

Planetary Helical and Right Angle Gear boxes



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MOTION CONTROL FOR ROBOTICS



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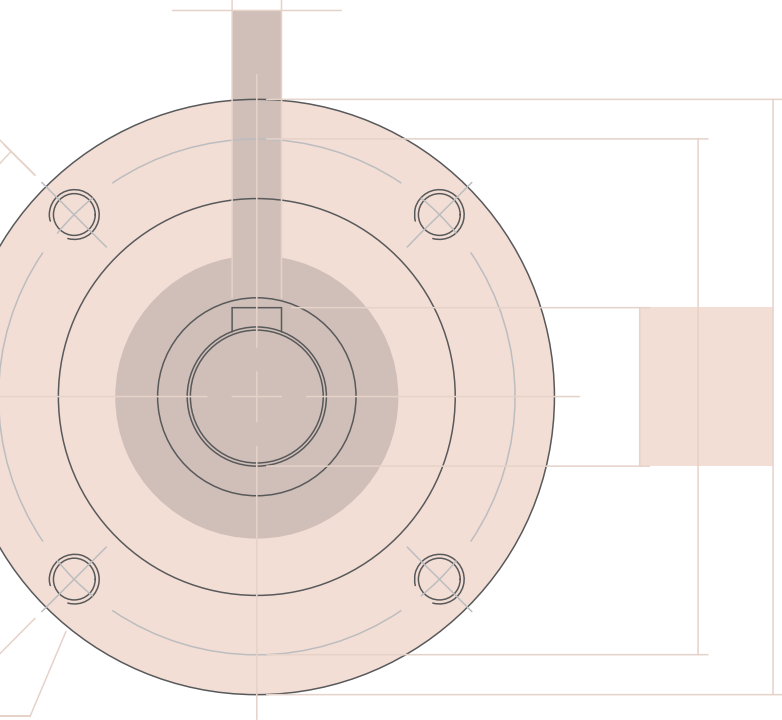
PRECISION PLANETARY GEAR REDUCERS

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PRECISION RIGHT ANGLE GEAR REDUCERS

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FEATURES

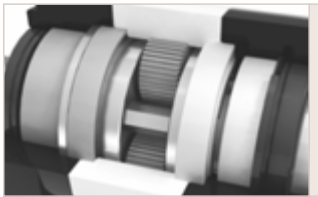
- NEMA mounting standards available for quick installation.
- Integral gear ratio available from 3:1 through 512:1 for wide range selection.
- Two types of GEAR REDUCERS with round and square output flange.
- High performance and high reduction ratio for transferring high torques in limited space.
- Precision gears to raise transmission efficiency above 96%.
- Hardened high strength steel components for reliability under severe environmental conditions.
- All grease-filled, the gear head can be used in any orientation without oil leaks.
- Available for wide range applications of automation and motion control in industries such as aerospace, medical, pharmaceutical, factory automation, printing, robotics, auto control system, automotive, textile equipment, semiconductor, manufacturing equipment, X-Y positioning systems, coordinate measuring, optical positioning equipment, telecommunications, packaging, material handling, assembly line, CCTV system, machine tools and special machinery etc.



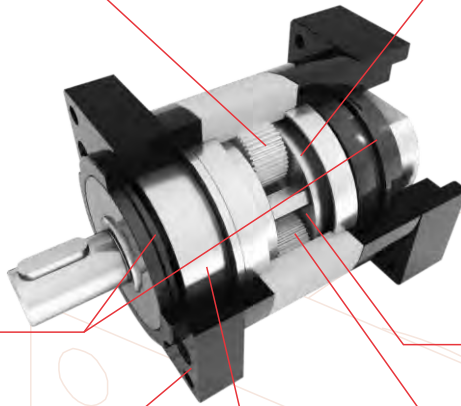
Needle bearings for high output torque.



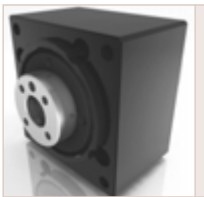
Closed planet cage provides extremely high rigidity.



All grease filled and double seal design to eliminate leakage in any orientation.



Planet gear train provides compact size yet high transmission efficiency.



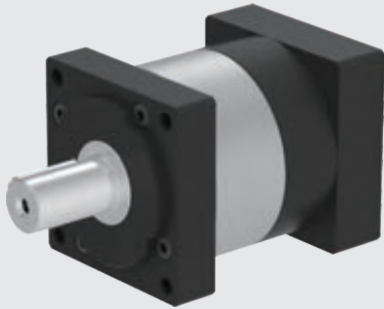
Versatile output design.



Larger bearings for increased loading.



Alloy steel made gears with carburized heat treatment for superior wear resistance and strength.



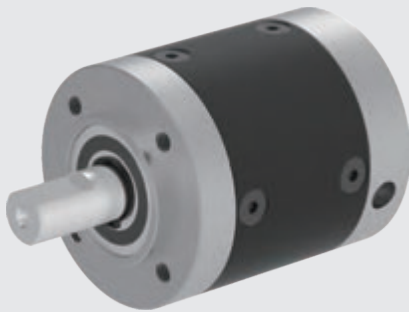
LX FEATURES

Precision performance square flange gearbox with two piece adaptor flange for flexible mounting options and optimized stock management. The semi-closed planet carrier design provides maximum radial load capacity and increase gear train reliability and stiffness. Four frame sizes are available with gear ratios from 1:3 to 1:100.



PN FEATURES

Precision performance round flange gearbox with two piece adaptor flange for flexible mounting options and optimized stock management. The semi-closed planet carrier design provides maximum radial load capacity and increased gear train reliability and stiffness. Four frame sizes are available with gear ratios from 1:3 to 1:100.



EL FEATURES

Why pay the cost for a heavy-duty gearbox for a light-duty application when our highly customizable economy line can give you what you need at the price that meets your target.

The economy line gear reducer with built for purpose engineering ensures that you don't over pay for features that are not required. Frame sizes are available from 22mm, 30mm, 32mm, 36mm, 42mm, 52mm, 60mm, 80mm and 90mm in various of ratio combinations.

Other frame sizes and dimensions can be customized according to the actual requirement.

LX/PN

TECHNICAL DATA

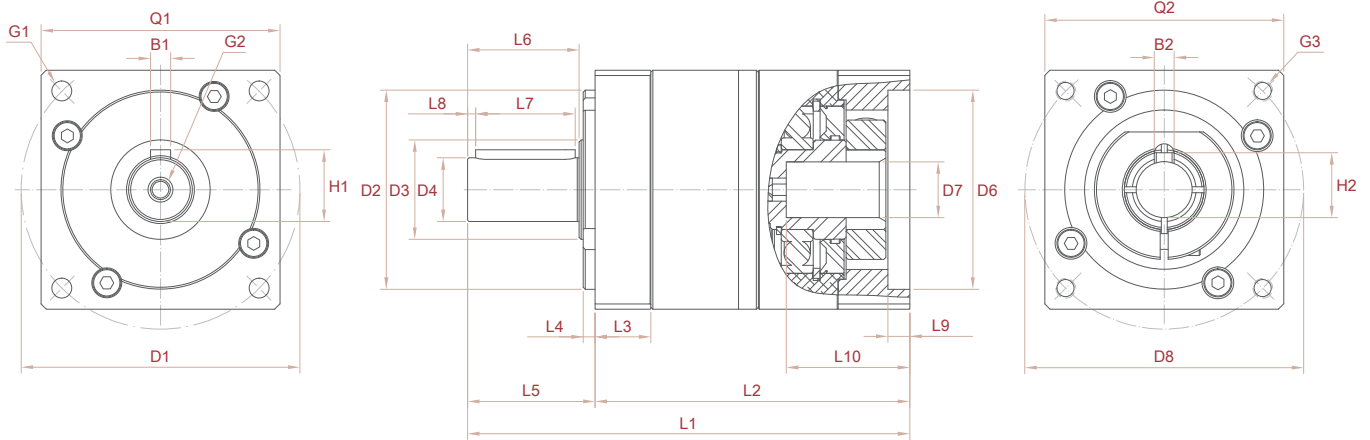
PRECISION PLANETARY GEAR REDUCERS
PS/PN TECHNICAL DATA

Model / Size		Stages	42 (NEMA 17)	60 (NEMA 23)	90 (NEMA 34)
Full load efficiency	%	1		96	
		2		92	
Backlash	arcmin	1	Standard		
			<12	<12	<12
			Precision		
		2	<6	<6	<6
			Standard		
			Precision		
Noise	dB(A)		<8	<8	
Lifetime	hr		58	62	64
Max radial load	N		300	1200	2450
Max axial load	N		110	1050	2200
Max input speed	min ⁻¹		12000	10000	8000
Torsional stiffness	Nm/arcmin		0.9	2.2	8
Weight	kg	1	0.5	1.2	3.2
		2	0.9	1.6	4.5
Operating temp.	°C			-25 ~ 90	
Degree of protection				IP 64	
Lubrication				Life lubrication	
Mounting direction				Any	

- Low noise
- Compact size and optimized weight
- Economic value with quality
- Optimized inertia moment
- Stable temperature rise
- High efficiency transmission
- Optimized design with special lubricant for long service life
- Flexible mounting dimensions

Model / Size		Stages	Ratio	42	60	90
Nominal output torque	Nm	1	3	13	34	108
			4	18	46	144
			5	17	48	138
			7	10	30	84
			9	7	22	66
			10	6	18	52
		2	12	24	53	150
			15	22	53	138
			16	24	53	150
			20	24	53	150
			25	22	48	138
			30	24	53	102
			40	22	48	132
			50	24	53	150
			70	10	34	96
100	6	18	70			
MAX Output torque			3 times of Nominal output torque			

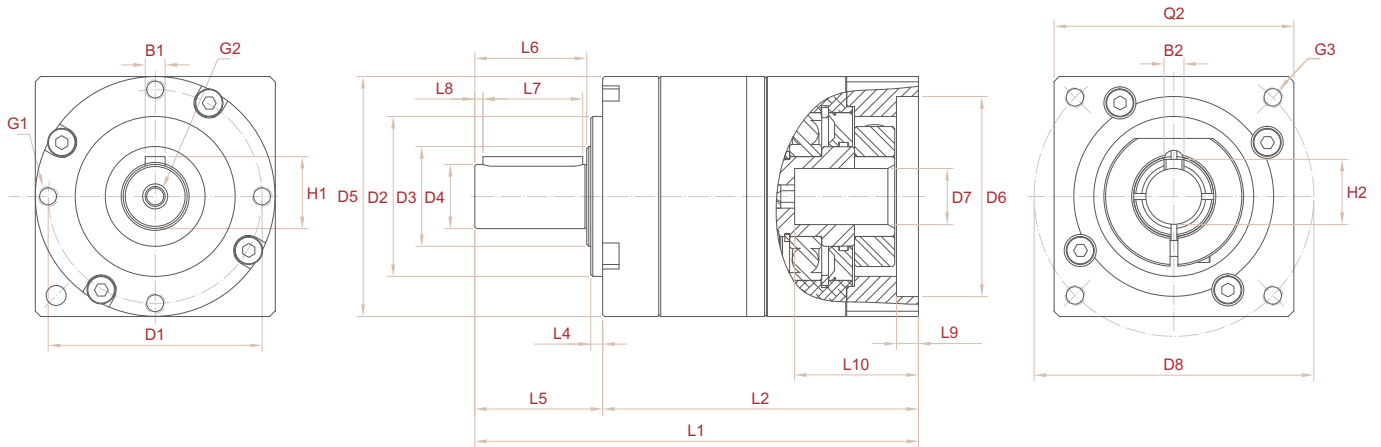
LX PROFILE DIMENSIONS



Model / Size			LX-042	LX-060	LX-090		
Overall length	1	L1	90	111	144		
	2		113.5	138	178.5		
	3		137	165	213		
Body length	1	L2	64	79	103		
	2		87.5	106	137.5		
	3		111	133	172		
Output flange		Q1	□42	□60	□90		
Input flange		Q2	□42	□60	□90		
Output							
Flange thickness		L3	9.5	14	20		
Pilot length		L4	2.5	3	3		
Output shaft length		L5	26	32	41		
Shaft shoulder to the shaft end		L6	22.5	28	37		
Key length		L7	18	25	30		
Key length to the shaft end		L8	2	2	2.5		
Mounting hole circle		D1	Ø50	Ø70	Ø100		
Pilot diameter		D2	Ø35 G6	Ø50 G6	Ø80 G6		
Shaft shoulder diameter		D3	Ø15	Ø17	Ø35		
Output shaft diameter		D4	Ø13 H7	Ø16 H7	Ø22 H7		
Key width		B1	5	5	6		
Key Height		H1	15	18	24.5		
Mounting hole		G1	Ø4.2	Ø5.2	Ø6.8		
Center screw hole x depth		G2	M4 x 10	M5 x 12	M6 x 16		
Input							
Pilot depth		L9	3	5.5	5.5		
Motor shaft length		L10	25	30	40		
Pilot diameter		D6	Ø30 G7	Ø22 G7	Ø50 G7	Ø38.1 G7	Ø70 G7
Input shaft diameter		D7	Ø8	Ø5	Ø14	Ø6.35	Ø19
Mounting hole circle		D8	Ø46	Ø43.84(□31)	Ø70	Ø66.67(□47.14)	Ø90
Mounting thread x depth		G3	M4 x 10	Ø3.3	M5 x 12	M4 x 10	M6 x 12
Key width		B2	3	—	5	—	6
Key Height		H2	9.4	—	16.3	—	21.8

PN

PROFILE DIMENSIONS



Model / Size			PN42	PN60	PN90		
Overall length	1	L1	90	111	144		
	2		113.5	138	178.5		
	3		137	165	213		
Body length	1	L2	64	79	103		
	2		87.5	106	137.5		
	3		111	133	172		
Output flange		D5	Ø42	Ø60	Ø90		
Input flange		Q2	□42	□60	□90		
Output							
Pilot length		L4	2.5	3	3		
Output shaft length		L5	26	32	41		
Shaft shoulder to the shaft end		L6	22.5	28	37		
Key length		L7	18	25	30		
Key length to the shaft end		L8	2	2	2.5		
Mounting hole circle		D1	Ø37	Ø53.5	Ø80		
Pilot diameter		D2	Ø26 G6	Ø40 G6	Ø60 G6		
Shaft shoulder diameter		D3	Ø15	Ø20	Ø35		
Output shaft diameter		D4	Ø13 H7	Ø16 H7	Ø22 H7		
Key width		B1	5	5	6		
Key Height		H1	15	18	24.5		
Mounting hole		G1	M4 x 10	M5 x 11	M6 x 15		
Center screw hole x depth		G2	M4 x 10	M5 x 12	M6 x 16		
Input							
Pilot depth		L9	3	5.5	5.5		
Motor shaft length		L10	25	30	40		
Pilot diameter		D6	Ø30 G7	Ø22 G7	Ø50 G7	Ø38.1 G7	Ø70 G7
Input shaft diameter		D7	Ø8	Ø5	Ø14	Ø6.35	Ø19
Mounting hole circle		D8	Ø46	Ø43.84(□31)	Ø70	Ø66.67(□47.14)	Ø90
Mounting thread x depth		G3	M4 x 10	Ø3.3	M5 x 12	M4 x 10	M6 x 12
Key width		B2	3	—	5	—	6
Key Height		H2	9.4	—	16.3	—	21.8

PRECISION PLANETARY GEAR REDUCERS
PN PROFILE DIMENSIONS

EL TECHNICAL DATA

Model / Size		Stages	22	32	42	52	60	80	90
Full load efficiency	%	1	90			95			
		2	81			90			
Noise	dB(A)		52	54	58	60	60	62	65
Lifetime	hr		N/A			20000			
Max radial load	N		50	100	300	450	520	1000	1500
Max axial load	N		15	30	110	30	150	200	300
Max input speed	min-1		16000	14000	12000	8000	8000	7000	7000
Weight	kg	1	0.019	0.153	0.42	0.652	1.115	1.484	2.164
		2	0.026	0.18	0.47	0.75	1.22	1.78	3.2
Operating temp.	°C	-25 ~ 90							
Degree of protection		IP 54							
Lubrication		Life lubrication							
Mounting direction		Any							

- Low cost
- Compact size
- Customizable
- Stable temperature rise
- Efficient transmission
- Optimized design with special lubricant for long service life
- Flexible mounting dimensions

Model / Size		Stages	Ratio	22	32	42	52	60	80	90
Nominal output torque	Nm	1	3	1.0	2.5	11	25	28	81	90
			4			15	34	38	108	120
			5			16	36	40	110	125
			7			8.5	23	25	63	70
			9			6	16	18	50	55
			10			5	14	15	39	43
		2	12	1.2	5.0	20	40	44	113	125
			15			18	40	44	104	115
			16			20	40	44	113	125
			20			20	40	44	113	125
			25			18	36	40	104	115
			30			20	40	44	77	85
			40			18	36	40	99	110
			50			20	40	44	113	125
			70			8	25	28	72	80
			100			5	14	15	52	58

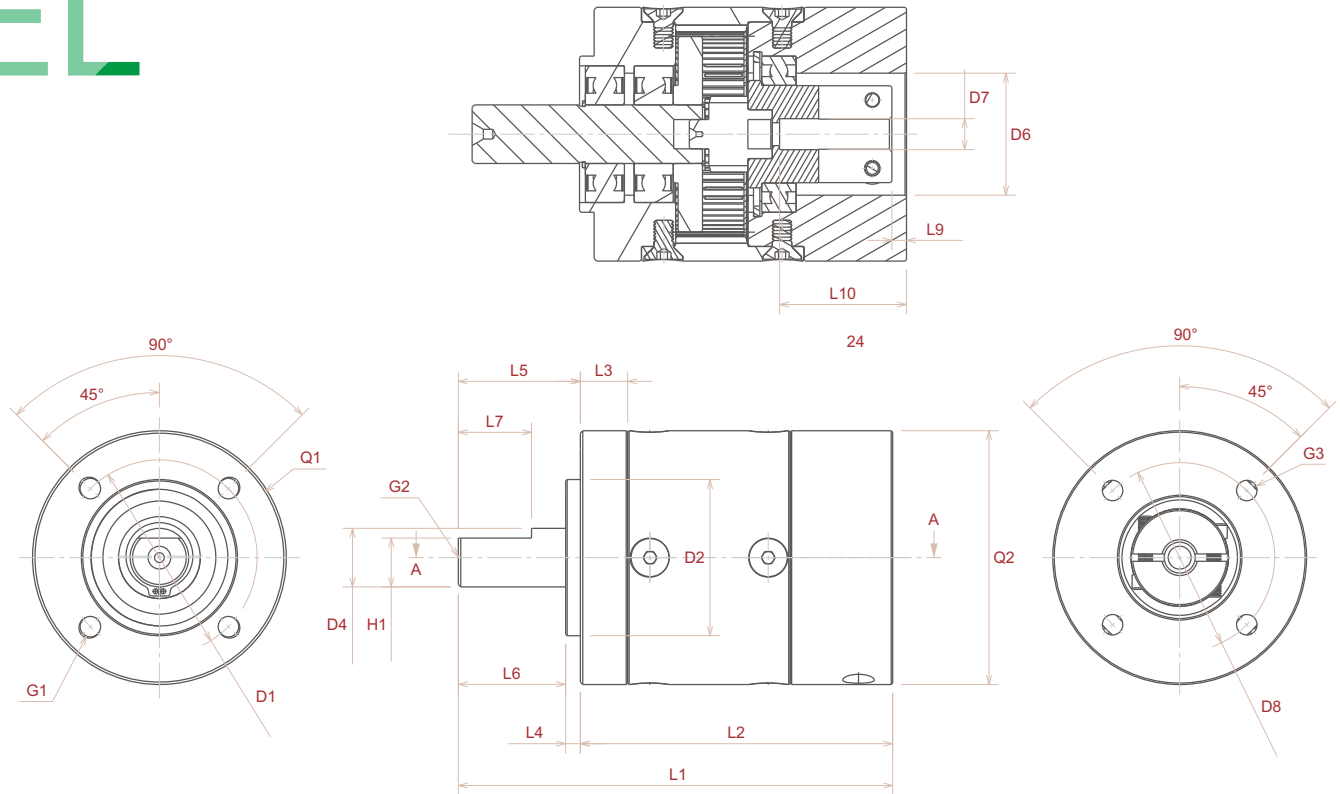
MAX Output torque 2.5 times of Nominal output torque

- 22: All available single stage ratios 1:3, 1:3.32, 1:3.75, 1:4.38
- 32: All available single stage ratios 1:3, 1:3.33, 1:3.62, 1:4, 1:4.5, 1:5.2, 1:6.25, 1:6.75, 1:8:1

ECONOMY GEAR REDUCERS / PROFILE DIMENSIONS

EL

PROFILE DIMENSIONS



Model / Size		EL22	EL32	EL42	EL52	EL60	EL90
Overall length	1	29.4	54.9	82	89	102.1	117.7
	2	35.7	65.4	97.5	103.5	118.6	139.2
	3	42	75.9	113	118	135.1	160.7
Body length	1	15.2	35.6	60	64	70.1	77.7
	2	21.5	46.1	75.5	78.5	86.6	99.2
	3	27.8	56.6	91	93	103.1	120.7
Output flange	Q1	Ø22	Ø32	Ø42	Ø52	Ø60	Ø90
Input flange	Q2	Ø22	Ø32	Ø42	Ø52	Ø60	Ø90
Output							
flange thickness	L3	6.9	5.5	5	9.7	17.5	13.3
Pilot length	L4	2	3	2	3	3	5
Output shaft length	L5	14.2	19.3	22	25	35	45
shaft shoulder to the shaft end	L6	12.2	16.3	20	22	32	40
Flat end length	L7	8	12	12	15	20	35
Mounting hole circle	D1	18	26	35	40	52	72
Pilot diameter	D2	14	20	25	32	40	55
shaft shoulder diameter	D3	—	—	—	—	—	—
Output shaft diameter	D4	4	6	8	12	14	19
Flat end height	H1	3.5	5.5	7	10	12	15
mounting thread	G1	M2	M3	M4	M5	M5	M6
center screw hole	G2	—	—	—	—	—	—
Input							
Pilot depth	L9	3	2	3	3	3.6	3.5
Motor shaft length	L10	7	15.6	22	24	31	41
Pilot diameter	D6	6.3	12.7	22	25	50	50
Input shaft diameter	D7	2	4	5	8	9	12.7
Mounting hole circle	D8	10~17	25.4	32	38.89	50	65
Mounting thread	G3	2.5	3.2	3.2	4.2	5.2	6.2

ECONOMY GEAR REDUCERS
EL PROFILE DIMENSIONS

FEATURES

Z Series

- Helical cut gears for precision
- Needle bearings for rigidity
- Large span bearing design for stiffness
- 3 arcmin or less of backlash per stage

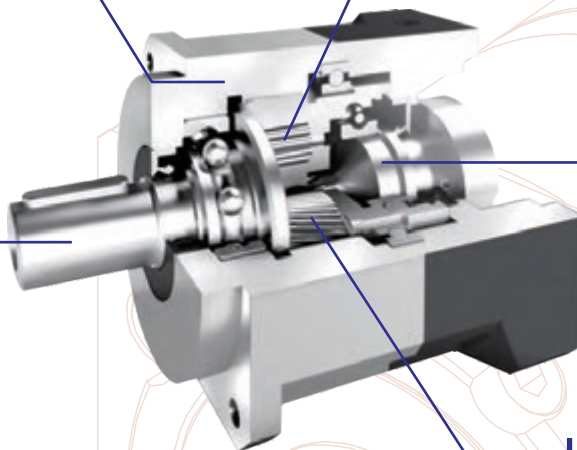
One piece and heat treated unibody designed housing for high output torque capability, longer lifespan and maintain stable precision performance.

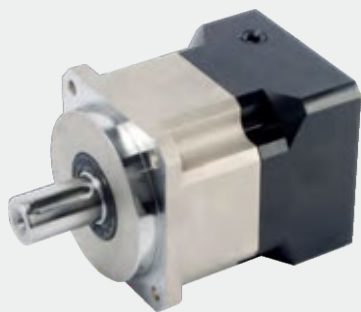
Planet gears with full complement needle bearing provide highest structural rigidity and lifespan of the gear reducer.

One piece pinion coupler design for maximum transmission efficiency and torsional stiffness

Gears made from high strength alloy steel and vacuum carburized to 58 - 62 HRC, then are skived to ensure high precision gear profile and impact resistance.

Output shaft with oversized and large-span bearing design that ensures the highest precision and torsional stiffness.





ZS FEATURES

High output torque solid one piece square housing that provides performance and efficiency with torque and sturdiness. The helical toothed and one piece carrier design provides maximum radial load capacity as well as system reliability and stiffness. Four frame sizes are available with gear ratios from 1:3 to 1:100.



ZN FEATURES

High output torque solid one piece round housing that provides performance and efficiency with torque and sturdiness. The helical toothed and one piece carrier design provides maximum radial load capacity as well as system reliability and stiffness. Four frame sizes are available with gear ratios from 1:3 to 1:100.



ZE FEATURES

Offers low-cost precision one piece housing gear reducer combined many of the features and benefits that's upgraded from our PS / PN series with the ability to serve as an easy drop-in replacement from spur to helical toothed gear reducers. The ZE Series provides a cost-effective solution for many applications. Four frame sizes are available with gear ratios from 1:3 to 1:100.



ZF FEATURES

Flexible mounting diameter and high output torque solid round housing that provides performance and efficiency with torque and sturdiness. The helical toothed and one piece carrier design provides maximum radial load capacity as well as system reliability and stiffness. The flange type output shaft is targeted for application in Robotics, Automation and Offshore. Four frame sizes are available with gear ratios from 1:4 to 1:100.

ZS/ZNIZE

TECHNICAL DATA

Model / Size		Stages	60	90	120	140
Full load efficiency	%	1			97	
		2			94	
Backlash	arcmin	1	<3	<3	<3	<3
		2	<5	<5	<5	<5
Noise	dB(A)		<65	<67	<70	<72
Lifetime	hr				30000	
Max radial load	N		1200	2450	4400	9000
Max axial load	N		1050	2200	4000	8200
Max input speed	min-1		10000	8000	8000	6000
Torsional stiffness	Nm/arcmin		7	14	25	50
Weight	kg	1	1.35	4.25	9.15	14.6
		2	1.7	7	13	19.2
Operating temp.	°C				-25 ~ 90	
Degree of protection					IP 65	
Lubrication					Life lubrication	
Mounting direction					Any	

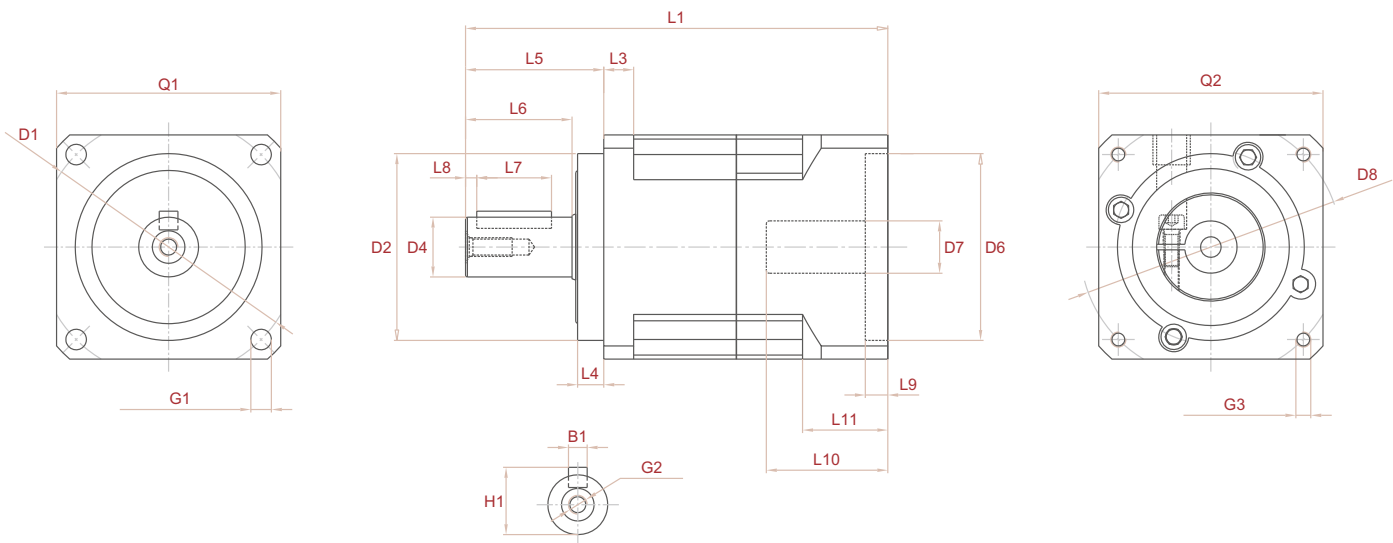
- Low noise
- Compact size and optimized weight
- Precision gearing
- Optimized inertia moment
- Stable temperature rise
- High efficiency transmission
- Optimized design with special lubricant for long service life
- Flexible mounting dimensions

Model / Size		Stages	Ratio	60	90	120	140
Nominal output torque	Nm	1	3	34	80	220	460
			4	50	120	300	650
			5	50	125	350	700
			7	50	125	350	700
			10	35	80	220	460
			15	34	80	220	460
		2	20	50	120	300	650
			25	50	125	350	700
			30	34	80	220	460
			35	50	125	350	700
			40	50	120	300	650
			50	50	125	350	700
			70	50	125	350	700
			100	35	80	220	460
MAX Output torque			3 times of Nominal output torque				

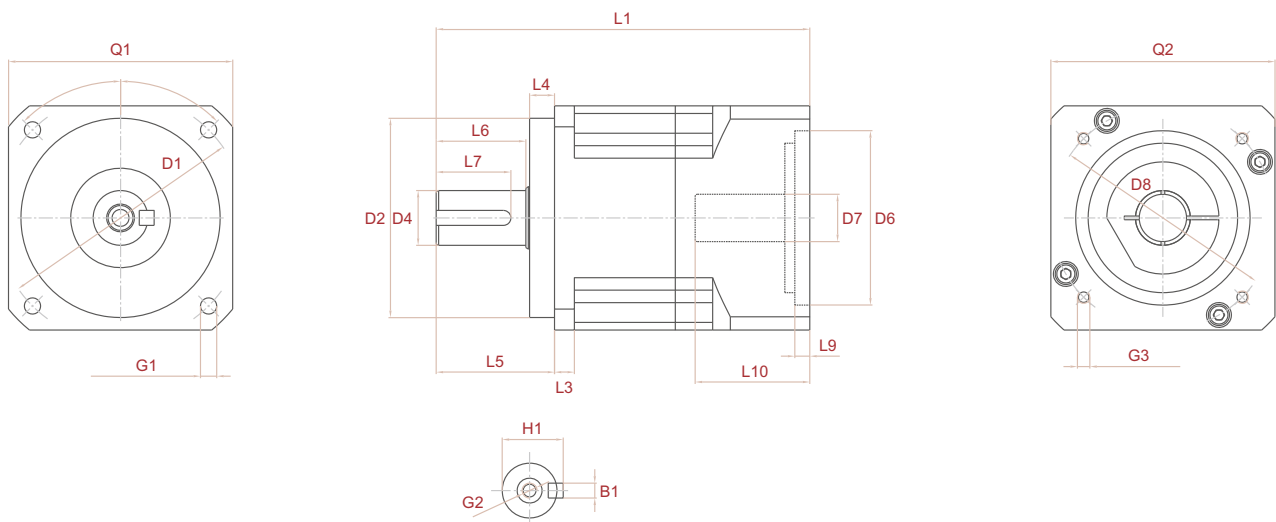


PROFILE DIMENSIONS

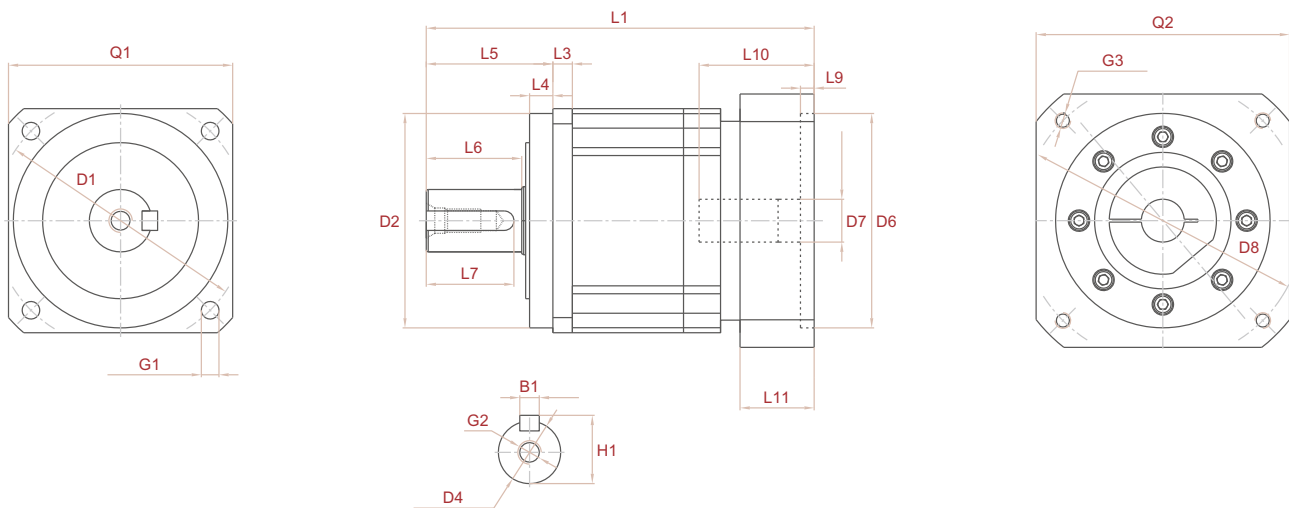
ZS60



ZS90

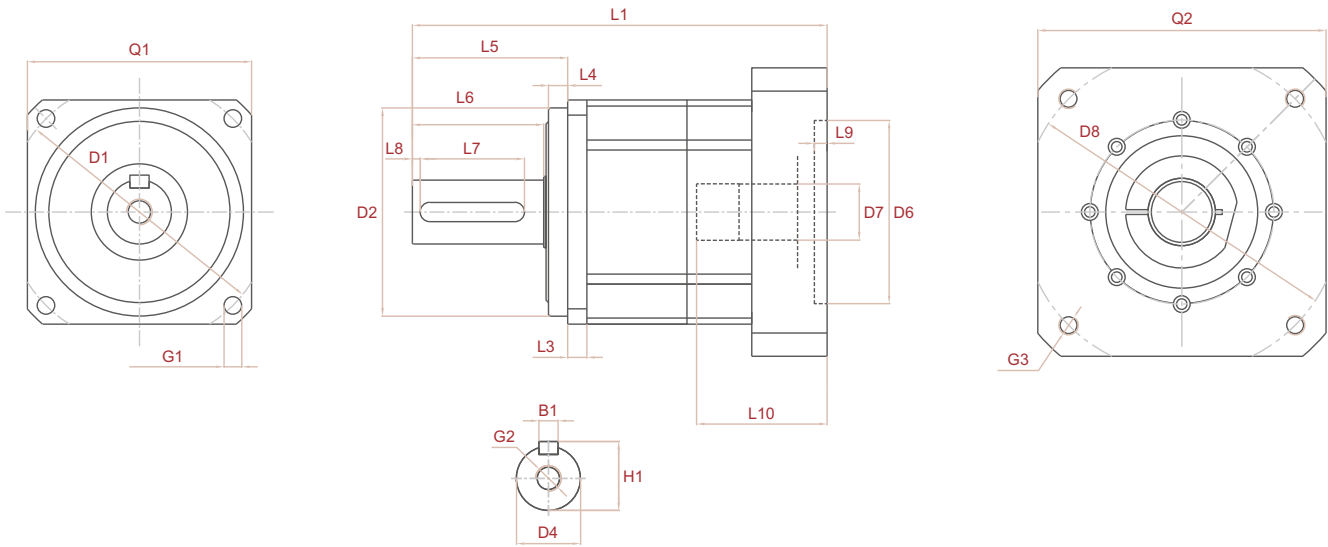


ZS120





ZS140

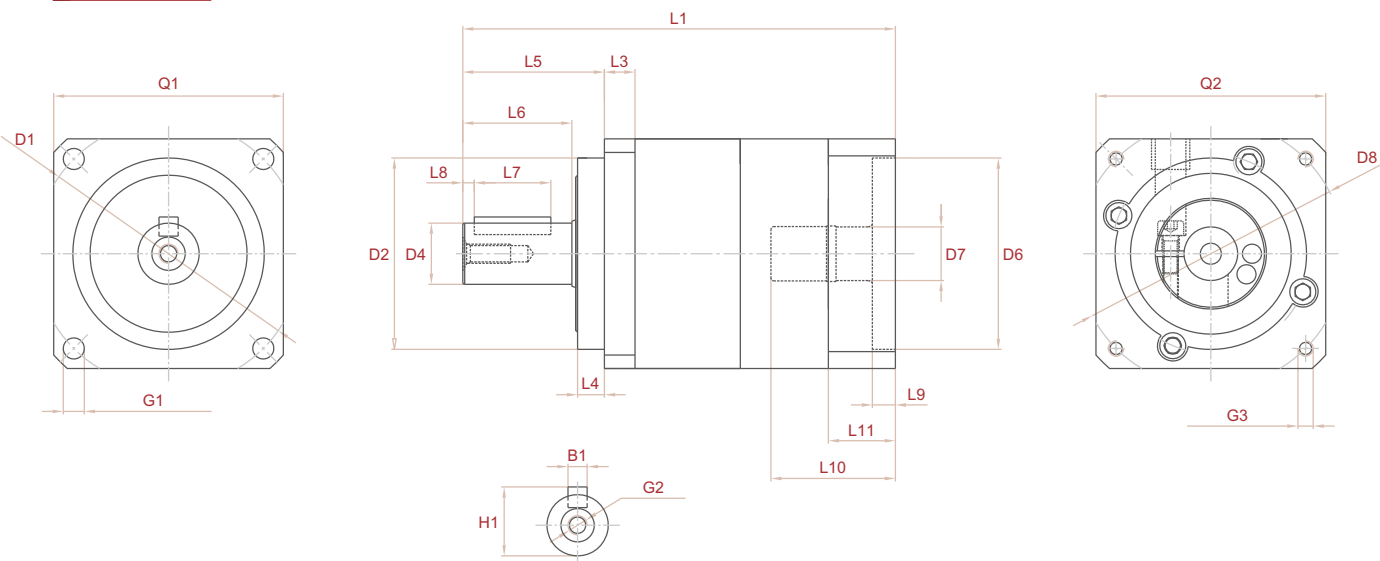


Model / Size	Stages		ZS60	ZS90	ZS120	ZS140
Overall length	1	L1	113	150	199	259
	2		133	183	236	312.5
Output flange		Q1	□60	□90	□115	□140
Input flange		Q2	□60	□90	□130	□180
Output						
Length from flange		L3	8	8	10	12
Pilot length		L4	7	10	12	12
Output shaft length		L5	37	47.5	65	97
shaft shoulder to the shaft end		L6	28.5	36	49	82
Flat end length / Key length		L7	20	30	45	65
Key length to the shaft end		L8	3	—	—	5
Mounting hole circle		D1	Ø70	Ø100	Ø130	Ø165
Pilot diameter		D2	Ø50 G6	Ø80 G6	Ø110 H6	Ø130 H6
Output shaft diameter		D4	Ø16 G6	Ø22 G6	Ø32 G6	Ø40 H6
Key width		B1	5	6	10	12
Flat end height / Key Height		H1	18	24.5	35	43
mounting thread x depth		G1	4-Ø5.5	4-Ø6.5	4-Ø9	4-Ø11
center screw hole x depth		G2	M5x12	M6	M12	M16
Input						
Pilot depth		L9	6	6	7	8
motor shaft length		L10	32.5	46	59	81.5
Offset length		L11	22.8	—	38	—
Pilot diameter		D6	Ø50 G6	Ø70 G6	Ø110 H7	Ø114.3 G6
Input shaft diameter		D7	Ø14 G6	Ø19 G6	Ø22 G6	Ø35 G6
Mounting hole circle		D8	Ø70	Ø90	Ø145	Ø200
mounting thread x depth		G3	4-M4	4-M5	4-M8	4-M12

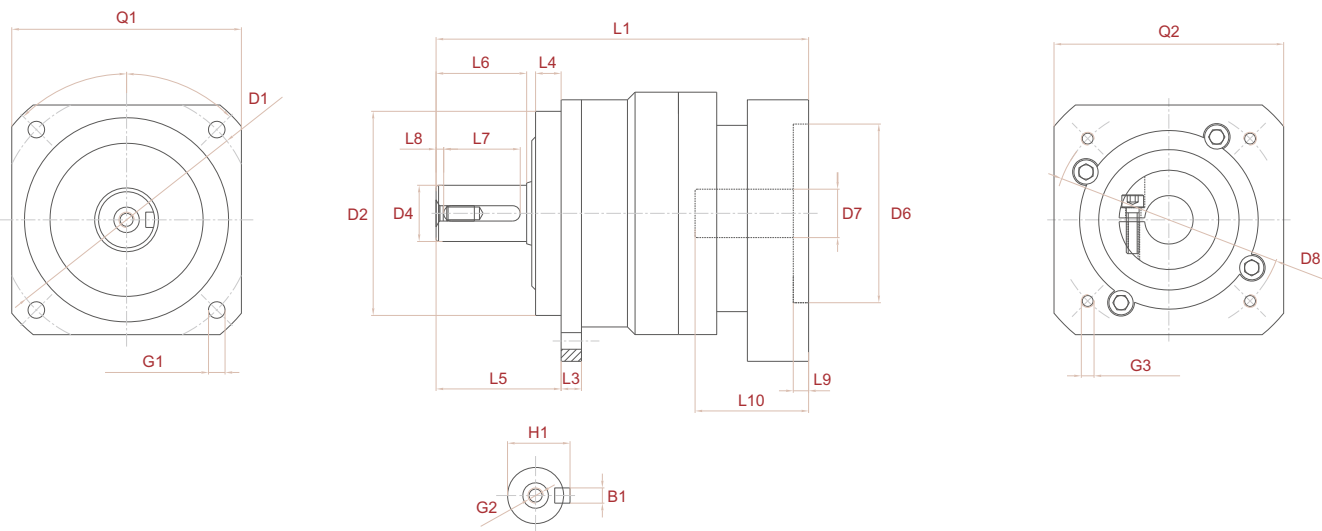


PROFILE DIMENSIONS

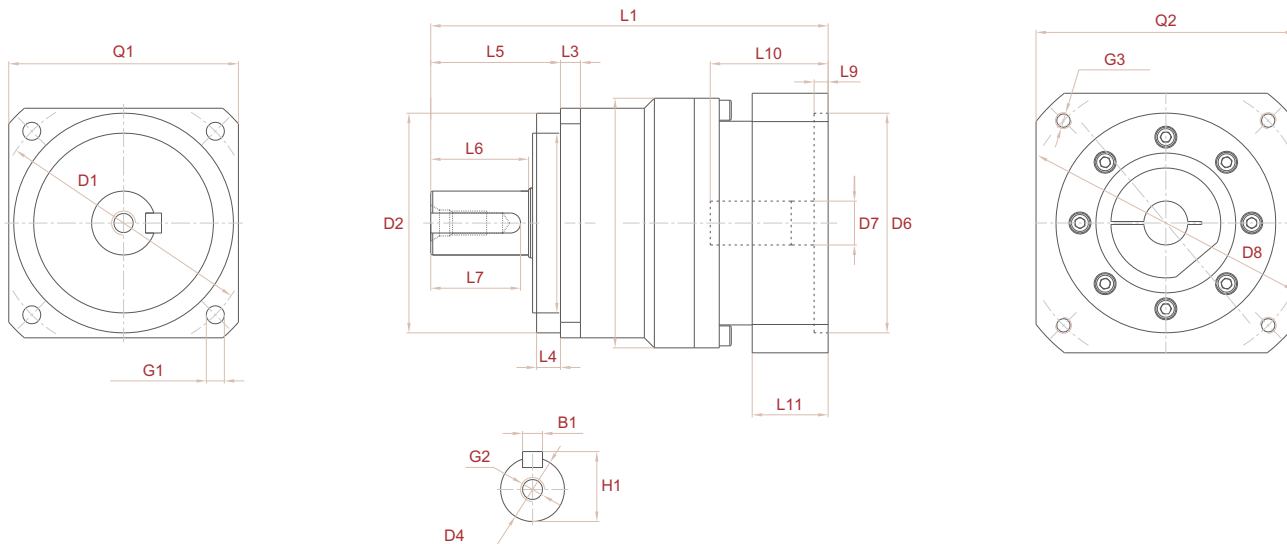
ZN60



ZN90



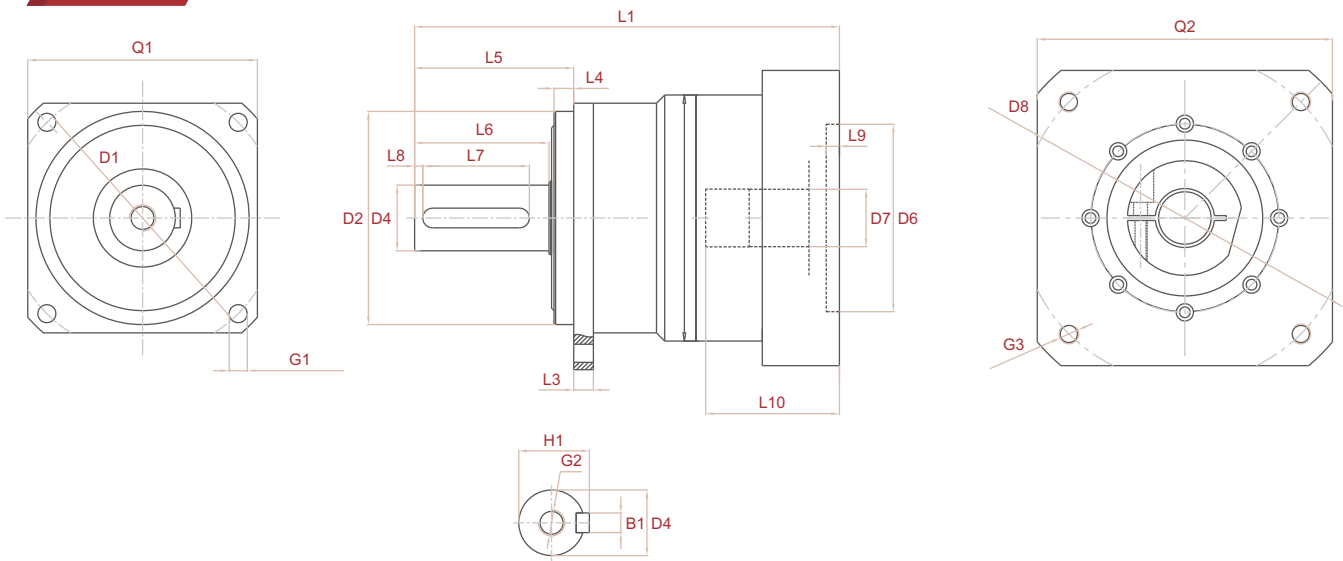
ZN120





PROFILE DIMENSIONS

ZN140

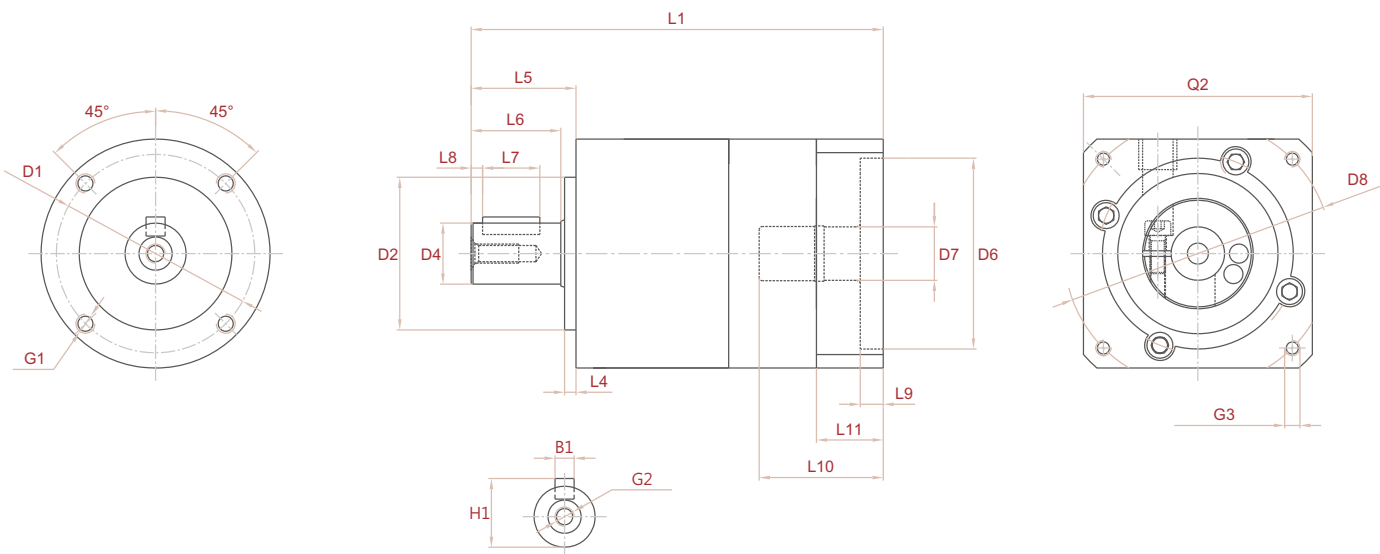


Model / Size	Stages		ZN60	ZN90	ZN120	ZN140
Overall length	1	L1	113	146	199	259
	2		133	179	236	312.5
Output flange		Q1	□60	□90	□115	□140
Input flange		Q2	□60	□90	□130	□180
Output						
Length from flange		L3	8	10	10	12
Pilot length		L4	7	10	12	12
Output shaft length		L5	37	49	65	97
shaft shoulder to the shaft end		L6	28.5	35.5	49	82
Flat end length / Key length		L7	20	30	45	65
Key length to the shaft end		L8	3	3	—	5
Mounting hole circle		D1	Ø70	Ø100	Ø130	Ø165
Pilot diameter		D2	Ø50 G6	Ø80 G6	Ø110 H6	Ø130 H6
Output shaft diameter		D4	Ø16 G6	Ø22 G6	Ø32 G6	Ø40 H6
Key width		B1	5	6	10	12
Flat end height / Key Height		H1	18	24.5	35	43
mounting thread x depth		G1	4-Ø5.5	4-Ø6.5	4-Ø9	4-Ø11
center screw hole x depth		G2	M5x12	M6	M12	M16
Input						
Pilot depth		L9	6	6	7	8
motor shaft length		L10	32.5	47	59	81.5
Offset length		L11	17.5	—	38	—
Pilot diameter		D6	Ø50 G6	Ø70 G6	Ø110 H7	Ø114.3 G6
Input shaft diameter		D7	Ø14 G6	Ø19 G6	Ø22 G6	Ø35 G6
Mounting hole circle		D8	Ø70	Ø90	Ø145	Ø200
mounting thread x depth		G3	4-M4	4-M5	4-M8	4-M12

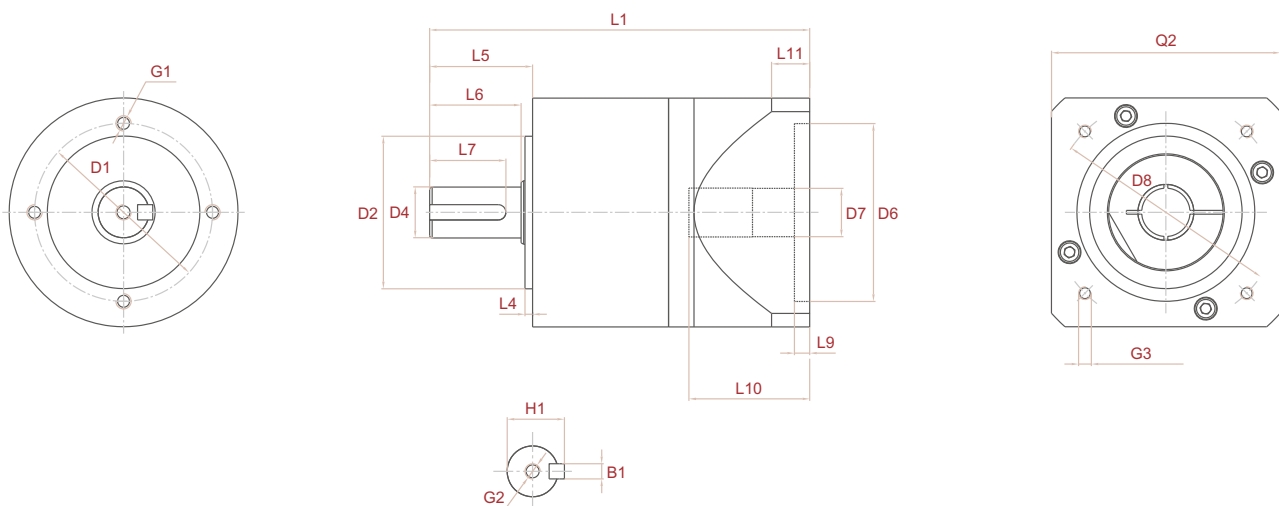


PROFILE DIMENSIONS

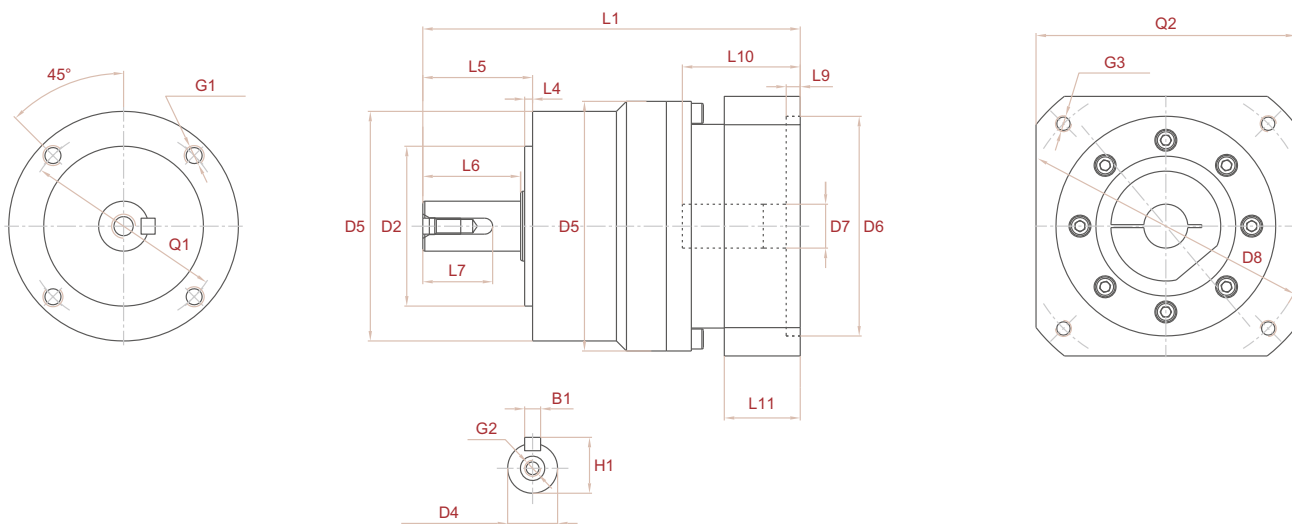
ZE60



ZE90



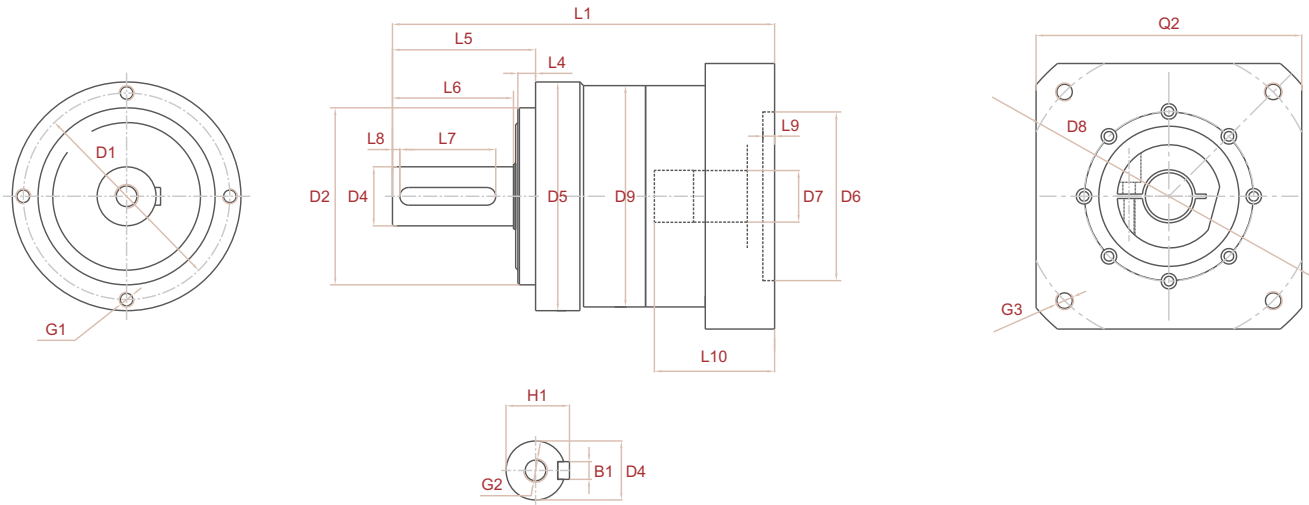
ZE120



ULTRA PRECISION PLANETARY GEAR REDUCERS
ZE PROFILE DIMENSIONS



ZE140



Model / Size	Stages		ZE60	ZE90	ZE120	ZE140
Overall length	1	L1	108	149.5	189	259
	2		128	175.5	226	312.5
Output flange		Q1	–	–	–	–
Input flange		Q2	□60	□90	□130	□180
Output						
Pilot length		L4	3	3	4	12
Output shaft length		L5	27.5	40.5	55	97
shaft shoulder to the shaft end		L6	23.5	36	49	82
Flat end length / Key length		L7	15	30	35	65
Key length to the shaft end		L8	3	–	–	5
Mounting hole circle		D1	Ø52	Ø70	Ø100	Ø140
Pilot diameter		D2	Ø40 G6	Ø60 G6	Ø80 G6	Ø120 H6
Output shaft diameter		D4	Ø16 G6	Ø20 H6	–	Ø40 H6
Flange Section		D5	–	–	Ø115	Ø155
Centering		D9	Ø60	Ø90	Ø120	Ø150
Key width		B1	5	6	8	12
Flat end height / Key Height		H1	18	22.5	28	43
mounting thread x depth		G1	4-M5	4-M6	4-M10	4-M10
center screw hole x depth		G2	M5x12	M6	M8	M16
Input						
Pilot depth		L9	6	6	7	8
motor shaft length		L10	32.5	47.5	59	81.5
Offset length		L11	17.5	15	38	–
Pilot diameter		D6	Ø50 G6	Ø70 G6	Ø110 H7	Ø114.3 G6
Input shaft diameter		D7	Ø14 G6	Ø19 G6	Ø22 G6	Ø35 G6
Mounting hole circle		D8	Ø70	Ø90	Ø145	Ø200
mounting thread x depth		G3	4-M4	4-M5	4-M8	4-M12



ULTRA PRECISION PLANETARY GEAR REDUCERS
ZF TECHNICAL DATA

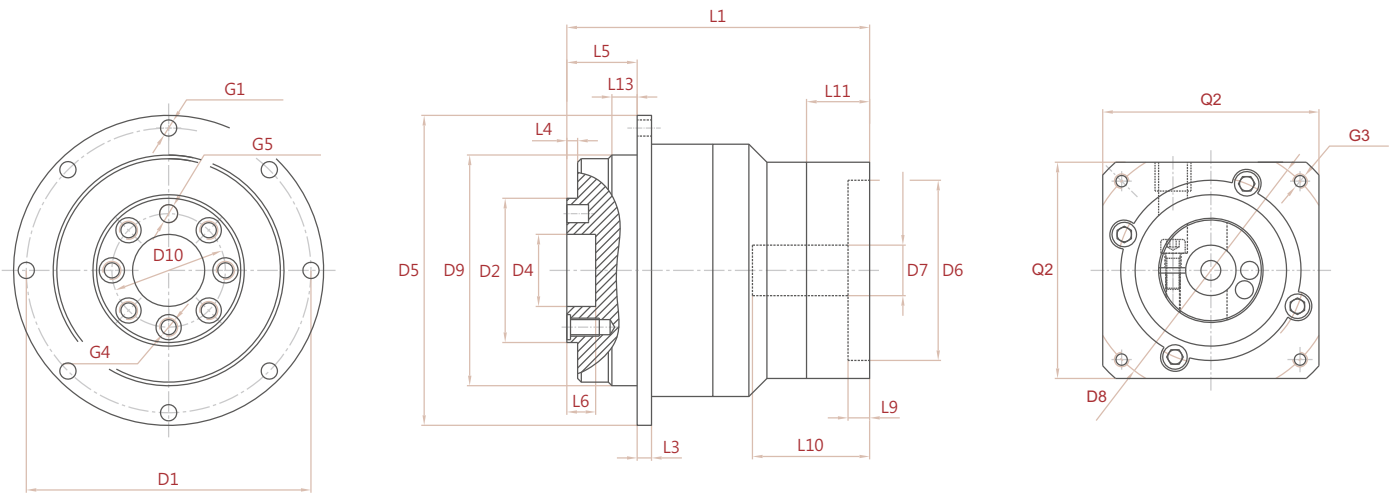
Model / Size		Stages	60	90	120	140
Full load efficiency	%	1			98	
		2			95	
Backlash	arcmin	1	<3	<3	<3	<3
		2	<5	<5	<5	<5
Noise	dB(A)		<60	<63	<65	<66
Lifetime	hr			30000		
Max radial load	N		1300	3100	7800	12000
Max axial load	N		680	1650	4000	8100
Max input speed	min-1		6000	6000	6000	5000
Torsional stiffness	Nm/arcmin		13	31	82	151
Weight	kg	1	0.5	1.2	3.2	6
		2	0.9	1.6	4.5	8.6
Operating temp.	°C			-25 ~ 90		
Degree of protection				IP 65		
Lubrication				Life lubrication		
Mounting direction				Any		

- Low noise
- Compact size and optimized weight
- Precision gearing
- Optimized inertia moment
- Stable temperature rise
- Durable performance with high strength
- High efficiency transmission
- Optimized design with special lubricant for long service life
- Flexible mounting dimension

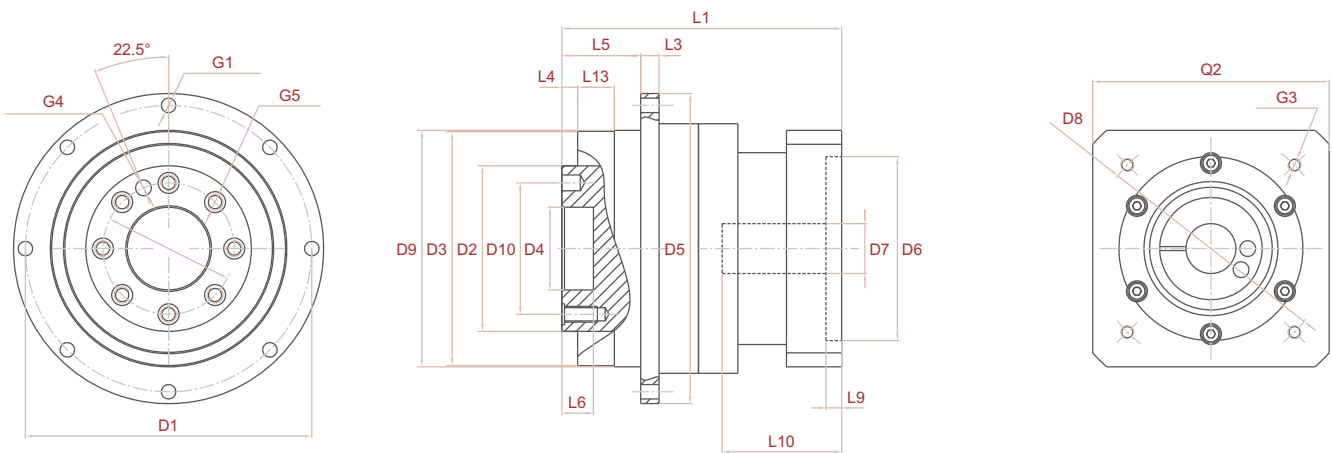
Model / Size		Stages	Ratio	60	90	120	140
Nominal output torque	Nm	1	4	50	120	300	650
			5	50	125	350	700
			7	50	125	350	700
			10	35	80	220	460
		2	20	50	120	300	650
			25	50	125	350	700
			35	50	125	350	700
			40	50	120	300	650
			50	50	125	350	700
			70	50	125	350	700
			100	35	80	220	460
MAX Output torque			3 times of Nominal output torque				

ZF PROFILE DIMENSIONS

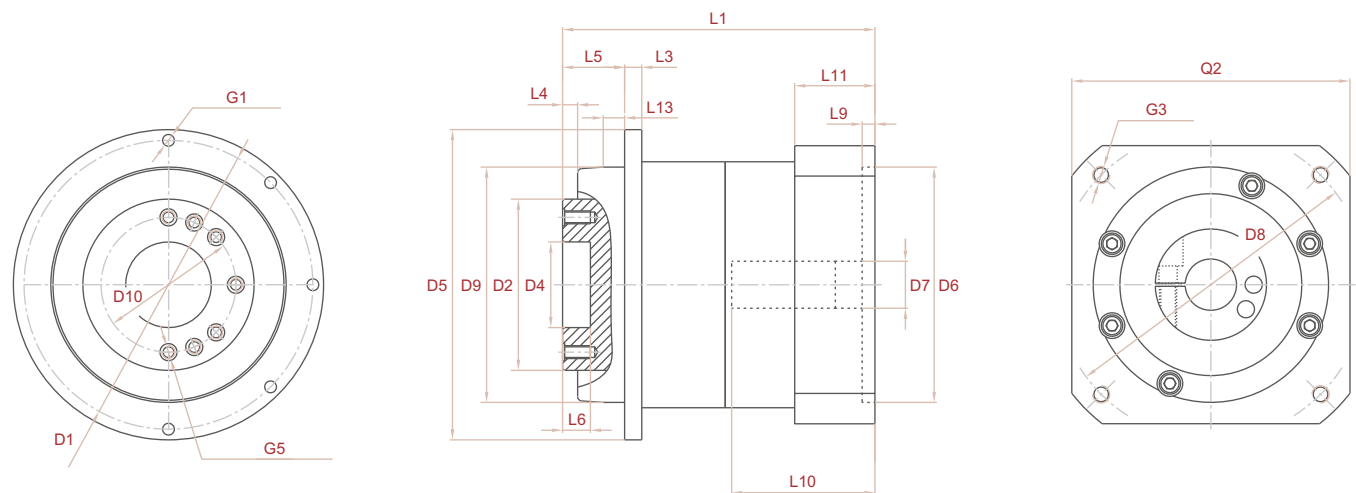
ZF60



ZF90



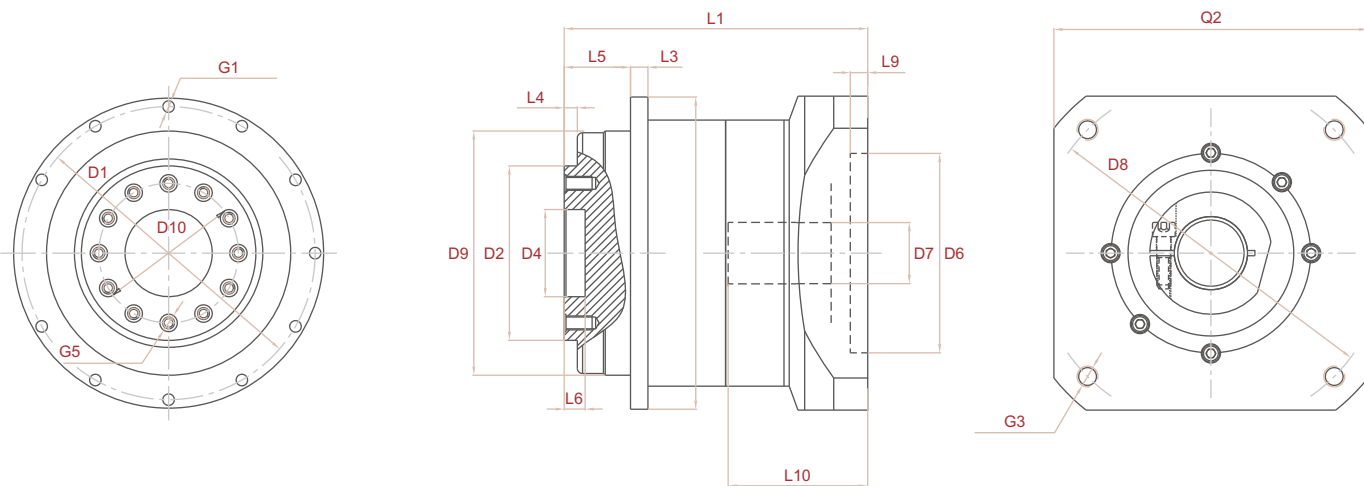
ZF120





PROFILE DIMENSIONS

ZF140

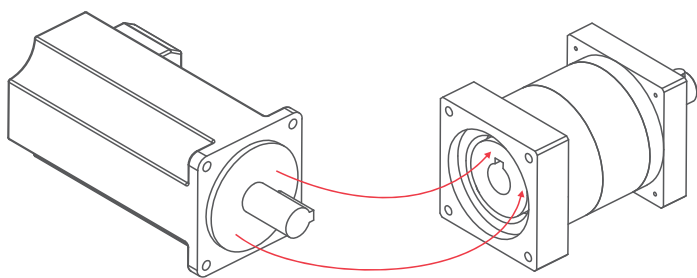


Model / Size	Stages		ZF60	ZF90	ZF120	ZF140
Overall length	1	L1	84	106.5	146	174
	2		104	134.5	177	211.5
Output flange		Q1	–	–	–	–
Input flange		Q2	□60	□90	□130	□180
Output						
Length from flange		L3	7	7	8	10
Pilot length		L4	3	6	7	7.5
Output shaft length		L5	19.5	30	29	38
shaft shoulder to the shaft end		L6	8	12	13	12
Spigot depth		L13	7	14	10	–
Hole circle diameter		D1	Ø79	Ø109	Ø135	Ø168
Mounting hole circle		D2	Ø40 H6	Ø63 H7	Ø80 H6	Ø100 H7
Pilot diameter		D3	–	Ø89.2	–	–
Centering		D4	Ø20 H7	Ø31.5 H7	Ø40 H7	Ø50 H7
Output shaft diameter		D5	Ø86	Ø118	Ø145	Ø179
Centering		D9	Ø64 H6	Ø90 H7	Ø110 H6	Ø140 H6
Hole circle diameter		D10	Ø31.5	Ø50	Ø63	Ø80
Pinion bore		G1	8-Ø4.5	8-Ø5.5	8-Ø5.5	12-Ø6.6
mounting thread x depth		G4	Ø5 6H7	Ø6 7H7	–	–
		G5	7-M5	8-M6	12-M6	12-M8
Input						
Pilot depth		L9	6	6	6	10
motor shaft length		L10	32.5	45.5	67	80
Offset length		L11	17.5	–	37.5	–
Pilot diameter		D6	Ø50 G6	Ø70 G6	Ø110 G7	Ø114.3 G6
Input shaft diameter		D7	Ø14 G6	Ø19 H7	Ø22 G6	Ø35 G6
Mounting hole circle		D8	Ø70	Ø90	Ø145	Ø200
mounting thread x depth		G3	4-M4	4-M5	4-M8	4-M12

GEAR REDUCER MOUNTING INSTRUCTION / TORQUE REQUIRED TO SECURE BOLT

GEAR REDUCER MOUNTING INSTRUCTIONS

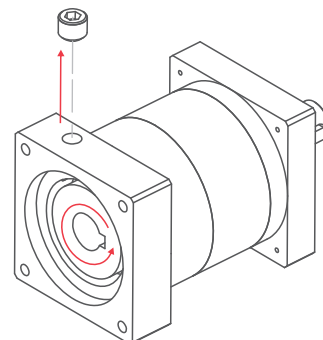
STEP 1



- A. Verify fit before assembly
- B. Clean both surfaces thoroughly

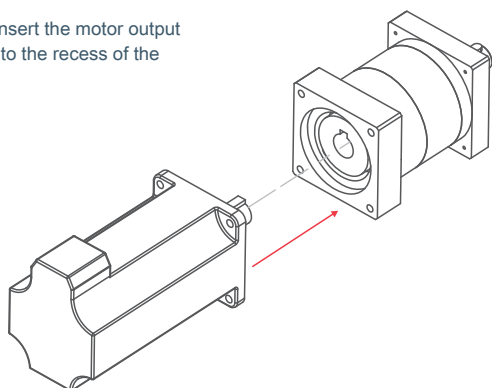
STEP 2

- A. Loosen the plug screw on the side of gearbox input flange.
- B. Rotate the gearbox inlet bushing until the head of the lock bolt is aligned with access hole.
- C. Loosen the lock bolt on the gearbox inlet bushing.

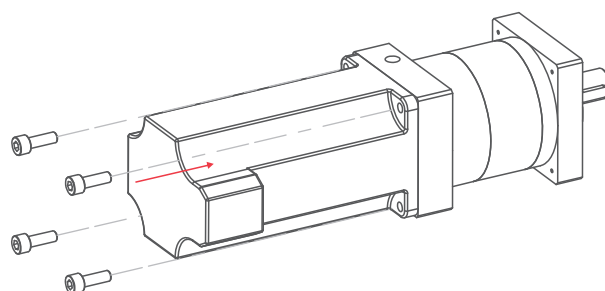


STEP 3

Position and then insert the motor output shaft and flange into the recess of the gearbox.

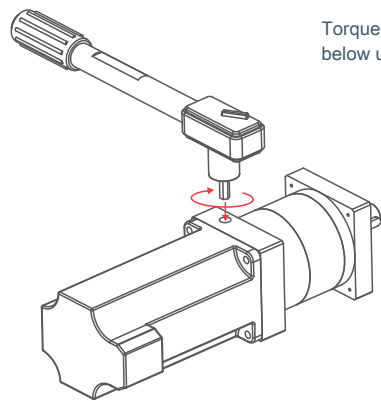


STEP 4



Secure motor to gearbox using specified hardware.

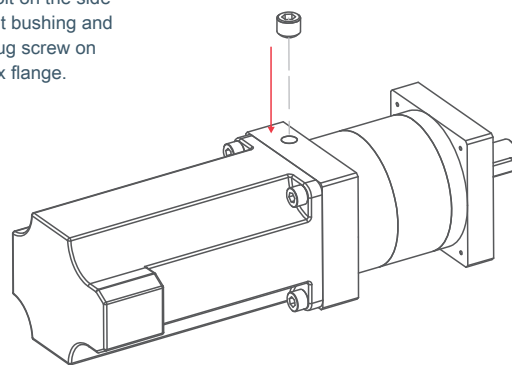
STEP 5



Torque motor coupling according to table below using calibrated torque wrench.

STEP 6

Tighten the lock bolt on the side of the gearbox inlet bushing and then tighten the plug screw on the side of gearbox flange.



Tightening Torque Recommended For Motor Mounting Bolt & Motor Lock Sleeve Bolt

Bolt Size		M3	M4	M5	M6	M8	M10	M12	M14
Width Across Flats	mm	2.5	3	4	5	6	8	10	14
	Nm	2.1	4.9	9.8	17	41	80	139	343
Strength 12.9 Tightening Torque	In-lbs	19	44	87	151	364	709	1232	3038

Note:

Torques shown above are minimum tightening values. Bolts can be safely tightened up to 25% higher for increasing holding torques. Optionally, Loctite can be applied to the threads of the Lock Bolt. (Use Loctite 242 for screw sizes above M5 and Loctite 222MS for screws sizes M5 and below)

FEATURES

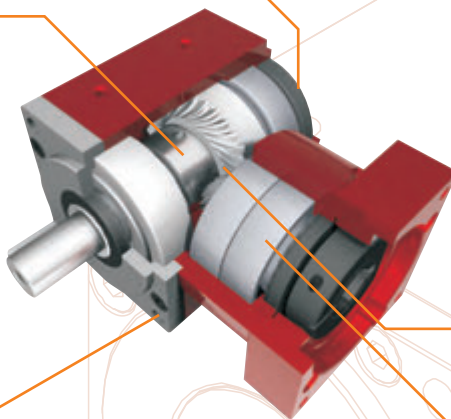
- Precision spiral bevel gears raise efficiency above 96%.
- Reduction ratios for transferring high torques in limited space.
- Hardened high strength steel components for reliability under severe conditions.
- All grease-filled, the gear head can be used in any orientation without oil leaks.
- Backlash under 5 arc-mins low backlash design.
- Various of output options available for automation and motion control applications in industries such as aerospace, medical, pharmaceutical, factory automation, printing, robotics, auto control system, automotive, textile equipment, semiconductor, manufacturing equipment, X-Y positioning systems, coordinate measuring, optical positioning equipment, telecommunications, packaging, material handling, assembly line, CCTV system, machine tools and specialty machinery.



Axial compression mechanism to increase concentricity and engagement between the shaft and bearing.



Patented design provides unique backlash adjustment.



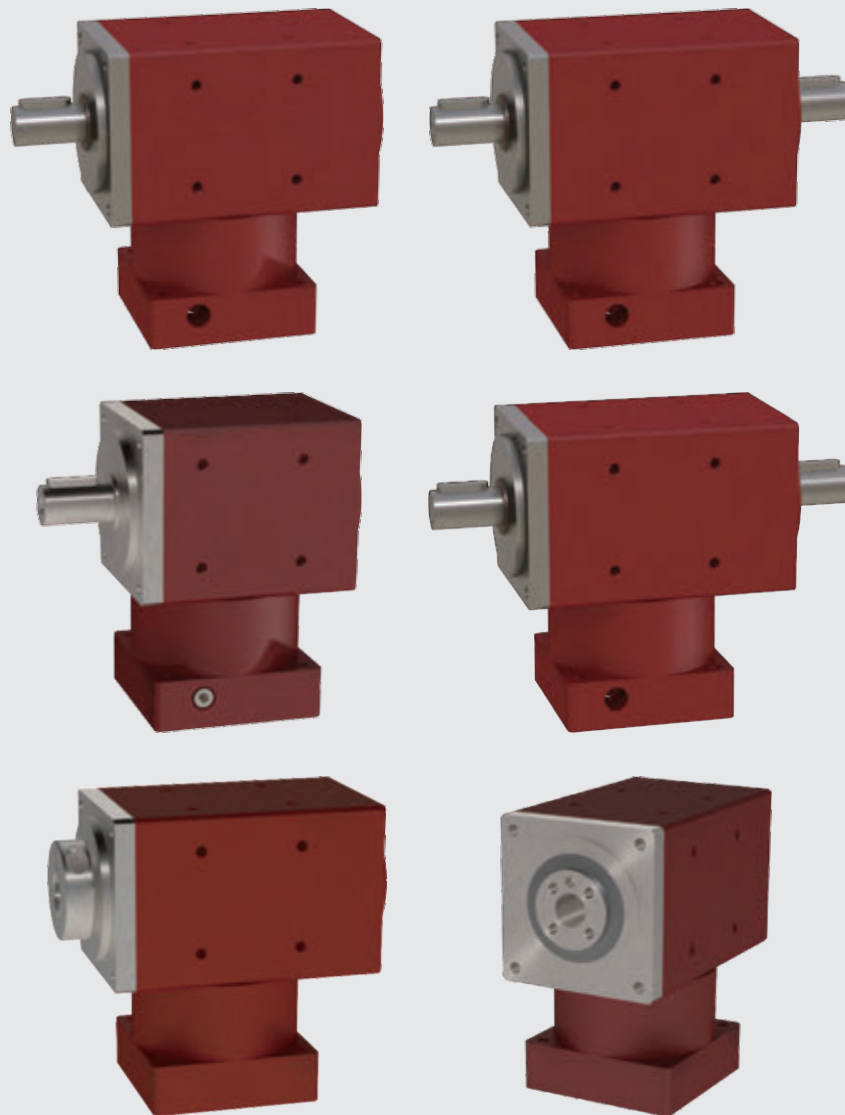
Unique wear resistant treatment for spiral bevel reliability.



Patented output mount design for versatility



Double ball bearing design for stable operation at high speed.



RX FEATURES

The compact and rigid right angle design ensures the highest performance while being space and weight efficient. Ground spiral bevel gear set provides the highest efficiency and lower meshing noise with long service life. Available with solid or hollow shafts on the output end. For output with a hollow shaft, the shaft is extended so a shrink disc can be fitted.

Lubricated for life, the gear reducers are virtually maintenance-free (When used under normal conditions).

Three frame sizes are available with gear ratios 1:1, 1:2, 1:3, 1:4 and 1:5

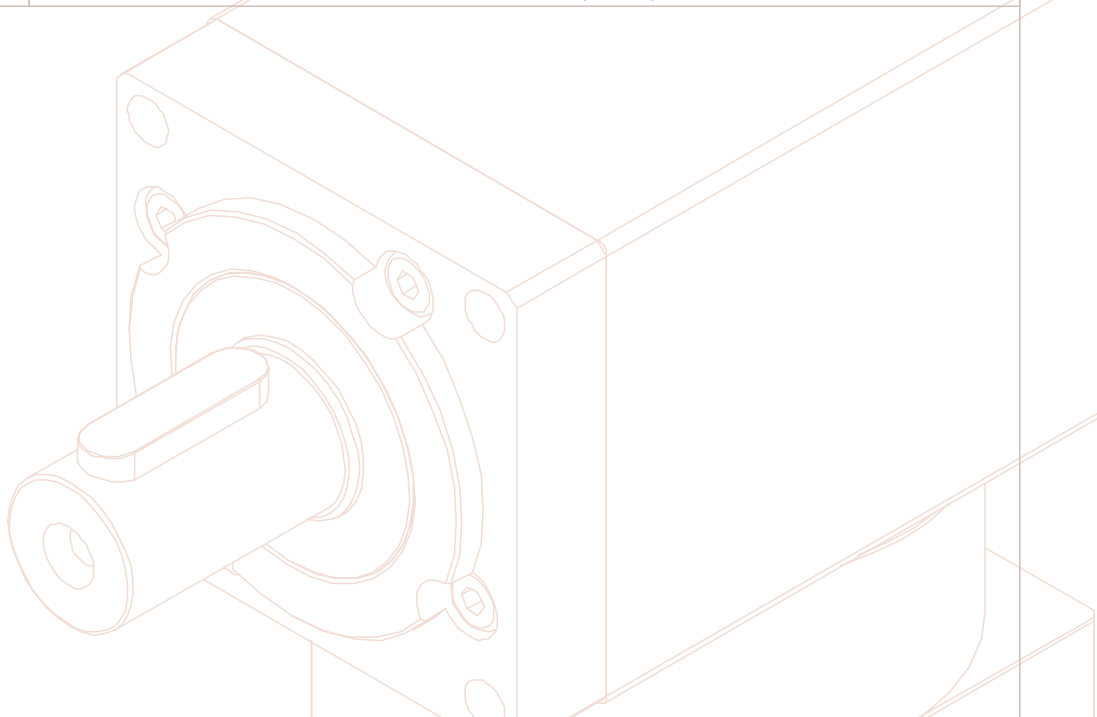
RX TECHNICAL DATA

PRECISION RIGHT ANGLE GEAR REDUCERS
RX TECHNICAL DATA

Model / Size		42	60	90
Full load efficiency	%		96	
Backlash	arcmin	<6	<6	<6
Noise	dB(A)	60	65	67
Lifetime	hr		20000	
Max radial load	N	600	800	1700
Max axial load	N	700	900	1500
Max input speed	min-1	12000	8000	7000
Torsional stiffness	Nm/arcmin	1.5	2.4	6.6
Weight	kg	0.6	1.7	5.4
Operating temp.	°C		-25 ~ 90	
Degree of protection			IP 65	
Lubrication			Life lubrication	
Mounting direction			Any	

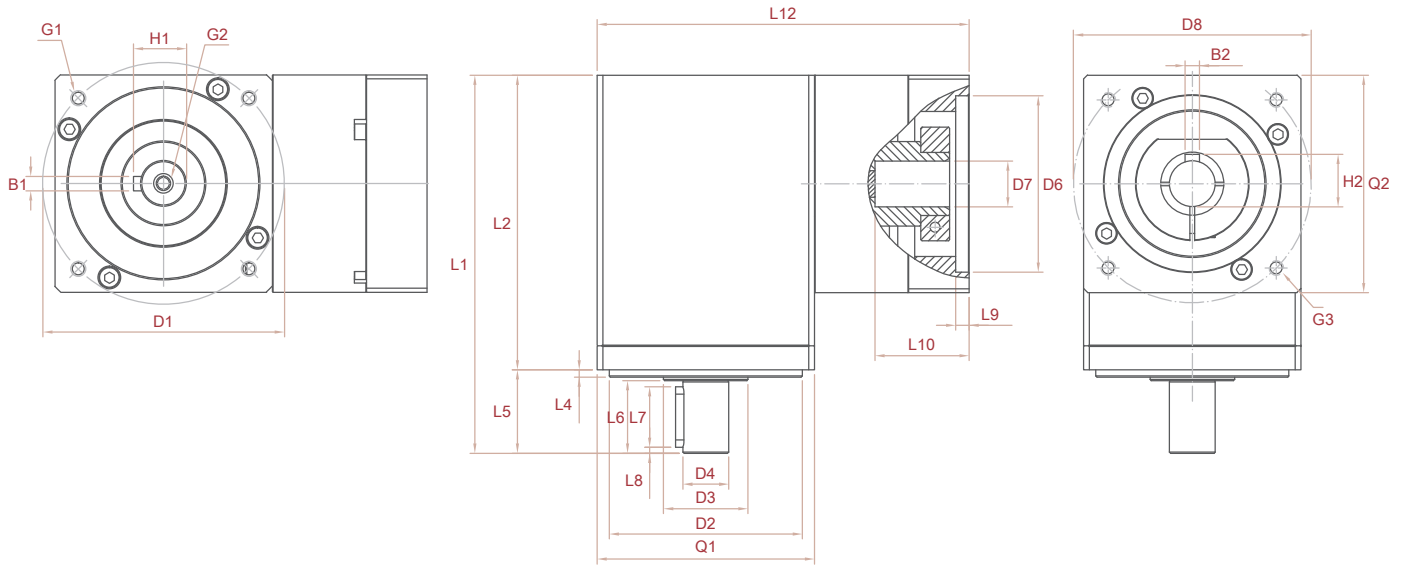
- Low noise
- Compact size and optimized weight
- Precision spiral gearing
- Optimized inertia moment
- Stable temperature rise
- High efficiency transmission
- Optimized design with special lubricant for long service life
- Flexible mounting dimensions

Model / Size		Ratio	42	60	90
Nominal output torque	Nm	1	10	56	157
		2	9	52	130
		3	7	48	108
		4	6	45	75
		5	5	42	72
MAX Output torque			2 times of Nominal output torque		



RX

PROFILE DIMENSIONS

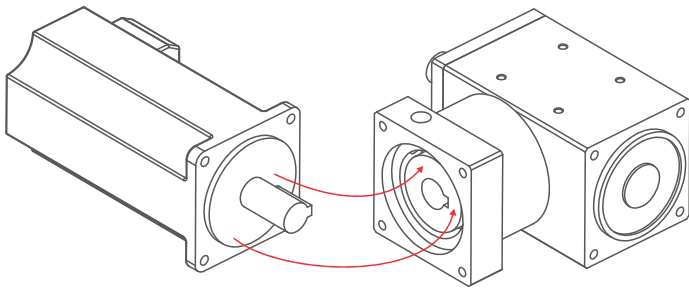


Model / Size		RX-032	RX-042	RX-060	RX-090		
Output flange	Q1	□32	□42	□60	□90		
Input flange	Q2	□32	□42	□60	□90		
Output							
Overall length	L1	56.5	85	107	157		
Body length	L2	41	65	79	122		
Pilot length	L4	2.5	2.5	3	3		
Output shaft length	L5	15.5	20	28	35		
shaft shoulder to the shaft end	L6	12.5	17	24	31		
Flat end length / Key length	L7	12.5	12	18	25		
Key length to the shaft end	L8	—	2	2	2.5		
Mounting hole circle	D1	Ø38	Ø50	Ø70	Ø100		
Pilot diameter	D2	Ø28 G6	Ø35 G6	Ø50 G6	Ø80 G6		
shaft shoulder diameter	D3	Ø12	Ø15	Ø20	Ø35		
Output shaft diameter	D4	Ø6 h7	Ø10 H7	Ø14 H7	Ø19 H7		
Key width	B1	—	3	5	6		
Flat end height / Key Height	H1	5.5	11.2	16	21.5		
mounting thread x depth	G1	M3x8	M4x8	M5x12	M6x15		
center screw hole x depth	G2	—	M4x8	M5x12	M6x15		
Input							
Pilot depth	L9	3	3	5.5	5.5		
motor shaft length	L10	20	25	30	40		
Overall length	L12	59	75	105.3	154		
Pilot diameter	D6	22	Ø30 G7	Ø22 G7	Ø50 G7	Ø38.1 G7	Ø70 G7
Input shaft diameter	D7	5	Ø8	Ø5	Ø14	Ø6.35	Ø19
Mounting hole circle	D8	Ø32.53(□23)	Ø46	Ø43.84(□31)	Ø70	Ø66.67(□47.14)	Ø90
mounting thread x depth	G3	Ø2.7	M4 x 10	Ø3.3	M5 x 12	M4 x 10	M6 x 12
Key width	B2	—	3	—	5	—	6
Key Height	H2	—	9.4	—	9.4	—	21.8

RIGHT ANGLE GEAR REDUCER MOUNTING INSTRUCTION / TORQUE REQUIRED TO SECURE BOLT

RIGHT ANGLE GEARBOX MOUNTING INSTRUCTION

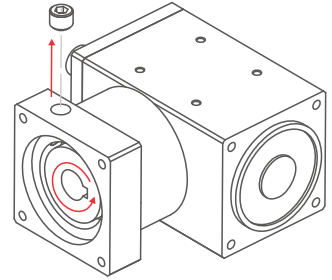
STEP 1



- A. Verify fit before assembly
- B. Clean both surfaces thoroughly

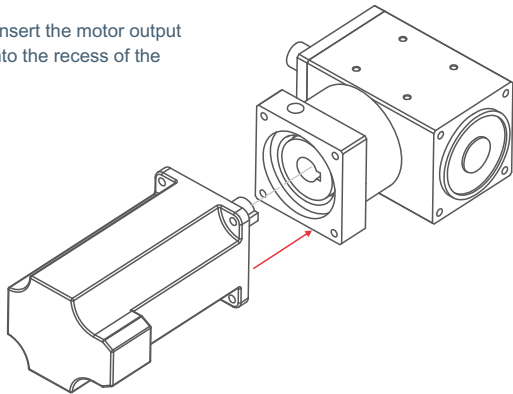
STEP 2

- A. Loosen the plug screw on the side of gearbox input flange.
- B. Rotate the gearbox inlet bushing until the head of the lock bolt is aligned with the access hole.
- C. Loosen the lock bolt on the gearbox inlet bushing.

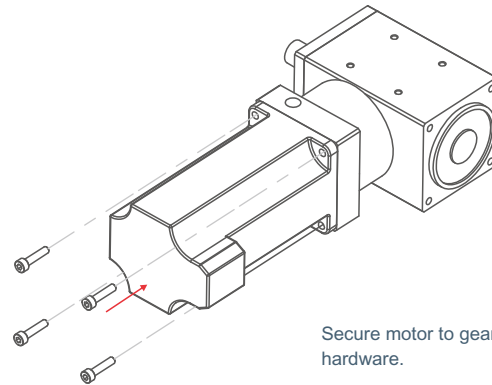


STEP 3

Position and then insert the motor output shaft and flange into the recess of the gearbox.



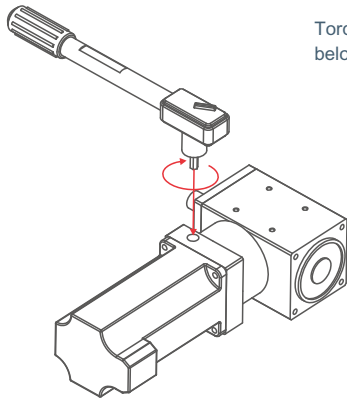
STEP 4



Secure motor to gearbox using specified hardware.

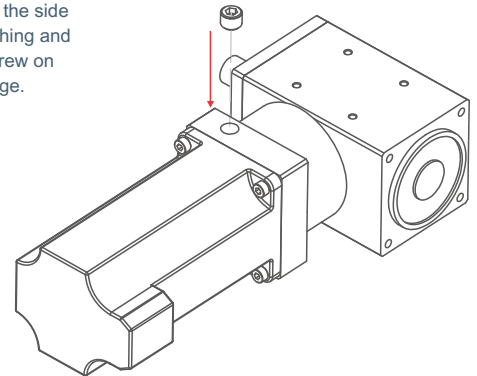
STEP 5

Torque motor coupling according to table below using a calibrated torque wrench.



STEP 6

Tighten the lock bolt on the side of the gearbox inlet bushing and then tighten the plug screw on the side of gearbox flange.



Tightening Torque Recommended For Motor Mounting Bolt & Motor Lock Sleeve Bolt

Bolt Size		M3	M4	M5	M6	M8	M10	M12	M14
Width Across Flats	mm	2.5	3	4	5	6	8	10	14
	Nm	2.1	4.9	9.8	17	41	80	139	343
Strength 12.9 Tightening Torque	In-lbs	19	44	87	151	364	709	1232	3038

Note:

Torques shown above are minimum tightening values. Bolts can be safely tightened up to 25% higher for increasing holding torques. Optionally, Loctite can be applied to the threads of the Lock Bolt. (Use Loctite 242 for screw sizes above M5 and Loctite 222MS for screws sizes M5 and below)

STEP ONE

Determine the Gear Reducer Ordering

Precision Planetary Gear Reducer Type

- LX = Precision Planetary Gearbox With Square Output Flange
- PN = Precision Planetary Gearbox With Round Output Flange
- ZS = Ultra Precision Planetary Gearbox With Square Housing
- ZN = Ultra Precision Planetary Gearbox With Round Housing
- ZE = Ultra Precision Planetary Gearbox With Flange Output
- ZF = Ultra Precision Low Cost Planetary Gearbox With Round Output Flange

Backlash Type

- S = Standard Backlash
- L = Low Backlash
- (Not Applicable For Ultra Precision Series)

LX — **060** — **050** — **S** — **17608**

Frame Size

- 042 = 42mm
- 060 = 60mm
- 080 = 80mm
- 090 = 90mm
- 120 = 120mm
- 140 = 140mm

Gear Ratio

Single Stage		Two Stages	
3	7	12	35
4	9	15	40
5	10	20	50
		25	70
		30	100

Motor Code

- NEMA 17 - 17000
- NEMA 23 - 17608
- NEMA 34 0.5" shaft- 86127
- NEMA 34 14mm - 8614
- NEMA 34 16mm - 8616
- 56mm / 8mm shaft -17610
- 60mm / 10mm shaft - 01910
- 60mm / 14mm shaft - 01917
- others available on request

Economy Gear Reducer Type

- EL = Economy Gearbox

Output Flange Style

- S = Square Flange
- R = Round Flange

EL — **060** — **050** — **S** — **S**

Frame Size

- 022 = 22mm
- 032 = 32mm
- 042 = 42mm
- 060 = 60mm
- 080 = 80mm
- 090 = 90mm

Gear Ratio

Single Stage		Two Stages	
3	7	12	35
4	9	15	40
5	10	20	50
		25	70
		30	100

Input Flange Style

- S = Square Flange
- R = Round Flange

Precision Right Angle Gear Reducer Type

- RX = Precision Right Angle Gearbox (Ratio 1:2, 1:3, 1:4, 1:5)

RX — **AS** — **060** — **001** — **17608**

Frame Size

- 042 = 42mm
- 060 = 60mm
- 090 = 90mm

- AS = Single output shaft
- HS = Single hollow shaft
- FS = Single flange output

Gear Ratio

Single Stage
1
2
3
4
5

Motor Code

- NEMA 17 - 17000
- NEMA 23 - 17608
- NEMA 34 0.5" shaft- 86127
- NEMA 34 14mm - 8614
- NEMA 34 16mm - 8616
- 56mm / 8mm shaft -17610
- 60mm / 10mm shaft - 01910
- 60mm / 14mm shaft - 01917
- others available on request

ORDERING INSTRUCTION

STEP TWO

Please fill in the blanks with the Gearbox ordering No. and the motor or Gearbox type No. to be collocated.

Gearbox Ordering Number



Motor or Gearbox Model Number

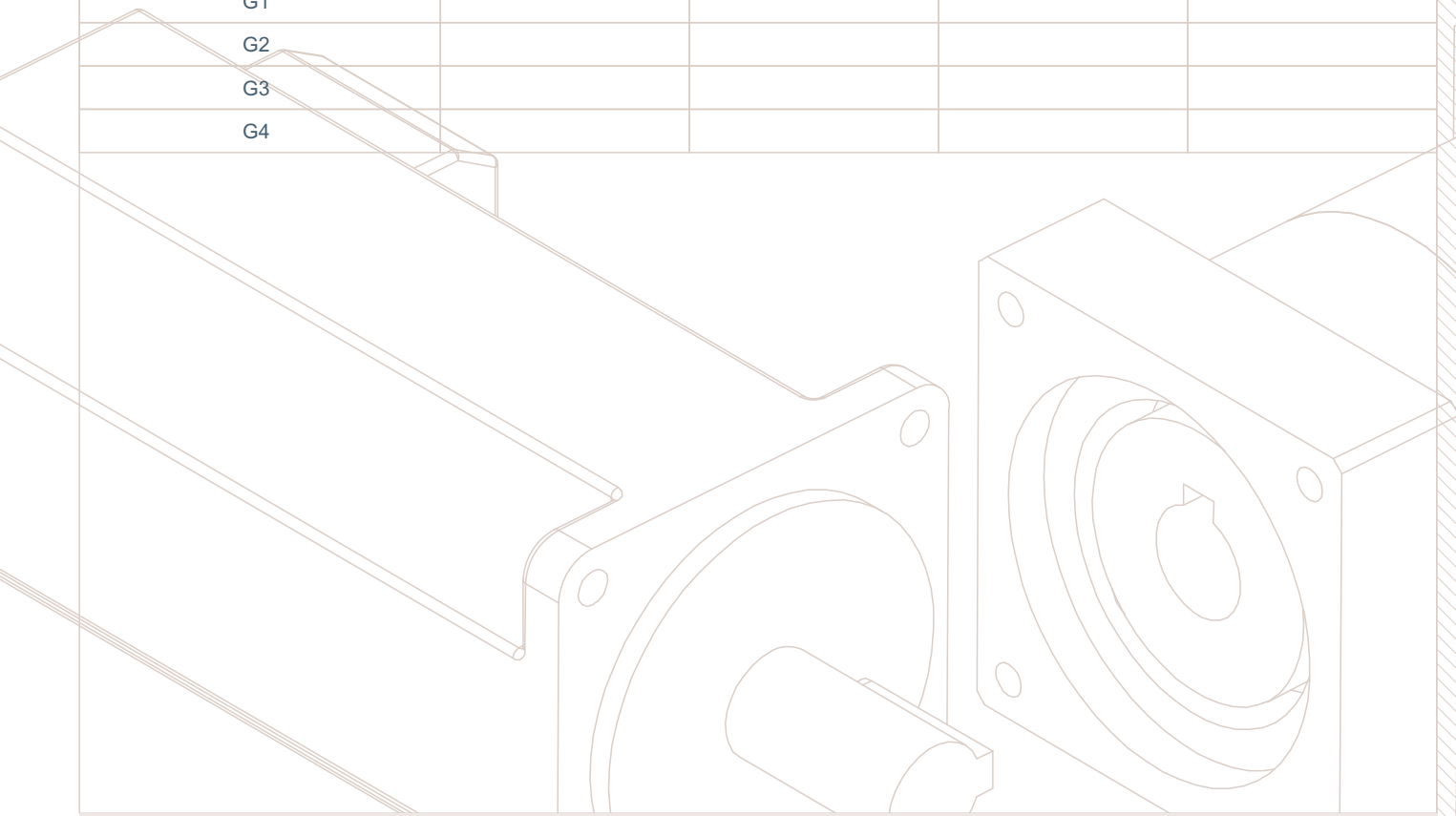
STEP THREE

1. Please fill all relevant dimensions of the motor or Gearbox output end in the chart below for collocating with the Gearbox you selected.
2. Dimension F7 in the chart below to be specified clearly with relevant depth and quantity.

Motor or Gear Reducer Output Dimension (See following page)

mm in

Type of output	AA	AB	AC	AD
Dimension				
F1				
F2				
F3				
F4				
F5				
F6				
F7				
F8				
F9				
F10				
G1				
G2				
G3				
G4				



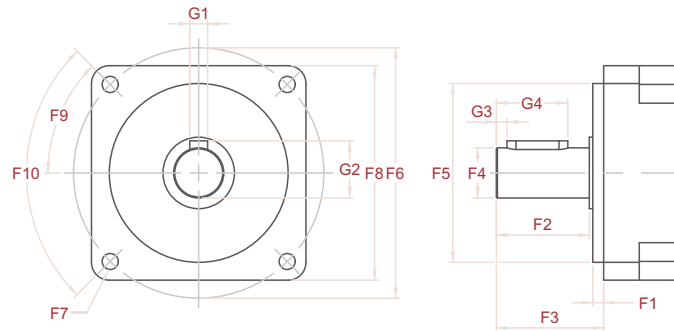
ORDERING INSTRUCTION

MOTOR OR GEAR REDUCER OUTPUT TYPE / UNIT CONVERSION TABLE

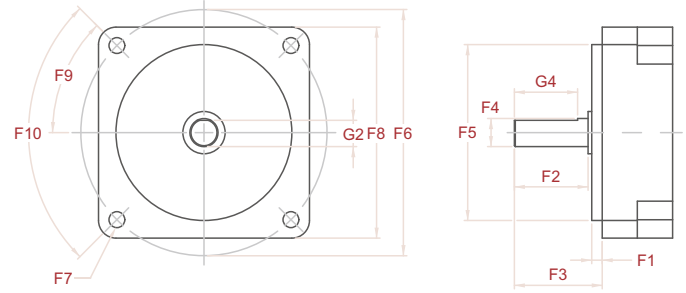
MOTOR OR GEAR REDUCER OUTPUT TYPE

Please fill in the blanks on the previous page with the motor or Gearbox output dimension according to the type or output provided in the chart below.

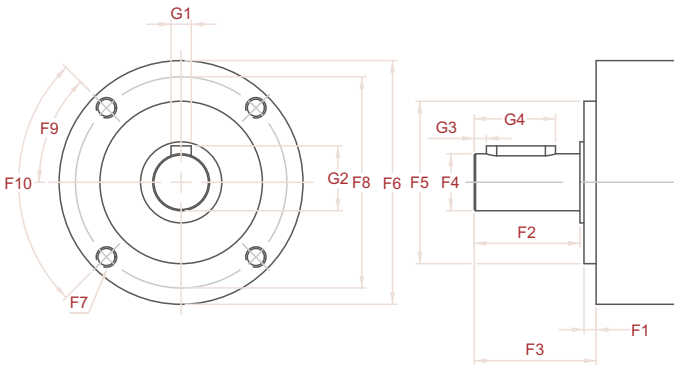
AA (Square flange , keyed shaft)



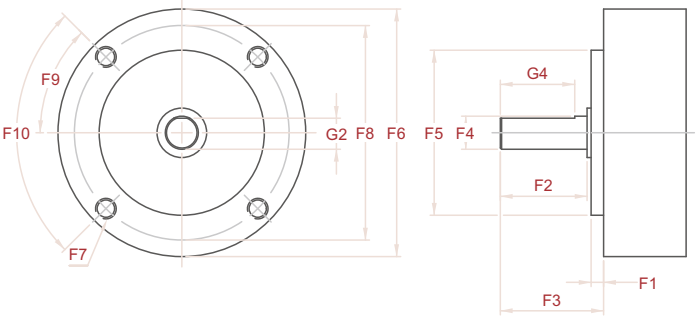
AB (Square flange , round shaft)



AC (Round flange , keyed shaft)



AD (Round flange , round shaft)



UNIT CONVERSION TABLE

TORQUE

N.m	kg.m	kg.cm	ft-lb	in-lb	oz-in
1	0.102	10.2	0.738	8.851	141.6
9.807	1	100	7.233	86.77	1389
0.098	0.01	1	0.072	0.868	13.89
1.356	0.138	13.83	1	12	192
0.113	0.0115	1.152	0.083	1	16
0.007	0.0007	0.072	0.005	0.0625	1

MOMENT INERTIA

lb-in ²	g-cm ²	oz-in ²
0.00034	1	0.00547
0.0625	182.9	1
1	2926.4	16

LENGTH

mm	cm	m	in	ft
1	0.1	0.001	0.0394	0.0033
10	1	0.01	0.3937	.0328
1000	100	1	39.37	3.28
25.4	2.54	0.0254	1	0.0833
304.8	30.48	0.3048	12	1

WEIGHT

g	kg	lb	oz
1	0.001	0.002	0.035
1000	1	2.2	35.27
454	0.454	1	16
28.35	0.028	0.06	1

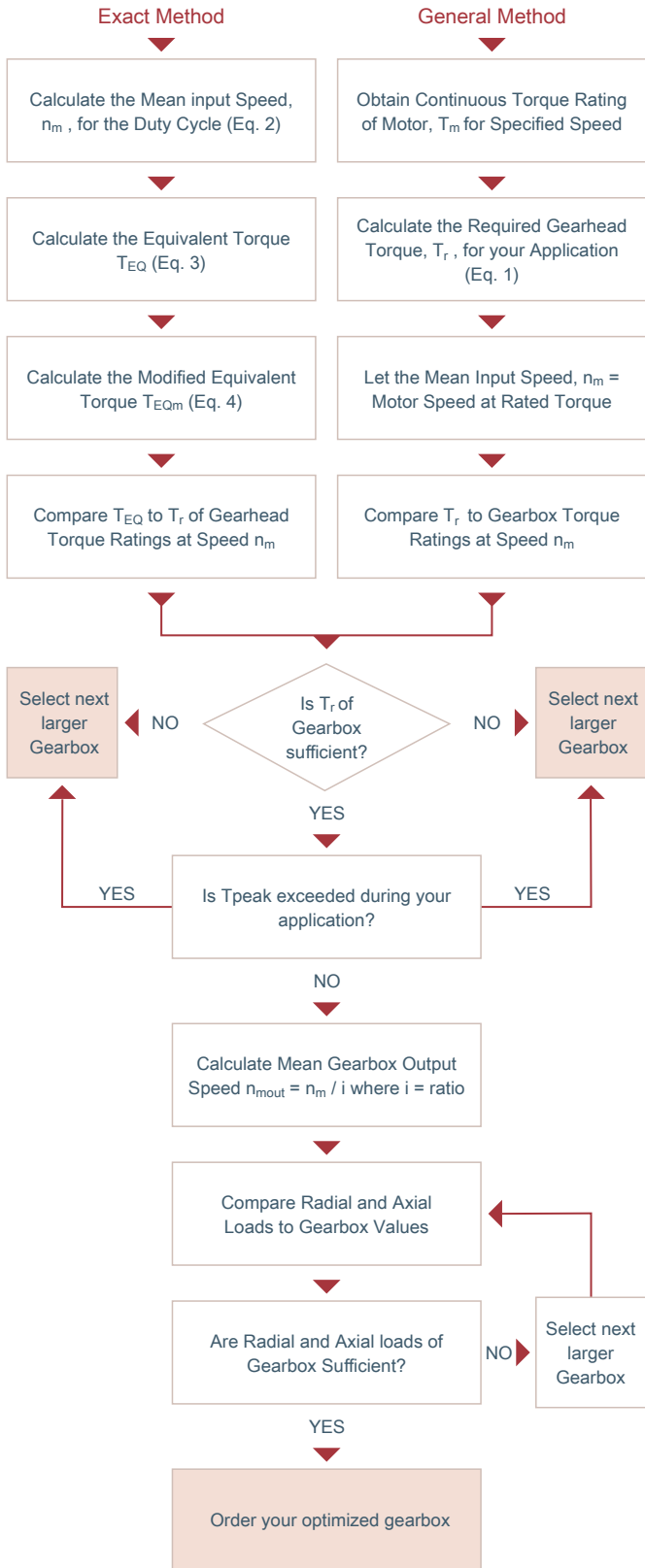
SELECTION OF YOUR OPTIMUM GEARBOX

STEP 1

Select the required precision class and gearbox configuration (in-line or right angle).

STEP 2

Select the proper gearbox using exact or general method.



General Method:

Required Gearbox Torque(T_r)

$$(1) T_r = T_{M^*} \times i \times e$$

Where:

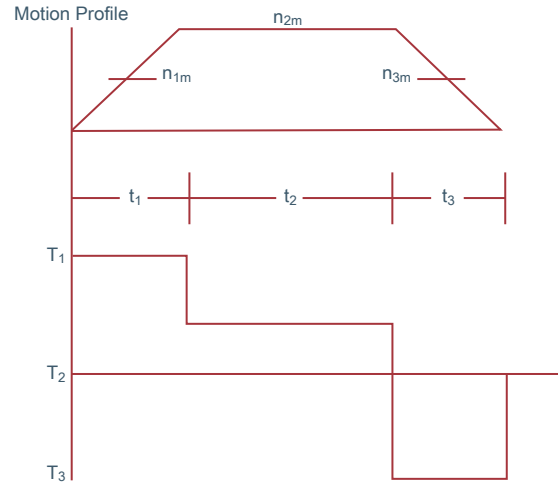
T_{M^*} = Continuous torque of motor

i = Gearbox ratio

e = Efficiency of Gearbox

*Since many motors are capable of exceeding their continuous torque rating for extended lengths of time, the value for T_M will only provide a starting point for Gearbox selection. Only use the general method if the continuous motor rating is not exceeded in the application.

Exact Method:



t_n = time period n

n_{nm} = mean speed during time period

$t_n T_n$ = torque during time period t_n

Mean input speed (n_m)

$$(2) n_m = \frac{n_{1m}t_1 + n_{2m}t_2 + n_{3m}t_3 + \dots + n_{nm}t_n}{t_t}$$

where $t_t = t_1 + t_2 + t_3 + \dots + t_n$

Equivalent torque (T_{EC})

$$(3) T_{EC} = 8.7 T_1 \frac{n_{1m}^{8.7} t_1}{n_m^{8.7} t_t} + T_2 \frac{n_{2m}^{8.7} t_2}{n_m^{8.7} t_t} + T_3 \frac{n_{3m}^{8.7} t_3}{n_m^{8.7} t_t} + \dots + T_n \frac{n_n^{8.7} t_n}{n_m^{8.7} t_t}$$

Modified equivalent torque (T_{ECm})

$$(4) T_{ECm} = (T_{EC})/C$$

C	Numer of cycles/hr
1.0	>0
0.9	>1000
0.7	>2500
0.5	>5000

where C is:

For applications > 10,000 cycles/hour or for continuous duty operation, please contact our engineer consultant.



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