Technical data sheet D7..L/BAC

Butterfly valve with actuator, 3-way, Flange, PN 16

- **Torque motor 160 Nm**
- **Nominal voltage AC 24...240 V / DC 24...125 V**
- **Control Open/close, modulating, communicative, hybrid**
- **for mixing and diverting applications**
- **For water-side changeover and control applications**
- **Communication via BACnet MS/TP, Belimo MP-Bus or conventional control**

Type overview

Type	DN [ ]	kvmax [m³/h]	kvs [m³/h]	PN [ ]
D7150NL/BAC	150	1100	400	16
D7200WL/BAC	200	1800	800	16
D7250WL/BAC	250	3000	1200	16
D7300WL/BAC	300	4700	1700	16

General technical data can be found on the data sheets for the products D6..NL, D6..WL and PRCA-BAC-S2-T.
kvmax: for change-over applications
kvs: for control applications with linear or equal percentage characteristic with opening angle 60% (parameterisable with Belimo Assistant App).
The maximum flow speed of 4 m/s may not be exceeded in the butterfly valve.

Technical data

Electrical data	Nominal voltage	AC 24...240 V / DC 24...125 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 19.2...264 V / DC 19.2...137.5 V
	Power consumption in operation	20 W
	Power consumption in rest position	6 W
	Power consumption for wire sizing	with 24 V 20 VA / with 230 V 52 VA
Functional data	Torque motor	160Nm
	Communicative control	BACnet MS/TP Modbus RTU MP-Bus
	Operating range Y	2...10 V
	Operating range Y variable	0.5...10 V 4...20 mA
	Position feedback U	2...10 V
	Position feedback U variable	0.5...10 V
	Running time motor	35 s / 90°
	Running time motor variable	30...120 s
	Sound power level Motor	68 dB(A)
	Fluid	Cold and warm water, water with glycol up to max. 50% vol.
	Fluid temperature	-20...120°C
	Close-off pressure Δps	1200 kPa
	Differential pressure Δpmax	300 kPa
	Flow	100% opening angle: Bypass B – AB: 70% of kvmax value; 60% opening angle: Bypass B – AB: 100% of kvs value
	Flow characteristic	0...100% opening angle: control path A–AB: S-form; Bypass B – AB: S-form inverted; 0...60% opening angle: control path A–AB: equal percentage; Bypass B – AB: equal percentage inverted
	Flow characteristic note	For butterfly valve actuator combinations with the PR actuator, the flow characteristic can be set to linear using the Belimo Assistant App
	Leakage rate	tight, leakage rate A (EN 12266-1)

Technical data

Functional data	Pipe connectors	Flange PN 16 according to ISO 7005-2
	Installation position	upright to horizontal (in relation to the stem)
	Servicing	maintenance-free
	Manual override	hand lever
Safety	Degree of protection IEC/EN	IP66/67
	Degree of protection NEMA/UL	NEMA 4X
	Enclosure	UL Enclosure Type 4X
	Control pollution degree	3
	Ambient temperature	-30...50°C
	Storage temperature	-40...80°C
	Ambient humidity	Max. 100% r.H.

Safety notes

- The valve has been designed for use in stationary heating, ventilation and air-conditioning systems and must not be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Caution: Power supply voltage!
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- Apart from the connection box, the device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- The device contains electrical and electronic components and must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Product features

Mode of operation

The 3-way butterfly valve is operated by two multifunctional actuators (for isolation and control applications). Both actuators can be controlled with the same control signal, however, one of the actuators needs to be set up for the use of an inverted control signal. This settings can be made using the Belimo Assistant App. It is recommended to monitor the feedback signal U5 of the actuators to ensure that the 3-way function in the control and bypass path is guaranteed.

Parametrisable actuators

For change-over applications, both actuators are parameterised with either on/off or communicative control. In addition, the control signal of one of the two actuators is set to "inverted". This allows both actuators to be controlled with the same control signal. For control functions, the control can be selected between 2..10 V, 0.5..10 V, 4..20 mA or communicative. The control signal of one of the two actuators is configured to be "inverted" and additionally a kv setting is made via the limitation of the opening angle.

Manual override

The valve can be manually operated using a hand crank. Unlocking is carried out manually by removing the hand crank.

Combination valve/actuator

Two butterfly valves and two actuators are supplied separately, so that any installation on one T-piece is possible. The T-piece must be ordered separately.

Accessories

	Description	Type
Mechanical accessories	T-piece for 3-way butterfly valve DN 150	ZD7150
	T-piece for 3-way butterfly valve DN 200	ZD7200
	T-piece for 3-way butterfly valve DN 250	ZD7250
	T-piece for 3-way butterfly valve DN 300	ZD7300
	Description	**Type**
Service Tools	Belimo Assistant App, Smartphone app for easy commissioning, parameterising and maintenance	Belimo Assistant App
	Converter Bluetooth / NFC	ZIP-BT-NFC
	Service Tool, with ZIP-USB function, for parametrisable and communicative Belimo actuators / VAV controller and HVAC performance devices	ZTH EU

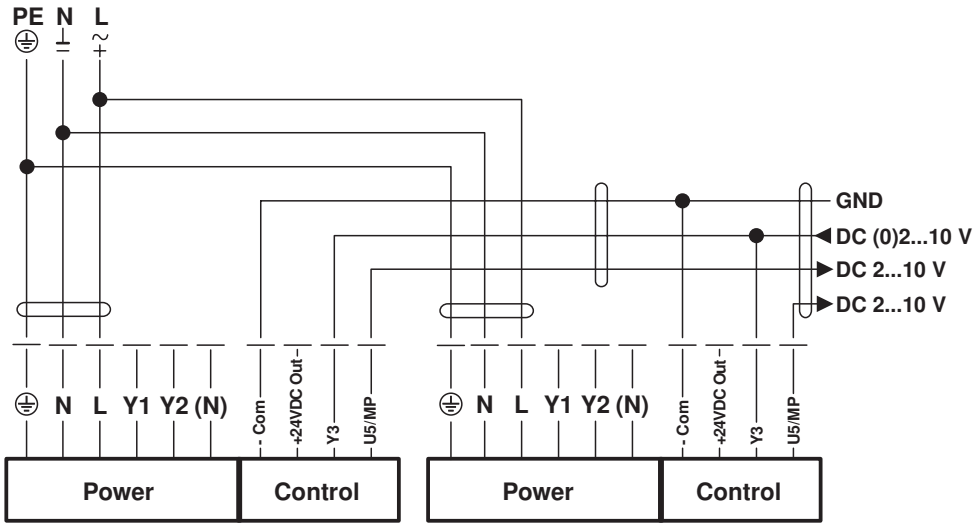
Electrical installation

Notes

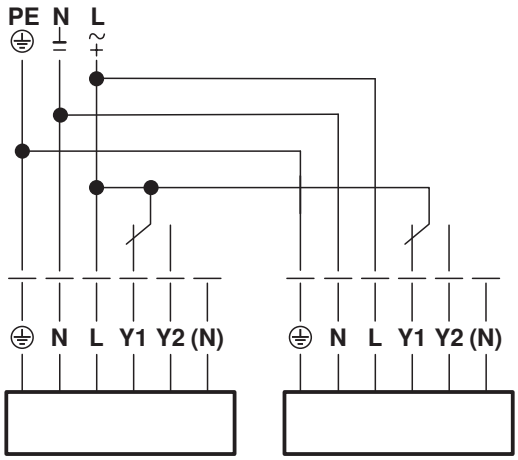
- Caution: Power supply voltage!
- The wiring of the line for BACnet (MS/TP) has to be carried out in accordance with applicable RS485 regulations.

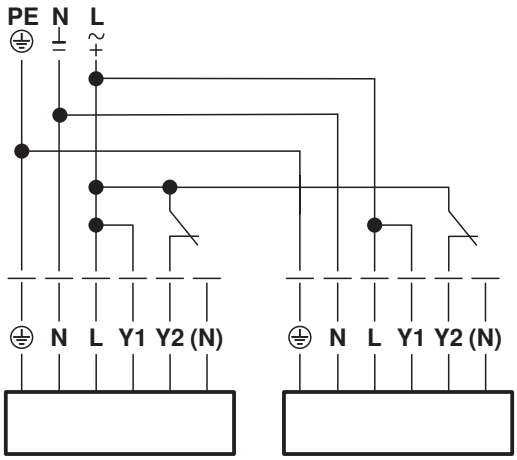
Wiring diagrams

Modulating control



Control open/close

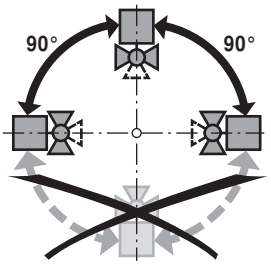




Installation notes

Recommended installation positions

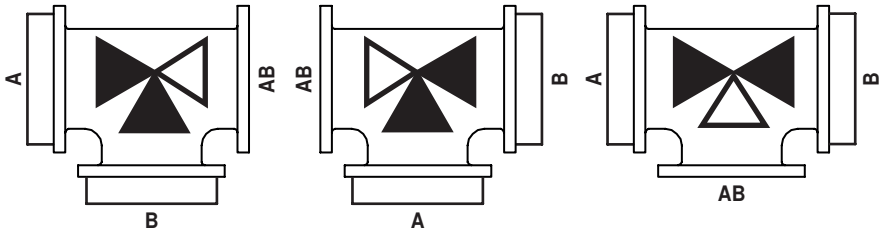
The butterfly valves may be mounted upright to horizontal. The butterfly valves may not be installed in a hanging position i.e. with the spindle pointing downwards.



Installation notes

Recommended installation positions

The two butterfly valves can be mounted in any combination on one T-piece.



Water quality requirements

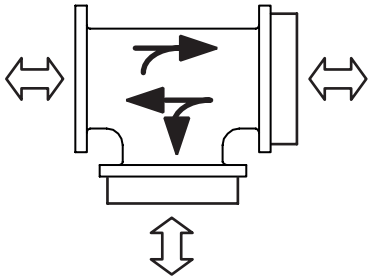
The water quality requirements specified in VDI 2035 must be adhered to.
Belimo valves are regulating devices. For the valves to function correctly in the long term, they must be kept free from particle debris (e.g. welding beads during installation work). The installation of a suitable strainer is recommended.

Servicing

Butterfly valves and rotary actuators are maintenance-free.
Before any service work on the final controlling device is carried out, it is essential to isolate the rotary actuator from the power supply (by unplugging the electrical cable if necessary). Any pumps in the part of the piping system concerned must also be switched off and the appropriate slide valves closed (allow all components to cool down first if necessary and always reduce the system pressure to ambient pressure level).
The system must not be returned to service until the butterfly valve and the rotary actuator have been reassembled correctly in accordance with the instructions and the pipeline has been refilled by professionally trained personnel.
To avoid a torque increase during off season shut down, exercise the butterfly valve (full open and close) at least once a month.

Flow direction

Direction of flow in both directions possible.



Flow setting

The Belimo butterfly valves have an approximate equal percentage characteristic curve of a 0...60% opening angle. Depending on the desired kv value, the opening angle can be set with the Belimo Assistant App with a smartphone via Near Field Communication (NFC). Belimo butterfly valves can be ideally used as a control armature.

		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
DN 150	kv (m3/h)	1	30	70	140	240	400	580	800	1010	1100
DN 200	kv (m3/h)	10	60	170	330	530	800	1120	1450	1690	1800
DN 250	kv (m3/h)	10	100	280	520	830	1200	1760	2340	2800	3000
DN 300	kv (m3/h)	30	150	400	700	1100	1700	2400	3300	4200	4700

The kv values vor 3-way valves are calculated values based on kv values for 2-way valves, considering the pipe friction losses caused by a T-piece.

Installation notes

Parameterisation linear characteristic curve

For butterfly valve actuator combinations with the PR actuator, the flow characteristic can be set to linear using the Belimo Assistant App.
The following table shows the respective kv values in relation to the control signal (%).

		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
DN 150	kv (m3/h)	110	220	330	440	550	660	770	880	990	1100
DN 200	kv (m3/h)	180	360	540	720	900	1080	1260	1440	1620	1800
DN 250	kv (m3/h)	300	600	900	1200	1500	1800	2100	2400	2700	3000
DN 300	kv (m3/h)	470	940	1410	1880	2350	2820	3290	3760	4230	4700

The kv values vor 3-way valves are calculated values based on kv values for 2-way valves, considering the pipe friction losses caused by a T-piece.

Configuration for various applications

The Belimo 3-way butterfly valve can flexibly be used for change-over and control applications. A specific parametrisation is necessary for each application.

Service

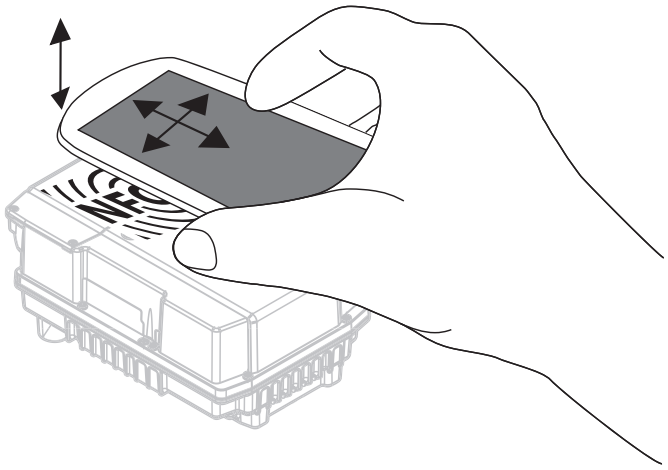
NFC connection

Belimo equipment marked with the NFC logo can be operated with the Belimo Assistant App.

Requirement:
- NFC- or Bluetooth-capable smartphone
- Belimo Assistant App (Google Play & Apple AppStore)

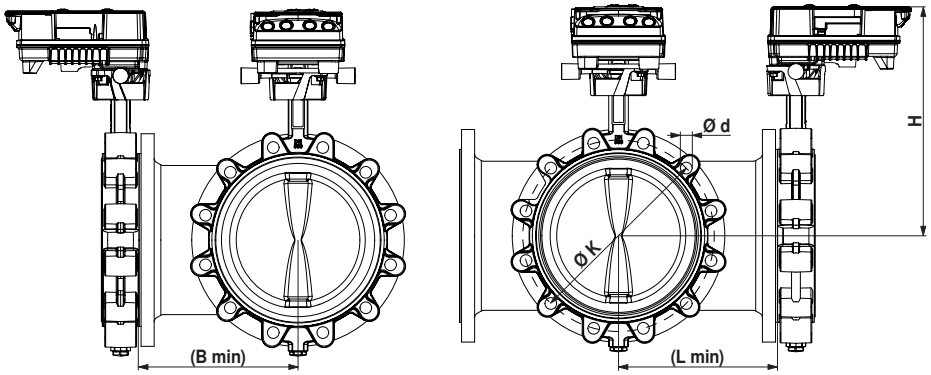
Align NFC-capable smartphone on the actuator so that both NFC antennas are superposed.

Connect Bluetooth-enabled smartphone via the Bluetooth-to-NFC Converter ZIP-BT-NFC to the actuator. Technical data and operation instructions are shown in the ZIP-BT-NFC data sheet.



Dimensions / Weight

Dimensional drawings



Type	DN [ ]	L [mm]	B [mm]	H [mm]	d (PN16)	K (PN16) [mm]	Weight
D7150NL/BAC	150	220	220	350	8 x M20	240	30 kg
D7200WL/BAC	200	260	260	400	12 x M20	295	51 kg
D7250WL/BAC	250	300	300	450	12 x M24	355	76 kg
D7300WL/BAC	300	340	340	500	12 x M24	410	100 kg

Further documentation

- Data sheets for butterfly valves
- Data sheets for actuators
- Installation instructions for actuators and/or butterfly valves
- Notes for project planning for butterfly valves
- General notes for project planning
- Data sheet for T-piece