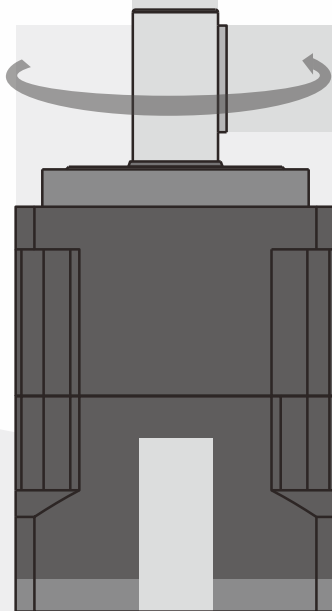
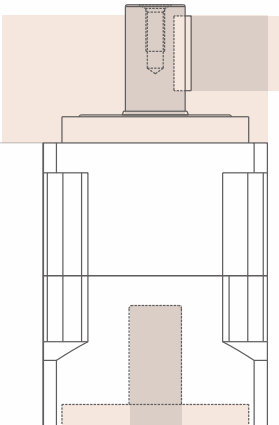




ZIPP PRECISION GEAR REDUCER

DRIVE YOU FURTHER

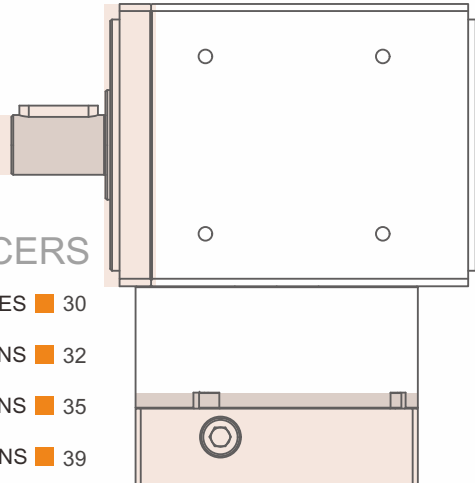




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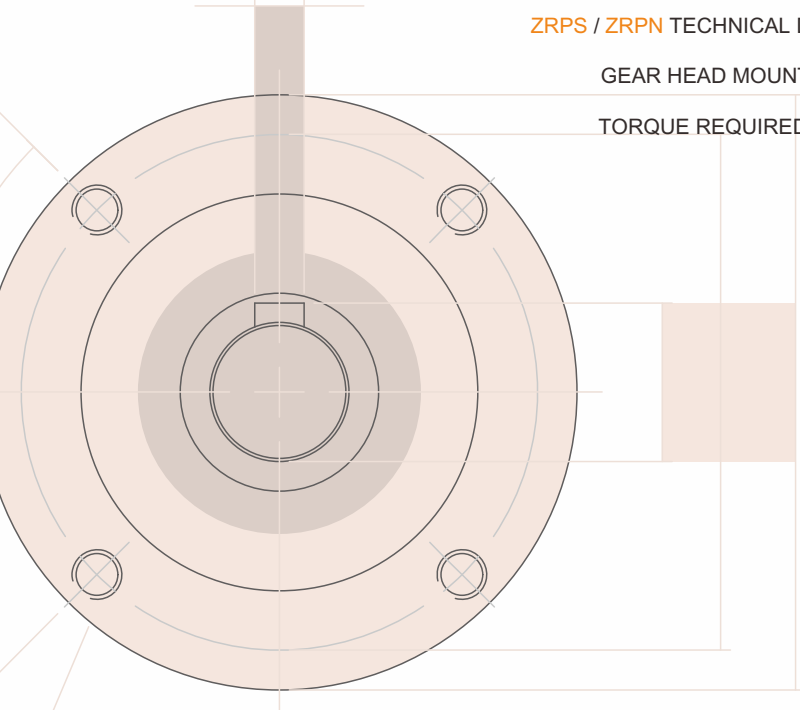
PRECISION PLANETARY GEAR REDUCERS

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- 03 ■ PS / PN TECHNICAL DATA & DIMENSIONS
- 06 ■ ZPS / ZPN TECHNICAL DATA & DIMENSIONS
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- 50 ■ ORDERING INSTRUCTION
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FEATURES

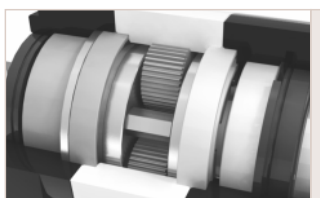
- NEMA mounting standards available for quick installation.
- Integral gear ratio available from 3:1 through 512:1 for wide range selection.
- Two types of GEAR REDUCERS with round and square output flange.
- High performance and high reduction ratio for transferring high torques in limited space.
- 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.



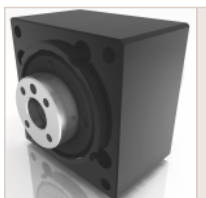
Closed planet cage provides extremely high rigidity.



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.



PS_{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.



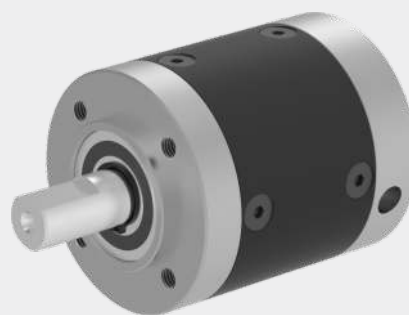
ZPS/ZPN_{FEATURES}

Adopt straight gear drive, after carburizing quenching treatment, tooth profile modification treatment, to ensure smooth operation, low noise.

Simple structure, mass production, fast delivery time and high cost performance.

The reducer has a complete range, which can meet the replacement of most of the reducers on the market.

Easy maintenance: there is no need to replace the grease during the product life cycle, and the installation is more convenient.



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 30mm, 32mm, 36mm, 42mm, 52mm, 60mm and 90mm in various of ratio combinations.

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

PS/PN

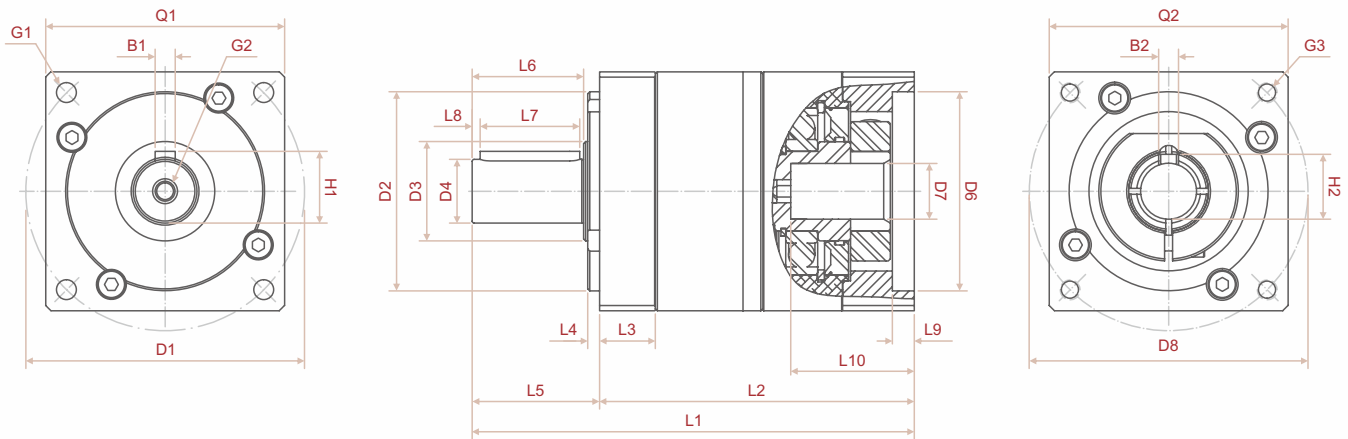
TECHNICAL DATA

- 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	42 (NEMA 17)		60 (NEMA 23)		90 (NEMA 34)	
Full load efficiency	%	1	96					
		2	92					
Standard Backlash	arcmin	1	<14		<13		<12	
		2	<17		<16		<15	
Precision Backlash	arcmin	1	<8		<7		<6	
		2	<10		<9		<8	
Noise	dB(A)		58		62		64	
Lifetime	hr		20000					
Max radial load	N		810		1150		2080	
Max axial load	N		405		575		1040	
Nominal Input Speed	rpm	1,2	4500		4000		3600	
Max input speed	rpm		9000		8000		7000	
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.	℃		-20 ~ 90					
Degree of protection			IP 65					
Lubrication			Life lubrication					
Mounting direction			Any					
Model / Size		Stages	Ratio	42	60	90		
Nominal output torque	Nm	1	3	13	34	102		
			4	16	48	138		
			5	15	46	130		
			7	10	30	90		
			9	7	22	80		
			10	6	17	60		
		2	12	13	34	102		
			15	13	34	102		
			16	16	48	138		
			20	16	48	138		
			25	15	46	130		
			30	13	34	102		
			40	16	48	138		
			50	15	46	130		
			70	10	30	90		
			100	6	17	60		
MAX Output torque		2.5 times of Nominal output torque						
Model / Size		Stages	Ratio	42	60	90		
Mass Moments of Inertia	g-cm ²	1	3	21	140	800		
			4,5	18	90	500		
			7,9,10	17	60	400		
		2	12,15,21,30	23	120	750		
			20,28,40	20	80	450		
			25,35,50	16	70	400		
			49,70,100	20	80	450		

PS

PROFILE DIMENSIONS

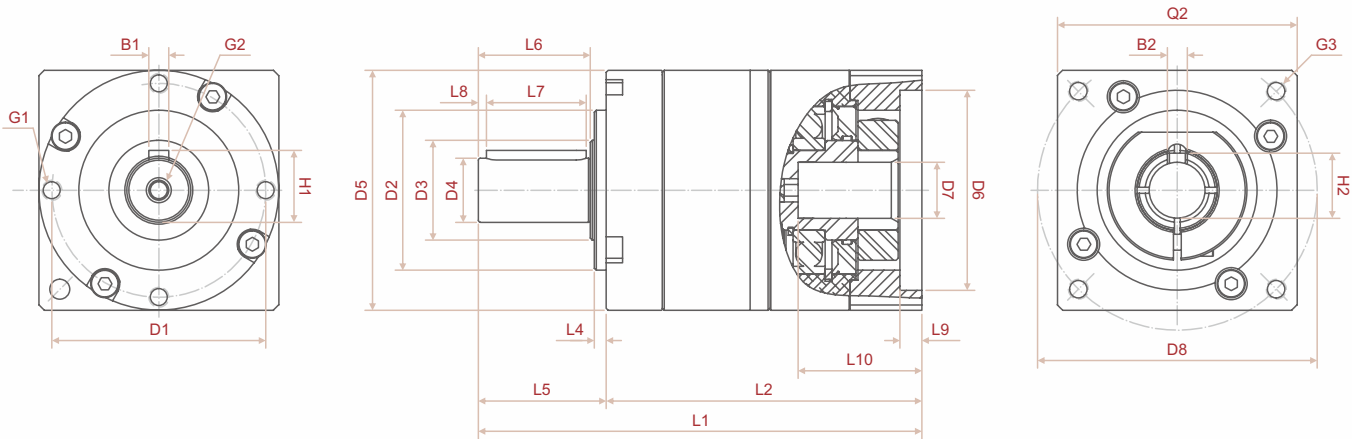


Model / Size			PS42		PS60		PS90
Overall length	1	L1	90		111		144
	2		113.5		138		178.5
	3		137		165		213
Body length	1	L2	64		79		103
	2		87.5		106		137.5
	3		111		133		172
Output flange		Q1	□42		□60		□90
Input flange		Q2	□42		□60		□90
Output							
Flange thickness		L3	9.5		14		20
Pilot length		L4	2.5		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		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	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

PRECISION PLANETARY GEAR REDUCERS
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

ZPS/ZPN

TECHNICAL DATA

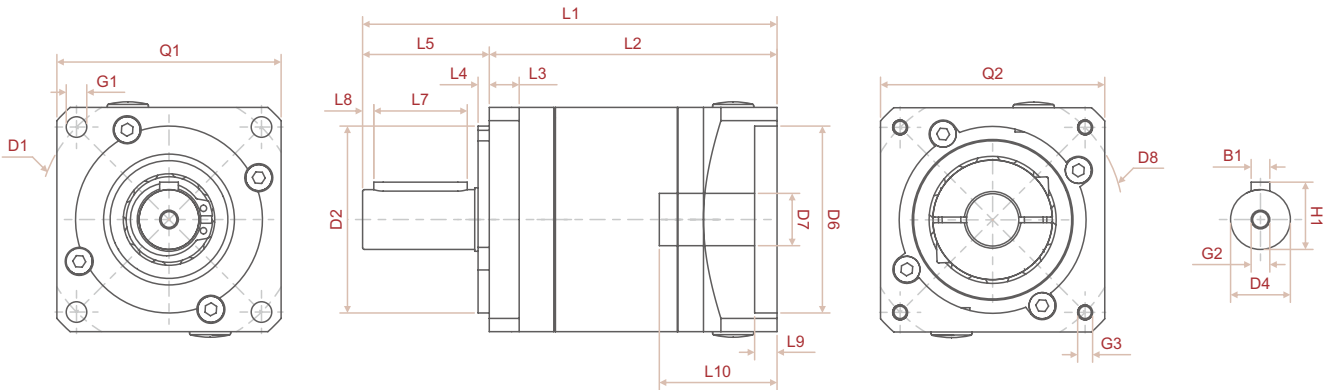
Model / Size		Stages	60	80	90	120	160*	
Full load efficiency	%	1	≥95					
		2	≥92					
Standard Backlash	arcmin	1	≤10	≤10	≤10	≤10	≤10	
		2	≤12	≤12	≤12	≤12	≤12	
Precision Backlash	arcmin	1	≤8	≤8	≤8	≤8	≤8	
		2	≤10	≤10	≤10	≤10	≤10	
Noise	dB(A)		57	58	58	58	65	
Lifetime	hr		20000					
Max radial load	N		889	1020	1020	2230	3200	
Max axial load	N		850	980	980	1150	3000	
Nominal Input Speed	rpm	1,2	3000	3000	3000	2500	2000	
Max input speed	rpm	1,2	5000	5000	5000	5000	3500	
Torsional stiffness	Nm/arcmin	1,2	2.6	7.5	7.5	15.5	35.8	
Weight	kg	1	1.1	2.2	3	6.3	18.1	
		2	1.3	2.8	3.8	8	23.1	
Operating temp.	°C		-10 ~ 90					
Degree of protection			IP 65					
Lubrication			Synthetic lubrication					
Mounting direction			Any					
Model / Size		Stages	Ratio	60	80	90	120	160*
Nominal output torque	Nm	1	3	16.5	60	60	148	310
			4	27	86	86	222	605
			5	27	94.5	94.5	235	420
			7	19.5	64	64	158	270
			10	8.5	39.5	39.5	93	245
		2	12,15	26	96	96	250	680
			16,20	30	96	96	250	680
			25	33	105.5	105.5	264	460
			28	30	96	96	250	460
			30,35	35	105.5	105.5	364	460
			40	30	96	96	250	460
			50	33	105.5	105.5	264	310
			70	21.5	71.5	71.5	177	295
			100	21.5	87	87	170	295
MAX Output torque		2 times of Nominal output torque						
Model / Size		Stages	Ratio	60	80	90	120	160*
Mass Moments of Inertia	g-cm ²	1	3	107	400	400	1650	4130
			4	94	309	309	1220	5150
			5	92	291	291	1150	4930
			7	91	285	285	1130	5840
			10	91	283	283	1100	4250
		2	12,15	94	291	291	1650	6300
			16	94	291	291	1220	6300
			20	92	291	291	1150	6300
			25	92	291	291	1130	4930
			28	91	285	285	1130	6300
			30,35,40	91	285	285	1130	4930
			50	91	283	283	1110	4930
			70	92	283	283	1110	4930
			100	92	291	291	1150	4930
* Type 160 only suitable for ZPS								

ZPS

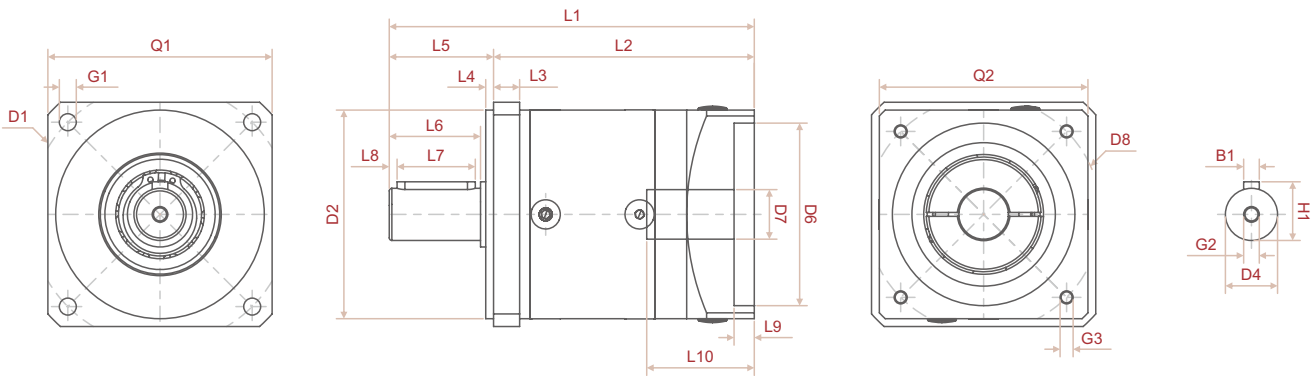
PROFILE DIMENSIONS

PRECISION PLANETARY GEAR REDUCERS
ZPS PROFILE DIMENSIONS

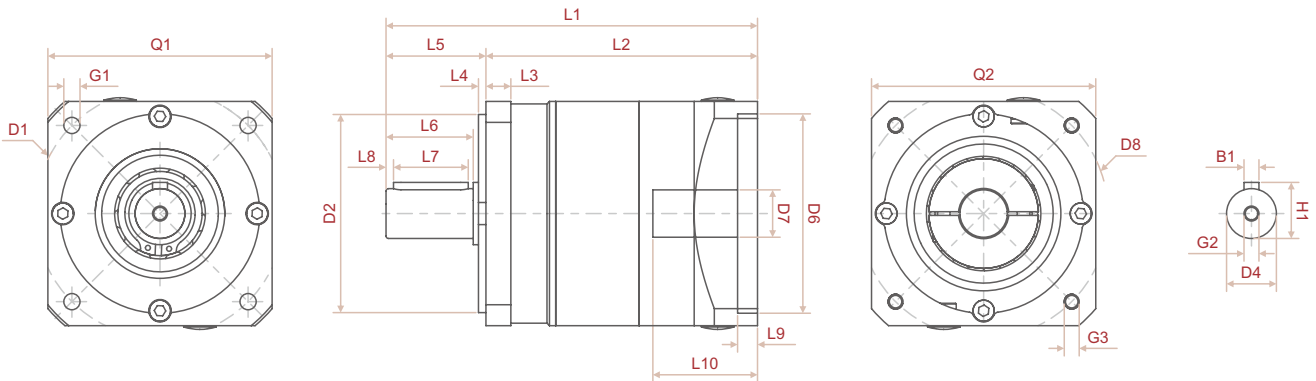
ZPS60



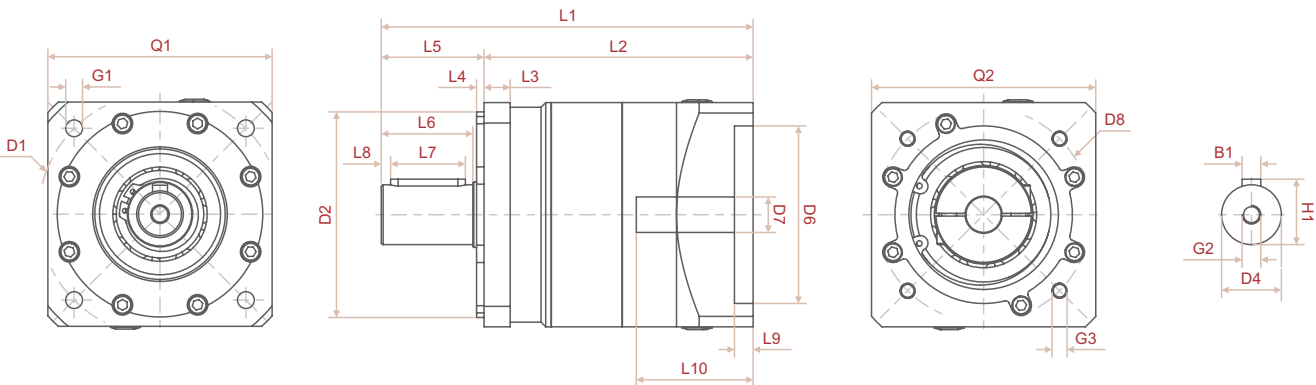
ZPS80



ZPS90



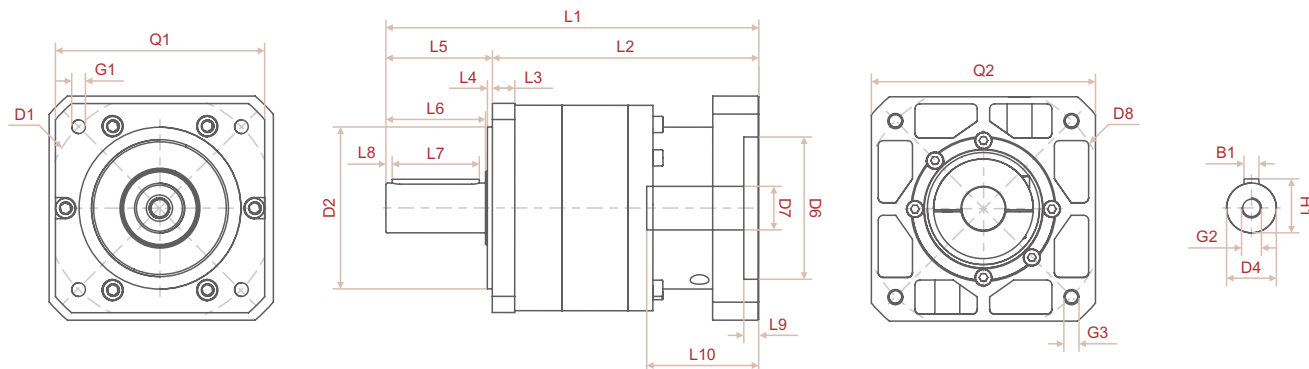
ZPS120



ZPS

PROFILE DIMENSIONS

ZS160

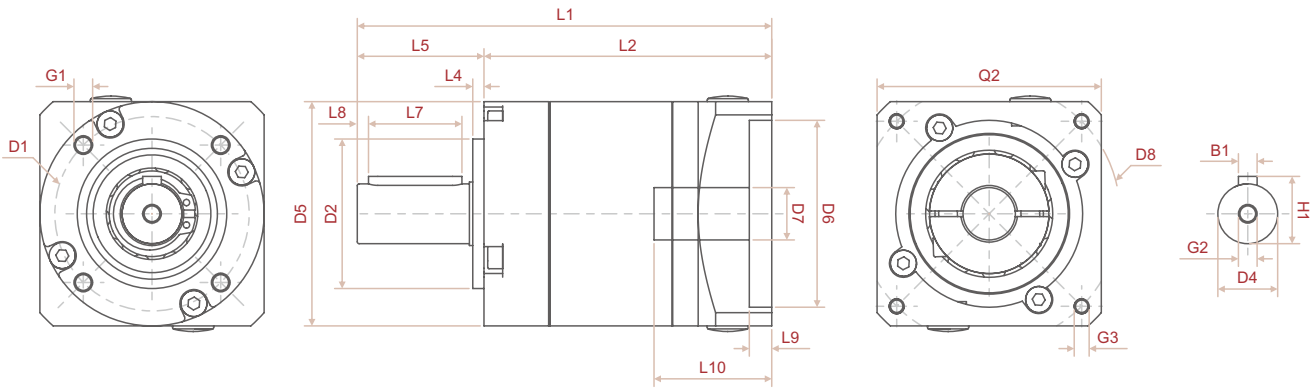


Model / Size			ZPS60		ZPS80		ZPS90		ZPS120		ZPS160	
Overall length	1	L1	111		140		149		199		287	299.5
	2		126.5		163		172		229.5		328	340.5
Body length	1	L2	77		100		109		144		201.5	214
	2		92.5		123		132		174.5		242.5	255
Output flange		Q1	□60		□80		□90		□120		□168	
Input flange		Q2	□60		□80		□90		□120		□130	□180
Output												
Flange thickness		L3	8		10		10		14		18	
Pilot length		L4	3		3		3		4		4	
Output shaft length		L5	34		40		40		55		85.5	
Shaft shoulder to the shaft end		L6	-		35		35		49		80	
Key length		L7	25		30		30		40		70	
Key length to the shaft end		L8	3		3		3		5		5	
Mounting hole circle		D1	Ø70		Ø100		Ø100		Ø130		Ø185	
Pilot diameter		D2	Ø50 h6		Ø80 h6		Ø80 h6		Ø110 h7		Ø130 h7	
Output shaft diameter		D4	Ø14 h6	Ø16 h6	Ø20 h6	Ø22 h6	Ø20 h6	Ø22 h6	Ø25 h6	Ø32 h6	Ø40 h7	
Key width		B1	5		6		6		8	10	12	
Key Height		H1	16	18	22.5	16	22.5	16	28	35	43.3	
Mounting hole		G1	4-Ø5.5		4-Ø6.5		4-Ø6.5		4-Ø9		4-Ø11	
Center screw hole x depth		G2	M5x12		M6x13		M6x13		M10x22		M16x30	
Input												
Pilot depth		L9	6		8		8		10		10	12
Motor shaft length		L10	31.5		41.5		42		62.5		75	90
Pilot diameter		D6	Ø38.1 G7	Ø50 G7	Ø70 F8	Ø80 F8	Ø70 G7	Ø80 G7	Ø95 F7	Ø110 F7	Ø110 F7	Ø114.3 F7
Input shaft diameter		D7	Ø8 H7	Ø14 H7	Ø19 H7	Ø16 H7 Ø19 H7	Ø19 H7	Ø16 H7 Ø19 H7	Ø19 G7 Ø24 G7	Ø22 G7 Ø24 G7	Ø22 G7 Ø24 G7	Ø35 G7 Ø42 G7
Mounting hole circle		D8	Ø66.67 (□47.14)	Ø70	Ø90	Ø100	Ø90	Ø100	Ø115 Ø130	Ø145	Ø145	Ø200
Mounting thread x depth		G3	4-M4x12	4-M4x12 4-M5x12	4-M5x12 4-M6x12	4-M6x12	4-M5x12 4-M6x12	4-M6x12	4-M6x20 4-M8x20	4-M8x20	4-M8x20	4-M12x20

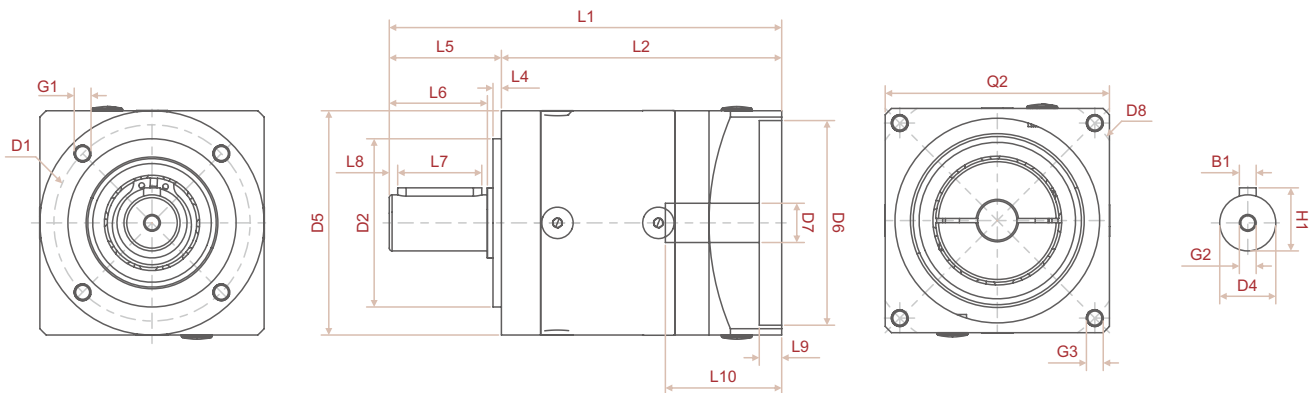
ZPN

PROFILE DIMENSIONS

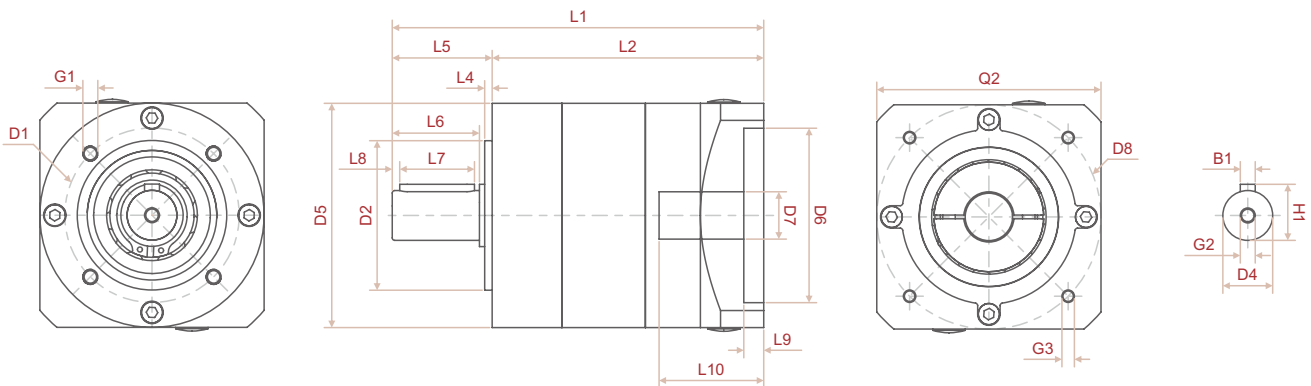
ZPN60



ZPN80



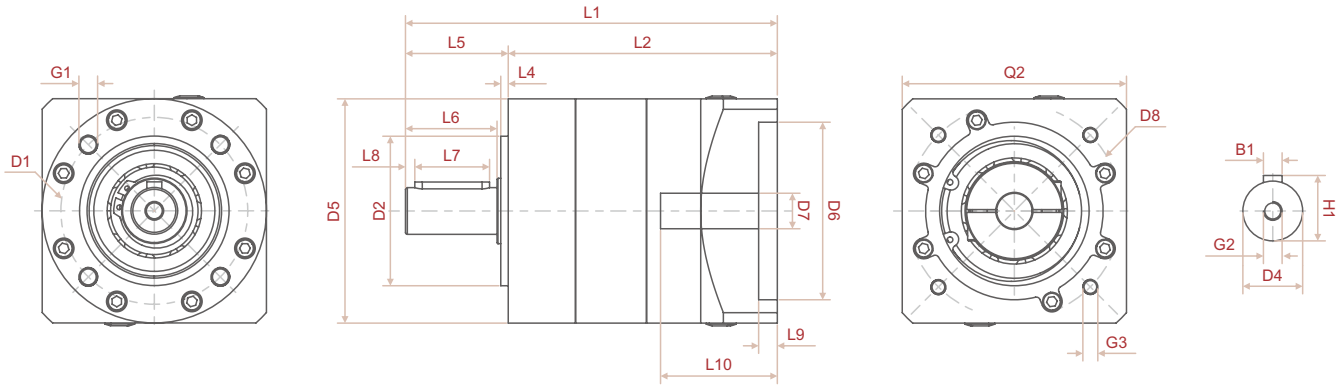
ZPN90



ZPN

PROFILE DIMENSIONS

ZPN120



Model / Size			ZPN60	ZPN80	ZPN90	ZPN120
Overall length	1	L1	111	140	149	199
	2		126.5	163	172	229.5
Body length	1	L2	77	100	109	144
	2		92.5	123	132	174.5
Output flange		D5	Ø60	Ø80	Ø90	Ø120
Input flange		Q2	□60	□80	□90	□120
Output						
Pilot length		L4	3	3	3	4
Output shaft length		L5	34	40	40	55
Shaft shoulder to the shaft end		L6	-	35	35	49
Key length		L7	25	30	30	40
Key length to the shaft end		L8	3	3	3	5
Mounting hole circle		D1	Ø52	Ø70	Ø70	Ø100
Pilot diameter		D2	Ø40 h6	Ø60 h6	Ø60 h6	Ø80 h7
Output shaft diameter		D4	Ø14 h6 Ø16 h6	Ø20 h6 Ø22 h6	Ø20 h6 Ø22 h6	Ø25 h6 Ø32 h6
Key width		B1	5	6	6	8 10
Key Height		H1	16 18	22.5 16	22.5 16	28 35
Mounting hole		G1	4-M5x12	4-M6x15	4-M6x15	4-Ø10x20
Center screw hole x depth		G2	M5x12	M6x13	M6x13	M10x22
Input						
Pilot depth		L9	6	8	8	10
Motor shaft length		L10	31.5	41.5	42	62.5
Pilot diameter		D6	Ø38.1 G7 Ø50 G7	Ø70 F8 Ø80 F8	Ø70 G7 Ø80 G7	Ø95 F7 Ø110 F7
Input shaft diameter		D7	Ø8 H7 Ø14 H7	Ø19 H7 Ø16 H7 Ø19 H7	Ø19 H7 Ø16 H7 Ø19 H7	Ø19 G7 Ø22 G7 Ø24 G7 Ø24 G7
Mounting hole circle		D8	Ø66.67 (□47.14) Ø70	Ø90 Ø100	Ø90 Ø100	Ø115 Ø130 Ø145
Mounting thread x depth		G3	4-M4x12 4-M4x12 4-M5x12	4-M5x12 4-M6x12	4-M5x12 4-M6x12	4-M6x20 4-M8x20 4-M8x20



TECHNICAL DATA

- 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	32	42	52	60	90
Full load efficiency	%	1	80	95			
		2	70	90			
Noise	dB(A)		54	58	60	60	65
Lifetime	hr		N/A	20000			
Max radial load	N		100	150	300	400	700
Max axial load	N		50	75	150	200	350
Max input speed	rpm		8000	8000	7000	7000	6000
Weight	kg	1	0.153	0.42	0.652	1.115	2.164
		2	0.18	0.47	0.75	1.22	3.2
Operating temp.	°C		-20 ~ 90				
Degree of protection			IP 54				
Lubrication			Life lubrication				
Mounting direction			Any				

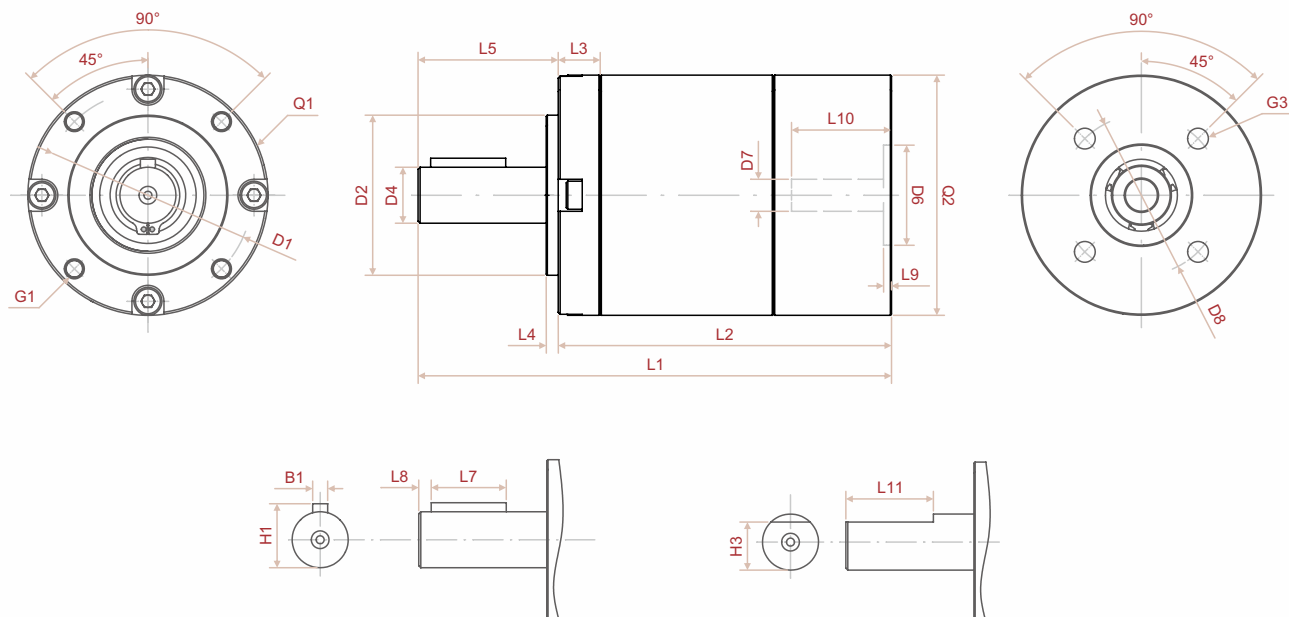
Model / Size		Stages	Ratio	32	Ratio	42	52	60	90
Nominal output torque	Nm	1	3.6	1.3	3	8	17	19	52
			4.5		4	9	18	21	60
			6.25		5	9	18	21	60
			8		7	5.5	13	13	45
					9	5	10	10	40
					10	5	10	10	40
		2	16.2	1.3	12	8	17	19	52
			22.5		15	8	17	19	52
			28.8		16	9	18	21	60
			28.125		20	9	18	21	60
			36		25	9	18	21	60
			50		30	8	17	19	52
					40	9	18	21	60
					50	9	18	21	60
					70	5.5	13	13	45
					100	5	10	10	40

MAX Output torque		2 times of Nominal output torque					
		• 32: All available single stage ratios					

Model / Size		Stages	Ratio	42	60	90
Mass Moments of Inertia	g-cm ²	1	3	21	140	800
			4,5	18	90	500
			7,9,10	17	60	400
		2	12,15,21,30	23	120	750
			20,28,40	20	80	450
			25,35,50	16	70	400
			49,70,100	20	80	450

EL

PROFILE DIMENSIONS



Model / Size			EL32	EL42	EL52	EL60	EL90
Overall length	1	L1	54.9	84	89	106.6	122.5
	2		65.4	99.3	103.5	123.4	144
	3		75.9	114.6	118	140.2	165.5
Body length	1	L2	35.6	62	64	71.6	77.5
	2		46.1	77.3	78.5	88.4	99
	3		56.6	92.6	93	105.2	120.5
Output flange		Q1	Ø32	Ø42	Ø52	Ø60	Ø90
Input flange		Q2	Ø32	Ø42	Ø52	Ø60	Ø90
Output							
flange thickness	L3		5.5	5	9.7	10.5	13.3
Pilot length	L4		3	2	3	3	5
Output shaft length	L5		19.3	22	25	35	45
Key length	L7		—	18	25	30	40
Key length to the shaft end	L8		—	2	2	2	2.5
Flat end length	L11		12	—	—	—	—
Mounting hole circle	D1		26	34	40	52	72
Pilot diameter	D2		20	26	32	40	55
Output shaft diameter	D4		6	8	12	14	19
Key width	B1		—	3	4	5	6
Key Height	H1		—	11.2	13.5	16	22.5
Flat end height	H3		5.5	—	—	—	—
mounting thread	G1		M3	M4	M5	M5	M6
Input							
Pilot depth	L9		2	3	3	3.6	3.5
Motor shaft length	L10		15.6	24	24	31.5	41
Pilot diameter	D6		12.7	22	25	50	50
Input shaft diameter	D7		4	5	8	9	12.7
Mounting hole circle	D8		25.4	32	38.89	50	65
Mounting thread	G3		3.2	3.2	4.2	5.2	6.2

FEATURES

- 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

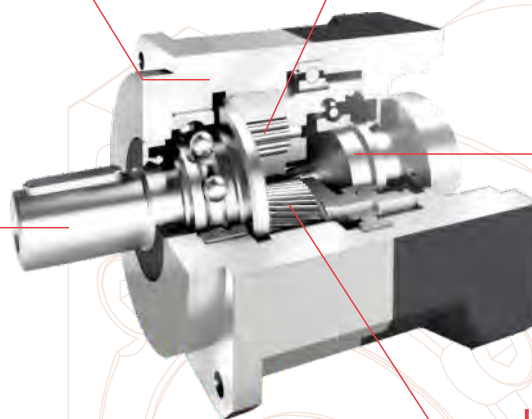
One piece and heat treated unibody designed housing for high output torque capability, longer lifespan and maintain stable precision performance.

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

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





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.



ULTRA PRECISION PLANETARY GEAR REDUCERS
ZS TECHNICAL DATA

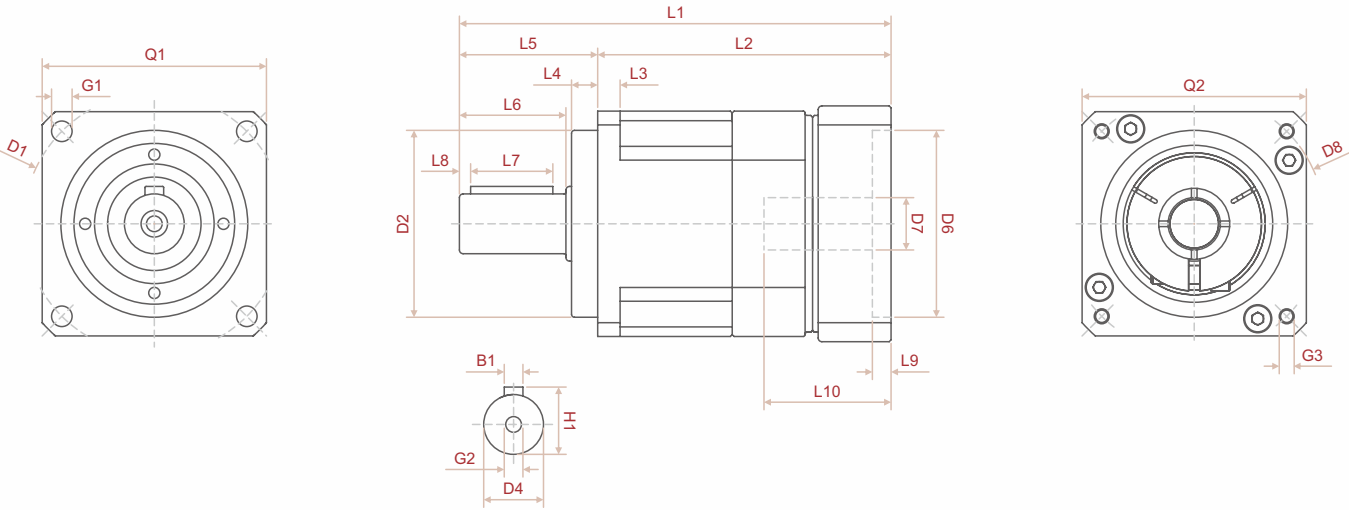
Model / Size		Stages	60	90	115	142	180	220
Full load efficiency	%	1	95					
		2	92					
Standard Backlash	arcmin	1	≤5	≤5	≤5	≤5	≤5	≤5
		2	≤8	≤8	≤8	≤8	≤8	≤8
Precision Backlash	arcmin	1	≤3	≤3	≤3	≤3	≤3	≤3
		2	≤5	≤5	≤5	≤5	≤5	≤5
Noise ②	dB(A)		58	63	63	65	67	70
Lifetime ①	hr		20000					
Max radial load	N		1530	3250	6700	9400	14500	50000
Max axial load	N		630	1300	3000	4000	6200	35000
Nominal Input Speed	rpm		5000	4000	4000	2000	2000	2000
Max input speed	rpm		10000	8000	8000	4000	4000	4000
Torsional stiffness	Nm/arcmin		7	12	23	45	148	220
Weight	kg	1	1.3	3.7	7.8	16.1	30	58
		2	2	5.6	9	19	42	65
Operating temp.	°C		-10 ~ 90					
Degree of protection			IP 65					
Lubrication			Synthetic lubrication					
Mounting direction			Any					

① Life reduced by half under continuous operation.
② Noise level measured on input running at 3000 rpm with no load (i = 5)

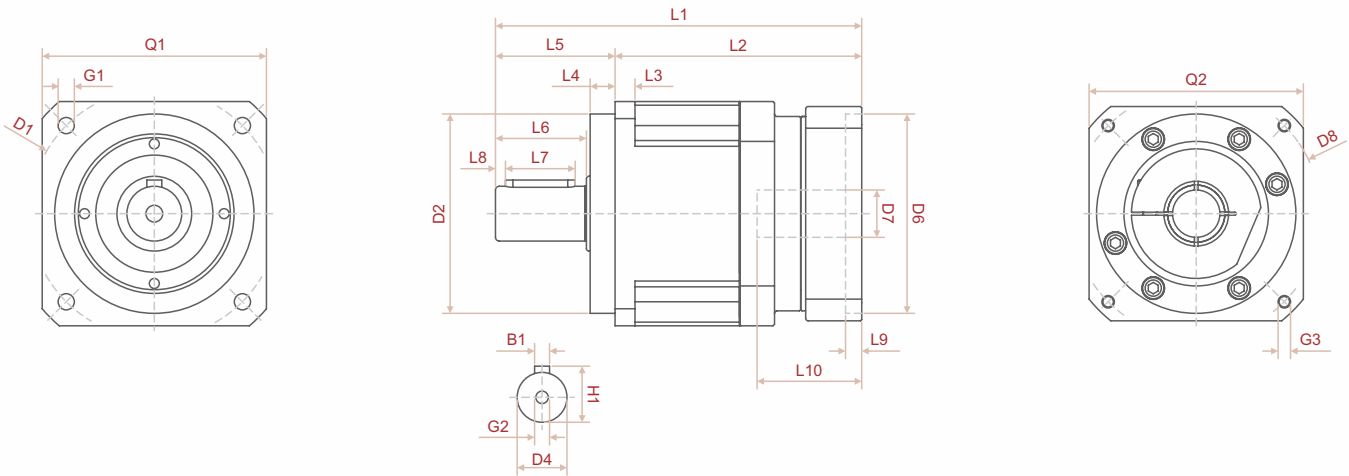
Model / Size		Stages	Ratio	60	90	115	142	180	220
Nominal output torque	Nm	1	3	55	130	208	342	588	1140
			4	50	140	290	542	1050	1700
			5	60	160	330	650	1200	2000
			7	50	140	300	550	1100	1800
			10	40	100	230	450	520	1220
		2	12,15	55	130	208	342	588	1140
			20	50	140	290	542	1050	1700
			25	60	160	330	650	1200	2000
			30	55	130	208	342	588	1140
			35	60	160	330	650	1200	2000
			40	50	140	290	542	1050	1700
			50	60	160	330	650	1200	2000
			70	50	140	300	550	1100	1800
		100	40	100	230	450	520	1220	
MAX Output torque		3 times of Nominal Output Torque							
Model / Size		Stages	Ratio	60	90	115	142	180	220
Mass Moments of Inertia	Kg-cm ²	1	3	0.16	0.61	3.25	10	28.98	69.61
			4	0.14	0.48	2.74	7.17	23.67	54.37
			5	0.13	0.47	2.71	6.52	23.29	53.27
			7	0.13	0.45	2.62	6.17	22.48	50.97
			10	0.13	0.44	2.57	6.1	22.51	50.56
		2	12,15,20,25	0.13	0.13	0.47	6.52	7.42	50.56
			30,35,40	0.13	0.13	0.47	6.52	7.42	22.51
			50	0.13	0.13	0.44	6.1	7.42	22.51
			70,100	0.13	0.13	0.44	6.1	7.03	22.51



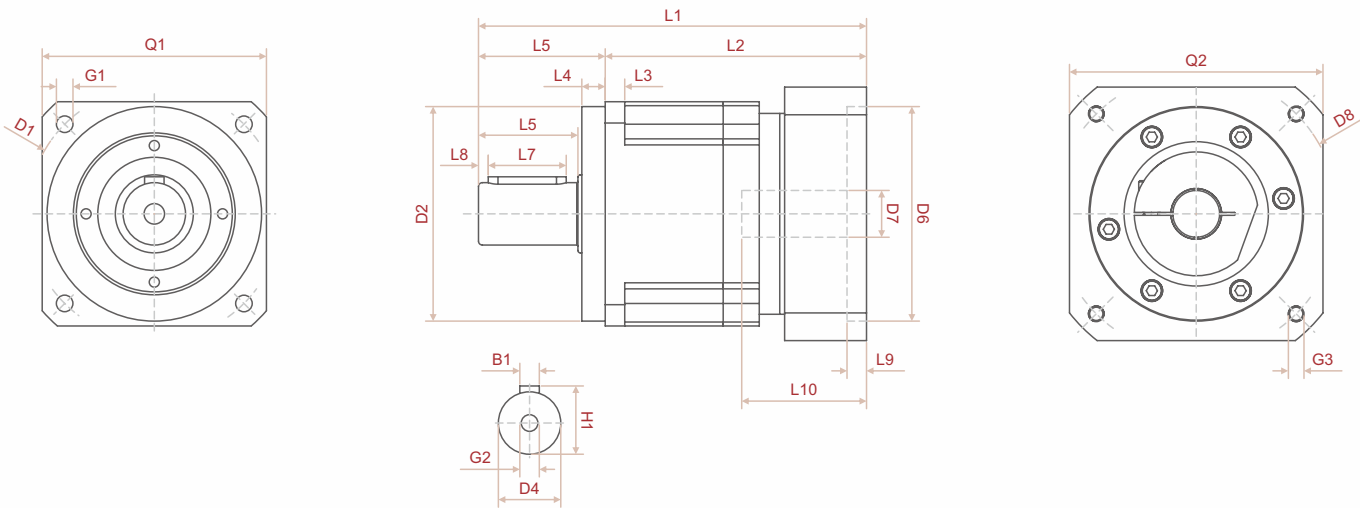
ZS060



ZS090



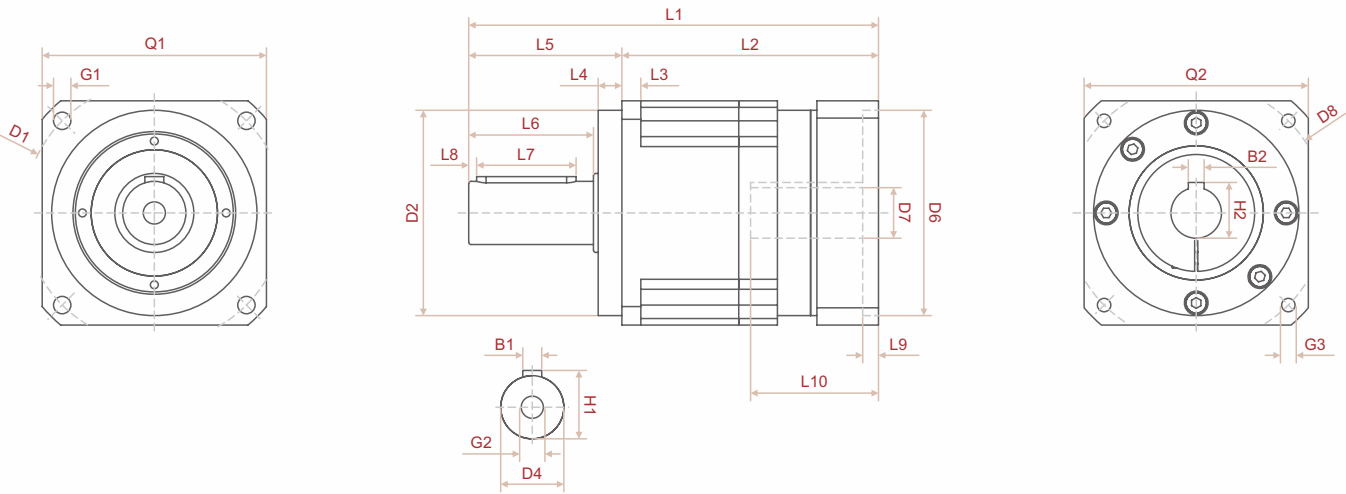
ZS115



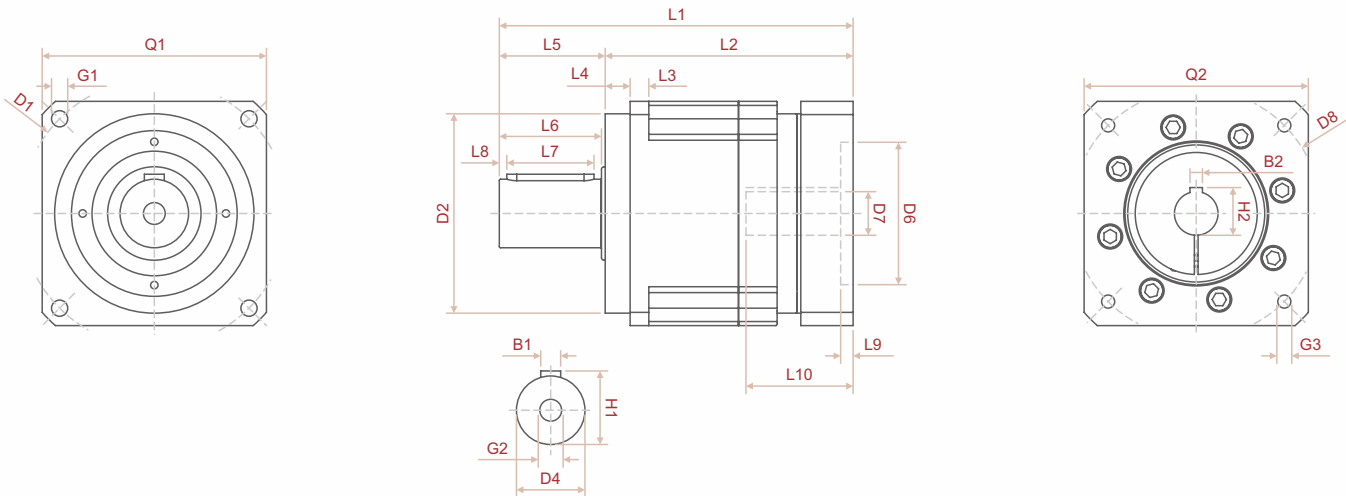


ULTRA PRECISION PLANETARY GEAR REDUCERS
ZS PROFILE DIMENSIONS

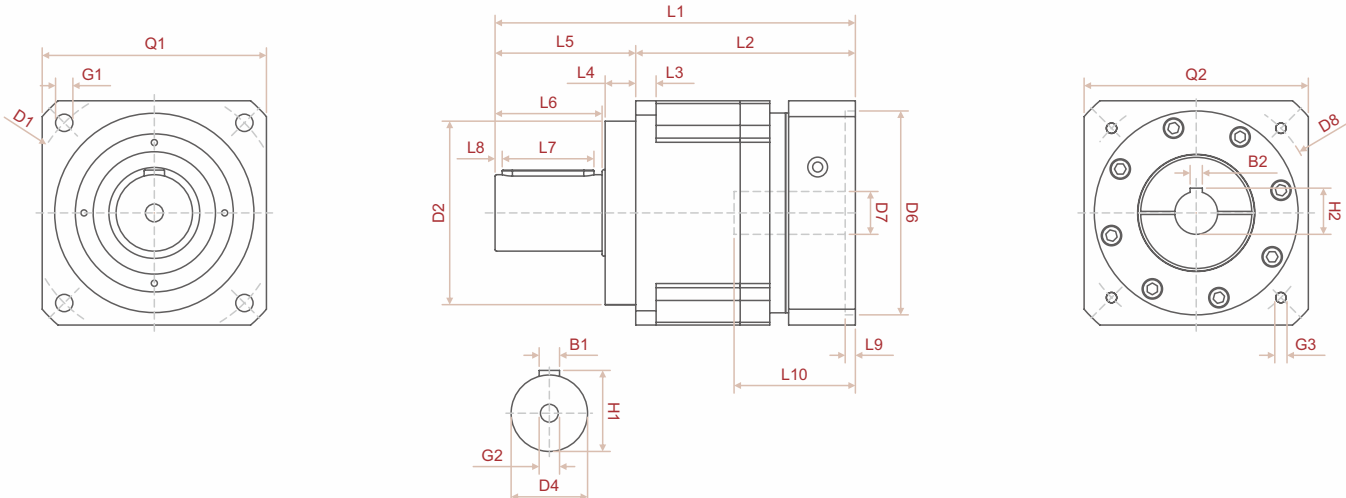
ZS142



ZS180



ZS220



ZS

PROFILE DIMENSIONS

Model / Size	Stages		ZS060		ZS090		ZS115		ZS142		ZS180		ZS220	
Overall length	1	L1	115.5		147		199		259.5		284		353.5	
	2		144.5		177.5		233.5		315		347		439.5	
Body length	1	L2	78.5		99		134		162.5		179		215.5	
	2		107.5		129.5		168.5		218		242		301.5	
Output flange		Q1	□60		□90		□115		□142		□180		□220	
Input flange		Q2	□60		□80	□86	□130		□142		□180		□220	
Output														
Length from flange		L3	6		8		10		12		15		20	
Pilot length		L4	7		10		12		15		20		30	
Output shaft length		L5	37		48		65		97		105		138	
shaft shoulder to the shaft end		L6	28.5		36.5		51		79		82		105	
Flat end length / Key length		L7	22		28		40		63		70		90	
Key length to the shaft end		L8	3		4		5		5		6		7	
Mounting hole circle		D1	Ø70		Ø100		Ø130		Ø165		Ø215		Ø250	
Pilot diameter		D2	Ø50 g6		Ø80 g6		Ø110 g6		Ø130 g6		Ø160 g6		Ø180 g6	
Output shaft diameter		D4	Ø16 h6		Ø22 h6		Ø32 h6		Ø40 h6		Ø55 h6		Ø75 h6	
Key width		B1	5		6		10		12		16		20	
Flat end height / Key Height		H1	18		24.5		35		43		59		79.5	
mounting thread x depth		G1	4-Ø5.5		4-Ø7		4-Ø9		4-Ø11		4-Ø13		4-Ø17	
center screw hole x depth		G2	M5x15		M8x20		M12x30		M16x36		M20x42		M20x42	
Input														
Pilot depth		L9	5		7		10		10		10		10	
motor shaft length		L10	34		42		59		81		86		119	
Pilot diameter		D6	Ø38.1 F8	Ø50 F8	Ø70 F8	Ø80 F8	Ø95 F8	Ø110 F8	Ø110 G7		Ø114.3 G7		Ø114.3 G7	Ø200 G7
Input shaft diameter		D7	Ø8	Ø14	Ø19	Ø19	Ø24 G7	Ø22 G7 Ø24 G7	Ø24		Ø35	Ø42	Ø42	Ø42
Key width		B2	—		—		—		8		10	12	12	
Key Height		H2	—		—		—		27.3		38.3	45.3	45.3	
Mounting hole circle		D8	Ø66.67 (□47.14)	Ø70	Ø90	Ø100	Ø115	Ø145	Ø145		Ø200		Ø200	Ø235
Mounting thread x depth		G3	4-M4x12	4-M4x12 4-M5x12	4-M5x15 4-M6x15	4-M6x15	4-M8x20	4-M8x20	4-M8x20		4-M12x35		4-M12x30	4-M12x30



TECHNICAL DATA

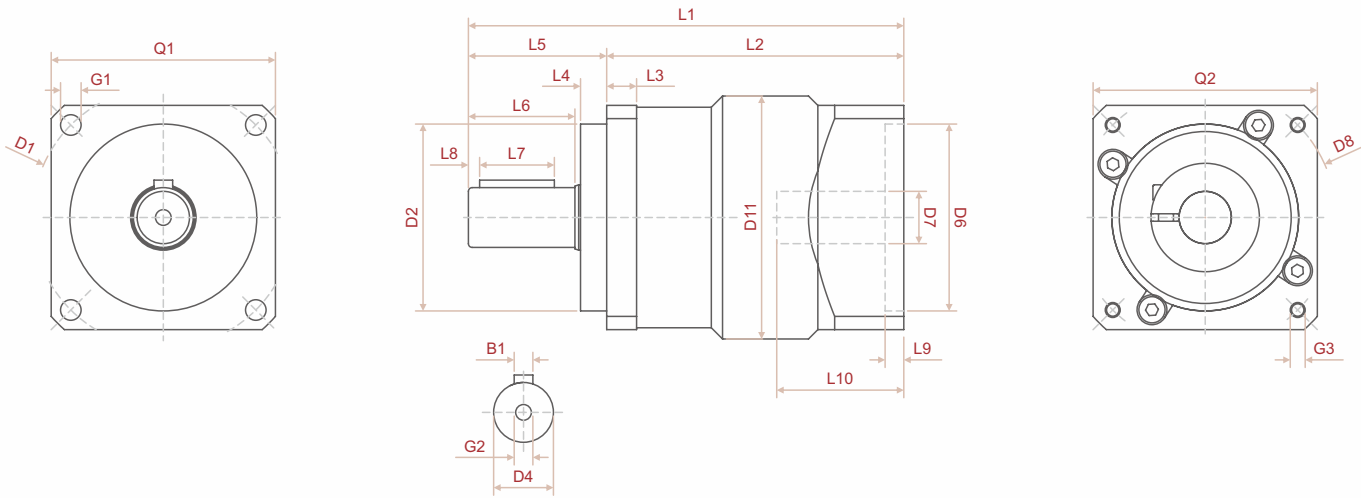
ULTRA PRECISION PLANETARY GEAR REDUCERS
ZN TECHNICAL DATA

Model / Size		Stages	60	90	120	150	180	220	
Full load efficiency	%	1	95						
		2	92						
Standard Backlash	arcmin	1	≤5	≤5	≤5	≤5	≤5	≤5	
		2	≤8	≤8	≤8	≤8	≤8	≤8	
Precision Backlash	arcmin	1	≤3	≤3	≤3	≤3	≤3	≤3	
		2	≤5	≤5	≤5	≤5	≤5	≤5	
Noise ②	dB(A)		58	63	63	65	67	70	
Lifetime ①	hr		20000						
Max radial load	N		1530	3250	6200	9000	14500	50000	
Max axial load	N		1000	2100	4000	4200	7000	35000	
Nominal Input Speed	rpm		3000	3000	3000	3000	2500	2000	
Max input speed	rpm		6000	6000	6000	6000	5000	4000	
Torsional stiffness	Nm/arcmin		7	15	25	50	145	225	
Weight	kg	1	1.3	3.7	7.8	16.1	30	58	
		2	2	5.6	9	19	42	65	
Operating temp.	℃		-10 ~ 90						
Degree of protection			IP 65						
Lubrication			Synthetic lubrication						
Mounting direction			Any						
① Life reduced by half under continuous operation.									
② Noise level measured on input running at 3000 rpm with no load (i = 5)									
Model / Size		Stages	Ratio	60	90	120	150	180	220
Nominal output torque	Nm	1	3	40	100	220	340	790	1140
			4	50	110	300	500	1050	1800
			5	60	150	360	600	1180	2000
			7	55	150	360	600	1000	1700
			10	40	100	240	380	900	1500
		2	12,15	40	100	220	340	790	1140
			20	50	110	300	500	1050	1800
			25	60	150	360	600	1180	2000
			30	40	100	220	340	790	1140
			35	60	150	360	600	1180	2000
			40	50	110	300	500	1050	1800
			50	60	150	360	600	1180	2000
			70	55	150	360	600	1000	1700
			100	40	100	240	380	900	1500
MAX Output torque		3 times of Nominal Output Torque							
Model / Size		Stages	Ratio	60	90	120	150	180	220
Mass Moments of Inertia	Kg-cm²	1	3	0.13	0.61	3.25	9.21	28.98	69.61
			4	0.13	0.48	2.74	7.54	23.67	54.37
			5	0.13	0.47	2.71	7.42	23.29	53.27
			7	0.13	0.45	2.62	7.14	22.48	50.97
			10	0.13	0.4	2.57	7.03	22.51	50.56
		2	12,15,20,25	0.03	0.13	0.48	2.63	7.42	50.56
			30,35,40	0.03	0.13	0.48	2.43	7.42	22.51
			50	0.03	0.13	0.48	2.39	7.42	22.51
			70,100	0.03	0.13	0.44	2.39	7.03	22.51

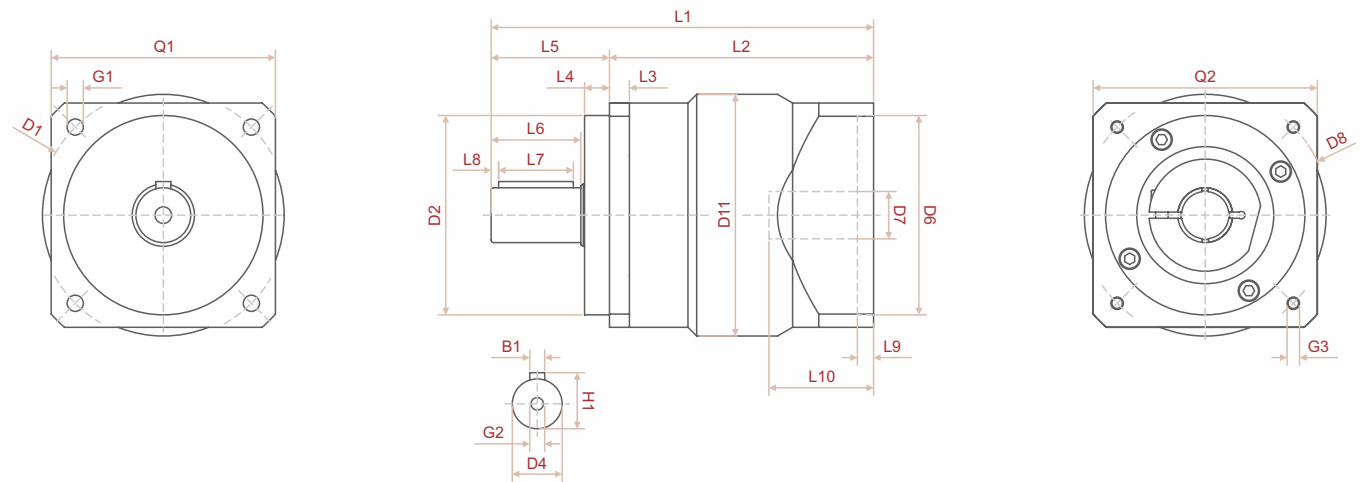


PROFILE DIMENSIONS

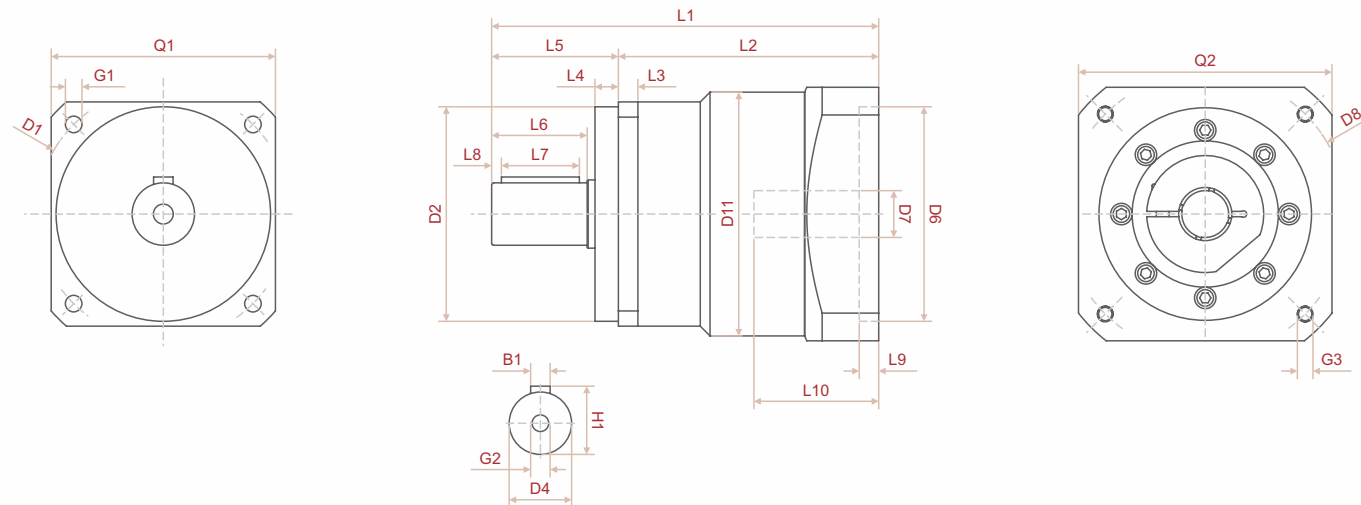
ZN060



ZN090



ZN120

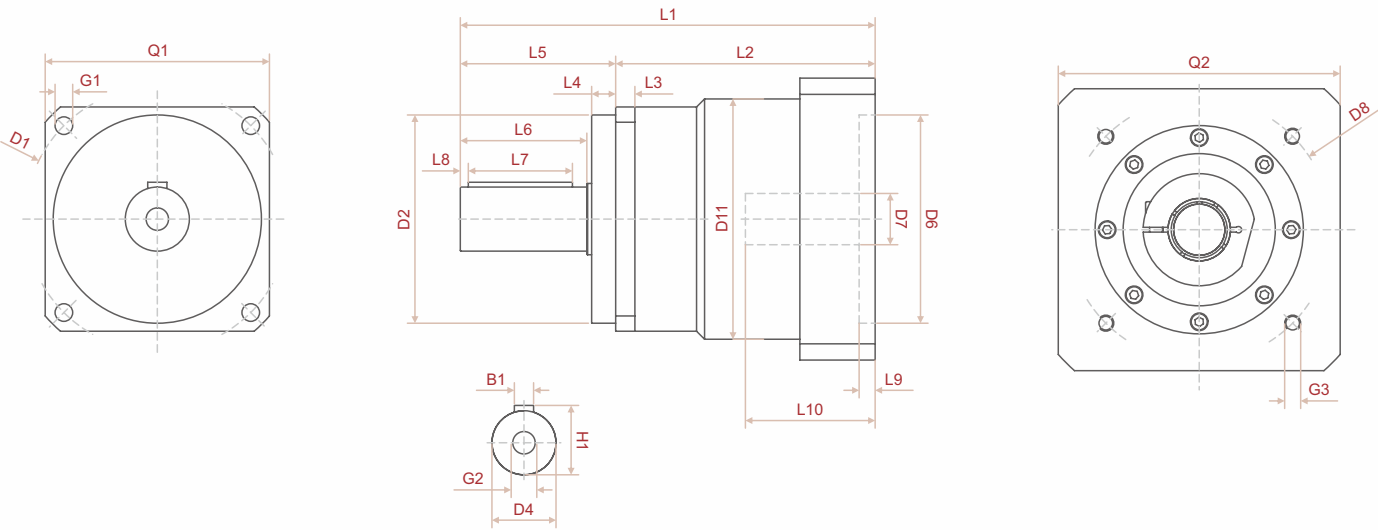




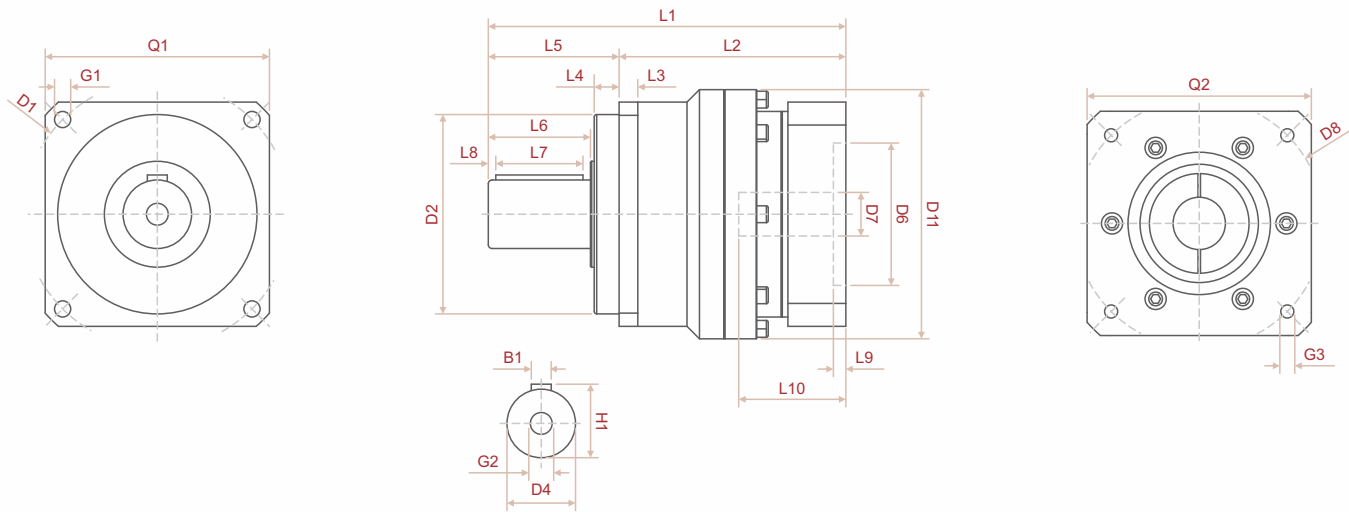
PROFILE DIMENSIONS

ULTRA PRECISION PLANETARY GEAR REDUCERS
ZN PROFILE DIMENSIONS

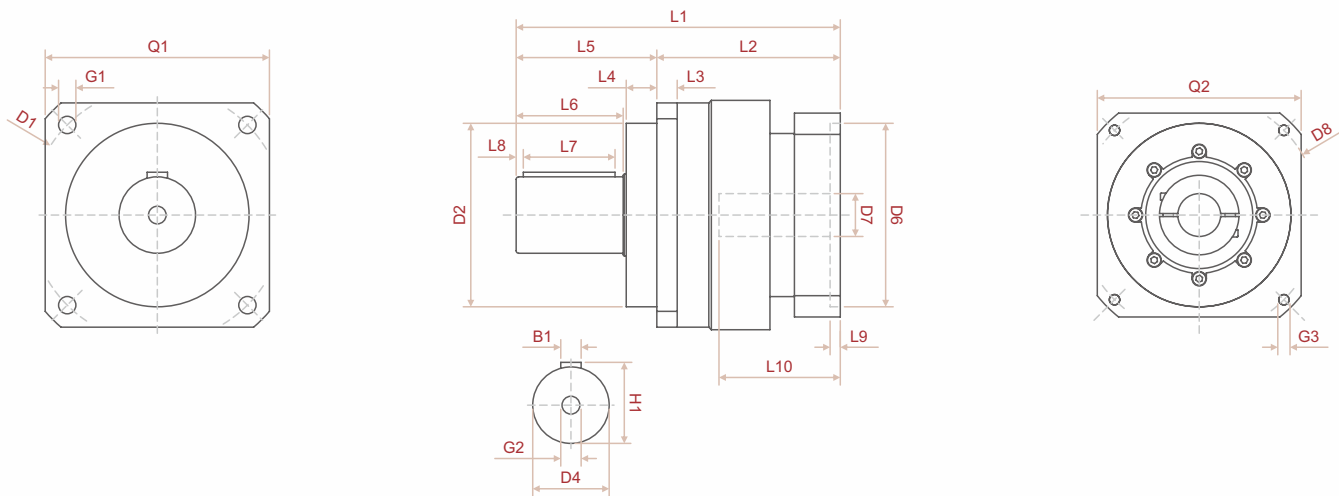
ZN150



ZN180



ZN220





PROFILE DIMENSIONS

Model / Size	Stages		ZN060		ZN090		ZN120		ZN150		ZN180		ZN220	
Overall length	1	L1	116.5		153.5		198.5		252	259	287		318	350
	2		136.5		183		235.5		279.5	297.5	336		382	414
Body length	1	L2	79.5		106		133.5		155	162	182		180	212
	2		99.5		135.5		170.5		182.5	200.5	231		244	276
Output flange		Q1	□60		□90		□115		□140	□140	□180		□220	□220
Input flange		Q2	□60		□90		□130		□130	□176	□180		□220	□225
Output														
Length from flange		L3	8		8		10		12		15		20	
Pilot length		L4	7		10		12		15		20		30	
Output shaft length		L5	37		47.5		65		97		105		138	
shaft shoulder to the shaft end		L6	28.5		36		49		79		82		105	
Flat end length / Key length		L7	20		30		40		65		70		90	
Key length to the shaft end		L8	3		3		5		5		6		7	
Mounting hole circle		D1	Ø70		Ø100		Ø130		Ø165		Ø215		Ø250	
Pilot diameter		D2	Ø50 g6		Ø80 h7		Ø110 g6		Ø130 g6		Ø160 g6		Ø180 g6	
Output shaft diameter		D4	Ø16 h6		Ø22 h6		Ø32 h6		Ø40 h6		Ø55 g6		Ø75 g6	
Housing diameter		D11	Ø65		Ø97		Ø125		Ø150		Ø200		Ø225	
Key width		B1	5		6		10		12		16		20	
Flat end height / Key Height		H1	18		24.5		35		43		59		79.5	
mounting thread x depth		G1	4-Ø5.5		4-Ø6.5		4-Ø9		4-Ø11		4-Ø13		4-Ø17	
center screw hole x depth		G2	M5x13		M8x16		M12x25		M16x30		M20x42		M20x35	
Input														
Pilot depth		L9	3.5	6	6		10		10		8		10	
motor shaft length		L10	32		45		59		63	82	82		82	
Pilot diameter		D6	Ø38.1 G6	Ø50 G6	Ø70 G6	Ø80 G6	Ø95 G6	Ø110 G6	Ø110 G6	Ø130 G6	Ø114.3 G7	Ø114.3 G7	Ø180 G6	Ø200 G6
Input shaft diameter		D7	Ø6.35	Ø14	Ø19	Ø16	Ø22 G6	Ø22 G6 Ø24 G6	Ø24	Ø32	Ø35	Ø42	Ø42	Ø55
Mounting hole circle		D8	Ø66.67 (□47.14)	Ø70	Ø90	Ø100	Ø115	Ø130 Ø145	Ø145	Ø165	Ø200	Ø200	Ø215	Ø235
Mounting thread x depth		G3	4-M4x12	4-M4x12 4-M5x12	4-M6x15	4-M6x15	4-M8x20	4-M8x20	4-M8x20	4-M10x20	4-M12x30		4-M12x30	

ULTRA PRECISION PLANETARY GEAR REDUCERS / TECHNICAL DATA



ULTRA PRECISION PLANETARY GEAR REDUCERS
ZE TECHNICAL DATA

Model / Size		Stages	60	90	120	140
Full load efficiency	%	1	≥95			
		2	≥92			
Standard Backlash	arcmin	1	≤5	≤5	≤5	≤5
		2	≤8	≤8	≤8	≤8
Precision Backlash	arcmin	1	≤3	≤3	≤3	≤3
		2	≤5	≤5	≤5	≤5
Noise ②	dB(A)		≤60	≤60	≤65	≤67
Lifetime ①	hr		20000			
Max radial load	N		1300	2800	5200	9400
Max axial load	N		550	1000	2300	4700
Nominal Input Speed	rpm		5000	4000	4000	3000
Max input speed	rpm		10000	8000	8000	6000
Torsional stiffness	Nm/arcmin		5	11	18	50
Weight	kg	1	1.35	4.25	9.15	14.6
		2	1.7	7	13	19.2
Operating temp.	°C		-20 ~ 90			
Degree of protection			IP 65			
Lubrication			Synthetic lubrication			
Mounting direction			Any			

① Life reduced by half under continuous operation.
② Noise level measured on input running at 3000 rpm with no load (i = 5)

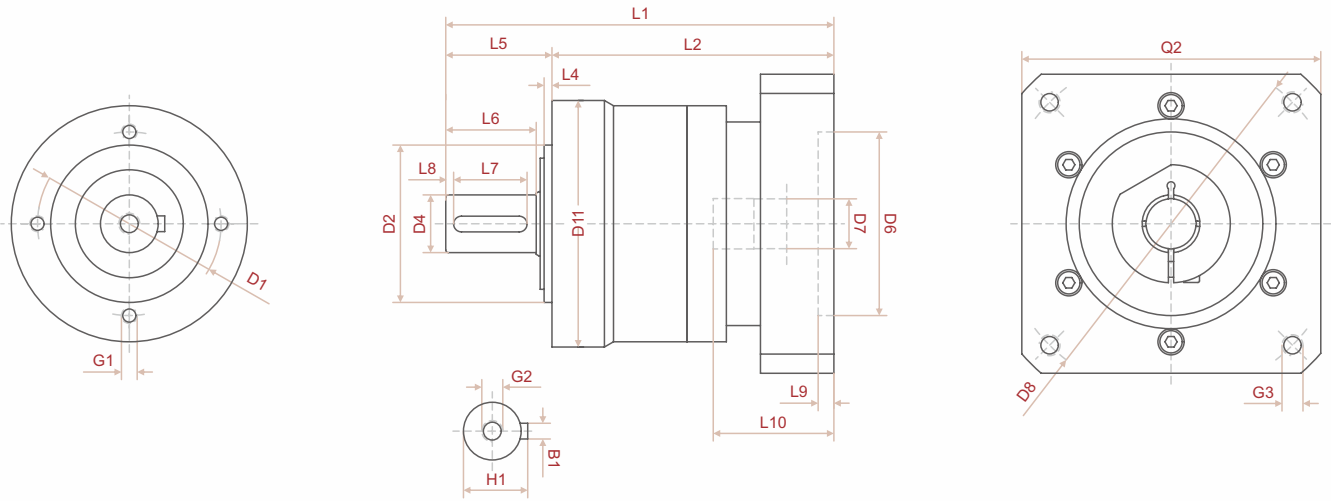
Model / Size		Stages	Ratio	60	90	120	140	
Nominal output torque	Nm	1	3	35	100	170	342	
			4	40	110	220	542	
			5	45	125	250	650	
			7	40	110	200	550	
			10	30	80	180	450	
		2	15	35	100	170	342	
			20	45	110	220	542	
			25	45	125	250	650	
			30	40	110	220	600	
			35	40	125	200	550	
			40	40	110	220	542	
			50	45	125	250	650	
			70	40	110	200	550	
			100	30	80	180	450	
MAX Output torque		2.5 times of Nominal Output Torque						
Model / Size		Stages	Ratio	60	90	120	140	
Mass Moments of Inertia	Kg-cm ²	1	3	0.16	0.61	3.25	9.21	
			4	0.14	0.48	2.74	7.54	
			5	0.13	0.47	2.71	7.42	
			7	0.13	0.45	2.62	7.14	
			10	0.13	0.44	2.57	7.03	
		2	15,20,25	0.13	0.47	2.71	7.42	
			35	0.13	0.45	2.57	7.14	
			30,40,50	0.13	0.44	2.62	7.03	
			70,100	0.13	0.13	0.44	2.57	

PROFILE DIMENSIONS



PROFILE DIMENSIONS

ZE140



Model / Size	Stages		ZE60	ZE90	ZE120	ZE140
Overall length	1	L1	123	146.5	191.5	262
	2		151	183	234	330
Body length	1	L2	90.5	105.5	136.5	166.5
	2		118.5	142	179	233
Input flange		Q2	□ 60	□ 90	□ 130	□ 180
Output						
Pilot length	L4		3	3	4	12
Output shaft length	L5		32.5	40.5	55	97
shaft shoulder to the shaft end	L6		28.5	36.5	49	82
Flat end length / Key length	L7		20	30	40	65
Key length to the shaft end	L8		3	3	5	5
Mounting hole circle	D1		Ø52	Ø70	Ø100	Ø140
Pilot diameter	D2		Ø40 g6	Ø60 g6	Ø80 g6	Ø120 g6
Output shaft diameter	D4		Ø16 g6	Ø20 g6	Ø25 g6	Ø40 g6
Housing diameter	D11		Ø65	Ø95	Ø125	Ø155
Key width	B1		5	6	8	12
Flat end height / Key Height	H1		18	22.5	28	43
mounting thread x depth	G1		8-M5	4-M6	4-M10	4-M10
center screw hole x depth	G2		M5x12	M8	M8	M16
Input						
Pilot depth	L9		6	6	8	8
motor shaft length	L10		32	47	62.5	81.5
Pilot diameter	D6		Ø50 G6	Ø80 G6	Ø110 G6	Ø114.3 G6
Input shaft diameter	D7		Ø14 G6	Ø19 G6	Ø22 G6	Ø35 G6
Mounting hole circle	D8		Ø70	Ø100	Ø145	Ø200
mounting thread x depth	G3		4-M4	4-M6	4-M8	4-M12



TECHNICAL DATA

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

Model / Size		Stages	60	90	110	140	200
Full load efficiency	%	1	95				
		2	92				
Standard Backlash	arcmin	1	≤5	≤5	≤5	≤5	≤5
		2	≤7	≤7	≤7	≤7	≤7
Precision Backlash	arcmin	1	≤3	≤3	≤3	≤3	≤3
		2	≤6	≤6	≤5	≤5	≤5
Noise ②	dB(A)		60	63	65	65	67
Lifetime ①	hr		20000				
Max. Bending moment M_{2KB}	Nm		120	241	430	1320	3200
Max axial load	N		1800	2000	4800	6100	7250
Nominal Input Speed	rpm		5000	4000	4000	2000	2000
Max input speed	rpm		10000	8000	8000	4000	4000
Torsional stiffness	Nm/arcmin		11	30	82	150	435
Weight	kg	1	1.3	3.7	5.6	16.1	30
		2	2.1	5.6	9	19	42
Operating temp.	°C		-10 ~ 90				
Degree of protection			IP 65				
Lubrication			Synthetic lubrication				
Mounting direction			Any				

① Life reduced by half under continuous operation.

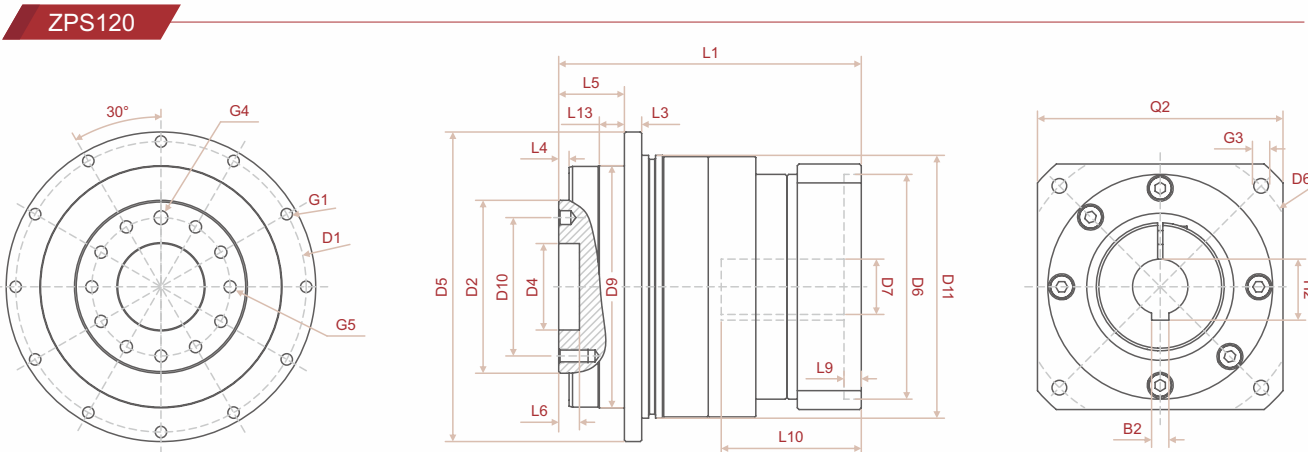
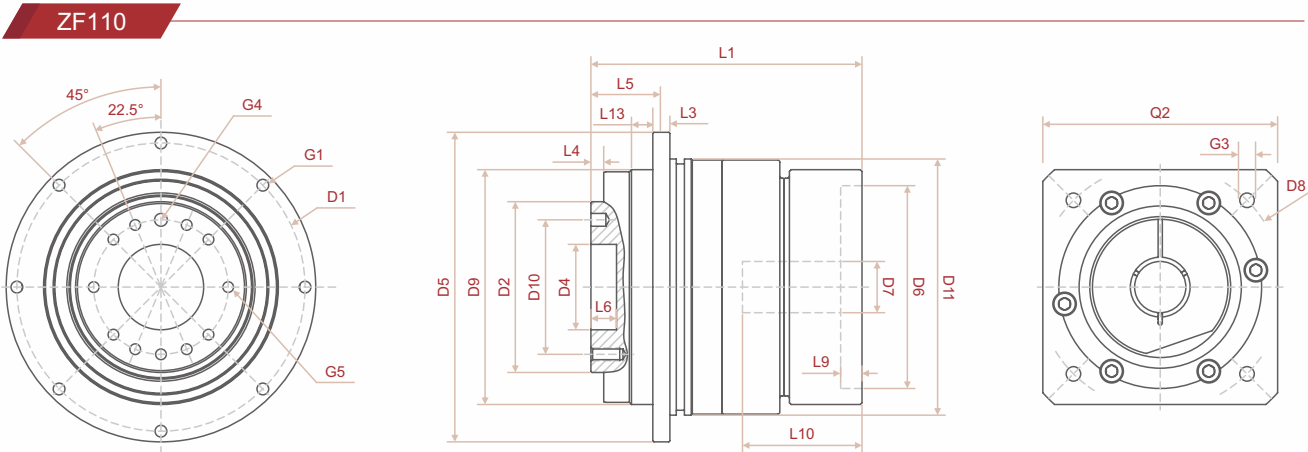
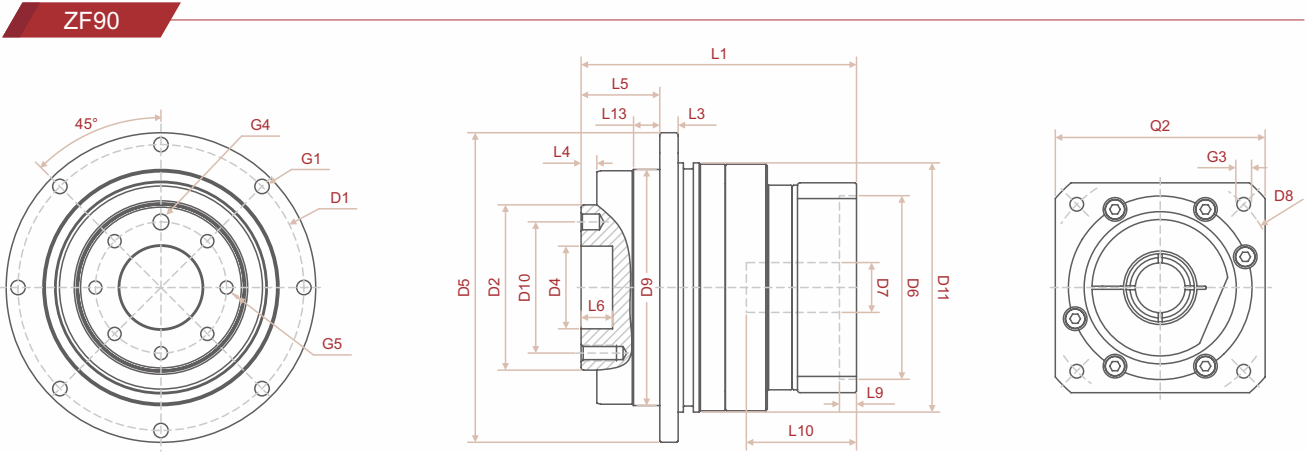
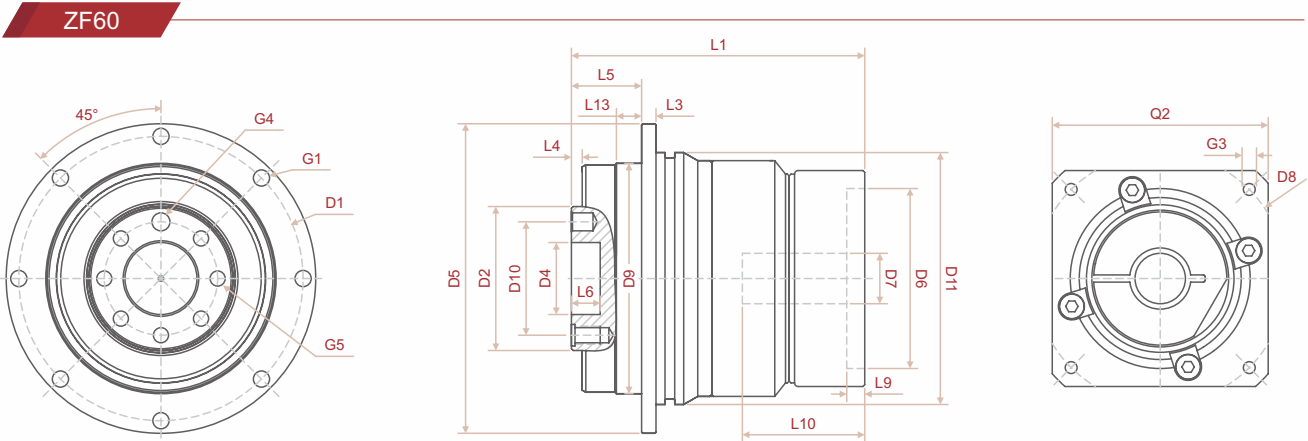
② Noise level measured on input running at 3000 rpm with no load ($i = 5$)

Model / Size		Stages	Ratio	60	90	110	140	200
Nominal output torque	Nm	1	3	55	130	—	—	—
			4	50	140	270	542	1050
			5	60	160	330	650	1200
			7	50	140	300	550	1100
			10	40	100	230	450	520
		2	12,15	55	130	—	—	—
			20	50	140	285	542	1145
			25	60	160	335	650	1220
			30	55	130	—	—	—
			35	60	160	335	650	1220
			40	50	140	285	542	1145
			50	60	160	335	650	1220
			70	50	140	310	550	1120
		100	40	100	250	450	920	
MAX Output torque		3 times of Nominal Output Torque						
Model / Size		Stages	Ratio	60	90	110	140	200
Mass Moments of Inertia	Kg-cm ²	1	3	0.16	0.61	—	—	—
			4	0.14	0.48	2.87	7. 17	24. 92
			5	0.13	0.47	2.71	6. 52	23. 29
			7	0.13	0.45	2.65	6. 17	22. 64
			10	0.13	0.44	2.57	6. 1	20. 72
		2	12,15	0.16	0.13	—	—	—
			20,25	0.16	0.13	0.65	6. 52	7. 56
			30	0.14	0.13	—	—	—
			35	0.14	0.13	0.6	6. 52	7. 56
			40	0.14	0.13	0.6	6. 52	7. 06
			50,70,100	0.14	0.13	0.58	6. 1	7. 06



PROFILE DIMENSIONS

ULTRA PRECISION PLANETARY GEAR REDUCERS
ZF PROFILE DIMENSIONS

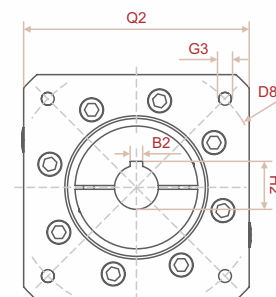
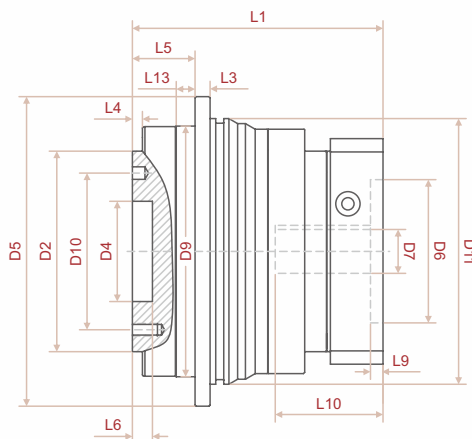
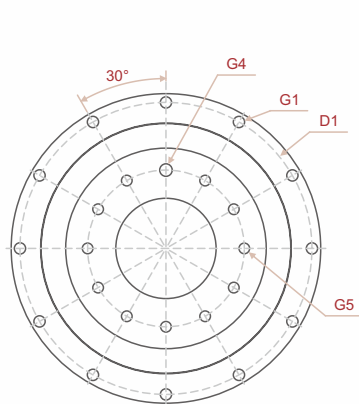


ZF

PROFILE DIMENSIONS

ZF200

ZF200

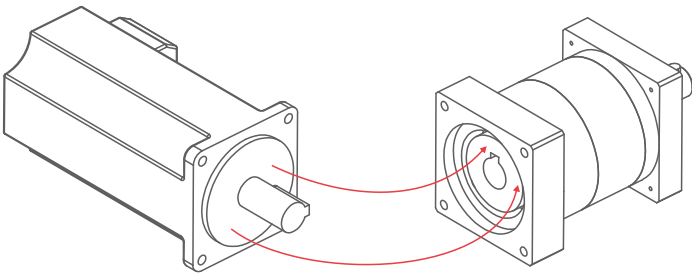


Model / Size	Stages		ZF60		ZF90		ZF110		ZF140		ZF200	
Overall length	1	L1	81.5		105	104	127	135	175	177	200	
	2		110.5		134.5	135.5	159.5	169.5	230.5	232.5	263	
Input flange		Q2	□60		□80	□86	□110	□130	□142	□180	□180	
Output												
Length from flange		L3	4		7		8		10		12	
Pilot length		L4	3		6		6		60		8	
Output shaft length		L5	19.5		30		29		38		50	
shaft shoulder to the shaft end		L6	8		12		12		12		16	
Spigot depth		L13	7		10		10		15		15	
Hole circle diameter		D1	Ø79		Ø109		Ø135		Ø168		Ø233	
Mounting hole circle		D2	Ø40 h7		Ø63 h7		Ø80 h7		Ø100 h7		Ø160 h7	
Centering		D4	Ø20 H7		Ø31.5 H7		Ø40 H7		Ø50 H7		Ø80 H9	
Output shaft diameter		D5	Ø86		Ø118		Ø145		Ø179		Ø247	
Centering		D9	Ø64 h7		Ø90 h7		Ø110 h7		Ø140 h7		Ø200 h7	
Hole circle diameter		D10	Ø31.5		Ø50		Ø63		Ø80		Ø125	
Housing diameter		D11	Ø70		Ø95		Ø119		Ø152		Ø212	
Pinion bore		G1	8-Ø4.5 THRU.		8-Ø5.5 THRU.		8-Ø5.5 THRU.		12-Ø6.6 THRU.		12-Ø9.0 THRU.	
mounting thread x depth		G4	Ø5 H7x6 DP.		Ø6 H7x7 DP.		Ø6 H7x7 DP.		Ø8 H7x7 DP.		Ø10 H7x10 DP.	
		G5	7-M5x8		7-M6x13		11-M6x13		11-M8x17		11-M10x20	
Input												
Pilot depth		L9	5		6.5		10		10		10	
motor shaft length		L10	34		42		56	64	84	83	83	
Pilot diameter		D6	Ø38.1 G6	Ø50 G6	Ø70 F8	Ø80 F8	Ø95 G7	Ø110 G7	Ø130 G7	Ø114.3 G7	Ø114.3 G7	
Input shaft diameter		D7	Ø8	Ø14	Ø19	Ø19	Ø24 G7	Ø22 G7 Ø24 G7	Ø32	Ø42	Ø35	Ø42
Key width		B2	—		—		—		10	12	10	12
Key Height		H2	—		—		—		35.3	45.3	38.3	45.3
Mounting hole circle		D8	Ø66.67 (□47.14)	Ø70	Ø90	Ø100	Ø115	Ø145	Ø165	Ø200	Ø200	
mounting thread x depth		G3	4-M4x10	4-M4x10 4-M5x12	4-M5x15 4-M6x15	4-M6x14	4-M8x20	4-M8x20	4-M10x30	4-M12x35	4-M12x35	

GEAR REDUCER MOUNTING INSTRUCTION / TORQUE REQUIRED TO SECURE BOLT

GEAR REDUCER MOUNTING INSTRUCTION

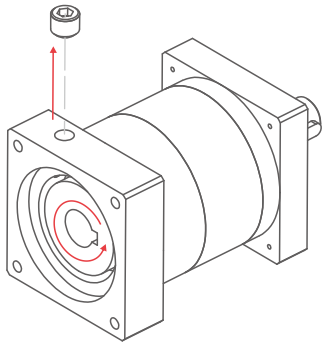
STEP 1



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

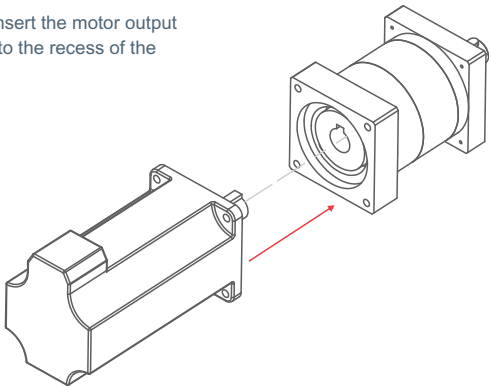
STEP 2

- 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 access hole.
- C. Loosen the lock bolt on the gearbox inlet bushing.

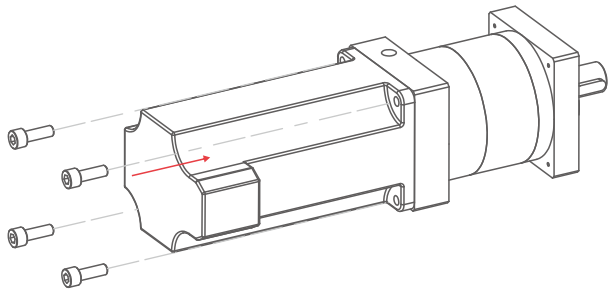


STEP 3

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

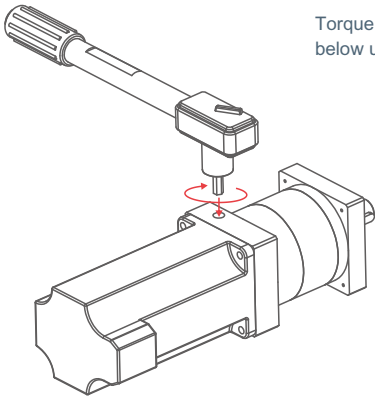


STEP 4



Secure motor to gearbox using specified hardware.

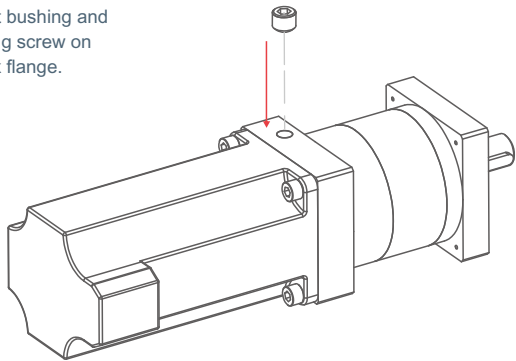
STEP 5



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.



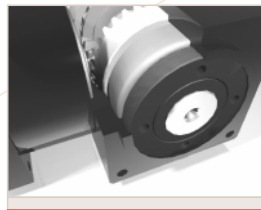
Tightening Torque Recommended For Motor Mounting Bolt & Motor Lock Sleeve Bolt

Bolt Size		M3	M4	M5	M6	M8	M10	M12	M14
Width Across Flats	mm	2.5	3	4	5	6	8	10	14
Strength 12.9 Tightening Torque	Nm	2.1	4.9	9.8	17	41	80	139	343
	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

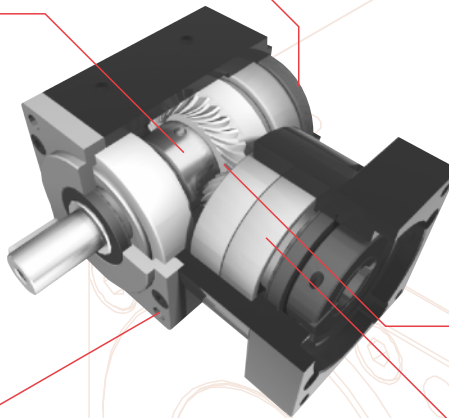
- Precision spiral bevel gears raise efficiency above 96%.
- Reduction ratios for transferring high torques in limited space.
- Hardened high strength steel components for reliability under severe conditions.
- All grease-filled, the gear head can be used in any orientation without oil leaks.
- Backlash under 5 arc-min as low backlash design and 7 arc-min as standard backlash.
- Various of output options available in 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.



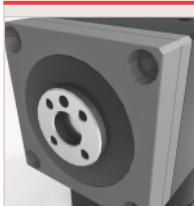
Axail compression mechanism to increase concentricity and ebgagement between shaft and bearing.



Patented design provides unique backlash adjustment.



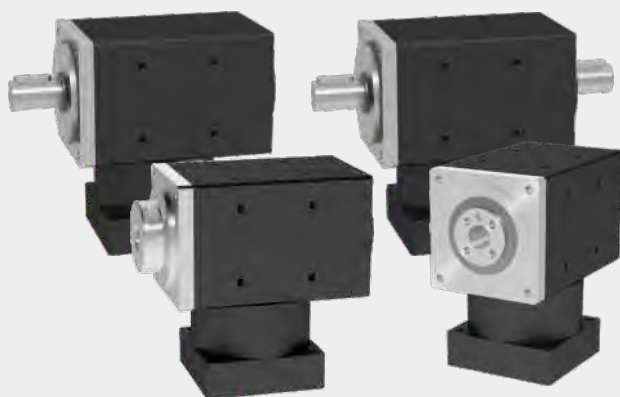
Unique wear resistant treatment for spiral bevel reliability.



Patented output mount design for versatility.



Double ball bearing for stable operation at high speed.



RB/RL 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



ZSR FEATURES

- It adopts helical gear drive, after carburizing and quenching treatment, tooth profile modification treatment to ensure low noise and stable operation, bearing capacity is increased by 20% compared with straight tooth.
- Integral output shaft, planetary wheel bearing support at both ends, to achieve high accuracy, strength
- High Precision: return clearance is small, precision single- stage can be done within 3-5 arcmin.
- Easy Maintenance: no need to replace grease during product life, installation is more convenient.



ZFR FEATURES

- Adopt helical gear drive, after carburizing quenching treatment, tooth profile modification treatment, to ensure low noise and smooth operation; The bearing capacity is 20% higher than that of straight teeth.
- High precision: back clearance less than 3 arc minutes, fine positioning.
- High load capacity: The main bearing adopts conical needle roller bearings to achieve high load capacity.
- Easy maintenance: there is no need to replace the grease during the product life cycle, and the installation is more convenient.



ZRPS/ZRPN FEATURES

- Space saving: The right Angle reducer uses spiral bevel gear, and the installation of the motor can achieve 90 degree bending, saving space.
- Adopt straight gear drive, after carburizing rate fire treatment, tooth profile modification treatment, to ensure smooth operation, low noise
- Simple structure, mass production, fast delivery time and high cost performance:
- Easy maintenance: there is no need to replace the grease during the product life cycle, and the installation is more convenient.

RB/RL

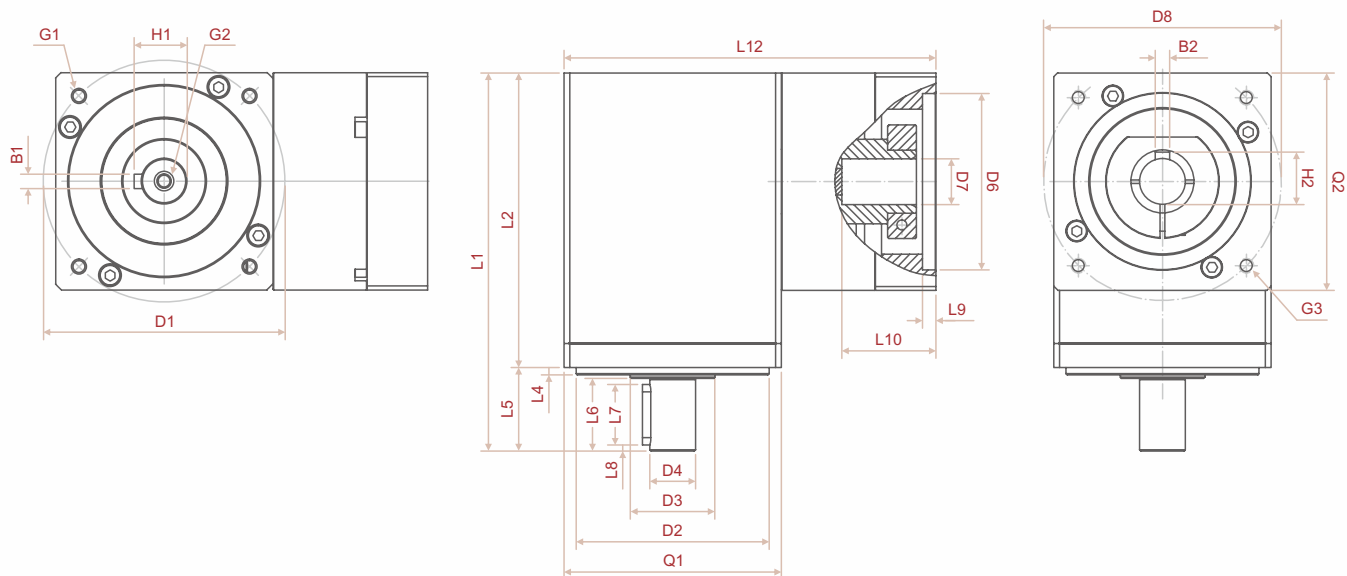
TECHNICAL DATA

- 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		42		60		90	
Full load efficiency	%	96					
Backlash	arcmin	<6		<6		<6	
Noise	dB(A)	70		72		75	
Lifetime	hr	20000					
Max radial load	N	600		800		1700	
Max axial load	N	700		900		1500	
Nominal Input Speed	rpm	4000		4000		3000	
Max input speed	rpm	12000		8000		7000	
Torsional stiffness	Nm/arcmin	1.5		2.4		6.6	
Weight	kg	0.6		1.7		5.4	
Operating temp.	℃	-20 ~ 90					
Degree of protection		IP 65					
Lubrication		Life lubrication					
Mounting direction		Any					
Model / Size		Ratio	42		60		90
Nominal output torque	Nm	1	10		26		73
		2	8		23		69
		3	5		21		54
		4	3		15		44
		5	3		14		43
MAX Output torque		2 times of Nominal Output Torque					
Model / Size		Ratio	42		60		90
Mass Moments of Inertia	g-cm ²	1	70		360		1910
		2	60		230		1050
		3	60		210		940
		4	60		210		900
		5	60		200		900

RB

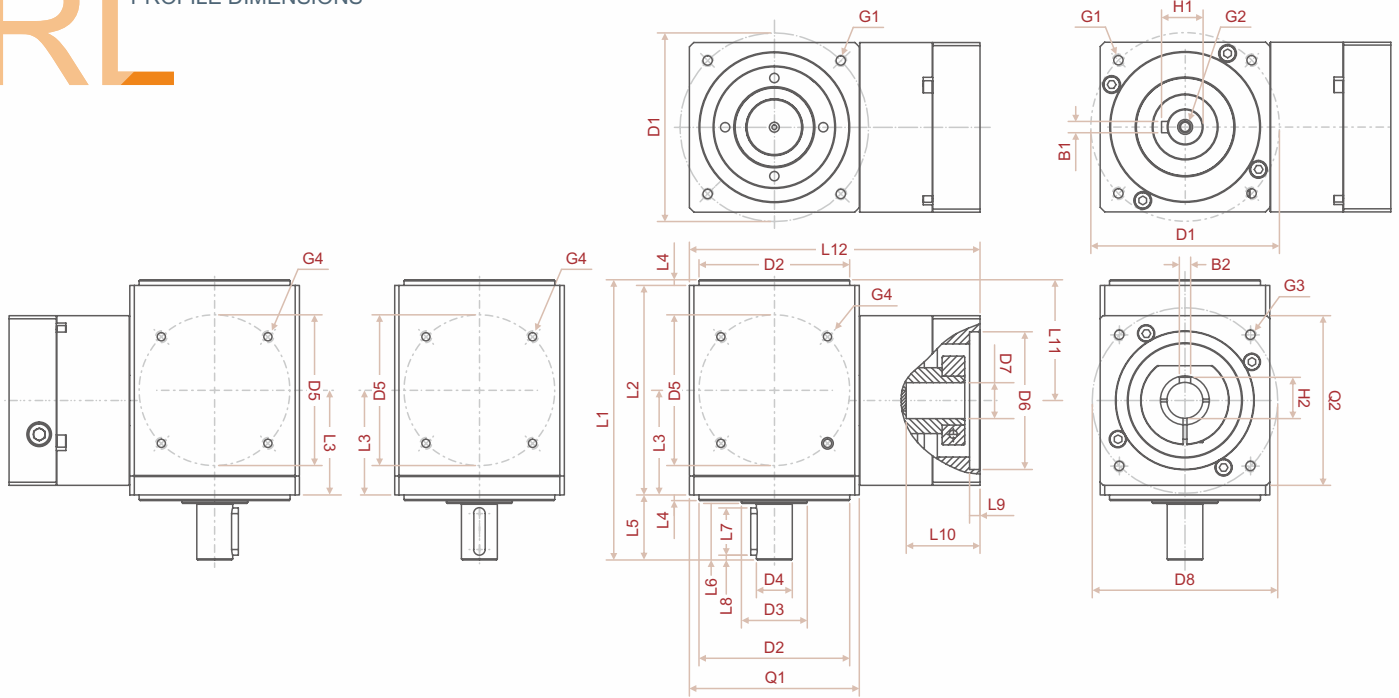
PROFILE DIMENSIONS



Model / Size		RB32	RB42	RB60	RB90
Output flange	Q1	□ 32	□ 42	□ 60	□ 90
Input flange	Q2	□ 32	□ 42	□ 60	□ 90
Output					
Overall length	L1	56.5	85	122	165
Body length	L2	41	65	94	130
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

RL

PROFILE DIMENSIONS



PRECISION RIGHT ANGLE GEAR REDUCERS
RL PROFILE DIMENSIONS

Model / Size		RL32	RL42		RL60		RL90
Output flange	Q1	□32	□42		□60		□90
Input flange	Q2	□32	□42		□60		□90
Output							
Overall length	L1	60	73.5		107		149
Body length	L2	42	51		76		111
Length from flange	L3	21	25.5		38		55.5
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	16.5		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	38	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	M4x10		M5x12		M6x15
center screw hole x depth	G2	—	M4x10		M5x12		M6x15
mounting thread x depth	G4	M2x4	M3x6		M4x8		M5x10
Input							
Pilot depth	L9	3	3		5.5		5.5
motor shaft length	L10	20	25		30		40
Offset length	L11	23.5	29		44.5		64
Overall length	L12	59	73		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



TECHNICAL DATA

PRECISION RIGHT ANGLE GEAR REDUCERS
ZSR TECHNICAL DATA

Model / Size		Stages	060	090	115	142	180	220
Full load efficiency	%	1	95					
		2	92					
Standard Backlash	arcmin	1	≤9	≤9	≤9	≤6	≤6	≤4
		2	≤12	—	—	—	—	—
Precision Backlash	arcmin	1	≤7	≤7	≤7	≤4	≤4	≤4
		2	≤10	—	—	—	—	—
Noise ②	dB(A)		63	65	70	65	72	74
Lifetime ①	hr		20000					
Max radial load	N		1530	3250	6700	9400	14500	50000
Max axial load	N		765	1300	3000	4000	6200	35000
Nominal Input Speed	rpm		3000	3000	3000	2000	2000	2000
Max input speed	rpm		6000	6000	6000	4000	4000	4000
Torsional stiffness	Nm/arcmin		6	12	23	45	148	220
Weight	kg	1	2.6	7	14	30	50	68
		2	3.0	—	—	—	—	—
Operating temp.	°C		-10 ~ 90					
Degree of protection			IP 65					
Lubrication			Synthetic lubrication					
Mounting direction			Any					

① Life reduced by half under continuous operation.
② Noise level measured on input running at 3000 rpm with no load (i = 5)

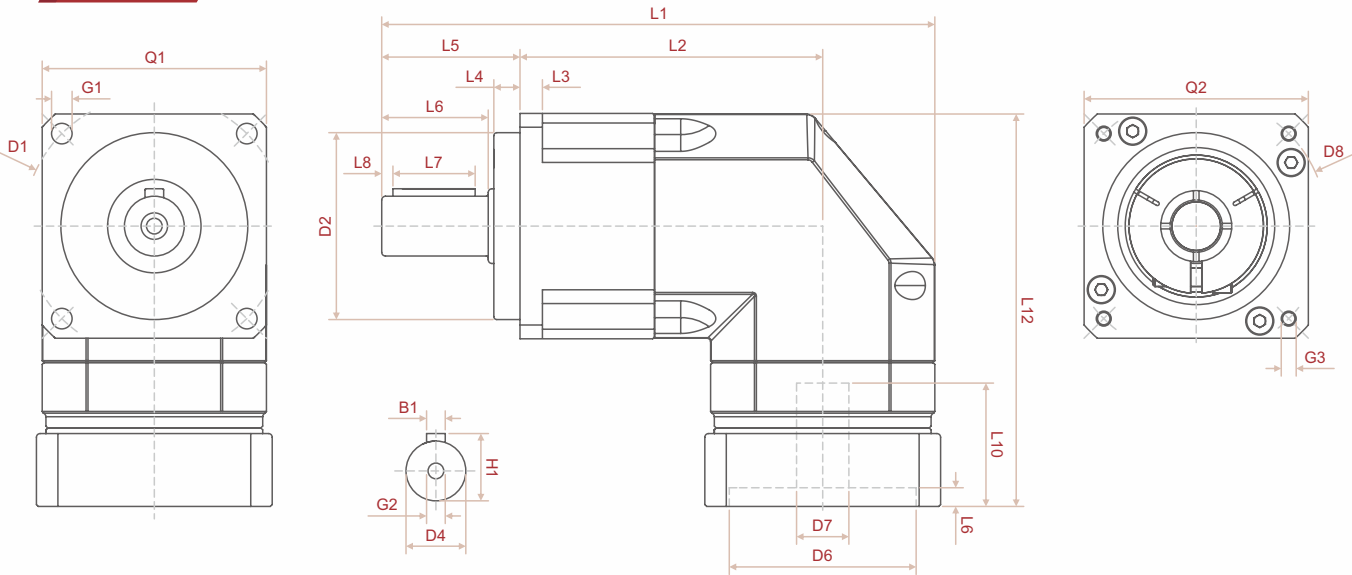
Model / Size		Stages	Ratio	060	090	115	142	180	220	
Nominal output torque	Nm	1	3	55	145	290	342	588	1140	
			4	50	150	300	542	1050	1700	
			5	60	140	290	650	1200	2000	
			7	50	125	270	550	1100	1800	
			10	40	140	290	650	520	1220	
			14	50	125	270	550	1100	1800	
			20	40	95	220	450	520	1220	
		2	25	54						
			30	53						
			35	54						
			40	55						
			50	54						
			70	54						
			100	54						
MAX Output torque		3 times of Nominal output torque								

Model / Size		Stages	Ratio	060	090	115	142	180	220
Mass Moments of Inertia	Kg-cm ²	1	3	0.23	0.98	2.36	23.4	68.9	135.4
			4	0.18	0.68	1.68	23.4	68.9	135.4
			5	0.17	0.66	1.55	23.4	68.9	135.4
			7	0.15	0.60	1.48	23.4	68.9	135.4
			10	0.14	0.58	1.45	21.8	65.6	119.8
			14,20	0.18	0.58	1.45	21.8	65.6	119.8
		2	25	0.18					
			30,35,40	0.15					
			50,70	0.15					
			100	0.14					

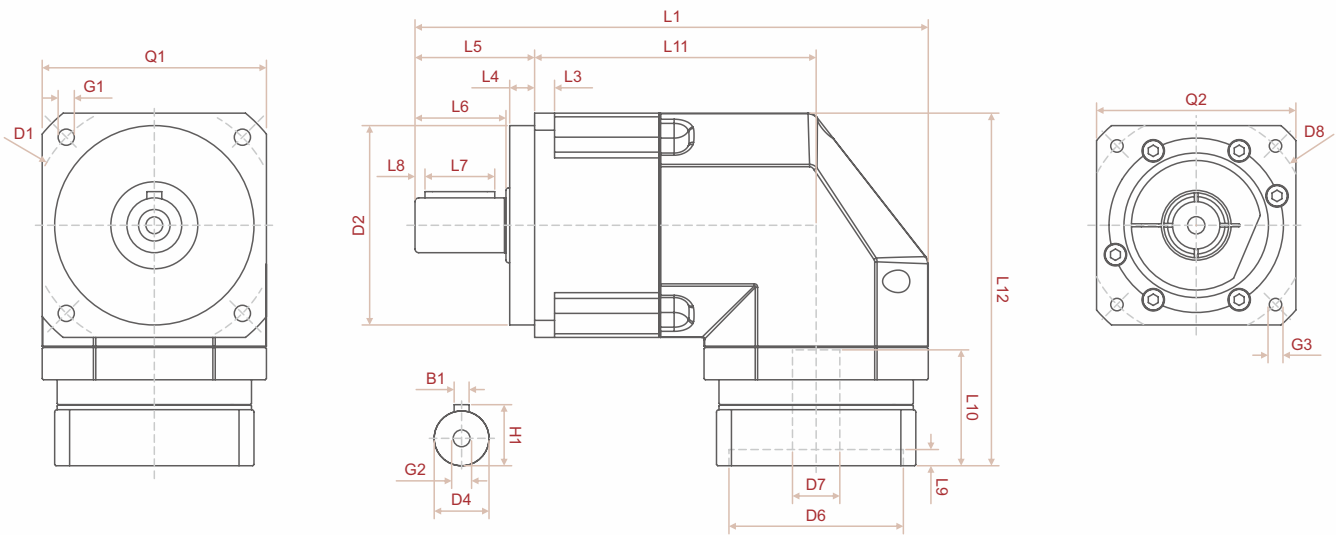
ZSR

PROFILE DIMENSIONS

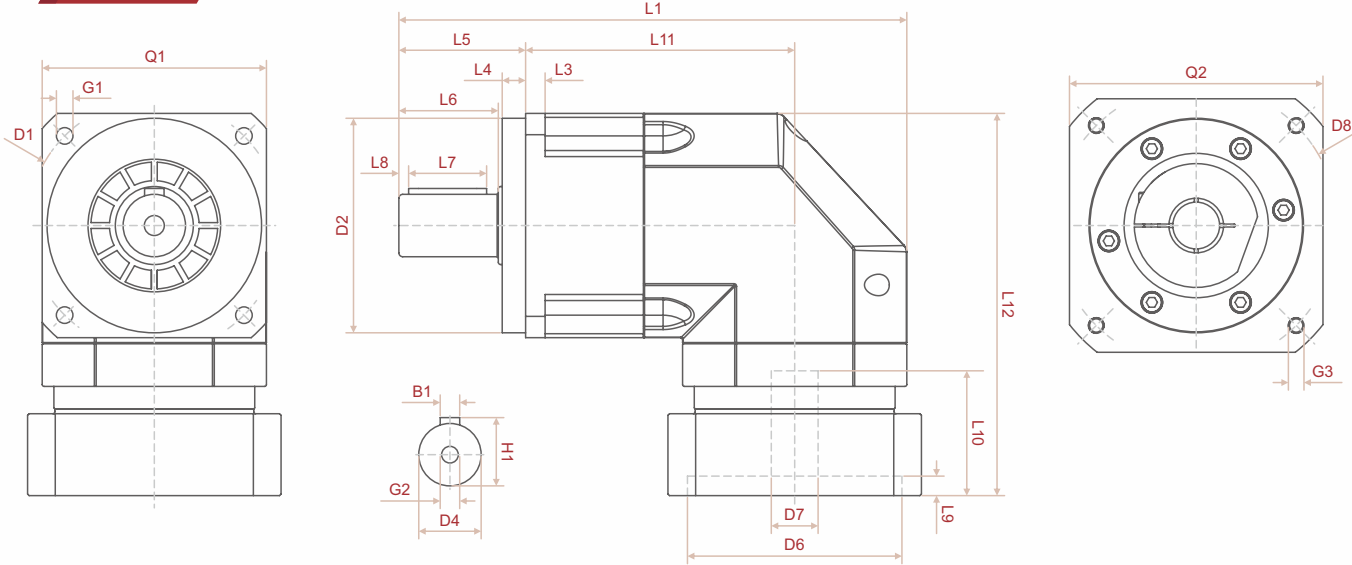
ZSR060



ZSR090



ZSR115

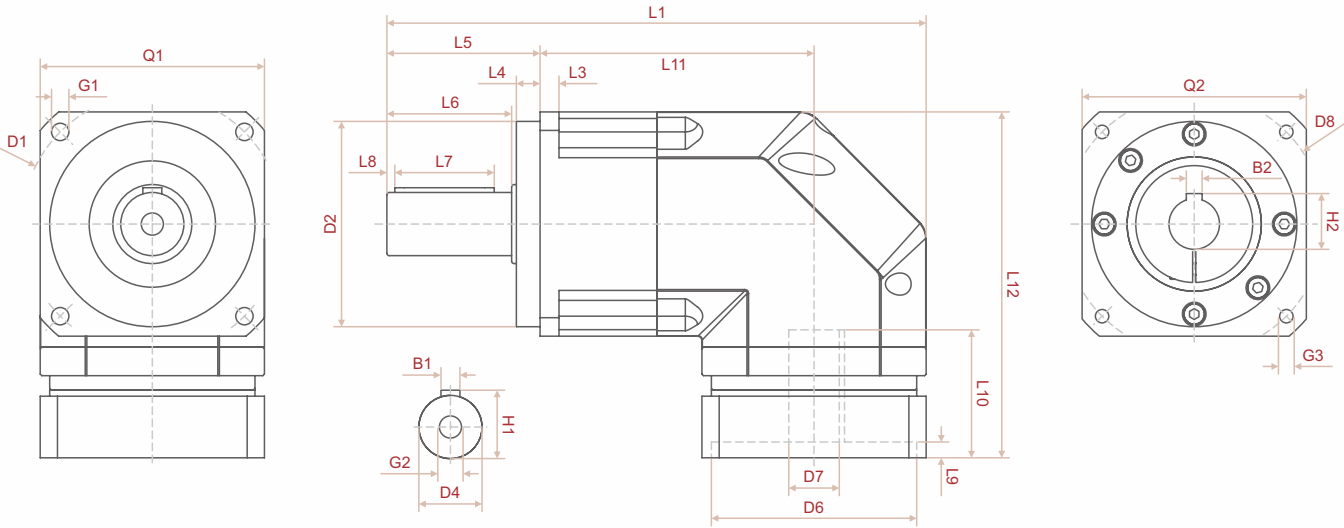


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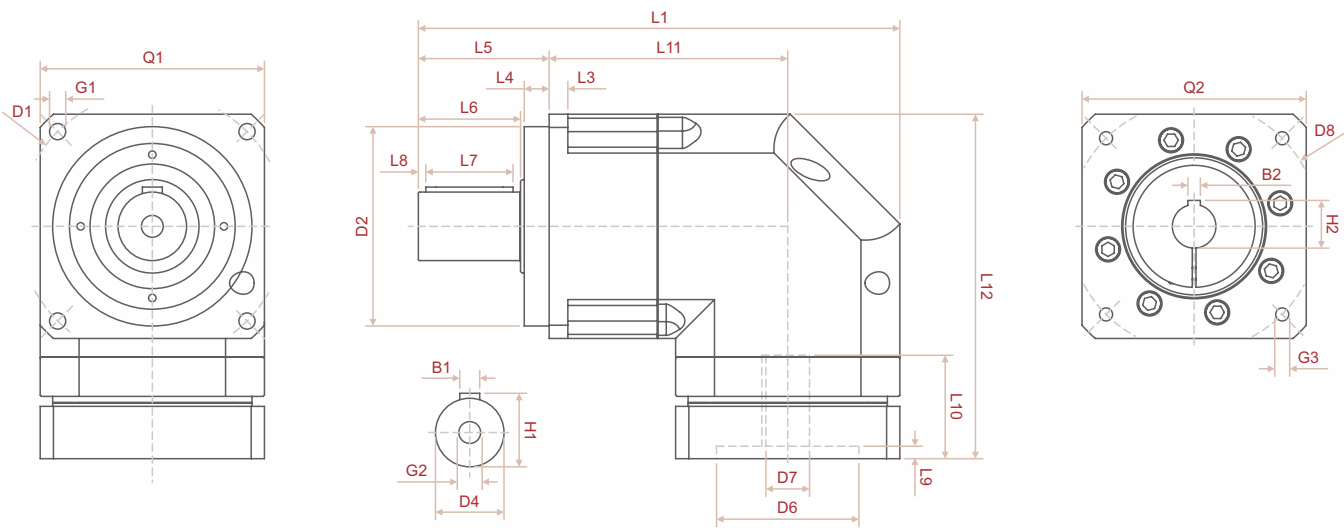
PROFILE DIMENSIONS

PRECISION RIGHT ANGLE GEAR REDUCERS
ZSR PROFILE DIMENSIONS

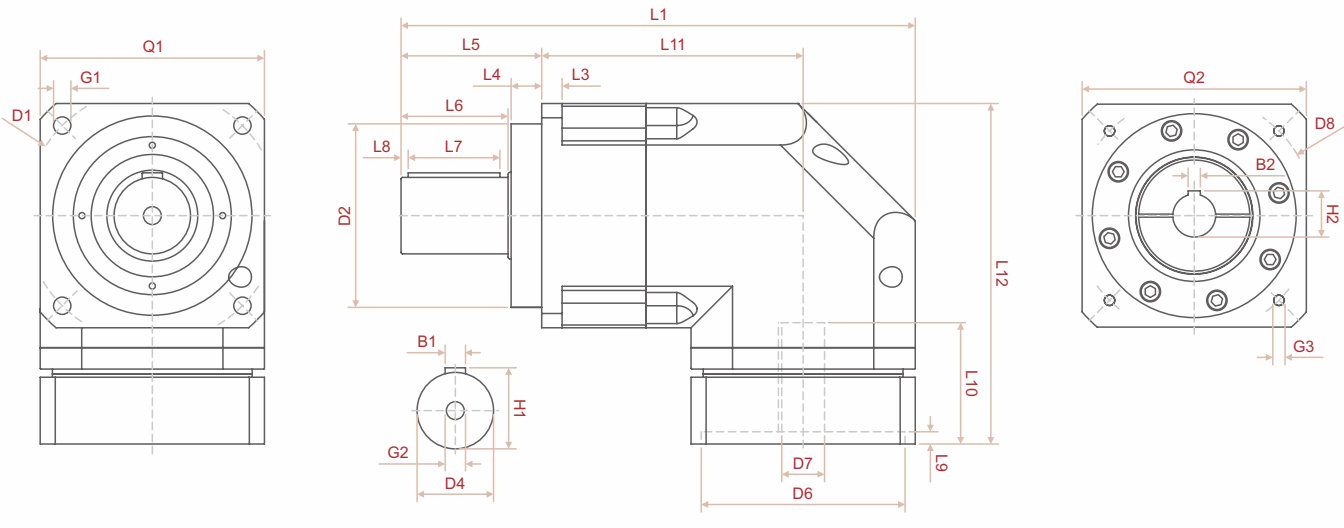
ZSR142



ZSR180



ZSR220



ZSR

PROFILE DIMENSIONS

Model / Size	Stages		ZSR060		ZSR090		ZSR115		ZSR142		ZSR180		ZSR220	
Overall length	1	L1	148		206		260.5		341.5		386.5		504.5	
	2		177		—		—		—		—		—	
Offset length	1	L11	81		113		138		173.5		191.5		256.5	
	2		110		—		—		—		—		—	
Output flange		Q1	□60		□90		□115		□142		□180		□220	
Input flange		Q2	□60		□90		□115		□142		□180		□220	
Output														
Length from flange		L3	6		8		10		12		15		20	
Pilot length		L4	7		10		12		15		20		30	
Output shaft length		L5	37		48		65		97		105		138	
shaft shoulder to the shaft end		L6	28.5		36.5		51		79		82		105	
Flat end length / Key length		L7	22		28		40		63		70		90	
Key length to the shaft end		L8	3		4		5		5		6		7	
Mounting hole circle		D1	Ø70		Ø100		Ø130		Ø165		Ø215		Ø250	
Pilot diameter		D2	Ø50 g6		Ø80 g6		Ø110 g6		Ø130 g6		Ø160 g6		Ø180 g6	
Output shaft diameter		D4	Ø16 h6		Ø22 h6		Ø32 h6		Ø40 h6		Ø55 h6		Ø75 h6	
Key width		B1	5		6		10		12		16		20	
Flat end height / Key Height		H1	18		24.5		35		43		59		79.5	
mounting thread x depth		G1	4-Ø5.5		4-Ø7		4-Ø9		4-Ø11		4-Ø13		4-Ø17	
center screw hole x depth		G2	M5x15		M8x20		M12x30		M16x36		M20x42		M20x42	
Input														
Pilot depth		L9	6.5		7		10		10		10		10	
motor shaft length		L10	33		42		59		81		83		119	
Overall length		L12	105		141.5		196		219		276.5		334	
Pilot diameter		D6	Ø38.1 F8	Ø50 F8	Ø70 F8	Ø80 F8	Ø95 F8	Ø110 F8	Ø130 G7		Ø114.3 G7		Ø114.3 G7	Ø200 G7
Input shaft diameter		D7	Ø8	Ø14	Ø19	Ø19	Ø24 G7	Ø22 G7 Ø24 G7	Ø32		Ø35	Ø42	Ø42	Ø42
Key width		B2	—		—		—		10		10	12	12	
Key Height		H2	—		—		—		35.3		38.3	45.3	45.3	
Mounting hole circle		D8	Ø66.67 (□47.14)	Ø70	Ø90	Ø100	Ø115	Ø145	Ø165		Ø200		Ø200	Ø235
mounting thread x depth		G3	4-M4x12	4-M4x12 4-M5x12	4-M5x15 4-M6x15	4-M6x15	4-M8x20	4-M8x20	4-M10x30		4-M12x35		4-M12x30	4-M12x30



TECHNICAL DATA

PRECISION RIGHT ANGLE GEAR REDUCERS
ZFR TECHNICAL DATA

Model / Size		Stages	060	090	110	140	200
Full load efficiency	%	1	95				
		2	92				
Standard Backlash	arcmin	1	≤9	≤9	≤9	≤9	≤9
		2	≤12	≤12	≤12	≤12	≤12
Precision Backlash	arcmin	1	≤7	≤7	≤7	≤7	≤7
		2	≤10	≤10	≤10	≤10	≤10
Noise ②	dB(A)		63	68	70	70	67
Lifetime ①	hr		20000				
Max. Bending moment M2KB	N		120	241	417	1320	1450
Max axial load	N		765	2000	4550	6100	7250
Nominal Input Speed	rpm		3000	3000	3000	2000	2000
Max input speed	rpm		6000	6000	6000	4000	4000
Torsional stiffness	Nm/arcmin		11	30	84	150	435
Weight	kg	1	1.7	3.9	5.9	16.5	43.1
		2	2.5	5.9	9.3	19.4	55.3
Operating temp.	°C		-10 ~ 90				
Degree of protection			IP 65				
Lubrication			Synthetic lubrication				
Mounting direction			Any				

① Life reduced by half under continuous operation.
② Noise level measured on input running at 3000 rpm with no load (i = 5)

Model / Size		Stages	Ratio	060	090	110	140	200
Nominal output torque	Nm	1	3	—	—	290	—	—
			4	50	150	300	582	1050
			5	54	140	290	600	1200
			7	44	125	270	540	1100
			10	54	140	290	600	1200
			14	44	125	270	540	1100
		2	20	37	95	220	500	800
			25	66	176	335	600	1220
			35	66	176	310	600	1220
			40	50	142	285	582	1145
			50,70,100	66	176	335	600	1220
			140	54	145	310	540	1220

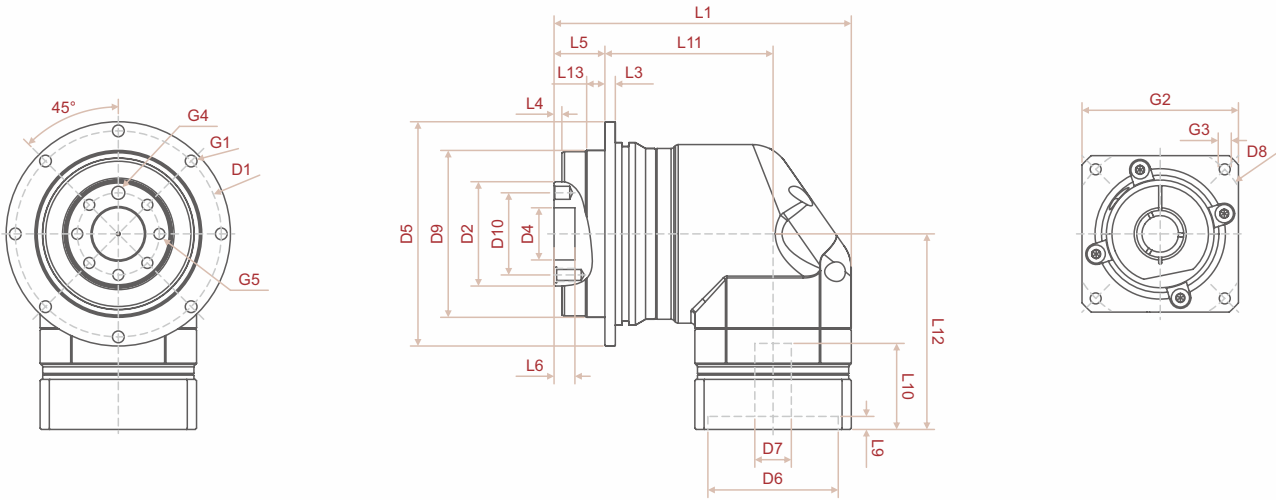
MAX Output torque 3 times of Nominal output torque

Model / Size		Stages	Ratio	060	090	110	140	200
Mass Moments of Inertia	Kg-cm ²	1	3	—	—	2.36	—	—
			4	0.18	0.68	1.68	7.17	26
			5	0.17	0.66	1.55	6.52	13.8
			7	0.15	0.6	1.48	6.17	23
			10,14,20	0.14	0.58	1.45	6.1	22.9
		2	25	0.18	0.18	0.65	2.8	7.56
			35,40	0.14	0.14	0.6	2.59	7.56
			50,70	0.14	0.14	0.58	2.54	7.06
			100,140	0.14	0.14	0.58	2.54	2.54

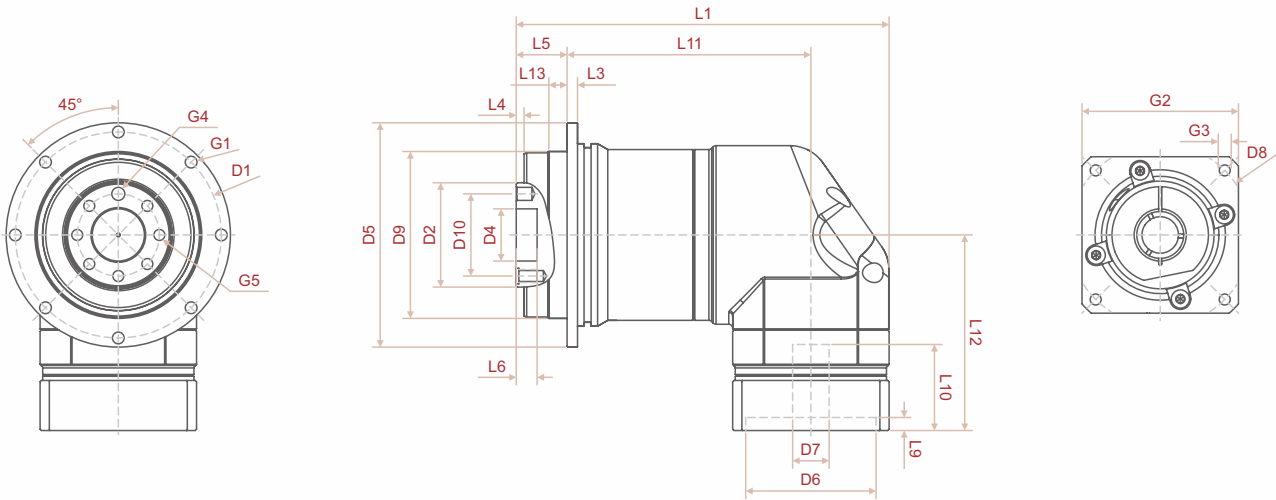
ZFR

PROFILE DIMENSIONS

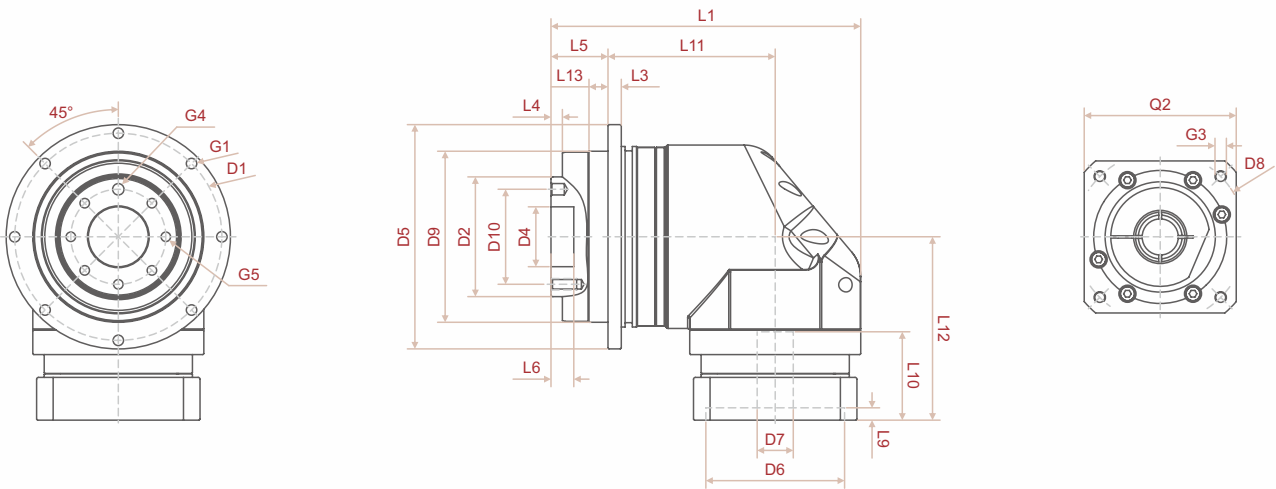
ZFR060-1



ZFR060-2



ZFR090-1



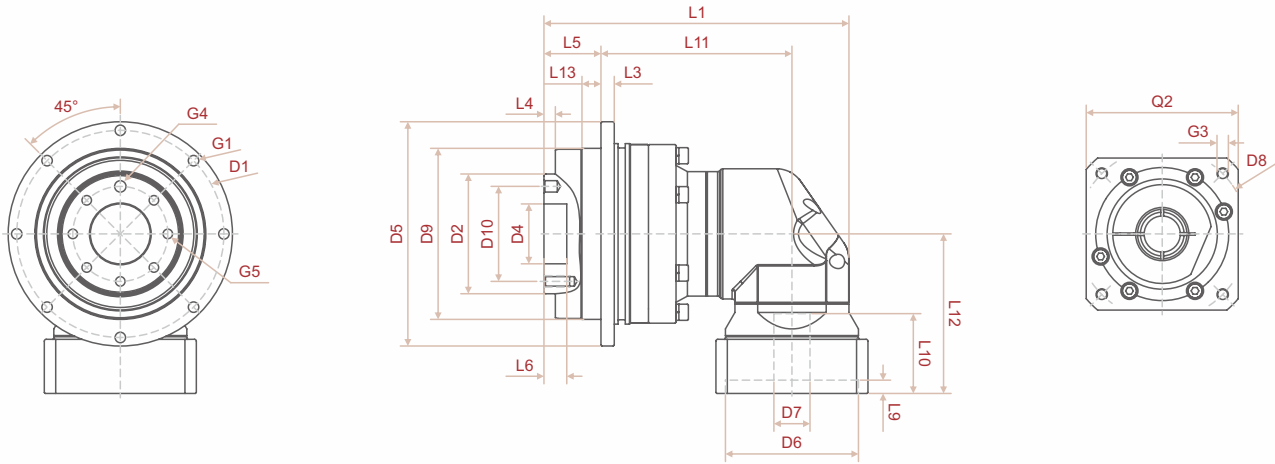
PRECISION RIGHT ANGLE GEAR REDUCERS
ZFR PROFILE DIMENSIONS

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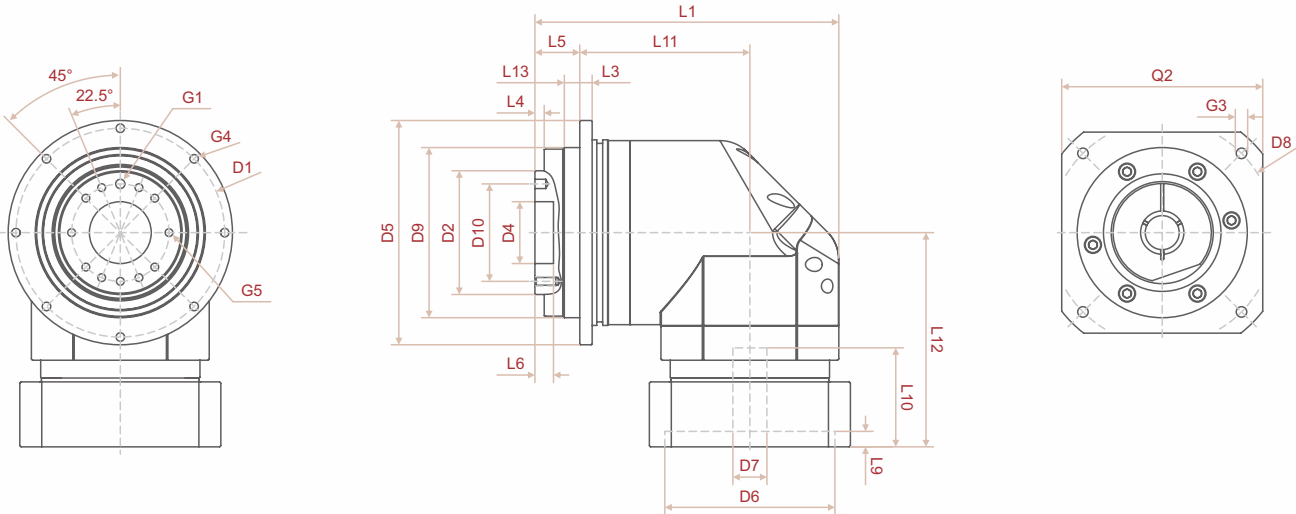
PROFILE DIMENSIONS

PRECISION RIGHT ANGLE GEAR REDUCERS
ZFR PROFILE DIMENSIONS

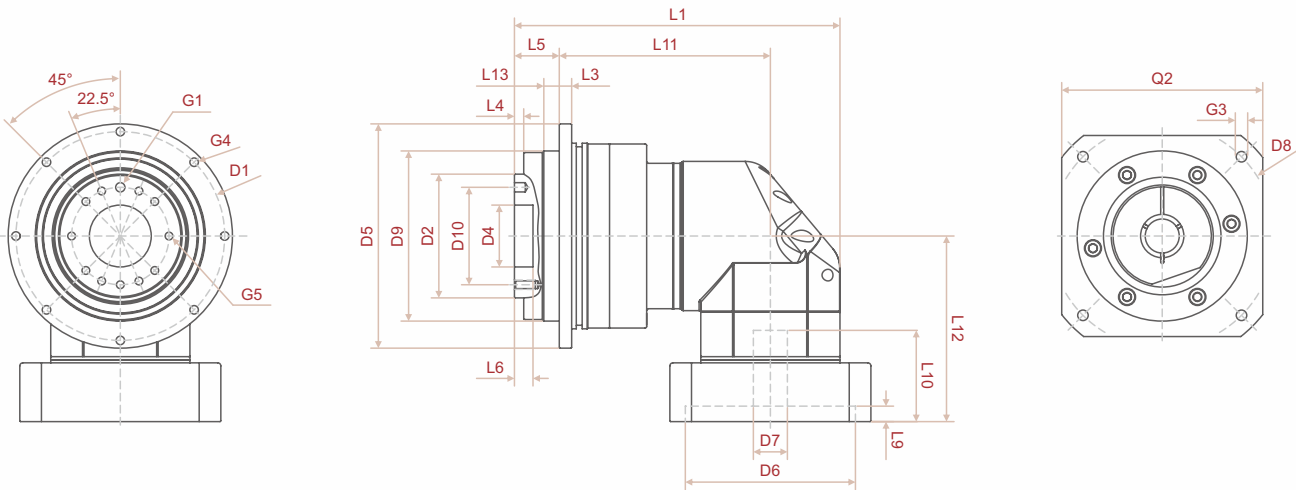
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ZFR110-1



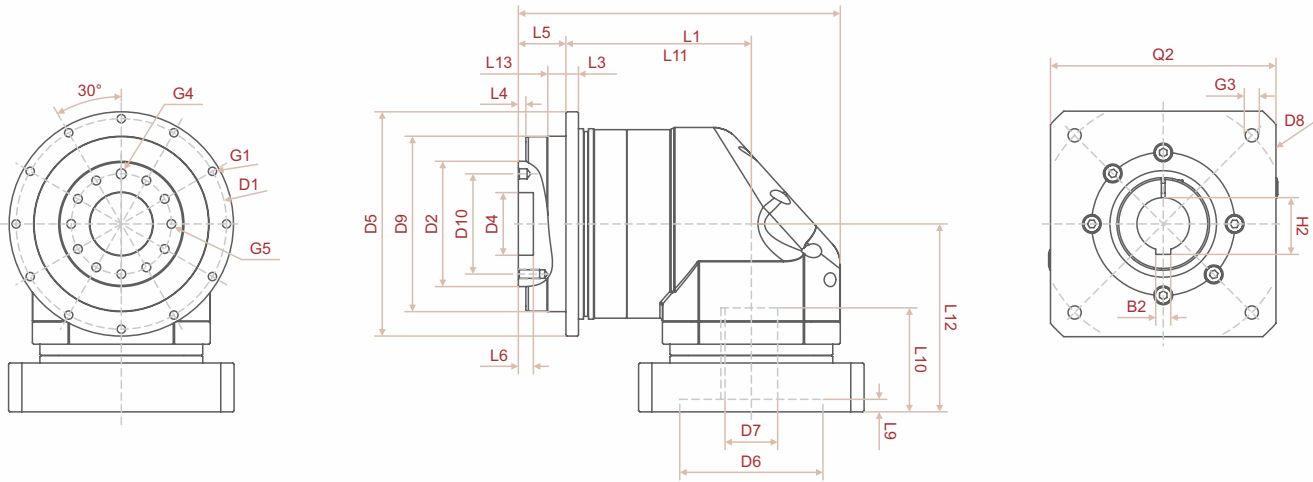
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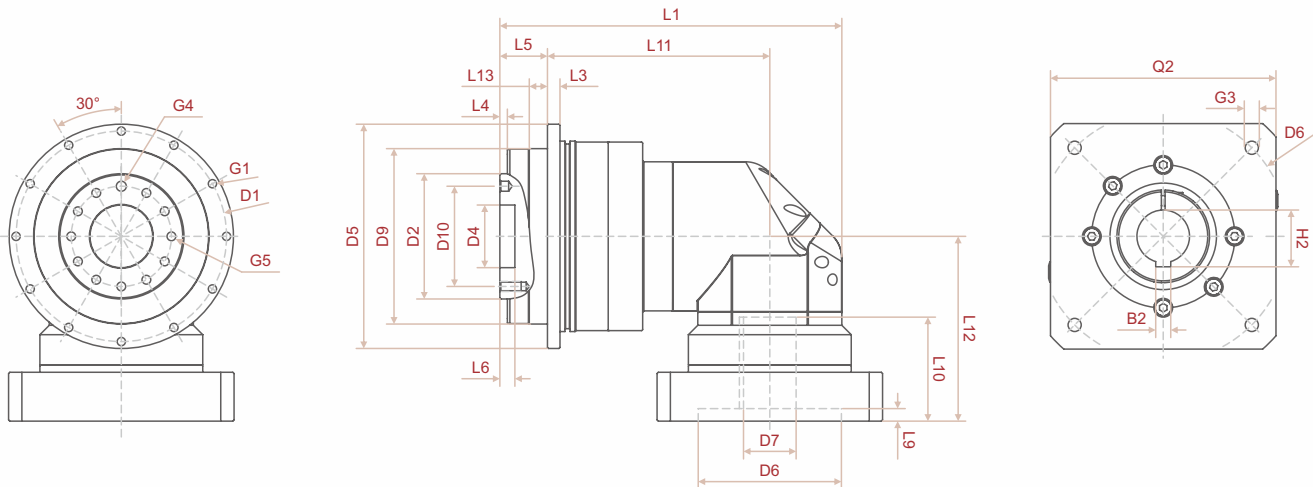
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PROFILE DIMENSIONS

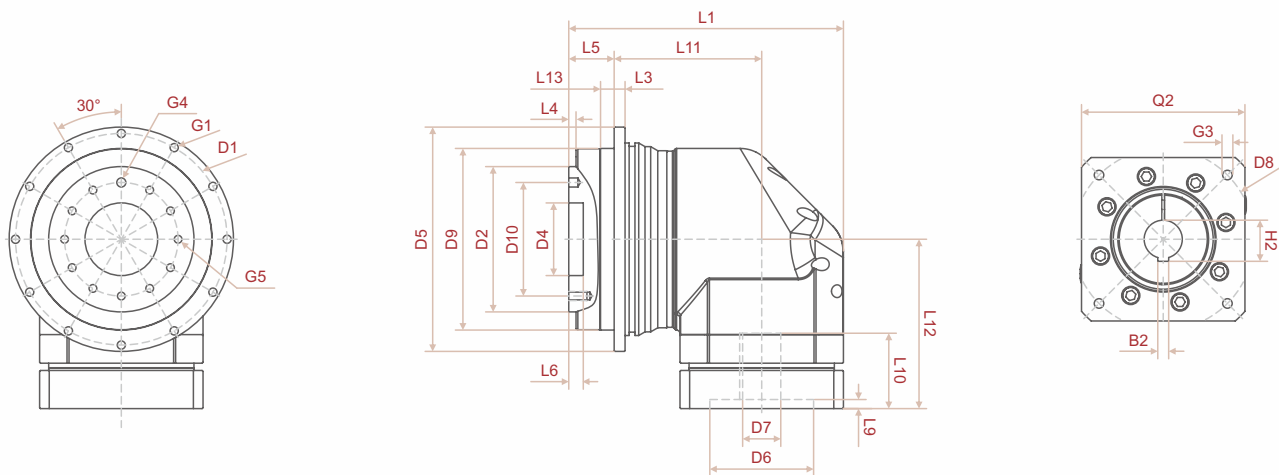
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ZFR140-2



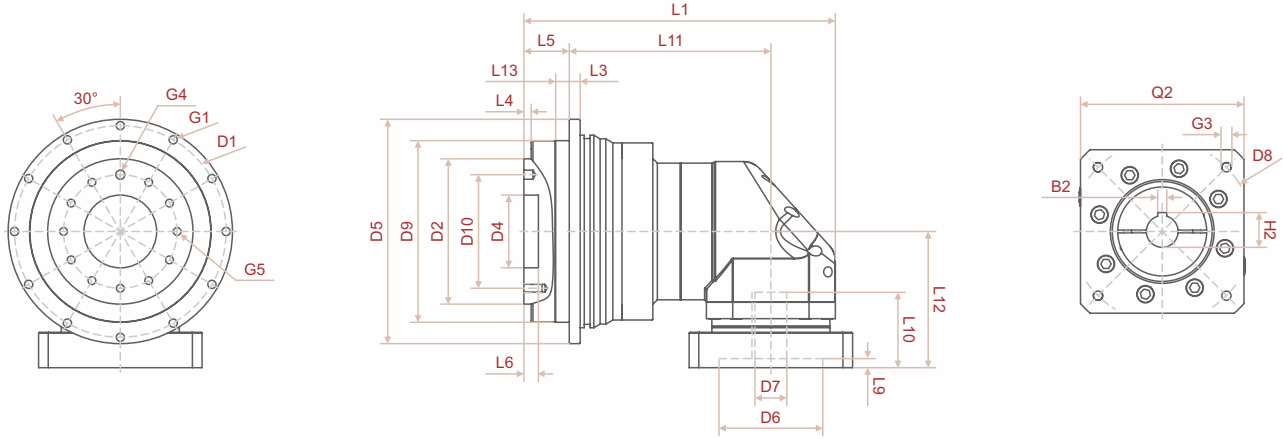
ZFR200-1



ZFR

PROFILE DIMENSIONS

ZFR200-2



Model / Size		Stages		ZFR060		ZFR090		ZFR110		ZFR140		ZFR180		
Overall length		1	L1	114		163		196.5		257		302.5		
		2		143		160.5		210.5		280.5		343		
Offset length		1	L11	64.5		88		167.5		148		162.5		
		2		93.5		100.5		136.5		177.5		222		
Input flange			Q2	□60		□80	□86	□130		□180		□180		
Output														
Length from flange			L3	4		7		8		10		12		
Pilot length			L4	3		6		6		6		8		
Output shaft length			L5	19.5		30		29		38		50		
Shaft shoulder to the shaft end			L6	8		12		12		12		16		
Spigot depth			L13	7		10		10		15		15		
Mounting hole circle			D1	Ø79		Ø109		Ø135		Ø168		Ø233		
Pilot diameter			D2	Ø40 h7		Ø63 h7		Ø80 h7		Ø100 h7		Ø160 h7		
Output shaft diameter			D4	Ø20 H7		Ø31.5 H7		Ø40 H7		Ø50 H7		Ø80 H9		
Output shaft diameter			D5	Ø86		Ø118		Ø145		Ø179		Ø247		
Centering			D9	Ø64 h7		Ø90 h7		Ø110 h7		Ø140 h7		Ø200 h7		
Hole circle diameter			D10	Ø31.5		Ø50		Ø63		Ø80		Ø125		
Pinion bore			G1	8-Ø4.5 THRU.		8-Ø5.5 THRU.		8-Ø5.5 THRU.		12-Ø6.6 THRU.		12-Ø9.0 THRU.		
Mounting thread x depth			G4	Ø5 H7x6 DP.		Ø6 H7x7 DP.		Ø6 H7x7 DP.		Ø8 H7x7 DP.		Ø10 H7x10 DP.		
			G5	7-M5x8		7-M6x13		11-M6x13		11-M8x17		11-M10x20		
Input														
Pilot depth			L9	5		6.5		10		10		10		
Motor shaft length		1	L10	33		46.5		64		83		83		
		2		33		42		59		83		83		
Offset length		1	L12	75		96.5		138.5		150		186.5		
		2		75		84		120		147.5		150		
Pilot diameter			D6	Ø38.1 G7	Ø50 G7	Ø70 F8	Ø80 F8	Ø110 G7	Ø110 G7	Ø130 G7	Ø114.3 G7	Ø114.3 G7		
Input shaft diameter			D7	Ø14		Ø19		Ø22 F7		Ø24 F7	Ø35	Ø42	Ø35	Ø42
Key width			B2	—		—		—		10	12	10	12	
Key Height			H2	—		—		—		38.3	45.3	38.3	45.3	
Mounting hole circle			D8	Ø66.67 (□47.14)	Ø70	Ø90	Ø100	Ø145	Ø130	Ø165	Ø200	Ø200		
mounting thread x depth			G3	4-M4x12	4-M4x12 4-M5x12	4-M6x15	4-M6x12	4-M8x20	4-M8x20	4-M10x30	4-M12x35	4-M12x35		

ZRPS/ZRPN

TECHNICAL DATA

Model / Size		Stages	060	090	120
Full load efficiency	%	1	95		
		2	92		
Standard Backlash	arcmin	1	≤10	≤10	≤10
		2	≤12	≤12	≤12
Precision Backlash	arcmin	1	≤8	≤8	≤8
		2	≤10	≤10	≤10
Noise ②	dB(A)		57	58	58
Lifetime ①	hr		20000		
Max radial load	N		889	1020	2230
Max axial load	N		850	980	1550
Nominal Input Speed	rpm		3000	3000	3000
Max input speed	rpm		6000	6000	6000
Torsional stiffness	Nm/arcmin		2.6	7.5	15.5
Weight	kg	1	3.0	7.5	12.1
		2	3.8	9.2	15.5
Operating temp.	°C		-10 ~ 90		
Degree of protection			IP 65		
Lubrication			Synthetic lubrication		
Mounting direction			Any		

① Life reduced by half under continuous operation.
② Noise level measured on input running at 3000 rpm with no load (i = 5)

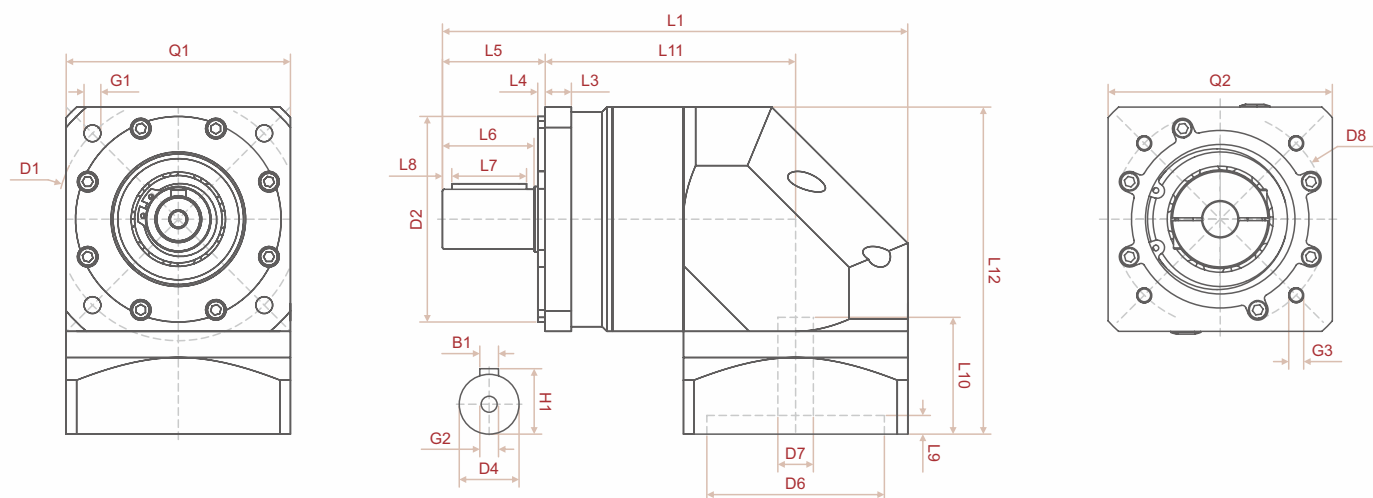
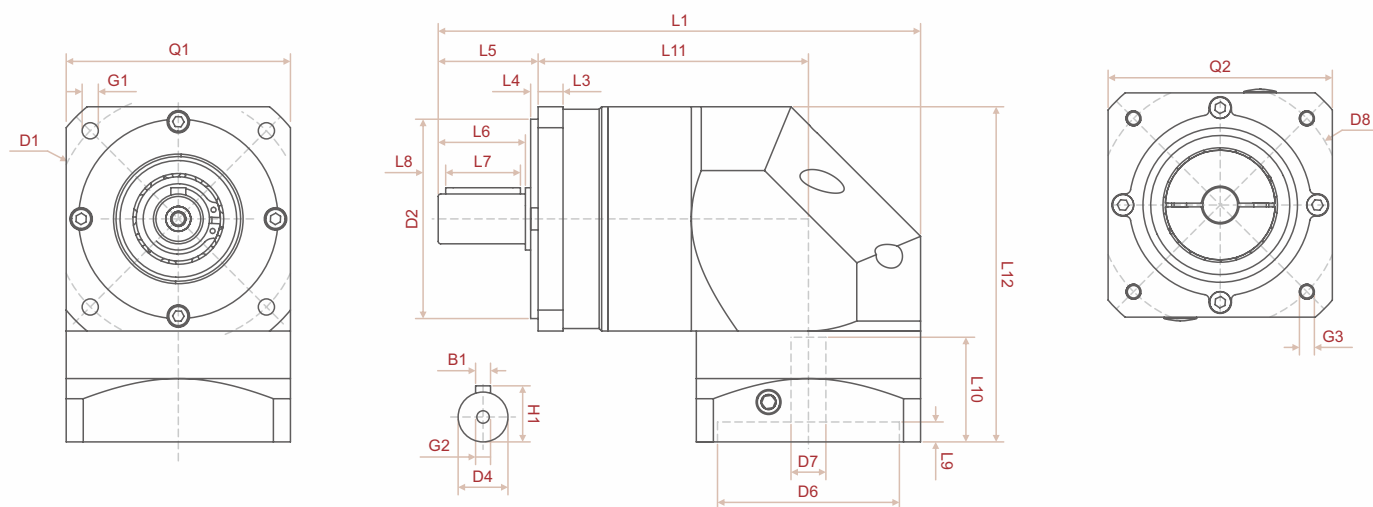
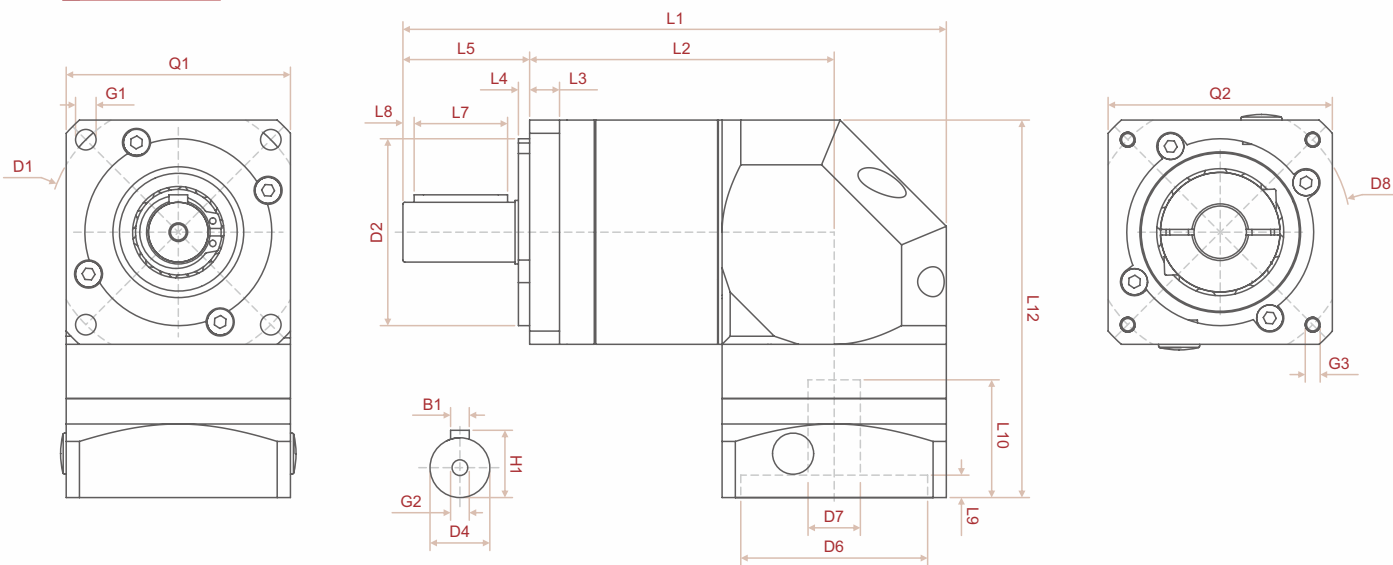
Model / Size		Stages	Ratio	060	090	120
Nominal output torque	Nm	1	3	16.5	60	148
			4	27	86	222
			5	27	94.5	235
			7	19.5	64	158
			10	8.5	39.5	93
		2	12,15	26	96	250
			16,20	30	96	250
			25	33	105.5	264
			30	30	96	250
			35	35	105.5	264
			40	30	96	250
			50	33	105.5	264
			70	21.5	71.5	177
			100	21.5	87	170

MAX Output torque 2 times of Nominal output torque

Model / Size		Stages	Ratio	060	090	120
Mass Moments of Inertia	Kg-cm ²	1	3	0.107	0.400	1.650
			4	0.094	0.309	1.220
			5	0.092	0.291	1.150
			7	0.091	0.285	1.130
			10	0.091	0.283	1.110
		2	12,15	0.094	0.291	1.650
			16	0.094	0.291	1.220
			20	0.092	0.291	1.150
			25	0.092	0.291	1.130
			30,35,40	0.091	0.285	1.130
			50	0.091	0.283	1.110
			70	0.092	0.283	1.110
			100	0.092	0.291	1.150

ZRPS090

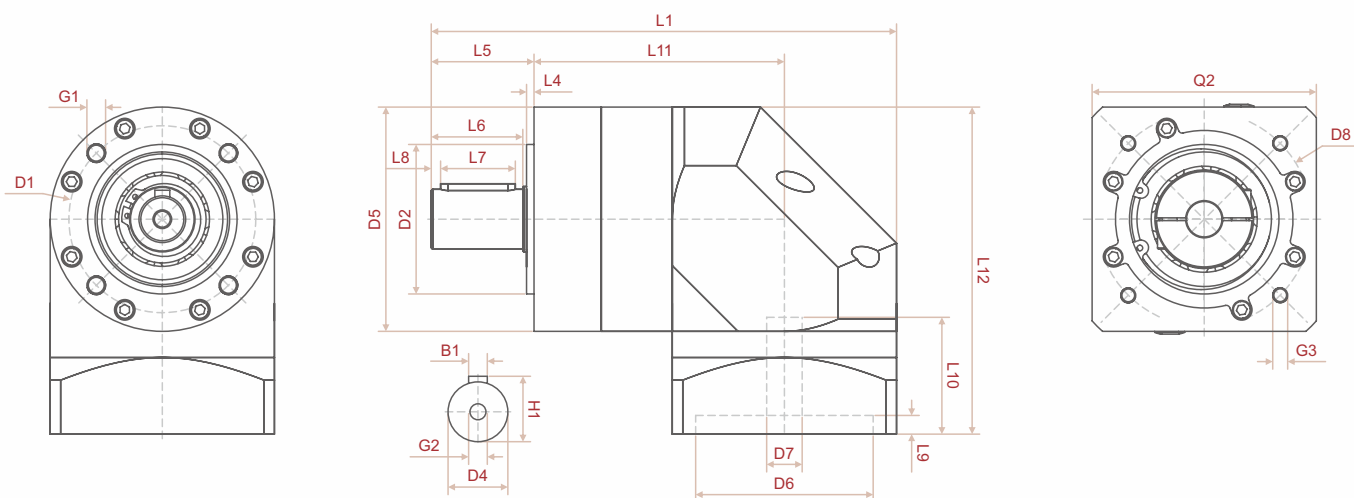
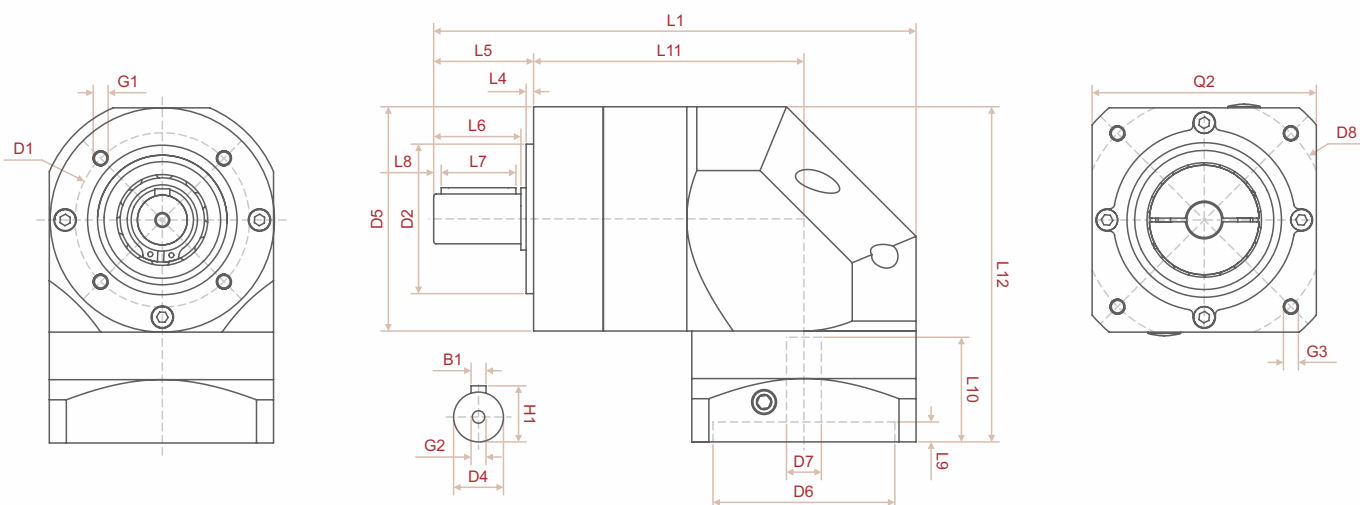
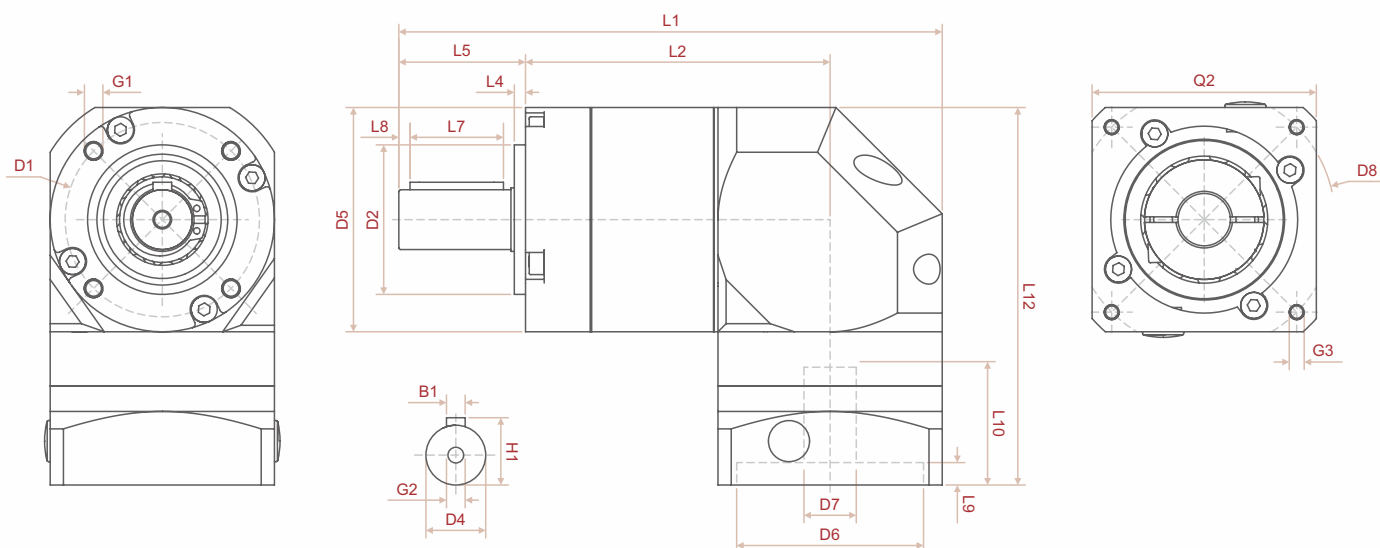
ZRPS120



ZRPS

PROFILE DIMENSIONS

Model / Size	Stages		ZRPS060		ZRPS090		ZRPS120	
Overall length	1	L1	145.5		193.5		249	
	2		161.5		216.5		279.5	
Offset length	1	L11	81.5		108.5		134	
	2		97		131.5		164.5	
Output flange		Q1	□60		□90		□120	
Input flange		Q2	□60		□90		□120	
Output								
Length from flange		L3	8		10		14	
Pilot length		L4	3		3		4	
Output shaft length		L5	34		40		55	
shaft shoulder to the shaft end		L6	—		35		49	
Flat end length / Key length		L7	25		30		40	
Key length to the shaft end		L8	3		3		5	
Mounting hole circle		D1	Ø70		Ø100		Ø130	
Pilot diameter		D2	Ø50 h6		Ø80 h6		Ø110 h7	
Output shaft diameter		D4	Ø14 h6	Ø16 h6	Ø20 h6	Ø22 h6	Ø25 h6	Ø32 h6
Key width		B1	5		6		8	10
Flat end height / Key Height		H1	16	18	22.5	24.5	28	35
mounting thread x depth		G1	4-Ø5.5		4-Ø6.5		4-Ø9	
center screw hole x depth		G2	M5x12		M6x13		M10x22	
Input								
Pilot depth		L9	6		8		10	
motor shaft length		L10	31.5		42		62.5	
Overall length		L12	101		—		—	
Pilot diameter		D6	Ø38.1 G7	Ø50 G7	Ø70 G7	Ø80 G7	Ø95 F7	Ø110 F7
Input shaft diameter		D7	Ø8 H7	Ø14 H7	Ø19 H7	Ø16H7/Ø19H7	Ø19G7/Ø24G7	Ø22G7/Ø24G7
Key width		B2	—	—	—	—	—	—
Key Height		H2	—	—	—	—	—	—
Mounting hole circle		D8	Ø66.67(□47.14)	Ø70	Ø90	Ø100	Ø115/Ø130	Ø145
mounting thread x depth		G3	4-M4x12	4-M4x12 4-M5X12	4-M5x12 4-M6X12	4-M6x12	4-M6x20 4-M8X20	4-M8x20



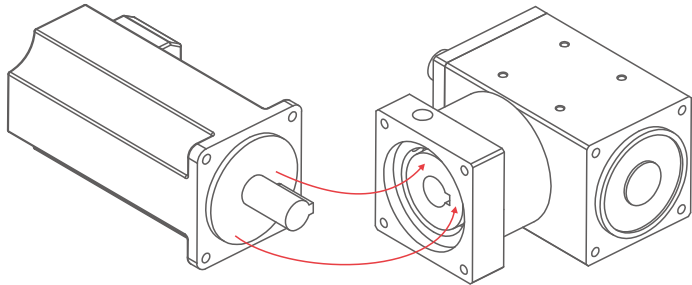
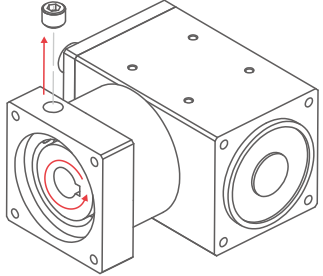
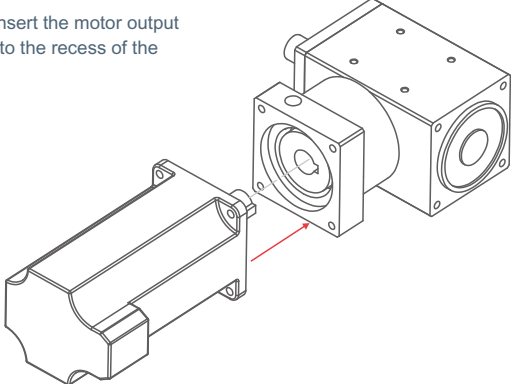
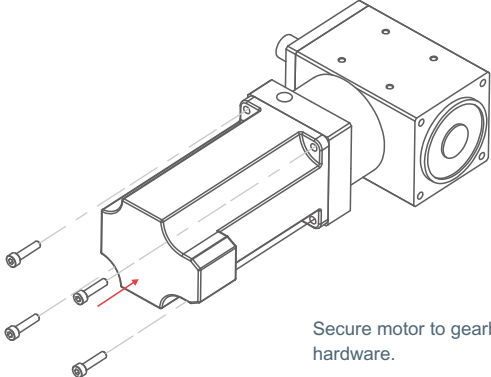
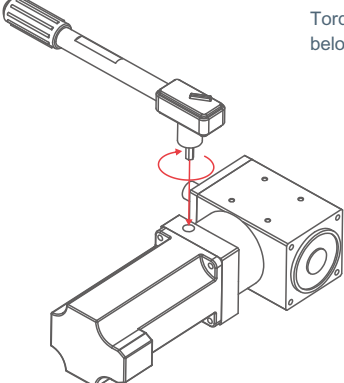
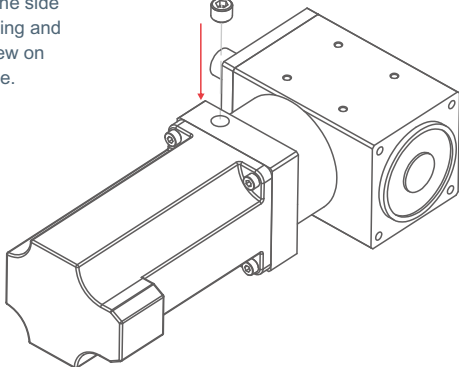
ZRPN

PROFILE DIMENSIONS

Model / Size	Stages		ZRPN060		ZRPN090		ZRPN120	
Overall length	1	L1	145.5		193.5		249	
	2		161.5		216.5		279.5	
Offset length	1	L11	81.5		108.5		134	
	2		97		131.5		164.5	
Output flange		Q1	Ø60		Ø90		Ø120	
Input flange		Q2	□60		□90		□120	
Output								
Pilot length		L4	3		3		4	
Output shaft length		L5	34		40		55	
shaft shoulder to the shaft end		L6	—		35		49	
Flat end length / Key length		L7	25		30		40	
Key length to the shaft end		L8	3		3		5	
Mounting hole circle		D1	Ø52		Ø70		Ø100	
Pilot diameter		D2	Ø40 h6		Ø60 h6		Ø80 h7	
Output shaft diameter		D4	Ø14 h6	Ø16 h6	Ø20 h6	Ø22 h6	Ø25 h6	Ø32 h6
Key width		B1	5		6		8	10
Flat end height / Key Height		H1	16	18	22.5	24.5	28	35
mounting thread x depth		G1	4-M5x12		4-M6x15		4-M10x20	
center screw hole x depth		G2	M5x12		M6x13		M10x22	
Input								
Pilot depth		L9	6		8		10	
motor shaft length		L10	31.5		42		62.5	
Overall length		L12	101		—		—	
Pilot diameter		D6	Ø38.1 G7	Ø50 G7	Ø70 G7	Ø80 G7	Ø95 F7	Ø110 F7
Input shaft diameter		D7	Ø8 H7	Ø14 H7	Ø19 H7	Ø16H7/Ø19H7	Ø19G7/Ø24G7	Ø22G7/Ø24G7
Key width		B2	—	—	—	—	—	—
Key Height		H2	—	—	—	—	—	—
Mounting hole circle		D8	Ø66.67(□47.14)	Ø70	Ø90	Ø100	Ø115/Ø130	Ø145
mounting thread x depth		G3	4-M4x12	4-M4x12 4-M5X12	4-M5x12 4-M6X12	4-M6x12	4-M6x20 4-M8X20	4-M8x20

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

RIGHT ANGLE GEARBOX MOUNTING INSTRUCTION

STEP 1		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. 	
A. Verify fit before assembly B. Clean both surfaces thoroughly			
STEP 3		STEP 4	
Position and then insert the motor output shaft and flange into the recess of the gearbox. 		 Secure motor to gearbox using specified hardware.	
STEP 5		STEP 6	
 Torque motor coupling according to table below using a calibrated torque wrench.		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
	In-lbs	19	44	87	151	364	709	1232	3038
Strength 12.9 Tightening Torque									

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)

ORDERING INSTRUCTION

STEP ONE

Determine the Gear Reducer Ordering

Precision Planetary Gear Reducer Type

PS = Precision Planetary Gearbox With Square Output Flange
PN = Precision Planetary Gearbox With Round Output Flange
ZPS = Spur Gear Planetary Gearbox With Square Output Flange
ZPN = Spur Gear 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 Planetary Gearbox With Round Flange Output

Gear Ratio

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

PS — 060 — 050 — S

PS & PN Frame Size	ZPS & ZPN Frame Size		ZS Frame Size	
042 = 42mm 060 = 60mm 090 = 90mm	060 = 60mm 080 = 80mm 090 = 90mm	120 = 120mm 160 = 160mm	060 = 60mm 090 = 90mm 115 = 115mm	142 = 142mm 180 = 180mm 220 = 220mm
ZN Frame Size		ZE Frame Size		ZF Frame Size
060 = 60mm 090 = 90mm 120 = 120mm	150 = 150mm 180 = 180mm 220 = 220mm	060 = 60mm 090 = 90mm 120 = 120mm	140 = 140mm	060 = 60mm 090 = 90mm 110 = 110mm

Backlash Type

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

Economy Gear Reducer Type

EL = Economy Gearbox

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	30	70
4	9	15	35	100
5	10	20	40	
		25	50	

Output Flange Style

S = Square Flange
R = Round Flange

Input Flange Style

S = Square Flange
R = Round Flange

Precision Right Angle Gear Reducer Type

RB = Precision Right Angle Gearbox (Ratio 1:1)
RL = Precision Right Angle Gearbox (Ratio 1:2, 1:3, 1:4, 1:5)
ZSR = Only available in Single output shaft
ZFR = Helical Planetary & Right Angle Gearbox

RB — AS — 060 — 001

AS = Single output shaft
BS = Double output shaft
(Not applicable for RB series)
HS = Single hollow shaft
PS = Double hollow shaft
(Not applicable for RB series)
FS = Single flange output
DS = Double flange output
(Not applicable for RB series)
*ZSR = Only available in Single output shaft

RB & RL Gear Ratio	ZSR Gear Ratio		
Single Stage	Single Stage	Two Stages	
RB: 1 RL: 2,3,4,5	3 7 4 9 5 10	12 30 15 35 20 40 25 50	70 100

RB & RL Frame Size	ZSR Frame Size	
042 = 42mm 060 = 60mm 090 = 90mm	060 = 60mm 090 = 90mm 115 = 115mm	142 = 142mm 180 = 180mm 220 = 220mm
	ZFR Frame Size	
	060 = 60mm 090 = 90mm 110 = 110mm	140 = 140mm 200 = 200mm

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)

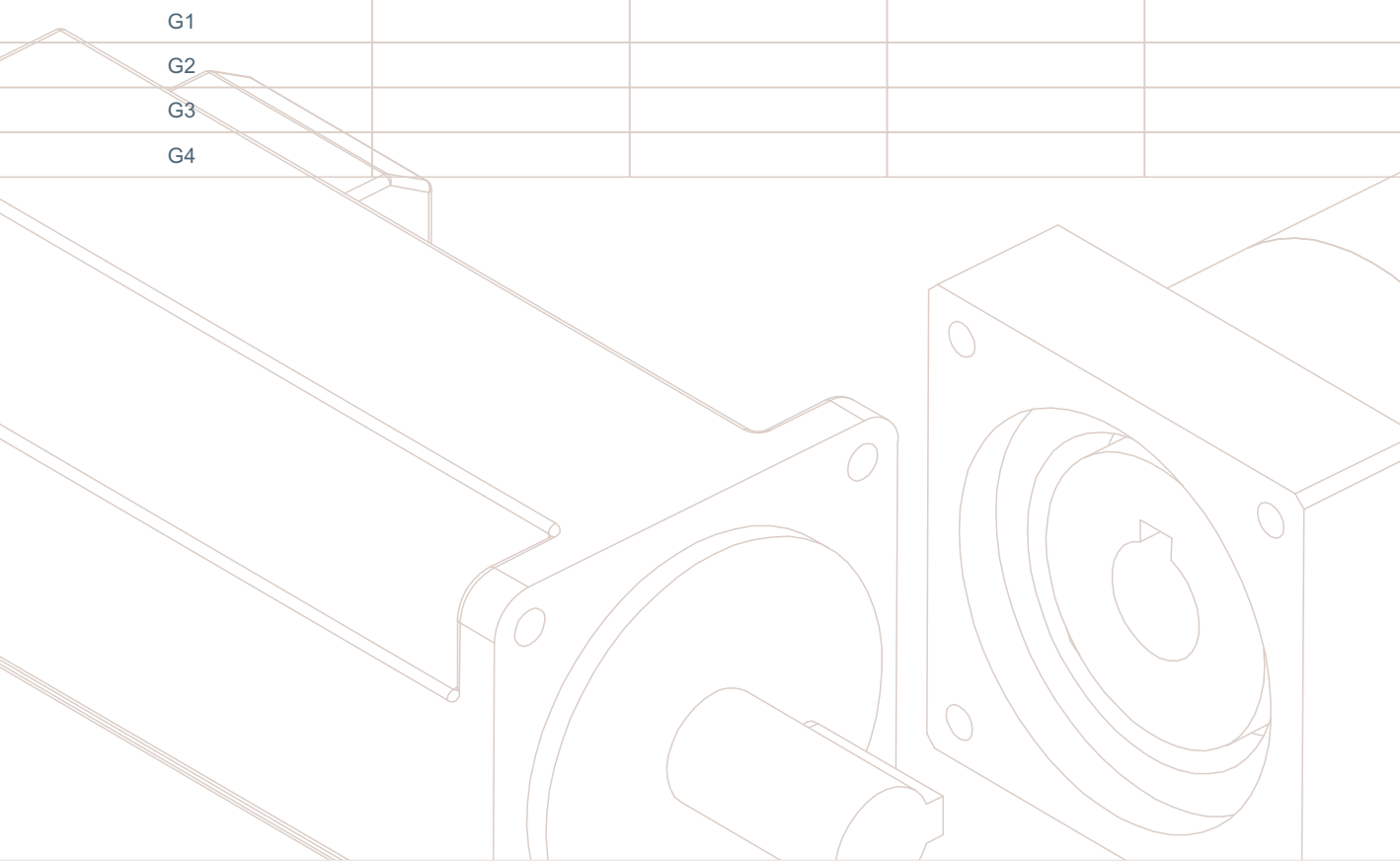
☐

mm

☐

in

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

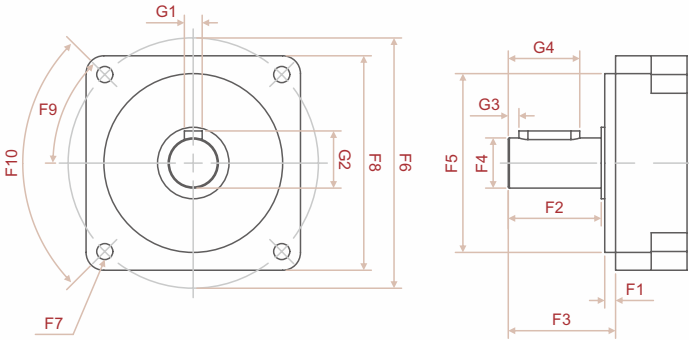


MOTOR OR GEAR REDUCER OUTPUT TYPE / UNIT CONVERSION TABLE

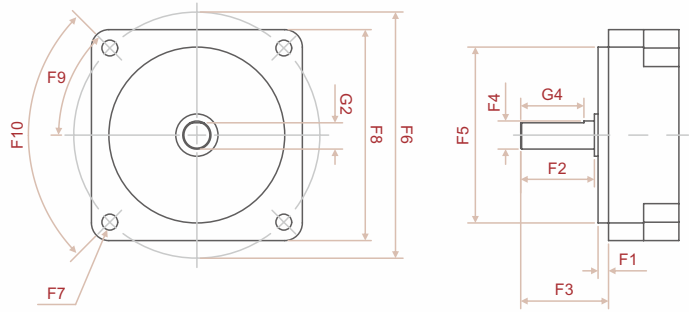
MOTOR OR GEAR REDUCER OUTPUT TYPE

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.

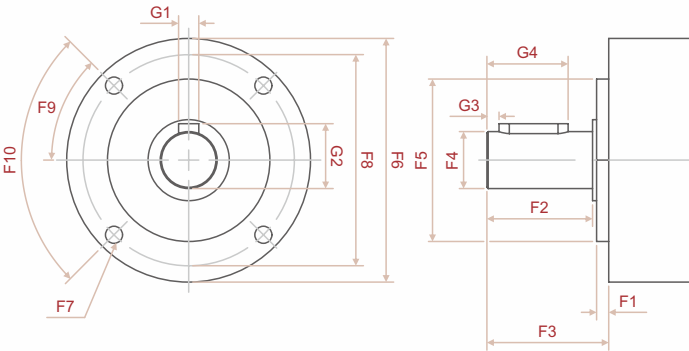
AA (Square flange , keyed shaft)



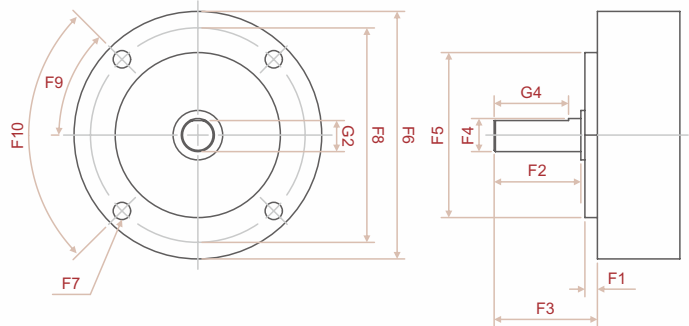
AB (Square flange , round shaft)



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

MOTOR OR GEARHEAD OUTPUT TYPE

UNIT CONVERSION TABLE

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.

Exact Method

Calculate the Mean input Speed, n_m , for the Duty Cycle (Eq. 2)

Calculate the Equivalent Torque T_{EQ} (Eq. 3)

Calculate the Modified Equivalent Torque T_{ECm} (Eq. 4)

Compare T_{EQ} to T_r of Gearhead Torque Ratings at Speed n_m

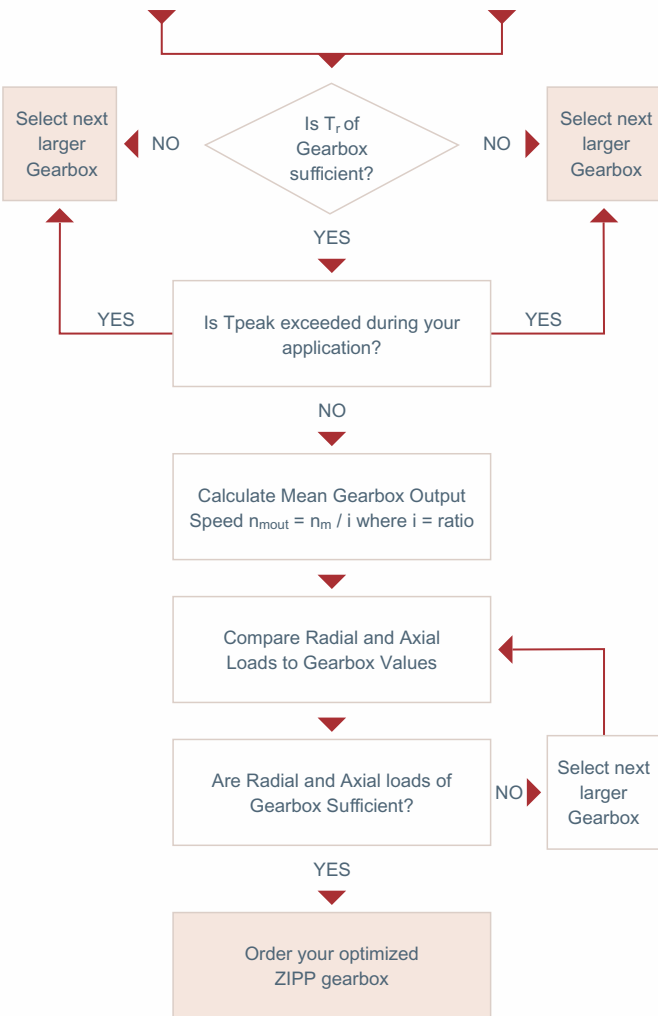
General Method

Obtain Continuous Torque Rating of Motor, T_m for Specified Speed

Calculate the Required Gearhead Torque, T_r , for your Application (Eq. 1)

Let the Mean Input Speed, n_m = Motor Speed at Rated Torque

Compare T_r to Gearbox Torque Ratings at Speed n_m



General Method:

Required Gearbox Torque(T_r)

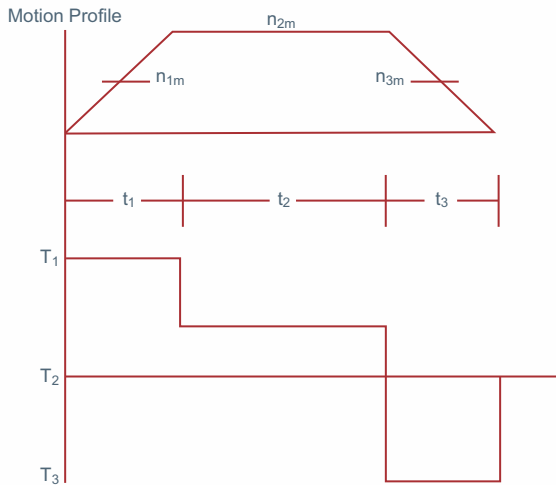
$$(1) T_r = T_m \times i \times e$$

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})

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

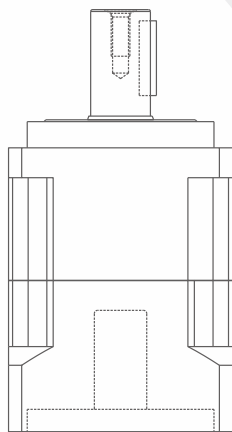
Modified equivalent torque (T_{ECm})

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

where C is:

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

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



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