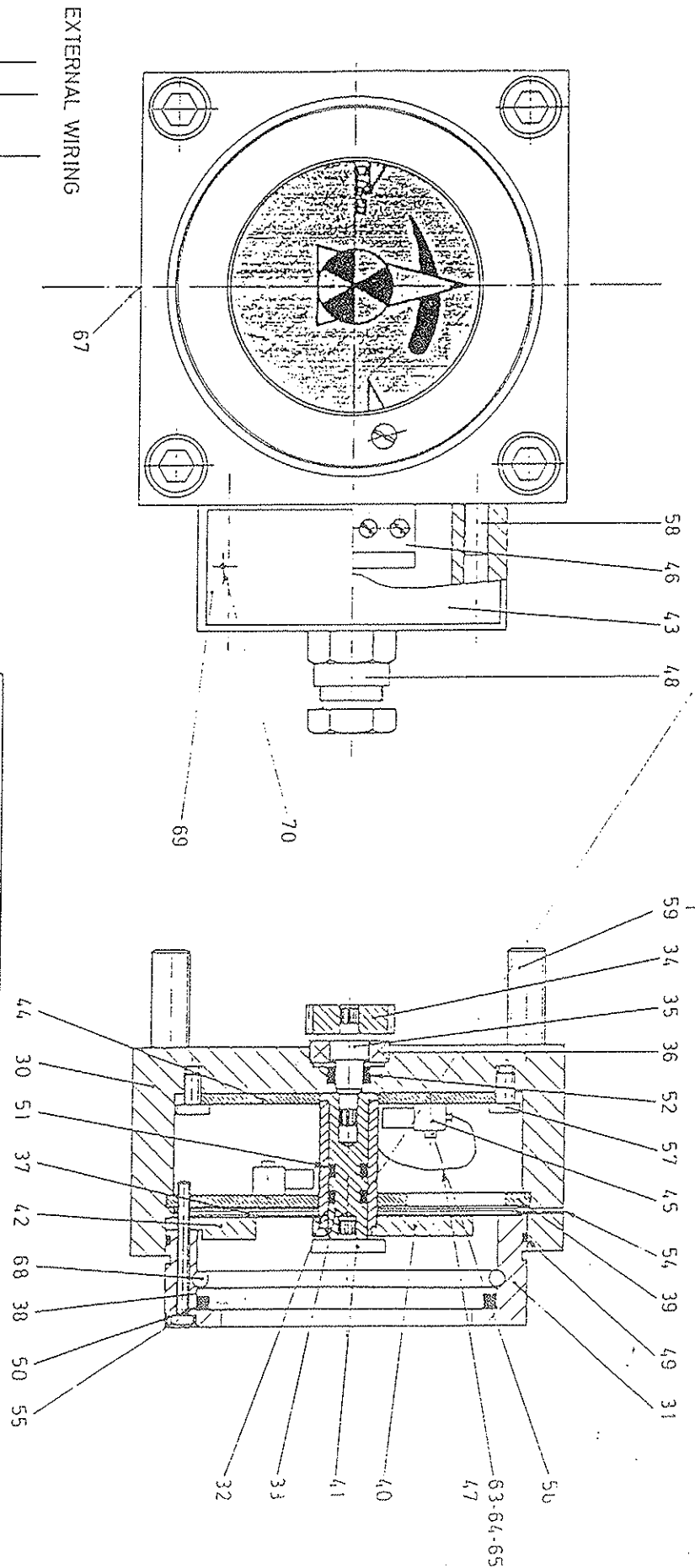
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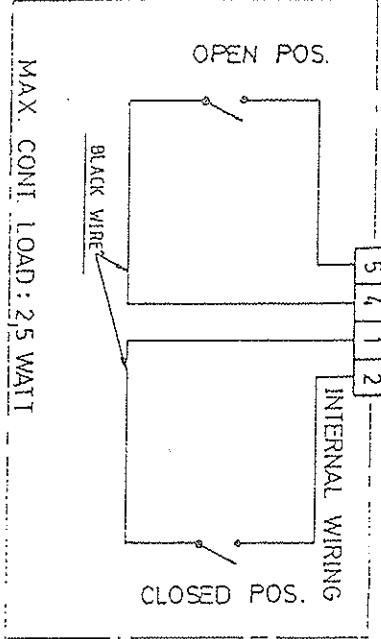
BEFORE MOUNTING THE X-RINGS THEY MUST BE PLACED IN HYDRAULIC OIL IN ORDER TO SOFTEN THE RINGS.

POS. 54 AND POS.61 MUST BE SEALED WITH LOCTITE 638.

BOLT TORQUE LUBRICATED : 10 Nm



INSULATION TESTED TO 1000 VOLT.



TERMINAL CONFIGURATIONS

NO. : 1  
ID. NO. : 045-0251

NO. : 2  
ID. NO. : 045-0261

NO. : 3  
ID. NO. : 045-0271

NO. : 4  
ID. NO. : 045-0281

THE FRICTION DRIVE MUST BE TORQUE TESTED :

MIN. TORQUE : 2Ncm

MAX. TORQUE : 7Ncm

**Danfoss**

DANFOSS SYSTEM HYDRAULIK A/S

Part No. HPR-02

7 10 55 C 06 7 1

NO.	DATE	REVISION
1		
2		