

# Özkan Seal On Disc Butterfly Valve

Components of the seal on disc butterfly valve are hydro-dynamically shaped by computer analysis, delivering low resistance to flow with maximum mechanical strength.



TECHNICAL GUIDE: **VH6.2**

## Applications

Potable water reticulation  
Raw water  
River water  
Grey water  
Screened effluent

## Product Attributes

Bi-directional sealing  
Low operational torque  
High corrosion resistance  
316L weld deposited seat

## Approvals/Standards

BS EN593 Butterfly valve  
AS4795 Butterfly valve

EN 558-1 Series 13 and 14 face to face dimensions

Working tests to EN 1074 EN 12266

## Quality

ISO 9001:2008 Quality Management  
ISO 14001:2004 Environmental Management  
OHAS 18001:2007 Health and Safety

Complies with AS4795. Components of the seal on disc butterfly valve are hydro-dynamically shaped by computer analysis to deliver low resistance to flow with a maximum mechanical strength.

## Design Specifications

- DN150 – DN2500 standard size range. Larger options available on request
- PN16, PN 25 and PN 40 pressure classes available
- -15°C to +80°C temperature range
- Pressure ratings. PN10, PN16, PN25, PN40
- Flange connections: EN1092, AS2129, AS4087, ANSI B16.5 AWWA C207 and others on request
- Flange face gramophone grooved on request

## Design Features

1. **Body**  
Streamline design and smooth finish of the body provides minimum resistance to flow.
2. **Lifting holes and feet**  
Integral lifting holes provide easy installation and feet ensure strong ground support.
3. **Disc**  
Streamlined and low profiled disc including closed hubs ensuring higher kv values. Double offset disc design reduces seal wear and torque.
4. **Sealing system**  
Sealing on seat face is ensured by an endless T profile resilient sealing ring which is held on the periphery of the disc by a retaining ring. In closed position the sealing ring is pressed against the conically shaped seat face of the body and provides safe sealing in either direction of flow. In opened position the sealing ring is completely unstressed due to the double eccentric disc design.
5. **Retaining ring**  
The one piece retaining ring prevents sealing ring from rolling out. Sealing ring can be replaced easily at site without dismantling the valve disc and without requirement of any special tool.
6. **Shafts**  
Stub shaft design provides minimal restriction to flow.
7. **Shaft connection**  
Positive disc to shaft connection by use of key.
8. **Shaft sealing**  
Multiple O-ring shaft sealing system ensures maintenance free sealing for life span.
9. **Bearing system**  
Self lubricating plain bearings reduce shaft friction and operating torque. These bearings keep the shaft centralised and prevent axial movement.
10. **Body seat**  
Stainless steel weld filled and finished integral body seat ensures a corrosion and erosion resistant seat face.
11. **Worm gear operators**  
Are designed for easy operating of butterfly valve by only one operator.
12. **Travelling nut**  
Bottom end of the worm shaft is threaded and a travelling nut moves up and down on this threaded spindle. When operating the gear (*valve*) in "open" or "close" direction, the travelling nut also moves towards the corresponding end stop and prevents the over travel of the valve disc.
13. **Top flange**  
All butterfly valves are equipped with ISO top flanges for all types of actuator- operator connections.
14. **Unique tracking number**  
Every valve is equipped with a cast tracking number for easy traceability and identification.
15. **Handwheel**  
Every valve is equipped with a handwheel (*standard version*). In combination with the gearbox, the valve is designed for one man operation. Other accessories for operation i.e. electric actuator or head stock on request.

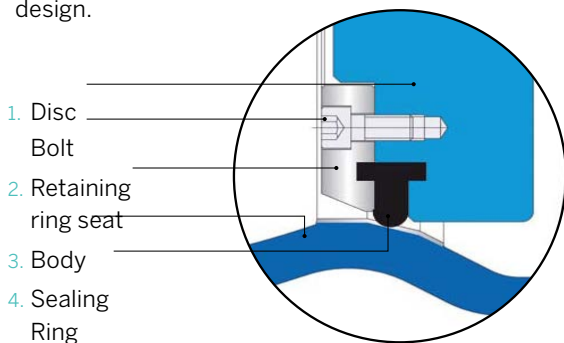
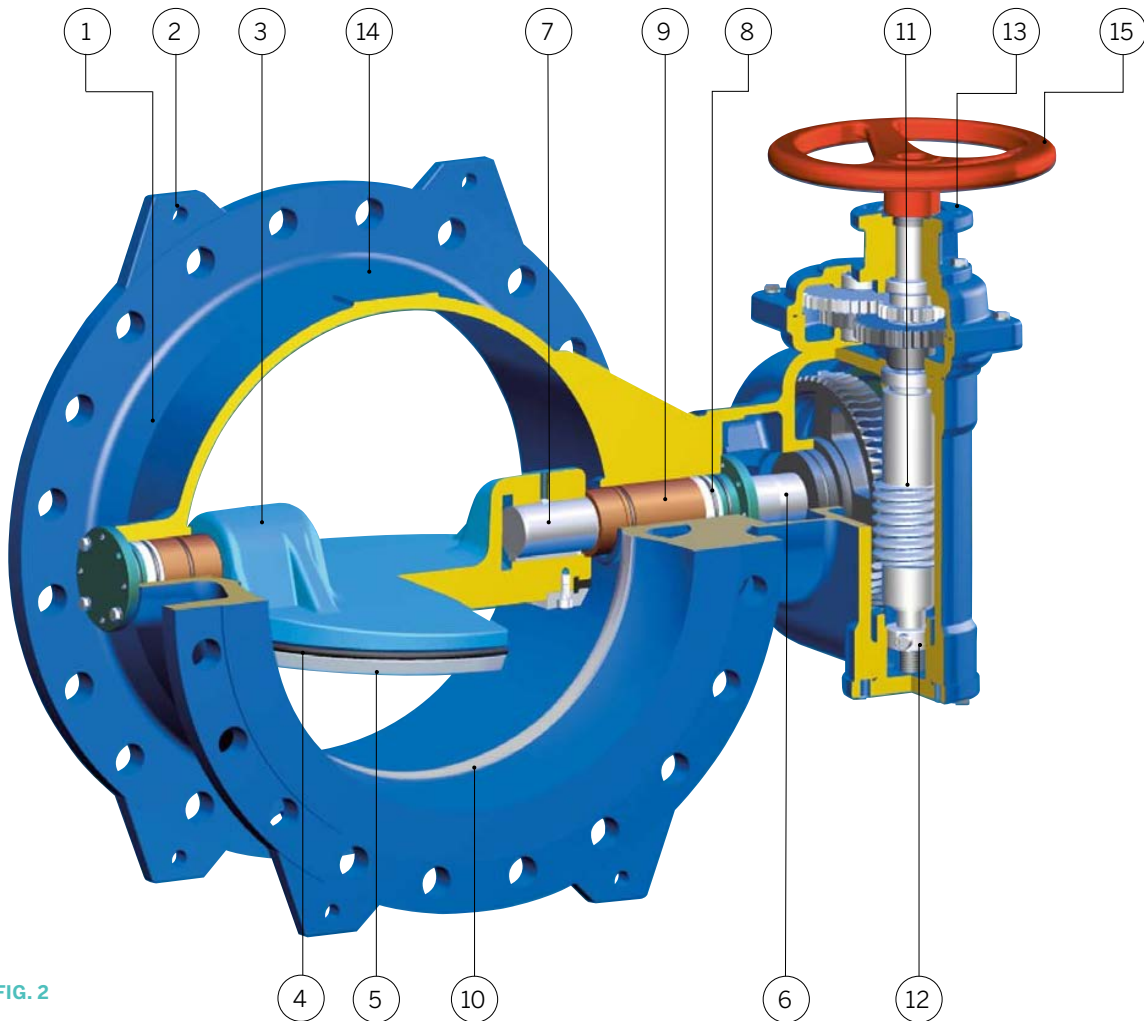


FIG. 1

**TABLE 1**

	<b>STANDARD</b>	<b>OPTION</b>
Design	EN 593 Double Flanged, Double Eccentric	
Nominal Sizes	DN 150 - DN 2500	
Pressure Rating	PN 10, PN 16, PN 25, PN 40	
Medium	Potable water, raw water	Sea water
Face To Face	EN 558 – 1 SERIES 14	EN 558 – 1 SERIES 13
Flanges	EN 1092 – 2 PN 10 / 16 / 25 / 40	ANSI B16.5; ASME B 16.47 Series A AWWA C207; AS 2129 – AS4087; SABS 1123, Gramophone grooved raised face flange
Body	Ductile Iron	
Disc	Ductile Iron	Al-Ni bronze, stainless steel
Sealing Ring	EPDM rubber	NBR
Shaft	Stainless steel	
Body Seat	Stainless steel weld overlay & micro finished	Rubber lined
Retaining Ring	Carbon steel	Al-Ni bronze, stainless steel
Internal Fixings	Stainless steel	
External Fixings	Stainless steel	
Bearing Bush	Bronze	NI-AL bronze
Coating	Epoxy coated, min. 250 Microns thickness	Two pack epoxy, solvent free epoxy, coal tar epoxy
Operation	Manual by worm gearbox and handwheel	Electric, Pneumatic, Hydraulic, Actuator
Work Temperature	According to EN 1074	
Colour	RAL 5005	Ask for other colours
Closing Direction	Clockwise	Anti clockwise
Gearbox	Position 01 a with handwheel (see page page <?>)	Other versions on request (see page page <?>)



**FIG. 2**

## Technical Specifications

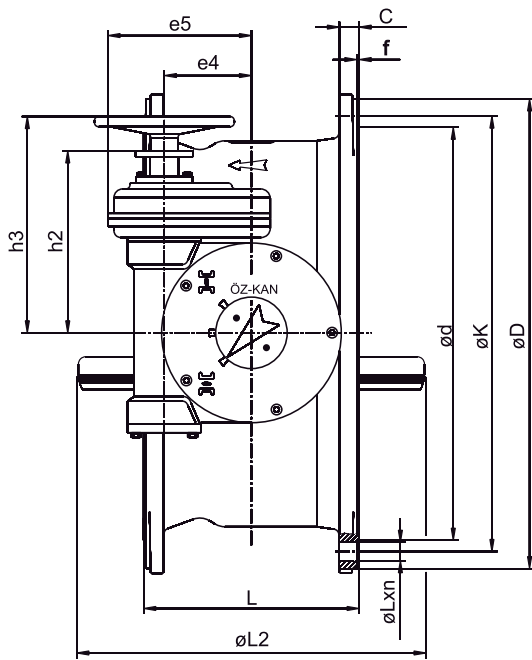


FIG. 3

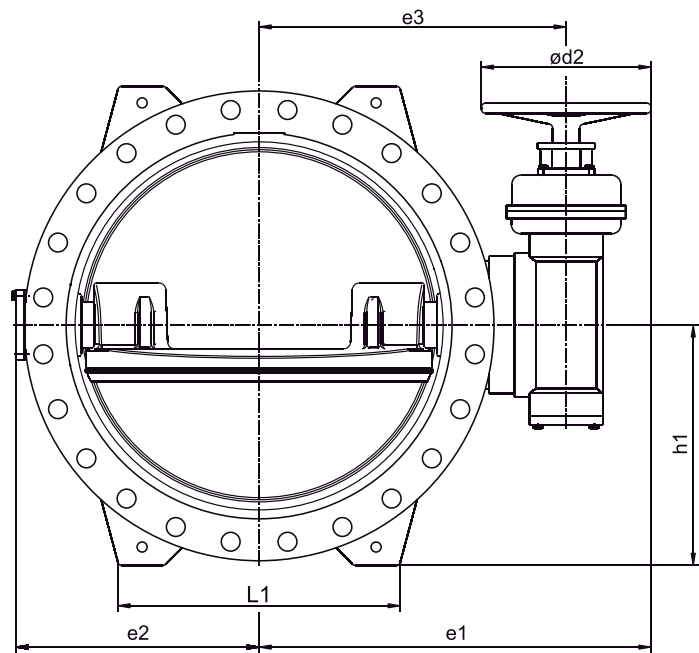


FIG. 4

TABLE 2

DN	PN	L Series 14	L Series 13	L1	L2	e1	e2	e3	e4	e5	d2	h1	h2	h3	GEARBOX	WEIGHT (kg)
150	10	210	140	-	152	378	151	255	71	134	245	143	136	212	TK1	45
200	10	230	152	180	199	405	177	282	71	134	245	180	136	212	TK1	60
250	10	250	165	220	251	481	214	352	95	158	245	213	163	239	TK2	95
300	10	270	178	280	281	503	237	380	95	158	245	242	163	239	TK2	115
350	10	290	190	320	336	595	283	410	110	175	370	264	184	271	TK3	155
400	10	310	216	335	385	626	297	441	110	175	370	293	184	271	TK3	165
450	10	330	222	380	434	670	333	485	110	198	370	320	285	372	TK3-R D4	220
500	10	350	229	400	474	701	344	516	156	245	370	345	334	420	TK4-R D4	285
600	10	390	267	440	576	749	414	564	156	245	370	400	334	420	TK4-R D4	350
700	10	430	292	540	671	838	511	653	190	313	370	460	397	484	TK5-R D5	575
750	10	450	305	580	710	882	542	697	190	313	370	496	397	484	TK5-R D5	690
800	10	470	318	610	766	855	530	670	190	313	370	520	397	484	TK5-R D5	680
900	10	510	330	670	861	965	618	780	242	365	370	568	432	519	TK6-R D6	980
1000	10	550	410	740	951	1039	650	854	242	365	370	625	432	519	TK6-R D6	1155
1100	10	590	440	750	1053	1022	720	837	242	365	370	695	432	519	TK6-R D6	1558
1200	10	630	470	900	1147	1251	782	1008	290	515	485	738	538	625	TK7-R D7	1965
1300	10	670	-	988	1248	1301	867	1059	290	515	485	803	538	625	TK7-R D7	2867
1400	10	710	530	1160	1345	1349	917	1101	290	515	485	848	538	625	TK7-R D7	2690
1500	10	750	-	1080	1435	1411	1015	1168	431	656	485	910	681	768	TK8-R D8	3440
1600	10	790	600	1250	1537	1483	1060	1240	431	656	485	970	681	768	TK8-R D8	4366
1800	10	870	670	1220	1722	1586	1183	1343	431	656	485	1075	681	768	TK8-R D8	4760
2000	10	950	760	1300	1901	1769	1303	1526	431	656	485	1183	681	768	TK8-R D8	7183
2200	10	1030	-	1500	2085	1906	1420	1603	431	656	605	1285	809	909	TK8-R D8 5	8320
2400	10	1110	-	1600	2308	2095	1593	1792	519	744	605	1390	898	998	TK10-R D10 5	12900
2500	10	1150	-	1600	2396	2122	1610	1819	519	744	605	1440	898	998	TK10-R D10 5	13820

Note: Dimensions C, f and øLxn depend on flange specification ordered

**TABLE 3**

DN	PN	L Series 14	L Series 13	L1	L2	e1	e2	e3	e4	e5	d2	h1	h2	h3	GEARBOX	WEIGHT (kg)
150	16	210	140	-	152	378	151	255	71	134	245	143	136	212	TK1	45
200	16	230	152	180	199	405	177	282	71	134	245	180	136	212	TK1	60
250	16	250	165	220	251	481	214	352	95	158	245	213	163	239	TK2	95
300	16	270	178	280	281	503	237	380	95	158	245	242	163	239	TK2	115
350	16	290	190	320	336	595	283	410	110	175	370	272	184	271	TK3	162
400	16	310	216	335	385	626	297	441	110	198	370	300	285	372	TK3-RD4	204
450	16	330	222	380	434	670	333	485	110	198	370	330	285	372	TK3-RD4	240
500	16	350	229	400	474	721	344	531	156	245	370	370	334	420	TK4-RD4	325
600	16	390	267	500	576	779	414	594	156	245	370	432	334	420	TK4-RD4	435
700	16	430	292	540	671	838	511	653	190	313	370	467	397	484	TK5-RD5	610
750	16	450	305	580	710	682	542	697	190	313	370	496	397	484	TK5-RD5	707
800	16	470	318	615	766	928	530	743	190	313	370	525	397	484	TK5-RD5	780
900	16	510	330	675	861	1007	618	802	242	365	370	573	432	519	TK6-RD6	1065
1000	16	550	410	740	951	1039	650	854	242	365	370	638	432	519	TK6-RD6	1320
1100	16	590	440	750	1053	1091	720	906	242	365	370	696	432	519	TK6-RD6	1558
1200	16	630	470	900	1147	1251	782	1008	290	515	485	753	538	625	TK7-RD7	2375
1300	16	670	-	988	1248	1301	867	1059	290	515	485	803	538	625	TK7-RD7	2867
1400	16	710	530	1160	1345	1349	917	1101	290	515	485	848	538	625	TK7-RD7	2870
1500	16	750	-	1153	1435	1385	986	1142	431	656	485	930	681	768	TK-RD8	4055
1600	16	790	600	1250	1537	1508	1115	1265	431	656	485	975	681	768	TK-RD8	5150
1800	16	870	670	1220	1722	1630	1217	1387	431	656	485	1080	681	768	TK-RD8	5580
2000	16	950	760	1300	1901	1769	1303	1526	431	656	485	1193	681	768	TK-RD8	8500
2200	16	1030	-	1500	2085	1975	1460	1672	519	744	605	1290	898	998	TK10-RD105	11220
2400	16	1110	-	1630	2308	2095	1593	1792	519	744	605	1390	898	998	TK10-RD105	14650
2500	16	1150	-	1650	2396	2122	1610	1819	519	744	605	1440	898	998	TK10-RD105	16040

**TABLE 4**

DN	PN	L Series 14	L Series 13	L1	L2	e1	e2	e3	e4	e5	d2	h1	h2	h3	GEARBOX	WEIGHT (kg)
150	25	210	140	-	152	378	151	255	71	134	245	150	136	212	TK1	55
200	25	230	152	200	199	462	199	339	95	158	245	190	163	239	TK2	110
250	25	250	165	305	251	556	250	371	110	175	370	223	184	271	TK3	160
300	25	270	178	340	281	591	277	406	110	198	370	253	285	372	TK3-R04	185
350	25	290	190	320	336	619	294	434	110	198	370	288	285	372	TK3-R04	216
400	25	310	216	375	379	663	342	478	156	245	370	320	334	420	TK4-RD4	295
450	25	330	222	470	427	709	382	524	156	245	370	345	334	420	TK4-RD4	352
500	25	350	229	430	474	745	410	560	190	313	370	375	397	484	TK5-RD5	475
600	25	390	267	530	567	798	461	611	190	313	370	433	397	484	TK5-RD5	655
700	25	430	292	640	663	877	535	682	242	365	370	490	432	519	TK6-RD6	900
750	25	450	305	600	710	907	542	722	242	365	370	526	432	519	TK6-RD6	960
800	25	470	318	575	747	974	590	789	242	365	370	560	432	519	TK6-RD6	1184
900	25	510	330	745	854	1114	685	871	290	515	485	610	538	625	TK7-RD7	1800
1000	25	550	410	760	952	1171	741	928	290	515	485	675	538	625	TK7-RD7	2120
1200	25	630	470	880	1148	1286	824	1043	290	515	485	775	538	625	TK7-RD7	2780
1400	25	710	530	1010	1345	1476	964	1233	431	656	485	888	681	768	TK8-RD8	4210
1600	25	790	600	1210	1543	1603	1110	1300	431	656	605	1000	809	909	TK8-RD8.5	5640
1800	25	870	670	1345	1678	1833	1255	1530	519	744	605	1118	898	998	TK10-RD10.5	9100
2000	25	950	760	1400	1886	1886	1353	1583	519	744	605	1228	898	998	TK10-RD10.5	11560

**TABLE 5**

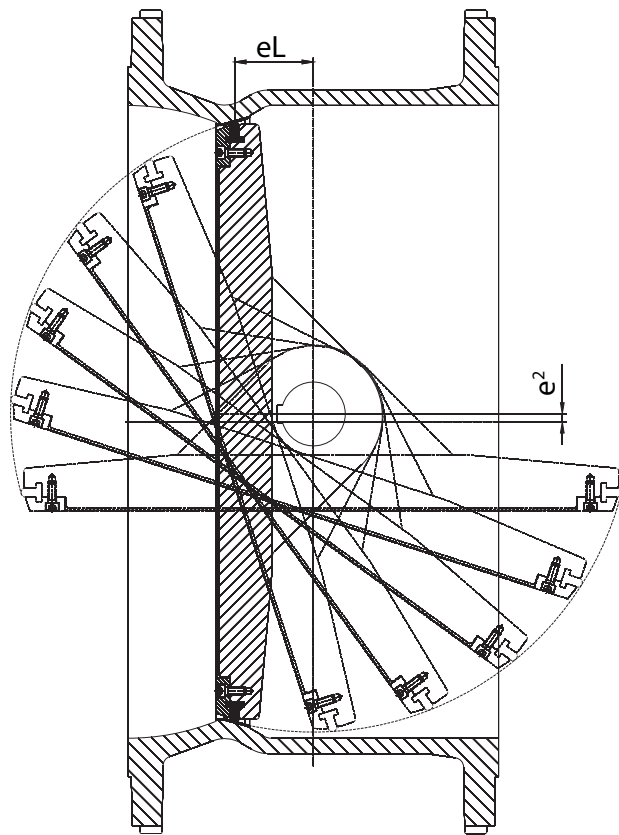
DN	PN	L Series 14	L1	L2	e1	e2	e3	e4	e5	d2	h1	h2	h3	GEARBOX	WEIGHT (kg)
150	40	210	-	152	378	151	255	71	134	245	150	136	212	TK.1	55
200	40	230	200	199	462	198	389	95	158	245	198	163	239	TK2	119
250	40	250	305	251	579	250	394	110	198	370	235	285	372	TK3-R D4	180
300	40	270	340	281	610	277	425	110	198	370	268	285	372	TK3-R D4	210
350	40	290	360	336	631	294	446	156	245	370	300	334	420	TK4-R D4	296
400	40	310	380	379	696	342	511	156	245	370	340	334	420	TK4-R D4	360
450	40	330	470	422	716	386	531	190	313	370	353	357	484	TK5-R D5	490
500	40	350	440	467	762	412	577	190	313	370	388	397	484	TK5-R D5	545
600	40	390	530	567	828	461	643	190	313	370	455	397	484	TK5-R D5	740
700	40	430	640	663	877	535	692	242	365	370	508	432	519	TK6-R D6	1079
800	40	470	568	748	1068	592	825	290	515	485	580	538	625	TK7-R D7	1828
900	40	510	745	855	1114	685	871	290	515	485	645	538	625	TK7-R D7	2280
1000	40	550	800	949	1188	725	945	290	515	485	695	538	625	TK7-R D7	2530
1200	40	630	880	1126	1316	883	1073	431	656	485	800	681	768	TK8-R D8	3906
1400	40	710	1110	1314	1536	968	1233	431	656	605	915	809	909	TK8-R D85	5340
1600	40	790	1250	1485	1733	1133	1430	519	744	605	1030	898	998	TK10-R D105	8820
1800	40	870	1350	1674	1833	1318	1530	519	744	605	1140	898	998	TK10-R D105	11480

## Design Properties

### Double Eccentricity

The first eccentricity ( $e_1$ ) brings the axis of rotation outside the sealing axis. That's why full circle sealing between body seat and sealing ring is achieved. The second eccentricity ( $e_2$ ) brings the axis of the disc from axis of the valve. By the help of second eccentricity the sealing ring is off seated after only a few degrees of movement at open direction. The purpose of the second eccentricity is to quickly relieve rubber seal compression in the area of the disc shafts to eliminate rubber "scruffing and abrasive wear".

When the valve is open, the rubber is completely unstressed, so that no permanent impression is retained even if the valve remains open for years.



**FIG. 5**

**NOTE:** Butterfly valves are designed to be mounted with the disc shaft horizontal. For any other orientation of the disc shaft, please consult supplier.

## Worm Gear Operators

TK-TYPE range worm gear operators have been designed for the operation of butterfly valves. Worm gear operators offer a quarter turn (90°) motion that is required by butterfly valves and disc motion is limited at open and closed positions by travelling nut system.

Self locking (non reversing) gear design guarantees the correct operation and tightness of butterfly valves.

Nine types of worm gear operators cover the torque requirements of the whole range of butterfly valves.

## Design Features

- Robust design
- Factory set 90° swing angle. Setting of the end stop by travelling nut system.
- Strong; integrated into the body valve attachment
- Valve attachment according to ISO 5211
- Self locking worm gearing with minimum backlash
- ISO 5210 top flange for mounting of multi-turn actuators
- Mechanical position indicator

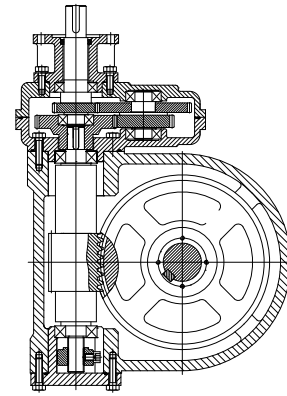


FIG. 6

## Possible Positions For Worm Gear Operators

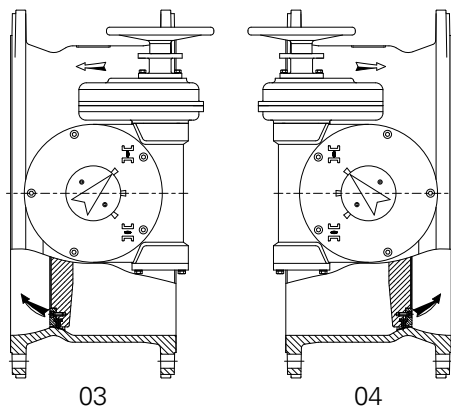
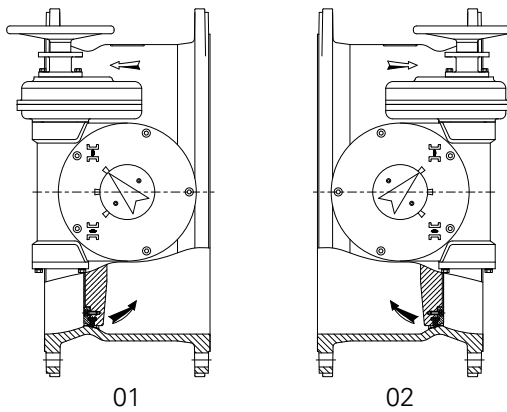


FIG. 7

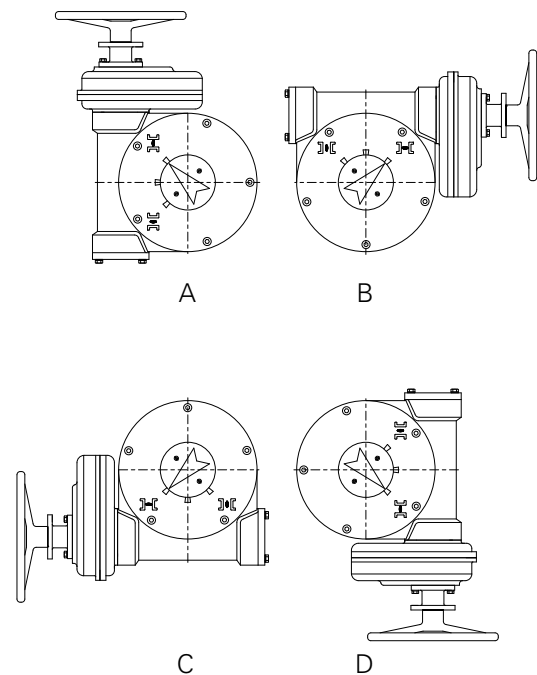
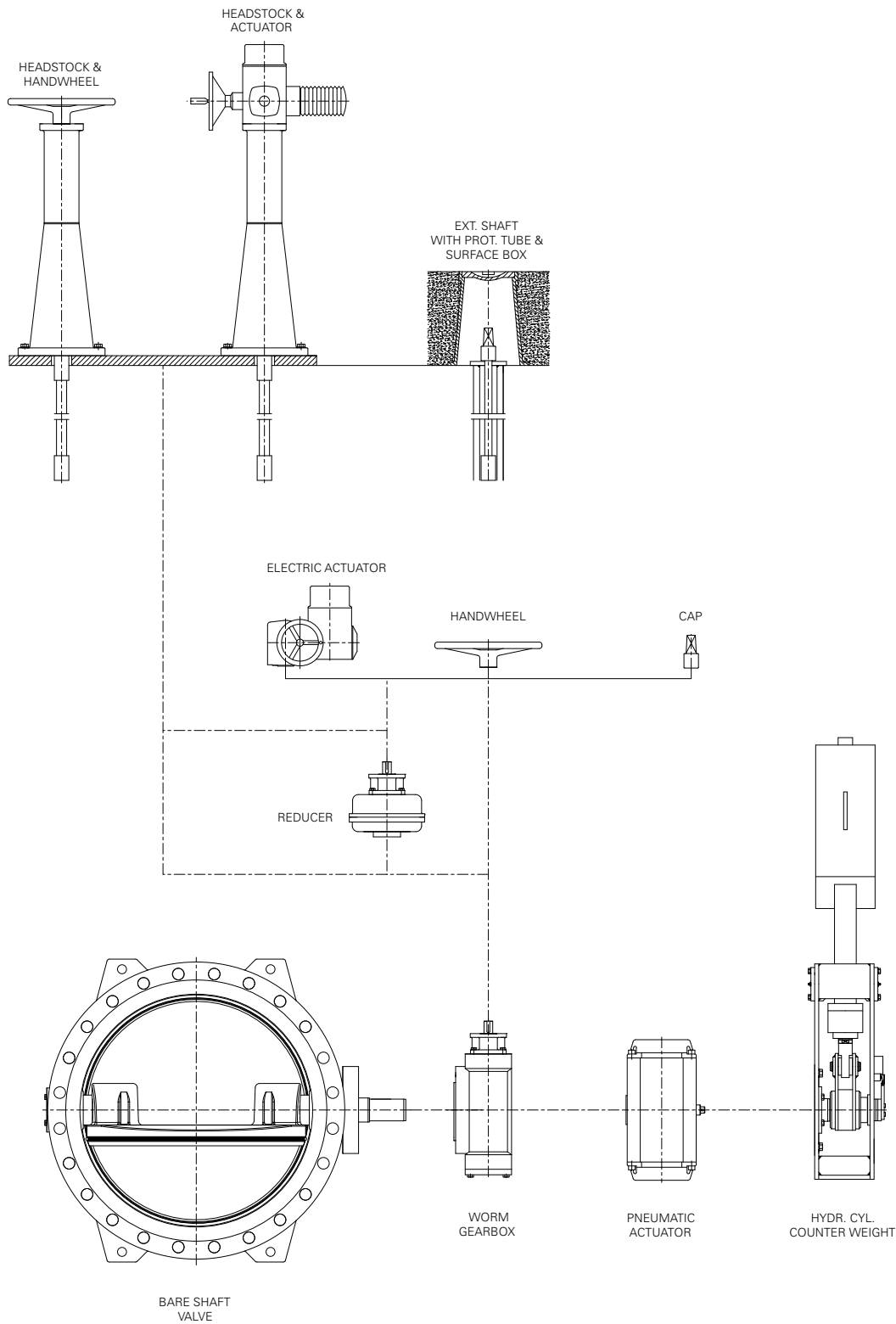


FIG. 8

# Possible Actuators for Özkan Butterfly Valves



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