Pressure switch type DG

Product documentation

Piston-type pressure switch

Operating pressure p_{max}: 700 bar

D 5440
03-2016-1.0

HAWE HYDRAULIK

Contents

1 Overview of pressure switch type DG

Pressure switches open and close an electrical contact at a previously defined pressure. As soon as the pressure is reached, a further work step is started or stopped by an electrical signal.

Features and benefits:

- Compact design
- Option of integration into the HAWE modular system

Intended applications:

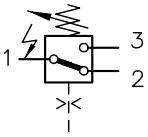
- General hydraulic systems
- Machine tools

Pressure switch type DG 1

Pressure switch type DG 3

2 Available versions, main data

Circuit symbol:



DG 1

DG 3

Order coding example:

DG 1 RF DG 33 DG 34	M	V	- YS 8	300 F

Pressure setting (factory-set, optional), bar Series: setting with increasing pressure
Coding F: setting with decreasing pressure

Hydraulic connection Table 4 Hydraulic connection

Adjustment devices Table 3 Adjustment devices

Electrical connection Table 2 Electrical connection

Basic type Table 1 Basic type

Table 1 Basic type

Basic type	Description	Pressure setting (range)	
		$p_{min-max}$ (bar)	p_{max} (bar)
DG 1 R	Scale, pipe connection	20 ... 600	600
DG 1 RF	Scale, front ring for control panel installation, pipe connection		
DG 1 RU DG 1 RUFS	Scale mounted with 180° rotation, for “suspended” installation		
DG 33 DG 34 DG 35 DG 36 DG 364 DG 365	Manifold mounting	200 to 700 100 ... 400 20 to 250 4 to 12 4 to 50 12 to 170	700

Table 2 Electrical connection

Coding	Electrical connection	Protection class (IEC 60529)	DG 1 R DG 1 RF DG 1 RU	DG 1 RS DG 1 RFS DG 1 RUFS	DG 3
--	Terminal connection	IP 54	●		
--	Line connector DIN EN 175 301-803 A			●	●
- X	DIN EN 175 301-803 A (without line connector)	IP 65			●
- AMP	AMP Junior Timer	IP 65			●
- S	SCHLEMMER (bayonet PA 6)	IP 67			●
- M	M12x1 (in compliance with DESINA)	IP 67			●

Table 3 Adjustment devices

Coding	Version
No designation	Turn knob for DG 1 R(S), DG 1 RF(S) Adjusting screw for DG 3..
R	DG 3.. only: Adjustable by hand (wing bolt and wing nut)
V	DG 3.. only : Turn knob
H	DG 3.. only : Lockable turn knob (BKS lock) Key in line with factory specifications for the automotive industry; a key is included in the scope of delivery (with an additional key held by authorised plant personnel).

Table 4 Hydraulic connection

Suitable for DG 1 R..

For combination with various fittings, see D 7065

Coding	Connection type
No designation	Directly using a type-B pipe screw connection in accordance with DIN 3852-2 G 1/4 or G 1/2 A connection thread DIN EN ISO 228-1
	With union nut DIN 16283 (pressure gauge screw fitting, e.g. DIN 16270)

Suitable for DG 3..

Coding	Connection type
No designation	Manifold mounting
- 1/4	Pipe connection G 1/4 (BSPP)
- Y1	Tapped journal G 1/4 A (BSPP)
- Y2	Tapped journal M12x1.5
- Y3	Tapped journal G 1/8 (BSPP)
- YS 6 - YS 8	Tapered cone ∅6 and ∅8 for a cutting ring and union nut
- Y6 - Y8	Pipe bracket ∅6 and ∅8 for a pipe screw connection

3 Parameters

3.1 General and hydraulic

Description	Pressure switch
Design	Spring-loaded piston-type pressure switch
Model	Pipe connection, manifold mounting
Material	DG 1: Galvanised steel housing DG 3: Die-cast zinc housing
Tightening torques	See Chapter 4, "Dimensions"
Installation position	DG 1 R.. = Vertical, sideways scale, hydraulic part at the bottom DG 3.. = As desired
Hydraulic fluid	Hydraulic oil: according to Part 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity limits: min. approx. 4, max. approx. 1500 mm^2/s opt. operation approx. 10... 500 mm^2/s. Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.
Cleanliness level	**ISO 4406** 21/18/15...19/17/13
Temperatures	Ambient: approx. -40 ... +80°C, Fluid: -25 ... +80°C, Note the viscosity range! Permissible temperature during start: -40°C (observe start-viscosity!), as long as the service temperature is at least 20K higher for the following operation. Biologically degradable pressure fluids: Observe manufacturer's specifications. By consideration of the compatibility with seal material not over +70°C.

Weight

Type	
DG 1 R..	= 1.3 kg
DG 33	= 0.3 kg
DG 34	= 0.3 kg
DG 35	= 0.3 kg
DG 36	= 0.3 kg
DG 364	= 0.3 kg
DG 365	= 0.3 kg
DG 3.. - 1/4	= 0.4 kg
DG 3.. - Y..	= 0.4 kg

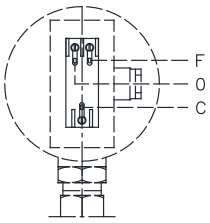
3.2 Electrical data

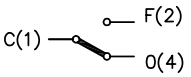
Switching operations/h	Reference values approx. 2000 switching operations/h max. (roughly equally distributed). Note the number of possible switching cycles; see below. Switching accuracy ± 2 to 3% (repeat accuracy for increasing pressure!)

Electrical connection

DG 1 R
DG 1 RF
DG 1 RU

Terminal connection
Cable 3x0.75
See also the product assembly instructions

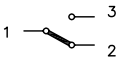




DG 1 RS
DG 1 RFS
DG 1 RUFS
DG 3. - X

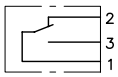
DIN EN 175 301-803 A

3-pole



DG 3. -S

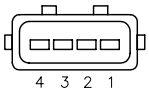
3-pole

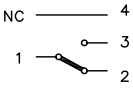


DG 3. - AMP

AMP Junior Timer

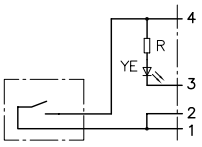
4-pole





DG 3. - M

4-pole



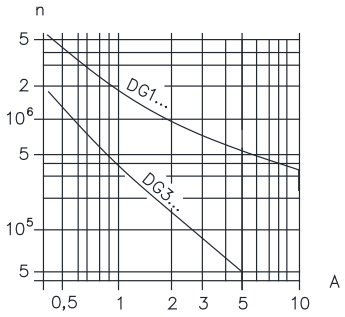
Micro switch used	Saia-Burgess, 26127 Oldenburg, Germany

Pressure switch	DG 1..	DG 3..
Micro switch type	X 04-Z 25	XCG 3
Mechanical lifetime approx.	10 x 10^6	10 x 10^6

For 12 V DC = 4 A and L/R = 10 ms

Pressure switch	DG 1..	DG 3..
Mechanical lifetime approx.	1 x 10^6	0.35 x 10^6

For 230 V, 1 A and cos. φ = 0.3



A current at 230 V AC; n switching cycles

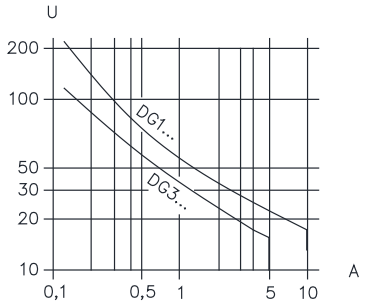
Pressure switch	DG 1..	DG 3..
Alternating current Nominal switching capacity VDE 0630 A/V	3/380	1/250

Direct current switching capacity

To ensure a safe contact, the current must not fall below certain minimum values:

24 V DC = I_{min} = 10 mA

12 V DC = I_{min} = 100 mA



A current; U DC voltage (V DC)

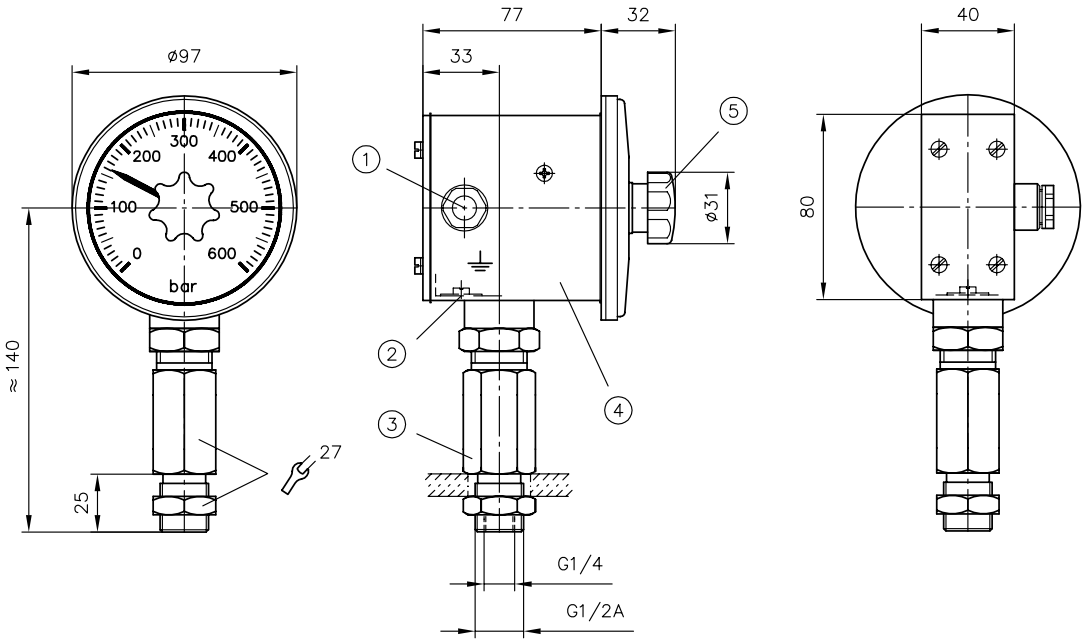
Version **-M**
(M12x1, in compliance with DESINA)

Supply voltage U	24 V DC (18-30 V DC, DIN EN 61121)
Switching current I_{max}	2 A

4 Dimensions

All dimensions in mm, subject to change.

DG 1 R



1 Cable fitting PG 9

2 Ground connection

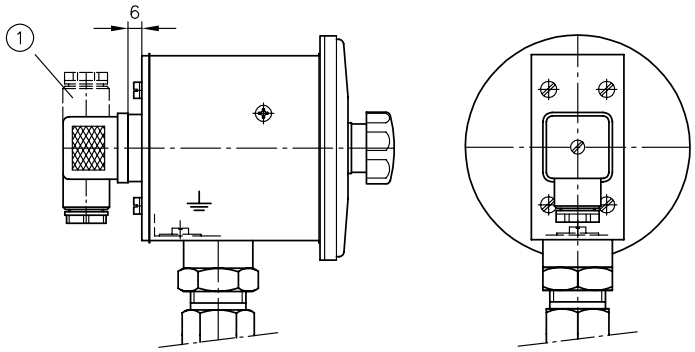
3 Actuation cylinder

4 Scale housing

5 Setting knob for main switch

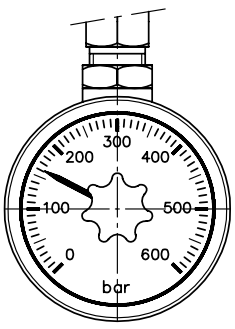
Note
For types DG 1.., the scale housing ④ must not be twisted relative to the hex (width across flats 27) ③ for functional-technical reasons!

DG 1 RS



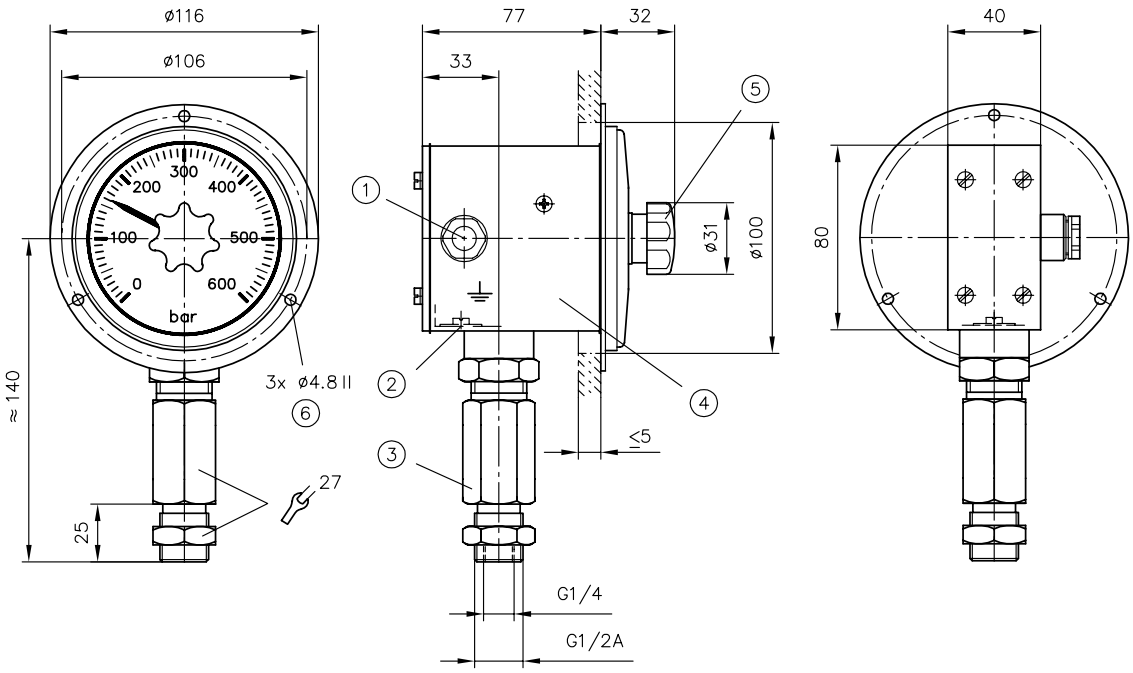
1 Line connector can be mounted offset by 4x90°

DG 1 RU



DG 1 RF

With front ring for switch panel installation



1 Cable fitting PG 9

2 Ground connection

3 Actuation cylinder

4 Scale housing

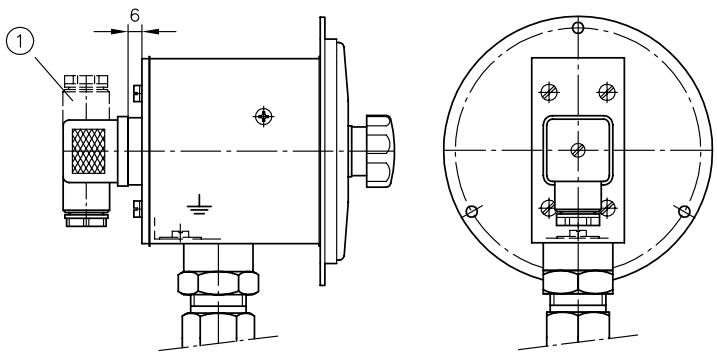
5 Setting knob for main switch

6 Fixing holes are rotated by 180° in version “U”.

Note

For types DG 1.., the scale housing ④ must not be twisted relative to the hex (width across flats 27) ③ for functional-technical reasons!

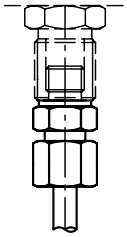
DG 1 RFS (DG 1 RUFS)



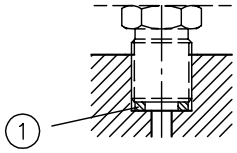
1 Line connector can be mounted offset by 4x90°

Hydraulic connection

G 1/4 thread
for pipe screw connection



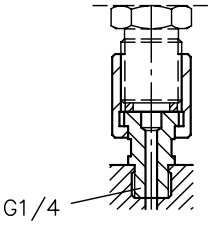
G 1/2 (BSPP) thread
e.g. pressure gauge screw fitting



1 Cu sealing ring DIN 7603

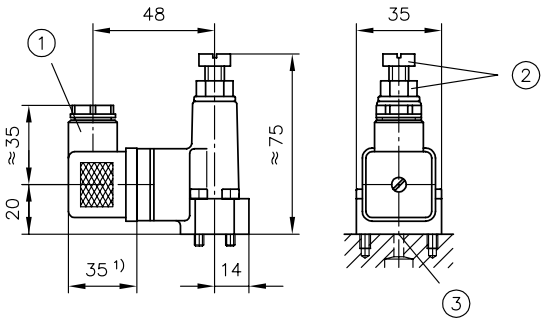
G 1/2 (BSPP) thread
Fitting type X1 (example) from D 7065

DG.. can be fitted in any direction



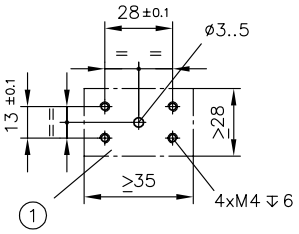
DG 3..

Series (adjustment device without designation)

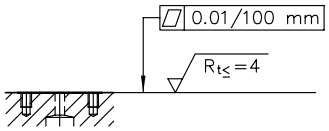


1 Plug can be mounted offset by 4x90°
2 Adjusting screw and lock nut (width across flats 10)
3 Sealing with O-ring

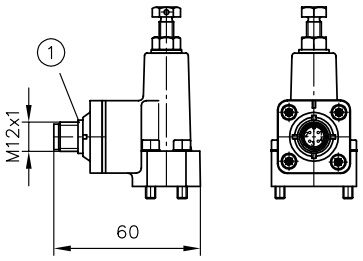
Base plate hole pattern



1 Hydraulic connection

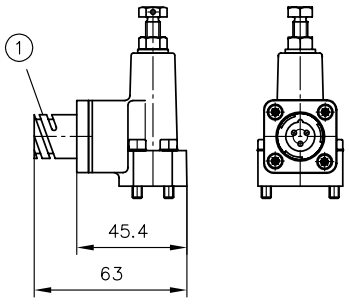


DG 3..M



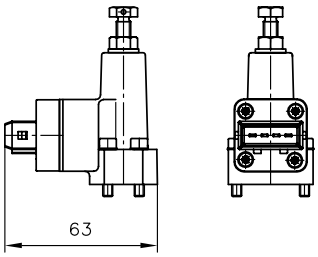
1 Light ring (yellow)

DG 3..S



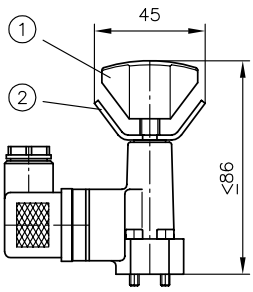
1 Bayonet PA 6 (Schlemmer)

DG 3...AMP



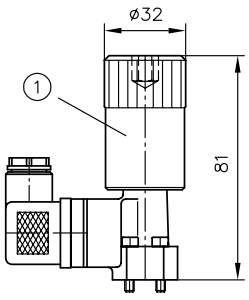
Adjustment device

Coding **R**



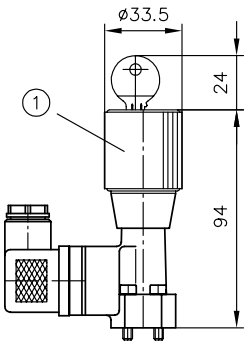
1 Wing bolt
2 Wing nut

Coding **V**



1 Turn knob

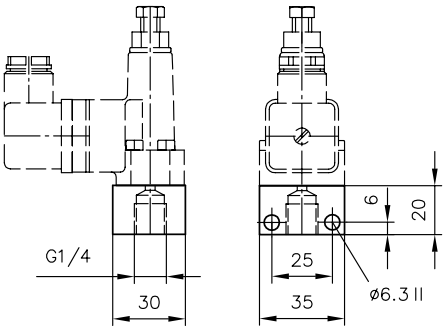
Coding **H**



1 Turn knob

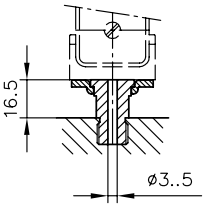
Hydraulic connection

DG 3.. **- 1/4**



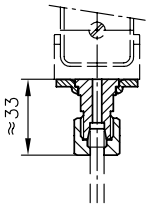
DG 3.. **- Y1** (G 1/4 (BSPP))
DG 3.. **- Y2** (M12x1.5)
DG 3.. **- Y3** (G 1/8 (BSPP))

Tapped journal with sealing edge



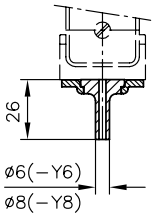
DG 3.. **- YS6**
DG 3.. **- YS8**

Pipe connection with EO progressive ring and union nut



DG 3.. **- Y6**
DG 3.. **- Y8**

Pipe connection pieces



DG 3.. can be rotated in any direction around the pipe axis after loosening the clamping plate (by loosening M4).

5 Assembly, operation and maintenance recommendations

5.1 Intended application

This product is intended exclusively for hydraulic applications (fluid engineering). The product meets high technical safety standards and regulations for fluid and electrical engineering.

The user must observe the safety measures and warnings in this documentation.

Essential requirements for the product to function correctly and safely:

- All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- The product must only be assembled and put into operation by qualified personnel.
- The product must only be operated within the specified technical parameters. The technical parameters are described in detail in this documentation.
- The operating and maintenance manual of the specific complete system must also always be observed.

If the product can no longer be operated safely:

Remove the product from operation and mark it accordingly. It is then not permitted to continue using or operating the product.

5.2 Assembly information

The product must only be installed in the complete system with standard connection components that comply with market requirements (screw fittings, hoses, pipes, etc.).

The hydraulic system must be shut down correctly prior to dismounting; this applies in particular to hydraulic systems with hydraulic accumulators.

Danger
Risk to life caused by sudden movement of the hydraulic drives when dismantled incorrectly!
Risk of serious injury or death.

- Depressurise the hydraulic system.
- Perform safety measures in preparation for maintenance.

5.2.1 Preparing the base plate for DG 3

See description in Chapter 4, "Dimensions".

5.3 Operating instructions

Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of a hydraulic power pack. Contamination can cause irreparable damage.

Examples of fine contamination include:
- Metal chips
- Rubber particles from hoses and seals
- Dirt due to assembly and maintenance
- Mechanical debris
- Chemical ageing of the hydraulic fluid

Note
Fresh hydraulic fluid from the drum does not always have the highest degree of purity. Under some circumstances the fresh hydraulic fluid must be filtered before use.

Pay attention to the cleanliness level of the hydraulic fluid in order to maintain faultless operation.
(Also see cleanliness level in Chapter 3, "Parameters".)

5.4 Maintenance information

This product is largely maintenance-free.

Conduct a visual inspection at regular intervals, but at least once per year, to check if the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the device surface of dust deposits and dirt at regular intervals, but at least once per year.

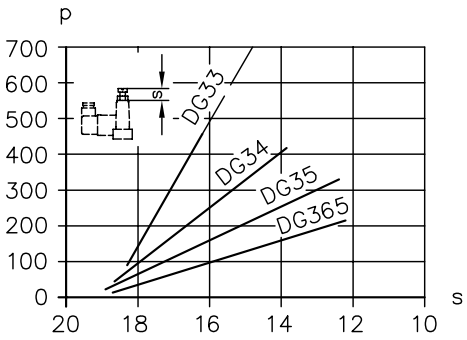
5.5 Adjustability and switching pressure

Adjustability

When deactivating pumps directly, be aware of a potential afterrun caused by mass action.
Also available for delivery with preset pressure.
Type coding, e.g.
DG 33–600 (setting for increasing pressure)
DG 33–600 F (setting for decreasing pressure)

Pressure increases
Pressure drops

The tables only contain approximate reference values. Use a pressure gauge to establish a more accurate switching point!

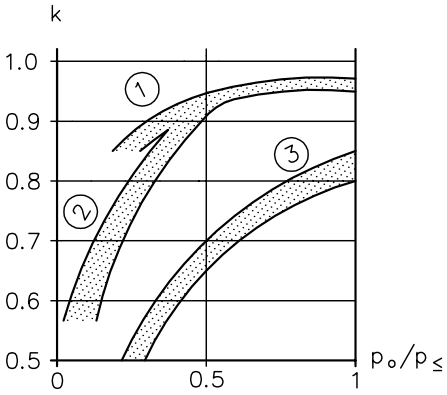


p pressure setting (bar); s adjustment dimension (mm)

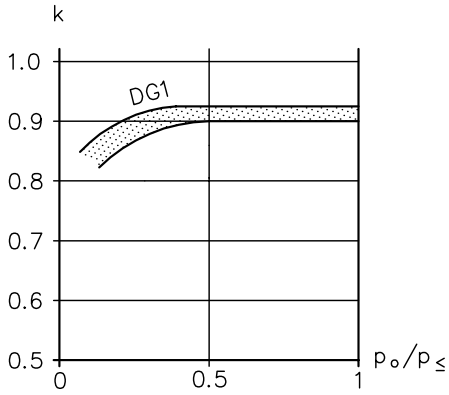
DG 1 R..	Using a setting knob on the pressure selection scale (there may be slight deviations between the scale value and the pressure value measured with the pressure gauge).
DG 3..	Using an adjusting screw, after loosening the counter screw (spanner width across flats 10)
DG 3..R	By hand with a wing bolt after loosening the wing nut
DG 3..V	With turn knob
DG 3..H	Using a turn knob after releasing (spanner)

Switching pressures

Switching differential between the upper switching point p_o as the pressure increases and the lower switching point as the pressure drops.
The calculated pressure value $p_u = k \cdot p_o$ can only be considered an approximate reference value.



$p_o/p \leq$ set response pressure; k factor



$p_o/p \leq$ set response pressure; k factor

1 DG 33, DG 34
2 DG 35, DG 364, DG 365
3 DG 36

p_o = Upper switching point at which the device jumps from its idle position to its switching position during a pressure increase (response pressure, adjustment range p_{min} to p_{max} "Available versions, main data", Table 1)

p_u = Lower switching point at which the device reverts from its switching position back to its idle position during a pressure drop

p_{max} = Max. pressure setting in accordance with "Available versions, main data", Table 1

6 Other information

6.1 Accessories, spare parts and separate components

Seal kit for type DG 3

Sealing with O-ring. Available as a complete seal kit in the event of a replacement:

DS 5440-33 (DG 33)
DS 5440-34 (DG 34)
DS 5440-35 (DG 35)
DS 5440-36 (DG 36, DG 365)

Line connectors

Coding	Description	Order coding
G..	Line connector	MSD 3-309
L..	Line connector with LED	SVS 296100
L5K - DG	Line connector with LED, 5 m cable	L5K - DG
L10K - DG	Line connector with LED, 10 m cable	L10K - DG
S	Angled plug for bayonet PA6 Straight plug for bayonet PA6	7846 010 A 7846 010 B

Coding	Description
K	Kostel, 03888005
S	Schlemmer, cone with bayonet 10 SL
AMP	AMP, AMP Junior 2-pole code number 1

Further information

Additional versions

- Electronic pressure switch type DG 5: D 5440 E/1
- Electronic pressure switch type DG 6: D 5440 F
- Electronic pressure transducer type DT 2: D 5440 T/1
- Electronic pressure transducer type DT 11: D 5440 T/2

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