



# ***Instruction Manual***

## ***DP01***

### ***Paddle-Type Flow Switch***



PKP Prozessmesstechnik GmbH  
Borsigstraße 24  
D-65205 Wiesbaden-Nordenstadt  
Tel.: ++49-(0)6122-7055-0  
Fax: ++49-(0)6122-7055-50  
Email: [info@pkp.de](mailto:info@pkp.de)

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## **Safety Information**

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### **General Instructions**

To ensure safe operation, the device should only be operated according to the specifications in the instruction manual. The requisite Health & Safety regulations for a given application must also be observed. This statement also applies to the use of accessories. Every person who is commissioned with the initiation or operation of this device must have read and understood the operating instructions and in particular the safety instructions!

The liability of the manufacturer expires in the event of damage due to improper use, non-observance of this operating manual, use of insufficiently qualified personnel and unauthorized modification of the device.

### **Proper Usage**

The paddle-type flow switch of the DP01 series are used for flow monitoring of low-viscosity liquids. All other usage is regarded as being improper and outside the scope of the device.

In particular, applications in which shock loads occur (for example, pulsed operation) should be discussed and checked in advance with our technical staff.

The series DP01 flow switch devices should not be deployed as the sole agents to prevent dangerous conditions occurring in plant or machinery. Machinery and plant need to be designed in such a manner that faulty conditions and malfunctions do not arise that could pose a safety risk for operators.

### **Dangerous substances**

For dangerous media such as e.g. Oxygen, Acetylene, flammable or toxic substances as well as refrigeration systems, compressors, etc. must comply with the relevant regulations beyond the general rules.

## Qualified Personnel

The DP01 devices may only be installed by trained, qualified personnel who are able to mount the devices correctly. Qualified personnel are persons, who are familiar with assembling, installation, placing in service and operating these devices and who are suitably trained and qualified.

## Inward Monitoring

Please check directly after delivery the device for any transport damages and deficiencies. Additional with reference to the accompanying delivery note the number of parts must be checked.

Claims for replacement or goods which relate to transport damage can only be considered valid if the delivery company is notified without delay.

## General Installation Instructions

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1. Install the flow control switches, if possible, in horizontal pipes.
2. The switches must be installed vertically, deviation max. 45° (Fig. 1).
3. The brass and stainless steel union nut should be tightened to a maximum torque of 30 Nm.
4. The knurled plastic union nut (PA 6.6) should be tightened by hand or with a suitable tool. Max. tightening torque 8 Nm.
5. There is an arrow on the top of the switch head which must run parallel to the pipe axis and point in the direction of flow (Fig. 2)
6. If necessary, the piping system in which the control switch is to be installed must be cleaned before installing the switch and freed of magnetic particles such as welding residues.
7. The calming distance before and after the control switch should be at least 5 x DN.

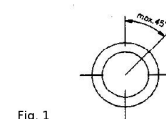


Fig. 1

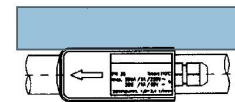


Fig. 2

## Flow Switch for Direct Installation (Types DP01.4, DP01.5 and DP01.6)

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1. Types DP01.4 and DP01.5 are suitable for installation in sockets with female G ½ thread.
2. Type DP01.6 is supplied with brass soldering nipple or 1.4571 welding nipple including O-ring seal.
3. Type DP01.6 may only be installed vertically in horizontal pipes.
4. The control switch must be installed so that the paddle does not touch the pipe wall.
5. It is essential to observe the installation height dimension.

## **Flow Switch with Pipe Section (Types DP01.1, DP01.2 and DP01.3)**

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1. The pipe section of the flow switch is installed in existing pipes like a valve.
2. The switching point adjustment range is indicated on the nameplate.
3. The sealing of the brass or stainless steel pipe sections should be achieved with threaded seals (Teflon tape, surface coating, etc.) or with suitable sealing rings which must seal at the end face of the pipe.
4. For flow control switches, which are optionally equipped with a copper pipe section, installation in the pipeline is carried out by means of a soldered connection. During soldering, the upper part of the flow switch with the O-ring must be removed to avoid overheating.

### **Type of Contact**

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The switching unit of the control switch allows two different contact types:

1. Working contact (N/O) – red arrow on the switching unit
2. Break contact (N/C) – white arrow on the switching unit

The table below explains the two types of contact:

<b>Type of contact</b>	<b>Flow</b>	<b>Contact function</b>
Working contact (red arrow)	rising	N/O
	falling	N/C
Break contact (white arrow)	rising	N/C
	falling	N/O

Unless otherwise ordered by the customer, the switching unit is factory set as a N/O, i.e. the reed contact opens when the value falls below the set switching point.

## Adjusting the Switching Unit (Figs. 14 to 16)

- To adjust the switching unit, the cover of the switch head must be opened (Fig. 14).

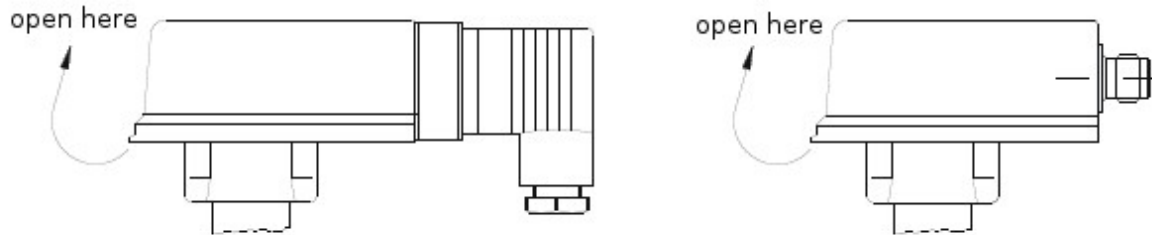


Fig. 14

- Then loosen the locking screw (hexagon socket SW 2.5 for brass and stainless steel version or cross slot for plastic version) and move the switching unit so far that the red arrow at the input of the guide of the switching unit is visible at the desired normally open contact (Fig. 15) or the white arrow at the input of the normally closed contact (Fig. 16).
- You can fine tune the switching point to the length of the arrow: moving to the end of the arrow means that the switching point is at a higher level. Move to arrowhead means: Switching point is at lower level.
- Now carefully tighten the locking screw again.
- After setting the switching point, we recommend securing the locking screw with lacquer or screw locking lacquer.
- Close the cover again until it clicks into place.

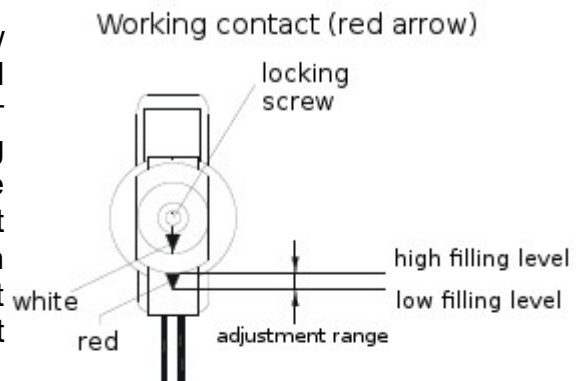


Fig. 15

Break contact (white arrow)

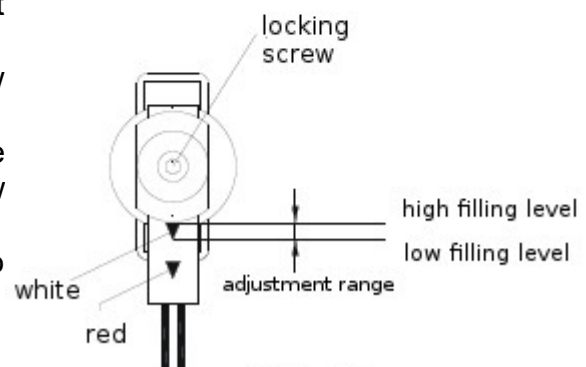


Fig. 16

# Electrical Connection

## Angled plug connector DIN 43650, type A / ISO 4400

**Attention:** Danger to life due to electrical voltage!

Disconnect the electrical system from the power supply before connecting the strands of the connecting cable.

- Loosen the central screw (pos. 6) M3x35 and remove the cable socket (pos. 2) from the appliance plug (pos. 1) (Fig. 5). Remove the central screw (pos. 6) from the connector (pos. 2).
- Open the inner part (pos. 8) of the connector (pos. 2) with a screwdriver or a similar tool (fig. 6).
- Loosen the cable gland (pos. 5) M16x1,5 (Fig. 7).

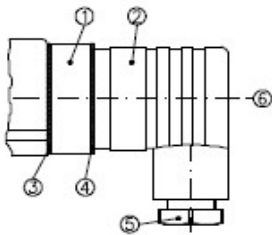


Fig. 5

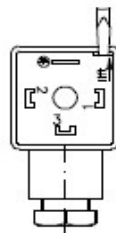


Fig. 6

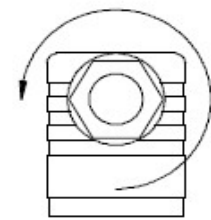


Fig. 7

- Insert the connecting cable through the screw connection (pos. 5), the pressure ring (pos. 10) and the rubber insert (pos. 9) into the cable socket (Fig. 8).
- Connect the cable as shown in the connection diagram (Fig. 11).
- Press the inner part (pos. 8) into the cable socket until it clicks into place (pos. 2).
- Insert the central screw (Pos. 6) into the cable socket (pos. 2) and tighten the cable gland (pos. 5) (Fig. 9).
- Plug the cable socket (pos. 2) into the appliance plug (pos. 3) and tighten the central screw (pos. 6) (Fig. 10).

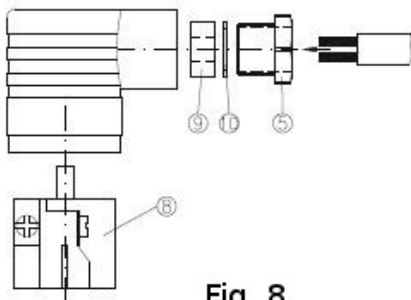


Fig. 8

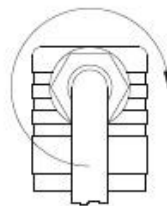


Fig. 9

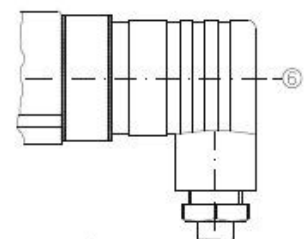


Fig. 10

- To guarantee protection class IP 65 according to EN 60529, the connection cable used must have a sheath diameter of 4,5 to 10 mm.
- You must also ensure that all seals on the device plug (pos. 3, 4 and 9) are inserted correctly.

### **Reed contact**

Connected to PIN 1 und PIN 2

## Technical Data

Materials of the wetted parts:

Component designation	DP01.1.1 DP01.3.1 DP01.4.1 DP01.5.1 DP01.6.1	DP01.1.2 DP01.4.2 DP01.5.2 DP01.6.2	DP01.2.3
Upper part	brass 2.0401	st. steel 1.4571	PPO (Noryl GFN3)
Screw-in spigot	brass 2.0401	st. steel 1.4571	st. steel 1.4571
Rocker rod system	brass 2.0401	st. steel 1.4571	PPO (Noryl GFN3)
Axle pin	st. steel 1.4571	st. steel 1.4571	st. steel 1.4571
Sockets	PVDF	PVDF	PPO (Noryl GFN3)
Magnet	hard ferrite	hard ferrite	hard ferrite
O-Ring	NBR	NBR	NBR
V-Seal	-----	-----	EPDM

All other relevant technical data (e.g. type designation, pressure rating, max. temperature, electrical connection values and switching point adjustment ranges) can be found in the technical appendix.

# ***Installation Instructions for Paddle-Type Flow Switch Series DP01.3..***

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Monitoring and measuring devices work predominantly on an electromechanical basis. For this reason, the general installation and operating instructions refer to the mechanical and electrical operating data of the individual devices or device groups.

## ***1. General***

Before installation, check whether the material of the paddle flow switch is suitable for the medium to be measured!

The paddle-type flow switch of the series DP01.3.. are special devices with integrated microswitch 250 V / 5 A, AC (mac.).

The version is available with male or female thread.

The device emits a signal when the value falls below the set switching point.

The terminal assignment in the plug is shown on the nameplate. The electrical cable can be connected to the screw terminals without soldering.

## ***2. Installation of the pipeline***

The device is installed in the pipeline with Teflon tape to seal it. During installation, make sure that the flow direction is correct, indicated by the arrow on the switch head. The pipeline must be cleaned beforehand from coarse contamination.

The calming distance before and after the device must be at least 5xD.

If the switching point is not set, the device must be set to the desired switch-off point by shifting the microswitch.

**Attention:** When installing the device, make sure that the paddle system is neither damaged nor twisted.

## ***3. Adjustment of the switching point***

There is a cover on the switch head which is pushed upwards. The switching point can be adjusted with the screw underneath.

The switching point range is indicated on the nameplate.

## ***4. Functional description***

The device is equipped with a changeover contact. Terminals 1 and 2 are closed at current. Switchover from 2 to 3 takes place when the switching point is undercut.



# DP01

## Paddle-Type Flow Switch

- for liquids
- long-term stable switching points by counter magnet technology
- with or without T-fitting for piping from 1/4" to 6"
- design in brass, stainless steel and with PVC T-fitting
- upper part detachably connected with T-piece, thus cleaning and exchange fast possible
- switching range: 2,1...83 l/min water
- available with reed contact or microswitch
- instant response
- switching function depends only on flow, not on pressure and temperature of fluid



### Description:

The model DP01 flow switches operate according to the paddle principle. The flowing liquid pushes against the surface area of a paddle mounted at the end of a pivoting arm. The dynamic pressure against the plate deflects the arm. This motion causes a permanent magnet attached on the other end of the arm to switch an adjustable reed contact located outside the liquid being monitored. By moving the reed contact, different switching points can be set.

Two repulsive magnets generate the restoring force. This results in better long-term stability and higher tolerance to pressure peaks.

### Typical application:

The DP01 paddle flow switch is suitable for monitoring the switching point of low-viscosity liquids.

Typical fields of application:

- Cooling systems
- Heating systems
- Welding systems
- Laser cooling systems

The paddle principle makes the device relative dirt resistant.

## Models and switching ranges

(all switching ranges refer to water, 20 °C,  
horizontal pipeline, tolerance +/- 15 %)

### DP01.1.: with brass- or stainless steel T-fitting and reed contact

Nominal size DN	Connection	Switch on at [l/min] H <sub>2</sub> O	Switch off at [l/min] H <sub>2</sub> O	Max. flow rate [l/min] H <sub>2</sub> O
8	G 1/4	2,1...2,7	1,8...2,4	45
10	G 3/8	2,5...3,2	2,2...2,9	60
15	G 1/2	3,4...4,2	3,0...3,8	67
20	G 3/4	7,0...9,1	6,4...8,2	120
25	G 1	13,5...17	12...15,5	195
32	G 1 1/4	15,5...20,5	14,5...19	240
40	G 1 1/2	26,5...34,5	15,5...32,5	400
50	G 2	39,5...51,0	39...50	400

### DP01.2.: with PVC- T-fitting and reed contact

Nominal size DN	Connection	Switch on at [l/min] H <sub>2</sub> O	Switch off at [l/min] H <sub>2</sub> O	Max. flow rate [l/min] H <sub>2</sub> O
15	DN 15	5,1...6,9	4,9...6,5	50
20	DN 20	9,4...12,3	9,1...11,9	100
25	DN 25	10,7...15,2	10,4...14,8	100
32	DN 32	17,0...22,6	16,8...22,5	150
40	DN 40	21,8...30,1	21,6...29,9	200
50	DN 50	29,0...40,0	28,6...39,9	260

### DP01.3.: with brass-T-fitting and microswitch

Nominal size DN	Connection	Switch off at [l/min] H <sub>2</sub> O decreasing	Max. flow rate [m <sup>3</sup> /h] H <sub>2</sub> O
10	G 3/8 female	4,0...5,0	10
15	G 1/2 female	5,0...6,0	20
15	G 1/2 male	4,0...5,0	10
20	G 3/4 female	8,0...10,0	40
25	G 1 female	17,0...20,0	60
32	G 1 1/4 female	24,0...28,0	80
40	G 1 1/2 female	43,0...50,0	100
50	G 2 female	69,0...83,0	150

### DP01.4.: without T-fitting, screw-in thread 1/2", installation length 51 mm, reed contact

Can be used in nominal size	Connection screw-in spigots*	Switch on at [m <sup>3</sup> /h] H <sub>2</sub> O	Switch off at [m <sup>3</sup> /h] H <sub>2</sub> O	Max. flow rate [m <sup>3</sup> /h] H <sub>2</sub> O
DN 50	G 1/2 male	1,9...2,7	1,8...2,6	30
DN 80	G 1/2 male	5,0...8,0	4,9...7,9	80
DN 100	G 1/2 male	8,3...12,5	8,2...12,4	150
DN 150	G 1/2 male	17,5...25,0	17,4...24,9	200

\*Installation in welding socket acc. to EN 10241, 15 mm long

## Order Code:

Order number: **DP01.** **1.** **2.** **25.** **0.** **0.**

Paddle type flow switch

### Version:

- 1 = with T-fitting, brass or st. steel (reed contact)
- 2 = with PVC-T-fitting, glue fittin (reed contact)
- 3 = with brass-T-fitting (micro switch)
- 4 = with 1/2" screw-in thread, (reed contact) brass or st. steel, installation length 51 mm

### Material:

- 1 = brass (not DP01.2.)
- 2 = stainless steel (not DP01.2., DP01.3.)
- 3 = PVC (DP01.2. only)

### Nominal size:

#### DP01.1. only

08 = 1/4"

#### DP01.1. and DP01.3.

10 = 3/8"

#### DP01.3. only

14 = 1/2" male thread

#### DP01.1., DP01.2., DP01.3.

15 = 1/2"

20 = 3/4"

25 = 1"

32 = 1 1/4"

40 = 1 1/2"

50 = 2"

#### DP01.4.

00 = all nominal sizes from 2" to 6" acc. to table

### Preset switching point:

0 = without

1 = factory set switching point (increasing)

2 = factory set switching point (decreasing)

### Options:

0 = without

1 = please specify in plain text

## Technical Data:

**Max. pressure:** brass and st. st.: PN 25  
PVC: PN 10 at 0...20 °C  
PN 2,5 at 0...60 °C

### Temperature ranges:

**Media:** brass and st. st.: -20...+110 °C  
PVC 60 °C

**Environment:** brass and st. st.: -25...+80 °C  
-20...+70 °C at microsw.  
PVC: 0...60 °C

**Device plug:** device plug DIN EN 175301-803-A  
incl. connector

**Reed contact:** contact function: N/C / N/O  
switching capacity: 230 VAC / 48 VDC,  
1 A, 20 W / 26 VA

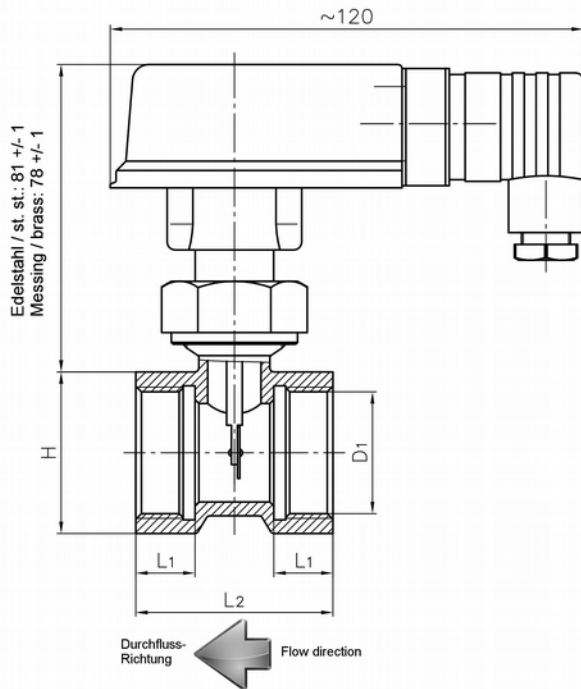
**Microswitch:** contact function: changeover contact  
switching capacity: 250 VA, 5 A, 1250 VA  
switching hysteresis: 10...30 %

**Protection cl.:** IP 65  
class II, EN 60730-1

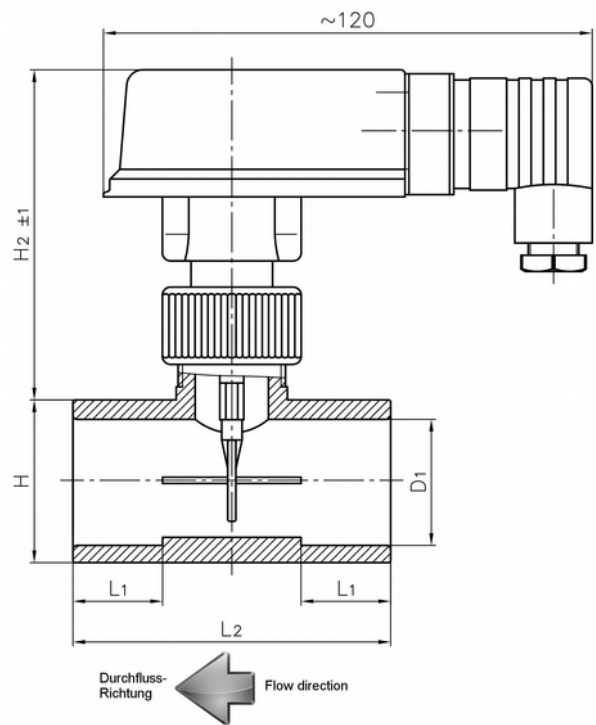


## Dimensions and Materials:

DP01.1.: with brass- or stainless steel T-fitting and reed contact



DP01.2.: with PVC- T-fitting and reed contact



Connection	brass version			st. steel version		
	L <sub>1</sub>	L <sub>2</sub>	H	L <sub>1</sub>	L <sub>2</sub>	H
G 1/4	11	50	27	11	50	27
G 3/8	11	50	27	11	50	27
G 1/2	11	50	27	11	50	27
G 3/4	15	50	32	15	50	32
G 1	15	50	41	15	50	41
G 1 1/4	15	50	48	15	50	46
G 1 1/2	15	50	55	15	50	55
G 2	22	64	70	15	50	70

Nominal size	L <sub>1</sub>	L <sub>2</sub>	H <sub>1</sub>	H <sub>2</sub>	D1
DN 15	16	54	28	84	20
DN 20	19	66	34	86	25
DN 25	22	78	40	86	32
DN 32	26	98	50	104	40
DN 40	31	118	62	103	50
DN 50	38	144	77	101	63

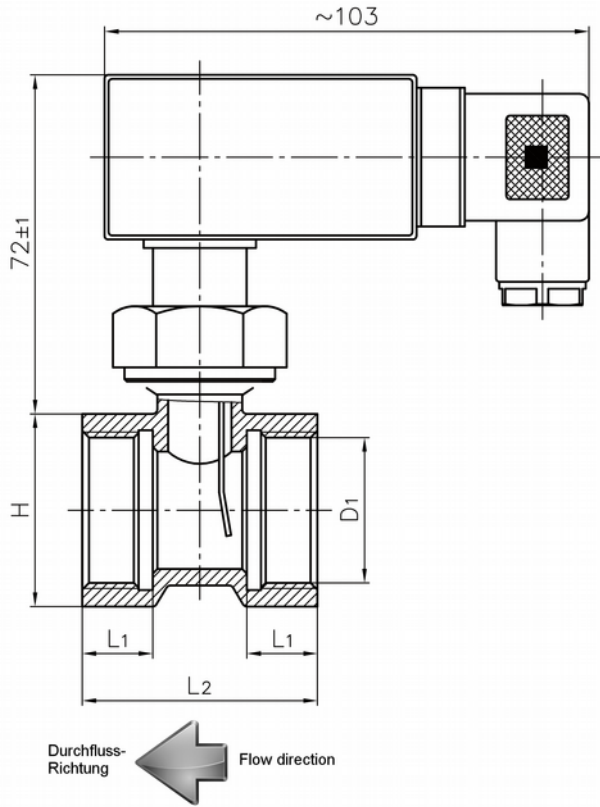
Material:

	DP01.1.1.	DP01.1.2.
Body, paddle	brass	st. steel 1.4571
Pipe section	brass	st. steel 1.4571
Socket	PPE Noryl GFN 3	PVDF
Rivet	brass	st. steel
Pivot	st. steel 1.4571	st. steel 1.4571
Magnet	hard ferrite	hard ferrite
Gasket	NBR	NBR

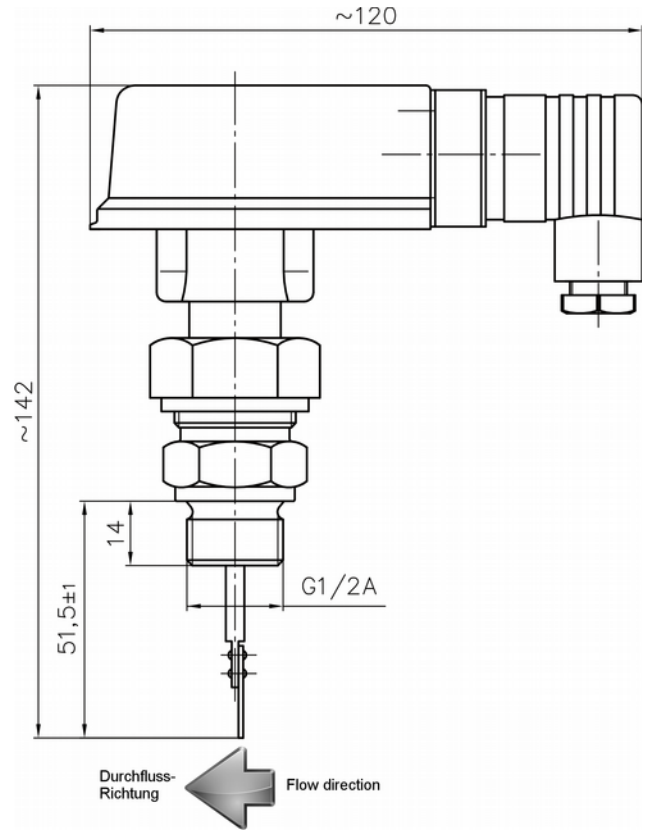
Material:

	DP01.2.2.
Body, paddle	PPE Noryl GFN 3
Pipe section	PVC
Magnet	hard ferrite
gasket	EPDM

**DP01.3.: with brass-T-fitting and microswitch**



**DP01.4.: without T-fitting, screw-in thread 1/2", installation length 51 mm, reed contact**



Connection	L <sub>1</sub>	L <sub>2</sub>	H
<b>G 3/8 female</b>	11	50	27
<b>G 1/2 female</b>	11	50	27
<b>G 1/2 male</b>	10	60	
<b>G 3/4 female</b>	15	50	32
<b>G 1 female</b>	15	50	41
<b>G 1 1/4 female</b>	15	50	48
<b>G 1 1/2 female</b>	15	50	55
<b>G 2 female</b>	22	64	70

**Material:**

	DP01.4.1.	DP01.4.2.
<b>Body, paddle</b>	brass	st. steel 1.4571
<b>Process connection</b>	brass	st. steel 1.4571
<b>Socket</b>	PPO Noryl GFN 3	PVDF
<b>Rivet</b>	brass	st. steel 1.4303
<b>Pivot</b>	st. steel 1.4571	st. steel 1.4571
<b>Magnet</b>	hard ferrite	hard ferrite
<b>Gasket</b>	NBR	NBR

**Material:**

	DP01.3.
<b>Body</b>	brass, nickel-plated
<b>Pipe section</b>	brass
<b>Paddle</b>	stainless steel 1.4310, 1.4301
<b>Magnet</b>	hard ferrite
<b>Gasket</b>	NBR