

# Pressure switch type DG 7

## Assembly instructions



2 switch outputs, IO-Link



© by HAWE Hydraulik SE.

The reproduction and distribution of this document as well as the use and communication of its contents to others without explicit authorisation is prohibited.

Offenders will be held liable for the payment of damages.

All rights reserved in the event of patent or utility model applications.

Brand names, product names and trademarks are not specifically indicated. In particular with regard to registered and protected names and trademarks, usage is subject to legal provisions.

HAWE Hydraulik respects these legal provisions in all cases.

Printing date / document generated on: 25.03.2020

## 1 Overview of pressure switch type DG 7

Pressure switches are hydraulic accessories. They close or open electrical contacts when under pressure.

The pressure switches are used to issue an electrical switching command or signal for further work steps when a predefined pressure value is reached. Two independent switching points can be programmed.

The DG 7 pressure switch device has an IO-Link communication interface. The parameters of the device can only be adjusted using IO-Link via a PC or memory module.

### Features and benefits:

- Two switch outputs as normally closed contact or normally open contact, PNP or NPN programmable
- Process data, output signal and diagnostic messages available via IO-Link
- Compact design
- Shorter commissioning times

### Intended applications:

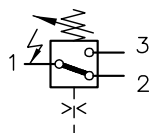
- Mobile hydraulics
- Industrial hydraulics



Pressure switch type DG 7

## 2 Available versions, main data

Circuit symbol:



Order coding example:

DG 7	2	
	Pressure stage	Table 1 Pressure stage
	Basic type	

### Table 1 Pressure stage

Coding	Pressure setting (bar)
1	0 ... 100
2	0 ... 250
4	0 ... 400

# 3

## Parameters

### 3.1 General

Designation	Pressure switch
Design	Metallic thin-film cell
Model	Screw-in part
Electrical connection	M12x1, 4-pole
Material	V2A
Tightening torque	25 to 35 Nm <a href="#">Chapter 4, "Dimensions"</a>
Material with contact to the medium	V2A
Installation position	As desired
Weight	approx. 61 g
Protection class	IP 67, mounted
Temperature	Medium temperature: -40 to +90°C Ambient temperature: -40 to +100°C Storage temperature: -40 to +100°C

### Pressure

		DG 71	DG 72	DG 74
Measuring range	bar	0...100	0...250	0...400
	PSI	0...1,450	0...3,625	0...5,800
Maximum pressure $p_{max}$	bar	250	625	1000
	PSI	3,625	9,060	14,500
Bursting pressure $p_{burst}$	bar	1000	1,200	1,700
	PSI	14,500	17,400	24,650
Switching point SP1 and SP2	bar	1...100	2.5...250	4...400
	PSI	14.5...1,450	40...3,626	40...5,800
Reset point rP1 and rP2	bar	0.5...99.5	1.3...248.8	2...398
	PSI	7...1,443	19...3,609	29...5,773
In increments of $\Delta p$	bar	0.05	0.1	0.2
	PSI	0.7	1.5	2.9

#### NOTE

The measuring system may be damaged between  $p_{max}$  and  $p_{burst}$ , although the device may still appear intact on the outside.

### 3.2 Electrical data

Version	PNP/NPN switching, programmable
Operating voltage $U_B$	18 to 30 DC, protected against polarity reversal
Idle current $I_L$	< 15 mA
Insulation resistance $R_{ISO}$	> 100 M $\Omega$

#### Outputs

Switching current $I_A$	< 100 mA, overload-proof
Voltage drop $\Delta U_A$	< 2 V
Switching frequency $f_s$	$\leq$ 170 Hz
Switching cycles N	> 60 million

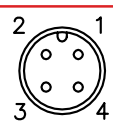
#### Accuracy

Switching point accuracy	< $\pm 0.5$
Hysteresis	< $\pm 0.2$
Repeat accuracy	< $\pm 0.05$

#### Reaction time

Start-up	0.3 s
Response time of output $T_s$	< 3 ms

#### Electrical connection

Signal	Pin	Wire colour	
$U_B$	1	Brown	 <p>1 +24 V 2 PNP switching signal 3 GND 4 IO-Link</p>
OUT2	2	White	
GND	3	Blue	
OUT1/IO-Link	4	Black	

### 3.3 IO-Link communication

Type	COM2, 38.4 kBaud
Revision	1.1
SDCI standard	IEC 61131-9
Device ID	DG 7 IO 1: 709 d/00 02 c5 h DG 7 IO 2: 710 d/00 02 c6 h DG 7 IO 4: 708 d/00 02 c4 h
Profiles	Smart Sensor, Process Data Variable, Device Identification, Device Diagnosis
SIO mode	Yes
Master port class	A
Analogue process data	2
Binary process data	2
Cycle time	> 5 ms

A superordinate IO-Link Master is required to use the IO-Link interface. Process and diagnostic data can be accessed directly using the IO-Link.

It is also possible to adjust the settings during ongoing operation.

The device-specific IODD file will be provided on request.

### 3.4 Acceptance tests and environmental tests

EMC	DIN EN 61326-1
Pressure equipment directive	DIN EN 13445 -1:2014/A1:2014
Shock resistance	DIN EN 60068-2-27 50 g, 1 ms
Vibration resistance	DIN EN 60068-2-6 20 g, 10 to 2,000 Hz
MTTF	667.77a

#### For the scope of cULus:

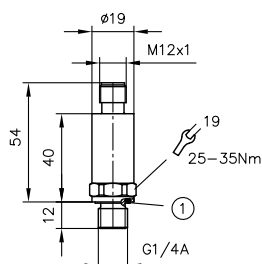
The device needs to be supplied by a galvanically isolated source that has a UL-approved fuse as a secondary system with a max. nominal current of either

- a) 5 A at voltages of 0 to 20 Vrms (0 to 28.3 Vp) or
- b) 100/Vp at voltages of 20 to 30 Vrms (28.3 to 42.4 Vp).

The device must always be connected using a listed (CYJV/7) or R/C (CYJV2/8) cable socket with suitable data in accordance with the "Condition of Acceptability".

## 4 Dimensions

All dimensions in mm, subject to change.



1 Seal

## 5 Installation, operation and maintenance information

### 5.1 Assembly

Attach the electrical pressure switch to an appropriate process connection (see also [Chapter 6.1, "Accessories, spare parts and separate components"](#)).

Tightening torque: 25 Nm to 35 Nm

De-energise your system and establish the electrical connection for the device using an M12 line connector (see [Chapter 6.1, "Accessories, spare parts and separate components"](#)). Please note that the assembly accessories are not included in the delivery of the pressure switch, and need to be ordered separately.

The device can be sealed to prevent unauthorised adjustment after definitive setting of the pressure switch.

#### **i** NOTE

Inadmissible excess pressures and pressure surges must be prevented because they may damage the device.  
To avoid or mitigate such effects, contact our specialist staff!

#### **⚠** CAUTION

At an ambient temperature of 65°C or a working fluid temperature of 90°C, the following can occur:

- Hot surface
- Risk of burns

Please stick the enclosed warning label around the connected cable.

## 5.2 Switching function

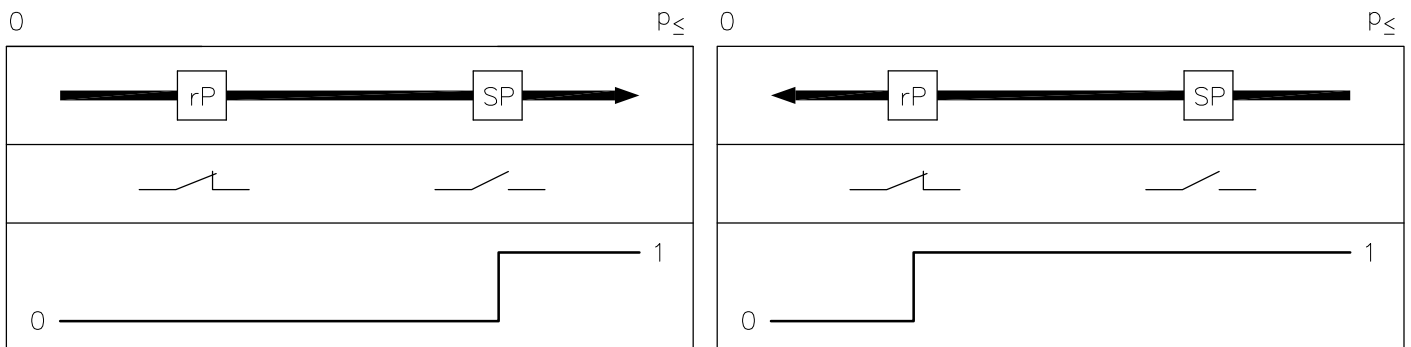
### Hysteresis N/O contact

System pressure increases above the switching point SP.

1. The contact closes.
- ✓ A signal is present at the output.

System pressure falls below the reset point rP.

1. The contact opens.
- ✓ No signal is present at the output.



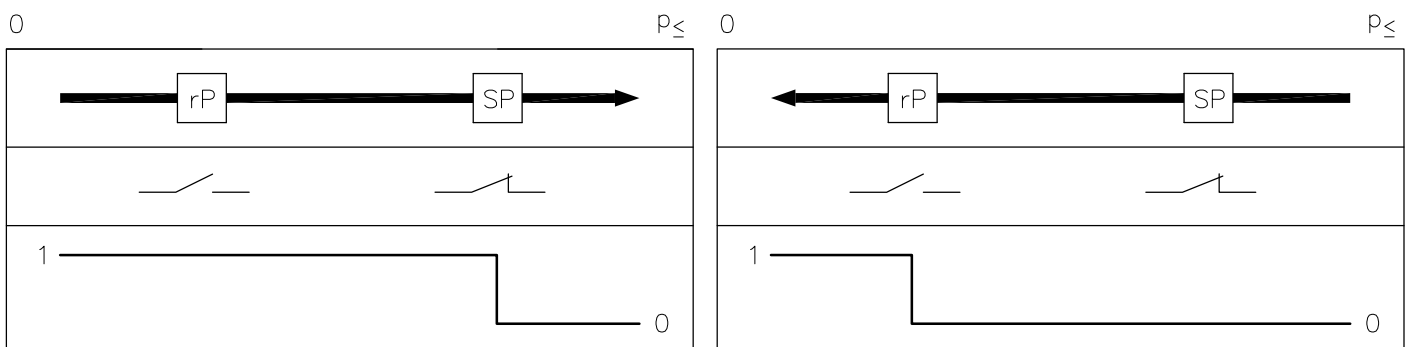
### Hysteresis N/C contact

System pressure increases above the switching point SP.

1. The contact opens.
- ✓ No signal is present at the output.

System pressure falls below the reset point rP.

1. The contact closes.
- ✓ A signal is present at the output.





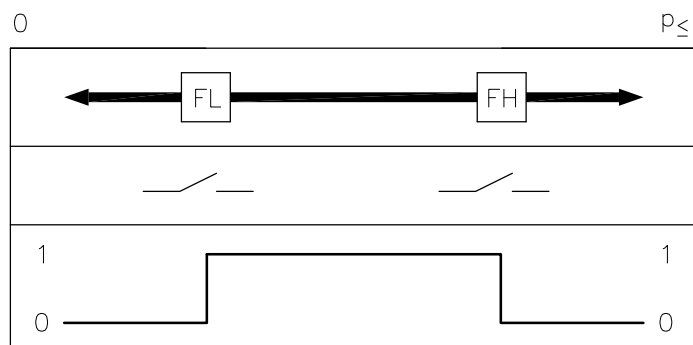
### Window function N/O contact

The system pressure lies between the bottom window switching point FL and the top window switching point FH.

- Both contacts are closed.
- ✓ A signal is present at the output.

The system pressure falls below the bottom window switching point FL or rises above the top window switching point FH.

- One contact opens
- ✓ No signal is present at the output.



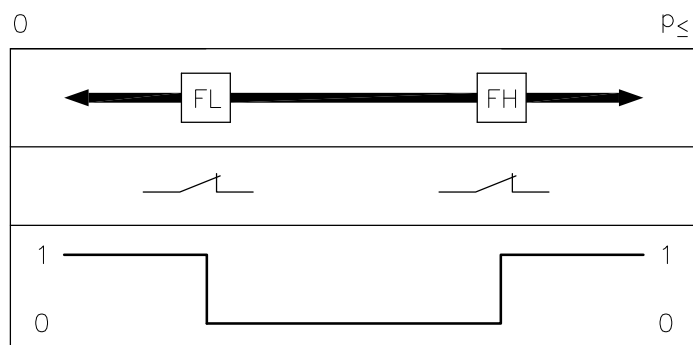
### Window function N/C contact

The system pressure lies between the bottom window switching point FL and the top window switching point FH.

- Both contacts are open.
- ✓ No signal is present at the output.

The system pressure falls below the bottom window switching point FL or rises above the top window switching point FH.

- One contact closes.
- ✓ A signal is present at the output.



### 5.3 Adjusting the parameters using a PC

IO-Link-compatible software is required in order to adjust the parameters using a PC (e.g. LINERECORDER SENSOR).

IO-Link interfaces are provided for connecting the pressure switch using a computer's USB interface.

1. Prepare the computer, software and interface.
2. Connect the IO-Link-compatible pressure switch to the IO-Link interface.
3. Follow the menu in the IO-Link software.
4. Adjust the parameters as required.
5. Commission the device.

### 5.4 Adjusting the parameters using a memory plug

A suitable memory plug can be used to write or transfer a parameter record onto the device.

1. Load a suitable parameter record onto the memory plug (e.g. using a PC or a pressure switch with the corresponding parameter settings).
2. Connect the memory plug between the pressure switch and the cable socket.  
When the power supply is switched on, the parameter record saved on the memory plug will be transferred onto the sensor.
3. Remove the memory plug.
4. Commission the pressure switch.

## 6 Other information

### 6.1 Accessories, spare parts and separate components

#### M12 connector

Order coding:	MSD-T7
Order number:	6217 8048-00
Description:	M12 line connector. 4-pole. Cable feed rotatable by 90°. Cable must be provided by the customer

#### Flange adapter

Order coding:	Y 9
Order number:	6800 6832-07
Description:	Flange adapter

#### Mounting adapter

Order coding:	X84G
Order number:	6900 1032-00
Description:	Straight screw-in connector with G 1/4 internal thread, G 1/4 external thread

#### USB IO-Link master

Order coding:	USB IO-Link master
Order number:	4703 4415-00
Description:	For connecting IO-Link-compatible sensors to a PC

#### IO-Link memory plug

Order coding:	IO-Link memory plug
Order number:	4703 4414-00
Description:	For quick and easy adjustment of parameter settings on IO-Link sensors

## Further information

### Additional versions

- Electronic pressure switch type DG 6: D 5440 F
- Electronic pressure switch type DG 5: D 5440 E/1
- Pressure switch type DG 51 E: D 5440 E/2
- Electronic pressure transducer type DT 2: D 5440 T/1
- Electronic pressure transducer type DT 11: D 5440 T/2
- Pressure switch type DG: D 5440
- Fitting type X 84: D 7077