C16

Nozzle Check Valve
Series 14

Product Description

DENZ-C16 Nozzle Check Valve is used as protection against reverse flow when power failure in areas where noise pollution or water hammering is a critical issue. It can provide not only quiet performance but also low head loss. Its compact mechanism combined with its spring assisted closure ensure that the Nozzle Check Valve retains its high performance regardless of whether it is installed vertically or horizontally.

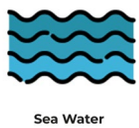
Application Areas

- Transmission pipeline compressor discharge
- Water treatment plants
- Desalination plants
- Pumping stations
- Subsea pump and flowline applications
- Hydropower installations
- Potable water systems

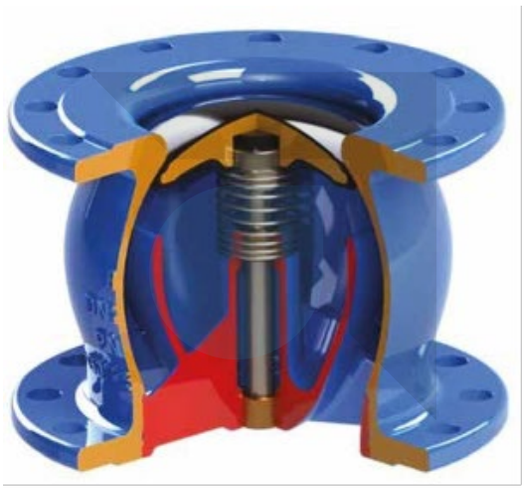
Production References	
Size Range	DN50 - DN1000
Pressure Range	PN10/16/25
Temperature	EPDM: +80°C NBR: 60°C VITON: 120°C
Face to face	EN 558 Series 14 / DIN 3202 F4
Design	EN593
Connection	Flanged - EN1092-2
Coating	Electrostatic Powder Epoxy
Testing	EN 12266-1
Marking	EN 19


Potable Water


Irrigation

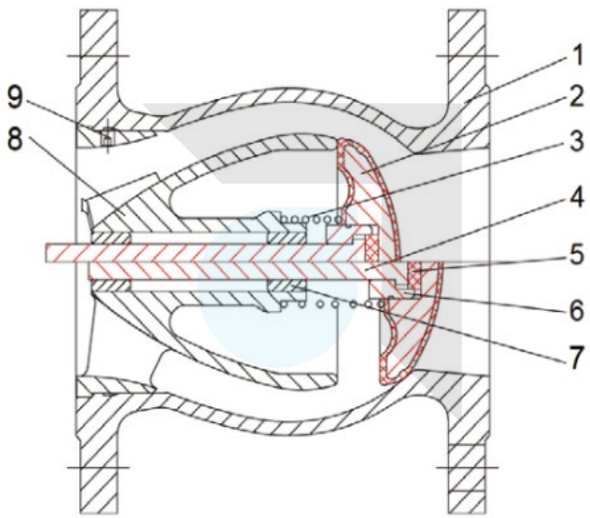

Sea Water

Product Features



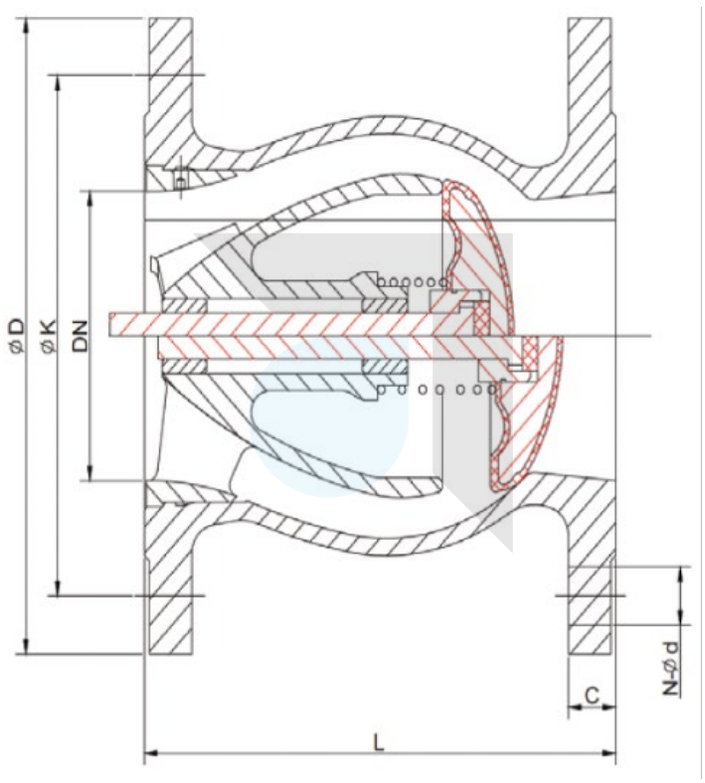
- ENGJS500-7 Ductile iron body and bonnet for high strength and impact resistance.
- A nozzle check valve whose body diameter is significantly greater than its inlet diameter exhibits the best flow characteristics.
- DENZ Nozzle Check Valves have disc faces designed to maximize hydrodynamic efficiency and minimize pressure loss.
- An O-ring specially designed and sourced by DENZ is installed in the seat of all DENZ Nozzle Check Valves.
- Using a soft seat reduces reverse flow leakage and helps the valve close quietly.
- DENZ Nozzle Check Valves use only one spring designed for a million cycle life, unlike most other companies, which use multiple springs. Spring failures are reduced when the number of springs is minimized.
- Low maintenance requirements provides long service life.
- Vertical and horizontal installations are possible with DENZ Nozzle Check Valves.
- Reduces the effect of water hammer on the system
- The body has an arrow mark showing the correct direction for a directional application
- AISI420 or AISI304 stainless steel shaft for high strength and corrosion resistance
- 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	Spring	Stainless Steel AISI 304/316
4	Stem	Stainless Steel AISI 420/304/316
5	Washer	EPDM
6	Nut	Stainless Steel AISI 420/304
7	Bushing	Bronze / Brass MS58
8	Diffuser	Ductile Iron GJS 500-7
9	Set Screw	Stainless Steel 304

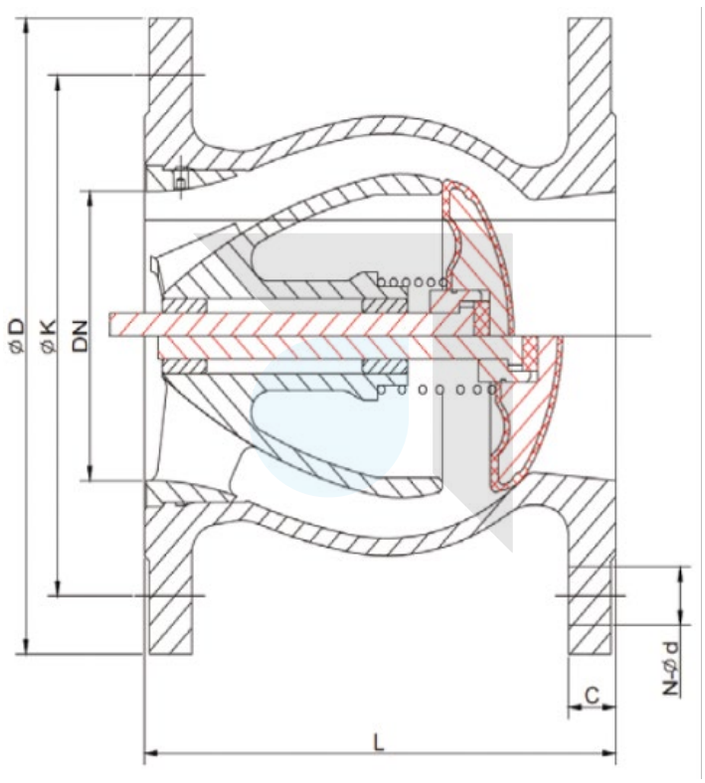
Dimensions



PN10							
DN	L	D	K	d2	b	n	KG
200	230	340	295	23	20	8	39
250	250	400	350	23	22	12	40
300	270	455	400	23	24,5	12	90
350	290	505	460	23	24,5	16	105
400	310	565	515	28	24,5	16	140
450	330	615	565	28	24,5	20	148
500	350	670	620	28	26,5	20	205
600	390	780	725	31	30	20	278
700	430	895	840	31	32,5	24	330
800	470	1015	950	34	35	24	480
900	510	1115	1050	34	37,5	28	660
1000	550	1230	1160	37	40	28	808
1100	590	1340	1270	37	40	32	1148
1200	630	1455	1380	40	45	32	1498
1000	550	5	1230	1160	1112	40	37x28

Units: mm / indicative dimensions & weights

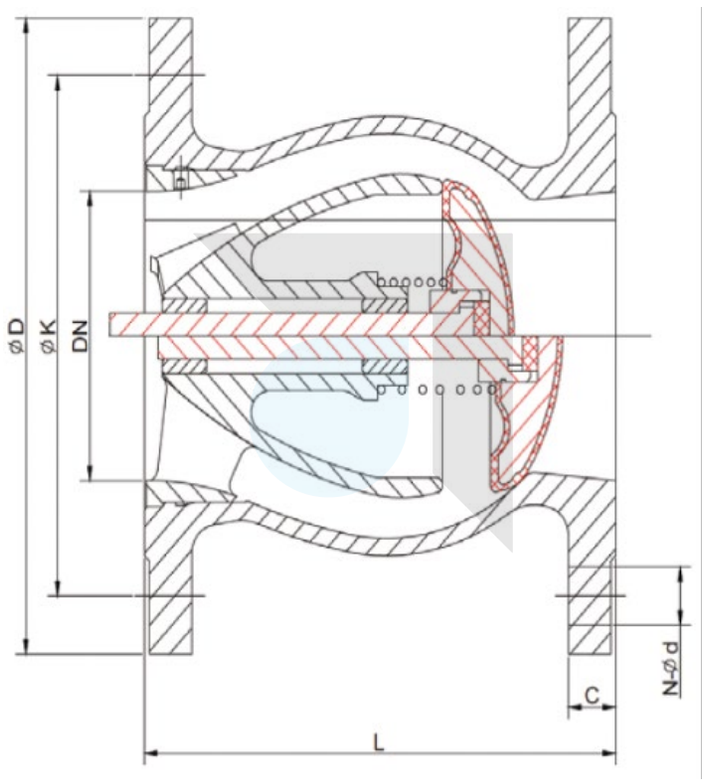
Dimensions



PN16							
DN	L	D	K	d2	b	n	KG
300	370	455	410	28	24,5	12	65
350	290	520	470	28	26,5	16	96
400	310	580	525	31	28	16	148
450	330	640	585	31	28	20	198
500	350	715	650	34	31,5	20	258
600	390	840	770	37	36	20	418
700	430	910	840	37	39,5	24	530
800	470	1025	950	40	43	24	635
900	510	1125	1050	40	46,7	28	830
1000	550	1225	1170	43	50	28	1078
1200	630	1485	1390	49	57	32	1848

Units: mm / indicative dimensions & weights

Dimensions



PN25							
DN	L	D	K	d2	b	n	KG
200	230	360	310	28	22	12	140
250	250	425	370	31	24,5	12	205
300	270	485	430	31	27,5	16	235
350	290	555	490	34	30	16	250
400	310	620	550	37	32	16	420
450	330	670	600	37	34,5	20	490
500	350	730	660	37	36,5	20	695
600	390	845	770	40	42	20	780
700	430	960	875	43	46,5	24	1000
800	470	1085	990	49	51	24	1290
900	510	1185	1090	49	59,5	28	1830
1000	550	1320	1210	56	60	28	2250
1200	630	1530	1420	56	74	32	3600

Units: mm / indicative dimensions & weights

Advantages of Nozzle Check Valve

Energy saving

Typically, systems are operated at low flow rates to minimise pressure losses and maximise plant efficiencies. To help operators achieve this, DENZ Nozzle Check Valves can be fully open at a flow velocity of 1.5m/s, ensuring minimal pressure drop across the valve.

Non-slamming

The high economic efficiency of DENZ Nozzle Check Valves is a result of very low pressure losses and the maintenance-free design. Due to short strokes and low moving masses supported by helical springs the valves close slam-free within fractions of seconds.

maintenance Free

The DENZ Nozzle Check Valves designs use no soft parts. Also as there are no wearing parts, it is considered maintenance free. The springs are sized according to the flow rates to ensure that the valves are in the fully open position during normal use. This minimises cycling of the spring, giving the valves a long design life without regular maintenance.

Horizontal or Vertical Installation

Lightweight discs and spring assisted closure combine to allow the DENZ Nozzle Check Valves to maintain the same high performance regardless of vertical or horizontal installation.

How does DENZ Nozzle Type Check Valve work?

DENZ Nozzle Type Check Valve works based on the principle of differential pressure. In this case, the valve opens if the upstream pressure is more than the downstream pressure. The valve closes when the downstream pressure is more than the upstream pressure. So, for a silent check valve to open, the suction pressure is high enough to provide pressure energy. The pressure energy of the flowing fluid provides the force used to compress the valve spring.

Compressing the valve spring forces the valve disc to open allowing fluid flow. The fluid keeps flowing while the valve is open and the pressure remains high. When the pressure reduces the valve spring uses its potential energy to revert to its length and in that instance, it forces the valve disc to close. For DENZ Nozzle Type Check Valve, the fluid flow starts closing immediately after suction pressure starts reducing. As such, the valve starts closing slowly which helps to eliminate the water hammer problem.

DENZ Nozzle Type Check Valves do not rely on gravitational force to close like lift check valves. The opening of this valve depends on the suction pressure level from the pump while closing the valve depends on compressive strength and thus potential energy associated with the compressed spring. As such, a silent check valve can be installed in vertical or horizontal direction as either orientation will not affect its working principle.

Troubleshooting

The valve vibrates or chatters
The fluid is moving at high velocity. Ensure the flow rate is as recommended by the silent check valve manufacturer.

Valve Leaking Fluid
Foreign materials are clogging the valve. Open the valve and remove any foreign materials.
The valve seat is damaged. Replace the valve seat.
The valve gasket is worn out or damaged. Replace the gasket.
Loose connection between the valve and the pipe. Tighten the connecting elements that are bolts and nuts or screws to the torque recommended by the silent check valve manufacturer.

No Fluid Flows Through The Silent Check Valve
The valve was installed in the wrong direction. Reinstall the valve according to the flow direction indicated by the silent check valve manufacturer.

Key Differences Between Axial and Swing Check Valves

Some styles of check valves are specifically designed to allow their disc, or flapper, to slam shut in certain conditions, such as the reversal of fluid flow. This sudden shutting, or slamming, creates a wave of pressure in the liquid that reverberates throughout the system and, depending on the precise application, can ultimately lead to reduced process efficiency, valve damage, gasketed joint leaks and other issues. This inevitable — but controllable — phenomenon is commonly referred to as water hammer.

DENZ Axial Check Valves are designed specifically for use in these situations. As their name implies, these valves close without slamming, meaning no excess pressure spikes are created. The disc of a DENZ Axial Check Valve has an internal spring opposing the opening fluid flow pressure. When the flow of a media is strong enough, the spring compresses and the valve opens; the disc is smoothly pushed back toward the seating surface in the valve by the spring as the flow decreases and stops, but before flow direction reverses.

Often called flapper style check valves, swing check valves are a more traditional variety. The disc of a swing check valve is secured to the body of the valve by a trunnion and hinge arm, without the aid of a spring. Unlike an axial check valve, which opens and closes at rates comparable to the pressure of the fluid flow, a swing check valve opens and closes more suddenly, relying on the installation orientation, gravity, and reversing flow to close the valve.

Both axial check valves and swing check valves are suitable for use in a wide range of applications. Generally, though, axial check valves are ideal for vertical runs of piping, or complex applications that require constant and controllable pressure levels. Alternatively, swing valves are often used in very large-volume applications, horizontal pipe runs, and those applications in which varying pressures and flow rates are not a concern.

DENZ axial check valves are also used in similar applications throughout the chemical processing industry, steam condensate systems, and in the power generation industry.

Swing valves, because of their less controlled opening and closing mechanics, are used in less sensitive applications. They are most commonly employed in large-scale pipeline applications, such as liquid, gas, and steam, generally only in horizontal configurations. In particular, they're often used in natural gas applications, as natural gas processing generally does not require as stringent pressure control as the oil and refining industry or in sewage and water treatment systems.