

Technical manual

Enodia

Butterfly valves
DN 400 to 1200 mm

Summary



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Applications and main characteristics

Industrial processes and general services, water distribution and treatment, ship yards, etc ...

Applications :

- Water distribution and supply with the main European approvals, water treatment, most of the fluids of general services.
- Industrial applications such as :
Metallurgical, mining, paper-making, shipbuilding, nuclear, environmental and mechanical, food industry (see our list of approvals).
- For special applications, especially for particularly difficult media, contact our technical back office team.

Main characteristics :

- Dimensional implement of the Sylax range
- Available in :
 - . centering lugs : DN400 to 1000
 - . tapped lugs : DN400 to 500
 - . double flanges : DN400 to 1200
- Vertical and horizontal mounting of the shaft.
- Two parts shaft with guide bushes linked by rods which ensure anti-ejection. For DN1200, the anti-ejection is ensured by a circlip.
- High power transmission with robust grooved connection between the shaft and the disc.
- Cast iron body, JL1040 (DN400 to 600) and ductile iron JS1030 (DN400 to 1200).
- Body epoxy coated 80µm colour blue RAL 5017 (a lot of other coatings on option, please ask our sales department).
- Hollow disc, spherically machined, driven by grooves. The floating disc eliminates the stress against the liner when actuating the butterfly valve.
- Secondary tightness.
- Easy maintenance. Interchangeable disc and liner
-
- Wide choice of actuators

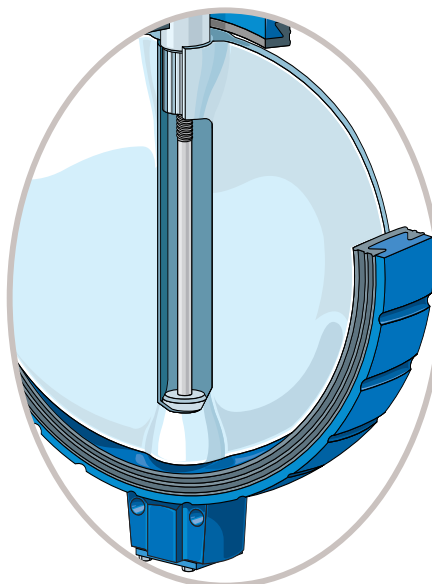
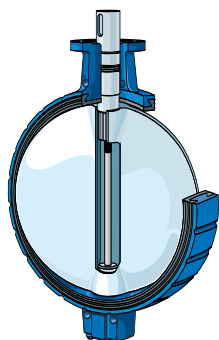
An instruction notice specifying the installation characteristics and the commission of the Enodia is available on our web site www.danfoss-socla.com or on request by our sales department.

Sale leaflet

By concentrating the technologies and by integrating technical solutions of the highest levels,

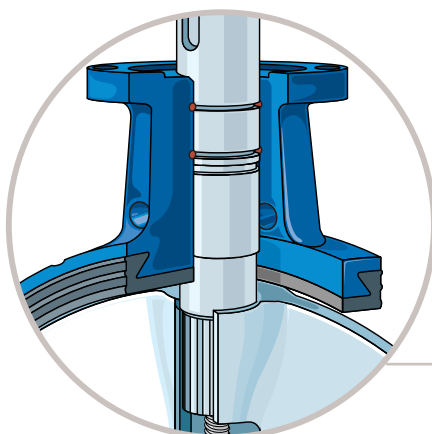
Danfoss Socla fulfils its ambition :

- competitiveness of a standard range,
- reliability,
- comprehensive range thanks to a multiplicity of solutions.

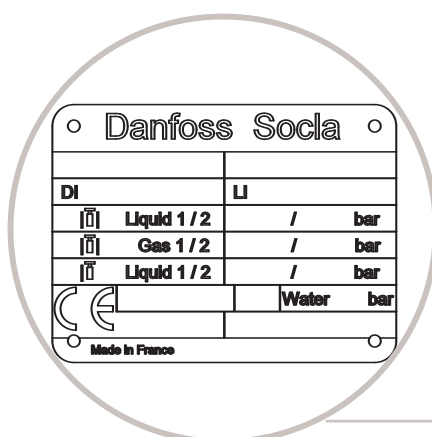


- Two part shaft with guide bushes linked by rods which ensure anti-ejection. For DN1200, the anti-ejection is ensured by a circlip.
- Spline driven one piece shaft connected to floating disc :

. high reliability of tightness and torque transmission in the long term.



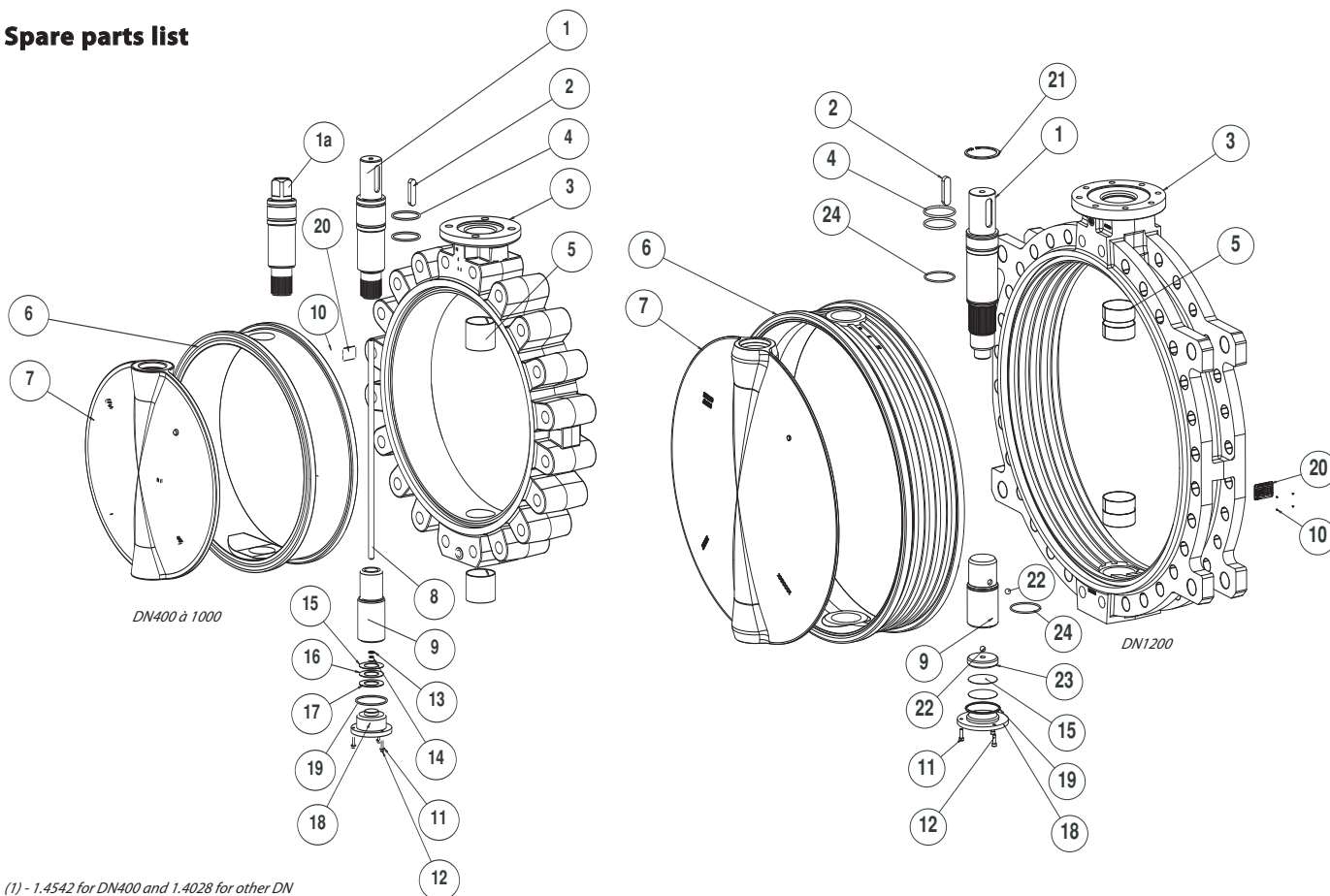
- Safety reinforced by double water tightness.
- High power transmission with robust grooved connection between the shaft and the disc.
- Complete protection of the shaft and valve body from fluids.
- Reliability of movements with self-lubricating bearings.



- Identification and traceability ensured by riveted metal tag : see on page 12.

Technical manual Enodia

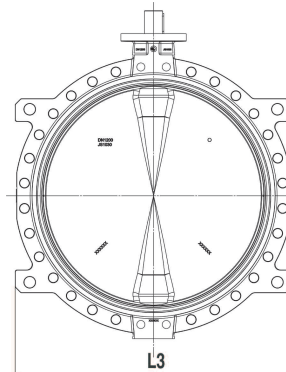
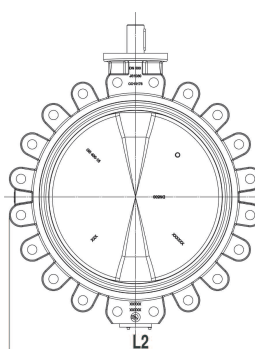
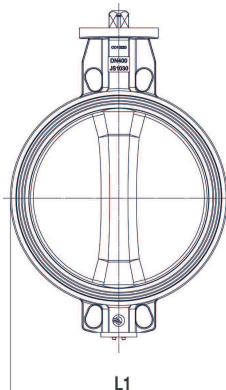
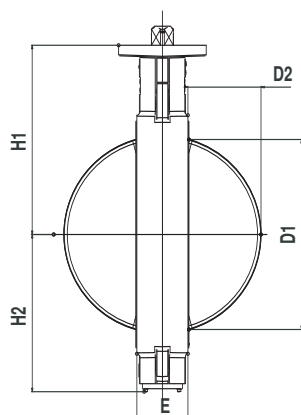
Spare parts list



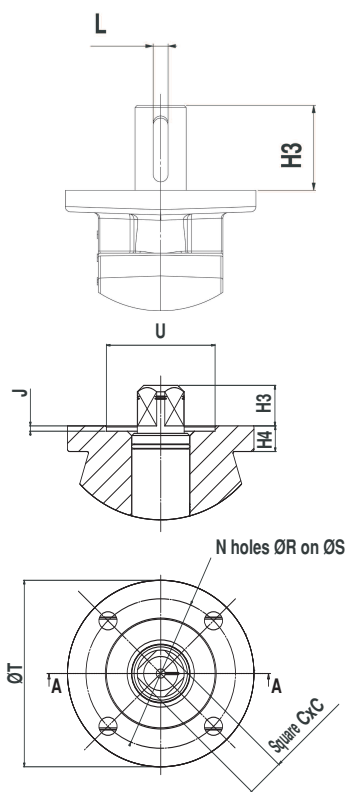
(1) - 1.4542 for DN400 and 1.4028 for other DN
(2) - EN-GJL-250 DN400 to DN600

Nb	DESCRIPTION	Qty	MATERIALS ACCORDING TO NORMS			
			Materials	EN	ASTM	JIS
1	Upper shaft	1	Stainless steel (1)	X5CrNiCuNb16-4 (1.4542)	630 ou 420	SUS630 ou SUS420J2
1a	Upper shaft square version	1		ou X30Cr13 (1.4028)		
2	Key	1	Steel	-	-	-
3	Body	1	Ductile iron or cast iron (2)	EN GJS 400-15 (JS1030) ou EN-GJL-250 (JL1040)	-	FCD40 ou FC25
4	O-ring	2	Nitrile	-	-	-
5	Guide bushes	4	Zinc coated steel + PTFE	-	-	-
6	Liner	1	EPDM or HIGH CONTENT NITRILE or SILICONE or FKM	-	-	-
7	Disc	1	Ductile iron or stainless steel or alu-bronze (2)	EN GJS 400-15 (JS1030) ou GX5CrNiMo19-11-2 (1.4408) ou CuAl10Fe5Ni5-C (CC333G)	-	FCD40 ou SC514 ou ...
8	Rod	1	Zinc coated steel	-	-	-
9	Lower shaft	1	Stainless steel (1)	X5CrNiCuNb16-4 (1.4542) ou X30Cr13 (1.4028)	630 ou 420	SUS630 ou SUS420J2
10	Rivet	4	Stainless steel	-	-	-
11	Stop washer	3 ou 4	Zinc coated steel	-	-	-
12	Screw	3 ou 4	Zinc coated steel	-	-	-
13	Flat washer	1	Zinc coated steel	-	-	-
14	Stop nut	1	Zinc coated steel	-	-	-
15	Packing rings	2	Steel	S275JR (1.0037)	grC/D	-
16	Packing ring	1	Steel	S275JR (1.0037)	grC/D	-
17	Stop guide	1	Zinc coated steel + PTFE	-	-	-
18	Bottom	1	Steel	S275JR (1.0037)	grC/D	-
19	O-ring	1	Nitrile	-	-	-
20	Identification plate	1	Aluminium	EN AW - AL995 (EN AW - 1050A)	-	-
DN 1200 Version						
21	Circlips	1	Steel	-	-	-
22	Ball	2	Steel	100Cr6 (1.3505)	52100	SUJ 2
23	Spacer	1	Zinc coated steel	X30Cr13 (1.4028)	420	SUS420J2
24	O-ring	2	Nitrile	-	-	-

Overall dimensions



• Centering lugs



Diameter		Face to face	Overall dimensions				Iso top according to EN ISO 5211								Square drive outlet DN400/450* round other DN			Travel of the disc		Kg
DN	NPS		E	L1	H1	H2	H4	N	øR	øS	øT	øU	J	N°	C	H3	L**	D1	D2	
400	16	102	488	378	314	21	4	17	140	175	102	4	F14	□36	38		382	146,5	62	
450	18	114	526	368	346	20	4	17	140	175	102	5	F14	□36	38		431	166	87	
500	20	127	570	403	371	20	4	17	140	175	102	5	F14	48	80	14	471	180,5	100	
600	24	154	679	495	432	25	4	22	165	210	132	6	F16	58	91	16	561,5	214	175	
700	28	165	793	570	503	30	8	18	254	300	202	6	F25	89	110	25	654,5	255	263	
800	32	190	889	630	568	30	8	18	254	300	202	6	F25	89	110	25	750,5	292	343	
900	36	203	995	700	655	40	8	22	298	350	232	6	F30	98	130	28	841	331	508	
1000	40	216	1100	750	705	40	8	22	298	350	232	6	F30	98	130	28	940,5	374,5	584	

** according to norm NFE22-175

• Tapped lugs

Diameter		Face to face	Overall dimensions				Iso top according to EN ISO 5211								Square drive outlet DN400/450* round other DN			Travel of the disc		Kg
DN	NPS		E	L2	H1	H2	H4	N	øR	øS	øT	øU	J	N°	C	H3	L**	D1	D2	
400	16	102	572	378	314	21	4	17	140	175	102	4	F14	□36	38		382	146,5	89	
450	18	114	638	368	346	20	4	17	140	175	102	5	F14	□36	38		431	166	114	
500	20	127	708	403	371	20	4	17	140	175	102	5	F14	48	80	14	471	180,5	154	

** according to norm NFE22-175

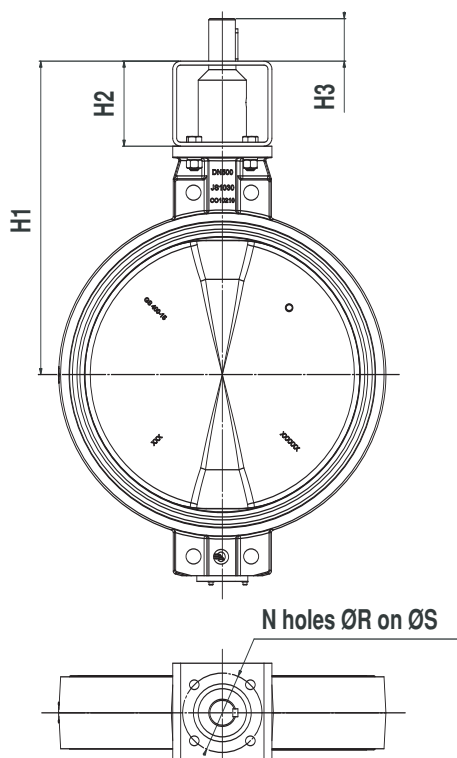
• Double flanges

Diameter		Face to face	Overall dimensions				Iso top according to EN ISO 5211								Square drive outlet DN400/450* round other DN			Travel of the disc		Kg
DN	NPS	E	L2/L3 (1)	H1	H2	H4	N	øR	øS	øT	øU	J	N°	C	H3	L**	D1	D2		
400	16	102	597	378	314	21	4	17	140	175	102	4	F14	□36	38		382	146,5	84	
450	18	114	670	368	346	20	4	17	140	175	102	5	F14	□36	38		431	166	117	
500	20	127	730	403	371	20	4	17	140	175	102	5	F14	48	80	14	471	180,5	149	
600	24	154	840	495	432	25	4	22	165	210	132	6	F16	58	91	16	561,5	214	219	
700	28	165	960	570	503	30	8	18	254	300	202	6	F25	89	110	25	654,5	255	324	
800	32	190	1085	630	568	30	8	18	254	300	202	6	F25	89	110	25	750,5	292	448	
900	36	203	1185	700	655	40	8	22	298	350	232	6	F30	98	130	28	841	331	600	
1000	40	216	1320	750	705	40	8	22	298	350	232	6	F30	98	130	28	940,5	374,5	732	
1200	48	254	1485	870	768	40	8	22	298	350	232	6	F30	98	125	28	1134	454	924	

(1) L3 : DN 1200 only

** according to norm NFE22-175

Connecting kits for actuation



We recommend direct mounting of the actuation, otherwise see table below.

DN	NPS	iso top of the valve	Iso top of the actuation																
			F10		F12		F14		F16		F25		F30		F35				
			H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2			
400	16	F14/□36	468	90	468	90	528	150	528	150	598	220							
450	18		458		458		518		518		588								
500	20	F14/Ø48	493	90	493	90	553	150	553	150	623								
600	24	F16/Ø58	585	90	585	90	645	150	645	150	715		645	150					
700	28	F25/Ø89					790	220	790		790	220	790	220					790
800	32						850		850		850		850		850				
900	36	F30/Ø98							920	220	920	220	920	220	920	220	920	220	
1000	40								970		970		970		970				
1200	48								1090		1090		1090		1090				

We recommend direct mounting of the actuation

DN	NPS	iso top of the valve	Exceeding length of the shaft H3						
			Kit	□36	Ø48	Ø58	Ø89	Ø98	
400	16	F14/□36	F10						
			F12	38	65				
F14	38		65	80					
450	18		F16	38		80	110		
			F25				110	130	
500	20	F14/Ø48	F10						
			F12	38	65				
			F14	38	65	80			
			F16	38		80	110		
			F25				110	130	
600	24	F16/Ø58	F10						
			F12	38	65				
			F14	38	65	80			
			F16	38		80	110		
			F25				110	130	
			F30					130	
700	28	F25/Ø89	F14	38	65	80			
			F16	38		80	110		
F25					110				
800	32		F30					130	
			F35					130	
900	36		F30/Ø98	F16	38		80	110	
1000	40			F25				110	130
		F30							130
1200	48	F35							

N°	N	ØR	ØS
F10	4	10,5	102
F12	4	12,5	125
F14	4	17	140
F16	4	22	165
F25	8	18	254
F30	8	22	298
F35	8	32	356

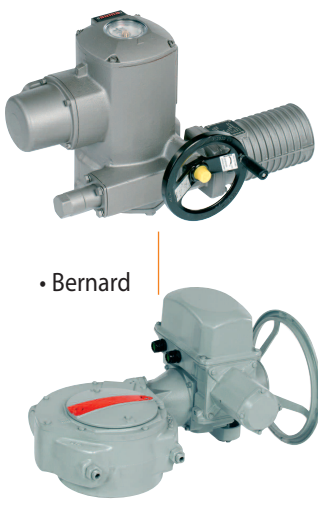
Reminder of the iso top dimensions EN ISO 5211 (see also the overall dimensions).

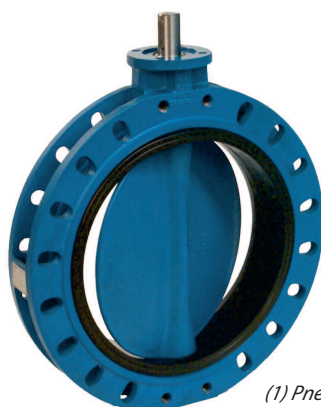
Other special executions on request subjected to technical feasibility.

Actuations

Find below the different standard assembly combinations.

For any other information, please ask our technical Department.

ASSEMBLY LEVEL 2		
	• 1 or 2 mechanical limit switch • Switchbox : . mechanical . inductive • Inductive limit switch • Positioners (1)	 <i>For other options, please consult us.</i>
ASSEMBLY LEVEL 1		
	Manual gearbox  <i>Optional: with chain-wheel</i> GEAR BOX	• Remote control + emergency hand wheel • Air torque  PNEUMATIC ACTUATOR • Auma • Bernard  ELECTRIC ACTUATOR



(1) Pneumatic actuator only

Connecting flanges

The Enodia butterfly valve can be mounted with the following connections (other types on request) :

Attention : the body of the Enodia butterfly valve is not a multi-connection body (connection to many flanges of different sizes). Generally, every connection relates to a different reference of finished products.

- ✓ : possible mounting
- : possible mounting with re-machining
- ▼ : consult us
- : impossible mounting
- : mounting without norm

• Centering lugs

DN	NPS	EN1092-1 & EN1092-2					ASME/ANSI B16.1 Class 125	ASME/ANSI B16.5 Class 150	BS10		JIS B2238 & JIS B2239			AWWA C207 B,D
		PN6	PN10	PN16	PN25	PN40			Table D	Table E	5K	10K	16K	
400	16	✓ ⁽¹⁾	● ⁽²⁾	✓	✓	✓	✓	✓	■	■	✓	✓	✓	✓
450	18	✓ ⁽¹⁾	● ⁽²⁾	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
500	20	✓	✓	✓	✓	■	✓	✓	✓	✓	✓	✓	✓	✓
600	24	●	✓	✓	✓	■	✓	✓	■	■	✓	✓	✓	✓
700	28	✓	✓	✓	✓	■	■	■	■	■	✓	✓	■	✓
800	32	✓	✓	✓	✓	■	■	■	■	■	✓	✓	■	✓
900	36	✓	✓	✓	✓	■	✓	■	■	■	✓	✓	✓	✓
1000	40	✓	✓	✓	✓	■	■	■	■	■	✓	✓	✓	✓

(1) - JL1040 - (2) - JS1030

• Tapped lugs

DN	NPS	EN1092-1 & EN1092-2					ASME/ANSI B16.1 Class 125	ASME/ANSI B16.5 Class 150	BS10		JIS B2238 & JIS B2239			AWWA C207 B,D
		PN6	PN10	PN16	PN25	PN40			Table D	Table E	5K	10K	16K	
400	16	■	✓	✓	■	■	✓	✓	■	■	■	✓	✓	✓
450	18	■	✓	✓	■	■	■	■	■	■	■	✓	■	■
500	20	✓	✓	✓	■	■	✓	✓	■	■	✓	✓	✓	✓

• Double flanges

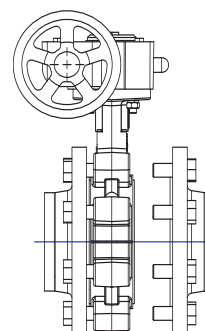
DN	NPS	EN1092-1 & EN1092-2					ASME/ANSI B16.1 Class 125	ASME/ANSI B16.5 Class 150	BS10		JIS B2238 & JIS B2239			AWWA C207 B,D
		PN6	PN10	PN16	PN25	PN40			Table D	Table E	5K	10K	16K	
400	16	●	✓	✓	■	■	✓	✓	■	■	●	●	●	✓
450	18	●	✓	✓	■	■	▼	▼	●	▼	▼	✓	■	▼
500	20	●	✓	✓	■	■	✓	✓	▼	▼	●	✓	●	✓
600	24	●	✓	✓	●	■	✓	✓	▼	▼	●	▼	▼	✓
700	28	●	✓	✓	●	■	■	■	■	■	●	✓	●	▼
800	32	●	✓	✓	●	■	■	■	■	■	●	▼	●	▼
900	36	●	✓	✓	●	■	▼	■	●	●	●	✓	●	▼
1000	40	●	✓	✓	●	■	■	■	■	■	●	●	●	▼
1200	40	●	✓	✓	▼	■	▼	■	●	●	●	✓	▼	▼

• End of line mounting and downstream removing

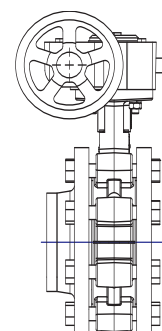
The end of line mounting and the downstream removing, at ambient temperature, of the Enodia butterfly valve is limited to the pressure mentioned on page 9 according to the PED directive 97/23/CE

Theses mountings are only possible on tapped lugs and double flanges bodies.

Downstream
removing



End of line
mounting



Normalisation
• Design :

According to EN 593 and marking according to EN 19

• Iso top connection for actuations :

According to EN ISO 5211

• Face to face :

According to 558-1 series 20
ISO 5752 series 20
API 609 table 2

• Connecting flanges : see on page 7

According to EN 1092-1 and EN 1092-2
ASME/ANSI B16.1 Class 125
ASME/ANSI B16.5 Class 150
BS10 Table D and Table E
JIS B 2238 and JIS B 2239
AWWA C207 Table B and Table D

• Tests :

According to EN12266-1

- Resistance and tightness of the body (directive PED 97/23/CE) : test P11 (1,5 x allowable operating pressure).
- Tightness of the seat : test P12 rate A (1,1 x allowable operating pressure).

• European Directives :

Our butterfly valves are in accordance to the safety requirements of the following directives :

Directive 97/23/CE : Equipments under pressure PED (Pressure Equipment Directive)

Applies to the design, manufacturing and the assessment of the conformity of pressure equipment, the maximum allowable pressure of which is 0.5 bar.

Pressure equipment for water supply, distribution, and disposal of water is excluded.

Depending on the type of pressure equipment, maximum allowable temperature (PS), DN, physical nature of the fluid (liquid, gas or vapour) and the degree of danger of the fluid (group1/2)*, the directive classifies this same equipment into different categories (article 3.3, I, II, III, IV), required for the assessment of conformity with CE marking.

The equipment defined in article 3.3 of the directive must not bear the CE marking.

(*) Group 1 : hazardous fluids (directive 67/548/EEC) / explosive / highly flammable /easily flammable / flammable / very toxic / toxic / combustion agents.

Group 2 : all other fluids.

Important notice : the indicated pressure for the different categories of fluids (L1/L2/G1/G2) is under no condition a guarantee of use. Therefore, it is essential to validate the use of products under given operating conditions. Danfoss Socla is not responsible for alterations of the products to working conditions not previously specified by the customer.

In order to facilitate your choice regarding these new regulatory requirements, Danfoss Socla has put the necessary information concerning products with CE marking, specification sheets and product identification plates at your disposal in the price list (+ see additional explanations on the detachable slip).

In addition, the operating instructions are available on our web site www.danfoss-socla.com or by simple request from our sales department.

An instruction notice specifying the installation characteristics and the commission of the Enodia is available on our web site www.danfoss-socla.com or on request by our sales department.

Pressure/Temperature
DIRECTIVE 97/23/CE Equipments under pressure.

Products manufactured in conformity with the requirements of the directive, according to pressure, DN and fluid (see on the precedent page).

Liner	DN in mm	Mounting	PFA (bar) WATER	PS (bar)				Cat.
				L1	L2	G1	G2	
16 bar EPDM , Nitrile	400 to 1200	Flanges	16	x	16	x	x	I
		End of line	8	x	8	x	x	I
10 bar EPDM , Nitrile, White EPDM	400 to 1200	Flanges	10	10	10	x	x	I
		End of line	6	6	6	x	x	I
6 bar EPDM , Nitrile, White EPDM, White Nitrile, Carboxylated nitrile	400 to 500	Flanges	6	6	6	x	6	I
		End of line	4	4	4	x	x	I
	600	Flanges	6	6	6	x	5	I
		End of line	4	4	4	x	x	I
	700 to 800	Flanges	6	6	6	x	4	I
		End of line	4	4	4	x	x	I
	900 to 1000	Flanges	6	6	6	x	3,5	I
		End of line	4	4	4	x	x	I
	1200	Flanges	6	6	6	x	2,5	I
		End of line	4	4	4	x	x	I
16 bar Neoprene, Butyl, Natural rubber, White natural rubber	400 to 1200	Flanges	16	16	16	x	x	II
		End of line	8	8	8	x	x	II
10 bar Hypalon, FKM	400 to 1200	Flanges	10	10	10	x	x	II
		End of line	6	6	6	x	x	II
6 bar Neoprene, Butyl, Natural rubber, White Natural rubber, Hypalon, Silicone, FKM	400 to 800	Flanges	6	6	6	x	6	II
		End of line	4	4	4	x	x	II
	900 to 1000	Flanges	6	6	6	x	5	II
		End of line	4	4	4	x	x	II
	1200	Flanges	6	6	6	x	4	II
		End of line	4	4	4	x	x	II

PS : Maximum allowable pressure (in bar) according to Directive 97/23/CE

PFA : Allowable operating pressure (in bar) for supply, distribution and disposal of water.

Torque values

<i>Torques for water in Nm One actuation minimum per month.</i>	400	450	500	600	700	800	900	1000	1200
PS 6 bar	900	1250	1600	2200	3600	5500	7600	8700	7500
PS 16 bar	1000	1400	1800	2500	4100	6500	8500	9500	8500

Flow rate (Kv)

OPENING STAGE - Stainless steel disc

DN	10°	20°	30°	40°	50°	60°	70°	80°	90°
400	186	670	1395	2660	4420	7000	10000	13560	14695
450	230	868	1826	3340	5656	8634	12278	15575	17000
500	284	1060	2348	4415	7595	11335	14995	20380	20080
600	450	1544	3545	7000	11475	15995	20725	24045	25000
700	700	2450	5483	9900	14994	21150	26540	30700	32990
800	1110	3500	8000	14990	22495	31290	39990	46230	49000
900	1400	4950	12500	23000	34880	46500	57130	61915	63460
1000	1990	7000	17500	32090	46025	60000	70000	77078	77920
1200	2540	9650	24865	46710	69390	88760	101750	108160	109775

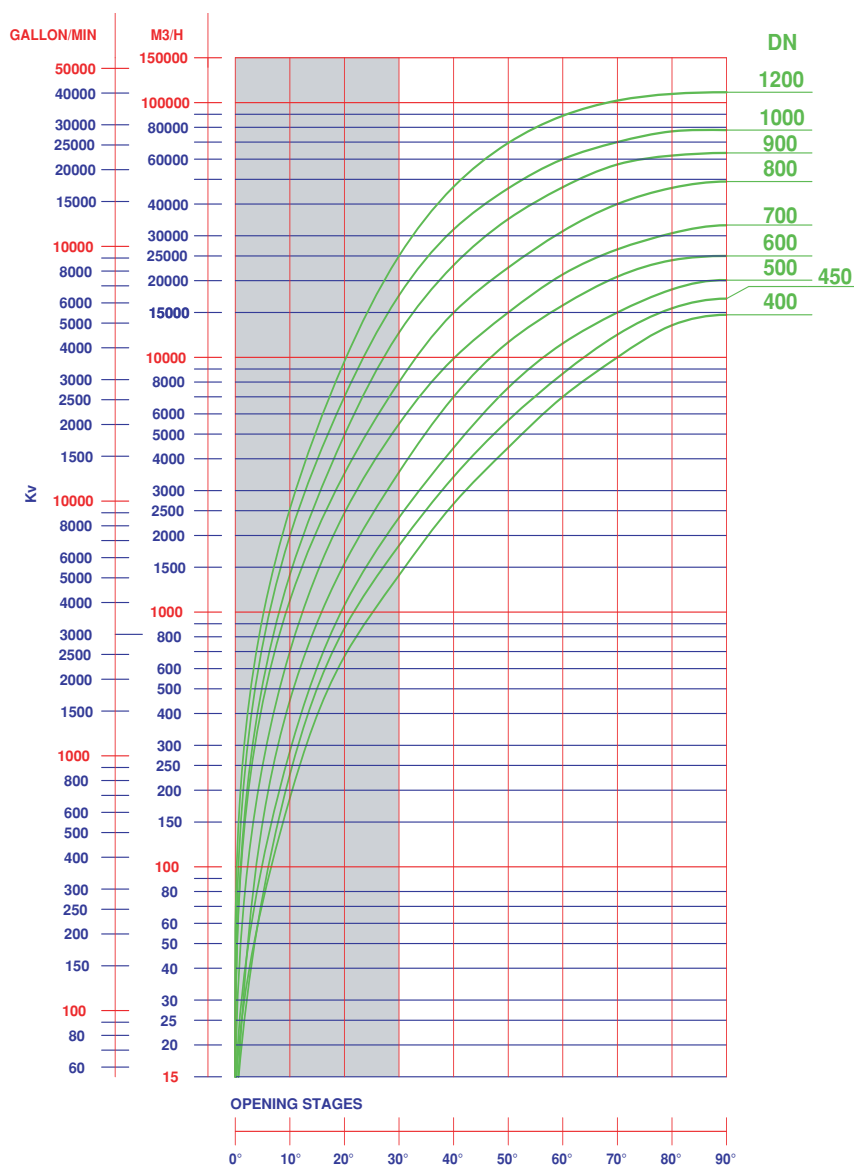
The butterfly valve is not the best product for regulating. Nevertheless, the Enodia butterfly valve can be used to regulate by an opening stage between 30° and 90°.

A regulation in the opening stage lower than 30° is not advisable because of over speed, cavitation effect, which could damage prematurely the valve.

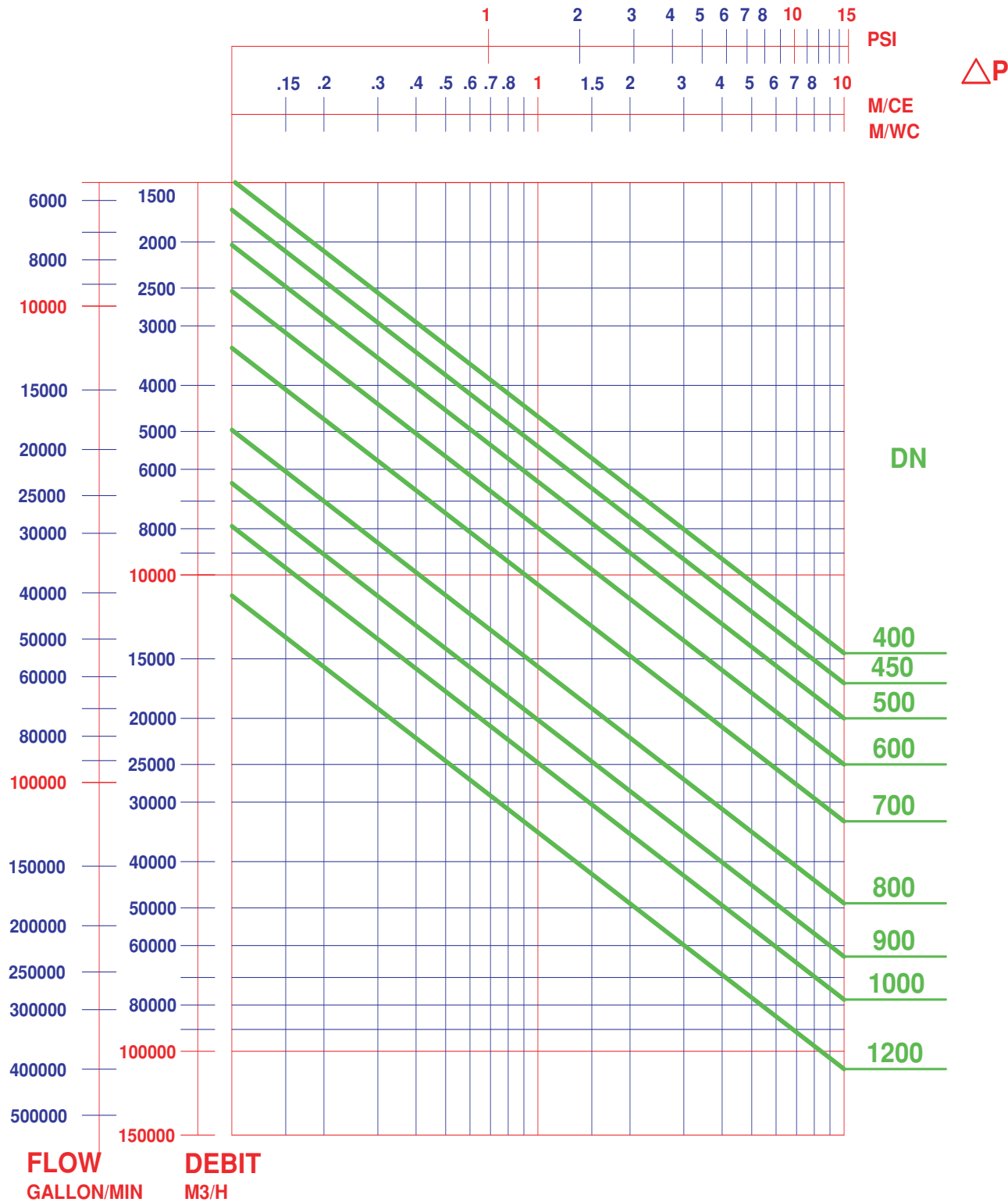
Kv = volume of water in m³/h through a valve at a preset opening stage and under a head loss of 1 bar.

The maximum flow velocity of the fluid through the valve must not exceed, for fluid liquids :

- 3 m/s for DN 400
- 2,5 m/s for DN 450 to 800
- 2 m/s for DN 900 to 1200
- for gas and pulverulent or paste fluids : please consult us.



Head loss diagram (Δp)

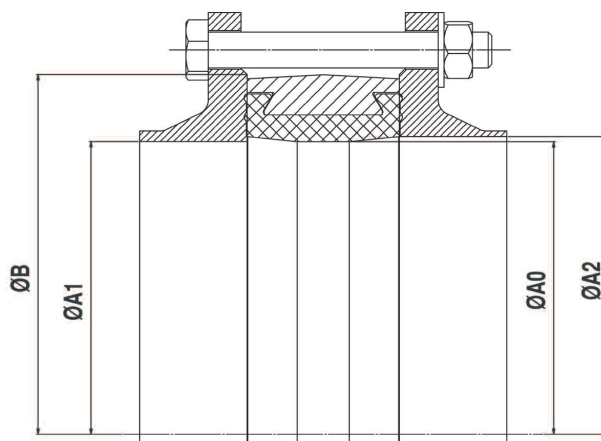


Technical manual Enodia

Type of flange

The Enodia butterfly valve has been designed to be mounted on normalised standard flanges. Only standard flanges type 11, 21 and 34 according to EN 1092 are quite compatible.

For other types of flanges, refer to the table below. Non appropriate connections will cancel our guarantee.



DN	Ø A0	Ø A1 mini	Ø A2 maxi		Ø B mini
			PS16	PS6	
400	392	406	417		482
450	442	452	470		532
500	485	492	502		585
600	580	582	602		685
700	670	676	692	718	795
800	770	771	793	819	900
900	860	862	902	922	1000
1000	960	962	1002	1022	1110
1200	1160	1157	1199		1330

NOTE:

The use of expansion seals, as well as the use of elastomer coated flanges, between the flange and the valve are strictly forbidden.

Tag / traceability

○ Danfoss Socla ○	
①	②
DI ③	LI ④
⑤ Liquid 1 / 2	⑥ / bar
⑦ Gas 1 / 2	⑧ / bar
⑨ Liquid 1 / 2	⑩ / bar
⑪ Water ⑫ bar	
⑬	⑭
Made in France	

Rep	Description
1	Name of the valve
2	Reference
3	Material of the disc
4	Material of the liner
5	Pressure PS between flanges L1/L2 (liquid)
6	Pressure PS between flanges G1/G2 (gas)
7	Pressure PS end flange L1/L2 (liquid)
8	Pressure PFA Water
9	Manufacturing order
10	Notified Body Number for the Directive PED 97/23/CE
11	Year of manufacturing
12	Connecting flanges

Bolts and nuts

Note : Bolts and nuts are not part of our standard supply.

CENTERING LUG TYPE BODY

* Assembly by rods : Number of nuts = 2x Number of rods (below)

**Assembly by bolts : Number of nuts = Number of screws (below)

DN	NPS	a	NF EN 10092 - PN10					NF EN 10092 - PN16					ASME/ANSI B16.1 Class 125 ASME/ANSI B16.5 Class 150 AWWA C207 Class D					
			ØV	Rods*		Screw/face**		ØV	Rods*		Screw/face**		ØV UNC	Rods*		Screw/face**		
				Nb	c	Nb	e		Nb	c	Nb	e		Nb	c	Nb	e	
400	16	102	M24	16	29			M27	16	32			1	16	32			
450	18	114	M24	16	29	4	35	M27	16	32	4	35	1 1/8	12	35	4	50	
500	20	127	M24	16	29	4	45	M30	16	35	4	45	1 1/8	16	35	4	45	
600	24	154	M27	16	32	4	60	M33	16	38	4	60	1 1/4	16	38	4	60	
700	28	165	M27	20	32	4	50	M33	20	38	4	45	1 1/4	24	38	4	45	
800	32	190	M30	20	35	4	60	M36	20	42	4	55	1 1/2	24	45	4	50	
900	36	203	M30	24	35	4	45	M36	24	42	4	45	1 1/2	28	45	4	45	
1000	40	216	M33	24	38	4	60	M39	24	45	4	55	1 1/2	32	45	4	45	

TAPPED LUG TYPE BODY

* Assembly by rods : Number of nuts = 2x Number of rods (below)

**Assembly by bolts : Number of nuts = Number of screws (below)

DN	NPS	a	NF EN 10092 - PN10						NF EN 10092 - PN16						ASME/ANSI B16.1 Class 125 ASME/ANSI B16.5 Class 150 AWWA C207 Class D					
			ØV	Screw/face**			Nb	e	f	ØV	Screw/face**			Nb	e	f	ØV UNC	Screw/face**		
400	16	102	M24	16	45	4				M24	16	45	4				1	16	45	4
450	18	114	M24	20	35	4				M24	20	35	4				1 1/8	16	50	4
500	20	127	M24	20	45	4				M24	20	45	4				1 1/8	20	45	4

DOUBLE FLANGE BODY

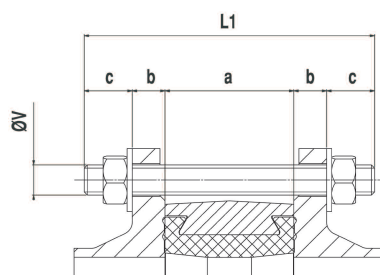
* Assembly by rods between flanges : Number of nuts = 2x Number of rods (below)

** Number of screw/face end flange mounting = Nb1+Nb2, Number of nuts/face = Nb1
For c1, use nuts Hm (thin nuts).

DN	NPS	a	d	NF EN 10092 PN10								NF EN 10092 PN16								ASME/ANSI B16.1 Class 125 ASME/ANSI B16.5 Class 150 AWWA C207 Class D							
				ØV					Shaft crossing		ØV					Shaft crossing		ØV UNC					Shaft crossing				
					Nb1*	c	c1	f	Nb2**	e		Nb1*	c	c1	f	Nb2**	e		Nb1*	c	c1	f	Nb2**	e			
400	16	102	29	M24	12	29	22	4	4	45	M27	12	32	22	4	4	45	1	12	32	22	4	4	45			
450	18	114	31	M24	16	29	22	4	4	35	M27	16	32	24	4	4	35	1 1/8	12	32	24	4	4	35			
500	20	127	34	M24	16	29	22	4	4	40	M30	16	35	26	4	4	35	1 1/8	16	35	26	4	4	35			
600	24	154	37	M27	16	32		4	4	50	M33	16	38		5	4	55	1 1/4	16	38		4	4	50			
700	28	165	42	M27	20	32		4	4	40	M33	20	38		5	4	30	1 1/4	24	38		4	4	30			
800	32	190	44	M30	20	35		4	4	50	M36	20	42		5	4	45	1 1/2	24	42		5	4	45			
900	36	203	43	M30	24	35		4	4	45	M36	24	42		5	4	45	1 1/2	28	42		5	4	45			
1000	40	216	48	M33	24	38		4	4	60	M39	24	45		6	4	55	1 1/2	32	45		5	4	55			
1200	48	254	78	M36	28	42		5	4	70	M45	28	40		7	4	60	1 1/2	40	50		5	4	60			

For any other connecting flanges, please consult the corresponding norms and use the formula below.

Bolts and nuts



For wafer type body; assembly by rods :

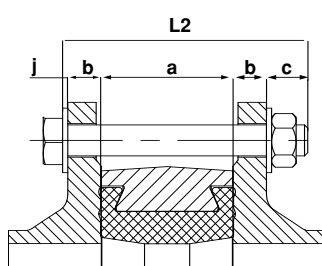
$$L1 = a + 2(b+c)$$

L1 = minimum length of rods

a = width of the butterfly valve

b = thickness of the flange (customer)

c = thickness of washer + thickness of nut + exceeding length of the rod.



For wafer type body; assembly by bolts :

$$L2 = a + 2b + c + j$$

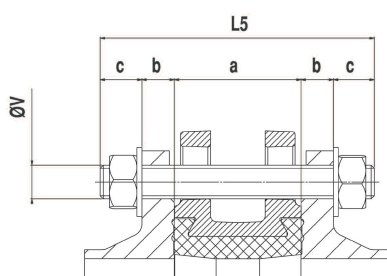
L2 = minimum length under head of screw

a = width of the butterfly valve

b = thickness of the flange (customer)

c = thickness of washer + thickness of nut + exceeding length of the rod

j = thickness of the washer under head of screw



For double flange body, mounting between flanges; assembly by rods :

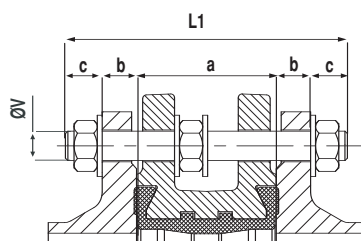
$$L5 = a + 2(b+c)$$

L5 = minimum length of rods

a = width of the butterfly valve

b = thickness of the flange (customer)

c = thickness of washer + thickness of nut + exceeding length of the rod.



For double flange body, assembly by rods :

$$L1 = a + 2(b+c)$$

L1 = minimum length of rods

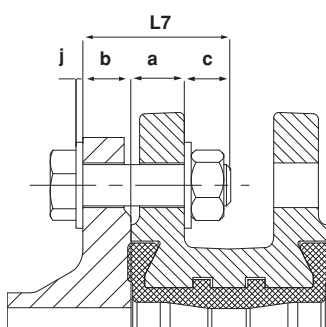
a = width of the butterfly valve

b = thickness of the flange (customer)

c = thickness of washer + thickness of nut + exceeding length of the rod.

Mounting in case of downstream pipework dismantling (see page 7).

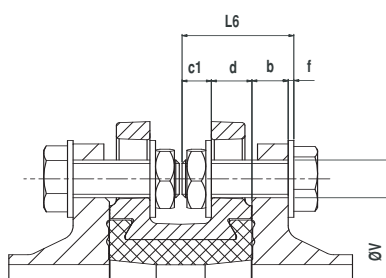
Bolts and nuts



For double flange body, permanent downstream dismantling, assembly by bolts :

$$L7 = a + b + c + j$$

- L7 = minimum length under head of screw
- a = width of the flange of the butterfly valve body
- b = thickness of the flange (customer)
- c = thickness of washer + thickness of nut + exceeding length of the rod.
- j = thickness of the washer under head of the screw

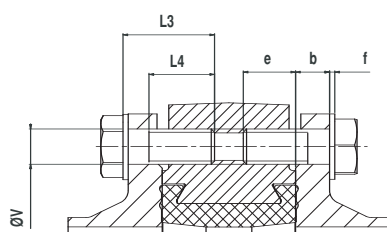


For double flange body, assembly by bolts or end of line mounting :

$$L6 = b + d + c1 + f$$

- L6 = minimum length under head of screw
- d = width of the flange of the butterfly valve body.
- b = thickness of the flange (customer)
- c1 = thickness of washer + thickness of nut + exceeding length of the rod.
- f = thickness of the washer

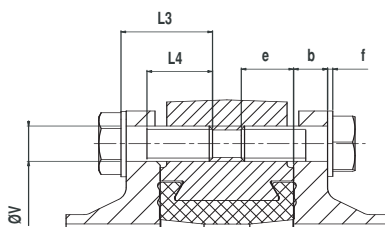
Note : use nuts with reduced face-to-face dimensions



For double flange body, mounting shaft crossing :

$$L3 \leq b + e + f \text{ with } L4 \geq L3 - (b + f)f$$

- L3 = maximum length under head of screw
- L4 = minimum length of the threading of the screw
- b = thickness of the flange (customer)
- e = maxi depth of screws
- f = thickness of washer



For lug type body; assembly by screws :

$$L3 \leq b + e + f \text{ avec } L4 \geq L3 - (b + f)f$$

- L3 = maximum length under head of screw
- L4 = minimum length of the threading of the screw
- b = thickness of the flange (customer)
- e = maxi depth of screws
- f = thickness of washer

Installation

• General remarks :

For safety reasons, the installation must take place under the supervision of authorised people taking account of local safety instructions and advice.

The handling of butterfly valves and their controls must be done by staff trained in all technical aspects of their operation.

Before installation the pipes must be depressurised and purged (empty of its fluid) in order to avoid any danger to the operator.

The pipe work must be correctly aligned so that no extra stress is exerted on the valve casing.

against the operating pressure : the PN number of the flanges must be greater or equal to the operating pressure.

The valve is a machined piece of equipment and must not be used to prise apart the flanges.

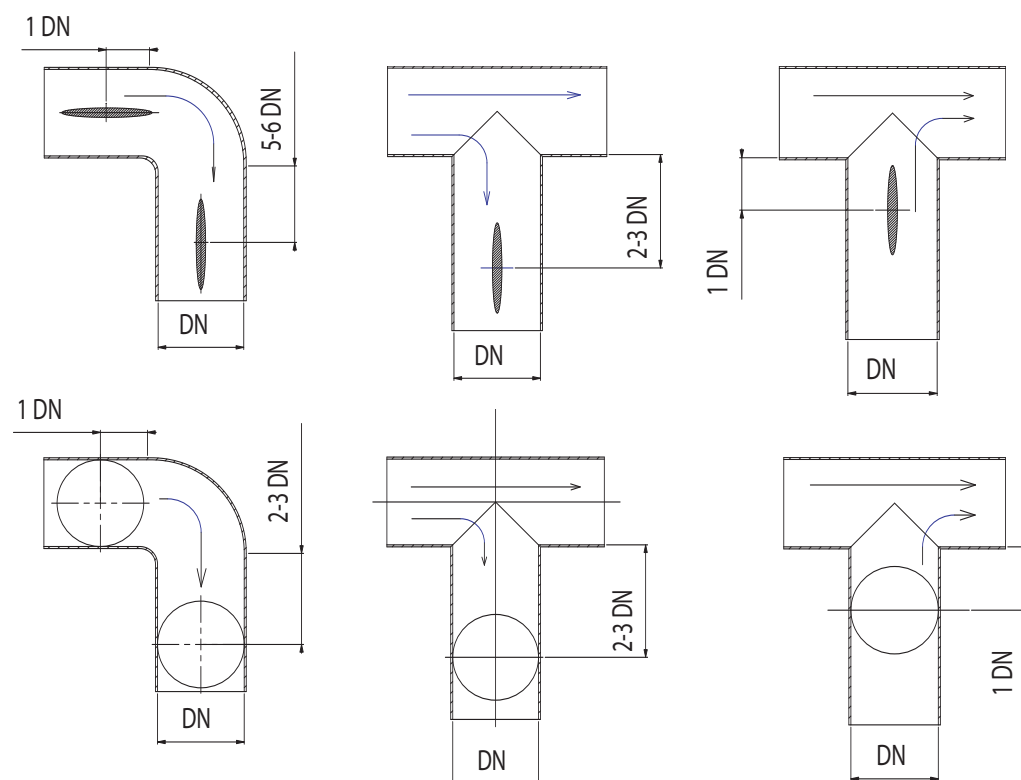
An **instruction notice** specifying the installation characteristics and the commission of the Enodia is added to every product. It is available on our web site **www.danfoss-socla.com** or on request by our sales department.

Check the compatibility of the connection flanges

• Installation conditions :

It is recommended that the distances mentioned below be respected in order to prolong the life time of the valve.

Mounting the valve close to pipe work junctions places it in turbulent zones which increase its wear.



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