

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

1	General	1
2	Safety Information	2
3	Delivery, Completeness, Storage	5
4	Installation, Operation, Maintenance	6
5	Additional Equipment	15

1 General

1.1 Manufacturer

Albert Handtmann Armaturenfabrik GmbH & Co. KG
Arthur-Handtmann-Str. 11; D-88400 Biberach
Tel.: +49(0) 73 51/3 42-0; Fax: +49(0) 73 51/ 3 42-44 80
E-Mail: sales.fittings@handtmann.de



1.2 Proper application

Butterfly valves are used in the food, beverage, pharmaceutical and chemical industries. They are suitable for the shut-off and distribution of liquids in pipe system. The actuation is carried out either manually by hand or pneumatically via a drive.

During installation, operation and maintenance please pay attention to the generally accepted safety regulations as well as to the operating instructions.

For use and operation the instructions in the operating instructions must be observed.

1.3 Misuse

Misuse is:

- Application in different operating conditions as intended for the specific type.
- Installation, operation and maintenance by unqualified staff.
- Any unauthorized modification of the valve or a valve component.
- On-observance of the operating instructions.

Any misuse will automatically lead to a loss of right to claim under guarantee as well as any liability.

1.4 Duties of operator

The operator must ensure in particular that

- the fitting/component/assembly is operated in accordance with its intended purpose and in correct functional condition.
- the legal requirements for operation and maintenance are observed.
- only sufficiently qualified authorised personnel performs maintenance on the fitting/component/assembly.

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

- the personnel responsible for operation and maintenance is familiar with and observes the operating and assembly instructions and particularly the safety instructions contained in them.
- the attached safety and warning signs are not removed and remain legible.

2 Safety Information

Notice and Safety

The following safety advice is an addition to existing national regulations and laws for accident prevention. Existing regulations and laws for accident prevention always have to be adhered to. Pay attention to the specific regulations and laws in your country.

The safety advice does not take into account:

- Coincidences and events that may occur during assembly, operation and maintenance.
- Local safety regulations in responsibility of the operator.

Basic safety advice

Requirements for a proper function of the valve/component:

- Proper transportation and storage
- Installation and setting into operation by authorized staff
- Operation according to these operating instructions – proper application
- Proper and regular maintenance



WARNING

Warning – general dangers!

To avoid danger for health and life the following safety instructions strictly have to be obeyed.

- Assembly and setting into operation only by qualified staff.
- Instruction and supervision by the operator.
- Keeping of technical and electrical data as specified in the operating instructions.
- Guarantee the electric safety of external devices.
- Keep legal regulations.

Non-observance may lead to the following dangers:

- Malfunction of the valve/component respectively of the plant.
- Danger for persons due to electrical, mechanical and chemical affects.
- Danger for the environment due to possible leakage of dangerous media.

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

2.1 Hazards and Safety Instructions



DANGER

Danger – endangerment caused by product-specific and process-specific conditions!

This symbol identifies an extremely dangerous situation that may result in severe bodily injury or even death if the relevant safety instructions are disregarded.

Danger to service personnel	
Explanations	Measures
<p>Crushing hazard to fingers, hands and feet</p> <p>Crushing injuries can arise during transport, assembly or maintenance work.</p>	<ul style="list-style-type: none"> Always wear safety shoes and protective gloves.
<p>The safety valve can weigh several kilograms.</p>	<ul style="list-style-type: none"> Secure the valve against slipping and falling during assembly, disassembly and in maintenance work.
<p>Unintentional opening and closing of the valve must be prevented during maintenance work.</p> <p>Do not place your hands in the valve housing or the seat area of the valve disk.</p>	<ul style="list-style-type: none"> Disconnect the electrical connection to the valve. Disconnect the pneumatic connection to the valve. (disconnect hoses)
<p>Shock and impact danger</p> <p>When carrying out maintenance work the piping system should be made pressure-free or drained beforehand in the area concerned.</p> <p>The piping area awaiting maintenance should be sealed off from the other piping system.</p>	<ul style="list-style-type: none"> Check the piping pressure. Check which medium was in the piping. If necessary, rinse the piping again beforehand with water.
<p>Danger of burns, scalds and chemical burns</p> <p>If the pressure system is subjected to increased media temperatures, the surface temperature of the valve housing can also reach this value.</p>	<ul style="list-style-type: none"> Attach warning signs. Rinse the piping system with cold water before carrying out maintenance work.
<p>If the liquid medium is drained from the system, this can lead to burns, scalding or causticization for the operating and service personnel.</p>	<ul style="list-style-type: none"> Install the collecting tub for controlled depressurized draining. Make certain that no CIP program can be activated during the maintenance work.

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

Malfunction due to incorrect handling	
Explanations	Measures
The valve must be switched off in the case of noticeable malfunctions.	<ul style="list-style-type: none"> • Faults must be eliminated immediately.
The valve may not work any longer or malfunction considerably if faulty or non-specified parts are installed on the valve or used as replacement parts.	<ul style="list-style-type: none"> • Only use parts approved by the manufacturer.
If the valve is not checked or serviced at regular intervals, it may not work properly any longer or malfunction considerably.	<ul style="list-style-type: none"> • Check the valve within the scope of operational maintenance cycles. • Inspection and maintenance work should only be carried out by qualified staff.
Malfunction through improper use	
The range of application of the valve is intended for specific operating states (pressure, temperature, media).	<ul style="list-style-type: none"> • Ensure proper use.



DANGER



Danger - hazards caused by electric current!

The electrical supply may be disrupted during assembly work.

- Electrical components must be inspected by qualified electricians on a regular basis.



WARNING



Warning – general dangers!

If the pressure system is subjected to increased fluid temperatures, the surface temperature of the subassembly can also reach this value.

- Attach warning signs (W026) for hot surfaces.



CAUTION

Caution – damage to components!

Installation of faulty or non-specified parts or using the same as replacement parts may disable or disrupt functionality considerably.

- Only use parts approved by the manufacturer.

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

ATTENTION



Dazzling effect and formation of shadows on the system should be avoided.

- We recommend a lighting intensity in accordance with DIN EN 12464-1 of at least 500 lux.

ATTENTION



A limited permit for working with open flames/welding must be obtained before beginning welding tasks.

3 Delivery, Completeness, Storage

- Check the data of the delivery note for factual correctness and the material for completeness. We regret that money cannot be refunded after purchase.
- Always check the material for transport damages. Possible damages have to be informed immediately.
- Store the material in a dry place and if possible in its original packaging.

NOTICE

**Note**

Dispose of packaging in an environmentally sound way. The packaging can consist of the following materials:

Wood / polyethylene film (PE film) / paper or cardboard / plastic / strip iron.

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

4 Installation, Operation, Maintenance

4.1 Valve types

This operating manual applies to the following single butterfly valves or multi-way combinations.

Butterfly valve, manually activated (DN)			
Type group	Article No.	Connection	DN
440xx	44001	G/G	25-125
	44002	KN/G	25-125
	44003	S/S	25-125
	44004	S/G	25-150
	44006	KN/G	25-150
	44009	S/S	25-125
	44012	S/G	25-150
447xx	44701	ZSV	25-150
	44702	ZSV	25-200

G = thread
 KN = taper and grooved nut
 S = weld end
 ZSV = between flanges

Butterfly valve, pneumatically activated (DN)			
Type group	Article No.	Connection	DN
444xx	44422 (L/L)	KN/G	25-125
	44424 (L/L)	S/G	25-125
446xx	44622 (L/F)	KN/G	25-125
	44624 (L/F)	S/G	25-125
448xx	44821 (L/F)	ZSV	25-200
	44831 (L/L)	ZSV	25-200
	44841 (L/F-R)	ZSV	25-200
	44851 (L/L-R)	ZSV	25-200

L/L = air opening / air closing
 L/F = air opening / spring closing
 R = rules

Butterfly valve, manually activated (OD)			
Type group	Article No.	Connection	OD
440xx	44063	S/S	1" – 4"
447xx	44761	ZSV	1" – 4"
	44762	ZSV	1" – 4"

S = weld end
 ZSV = between flanges

Butterfly valve, pneumatically activated (OD)			
Type group	Article No.	Connection	OD
448xx	44861 (L/F)	ZSV	1" – 4"
	44869 (L/F-R)	ZSV	1" – 4"

L/F = air opening / spring closing
 R = rules

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

Butterfly valve multi-way combination, manually activated					
Type group	Article No.	Variant	Connection	DN	
441xx	44100	T-piece centred with DK	S/S G	25-150	G = thread KN = taper and grooved nut S = weld end ZSV = between flanges
	44113	T-piece left and centred with DK	S ZSV G	25-125	
	44115	T-piece right and centred with DK	S ZSV G	25-125	
	44134	T piece/bend, on one side with two DK	KN G	25-100	

Butterfly valve multi-way combination, pneumatically activated					
Type group	Article No.	Variant	Connection	DN	
442xx	44220 (L/F)	T-piece centred with DK	S/S ZSV	25-125	L/F = air opening / spring closing
	44221 (L/F)	T-piece centred with DK	S/S G	25-125	
	44222 (L/F)	T-piece left and centred with DK	S ZSV ZSV	25-100	

4.2 Technical description

Butterfly valves are used to shut off and distribute liquids in piping systems.

Actuation is either manual or by a pneumatic actuator.

The valve status that is uniquely defined for the pneumatically activated butterfly valve is described by two possible end settings. Depending on the process request, one of the end settings is selected as the basic position. A combined OPEN/CLOSED end setting is selected in the multi-way combination with 2 integrated butterfly valves.

Valve closed Valve disc is turned into the profile sealing ring and is thus perpendicular to the flow in the piping

Valve open Valve disc is turned out of the profile sealing ring and is thus in the longitudinal direction to the flow in the piping

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

Basic position > CLOSED <

- The valve is opened while the actuator is being pressurized with compressed air or during manual activation.
- The valve disc turns out of the basic position or the seal and moves in the direction of the end position.
- The pipeline is released and liquid flows around the valve disc.
- After the valve disc reaches the end position it is in longitudinal direction to the piping.
- If the actuator is depressurized or while it is being closed manually the valve disc moves back to the basic position.
- When it is turned into the seal the piping is shut off.
- After the valve disc reaches the basic position it is crosswise to the piping.

Basic position > OPEN <

- The valve is closed while the actuator is being pressurized with compressed air or during manual activation.
- The valve disc turns out of the basic position in the direction of the final position.
- When the valve disc is turned into the seal the piping is shut off.
- After the valve disc reaches the end position it is crosswise to the piping.
- If the actuator is depressurized or while it is being opened manually the valve disc moves back to the basic position again.
- The pipeline is released and liquid flows around the valve disc.
- After the valve disc reaches the basic position it is in longitudinal direction to the piping.

Basic position > CLOSED / OPEN < with multi-way combinations

- When the actuator valve is being pressurized with compressed air it moves to the corresponding position. The valve connected via a rod moves to the opposite position.
- One of the valve discs is turned out of the seal and the piping is released. The other valve disc is turned into the seal and the piping is shut off.
- When pressure is released, the valve discs move back to the opposite basic positions.
- The piping that was previously opened is shut off and the piping that was previously shut off is released.

Butterfly valve position on branches with CIP

- The axes of the valve discs must be perpendicular to the pipe axes.
- Butterfly valve in product branches should be completely opened for CIP and the blind nuts should be screwed on.
- The valve disc protrudes partially into the pipe and causes turbulence. This ensures problem-free cleaning on the front part of the valve disc as well.

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

4.3 Performance data

Product range

Materials	Stainless steel 1.4301 (304), 1.4404 (304L), 1.4404 (316L)
Seals	EPDM, FDA proof
Interior surface	≤ 0.8 µm

Other parts

Materials	Stainless steel 1.4301
Seals	EPDM
Surface	Polished, bright metal

Production

Operating pressure	0 - 10 bar / 0 – 145 psi
Temperature	0 – 95 °C / 32°F – 203°F

Cleaning

CIP operating pressure	2 - 5 bar / 30 – 80 psi
Temperature	Hot water max. 95 °C / 203°F Steam 140 °C / 284°F Hot caustic solution max. 75 °C / 158°F

Electrical data

Various control modules are available for integrating the butterfly valve into an automated operating process.

Proximity switches	1 or 2 connections
Electr. position display	2 connections
Combi switchbox	Pilot valve with 2x proximity switching
Position control	An intelligent position controller can be attached to turn the pneumatic butterfly valve into a control element. Both liquids and gas flows can be controlled with this variant.

Pneumatic data

Compressed air supply	6 – 8 bar, non-oiled compressed air Standard actuator L/F (air opening/spring closing)
-----------------------	---

ATTENTION



Note

The indicated values are standard values and refer to EPDM as sealing material.

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

4.4 Assembly instructions



DANGER

Danger – risk of injuries to persons!

- Check the current system status, such as pressure, temperature, medium and operating condition.
- Clean, empty/depressurize the piping system beforehand.
- Disconnect pneumatic and electric connections from the actuator.
- Do not reach into the switching area of the valve or into the piping (danger of crushing).
- Always follow the instructions for handling and safety during assembly and maintenance work.

- Always remove profile packing.
- Saw off pipe ends and deburr.
- Weld on butterfly valve flanges while they are bolted together with no gap or tension.
- TIG welding process with welding gas.
- Mount butterfly valve with seal, mount drive if necessary.
- Loosen bolts on side flanges.
- Remove the actuator unit with retaining bracket if fitted.
- Undo the hexagon nuts completely, open the side flanges and remove the valve disc.
- Position the flap crosswise and first remove the profile packing by the short bearing journal.
- Lightly grease the holes in the new profile packing.
The grease must be compatible for the material of the profile packing. The greases must be approved for use in food processing.
(for EPDM z.B. TURMSILON LMI 5000)
- Place a suitable protective assembly cap over the bearing journal rectangle.
- Pull the profile packing first by the long bearing journal of the flap with the protective cap attached to it.
The protective cap prevents the profile packing from being damaged.
- Position the flap crosswise, press the seal flat and push using the short bearing journal.
- Check the valve for external and internal damages.
- Insert the flap again with the seal in the "CLOSED" position
- Tighten the hexagon nut and stud bolt for centring, move the flap to the "ON" position, then tighten the hexagon nuts and stud bolts.
- Mount the position display and activation. With crank or pneumatic actuator, note the position of the valve disc or rectangle.
(use screw locking fluid Loctite 221).
- After carrying out any work the function must be checked mechanically or pneumatically.

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

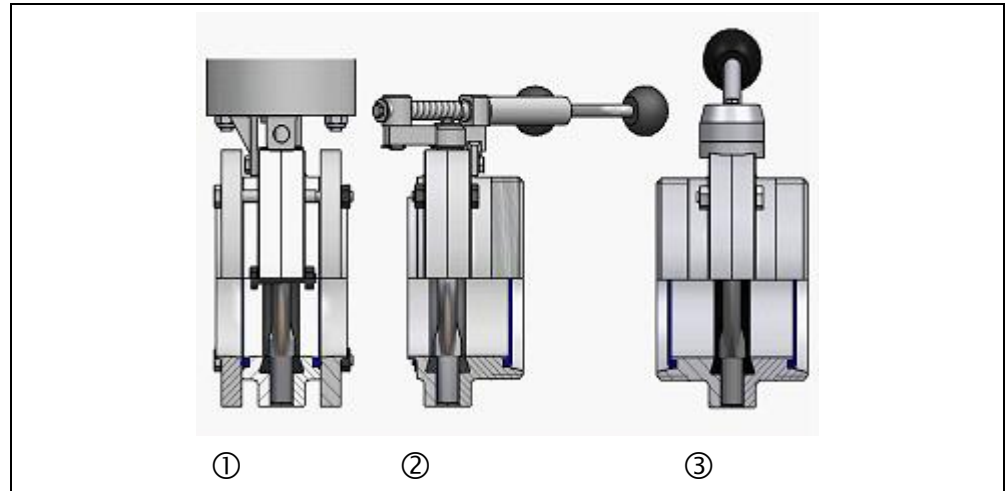


Fig. 1:

- 1 Butterfly valve with actuator
- 2 Butterfly valve with hand crank
- 3 Butterfly valve with handle

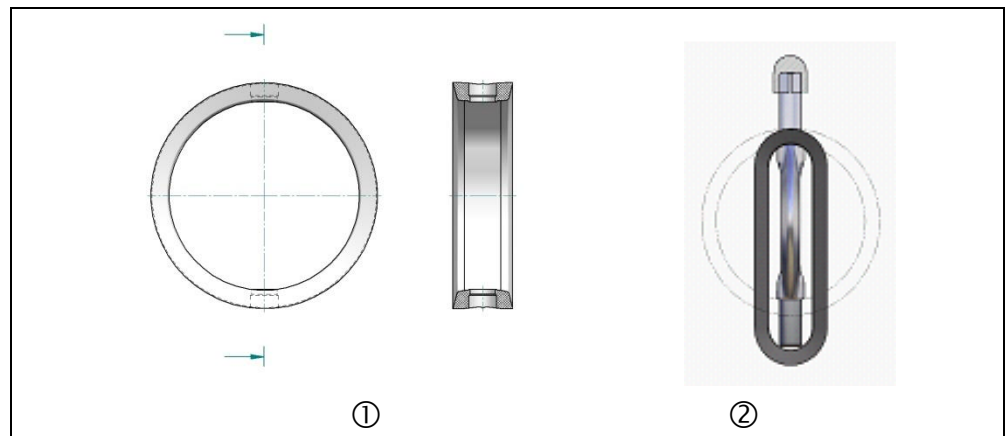


Fig. 2:

- 1 Cross-section of profile packing
- 2 Mounting of profile packing

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

4.4.1 Sealing material

		Resistances																	
		Media containing grease and oil				Aqueous media					CIP				Disinfection				
Abbreviations	Temperature in °C	Dairy products	Whey	Vegetable oils /	Essential oils	Cold water	Beer / wine	Hot wort	Fruit juice	Vinegar	CIP	Caustic soda solution	Hydrochloric acid	Nitric acid	Peracetic acid	Hydrogen peroxide	Sodium-hypochloride	Ozone	Water vapour
EPDM	-40 to +150	○ ●	●	○	○	+	+	●	+	+	+	+	+	+	●	●	●	+	+

○ Some reservations ● Good + Recommended

4.5 Maintenance



CAUTION

Danger - Special dangers with pneumatically activated butterfly valves

Follow the safety instructions during maintenance and disassembly

- The valve must be switched off and secured against re-use in the case of malfunctions.
- Electrical power to the valve must always be turned off when work is being performed.
- Do not reach into the switching area of the valve or into the piping (danger of crushing).
- Depressurize the piping system. Note the media temperature (risk of burns).

- The piping system must be depressurized and drained.
- Check existing pneumatic and electrical connections to ensure the screw connection is properly seated.

Inspection Intervals

Visual inspections should be carried out continuously:

- Check the compressed air supply (compressed air hose, hose routing, hose coupling, filter...).
- Check the electrical supply (wiring, pipe surface, cable couplings...).
- Check housing tightness (liquid outlet ...).
- Test the valve functions.

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

Maintenance intervals

The maintenance intervals depend on the operating conditions, for example switching frequency and kind of media,

temperatures, temperature changes, pressure, etc. The maintenance interval must therefore be determined by the plant operator.

It is recommended, however, that the seals always be checked annually and be changed when necessary.

In the case of increased temperature load in the production (>60 °C) and more frequent switching frequency (> 10,000/year), shorter maintenance intervals may also be necessary.

Cleaning parameters

The butterfly valves and the sealing material are designed for standard CIP operation in the product-affected area.

The following are to be considered as standard conditions:

- CIP media on the basis of commercially available caustic-acid components with given chemical resistance to EPDM sealing material. Consultation should be carried out with the valve manufacturer for different kinds of media.
- Cleaning additives in the concentration range of 2-4 %.
- Temperatures for cleaning media in the range of 30-70°C or hot water to 90°C.
- Pressure range for cleaning 2-5 bar.
- Flow velocity 2-5 m/s.
- Cleaning cycles according to the medium up to 15 minutes. Depending on the chosen cleaning function, the valve should be opened and closed.

4.6 Spare parts

Spare parts kit for butterfly valve (wetted) EPDM for standard applications

DN	44710	NPS	44710
25	044710.00025LE	1	044710.00905LE
32	044710.00032LE	1,5	044710.00907LE
40	044710.00040LE	2	044710.00909LE
50	044710.00050LE	2,5	044710.00910LE
65	044710.00065LE	3	044710.00911LE
80	044710.00080LE	4	044710.00913LE
100	044710.00100LE		
125	044710.00125LE		
150	044710.00150LE		
200	044710.00200LE		

LE – EPDM

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

Gaskets for butterfly valve - optional

DN	EPDM with PTFE coated	HNBR
25	044310.22025	044310.12025
32	044310.22032	044310.12032
40	044310.22040	044310.12040
50	044310.22050	044310.12050
65	044310.22065	044310.12065
80	044310.22080	044310.12080
100	044310.22100	044310.12100
125	044310.22125	044310.12125
150	044310.22150	044310.12150
200	044310.22200	044310.12200

Spare parts kit for butterfly valve handle

DN	44710
25 - 32	044710.00032LX
40 - 65	044710.00065LX
80 - 100	044710.00100LX
125 - 150	044710.00150LX

Spare parts kit for butterfly valve actuator

DN	∅ mm	44710
LL / LF 25 - 32	76	044710.0P032LX
LL 40 – 125 / LF 40 - 100	102	044710.0P100LX
LL 150 – 200 / LF 125 - 200	133	044710.0P200LX

ATTENTION

The valve actuators are also available with ∅ 75 / 100 / 135.

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

5 Additional Equipment

5.1 Proximity switch, inductive

Type make contact (NO); № 106220	BES M12EE-PSC40B-S04G,
Nominal switching distance	4 mm even
>> with trip cam material steel	
>> with trip cam material stainless steel	2,8 mm even
Supply current U	10 ...30 VDC
No-load current bedämpft / unbedämpft	max. 10 mA/max. 5 mA
Operating current	200 mA
Potential drop U	max. 2,5 V
Switching frequency	200 Hz
Reserve battery protection	yes
Short-circuit proof	yes
Construction size	M12x1
Casing material	Stainless steel
Temperature range	- 25° C ... + 85° C
Enclosure rating	IP 68
Indicator	Multi-hole – LED

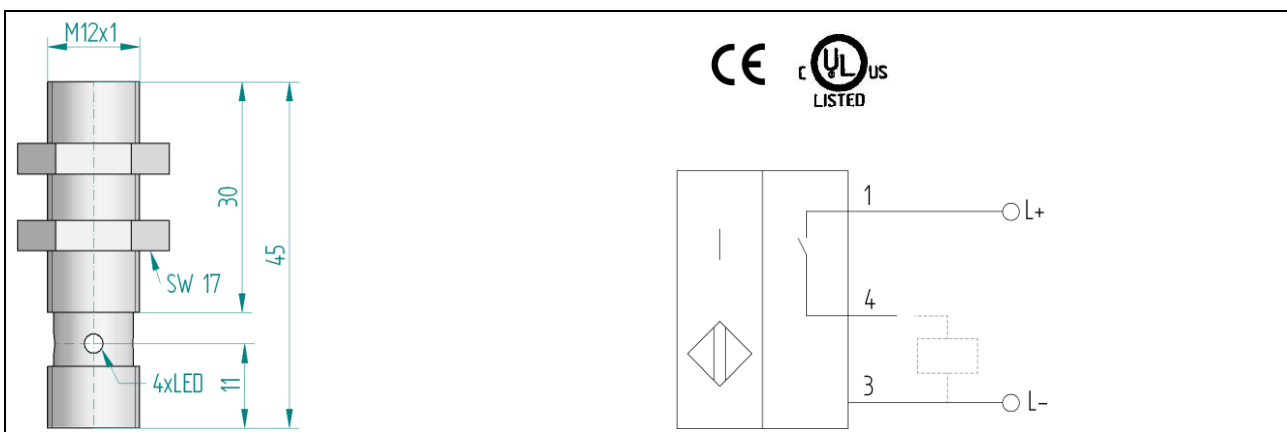


Fig. 3: Dimensions and connection scheme PNP

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

Type make contact (NO); № 106220	BES M12EE-PSC40B-S04G,
Nominal switching distance	4 mm even
>> with trip cam material steel	
>> with trip cam material stainless steel	2,8 mm even
Supply current U	10 ...30 VDC
No-load current bedämpft / unbedämpft	max. 10 mA/max. 5 mA
Operating current	200 mA
Potential drop U	max. 2,5 V
Switching frequency	200 Hz
Reserve battery protection	yes
Short-circuit proof	yes
Construction size	M12x1
Casing material	Stainless steel
Temperature range	- 25° C ... + 85° C
Enclosure rating	IP 68
Indicator	Multi-hole – LED

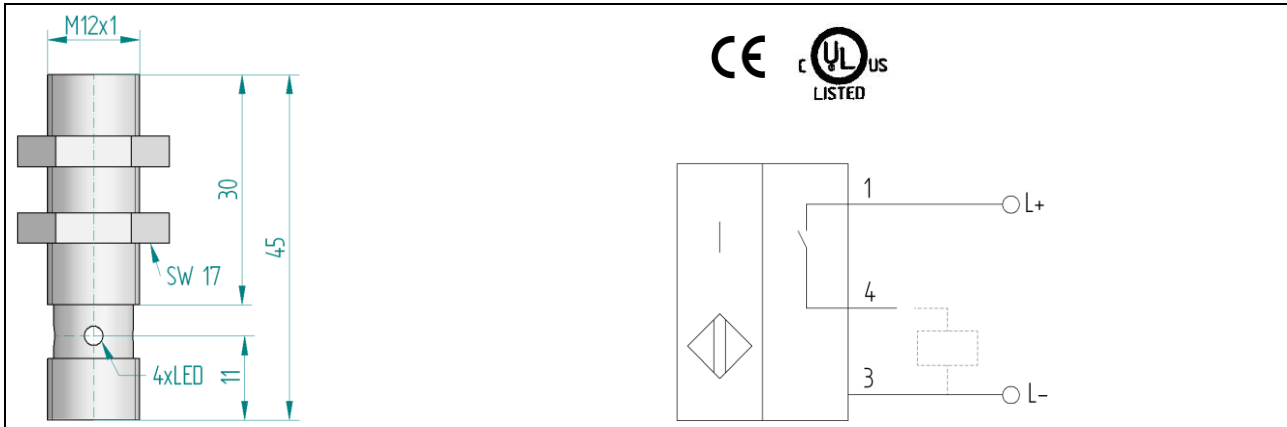


Fig. 4: Dimensions and connection scheme PNP

Butterfly valve

440xx/ 441xx/ 442xx/ 444xx/ 446xx/ 447xx/ 448xx

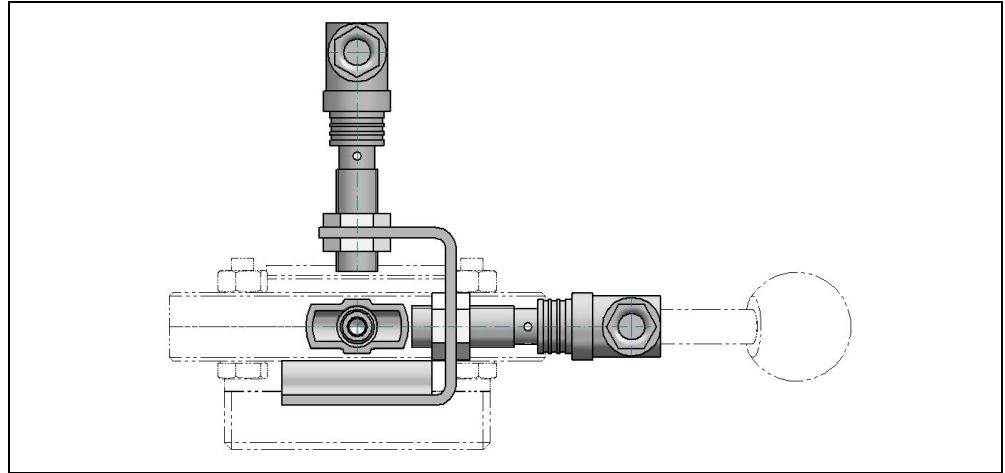


Fig. 5: Butterfly valve manually activated, bottom view

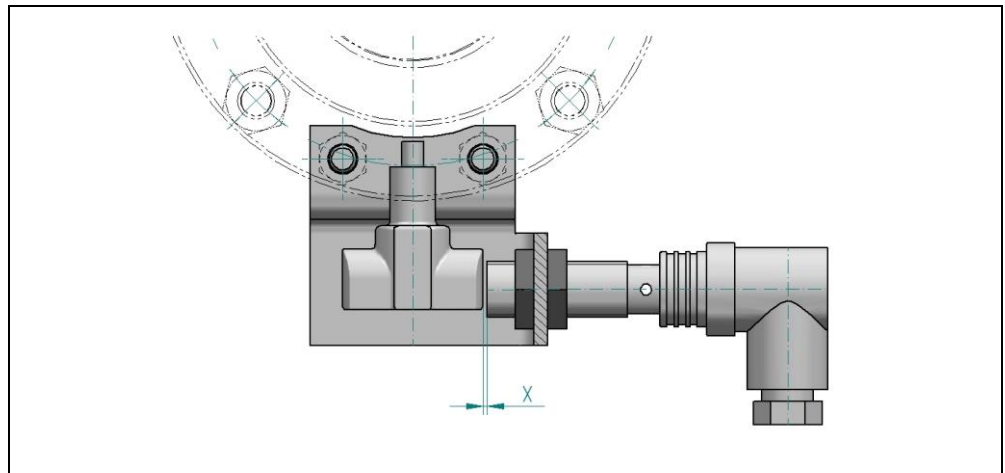


Fig. 6: Proximity switch setting dimension $X_{\min} = 0.5\text{mm}$, $X_{\max} = 2.5\text{mm}$

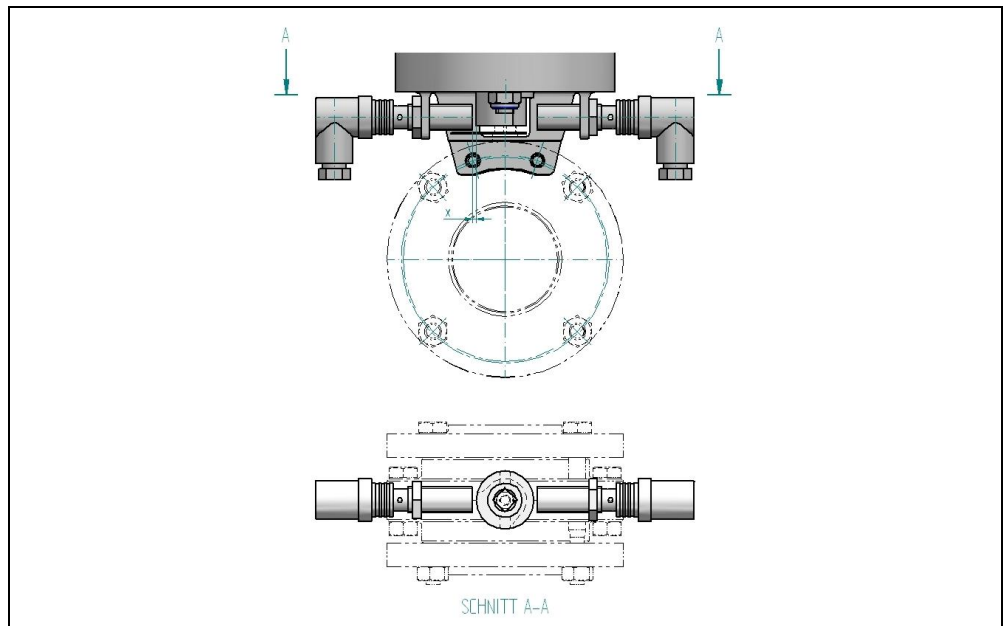


Fig. 7: Butterfly valve with pneumatic actuator