C11
Tilting Check Valve
with Hydraulic Brake

Product Description

DENZ C11 Tilting Check Valve with Hydraulic Brake is a non-return valve that is commonly used in pipeline networks requiring rapid closure and absorbing waln conjunction with the counter lever and weight attached to its shaft through a hydraulic piston, this ensures a soft open, depending on the amount of flow, and maintains rapid closure times when the flow stops.

As a result of the disc design where the center is shifted in two axes, it is able to decrease the operation torque values, reduce friction on the disc sealing area, and therefore extend the service life of the disc.

Application Areas

- Pumping stations
- Desalination plants
- Water treatment and distribution systems
- Pipelines
- Industry

Operation Versions

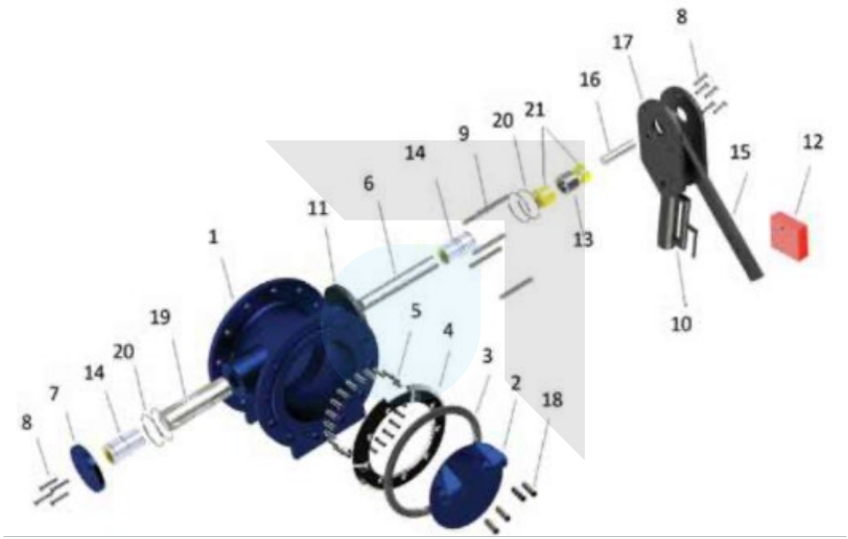
- Single counterweight and hydraulic piston
- Double counterweight and hydraulic piston
- Custom production for specific orders

Production References	
Size Range	DN100 – DN2400
Pressure Range	PN10/16/25/40
Temperature	EPDM: +80°C NBR: 60°C VITON: 120°C
Face to face	EN558 Series 14 / DIN 3202 F4
Design	EN12334
Connection	Flanged - EN1092-2
Coating	Electrostatic Powder Epoxy
Testing	EN 12266-1
Marking	EN 19

Product Features

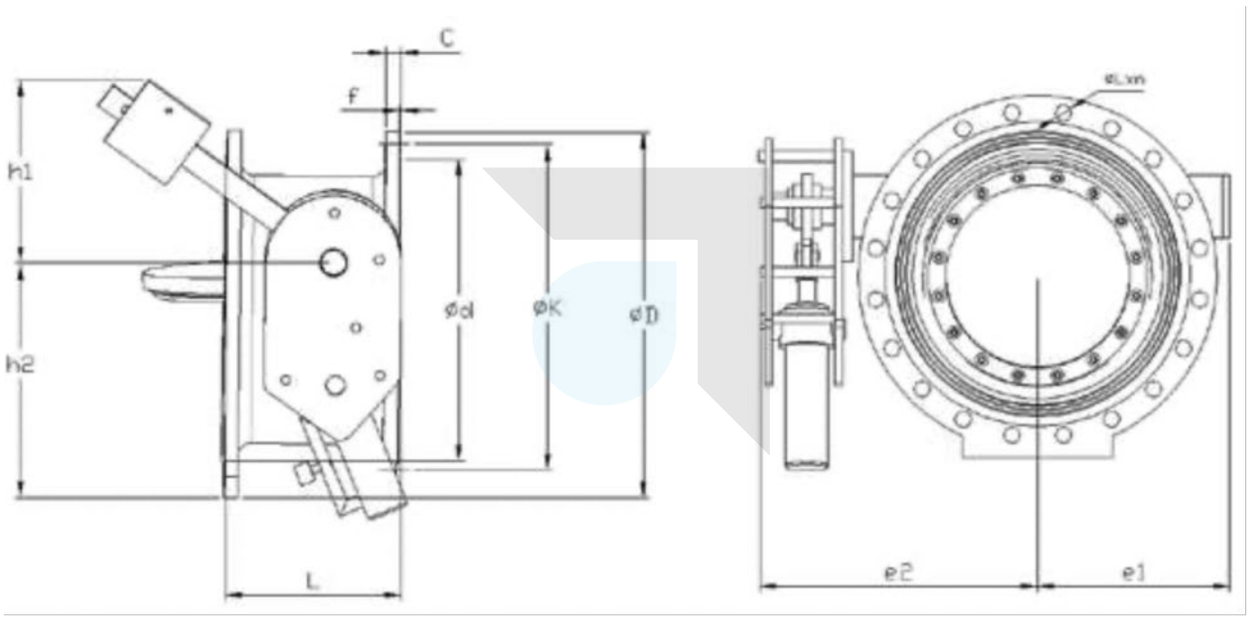
- ENGJS500-7 Ductile iron body and bonnet for high strength and impact resistance.
- This valve is designed as a resilient seated type. There is an option to order the metal seated type for specific orders.
- As a default, the sealing ring on the disc is EPDM. Various options are available, including NBR and VITON.
- Drop-tight sealing is extended with a solid/one-piece block molded T-shaped disc sealing ring.
- The counter lever length and weight can be adjusted to adjust the speed of the open/close. DENZ-C11 Tilting check valve with hydraulic damper is recommended for controlling speed.
- Both sides of the valve can be fitted with the arm and counterweight. Counterweights can be customized by the end user according to their usage. It is the responsibility of the DENZ technical team to provide the necessary support to the end user.
- When the valve is connected to the pipeline, the sealing can be easily replaced. For this process, the valve does not need to be removed from the pipeline. A new sealing can be installed by removing the bolts of the retaining ring.
- A welding seat made of SS308 LSI grade stainless steel is manufactured on the body using automatic welding machines and microfinished precision milling. The disc sealing ring applies equal pressure to all points of the welding seat once the disc is fully closed.
- The shafts are equipped with corrosion-resistant bronze or brass bushings.
- Due to the double shaft design, pressure loss is minimized and energy efficiency is increased.
- The pumps require less energy to operate due to the low torque advantage.
- Internal and external coatings with an average thickness of 250 microns are applied to the disc and body. Depending on the application, higher coating thicknesses can be applied.
- Coatings that meet WRAS hygienic standards are available upon request.
- During the installation process, it is important to consider the direction arrow on the body.
- AISI420 stainless steel spindle for high strength and corrosion resistance. Upper grade shaft materials can be used.
- 100% of the valves are subjected to Hydrostatic tests according to EN 12266-1. Pressure for seat: PN x 1.1 , for shell: PN x 1.5

Material List



#	Part	Material
1	Body	Ductile Iron EN-GJS-400/500 (GGG40/50)
2	Disc	Ductile Iron EN-GJS-400/500 (GGG40/50)
3	Disc Gasket	EPDM / NBR / VITON
4	Retaining Ring	ST37 Steel / AISI 304 / 316
5	Ring Bolts	Stainless Steel A2 / A4
6	Shaft	Stainless Steel AISI 420 / 304 / 316
7	Cover Bolts	Galvanized Steel 8.8 / A2 / A4
8	Bolt	Stainless Steel A2 / A4
9	Tie-rod	Stainless Steel AISI 304
10	Brake	Hydraulic piston
11	Connection adaptor	Ductile Iron EN-GJS-400/500 (GGG40/50)
12	Counterweight	ST37 Steel / Ductile Iron
13	Plug	Ductile Iron EN-GJS-400/500 (GGG40/50)
14	Bearing bush	Bronze
15	Lever	ST37 Steel / Ductile Iron
16	Brake Shaft	Stainless Steel AISI 420 / 304 / 316
17	Hydraulic Cover	ST37 Steel
18	Bolt	Stainless Steel A2 / A4
19	Shaft	Stainless Steel AISI 420 / 304 / 316
20	O-ring	EPDM / NBR / VITON
21	Bushing	PTFE

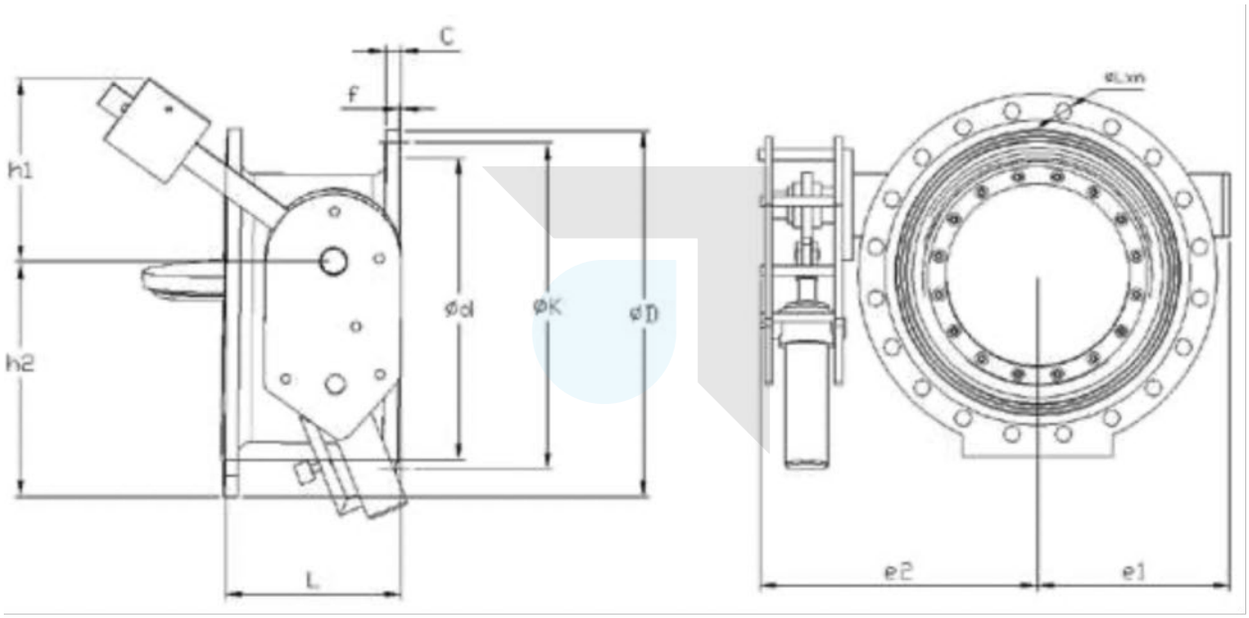
Dimensions



DN	L	f	hl	h2	el	e2	PN10					PN16				
							øD	øK	ød	C	øl*n	øD	øK	ød	C	øl*n
100	190	3					220	180	156	19	19x8	220	180	156	19	19x8
125	200	3					250	210	184	19	19x8	250	210	184	19	19x8
150	210	3	277	349	132	265	285	240	211	19	23x8	285	240	211	19	23x8
200	230	3	298	378	210	358	340	295	266	20	23x8	340	295	266	20	23xl2
250	250	3	289	392	242	374	405	350	319	22	23xl2	405	355	319	22	28xl2
300	270	4	295	384	263	416	460	400	370	24,5	23xl2	460	410	370	24,5	28xl2
350	290	4	326	468	292	469	505	460	429	24,5	23xl6	520	470	429	26,5	28xl6
400	310	4	340	454	323	516	565	515	480	24,5	28xl6	580	525	480	28	3lxl6
450	330	4	336	499	359	552	615	565	530	25,5	28x20	640	585	548	30	3lx20
500	350	5	487	507	383	597	670	620	582	28,5	28x20	715	650	609	31,5	34x20
600	390	5	517	642	433	633	780	725	682	30	3lx20	840	770	720	36	37x20
700	430	5	604	809	498	753	895	840	794	32,5	31x24	910	840	794	39,5	37x24
800	470	5	645	914	564	815	1015	950	901	35	34x24	1025	950	901	43	4lx24
900	510	5	708	1033	663	935	1115	1050	1001	37,5	34x28	1125	1050	1001	46,5	4lx28
1000	550	5	707	1257	689	1047	1230	1160	1112	40	37x28	1255	1170	1112	50	44x28
1100	590	5					1355	1270	1218	53,5	37x32	1355	1270	1218	53,5	44x32
1200	630	5					1455	1380	1328	45	4lx32	1485	1390	1328	57	50x32
1300	670	5					1585	1490	1432	59	42x32	1585	1490	1432	59	50x32
1400	710	5					1675	1590	1530	46	44x36	1685	1590	1530	60	50x36
1500	750	5					1820	1700	1640	47	44x36	1820	1710	1640	62,5	57x36
1600	790	5					1915	1820	1750	49	50x40	1930	1820	1750	65	57x40
1800	870	5					2115	2020	1950	52	50x44	2130	2020	1950	70	57x44
2000	950	5					2325	2230	2150	55	50x48	2345	2230	2150	75	62x48
2200	1030	6					2555	2440	2370	65	57x52	2555	2440	2360	80	62x52

Units: mm / indicative dimensions & weights

Dimensions



DN	L	f	hl	h2	el	e2	PN25					PN40				
							øD	øK	ød	C	øl*n	øD	øK	ød	C	øl*n
100	190	3					235	190	156	19	23x8	235	190	156	19	23x8
125	200	3					270	220	184	19	28x8	270	220	184	23,5	28x8
150	210	3	277	349	132	265	300	250	211	20	28x8	300	250	211	26	28x8
200	230	3	298	378	210	358	380	310	274	22	28xl2	375	320	284	30	3lxl2
250	250	3	289	392	242	374	425	370	330	24,5	28xl6	450	385	345	34,5	34xl2
300	270	4	295	384	263	416	485	430	389	27,5	3lxl6	515	450	409	39,5	34xl6
350	290	4	326	468	292	469	555	490	448	30	34xl6	580	510	465	44	37xl6
400	310	4	340	454	323	516	620	550	503	32	37xl6	660	585	535	48	4lxl6
450	330	4	336	499	359	552	670	600	548	34,5	37x20	685	610	560	49	4lx20
500	350	5	487	507	383	597	730	660	609	36,5	37x20	755	670	615	52	44x20
600	390	5	517	642	433	633	845	770	720	42	4lx20	890	795	735	58	50x20
700	430	5	604	809	498	753	960	875	820	46,5	44x24	995	900	840	64	50x24
800	470	5	645	914	564	815	1085	990	928	51	50x24	1140	1030	960	72	57x24
900	510	5	708	1033	663	935	1165	1090	1028	55,5	50x28	1250	1140	1070	80	57x28
1000	550	5	707	1257	689	1047	1320	1210	1140	60	57x28	1360	1250	1180	95	57x28
1100	590	5					1420	1310	1240	64,5	57x32					
1200	630	5					1530	1420	1350	69	57x32	1575	1460	1380	95	62x32
1300	670	5														
1400	710	5					1755	1640	1560	74	62x36	1795	1680	1600	105	62x36
1500	750	5					1865	1750	1678	77,5	62x36					
1600	790	5					1975	1860	1780	81	622x40	2025	1900	1815	120	70x40
1800	870	5					2195	2070	1985	88	70x44	2240	2110	2010	165	70x48
2000	950	5					2425	2300	2210	95	70x48					
2200	1030	6														

Units: mm / indicative dimensions & weights

Materials of C11 Tilting Check Valve with Hydraulic Damper

Ductile iron is the material of construction of the standard Tilted Disc Check valve. Aluminium bronze or stainless steel are the metals that make up the internal components.

Lubrication

DENZ Tilting check valves are equipped with grease fittings on the pivot pin covers. A waterproof, health and hygienic grease must be applied to the valve's pivot trunnions at least monthly or as conditions dictate. Use a cartridge grease gun to inject grease into each grease fitting using several full strokes.

Storage of DENZ Check Valves

The process of unloading must be carried out carefully in order to avoid any damage. It is important to place the load gently on the ground without letting it drop. Lifting is only accomplished by using shackles in the flange bolt holes or by slings around the body casting. There should be a valid inspection certificate on the forklift if one is used and the capacity of the forklift must be sufficient to lift the required weight.

The unloading workers must all be able to perform their duties. During the course of the work, they are required to wear safety boots, safety vests, safety goggles and hard hats.

There should be sufficient strength in all the slings used to lift the material. They should be stored in a cool, dry place away from sunlight and chemical elements, and they should perform as expected.

It is important to inspect the item immediately after unloading for compliance with specifications and for damage that may have occurred in shipment. As a minimum, the specification check should include size, pressure class, and so on. There are at least the following components that should be checked for damage in shipment: coating, seating and sealing surfaces, accessories, or any other evidence of mishandling during shipment. In the position in which each item will be installed, each item should be opened and closed one time.

DENZ Valves should be stored in a dry, cool environment, free from direct sunlight and any corrosive or chemically active atmosphere. It is very important that the valves are stored in an upright position and in an almost closed position in order to prevent long-term compression of the wedge rubber on the valve. In the event that valves are stored in cold storage, they must be protected from freezing. It is recommended to follow the rule of "first in, first out".

Markings on DENZ Check Valves

- DENZ Logo (or the logo of the OEM client)
- Product dimension (DN)
- Pressure class (PN)
- Material standard
- Casting batch number (Date of the casting)

Before Installation

Ensure working conditions are within the specified capacity of the product being installed. Refer to the certified Engineering drawings to assist in determining these values.

Make sure that the construction material of the DENZ Check Valve is chemically compatible with the media flowing in the pipeline

Before installation, rotate the counterweight to check whether valve rotation is flexible and positioning accuracy.

Make sure valve inside and the pipeline are clean. Any foreign material such as pipe scale, metal chips etc. can obstruct disc movement or damage the valve.

Make sure packing seals, the packing should be compressed tightly before installation, meanwhile do not prevent the stem rotation.

The distance between pipe flanges should be checked to assure sufficient clearance for valve.

Wedge should be full opened or closed when under pressure. Can't use the wedge to regulate the flow rate.

At usage, stem screw should be in-pouring lubrication usually.

Regular check on valve's seals surface, stem and gasket, packing etc. parts. If any parts broken, should repair or replace in time.

Installation

This information is provided as a recommendation to the customer for the proper use and installation of DENZ tilting type check valves.

Make sure that all pressurized lines involved in the installation are isolated, depressurized, and drained before starting work. The failure to do so may cause sudden pressure release and severe injury or death.

It is essential to protect DENZ Check valves during transportation, loading, and handling. Using a crane or any other lifting device should only be done through the flange holes, lifting eyes, or appropriate straps. The valve should never be suspended in the lever or counterweight.

It is important to perform a visual check of the system before it is installed. Checking the stem, valve seat area, flanges, and coating is an area that should be paid special attention to. Check for defects, bended parts, dents, scratches, and other damage. If defects are detected, the valves should be repaired or replaced.

It is essential to use the right gaskets, bolts, washers, and nuts when installing DENZ Check valves with flanges. It is important to tighten bolts in a criss-cross pattern and to apply torque to bolts. For an even pressure on the gasket surface, the valve flanges should be aligned. To find out the sizes of bolts and nuts, please contact our sales team.

It is important to ensure that the connecting flanges of the pipeline, which come into contact with the check valve, are arranged parallel to one another and exactly aligned to avoid tension loads acting upon the valve body during installation. The connecting bolts must also be tightened regularly in a cross pattern for the same reason, and to ensure regular sealing of the flanges. The gasket supplier must inform you of the bolt tightening torques.

The trench should be pressure tested before it is closed after installation. Make sure the check valve and pipe are secured against movement. Ensure that the pipeline and valve are drained prior to gas/air tests if they are tested with water. DENZ valves are designed to resist a test pressure of 1.5 times of the PN value at open position and 1,1 times of the PN value at closed position.

Testing

Check to see that all valve joints and pressure-containing bolts are tight. After testing, relieve excess pressure from the upstream side of the valve.

Warning

Special care should be taken in the installation, inspection and repair of pressure containing devices such as valves and hydrants. Failure to follow proper practice and guidelines can result in serious injury. Do not make repairs while check valve is under pressure.

Operation

1. On check valves without lever or weight, there are no special instructions regarding the operation since the valve is actuated by line flow.
2. If supplied with a lever or weight, the check valve can be adjusted to counteract slamming and/ or surge. Adjustment may be accomplished by adjusting the tension on the spring, or the position, and/or amount, of weight on the valve.

Maintenence

Normally there is very little maintenance on a check valve. On standard check valves it is suggested the valve be checked and controlled once a year. Depressurize the valve for inspection. Check for wear at all oscillating locations.

On the DENZ Series C Check Valves with extended shaft valves, every six months add a recommended grease between O-rings until resistance to flow is felt on the grease gun lever. If leakage occurs due to oscillation, replace O-rings by removing retainer plug. Be sure to pressurize space between o-rings with grease after reassembly. Look for excessive wear on extended shaft and bearing bore that would prevent O-ring sealing.

Spare Parts

Under most conditions the only spare parts needed for swing check valves would be bonnet gasket, and any applicable retaining plug gaskets and O-rings, if valve is equipped with extended shaft.

Under conditions where very frequent oscillation of a clapper is experienced, and/or sever, service conditions, other parts may be kept in stock.

Caution

Before removing the valve, the line must be drained to prevent pressure from being released.

1. The inlet flange of DENZ C11 should be facing down on a flat surface or bench.
2. Drive out both locating pins using a flat-nosed punch
3. A jam nut, a lockwasher, a pointer, pivot pin cover bolts, and covers should be removed from the indicator.
4. It is necessary to remove the pivot pins from the pivots. It has a tapped end for the insertion of threaded rods and a tapped hole on the other end for the pin.
5. Remove the diagonal flange bolts from the outlet body section of the valve using a hoist attached to the outer flange of the valve.
6. The outlet body section of the valve can be raised using the hoist. With a soft-blow hammer or block of wood, hammer down the inlet body section if the valve sections are joined tightly by the gasket. Putting the outlet section on a wooden skid after separating the body sections will allow the outlet section to clear the pivot trunnions.
7. If the Loctite is too hard, heat the disc trunnions with a propane torch to soften the Loctite. Remove the pivot pin bushings on 12” and larger valves.
8. With a nylon sling passing through the disc trunnions and eye bolt, raise the disc while maintaining its 55-degree tilt by threading an eye bolt into one of the threaded holes in its rectangular pad.
9. Put the disc on a wooden skid and turn it over with the disc ring facing up using the nylon sling attached to just the eye bolt.

As a result, all parts can now be inspected for wear or damage and replacement parts can be ordered as needed. It is recommended that you replace the seat and disc ring as a set if you are replacing them. Ideally, pivot pins should fit tightly inside the body while leaving plenty of space between them and the bushings.

Troubleshooting

A power source is not required to open the valve to allow forward flow. In spite of the fact that the valve may not open to full open, it will ensure minimal headloss even when it does not open to the full open position as a function of the fluidvelocity. In order to prevent reverse flow through the pump, the valve will automatically close. A moderate bang during closing is normal if the valve has metal seats.

There is a leak at the valve inspection covers:
Replace non-asbestos sheet gaskets or retighten bolts evenly.

The leak occurs at the grease fitting:
The grease fitting needs to be injected with grease or replaced

Flange leakage:
Replace or retighten the mating flange gasket or retighten bolts using the cross-over method. Flange gaskets are typically made from 70 durometer material. Make sure that the pipe mating is aligned correctly.

Leaks in valves when they are closed:
It is recommended that you cycle the valve in order to flush debris from the seat. Ensure that the isolation butterfly or gate valve is open when the valve is closed and subject to a minimum differential pressure of 10 psi. The interior of the valve should be inspected if leakage persists. Make sure the seating surfaces are clean. In combination with a power-operated control valve, there may not be sufficient reverse flow to seat the valve. Power outages are required for these types of installations to ensure that the valve seats properly so that the pump trips while the control valve is open.

Failure to open valve:
Ensure that there is a pressure differential across the disc. It is necessary to have a higher downstream pressure than an upper downstream pressure. Check that all shutoff valves are open for suction and discharge, and that there are no obstructions in the line. Inspect the disc ring and seat ring for damage and debris wedges on both sides of the valve as well as draining both sides of the valve.

Operating at a high level of noise:
It is normal to hear flow noise during the flow process. Cavitation may cause loud flow noise similar to hammering caused by dropping high pressures across valves. Analyze the velocity of flow through valves and pump applications.