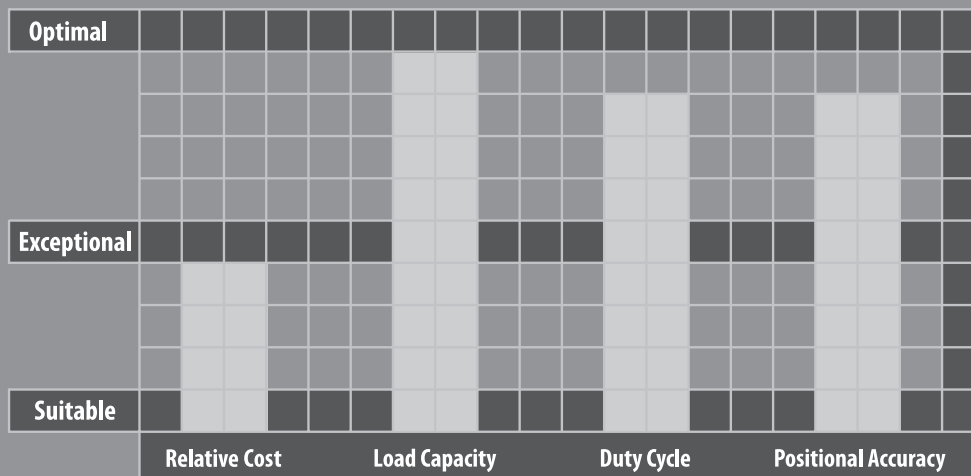


TWINGEAR SERIES

TwinGear harnesses the power of two with its hypoid primary stage and helical secondary stage. This gear train redefines power, compactness and precision, setting benchmarks in the industry. High torsional stiffness and backlash <6 arc-minutes and make it a contender in dynamic motion control applications. With ratios spanning from 15-75:1 and maximum acceleration torque as high as 11,250Nm, TwinGear can be applied confidently across a myriad of applications.

Our customers demanded a more compact helical bevel design and we answered. TwinGear can fit in the narrowest space envelopes. Solid shaft, dual shaft, hollow shaft and shrink disc mounting interfaces provide the ultimate flexibility for machine designers. Rated up to 8,000rpm, this product outperforms in high speed, continuous duty applications while staying quiet and cool.

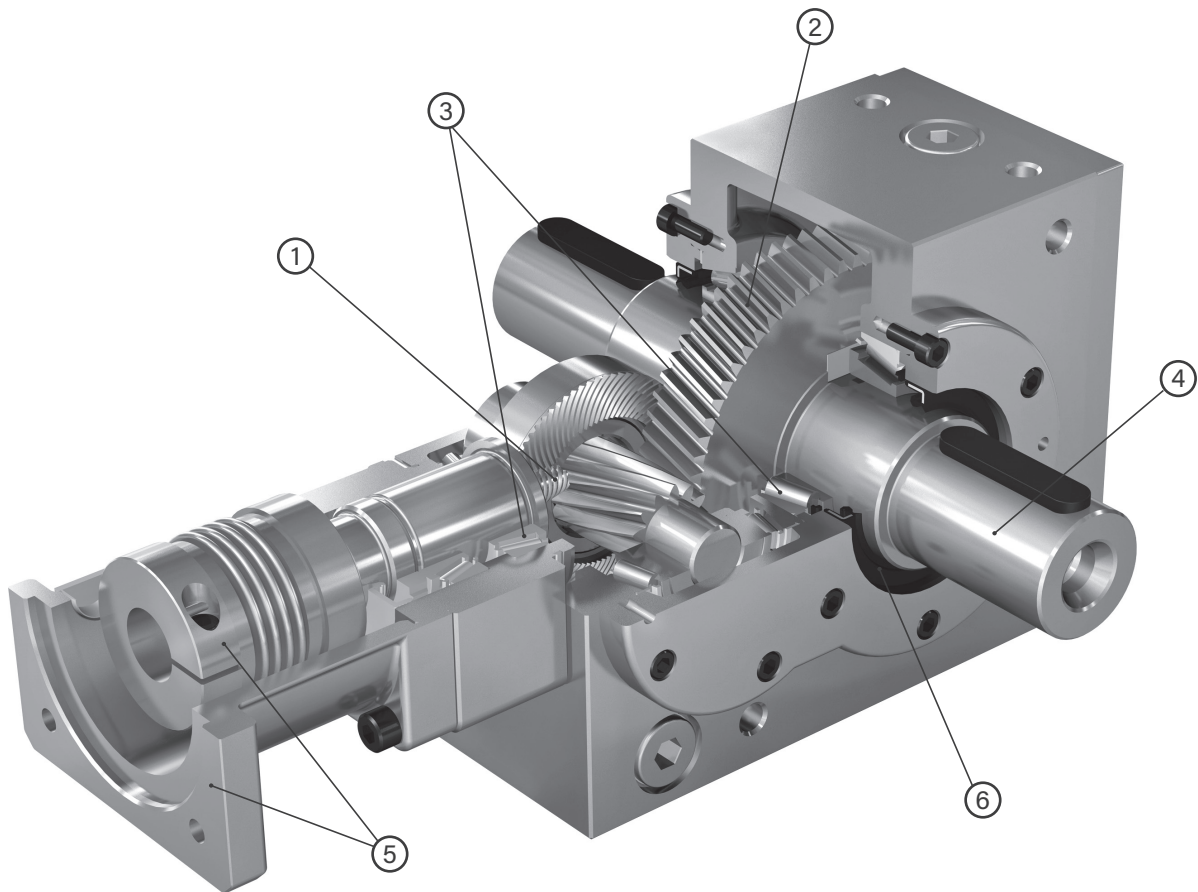




TWINGEAR SERIES

- High performing helical-bevel two-stage gearbox with maximum acceleration torque as high as 11,250Nm
- Low backlash (<4 arc-min) with exceptional torsional rigidity
- 8 Frame sizes and 8 ratios available, up to 75:1
- Suitable for high input speeds up to 8,000 rpm
- Extremely compact design to fit into challenging space envelopes
- Assembled in Germany

Featured Highlights



- ① Hypoid primary stage with optimized contact pattern for uniform load distribution, low noise and high transmission accuracy
- ② Helical secondary stage for high torque generation
- ③ Tapered roller bearings at input and output for high radial and axial load capacity
- ④ Four output mounting styles for maximum flexibility: Keyed solid shaft, keyed dual shaft, keyed hollow shaft and hollow shrink disc
- ⑤ Simple, low inertia connection to various servo motors using adapter flange and stiff zero backlash coupling
- ⑥ Output seal allows for IP64 protection

Model Code

KS	20	KH	25	13L	XXX
Series Name	Frame Size	Output mounting type	Ratio	Shaft Arrangement	*Motor mounting code
KS TwinGear	10 20 30 35 40 50 60 70	KL: Solid Out Shaft KH: Hollow Output Shaft	15 20 25 30 40 50 60 75	1L: Keyed Solid Shaft Left 3L: Keyed Solid Shaft Right 13L: Keyed Dual Solid Shaft 13L: Keyed Hollow Shaft 1LSV: Hollow Shrink Disc Shaft Right 3LSV: Hollow Shrink Disc Shaft Left	Motor mounting code varies depending on the motor

* Motor mounting code varies depending on the motor. Contact us to configure the code.

Performance Specifications

Frame Size	Unit	Note	10	20	30	35	40	50	60	70
Ratio	i		15 / 20 / 25 / 30							
Nominal Output Torque	T2N [Nm]	*1	150	250	480	950	1750	3200	5000	7500
Maximum Acceleration Torque	T2B [Nm]	*2	225	375	720	1425	2625	4800	7500	11250
Emergency Stop Torque	T2Not [Nm]	*3	300	500	960	1900	3500	6400	10000	15000
Nominal Input Speed	n1N [rpm]	*4	2400	2400	2000	1600	1300	900	800	700
Maximum Input Speed	n1max [rpm]	*5	8000	7000	6000	5000	4000	4000	3500	3500
Maximum Radial Load	F2Rmax [N]	*6	4900	7200	10000	15000	18000	25000	30000	35000
Maximum Axial Load	F2Amax [N]	*7	2450	3600	5000	7500	9000	12500	15000	17500
Efficiency	h [%]	*8	> 92	> 92	> 92	> 92	> 92	> 92	> 92	> 92
Torsional Rigidity	Ct21 [Nm/arcmin]	*9	10	16	34	75	150	377	473	726
Maximum Torsional Backlash	jt [arcmin]	*10	≤ 6	≤ 6	≤ 6	≤ 5	≤ 5	≤ 4	≤ 4	≤ 4
Noise Level	LpA [dB(A)]	*11	< 69	< 69	< 71	< 71	< 73	< 73	< 75	< 75
Ambient Temperature	[°C]	-	-10 to 90							
Permitted Housing Temperature	[°C]	-	90							
Protection Class	-	-	IP64							
Lubrication	-	-	Synthetic Oil [ISO VG-Class 150]							
Service Life	SL [h]	*12	30,000							
Weight	m [kg]	-	10	16	27	52	75	115	190	300

Frame Size	Unit	Note	10	20	30	35	40	50	60	70
Ratio	i		40 / 50							
Nominal Output Torque	T2N [Nm]	*1	110	200	360	700	1300	3200	5000	7500
Maximum Acceleration Torque	T2B [Nm]	*2	165	300	540	1050	1950	4800	7500	11250
Emergency Stop Torque	T2Not [Nm]	*3	220	400	720	1400	2600	6400	10000	15000
Nominal Input Speed	n1N [rpm]	*4	3700	3700	3100	2500	2100	1400	1300	1200
Maximum Input Speed	n1max [rpm]	*5	8000	7000	6000	5000	4000	4000	3500	3500
Maximum Radial Load	F2Rmax [N]	*6	4900	7200	10000	15000	18000	25000	30000	35000
Maximum Axial Load	F2Amax [N]	*7	2450	3600	5000	7500	9000	12500	15000	17500
Efficiency	h [%]	*8	> 92	> 92	> 92	> 92	> 92	> 92	> 92	> 92
Torsional Rigidity	Ct21 [Nm/arcmin]	*9	10	16	34	75	150	377	473	726
Maximum Torsional Backlash	jt [arcmin]	*10	≤ 6	≤ 6	≤ 6	≤ 5	≤ 5	≤ 4	≤ 4	≤ 4
Noise Level	LpA [dB(A)]	*11	< 69	< 69	< 71	< 71	< 73	< 73	< 75	< 75
Ambient Temperature	[°C]	-	-10 to 90							
Permitted Housing Temperature	[°C]	-	90							
Protection Class	-	-	IP64							
Lubrication	-	-	Synthetic Oil [ISO VG-Class 150]							
Service Life	SL [h]	*12	30,000							
Weight	m [kg]	-	10	16	27	52	75	115	190	300

Frame Size	Unit	Note	10	20	30	35	40	50	60	70
Ratio	i		60 / 75							
Nominal Output Torque	T2N [Nm]	*1	75	125	250	475	900	2550	4050	5100
Maximum Acceleration Torque	T2B [Nm]	*2	110	185	375	710	1350	3825	6075	7650
Emergency Stop Torque	T2Not [Nm]	*3	150	250	500	950	1800	5100	8100	10200
Nominal Input Speed	n1N [rpm]	*4	4500	4500	3900	3300	2700	1900	1600	1500
Maximum Input Speed	n1max [rpm]	*5	8000	7000	6000	5000	4000	4000	3500	3500
Maximum Radial Load	F2Rmax [N]	*6	4900	7200	10000	15000	18000	25000	30000	35000
Maximum Axial Load	F2Amax [N]	*7	2450	3600	5000	7500	9000	12500	15000	17500
Efficiency	h [%]	*8	> 90	> 90	> 90	> 90	> 90	> 90	> 90	> 90
Torsional Rigidity	Ct21 [Nm/arcmin]	*9	10	16	34	75	150	377	473	726
Maximum Torsional Backlash	jt [arcmin]	*10	≤ 6	≤ 6	≤ 6	≤ 5	≤ 5	≤ 4	≤ 4	≤ 4
Noise Level	LpA [dB(A)]	*11	< 67	< 67	< 69	< 69	< 71	< 71	< 73	< 73
Ambient Temperature	[°C]	-	-10 to 90							
Permitted Housing Temperature	[°C]	-	90							
Protection Class	-	-	IP64							
Lubrication	-	-	Synthetic Oil [ISO VG-Class 150]							
Service Life	SL [h]	*12	30,000							
Weight	m [kg]	-	10	16	27	52	75	115	190	300

*1 At nominal input speed, service life is 30,000 hours.

*2 The maximum torque when starting or stopping operation. Permitted 1,000 cycles/hour.

*3 The maximum torque allowed under a stress situation. Permitted 1,000 times during service life.

*4 Average input speed at nominal torque. Maintain housing temperature below 90°C.

*5 The maximum intermittent input speed.

*6 Maximum radial load gearbox can accept. Measured at center of output shaft at 400rpm.

*7 Maximum axial load gearbox can accept. Measured at center of output shaft at 400rpm.

*8 The efficiency at full load.

*9 At nominal output torque. Does not include lost motion.

*10 Measured at output, 2% load and max 10Nm.

*11 Measured at 1,500 rpm input at partial load.

*12 Based on S5 duty cycle <60% and <20 minute run time.

Performance Specifications

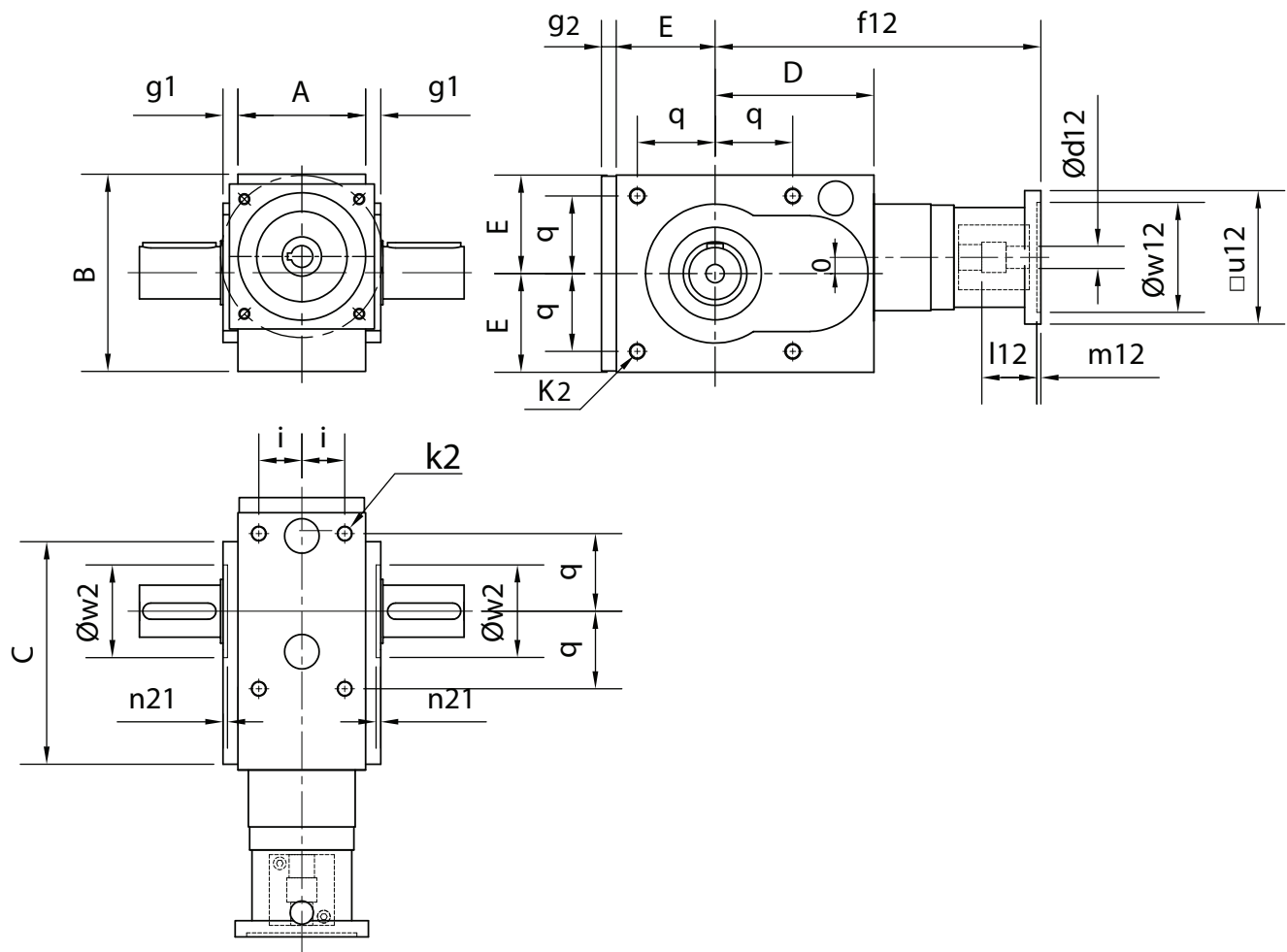
Moment of inertia I_1 [kgcm²]

Ratio	Frame Size							
	10	20	30	35	40	50	60	70
15:1	0.676	2.64	5.56	9.86	26.2	57.3	100.8	185
20:1	0.605	2.41	5.23	8.98	22.1	50.2	90.1	151
25:1	0.579	2.34	5.05	8.53	20.9	45.4	73.0	133
30:1	0.577	2.34	5.10	8.45	21.5	44.0	70.2	132
40:1	0.557	2.29	4.88	8.12	20.5	41.2	64.3	118
50:1	0.547	2.26	4.83	7.96	20.0	39.8	60.8	111
60:1	0.542	2.27	4.79	7.87	19.1	38.9	58.7	107
75:1	0.537	2.24	4.77	7.79	18.9	38.3	57.1	104

Units and Symbols

Maximum Motor Acceleration Torque	T1BMot	Nm
Nominal Output Torque	T2N	Nm
Maximum Acceleration Torque	T2B	Nm
Emergency Stop Torque	T2Not	Nm
Nominal Input Speed	n1N	rpm
Maximum Input Speed	n1max	rpm
Maximum Input Radial Load	F1Rmax	N
Maximum Output Radial Load	F2Rmax	N
Maximum Input Axial Load	F1Amax	N
Maximum Output Axial Load	F2Amax	N
Mass Moment of Inertia	I1	kgcm ²
Efficiency at Full Load		%
Torsional Rigidity	Ct21	Nm/arc-min
Maximum Torsional Backlash	jt	arc-min
Noise Level	LpA	dB(A)
Service Life	Lh	h
Run time	RT	min
Duty cycle	DC	%
Ambient Temperature	ta	°C
Thermal Performance Limit	Ptherm	kW
Performance	P	kW
Weight	m	kg

Dimensions and Configurations



Base Dimensions

Frame Size	A	B	C	D	E	g1	g2	o	k2	q	i	w2H7	n21
10	75	110	147.5	92.5	55	10.5	10.5	7.5	M8	44	28	55	4
20	90	140	180	110	70	13	13	9	M10	55	30	63	4
30	110	170	222	137	85	13	13	14	M12	67	37	80	4
35	140	210	275	170	105	16	16	18	M16	85	50	95	6
40	170	240	322	202	120	16	16	23	M16	95	60	110	6
50	210	280	383	243	140	16	23	32	M16	110	75	120	6
60	240	360	475	295	180	18	25	38	M20	140	80	130	8
70	280	450	585	360	225	18	25	42	M20	175	90	160	10

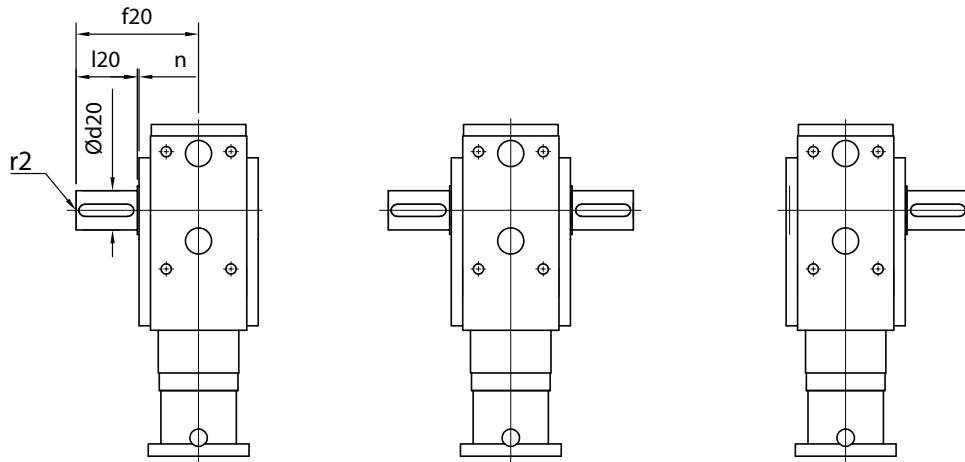
Motor Adapter Flange and Coupling Dimensions

Frame Size	u12 x f12 (Motor Adapter)			Ød12 x l12 (Coupling)		
10	55x184	75x194	90x197	9x23	11x26	14x33
20	75x232	90x232	90x244	11x26	14x33	19x43
30	90x281	115x281	115x291	14x33	19x43	24x53
35	115x337	140x352	140x362	19x43	24x53	32x63
40	140x395	190x400	190x415	24x53	32x63	38x83
50	190x481	190x490	260x490	32x63	38x83	48x115
60	190x558	260x568	-	32x63	38x83	48x115
70	Contact us			Contact us		

*Above Motor Adapter Flange and Coupling Dimensions are for reference only and depend on motor dimensions. Contact us to configure adaptation for your specific motor.

Dimensions and Configurations

Keyed Solid Output Shaft



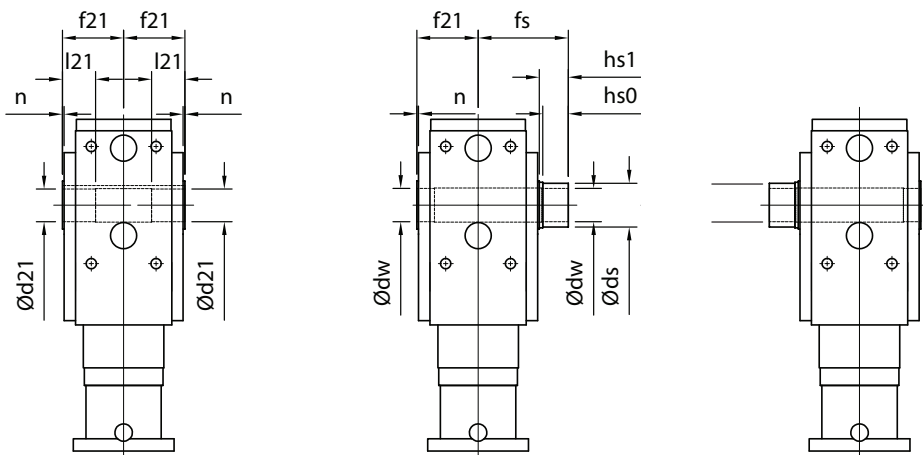
Shaft Arrangement 1L

Shaft Arrangement 13L

Shaft Arrangement 3L

Frame Size	Ø d20 k6	l20	f20	n	r2	Key
10	30	50	100	2	M10	8x7x45
20	35	55	115	2	M12	10x8x45
30	45	70	140	2	M16	14x9x63
35	55	85	174	3	M20	16x10x80
40	65	110	214	3	M20	18x11x100
50	80	130	254	3	M20	22x14x100
60	90	160	301	3	M24	25x14x140
70	100	180	341	3	M24	28x16x160

Hollow Shaft: Keyed and Shrink Disc



Shaft Arrangement 13L

Shaft Arrangement 1LSV

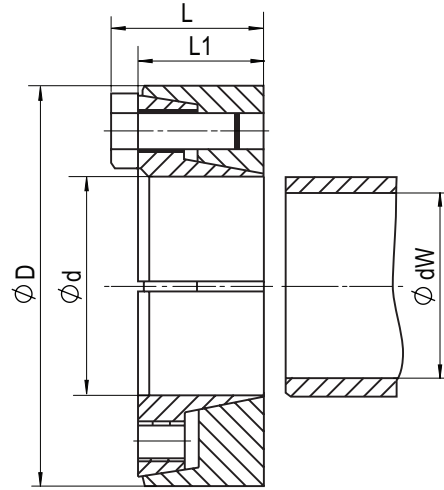
Shaft Arrangement 3LSV

Frame Size	Ød21 H7	l21	f21	n	Keyway	Ødw H7	Øds F7	hs0	hs1	fs
10	25	40	50	2	8x7	25	30	22	25	77
20	28	28	60	2	8x7	30	36	25.5	28.5	90
30	38	38	70	2	10x8	40	50	29	33	104
35	45	45	89	3	14x9	50	62	31.5	37	126
40	55	55	104	3	16x10	60	68	31.5	35	141
50	65	65	124	3	18x11	70	80	34	41	165
60	75	75	141	3	20x12	75	95	46.5	51	195
70	90	90	161	3	25x14	90	110	52	60.5	225

* Hollow output shaft arrangements 1LSV/3LSV include extended shrink disc shaft only. Shrink disc sold separately.

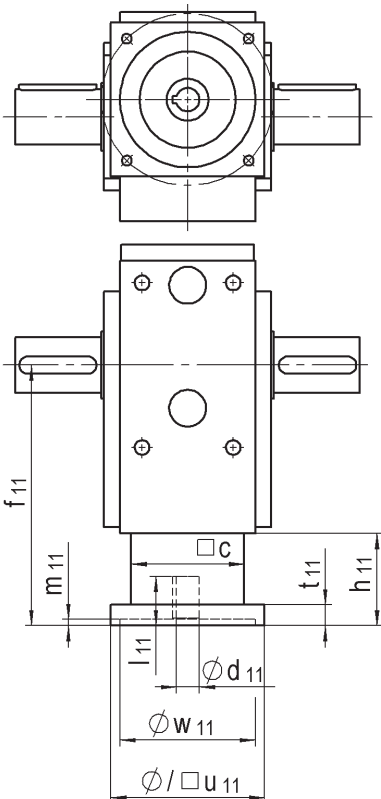
Mounting Options

Shrink Discs - For use with 1LSV/3LSV Hollow Shaft Configurations



Frame Size	Shrink Disc Model	Ød	Ødw	ØD	L	L1	Torque (Nm)	Screw Size	Mass (kg)
10	KBS 19/1 - 30x60	30	25	60	24	20	352	M6	0.3
20	KBS 19/1 - 36x72	36	30	72	27.3	22	714	M8	0.5
30	KBS 19/1 - 50x90	50	40	90	31.3	26	1490	M8	0.8
35	KBS 19/1 - 62x110	62	50	110	34.3	29	2230	M8	1.4
40	KBS 19/1 - 68x115	68	60	115	34.3	29	3590	M8	1.4
50	KBS 19/1 - 80x145	80	70	145	37.4	31	5400	M10	2.5
60	Contact Us	-	-	-	-	-	-	-	-
70	Contact Us	-	-	-	-	-	-	-	-

Keyed Input Shaft Option



Motor Adapter Flange and Input Keyway Dimensions

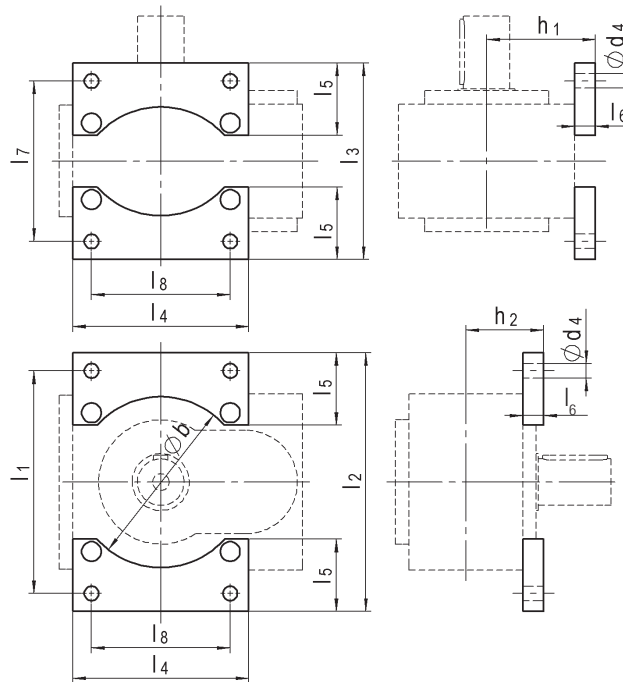
Frame Size	Ød11 x l11			f11	h11	t11	c	m1
10	9x23	11x26	14x33	155	62.5	15	70	5
20	11x26	14x33	19x43	175	65	15	80	5
30	14x33	19x43	24x53	212	75	17	90	5
35	19x43	24x53	32x63	270	100	20	105	5
40	24x53	32x63	38x83	322	120	22	130	6
50	32x63	38x83	42x115	397	154	45	135	6
60	38x83	42x115	48x115	454	159	45	145	6
70	42x115	48x115	55x115	527	167	45	170	6

*Above Motor Adapter Flange and Input Keyway Dimensions are for reference only and depend on motor dimensions. Contact us to configure the appropriate adaptation for your specific motor.

*In lieu of standard coupling mounting system.

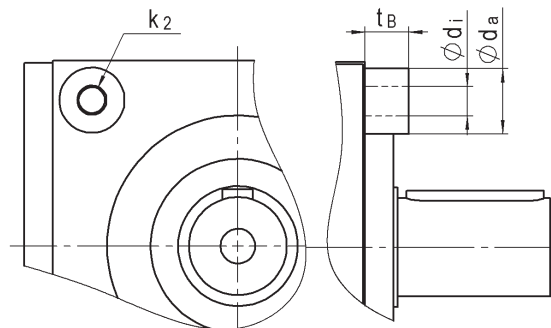
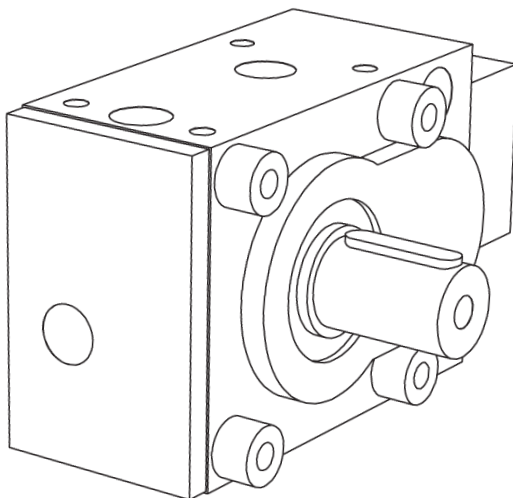
Mounting Options

Base Mounted Feet



Frame Size	l1	l2	l3	l4	l5	l6	l7	l8	Øb	h1	h2	Ød4
10	146	168	136	110	50	17	114	88	108	72	54.4	9
20	178	208	158	140	60	20	128	110	135	90	65	11
30	215	250	190	170	70	20	155	134	165	105	75	14
35	265	310	240	210	90	25	195	170	205	130	95	18
40	295	345	275	240	100	30	225	190	235	150	115	18
50	335	385	315	280	100	30	265	220	275	170	135	18
60	430	480	360	360	125	30	310	280	350	210	150	22
70	520	580	410	450	140	30	350	350	440	255	170	22

Space Sleeves for Tapped Holes

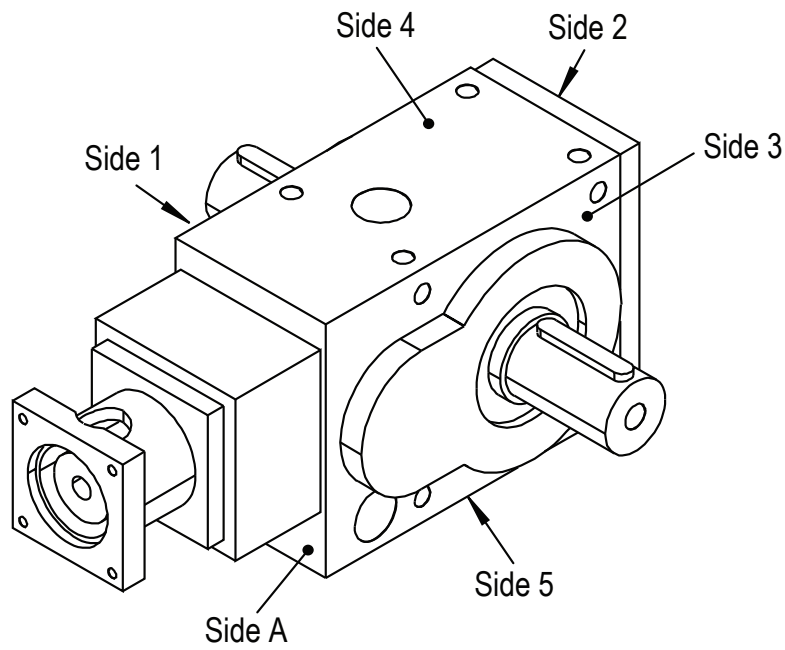


Frame Size	k2	di	da	tB
10	M8	9	20	15
20	M10	11	25	20
30	M12	13,5	30	20
35	M16	17,5	35	25
40	M16	17,5	35	25
50	M16	17,5	35	25
60	M20	22	45	30
70	M20	22	45	30

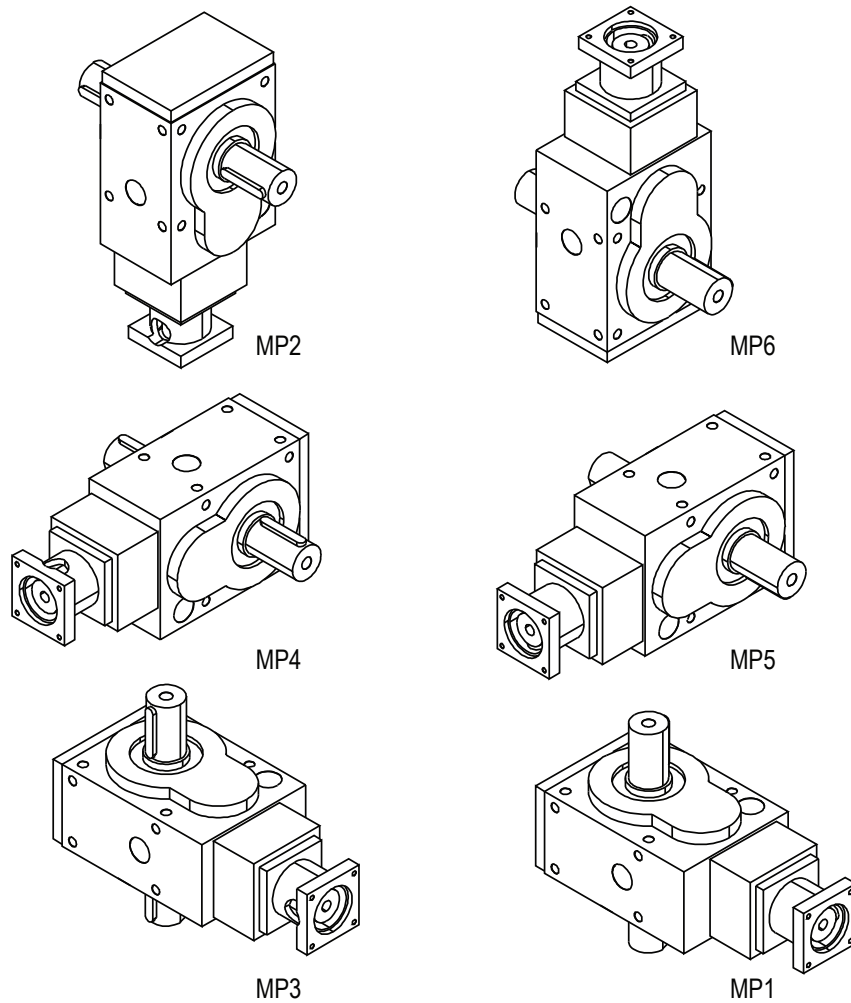
* Usable height of thread 1.5 x thread size.

Installation Information

Side Definition

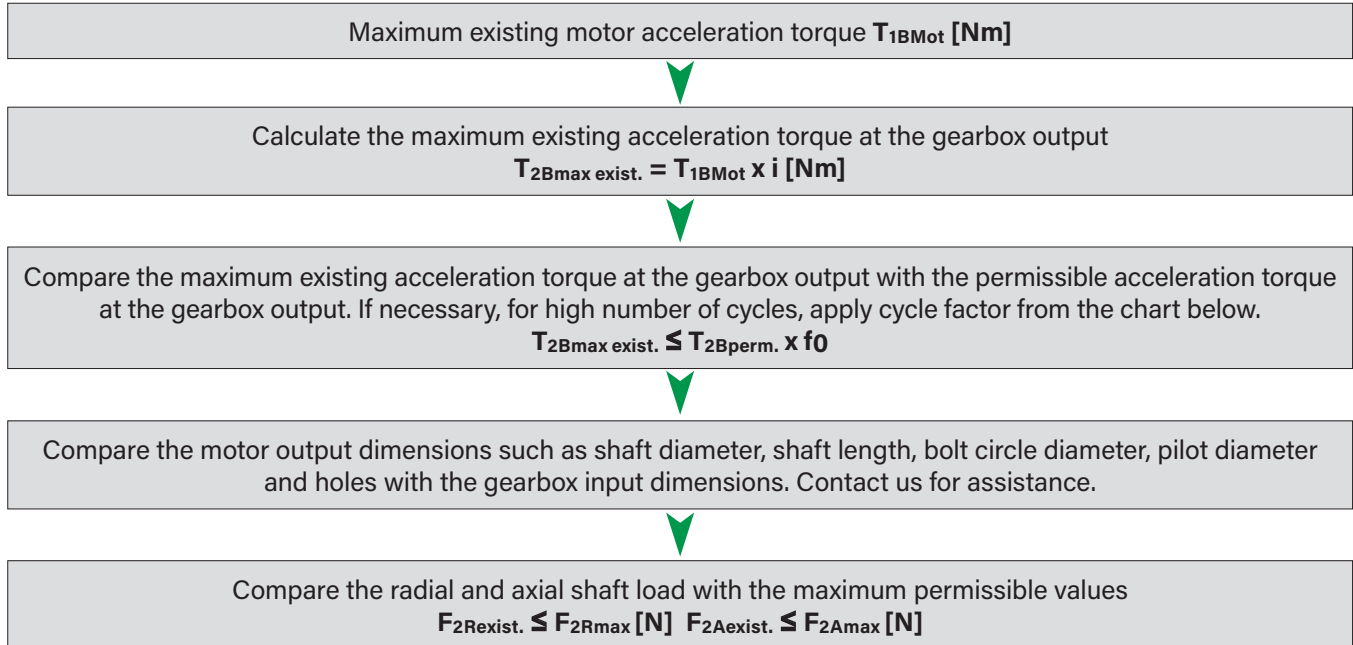


Mounting Positions



Gearbox Selection and Maintenance

Gearbox Selection Procedure



*Above selection is based on S5 cyclical duty cycle [DC] of <60% and run time [RT] < 20 min. Contact us for sizing assistance for S1 continuous operation.

Cycle Factor [f ₀]	<1,000 cycles/hour	1,000-3,000 cycles/hour	3,000-5,000 cycles/hour	5,000-7,000 cycles/hour
<1 hours/day	1.00	0.85	0.75	0.75
<8 hours/day	0.75	0.65	0.65	0.55
<16 hours/day	0.70	0.60	0.55	0.40
<24 hours/day	0.65	0.55	0.40	0.35

Gearbox Maintenance and Lubrication

Nidec Drive Technology Corporation TwinGear helical bevel gearboxes are supplied lubricated unless requested otherwise. For operating temperatures up to 80°C, we recommend the use of mineral hypoid gear oil API GL-4 to MIL-L-2105-A specification. For operating temperatures up to 95°C, we recommend the use of synthetic gear oils based on Poly-Alpha-Olefins (PAO) and for temperatures of up to 120°C, polyglycol-based synthetic gear oils to ISO VG-Class 150 (DIN 51519) or CLP DIN 51517 specification. In case of high temperatures, special seals must be specified.

The first oil change must be carried out after 500 operating hours. Draining the oil should take place immediately after the unit has been shut down, while the oil is still warm. Further oil changes are recommended every 5,000 operating hours and time intervals should not exceed 18 months. Oil drain plugs are fitted on all sides of the gearbox except the input side. Before re-filling, please ensure that all drain plugs have been inserted and tightened with the exception of the oil filling screw. In cases of doubt, please use new oil seals. When changing oil, we recommend that you fill the gear unit with the type of oil previously used. In particular, synthetic oils must not be mixed with mineral oils or other oil variants. When changing from mineral oil to synthetic oil, the gearbox must be rinsed thoroughly with the new oil type.

Upon request, gearboxes can be supplied with a lubricant indicator (oil sight glass, angular oil level indicator, oil dipstick). This requires details about mounting position and speed. Gearboxes without a lubricant indicator can be filled with the recommended average quantity of oil when speeds are low and the gearbox is installed pointing upwards. If the gearbox has a lubricant indicator, filling can be carried out precisely. The middle of the oil sight glass indicates the minimum fill level, whereas the maximum fill level is reached when an air bubble above the oil is still visible in the sight glass.

The condition of the gearbox, especially the leak tightness and the oil level must be checked regularly. Shaft seals which leak must be replaced to ensure operational safety. Please contact us for more detailed disassembly and lubrication instructions as well as lubricant options. Service kits with wear parts are available from our service department. Our products can also be sent back to the factory for inspection and lubrication.

Oil Quantities

Frame Size	10	20	30	35	40	50	60	70
Average Oil Quantity (liters)	0.3	0.6	1	1.9	3	5	9.5	21
Maximum Oil Capacity (liters)	0.4	0.75	1.5	2.7	4.5	6.5	13.5	32.5

* Oil quantity is dependent on ratio, speed, shaft arrangement and installation position.

Gearbox Selection and Maintenance

Gearbox Maintenance and Lubrication

Nidec Drive Technology Corporation PowerGear spiral bevel gearboxes are supplied lubricated unless requested otherwise. Frame sizes 27-45 are supplied with synthetic grease and are maintenance free. Sizes 54-110 are oil filled, but do not include oil drain holes and are therefore also maintenance free. Oil changes can be performed on frame sizes 140-450.

For operating temperatures up to 80°C, we recommend the use of mineral hypoid gear oil API GL-4 to MIL-L-2105-A specification. For operating temperatures up to 95°C, we recommend the use of synthetic gear oils based on Poly-Alpha-Olefins (PAO) and for temperatures of up to 120°C, polyglycol-based synthetic gear oils to ISO VG-Class 150 (DIN 51519) or CLP DIN 51517 specification. In case of high temperatures, special seals must be specified.

The first oil change must be carried out after 500 operating hours. Draining the oil should take place immediately after the unit has been shut down, while the oil is still warm. Further oil changes are recommended every 5,000 operating hours and time intervals should not exceed 18 months. Oil drain plugs are fitted on all sides of the gearbox except the input side. Before re-filling, please ensure that all drain plugs have been inserted and tightened with the exception of the oil filling screw. In cases of doubt, please use new oil seals. When changing oil, we recommend that you fill the gear unit with the type of oil previously used. In particular, synthetic oils must not be mixed with mineral oils or other oil variants. When changing from mineral oil to synthetic oil, the gearbox must be rinsed thoroughly with the new oil type.

Upon request, gearboxes can be supplied with a lubricant indicator (oil sight glass, angular oil level indicator, oil dipstick). This requires details about mounting position and speed. Gearboxes without a lubricant indicator can be filled with the recommended average quantity of oil when speeds are low and the gearbox is installed pointing upwards. If the gearbox has a lubricant indicator, filling can be carried out precisely. The middle of the oil sight glass indicates the minimum fill level, whereas the maximum fill level is reached when an air bubble above the oil is still visible in the sight glass.

The condition of the gearbox, especially the leak tightness and the oil level must be checked regularly. Shaft seals which leak must be replaced to ensure operational safety. Please contact us for more detailed disassembly and lubrication instructions as well as lubricant options. Service kits with wear parts are available from our service department. Our products can also be sent back to the factory for inspection and lubrication.

Oil Quantities

Frame Size	54	65	75	90	110	140	170	210	240	280	360	450
Average Oil Quantity (liters)	0.05	0.07	0.1	0.2	0.3	0.4	1.0	2.2	2.6	3.0	9.0	22.0
Maximum Oil Capacity (liters)	-	-	-	-	0.35	0.6	1.2	2.5	3.5	5.0	15.0	32.0

* Oil quantity is dependent on ratio, speed, shaft arrangement and installation position.