DIEQUA Corporation

Sizing & Selection

Robot Flange

Hollow Shaft

Solid Shaft

Industrial

Installation Information

Application Questions

RIGHT ANGLE SERVO WORM GEARHEADS

COMPLETE PRODUCT CATALOG

DIEQUA Corporation

DieQua Corporation is a manufacturer and supplier of a wide range of motion control and power transmission drive components. Our focus has always been to provide products that offer superior value, the highest quality, the most unique designs, and the most reliable performance. DieQua continues to develop innovative products to meet the changing technological needs of the industries and customers we serve.

The DieQua Process

DieQua has an enormous product offering. Making a proper selection, or even knowing what is possible can be daunting. Our staff is specifically trained to first listen, and then ask questions, to gain a thorough understanding of your specific and unique application. Then, we help you navigate to the specific product, or even a special design, that will meet or exceed your needs. It is through our consultative approach that we are most helpful to our customers in finding the best design solution.

IN THIS GUIDE

High-Performance Servo Worm (HPSW-1) — Sizes 25-110

Output Shaft Options


Hollow Shaft with Keyway


Robot Flange


Hollow Shaft with Shrink Disc


Solid Shaft

Single and Dual output available

High-Performance Servo Worm (HPSW-2) — Sizes 125-200

Output Shaft Options


Hollow Shaft with Shrink Disc


Solid Shaft

Single and Dual output available

Industrial Servo Worm (ISW) — Sizes 28-110

Output Shaft Options


Hollow Shaft with Keyway


Solid Shaft

Single and Dual output available

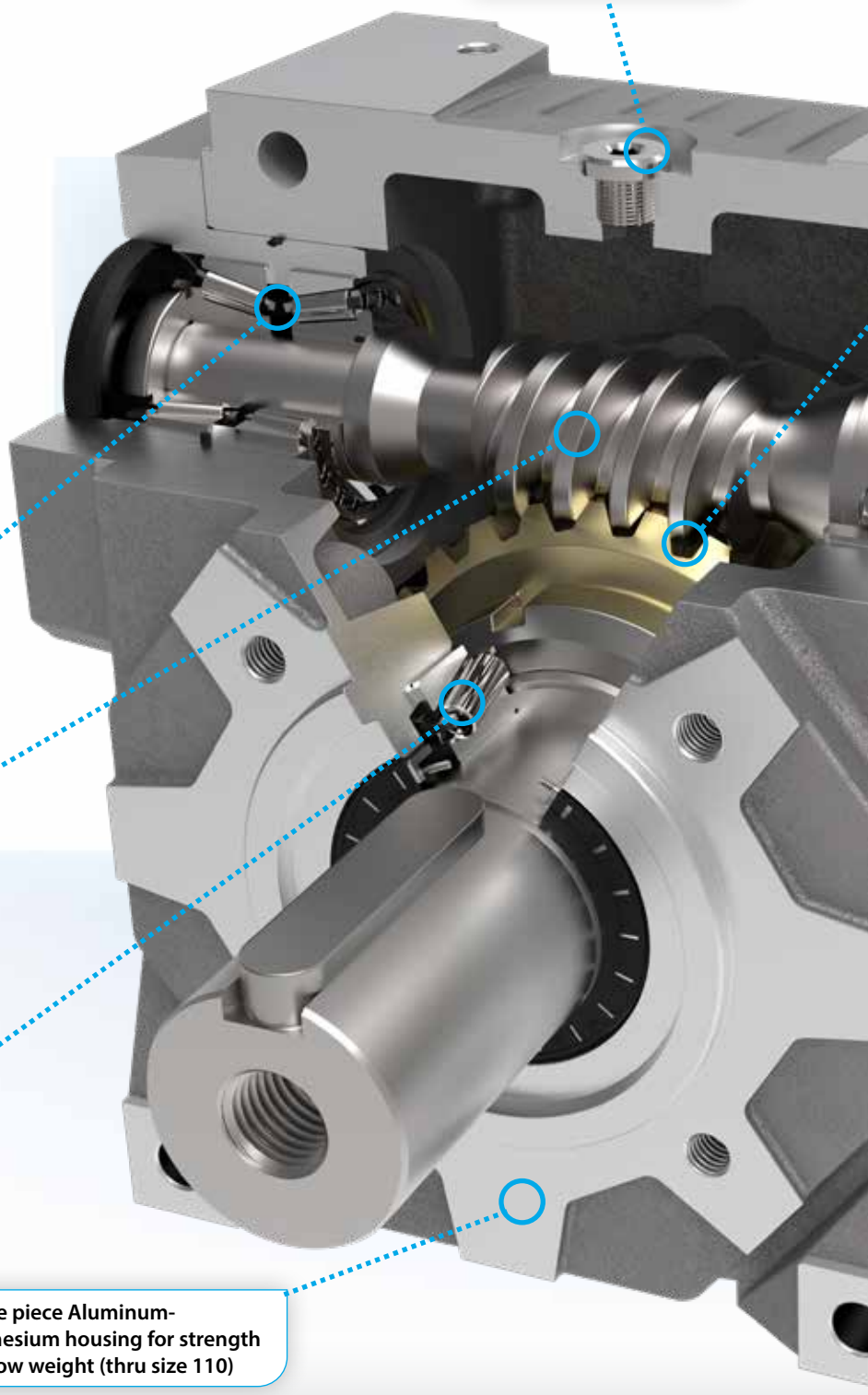
High-Performance Servo Worm (HPSW-25-110)

Design Features & Highlights

DieQua's optimized contact pattern featuring a unique gear-cutting process, along with state-of-the-art assembly, leads to nearly 90% pattern surface, drastically reducing the contact pressure.

A specially developed bronze alloy provides unmatched wear resistance. When combined with the 90% contact pattern, low backlash is maintained throughout the life of the gearbox.

All these advancements mean DieQua's servo worm gearheads can run up to 6000 RPM. Competing products just don't compare.



Maintenance Free
The gearbox is filled with a high-performance lifetime synthetic Lubricant.

High Speed Bearing System
2 taper roller bearing system mounted on worm shaft opposite input coupling to insure minimal axial growth with temerature rise.

Unique Dual-Pitch Worm
This design allows for the backlash to be adjusted by moving the worm axially relative to the ring gear.

Oversized Output Taper Roller Bearings
For increased radial load capacity (Ball bearings for size 25)

Single piece Aluminum-Magnesium housing for strength and low weight (thru size 110)

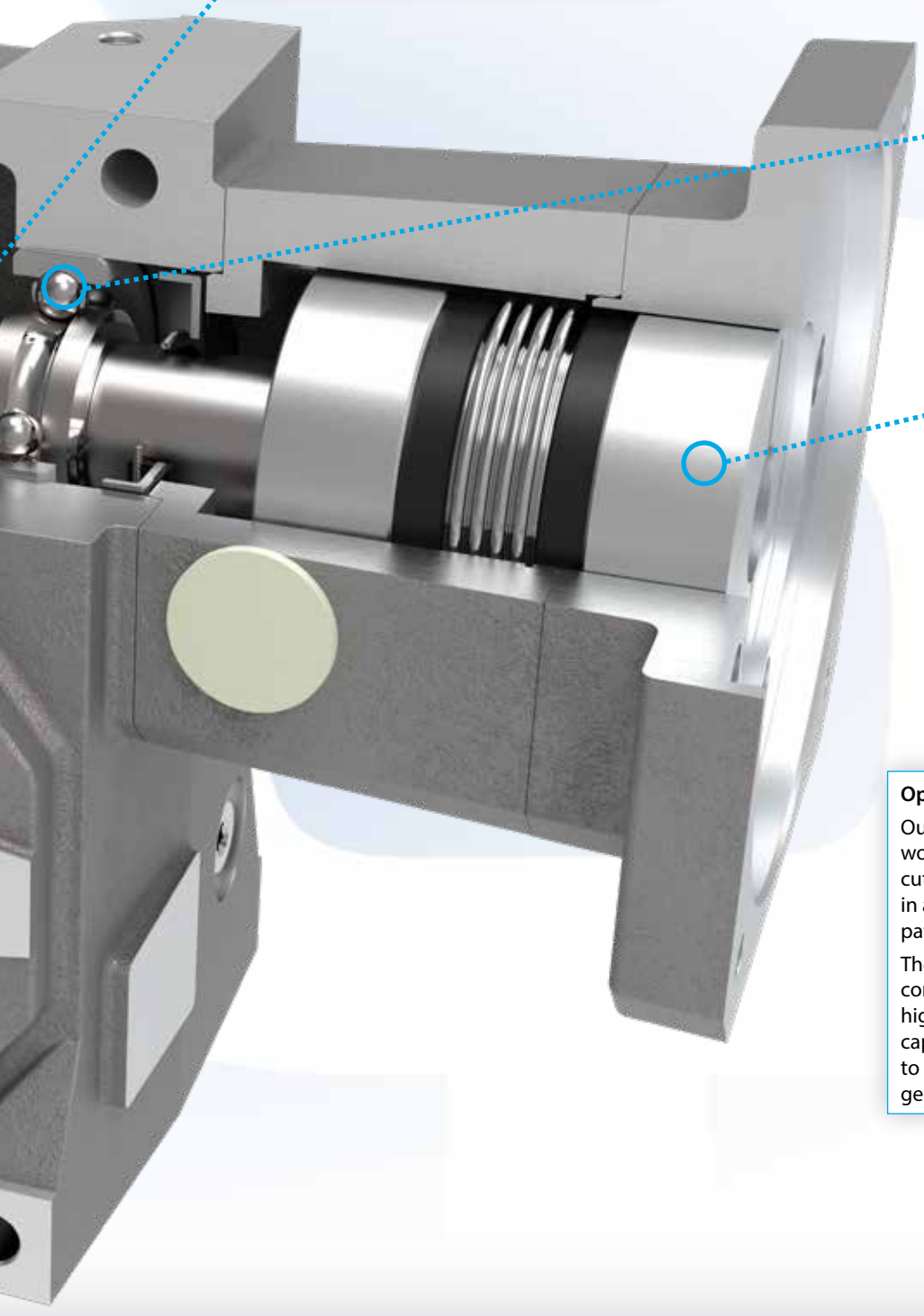
Two Backlash Classes:

P1 = ≤ 1 arcminute of backlash

P2 = ≤ 10 arcminutes of backlash

Special Bronze Alloy Ring Gear

This proprietary material was developed for increased life by reducing friction between the ring and the worm.



Floating Ball Bearing

A "floating" ball bearing that moves axially with temperature rise. With this design, we can achieve up to 6000 rpm input speeds.

Rapid Servomotor Mounting System

All gearboxes incorporate a torsionally rigid metal-bellow coupling and a servo mounting flange specific to your servo motor mounting dimensions.

Optimized Contact Pattern

Our unique dual pitch worm design and tooth cutting process results in a nearly 90% contact pattern on the teeth.

The result is reduced contact pressure and higher load carrying capacity when compared to other similar sized gearboxes.

High-Performance Servo Worm (HPSW-25-110)

Selection Calculations

General Specifications

Range: 8 sizes, 25-110

Reduction ratios: 10 ratios, 3:1 - 90:1

Maximum output torque: 1500 Nm (13,275 in lbs)

Sizing bases on 20,000 hours average life with service factor S1

Housing Material: Diecast aluminum-magnesium alloy

Input: High precision, torsionally rigid, bellow coupling.

Flanges to fit any servo motor

Gears: Worms made of alloyed steel, hardened and ground, with a **unique dual pitch**.

Ring gears made from special bronze alloy for increased wear resistance.

Bearings: Floating ball bearing and oversize taper roller bearings for increased radial and axial capacity.

Seals: Viton

Lubricant: Full synthetic oil, Lubriplate Mobil

Gearbox Selection Process

The following page contains the performance data for gearbox selection. The data is broken down into two categories, S1 Continuous duty torque, and S5 intermittent duty torque.

S1 Continuous duty is defined as a duty cycle greater than 60% of a given work cycle.

S5 Intermittent duty is defined as a duty cycle less than 60% of a given work cycle with certain considerations. The actual running time percentage per work cycle plus the number of starts per hour will affect the S5 torque calculation. If you starts per hour exceeds 5000 please consult DieQua technical staff for more precise calculations.

Legend	
E-stop (Nm)	Gearbox output emergency torque (2 seconds duration maximum, applied a maximum of 25,000 times over the gearbox ife)
ST (N m)	Starting input friction torque (without any load on output)
N1	Maximum input RPM to be achieved during a full cycle (S5 service) or input nominal RPM (S1 service)
i	Exact gear ratio
Et (Nm/ArcMinute)	Torsional stiffness on output
ig ($kg.m^2$)	Polar moment of inertia on input (to be added to coupling inertia, see page 7)
η (%) [1]	Gearbox efficiency at considered input RPM
Fr (N)	Permissible radial load on output shaft (applied at the middle of the shaft)
Fa (N)	Permissible axial load on output shaft

Reversibility Classes (RC)	
1	Total reversibility
2	[2] Uncertain reversibility
3	[3] Self-locking at $N_1 = 0$

Notes:

[1] Efficiency values given for reference only and achieved after 24 hours full load operation

[2] Units can become reversible under vibrations. For safety applications we advise to use a brake.

[3] Static self-locking only.

Break In Period: Contact the factory for instructions and recommendations.

High-Performance Servo Worm (HPSW-25-110)

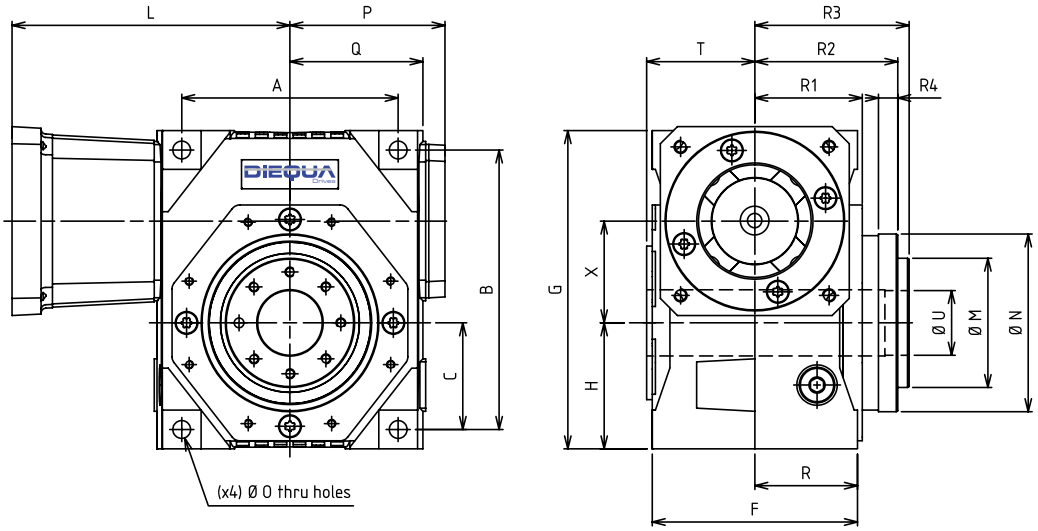
Technical Specifications

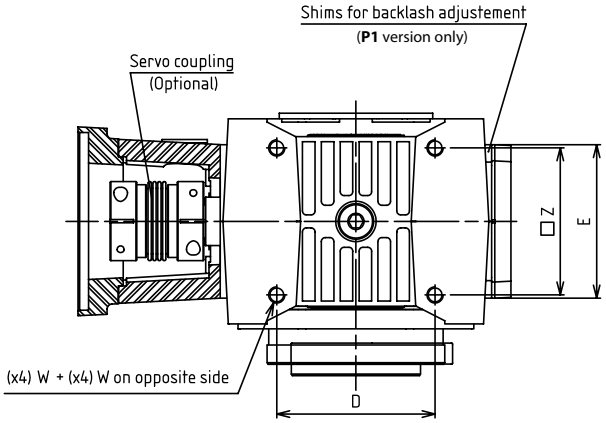
input speed (rpm)		6000		4000			3000			2000			1000				ST					
Size	Ratio i	T (Nm) S5	eff. (η)	T (Nm) S1	T (Nm) S5	eff. (η)	T (Nm) S1	T (Nm) S5	eff. (η)	T (Nm) S1	T (Nm) S5	eff. (η)	T (Nm) S1	T (Nm) S5	eff. (η)	E-stop (Nm)	Starting torque (Nm*)	ig (kg.m2)	Et	RC	Fr (N)	Fa (N)
25	5.2	11	89	8	13	88	9	15	87	11	18	86	14	23	84	46	0.03	2.2 x 10-6	2	1	1500	500
	7.25	11	88	8	14	87	9	15	86	11	18	85	14	24	82	46	0.03	1.51 x 10-6	2	1	1500	500
	10.25	11	87	8	13	86	8	14	85	11	18	84	14	23	81	46	0.03	1.51 x 10-6	2	1	1500	500
	14.5	13	82	9	15	81	11	18	79	12	20	77	16	26	74	46	0.03	9.58 x 10-7	2	2	1500	500
	19.5	13	80	9	15	78	11	18	76	12	20	74	16	26	70	46	0.03	8.67 x 10-7	2	2	1500	500
	30	15	73	11	18	70	12	20	68	14	23	65	17	29	60	46	0.03	8 x 10-7	2	3	1500	500
	45	15	67	11	18	64	11	19	62	14	23	59	17	28	53	42	0.03	7.77 x 10-7	2	3	1500	500
	60	14	62	10	16	59	11	19	56	13	21	53	15	25	48	35	0.03	7.6 x 10-7	2	3	1500	500
35	5.2	23	94	16	27	93	18	31	92	22	36	91	29	48	89	96	0.03	7.4 x 10-6	5	1	3800	2800
	7.25	23	92	17	28	91	19	32	90	23	37	89	30	48	86	96	0.03	5.6 x 10-6	5	1	3800	2800
	10.25	24	90	17	29	89	20	34	88	23	39	87	30	51	81	96	0.03	5 x 10-6	5	1	3800	2800
	14.5	27	87	19	31	85	22	35	83	26	41	81	33	52	77	96	0.03	4.4 x 10-6	5	2	3800	2800
	19.5	28	84	20	32	82	22	35	80	26	42	78	33	50	73	96	0.2	4.2 x 10-6	5	2	3800	2800
	30	30	77	23	37	74	25	40	72	29	46	69	36	58	63	96	0.2	4 x 10-6	5	3	3800	2800
	45	30	71	23	36	68	25	40	65	28	45	61	35	56	56	87	0.2	3.9 x 10-6	5	3	3800	2800
	60	30	65	22	34	62	24	37	59	27	41	55	34	50	50	73	0.1	3.1 x 10-6	5	3	3800	2800
	90	28	57	21	32	53	23	35	50	26	39	46	32	46	41	72	0.1	2.31 x 10-6	5	3	3800	2800
45	3.125	-		30	48	95	38	60	94	44	70	93	50	81	92	214	0.4	4.7 x 10-5	9	1	5800	4000
	5.2	54	95	36	62	94	41	70	93	50	83	92	67	109	91	214	0.4	2.9 x 10-5	9	1	5800	4000
	7.25	59	94	42	71	93	48	80	92	57	93	91	76	121	89	214	0.4	2.2 x 10-5	9	1	5800	4000
	10.25	68	93	46	80	92	53	88	91	62	98	90	80	128	88	214	0.4	1.5 x 10-5	9	1	5800	4000
	14.5	69	90	52	83	88	59	94	87	68	109	86	88	141	82	214	0.4	1.4 x 10-5	9	2	5800	4000
	19.5	66	89	50	80	87	55	88	86	64	102	84	81	129	80	214	0.3	1 x 10-5	9	2	5800	4000
	30	74	83	55	88	80	61	98	78	70	112	76	88	141	71	214	0.3	1 x 10-5	9	2	5800	4000
	45	74	77	54	86	75	59	94	72	68	109	69	83	133	64	185	0.3	8.2 x 10-6	9	3	5800	4000
	60	69	73	50	78	70	55	86	68	62	97	64	75	116	59	170	0.2	7.3 x 10-6	9	3	5800	4000
	90	63	66	46	71	62	50	76	59	57	86	56	68	99	50	154	0.2	4.6 x 10-6	9	3	5800	4000
55	3.125			52	83	94	56	89	94	74	118	93	95	152	92	307	0.6	1.1 x 10-4	20	1	7000	4800
	5.2	85	95	60	103	94	68	116	94	82	137	93	111	181	91	307	0.6	7.5 x 10-5	20	1	7000	4800
	7.25	88	94	65	111	93	74	125	92	90	147	91	118	188	89	307	0.6	5.3 x 10-5	20	1	7000	4800
	10.25	102	92	76	132	90	87	145	89	103	165	88	133	206	85	307	0.6	4.5 x 10-5	20	1	7000	4800
	14.5	96	90	71	115	88	82	133	87	96	155	85	123	190	82	307	0.6	3.8 x 10-5	20	2	7000	4800
	19.5	101	88	77	123	87	87	139	85	101	162	83	128	205	80	307	0.4	3.1 x 10-5	20	2	7000	4800
	30	107	82	83	130	80	94	148	78	109	169	75	136	202	70	307	0.4	3.4 x 10-5	20	2	7000	4800
	45	110	77	83	130	74	93	145	72	106	163	69	131	202	63	307	0.4	2.8 x 10-5	20	3	7000	4800
	60	110	73	82	128	69	91	141	67	103	158	63	126	194	58	286	0.3	2.6 x 10-5	20	3	7000	4800
	90	102	65	76	117	62	82	125	59	94	142	55	113	164	49	263	0.3	1.2 x 10-5	20	3	7000	4800
63	5.2	128	95	90	153	95	105	179	94	126	210	93	169	275	91	497	0.8	1.6 x 10-4	36	1	8800	8500
	7.25	123	95	91	155	94	103	174	93	125	206	92	165	264	90	497	0.8	9 x 10-5	36	1	8800	8500
	10.25	134	94	103	169	93	118	194	92	141	231	91	181	290	89	497	0.8	8 x 10-5	36	1	8800	8500
	14.5	146	91	110	179	90	128	207	89	149	240	87	191	293	84	497	0.8	6.9 x 10-5	36	2	8800	8500
	19.5	155	90	119	190	88	135	215	87	156	250	85	199	318	82	497	0.5	5.5 x 10-5	36	2	8800	8500
	30	179	84	138	218	82	155	245	80	179	281	78	223	335	73	497	0.5	5.9 x 10-5	36	2	8800	8500
	45	163	80	123	193	77	137	214	75	156	239	72	193	287	67	403	0.5	5 x 10-5	36	3	8800	8500
	60	162	76	121	189	73	134	205	71	151	233	67	186	288	62	404	0.4	4.7 x 10-5	36	3	8800	8500
	90	149	68	110	169	65	121	184	63	137	207	59	166	241	53	368	0.4	3.2 x 10-5	36	3	8800	8500
75	5.2	213	96	147	252	95	174	396	94	209	349	94	282	459	92	834	1	3.7 x 10-4	50	1	10500	10500
	7.25	190	95	139	236	94	161	270	93	196	321	92	256	409	90	834	1	2.5 x 10-4	50	1	10500	10500
	10.25	187	94	146	234	93	168	269	92	204	326	91	261	418	88	834	1	2.2 x 10-4	50	1	10500	10500
	14.5	237	91	170	276	90	195	315	88	234	376	87	298	460	84	834	1	1.9 x 10-4	50	2	10500	10500
	19.5	228	89	168	270	88	194	310	87	227	362	85	288	434	81	834	0.6	1.5 x 10-4	50	2	10500	10500
	30	252	86	186	294	84	212	334	82	248	386	80	309	460	75	834	0.6	1.6 x 10-4	50	2	10500	10500
	45	243	79	190	299	76	212	331	74	244	383	71	301	472	65	718	0.6	1.4 x 10-4	50	3	10500	10500
	60	225	75	175	272	72	195	300	69	221	334	66	272	395	60	657	0.5	1.3 x 10-4	50	3	10500	10500
	90	218	68	167	257	64	184	280	62	209	316	57	255	370	52	625	0.5	8 x 10-5	50	3	10500	10500
90	5.2	332	96	227	387	95	271	460	95	327	546	94	445	725	92	1543	1.5	8.5 x 10-4	75	1	15800	13000
	7.25	376	95	263	460	95	306	490	95	373	597	94	490	784	92	1543	1.5	6 x 10-4	75	1	15800	15800
	10.25	391	95	273	478	94	314	528	93	383	627	92	488	781	90	1543	1.5	3.8 x 10-4	75	1	15800	15800
	14.5	379	92	272	444	91	314	504	90	380	612	88	486	748	85	1543	1.5	3.2 x 10-4	75	2	15800	15800
	19.5	429	91	318	506	90	367	584	88	431	685	87	544	865	84	1543	0.8	2.5 x 10-4	75	2	15800	15800
	30	433	86	316	500	84	362	572	82	424	661	80	531	792	75	1543	0.8	2.6 x 10-4	75	2	15800	15800
	45	454	83	343	538	80	385	599	79	441	674	76	546	811	71	1255	0.8	1.9 x 10-4	75	3	15800	15800
	60	432	80	328	512	77	364	559	75	412	622	72	507	761	67	1230	0.5	1.7 x 10-4	75	3	15800	15800
	90	394	74	298	459	70	332	505	68	372	562	64	460	667	59	1114	0.5	1 x 10-4	75	3	15800	15800
110	5.2	567	96	390	666	95	458	779	95	561	937	94	760	1239	92	2289	2	1.85 x 10-3	120	1	21500	16000
	7.25	579	95	417	680	95	488	795	95	599	976	94	802	1307	92	2289	2	1.3 x 10-3	120	1	21500	16000
	10.25	650	95	449	786	94	522	878	93	638	1047	92	827	1323	90	2289	2	8.5 x 10-4	120	1	21500	16000
	14.5	630	93	450	720	92	519	830	91	630	1014	90	810	1247	87	2289	2	6.3 x 10-4	120	2	21500	16000
	19.5	670	92	510	815	91	589	943	90	705	1121	88	893	1349	85	2289	1	4.6 x 10-4	120	2	21500	16000
	30	790	88	597	955	87	688	1100	85	812	1299	83	1015	1512	79	2289	1	3.5 x 10-4	120	2	21500	16000
	45	776	85	583	915	82	665	1037	80	765	1168	78	947	1411	73	2152	1	3.3 x 10-4	120	3	21500	16000
	60	683	81	522	815	79	588	905	77	669	1030	73	826	1239	68	2094	0.8	3 x 10-4	120	3	21500	16000
	90	645	75	497	765	72	557	847	70	625	944	66	778	1128	60	1941	0.8	1.7 x 10-4	120	3	21500	16000

* Note: These are estimated values. Actual values may vary.

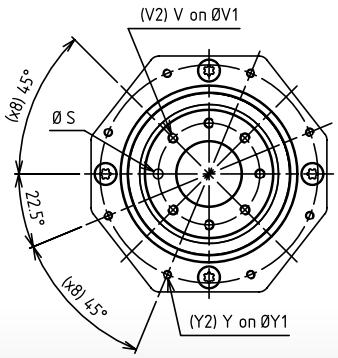
Robot Flange Dimensional Data (RF)

Sizes 45–110



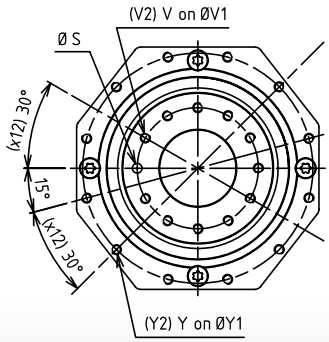


Sizes 45-55 and 63

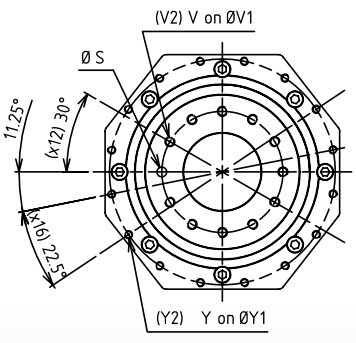


Sizes 75 and 90

Conforms to ISO9409 (Except size 90)



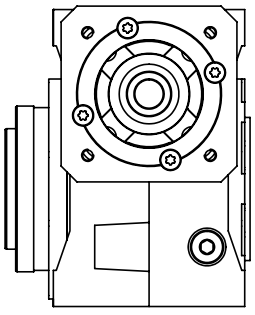
Size 110

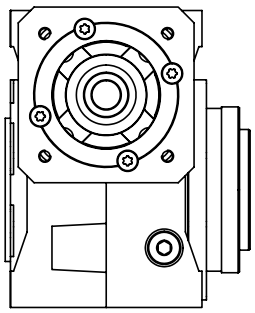


Robot Flange Dimensional Data

All dimensions in mm	45	55	63	75	90	110
A	108	120	134	172	186	220
B	135	155	173	208	234	276
C	53	61	66	82	91	108
D	81	90	98	136	141	175
E	68	78	91	110	130	140
F	100	112	127	148	170	182
G	153	175	197	232	264	306
H	62	71	78	94	106	123
I Max	105	116	126	151	165.5	189
I Min	97.5	108	116	140	153.5	177
J j6	15	18	20	24	28	32
K	20	22	24	28	28	36
L	**Based on selected Motor Flange**					
M h7	50	63	80	100	125	160
N h7	80	90	110	140	165	200
O	9	9	11	11	13	13
P max	83.5	91	101	124	136.5	152
Q	67.5	75	84	104	114.5	132
R	50	56	63.5	74	85	91
R1	54	59	66.5	79	93	100
R2	74	82	88.5	110	129	140
R3	80	89	95.5	117	138	150
R4	10	12	12	15	18	22
S H7	6	6	6	8	8	10
T	53	59.5	67	78	89	96
U	25	31.5	40	50	63	80
V - Depth	M6 - 11	M6 - 11	M6 - 11	M8 - 15	M8 - 15	M10 - 15
V1	40	50	63	80	100	125
V2	7	7	7	11	11	11
W	M8	M8	M10	M10	M12	M12
X	45	55	63	75	90	110
Y - Depth	M5 - 12	M5 - 12	M5 - 12	M6 - 15	M8 - 18	M8 - 19
Y1	100	109	135	168	190	233
Y2	8	8	8	12	12	16
Z	75	75	85	95	115	115
Weight kg	7.6	10.5	15.2	22.5	36.15	51.7
Max Tilting torque Nm	250	450	780	1200	2150	3900
Tiltiing rigidity Nm/ arcmin	330	520	580	800	1550	3050

Mounting Positions





Note: As viewed from motor input

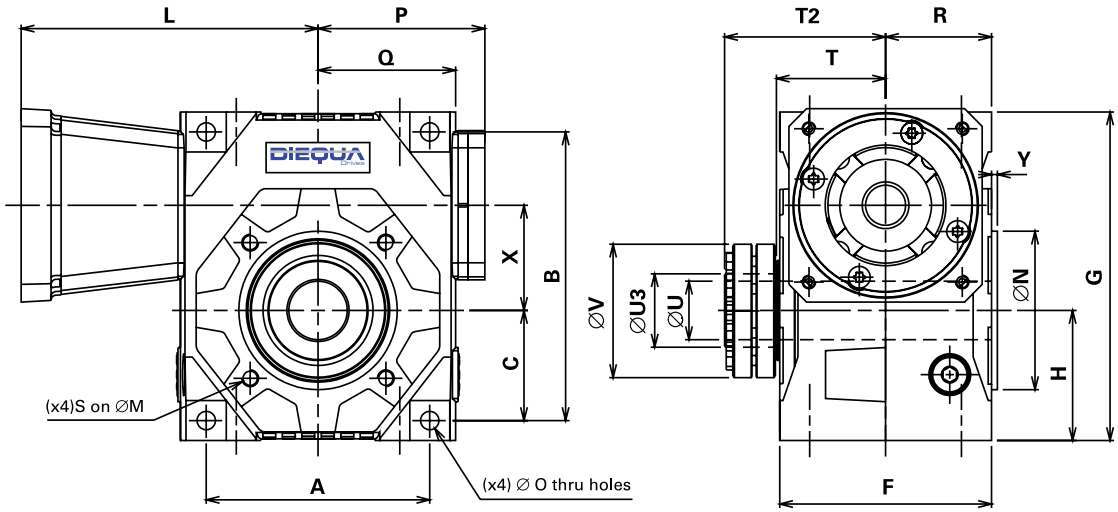
Note: All mounting positions on the machine are accepted with factory specified lubrication volumes.

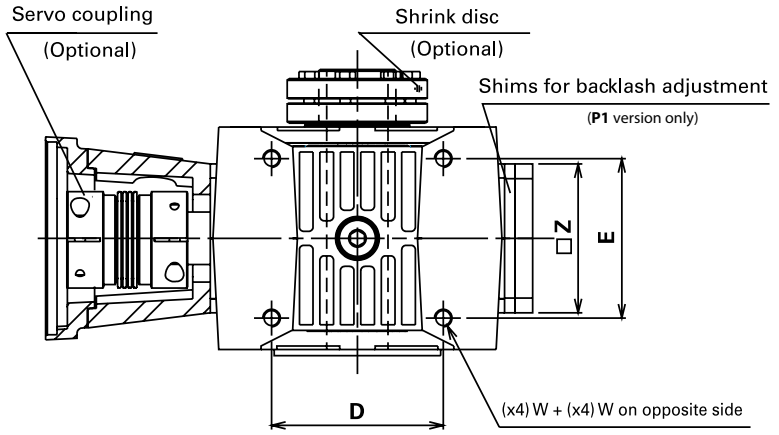
However, applications which use less than 360° of the output rotation require a higher oil level. Consult factory.

Hollow Shaft Dimensional Data

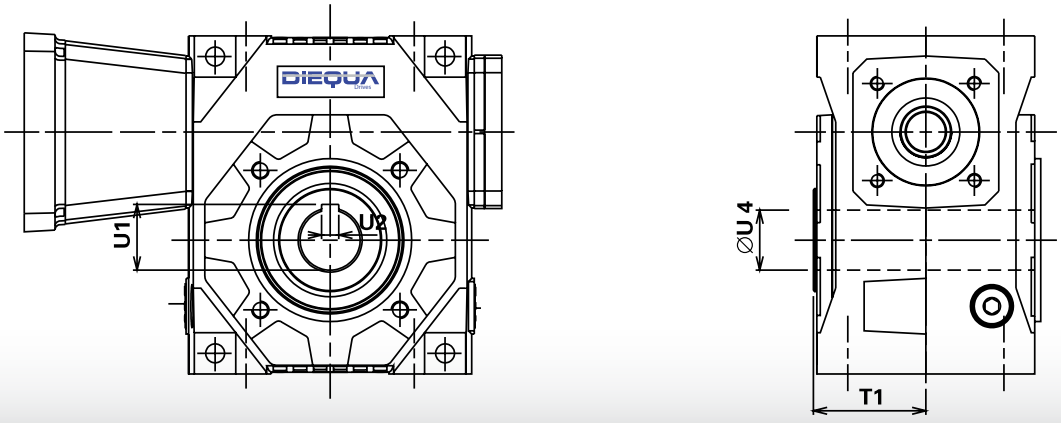
Sizes 35–110

Smooth Shaft for Shrink Disc (SD)





Keyed Hollow Shaft (HS): Size 25~110



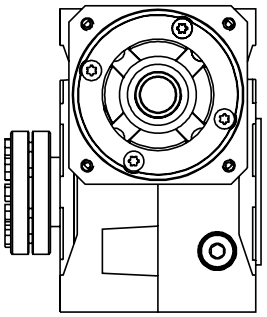
Hollow Shaft Dimensional Data

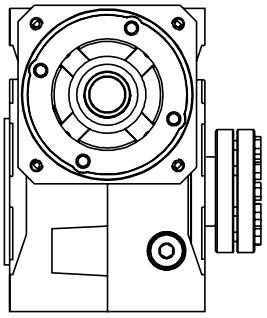
All dimensions in mm	25	35	45	55	63	75	90	110
A	66	86	108	120	134	172	186	220
B	84	110	135	155	173	208	234	276
C	33	44.5	53	61	66	82	91	108
D	49.5	62	81	90	98	136	141	175
E	44	56	68	78	91	110	130	140
F	64	86	100	112	127	148	170	182
G	96	126	153	175	197	232	264	306
H	39	52.5	62	71	78	94	106	123
I Max	53	84	105	116	126	151	165.5	189
I Min	–	77.5	97.5	108	116	140	153.5	177
J (j6)	9	12	15	18	20	24	28	32
K	10	17	20	22	24	28	28	36
L	**Based on selected Motor Flange**							
M	65	65	85	100	115	130	165	200
N (j7)	55	50	70	80	95	110	130	165
O	6.2	7	9	9	11	11	13	13
P max	49	70	83.5	91	101	124	136.5	152
Q	42	55	67.5	75	84	104	114.5	132
R	32	43	50	56	65.5	74	85	91
S(*)	M5	M6	M8	M8	M10	M10	M12	M12 (8)
T		45	52	58	63.5	76	87	93
T1	34.5	45	52	58	65.5	76	87	93
T2	–	69	78	87	96.5	110	124	133
U (H7)	–	20	25	30	35	40	50	60
U1	16.3	18.3	28.3	33.3	38.5	43.5	53.8	64.4
U2	5	5	8	8	10	12	14	18
U3		24	30	36	44	50	68	80
U4	14	16	25	30	35	40	50	60
V	–	50	60	72	80	90	115	145
W	M5	M6	M8	M8	M10	M10	M12	M12
X	25	35	45	55	63	75	90	110
Y(*)	3	3	3	3.5	3.5	4	4	5
Z	50	58	75	75	85	95	115	115
Weight(kg)	1.4	3.4	6.2	8.5	13.9	20.5	32.5	46.5

Notes: Size 25 only available in keyed hollow shaft
(*) Flanges on both sides

Mounting Positions

L





R

Note: As viewed from motor input

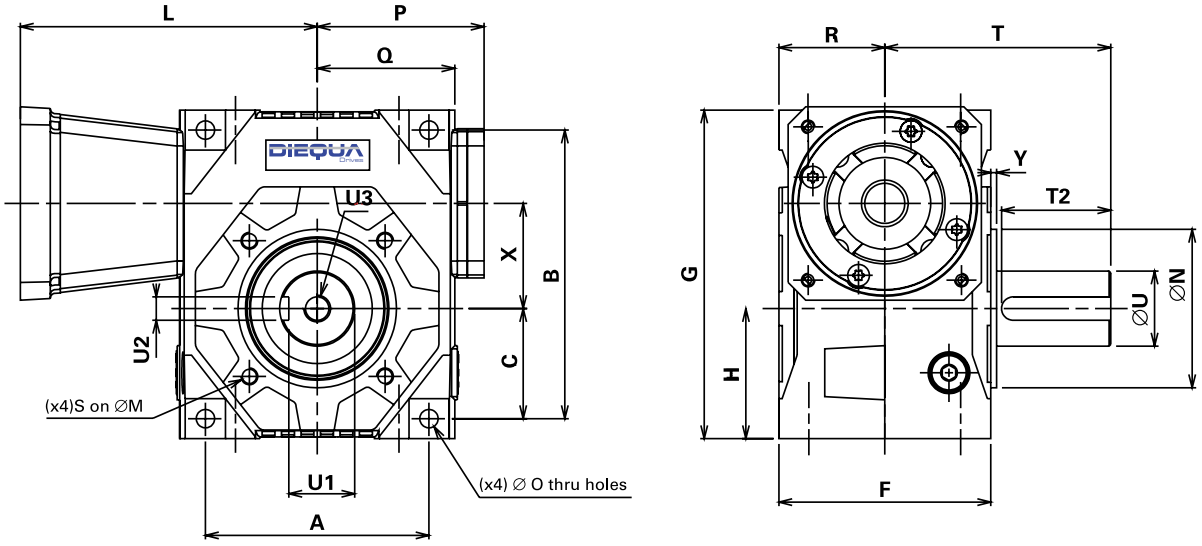
Note: All mounting positions on the machine are accepted with factory specified lubrication volumes.

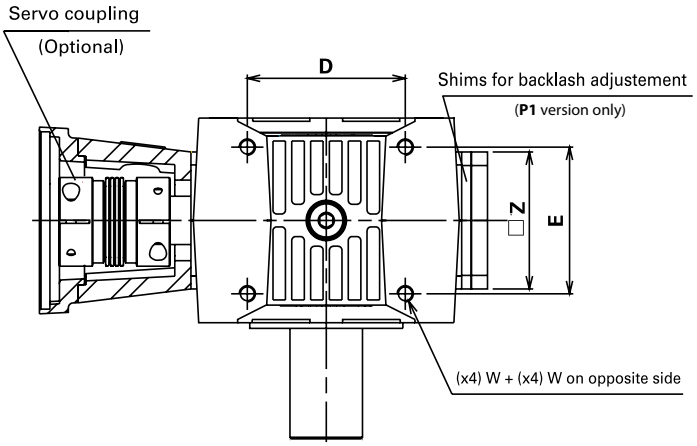
However, applications which use less than 360° of the output rotation require a higher oil level. Consult factory.

Output Shaft Dimensional Data

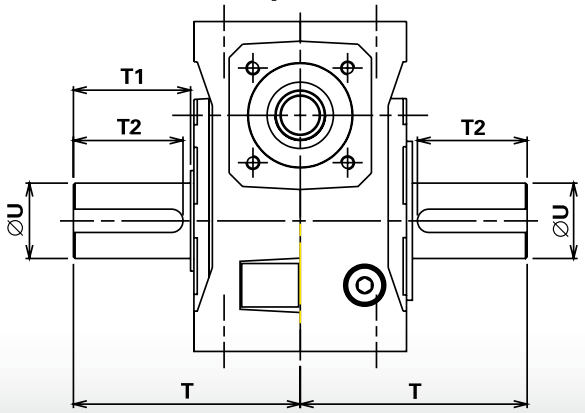
Sizes 35–110

Single Output Shaft (SS)





Dual Output Shaft (DS)



Output Shaft Dimensional Data

All dimensions in mm	35	45	55	63	75	90	110
A	86	108	120	134	172	186	220
B	110	135	155	173	208	234	276
C	44.5	53	61	66	82	91	108
D	62	81	90	98	136	141	175
E	56	68	78	91	110	130	140
F	86	100	112	127	148	170	182
G	126	153	175	197	232	264	306
H	52.5	62	71	78	94	106	123
I Max	84	105	116	126	151	168.5	189
I Min	77.5	97.5	108	116	140	153.5	177
J (j6)	12	15	18	20	24	28	32
K	17	20	22	24	28	28	36
L	**Based on selected Motor Flange**						
M	65	85	100	115	130	165	200
N (j7)	50	70	80	95	110	130	165
O	7	9	9	11	11	13	13
P max	70	83.5	91	101	124	136.5	152
Q	55	67.5	75	84	104	114.5	132
R	43	50	56	63.5	74	85	91
S	M6	M8	M8	M10	M10	M12	M12 (8)
T	83	107	118	135.5	151	187	208
T1	38(*)	55(*)	60(*)	70	75	100	115
T2	35	50	55	65	70	95.5	110
U (h6)	25	35	40	45	50	65	75
U1	21	30	35	39.5	44.5	58	67.5
U2	8	10	12	14	14	18	20
U3	M10	M12	M16	M16	M16	M20	M20
W	M6	M8	M8	M10	M10	M12	M12
X	35	45	55	63	75	90	110
Y	3	3	3.5	3.5	4	4	5
Z	58	75	75	85	95	115	115
Weight (kg)	3.6	6.8	9.2	15.2	22.2	35.1	50.3

Notes: (*) No shoulder on shaft

Motor Flange and Coupling Selection Process

There are few industry standards regulating servo motor mounting dimensions. This requires DieQua to stock an enormous number of different flanges and mounting components. These lists are updated constantly and are not listed in this catalog.

There are two ways to select the proper mounting flange and coupling. The first and most accurate way is to provide the motor performance data and mounting dimensions listed below. Our technical staff will review the motor mounting dimensions and select the proper flange and coupling. The will also double check the motor torque data to make sure the gearbox is properly sized for the motor.

The second way is to scan the QR code below to gain access to the Motor Flange page on our website (diequa.com/servoflangeplates) where you can view the list of existing flanges plates organized by size.

The bellow coupling selection table is identified below for reference since it contains moment of inertia data. The coupling inertia data needs to be added to the gearbox inertia data so that accurate load inertia matching calculations can be performed.

Motor Mfg: _____

Part number: _____

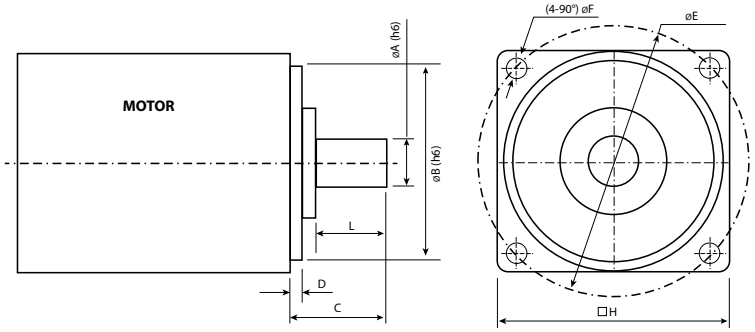
Rated power: _____

Rated torque: _____

Peak torque: _____

Rated speed: _____

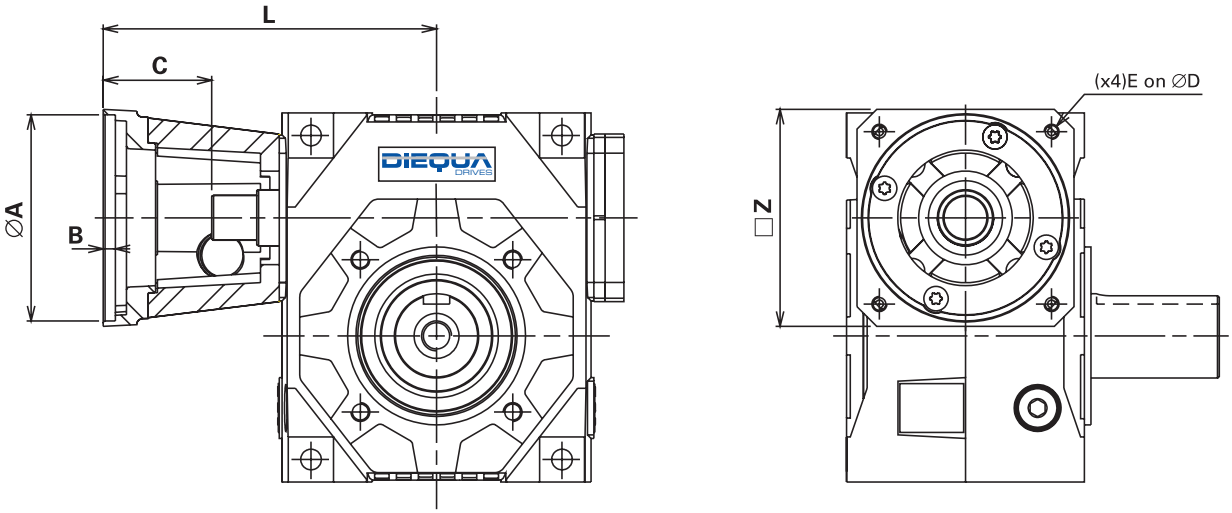
Peak speed: _____



Motor Shaft Diameter	Pilot Diameter	Motor Shaft Length	Pilot Height	Bolt Circle	Mount Hole Diameter	Motor Flange Square	Actual length of Motor Shaft	Motor Part Number
ØA (h6)	ØB (h6)	C	D	ØE	ØF	H	L	

Connecting Flange

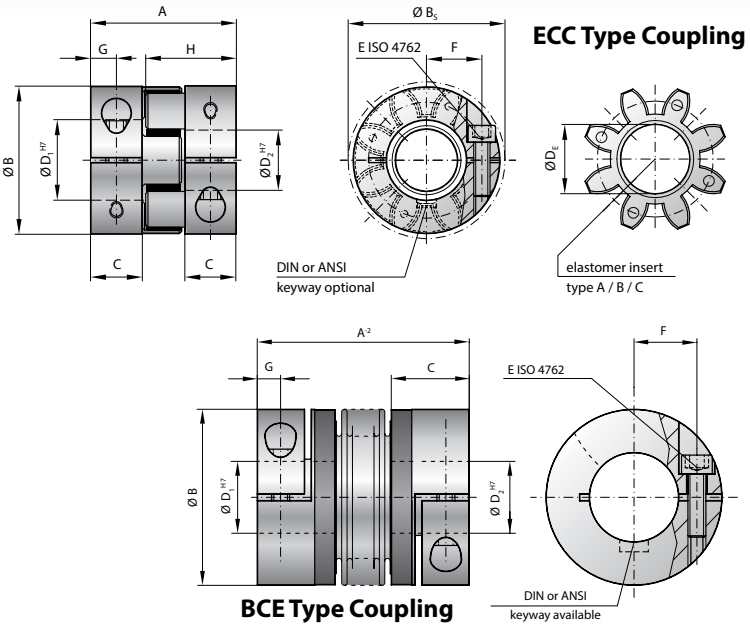
If no flange can be found in the list of flanges from our table directory, reference the above table A~F, H & L.



Coupling Information

Couplings for High Performance Servo Reducers

Input Motor Coupling	HPSW - Size							
	25	35	45	55	63	75	90	110
ECC-010								
BCE-4.5								
BCE-010								
BCE-015								
BCE-030								
BCE-060								
BCE-080								
Coupling Type:	ECC: Elastomer insert coupling, compact hubs BCE: Bellows coupling, clamping hub Consult DieQua for coupling options							



Flange Plates

Scan QR code to see current data on Flange Plates

www.diequa.com/hpsw-flanges

Coupling Part No.	Rated Torque	A-2	ØB	C	D1/2	E	Tightening torque of fastener	F	G
	Nm	mm	mm	mm	mm	mm	Nm	mm	mm
ECC-005(A)	9	26	25	8	4~12.7	M3	2	8	4
ECC-010(A)	12.5	32	32	10.3	4~16	M4	4	10.5	5
BCE-010	10	44	40	13	6~24	M4	4.5	11	5
BCE-015	15	58	49	21.5	8~28	M5	8	17	6.5
BCE-030	30	68	56	26	10~32	M6	15	20	7.5
BCE-060	60	79	66	28	14~35	M8	40	23	9.5
BCE-080	80	92	82	32.5	16~42	M10	70	27	11

Ordering Information

Part Number Example: **HPSW 45 P1 i SD R – Motor Part Number**

Type	Size	BL	Ratio	Output	Mounting Position	Motor Part Number
HPSW	**45**	**P1**	**i**	**SD**	**R**	
	25(*) 35 45 55 63 75 90 110	P1 ≤ 1 arc min P3 ≤ 10 arc min	03 (3.125:1) 05 (5.2:1) 07 10 20 30 45 60 90		L, R	

Size	SD	HS	SS	DS	RF
25	X	•	X	X	X
35	•	•	•	•	X
45	•	•	•	•	•
55	•	•	•	•	•
63	•	•	•	•	•
75	•	•	•	•	•
90	•	•	•	•	•
110	•	•	•	•	•

(*) Size 25, ≤ 15 arc minutes

SD = Shrink Disc
HS = Hollow Shaft
SS = Single Shaft
DS = Dual Shaft
RF = Robot Flange

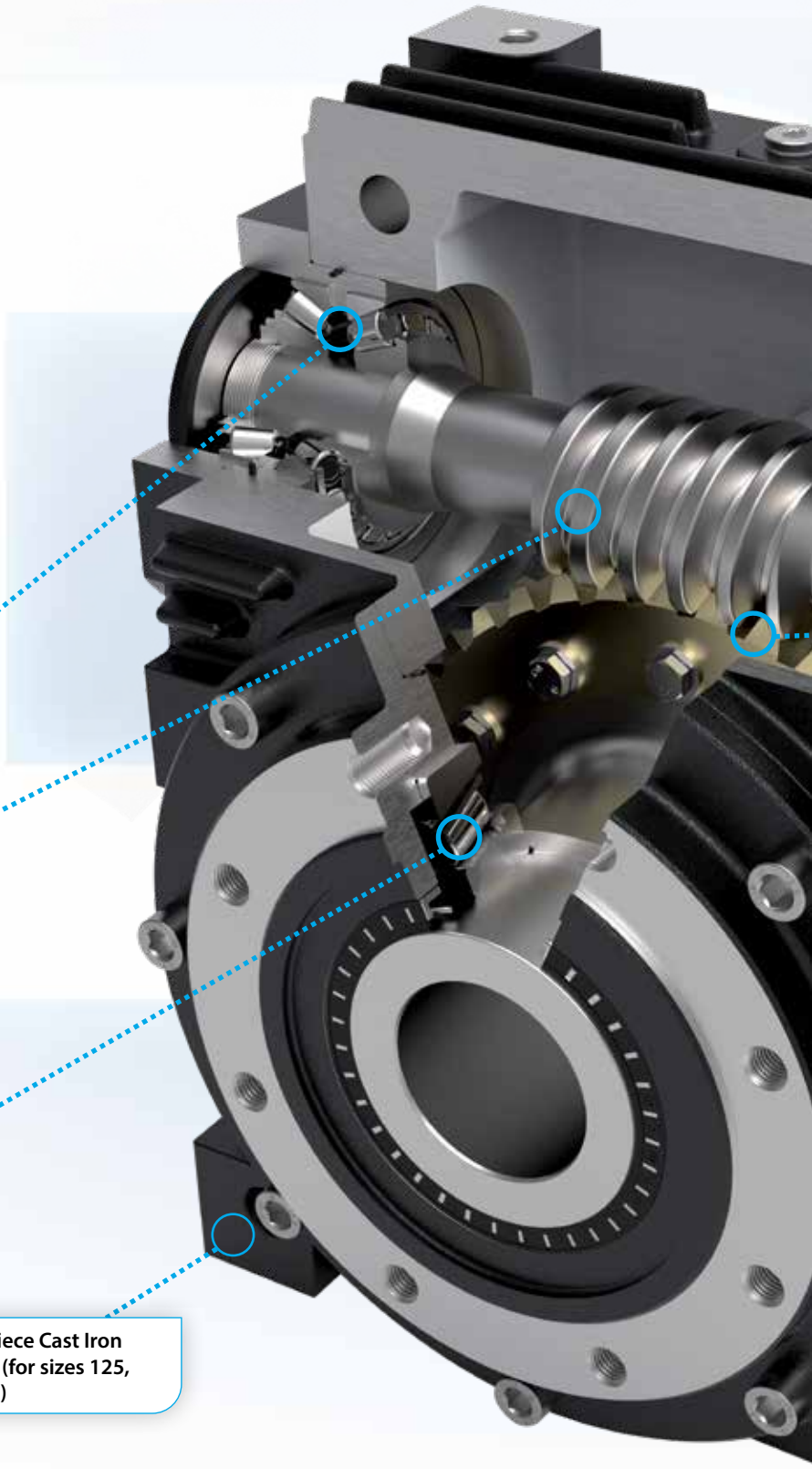
High-Performance Servo Worm (HPSW-125-200)

Design Features & Highlights

DieQua's optimized contact pattern featuring a unique gear-cutting process, along with state-of-the-art assembly, leads to nearly 90% pattern surface, drastically reducing the contact pressure.

A specially developed bronze alloy provides unmatched wear resistance. When combined with the > 90% contact pattern, low backlash is maintained throughout the life of the gearbox.

All these advancements mean DieQua's servo worm gearheads can run up to 6000 RPM.



High Speed Bearing System
2 taper roller bearing system mounted on worm shaft opposite input coupling to insure minimal axial growth with temerature rise.

Unique Dual-Pitch Worm
This design allows for the backlash to be adjusted by moving the worm axially relative to the ring gear.

Oversized Output Taper Roller Bearings
For increased radial and axial load capacity.

Single piece Cast Iron housing (for sizes 125, 165, 200)

Maintenance Free
The gearbox is filled with a high-performance lifetime synthetic Lubricant.

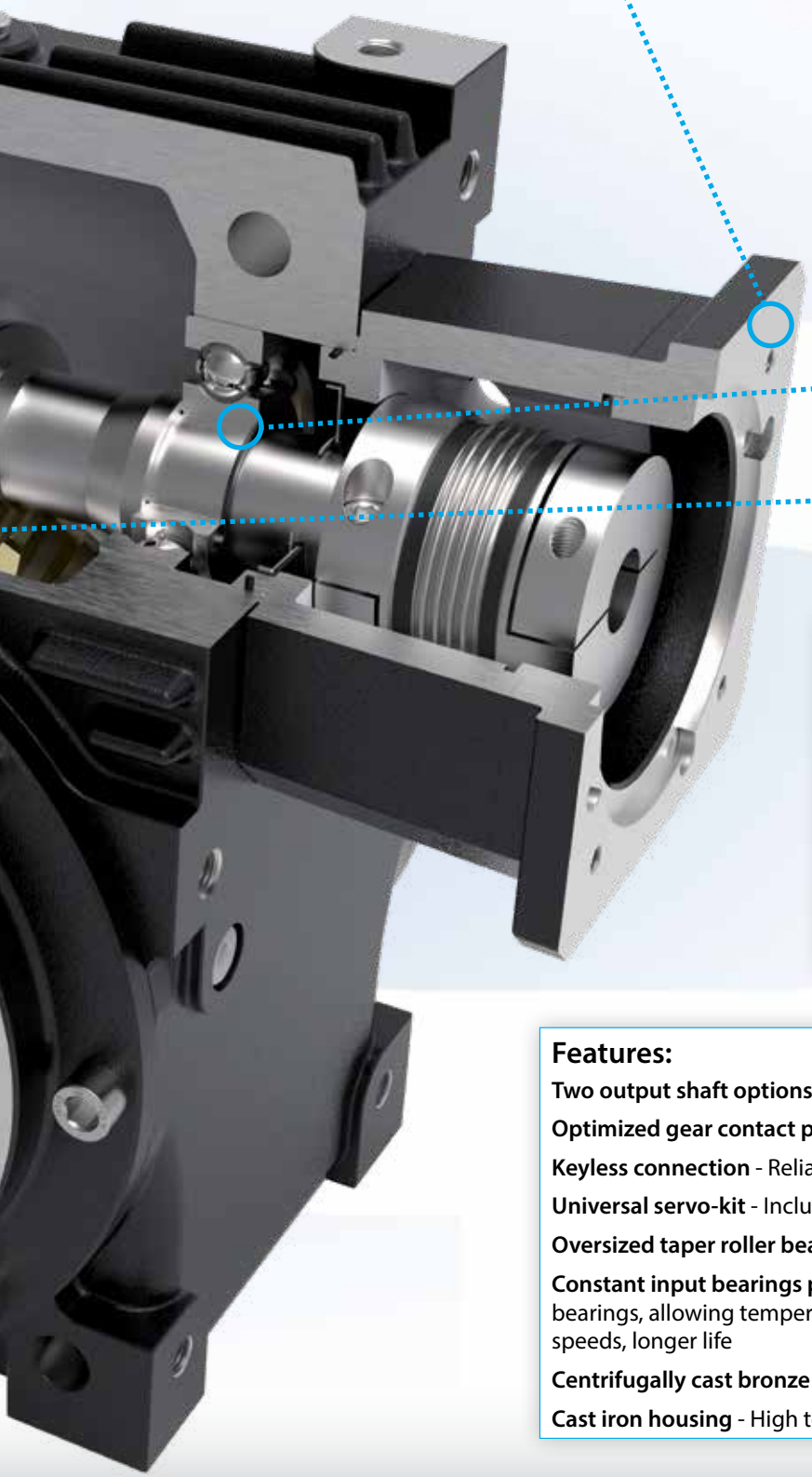
Rapid Servomotor Mounting System

All gearboxes incorporate a torsionally rigid metal-bellow coupling and a servo mounting flange specific to your servo motor mounting dimensions.

Two Backlash Classes:

P1 = ≤ 1.0 arcminutes of backlash

P3 = ≤ 5 arcminutes of backlash



Floating Ball Bearing

A "floating" ball bearing that moves axially with temperature rise. With this design, we can achieve up to 6000 rpm input speeds.

Special Bronze Alloy Ring Gear

This proprietary material was developed for increased life by reducing friction between the ring and the worm.

Optimized Contact Pattern

Our unique dual pitch worm design and tooth cutting process results in a nearly 90% contact pattern on the teeth.

The result is reduced contact pressure and higher load carrying capacity when compared to other similar sized gearboxes.

Features:

Two output shaft options - Hollow shaft, Single output shaft

Optimized gear contact pattern - Less stress, longer life

Keyless connection - Reliable and backlash-free connection with shrink disc

Universal servo-kit - Including high torsional stiffness coupling + flange

Oversized taper roller bearings - Provides very high permissible loads

Constant input bearings preload design - Two taper roller bearings + one floating ___ bearings, allowing temperature variations with same preload, higher input permission speeds, longer life

Centrifugally cast bronze alloy wheel ring - Superior shock and wear resistance

Cast iron housing - High torsional rigidity

High-Performance Servo Worm (HPSW-125-200)

Selection Calculations

General Specifications

Range: 3 sizes, 125, 165, 200

Reduction ratios: 9 ratios, 5:1 - 90:1

Maximum output torque: 7800 Nm (69,030 in lbs)

Sizing based on 10,000 hours average life with service factor S1

Housing Material: Cast Iron

Input: High precision, torsionally rigid, bellow coupling.

Flanges to fit any servo motor

Gears: Worms made of alloyed steel, hardened and ground, with a unique dual pitch.

Ring gears made from special bronze alloy for increased wear resistance.

Bearings: Floating ball bearing and oversize taper roller bearings for increased radial and axial capacity.

Seals: Viton

Lubricant: Full synthetic oil, Mobil Glygoyle 30

Gearbox Selection Process

The following page contains the performance data for gearbox selection. The data is broken down into two categories, S1 Continuous duty torque, and S5 intermittent duty torque.

S1 Continuous duty is defined as a duty cycle greater than 60% of a given work cycle.

S5 Intermittent duty is defined as a duty cycle less than 60% of a given work cycle with certain considerations. The actual running time percentage per work cycle plus the number of starts per hour will affect the S5 torque calculation. If your starts per hour exceeds 5000 please consult DieQua technical staff for more precise calculations.

Legend	
T (Nm)	Maximum output torque during operating cycle / continuous operation
N1 (RPM)	Maximum input speed achieved during operating cycle
E-stop (Nm)	Gearbox output emergency torque (2 seconds maxikum duration, maximum of 25,000 times)
ST (Nm)	Starting input friction torque (without any load on output)
i	Exact gear ratio
ig ($kg.m^2$)	Polar moment of inertia on input (to be added to coupling inertia, see page 19)
η (%)	Gearbox efficiency at considered input RPM
Fr (N)	Permissible radial load on output shaft (applied at the middle of the shaft
Fa (N)	Permissible axial load on output shaft

Reversibility Classes (RC)	
1	Total reversibility
2	[2] Uncertain reversibility
3	[3] Self-locking at $N_1 = 0$

Notes:

[1] Efficiency values given for reference only and achieved after 24 hours full load operation

[2] Units can become reversible under vibrations. For safety applications we advise to use a brake.

[3] Static self-locking only.

Break In Period: Contact the factory for instructions and recommendations.

High-Performance Servo Worm (HPSW-125-200)

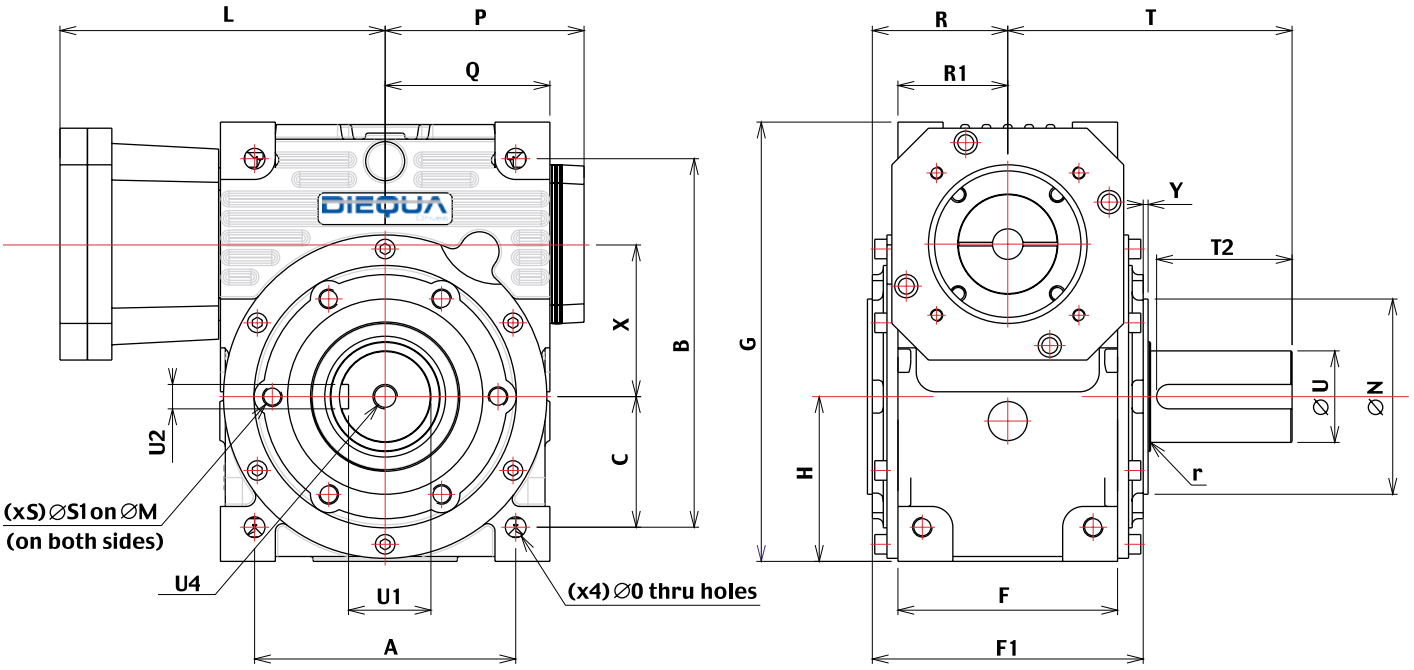
Technical Specifications

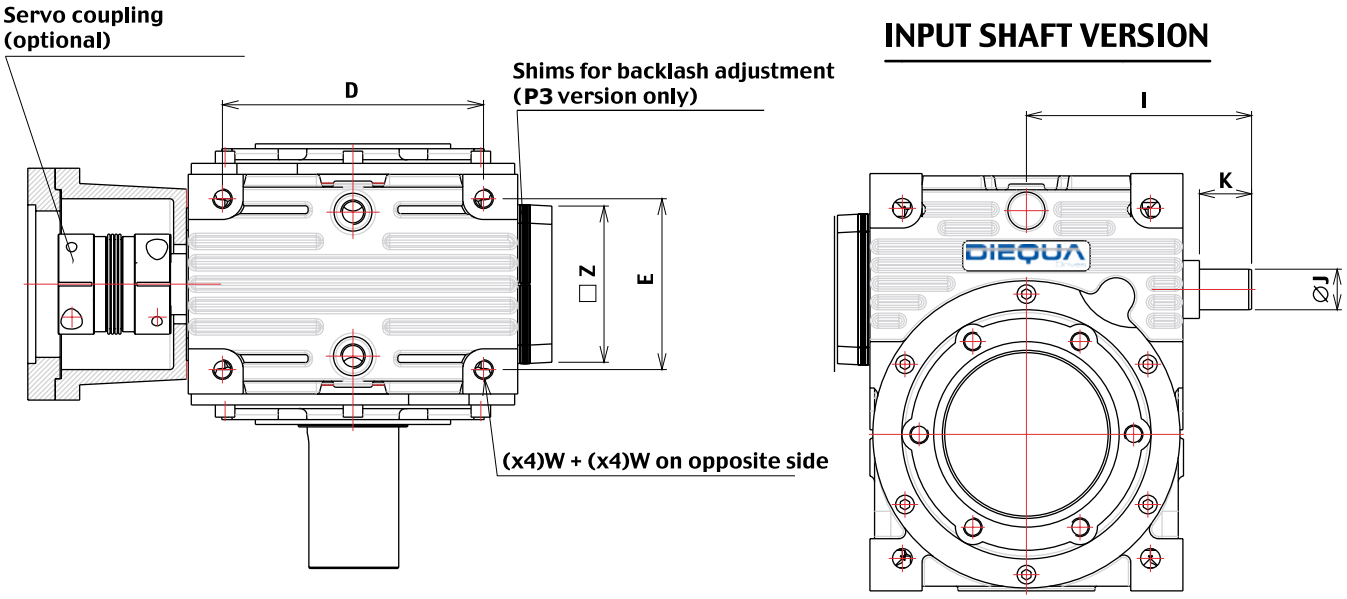
input speed (rpm)		6000		4000			3000			2000			1000			E-stop (Nm)	ST	ig (kg.m2)	RC	Fr (N)	Fa (N)
	Ratio i	T (Nm) S5	eff. ( )	T (Nm) S1	T (Nm) S5	eff. (η)	T (Nm) S1	T (Nm) S5	eff. (η)	T (Nm) S1	T (Nm) S5	eff. (η)	T (Nm) S1	T (Nm) S5	eff. (η)		Starting torque (Nm*)				
125	5.125	792	97	609	1005	96	716	1181	99	884	1459	95	1217	2008	94	3767	0.75	50	1	13600	12000
	7.2	840	97	632	1043	96	742	1224	95	907	1497	95	1208	1993	93	3767	0.75	38	1	15000	15000
	10.25	832	96	622	1026	95	725	1196	95	887	1464	94	1147	1893	92	3767	0.75	30.5	1	16700	18000
	15.25	726	94	542	894	93	625	1031	92	759	1252	91	972	1604	89	3342	0.75	25	1	18900	22000
	20.5	1026	93	759	1252	92	877	1447	91	1043	1721	89	1320	2178	87	3767	0.75	23.4	1	20600	22000
	29.5	869	90	634	1046	88	731	1206	87	861	1421	85	1079	1780	81	3295	0.75	23.15	2	22900	22000
	45	1142	86	833	1374	84	952	1571	82	1104	1822	80	1369	2259	75	3767	0.75	21	3	26000	22000
	60	980	82	713	1176	79	815	1345	77	929	1533	74	1150	1898	69	2937	0.75	20	3	28000	22000
	90	825	74	598	987	71	680	1122	68	779	1285	64	960	1584	58	2502	0.80	19	3	32000	22000
165	5.125	1450	97	1128	1861	97	1324	2185	96	1648	2719	96	2334	3851	94	7251	0.80	120	1	17800	15000
	7.2	1411	97	1092	1802	96	1266	2089	96	1569	2589	95	2151	3549	94	7251	0.80	77	1	19700	19000
	10.25	1513	96	1161	1916	96	1346	2221	95	1650	2723	94	2215	3655	93	7251	0.80	63	1	21900	24000
	15.25	1333	95	1030	1700	94	1177	1942	93	1443	2381	92	1896	3128	90	5572	0.80	52.7	1	24700	29000
	20.5	1775	94	1338	2208	93	1530	2525	92	1856	3062	90	2392	3947	88	7251	0.80	51.5	1	27000	34000
	29.5	1492	91	1111	1833	89	1264	2086	88	1535	2533	86	1945	3209	83	6571	0.80	52.8	2	30000	34000
	45	2219	87	1630	2690	85	1858	3066	84	2211	3648	81	2765	4562	77	7251	0.80	46.5	3	34100	34000
	60	1740	83	1272	2099	81	1439	2374	79	1723	2843	76	2127	3510	71	6331	0.80	40	3	37200	34000
	90	1552	76	1123	1853	73	1261	2081	70	1489	2457	67	1842	3039	60	4933	0.90	38	3	42000	34000
200	5.125	2592	98	2008	3313	97	2392	3947	97	2954	4874	96	4208	6943	95	12826	0.90	287	1	37000	37500
	7.2	2721	97	2108	3478	97	2462	4062	96	3042	5019	96	4236	6989	94	12826	0.90	177	1	41000	44500
	10.25	2691	97	2071	3417	96	2408	3973	96	2946	4861	95	4007	6612	93	12826	0.90	143	1	46000	52600
	15.25	2346	95	1813	2991	94	2083	3437	94	2540	4191	93	3376	5570	91	12448	0.90	102	1	51800	63000
	20.5	3356	94	2551	4209	93	1909	4800	92	3538	5838	91	4590	7574	89	12826	0.90	96	1	56600	71000
	29.5	2841	92	2117	3493	90	2410	3977	89	2925	4826	87	3738	6168	84	12277	0.90	99	2	63000	71000
	45	3747	88	2775	4579	86	3154	5204	85	3788	6250	83	4747	7833	78	12826	0.90	82.5	3	71700	71000
	60	3170	85	2325	3836	82	2636	4349	90	3158	5212	77	3928	6481	72	11674	0.90	71	3	78000	71000
	90	2714	78	1985	3275	75	2228	3676	72	2641	4358	69	3316	5471	62	9323	0.90	69	3	88000	71000

* Note: These are estimated values. Actual values may vary.

High-Performance Servo Worm (HPSW-125-200)

Solid Output Shaft Dimensional Data (Single Side)





Solid Output Shaft Dimensional Data (Single Side)

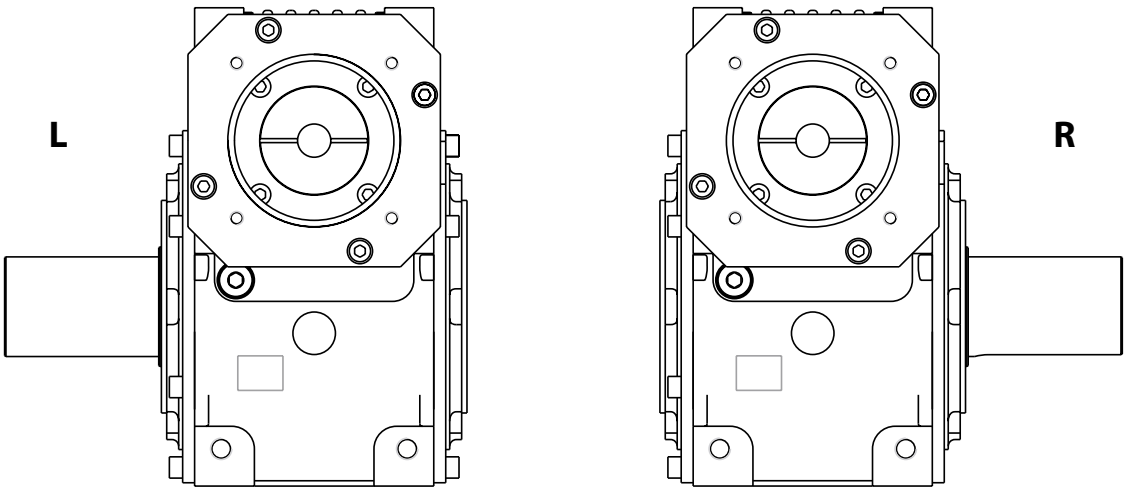
Size	125	160	200
A	214	284	342.5
B	302	377	483
C	107	142	171
D	214	284	342.5
E	140	150	224
F	180	198	288
F1	222	246	374
G	360	450	576
H	135	175	216
I	195	240	289
J (j6)	35	42	48
K	45	50	55
L	Based on selected Motor Flange		
M (h7)	185	230	300
N (h7)	160	190	250
O	17	22	28

All dimensions in mm

Size	125	160	200
P	163	204	251
Q	135	175	216
R	111	123	187
R1	90	99	144
S (H7)	6	6	8
S1	M16	M20	M20
T	117	129	194
T2	157	177	264
U	65	75	100
U3	80	90	140
V	145	155	230
W	M16	M20	M20
X	125	160	200
Y	4	5	5
Z	130	140	180
Weight (kg)	108	172	370

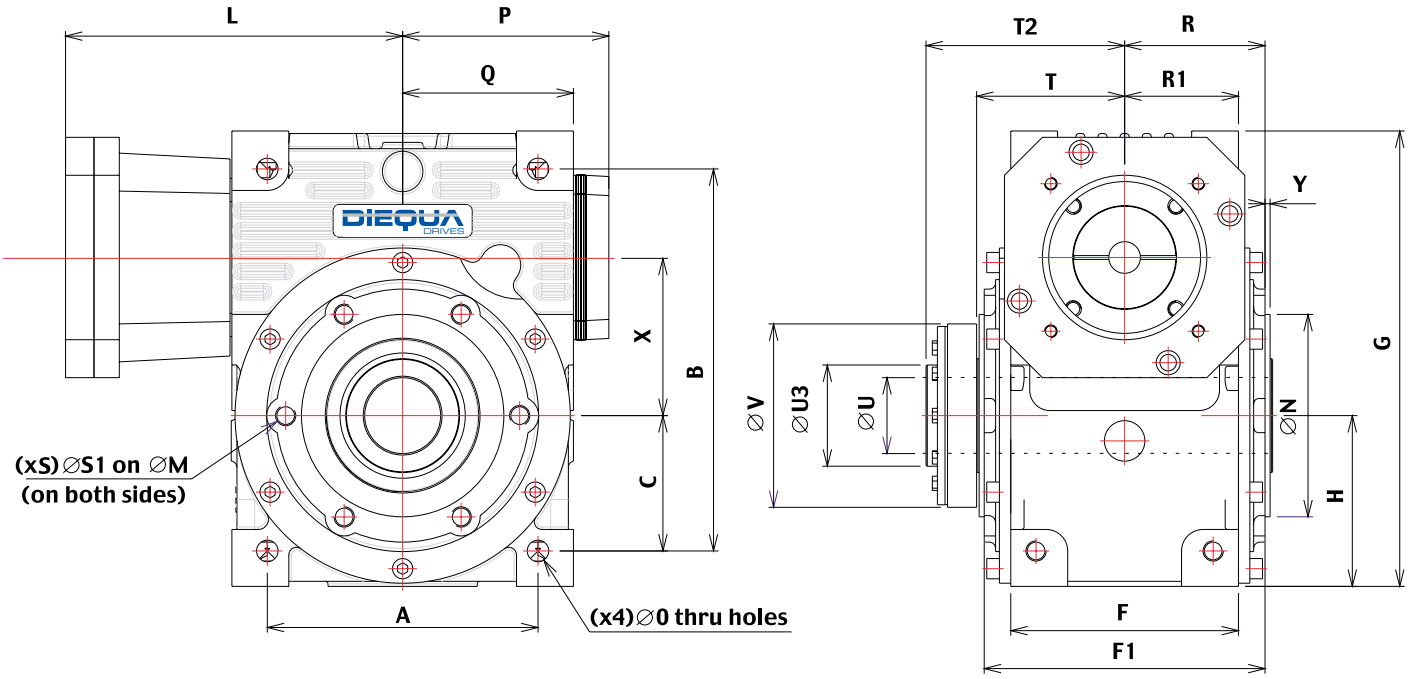
All dimensions in mm

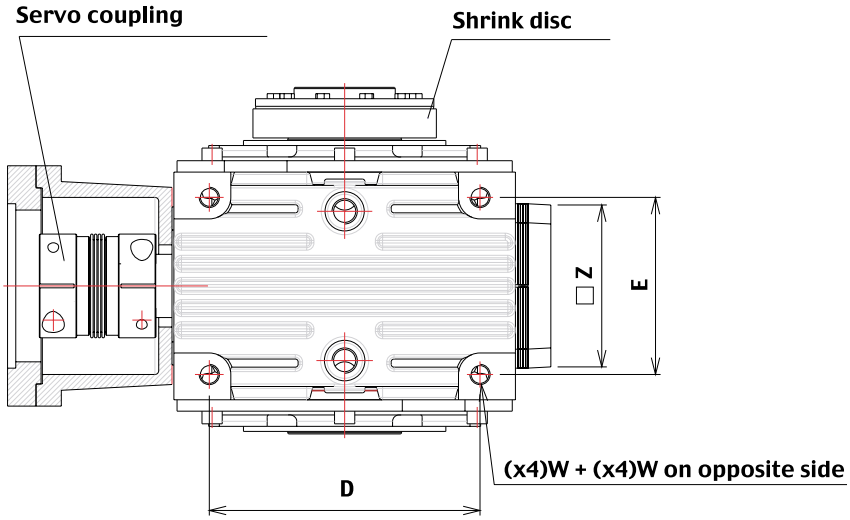
Mounting Positions



Note: All mounting positions on the machine are accepted with factory specified lubrication volumes.
However, applications which use less than 360° of the output rotation require a higher oil level. Consult factory.

Hollow Bore Shrink Disk Dimensional Data





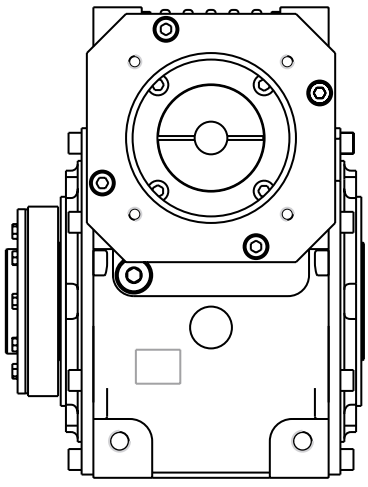
Hollow Bore Shrink Disk Dimensional Data

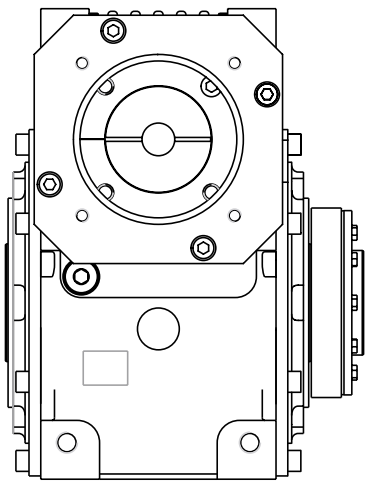
Size	125	160	200
A	214	284	342.5
B	302	377	483
C	107	142	171
D	214	284	342.5
E	140	150	224
F	180	198	288
F1	222	246	374
G	360	450	576
H	135	175	216
I	195	240	289
J	35	42	48
K	45	50	55
L	Based on selected Motor Flange		
M (h7)	185	230	300
N (j7)	160	190	250
O	17	22	28
P	163	204	251
All dimensions in mm			

Size	125	160	200
Q	135	175	216
r	3	3	5
R	111	123	187
R1	90	99	144
S	6	6	8
S1	M16	M20	M20
T	117	269	359
T2	157	135	164
U (H7)	65	90	120
U1	67.5	81	109
U2	20	25	32
U3	80	90	140
U4	M20	M24	M24
V	145	155	230
W	M16	M20	M20
X	125	160	200
Y	4	5	5
Z	130	140	180
Weight (kg)	108	172	370
All dimensions in mm			

Mounting Positions

L





R

Note: All mounting positions on the machine are accepted with factory specified lubrication volumes.
However, applications which use less than 360° of the output rotation require a higher oil level. Consult factory.

Motor Flange and Coupling Selection Process

There are few industry standards regulating servo motor mounting dimensions. This requires DieQua to stock an enormous number of different flanges and mounting components. These lists are updated constantly and are not listed in this catalog.

There are two ways to select the proper mounting flange and coupling. The first and most accurate way is to provide the motor performance data and mounting dimensions listed below. Our technical staff will review the motor mounting dimensions and select the proper flange and coupling. The will also double check the motor torque data to make sure the gearbox is properly sized for the motor.

The second way is to scan the QR code below to gain access to the Motor Flange page on our website (diequa.com/servoflangeplates) where you can view the list of existing flanges plates organized by size.

The bellow coupling selection table is identified below for reference since it contains moment of inertia data. The coupling inertia data needs to be added to the gearbox inertia data so that accurate load inertia matching calculations can be performed.

Motor Mfg: _____

Part number: _____

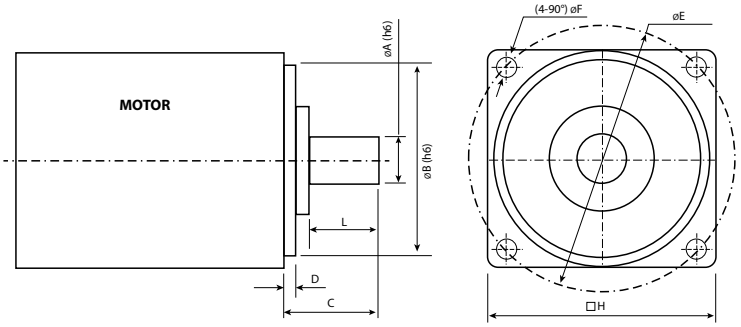
Rated power: _____

Rated torque: _____

Peak torque: _____

Rated speed: _____

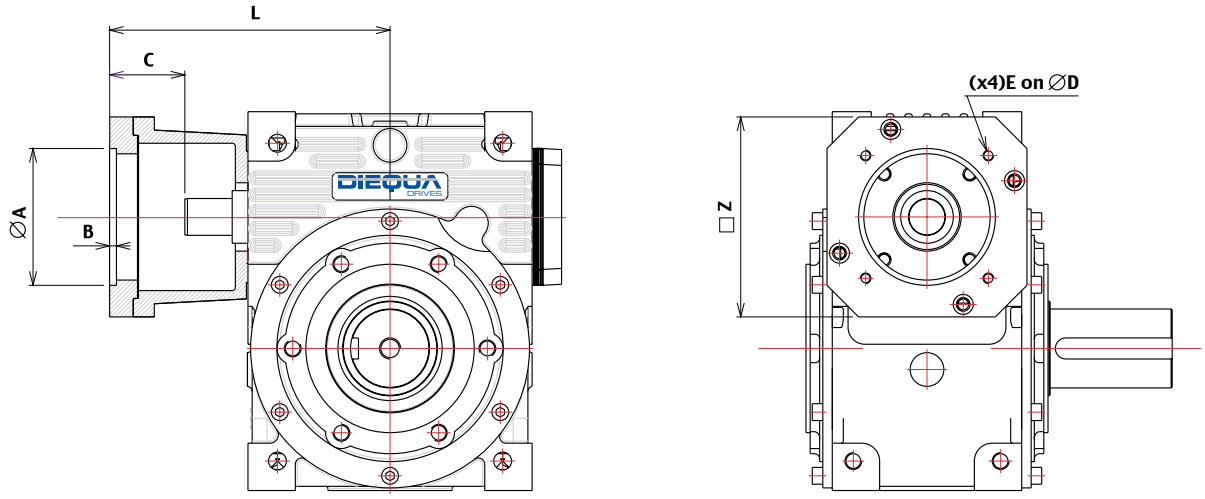
Peak speed: _____



Motor Shaft Diameter	Pilot Diameter	Motor Shaft Length	Pilot Height	Bolt Circle	Mount Hole Diameter	Motor Flange Square	Actual length of Motor Shaft	Motor Part Number
ØA (h6)	ØB (h6)	C	D	ØE	ØF	H	L	

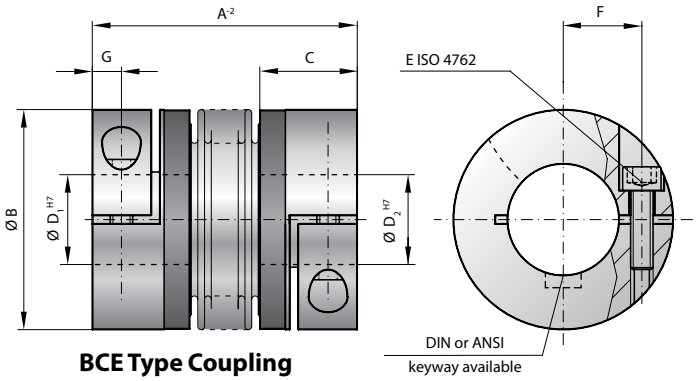
Connecting Flange

If no flange can be found in the list of flanges from our table directory, reference the above table A~F, H & L



Couplings for HPSW-High Performance Servo Reducers

Input Motor Coupling	HPSW - Size		
	125	160	200
BCE-150			
BCE-300			
BCE-500			
Coupling Type:	BCE: Bellows coupling, clamping hub Consult DieQua for coupling options		



BCE Type Coupling

Flange Plates

Scan QR code to see current data on Flange Plates

www.diequa.com/hpsw-flanges

Coupling Part No.	Rated Torque	A-2	ØB	C	D1/2	E	Tightening torque of fastener	F	G
	Nm	mm	mm	mm	mm	mm	Nm	mm	mm
BCE-150	150	92	82	32.5	19~42	M10	85	27	11
BCE-300	300	109	110	41	24~60	M12	120	39	13
BCE-500	500	114	123	42.5	35~62	M16	200	41	17

Ordering Information

Part Number Example: **HPSW 165 P3 i SD L/R – Motor Part Number**

Type	Size	BL	Ratio	Output	Mounting Position	Motor Part Number
HPSW	**165**	**P1**	**i**	**SD**	**R**	
	125 165 200	P1 ≤ 1 arc min P2 ≤ 5 arc min	05 (5.125) 07 (7.2) 10 (10.25) 15 (15.25) 20 (20.5) 30 (29.5) 45 60 90	SD = Shrink Disc SS = Single Shaft	L/R	

Industrial Servo Worm (ISW)

Design Features & Highlights

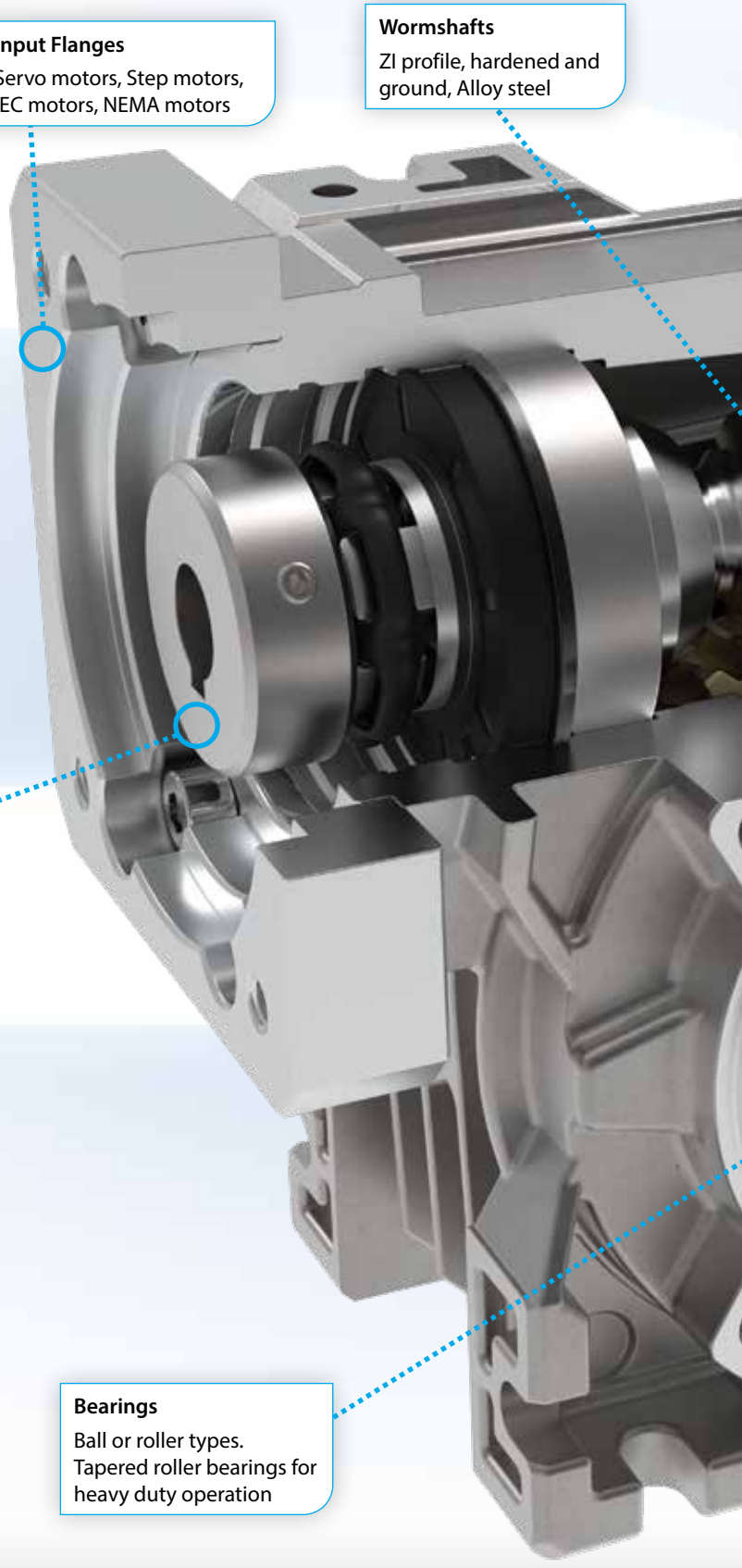
The worm gearboxes, ISW series, specifically designed for universal mounting, are manufactured with aluminum die cast housings and covers up to size 85 and cast iron from the size 110.

Torque values listed in the selection tables are output torque values for the specific gearbox size, and motor powers are always referred to 1440 rpm.

Input Viton oil seals recommened with 2000 rpm motors, and silicone oil seals for low temperatures are installed upon request.

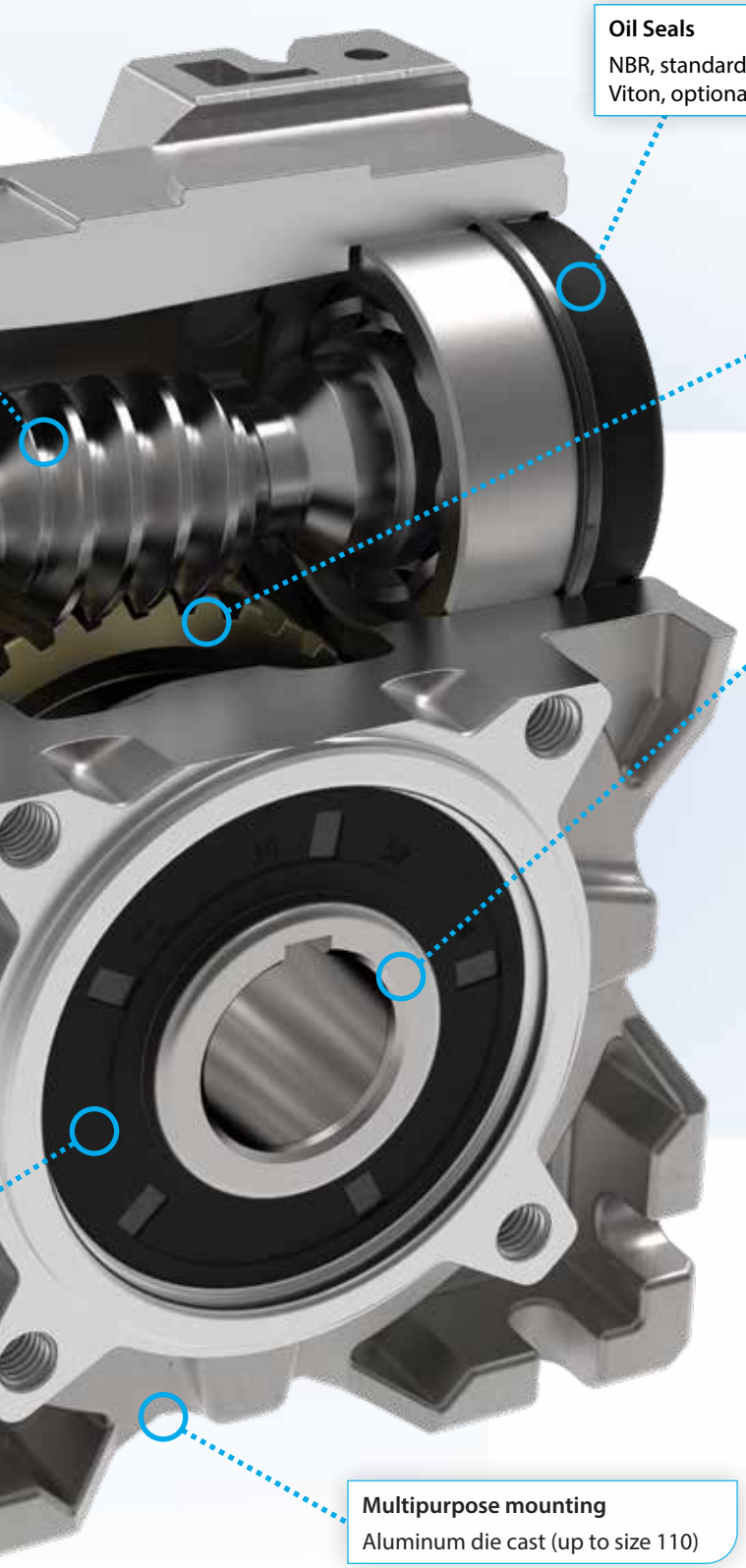
Gearboxes are delivered filled with synthetic long-life oil (without plugs).

Selection table data are intended for service factor SF1.0, i.e. 8-10 running hours per day, uniform load, less than 6 start/stops per hour, and room temperature from 15 to 35°C (-27 to +145°F)



The motor coupling is unique!

- Elminates fretting corrosion common to quill mount
- Provides a near-zero backlash motor-to-reducer connection
- Reduces efficiency losses due to motor mounting misalignment
- One gearbox for multiple motor frame sizes



Oil Seals
NBR, standard
Viton, optional

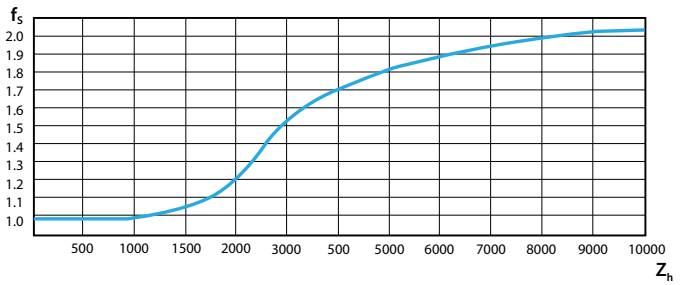
One Backlash Classes:
P4 = ≤ 30.0 arcminutes of backlash

Wormwheels
Bronze alloy cast on to a cast iron hub

Output
Hollow bore as standard; single or double solid shaft on request

Multipurpose mounting
Aluminum die cast (up to size 110)

Duty Cycle Shock Factor



Shock Factor

Shock factor is a service factor keep into account rapid motion inversions associated with quick acceleration times; it is very important to consider this service factor when sizing the gearbox.

Legend	
F_s	Shock service factor
Z_h	Number of cycles per hour

Industrial Servo Worm (ISW)

Selection Calculations

General Specifications

Range: 7 sizes, 28-110

Reduction ratios: 12 ratios, 5:1 - 100:1

Maximum output torque: 840 Nm (7,400 in lbs)

Sizing bases on 10,000 hours average life with service factor S1

Housing Material: Diecast Aluminum-Magnesium alloy

Input: Diecast aluminum coupling with an elastomer insert. For higher input torque, steel coupling with elastomer insert.

Flanges to fit any servo motor

Gears: Worms made of alloyed steel, hardened and ground.

Ring gears made from special bronze alloy centrifical cast onto cast iron hub.

Bearings: Ball bearing and taper roller bearings for increased radial and axial capacity.

Seals: NBR standard. Viton upon request.

Lubricant: Full synthetic oil, ISO VG 320

Gearbox Selection Process

The following page contains the performance data for gearbox selection. The data is broken down into two categories, S1 Continuous duty torque, and S5 intermittent duty torque.

S1 Continuous duty is defined as a duty cycle greater than 60% of a given work cycle.

S5 Intermittent duty is defined as a duty cycle less than 60% of a given work cycle with certain considerations. The actual running time percentage per work cycle plus the number of starts per hour will affect the S5 torque calculation. If you starts per hour exceeds 5000 please consult DieQua technical staff for more precise calculations.

Legend	
T (Nm)	Maximum output torque during operating cycle / continuous operation
N1 (RPM)	Maximum input speed achieved during operating cycle
E-stop (Nm)	Gearbox output emergency torque (2 seconds maxikum duration, maximum of 25,000 times)
ST (Nm)	Starting input friction torque (without any load on output)
i	Exact gear ratio
ig ($kg.m^2$)	Polar moment of inertia on input (to be added to coupling inertia, see page 29)
η (%)	Contact DieQua for further information
Fr (N)	Permissible radial load on output shaft (applied at the middle of the shaft
Fa (N)	Permissible axial load on output shaft
RC	Reversibility Class

Reversibility Classes (RC)	
1	Total reversibility
2	[2] Uncertain reversibility
3	[3] Self-locking at $N_1 = 0$

Notes:

[1] Efficiency values given for reference only and achieved after 24 hours full load operation

[2] Units can become reversible under vibrations. For safety applications we advise to use a brake.

[3] Static self-locking only.

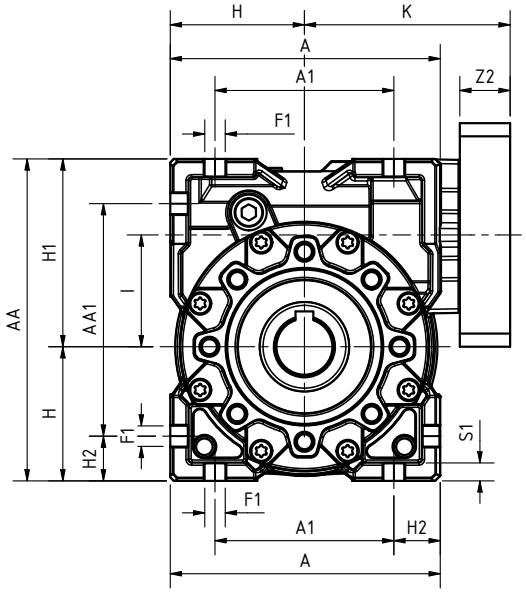
Break In Period: Contact the factory for instructions and recommendations.

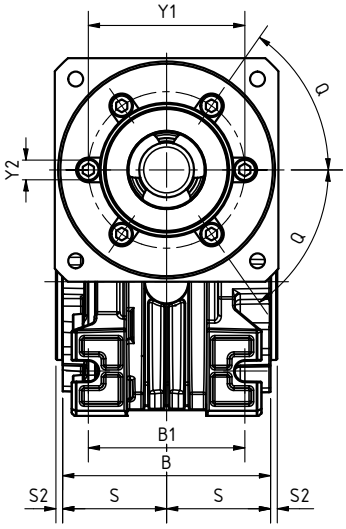
Technical Specifications

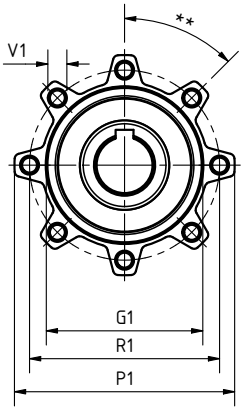
Size	Ratio i	input speed up to 2000 rpm			E-stop (Nm)	i g (kg.m2)	Backlash (arc min)	RC	Fr (N)	Fa (N)	P (kg)
		T (Nm) S1	T (Nm) S5	η (%)							
		---	---	---	---	---	---	---	---	---	---
28	7	19	24	84	100	0.06	<28	1	65	13	1.1
	10	19	24	81	90	0.05	<28	1	75	15	1.1
	15	19	24	77	80	0.05	<28	1	82	16	1.1
	20	22	27	74	70	0.05	<28	2	90	18	1.1
	28	21	26	66	80	0.05	<25	2	93	19	1.1
	40	24	29	62	65	0.05	<25	3	105	21	1.1
	49	22	24	62	59	0.05	<25	3	112	22	1.1
	56	17	18	57	51	0.05	<25	3	120	24	1.1
	70	12	13	51	45	0.05	<25	3	130	26	1.1
	80	11	12	45	45	0.05	<25	3	130	26	1.1
	100	8	9	45	40	0.05	<25	3	130	26	1.1
40	5	45	50	87	285	0.25	<28	1	140	28	2.5
	7	44	54	85	270	0.22	<28	1	150	30	2.5
	10	48	59	83	245	0.20	<28	1	155	31	2.5
	15	47	58	78	225	0.18	<28	1	165	33	2.5
	20	45	56	75	180	0.18	<25	2	190	38	2.5
	28	47	59	68	210	0.18	<28	2	210	42	2.5
	40	42	51	61	175	0.18	<28	3	225	45	2.5
	49	50	62	58	160	0.18	<28	3	240	48	2.5
	56	50	56	56	145	0.18	<28	3	250	50	2.5
	70	38	41	52	130	0.18	<28	3	260	52	2.5
	80	31	34	50	120	0.18	<28	3	260	52	2.5
	100	23	25	46	110	0.18	<28	3	260	52	2.5
50	5	81	98	88	530	0.74	<28	1	200	40	3.8
	7	82	102	86	515	0.60	<28	1	175	35	3.8
	10	84	104	84	460	0.53	<28	1	200	40	3.8
	15	83	104	78	420	0.49	<28	1	240	48	3.8
	20	72	89	76	345	0.48	<25	2	260	52	3.8
	28	91	113	71	420	0.47	<28	2	300	60	3.8
	40	78	97	64	330	0.47	<25	3	340	68	3.8
	49	89	110	62	305	0.47	<25	3	360	72	3.8
	56	88	109	60	280	0.47	<25	3	390	78	3.8
	70	72	80	53	240	0.46	<25	3	420	84	3.8
	80	61	68	52	230	0.46	<25	3	420	84	3.8
	100	44	49	47	205	0.46	<25	3	420	84	3.8
60	5	89	125	89	850	1.49	<28	1	290	58	6.5
	7	93	113	86	835	1.34	<28	1	300	60	6.5
	10	140	173	84	800	1.18	<28	1	320	64	6.5
	15	131	162	81	745	1.10	<28	1	370	74	6.5
	20	148	183	77	690	1.07	<25	2	420	84	6.5
	28	141	181	71	720	1.05	<28	2	480	96	6.5
	40	147	181	66	585	1.04	<25	3	510	102	6.5
	49	156	193	62	510	1.04	<25	3	570	114	6.5
	56	126	156	60	475	1.03	<25	3	610	122	6.5
	70	132	146	55	420	1.03	<25	3	660	132	6.5
	80	107	118	53	385	1.03	<25	3	660	132	6.5
	100	79	87	49	345	1.03	<25	3	660	132	6.5
70	5	176	200	89	1260	3.10	<28	1	335	67	9.0
	7	174	214	88	1245	3.06	<28	1	330	66	9.0
	10	195	241	86	1230	2.75	<28	1	370	74	9.0
	15	200	247	83	1145	2.57	<28	1	450	90	9.0
	20	194	240	81	970	2.51	<25	2	516	103	9.0
	28	217	268	75	1135	2.47	<28	2	560	112	9.0
	40	201	249	71	900	2.45	<25	3	610	122	9.0
	49	209	258	67	785	2.44	<25	3	690	138	9.0
	56	181	223	64	740	2.44	<25	3	730	146	9.0
	70	183	226	59	640	2.44	<23	3	790	158	9.0
	80	170	187	56	595	2.43	<23	3	790	158	9.0
	100	125	138	52	530	2.43	<23	3	790	158	9.0
85	5	279	335	90	2205	5.00	<28	1	410	82	13.5
	7	277	343	88	2190	4.89	<28	1	420	84	13.5
	10	312	386	86	2120	4.12	<28	1	460	92	13.5
	15	329	406	83	1985	3.71	<28	1	550	110	13.5
	20	323	399	82	1670	3.57	<25	2	630	126	13.5
	28	342	422	76	1935	3.48	<28	2	720	144	13.5
	40	348	430	72	1550	3.43	<25	3	730	146	13.5
	49	359	443	67	1350	3.42	<25	3	840	168	13.5
	56	324	400	68	1265	3.41	<25	3	870	174	13.5
	70	336	415	63	1130	3.40	<25	3	940	188	13.5
	80	308	340	60	1035	3.40	<25	3	940	188	13.5
	100	225	2488	56	915	3.39	<25	3	940	188	13.5
		---	---	---	---	---	---	---	---	---	---
110	7	533	658	88	4470	22.16	<28	1	500	100	39.0
	10	600	741	87	4315	19.42	<28	1	540	105	39.0
	15	646	798	84	4110	17.96	<28	1	670	130	39.0
	20	641	792	83	3445	17.45	<25	2	750	150	39.0
	28	674	833	76	4220	17.13	<28	2	800	160	39.0
	40	671	829	73	3195	16.96	<25	3	930	185	39.0
	49	684	844	71	2775	16.91	<25	3	1050	210	39.0
	56	610	754	70	2620	16.88	<25	3	1110	220	39.0
	70	669	826	67	2345	16.85	<25	3	1110	220	39.0
	80	675	744	66	2160	16.84	<25	3	1110	220	39.0
	100	494	545	61	1890	16.82	<25	3	1110	220	39.0

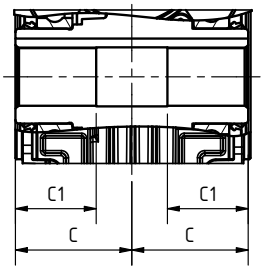
Industrial Servo Worm (ISW)

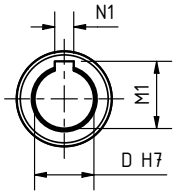
Dimensional Data

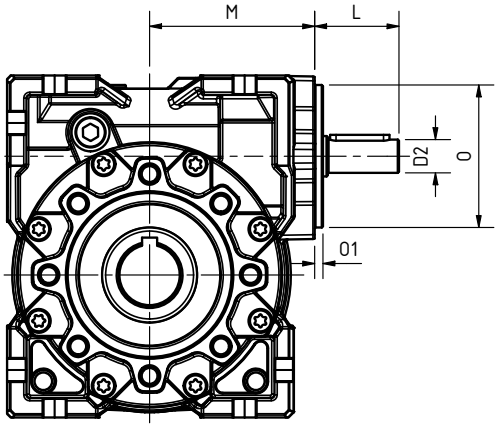


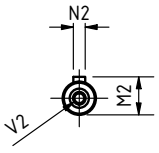




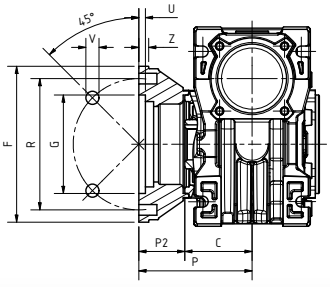


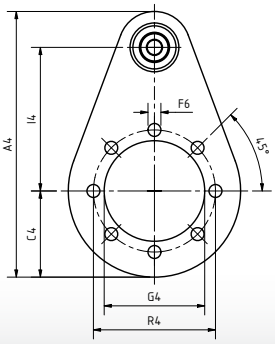


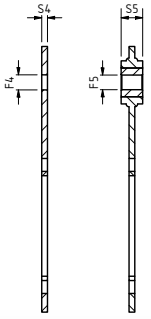




TAR **TAB**





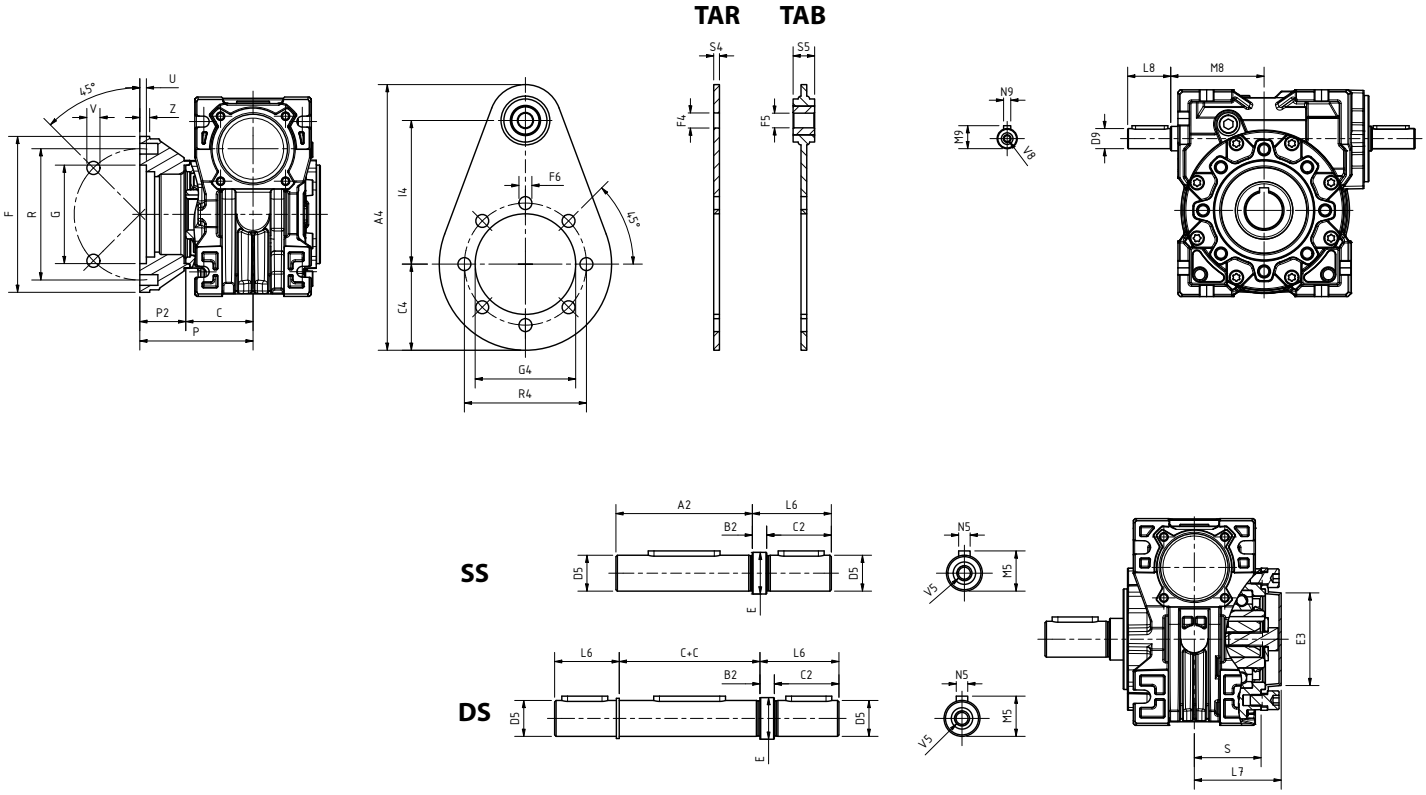


Dimensional Data

ISW	28	40	50	60	70	85	110
A	80	100	120	144	172	206	255
A_1	54	70	80	100	120	140	170
AA	97	121.5	144	174	205	238	295
AA_1	71	91.5	104	130	153	172	210
B	53	71	85	100	112	130	144
B_1	44	60	70	85	90	100	115
C	14	41	49	60	60	61	77.5
C_1	26.5	26	30.5	39	37.5	38.5	52.5
$D_{(H7)}$	14	19	24	25	37.5	32	42
$D_{2\,(h6)}$	9	11	14	19	19	24	28
øD	14.0	18.0 19.0 20.0	24.0 25.0	25.0	25.0 28.0 30.0	32.0 35.0	42.0
	0.625 in	0.75 in	1.00 in	1.125 in	1.25 in	1.375 in	1.625 in
F	80	110 {110}	125 [160] {125}	180 {180}	200	210	270
F_1	7	7	9	9	11	13	15
$G_{(H8)}$	50	60 {60}	70 [110] {70}	115 {115}	130	152	170
$G_{1\,(h8)}$	55	60	70	80	95	110	130
H	40	50	60	72	86	103	127.5
H_1	57	71.5	84	102	119	135	167.5
H_2	13	15	20	22	26	33	42.5
I	28	40	50	60	70	85	110
K	57.5	70.5	83-88*	93-94*	117-118*	134-137*	151-153*
L	20	23	30	40	40	50	60
L_1	30.0	41.0	49.0	60.0	60.0	61.0	77.5
	1.18 in	1.61 in	1.93 in	2.36 in	2.36 in	2.40 in	3.05 in
M	50	65	75	87	110	123.5	146
M_1	16.3	20.8 21.8 22.8	27.3 28.3	28.3	28.3 31.3 33.3	35.3	45.3
	0.71 in	0.84 in	1.12 in	1.25 in	1.37 in	1.52 in	1.80 in
M_2	10.2	12.5	16	22.5	22.5	27	31
N_1	5	6	8	8	8	10	12
	0.19 in	0.19 in	0.25 in	0.25 in	0.25 in	0.31 in	0.38 in
N_2	3	4	5	6	6	8	8
P	53	69 {99}	93 [90.5] {123}	86 {116}	111	111	131
P_1	75	86	100	110	130	160	200
P_2	23	28 {58}	44 [41.5] {74}	25 {56}	51	50	53.5
R	68	87 {87}	90 [130] {90}	150.5 {150.5}	165	175	230
R_1	65	75	85	95	115	130	165
S	27.5	38.5	46.5	57	57	67	74
S_1	6	7	8	10	11	14	13
S_2	2.5	2.5	3	3	3	3	3.5
U	10	4 {4}	5 [11] {5}	6.5 {6.5}	12	6	5
V	7	9 {9}	10.5 [9] {9}	11 {11}	13	13	14
V_1	M6x10 (4)	M6x8.5 (4)	M8x10 (4)	M8x16 (8)	M8x16 (8)	M10x18 (8)	M10x21 (8)
V_2	M4x10	M4x10	M6x15	M8x20	M8x20	M8x20	M8x20
Z	7	6 {8}	10 [13] {10}	10 {10}	14	16	18
Z2	13	13	13-18.5	14-15	15.5-17.5	15.5-18.5	18-20

Note: All data is in mm unless otherwise noted.

Dimensional Data



Series			Size						
			28	**40**	**50**	**60**	**70**	**85**	**110**
ISW	**SS & DS** Insert shafts, single & dual	A_2	58	80	95	117	117	119	153
		B_2	1	10	10	10	10	10	10
		C	30	41	49	60	60	61	77.5
		C_2	30	40	45	50	60	70	100
		D_5 (g6)	14	19 (18)	24 (25)	25	28	32 (35)	42
		E	14	22	28	30	34	38	50
		L_6	31	50	55	60	70	80	110
		M_5	16	21.5	27	28	31	35	45
		N_5	5	6	8	8	8	10	12
		V_5	M5x10	M8x20	M8x20	M8x20	M8x20	M10x25	M10x25
	OSC Cover	E_3	50	52	62	75	90	100	120
		L_7	36	48.5	55.5	68.5	67	77	85
		S	27.5	38.5	46.5	57	57	67	74
	TAR & TAB Torque, arm with & without bushing	A_4	138	168	185	235	295	313	388
		C_4	38	43	60	55	65	75	100
		F_4	10.5	10.5	10.5	10.5	10.5	20.5	20.5
		F_5	10	10	10	10	10	20	20
		F_6	7	7	9	9	9	12	13
		G_4	55	60	70	80	95	110	130
		I_4	80	90	100	150	150	200	250
		R_4	65	75	85	95	115	130	165
		S_4	4	4	4	6	6	6	6
		S_5	15	15	15	20	20	25	25

Motor Flange and Coupling Selection Process

There are few industry standards regulating servo motor mounting dimensions. This requires DieQua to stock an enormous number of different flanges and mounting components. These lists are updated constantly and are not listed in this catalog.

There are two ways to select the proper mounting flange and coupling. The first and most accurate way is to provide the motor performance data and mounting dimensions listed below. Our technical staff will review the motor mounting dimensions and select the proper flange and coupling. The will also double check the motor torque data to make sure the gearbox is properly sized for the motor.

The second way is to scan the QR code below to gain access to the Motor Flange page on our website (diequa.com/servoflangeplates) where you can view the list of existing flanges plates organized by size.

The bellow coupling selection table is identified below for reference since it contains moment of inertia data. The coupling inertia data needs to be added to the gearbox inertia data so that accurate load inertia matching calculations can be performed.

Motor Mfg: _____

Part number: _____

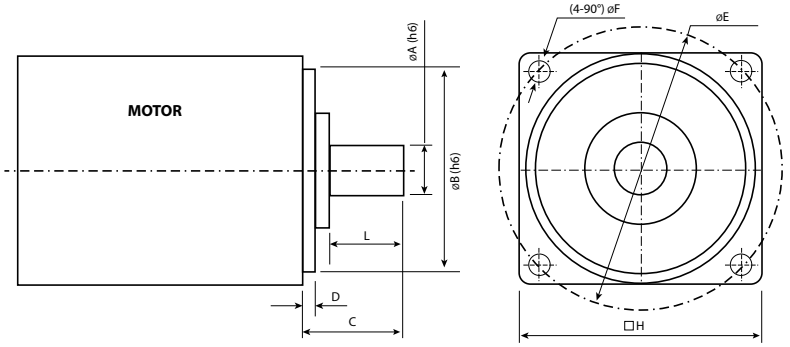
Rated power: _____

Rated torque: _____

Peak torque: _____

Rated speed: _____

Peak speed: _____



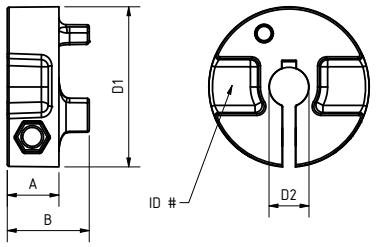
Motor Shaft Diameter	Pilot Diameter	Motor Shaft Length	Pilot Height	Bolt Circle	Mount Hole Diameter	Motor Flange Square	Actual length of Motor Shaft	Motor Part Number
Ø A (h6)	Ø B (h6)	C	D	ØE	ØE	H	L	

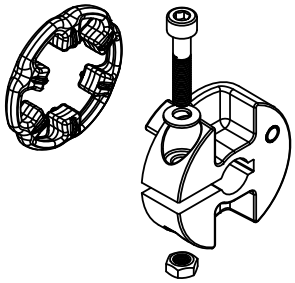
Couplings for Industrial Servo Worm Reducers

Flange Plates

Scan QR code to see current data on Flange Plates

www.diequa.com/isw-flanges





Type	Kit Part No.	ISW Size	Mt [Nm]	Mt1 [Nm]	Mt2 [Nm]	A [mm]	B [mm]	D1 [mm]	D2 [mm]	ID#
ISW3	ISW3.009	28 - 40	4.5 - 6.0	15	8 - 10	11	19	30	9	309
	ISW3.011	28 - 40	4.5 - 6.0	15	8 - 10			30	11	311
	ISW3.014	40	7.0 - 8.5	28	18 - 22			36	14	314
	ISW3.N42	28 - 40	4.5 - 6.0	16	8 - 10			30	3/8"	3N42
	ISW3.N48	40	1.5 - 6.0	18	10 - 12			36	1/2"	3N48
	ISW3.N56	40	7.0 - 8.5	30	20 - 24			36	5/8"	3N56
ISW5	ISW5.011	50-60	8.9 - 10	15	8 - 10	14.5	23	45	11	311
	ISW5.014	50-60		30	12 - 17			45	14	314
	ISW5.019	50-60		40	20 - 25			45	19	319
	ISW5.024	60		70	30 - 40			52	24	324
	ISW5.N56	50 - 60		45	30 - 35			45	5/8"	5N56
	ISW5.N140	60		60	40 - 45			52	7/8"	5N140
ISW6	ISW6.014	70	15.3 - 18	60	30 - 40	19.5	31.5	58	14	614
	ISW6.019	70-85-110		90	50 - 65				19	619
	ISW6.024	70-85-110		130	85 - 100				24	624
	ISW6.028	70-85-110		180	100 - 120				28	628
	ISW6.N56	70-85-110		50	---				5/8"	6N56
	ISW6.N140	70-85-110		85	---				7/8"	6N140
	ISW6.N180	70-85-110		200	---				1-1/8"	6N180

Mt - Screw locking torque

Mt1 - Transmissible torque with key

Mt2 - Transmissible torque without key

D2 - Optional bores available

Note: For motor shaft diameters not listed above, reduction bushings will be used.

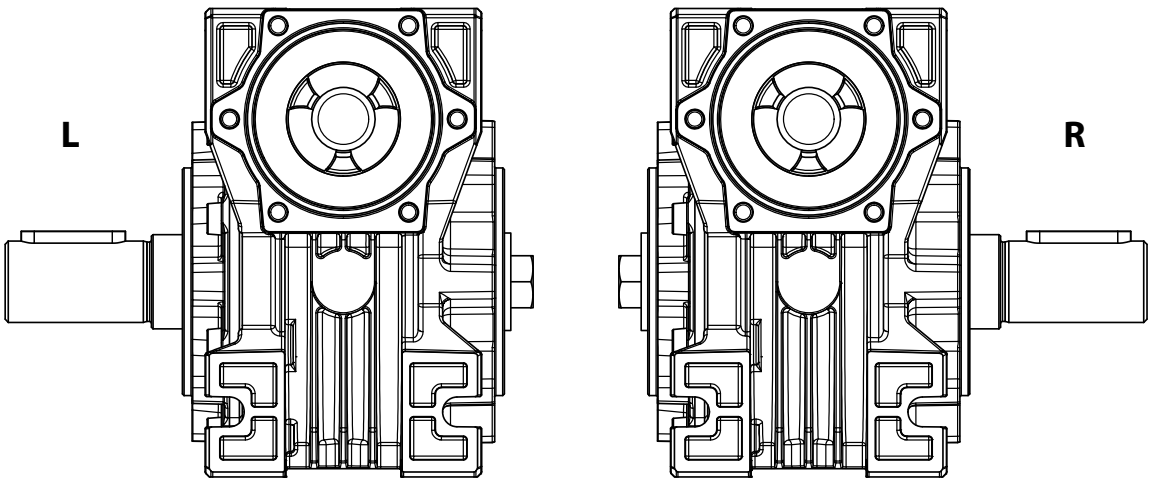
ISW Ordering Information

Part Number Example **ISW 028 P4 i L/R – Motor Part Number**

Type	Size	BL	Ratio	Mounting Position	Output	Motor Part Number	Option(s)
ISW	**028**	**P4**	**i**	**L/R**	**(HS, SS, DS)**	**Customer Supplied**	
	28 40 50 60 70 85 110	P4 ≤ 30 arc min	05 (1) 07 10 15 20 28 40 49 56 70 80 100	L or R	HS = Hollow Shaft SS = Single Solid Shaft DS = Dual Solid Shaft		

Note: (1) Not available on size 28 & 110

Mounting Positions



Note: All mounting positions on the machine are accepted with factory specified lubrication volumes.
However, applications which use less than 360° of the output rotation require a higher oil level. Consult factory.

DieQua engineering is here to help.

DieQua's extensive application expertise, broad product knowledge and consultative approach is available to help guide your product selection and identify the best possible solution to meet and exceed your application's requirements.

Please identify as much of the details below prior to our conversation.

1	Nominal Torque [Nm]:	
2	Acceleration Torque [Nm]:	
3	Output Shaft Type [mm]:	
4	Backlash [arcmin.]:	
5	Input speed [rpm]:	
6	Output speed [rpm]	
7	Environmental Requirements [IP]:	
8	Temperature Requirements [F/C°]:	
9	Motor details, [Manufacturer/part Number]:	
10	Others:	
11	Preliminary Application Sketch:	
12	Drawing Format [PDF / STP / DWG / IGS]:	

ABOUT DIEQUA

Founded in 1980 by Dietmar Quaas, and now owned by his sons, DieQua Corporation has expanded from a single product line to become a leading manufacturer and supplier of an extensive line of high-quality power transmission and precision motion control products, including gearboxes, servo gearheads, screw jack systems, speed reducers, cycloidal reducers, and connecting components. The company also offers custom product modifications and complete design solutions for virtually any application. DieQua Corporation serves a wide range of industries, including medical and health care, marine engineering, renewable energy, mining, transportation, steel, forestry and lumber, water and wastewater, automotive, and factory automation, to name a few.

An experienced and knowledgeable technical sales, customer service, and engineering support staff, as well as local distributors, ensure that DieQua customers in North America, Mexico and South America select the optimum components, systems, and best design solutions for their specific requirements.

The DieQua family of products


Spiral Bevel Gearboxes


Servo Gearheads

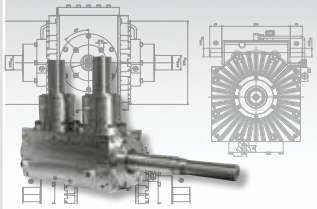

SymphoDrive FlexSpline Reducers


Screw Jack Systems


Helical Speed Reducers


Speed Modulating Gearboxes


Zero Backlash Couplings and Line Shafts


Custom Designs

The DieQua Advantage

Engineering Support

DieQua Corporation has several decades of combined experience specifying power transmission and motion control components. This assures proper selection of components and systems to suit your unique requirements.

Warehousing

We pride ourselves for our extensive in-stock inventory. For fast product turnaround, DieQua Corporation stocks many components of various ratios and sizes, ready to ship fast.

Manufacturing and Assembly

DieQua Corporation now manufactures or assembles most of the products, for on-time delivery of standard orders as well as prototypes. We are ISO 9001 certified and are constantly improving our quality systems to ensure our customers receive the best products.

DIEQUA Corporation

180 Covington Drive
Bloomingdale, IL 60108 USA

630.980.1133

www.diequa.com

1124/2.5K