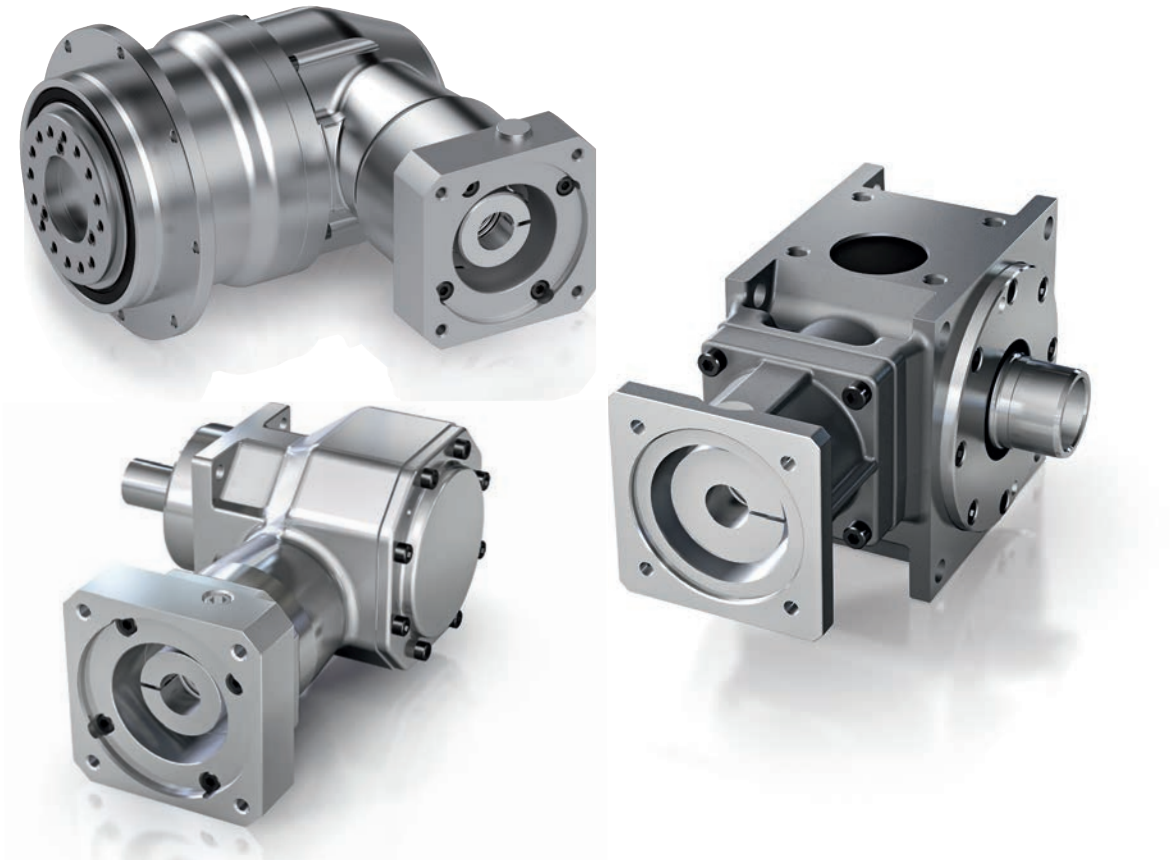
Nidec

Highly Dynamic Servo Hypoid Gearboxes



DynaGear, DynaGear Eco and EvoGear Series

Reliable and Highly Efficient

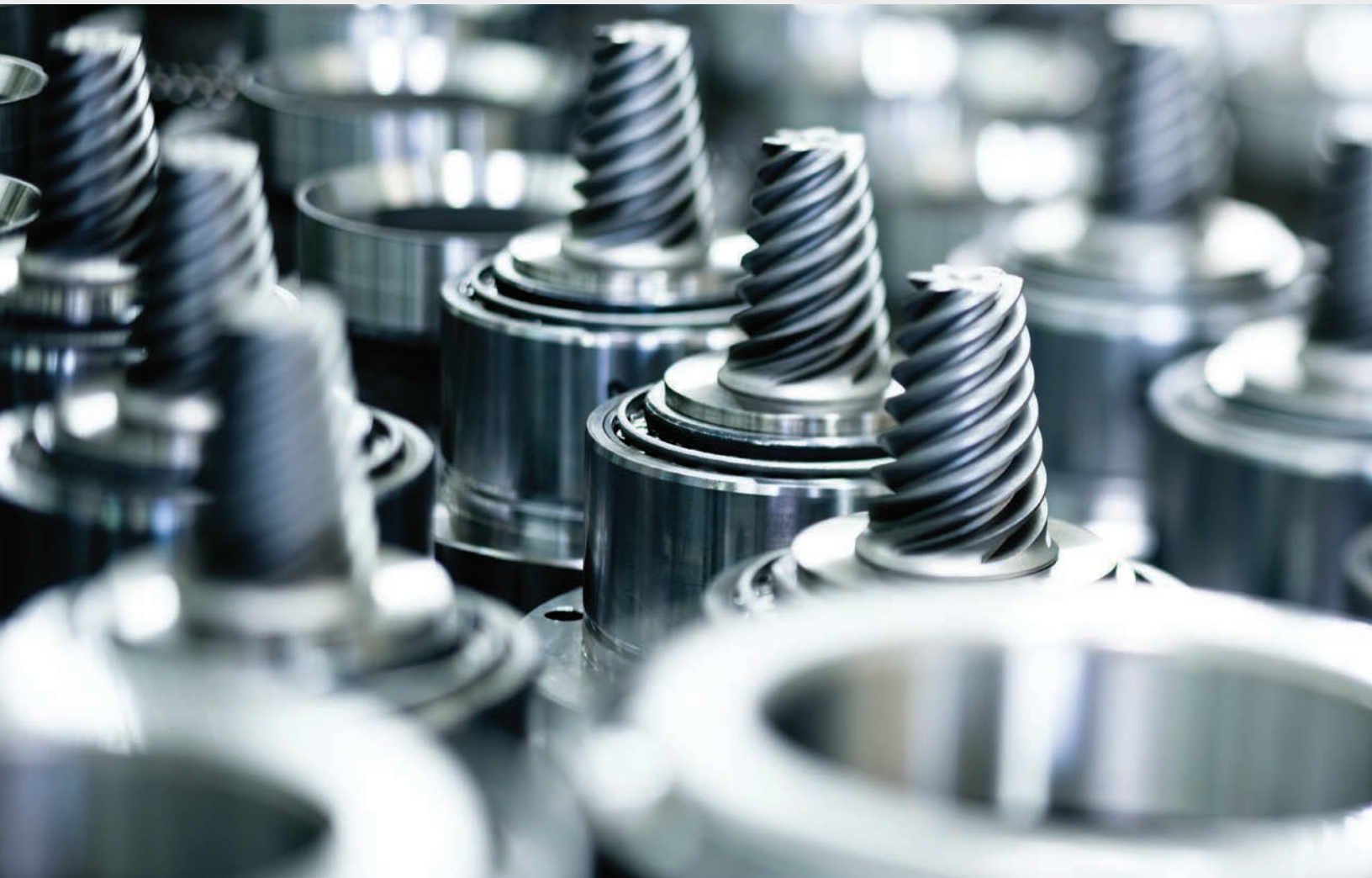
NIDEC DRIVE TECHNOLOGY CORPORATION

Legacy of Innovation in Hypoid Gearing

Nidec Drive Technology Corporation acquired MS-Graessner GmbH & Co. KG, based out of Dettenhausen, Germany, in 2018. This strategic acquisition gives us over 60 years of design and manufacturing experience in the area of high precision helical bevel, spiral bevel and hypoid gears. It strengthens our position in the European market by giving our global customer base unparalleled access a to broad range of gear technologies with local product distribution and expertise.

By way of the Gleason manufacturing process, our Dettenhausen facility and highly skilled 120-person workforce excels in producing solutions for custom and highly specialized applications. Whether it's for a specific single piece project or for mass production, we develop the best possible engineering solution—providing more power density, less noise, higher efficiency and more precision at every turn.

Our hypoid product families—DynaGear, DynaGear Eco and EvoGear—were developed as a result of in-depth knowledge of different industry sectors and applications. We offer a wide range of frame sizes, ratios and mounting configurations to meet virtually any requirement. The success of our customers is the top priority for Nidec DTC. Our product quality, reliability and availability give our customers a competitive advantage as they continue to improve their machine performance to compete globally.



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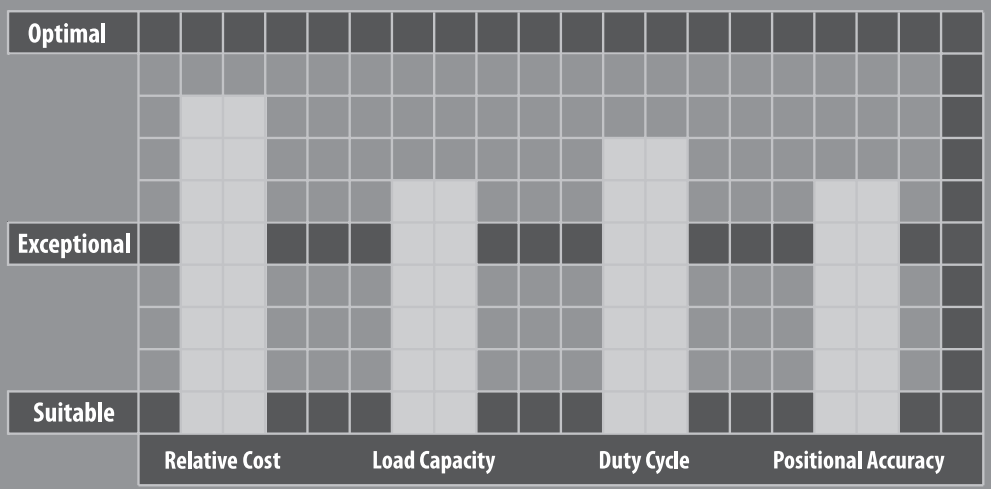
DYNAGEAR ECO SERIES

DynaGear Eco is a cost-optimized right-angle hypoid solution that performs well in dynamic servo applications requiring low torsional backlash and high efficiency in a compact footprint. DynaGear Eco uses optimized hypoid gears for high torque transfer and backlash down to < 6 arc-min. Tapered roller bearings on the input and output sides of the gearbox absorb high radial and axial loads, ensuring long service life.

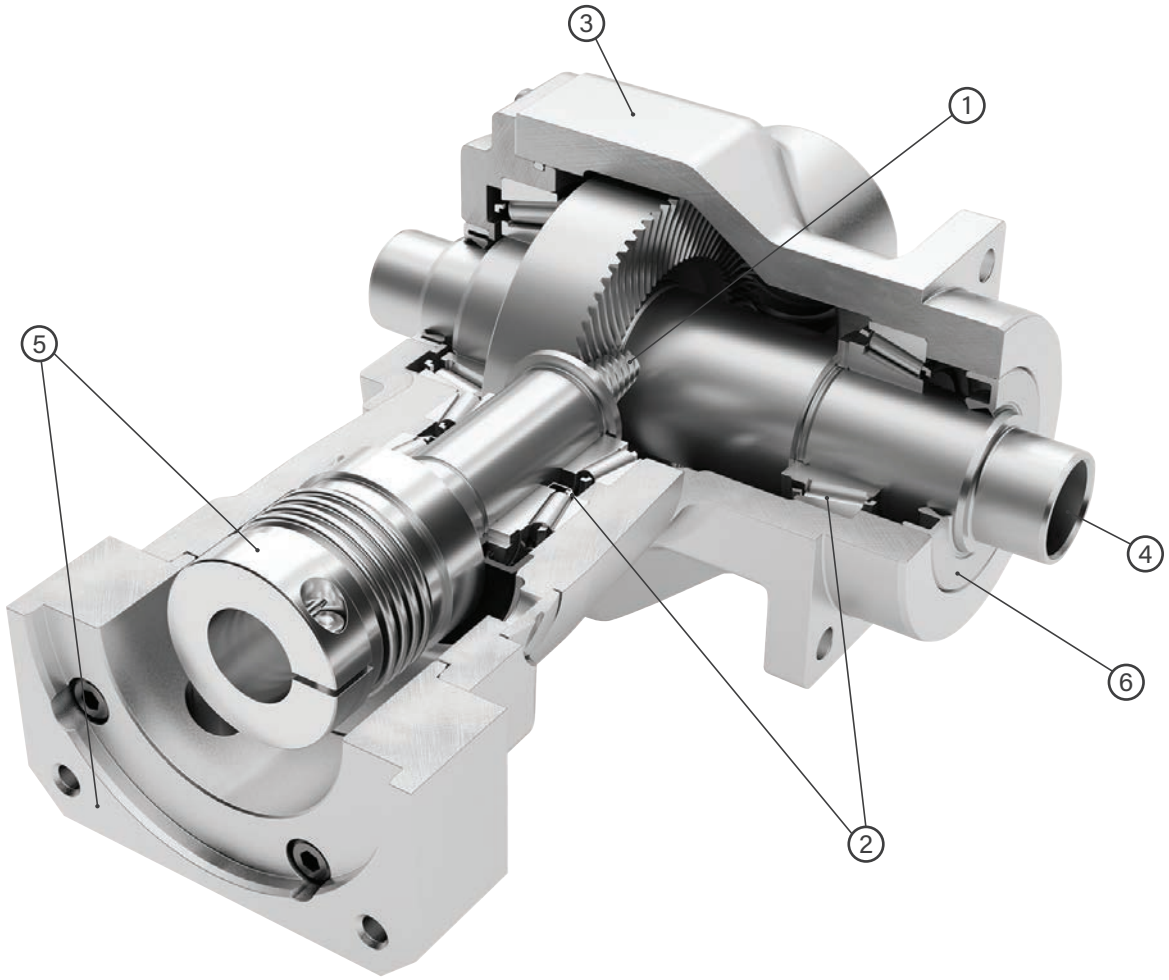
DynaGear Eco comes in three frame sizes which use a weight efficient one-piece aluminum housing for high stability under load. Output mounting options include solid and hollow shaft, utilizing industry standard dimensions. Its compact design provides significant space savings for small installation envelopes. Lubricated for life, DynaGear Eco is a reliable maintenance-free solution.



DYNAGEAR ECO SERIES

- Highest quality hypoid gearing with optimized contact pattern combines the space and configuration advantages of worm gearing with the high efficiencies of bevel gearing
- Cost-effective design with low backlash (<6 arc-min), high torsional stiffness, smooth torque transmission and negligible noise. Efficiency as high as 96%
- Solid or hollow output shaft with shrink disc. Industry standard mounting dimensions for easy changeout in existing applications
- Compact, rigid, weight efficient design
- Maintenance-free solution that is lubricated for life
- Assembled in Germany

Featured Highlights



1. Hypoid gearing with optimized contact pattern for uniform load distribution
2. Tapered roller bearings at input and output for high radial and axial load capacity
3. Weight efficient one-piece aluminum housing ensuring high stability under load
4. Solid or hollow output shaft with optional 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

DE-PL	–	75	–	8	–	XXX
Series Name		Frame Size		Ratio		*Motor Mounting Code
DE-PL: Solid Output Shaft **DE-PLH:** Hollow Output Shaft		55 75 90		5 8 10 15		Motor mounting code varies depending on the motor

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

Performance Specifications

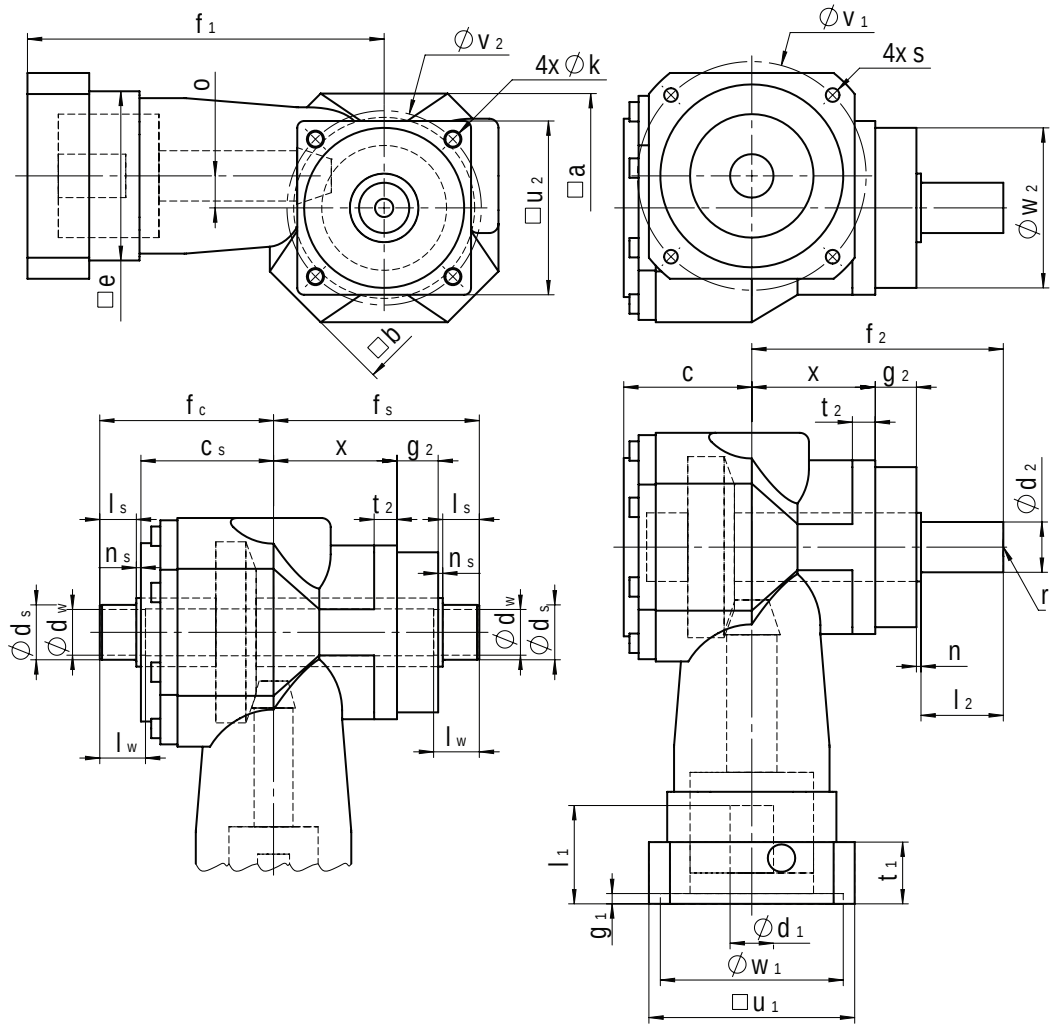
Frame Size	Units	Note	55	75	90	55	75	90
Ratio	**i**		**5/8/10**			**15**		
Nominal Output Torque	T2N [Nm]	*1	35	70	140	25	50	95
Maximum Acceleration Torque	T2B [Nm]	*2	53	105	210	38	75	143
Emergency Stop Torque	T2Not [Nm]	*3	70	140	280	50	100	190
Nominal Input Speed (Ratios 5/8)	n1N [rpm]	*4	3100	2400	2100	-	-	-
Nominal Input Speed (Ratios 10/15)	n1N [rpm]	*4	3800	2900	2600	3800	2900	2600
Maximum Input Speed	n1max [rpm]	*5	6000	6000	5000	6000	6000	5000
Maximum Radial Load	F2Rmax [N]	*6	2200	4050	6200	2200	4050	6200
Maximum Axial Load	F2Amax [N]	*7	1100	2025	3100	1100	2025	3100
Moment of Inertia (Ratio 5)	[kgcm²]	-	0.44	1.07	3.70	-	-	-
Moment of Inertia (Ratio 8)	[kgcm²]	-	0.37	0.89	3.00	-	-	-
Moment of Inertia (Ratio 10)	[kgcm²]	-	0.35	0.84	2.90	-	-	-
Moment of Inertia (Ratio 15)	[kgcm²]	-	-	-	-	0.33	0.79	2.70
Efficiency	h [%]	*8	> 96	> 96	> 96	> 93	> 93	> 93
Torsional Rigidity	Ct21 [Nm/arcmin]	*9	2.5	5	12	2.5	5	12
Maximum Torsional Backlash	jt [arcmin]	*10	≤ 7	≤ 7	≤ 6	≤ 7	≤ 7	≤ 6
Noise Level	LpA [dB(A)]	*11	< 66	< 66	< 68	< 66	< 66	< 68
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	15,000					
Weight	m [kg]	-	2.6	4.5	9.0	2.6	4.5	9.0

*1 At nominal input speed, service life is 15,000 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 The average input speed at nominal input torque. Maintain housing temperature below permitted value.
*5 The maximum intermittent input speed.
*6 The maximum radial load the gearbox can accept. Measured at center of output shaft at 400rpm output.
*7 The maximum axial load the gearbox can accept. Measured at center of output shaft at 400rpm output.
*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 3,000 rpm input.
*12 Based on S5 duty cycle <60% and <20 minute run time.

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	kgcm²
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	x	o	□e	f1	g1	t1	g2	t2	Ø k	□u2	Øv2	Øw2g6
55	84	91.5	47	9	58	130	4.5	20	18	8.5	5.5	66	68	60
75	100	110	54	14	74	156	4.5	27	18	10	6.5	76	85	70
90	125	139	68	18	89	187	4.5	33	20	13	9	101	120	90

Input Dimensions

Frame Size	Ød1	l1	□u1	Øv1	Øw1 F7	s
55	9	23	60	63	40	M4
	11	26	75	75	60	M5
	14	33	75	75	60	M5
75	11	26	75	75	60	M5
	14	33	75	75	60	M5
	19	43	90	100	80	M6
90	14	33	90	100	80	M6
	19	43	90	100	80	M6
	24	53	115	130	110	M8

Solid Output Dimensions

Frame Size	Ød2 k6	l2	f2	n	r	c
55	16	28	95	2	M5	46.5
75	22	36	110	2	M8	56
90	32	58	148	2	M12	68

Hollow Output Dimensions

Frame Size	ØdW H6	ØdS h8	lS	nS	lW	fS	fC	cS
55	15	18	14	2	18	81	65.5	49.5
75	20	24	16	2	20	90	76	58
90	30	36	20	2	25	110	90.5	68.5

* Above input dimensions are for reference only and depend on motor dimensions.
Contact us to configure the appropriate adaptation for your specific motor.

Gearbox Selection Procedure

Maximum existing motor acceleration torque T_{1BMot} [Nm]

▼

Calculate the maximum existing acceleration torque at the gearbox output

$T_{2Bmax\ exist.} = T_{1BMot} \times i$ [Nm]

▼

Compare the maximum existing acceleration torque at the gearbox output with the permissible acceleration torque at the gearbox output. If necessary, for high number of cycles, apply cycle factor from the chart below.

$T_{2Bmax\ exist.} \leq T_{2Bperm.} \times f_0$

▼

Existing average speed $n_{1\ exist.} \leq$ nominal speed n_{1N}

Valid for an average torque of 30 % of the permissible output torque T_{2N}

▼

Compare the motor output dimensions such as shaft diameter, shaft length, bolt circle diameter, pilot diameter and holes with the gearbox input dimensions. Contact us for assistance.

▼

Compare the radial and axial shaft load with the maximum permissible values

$F_{2Rexist.} \leq F_{2Rmax}$ [N] $F_{2Aexist.} \leq F_{2Amax}$ [N]

*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 [f0]	<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 & Lubrication

Nidec Drive Technology Corporation hypoid gearboxes are maintenance-free and are supplied lubricated for life with a high-quality synthetic oil according to ISO VG-Class 150 (DIN 51 519). For continuous operation close to the thermal performance limit, we recommend performing regular leak inspection at the shaft seals. For these continuous duty cycles, we recommend changing the oil after approximately 15,000 operating hours. Please contact us for disassembly and lubrication instructions, lubricant options and quantities. 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.

Ratios higher than 15:1 utilize a planetary stage at the input or output section of the gearbox, resulting in separate lubrication chambers. The planetary chamber will utilize a high viscosity grease. This grease does not need to be changed. It is not advisable to disassemble the planetary section of the gearbox.

www.nidec-dtc.com

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