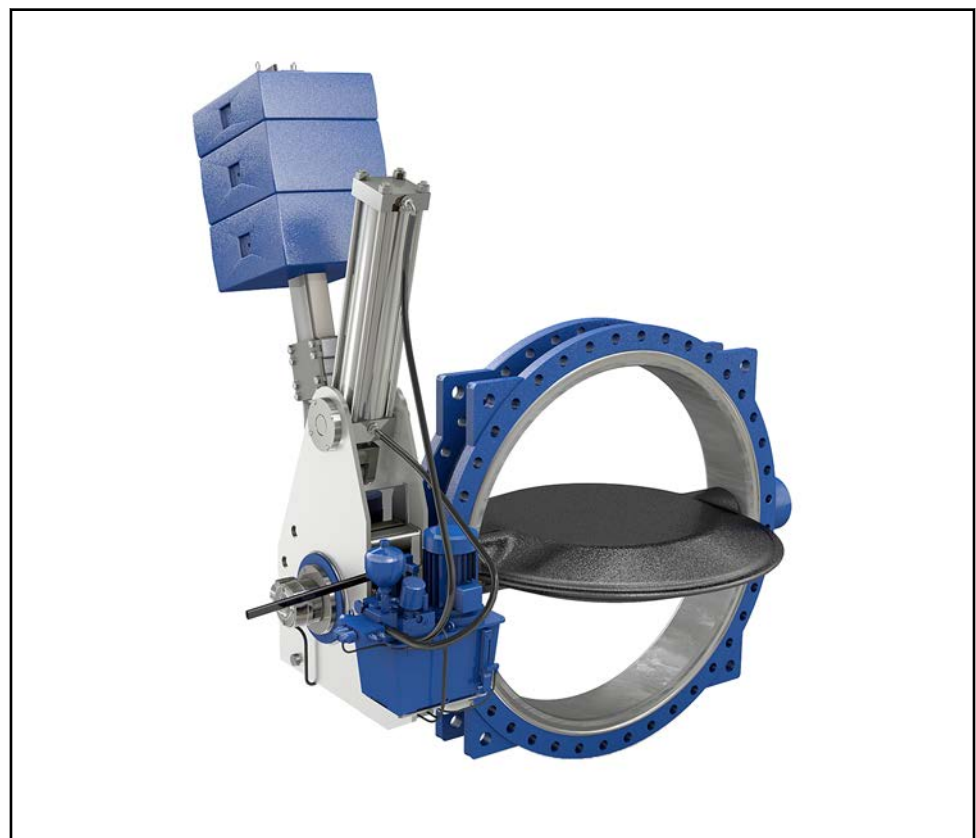


Combined Butterfly/Check Valve

DUALIS

DN 500 to 1400
PN 6 up to 40 bar

Type Series Booklet



Legal information/Copyright

Type Series Booklet DUALIS

All rights reserved. The contents provided herein must neither be distributed, copied, reproduced, edited or processed for any other purpose, nor otherwise transmitted, published or made available to a third party without the manufacturer's express written consent.

Subject to technical modification without prior notice.

© 12.09.2014

Butterfly Valves

Combined Butterfly/Check Valve

DUALIS



Main applications

- Water
- Energy
- Industry

Fluids handled

- Seawater
- Drinking water
- Brackish water
- Grey water
- Solids-laden fluids
- Corrosive fluids
- Gas

Operating data

Operating properties

Characteristic	Value
Max. permissible pressure	40 bar (depending on valve design)
Max. permissible temperature	-10 °C to +65 °C
Enclosure	IP 65 Motor: IP 55

Design details

Design

- DUALIS consists of a (centred-disc or offset-disc) butterfly valve and a (single-acting) counterweight actuator closing the valve by force of gravity.

- The counterweight actuator is mounted on the valve's top flange and directly connected to the actuating stem. It consists of the following components:
 - Mechanical section: bracket, lever arm, hydraulic cylinder, counterweights
 - Hydraulic power pack
 - Limit switch box
 - Terminal box for site connection by customer
- DUALIS combines two functions:
 - the on/off butterfly valve function required of a pump discharge valve in pumping stations
 - the check valve function required for:
 - absolutely tight shut-off of sections of piping,
 - piping protection by means of flow velocity monitoring system,
 - protection of turbines in barrages/dams.
- Please request particulars for installation in regions with seismic hazards. Other solutions may be provided.

Product benefits

- Absolutely reliable, gravity-powered closing system
- Two-speed closing action prevents surge pressures.
- Modular design
- The valve can be opened using an emergency hand pump.
- Safety locking option by manually locking the counterweight actuator
 - in open position
 - in closed position

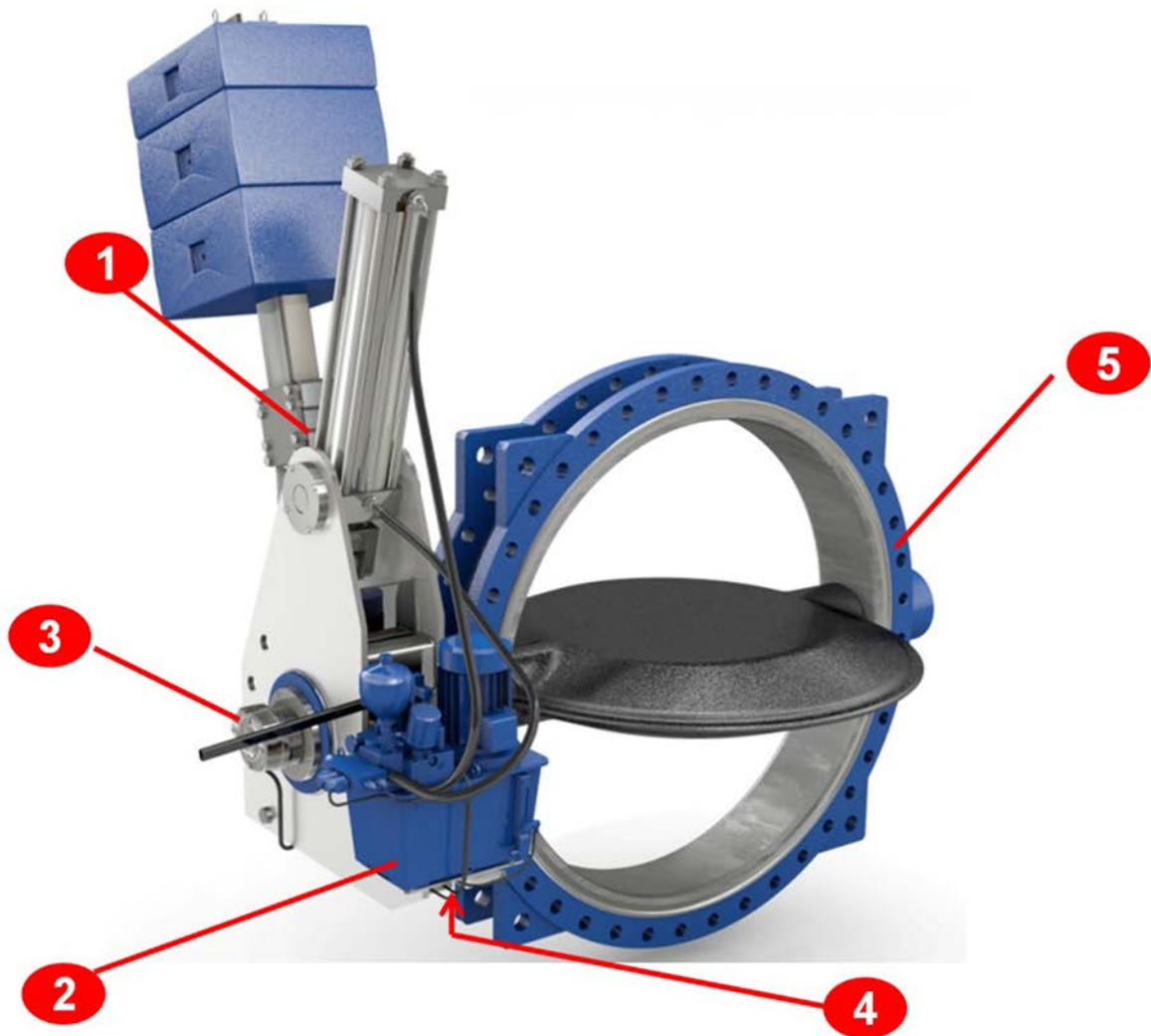
Related documents

Document	Reference No.
ISORIA 10 type series booklet	8444.1
ISORIA 16 type series booklet	8445.1
ISORIA 20 type series booklet	8446.1
ISORIA 25 type series booklet	8447.1
MAMMOUTH type series booklet	8612.12

Document	Reference No.
DANAÏS type series booklet	8460.11

Also available for other KSB valves or commercial quarter-turn valves on request.

Configuration



- 1 : Counterweight
- 2 : Integrated hydraulic power pack
- 3 : Limit switch box

- 4 : Terminal box
- 5 : Butterfly valve

Illustration

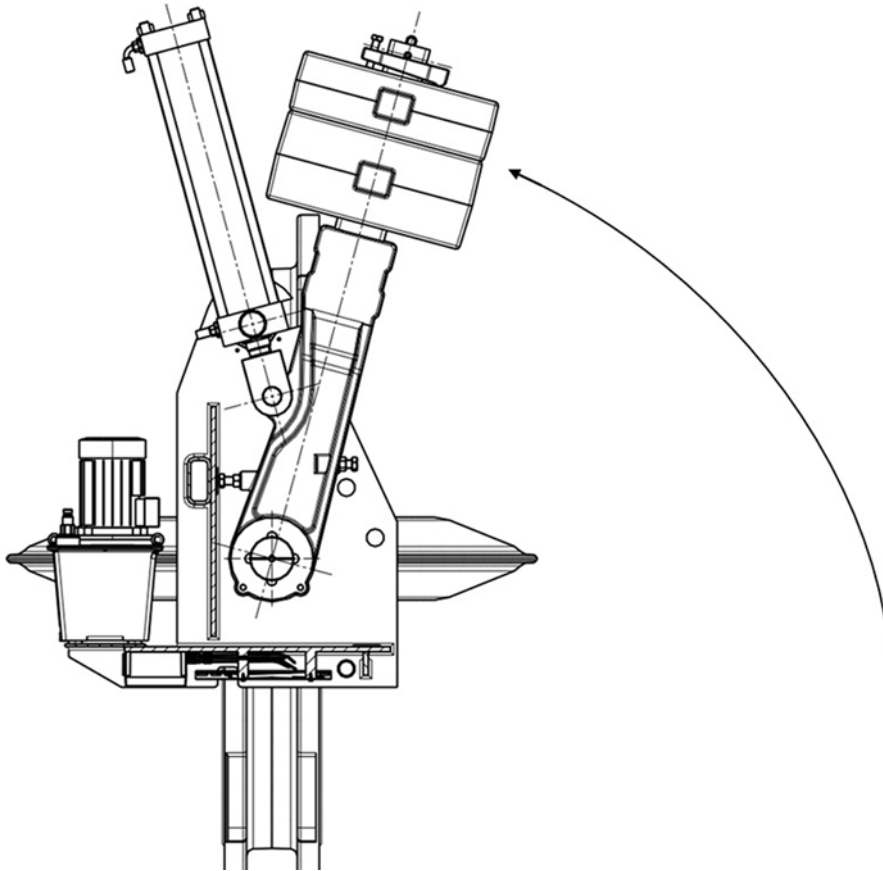
Illustration shows standard centred-disc design.

The counterweight actuator can also be mounted on offset-disc butterfly valves.

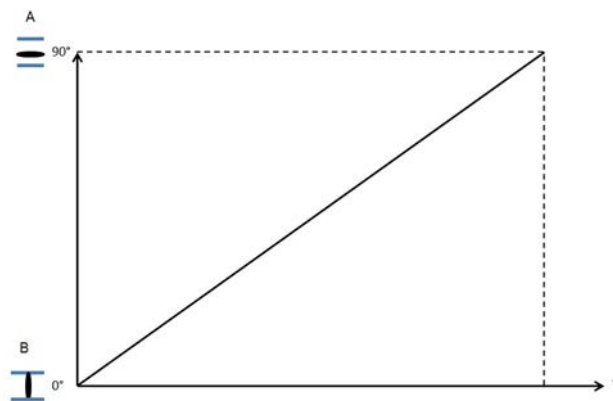
Function

Opening the valve

The valve is opened by means of a cylinder driven by the hydraulic power pack. During the opening process, the hydraulic cylinder moves the lever arm to the raised ("armed") position. When the valve is open, the cylinder rod is retracted.



The opening speed is constant as standard. It can be set by KSB or by the operator.

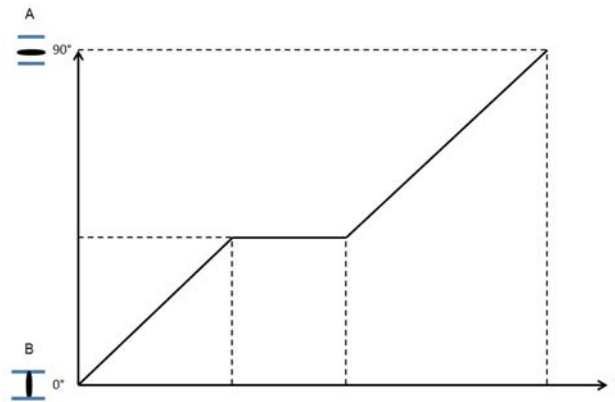


- A: Open
- B: Closed
- T: Time

Opening options

The opening action can be interrupted and resumed by the operator.

- The speed can be set by KSB or by the operator.
- Several stop-and-go cycles are possible during a single actuation.



A: Open
B: Closed
T: Time

Stop-and-go cycles are linked to the start commands for the pump in the system.

Holding in open position

To hold the valve open, the pressure inside the hydraulic cylinder needs to be monitored.

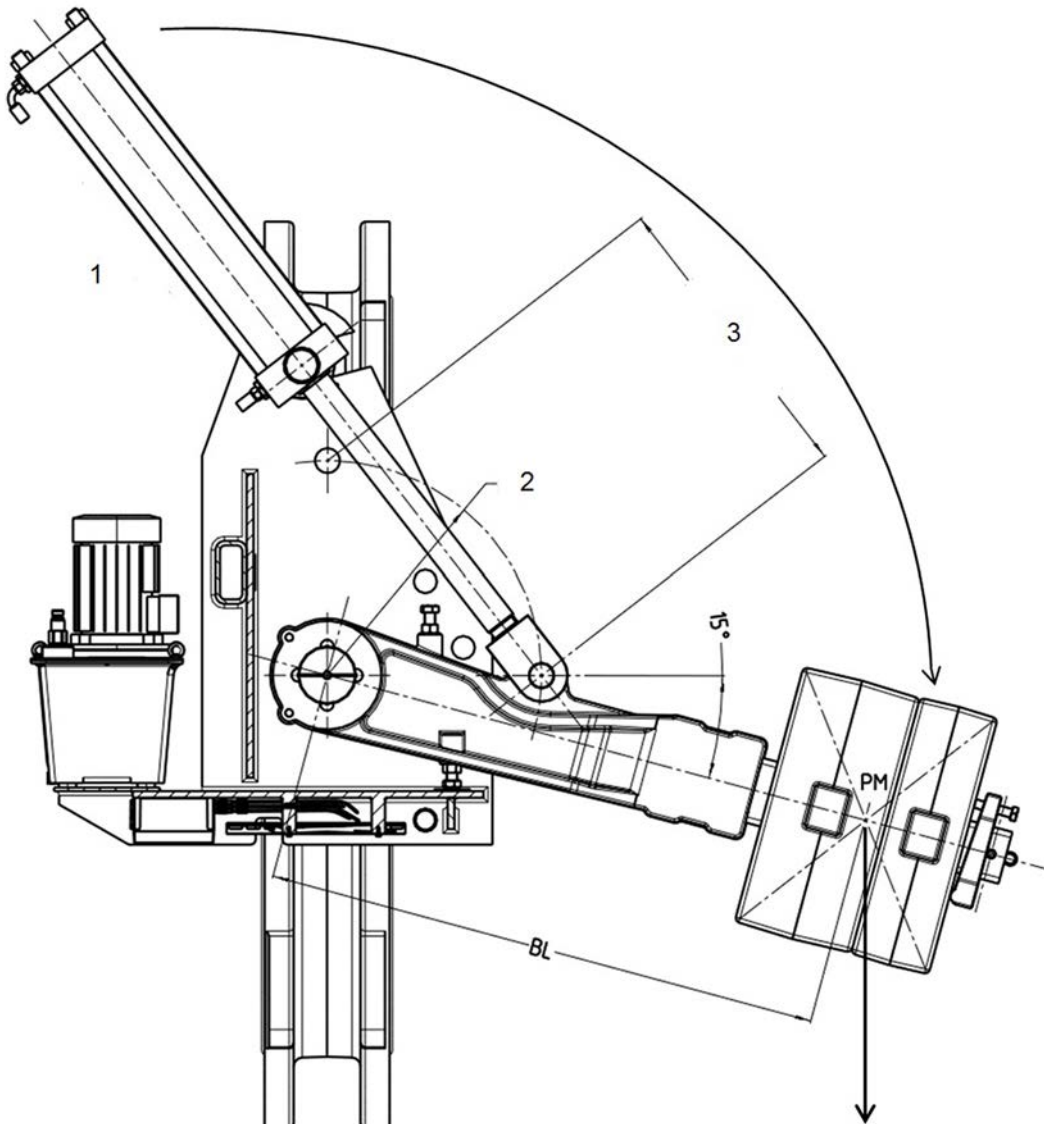
The pressure is continuously measured by a pressure sensor connected to the operator's monitoring system.

An accumulator compensates for pressure fluctuations in the system and maintains a defined minimum pressure. If the pressure drops below this limit, the hydraulic pump will re-charge the accumulator. Any pressure drop below this limit is detected by the sensor and signalled to the operator for the pump set of the hydraulic power pack to be started. The pump supplies hydraulic oil to the cylinder until the pressure required for the counterweight to be held in the raised ("armed") position has been restored.

Valve closure

The valve is closed by the counterweight being lowered either as a result of a site-supplied, process-related signal or, optionally, following a signal triggered by a power failure.

The lowering process of the counterweight is controlled until the valve is fully closed. Two-speed closing can be provided if required by the customer's process (slowing down before the valve is fully closed). When the valve is closed, the cylinder rod is in extended position.

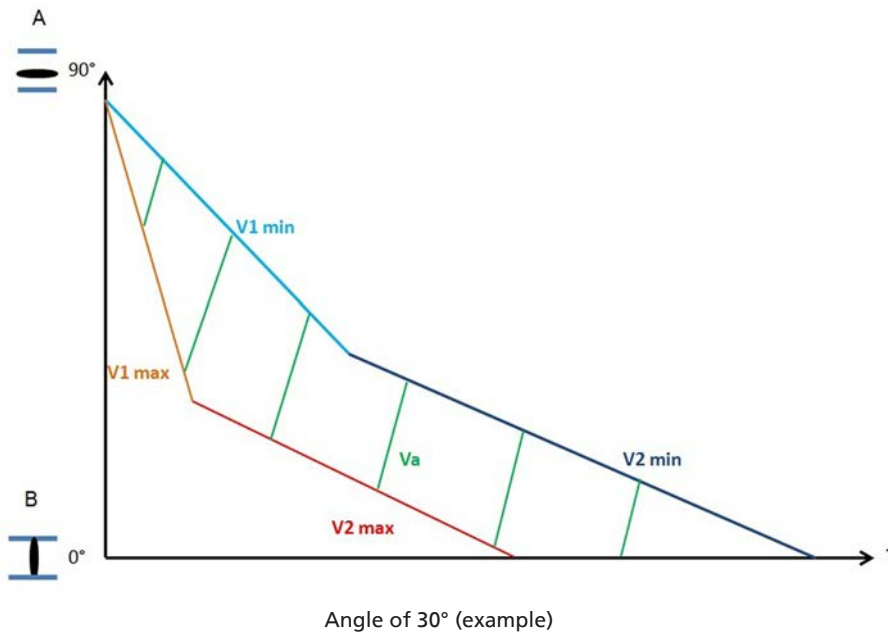


The valve is closed by the lowering of the counterweight.

- 1: Extended cylinder
- 2: Angle traversed between open and closed positions
- 3: Cylinder stroke

Closing options

Valve closure can be effected at two different speeds as required by the operator.



A: Open
B: Closed
T: Time
Va: Adjustable speed

V1 min: Minimum speed 1
V2 min: Minimum speed 2
V1 max: Maximum speed 1
V2 max: Maximum speed 2

General data of DUALIS

- Designed for a service life of 20 years
- Sound level: less than 75 dB A at a distance of 1 metre
- Cylinder to ISO 6020/2 type MT1
- Designed and manufactured in accordance with ISO 9001
- Machinery Directive 2006/42/EC (EN ISO 12100)

The complete unit meets the requirements of the applicable European directives. The electrical systems and components which meet the relevant European directives (EMC Directive, Low-voltage Directive) are CE-marked.

As a component, the valve with the complete counterweight assembly is not regarded as "completed machinery" capable of functioning autonomously in accordance with Machinery Directive EN 292-2. This directive stipulates that the CE symbol must not be used in this case, and no EC Declaration of Conformity may be issued. However, a Declaration of Incorporation will be issued for actuated valves intended for installation in other machinery.

Coating

The coating provides corrosion protection.

Scope

The following components are coated:

- The mechanical section of the counterweight assembly (bracket, lever arm, cylinder, counterweights)
- The hydraulic power pack

The entire counterweight assembly (mechanical section and hydraulic power pack) is coated in the same colour.

Coating systems

Standard industrial environment: standard two-layer system	
P30	AMERCOAT 124 zinc epoxy - 50 µm + CELLUTOP T polyurethane, grey RAL 7016 - 80 µm
EN ISO 12944 Class C3 - optional	
P61	AMERCOAT 124 zinc epoxy - 50 µm + AMERCOAT 71 TC epoxy - 50 µm + CELLUTOP T polyurethane, grey RAL 7016 - 80 µm
EN ISO 12944 Class C4 (high) - optional	
P71	AMERCOAT 124 zinc epoxy - 50 µm + AMERCOAT 400 MIO epoxy - 125 µm + CELLUTOP T polyurethane, grey RAL 7016 - 80 µm
EN ISO 12944 Class C5 (very high) - optional	
P81	AMERCOAT 124 zinc epoxy - 50 µm + AMERCOAT 71 TC .. epoxy - 50 µm + AMERLOCK 400 MIO epoxy - 125 µm CELLUTOP T polyurethane, grey RAL 7016 - 80 µm

Other coatings on request

Warranty

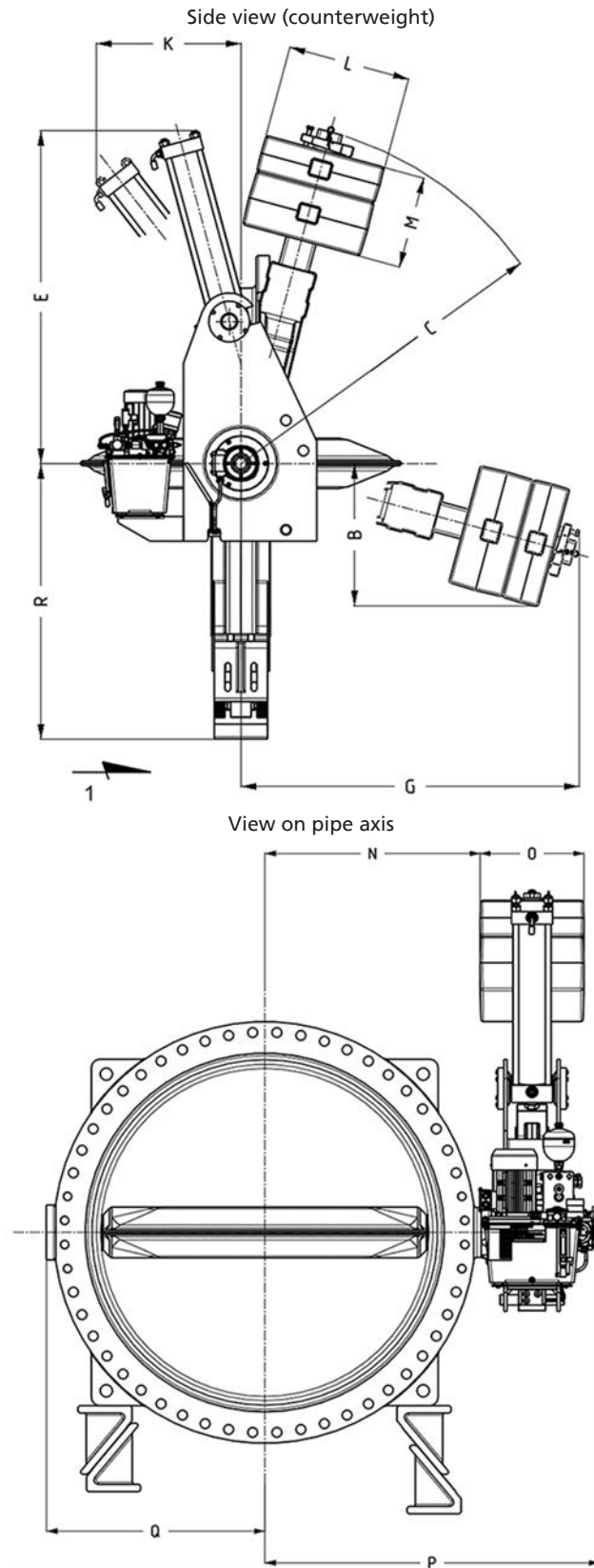
The warranty period for components with a standard coating is one year from delivery.

For a longer warranty period, multi-layer coatings are required.

EN - ISO 12944 - Part 2 Classification of environments		
Corrosivity category of environment	Examples of typical environments in a temperate climate (informative only)	
	Exterior	Interior
C3	Urban and industrial atmospheres, moderate sulphur dioxide pollution. Coastal areas with low salinity.	Production rooms with high humidity and some air pollution, e.g. food-processing plants, laundries, breweries, dairies.
C4 (high)	Industrial areas and coastal areas with moderate salinity.	Chemical plants, swimming pools, coastal ship- and boatyards.
C5-I (very high / industrial)	Industrial areas with high humidity and aggressive atmosphere.	Buildings or areas with permanent condensation and with high pollution.
C5-M (very high / marine)	Coastal and offshore areas with high salinity.	Buildings or areas with permanent condensation and with high pollution.

Dimensions

Drawing



Dimensions

DN	NPS	1)	2)	3)	B	Radius C	E	G	K	L	M	N	O	P	Q	R
ISORIA 10 / MAMMOUTH 10																
500	20	R380	2200	40	518	1186	1270	1175	560	500	180	342	400	1012	358	/
600	24	R380	2200	45	518	1186	1270	1175	560	500	180	397	400	1067	439	/
	26	R380	2200	45	518	1186	1270	1175	560	500	180	437	400	1107	451	/
700	28	R380	2200	50	518	1186	1270	1175	560	500	180	462	400	1132	482	/
	30	R380	3150	65	518	1186	1270	1175	560	500	270	492	400	1162	513	/
800	32	R380	3150	65	518	1186	1270	1175	560	500	270	517	400	1187	546	/
900	36	R380	4000	85	518	1186	1270	1175	560	500	360	567	400	1237	588	/
1000	40	R380	5300	70	592	1472	1260	1450	565	500	360	637	400	1307	646	/
	42	R380	5300	75	592	1472	1260	1450	565	500	360	655	400	1325	674	1055
1100	44	R380	5300	75	592	1472	1260	1450	565	500	360	680	400	1350	703	1076
1200	48	R380	8500	90	592	1472	1260	1450	565	500	450	730	400	1400	756	1112
	54	R480	8500	60	664	1543	1615	1520	680	600	360	877	500	1557	968	1210
1400	56	R480	8500	60	664	1543	1615	1520	680	600	360	902	500	1582	993	1235
ISORIA 16 / MAMMOUTH 16																
500	20	R380	2200	40	518	1186	1270	1175	560	500	180	342	400	1012	358	/
600	24	R380	2200	45	518	1186	1270	1175	560	500	180	397	400	1067	439	/
	26	R380	4000	65	518	1186	1270	1175	560	500	360	437	400	1107	451	/
700	28	R380	4000	70	518	1186	1270	1175	560	500	360	462	400	1132	482	/
	30	R380	4000	70	518	1186	1270	1175	560	500	360	492	400	1162	513	/
800	32	R380	4000	75	518	1186	1270	1175	560	500	360	517	400	1187	546	/
900	36	R380	5300	65	592	1472	1260	1450	565	500	360	567	400	1237	588	/
1000	40	R380	6500	75	592	1472	1260	1450	565	500	360	637	400	1307	646	/
1100	44	R480	8500	60	664	1543	1615	1520	680	600	360	752	500	1432	843	1100
ISORIA 20 / MAMMOUTH 20																
500	20	R380	2200	40	518	1186	1270	1175	560	500	180	342	400	1012	358	/
600	24	R380	3150	55	518	1186	1270	1175	560	500	270	397	400	1047	438	/
ISORIA 25 / MAMMOUTH 25																
500	20	R380	3150	50	518	1186	1270	1175	560	500	270	342	400	1012	358	/
600	24	R380	4000	65	518	1186	1270	1175	560	500	360	397	400	1047	438	/

The counterweight actuator can be adapted to any type of centred-disc or offset-disc butterfly valve made by KSB or other manufacturers.

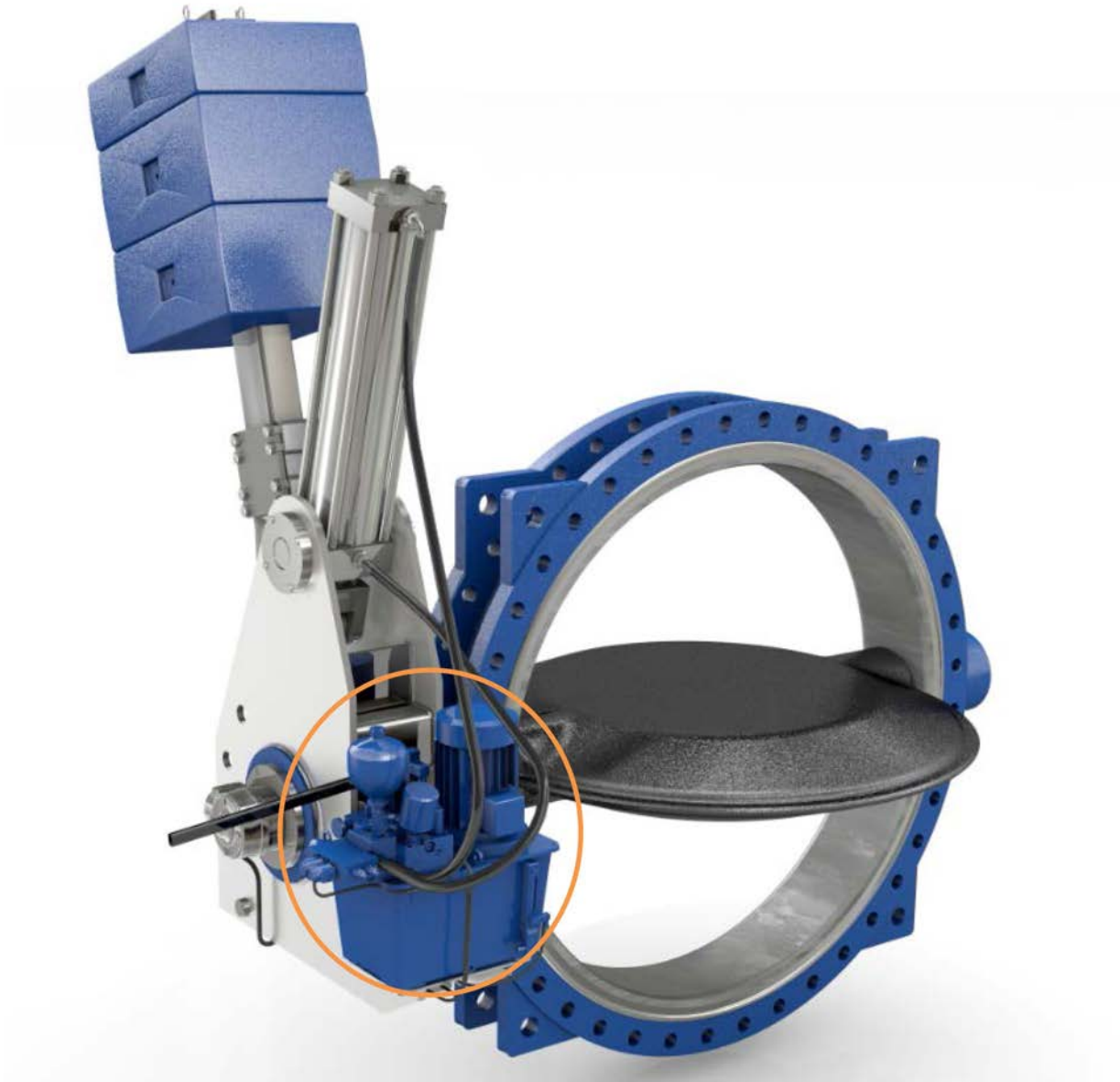
Request particulars.

-
- 1) Type of counterweight
 - 2) Torque [Nm]
 - 3) Minimum hydraulic pressure for raising the counterweight [bar]
-

Other components

Hydraulic power pack

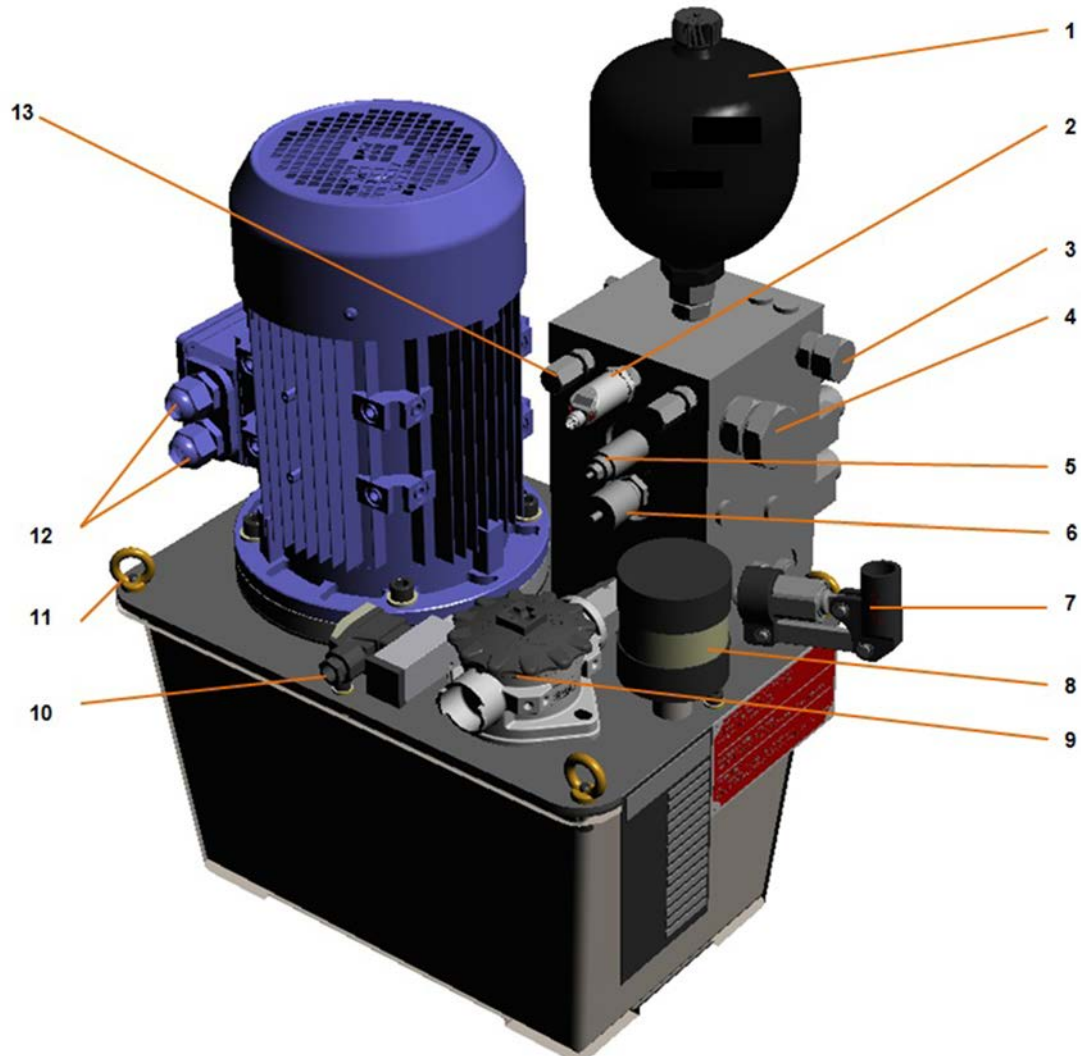
Position



Technical data of the hydraulic power pack

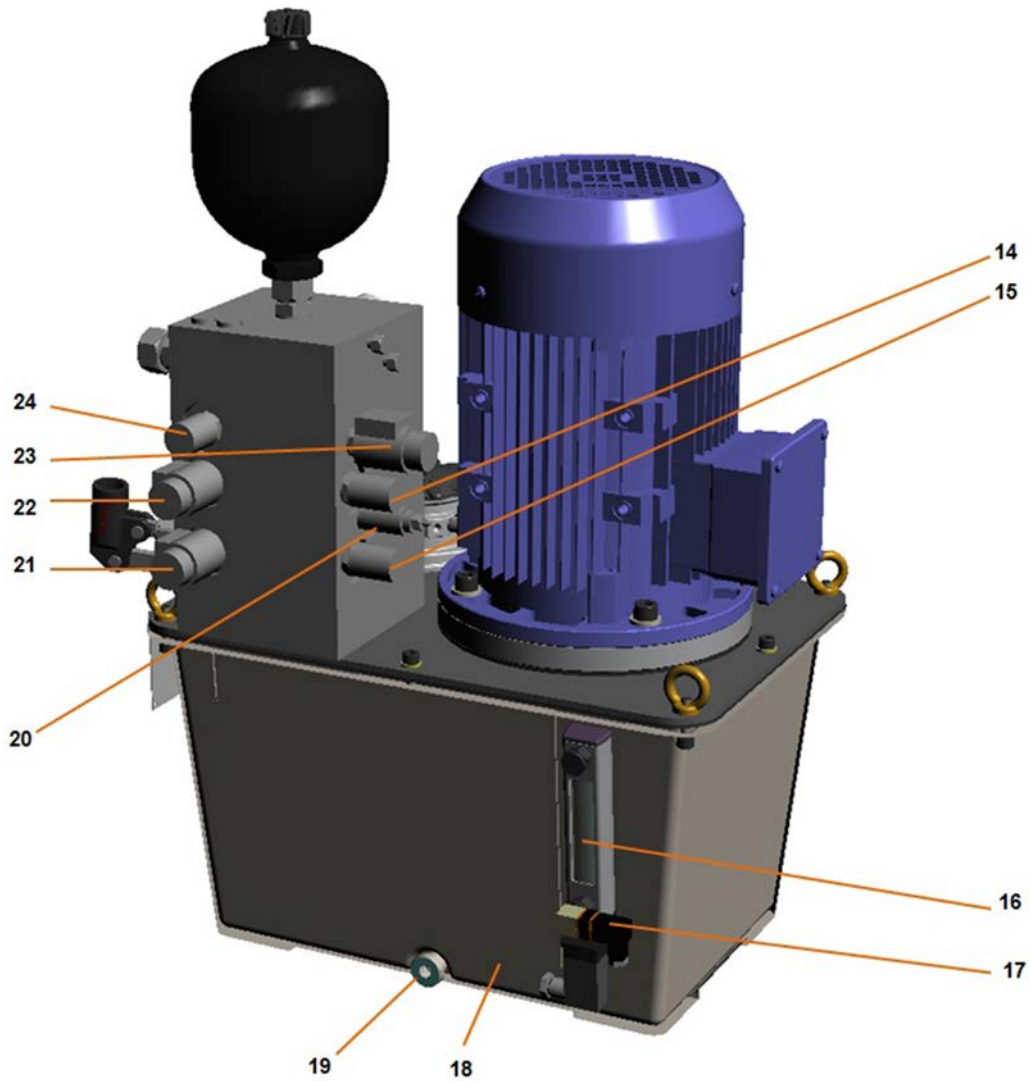
The hydraulic power pack is supplied and fitted by KSB.

3D front view with list of components



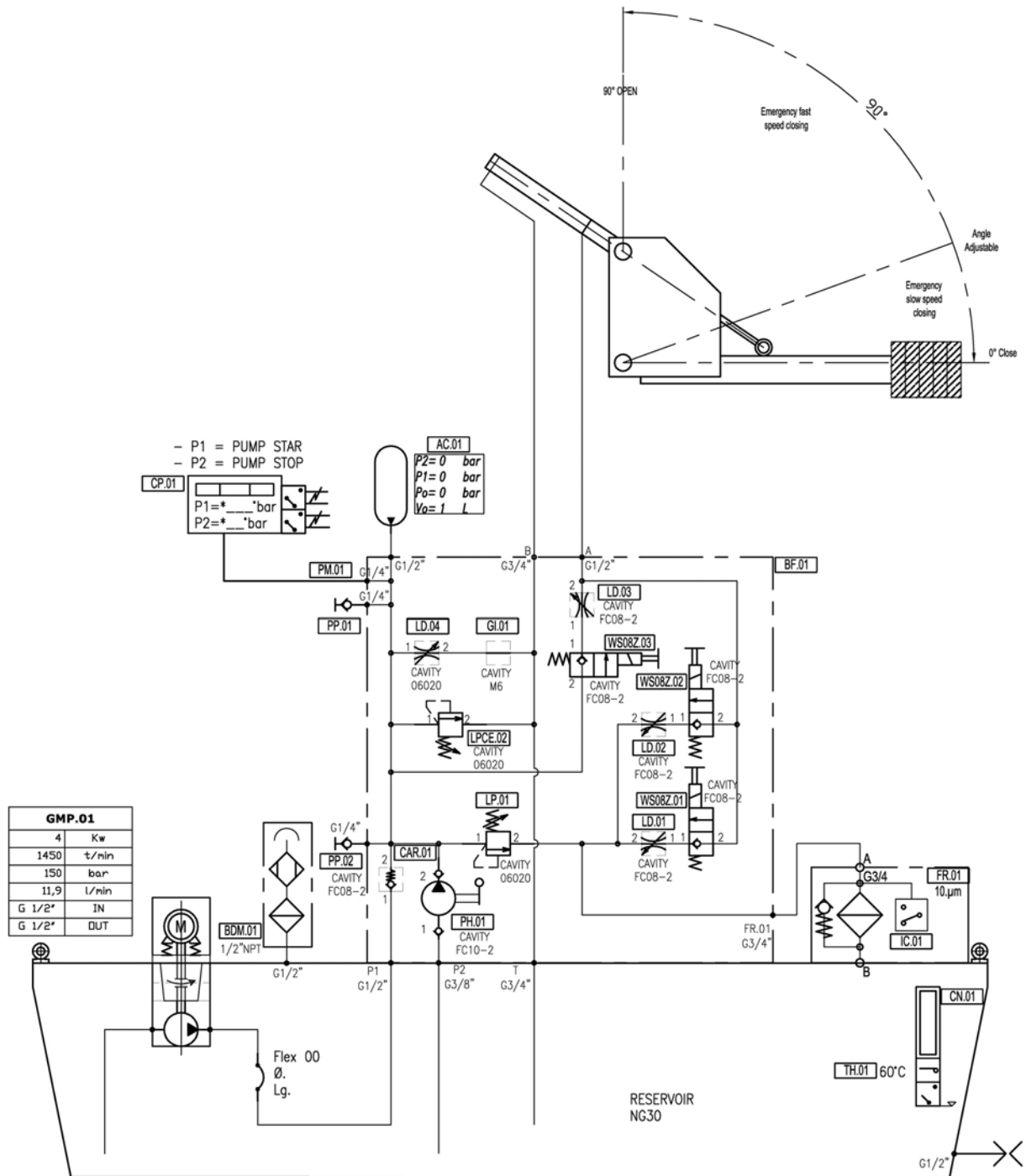
- | | |
|--|-----------------------------|
| 1: Accumulator - AC.01 | 8: Air filter - BDM.01 |
| 2: Pressure sensor - CP.01 | 9: Oil filter - FR.01 |
| 3: Cylinder supply port | 10: Clogging sensor - IC.01 |
| 4: Cylinder return port | 11: Suspension lug |
| 5: Lead-sealed pressure limiter - LPCE.02 (accumulator protection) | 12: Motor terminal strip |
| 6: Flow limiter - LD.04 for draining the accumulator | 13: Connection - PP.01 |
| 7: Hand pump | |

3D rear view with list of components



- | | | | |
|-----|--------------------------------------|-----|--------------------------------------|
| 14: | Flow limiter - LD.01 (closing speed) | 20: | Pressure limiter - LP.01 |
| 15: | Flow limiter - LD.02 (closing speed) | 21: | Solenoid valve closure - WS08.Z02 |
| 16: | Oil level - CN.01 (contact) | 22: | Solenoid valve closure - WS08.Z01 |
| 17: | Temperature sensor - TH.01 | 23: | Solenoid valve closure - WS08.Z03 |
| 18: | Oil reservoir | 24: | Flow limiter - LD.03 (opening speed) |
| 19: | Drain plug | | |

Hydraulic schematic

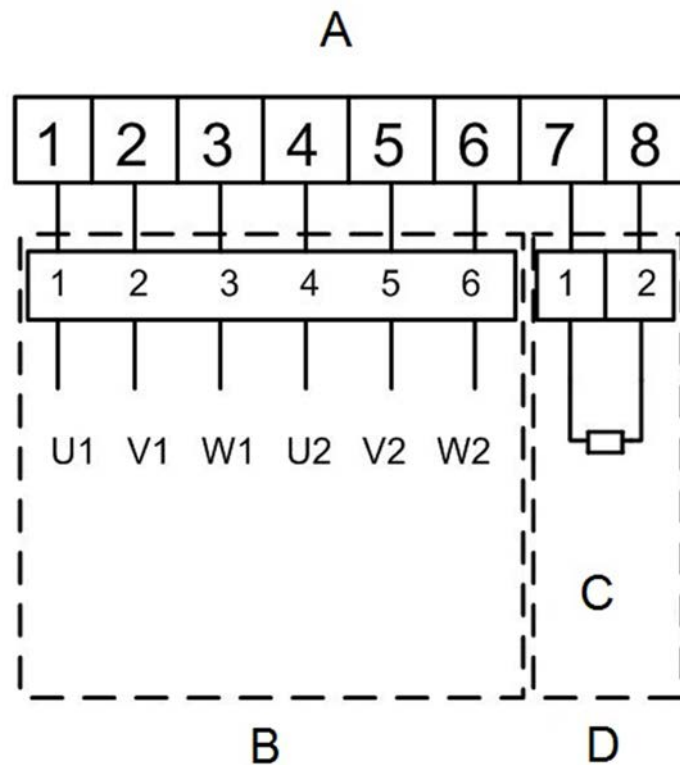


Technical data

Description	Data
Effective volume	30 litres
Reservoir material	Aluminium as standard (optional: steel)
Lid material:	Coated steel (thickness as per specification)
Maximum pressure	160 bar
Oil used	ISO VG 46
Ambient temperature range	-20 to +55 °C
Oil temperature range	+10 to +50 °C
Fluid level sensor	FSK127
Air filter mesh width	2 µm
Return filter mesh width	10 µm

Motor type	Weight	Dimensions (L x W x H)	Pump flow rate required
	[kg]	[mm]	[l/min]
0,75 kW	46,5	490 x 340 x 560	2,32
1,1 kW	49,5	490 x 340 x 580	3,6
1,5 kW	51,5	490 x 340 x 600	4,6
2,2 kW	56,5	490 x 340 x 629	6,1
3 kW	59,5	490 x 340 x 629	9,1
4 kW	64,5	490 x 340 x 647	11,9

Wiring diagram



- A: Motor unit
- B: 6-pole motor
- C: Heating
- D: Optional

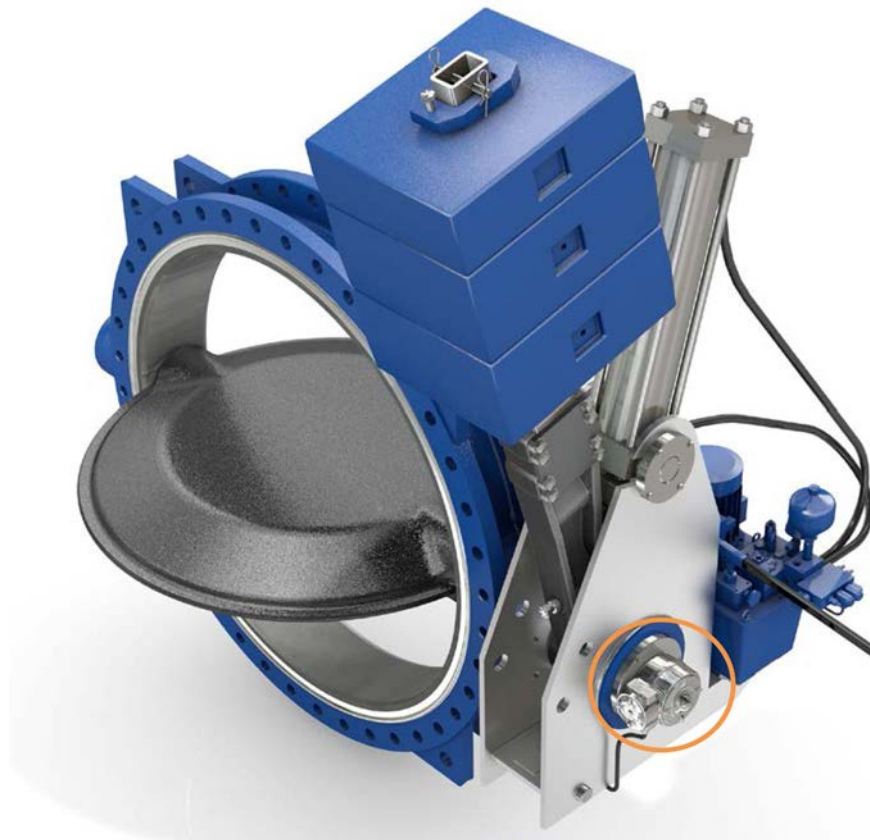
Hydraulic power pack control

Electrical or mechanical control	WS08Z.03	WS08Z.02	WS08Z.01
Opening	ON	OFF	OFF
Stop-and-go mode	OFF	OFF	OFF
Normal closing, high speed	OFF	OFF	ON
Normal closing, low speed	OFF	ON	OFF

Setting the speed		Component	Clockwise	Anti-clockwise
Setting of low speed, normal closing	SD08-01 C-N-V	LD.02	-	+
Setting of high speed, normal closing	SD08-01 C-N-V	LD.01	-	+
Setting of opening speed	SD08-01 C-N-V	LD.03	-	+

AMTROBOX limit switch box

Position



Technical data

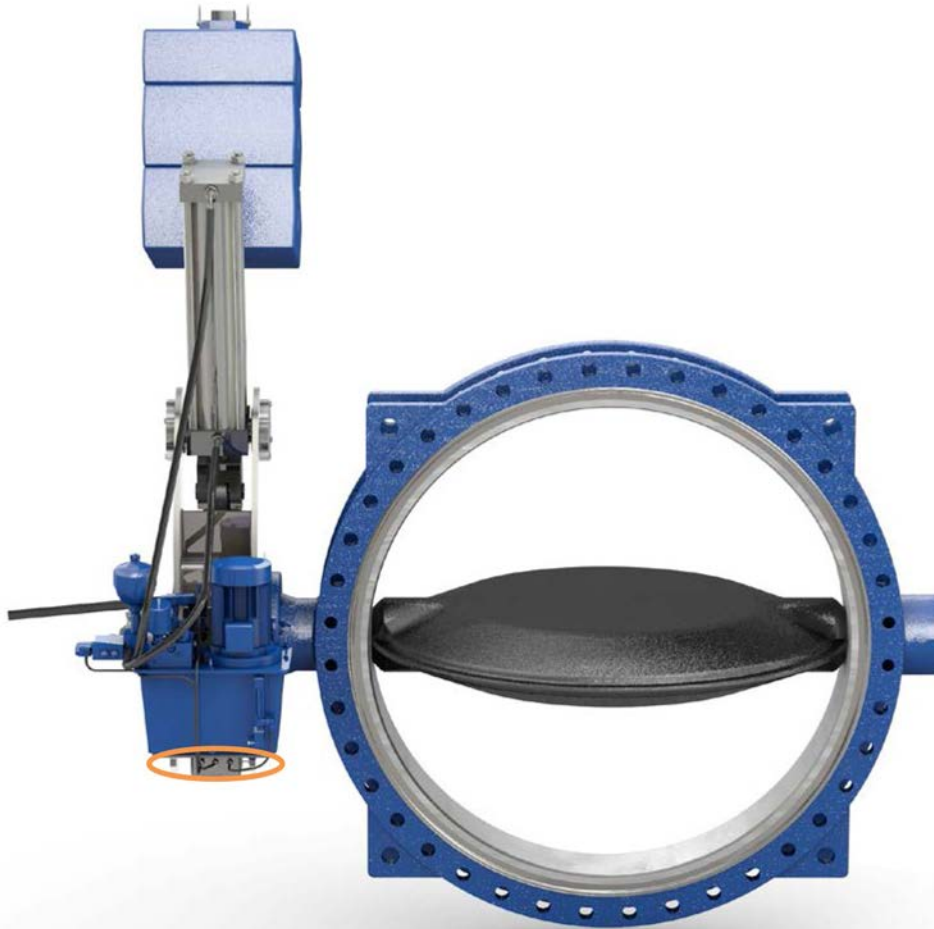
- Housing made of cast iron with anti-corrosive coating
- Position indicator function:
 - Open or closed positions indicated by means of electric limit switches or proximity sensors
 - Inductive proximity sensors (1/Open and 1/Closed, one intermediate position possible on request)
 - Actual-position feedback, 4-20 mA, passive - 2-wire system (optional)
- Housing enclosure: IP 68

For more information refer to KSB type series booklet, reference No. 8524.11.



Terminal box

Position

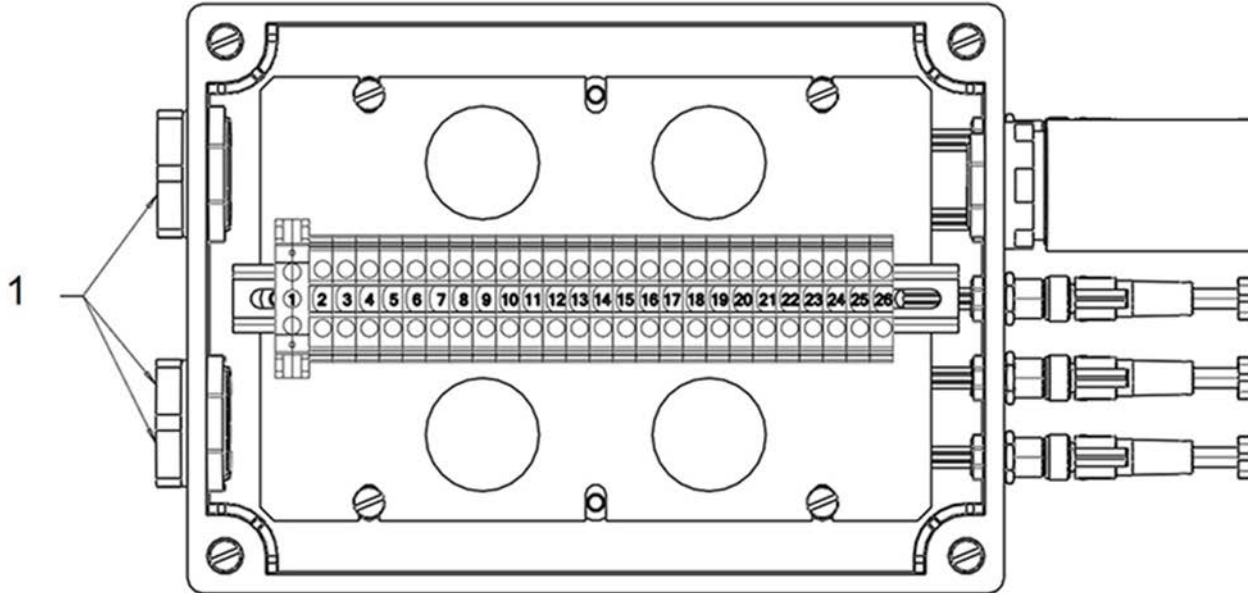


Technical data

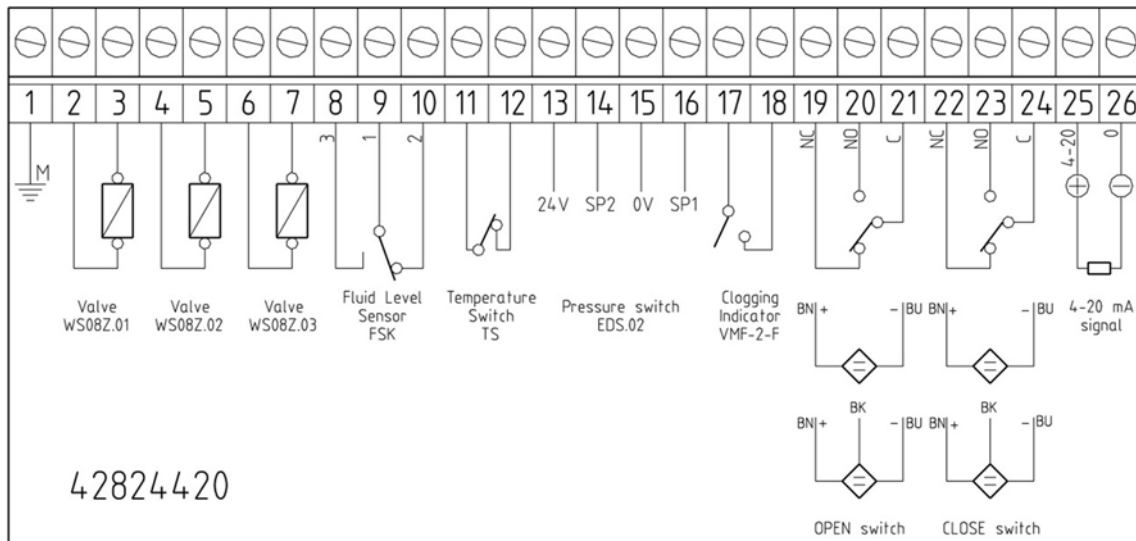
- Plastic housing: IP 67 to EN 60529
- Customer-supplied connection: 3 x ISO M25, thread pitch 1.5
- Supplied with 3 plugs (IP 67) as standard
- Connection of centralised instrumentation as shown in schematic below
- Cable diameter for connection to terminal strip: 0.2 to 4 mm²



Connection to terminal strip



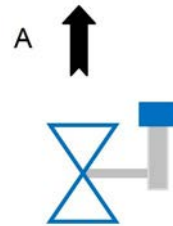
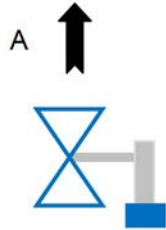
1 Customer-supplied connection: 3 x ISO M25, thread pitch 1.5



Variants

Options

- Centralised monitoring and programming via PLC
- Version with tropicalised motor for humid environments
- Application-specific coating
- KSB also supplies an electrical control cabinet tailored to the customer's requirements (on request).
- DUALIS can be installed in the piping in four installation positions:



Counterweight mounted on the right (when looking in the flow direction) and dropping in anti-clockwise direction

Counterweight mounted on the right (when looking in the flow direction) and dropping in clockwise direction



Counterweight mounted on the left (when looking in the flow direction) and dropping in anti-clockwise direction

Counterweight mounted on the left (when looking in the flow direction) and dropping in clockwise direction

A: Flow direction

Specifications required for enquiries/orders

Recommendations

- DUALIS is designed for fail-closed operation as standard, but it can also be used in fail-open mode if required for safety reasons (on request).
- The valve must always be installed with the stem in the horizontal position to ensure the perfect function of the unit.
- Observe all installation instructions supplied.
- After installation in the piping has been completed, a protective cage must be fitted around the counterweight assembly in order to protect the operators and users.

This guard is not included in KSB's standard scope of supply.

Torque / top flange / stem depending on DN and PN

ISORIA

DN	NPS	Pressure				
		6 bar	10 bar	16 bar	20 bar	25 bar
500	20	V hyd < 5.1 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 60 mm	V hyd < 5.1 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 60 mm	V hyd < 5.1 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 60 mm	V hyd < 5.1 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 60 mm	V hyd < 5.6 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 60 mm
600	24	V hyd < 3.85 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 65 mm	V hyd < 3.85 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 65 mm	V hyd < 3.1 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 65 mm	V hyd < 3.9 m/s Torque: 3150 mdaN Flange: F16 Stem Ø: 75 mm	V hyd < 4.2 m/s Torque: 4000 mdaN Flange: F16 Stem Ø: 75 mm
650	26	V hyd < 3.2 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 70 mm	V hyd < 3.2 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 70 mm	V hyd < 5.0 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 70 mm	/	/
700	28	V hyd < 3.25 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 70 mm	V hyd < 3.25 m/s Torque: 2200 mdaN Flange: F16 Stem Ø: 70 mm	V hyd < 4.7 m/s Torque: 4000 mdaN Flange: F16 Stem Ø: 70 mm	/	/
750	30	V hyd < 2.8 m/s Torque: 3150 mdaN Flange: F16 Stem Ø: 80 mm	V hyd < 2.8 m/s Torque: 3150 mdaN Flange: F16 Stem Ø: 80 mm	V hyd < 3.8 m/s Torque: 4000 mdaN Flange: F16 Stem Ø: 80 mm	/	/
800	32	V hyd < 2.8 m/s Torque: 3150 mdaN Flange: F16 Stem Ø: 80 mm	V hyd < 2.8 m/s Torque: 3150 mdaN Flange: F16 Stem Ø: 80 mm	V hyd < 3.35 m/s Torque: 4000 mdaN Flange: F16 Stem Ø: 80 mm	/	/
900	36	V hyd < 2.6 m/s Torque: 4000 mdaN Flange: F25 Stem Ø: 90 mm	V hyd < 2.6 m/s Torque: 4000 mdaN Flange: F25 Stem Ø: 90 mm	V hyd < 2.95 m/s Torque: 5300 mdaN Flange: F25 Stem Ø: 90 mm	/	/
1000	40	V hyd < 2.25 m/s Torque: 5300 mdaN Flange: F25 Stem Ø: 100 mm	V hyd < 2.25 m/s Torque: 5300 mdaN Flange: F25 Stem Ø: 100 mm	V hyd < 2.5 m/s Torque: 6500 mdaN Flange: F25 Stem Ø: 100 mm	/	/

V hyd = max. fluid velocity in m/s
Please contact us for higher flow velocities.
Please contact us for higher pressures (up to 40 bar).

MAMMOUTH

DN	NPS	Pressure				
		6 bar	10 bar	16 bar	20 bar	25 bar
1050	42	V hyd < 2.3 m/s Torque: 5300 mdaN Flange: F25 Stem Ø: 100 mm	V hyd < 2.3 m/s Torque: 5300 mdaN Flange: F25 Stem Ø: 100 mm	/	/	/
1100	44	V hyd < 2.1 m/s Torque: 5300 mdaN Flange: F25 Stem Ø: 100 mm	V hyd < 2.1 m/s Torque: 5300 mdaN Flange: F25 Stem Ø: 100 mm	V hyd < 1.75 m/s Torque: 9600 mdaN Flange: F30 Stem Ø: 140 mm	/	/
1200	48	V hyd < 2.0 m/s Torque: 6500 mdaN Flange: F25 Stem Ø: 100 mm	V hyd < 2.0 m/s Torque: 6500 mdaN Flange: F25 Stem Ø: 100 mm	/	/	/
1300	52	/	/	/	/	/
1350	54	V hyd < 1.35 m/s Torque: 8500 mdaN Flange: F30 Stem Ø: 140 mm	V hyd < 1.35 m/s Torque: 8500 mdaN Flange: F30 Stem Ø: 140 mm	/	/	/
1400	56	V hyd < 1.2 m/s Torque: 8500 mdaN Flange: F30 Stem Ø: 140 mm	V hyd < 1.2 m/s Torque: 8500 mdaN Flange: F30 Stem Ø: 140 mm	/	/	/

V hyd = max. fluid velocity in m/s
Please contact us for higher flow velocities.
Please contact us for higher pressures (up to 40 bar).



KSB S.A.S.
4, allée des Barbanniers • 92635 Gennevilliers Cedex (France)
Tél. +33 1 41 47 75 00 • Fax +33 1 41 47 75 10 • www.ksb.com