SESAME

SERVO GEARBOXES

100%
Made in Taiwan

RoHS
SESAME MOTOR CORP.

CE

c UL us

GCL INTERNATIONAL UKAS MANAGEMENT SYSTEMS ISO 9001 5965
858092171G

GCL INTERNATIONAL UKAS MANAGEMENT SYSTEMS ISO 14001 5965
38E08580

CONTENTS

COMPANY PROFILE

Quality Policy:

Honesty
To provide integrity and pragmatic services

Creativity
To create customer competitive advantage

Positivity
Positive support and responsibility

Innovation
Moving forward of technical innovation

Environmental Policy:

- Full participation to comply with eco-regulation
- Prevent pollution; save energy and reduce waste
- Keep improving and propagating Green Concept

"SESAME MOTOR CORP." Founded in 1990, have more than 30 years of professional motor and gearbox manufacturing and sales experience. Sesame Motor's 7000 square meters factory locates at Taichung City. Adding modern workshop facilities with the effective integration of ERP systems, purchase world class processing and testing equipment; as we continuously enhance key parts'productivity we had not only expending overall productivity, shorten delivery, and ensure products'quality to achieve customer satisfaction. SESAME MOTOR products have received unanimous praise.

"SESAME MOTOR" is built base on spirit of “customer satisfaction, priority service” philosophy, providing three privileges “best quality, fastest delivery, and best sale service”. Our products have obtained high market share in Taiwan, that had lead “SESAME MOTOR” be a well-known brand. In addition to our official branch in Shanghai, we have agents in the United States, Germany, Denmark, Poland, UK, Turkey, Russia, Korea, Japan, China, Thailand, Malaysia and India. Trademark registered in major countries all over the world.

"SESAME MOTOR" has been successively obtained CE, CCC, UL, ISO9001 and ISO14001 certification and honorary awards. "SESAME MOTOR" also has a professional R&D team and experienced production-related sectors; can provide high accuracy products for different customer needs; high-quality servo gearhead and the surrounding transmission components, develop and produce other kinds of gear; customized motor products. All Sesame products are 100% Made in Taiwan, including raw material, development, design, machining and assembly, to offer the best solutions with detailed-oriented, high precision, high efficiency and low noise properties. Product will be used in tool machines, industrial robots, semiconductor devices,aircraft industrial, medical and rehabilitation equipment, electric scooter, auto storage devices, green energy-related industries, testing and food machinery, bakery equipment, packaging machinery and agricultural equipment and other sophisticated automation equipment.

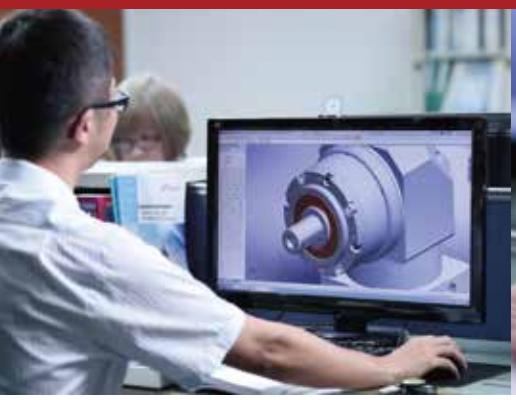
Vision

"SESAME MOTOR" strong operating team adhere to the blue ocean strategy of entering the international market and high-tech field, to create the future more professional, better quality of sustainable management systems, establishment of "a combination of leading technology and brand reputation" for competitive advantage.

Mission

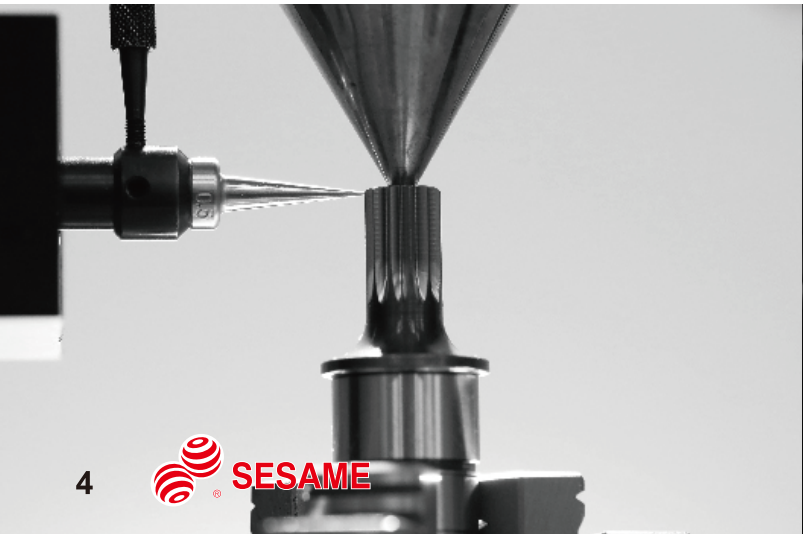
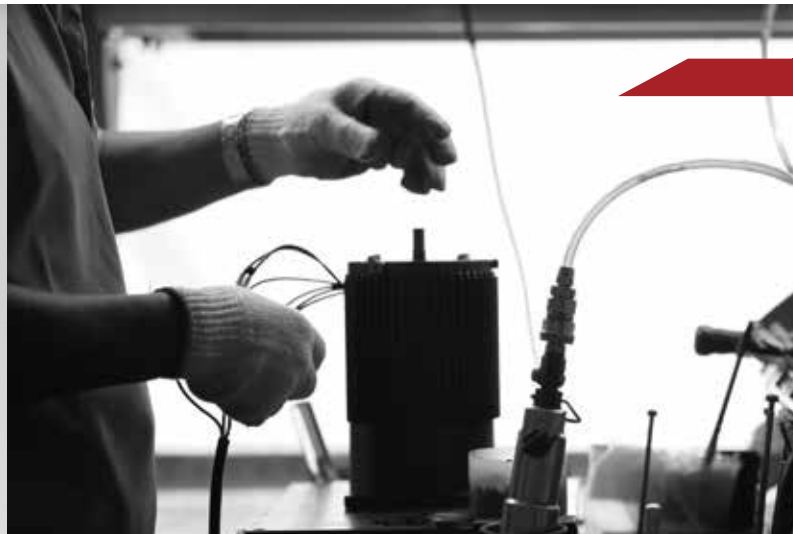
We adhere to three product principles of "technology, environmental protection, innovation", as entering the era of Industry 4.0, providing contribution to precision automation equipment in various fields.

BUSINESS PHILOSOPHY



Corporate Culture

"SESAME MOTOR" continuously providing quality products and best services; with "Honesty" for providing integrity and pragmatic service; with "Creativity" given customer advantage competitiveness; with "Positivity" to support and responsible for the efficiency of productivity; with "Innovation" on profession and knowledge of know-how. Taking into account environment protection, employee welfare and sustainable management, we aim to become the first market trend indicators.

Quality Products

We offer premium performance planetary gearboxes, gear motors and customized products with a strong R&D team.

Priority Service

"SESAME MOTOR" is moving forward to globalization based on spirit of "customer satisfaction, priority service" philosophy, providing three privileges "best quality, fastest delivery, and best sale service.

CORPORATE ENVIRONMENT

Aerial View of Sesame

Certifications

CE

CCC

ISO 14001:2015

ISO 9001:2015

Germany Patent

Trade Marks

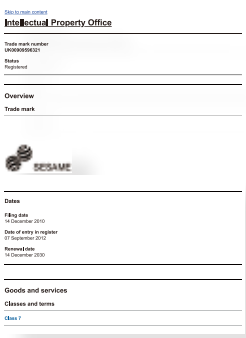
China

United States

Canada

Japan

Mexico



UK

Russia

Korea

Iran

India

Philippines

Vietnam

Indonesia

Malaysia

Singapore

European

Applications & Features

Machine Tools

Metal Cutting Machines, Machining Centers, CNC Drilling Machines, Lathes and Turning Machines, Milling and Boring Machines, Grinding Machines, Drilling Machines, Planning Machines, Metal Forming Machines Tools, Presses, Tube and Wire Processing Machines.

Industry Machinery

Packaging Machinery, Food and Beverage Processing Machinery, Bakery Equipment, Agricultural Machinery, Textile Machinery, Shoemaking Machinery, Wood Working Machinery, Printing Machinery, Plastic Processing Machinery, Laser Cutting and Welding Machines.

Automation Equipment

Industrial Robots, Semiconductor Devices, Automatic Storage System, Surface Treatment Equipments, AGVs, AMRs.

Automation and Precise Positioning Equipment with Servo Motors

Testing Devices

Applications of Planetary Gearheads

Medical and Rehabilitation Equipment

Green Energy Related Industries

Aerospace Industry

Electric Scooter

Program Features & Benefits

- Multiple design configurations and performance levels
- Adapters for all servo motors
- Drop-ins for most industry standards
- Hardened and ground gearing
- One-piece planet carrier/output shaft on most models
- Planets with full needle bearing support
- IP65 protection on most models

SERVO GEARBOXES

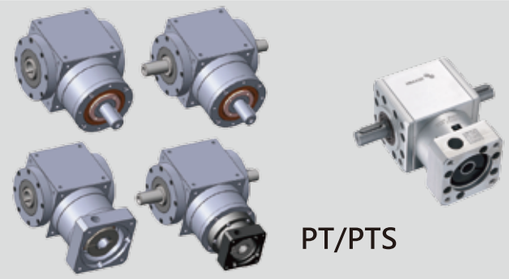
	Premium Type	Precision Type		Primary Type	
In-line	 PGH	 PGLH	 PGL	 PEE	 PEC
	 PHL	 PGEH	 PGE	 PAE	 PAC
		 PGCH	 PGC	 PBE	 PBC
	 PUL	 PUA	 PGSH	 PGS	
	 PHF	 PGF		 PAN	 PNS
Right Angle	 PUR	 PGRH	 PGR	 PAER	 PACR
	 PHFR	 PGFR	 PGCHR	 PANR	 PNSR

Strain Wave Gearboxes

AGV/AMR Gearboxes

PGV

Servo Spiral Bevel Gearboxes



PT/PTS

Stainless Steel Gearboxes

SGC

SGE

Hollow Shaft Gearboxes

PGW

Ultra High Stiffness & Rigidity Gearboxes

PGHA/PGHX

PHL

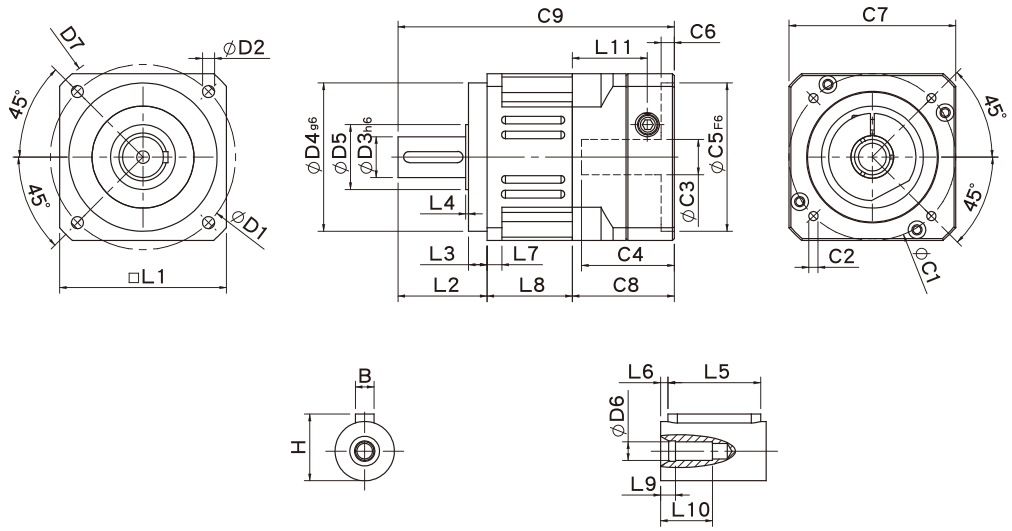
PHL premium high precision gearboxes are square mounting flange, caged premium class helical planetary gears in an in-line housing through sizes 90. High torque capacity, quiet operation with backlash as low as <1 arc-min. The PHL high-precision planetary gearbox series have excellent product characteristics such as high efficiency, precision, reliability and long service life, and is most suitable for high-performance applications of precise positioning and high dynamic motion control, such as printing machinery, automation, robotics, etc.

Frame Size (mm)	42, 60, 90
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	4000 - 5000
Max Input Speed (rpm)	8000 - 10000
Backlash (arc-min)	1 Stage : 1 - 5 2 Stages : 3 - 7
Noise Level (dBA / 1m)	56 - 60

Features

- ▶ Backlash as low as 1 arc-min, ultimate performance.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PHL Single Stage Dimensions



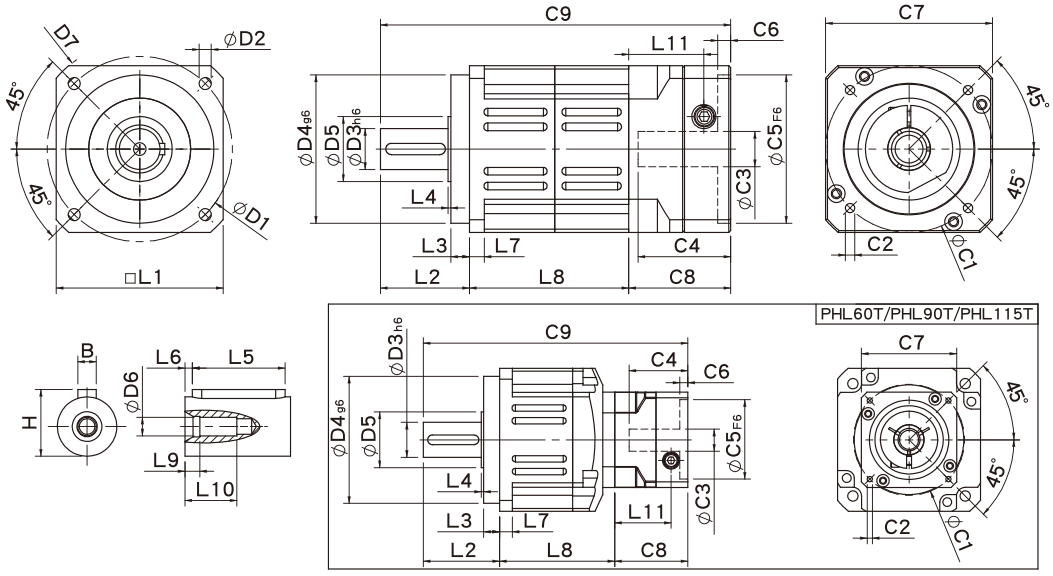
Specifications Unit:mm

Dimensions	PHL42	PHL60	PHL90
D1	50	70	100
D2	3.4	5.5	6.5
$D3_{h6}$	13	16	22
$D4_{g6}$	35	50	80
D5	15	25	35
D6	M4x0.7P	M5x0.8P	M8x1.25P
D7	56	80	118
L1	42.6	60	90
L2	26	37	48
L3	5.5	7	10
L4	1	1.5	1.5
L5	15	25	32
L6	2	2	3
L7	4	6	8
L8	28.3	37	46
L9	4	4	4.5
L10	14	16.5	20.5
L11	29	35.5	40.5
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14	≦19/≦24
C4[2]	27	37	47
$C5^{2}{}_{F6}$	30	50	70
C6[2]	4	4	6
C7[2]	42.6	60	90
C8[2]	38.5	46	55
C9[2]	92.8	120	149
B	5	5	6
H	15	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PHL Double Stage Dimensions



Specifications

Unit:mm

Dimensions	PHL42	PHL60	PHL60T	PHL90	PHL90T
D1	50	70		100	
D2	3.4	5.5		6.5	
$D3_{h6}$	13	16		22	
$D4_{g6}$	35	50		80	
D5	15	25		35	
D6	M4x0.7P	M5x0.8P		M8x1.25P	
D7	56	80		118	
L1	42.6	60		90	
L2	26	37		48	
L3	5.5	7		10	
L4	1.5	1.5		1.5	
L5	15	25		32	
L6	2	2		3	
L7	4	6		8	
L8	55.3	70	65.5	86	78.5
L9	4	4		4.5	
L10	14	16.5		20.5	
L11	29	35.5	29	40.5	35.5
C1[2]	46	70	46	90	70
C2[2]	M4x0.7P	M5x0.8P	M5x0.8P	M6x1.0P	M5x0.8P
C3[2]	≦8/≦11	≦14	≦8/≦11	≦19/≦24	≦14
C4[2]	27	37	27	47	37
$C5^{2}_{F6}$	30	50	30	70	50
C6[2]	4	4	4	6	4
C7[2]	42.6	60	42.6	90	60
C8[2]	38.5	46	38.5	55	46
C9[2]	119.8	153	141	189	172.5
B	5	5		6	
H	15	18		24.5	

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PHL Specifications

Specifications		Stage	Ratio	PHL42	PHL60	PHL90
Nominal Output Torque T_{2N}	N•m	1	3	19	53	145
			4	20	55	150
			5	17	54	140
			6	15	46	135
			7	14	44	125
			8	12	41	110
			9	11	37	95.0
			10	11	37	95.0
		Stage	Ratio	PHL42	PHL60(T)	PHL90(T)
		2	15	19	53	145
			20	20	55	150
			25	17	54	140
			30	17	54	140
			35	17	54	140
			40	17	54	140
			45	17	54	140
			50	17	54	140
			60	15	46	135
			70	14	44	125
			80	12	41	110
			90	11	37	95.0
			100	11	37	95.0
Emergency Stop Torque T_{2NOT}	N•m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)			
Nominal Input Speed n_{1N}	rpm	1,2	3-100	5000	5000	4000
Max. Input Speed n_{1max}	rpm	1,2	3-100	10000	10000	8000
Micro Backlash P0	arcmin	1 2	3-10 15-100	≦1 ≦3	≦1 ≦3	≦1 ≦3
Precision Backlash P1	arcmin	1 2	3-10 15-100	≦3 ≦5	≦3 ≦5	≦3 ≦5
Standard Backlash P2	arcmin	1 2	3-10 15-100	≦5 ≦7	≦5 ≦7	≦5 ≦7
Torsional Rigidity	N•m /arcmin	1,2	3-100	2.5	6	12
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	760	1570	2780
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	410	750	1870
Operating Temp.	℃		3-100	-10℃ ~ +90℃		
Service Life	hr		3-100	20,000 (10,000 Continuous Operation)		
Efficiency	%	1 2	3-10 15-100	≧97% ≧94%		
Weight	kg	1 2	3-10 15-100	0.6 0.9	1.3 2.0/1.6	3.5 5.6/3.9
Mounting Position	-	1,2	3-100	Any Direction		
Noise Level [2]	dBA/1m	1,2	3-100	56	58	60
Protection Class	-	1,2	3-100	IP65		
Lubrication	-	1,2	3-100	Synthetic Lubricant		

Inertia (J1)

Stage	Ratio	unit	PHL42	PHL60	PHL90
1	3	kg•cm²	0.03	0.23	0.97
	4		0.02	0.18	0.67
	5		0.02	0.17	0.65
	6/7/8		0.02	0.14	0.60
	9/10		0.02	0.14	0.58
Stage	Ratio		PHL42	PHL60(T)	PHL90(T)
2	15/20/25		0.02	0.17 (0.02)	0.65 (0.17)
	30/35/40		0.02	0.14 (0.02)	0.60 (0.14)
	45/50/60/70/80/90/100		0.02	0.14 (0.02)	0.58 (0.14)

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

SESAME Planetary Gearboxes Q&A

Q1. What is a speed reducer (gearbox)?

Speed reducers and gearboxes are gearing assembly generally used in automation control systems to reduce the input power speed, usually from motors, to achieve desired output speed and torque.

They reduce motor rotational speed while increasing motor output torque, which means increasing the amount of usable work. The motor power is transmitted through motor shaft to a gear train (assembled by small gears, large gears and a housing) in a speed reducer, and delivered by speed reducer output shaft. The ratio between the number of teeth on two gears that engaged together is called gear ratio. In such case, the ratio between output speed and input speed is called reduction ratio.

PGH

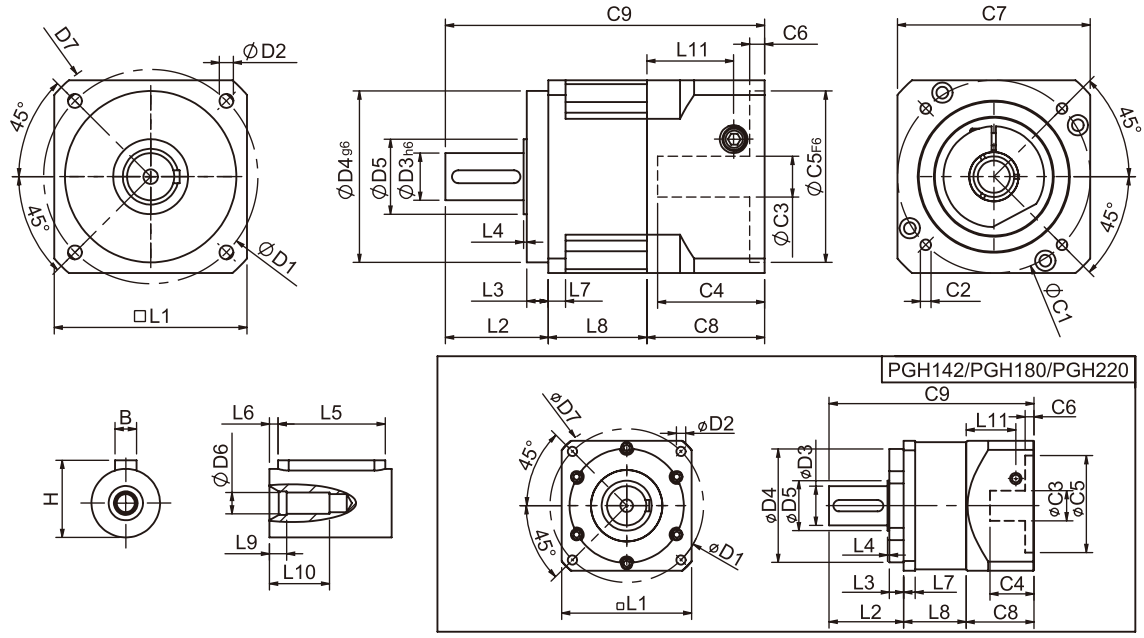
Square mounting flange, caged premium class helical planetary gears in an in-line housing through sizes 220 mm. High torque capacity, quiet operation with backlash as low as < 1 arc-min. PGH planetary gearbox series is the best power transmission component for the Industrial Robots, Semiconductor Devices, Automatic Storage System, etc.

Frame Size (mm)	42-220
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,000-5,000
Max Input Speed (rpm)	4,000-10,000
Backlash (arc-min)	1 Stage : 1 - 6 2 Stages : 3 - 8
Noise Level (dBA / 1m)	56 - 70

Features

- ▶ Backlash as low as 1 arc-min, ultimate performance.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PGH Single Stage Dimensions



Specifications

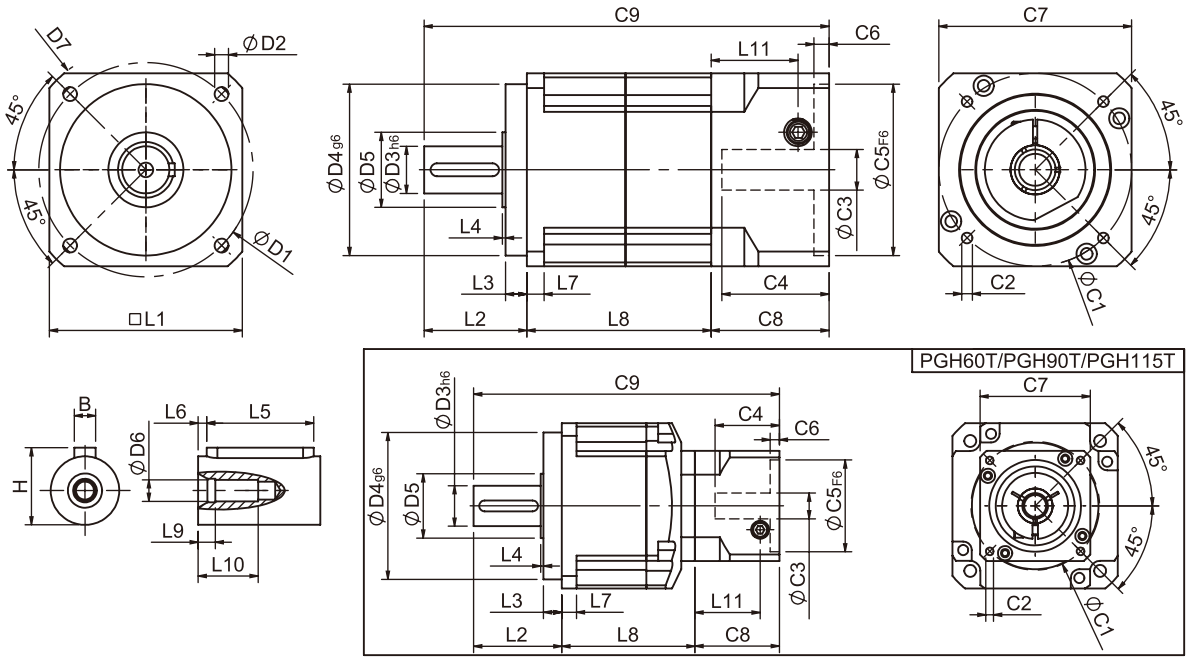
Unit:mm

Dimensions	PGH42	PGH60	PGH90	PGH115	PGH142	PGH180	PGH220
D1	50	70	100	130	165	215	250
D2	3.4	5.5	6.5	8.5	10.5	13	17
$D3_{h6}$	13	16	22	32	40	55	75
$D4_{g6}$	35	50	80	110	130	160	180
D5	15	25	35	45	50	70	114.4
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	56	80	118	148	186	239	292
L1	42.6	60	90	115	142	182	220
L2	26	37	48	63	91.5	100.5	138
L3	5.5	7	10	10	10	16	30
L4	1	1.5	1.5	3.5	2.5	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	4	6	8	11	16	18	20
L8	28.3	37	46	57	75.5	94	111
L9	4	4	4.5	6	6	8	15
L10	14	16.5	20.5	30	38	48	42
L11	29	35.5	40.5	42	63	69.5	96
$C1^{2}$	46	70	90	115	145	200	235
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38	≦50	≦55
$C4^{2}$	27	37	47	56	66.5	82	112
$C5^{2}{}_{F6}$	30	50	70	95	110	114.3	200
$C6^{2}$	4	4	6	10	6	13	6
$C7^{2}$	42.6	60	90	115	140	180	220
$C8^{2}$	38.5	46	55	63	80	95	120
$C9^{2}$	92.8	120	149	183	247	289.5	369
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGH Double Stage Dimensions-1



Specifications

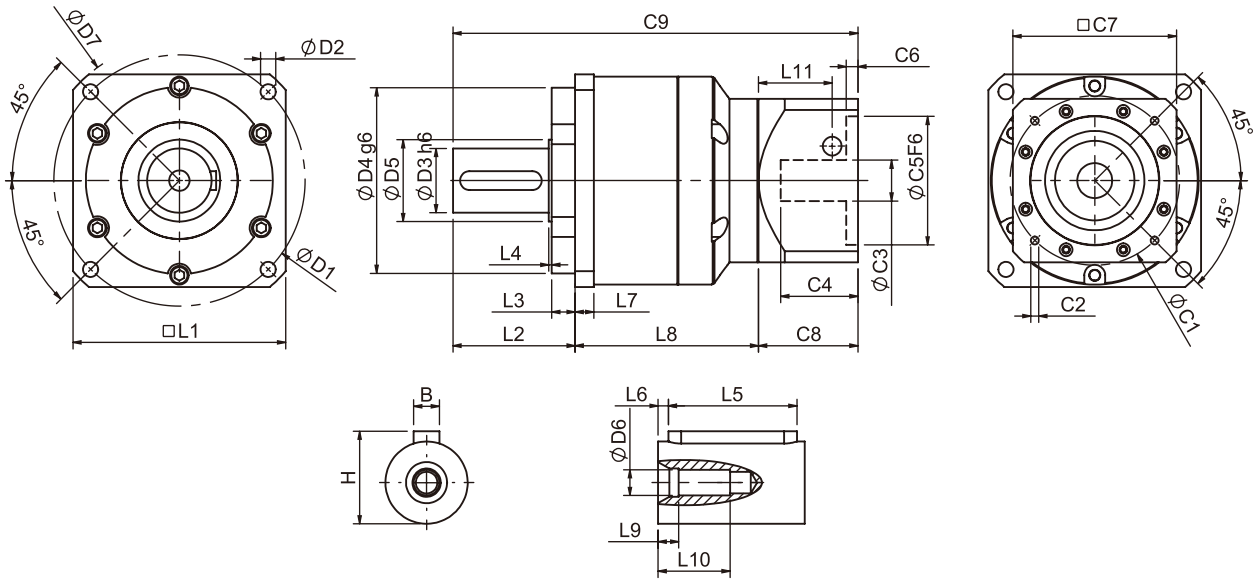
Unit:mm

Dimensions	PGH42	PGH60	PGH60T	PGH90	PGH90T	PGH115T
D1	50	70		100		130
D2	3.4	5.5		6.5		8.5
$D3_{h6}$	13	16		22		32
$D4_{g6}$	35	50		80		110
D5	15	25		35		45
D6	M4x0.7P	M5x0.8P		M8x1.25P		M12x1.75P
D7	56	80		118		148
L1	42.6	60		90		115
L2	26	37		48		63
L3	5.5	7		10		10
L4	1	1.5		1.5		3.5
L5	15	25		32		40
L6	2	2		3		5
L7	4	6		8		11
L8	55.3	70	65.5	86	78.5	99.5
L9	4	4		4.5		6
L10	14	16.5		20.5		30
L11	29	35.5	29	40.5	35.5	40.5
$C1^{2}$	46	70	46	90	70	90
$C2^{2}$	M4x0.7P	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P	M6x1.0P
$C3^{2}$	≦8/≦11	≦14/≦19	≦8/≦11	≦19/≦24	≦14	≦19/≦24
$C4^{2}$	27	37	27	47	37	47
$C5^{2}{}_{F6}$	30	50	30	70	50	70
$C6^{2}$	4	4	4	6	4	6
$C7^{2}$	42.6	60	42.6	90	60	90
$C8^{2}$	38.5	46	38.5	55	46	55
$C9^{2}$	119.8	153	141	189	172.5	217.5
B	5	5		6		10
H	15	18		24.5		35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGH Double Stage Dimensions-2



Specifications

Unit:mm

Dimensions	PGH142T	PGH180T	PGH220T
D1	165	215	250
D2	10.5	13	17
$D3_{h6}$	40	55	75
$D4_{g6}$	130	160	180
D5	50	70	114.4
D6	M16x2.0P	M20x2.5P	M20x1.5P
D7	186	239	292
L1	142	182	220
L2	91.5	100.5	138
L3	10	16	30
L4	2.5	2.5	3
L5	60	70	90
L6	5	6	7
L7	16	18	20
L8	127.5	166	202
L9	6	8	15
L10	38	48	42
L11	42	63	74
$C1^{2}$	115	145	200
$C2^{2}$	M8x1.25P	M8x1.25P	M12x1.75P
$C3^{2}$	≦24/≦32/≦38	≦35/≦38	≦50
$C4^{2}$	56	66.5	81
$C5^{2}{}_{F6}$	95	110	114.3
$C6^{2}$	10	6	6
$C7^{2}$	115	140	180
$C8^{2}$	63	80	93
$C9^{2}$	282	346.5	433
B	12	16	20
H	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGH Specifications

Specifications		Stage	Ratio	PGH42	PGH60	PGH90	PGH115	PGH142	PGH180	PGH220
Nominal Output Torque T_{2N}	N•m	1	3	19	53	145	290	520	950	1100
			4	20	55	150	300	550	1050	1700
			5	22	60	160	330	600	1200	2000
			6	20	55	150	310	560	1100	1900
			7	19	50	140	300	530	1100	1800
			8	17	45	120	260	480	1000	1600
			9	14	40	100	230	450	900	1500
			10	14	40	100	230	450	900	1500
		Stage	Ratio	PGH42	PGH60(T)	PGH90(T)	PGH115(T)	PGH142(T)	PGH180(T)	PGH220(T)
		2	15	19	53	145	290	520	950	2000
			20	20	55	150	300	550	1050	2000
			25	22	60	160	330	600	1200	2000
			30	22	60	160	330	600	1200	2000
			35	22	60	160	330	600	1200	2000
			40	22	60	160	330	600	1200	2000
			45	22	60	160	330	600	1200	2000
			50	22	60	160	330	600	1200	2000
			60	20	55	150	310	560	1100	1900
			70	19	50	140	300	530	1100	1800
			80	17	45	120	260	480	1000	1600
			90	14	40	100	230	450	900	1500
			100	14	40	100	230	450	900	1500
Emergency Stop Torque T_{2NOT}	N•m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)							
Nominal Input Speed n_{1N}	rpm	1,2	3-100	5000	5000	4000	4000	3000	3000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	10000	10000	8000	8000	6000	6000	4000
Micro Backlash P0	arcmin	1	3-10	≦2	≦2	≦2	≦1	≦1	≦1	≦1
		2	15-100	≦4	≦4	≦4	≦3	≦3	≦3	≦3
Precision Backlash P1	arcmin	1	3-10	≦4	≦4	≦4	≦3	≦3	≦3	≦3
		2	15-100	≦6	≦6	≦6	≦5	≦5	≦5	≦5
Standard Backlash P2	arcmin	1	3-10	≦6	≦6	≦6	≦5	≦5	≦5	≦5
		2	15-100	≦8	≦8	≦8	≦7	≦7	≦7	≦7
Torsional Rigidity	N•m /arcmin	1,2	3-100	3	7	14	25	50	145	225
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	760	1570	3250	6620	9400	14500	33000
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	410	750	1870	3310	4670	6460	18530
Operating Temp.	°C		3-100	-10°C ~ +90°C						
Service Life	hr		3-100	20,000 (10,000 Continuous Operation)						
Efficiency	%	1	3-10	≧97%						
		2	15-100	≧94%						
Weight	kg	1	3-10	0.6	1.3	3.5	7.8	16.1	27	55
		2	15-100	0.9	2.0/1.6	5.6/3.9	9.5	19	34	68.5
Mounting Position	-	1,2	3-100	Any Direction						
Noise Level [2]	dBA/1m	1,2	3-100	56	58	60	63	65	67	70
Protection Class	-	1,2	3-100	IP65						
Lubrication	-	1,2	3-100	Synthetic Lubricant						

Inertia (J1)

Stage	Ratio	unit	PGH42	PGH60	PGH90	PGH115	PGH142	PGH180	PGH220
1	3	kg•cm²	0.03	0.23	0.97	2.35	10.00	30.50	79.50
	4		0.02	0.18	0.67	1.66	7.17	25.86	58.21
	5		0.02	0.17	0.65	1.50	6.52	23.63	54.36
	6/7/8		0.02	0.14	0.60	1.45	6.17	22.92	54.12
	9/10		0.02	0.14	0.58	1.41	6.1	22.73	53.98
Stage	Ratio		PGH42	PGH60(T)	PGH90(T)	PGH115(T)	PGH142(T)	PGH180(T)	PGH220(T)
2	15/20/25		0.02	0.17 (0.02)	0.65 (0.17)	0.65	1.50	6.52	23.63
	30/35/40		0.02	0.14 (0.02)	0.60 (0.14)	0.60	1.45	6.17	22.92
	45/50/60/70/80/90/100		0.02	0.14 (0.02)	0.58 (0.14)	0.58	1.41	6.10	22.73

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGRH

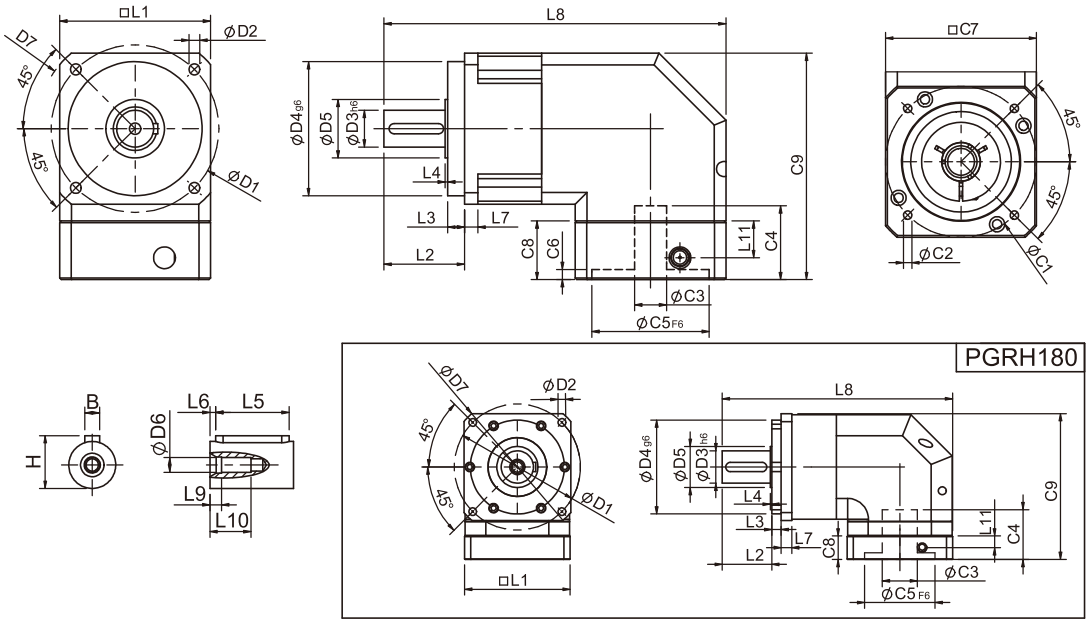
The PGRH Precision Series right-angle housing, square mounting flange, with caged precision class helical planetary gears, in sizes through 220 mm. High torque capacity, quiet operation and backlash as low as <2 arc-min. The square output flange makes it particularly easy to install and save spaces for a wide range of applications. PGRH series gear-head overall design suitable for combination operation with servo motor high-speed input and achieves maximum torque output. Precision gear design and gear processing create a planetary gear-head with low backlash operation, high efficiency, low noise and long service life performances.

Frame Size (mm)	42, 60, 90, 115, 142, 180, 220
Ratio	3 : 1 - 200 : 1
Nominal Input Speed (rpm)	2,000 - 5,000
Max Input Speed (rpm)	4,000 - 10,000
Backlash (arc-min)	1 Stage : 2 - 7 2 Stages : 4 - 9
Noise Level (dBA / 1m)	62 - 74

Features

- ▶ 3 Levels of backlash, 7 frame sizes from 42-220 mm.
- ▶ Premium and precision gear design, ratios from 3:1-200:1.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PGRH Single Stage Dimensions



Specifications

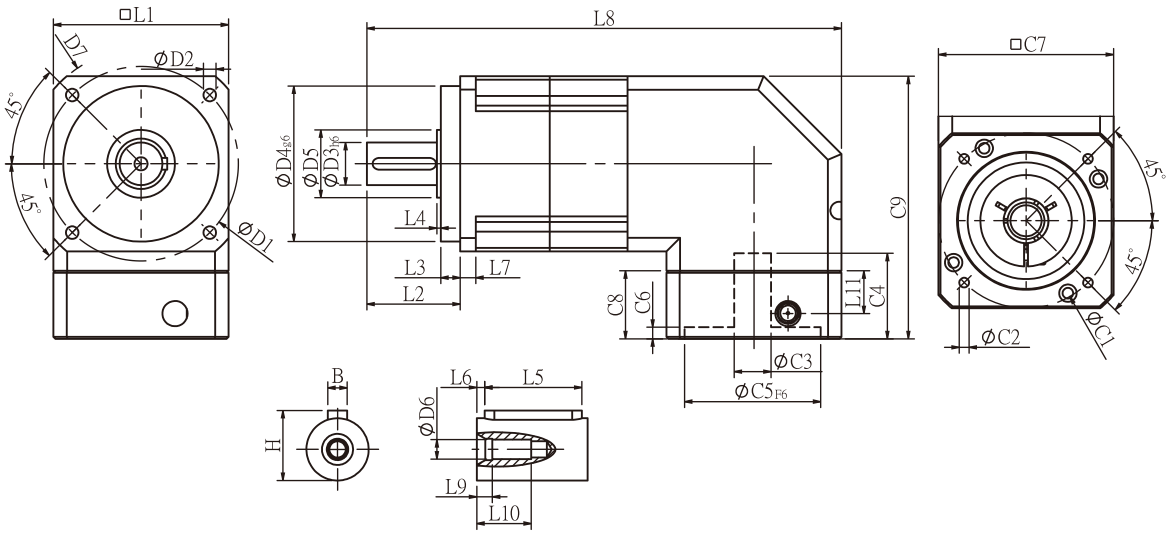
Unit:mm

Dimensions	PGRH42	PGRH60	PGRH90	PGRH115	PGRH142	PGRH180	PGRH220
D1	50	70	100	130	165	215	250
D2	3.4	5.5	6.5	8.5	10.5	13	17
D3h6	13	16	22	32	40	55	75
D4g6	35	50	80	110	130	160	180
D5	15	25	35	45	50	70	114.4
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	56	80	118	148	186	239	292
L1	42.6	60	90	115	142	182	220
L2	26	37	48	63	91.5	100.5	138
L3	5.5	7	10	10	10	16	30
L4	1	1.5	1.5	3.5	2.5	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	4	6	8	11	16	18	20
L8	103.6	148.2	204	246.5	325	392.7	490.2
L9	4	4	4.5	6	6	8	15
L10	14	16.5	20.5	30	38	48	42
L11	13.5	21.5	22	32	44.7	20	60
C1 [2]	46	70	90	115	145	200	215
C2 [2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3 [2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32	≦35	≦50	≦55
C4 [2]	29	34	44	53	76.8	78.8	98.7
C5 [2] F6	30	50	70	95	110	114.3	180
C6 [2]	6	5	5	6	9	6	6
C7 [2]	42.6	60	90	115	140	182	220
C8 [2]	25	33	35	48	65	40	85
C9 [2]	70.8	107.8	135	174.5	207	248.5	287.5
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGRH Double Stage Dimensions-1



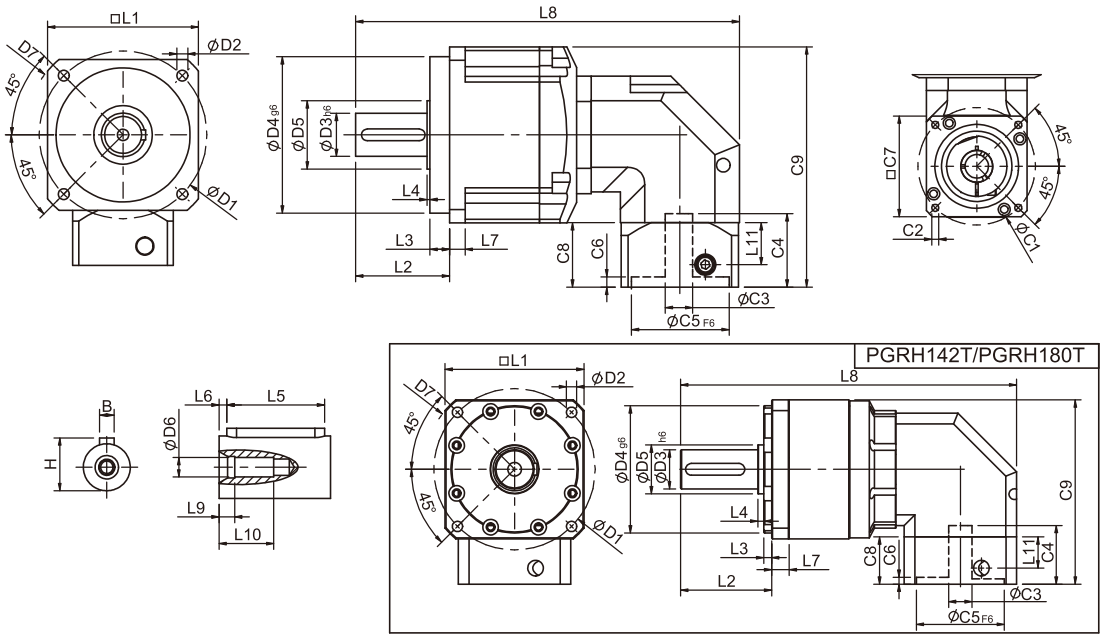
Specifications Unit:mm

Dimensions	PGRH42	PGRH60	PGRH90
D1	50	70	100
D2	3.4	5.5	6.5
D3h6	13	16	22
D4g6	35	50	80
D5	15	25	35
D6	M4x0.7P	M5x0.8P	M8x1.25P
D7	56	80	118
L1	42.6	60	90
L2	26	37	48
L3	5.5	7	10
L4	1	1.5	1.5
L5	15	25	32
L6	2	2	3
L7	4	6	8
L8	130.6	181.2	248
L9	4	4	4.5
L10	14	16.5	20.5
L11	13.5	21.5	22
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24
C4[2]	29	34	44
C5[2]F6	30	50	70
C6[2]	6	5	5
C7[2]	42.6	60	90
C8[2]	25	33	35
C9[2]	70.8	107.8	135
B	5	5	6
H	15	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGRH Double Stage Dimensions-2



Specifications

Unit:mm

Dimensions	PGRH60T	PGRH90T	PGRH115T	PGRH142T	PGRH180T	PGRH220T
D1	70	100	130	165	215	250
D2	5.5	6.5	8.5	10.5	13	17
$D3_{h6}$	16	22	32	40	55	75
$D4_{g6}$	50	80	110	130	160	180
D5	25	35	45	50	70	114.4
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	80	118	148	186	239	292
L1	60	90	115	142	182	220
L2	37	48	63	91.5	100.5	138
L3	7	10	10	10	16	30
L4	1.5	1.5	3.5	2.5	2.5	3
L5	25	32	40	60	70	90
L6	2	3	5	5	6	7
L7	6	8	11	16	18	20
L8	151.8	200.7	272.5	345.5	424.5	537.2
L9	4	4.5	6	6	8	15
L10	16.5	20.5	30	38	48	42
L11	13.5	21.5	22	32	44.7	44
C1 [2]	46	70	90	115	145	200
C2 [2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3 [2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32	≦35	≦50
C4 [2]	29	34	45.2	53.5	76.8	78.8
$C5^{2}_{F6}$	30	50	70	95	110	114.3
C6 [2]	6	5	5	6	9	6
C7 [2]	42.6	60	90	115	140	180
C8 [2]	25	33	35	48	65	65
C9 [2]	79.5	122.8	147.5	188	207	267.5
B	5	6	10	12	16	20
H	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGRH Specifications

Specifications		Stage	Ratio	PGRH-42	PGRH-60	PGRH-90	PGRH-115	PGRH-142	PGRH-180	PGRH-220
Nominal Output Torque T_{2N}	N • m	1	3	10	40	95	200	380	750	950
			4	12	48	120	260	520	1000	1500
			5	15	60	150	325	600	1200	2000
			6	18	55	150	310	560	1100	1900
			7	19	50	140	300	530	1100	1800
			8	17	45	120	260	480	1000	1600
			9	14	40	100	230	450	900	1500
			10	15	60	150	325	600	1200	2000
			14	14	50	140	300	530	1100	1800
			20	14	40	100	230	450	900	1500
		Stage	Ratio	PGRH-42	PGRH-60(T)	PGRH-90(T)	PGRH-115T	PGRH-142T	PGRH-180T	PGRH-220T
		2	15	14	50	130	290	520	950	2000
			20	14	50	140	300	550	1000	2000
			25	15	60	150	325	600	1200	2000
			30	19	55	150	310	600	1100	1900
			35	19	50	140	300	550	1100	1800
			40	17	45	120	260	500	1000	1600
			45	17	40	100	230	450	900	1500
			50	17	60	150	325	600	1200	2000
			60	20	55	150	310	600	1100	1900
			70	20	50	140	300	530	1100	1800
			80	20	45	120	260	480	1000	1600
			90	14	40	100	230	450	900	1500
			100	14	60	150	325	600	1200	2000
			120	17	55	150	310	560	1100	1900
			140	17	50	140	300	530	1100	1800
			160	14	45	120	260	480	1000	1600
			180	12	40	100	230	450	900	1500
			200	12	40	100	230	450	900	1500
Emergency Stop Torque T_{2NOT}	N · m			(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)						
Nominal Input Speed n_{1N}	rpm	1,2	3-200	5000	5000	4000	4000	3000	3000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-200	10000	10000	8000	8000	6000	6000	4000
Micro Backlash P0	arcmin	1	3-20	-	-	≦3	≦2	≦2	≦2	≦2
		2	15-200	-	-	≦5	≦4	≦4	≦4	≦4
Precision Backlash P1	arcmin	1	3-20	≦5	≦5	≦5	≦4	≦4	≦4	≦4
		2	15-200	≦7	≦7	≦7	≦7	≦7	≦7	≦7
Standard Backlash P2	arcmin	1	3-20	≦7	≦7	≦7	≦6	≦6	≦6	≦6
		2	15-200	≦9	≦9	≦9	≦9	≦9	≦9	≦9
Torsional Rigidity	N·m /arcmin	1,2	3-200	3	7	14	25	50	145	225
Max. Radial Load F_{2rB} [1]	N	1,2	3-200	760	1570	3250	6620	9400	14500	33000
Max. Axial Load F_{2aB} [1]	N	1,2	3-200	410	750	1870	3310	4670	6460	18530
Operating Temp.	℃		3-200	-10℃ ~ +90℃						
Service Life	hr		3-200	20,000 (10,000 Continuous operation)						
Efficiency	%	1	3-20	≧95%						
		2	15-200	≧92%						
Weight	kg	1	3-20	1.0	2.6	6.8	13.5	25.1	42	75
		2	15-200	1.4	2.6/2.9	8.9/7.2	14.8	26.7	46	88
Mounting Position	-	1,2	3-200	Any Direction						
Noise Level [2]	dBA/1m	1,2	3-200	61	63	65	68	70	72	74
Protection Class	-	1,2	3-200	IP65						
Lubrication	-	1,2	3-200	Synthetic Lubricant						

Inertia (J1)

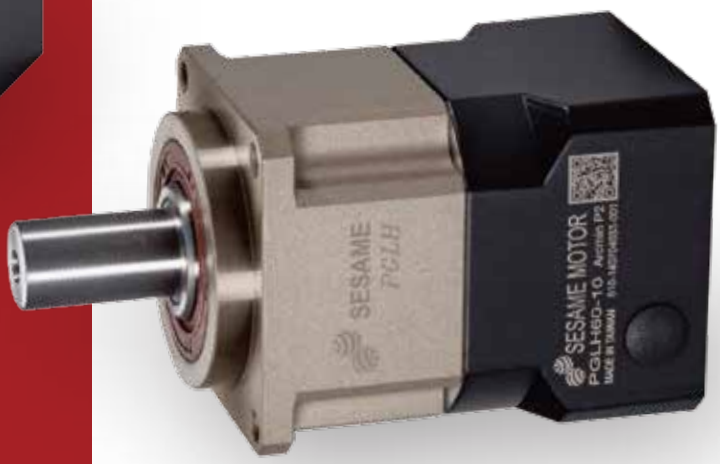
Stage	Ratio	unit	PGRH-42	PGRH-60	PGRH-90	PGRH-115	PGRH-142	PGRH-180	PGRH-220
1	3/4/5/7/9	Kg · cm^2	0.06	0.40	2.28	6.87	24.2	69.8	138.2
	6/8/10/14/20		0.05	0.30	1.45	4.76	14.5	50.3	103.6
Stage	Ratio		PGRH-42	PGRH-60(T)	PGRH-90(T)	PGRH-115T	PGRH-142T	PGRH-180T	PGRH-220T
2	15/20/25/35/45		0.06	0.40(0.08)	2.28(0.72)	3.02	7.83	27.7	80.3
	others		0.05	0.30(0.06)	1.45(0.38)	1.64	5.00	15.9	55.3

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGLH

This precision type helical gear planetary gear reducer is offering 3 precision levels and 6 frame sizes to choose. They are ready for most industry and motion control applications. Square mounting flange, caged precision class helical planetary gears in an in-line housing through sizes 220 mm. High torque capacity, quiet operation with backlash as low as < 3 arc-min. Ratios 3:1 to 100:1. PGLH is designed to offer a consideration for achieving the desired goal at the most cost effective price.

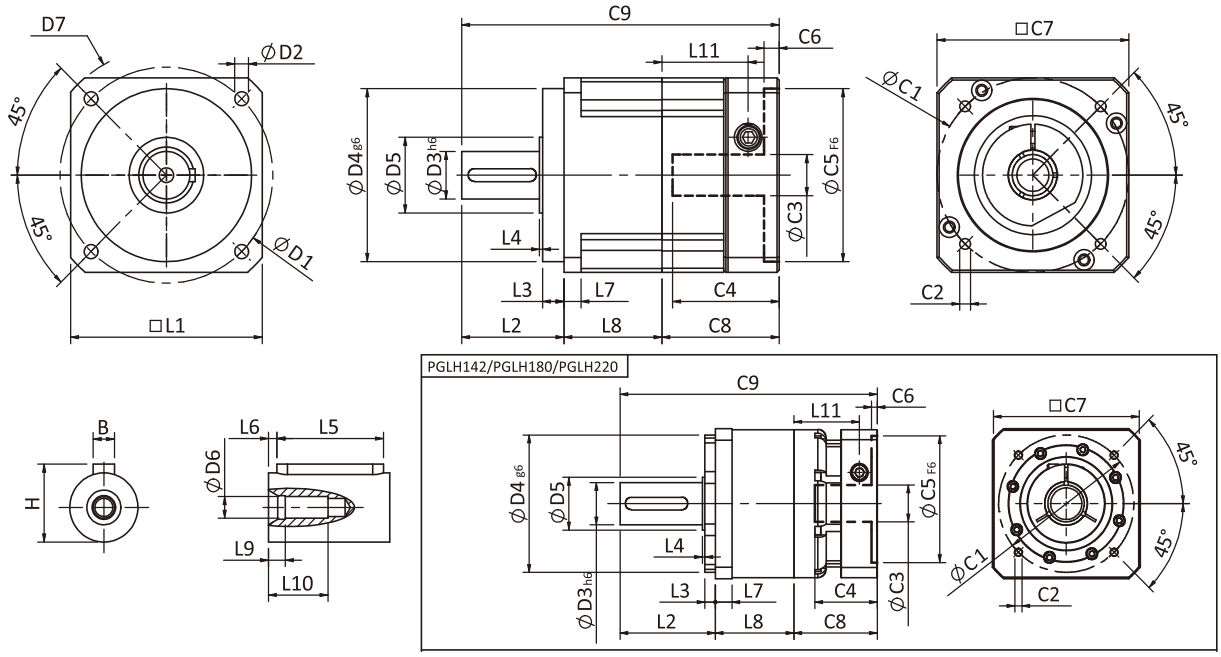


Frame Size (mm)	42, 60, 90, 115, 142, 180, 220
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,000 - 4,000
Max Input Speed (rpm)	3,000 - 8,000
Backlash (arc-min)	1 Stage : 3 - 8 2 Stages : 5 - 10
Noise Level (dBA / 1m)	58 - 72

Features

- ▶ In-line configuration with output shaft 13 mm through 75 mm diameter.
- ▶ Torque capacity range: 11 Nm through 2000 Nm.
- ▶ Caged planet carrier: with Precision Helical planet gear set.
- ▶ High performance, efficiencies and low acoustics.
- ▶ Wide range of ratios: 8 single stage ratios and up to 13 two-stage ratios.
- ▶ Output bearings deliver radial load capacity 28000 N, and axial capacities to 15000 N.
- ▶ Square servo and step motor input: accommodates 40 mm to 220 mm, with optional sizes available.

PGLH Single Stage Dimensions



Specifications

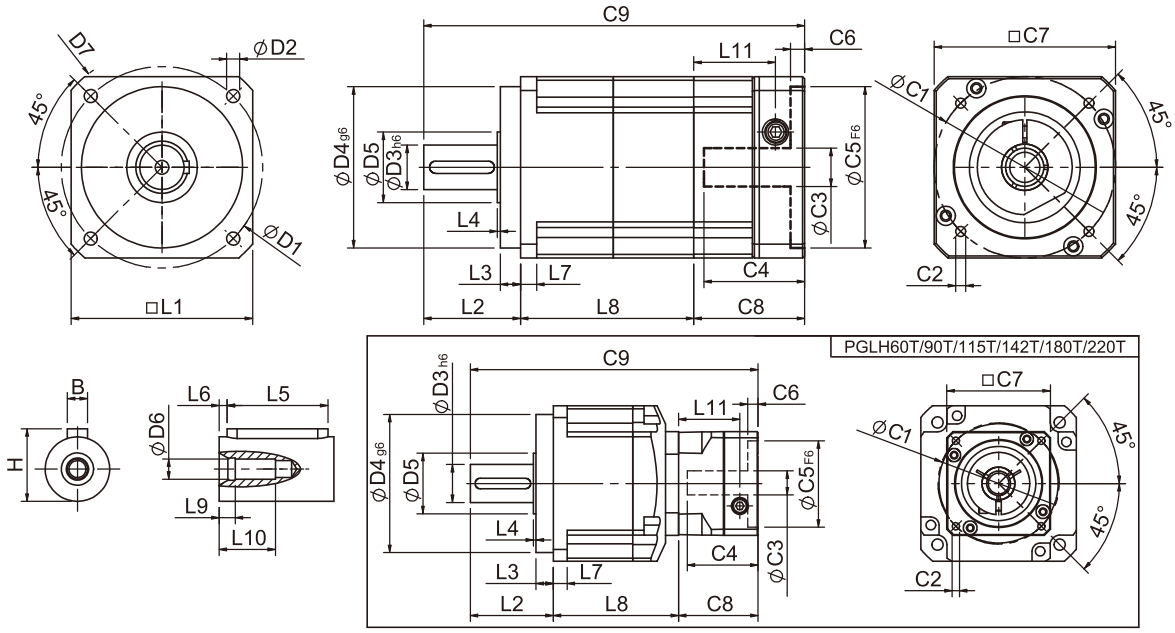
Unit:mm

Dimensions	PGLH42	PGLH60	PGLH90	PGLH115	PGLH142	PGLH180	PGLH220
D1	50	70	100	130	165	215	215
D2	3.4	5.5	6.5	8.5	10.5	13	17
$D3_{h6}$	13	16	22	32	40	55	75
$D4_{g6}$	35	50	80	110	130	160	180
D5	15	25	35	45	50	70	114.4
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	56	80	118	148	186	239	292
L1	42.6	60	90	115	142	182	220
L2	26	37	48	63	91.5	100.5	138
L3	5.5	7	10	10	10	16	30
L4	1	1.5	1.5	3.5	2.5	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	4	6	8	11	16	20	20
L8	28.3	37	46	57	75.5	94	111
L9	4	4	4.5	6	6	8	15
L10	14	16.5	20.5	30	38	48	42
L11	29	35.5	40.5	53.7	63	69.5	95
C1[2]	46	70	90	115	145	200	235
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦8/≦14	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38	≦50	≦55
C4[2]	27	37	41	56.3	66.5	82	112
$C5^{2}{}_{F6}$	30	50	70	95	110	114.3	200
C6[2]	4	4	6	10	5.5	13	6
C7[2]	42.6	60	90	115	140	182	220
C8[2]	38.5	46	55	75	80	95	120
C9[2]	92.8	120	149	195	247	289.5	369
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGLH Double Stage Dimensions



Specifications

Unit:mm

Dimensions	PGLH42	PGLH60	PGLH60T	PGLH90	PGLH90T	PGLH115T	PGLH142T	PGLH180T	PGLH220T
D1	50	70		100		130	165	215	250
D2	3.4	5.5		6.5		8.5	10.5	13	17
D3h6	13	16		22		32	40	55	75
D4g6	35	50		80		110	130	160	180
D5	15	25		35		45	50	70	114.4
D6	M4x0.7P	M5x0.8P		M8x1.25P		M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	56	80		118		148	186	239	292
L1	42.6	60		90		115	142	182	220
L2	26	37		48		63	91.5	100.5	138
L3	5.5	7		10		10	10	16	30
L4	1	1.5		1.5		3.5	2.5	2.5	3
L5	15	25		32		40	60	70	90
L6	2	2		3		5	5	6	7
L7	4	6		8		11	16	20	20
L8	55.3	70	65.5	90	78.5	99.5	127.5	166	202
L9	4	4		4.5		6	6	8	15
L10	14	16.5		20.5		30	38	48	42
L11	29	35.5	29	40.5	35.5	40.7	42	63	69.5
C1[2]	46	70	46	90	70	90	115	145	200
C2[2]	M4x0.7P	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3[2]	≦8/≦14	≦14/≦19	≦8/≦14	≦19/≦24	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38	≦50
C4[2]	27	37	27	41	37	46	56	66.5	76
C5[2]F6	30	50	30	70	50	70	95	110	114.3
C6[2]	4	4	4	6	4	10	10	5.5	6
C7[2]	42.6	60	42.6	90	60	90	115	140	180
C8[2]	38.5	46	38.5	55	46	60	63	80	90
C9[2]	119.8	153	141	193	172.5	222.5	282	346.5	430
B	5	5		6		10	12	16	20
H	15	18		24.5		35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGLH Specifications

Specifications		Stage	Ratio	PGLH-42	PGLH-60	PGLH-90	PGLH-115	PGLH-142	PGLH-180	PGLH-220
Nominal Output Torque T_{2N}	N • m	1	3	19	53	145	290	520	950	1100
			4	20	55	150	300	550	1000	1700
			5	17	54	140	290	600	1050	2000
			6	15	46	135	280	560	1000	1850
			7	14	44	125	270	530	960	1750
			8	12	41	110	240	480	900	1550
			9	11	37	95	220	430	800	1500
			10	11	37	95	220	430	800	1450
		Stage	Ratio	PGLH-42	PGLH-60 /60T	PGLH-90 /90T	PGLH-115T	PGLH-142T	PGLH-180T	PGLH-220T
		2	15	19	53	145	290	520	950	2000
			20	20	55	150	300	550	1000	2000
			25	17	54	140	290	600	1050	2000
			30	17	54	140	290	600	1050	2000
			35	17	54	140	290	600	1050	2000
			40	17	54	140	290	600	1050	2000
			45	17	54	140	290	600	1050	2000
			50	17	54	140	290	600	1050	2000
			60	15	46	135	280	560	1000	1850
			70	14	44	125	270	530	960	1750
			80	12	41	110	240	480	900	1550
			90	11	37	95	220	430	800	1500
			100	11	37	95	220	430	800	1450
Emergency Stop Torque T_{2NOT}	N•m			(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)						
Nominal Input Speed n_{1N}	rpm	1,2	3-100	4000	4000	3000	3000	2500	2500	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	8000	8000	6000	6000	5000	4000	3000
Micro Backlash P0	arcmin	1	3-10	≦4	≦4	≦4	≦3	≦3	≦3	≦3
		2	12-100	≦6	≦6	≦6	≦5	≦5	≦5	≦5
Precision Backlash P1	arcmin	1	3-10	≦6	≦6	≦6	≦5	≦5	≦5	≦5
		2	12-100	≦8	≦8	≦8	≦7	≦7	≦7	≦7
Standard Backlash P2	arcmin	1	3-10	≦8	≦8	≦8	≦7	≦7	≦7	≦7
		2	12-100	≦10	≦10	≦10	≦9	≦9	≦9	≦9
Torsional Rigidity	N•m /arcmin	1,2	3-100	2.5	6	12	23	50	145	200
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	640	1260	2230	4300	7140	11050	28000
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	410	600	1500	3310	4670	6460	15000
Operating Temp.	°C		3-100	-10°C ~ +90°C						
Service Life	hr		3-100	20,000 (10,000 Continuous Operation)						
Efficiency	%	1	3-10	≧97%						
		2	12-100	≧94%						
Weight	kg	1	3-10	0.6	13	3.5	7.8	16.1	27	55
		2	12-100	0.9	2.0(1.6)	5.6(3.9)	9.5	19	34	68.5
Mounting Position	-	1,2	3-100	Any Direction						
Noise Level [2]	dBA/1m	1,2	3-100	58	60	63	65	67	68	72
Protection Class	-	1,2	3-100	IP65						
Lubrication	-	1,2	3-100	Synthetic Lubricant						

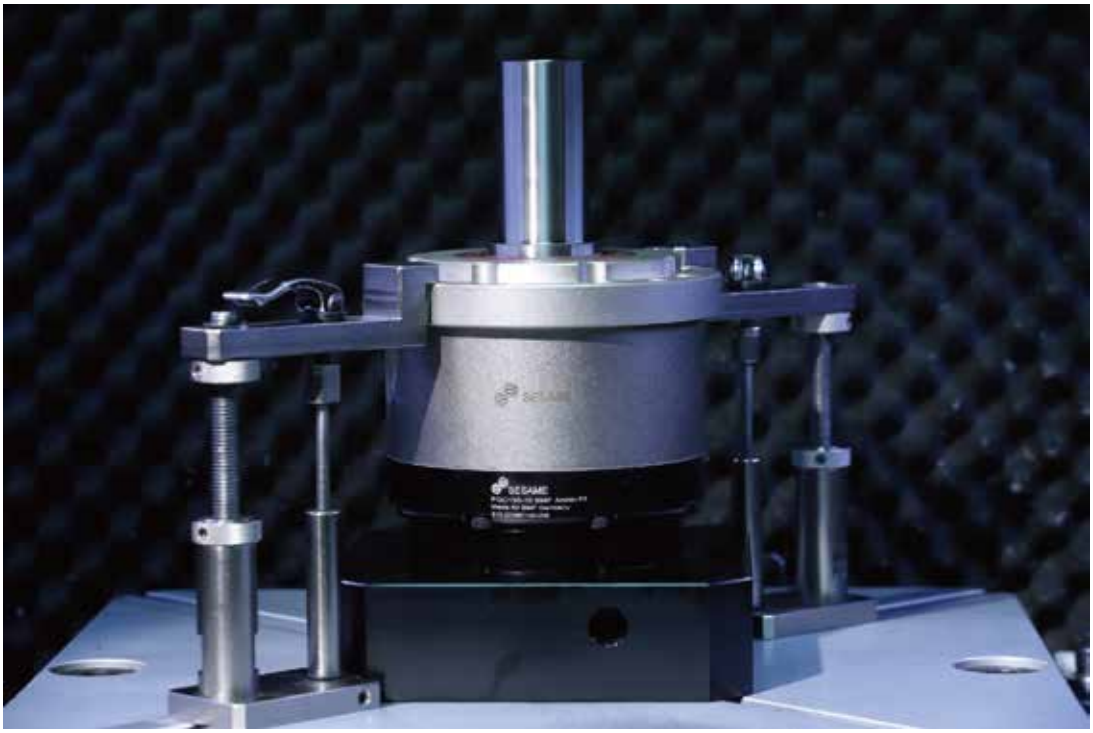
Inertia (J1)

Stage	Ratio	unit	PGLH-42	PGLH-60	PGLH-90	PGLH-115	PGLH-142	PGLH-180	PGLH-220
1	3	Kg · cm^2	0.03	0.23	0.97	2.35	10.00	30.50	79.50
	4		0.02	0.18	0.67	1.66	7.17	25.86	58.21
	5		0.02	0.17	0.65	1.50	6.52	23.63	54.36
	6/7/8		0.02	0.14	0.60	1.45	6.17	22.92	54.12
	9/10		0.02	0.14	0.58	1.41	6.10	22.73	53.98
Stage	Ratio		PGLH-42	PGLH-60(T)	PGLH-90(T)	PGLH-115T	PGLH-142T	PGLH-180T	PGLH-220T
2	15/20/25		0.02	0.17(0.02)	0.65(0.17)	0.65	1.50	6.52	23.63
	30/35/40		0.02	0.14(0.02)	0.60(0.14)	0.60	1.45	6.17	22.92
	45/50/60/70/80/90/100		0.02	0.14(0.02)	0.58(0.14)	0.58	1.41	6.10	22.73

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

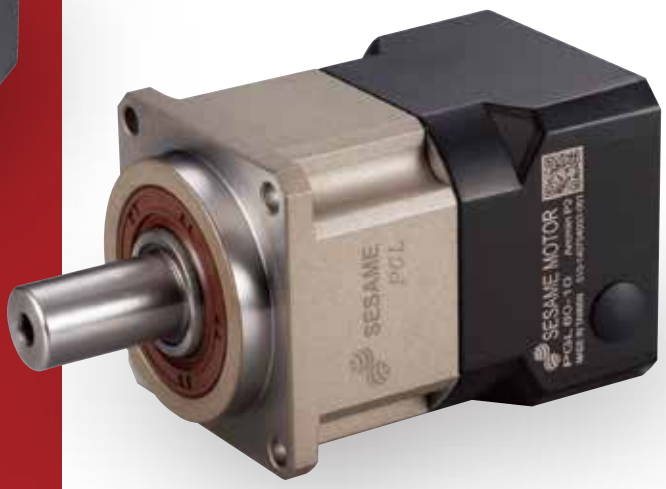
Q2. What is a speed reducer used for?



A speed reducer (gear reducer or gearbox) is a gear train between motor and the machinery that is used to transmit motor power, reduce motor rotation speed and increase output torque. Speed reducers are very common in a wide range of mechanical power transmission applications require high torque and lower speed, including conveyor, industrial mixer blender, winch lifting machine, variable speed drives and gear motors. Since the advantage of a speed reducer is to increase motor output torque with relatively low cost (compare to motor), the desired output torque is available by a smaller motor in size. It means the cost is reduced at the same time. In addition, when the reduction ratio and output torque change is required, or when the speed reducer fails, just replace the speed reducer.

PGL

This most seller precision type planetary speed reducer is offering 3 precision levels and 7 frame sizes to choose. They are ready for most industry and motion control applications. Square mounting flange, caged precision class spur planetary gears in an in-line housing through sizes 220 mm. Years of manufacturing and generations improves bring high torque capacity, quiet operation and steady performance with backlash as low as < 3 arc-min. Ratios 3:1 to 100:1.

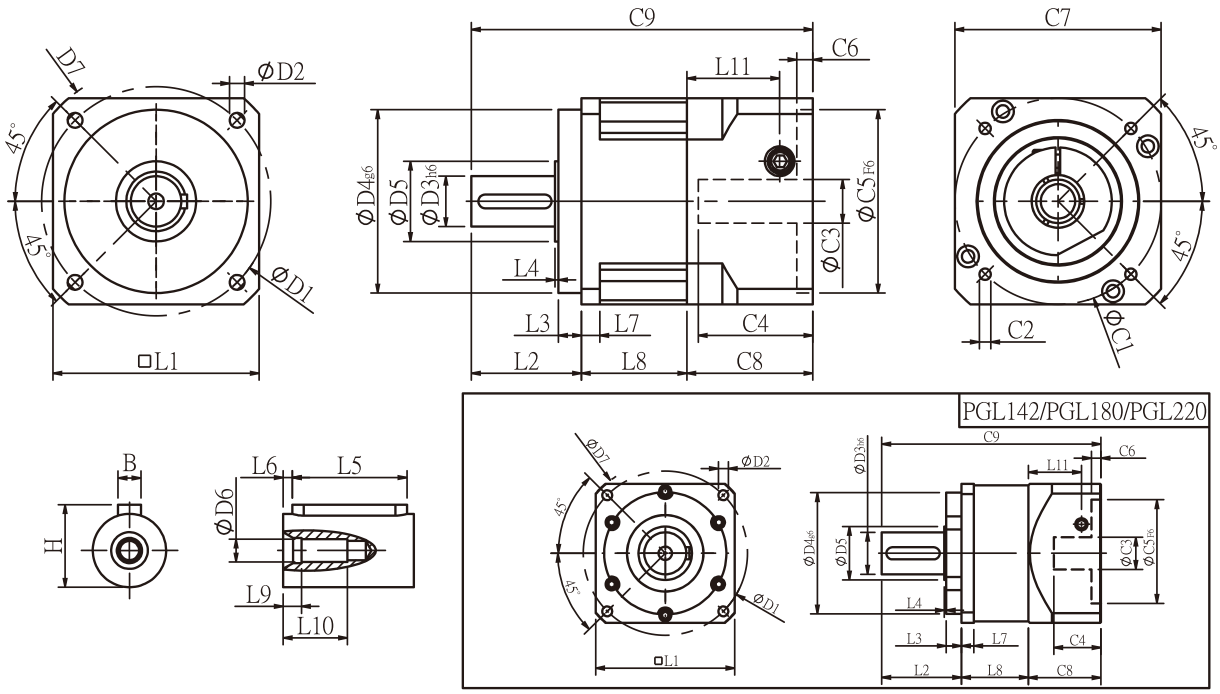


Frame Size (mm)	42, 60, 90, 115, 142, 180, 220
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,000 -3,000
Max Input Speed (rpm)	4,000 - 6,000
Backlash (arc-min)	1 Stage : 3 - 12 2 Stages : 5 - 15
Noise Level (dBA / 1m)	60 - 75

Features

- ▶ In-line configuration with output shaft 13 mm through 75 mm diameter.
- ▶ Torque capacity range: 10 Nm through 1670 Nm.
- ▶ Caged planet carrier: with precision planet gear set.
- ▶ High performance, efficiencies and low acoustics.
- ▶ Wide range of ratios: 8 single stage ratios and up to 13 two-stage ratios.
- ▶ Output bearings deliver radial load capacity as high as 13500 N, and axial capacities up to 7300 N.
- ▶ Square servo and step motor input: accommodates 40 mm through 220 mm, with optional sizes available.

PGL Single Stage Dimensions



Specifications

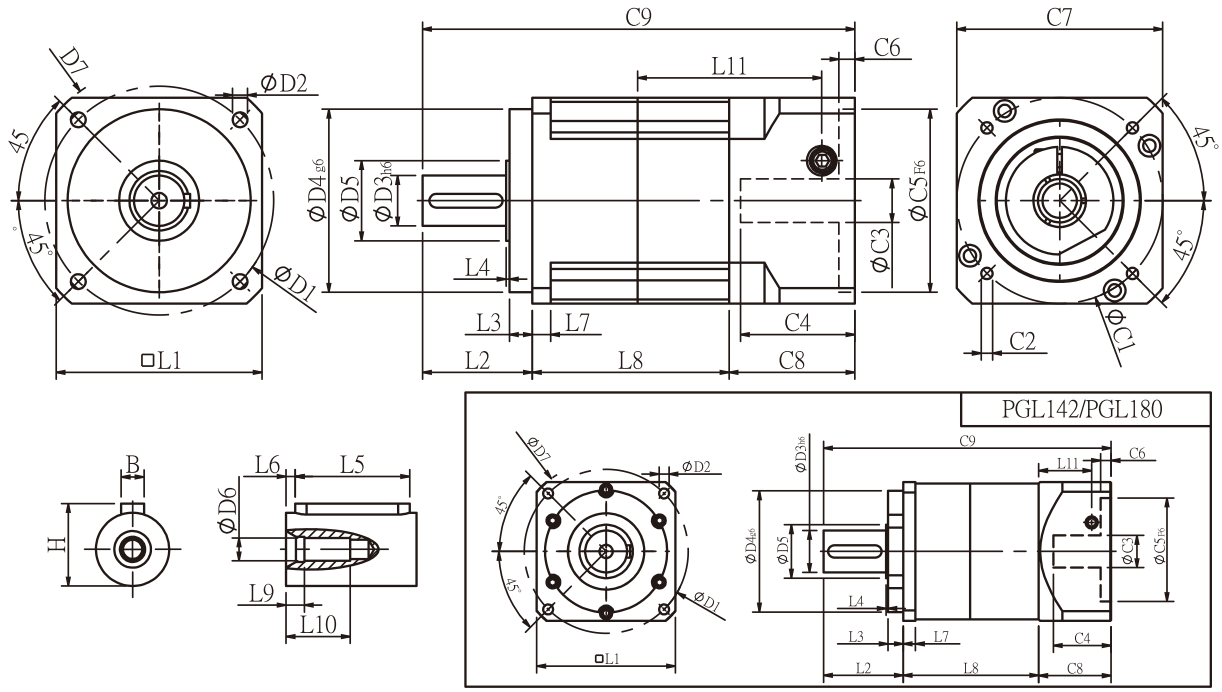
Unit:mm

Dimensions	PGL42	PGL60	PGL90	PGL115	PGL142	PGL180	PGL220
D1	50	70	100	130	165	215	250
D2	3.4	5.5	6.5	8.5	10.5	13	17
D3h6	13	16	22	32	40	55	75
D4g6	35	50	80	110	130	160	180
D5	15	25	35	45	50	70	90
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	56	80	118	148	186	239	292
L1	42.6	60	90	115	142	182	220
L2	26	37	48	62	93	104.5	138
L3	5.5	7	10	8	8	20	30
L4	1.5	1.5	1.5	3	6	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	4	6	8	12	18	16	20
L8	28.3	36	46	59	79	87.5	117.5
L9	4	4	4.5	6	6	8	7
L10	14	16.5	20.5	30	38	48	42
L11	29	35.5	40.5	42	63	69.5	102.2
C1[2]	46	70	90	115	145	200	235
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50	≦55
C4[2]	27	37	47	58	66	82	98
C5[2] F6	30	50	70	95	110	114.3	200
C6[2]	4	4	6	10	6	13	12
C7[2]	42.6	60	90	115	140	182	220
C8[2]	38.5	46	55	63	80	95	130
C9[2]	92.8	119	149	184	252	287	385.5
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGL Double Stage Dimensions-1



Specifications

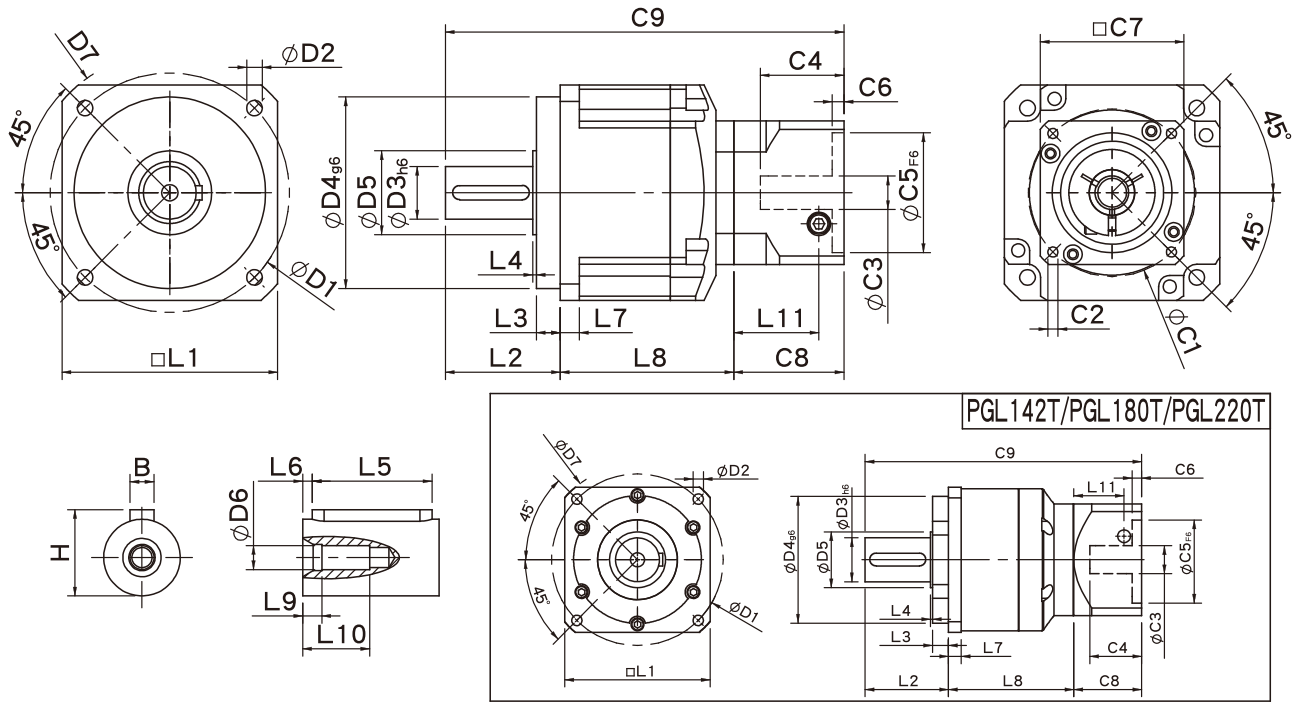
Unit:mm

Dimensions	PGL42	PGL60	PGL90	PGL115	PGL142	PGL180
D1	50	70	100	130	165	215
D2	3.4	5.5	6.5	8.5	10.5	13
$D3_{h6}$	13	16	22	32	40	55
$D4_{g6}$	35	50	80	110	130	160
D5	15	25	35	45	50	70
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P
D7	56	80	118	148	186	239
L1	42.6	60	90	115	142	182
L2	26	37	48	62	93	104.5
L3	5.5	7	10	8	8	20
L4	1.5	1.5	1.5	3	6	2.5
L5	15	25	32	40	60	70
L6	2	2	3	5	5	6
L7	4	6	8	12	18	16
L8	54.3	64	86	107	140	177.5
L9	4	4	4.5	6	6	8
L10	14	16.5	20.2	30	38	48
L11	29	35.5	40.5	42	63	69.5
$C1^{2}$	46	70	90	115	145	200
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
$C3^{2}$	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50
$C4^{2}$	27	37	47	58	66	82
$C5^{2}{}_{F6}$	30	50	70	95	110	114.3
$C6^{2}$	4	4	6	10	6	13
$C7^{2}$	42.6	60	90	115	140	182
$C8^{2}$	38.5	46	55	63	80	95
$C9^{2}$	118.8	147	189	232	313	377
B	5	5	6	10	12	16
H	15	18	24.5	35	43	59

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGL Double Stage Dimensions-2



Specifications

Unit:mm

Dimensions	PGL60T	PGL90T	PGL115T	PGL142T	PGL180T	PGL220T
D1	70	100	130	165	215	250
D2	5.5	6.5	8.5	10.5	13	17
$D3_{h6}$	16	22	32	40	55	75
$D4_{g6}$	50	80	110	130	160	180
D5	25	35	45	50	70	90
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	80	118	148	186	239	292
L1	60	90	115	142	182	220
L2	37	48	62	93	104.5	138
L3	7	10	8	8	20	30
L4	1.5	1.5	3	6	2.5	3
L5	25	32	40	60	70	90
L6	2	3	5	5	6	7
L7	6	8	15	18	16	20
L8	58.8	72.5	97.4	127	157	199.5
L9	4	4.5	6	6	8	7
L10	16.5	20.2	30	38	48	42
L11	29	35.5	40.5	42	63	69.5
C1[2]	46	70	90	115	145	200
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50
C4[2]	27	37	47	58	66	82
$C5^{2}{}_{F6}$	30	50	70	95	110	114.3
C6[2]	4	4	6	10	6	13
C7[2]	42.6	60	90	115	140	182
C8[2]	38.5	46	55	63	80	95
C9[2]	134.3	166.5	214.4	283	341.5	432.5
B	5	6	10	12	16	20
H	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGL Specifications

Specifications		Stage	Ratio	PGL-42	PGL-60	PGL-90	PGL-115	PGL-142	PGL-180	PGL-220
Nominal Output Torque T_{2N}	N • m	1	3	13.8	44.2	95.2	283	482	1151	1670
			4	11.9	35.9	74.6	249	490	1055	1574
			5	13.8	43.0	95.2	283	473	1151	1670
			6	12.5	39.4	90.9	266	436	1055	1574
			7	11.9	36.0	85.6	219	400	1055	1574
			8	10.9	32.4	85.0	216	363	860	1184
			9	9.8	28.7	80.0	210	320	764	1185
			10	10.1	25.0	75.0	210	320	763	1184
		Stage	Ratio	PGL-42	PGL-60 /60T	PGL-90 /90T	PGL-115 /115T	PGL-142 /142T	PGL-180 /180T	PGL-220 /220T
		2	15	13.8	44.2	95.2	283	482	1151	1670
			20	11.9	35.9	74.6	249	490	1055	1574
			25	13.8	43.0	95.2	283	473	1151	1670
			30	13.8	43.0	95.2	283	473	1151	1670
			35	13.8	43.0	95.2	283	473	1151	1670
			40	13.8	43.0	95.2	283	473	1151	1670
			45	13.8	43.0	95.2	283	473	1151	1670
			50	13.8	43.0	95.2	283	473	1151	1670
			60	12.5	39.4	90.9	266	436	1055	1574
			70	11.9	36.0	85.6	219	400	1055	1574
			80	10.9	32.4	85.0	216	363	860	1184
			90	9.8	28.7	80.0	210	320	764	1185
			100	10.1	25.0	75.0	210	320	763	1184
Emergency Stop Torque T_{2NOT}	N • m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B} =60% of Emergency Stop Torque)							
Nominal Input Speed n_{1N}	rpm	1,2	3-100	3000	3000	3000	2500	2000	2000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	6000	6000	6000	5000	4000	4000	4000
Micro Backlash P0	arcmin	1	3-10	-	-	-	≦3	≦3	≦3	≦3
		2	12-100	-	-	-	≦5	≦5	≦5	≦5
Precision Backlash P1	arcmin	1	3-10	-	≦6	≦6	≦5	≦5	≦5	≦5
		2	12-100	-	≦9	≦9	≦7	≦7	≦7	≦7
Standard Backlash P2	arcmin	1	3-10	≦12	≦9	≦9	≦7	≦7	≦7	≦7
		2	12-100	≦15	≦12	≦12	≦9	≦9	≦9	≦9
Torsional Rigidity	N • m /arcmin	1,2	3-100	1.0	2.8	7.5	15.5	30	57	110
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	450	1200	2050	4250	7680	9080	13500
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	320	900	1420	2930	4680	5100	7300
Operating Temp.	℃		3-100	-10℃ ~ +90℃						
Service Life	hr		3-100	20,000 (10,000 Continuous Operation)						
Efficiency	%	1	3-10	≧96%						
		2	12-100	≧92%						
Weight	kg	1	3-10	0.6	1.2	3.2	7.5	15.6	26	56
		2	12-100	0.8	1.9/1.5	5.3/3.6	12/8.8	20.7/17.2	36/31	80/62
Mounting Position	-	1,2	3-100	Any direction						
Noise Level [2]	dBA/1m	1,2	3-100	60	62	65	65	70	70	75
Protection Class	-	1,2	3-100	IP65						
Lubrication	-	1,2	3-100	Synthetic Lubricant						

Inertia(J1)

Stage	Ratio	unit	PGL-42	PGL-60	PGL-90	PGL-115	PGL-142	PGL-180	PGL-220
1	3	Kg • cm^2	0.03	0.20	0.81	2.20	7.89	25.2	77.9
	4		0.02	0.16	0.65	1.80	5.83	19.8	56.5
	5		0.02	0.15	0.62	1.61	5.38	18.3	53.3
	6/7/8		0.02	0.14	0.60	1.55	5.22	17.8	53.0
	9/10		0.02	0.14	0.60	1.53	5.20	17.6	52.9
Stage	Ratio		PGL-42	PGL-60(T)	PGL-90(T)	PGL-115(T)	PGL-142(T)	PGL-180(T)	PGL-220T
2	15/20/25		0.02	0.15(0.02)	0.62(0.15)	1.61(0.62)	5.38(1.61)	18.3(5.38)	53.9(18.3)
	30/35/40		0.02	0.14(0.02)	0.60(0.14)	1.55(0.60)	5.22(1.55)	17.8(5.22)	53.0(17.8)
	45/50/60/70/80/90/100		0.02	0.14(0.02)	0.60(0.14)	1.53(0.60)	5.20(1.53)	17.6(5.20)	52.9(17.6)

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGR

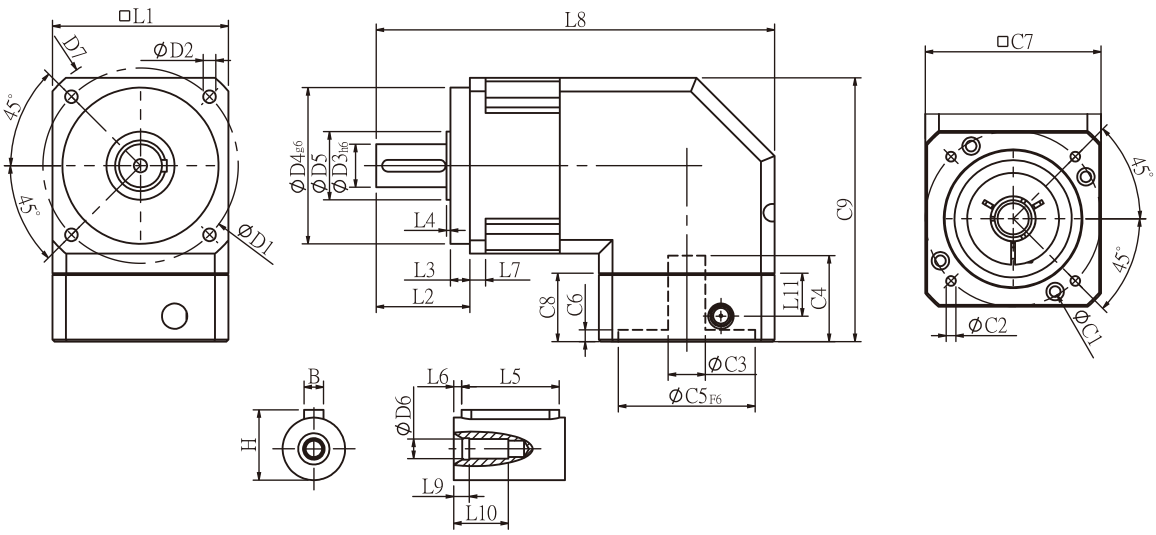
PGR series right angle planetary gearhead overall designs are suitable for combination operation with servo motor in high-speed input and achieve maximum torque output. Right angular design drastically reduces installation space. Precision gear design and gear processing create a planetary gearhead with low backlash operation, low noise, high efficiency and long service life performances.

Frame Size (mm)	42, 60, 90, 115, 142
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,000 - 3,000
Max Input Speed (rpm)	4,000 - 6,000
Backlash (arc-min)	1 Stage : 4 - 12 2 Stages : 6 - 15
Noise Level (dBA / 1m)	65 - 75

Features

- ▶ 3 levels of backlash, 5 frame sizes from 42-142 mm.
- ▶ Premium and precision gear design, ratios from 3:1-100:1.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PGR Single Stage Dimensions



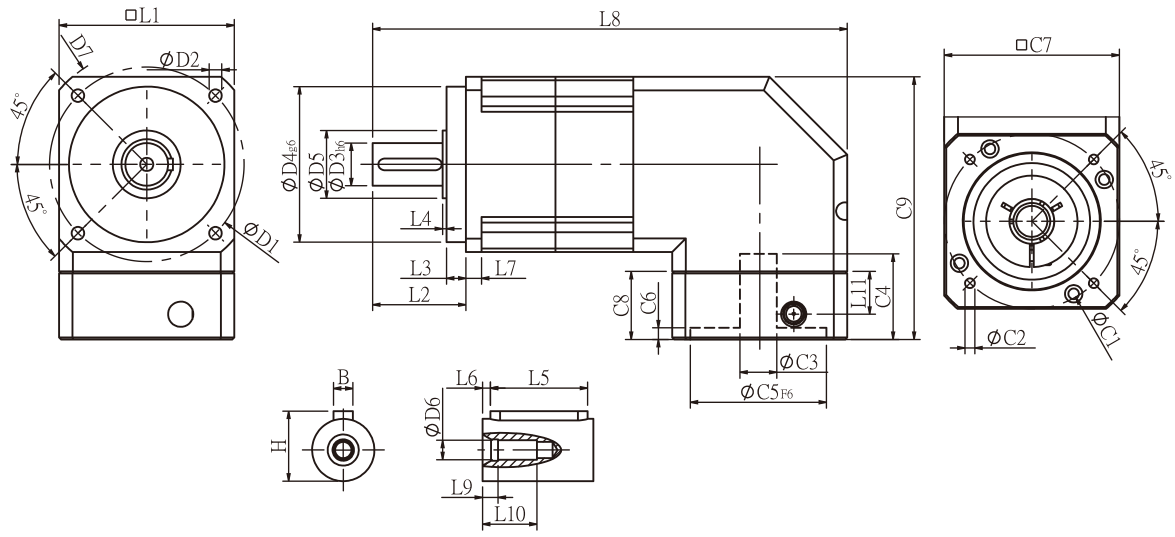
Specifications Unit:mm

Dimensions	PGR42	PGR60	PGR90	PGR115	PGR142
D1	50	70	100	130	165
D2	3.4	5.5	6.5	8.5	10.5
D3h6	13	16	22	32	40
D4g6	35	50	80	110	130
D5	15	25	35	45	50
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P
D7	56	80	118	148	186
L1	42.6	60	90	115	142
L2	26	37	48	62	93
L3	5.5	7	10	8	8
L4	1.5	1.5	1.5	3	6
L5	15	25	32	40	60
L6	2	2	3	5	5
L7	4	6	8	12	18
L8	103.6	148.7	204	244.5	330
L9	4	4	4.5	6	6
L10	14	16.5	20.5	30	38
L11	13.5	21.5	22	32	44.7
C1 [2]	46	70	90	115	145
C2 [2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P
C3 [2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32	≦35
C4 [2]	29	34	44	53	75
C5 [2] F6	30	50	70	95	110
C6 [2]	6	5	5	6	9
C7 [2]	42.6	60	90	115	140
C8 [2]	25	33	35	48	65
C9 [2]	70.8	107.8	135	174.5	207
B	5	5	6	10	12
H	15	18	24.5	35	43

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGR Double Stage Dimensions-1



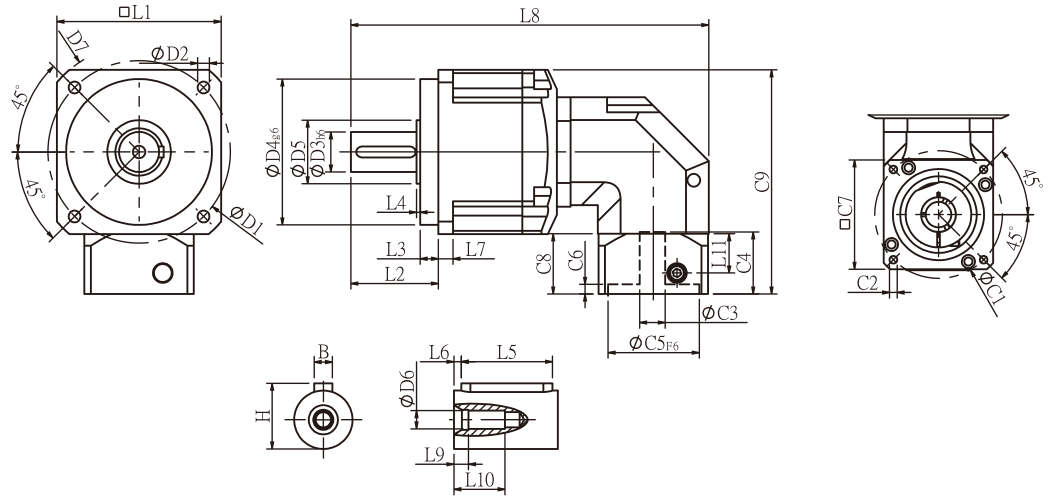
Specifications Unit:mm

Dimensions	PGR42	PGR60	PGR90	PGR115	PGR142
D1	50	70	100	130	165
D2	3.4	5.5	6.5	8.5	10.5
D3h6	13	16	22	32	40
D4g6	35	50	80	110	130
D5	15	25	35	45	50
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P
D7	56	80	118	148	186
L1	42.6	60	90	115	142
L2	26	37	48	62	93
L3	5.5	7	10	8	8
L4	1.5	1.5	1.5	3	6
L5	15	25	32	40	60
L6	2	2	3	5	5
L7	4	6	8	12	18
L8	129.6	176.7	244	292.5	391
L9	4	4	4.5	6	6
L10	14	16.5	20.5	30	38
L11	13.5	21.5	22	32	44.7
C1 [2]	46	70	90	115	145
C2 [2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P
C3 [2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32	≦35
C4 [2]	29	34	44	53	75
C5 [2]F6	30	50	70	95	110
C6 [2]	6	5	5	6	9
C7 [2]	42.6	60	90	115	140
C8 [2]	25	33	35	48	65
C9 [2]	70.8	107.8	135	174.5	207
B	5	5	6	10	12
H	15	18	24.5	35	43

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGR Double Stage Dimensions-2



Specifications Unit:mm

Dimensions	PGR60T	PGR90T	PGR115T	PGR142T
D1	70	100	130	165
D2	5.5	6.5	8.5	10.5
$D3_{h6}$	16	22	32	40
$D4_{g6}$	50	80	110	130
D5	25	35	45	50
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P
D7	80	118	148	186
L1	60	90	115	142
L2	37	48	62	93
L3	7	10	8	8
L4	1.5	1.5	3	6
L5	25	32	40	60
L6	2	3	5	5
L7	6	8	12	18
L8	145.1	196.2	269.4	343.5
L9	4	4.5	6	6
L10	16.5	20.2	30	38
L11	13.5	21.5	22	32
C1[2]	46	70	90	115
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32
C4[2]	29	34	44	53
$C5^{2}{}_{F6}$	30	50	70	95
C6[2]	6	5	5	6
C7[2]	42.6	60	90	115
C8[2]	25	33	35	48
C9[2]	79.5	122.8	147.5	188
B	5	6	10	12
H	18	24.5	35	43

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGR Specifications

Specifications		Stage	Ratio	PGR-42	PGR-60	PGR-90	PGR-115	PGR-142
Nominal Output Torque T_{2N}	N • m	1	3	13.8	35.3	76.2	220	380
			4	11.9	35.9	74.6	249	450
			5	13.8	43.0	95.2	283	473
			6	12.5	39.4	90.9	220	420
			7	11.9	36.0	85.6	219	400
			8	10.9	32.4	85.0	216	363
			9	9.8	28.7	80.0	210	320
			10	13.8	43.0	95.2	260	473
		Stage	Ratio	PGR-42	PGR-60 /60T	PGR-90 /90T	PGR-115 /115T	PGR-142 /142T
		2	15	13.8	44.2	95.2	283	482
			20	11.9	35.9	74.6	249	490
			25	13.8	43.0	95.2	283	473
			30	13.8	43.0	95.2	283	473
			35	13.8	43.0	95.2	283	473
			40	13.8	43.0	95.2	283	473
			45	13.8	43.0	95.2	283	473
			50	13.8	43.0	95.2	283	473
			60	12.5	39.4	90.9	266	436
			70	11.9	36.0	85.6	219	400
			80	10.9	32.4	85.0	216	363
			90	9.8	28.7	80.0	210	320
			100	10.1	25.0	75.0	210	320
Emergency Stop Torque T_{2NOT}	N • m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B} =60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-100	3000	3000	3000	2500	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	6000	6000	6000	5000	4000
Micro Backlash P0	arcmin	1	3-10	-	-	-	≦4	≦4
		2	12-100	-	-	-	≦6	≦6
Precision Backlash P1	arcmin	1	3-10	-	-	≦6	≦6	≦6
		2	12-100	-	-	≦9	≦8	≦8
Standard Backlash P2	arcmin	1	3-10	≦12	≦9	≦9	≦9	≦9
		2	12-100	≦15	≦12	≦12	≦11	≦11
Torsional Rigidity	N • m /arcmin	1,2	3-100	1.0	2.8	7.5	15.5	30
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	350	960	1630	3380	6150
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	320	900	1420	2930	5510
Operating Temp.	°C		3-100	-10°C~ +90°C				
Service Life	hr		3-100	20,000 (10,000 Continuous operation)				
Efficiency	%	1	3-10	≧94%				
		2	12-100	≧90%				
Weight	kg	1	3-10	1.0	2.5	6.5	13.2	24.6
		2	12-100	1.3	3.2/2.8	8.6/6.9	17.7/14.5	29.7/26.2
Mounting Position	-	1,2	3-100	Any direction				
Noise Level [2]	dBA/1m	1,2	3-100	65	67	70	70	75
Protection Class	-	1,2	3-100	IP65				
Lubrication	-	1,2	3-100	Synthetic Lubricant				

Inertia (J1)

Stage	Ratio	unit	PGR-42	PGR-60	PGR-90	PGR-115	PGR-142
1	3/4/5/7/9	Kg ·cm^2	0.06	0.40	2.28	6.87	24.2
	6/8/10		0.05	0.30	1.45	4.76	14.5
Stage	Ratio		PGR-42	PGR-60(T)	PGR-90(T)	PGR-115(T)	PGR-142(T)
2	15/20/25/35/45		0.06	0.40(0.08)	2.28(0.72)	6.87(3.02)	24.2(7.83)
	others		0.05	0.30(0.06)	1.45(0.38)	4.76(1.64)	14.5(5.00)

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGEH

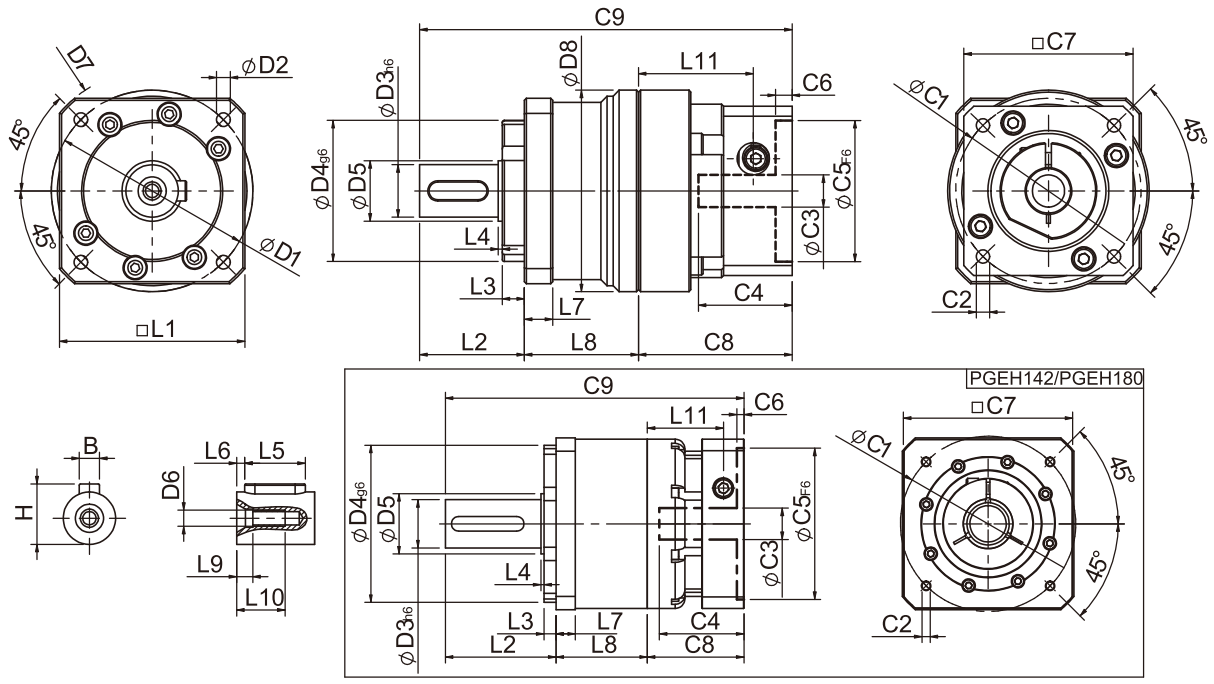
Sesame Motor PGEH in-line planetary gearheads provide integration between superior operating performance and cost effectiveness. One-piece planet carrier/output shaft and newly designed gear profile benefit higher output torque, precision, loading capacity and lower noise level. High quality gears and components are utilized to create compact and rigid unit with low backlash and maintenance-free operation. 3 levels of precision are available with max frame size 180 mm. Adapters for all servo motors.

Frame Size (mm)	50, 70, 90, 120, 142,180
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,500 - 4,000
Max Input Speed (rpm)	4,000 - 8,000
Backlash (arc-min)	1 Stage : 3 - 8 2 Stages : 5 - 10
Noise Level (dBA / 1m)	58 - 68

Features

- ▶ One-piece planet carrier/output shaft, high torsional rigidity and loading capacity.
- ▶ One-piece compact ring gear design, high precision and output torque.
- ▶ Alloy steel precision gears, low backlash, low noise, high wear resistance.
- ▶ Lubricated for life and IP65 sealing, maintenance free.
- ▶ Adapters for all servo motors.

PGEH Single Stage Dimensions



Specifications

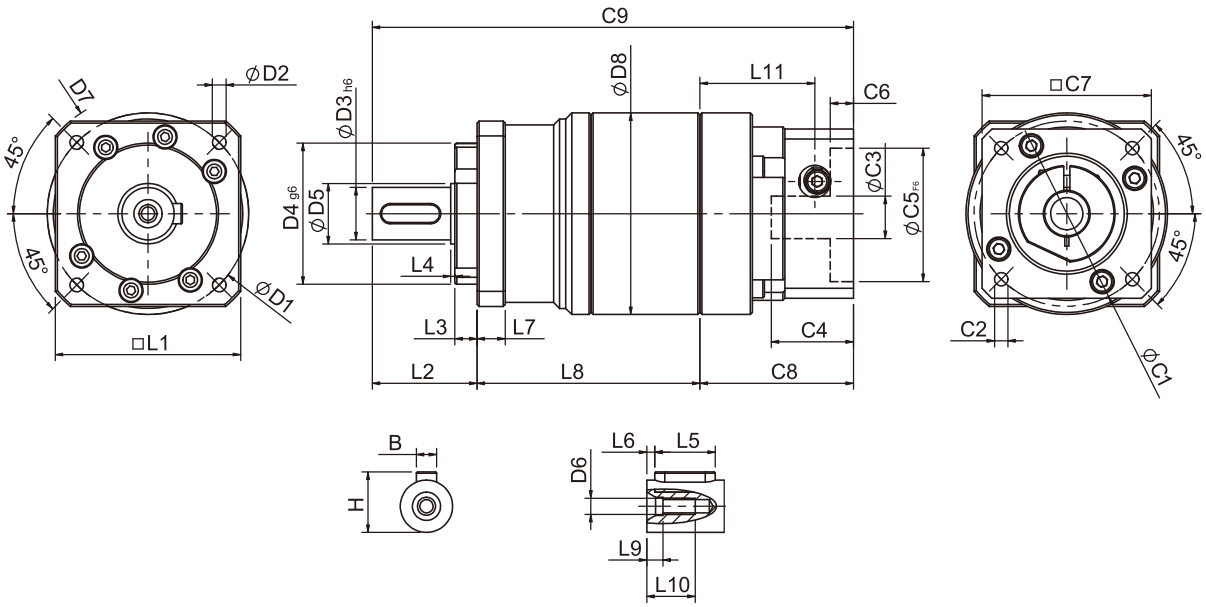
Unit:mm

Dimensions	PGEH50	PGEH70	PGEH90	PGEH120	PGEH142	PGEH180
D1	50	70	100	130	165	215
D2	3.4	5.5	6.8	9	10.5	13
$D3_{h6}$	13	16	22	32	40	55
$D4_{g6}$	35	50	80	110	130	160
D5	15	25	35	45	50	70
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P
D7	60	82	118	148	186	239
D8	50	70	94.5	120	-	-
L2	46	64	90	118	142	182
L3	26	37	43	59	91.5	100.5
L4	5.5	7	5	6	10	16
L5	1	1.5	1.5	3.5	2.5	2.5
L6	15	25	32	40	60	70
L7	2	2	3	5	5	6
L8	7	9.7	13.5	15.7	16	20
L9	28.3	37	51	61	75.5	94
L10	4	4	4.5	6	6	8
L11	12	16.5	20.5	30	38	48
L12	28.5	35.5	40.7	53.8	62.8	70
$C1^{2}$	46	70	90	115	145	200
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38	≦50
$C4^{2}$	26.5	37.6	41.4	51.3	66.5	82
$C5^{2}{}_{F6}$	30	50	70	95	110	114.3
$C6^{2}$	4.1	4.5	6	6	5.5	10
$C7^{2}$	42	60	90	115	140	180
$C8^{2}$	38.1	46.5	55.4	70	80	95
$C9^{2}$	92.4	120.5	149.4	190	247	289.5
B	5	5	6	10	12	16
H	15	18	24.5	35	43	59

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGEH Double Stage Dimensions-1



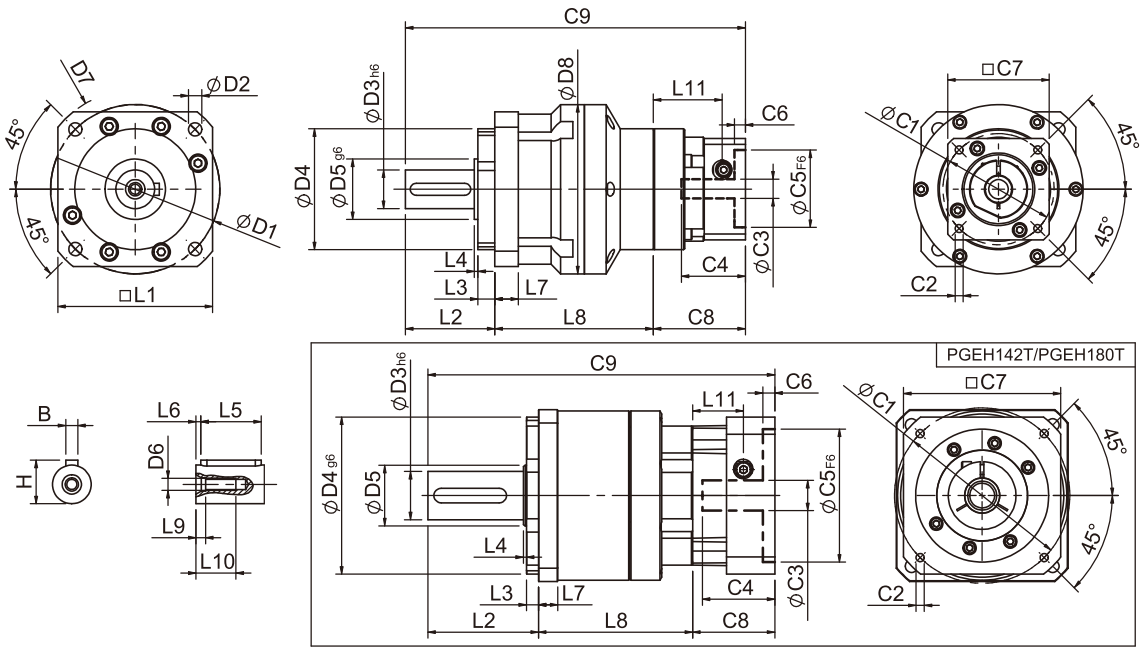
Specifications Unit:mm

Dimensions	PGEH50	PGEH70	PGEH90
D1	50	70	100
D2	3.4	5.5	6.8
D3h6	13	16	22
D4g6	35	50	80
D5	15	25	35
D6	M4x0.7P	M5x0.8P	M8x1.25P
D7	60	82	118
D8	50	70	94.5
L1	46	64	90
L2	26	37	43
L3	5.5	7	5
L4	1	1.5	1.5
L5	15	25	32
L6	2	2	3
L7	7	9.7	13.5
L8	55.3	70	95
L9	4	4	4.5
L10	12	16.5	20.5
L11	28.5	35.5	40.7
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24
C4[2]	26.5	37.6	41.4
C5[2]F6	30	50	70
C6[2]	4.1	4.5	6
C7[2]	42	60	90
C8[2]	38.1	46.5	55.4
C9[2]	119.4	153.5	193.4
B	5	5	6
H	15	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGEH Double Stage Dimensions-2



Specifications

Unit:mm

Dimensions	PGEH70T	PGEH90T	PGEH120T	PGEH142T	PGEH180T
D1	70	100	130	165	215
D2	5.5	6.8	9	10.5	13
$D3_{h6}$	16	22	32	40	55
$D4_{g6}$	50	80	110	130	160
D5	25	35	45	50	70
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P
D7	82	118	148	186	239
D8	70	94.5	120	-	-
L1	64	90	118	142	182
L2	37	43	59	91.5	100.5
L3	7	5	6	10	16
L4	1.5	1.5	3.5	2.5	2.5
L5	25	32	40	60	70
L6	2	3	5	5	6
L7	9.7	13.5	15.7	16	20
L8	65.5	83.5	103.5	127.5	166
L9	4	4.5	6	6	8
L10	16.5	20.5	30	38	48
L11	28.5	35.5	40.7	41.8	62.8
C1 [2]	46	70	90	115	145
C2 [2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P
C3 [2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35
C4 [2]	26.5	37.6	41.4	56	66.5
$C5^{2}_{F6}$	30	50	70	95	110
C6 [2]	4.1	4.5	6	10	5.5
C7 [2]	42	60	90	115	140
C8 [2]	38.1	46.5	55.4	63	80
C9 [2]	140.6	173	217.9	282	346.5
B	5	6	10	12	16
H	18	24.5	35	43	59

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGEH Specifications

Specifications		Stage	Ratio	PGEH-50	PGEH-70	PGEH-90	PGEH-120	PGEH-142	PGEH-180
Nominal Output Torque T_{2N}	N • m	1	3	19	53	145	290	520	950
			4	20	55	150	300	550	1000
			5	17	54	140	290	600	1050
			6	15	46	135	280	560	1000
			7	14	44	125	270	530	960
			8	12	41	110	240	480	900
			9	11	37	95	220	430	800
			10	11	37	95	220	430	800
		Stage	Ratio	PGEH-50	PGEH-70(T)	PGEH-90(T)	PGEH-120(T)	PGEH-142(T)	PGEH-180(T)
		2	15	19	53	145	290	520	950
			20	20	55	150	300	550	1000
			25	17	54	140	290	600	1050
			30	17	54	140	290	600	1050
			35	17	54	140	290	600	1050
			40	17	54	140	290	600	1050
			45	17	54	140	290	600	1050
			50	17	54	140	290	600	1050
			60	15	46	135	280	560	1000
			70	14	44	125	270	530	960
			80	12	41	110	240	480	900
			90	11	37	95	220	430	800
			100	11	37	95	220	430	800
Emergency Stop Torque T_{2NOT}	N•m	(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)							
Nominal Input Speed n_{1N}	rpm	1,2	3-100	4000	4000	3000	3000	2500	2500
Max. Input Speed n_{1max}	rpm	1,2	3-100	8000	8000	6000	6000	4000	4000
Micro Backlash P0	arcmin	1	3-10	≦4	≦4	≦4	≦3	≦3	≦3
		2	12-100	≦6	≦6	≦6	≦5	≦5	≦5
Precision Backlash P1	arcmin	1	3-10	≦6	≦6	≦6	≦5	≦5	≦5
		2	12-100	≦8	≦8	≦8	≦7	≦7	≦7
Standard Backlash P2	arcmin	1	3-10	≦8	≦8	≦8	≦7	≦7	≦7
		2	12-100	≦10	≦10	≦10	≦9	≦9	≦9
Torsional Rigidity	N•m /arcmin	1,2	3-100	2.5	6	12	23	50	145
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	640	1260	2230	4300	7140	11050
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	410	600	1500	3340	4670	6460
Operating Temp.	℃		3-100	-10℃ ~ +90℃					
Service Life	hr		3-100	20,000 (10,000 Continuous operation)					
Efficiency	%	1	3-10	≧97%					
		2	12-100	≧94%					
Weight	kg	1	3-10	0.6	13	3.5	7.8	16.1	27
		2	12-100	0.9	2.0(1.6)	5.6(3.9)	9.5	19	34
Mounting Position	-	1,2	3-100	Any Direction					
Noise Level [2]	dBA/1m	1,2	3-100	58	60	63	65	67	68
Protection Class	-	1,2	3-100	IP65					
Lubrication	-	1,2	3-100	Synthetic Lubricant					

Inertia (J1)

Stage	Ratio	unit	PGEH-50	PGEH-70	PGEH-90	PGEH-120	PGEH-142	PGEH-180
1	3	$Kg \cdot cm^2$	0.03	0.23	0.97	2.35	10.00	30.50
	4		0.02	0.18	0.67	1.66	7.17	25.86
	5		0.02	0.17	0.65	1.50	6.52	23.63
	6/7/8		0.02	0.14	0.60	1.45	6.17	22.92
	9/10		0.02	0.14	0.58	1.41	6.10	22.73
Stage	Ratio		PGEH-50	PGEH-70(T)	PGEH-90(T)	PGEH-120(T)	PGEH-142(T)	PGEH-180(T)
2	15/20/25		0.02	0.17(0.02)	0.65(0.17)	0.65	1.50	6.52
	30/35/40		0.02	0.14(0.02)	0.60(0.14)	0.60	1.45	6.17
	45/50/60/70/80/90/100		0.02	0.14(0.02)	0.58(0.14)	0.58	1.41	6.10

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGE

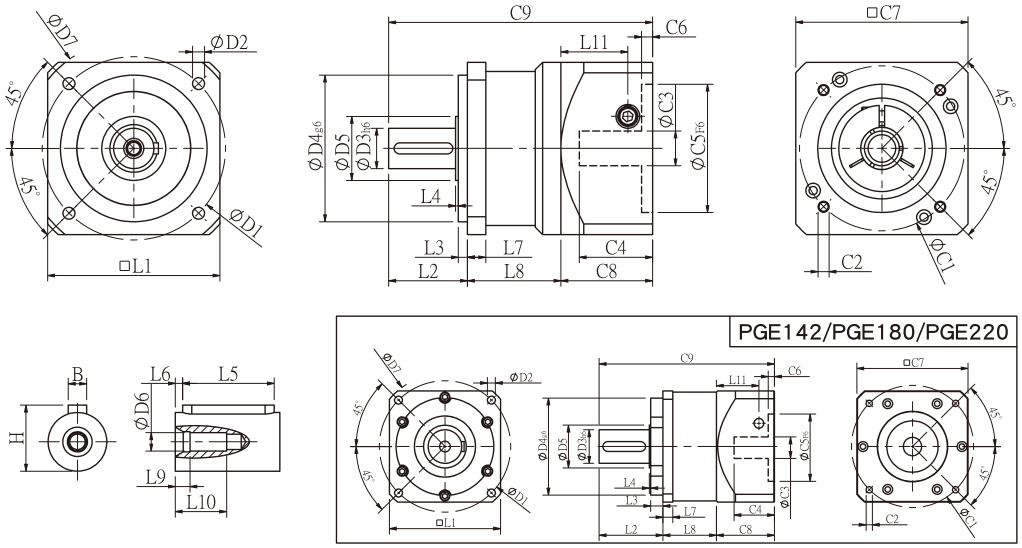
PGE precision type planetary gear reducer series are offering 3 precision levels and 7 frame sizes to choose. They are ready for most industry and general servo motor motion control applications. Square mounting flange, caged precision class spur planetary gears in an in-line housing through sizes 220mm. High torque capacity, quiet operation with backlash as low as < 3 arc-min. Ratios 3:1 to 100:1.

Frame Size (mm)	50, 70, 90, 120, 142, 180, 220
Ratio	3 : 1 - 100 : 1
Nominal Input Speed(rpm)	2,000 - 3,000
Max Input Speed(rpm)	4,000 - 6,000
Backlash(arc-min)	1 Stage : 3 - 12 2 Stages : 5 - 15
Noise Level(dBA / 1m)	60 - 75

Features

- ▶ In-line configuration with output shaft 13 mm through 75 mm diameter.
- ▶ Torque capacity range: 10 Nm through 1670 Nm.
- ▶ Caged planet carrier: with precision planet gear set.
- ▶ One-piece planet gears carrier & output shaft.
- ▶ High performance, efficiencies and low acoustics.
- ▶ Wide range of ratios: 5 single stage ratios and up to 9 two-stage ratios.
- ▶ Output bearings deliver radial load capacity as high as 13500 N, and axial capacities up to 7300 N.
- ▶ Square servo and step motor input: accommodates 50 mm through 220 mm, with optional sizes available.
- ▶ Service life lubricant.

PGE Single Stage Dimensions



Specifications

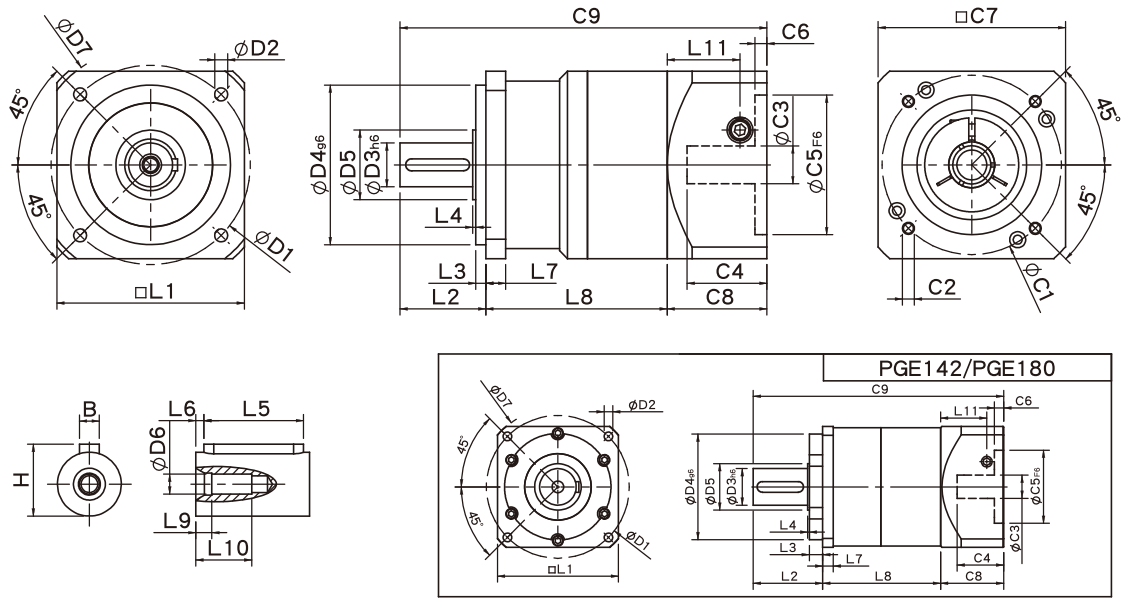
Unit:mm

Dimensions	PGE50	PGE70	PGE90	PGE120	PGE142	PGE180	PGE220
D1	50	70	100	130	165	215	250
D2	3.4	6	6.5	8.5	10.5	13	17
D3h6	13	16	22	32	40	55	75
D4g6	35	50	80	110	130	160	180
D5	15	25	35	45	50	70	90
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	64	90	120	152	186	239	292
L1	50	70	94	120	142	182	220
L2	24.5	37	43	60	93	104.5	138
L3	4	7	5	6	8	20	30
L4	1.5	1.5	1.5	3	6	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	5	6	10	12	18	16	20
L8	30	36	51	61	79	87.5	117.5
L9	4	4	4.5	6	6	8	7
L10	14	16.5	20.2	30	38	48	42
L11	24.4	31.5	36.5	42	63	69.5	102.2
C1[2]	46	70	90	115	145	200	235
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50	≦55
C4[2]	27	35	43	58	66	82	98
C5[2] F6	30	50	70	95	110	114.3	200
C6[2]	4	5	5	8	6	13	12
C7[2]	50	70	94	120	140	182	220
C8[2]	38.5	46	55	63	80	95	130
C9[2]	93	119	149	184	252	287	385.5
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGE Double Stage Dimensions-1



Specifications

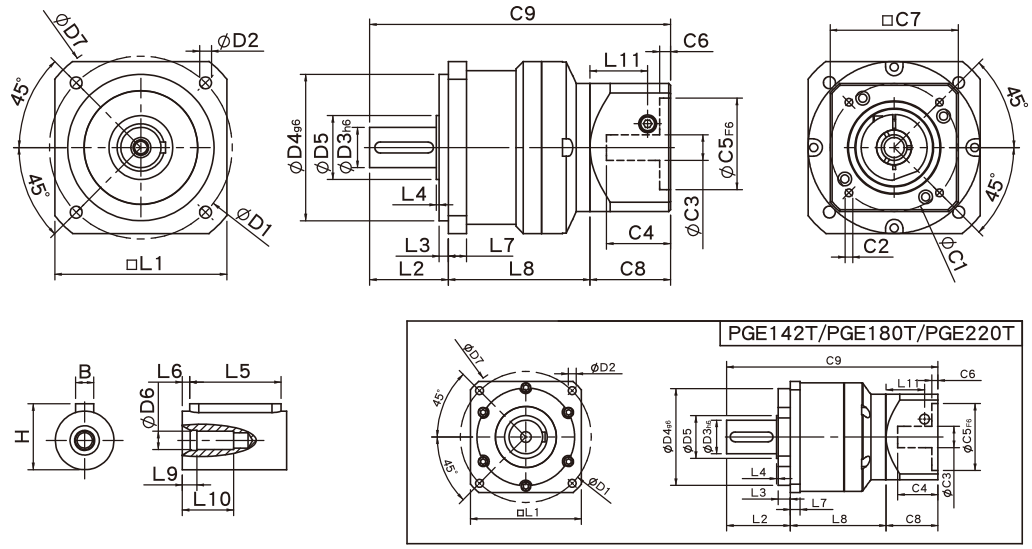
Unit:mm

Dimensions	PGE50	PGE70	PGE90	PGE120	PGE142	PGE180
D1	50	70	100	130	165	215
D2	3.4	6	6.5	8.5	10.5	13
D3h6	13	16	22	32	40	55
D4g6	35	50	80	110	130	160
D5	15	25	35	45	50	70
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P
D7	64	90	120	152	186	239
L1	50	70	94	120	142	182
L2	24.5	37	43	60	93	104.5
L3	4	7	5	6	8	20
L4	1.5	1.5	1.5	3	6	2.5
L5	15	25	32	40	60	70
L6	2	2	3	5	5	6
L7	5	6	10	12	18	16
L8	56	64	91	109	140	177.5
L9	4	4	4.5	6	6	8
L10	14	16.5	20.2	30	38	48
L11	24.4	31.5	36.5	42	63	69.5
C1 [2]	46	70	90	115	145	200
C2 [2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3 [2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50
C4 [2]	27	35	43	58	66	82
C5 [2] F6	30	50	70	95	110	114.3
C6 [2]	4	5	5	8	6	13
C7 [2]	50	70	94	120	140	182
C8 [2]	38.5	46	55	63	80	95
C9 [2]	119	147	189	232	313	377
B	5	5	6	10	12	16
H	15	18	24.5	35	43	59

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGE Double Stage Dimensions-2



Specifications

Unit:mm

Dimensions	PGE70T	PGE90T	PGE120T	PGE142T	PGE180T	PGE220T
D1	70	100	130	165	215	250
D2	6	6.5	8.5	10.5	13	17
D3 h6	16	22	32	40	55	75
D4 g6	50	80	110	130	160	180
D5	25	35	45	50	70	90
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	90	120	152	186	239	292
L1	70	94	120	142	182	220
L2	37	43	60	93	104.5	138
L3	7	5	6	8	20	30
L4	1.5	1.5	3	6	2.5	3
L5	25	32	40	60	70	90
L6	2	3	5	5	6	7
L7	6	10	12	18	16	20
L8	58.8	77.5	99.4	127	157	199.5
L9	4	4.5	6	6	8	7
L10	16.5	20.5	30	38	48	42
L11	29	35.5	40.5	42	63	69.5
C1 2	66.67	70	90	115	145	200
C2 2	M5x0.8P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3 2	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50
C4 2	27	41	47.75	58	66	82
C5 2 F6	38.1	50	70	95	110	114.3
C6 2	4	8	6	8	6	13
C7 2	60	70	94	120	140	182
C8 2	38.5	50	55	63	80	95
C9 2	134.3	170.5	214.4	283	341.5	432.5
B	5	6	10	12	16	20
H	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGE Specifications

Specifications		Stage	Ratio	PGE-50	PGE-70	PGE-90	PGE-120	PGE-142	PGE-180	PGE-220
Nominal Output Torque T_{2N}	N • m	1	3	13.8	44.2	95.2	283	482	1151	1670
			4	11.9	35.9	74.6	249	490	1055	1574
			5	13.8	43.0	95.2	283	473	1151	1670
			7	11.9	36.0	85.6	219	400	1055	1574
			10	10.1	25.0	75.0	210	320	763	1184
		Stage	Ratio	PGE-50	PGE-70(T)	PGE-90(T)	PGE-120(T)	PGE-142(T)	PGE-180(T)	PGE-220T
		2	15	13.8	44.2	95.2	283	482	1151	1670
			20	11.9	35.9	74.6	249	490	1055	1574
			25	13.8	43.0	95.2	283	473	1151	1670
			30	13.8	43.0	95.2	283	473	1151	1670
			35	13.8	43.0	95.2	283	473	1151	1670
			40	13.8	43.0	95.2	283	473	1151	1670
			50	13.8	43.0	95.2	283	473	1151	1670
			70	11.9	36.0	85.6	219	400	1055	1574
			100	10.1	25.0	75.0	210	320	763	1184
Emergency Stop Torque T_{2NOT}	N • m		3.0 Times of Nominal Output Torque) (* Max. Output Torque T_{2B} =60% of Nominal Output Torque)							
Nominal Input Speed n_{1N}	rpm	1,2	3-100	3000	3000	3000	2500	2000	2000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	6000	6000	6000	5000	4000	4000	4000
Micro Backlash P0	arcmin	1 2	3-10 15-100	- -	- -	- -	≦3 ≦5	≦3 ≦5	≦3 ≦5	≦3 ≦5
Precision Backlash P1	arcmin	1 2	3-10 15-100	- -	≦6 ≦9	≦6 ≦9	≦5 ≦7	≦5 ≦7	≦5 ≦7	≦5 ≦7
Standard Backlash P2	arcmin	1 2	3-10 15-100	≦12 ≦15	≦9 ≦12	≦9 ≦12	≦7 ≦9	≦7 ≦9	≦7 ≦9	≦7 ≦9
Torsional Rigidity	N • m /arcmin	1,2	3-100	1.0	2.8	7.5	15.5	30	57	110
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	450	1200	2050	4250	7680	9080	13500
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	320	900	1420	2930	4680	5100	7300
Operating Temp.	°C		3-100	-10°C ~ +90°C						
Service Life	hr		3-100	20,000 (10,000 Continuous Operation)						
Efficiency	%	1 2	3-10 12-100	≧ 96% ≧ 92%						
Weight	kg	1 2	3-10 12-100	0.7 0.9	1.4 2.2/1.7	3.0 5.0/3.4	7.3 11.5/8.5	15.6 20.7/17.2	26 36/31	56 80/62
Mounting Position	-	1,2	3-100	Any Direction						
Noise Level [2]	dBA/1m	1,2	3-100	60	62	65	65	70	70	75
Protection Class	-	1,2	3-100	IP65						
Lubrication	-	1,2	3-100	Synthetic Lubricant						

Inertia(J1)

Stage	Ratio	unit	PGE-50	PGE-70	PGE-90	PGE-120	PGE-142	PGE-180	PGE-220
1	3	Kg • cm^2	0.03	0.20	0.81	2.20	7.89	25.2	77.9
	4		0.02	0.16	0.65	1.80	5.83	19.8	56.5
	5		0.02	0.15	0.62	1.61	5.38	18.3	53.3
	7		0.02	0.14	0.60	1.55	5.22	17.8	53.0
	10		0.02	0.14	0.60	1.53	5.20	17.6	52.9
Stage	Ratio		PGE-50	PGE-70(T)	PGE-90(T)	PGE-120(T)	PGE-142(T)	PGE-180(T)	PGE-220T
2	15/20/25		0.02	0.15(0.02)	0.62(0.15)	1.61(0.62)	5.38(1.61)	18.3(5.38)	53.9(18.3)
	30/35/40		0.02	0.14(0.02)	0.60(0.14)	1.55(0.60)	5.22(1.55)	17.8(5.22)	53.0(17.8)
	50/70/100		0.02	0.14(0.02)	0.60(0.14)	1.53(0.60)	5.20(1.53)	17.6(5.20)	52.9(17.6)

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGCH

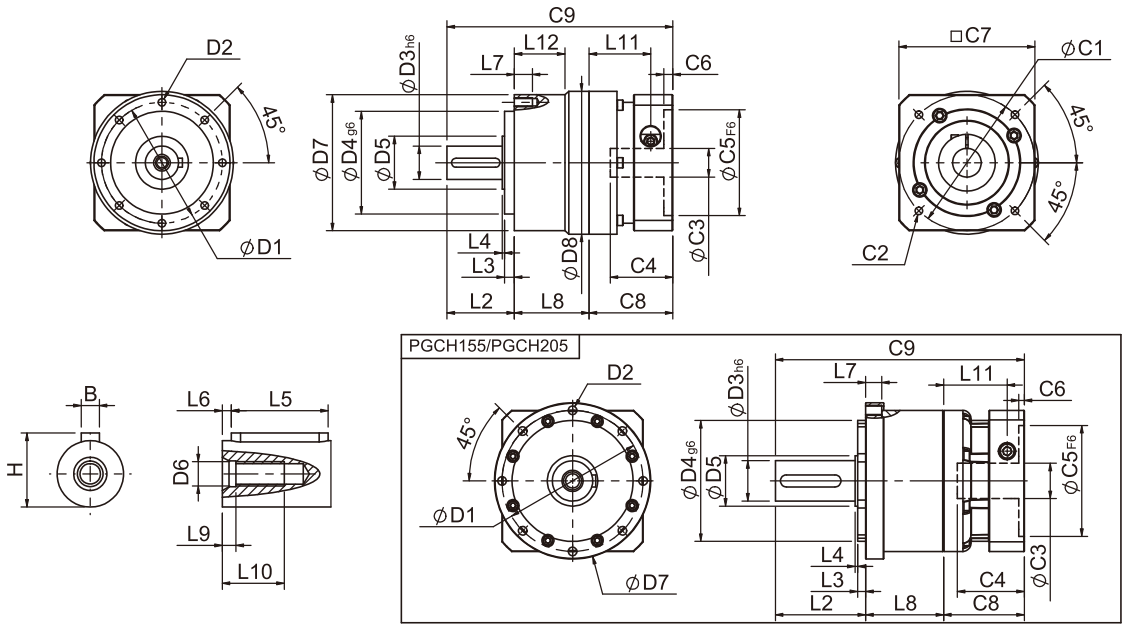
Sesame Motor PGCH in-line planetary gearheads provide integration between superior operating performance and cost effectiveness. One-piece planet carrier/output shaft and newly designed gear profile benefit higher output torque, precision, loading capacity and lower noise level. High quality gears and components are utilized to create compact and rigid unit with low backlash and maintenance-free operation. 3 levels of precision are available with max frame size 235 mm. Adapters for all servo motors.

Frame Size (mm)	50, 70, 90, 120, 155, 205, 235
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,000 - 5,000
Max Input Speed (rpm)	3,500 - 10,000
Backlash (arc-min)	1 Stage : 3 - 8 2 Stages : 5 - 10
Noise Level (dBA / 1m)	58 - 70

Features

- ▶ One-piece planet carrier/output shaft, high torsional rigidity and loading capacity.
- ▶ One-piece compact ring gear design, high precision and output torque.
- ▶ Alloy steel precision gears, low backlash, low noise, high wear resistance.
- ▶ Lubricated for life and IP65 sealing, maintenance free.
- ▶ Adapters for all servo motors.

PGCH Single Stage Dimensions



Specifications

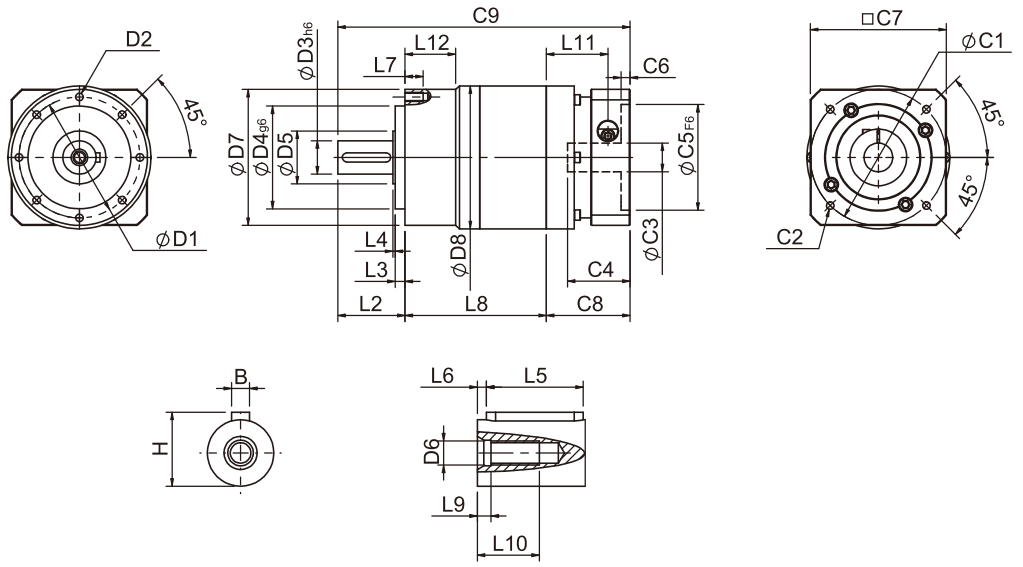
Unit:mm

Dimensions	PGCH50	PGCH70	PGCH90	PGCH120	PGCH155	PGCH205	PGCH235
D1	44	62	80	108	140	184	210
D2	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P	M16x2.0P
$D3_{h6}$	13	16	22	32	40	55	75
$D4_{g6}$	35	52	68	90	120	160	180
D5	15	25	35	45	50	70	114.5
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	50	70	90	120	155	205	235
D8	50	70	94.5	120	-	-	253
L2	24.5	36	44.5	60	89.5	96.5	126
L3	4	6	6.5	7	8	12	18
L4	1	1.5	1.5	3.5	2.5	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	8	10	12	16	16	20	28
L8	29.8	38	49.5	60	77.5	98	124
L9	4	4	4.5	6	6	8	15
L10	12	16.5	20.5	30	38	48	42
L11	29	35.4	40.7	53.7	63	69.5	95
L12	-	-	33.5	-	-	-	70
C1 [2]	46	70	90	115	145	200	235
C2 [2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3 [2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38	≦50	≦55
C4 [2]	26.5	37.6	41.4	51.3	66.5	77	112
$C5^{2}_{F6}$	30	50	70	95	110	114.3	200
C6 [2]	4.1	4.5	6	6	5.5	6	6
C7 [2]	42	60	90	115	140	180	220
C8 [2]	38.1	46.5	55.4	70	80	90	120
C9 [2]	92.4	120.5	149.4	190	247	284.5	370
B	5	5	6	10	12	16	20
H	13.5	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGCH Double Stage Dimensions-1



Specifications

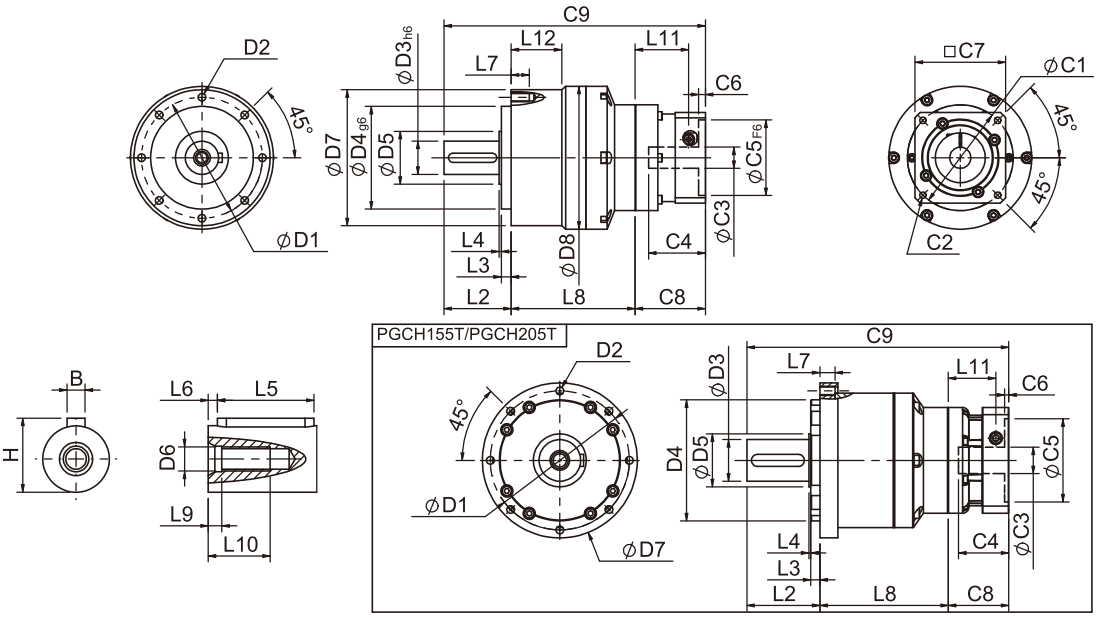
Unit:mm

Dimensions	PGCH50	PGCH70	PGCH90
D1	4	62	80
D2	M4x0.7P	M5x0.8P	M6x1.0P
$D3_{h6}$	12	16	22
$D4_{g6}$	35	52	68
D5	15	25	35
D6	M4x0.7P	M5x0.8P	M8x1.25P
D7	50	70	90
D8	50	70	94.5
L2	24.5	36	44.5
L3	4	6	6.5
L4	1	1.5	1.5
L5	15	25	32
L6	2	2	3
L7	8	10	12
L8	56.8	71	93.5
L9	4	4	4.5
L10	12	16.5	20.5
L11	29	35.4	40.7
L12	-	-	33.5
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24
C4[2]	26.5	37.6	41.4
$C5^{2}_{F6}$	30	50	70
C6[2]	4.1	4.5	6
C7[2]	42	60	90
C8[2]	38.1	46.5	55.4
C9[2]	119.4	153.5	193.4
B	5	5	6
H	13.5	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGCH Double Stage Dimensions-2



Specifications

Unit:mm

Dimensions	PGCH70T	PGCH90T	PGCH120T	PGCH155T	PGCH205T	PGCH235T
D1	62	80	108	140	184	210
D2	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P	M16x2.0P
$D3_{h6}$	16	22	32	40	55	75
$D4_{g6}$	52	68	90	120	160	180
D5	25	35	45	50	70	114.5
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	70	90	120	155	205	235
D8	70	94.5	120	-	-	253
L2	36	44.5	60	89.5	96.5	126
L3	6	6.5	7	8	12	18
L4	1.5	1.5	3.5	2.5	2.5	3
L5	25	32	40	60	70	90
L6	2	3	5	5	6	7
L7	10	12	16	16	20	28
L8	66.5	82	102.5	129.5	170	215
L9	4	4.5	6	6	8	15
L10	16.5	20.5	30	38	48	42
L11	29	35.4	40.7	53.7	63	68.9
L12	-	33.5	-	-	-	70
C1[2]	46	70	90	115	145	200
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38	≦50
C4[2]	26.5	37.6	41.4	51.3	66.5	77
$C5^{2}{}_{F6}$	30	50	70	95	110	114.3
C6[2]	4.1	4.5	6	6	5.5	6
C7[2]	42	60	90	115	140	180
C8[2]	38.1	46.5	55.4	70	80	90
C9[2]	140.6	173	217.9	289	346.5	431
B	5	6	10	12	16	20
H	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGCH Specifications

Specifications		Stage	Ratio	PGCH-50	PGCH-70	PGCH-90	PGCH-120	PGCH-155	PGCH-205	PGCH-235
Nominal Output Torque T_{2N}	N•m	1	3	19	53	145	290	520	950	1100
			4	20	55	150	300	550	1000	1700
			5	17	54	140	330	600	1050	2000
			6	15	46	135	310	560	1000	1900
			7	14	44	125	300	530	900	1800
			8	12	41	110	260	480	900	1600
			9	11	37	95	230	430	800	1500
			10	11	37	95	230	430	800	1500
		Stage	Ratio	PGCH-50	PGCH-70 PGCH-70T	PGCH-90 PGCH-90T	PGCH-120T	PGCH-155T	PGCH-205T	PGCH-235T
		2	15	19	53	145	290	520	950	2000
			20	20	55	150	300	550	1000	2000
			25	17	54	140	330	600	1050	2000
			30	17	54	140	330	600	1050	2000
			35	17	54	140	330	600	1050	2000
			40	17	54	140	330	600	1050	2000
			45	17	54	140	330	600	1050	2000
			50	17	54	140	330	600	1050	2000
			60	15	46	135	310	560	1000	2000
			70	14	44	125	300	530	960	1900
			80	12	41	110	260	480	900	1800
			90	11	37	95	230	430	800	1600
			100	11	37	95	230	430	800	1500
Emergency Stop Torque T_{2NOT}	N · m	(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)								
Nominal Input Speed n_{1N}	rpm	1,2	3-100	5000	4000	4000	4000	3000	2500	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	10000	8000	8000	8000	5000	4000	3500
Micro Backlash P0	arcmin	1	3-10	≦4	≦4	≦4	≦3	≦3	≦3	≦3
		2	12-100	≦6	≦6	≦6	≦5	≦5	≦5	≦5
Precision Backlash P1	arcmin	1	3-10	≦6	≦6	≦6	≦5	≦5	≦5	≦5
		2	12-100	≦8	≦8	≦8	≦7	≦7	≦7	≦7
Standard Backlash P2	arcmin	1	3-10	≦8	≦8	≦8	≦7	≦7	≦7	≦7
		2	12-100	≦10	≦10	≦10	≦9	≦9	≦9	≦9
Torsional Rigidity	N· m /arcmin	1,2	3-100	3	7	14	25	50	145	300
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	702	1377	2985	6100	7140	11050	28000
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	410	765	1625	3350	4670	6460	15000
Operating Temp.	℃		3-100	-10℃ ~ +90℃						
Service Life	hr		3-100	20,000 (10,000 Continuous operation)						
Efficiency	%	1	3-10	≧97%						
		2	12-100	≧94%						
Weight	kg	1	3-10	0.6	1.3	3.5	7.8	16.1	27	55
		2	12-100	0.9	2.0(1.6)	5.6(3.9)	8.7	19	34	67
Mounting Position	-	1,2	3-100	Any Direction						
Noise Level [2]	dBA/1m	1,2	3-100	58	58	60	63	65	67	70
Protection Class	-	1,2	3-100	IP65						
Lubrication	-	1,2	3-100	Synthetic Lubricant						

Inertia (J1)

Stage	Ratio	unit	PGCH-50	PGCH-70	PGCH-90	PGCH-120	PGCH-155	PGCH-205	PGCH-235
1	3	Kg · cm^2	0.03	0.23	0.97	2.35	10.00	30.50	79.50
	4		0.02	0.18	0.67	1.66	7.17	25.86	58.21
	5		0.02	0.17	0.65	1.50	6.52	23.63	54.36
	6/7/8		0.02	0.14	0.60	1.45	6.17	22.92	54.12
	9/10		0.02	0.14	0.58	1.41	6.10	22.73	53.98
Stage	Ratio		PGCH-50	PGCH-70(T)	PGCH-90(T)	PGCH-120(T)	PGHC-155(T)	PGCH-205(T)	PGCH-235T
2	15/20/25		0.02	0.17(0.02)	0.65(0.15)	0.65	1.50	6.25	30.50
	30/35/40		0.02	0.14(0.02)	0.60(0.14)	0.60	1.45	6.17	22.92
	45/50/60/70/80/90/100		0.02	0.14(0.02)	0.58(0.14)	0.58	1.41	6.10	22.73

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGC

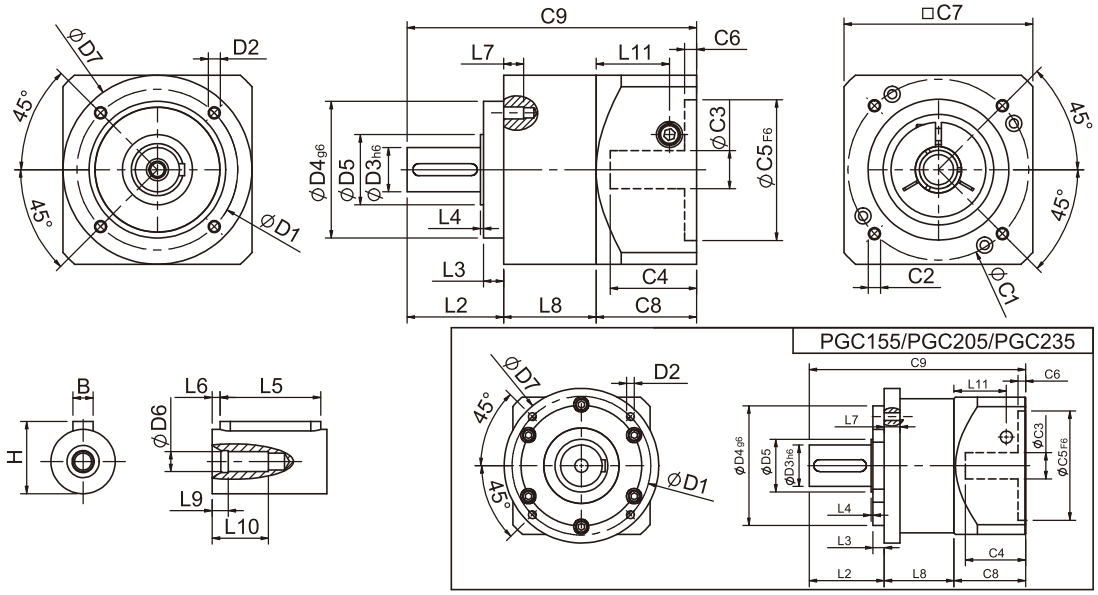
This precision type planetary gear reducer is offering 3 precision levels and 7 frame sizes to choose. They are ready for most industry and general servo motor motion control applications. Round mounting flange, caged precision class spur planetary gears in an in-line housing through sizes 235 mm. High torque capacity, quiet operation with backlash as low as < 3 arc-min. Ratios 3:1 to 100:1.

Frame Size (mm)	50, 70, 90, 120, 155, 205, 235
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,000 - 3,000
Max Input Speed (rpm)	4,000 - 6,000
Backlash (arc-min)	1 Stage : 3 - 12 2 Stages : 5 - 15
Noise Level (dBA / 1m)	60 - 75

Features

- In-line configuration with output shaft 13 mm through 75 mm diameter.
- Torque capacity range: 10 Nm through 1670 Nm.
- Caged planet carrier: with precision planet gear set.
- High performance, efficiencies and low acoustics.
- Wide range of ratios: 5 single stage ratios and up to 9 two-stage ratios.
- Output bearings deliver radial load capacity as high as 13500 N, and axial capacities up to 7300N.
- Square servo and step motor input: accommodates 50 mm through 235 mm, with optional sizes available.
- Service life lubricant.

PGC Single Stage Dimensions



Specifications

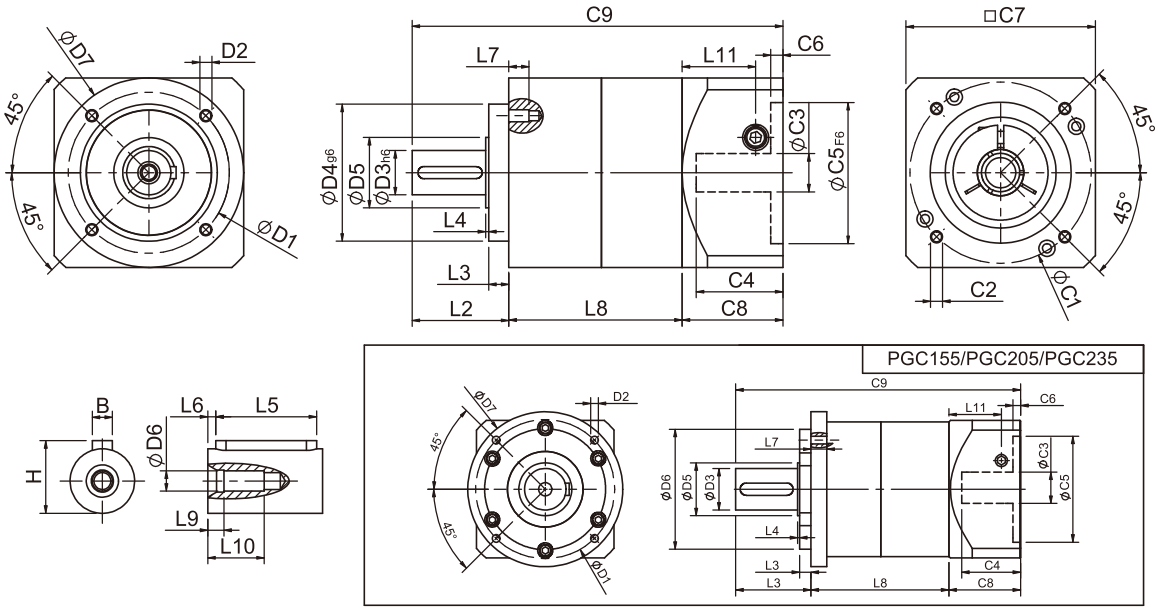
Unit:mm

Dimensions	PGC50	PGC70	PGC90	PGC120	PGC155	PGC205	PGC235
D1	44	62	80	108	140	184	210
D2	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P	M16x2.0P
D3h6	13	16	22	32	40	55	75
D4g6	35	52	68	90	120	160	180
D5	15	25	35	45	50	70	90
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	50	70	94	120	155	205	235
L2	24.5	35	48	60	93	99.5	126
L3	4	5	10	6	8	15	18
L4	1.5	1.5	1.5	3	6	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	8	10	10	15	18	21	32
L8	30	38	46	61	79	92.5	129.5
L9	4	4	4.5	6	6	8	7
L10	14	16.5	20.5	30	38	48	42
L11	24.4	31.5	36.5	42	63	69.5	102.2
C1 [2]	46	70	90	115	145	200	235
C2 [2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3 [2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50	≦55
C4 [2]	27	35	43	58	66	82	98
C5 [2] F6	30	50	70	95	110	114.3	200
C6 [2]	4	5	5	8	6	13	12
C7 [2]	50	70	94	120	140	182	220
C8 [2]	38.5	46	55	63	80	95	130
C9 [2]	93	119	149	184	252	287	385.5
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGC Double Stage Dimensions-1



Specifications

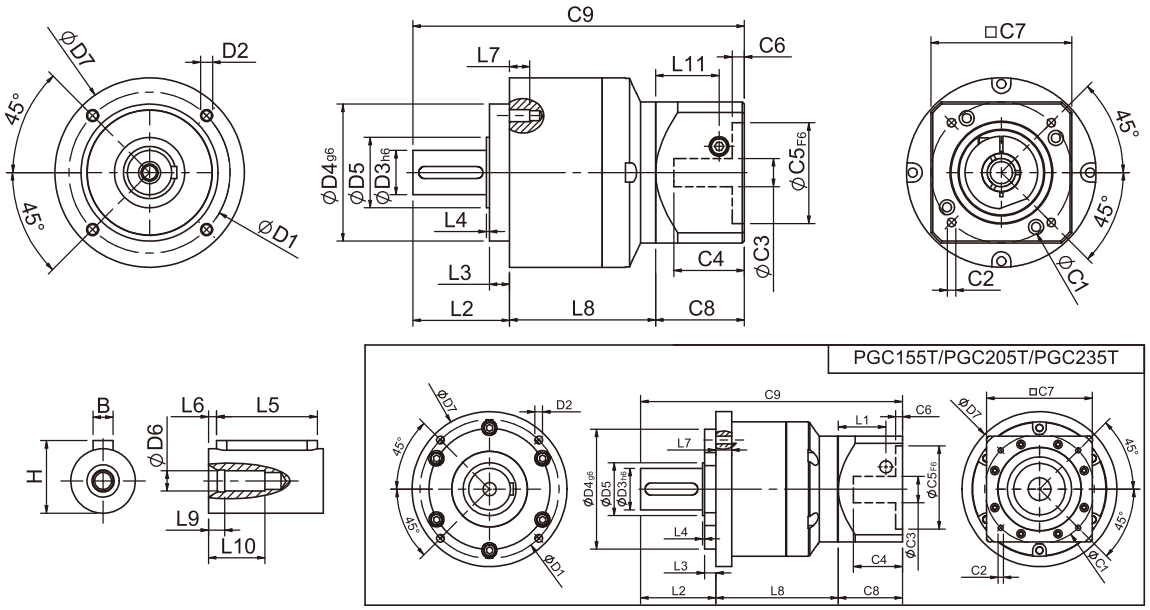
Unit:mm

Dimensions	PGC50	PGC70	PGC90	PGC120	PGC155	PGC205	PGC235
D1	44	62	80	108	140	184	210
D2	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P	M16x2.0P
D3 h6	13	16	22	32	40	55	75
D4 g6	35	52	68	90	120	160	180
D5	15	25	35	45	50	70	90
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	50	70	94	120	155	205	235
L2	24.5	35	48	60	93	99.5	126
L3	4	5	10	6	8	15	18
L4	1.5	1.5	1.5	3	6	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	8	10	10	15	18	21	32
L8	56	66	86	109	140	182.5	244
L9	4	4	4.5	6	6	8	7
L10	14	16.5	20.5	30	38	48	42
L11	24.4	31.5	36.5	42	63	69.5	102.2
C1[2]	46	70	90	115	145	200	235
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50	≦55
C4[2]	27	35	43	58	66	82	98
C5[2] F6	30	50	70	95	110	114.3	200
C6[2]	4	5	5	8	6	13	12
C7[2]	50	70	94	120	140	182	220
C8[2]	34	44	50	63	80	95	130
C9[2]	114.5	145	184	232	313	377	500
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGC Double Stage Dimensions-2



Specifications

Unit:mm

Dimensions	PGC70T	PGC90T	PGC120T	PGC155T	PGC205T	PGC235T
D1	62	80	108	140	184	210
D2	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P	M16x2.0P
$D3_{h6}$	16	22	32	40	55	75
$D4_{g6}$	52	68	90	120	160	180
D5	25	35	45	50	70	90
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	70	94	120	155	205	235
L2	35	48	60	93	99.5	126
L3	5	10	6	8	15	18
L4	1.5	1.5	3	6	2.5	3
L5	25	32	40	60	70	90
L6	2	3	5	5	6	7
L7	10	10	15	18	21	32
L8	60.8	72.5	99.4	127	162	211.5
L9	4	4.5	6	6	8	7
L10	16.5	20.5	30	38	48	42
L11	29	35.5	40.5	42	63	69.5
C1[2]	46	70	90	115	145	200
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50
C4[2]	28.5	41	47.75	58	66	82
$C5^{2}_{F6}$	30	50	70	95	110	114.3
C6[2]	5.5	8	6	8	6	13
C7[2]	50	70	94	120	140	182
C8[2]	40	50	55	63	80	95
C9[2]	135.8	170.5	214.4	283	341.5	432.5
B	5	6	10	12	16	20
H	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGC Specifications

Specifications		Stage	Ratio	PGC-50	PGC-70	PGC-90	PGC-120	PGC-155	PGC-205	PGC-235
Nominal Output Torque T_{2N}	N · m	1	3	13.8	44.2	95.2	283	482	1151	1670
			4	11.9	35.9	74.6	249	490	1055	1574
			5	13.8	43.0	95.2	283	473	1151	1670
			7	11.9	36.0	85.6	219	400	1055	1574
			10	10.1	25.0	75.0	210	320	763	1184
		Stage	Ratio	PGC-50	PGC-70(T)	PGC-90(T)	PGC-120(T)	PGC-155(T)	PGC-205(T)	PGC-235T
		2	15	13.8	44.2	95.2	283	482	1151	1670
			20	11.9	35.9	74.6	249	490	1055	1574
			25	13.8	43.0	95.2	283	473	1151	1670
			30	13.8	43.0	95.2	283	473	1151	1670
			35	13.8	43.0	95.2	283	473	1151	1670
			40	13.8	43.0	95.2	283	473	1151	1670
			50	13.8	43.0	95.2	283	473	1151	1670
			70	11.9	36.0	85.6	219	400	1055	1574
			100	10.1	25.0	75.0	210	320	763	1184
Emergency Stop Torque T_{2NOT}	N · m		(3.0 t imes of Nominal Output Torque) (*Max. Output Torque T_{2B} =60% of Emergency Stop Torque)							
Nominal Input Speed n_{1N}	rpm	1,2	3-100	3000	3000	3000	2500	2000	2000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	6000	6000	6000	5000	4000	4000	4000
Micro Backlash P0	arcmin	1 2	3-10 12-100	- -	- -	- -	≦3 ≦5	≦3 ≦5	≦3 ≦5	≦3 ≦5
Precision Backlash P1	arcmin	1 2	3-10 12-100	- -	≦6 ≦9	≦6 ≦9	≦5 ≦7	≦5 ≦7	≦5 ≦7	≦5 ≦7
Standard Backlash P2	arcmin	1 2	3-10 12-100	≦12 ≦15	≦9 ≦12	≦9 ≦12	≦7 ≦9	≦7 ≦9	≦7 ≦9	≦7 ≦9
Torsional Rigidity	N · m /arcmin	1,2	3-100	1.0	2.8	7.5	15.5	30	57	110
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	450	1200	2050	4250	7680	9080	13500
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	320	900	1420	2930	4680	5100	7300
Operating Temp.	℃		3-100	-10℃ ~ +90℃						
Service Life	hr		3-100	20,000 (10,000 Continuous operation)						
Efficiency	%	1 2	3-10 12-100	≧96% ≧92%						
Weight	kg	1 2	3-10 12-100	0.7 0.9	14 2.2(1.7)	3.0 5.0(3.4)	7.3 11.5(8.5)	15.6 20.7(17.2)	26 36(31)	56 80(62)
Mounting Position	-	1,2	3-100	Any Direction						
Noise Level [2]	dBA/1m	1,2	3-100	60	62	65	65	70	70	75
Protection Class	-	1,2	3-100	IP65						
Lubrication	-	1,2	3-100	Synthetic Lubricant						

Inertia (J1)

Stage	Ratio	unit	PGC-50	PGC-70	PGC-90	PGC-120	PGC-155	PGC-205	PGC-235
1	3	$Kg \cdot cm^2$	0.03	0.20	0.81	2.20	7.89	25.2	77.9
	4		0.02	0.16	0.65	1.80	5.83	19.8	56.5
	5		0.02	0.15	0.62	1.61	5.38	18.3	53.3
	7		0.02	0.14	0.60	1.55	5.22	17.8	53.0
	10		0.02	0.14	0.60	1.53	5.20	17.6	52.9
Stage	Ratio		PGC-50	PGC-70(T)	PGC-90(T)	PGC-120(T)	PGC-155(T)	PGC-205(T)	PGC-235T
2	15/20/25		0.02	0.15(0.02)	0.62(0.15)	1.61(0.62)	5.38(1.61)	18.3(5.38)	53.9(18.3)
	30/35/40		0.02	0.14(0.02)	0.60(0.14)	1.55(0.60)	5.22(1.55)	17.8(5.22)	53.0(17.8)
	50/70/100		0.02	0.14(0.02)	0.60(0.14)	1.53(0.60)	5.20(1.53)	17.6(5.20)	52.9(17.6)

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGCHR

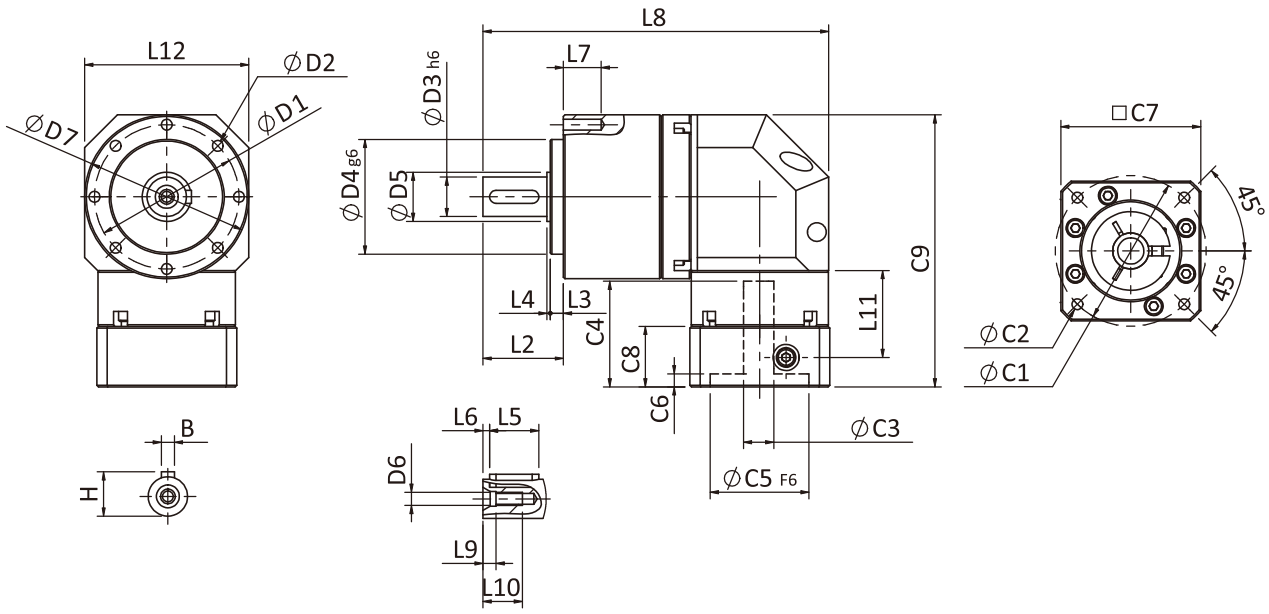
Sesame Motor PGCHR right angle planetary gearheads provide integration between superior operating performance and cost effectiveness. One-piece planet carrier/output shaft and newly designed gear profile benefit higher output torque, precision, loading capacity and lower noise level. High quality gears and components are utilized to create compact and rigid unit with low backlash and maintenance-free operation. The highest ratio 300:1 is available with max frame size 120 mm. Adapters customized for all servo motors.

Frame Size (mm)	50, 70, 90, 120
Ratio	3 : 1 - 300 : 1
Nominal Input Speed (rpm)	4,000 - 5,000
Max Input Speed (rpm)	8,000 - 10,000
Backlash (arc-min)	1 Stage : 8 - 10 2 Stages : 10 - 12
Noise Level (dBA / 1m)	61 - 68

Features

- ▶ One-piece planet carrier/output shaft, high torsional rigidity and loading capacity.
- ▶ One-piece compact ring gear design, high precision and output torque.
- ▶ Alloy steel precision gears, low backlash, low noise, high wear resistance.
- ▶ Lubricated for life and IP65 sealing, maintenance free.
- ▶ Adapters for all servo motor.

PGCHR Single Stage Dimensions



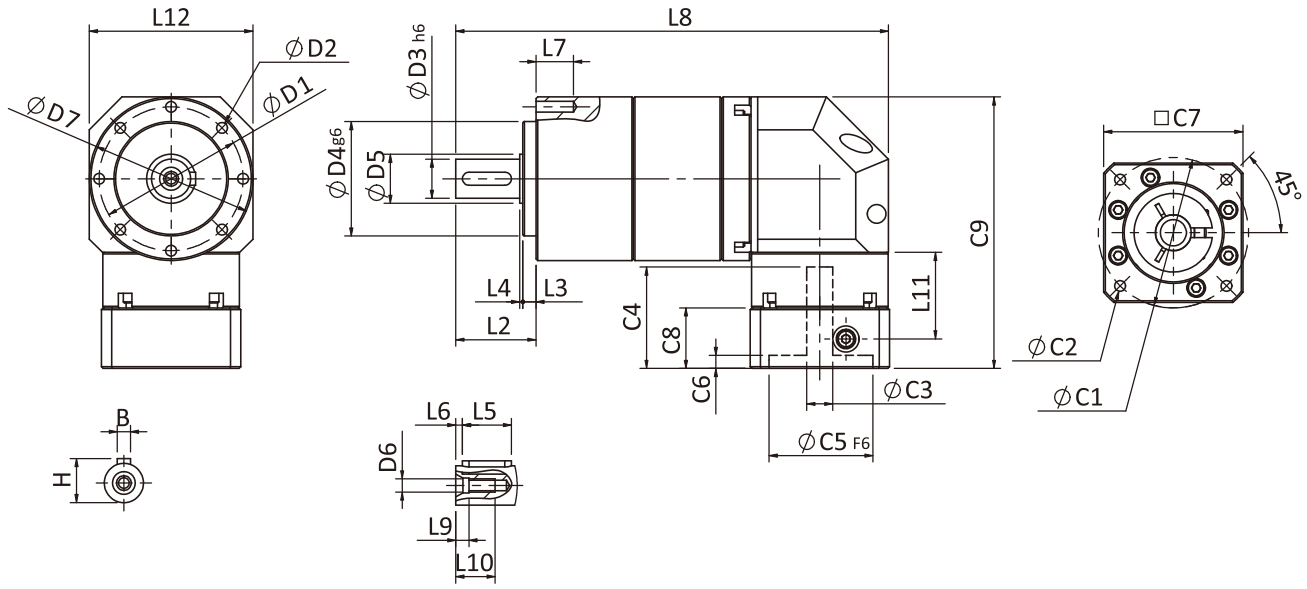
Specifications Unit:mm

Dimensions	PGCHR50	PGCHR70	PGCHR90
D1	44	62	80
D2	M4x0.7P	M5x0.8P	M6x1.0P
D3h6	12	16	22
D4g6	35	52	68
D5	15	25	35
D6	M4x0.7P	M5x0.8P	M8x1.25P
D7	50	70	90
L2	24.5	36	44.5
L3	4	6	6.5
L4	1	1.5	1.5
L5	15	25	32
L6	2	2	3
L7	8	10	12
L8	105.3	144.3	201
L9	4	4	4.5
L10	12	16.5	20.5
L11	26.5	36	41.2
L12	50	70	98
C1 [2]	46	70	90
C2 [2]	M4x0.7P	M5x0.8P	M6x1.0P
C3 [2]	≦8/≦11	≦14/≦19	≦19/≦24
C4 [2]	33	44	57
C5 [2]F6	30	50	70
C6 [2]	4	4	6
C7 [2]	42.6	60	90
C8 [2]	18.5	20	26
C9 [2]	83	111.4	149.2
B	4	5	6
H	13.5	18	24.5

*2. C1~C9 are motor specific dimensions (metric std shown). Sizes may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PGCHR Double Stage Dimensions-1



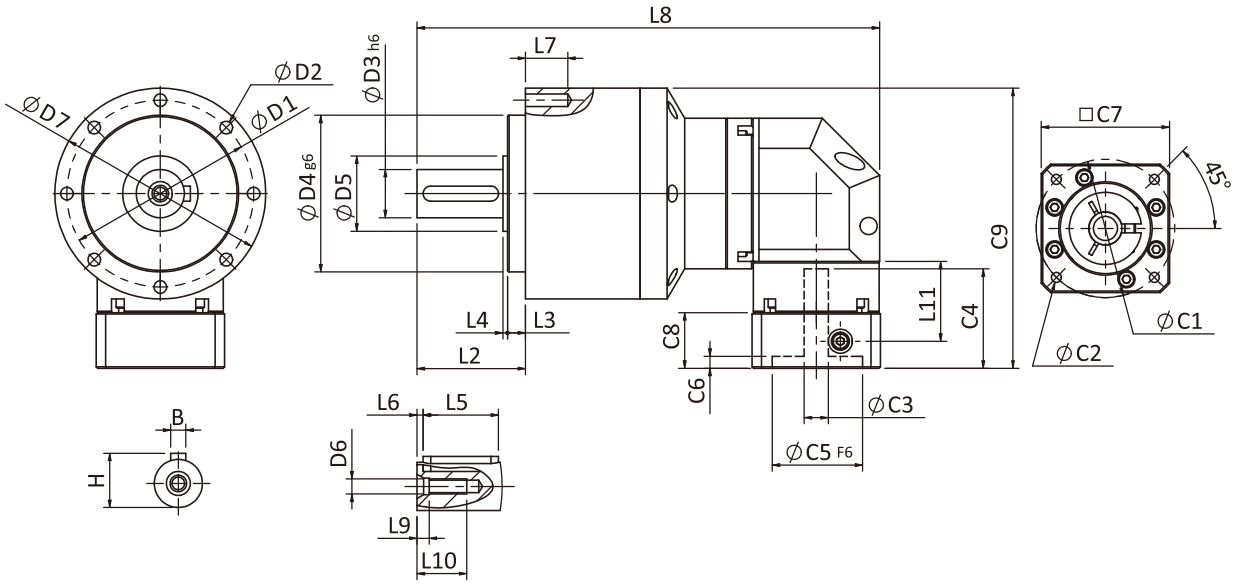
Specifications Unit:mm

Dimensions	PGCHR50	PGCHR70	PGCHR90
D1	44	62	80
D2	M4x0.7P	M5x0.8P	M6x1.0P
D3h6	12	16	22
D4g6	35	52	68
D5	15	25	35
D6	M4x0.7P	M5x0.8P	M8x1.25P
D7	50	70	90
L2	24.5	36	44.5
L3	4	6	6.5
L4	1	1.5	1.5
L5	15	25	32
L6	2	2	3
L7	8	10	12
L8	132.3	177.3	245
L9	4	4	4.5
L10	12	16.5	20.5
L11	26.5	36	41.2
L12	50	70	98
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24
C4[2]	33	44	57
C5[2]F6	30	50	70
C6[2]	4	4	6
C7[2]	42.6	60	90
C8[2]	18.5	20	26
C9[2]	83	111.4	149.2
B	4	5	6
H	13.5	18	24.5

*2. C1~C9 are motor specific dimensions (metric std shown). Sizes may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PGCHR Double Stage Dimensions-2



Specifications Unit:mm

Dimensions	PGCHR70T	PGCHR90T	PGCHR120T
D1	62	80	108
D2	M5x0.8P	M6x1.0P	M8x1.25P
D3h6	16	22	32
D4g6	52	68	90
D5	25	35	45
D6	M5x0.8P	M8x1.25P	M12x1.75P
D7	70	90	120
L2	36	44.5	60
L3	6	6.5	7
L4	1.5	1.5	3.5
L5	25	32	40
L6	2	3	5
L7	10	12	16
L8	153.5	196.8	269.5
L9	4	4.5	6
L10	16.5	20.5	30
L11	26.5	36	41.2
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24
C4[2]	33	44	57
C5[2]F6	30	50	70
C6[2]	4	4	6
C7[2]	42.6	60	90
C8[2]	18.5	20	26
C9[2]	93	123.65	160.2
B	5	6	10
H	18	24.5	35

*2. C1~C9 are motor specific dimensions (metric std shown). Sizes may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PGCHR Specifications

Specifications		Stage	Ratio	PGCHR-50	PGCHR-70	PGCHR-90	PGCHR-120
Nominal Output Torque T_{2N}	N · m	1	3	16	36	105	135
			4	18	48	140	180
			5	17	54	140	225
			7	14	44	125	300
			8	18	48	140	260
			9	16	35	95	230
			10	17	50	140	210
			12	18	40	120	-
			14	14	44	125	300
			15	17	45	135	-
			20	11	37	95	230
		Stage	Ratio	PGCHR-50	PGCHR-70/ PGCHR-70T	PGCHR-90/ PGCHR-90T	PGCHR-120T
		2	20	20	55	150	300
			25	17	54	140	330
			30	19	53	145	330
			35	17	54	140	330
			40	20	55	150	300
			50	17	54	140	330
			60	17	54	140	330
			70	17	54	140	330
			80	17	54	140	330
			100	17	54	140	330
			120	17	54	140	330
			140	14	44	125	300
			200	11	37	95	230
			300	11	37	95	230
Emergency Stop Torque T_{2NOT}	N · m	(2.5 t imes of Nominal Output Torque) (*Max. Output Torque T_{2B} =60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-300	5000	4000	4000	4000
Max. Input Speed n_{1max}	rpm	1,2	3-300	10000	8000	8000	8000
Standard Backlash P2	arcmin	1	3-16	≦10	≦10	≦9	≦8
		2	20-300	≦12	≦12	≦11	≦10
Torsional Rigidity	N ·m /arcmin	1,2	3-300	3	7	14	25
Max. Radial Load F_{2rB} [1]	N	1,2	3-300	702	1377	2985	6100
Max. Axial Load F_{2aB} [1]	N	1,2	3-300	410	765	1625	3350
Operating Temp.	℃		3-300	-10℃ ~ +90℃			
Service Life	hr		3-300	20,000 (10,000 Continuous Operation)			
Efficiency	%	1	3-16	≧95%			
		2	20-300	≧92%			
Weight	kg	1	3-16	1.1	2.2	6.0	10.5
		2	20-300	1.4	2.8/2.0	8.0/5.0	12.0
Mounting Position	-	1,2	3-300	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-300	61	63	65	68
Protection Class	-	1,2	3-300	IP65			
Lubrication	-	1,2	3-300	Synthetic Lubricant			

Inertia (J1)

Stage	Ratio	unit	PGCHR-50 (ψ8)	PGCHR-70 (ψ14)	PGCHR-90 (ψ19)	PGCHR-120 (ψ24)
1	3, 4, 5, 7	Kg · cm^2	0.07	0.40	2.0	2.7
	Other Ratios		0.05	0.30	1.5	2.2
Stage	Ratio		PGCHR-50 (ψ8)	PGCHR-70 (ψ14)/ PGCHR-70T (ψ8)	PGCHR-90 (ψ19)/ PGCHR-90T (ψ14)	PGCHR-120T (ψ19)
2	20, 25, 35		0.07	0.40/0.07	2.0/0.40	2.0
	Other Ratios		0.05	0.30/0.05	1.5/0.30	1.5

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

PEE

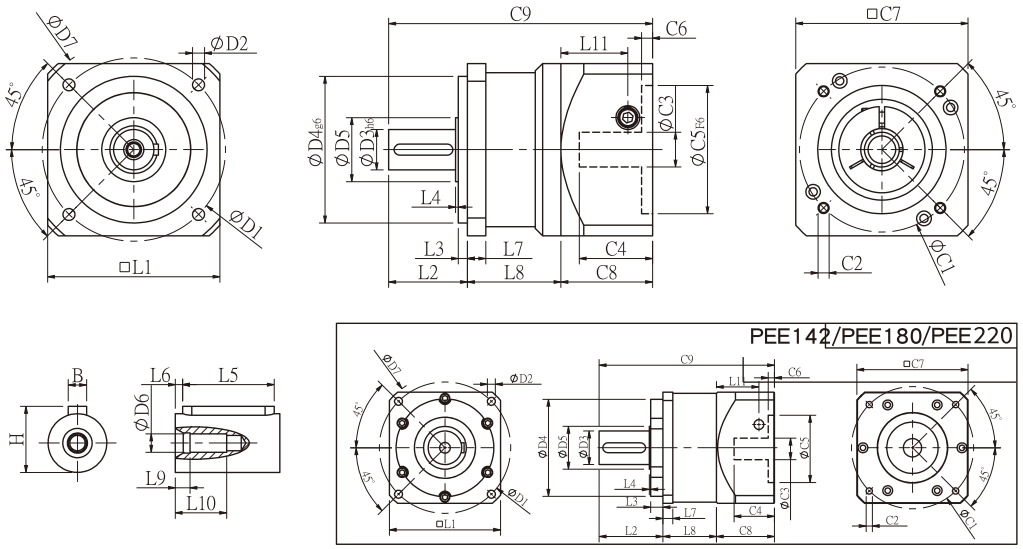
PEE series of economy Planetary Gearheads provide stable performance, a wide range of sizes up to 220 mm, in square flange and round housing, available ratios 3:1 to 100:1. High output torque and quiet operation with standard backlash 7-15 arc-min.

Frame Size (mm)	50, 70, 90, 120, 142, 180, 220
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,000 - 3,000
Max Input Speed (rpm)	4,000 - 6,000
Backlash (arc-min)	1 Stage : 7 - 12 2 Stages : 9 - 15
Noise Level (dBA / 1m)	65 - 80

Features

- In-line configuration with output shaft 13 mm through 75 mm diameter.
- Torque capacity range: 10 Nm through 1670 Nm.
- Solid performance, high efficiencies and low acoustics.
- Wide range of ratios up to 100:1.
- Output bearings deliver radial load capacity as high as 11120 N, and axial capacities up to 8560 N.
- Service life lubricant.

PEE Single Stage Dimensions



Specifications

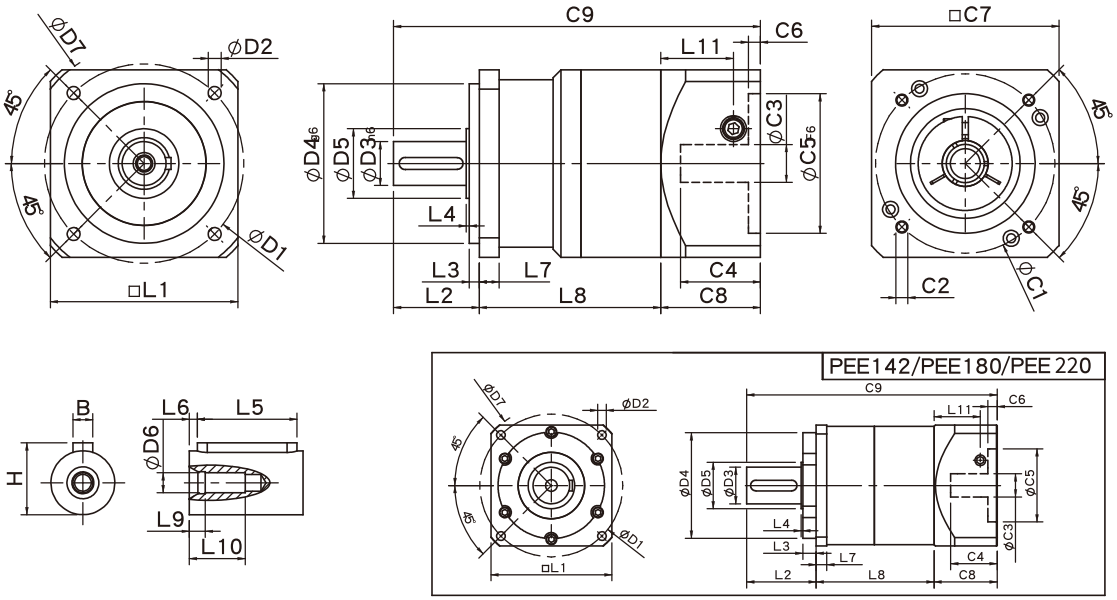
Unit:mm

Dimensions	PEE50	PEE70	PEE90	PEE120	PEE142	PEE180	PEE220
D1	50	70	100	130	165	215	250
D2	3.4	6	6.5	8.5	10.5	13	17
D3h6	13	16	22	32	40	55	75
D4g6	35	50	80	110	130	160	180
D5	15	25	35	45	50	70	90
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	64	90	120	152	186	239	292
L1	50	70	94	120	142	182	220
L2	24.5	37	43	60	93	104.5	138
L3	4	7	5	6	8	20	30
L4	1.5	1.5	1.5	3	6	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	5	6	10	12	18	16	20
L8	30	36	51	61	79	87.5	117.5
L9	4	4	4.5	6	6	8	7
L10	14	16.5	20.5	30	38	48	42
L11	24.4	31.5	36.5	42	63	69.5	102.2
C1[2]	46	70	90	115	145	200	235
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50	≦55
C4[2]	27	35	43	58	66	82	98
C5[2] F6	30	50	70	95	110	114.3	200
C6[2]	4	5	5	8	6	13	12
C7[2]	50	70	94	120	140	182	220
C8[2]	34	44	50	63	80	95	130
C9[2]	88.5	117	144	184	252	287	385.5
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions(metric std shown),Size may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PEE Double Stage Dimensions-1



Specifications

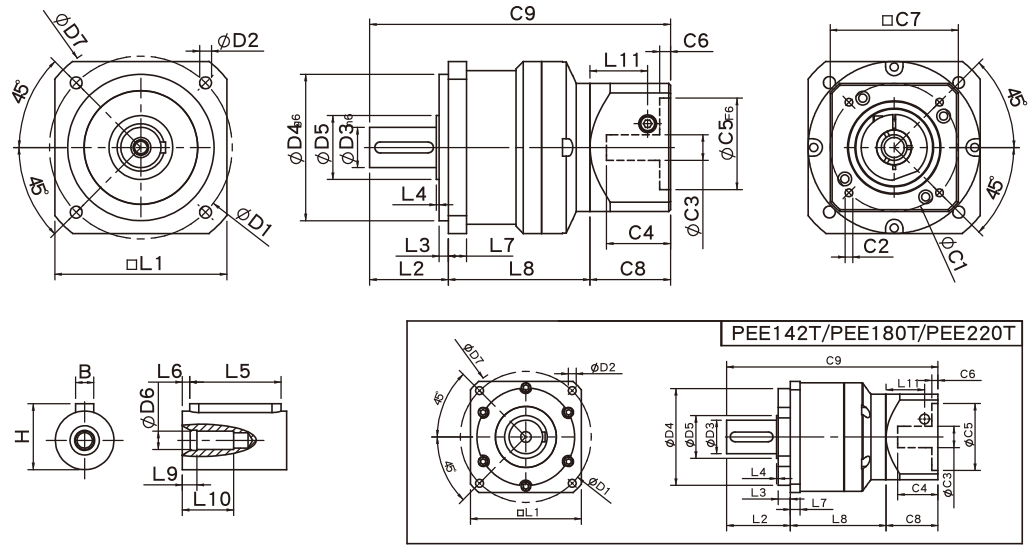
Unit:mm

Dimensions	PEE50	PEE70	PEE90	PEE120	PEE142	PEE180	PEE220
D1	50	70	100	130	165	215	250
D2	3.4	6	6.5	8.5	10.5	13	17
D3h6	13	16	22	32	40	55	75
D4g6	35	50	80	110	130	160	180
D5	15	25	35	45	50	70	90
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	64	90	120	152	186	239	292
L1	50	70	94	120	142	182	220
L2	24.5	37	43	60	93	104.5	138
L3	4	7	5	6	8	20	30
L4	1.5	1.5	1.5	3	6	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	5	6	10	12	18	16	20
L8	56	64	91	109	140	177.5	232
L9	4	4	4.5	6	6	8	7
L10	14	16.5	20.2	30	38	48	42
L11	24.4	31.5	36.5	42	63	69.5	102.2
C1[2]	46	70	90	115	145	200	235
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50	≦55
C4[2]	27	35	43	58	66	82	98
C5[2] F6	30	50	70	95	110	114.3	200
C6[2]	4	5	5	8	6	13	12
C7[2]	50	70	94	120	140	182	220
C8[2]	38.5	46	55	63	80	95	130
C9[2]	119	147	189	232	313	377	500
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions(metric std shown),Size may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PEE Double Stage Dimensions-2



Specifications

Unit:mm

Dimensions	PEE70T	PEE90T	PEE120T	PEE142T	PEE180T	PEE220T
D1	70	100	130	165	215	250
D2	6	6.5	8.5	10.5	13	17
$D3_{h6}$	16	22	32	40	55	75
$D4_{g6}$	50	80	110	130	160	180
D5	25	35	45	50	70	90
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	90	120	152	186	239	292
L1	70	94	120	142	182	220
L2	37	43	60	93	104.5	138
L3	7	5	6	8	20	30
L4	1.5	1.5	3	6	2.5	3
L5	25	32	40	60	70	90
L6	2	3	5	5	6	7
L7	6	10	12	18	16	20
L8	58.8	77.5	99.4	127	157	199.5
L9	4	4.5	6	6	8	7
L10	16.5	20.5	30	38	48	42
L11	29	35.5	40.5	42	63	69.5
C1[2]	66.67	70	90	115	145	200
C2[2]	M5x0.8P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50
C4[2]	27	41	47.75	58	66	82
$C5^{2}{}_{F6}$	38.1	50	70	95	110	114.3
C6[2]	4	8	6	8	6	13
C7[2]	60	70	94	120	140	182
C8[2]	38.5	50	55	63	80	95
C9[2]	134.3	170.5	214.4	283	341.5	432.5
B	5	6	10	12	16	20
H	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions(metric std shown),Size may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PEE Specifications

Specifications		Stage	Ratio	PEE-50	PEE-70	PEE-90	PEE-120	PEE-142	PEE-180	PEE-220
Nominal Output Torque T_{2N}	N • m	1	3	13.8	44.2	95.2	283	482	1151	1670
			4	11.9	35.9	74.6	249	490	1055	1574
			5	13.8	43.0	95.2	283	473	1151	1670
			7	11.9	36.0	85.6	219	400	1055	1574
			10	10.1	25.0	75.0	210	320	763	1184
		Stage	Ratio	PEE-50	PEE-70(T)	PEE-90(T)	PEE-120(T)	PEE-142(T)	PEE-180(T)	PEE-220(T)
		2	15	13.8	44.2	95.2	283	482	1151	1670
			20	11.9	35.9	74.6	249	490	1055	1574
			25	13.8	43.0	95.2	283	473	1151	1670
			30	13.8	43.0	95.2	283	473	1151	1670
			35	13.8	43.0	95.2	283	473	1151	1670
			40	13.8	43.0	95.2	283	473	1151	1670
			50	13.8	43.0	95.2	283	473	1151	1670
			70	11.9	36.0	85.6	219	400	1055	1574
			100	10.1	25.0	75.0	210	320	763	1184
Emergency Stop Torque T_{2NOT}	N • m		(3.0 t imes of Nominal Output Torque) (*Max. Output Torque T_{2B} =60% of Emergency Stop Torque)							
Nominal Input Speed n_{1N}	rpm	1,2	3-100	3000	3000	3000	2500	2000	2000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	6000	6000	6000	5000	4000	4000	4000
Standard Backlash P2	arcmin	1 2	3-10 12-100	≦12 ≦15	≦9 ≦12	≦9 ≦12	≦7 ≦9	≦7 ≦9	≦9 ≦9	≦7 ≦9
Torsional Rigidity	N • m /arcmin	1,2	3-100	1.0	2.8	7.5	15.5	30	57	110
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	350	960	1630	3380	6150	7260	11120
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	320	900	1420	2930	5510	5550	8560
Operating Temp.	°C		3-100	-10°C ~ +90°C						
Service Life	hr		3-100	20,000 (10,000 Continuous Operation)						
Efficiency	%	1 2	3-10 12-100	≧ 95% ≧ 90%						
Weight	kg	1	3-10	0.7	1.4	3.0	7.3	15.6	26	56
		2	12-100	0.9	2.2/1.7	5.0/3.4	11.5/8.5	20.7/17.2	36/31	80/62
Mounting Position	-	1,2	3-100	Any Direction						
Noise Level [2]	dBA/1m	1,2	3-100	≦65	≦67	≦70	≦70	≦75	≦75	≦80
Protection Class	-	1,2	3-100	IP65						
Lubrication	-	1,2	3-100	Urea Derivatives						

Inertia(J1)

Stage	Ratio	unit	PEE-50	PEE-70	PEE-90	PEE-120	PEE-142	PEE-180	PEE-220
1	3	Kg • cm^2	0.03	0.20	0.81	2.20	7.89	25.2	77.9
	4		0.03	0.16	0.65	1.80	5.83	19.8	56.5
	5		0.03	0.15	0.62	1.61	5.38	18.3	53.3
	7		0.03	0.14	0.60	1.55	5.22	17.8	53.0
	10		0.03	0.14	0.60	1.53	5.20	17.6	52.9
Stage	Ratio		PEE-50	PEE-70(T)	PEE-90(T)	PEE-120(T)	PEE-142(T)	PEE-180(T)	PEE-220(T)
2	15/20/25		0.02	0.15(0.02)	0.62(0.15)	1.61(0.62)	5.38(1.61)	18.3(5.38)	53.9(18.3)
	30/35/40		0.02	0.14(0.02)	0.60(0.14)	1.55(0.60)	5.22(1.55)	17.8(5.22)	53.0(17.8)
	50/70/100		0.02	0.14(0.02)	0.60(0.14)	1.53(0.60)	5.20(1.53)	17.6(5.20)	52.9(17.6)

1. Applied to the output shaft center at 400 rpm.
2. Measured at 3000 rpm with no load.
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PEC

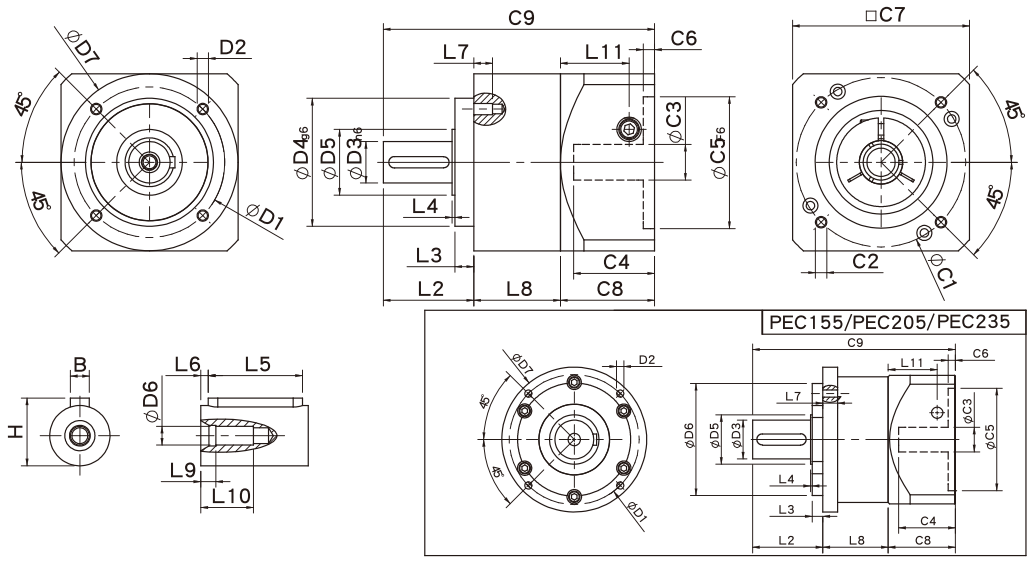
PEC series of economy Planetary Gearheads provide stable performance, a wide range of sizes up to 235 mm, in round flange and round housing, available ratios 3:1 to 100:1. High output torque and quiet operation with standard backlash 7-15 arc-min.

Frame Size (mm)	50, 70, 90, 120, 155, 205, 235
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,000 - 3,000
Max Input Speed (rpm)	4,000 - 6,000
Backlash (arc-min)	1 Stage : 7 - 12 2 Stages : 9 - 15
Noise Level (dBA / 1m)	65 - 80

Features

- In-line configuration with output shaft 13 mm through 75 mm diameter
- Torque capacity range: 10 Nm through 1670 Nm
- Solid performance, high efficiencies and low acoustics
- Wide range of ratios up to 100:1
- Output bearings deliver radial load capacity as high as 11120 N, and axial capacities up to 8560 N
- Service life lubricant

PEC Single Stage Dimensions



Specifications

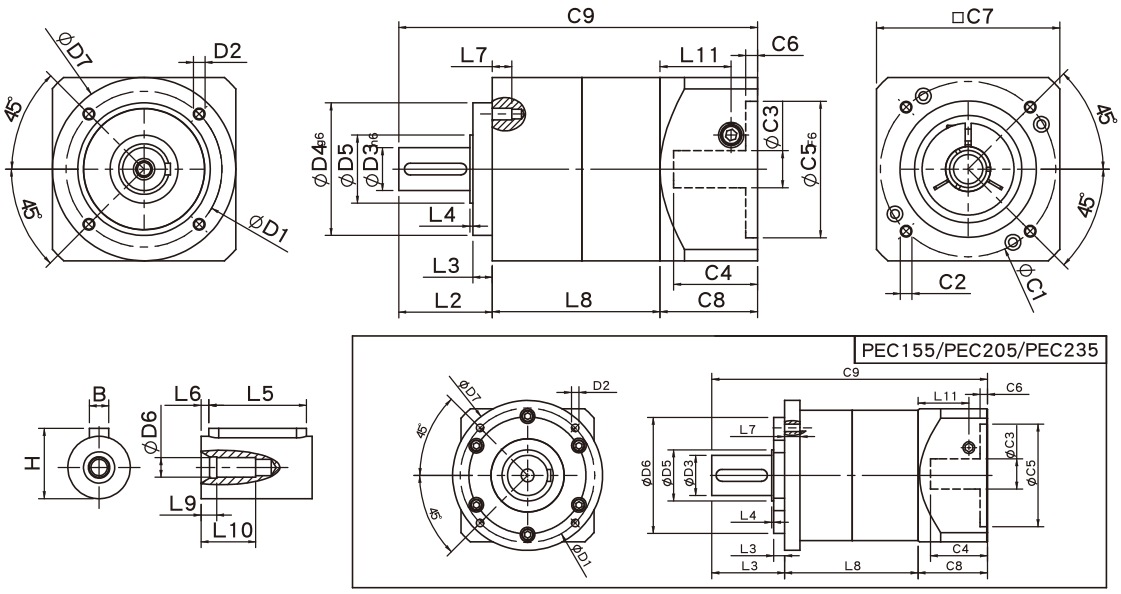
Unit:mm

Dimensions	PEC50	PEC70	PEC90	PEC120	PEC155	PEC205	PEC235
D1	44	62	80	108	140	184	210
D2	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P	M16x2.0P
$D3_{h6}$	12	16	22	32	40	55	75
$D4_{g6}$	35	52	68	90	120	160	180
D5	15	25	35	45	50	70	90
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	50	70	94	120	155	205	235
L2	24.5	35	48	60	93	99.5	126
L3	4	5	10	6	8	15	18
L4	1.5	1.5	1.5	3	6	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	8	10	10	16	18	21	32
L8	30	38	46	61	79	92.5	129.5
L9	4	4	4.5	6	6	8	7
L10	14	16.5	20.2	30	38	48	42
L11	24.4	31.5	36.5	42	63	69.5	102.2
C1[2]	46	70	90	115	145	200	235
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50	≦55
C4[2]	27	35	43	58	66	82	98
$C5^{2}{}_{F6}$	30	50	70	95	110	114.3	200
C6[2]	4	5	5	8	6	13	12
C7[2]	50	70	94	120	140	182	220
C8[2]	34	44	50	63	80	95	130
C9[2]	88.5	117	144	184	252	287	385.5
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions(metric std shown),Size may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PEC Double Stage Dimensions-1



Specifications

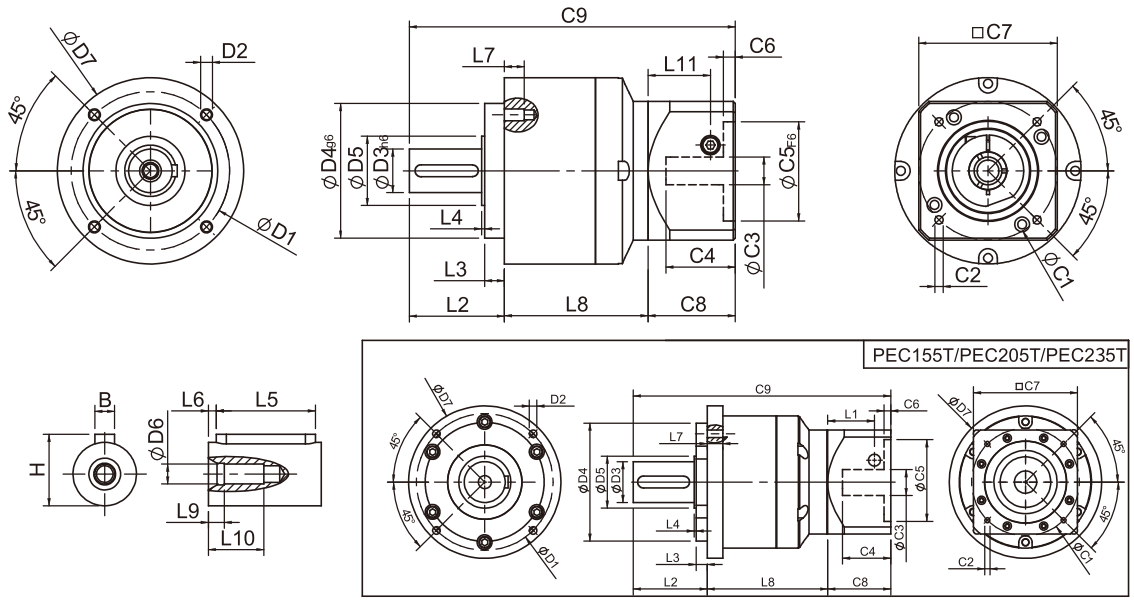
Unit:mm

Dimensions	PEC50	PEC70	PEC90	PEC120	PEC155	PEC205	PEC235
D1	44	62	80	108	140	184	210
D2	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P	M16x2.0P
D3 h6	12	16	22	32	40	55	75
D4 g6	35	52	68	90	120	160	180
D5	15	25	35	45	50	70	90
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	50	70	94	120	155	205	235
L2	24.5	35	48	60	93	99.5	126
L3	4	5	10	6	8	15	18
L4	1.5	1.5	1.5	3	6	2.5	3
L5	15	25	32	40	60	70	90
L6	2	2	3	5	5	6	7
L7	8	10	10	15	18	21	32
L8	56	66	86	109	140	182.5	244
L9	4	4	4.5	6	6	8	7
L10	14	16.5	20.5	30	38	48	42
L11	24.4	31.5	36.5	42	63	69.5	102.2
C1[2]	46	70	90	115	145	200	235
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50	≦55
C4[2]	27	35	43	58	66	82	98
C5[2] F6	30	50	70	95	110	114.3	200
C6[2]	4	5	5	8	6	13	12
C7[2]	50	70	94	120	140	182	220
C8[2]	34	44	50	63	80	95	130
C9[2]	114.5	145	184	232	313	377	500
B	5	5	6	10	12	16	20
H	15	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions(metric std shown),Size may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PEC Double Stage Dimensions-2



Specifications

Unit:mm

Dimensions	PEC70T	PEC90T	PEC120T	PEC155T	PEC205T	PEC235T
D1	62	80	108	140	184	210
D2	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P	M16x2.0P
$D3_{h6}$	16	22	32	40	55	75
$D4_{g6}$	52	68	90	120	160	180
D5	25	35	45	50	70	90
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	70	94	120	155	205	235
L2	35	48	60	93	99.5	126
L3	5	10	6	8	15	18
L4	1.5	1.5	3	6	2.5	3
L5	25	32	40	60	70	90
L6	2	3	5	5	6	7
L7	10	10	15	18	21	32
L8	60.8	72.5	99.4	127	162	211.5
L9	4	4.5	6	6	8	7
L10	16.5	20.5	30	38	48	42
L11	29	35.5	40.5	42	63	69.5
C1[2]	46	70	90	115	145	200
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3[2]	≦8	≦14	≦19/≦24	≦24/≦28	≦35	≦50
C4[2]	28.5	41	47.75	58	66	82
$C5^{2}{}_{F6}$	30	50	70	95	110	114.3
C6[2]	5.5	8	6	8	6	13
C7[2]	50	70	94	120	140	182
C8[2]	40	50	55	63	80	95
C9[2]	135.8	170.5	214.4	283	341.5	432.5
B	5	6	10	12	16	20
H	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions(metric std shown),Size may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PEC Specifications

Specifications		Stage	Ratio	PEC-50	PEC-70	PEC-90	PEC-120	PEC-155	PEC-205	PEC-235
Nominal Output Torque T_{2N}	N • m	1	3	13.8	44.2	95.2	283	482	1151	1670
			4	11.9	35.9	74.6	249	490	1055	1574
			5	13.8	43.0	95.2	283	473	1151	1670
			7	11.9	36.0	85.6	219	400	1055	1574
			10	10.1	25.0	75.0	210	320	763	1184
		Stage	Ratio	PEC-50	PEC-70(T)	PEC-90(T)	PEC-120(T)	PEC-155(T)	PEC-205(T)	PEC-235 (T)
		2	15	13.8	44.2	95.2	283	482	1151	1670
			20	11.9	35.9	74.6	249	490	1055	1574
			25	13.8	43.0	95.2	283	473	1151	1670
			30	13.8	43.0	95.2	283	473	1151	1670
			35	13.8	43.0	95.2	283	473	1151	1670
			40	13.8	43.0	95.2	283	473	1151	1670
			50	13.8	43.0	95.2	283	473	1151	1670
			70	11.9	36.0	85.6	219	400	1055	1574
			100	10.1	25.0	75.0	210	320	763	1184
Emergency Stop Torque T_{2NOT}	N • m		3.0 Times of Nominal Output Torque) (* Max. Output Torque T_{2B} =60% of Nominal Output Torque)							
Nominal Input Speed n_{1N}	rpm	1,2	3-100	3000	3000	3000	2500	2000	2000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	6000	6000	6000	5000	4000	4000	4000
Standard Backlash P2	arcmin	1 2	3-10 12-100	≦12 ≦15	≦9 ≦12	≦9 ≦12	≦7 ≦9	≦7 ≦9	≦7 ≦9	≦7 ≦9
Torsional Rigidity	N • m /arcmin	1,2	3-100	1.0	2.8	7.5	15.5	30	57	110
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	350	960	1630	3380	6150	7260	11120
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	320	900	1420	2930	5510	5550	8560
Operating Temp.	°C		3-100	-10°C ~ +90°C						
Service Life	hr		3-100	20,000 (10,000 Continuous Operation)						
Efficiency	%	1 2	3-10 12-100	≧ 95% ≧ 90%						
Weight	kg	1	3-10	0.7	1.4	3.0	7.3	15.6	26	56
		2	12-100	0.9	2.2/1.7	5.0/3.4	11.5/8.5	20.7/17.2	36/31	80/62
Mounting Position	-	1,2	3-100	Any Direction						
Noise Level [2]	dBA/1m	1,2	3-100	≦65	≦67	≦70	≦70	≦75	≦75	≦80
Protection Class	-	1,2	3-100	IP65						
Lubrication	-	1,2	3-100	Urea Derivatives						

Inertia(J1)

Stage	Ratio	unit	PEC-50	PEC-70	PEC-90	PEC-120	PEC-155	PEC-205	PEC-235
1	3	Kg • cm^2	0.03	0.20	0.81	2.20	7.89	25.2	77.9
	4		0.03	0.16	0.65	1.80	5.83	19.8	56.5
	5		0.03	0.15	0.62	1.61	5.38	18.3	53.3
	7		0.03	0.14	0.60	1.55	5.22	17.8	53.0
	10		0.03	0.14	0.60	1.53	5.20	17.6	52.9
Stage	Ratio		PEC-50	PEC-70(T)	PEC-90(T)	PEC-120(T)	PEC-155(T)	PEC-205(T)	PEC-235(T)
2	15/20/25		0.02	0.15(0.02)	0.62(0.15)	1.61(0.62)	5.38(1.61)	18.3(5.38)	53.9(18.3)
	30/35/40		0.02	0.14(0.02)	0.60(0.14)	1.55(0.60)	5.22(1.55)	17.8(5.22)	53.0(17.8)
	50/70/100		0.02	0.14(0.02)	0.60(0.14)	1.53(0.60)	5.20(1.53)	17.6(5.20)	52.9(17.6)

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PAE

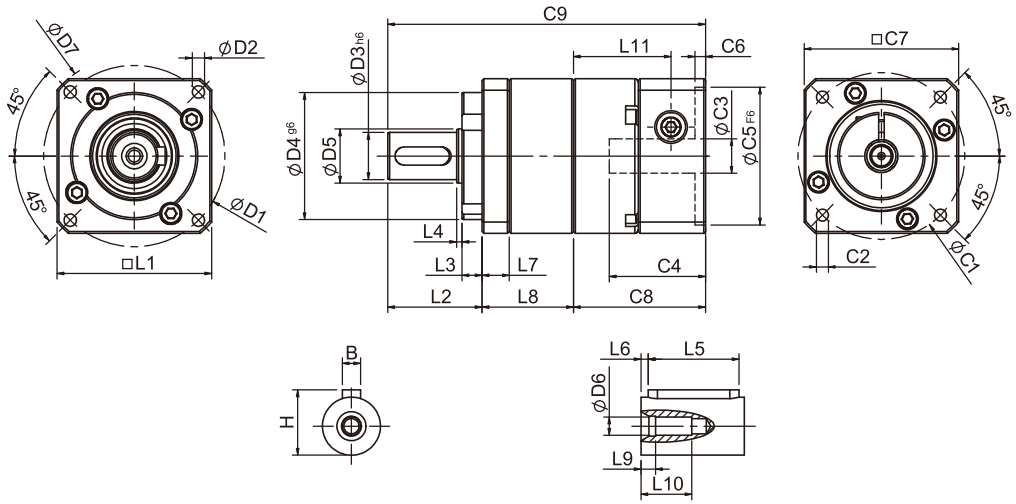
The PAE Primary Series square mounting flange, caged standard class planetary gears, in an in-line housing through sizes to 115 mm. Offers a economic alternative of torque capacity, quiet operation with backlash as low as <6 arc-min. For general speed reduce applications.

Frame Size (mm)	42, 60, 90, 115
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,500 - 4,000
Max Input Speed (rpm)	5,000 - 8,000
Backlash (arc-min)	1 Stage : 6 - 9 2 Stages : 8 - 12
Noise Level (dBA / 1m)	61 - 67

Features

- In-line Configuration.
- Output shaft, 13 mm through 32 mm diameter.
- Torque Capacity Range: 8 Nm through 260 Nm.
- Caged Planet Carrier: with standard planet gear set.
- High performance, efficiencies and low acoustics.
- Wide Range of Ratios: 6 single stage, 12 two stage ratios.
- Output Bearings deliver radial load capacity as high as 4200 N, and axial capacities up to 2600 N.
- Square Servo and Step Motor input: accommodates 40 mm through 130 mm, with optional sizes available.

PAE Single Stage Dimensions



Specifications Unit:mm

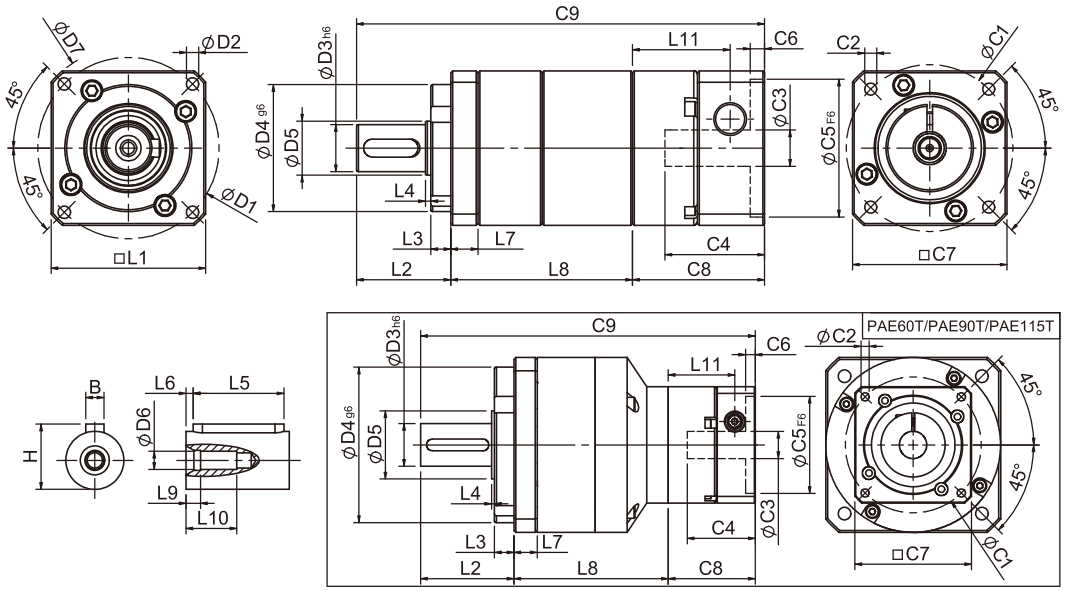
Dimensions	PAE42	PAE60	PAE90	PAE115
D1	50	70	100	130
D2	3.4	5.5	6.5	9
D3 h6	13	16	22	32
D4 g6	35	50	80	110
D5	15	20	35	45
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P
D7	56	80	118	148
L1	42.6(44)	60	90	115
L2	26	37	48	65
L3	5.5	7	10	12
L4	1.5	1.5	1.5	2
L5	15	25	32	40
L6	2	2	3	5
L7	7.3	10	12	16
L8	25	36.3	41.8	60.3
L9	4	4	4.5	6
L10	14	16.5	20.5	30
L11	26.9	34.3	41.5	51.5
C1[2]	46	70	90	145
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24/≦28	≦24/≦32/≦28
C4[2]	26.5	33.5	41	51.5
C5[2] F6	30	50	70	110
C6[2]	4	4	6	6
C7[2]	42.6	60	90	130
C8[2]	36.4	44.8	55.8	68
C9[2]	87.4	118.1	145.6	193.3
B	4	5	6	10
H	15	18	24.5	35

★ L1=44 when gear ratio is 10.

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PAE Double Stage Dimensions-1



Specifications

Unit:mm

Dimensions	PAE42	PAE60	PAE60T	PAE90	PAE90T	PAE115T
D1	50	70		100		130
D2	3.4	5.5		6.5		9
$D3_{h6}$	13	16		22		32
$D4_{g6}$	35	50		80		110
D5	15	20		35		45
D6	M4x0.7P	M5x0.8P		M8x1.25P		M12x1.75P
D7	56	80		118		148
L1	42.6(44)	60		90		115
L2	26	37		48		65
L3	5.5	7		10		12
L4	1.5	1.5		1.5		2
L5	15	25		32		40
L6	2	2		3		5
L7	7.3	10		12		16
L8	49.9	67	62.6	82.8	72.3	98.4
L9	4	4		4.5		6
L10	14	16.5		20.5		30
L11	26.9	34.3	26.9	41.5	34.3	41.5
C1[2]	46	70	46	90	70	90
C2[2]	M4x0.7P	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦8/≦11	≦19/≦24/≦28	≦14/≦19	≦19/≦24/≦28
C4[2]	26.5	33.5	26.5	41	33.5	41
$C5^{2}_{F6}$	30	50	30	70	50	70
C6[2]	4	4	4	6	4	6
C7[2]	42.6	60	42.6	90	60	90
C8[2]	36.4	44.8	36.4	55.8	44.8	55.8
C9[2]	112.3	148.8	136	186.6	165.1	219.2
B	5	5		6		10
H	15	18		24.5		35

★ L1=44 when gear ratio is 10.

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PAE Specifications

Specifications		Stage	Ratio	PAE42	PAE60	PAE90	PAE115
Nominal Output Torque T_{2N}	N•m	1	3	9	28	85	210
			4	10	32	80	240
			5	11	35	95	260
			7	10	28	85	220
			9	8	23	75	210
			10	8	21	65	190
		Stage	Ratio	PAE42	PAE60/ PAE60T	PAE90/ PAE90T	PAE115T
		2	15	11	34	90	230
			20	10	32	80	240
			25	11	35	95	260
			30	-	-	-	260
			35	11	35	95	260
			40	-	-	-	260
			45	11	35	95	260
			49	10	-	-	-
			50	-	35	95	260
			63	10	-	-	-
			70	-	28	85	220
			100	8	21	65	190
Emergency Stop Torque T_{2NOT}	N•m	(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-100	4000	4000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-100	8000	6000	6000	5000
Standard Backlash P2	arcmin	1	3-10	≦9	≦8	≦7	≦6
		2	15-100	≦12	≦10	≦9	≦8
Torsional Rigidity	N•m /arcmin	1,2	3-100	1.5	4.0	8.5	17
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	760	1250	2030	4200
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	410	700	1200	2600
Operating Temp.	°C	1,2	3-100	-10°C ~ +90°C			
Service Life	hr	1,2	3-100	20,000 (10,000 Continuous Operation)			
Efficiency	%	1	3-10	≧95%			
		2	15-100	≧90%			
Weight	kg	1	3-10	0.6	1.3	3.2	7.5
		2	15-100	0.8	1.8/1.6	4.8/3.7	9.2
Mounting Position	-	1,2	3-100	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-100	61	63	66	67
Protection Class	-	1,2	3-100	IP65			
Lubrication	-	1,2	3-100	Synthetic Lubricant			

Inertia (J1)

Stage	Ratio	unit	PAE42(ϕ8)	PAE60(ϕ14)	PAE90(ϕ19)	PAE115(ϕ24)
1	3	kg•cm²	0.04	0.23	0.77	2.30
	4		0.03	0.21	0.67	1.92
	5		0.03	0.21	0.61	1.71
	7		0.03	0.21	0.60	1.65
	9/10		0.03	0.21	0.60	1.63
Stage	Ratio		PAE42(ϕ8)	PAE60(ϕ14)/ PAE60T(ϕ8)	PAE90(ϕ19)/ PAE90T(ϕ14)	PAE115T(ϕ19)
2	15/20/25		0.03	0.21 (0.03)	0.61(0.21)	0.61
	30/35/49		0.03	0.21 (0.03)	0.60(0.21)	0.60
	40/45/50/63/70/100		0.03	0.21 (0.03)	0.60(0.21)	0.60

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

Q3. What are the basic factors affect the gearbox performance?

Factors that affect the performance of a gearbox (speed reducer) are:

- ▶ Service Factor
- ▶ Input Speed
- ▶ Gear Material Select
- ▶ Gear Processing and Assembly Error
- ▶ Lubricant Select
- ▶ Operating Environment
- ▶ Operating Time
- ▶ Loading Factors

Materials, structure design, operating speed, operating time, applied equipment mechanical conditions and maintenance are factors that may affect the performance of a gearbox (or speed reducer). Sesame Motor have decades of experience in structural design, performance verification and key factors setting to offer stable performance gearboxes and speed reducers.

PAER

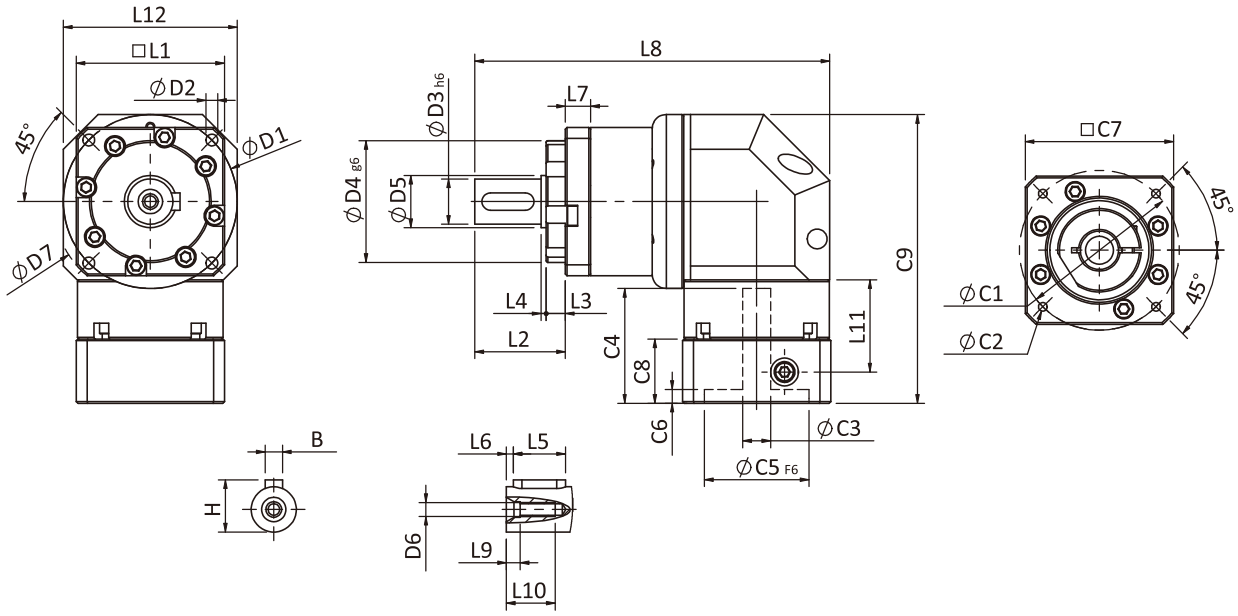
The PAER Standard Series square mounting flange, caged standard class planetary gears, in a right angle housing through sizes to 115 mm. Offers a economic alternative of torque capacity, quiet operation with backlash as low as <11 arc-min. For general speed reduce applications.

Frame Size (mm)	42, 60, 90, 115
Ratio	3 : 1 - 300 : 1
Nominal Input Speed (rpm)	2,500 - 4,500
Max Input Speed (rpm)	5,000 - 7,500
Backlash (arc-min)	1 Stage: 11-18 2 Stages: 13 - 20
Noise Level (dBA / 1m)	66 - 73

Features

- ▶ Right Angle Configuration.
- ▶ Output shaft, 13 mm through 32 mm diameter.
- ▶ Torque Capacity Range: 8 Nm through 240 Nm.
- ▶ Caged Planet Carrier: with standard planet gear set.
- ▶ High performance, efficiencies and low acoustics.
- ▶ Wide Range of Ratios: 10 single stage, 14 two stage ratios.
- ▶ Output Bearings deliver radial load capacity as high as 4200 N, and axial capacities up to 2600 N.
- ▶ Square Servo and Step Motor input: accommodates 40 mm through 130 mm, with optional sizes available.

PAER Single Stage Dimensions



Specifications

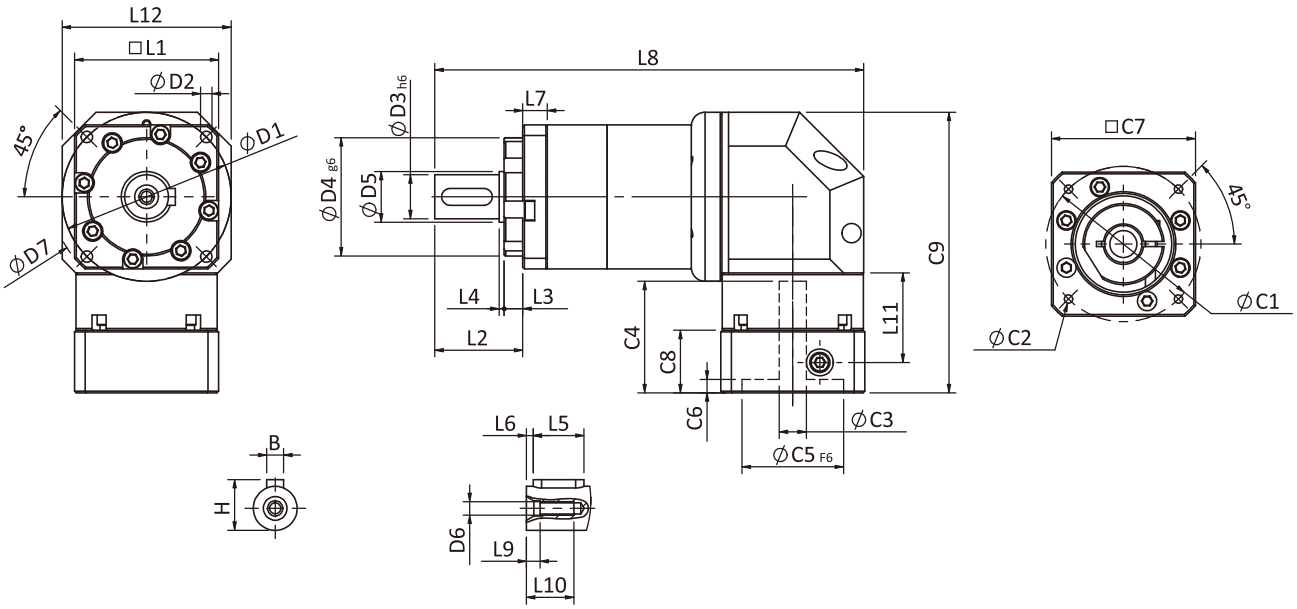
Unit:mm

Dimensions	PAER42	PAER60	PAER90	PAER115
D1	50	70	100	-
D2	3.4	5.5	6.5	-
D3 h6	13	16	22	-
D4 g6	35	50	80	-
D5	15	20	35	-
D6	M4x0.7P	M5x0.8P	M8x1.25P	-
D7	56	80	118	-
L1	42.6	60	90	-
L2	26	37	48	-
L3	5.5	7	10	-
L4	1.5	1.5	1.5	-
L5	15	25	32	-
L6	2	2	3	-
L7	7.3	10	12	-
L8	102	143.6	194.5	-
L9	4	4	4.5	-
L10	14	16.5	20.5	-
L11	26.5	36	40.7	-
L12	50	70	98	-
C1[2]	46	70	90	-
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	-
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	-
C4[2]	33	44	57	-
C5[2] F6	30	50	70	-
C6[2]	4	4	6	-
C7[2]	42.6	60	90	-
C8[2]	18.5	20	26	-
C9[2]	83	111.4	149.2	-
B	5	5	6	-
H	15	18	24.5	-

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PAER Double Stage Dimensions-1



Specifications

Unit:mm

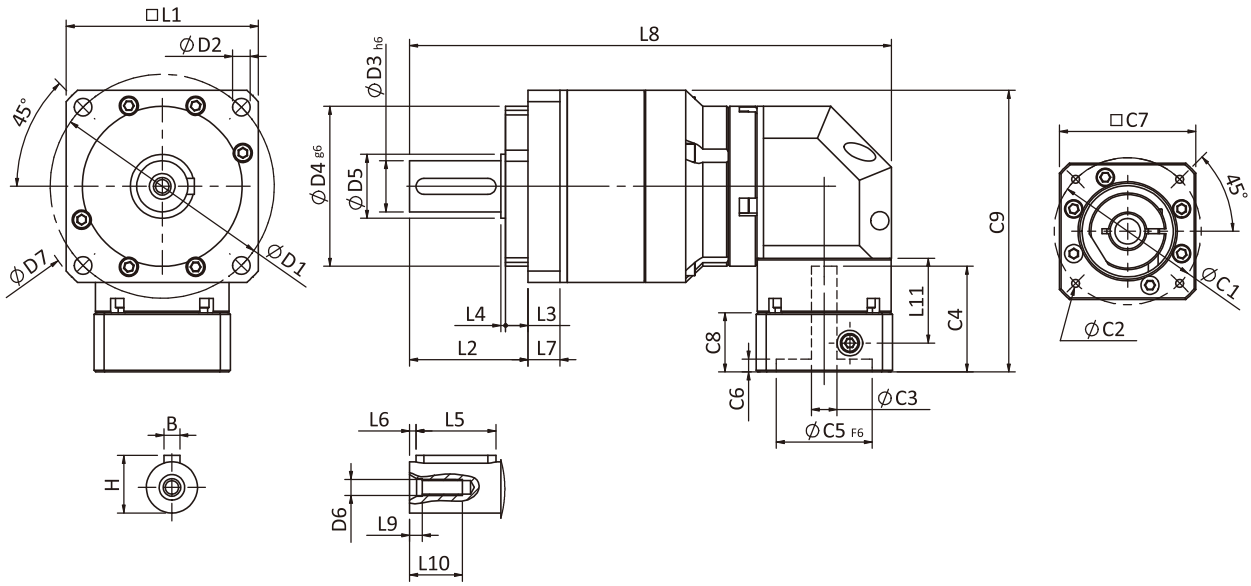
Dimensions	PAER42	PAER60	PAER90	PAER115
D1	50	70	100	-
D2	3.4	5.5	6.5	-
$D3_{h6}$	13	16	22	-
$D4_{g6}$	35	50	80	-
D5	15	20	35	-
D6	M4x0.7P	M5x0.8P	M8x1.25P	-
D7	56	80	118	-
L1[1]	42.6 (44)	60	90	-
L2	26	37	48	-
L3	5.5	7	10	-
L4	1.5	1.5	1.5	-
L5	15	25	32	-
L6	2	2	3	-
L7	7.3	10	12	-
L8	126.9	174.3	235.5	-
L9	4	4	4.5	-
L10	14	16.5	20.5	-
L11	26.5	36	40.7	-
L12	50	70	98	-
C1[2]	46	70	90	-
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	-
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	-
C4[2]	33	44	57	-
$C5^{2}{}_{F6}$	30	50	70	-
C6[2]	4	4	6	-
C7[2]	42.6	60	90	-
C8[2]	18.5	20	26	-
C9[2]	83	111.4	149.2	-
B	5	5	6	-
H	15	18	24.5	-

*1. L1=44 when gear ratios are 100, 200, and 300.

*2. C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PAER Double Stage Dimensions-2



Specifications Unit:mm

Dimensions	PAER60T	PAER90T	PAER115T
D1	70	100	130
D2	5.5	6.5	9
$D3_{h6}$	16	22	32
$D4_{g6}$	50	80	110
D5	20	35	45
D6	M5x0.8P	M8x1.25P	M12x1.75P
D7	80	118	148
L1	60	90	115
L2	37	48	65
L3	7	10	12
L4	1.5	1.5	2
L5	25	32	40
L6	2	3	5
L7	10	12	16
L8	150.6	190.6	268.1
L9	4	4.5	6
L10	16.5	20.5	30
L11	26.5	36	40.7
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24
C4[2]	33	44	57
$C5^{2}_{F6}$	30	50	70
C6[2]	4	4	6
C7[2]	42.6	60	90
C8[2]	18.5	20	26
C9[2]	88	121.4	157.7
B	5	6	10
H	18	24.5	35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PAER Specifications

Specifications		Stage	Ratio	PAER42	PAER60	PAER90	PAER115
Nominal Output Torque T_{2N}	N•m	1	3	9	28	85	135
			4	10	32	80	180
			5	11	35	95	215
			7	10	28	85	220
			8	10	32	80	210
			9	9	25	75	210
			10	11	35	95	210
			12	10	32	80	-
			14	10	28	85	220
			15	11	35	95	-
		Stage	Ratio	PAER42	PAER60/ PAER60T	PAER90/ PAER90T	PAER115T
		2	20	10	32	80	240
			25	11	35	95	240
			30	11	34	90	230
			35	11	35	95	240
			40	10	32	80	240
			50	11	35	95	240
			60	11	35	95	240
			70	11	35	95	240
			80	11	35	95	240
			100	8	35	95	240
			120	11	35	95	240
			140	-	28	85	220
			200	8	21	65	190
			300	8	21	65	190
Emergency Stop Torque T_{2NOT}	N•m	(2.5 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-300	4500	4000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-300	7500	7000	6000	5000
Standard Backlash P2	arcmin	1	3-15	≦18	≦15	≦13	≦11
		2	20-300	≦20	≦17	≦15	≦13
Torsional Rigidity	N•m /arcmin	1,2	3-300	1.5	4.0	8.5	17
Max. Radial Load F_{2rB} [1]	N	1,2	3-300	760	1250	2030	4200
Max. Axial Load F_{2aB} [1]	N	1,2	3-300	410	700	1200	2600
Operating Temp.	℃		3-300	-10℃ ~ +90℃			
Service Life	hr		3-300	20,000 (10,000 Continuous Operation)			
Efficiency	%	1	3-15	≧95%			
		2	20-300	≧90%			
Weight	kg	1	3-15	1.1	2.1	6.5	13.4
		2	20-300	1.3	3.2/3.0	8.7/4.7	15.1
Mounting Position	-	1,2	3-100	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-100	66	68	70	73
Protection Class	-	1,2	3-100	IP65			
Lubrication	-	1,2	3-100	Synthetic Lubricant			

Inertia (J1)

Stage	Ratio	unit	PAER42(ϕ8)	PAER60(ϕ14)	PAER90(ϕ19)	PAER115(ϕ24)
1	3, 4, 5, 7	kg•cm²	0.07	0.40	2.0	2.7
	Other Ratios		0.05	0.30	1.5	2.2
Stage	Ratio		PAER42(ϕ8)	PAER60(ϕ14) PAER60T(ϕ8)	PAER90(ϕ19) PAER90T(ϕ14)	PAER115T(ϕ19)
2	20, 25, 35		0.07	0.40/0.07	2.0/0.40	2.0
	Other Ratios		0.05	0.30/0.05	1.5/0.30	1.5

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PAC

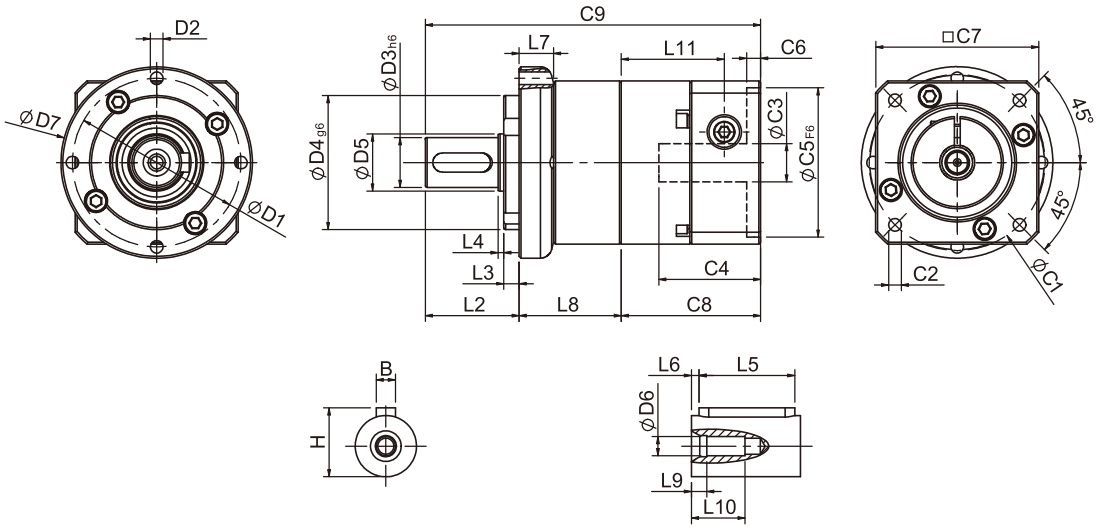
The PAC Standard Series round mounting flange, caged standard class planetary gears, in an in-line housing through sizes to 120 mm. Offers an economic alternative of torque capacity, quiet operation with backlash as low as <6 arc-min. For general speed reduce applications.

Frame Size (mm)	50, 70, 90, 120
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,500 - 4,000
Max Input Speed (rpm)	5,000 - 8,000
Backlash (arc-min)	1 Stage : 6 - 9 2 Stages : 8 - 12
Noise Level (dBA / 1m)	61 - 67

Features

- In-line Configuration.
- Output shaft, 12 mm through 32 mm diameter.
- Torque Capacity Range: 8 Nm through 260 Nm.
- Caged Planet Carrier: with standard planet gear set.
- High performance, efficiencies and low acoustics.
- Wide Range of Ratios: 6 single stage, 12 two stage ratios.
- Output Bearings deliver radial load capacity as high as 4200 N, and axial capacities up to 2600 N.
- Square Servo and Step Motor input: accommodates 40 mm through 130 mm, with optional sizes available.

PAC Single Stage Dimensions



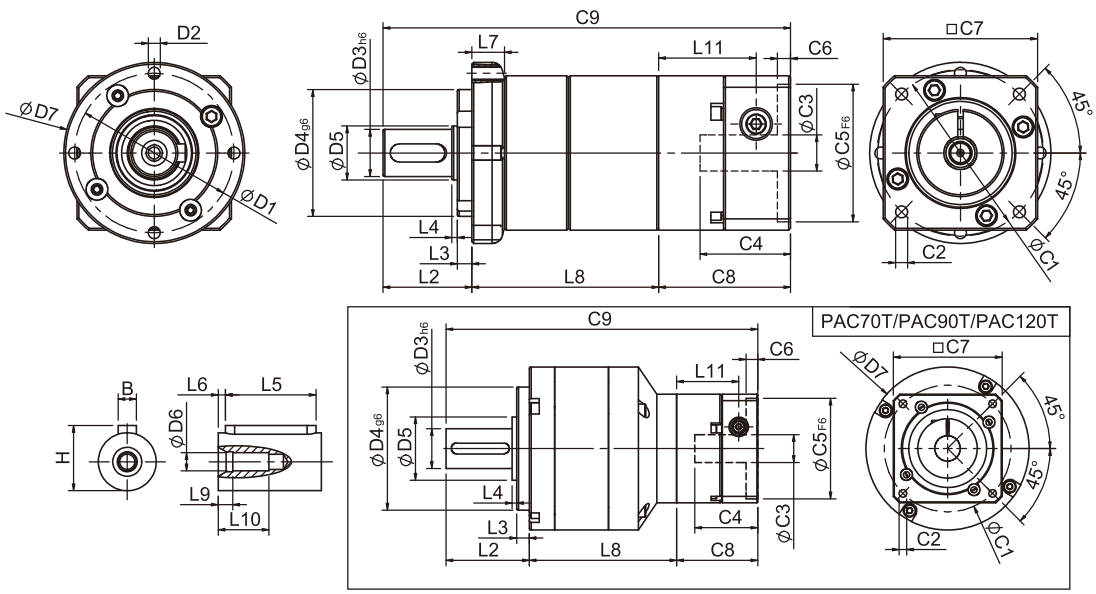
Specifications Unit:mm

Dimensions	PAC50	PAC70	PAC90	PAC120
D1	44	62	80	108
D2	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P
$D3_{h6}$	12	16	22	32
$D4_{g6}$	35	52	68	90
D5	15	20	35	45
D6	M4x0.7P	M5x0.8P	M8x1.25P	M12x1.75P
D7	50	70	90	120
L2	24.5	36	46	60
L3	4	6	7	7
L4	1.5	1.5	2.5	2
L5	15	25	32	40
L6	2	2	3	5
L7	8.8	13.3	14	15
L8	26.5	37.3	43.8	65.3
L9	4	4	4.5	6
L10	12	16.5	20.5	30
L11	26.9	34.3	41.2	51.5
$C1^{2}$	46	70	90	145
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24/≦28	≦24/≦32/≦38
$C4^{2}$	26.5	33.5	41	51.5
$C5^{2}{}_{F6}$	30	50	70	40
$C6^{2}$	4	4	6	6
$C7^{2}$	42.6	60	90	130
$C8^{2}$	36.4	44.8	55.8	68
$C9^{2}$	87.4	118.1	145.6	193.3
B	4	5	6	10
H	13.5	18	24.5	35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PAC Double Stage Dimensions-1



Specifications

Unit:mm

Dimensions	PAC50	PAC70	PAC70T	PAC90	PAC90T	PAC120T
D1	44	62		80		108
D2	M4x0.7P	M5x0.8P		M6x1.0P		M8x1.25P
$D3_{h6}$	12	16		22		32
$D4_{g6}$	35	52		68		90
D5	15	20		35		45
D6	M4x0.7P	M5x0.8P		M8x1.25P		M12x1.75P
D7	50	70		90		120
L2	24.5	36		46		60
L3	4	6		7		7
L4	1.5	1.5		2.5		2
L5	15	25		32		40
L6	2	2		3		5
L7	8.8	13.3		14		15
L8	51.4	68	63.6	84.8	74.3	103.4
L9	4	4		4.5		6
L10	14	16.5		20.5		30
L11	26.9	34.3	26.6	41.5	34.3	41.5
$C1^2$	46	70	46	90	70	90
$C2^2$	M4x0.7P	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P	M8x1.25P
$C3^2$	≦8/≦11	≦14/≦19	≦8/≦11	≦19/≦24/≦28	≦14/≦19	≦19/≦24/≦28
$C4^2$	26.5	33.5	26.5	41	33.5	41
$C5^2{}_{F6}$	30	50	30	70	50	70
$C6^2$	4	4	4	6	4	6
$C7^2$	42.6	60	42.6	90	60	90
$C8^2$	36.4	44.8	36.4	55.8	44.8	55.8
$C9^2$	112.3	148.8	136	186.6	165.1	219.2
B	4	5		6		10
H	13.5	18		24.5		35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PAC Specifications

Specifications		Stage	Ratio	PAC-50	PAC-70	PAC-90	PAC-120
Nominal Output Torque T_{2N}	N•m	1	3	9	28	85	210
			4	10	32	80	240
			5	11	35	95	260
			7	10	28	85	220
			9	8	23	75	210
			10	8	21	65	190
		Stage	Ratio	PAC-50	PAC-70/ 70T	PAC-90/ 90T	PAC-120T
		2	15	11	34	90	230
			20	10	32	80	240
			25	11	35	95	260
			30	-	-	-	260
			35	11	35	95	260
			40	-	-	-	260
			45	11	35	95	260
			49	10	-	-	-
			50	-	35	95	260
			63	10	-	-	-
			70	-	28	85	220
			100	8	21	65	190
Emergency Stop Torque T_{2NOT}	N•m	(3.0 t imes of Nominal Output Torque) (*Max. Output Torque T_{2B} =60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-100	4000	4000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-100	8000	6000	6000	5000
Standard Backlash P2	arcmin	1 2	3-10 15-100	≦9 ≦12	≦8 ≦10	≦7 ≦9	≦6 ≦8
Torsional Rigidity	N•m /arcmin	1,2	3-100	1.5	4.0	8.5	17
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	760	1250	2030	4200
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	410	700	1200	2600
Operating Temp.	℃		3-100	-10℃~ +90 ℃			
Service Life	hr		3-100	20,000 (10,000 Continuous operation)			
Efficiency	%	1 2	3-10 15-100	≧95% ≧90%			
Weight	kg	1 2	3-10 15-100	0.6 0.8	1.3 1.8(1.6)	3.2 4.8(3.7)	7.5 9.2
Mounting Position	-	1,2	3-100	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-100	61	63	66	67
Protection Class	-	1,2	3-100	IP65			
Lubrication	-	1,2	3-100	Synthetic Lubricant			

Inertia (J1)

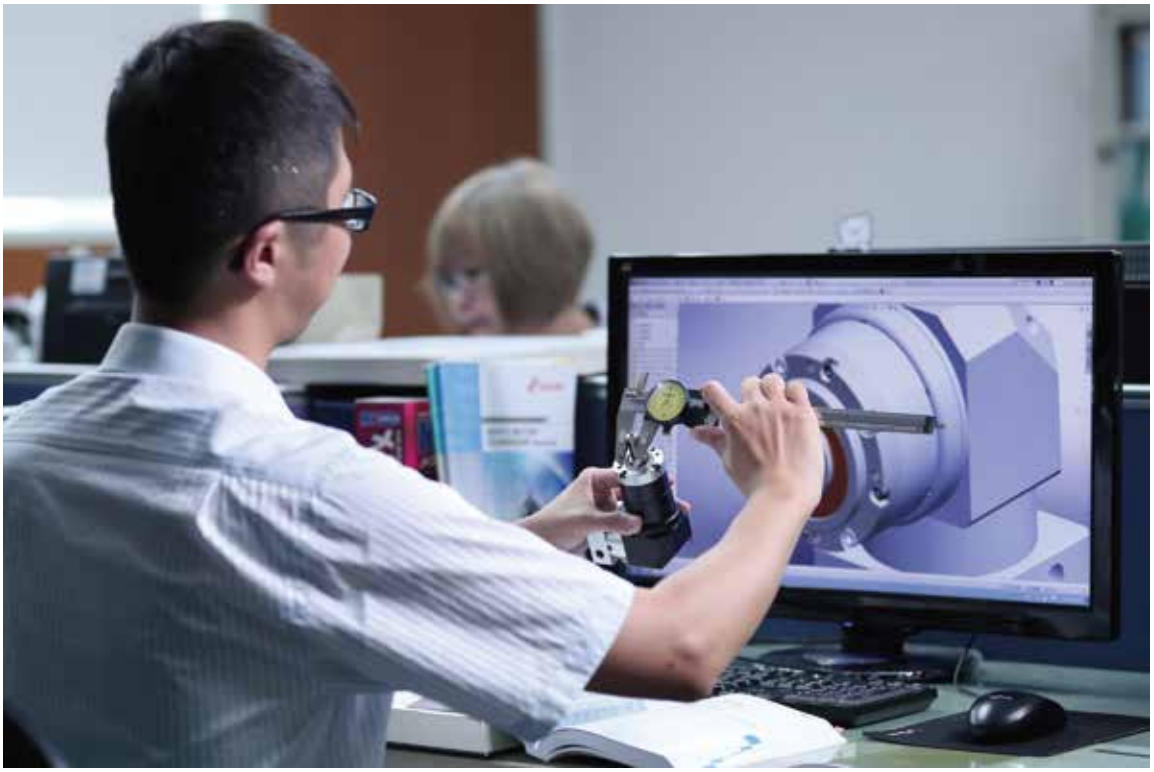
Stage	Ratio	unit	PAC-50(ψ8)	PAC-70(ψ14)	PAC-90(ψ19)	PAC-120(ψ24)
1	3	$Kg \cdot cm^2$	0.04	0.23	0.77	2.30
	4		0.03	0.21	0.67	1.92
	5		0.03	0.21	0.61	1.71
	7		0.03	0.21	0.60	1.65
	9/10		0.03	0.21	0.60	1.63
Stage	Ratio		PAC-50(ψ8)	PAC-70(ψ14)/ 70T(ψ8)	PAC-90(ψ19)/ 90T(ψ14)	PAC-120T (ψ19)
2	15/20/25		0.03	0.21(0.03)	0.61(0.21)	0.61
	30/35/49		0.03	0.21(0.03)	0.60(0.21)	0.60
	40/45/50/63/70/100		0.03	0.21(0.03)	0.60(0.21)	0.60

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

SESAME Planetary Gearboxes Q&A

Q4. How do I find out the gearbox I need?



In order to offer you the specific product or solution for your application, we need as much information as possible, including the applied machinery or equipment, what and how does the gearbox work in the machinery or equipment, the output parameters to the gearbox (axial and radial loading, rpm, reduction ratio, backlash, duty cycle and other requirements), and the motor that you intend to connect to the gearbox. Especially we must know the motor's brand, model, specifications and mounting flange dimensions because the gearbox must be suitable for the requirements from motor and your application at the same time. The motor bracket of the gearbox is customized according to the flange dimensions of the motor.

You may try out our online planetary gearboxes configuration in advance to download gearbox dimension drawings. This will help to check if the gearbox is overloaded and make ordering easier. Our sales department, account executives and R&D team will be pleased to assist you in selecting and designing issues. Please feel free to contact us for more information related to selection.

PACR

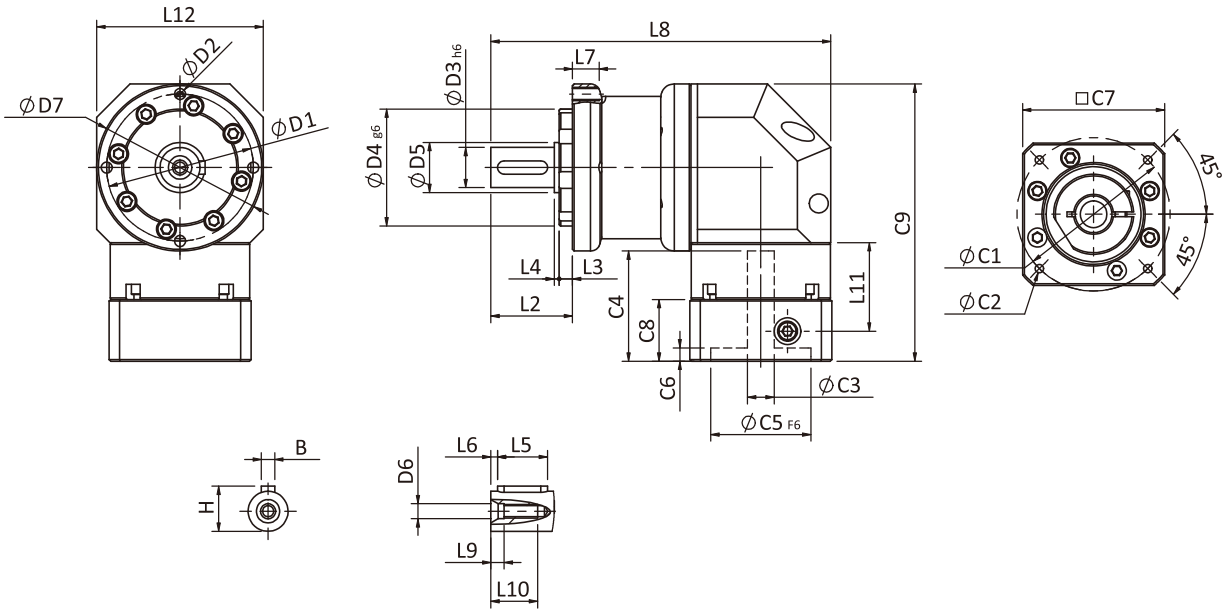
The PACR Primary Series flange mounting planetary speed reducer is equipped with caged standard class planetary gears in a right angle housing through sizes to 120 mm. It offers a economic alternative of torque capacity, quiet operation with backlash as low as <11 arc-min. For general speed reduce applications.

Frame Size (mm)	50, 70, 90, 120
Ratio	3 : 1 - 300:1
Nominal Input Speed (rpm)	2,500 - 4,500
Max Input Speed (rpm)	5,000 - 7,500
Backlash (arc-min)	1 Stage: 11 - 18 2 Stages: 13 - 20
Noise Level (dBA / 1m)	66 - 73

Features

- Right Angle Configuration.
- Output shaft, 12 mm through 32 mm diameter.
- Torque Capacity Range: 8 Nm through 240 Nm.
- Caged Planet Carrier: with standard planet gear set.
- High performance, efficiencies and low acoustics.
- Wide Range of Ratios: 10 single stage ratios, 14 two stage ratios.
- Output Bearings deliver radial load capacity as high as 4200 N, and axial capacities up to 2600 N.
- Square Servo and Step Motor input: accommodates 40 mm through 130 mm, with optional sizes available.

PACR Single Stage Dimensions



Specifications

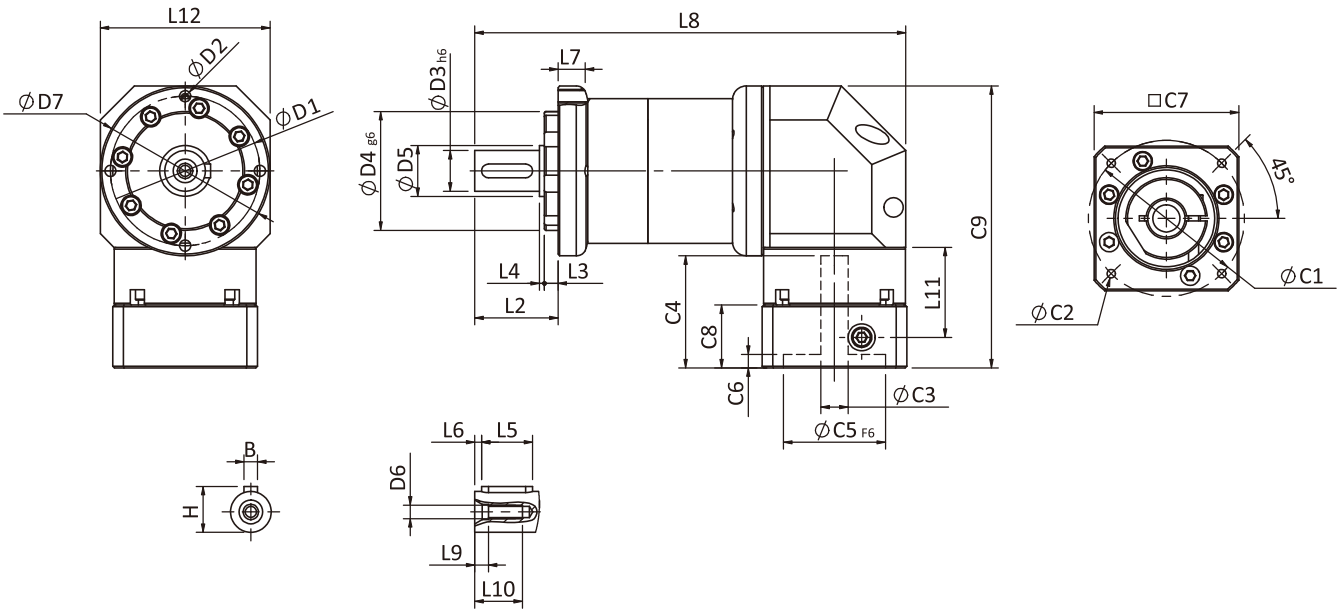
Unit:mm

Dimensions	PACR50	PACR70	PACR90	PACR120
D1	44	62	80	-
D2	M4x0.7P	M5x0.8P	M6x1.0P	-
D3h6	12	16	22	-
D4g6	35	52	68	-
D5	15	20	35	-
D6	M4x0.7P	M5x0.8P	M8x1.25P	-
D7	50	70	90	-
L2	24.5	36	46	-
L3	4	6	7	-
L4	1.5	1.5	2.5	-
L5	15	25	32	-
L6	2	2	3	-
L7	8.8	13.3	14	-
L8	102	143.6	194.5	-
L9	4	4	4.5	-
L10	14	16.5	20.5	-
L11	26.5	36	40.7	-
L12	50	70	98	-
C1[2]	46	70	90	-
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	-
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	-
C4[2]	33	44	57	-
C5[2]F6	30	50	70	-
C6[2]	4	4	6	-
C7[2]	42.6	60	90	-
C8[2]	18.5	20	26	-
C9[2]	83	111.4	149.2	-
B	4	5	6	-
H	13.5	18	24.5	-

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PACR Double Stage Dimensions-1



Specifications

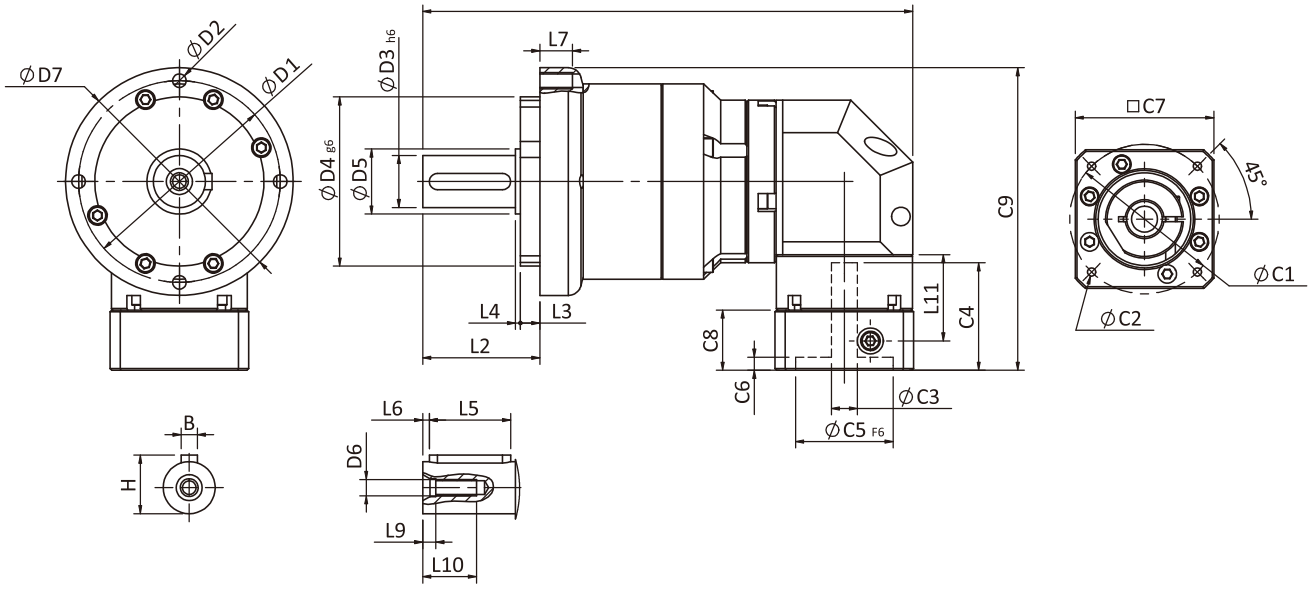
Unit:mm

Dimensions	PACR50	PACR70	PACR90	PACR120
D1	44	62	80	-
D2	M4x0.7P	M5x0.8P	M6x1.0P	-
D3h6	12	16	22	-
D4g6	35	52	68	-
D5	15	20	35	-
D6	M4x0.7P	M5x0.8P	M8x1.25P	-
D7	50	70	90	-
L2	24.5	36	46	-
L3	4	6	7	-
L4	1.5	1.5	2.5	-
L5	15	25	32	-
L6	2	2	3	-
L7	8.8	13.3	14	-
L8	126.9	174.3	235.5	-
L9	4	4	4.5	-
L10	14	16.5	20.5	-
L11	26.5	36	40.7	-
L12	50	70	98	-
C1[2]	46	70	90	-
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	-
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	-
C4[2]	33	44	57	-
C5[2]F6	30	50	70	-
C6[2]	4	4	6	-
C7[2]	42.6	60	90	-
C8[2]	18.5	20	26	-
C9[2]	83	111.4	149.2	-
B	4	5	6	-
H	13.5	18	24.5	-

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PACR Double Stage Dimensions-2



Specifications Unit:mm

Dimensions	PACR70T	PACR90T	PACR120T
D1	62	80	108
D2	M5x0.8P	M6x1.0P	M8x1.25P
D3h6	16	22	32
D4g6	52	68	90
D5	20	35	45
D6	M5x0.8P	M8x1.25P	M12x1.75P
D7	70	90	120
L2	36	46	60
L3	6	7	7
L4	1.5	2.5	2
L5	25	32	40
L6	2	3	5
L7	13.3	14	15
L8	150.6	190.6	268.1
L9	4	4.5	6
L10	16.5	20.5	30
L11	26.5	36	40.7
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24
C4[2]	33	44	57
C5[2]F6	30	50	70
C6[2]	4	4	6
C7[2]	42.6	60	90
C8[2]	18.5	20	26
C9[2]	93	121.4	160.2
B	5	6	10
H	18	24.5	35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PACR Specifications

Specifications		Stage	Ratio	PACR50	PACR70	PACR90	PACR120
Nominal Output Torque T_{2N}	N•m	1	3	9	28	85	135
			4	10	32	80	180
			5	11	35	95	215
			7	10	28	85	220
			8	10	32	80	210
			9	9	25	75	210
			10	11	35	95	210
			12	10	32	80	-
			14	10	28	85	220
			15	11	35	95	-
		Stage	Ratio	PACR50	PACR70/ PACR70T	PACR90/ PACR90T	PACR120T
		2	20	10	32	80	240
			25	11	35	95	240
			30	11	34	90	230
			35	11	35	95	240
			40	10	32	80	240
			50	11	35	95	240
			60	11	35	95	240
			70	11	35	95	240
			80	11	35	95	240
			100	8	35	95	240
			120	11	35	95	240
			140	-	28	85	220
			200	8	21	65	190
			300	8	21	65	190
Emergency Stop Torque T_{2NOT}	N•m	(2.5 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-300	4500	4000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-300	7500	7000	6000	5000
Standard Backlash P2	arcmin	1	3-15	≦18	≦15	≦13	≦11
		2	20-300	≦20	≦17	≦15	≦13
Torsional Rigidity	N•m /arcmin	1,2	3-300	1.5	4.0	8.5	17
Max. Radial Load F_{2rB} [1]	N	1,2	3-300	760	1250	2030	4200
Max. Axial Load F_{2aB} [1]	N	1,2	3-300	410	700	1200	2600
Operating Temp.	℃		3-300	-10℃ ~ +90℃			
Service Life	hr		3-300	20,000 (10,000 Continuous Operation)			
Efficiency	%	1	3-15	≧95%			
		2	20-300	≧90%			
Weight	kg	1	3-15	1.1	2.6	6.5	13.4
		2	20-300	1.3	3.2/3.0	8.7/7.1	15.1
Mounting Position	-	1,2	3-100	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-100	66	68	70	73
Protection Class	-	1,2	3-100	IP65			
Lubrication	-	1,2	3-100	Synthetic Lubricant			

Inertia (J1)

Stage	Ratio	unit	PACR50(ϕ8)	PACR70(ϕ14)	PACR90(ϕ19)	PACR120(ϕ24)
1	3, 4, 5, 7	kg•cm²	0.07	0.40	2.0	2.7
	Other Ratios		0.05	0.30	1.5	2.2
Stage	Ratio		PACR50(ϕ8)	PACR70(ϕ14)/ PACR70T(ϕ8)	PACR90(ϕ19)/ PACR90T(ϕ14)	PACR120T(ϕ19)
2	20, 25, 35		0.07	0.40/0.07	2.0/0.40	2.0
	Other Ratios		0.05	0.30/0.05	1.5/0.30	1.5

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PBE

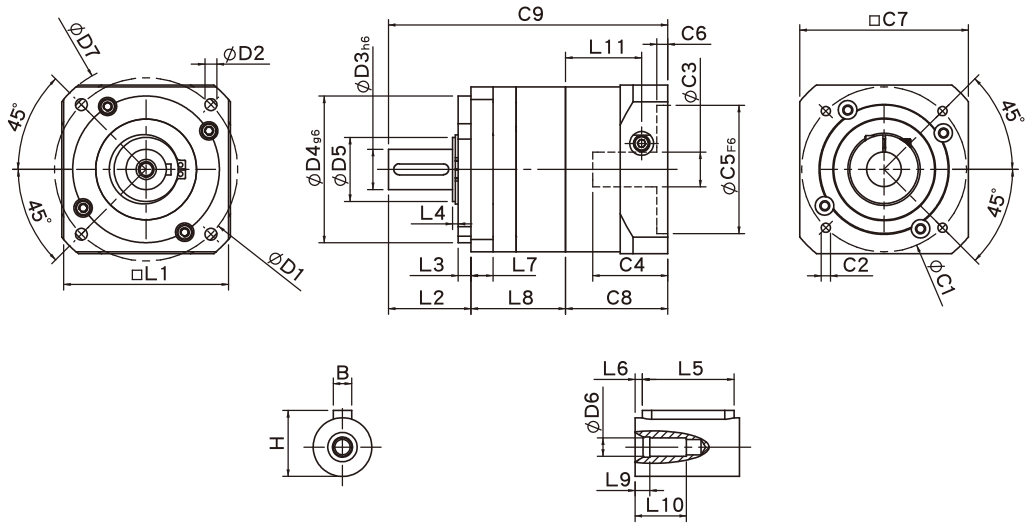
The PBE Primary Series square mounting flange, cantilevered primary class planetary gears, in an in-line housing through sizes 90. Offers a light torque capacity, quiet operation with backlash as low as <7 arc-min. Maximum ratio 729:1, and 1000:1 available by demand.

Frame Size (mm)	50, 70, 90
Ratio	3 : 1 - 729:1
Nominal Input Speed (rpm)	3,000 - 4,000
Max Input Speed (rpm)	6,000 - 8,000
Backlash (arc-min)	1 Stage : 7 - 9 2 Stages: 9 - 12 3 Stages : 12 - 15
Noise Level (dBA / 1m)	62 - 67

Features

- In-line Configuration.
- Output shaft, 13 mm through 22 mm diameter.
- Torque Capacity Range: 4.8 Nm through 58.6 Nm.
- Cantilevered Planet Carrier: with primary planet gear set.
- High performance, efficiencies and low acoustics.
- Wide Range of Ratios: 6 single stage ratios, 8 two stage ratios and 8 three stage ratios.
- Output Bearings deliver radial load capacity as high as 1700 N, and axial capacities up to 735 N.
- Square Servo and Step Motor input: accommodates 40 mm through 100 mm, with optional sizes available.

PBE Single Stage Dimensions



Specifications Unit:mm

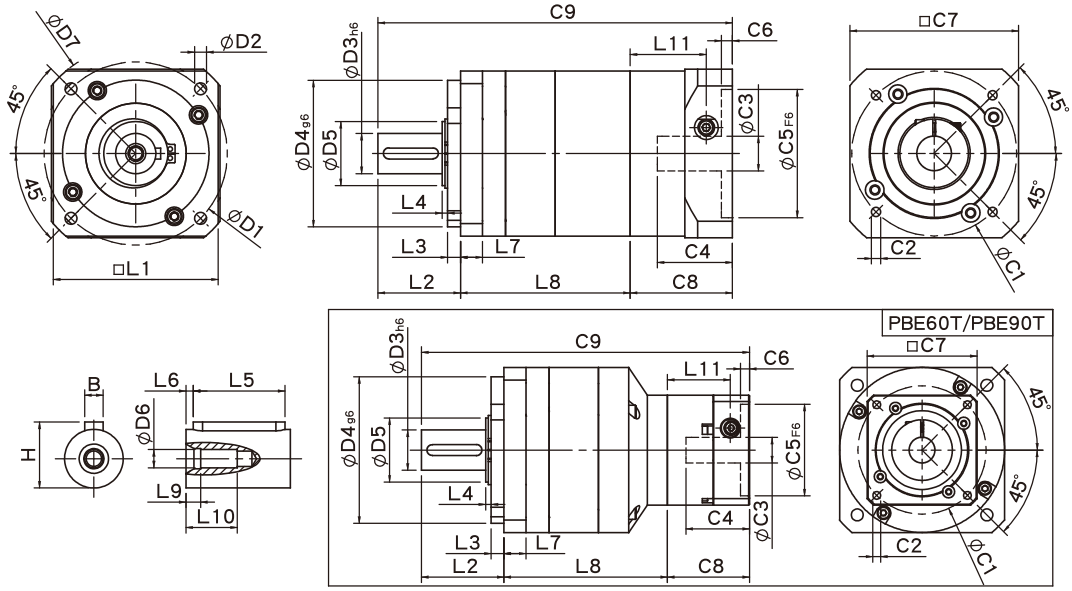
Dimensions	PBE42	PBE60	PBE90
D1	50	70	100
D2	3.4	5.5	6.5
$D3_{h6}$	13	16	22
$D4_{g6}$	35	50	80
D5	15	20	35
D6	M4x0.7P	M5x0.8P	M8x1.25P
D7	56	80	118
L1	42.6 (44)[1]	60	90
L2	26	36	45
L3	5.5	5	7
L4	2.6	2.7	3
L5	15	25	30
L6	2	2	3
L7	8	10	12
L8	32.4	49.6	54.4
L9	4	4	4.5
L10	14	16.5	20.5
L11	26.9	34.3	41.5
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24/≦28
C4[2]	26.5	33.5	41
$C5^{2}{}_{F6}$	30	50	70
C6[2]	4	4	6
C7[2]	42.6	60	92
C8[2]	36.4	44.8	55.8
C9[2]	94.8	130.4	155.2
B	4	5	6
H	15	18	24.5

★ L1=44 when gear ratio is 10.

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PBE Double Stage Dimensions



Specifications

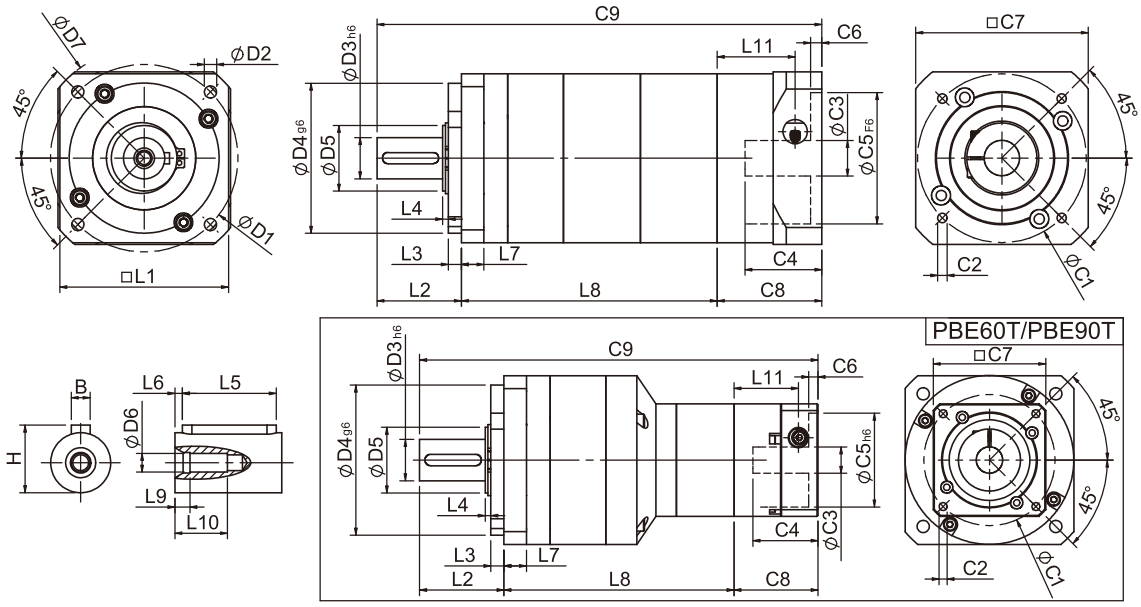
Unit:mm

Dimensions	PBE42	PBE60/PBE60T		PBE90/PBE90T	
D1	50	70		100	
D2	3.4	5.5		6.5	
$D3_{h6}$	13	16		22	
$D4_{g6}$	35	50		80	
D5	15	20		35	
D6	M4x0.7P	M5x0.8P		M8x1.25P	
D7	56	80		118	
L1	42.6	60		90	
L2	26	36		45	
L3	5.5	5		7	
L4	2.6	2.7		3	
L5	15	25		30	
L6	2	2		3	
L7	8	10		12	
L8	57.3	80.3	75.9	95.4	92
L9	4	4		4.5	
L10	14	16.5		20.5	
L11	26.9	34.3	26.9	41.55	34.3
C1[2]	46	70	46	90	70
C2[2]	M4x0.7P	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P
C3[2]	≦8/≦11	≦14/≦19	≦8/≦11	≦19/≦24/≦28	≦14/≦19
C4[2]	26.5	33.5	26.5	41	33.5
$C5^{2}_{F6}$	30	50	30	70	50
C6[2]	4	4	4	6	4
C7[2]	42.6	60	42.6	92	60
C8[2]	36.4	44.8	36.4	55.8	44.8
C9[2]	119.7	161.1	148.3	196.2	181.8
B	5	5		6	
H	15	18		24.5	

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PBE Triple Stage Dimensions



Specifications Unit:mm

Dimensions	PBE42	PBE60T	PBE90T
D1	50	70	100
D2	3.4	5.5	6.5
$D3_{h6}$	13	16	22
$D4_{g6}$	35	50	80
D5	15	20	35
D6	M4x0.7P	M5x0.8P	M8x1.25P
D7	56	80	118
L1	42.6	60	90
L2	26	36	45
L3	5.5	5	7
L4	2.6	2.7	3
L5	15	25	30
L6	2	2	3
L7	8	10	12
L8	82.2	100.8	122.7
L9	4	4	4.5
L10	14	16.5	20.5
L11	26.9	26.9	34.3
C1[2]	46	46	70
C2[2]	M4x0.7P	M4x0.7P	M5x0.8P
C3[2]	≦8/≦11	≦8/≦11	≦14/≦19
C4[2]	26.5	26.5	33.5
$C5^{2}{}_{F6}$	30	30	50
C6[2]	4	4	4
C7[2]	42.6	42.6	60
C8[2]	36.4	36.4	44.8
C9[2]	144.6	173.2	212.5
B	5	5	6
H	15	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PBE Specifications

Specifications		Stage	Ratio	PBE42	PBE60	PBE90
Nominal Output Torque T_{2N}	N•m	1	3	4.8	13.6	33.5
			4	6.3	21.6	58.6
			5	6.0	20.5	55.1
			7	5.6	19.2	51.8
			9	5.4	18.5	50.0
			10	5.4	17.0	48.0
		Stage	Ratio	PBE42	PBE60(T)	PBE90(T)
		2	15	4.8	13.6	33.5
			20	6.3	21.6	58.6
			25	6.0	20.5	55.1
			35	6.0	20.5	55.1
			45	6.0	20.5	55.1
			49	5.6	19.2	51.8
			63	5.6	19.2	51.8
			81	5.4	18.5	50.0
		Stage	Ratio	PBE42	PBE60(T)	PBE90(T)
		3	125	6.0	20.5	55.1
			175	6.0	20.5	55.1
			225	6.0	20.5	55.1
			245	6.0	20.5	55.1
			315	6.0	20.5	55.1
			405	6.0	20.5	55.1
			567	5.6	19.2	51.8
			729	5.4	18.5	50.0
Emergency Stop Torque T_{2NOT}	N•m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)			
Nominal Input Speed n_{1N}	rpm	1,2,3	3-729	4000	4000	3000
Max. Input Speed n_{1max}	rpm	1,2,3	3-729	8000	8000	6000
Backlash	arcmin	1 2 3	3-10 15-81 125-729	≦9 ≦12 ≦15	≦8 ≦10 ≦12	≦7 ≦9 ≦12
Torsional Rigidity	N•m /arcmin	1,2,3	3-729	0.8	2.0	7.0
Max. Radial Load F_{2rB} [1]	N	1,2,3	3-729	540	1040	1700
Max. Axial Load F_{2aB} [1]	N	1,2,3	3-729	360	720	735
Operating Temp.	°C		3-729	-10°C ~ +90°C		
Service Life	hr		3-729	20,000 (10,000 Continuous Operation)		
Efficiency	%	1 2 3	3-10 15-81 125-729	≧95% ≧90% ≧85%		
Weight	kg	1 2 3	3-10 15-81 125-729	0.5 0.7 0.9	1.2 1.7/1.5 2.0/1.8	3.1 4.7/3.6 5.3/4.0
Mounting Position	-	1,2,3	3-729	Any Direction		
Noise Level [2]	dBA/1m	1,2,3	3-729	≦62	≦64	≦67
Protection Class	-	1,2,3	3-729	IP64		
Lubrication	-	1,2,3	3-729	Synthetic Lubricant		

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PBC

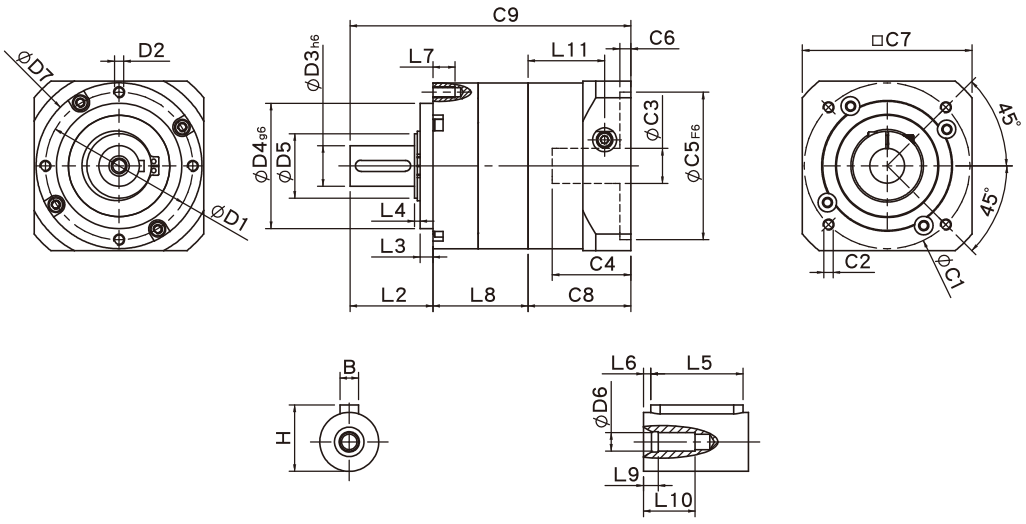
The PBC Economy Series features cylindrical mount housing, solid performance in sizes 50, 70 and 90 mm, in three stages with ratios from 3:1 through 729:1. Maximum ratio 1000:1 by demand.

Frame Size (mm)	50, 70, 90
Ratio	3:1-729:1
Nominal Input Speed (rpm)	3,000 - 4,000
Max Input Speed (rpm)	6,000 - 8,000
Backlash (arc-min)	1 Stage : 7-9 2 Stages : 9-12 3 Stages: 12 - 15
Noise Level (dBA / 1m)	62 - 67

Features

- In-line Configuration.
- Output shaft, 12 mm through 22 mm diameter.
- Torque Capacity Range: 4.8 Nm through 58.6 Nm.
- Cantilevered Planet Carrier: with primary planet gear set.
- High performance, efficiencies and low acoustics.
- Wide Range of Ratios: 6 single stage ratios, 8 two stage ratios and 8 three stage ratios.
- Output Bearings deliver radial load capacity as high as 1700 N, and axial capacities up to 735 N.
- Square Servo and Step Motor input: accommodates 40 mm through 100 mm, with optional sizes available.

PBC Single Stage Dimensions



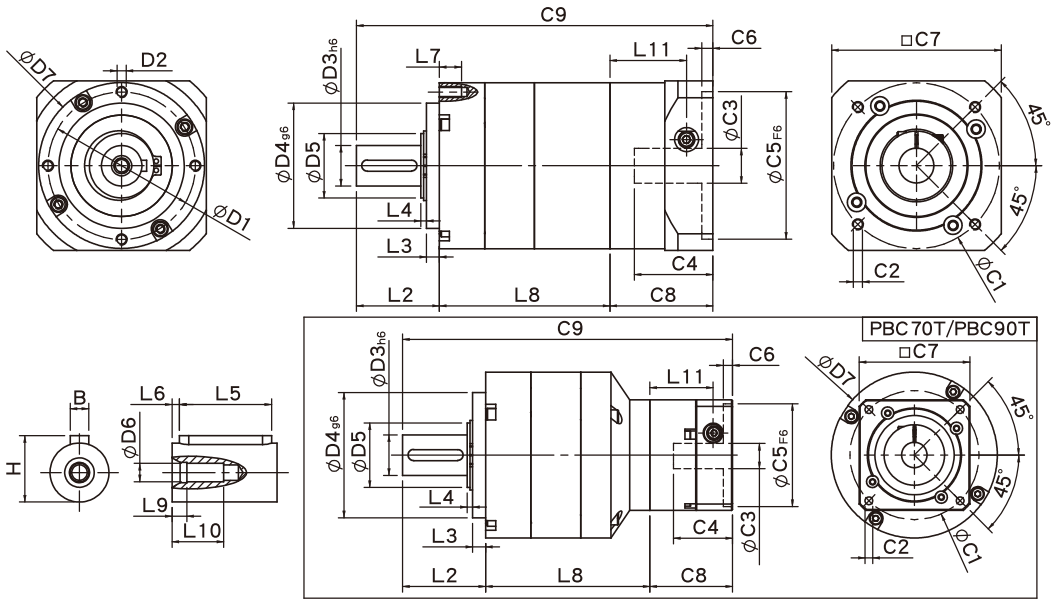
Specifications Unit:mm

Dimensions	PBC50	PBC70	PBC90
D1	44	62	80
D2	M4x0.7P	M5x0.8P	M6x1.0P
$D3_{h6}$	12	16	22
$D4_{g6}$	35	52	68
D5	15	20	35
D6	M4x0.7P	M5x0.8P	M8x1.25P
D7	50	70	90
L2	26	36	45
L3	5.5	5	7
L4	2.6	2.7	3
L5	15	25	30
L6	2	2	3
L7	8	10	12
L8	32.4	49.6	54.4
L9	4	4	4.5
L10	14	16.5	20.5
L11	26.9	34.3	41.55
$C1^{2}$	46	70	90
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24/≦28
$C4^{2}$	26.5	33.5	41
$C5^{2}{}_{F6}$	30	50	70
$C6^{2}$	4	4	6
$C7^{2}$	42.6	60	92
$C8^{2}$	36.4	44.8	55.8
$C9^{2}$	94.8	130.4	155.2
B	4	5	6
H	13.5	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PBC Double Stage Dimensions



Specifications

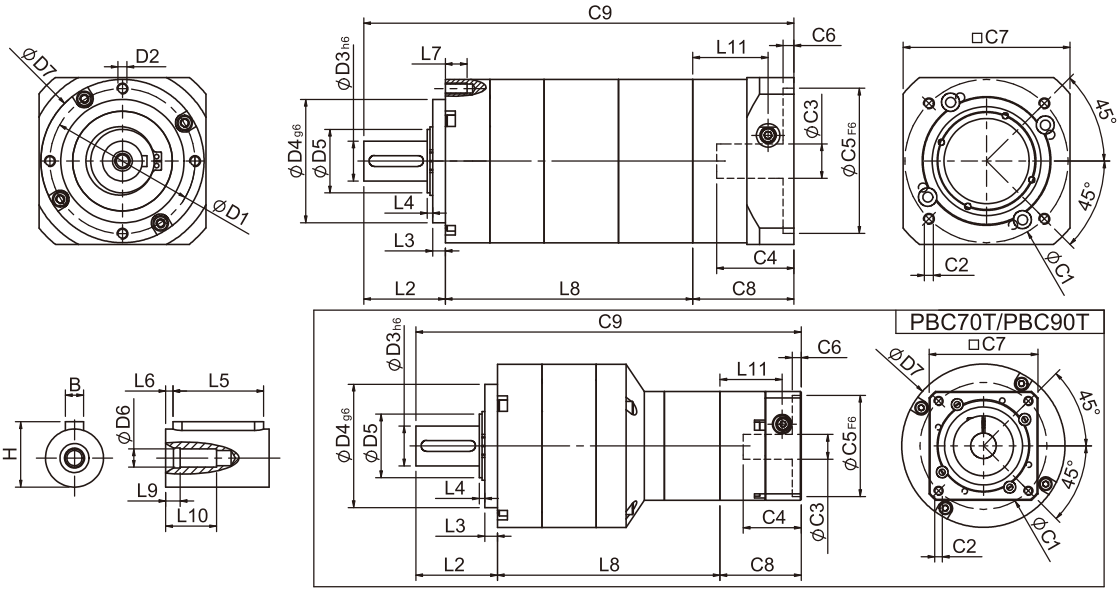
Unit:mm

Dimensions	PBC50	PBC70	PBC70T	PBC90	PBC90T
D1	44	62		80	
D2	M4x0.7P	M5x0.8P		M6x1.0P	
$D3_{h6}$	12	16		22	
$D4_{g6}$	35	52		68	
D5	15	20		35	
D6	M4x0.7P	M5x0.8P		M8x1.25P	
D7	50	70		90	
L2	26	36		45	
L3	5.5	5		7	
L4	2.6	2.7		3	
L5	15	25		30	
L6	2	2		3	
L7	8	10		12	
L8	57.3	80.3	75.9	95.4	92
L9	4	4		4.5	
L10	14	16.5		20.5	
L11	26.9	34.3	26.9	41.55	34.3
C1[2]	46	70	46	90	70
C2[2]	M4x0.7P	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P
C3[2]	≦8/≦11	≦14/≦19	≦8/≦11	≦19/≦24/≦28	≦14/≦19
C4[2]	26.5	33.5	26.5	41	33.5
$C5^{2}_{F6}$	30	50	30	70	50
C6[2]	4	4	4	6	4
C7[2]	42.6	60	42.6	92	60
C8[2]	36.4	44.8	36.4	55.8	44.8
C9[2]	119.7	161.1	148.3	196.2	181.8
B	4	5		6	
H	13.5	18		24.5	

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PBC Triple Stage Dimensions



Specifications Unit:mm

Dimensions	PBC50	PBC70T	PBC90T
D1	44	62	80
D2	M4x0.7P	M5x0.8P	M6x1.0P
$D3_{h6}$	12	16	22
$D4_{g6}$	35	52	68
D5	15	20	35
D6	M4x0.7P	M5x0.8P	M8x1.25P
D7	50	70	90
L2	26	36	45
L3	5.5	5	7
L4	2.6	2.7	3
L5	15	25	30
L6	2	2	3
L7	8	10	12
L8	82.2	100.8	122.7
L9	4	4	4.5
L10	14	16.5	20.5
L11	26.9	26.9	34.3
C1[2]	46	46	70
C2[2]	M4x0.7P	M5x0.7P	M5x0.8P
C3[2]	≦8/≦11	≦8/≦11	≦14/≦19
C4[2]	26.5	26.5	33.5
$C5^{2}{}_{F6}$	30	30	50
C6[2]	4	4	4
C7[2]	42.6	42.6	60
C8[2]	36.4	36.4	44.8
C9[2]	144.6	173.2	212.5
B	4	5	6
H	13.5	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PBC Specifications

Specifications		Stage	Ratio	PBC50	PBC70	PBC90
Nominal Output Torque T_{2N}	N• m	1	3	4.8	13.6	33.5
			4	6.3	21.6	58.6
			5	6.0	20.5	55.1
			7	5.6	19.2	51.8
			9	5.4	18.5	50.0
			10	5.4	17.0	48.0
		Stage	Ratio	PBC50	PBC70(T)	PBC90(T)
		2	15	4.8	13.6	33.5
			20	6.3	21.6	58.6
			25	6.0	20.5	55.1
			35	6.0	20.5	55.1
			45	6.0	20.5	55.1
			49	5.6	19.2	51.8
			63	5.6	19.2	51.8
			81	5.4	18.5	50.0
		Stage	Ratio	PBC50	PBC70(T)	PBC90(T)
		3	125	6.0	20.5	55.1
			175	6.0	20.5	55.1
			225	6.0	20.5	55.1
			245	6.0	20.5	55.1
			315	6.0	20.5	55.1
			405	6.0	20.5	55.1
			567	5.6	19.2	51.8
			729	5.4	18.5	50.0
Emergency Stop Torque T_{2NOT}	N• m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)			
Nominal Input Speed n_{1N}	rpm	1,2,3	3-729	4000	4000	3000
Max. Input Speed n_{1max}	rpm	1,2,3	3-729	8000	8000	6000
Backlash	arcmin	1 2 3	3-10 15-81 125-729	≦9 ≦12 ≦15	≦8 ≦10 ≦12	≦7 ≦9 ≦12
Torsional Rigidity	N•m /arcmin	1,2,3	3-729	0.8	2.0	7.0
Max. Radial Load F_{2rB} [1]	N	1,2,3	3-729	540	1040	1700
Max. Axial Load F_{2aB} [1]	N	1,2,3	3-729	360	720	735
Operating Temp.	°C	1,2,3	3-729	-10°C ~ +90°C		
Service Life	hr	1,2,3	3-729	20,000 (10,000 Continuous Operation)		
Efficiency	%	1 2 3	3-10 15-81 125-729	≧95% ≧90% ≧85%		
Weight	kg	1 2 3	3-10 15-81 125-729	0.5 0.7 0.9	1.2 1.7/1.5 2.0/1.8	3.1 4.7/3.6 5.3/4.0
Mounting Position	-	1,2,3	3-729	Any Direction		
Noise Level [2]	dBA/1m	1,2,3	3-729	≦62	≦64	≦67
Protection Class	-	1,2,3	3-729	IP64		
Lubrication	-	1,2,3	3-729	Synthetic Lubricant		

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
* 3. The inertia value of input shaft is same as that of the PAE series.
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGSH

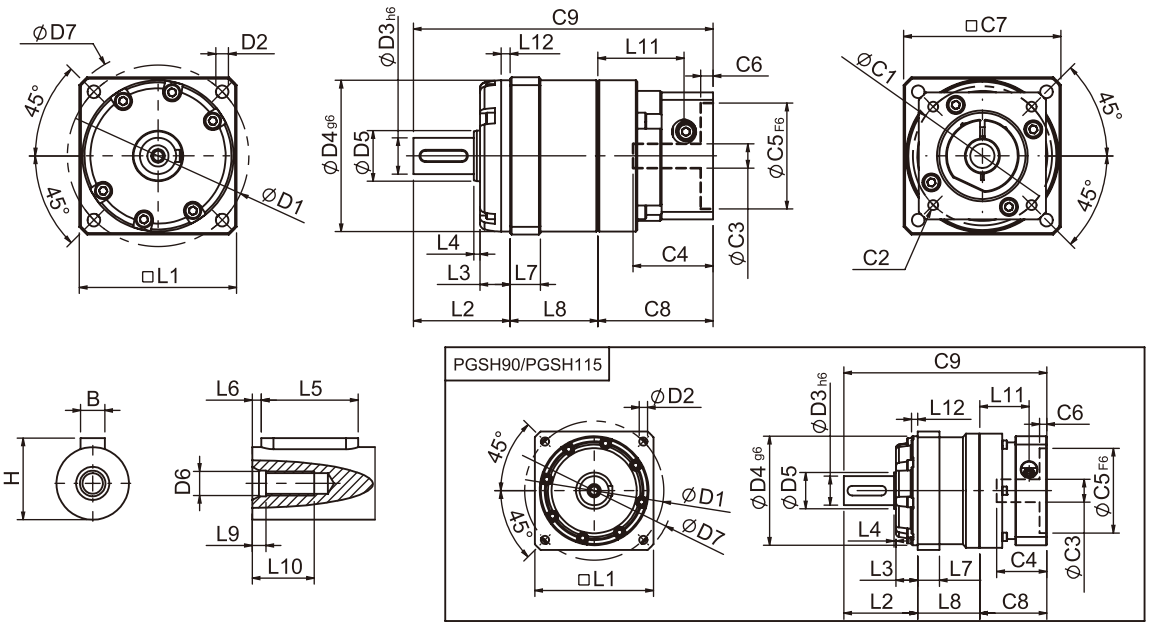
PGSH in-line planetary gearheads provide integration between superior operating performance and cost effectiveness. One-piece planet carrier/output shaft and newly designed gear profile benefit higher output torque, precision, loading capacity and lower noise level. High quality gears and components are utilized to create compact and rigid unit with low backlash and maintenance-free operation. 2 levels of precision are available with max frame size 142 mm. Adapters for all servo motors.

Frame Size (mm)	42, 60, 90, 115, 142
Ratio	3 : 1 - 100 : 1
Nominal Input Speed (rpm)	2,500 - 4,000
Max Input Speed (rpm)	5,000 - 8,000
Backlash (arc-min)	1 Stage : 5 - 8 2 Stages : 7 - 10
Noise Level (dBA / 1m)	58 - 67

Features

- ▶ One-piece planet carrier/output shaft, high torsional rigidity and loading capacity.
- ▶ One-piece compact ring gear design, high precision and output torque.
- ▶ Alloy steel precision gears, low backlash, low noise, high wear resistance.
- ▶ Lubricated for life and IP65 sealing, maintenance free.
- ▶ Adapters for all servo motors.

PGSH Single Stage Dimensions



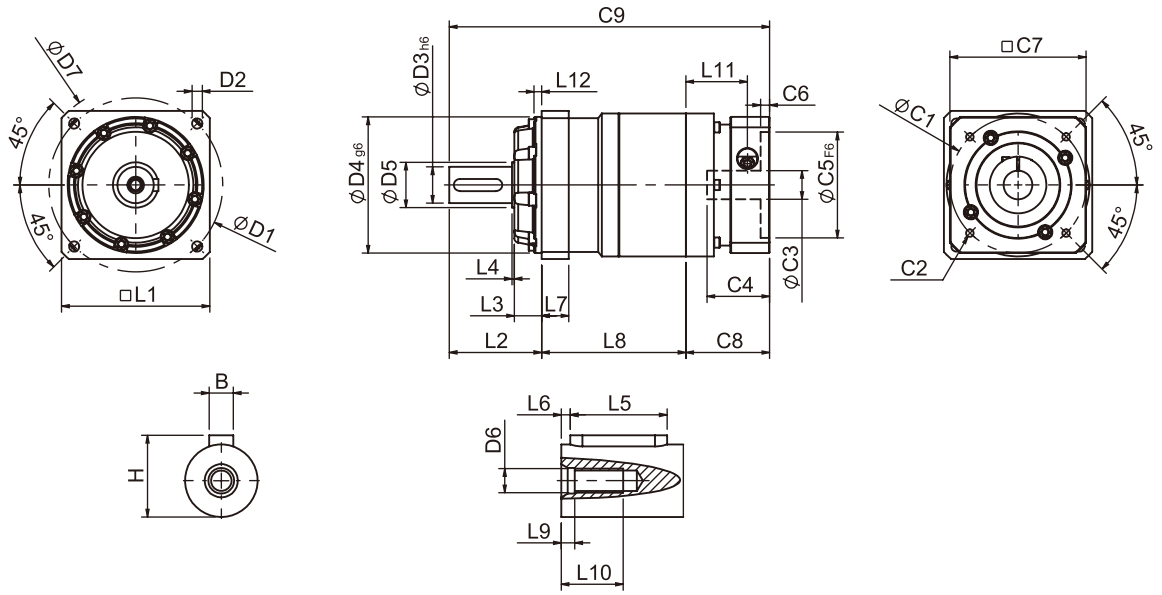
Specifications Unit:mm

Dimensions	PGSH42	PGSH60	PGSH90	PGSH115
D1	60	90	115	135
D2	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P
$D3_{h6}$	12	19	24	32
$D4_{g6}$	50	70	90	110
D5	16.7	20	30	45
D6	M4x0.7P	M6x1.0P	M8x1.25P	M12x1.75P
D7	70	104	132	164
L1	52	78	98	120
L2	32	50	61	75
L3	10	17	18	14.5
L4	2	3	1.5	5.5
L5	16	25	32	40
L6	2	3	3	5
L7	10	12	18	18.5
L8	29	37.8	51.4	63.8
L9	4	4	4.5	6
L10	12	16.5	20.5	30
L11	28.5	35.5	40.7	53.8
L12	3	4	5	5
$C1^{2}$	46	70	90	115
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32/≦38
$C4^{2}$	26.5	37.6	41.4	51.3
$C5^{2}{}_{F6}$	30	50	70	95
$C6^{2}$	4.1	4.5	6	6
$C7^{2}$	42	60	90	115
$C8^{2}$	38.1	46.5	55.4	70
$C9^{2}$	99.1	134.3	167.8	208.8
B	4	6	8	10
H	13.5	21.5	27	35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGSH Double Stage Dimensions-1



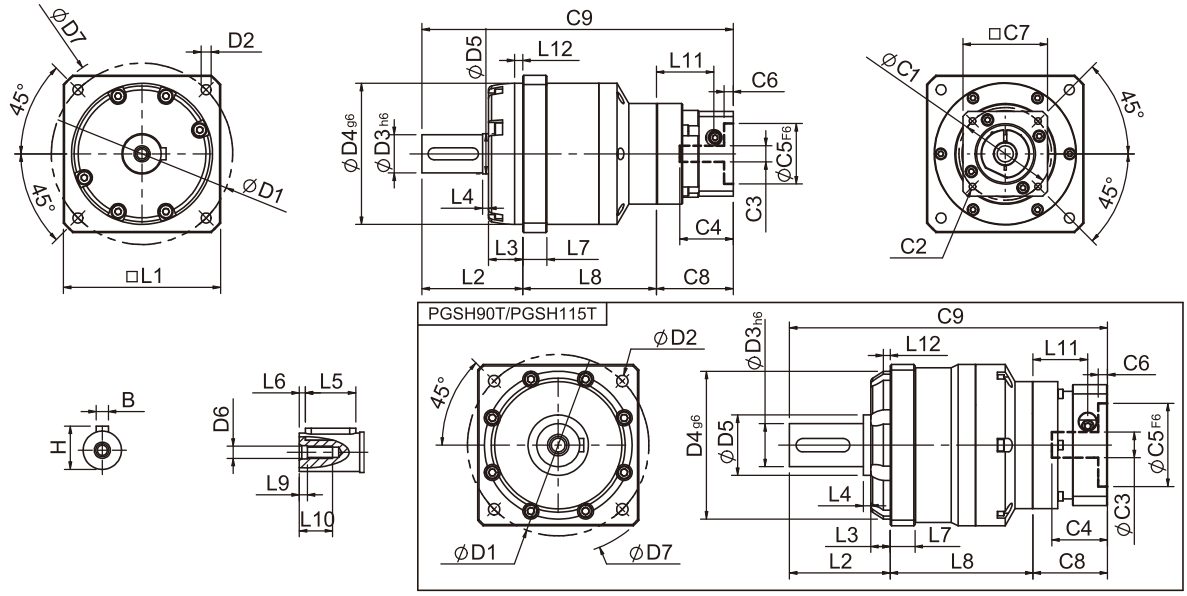
Specifications Unit:mm

Dimensions	PGSH42	PGSH60	PGSH90
D1	60	90	115
D2	M5x0.8P	M6x1.0P	M8x1.25P
$D3_{h6}$	12	19	24
$D4_{g6}$	50	70	90
D5	16.7	20	30
D6	M4x0.7P	M6x1.0P	M8x1.25P
D7	70	104	132
L1	52	78	98
L2	32	50	61
L3	10	17	18
L4	2	3	1.5
L5	16	25	32
L6	2	3	3
L7	10	12	18
L8	56	70.8	95.4
L9	4	4	4.5
L10	12	16.5	20.5
L11	28.5	35.5	40.7
L12	3	4	5
$C1^{2}$	46	70	90
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24
$C4^{2}$	26.5	37.6	41.4
$C5^{2}{}_{F6}$	30	50	70
$C6^{2}$	4.1	4.5	6
$C7^{2}$	42	60	90
$C8^{2}$	38.1	46.5	55.4
$C9^{2}$	126.1	167.3	211.8
B	4	6	8
H	13.5	21.5	27

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGSH Double Stage Dimensions-2



Specifications Unit:mm

Dimensions	PGSH60T	PGSH90T	PGSH115T
D1	90	115	135
D2	M6x1.0P	M8x1.25P	M10x1.5P
$D3_{h6}$	19	24	32
$D4_{g6}$	70	90	110
D5	20	30	45
D6	M6x1.0P	M8x1.25P	M12x1.75P
D7	104	132	164
L1	78	98	120
L2	50	61	75
L3	17	18	14.5
L4	3	1.5	5.5
L5	25	32	40
L6	3	3	5
L7	12	18	18.6
L8	66.3	83.9	106.5
L9	4	4.5	6
L10	16.5	20.5	30
L11	28.5	35.5	40.7
L12	4	5	5
$C1^{2}$	46	70	90
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24
$C4^{2}$	26.5	37.6	41.4
$C5^{2}{}_{F6}$	30	50	70
$C6^{2}$	4.1	4.5	6
$C7^{2}$	42	60	90
$C8^{2}$	38.1	46.5	55.4
$C9^{2}$	154.4	191.4	236.7
B	6	8	10
H	21.5	27	35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGSH Specifications

Specifications		Stage	Ratio	PGSH-42A	PGSH-42	PGSH-60	PGSH-90	PGSH-115	PGSH-142
Nominal Output Torque T_{2N}	N · m	1	3	8	15	53	145	290	520
			4	10	17	55	150	300	550
			5	10	16	54	140	290	600
			6	10	15	46	135	280	560
			7	10	14	44	125	270	530
			8	9	12	41	110	240	480
			9	9	11	37	95	220	430
			10	9	11	37	95	220	430
		Stage	Ratio	PGSH-42A	PGSH-42	PGSH-60 / PGSH-60T	PGSH-90 / PGSH-90T	PGSH-115T	PGSH-142T
		2	15	8	15	53	145	290	520
			20	10	17	55	150	300	550
			25	10	16	54	140	290	600
			30	10	16	54	140	290	600
			35	10	16	54	140	290	600
			40	10	16	54	140	290	600
			45	10	16	54	140	290	600
			50	10	16	54	140	290	600
			60	10	15	46	135	280	560
			70	10	14	44	125	270	530
			80	9	12	41	110	240	480
			90	9	11	37	95	220	430
			100	9	11	37	95	220	430
Emergency Stop Torque T_{2NOT}	N · m	(3.0 times of Nominal Output Torque) (* Max. Output Torque T_{2B} =60% of Emergency Stop Torque)							
Nominal Input Speed n_{1N}	rpm	1,2	3-100	4000	4000	4000	3000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-100	8000	8000	8000	6000	6000	5000
Precision Backlash P1	arcmin	1	3-10	≦6	≦6	≦6	≦6	≦5	≦5
		2	12-100	≦8	≦8	≦8	≦8	≦7	≦7
Standard Backlash P2	arcmin	1	3-10	≦8	≦8	≦8	≦8	≦7	≦7
		2	12-100	≦10	≦10	≦10	≦10	≦9	≦9
Torsional Rigidity	N · m /arcmin	1,2	3-100	2.5	2.5	6	12	23	50
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	1120	1120	1720	2800	4600	8300
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	520	520	830	1730	2950	4670
Operating Temp.	℃		3-100	-10℃~+90℃					
Service Life	hr		3-100	20,000 (10,000 Continuous operation)					
Efficiency	%	1	3-10	≧ 97%					
		2	12-100	≧ 94%					
Weight	kg	1	3-10	0.6	0.6	1.3	3.5	7.8	16.1
		2	12-100	0.9	0.9	2.0/1.6	5.6/3.9	9.5	19
Mounting Position	-	1,2	3-100	Any Direction					
Noise Level [2]	dBA/1m	1,2	3-100	58	58	60	63	65	67
Protection Class	-	1,2	3-100	IP65					
Lubrication	-	1,2	3-100	Synthetic Lubricant					

Inertia (J1)

Stage	Ratio	unit	PGSH-42A	PGSH-42	PGSH-60	PGSH-90	PGSH-115	PGSH-142
1	3	$Kg \cdot cm^2$	0.03	0.03	0.23	0.97	2.35	10.00
	4		0.02	0.02	0.18	0.67	1.66	7.17
	5		0.02	0.02	0.17	0.65	1.50	6.52
	6/7/8		0.02	0.02	0.14	0.60	1.45	6.17
	9/10		0.02	0.02	0.14	0.58	1.41	6.10
Stage	Ratio		PGSH-42A	PGSH-42	PGSH-60(T)	PGSH-90(T)	PGSH-115T	PGSH-142T
2	15/20/25		0.02	0.02	0.17(0.02)	0.65(0.17)	0.65	1.50
	30/35/40		0.02	0.02	0.14(0.02)	0.60(0.14)	0.60	1.45
	45/50/60/70/80/90/100		0.02	0.02	0.14(0.02)	0.58(0.14)	0.58	1.41

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGS

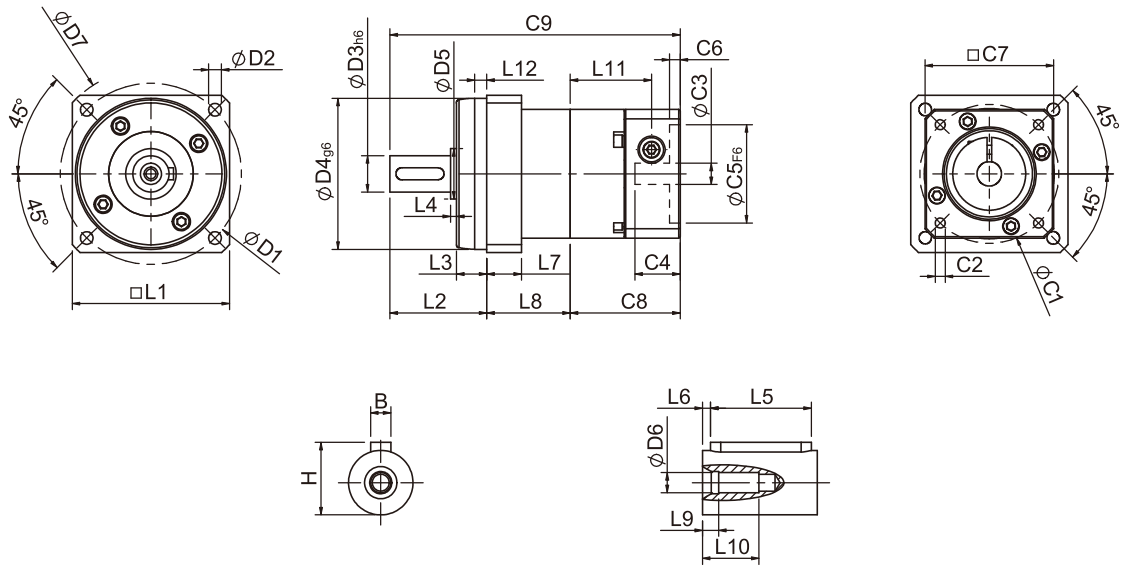
PGS in-line Planetary Gearheads are cost effective, compact and rigid gearboxes with standard backlash and maintenance-free operation in gantry robotics and packaging machineries. Series frame size 42 to 115 mm in square flange and round housing, ratios from 3:1 to 100:1. Low noise and low temperature rise, synthetic lubricant and high efficiency power transmission to provide solid performance. Compatible with servo motors, stepping motors and brushless DC motors.

Frame Size (mm)	42, 60, 90, 115
Ratio	3:1 - 100:1
Nominal Input Speed (rpm)	2,500 - 4,000
Max Input Speed (rpm)	5,000 - 8,000
Backlash (arc-min)	1 stage: 6 - 9 2 stages: 8 - 12
Noise Level (dBA / 1m)	61 - 67

Features

- In-line Configuration
- Output shaft, 12 mm through 32 mm diameter.
- Torque Capacity Range: 8 Nm through 260 Nm.
- Cantilevered Planet Carrier: with primary planet gear set.
- High performance, efficiencies and low acoustics.
- Wide Range of Ratios: 6 single stage ratios, 8 two stage ratios.
- Output Bearings deliver radial load capacity as high as 4600 N, and axial capacities up to 2950 N.
- Square Servo and Step Motor input: accommodates 40 mm through 100 mm, with optional sizes available.

PGS Single Stage Dimensions



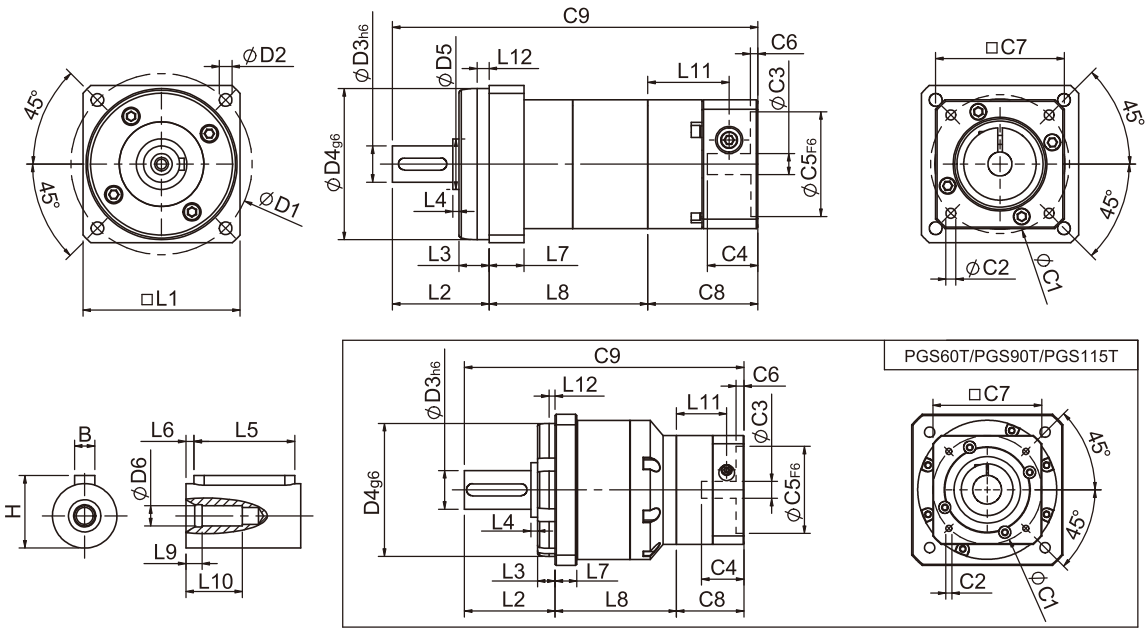
Specifications Unit:mm

Dimensions	PGS42	PGS60	PGS90	PGS115
D1	60	90	115	135
D2	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P
$D3_{h6}$	12	19	24	32
$D4_{g6}$	50	70	90	110
D5	17	20	30	45
D6	M4x0.7P	M6x1.0P	M8x1.25P	M12x1.75P
D7	70	104	132	165
L1	52	78	98	125
L2	32	50	61	75
L3	10	17	18	14.5
L4	2	3	1.5	5.5
L5	16	25	32	40
L6	2	3	3	5
L7	11.5	15.4	18	18
L8	27.6	37.8	46.2	62.3
L9	4	4	4.5	6
L10	14	16.5	20.5	30
L11	26.9	34.3	41.55	51.5
L12	3	4	5	5
$C1^{2}$	46	70	90	145
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24/≦28	≦24/≦32/≦38
$C4^{2}$	26.5	33.5	41	51.5
$C5^{2}{}_{F6}$	30	50	70	110
$C6^{2}$	4	4	6	6
$C7^{2}$	42.6	60	90	130
$C8^{2}$	36.4	44.8	55.8	68
$C9^{2}$	96	132.6	163	205.3
B	4	6	8	10
H	13.5	21.5	27	35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGS Double Stage Dimensions



Specifications

Unit:mm

Dimensions	PGS42	PGS60	PGS60T	PGS90	PGS90T	PGS115T
D1	60	90		115		135
D2	M5x0.8P	M6x1.0P		M8x1.25P		M10x1.5P
$D3_{h6}$	12	19		24		32
$D4_{g6}$	50	70		90		110
D5	17	20		30		45
D6	M4x0.7P	M6x1.0P		M8x1.25P		M12x1.75P
D7	70	104		132		165
L1	52	78		98		125
L2	32	50		61		75
L3	10	17		18		14.5
L4	2	3		1.5		5.5
L5	16	25		32		40
L6	2	3		3		5
L7	11.5	15.4		18		18
L8	52.5	68.5	64.1	87.2	76.7	100.4
L9	4	4		4.5		6
L10	14	16.5		20.5		30
L11	51.8	34.3	26.9	41.55	34.3	41.55
L12	3	4		5		5
$C1^{2}$	46	70	46	90	70	90
$C2^{2}$	M4x0.7P	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P	M6x1.0P
$C3^{2}$	≦8/≦11	≦14/≦19	≦8/≦11	≦19/≦24/≦28	≦14/≦19	≦19/≦24/≦28
$C4^{2}$	26.5	33.5	26.5	41	33.5	41
$C5^{2}{}_{F6}$	30	50	30	70	50	70
$C6^{2}$	4	4	4	6	4	6
$C7^{2}$	42.6	60	42.6	90	60	90
$C8^{2}$	36.4	44.8	36.4	55.8	44.8	55.8
$C9^{2}$	120.9	163.3	-	204	182.5	231.2
B	4	6		8		10
H	13.5	21.5		27		35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGS Specifications

Specifications		Stage	Ratio	PGS42	PGS60	PGS90	PGS115
Nominal Output Torque T_{2N}	N•m	1	3	9	28	85	210
			4	10	32	80	240
			5	11	35	95	260
			7	10	28	85	220
			9	8	23	75	210
			10	8	21	65	190
		Stage	Ratio	PGS42	PGS60/ PGS60T	PGS90/ PGS90T	PGS115T
		2	15	11	34	90	230
			20	10	32	80	240
			25	11	35	95	260
			35	11	35	95	260
			45	11	35	95	260
			49	10	28	85	260
			63	10	28	85	220
			81	8	23	75	210
			100	8	21	65	190
Emergency Stop Torque T_{2NOT}	N•m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)				
Nominal Input Speed n_{1N}	rpm	1,2	3-100	4000	4000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-100	8000	6000	6000	5000
Standard Backlash P2	arcmin	1 2	3-10 15-100	≦9 ≦12	≦8 ≦10	≦7 ≦9	≦6 ≦8
Torsional Rigidity	N•m /arcmin	1,2	3-100	1.5	4.0	8.5	17
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	1120	1720	2800	4600
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	520	830	1730	2950
Operating Temp.	°C	1,2	3-100	-10°C ~ +90°C			
Service Life	hr	1,2	3-100	20,000 (10,000 Continuous Operation)			
Efficiency	%	1 2	3-10 15-100	≧95% ≧90%			
Weight	kg	1 2	3-10 15-100	0.6 0.9	1.5 2.0/1.8	3.4 5.1/4.0	7.8 9.5
Mounting Position	-	1,2	3-100	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-100	61	63	66	67
Protection Class	-	1,2	3-100	IP65			
Lubrication	-	1,2	3-100	Synthetic Lubricant			

Inertia (J1)

Stage	Ratio	unit	PGS42(ϕ8)	PGS60(ϕ14)	PGS90(ϕ19)	PGS115(ϕ24)
1	3	kg•cm²	0.04	0.23	0.77	2.30
	4		0.03	0.21	0.67	1.92
	5		0.03	0.21	0.61	1.71
	7		0.03	0.21	0.60	1.65
	9/10		0.03	0.21	0.60	1.63
Stage	Ratio		PGS42(ϕ8)	PGS60(ϕ14)/ PGS60T(ϕ8)	PGS90(ϕ19)/ PGS90T(ϕ14)	PGS115T(ϕ19)
2	15/20/25		0.03	0.21 (0.03)	0.61 (0.21)	0.61
	35/49		0.03	0.21 (0.03)	0.60 (0.21)	0.60
	45/63/81/100		0.03	0.21 (0.03)	0.60 (0.21)	0.60

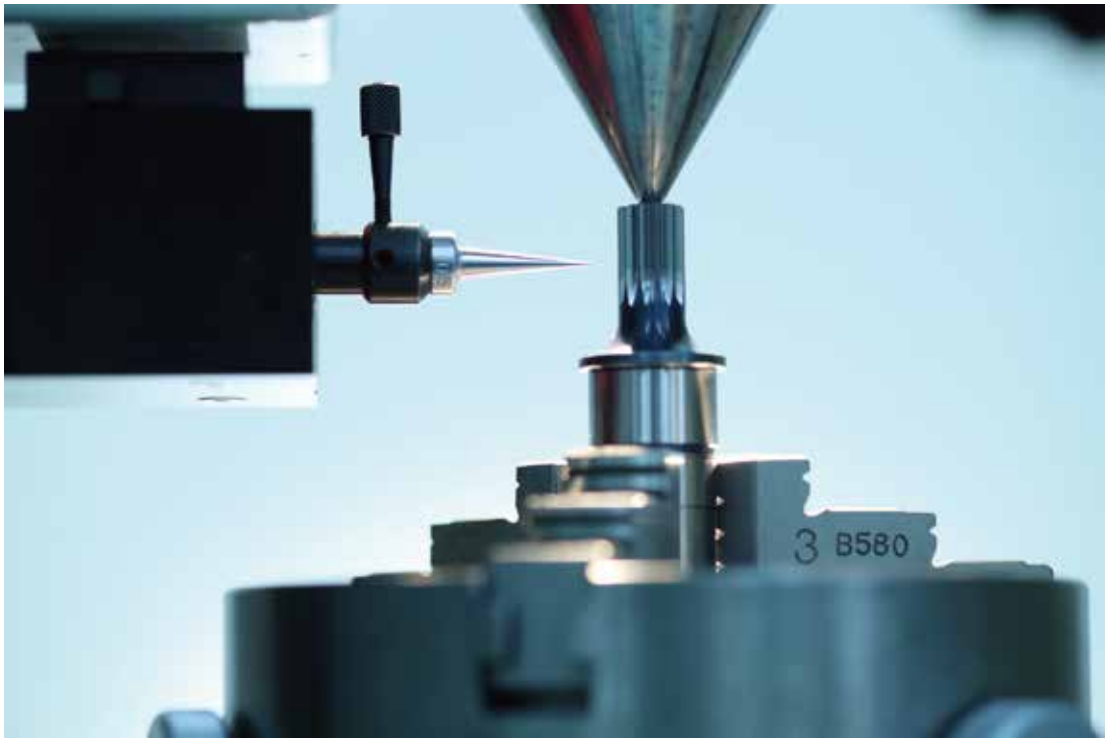
* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

Q5. What are Sesame Motor's advantage in products and services?

Sesame offer not only wide variety of planetary gearboxes, bevel gearboxes, induction motors and gear motors, but also expertise to assist in selecting the appropriate solution for your application. The well-trained service staff are dedicated to meet your needs from pre-sales consultative discussion, order follow up to delivery, and everything related to products usages and maintenance.

Sesame is an ISO 9001 and ISO14001 certified company offering CE, CCC, UL certified motors and gear motors, and full lines of servo gearheads and epicyclic gear reducers. SESAME is not only a brand with a high domestic market share, but also marketed in more than 50 countries around the world. There are more than 30 agents and distributors providing global customers with application analysis and after-sales services. We deliver products that consistently meet customer requirements, satisfaction and offer a service that can be relied on.



PAN

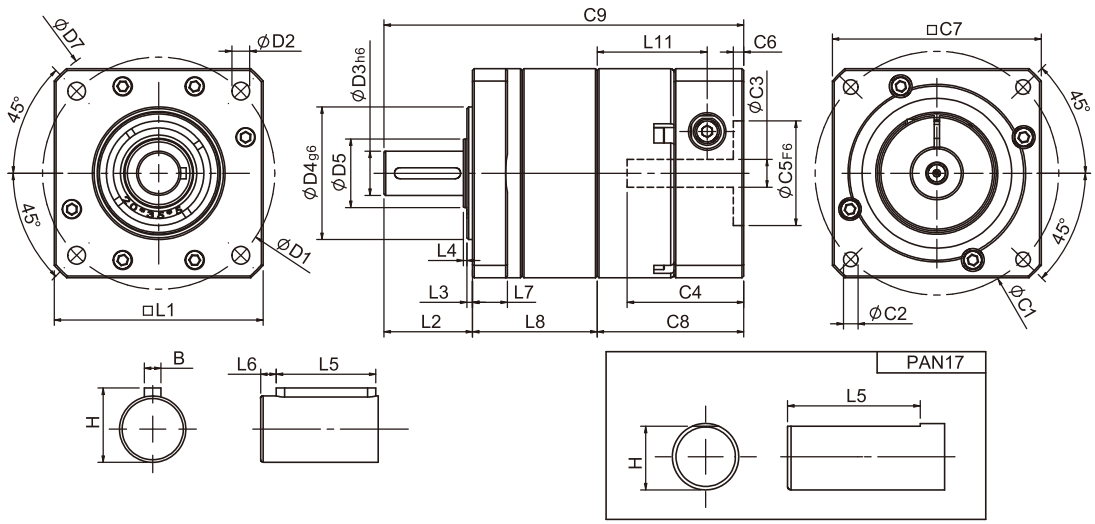
The PAN Standard Series gearboxes are equipped with a NEMA output flange with metric shaft, to offer exceptional torque ratings and capacity for many of present servo and stepper motion control applications. The gearboxes are drop-ins for most industry standards and available from single to three stages with ratios 3:1 up to 1000:1, the best backlash of <6 arc-minutes. Adapters for all servo and stepper motors.

Frame Size (mm)	17, 23, 34, 42, 56
Ratio	3:1-1000:1
Nominal Input Speed (rpm)	2,500 - 4,000
Max Input Speed (rpm)	5,000 - 6,000
Backlash (arc-min)	1 Stage: 6 - 9 2 Stages: 8 - 12 3 Stages: 12 - 15
Noise Level (dBA / 1m)	60 - 67

Features

- NEMA spec motor bracket
- Torque capacity range: 8 Nm through 215 Nm.
- Caged planet carrier: with standard planet gear set
- High performance, efficiencies and low acoustics.
- Wide range of ratios up to 1000:1.
- Output bearings deliver radial load capacity as high as 4760 N, and axial capacities up to 2630 N.

PAN Single Stage Dimensions



Specifications

Unit:mm

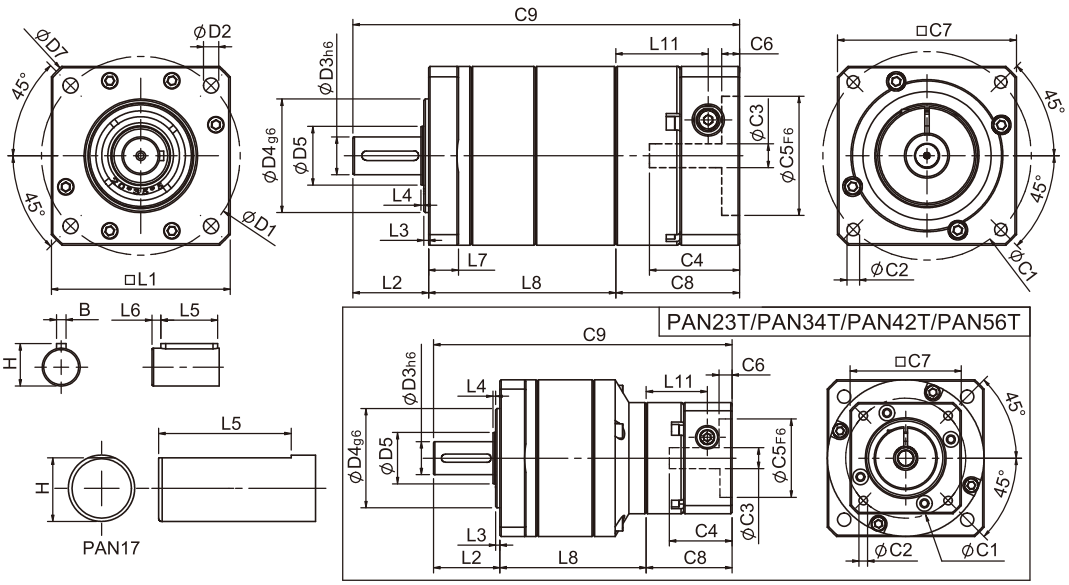
Dimensions	PAN17	PAN23	PAN34	PAN42	PAN56
D1	43.8	66.67	98.425	125.73	177.8
D2	3.25	5.1	5.6	7.1	10.2
$D3_{h6}$	9.525	12.7	19.05	25	25
$D4_{g6}$	21.97	38.1	73.025	55.55	114.3
D5	12	20	35	32	-
D7	56	80	118	148	195
L1	42.6 (44) [1]	60	90	115	145
L2	25.4	25.4	31.75	42	41
L3	1.6	1.6	1.7	2.4	4
L4	1	1	1	2	-
L5	19.05	19.05	25.4	32	32
L6	-	3	3	4	4
L7	6.5	10	12	19	20
L8	28.8	35.8	43.5	67.4	68.4
L11	26.9	31.6	37.3	51.8	51.8
C1[2]	46	70	90	145	145
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24/≦28	≦24/≦32/≦38	≦24/≦32/≦38
C4[2]	26.5	33.5	41	51.5	51.5
$C5^{2}{}_{F6}$	30	50	70	110	110
C6[2]	4	4	6	6	6
C7[2]	42.6	60	90	130	130
C8[2]	36.4	42.1	51.5	68	68
C9[2]	90.6	103.3	126.75	177.4	177.4
B	-	3.175	4.763	8	8
H	9.14	14.1	21.1	28	28

★ L1=44 when gear ratio is 10.

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PAN Double Stage Dimensions



Specifications

Unit:mm

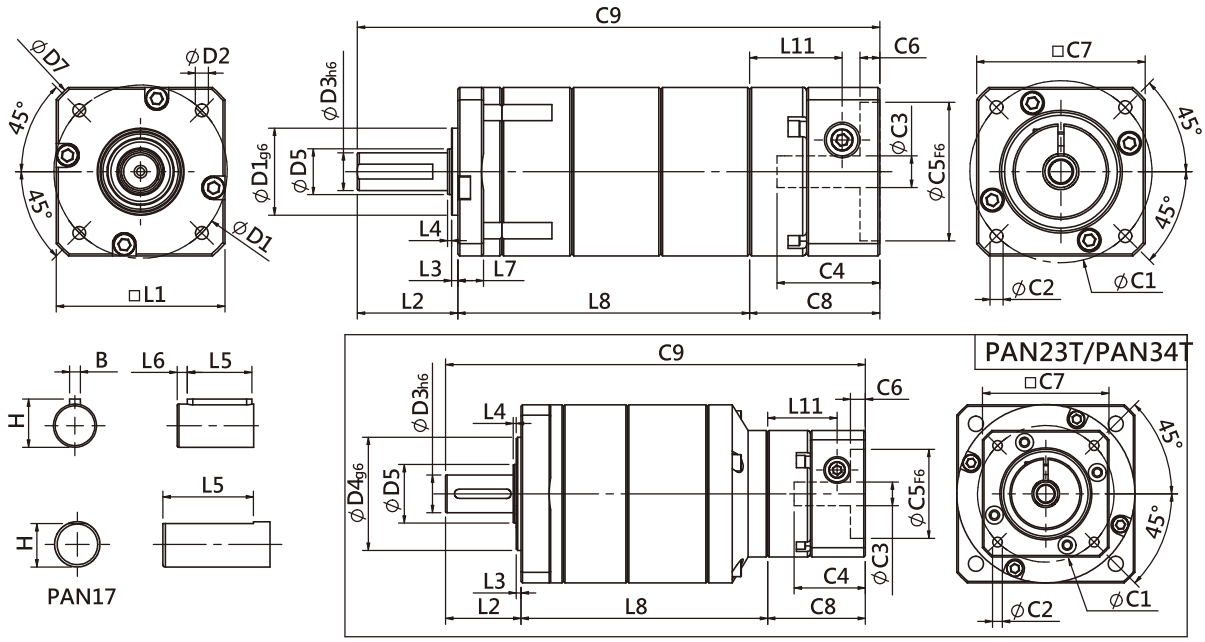
Dimensions	PAN17	PAN23	PAN23T	PAN34	PAN34T	PAN42T	PAN56T
D1	43.8	66.67		98.425		125.73	177.8
D2	3.25	5.1		5.6		7.1	10.2
$D3_{h6}$	9.525	12.7		19.05		25	25
$D4_{g6}$	21.97	38.1		73.025		55.55	114.3
D5	12	20		35		32	-
D7	56	80		118		148	195
L1	42.6 (44)[1]	60		90		115	145
L2	25.4	25.4		31.75		42	41
L3	1.6	1.6		1.7		2.4	4
L4	1	1		1		2	-
L5	19.05	19.05		25.4		32	32
L6	-	3		3		4	4
L7	6.5	10		12		19	20
L8	51.25	62.8	56.1	77.3	72.8	105.5	106.5
L11	23.4	31	23.4	37.3	31	37.3	37.3
C1[2]	46	70	46	90	70	90	90
C2[2]	M4x0.7P	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P	M6x1.0P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦8/≦11	≦19/≦24/≦28	≦14/≦19	≦19/≦24/≦28	≦19/≦24/≦28
C4[2]	26.5	33.5	26.5	41	33.5	41	41
$C5^{2}{}_{F6}$	30	50	30	70	50	70	70
C6[2]	4	4	4	6	4	6	6
C7[2]	42.6	60	42.6	90	60	90	90
C8[2]	32.9	41.5	32.9	51.5	41.5	51.5	51.5
C9[2]	109.55	129.7	114.4	160.55	146.05	199	199
B	-	3.175		4.763		8	8
H	9.14	14.1		21.1		28	28

★ L1=44 when gear ratio is 100.

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PAN Triple Stage Dimensions



Specifications Unit:mm

Dimensions	PAN17	PAN23T	PAN34T
D1	43.8	66.67	98.425
D2	3.25	5.1	5.6
$D3_{h6}$	9.525	12.7	19.05
$D4_{g6}$	21.97	38.1	73.025
D5	12	20	35
D7	56	80	118
L1	42.6 (44)	60	90
L2	25.4	25.4	31.75
L3	1.6	1.6	1.7
L4	1	1	1
L5	19.05	19.05	25.4
L6	-	3	3
L7	6.5	10	12
L8	73.7	83.1	106.6
L11	23.4	23.4	31
$C1^{2}$	46	46	70
$C2^{2}$	M4x0.7P	M4x0.7P	M5x0.8P
$C3^{2}$	≦8/≦11	≦8/≦11	≦14/≦19
$C4^{2}$	26.5	26.5	33.5
$C5^{2}{}_{F6}$	30	30	50
$C6^{2}$	4	4	4
$C7^{2}$	42.6	42.6	60
$C8^{2}$	32.9	32.9	41.5
$C9^{2}$	132	141.4	179.85
B	-	3.175	4.763
H	9.14	14.1	21.1

★ L1=44 when gear ratio is 1000.

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PAN Specifications

Specifications		Stage	Ratio	PAN17	PAN23	PAN34	PAN42	PAN56
Nominal Output Torque T_{2N}	N•m	1	3	9	28	85	200	200
			4	10	32	80	215	215
			5	11	35	95	215	215
			7	10	28	85	200	200
			9	8	23	75	195	195
			10	8	21	65	180	180
		Stage	Ratio	PAN17	PAN23/ PAN23T	PAN34/ PAN34T	PAN42T	PAN56T
		2	15	11	35/24	95/68	168	168
			20	11	35/31	95/95	215	215
			25	11	35/30	95/95	215	215
			35	11	35/28	95/95	215	215
			45	11	35/27	95/92	215	215
			50	(Ratio 49) : 10	35/27	95/82	205	205
			70	(Ratio 63) : 10	28/28	85/85	200	200
			90	(Ratio 81) : 8	23/23	75/75	195	195
			100	8	21/21	65/65	180	180
		Stage	Ratio	PAN17	PAN23T	PAN34T	PAN42T	PAN56T
		3	125	11	35	95	215	215
			175	11	35	95	215	215
			225	11	35	95	215	215
			245	11	35	95	215	215
			315	11	35	95	215	215
			405	11	35	95	215	215
			567	10	28	85	200	200
			729	8	23	75	195	195
			1000	8	21	65	180	180
Emergency Stop Torque T_{2NOT}	N•m	(2.5 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)						
Nominal Input Speed n_{1N}	rpm	1,2,3	3-1000	4000	4000	3000	2500	2500
Max. Input Speed n_{1max}	rpm	1,2,3	3-1000	6000	6000	6000	5000	5000
Standard Backlash P2	arcmin	1 2 3	3-10 15-100 125-1000	≦9 ≦12 ≦15	≦8 ≦10 ≦12	≦7 ≦9 ≦12	≦6 ≦8 ≦12	≦6 ≦8 ≦12
Torsional Rigidity	N•m /arcmin	1,2,3	3-1000	1.2	3.5	8.5	17	17
Max. Radial Load F_{2rB} [1]	N	1,2,3	3-1000	580	960	2160	4760	4760
Max. Axial Load F_{2aB} [1]	N	1,2,3	3-1000	410	430	1100	2630	2630
Operating Temp.	°C	1,2,3	3-1000	-10°C ~ +90°C				
Service Life	hr	1,2,3	3-1000	20,000(10,000 Continuous operation)				
Efficiency	%	1 2 3	3-10 15-100 125-1000	≧95% ≧90% ≧85%				
Weight	kg	1 2 3	3-10 15-100 125-1000	0.5 0.7 0.8	1.1 1.5/1.3 1.7	2.8 4.2/3.1 4.5	6.3 7.9 9.3	6.6 8.2 9.6
Mounting Position	-	1,2,3	3-1000	Any Direction				
Noise Level [2]	dBA/1m	1,2,3	3-1000	60	63	66	67	67
Protection Class	-	1,2,3	3-1000	IP65				
Lubrication	-	1,2,3	3-1000	Synthetic Lubricant				

Inertia (J1)

Stage	Ratio	unit	PAN17(ϕ8)	PAN23(ϕ14)	PAN34(ϕ19)	PAN42(ϕ24)	PAN56(ϕ24)
1	3	kg•cm²	0.04	0.23	0.77	2.30	2.30
	4		0.03	0.21	0.67	1.92	1.92
	5~10		0.03	0.21	0.61	1.71	1.71
Stage	Ratio		PAN17(ϕ8)	PAN23(ϕ14)/ PAN23T(ϕ8)	PAN34(ϕ19)/ PAN34T(ϕ14)	PAN42T(ϕ19)	PAN56T(ϕ24)
2	15		0.04	0.23 (0.04)	0.77 (0.23)	0.77	0.77
	Other Ratios		0.03	0.21 (0.03)	0.67 (0.21)	0.61	0.61
Stage	Ratio		PAN17(ϕ8)	PAN23T(ϕ8)	PAN34T(ϕ14)	PAN42T(ϕ19)	PAN56T(ϕ24)
3	All Ratios		0.03	0.03	0.21	0.61	0.61

* 1. Applied to the output shaft center at 100 rpm.
* 2. Measured at 3000 rpm with no load. These values are measured by gearbox with ratio = 10 (1-stage) or ratio = 100 (2-stage) at nominal input speed or 3000 rpm (if nominal input speed is higher than 3000 rpm) with no load.

※ The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PANR

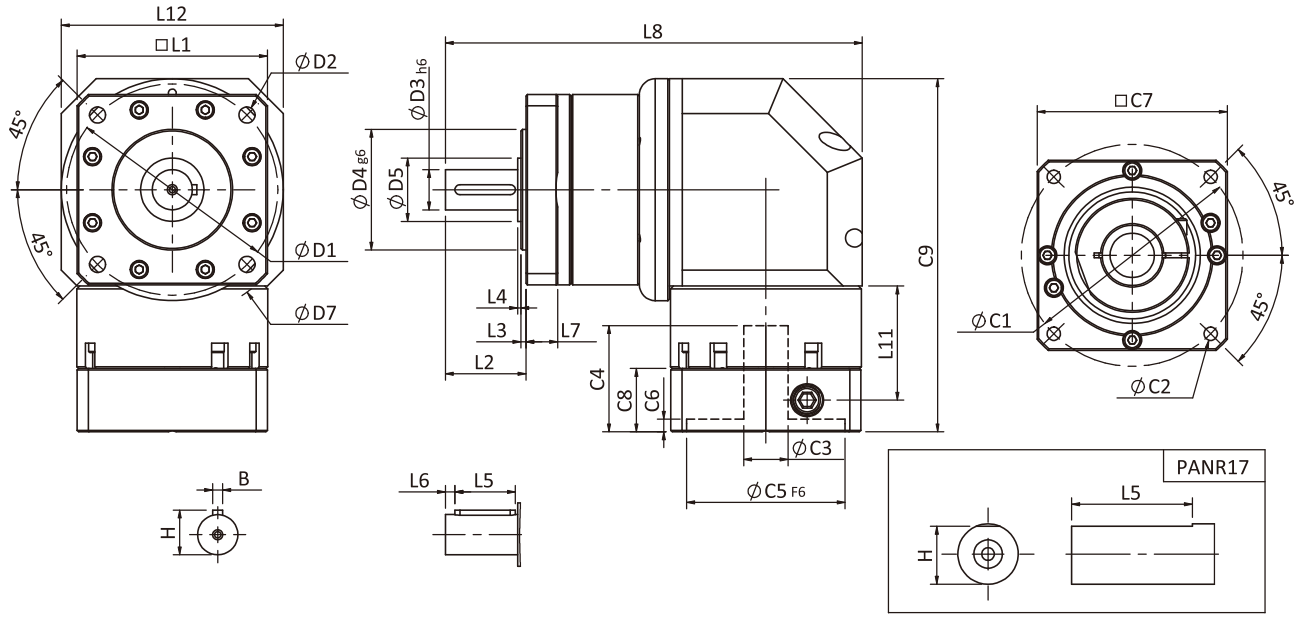
The PANR Primary Series are right angle configuration gearboxes equipped with a NEMA spec output flange and shaft, to offer exceptional torque ratings and capacity for many of present servo and stepper motion control applications. The gearboxes are drop-ins for most industry standards and available with ratios 3:1 up to 300:1. Adapters for all servo and stepper motors.

Frame Size (mm)	17, 23, 34, 42, 56
Ratio	3:1 - 300:1
Nominal Input Speed (rpm)	2,500 - 4,500
Max Input Speed (rpm)	5,000 - 7,500
Backlash (arc-min)	1 Stage: 11 - 18 2 Stages: 13 - 20
Noise Level (dBA / 1m)	66 - 73

Features

- ▶ NEMA spec flange.
- ▶ Torque capacity range: 8 Nm through 215 Nm.
- ▶ Caged planet carrier: with standard planet gear set.
- ▶ High performance, efficiencies and low acoustics.
- ▶ Wide range of ratios up to 300:1.
- ▶ Output bearings deliver radial load capacity as high as 4370 N, and axial capacities up to 2630 N.

PANR Single Stage Dimensions



Specifications

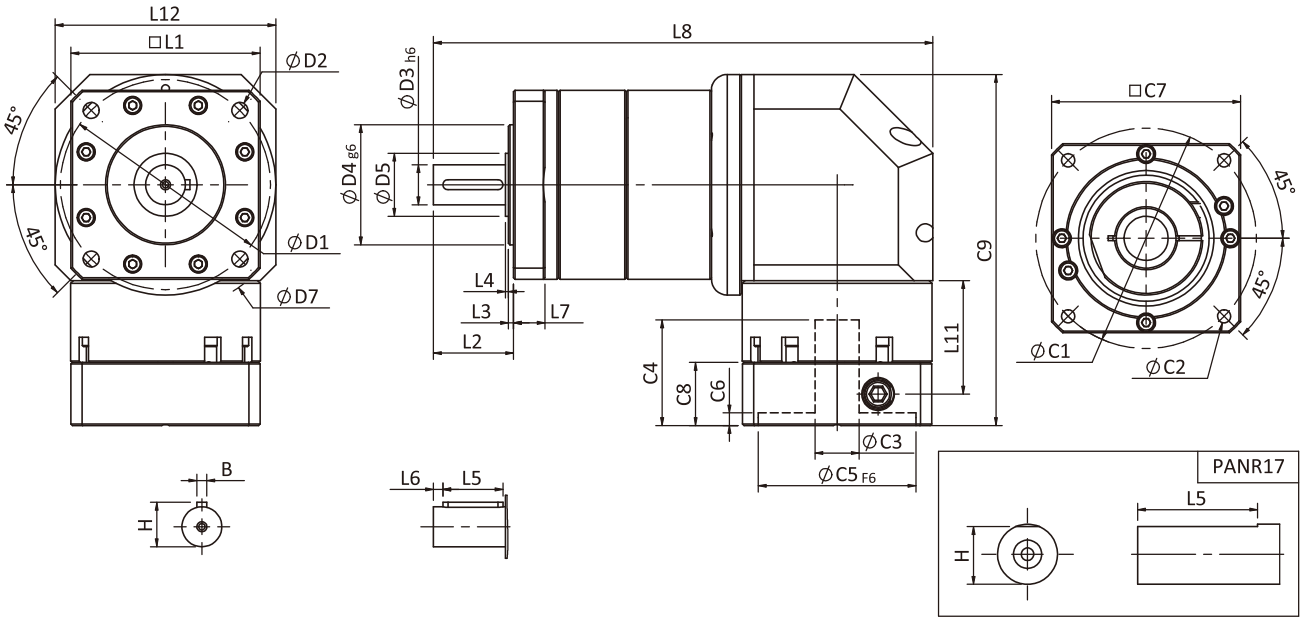
Unit:mm

Dimensions	PANR17	PANR23	PANR34	PANR42
D1	43.8	66.67	98.425	-
D2	3.25	5.1	5.6	-
$D3_{h6}$	9.525	12.7	19.05	-
$D4_{g6}$	21.97	38.1	73.025	-
D5	12	20	35	-
D7	56	80	118	-
L1	42.6	60	90	-
L2	25.4	25.4	31.75	-
L3	1.6	1.6	1.7	-
L4	1	1	1	-
L5	19.05	19.05	25.4	-
L6	-	3	3	-
L7	6.5	10	12	-
L8	105.2	131.5	182.25	-
L11	26.5	36	40.7	-
L12	50	70	98	-
C1[2]	46	70	90	-
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	-
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	-
C4[2]	33	44	57	-
$C5^{2}{}_{F6}$	30	50	70	-
C6[2]	4	4	6	-
C7[2]	42.6	60	90	-
C8[2]	18.5	20	26	-
C9[2]	83	111.4	149.2	-
B	-	3.175	4.763	-
H	9.14	14.1	21.1	-

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PANR Double Stage Dimensions-1



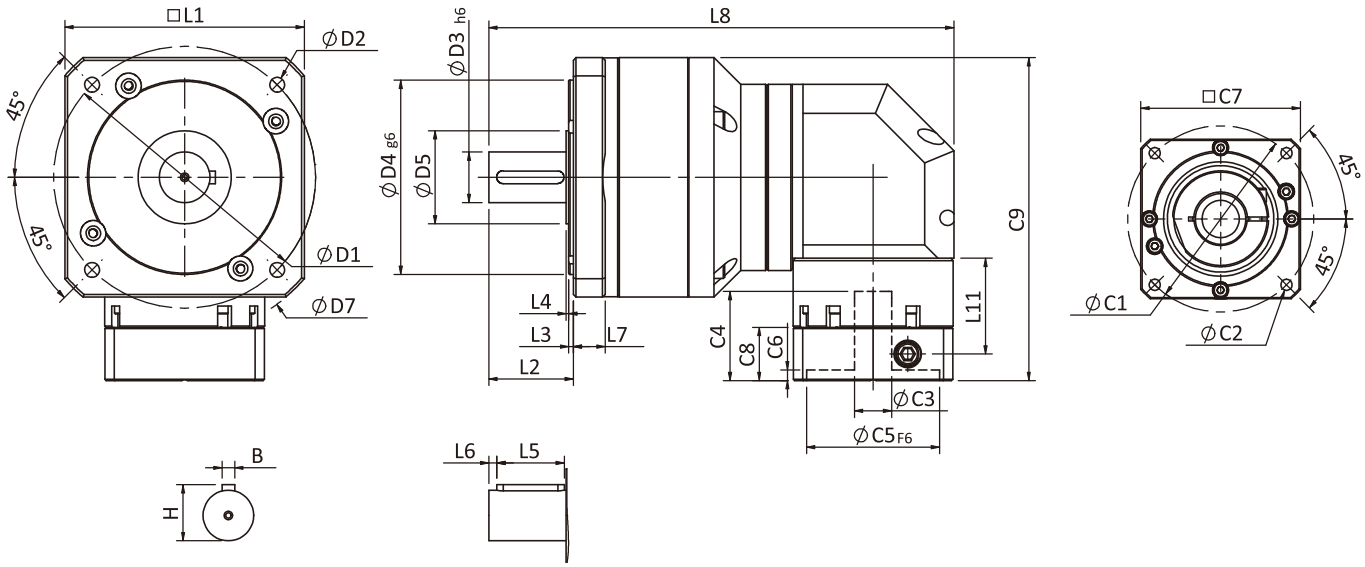
Specifications

Unit:mm

Dimensions	PANR17	PANR23	PANR34	PANR42
D1	43.8	66.67	98.425	-
D2	3.25	5.1	5.6	-
D3h6	9.525	12.7	19.05	-
D4g6	21.97	38.1	73.025	-
D5	12	20	35	-
D7	56	80	118	-
L1[1]	42.6 (44) [1]	60	90	-
L2	25.4	25.4	31.75	-
L3	1.6	1.6	1.7	-
L4	1	1	1	-
L5	19.05	19.05	25.4	-
L6	-	3	3	-
L7	6.5	10	12	-
L8	127.65	158.5	216.05	-
L11	26.5	36	40.7	-
L12	50	70	98	-
C1[2]	46	70	90	-
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	-
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	-
C4[2]	33	44	57	-
C5[2]F6	30	50	70	-
C6[2]	4	4	6	-
C7[2]	42.6	60	90	-
C8[2]	18.5	20	26	-
C9[2]	83	111.4	149.2	-
B	-	3.175	4.763	-
H	9.14	14.1	21.1	-

*1. L1=44 when gear ratios are 100, 200, and 300.
*2. C1~C9 are motor specific dimensions (metric std shown). Sizes may vary according to the motor flange chosen.
★ Specification subject to change without notice.

PANR Double Stage Dimensions-2



Specifications

Unit:mm

Dimensions	PANR23T	PANR34T	PANR42T	PANR56T
D1	66.67	98.425	125.73	177.8
D2	5.1	5.6	7.1	10.2
$D3_{h6}$	12.7	19.05	25	25
$D4_{g6}$	38.1	73.025	55.55	114.3
D5	20	35	32	-
D7	80	118	148	195
L1	60	90	115	145
L2	25.4	31.75	42	41
L3	1.6	1.7	2.4	4
L4	1	1	2	-
L5	19.05	25.4	32	32
L6	3	3	4	4
L7	10	12	19	20
L8	132.5	174.85	254.5	254.5
L11	26.5	36	40.7	40.7
C1[2]	46	70	90	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	≦19/≦24
C4[2]	33	44	57	57
$C5^{2}{}_{F6}$	30	50	70	70
C6[2]	4	4	6	6
C7[2]	42.6	60	90	90
C8[2]	18.5	20	26	26
C9[2]	88	121.4	157.7	157.7
B	3.175	4.763	8	8
H	14.1	21.093	28	28

*2. C1~C9 are motor specific dimensions (metric std shown). Sizes may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PANR Specifications

Specifications		Stage	Ratio	PANR17	PANR23	PANR34	PANR42 PANR56
Nominal Output Torque T_{2N}	N•m		3	9	28	85	135
			4	10	32	80	180
			5	11	35	95	215
			7	10	28	85	200
			8	10	32	80	195
			9	9	25	75	195
			10	11	35	95	210
			12	10	32	80	-
			14	10	28	85	200
			15	11	35	95	-
			16	8	23	75	195
		Stage	Ratio	PANR17	PANR23 PANR23T	PANR34 PANR34T	PANR42T PANR56T
			20	11	35/31	95/95	215
			25	11	35/30	95/95	215
			30	11	35/30	95/95	215
			35	11	35/28	95/95	215
			40	11	35/31	95/95	215
			50	11	35/30	95/95	215
			60	11	35/30	95/95	215
			70	11	35/28	95/95	215
			80	11	35/27	95/92	215
			100	8	35/27	95/82	205
			120	11	35/27	95/92	215
			160	-	23/23	75/75	195
			200	8	21/21	65/65	180
			243	8	23/23	75/75	195
			300	8	21/21	65/65	180
Emergency Stop Torque T_{2NOT}	N•m	(2.5 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-300	4500	4000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-300	7500	7000	6000	5000
Standard Backlash P2	arcmin	1 2	3-16 20-300	≦18 ≦20	≦15 ≦17	≦13 ≦15	≦11 ≦13
Torsional Rigidity	N•m /arcmin	1,2	3-300	1.2	3.5	8.5	17
Max. Radial Load F_{2rB} [1]	N	1,2	3-300	580	890	2050	4370
Max. Axial Load F_{2aB} [1]	N	1,2	3-300	410	430	1100	2630
Operating Temp.	°C	1,2	3-300	-10°C ~ +90°C			
Service Life	hr	1,2	3-300	20,000(10,000 Continuous Operation)			
Efficiency	%	1	3-16	≧95%			
		2	20-300	≧90%			
Weight	kg	1	3-16	1.0	2.4	6.1	12.2/12.5
		2	20-300	1.2	2.9/2.7	8.1/6.5	13.8/14.1
Mounting Position	-	1,2	3-300	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-300	66	68	70	73
Protection Class	-	1,2	3-300	IP65			
Lubrication	-	1,2	3-300	Synthetic Lubricant			

Inertia (J1)

Stage	Ratio	unit	PANR17(ϕ8)	PANR23(ϕ14)	PANR34(ϕ19)	PANR42(ϕ24) PANR56(ϕ24)
1	3, 4, 5, 7	kg•cm²	0.07	0.40	2.00	2.7
	Other Ratios		0.05	0.30	1.50	2.2
Stage	Ratio		PANR17(ϕ8)	PANR23(ϕ14) PANR23T(ϕ8)	PANR34(ϕ19) PANR34T(ϕ19)	PANR42T(ϕ19) PANR56T(ϕ19)
2	20, 25, 35		0.07	0.40/0.07	2.0/0.40	2.0
	Other Ratios		0.05	0.30/0.05	1.5/0.30	1.5

* 1. Applied to the output shaft center at 100 rpm.
* 2. Measured at 3000 rpm with no load. These values are measured by gearbox with ratio = 10 (1-stage) or ratio = 100 (2-stage) at nominal input speed or 3000 rpm (if nominal input speed is higher than 3000 rpm) with no load.

※ The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PNS

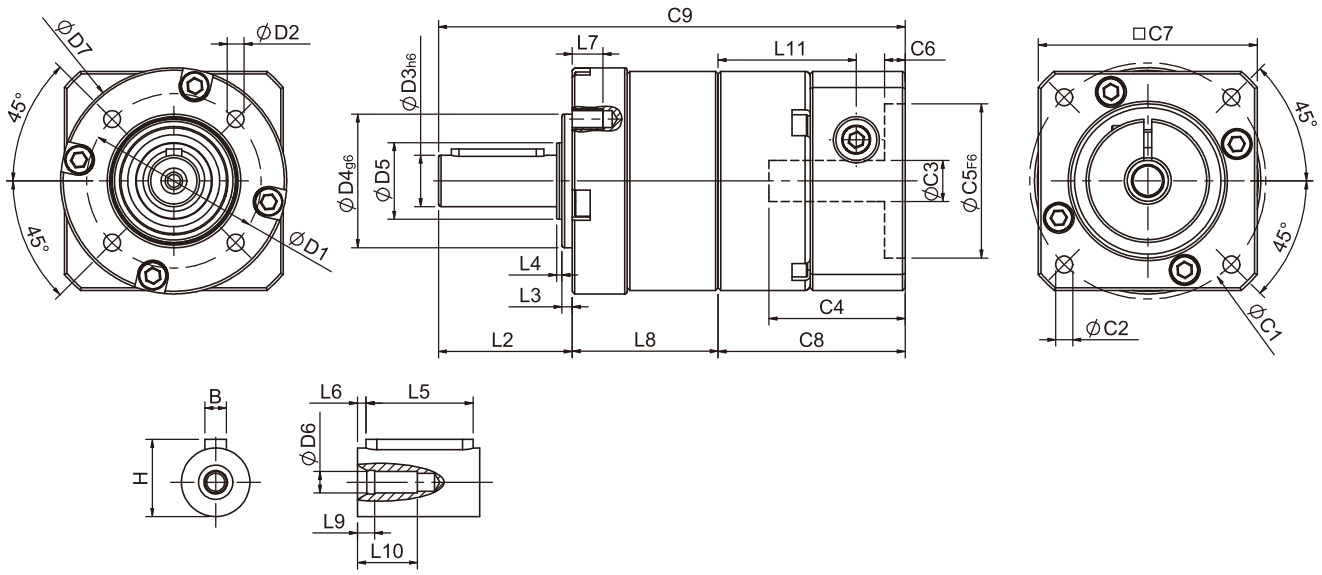
The PNS Primary Series round mounting flange, caged standard class planetary gears in an in-line housing through sizes 160. High torque capacity, quiet operation with backlash levels as low as <5 arc-min. Maximum ratio 1000:1. Right angle model (PNSR) is available with frame size up to 120 mm.

Frame Size (mm)	40, 60, 80, 120, 160
Ratio	3:1 - 1000:1
Nominal Input Speed (rpm)	2,500 - 4,000
Max Input Speed (rpm)	4,000 - 6,000
Backlash (arc-min)	1 Stage: 5 - 9 2 Stages: 7 - 12 3 Stages: 10 - 15
Noise Level (dBA / 1m)	60 - 68

Features

- In-line Configuration.
- Output shaft, 10 mm through 40 mm diameter.
- Torque Capacity Range: 8 Nm through 490 Nm.
- Caged Planet Carrier: with standard planet gear set.
- High performance, efficiencies and low acoustics.
- Wide Range of Ratios: 6 single stage ratios, 10 two-stage ratios and up to 9 three-stage ratios.
- Output Bearings deliver radial load capacity as high as 6720 N, and axial capacities up to 4200 N.
- Square Servo and Step Motor input: accommodates 40 mm through 140 mm, with optional sizes available.

PNS Single Stage Dimensions



Specifications

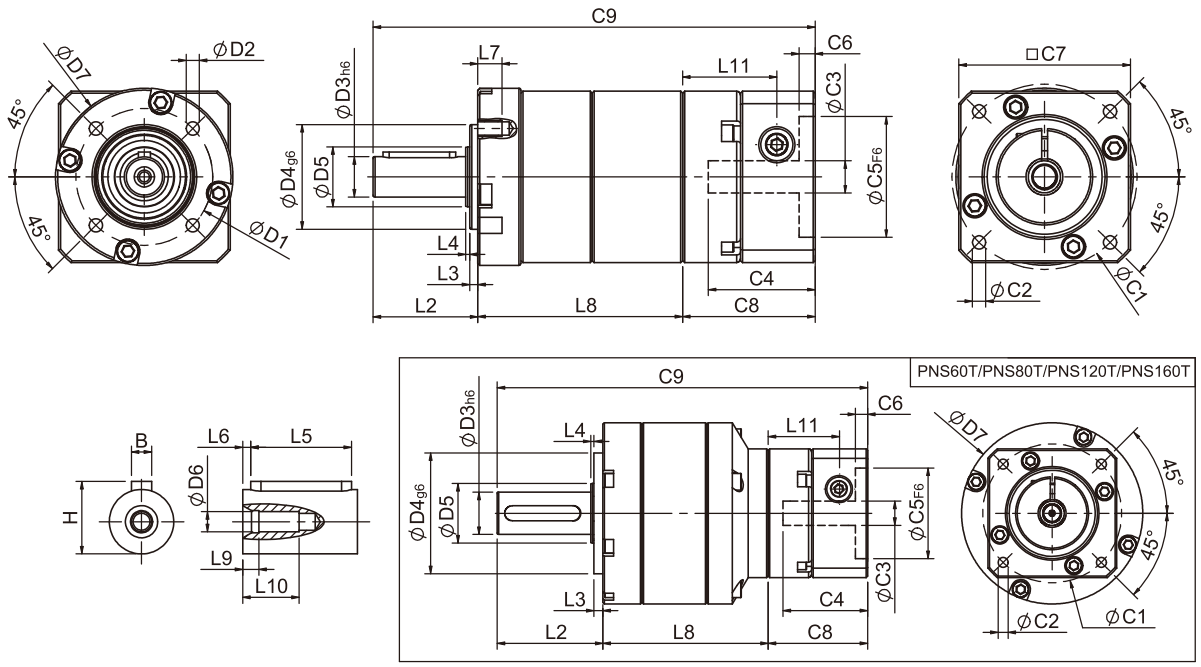
Unit:mm

Dimensions	PNS40	PNS60	PNS80	PNS120	PNS160
D1	34	52	70	100	145
D2	M4x0.7P	M5x0.8P	M6x1.0P	M10x1.5P	M12x1.75P
$D3_{h6}$	10	14	20	25	40
$D4_{g6}$	26	40	60	80	130
D5	15	20	35	40	50
D6	M3x0.5P	M5x0.8P	M6x1.0P	M10x1.5P	M16x2.0P
D7	44	60	90	116	160
L2	26	35	40	55	87
L3	2	3	3	4	5
L4	1	1	1	1	2
L5	18	25	28	40	65
L6	2.5	2.5	4	5	8
L7	6	8	10	15	20
L8	28.4	34.4	42.2	68.8	81
L9	3	4	4.5	6	6
L10	9	16.5	16.5	26	38
L11	26.9	31.6	37.3	51.8	63
$C1^{2}$	46	70	90	145	130
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24/≦28	≦24/≦32/≦38	≦35/≦38
$C4^{2}$	26.5	33.5	41	51.5	66.5
$C5^{2}{}_{F6}$	30	50	70	110	110
$C6^{2}$	4	4	6	6	5.5
$C7^{2}$	42.6	60	90	130	140
$C8^{2}$	36.4	42.1	51.5	68	80
$C9^{2}$	90.8	111.5	133.7	191.8	248
B	3	5	6	8	12
H	11.2	16	22.5	28	43

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PNS Double Stage Dimensions



Specifications

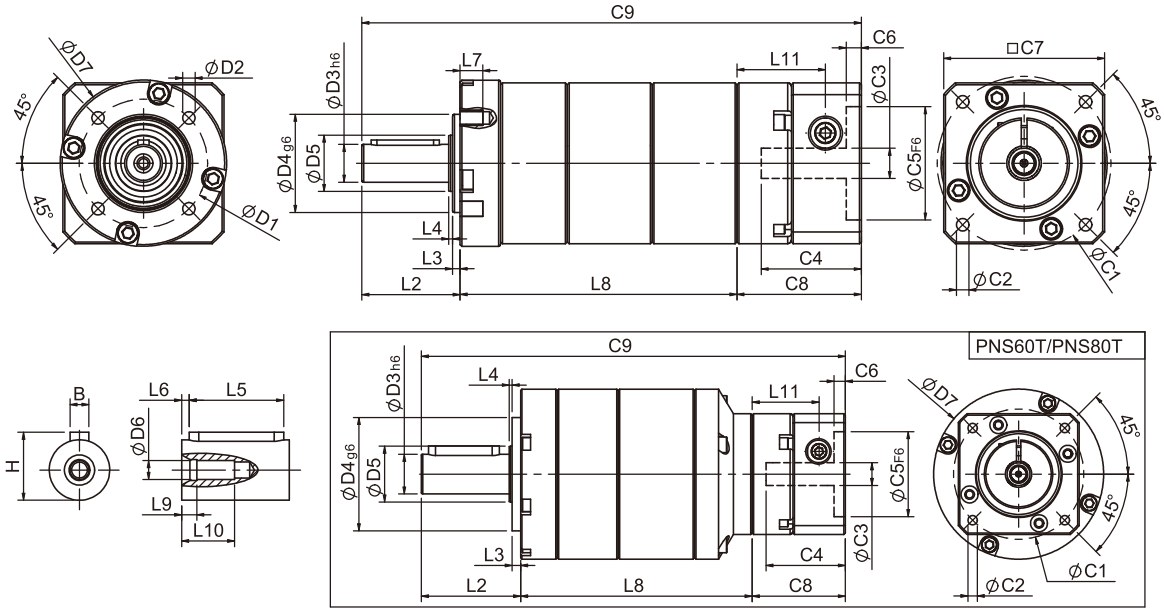
Unit:mm

Dimensions	PNS40	PNS60	PNS60T	PNS80	PNS80T	PNS120T	PNS160	PNS160T
D1	34	52		70		100	145	
D2	M4x0.7P	M5x0.8P		M6x1.0P		M10x1.5P	M12x1.75P	
$D3_{h6}$	10	14		20		25	40	
$D4_{g6}$	26	40		60		80	130	
D5	15	20		35		40	50	
D6	M3x0.5P	M5x0.8P		M6x1.0P		M10x1.5P	M16x2.0P	
D7	44	60		90		116	160	
L2	26	35		40		55	87	
L3	2	3		3		4	5	
L4	1	1		1		1	2	
L5	18	25		28		40	65	
L6	2.5	2.5		4		5	8	
L7	6	8		10		15	20	
L8	50.85	61.4	54.7	76	71.5	106.9	142	129
L9	3	4		4.5		6	6	
L10	9	16.5		16.5		26	38	
L11	23.4	31	23.4	37.3	31	37.3	63	42
$C1^{2}$	46	70	46	90	70	90	130	115
$C2^{2}$	M4x0.7P	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P
$C3^{2}$	≦8/≦11	≦14/≦19	≦8/≦11	≦19/≦24/≦28	≦14/≦19	≦19/≦24/≦28	≦35/≦38	≦24/≦28
$C4^{2}$	26.5	33.5	26.5	41	33.5	41	66.5	53.5
$C5^{2}{}_{F6}$	30	50	30	70	50	70	110	95
$C6^{2}$	4	4	4	6	4	6	5.5	5.5
$C7^{2}$	42.6	60	42.6	90	60	90	140	120
$C8^{2}$	32.9	41.5	32.9	51.5	41.5	51.5	80	58
$C9^{2}$	109.75	137.9	122.6	167.5	153	213.4	309	274
B	3	5		6		8	12	
H	11.2	16		22.5		28	43	

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PNS Triple Stage Dimensions-1



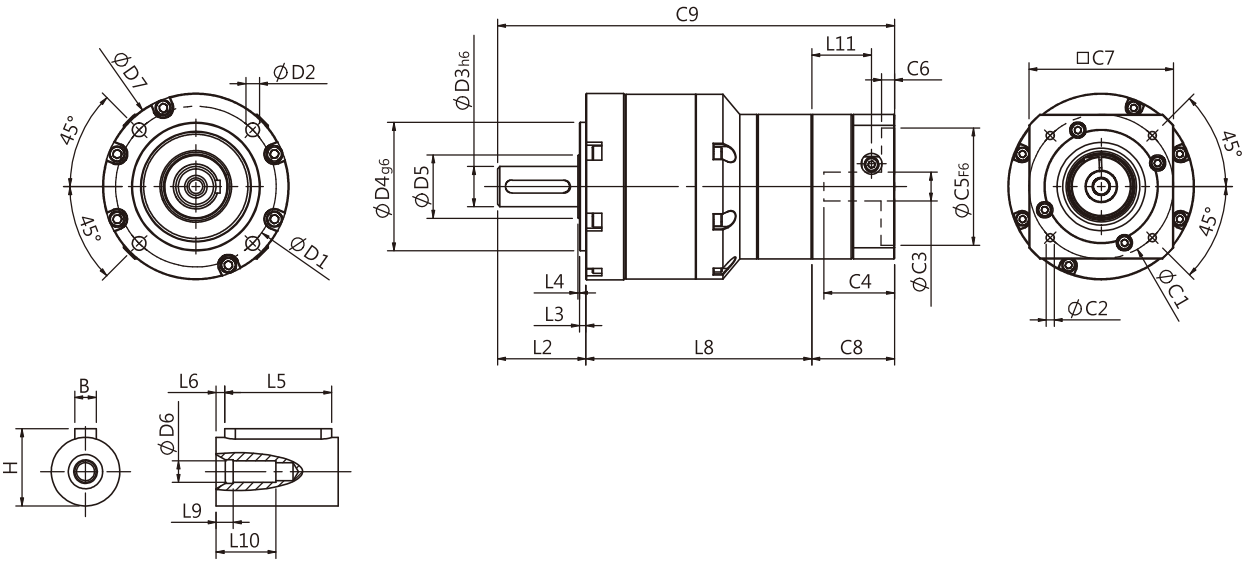
Specifications Unit:mm

Dimensions	PNS40	PNS60T	PNS80T
D1	34	52	70
D2	M4x0.7P	M5x0.8P	M6x1.0P
$D3_{h6}$	10	14	20
$D4_{g6}$	26	40	60
D5	15	20	35
D6	M3x0.5P	M5x0.8P	M6x1.0P
D7	44	60	90
L2	26	35	40
L3	2	3	3
L4	1	1	1
L5	18	25	28
L6	2.5	2.5	4
L7	6	8	10
L8	73.3	81.7	105.3
L9	3	4	4.5
L10	9	16.5	16.5
L11	23.4	23.4	31
$C1^{2}$	46	46	70
$C2^{2}$	M4x0.7P	M4x0.7P	M5x0.8P
$C3^{2}$	≦8/≦11	≦8/≦11	≦14/≦19
$C4^{2}$	26.5	26.5	33.5
$C5^{2}{}_{F6}$	30	30	50
$C6^{2}$	4	4	4
$C7^{2}$	42.6	42.6	60
$C8^{2}$	32.9	32.9	41.5
$C9^{2}$	132.2	149.6	186.8
B	3	5	6
H	11.2	16	22.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PNS Triple Stage Dimensions-2



Specifications Unit:mm

Dimensions	PNS120T	PNS160T
D1	100	145
D2	M10x1.5P	M12x1.75P
$D3_{h6}$	25	40
$D4_{g6}$	80	130
D5	40	50
D6	M10x1.5P	M16x2.0P
D7	116	160
L2	55	87
L3	4	5
L4	1	2
L5	40	65
L6	5	8
L7	15	20
L8	140.7	177
L9	6	6
L10	26	38
L11	37.3	42
C1[2]	90	115
C2[2]	M6x1.0P	M8x1.25P
C3[2]	≦19/≦24/≦28	24/≦28
C4[2]	41	53.5
$C5^{2}_{F6}$	70	95
C6[2]	6	5.5
C7[2]	90	120
C8[2]	51.5	58
C9[2]	247.2	322
B	8	12
H	28	43

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PNS Specifications

Specifications		Stage	Ratio	PNS40	PNS60	PNS-80	PNS-120	PNS-160
Nominal Output Torque T_{2N}	N•m	1	3	9	28	85	200	420
			4	10	32	80	215	490
			5	11	35	95	215	473
			7	10	28	85	200	400
			9	8	23	75	195	320
			10	8	21	65	180	320
		Stage	Ratio	PNS40	PNS60/ PNS60T	PNS80/ PNS80T	PNS-120T	PNS160/ PNS160T
		2	15	11	35/24	95/68	168	420
			20	11	35/31	95/95	215	490
			25	11	35/30	95/95	215	473
			35	11	35/28	95/95	215	473
			45	11	35/27	95/92	215	473
			50	(Ratio 49) : 10	35/27	95/82	205	473
			70	(Ratio 63) : 10	28/28	85/85	200	400
			90	(Ratio 81) : 8	23/23	75/75	195	320
			100	8	21/21	65/65	180	320
		Stage	Ratio	PNS40	PNS60T	PNS80T	PNS120T	PNS160T
		3	125	11	35	95	215	473
			175	11	35	95	215	473
			225	11	35	95	215	473
			245	11	35	95	215	(Ratio 250) : 473
			315	11	35	95	215	(Ratio 350) : 473
			405	11	35	95	215	(Ratio 400) : 473
			567	10	28	85	200	(Ratio 500) : 473
			729	8	23	75	195	(Ratio 700) : 400
			1000	8	21	65	180	320
Emergency Stop Torque T_{2NOT}	N•m	(2.5 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)						
Nominal Input Speed n_{1N}	rpm	1,2,3	3-1000	4000	4000	3000	2500	2500
Max. Input Speed n_{1max}	rpm	1,2,3	3-1000	6000	6000	6000	5000	4000
Standard Backlash P2	arcmin	1	3-10	≦9	≦8	≦7	≦6	≦5
		2	15-100	≦12	≦10	≦9	≦8	≦7
		3	125~1000	≦15	≦12	≦12	≦12	≦10
Torsional Rigidity	N•m /arcmin	1,2,3	3-1000	1.2	3.5	8.5	17	30
Max. Radial Load F_{2rB} [1]	N	1,2,3	3-1000	580	890	2050	4370	6720
Max. Axial Load F_{2aB} [1]	N	1,2,3	3-1000	410	430	1100	2630	4200
Operating Temp.	℃	1,2,3	3-1000	-10℃ ~ +90℃				
Service Life	hr	1,2,3	3-1000	20,000 (10,000 Continuous Operation)				
Efficiency	%	1	3-10	≧95%				
		2	15-100	≧90%				
		3	125~1000	≧85%				
Weight	kg	1	3-10	0.5	1.1	2.8	6.3	6.6
		2	15-100	0.7	1.5/1.3	4.2/3.1	7.9	20.7/11.2
		3	125~1000	0.8	1.7	4.5	9.3	22.4
Mounting Position	-	1,2,3	3-1000	Any Direction				
Noise Level [2]	dBA/1m	1,2,3	3-1000	60	63	66	67	68
Protection Class	-	1,2,3	3-1000	IP65				
Lubrication	-	1,2,3	3-1000	Synthetic Lubricant				

Inertia (J1)

Stage	Ratio	unit	PNS40(ϕ8)	PNS60(ϕ14)	PNS80(ϕ19)	PNS120(ϕ24)	PNS160(ϕ35)
1	3	kg•cm²	0.04	0.23	0.77	2.30	7.89
	4		0.03	0.21	0.67	1.92	5.83
	5~10		0.03	0.21	0.61	1.71	5.38
Stage	Ratio		PNS40(ϕ8)	PNS60(ϕ14) PNS60T(ϕ8)	PNS80(ϕ19) PNS80T(ϕ14)	PNS120T(ϕ19)	PNS160(ϕ35) PNS160T(ϕ24)
2	15		0.04	0.23/(0.04)	0.77/(0.23)	0.77	5.38/(1.61)
	Other Ratios		0.03	0.21/(0.03)	0.61/(0.21)	0.61	5.38/(1.61)
Stage	Ratio		PNS40(ϕ8)	PNS60T(ϕ8)	PNS-80T(ϕ14)	PNS120T(ϕ19)	PNS160T(ϕ24)
3	All Ratios		0.03	0.03	0.21	0.61	1.61

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

SESAME Planetary Gearboxes Q&A

Q6. What are Sesame Motor's advantage in Manufacturing & Quality Control?

Although Sesame manufacture and assemble almost the products we offer, we are still moving forward by expansion of plant, facilities, machining lines and quality control equipments to increase key-parts self-manufacturing ability and shorten lead time. We know the best way to achieve customer satisfaction is offering quality products and reliable performance. The commitment of providing such assurance and consistency is continuous improvement in production and implement of quality management as well as employees welfare and environment-friendly manufacturing.

PNSR

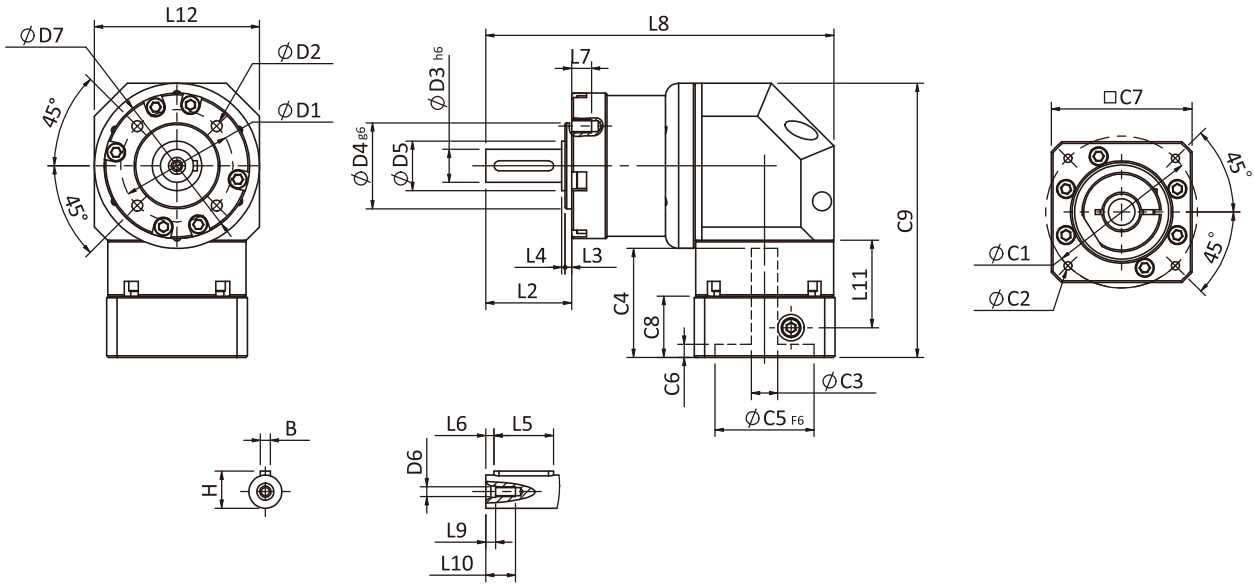
The PNSR Primary Series right angle round mounting flange, caged standard class planetary gears in a right angle housing through sizes 120. High torque capacity, quiet operation with backlash levels as low as <11 arc-min. Maximum ratio 300:1.

Frame Size (mm)	40, 60, 80, 120
Ratio	3:1 - 1000:1
Nominal Input Speed (rpm)	2,500 - 4,500
Max Input Speed (rpm)	5,000 - 7,500
Backlash (arc-min)	1 Stage: 11 - 18 2 Stages: 13 - 20
Noise Level (dBA / 1m)	66 - 73

Features

- ▶ Right angle configuration.
- ▶ Torque Capacity Range: 8 Nm through 215 Nm.
- ▶ Caged Planet Carrier: with standard planet gear set.
- ▶ High performance, efficiencies and low acoustics.
- ▶ Wide Range of Ratios: 11 single stage ratios, 16 two-stage ratios.
- ▶ Input adapter for all servo and stepper motors.

PNSR Single Stage Dimensions



Specifications

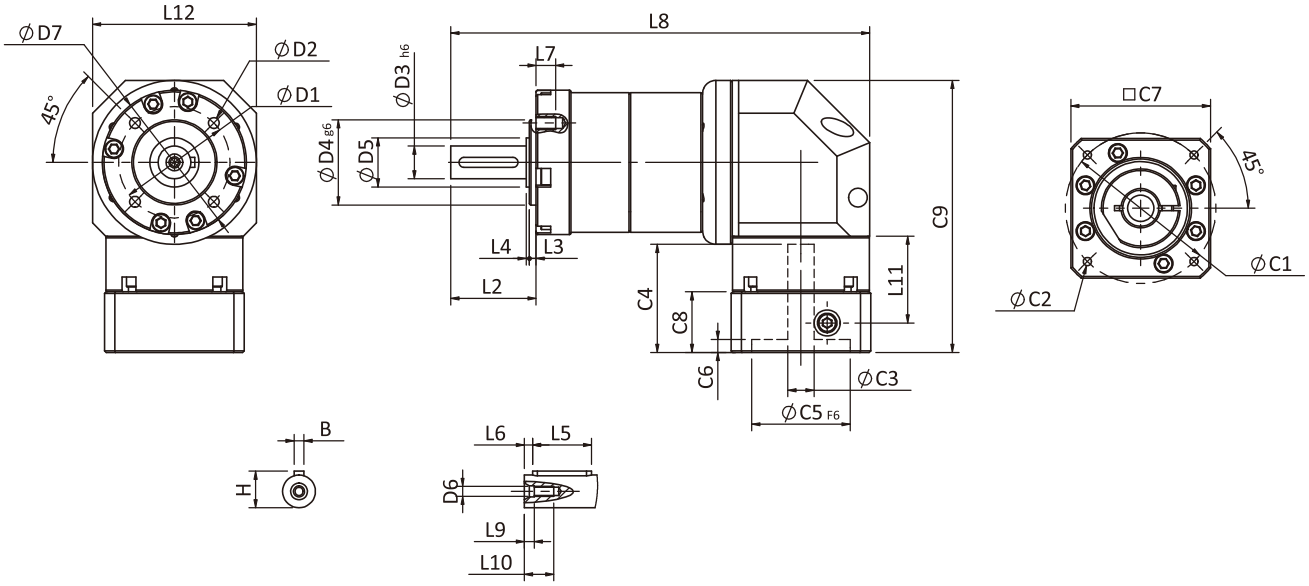
Unit:mm

Dimensions	PNSR40	PNSR60	PNSR80	PNSR120
D1	34	52	70	-
D2	M4x0.7P	M5x0.8P	M6x1.0P	-
D3h6	10	14	20	-
D4g6	26	40	60	-
D5	15	20	35	-
D6	M3x0.5P	M5x0.8P	M6x1.0P	-
D7	44	60	90	-
L2	26	35	40	-
L3	2	3	3	-
L4	1	1	1	-
L5	18	25	28	-
L6	2.5	2.5	4	-
L7	6	8	10	-
L8	105.4	139.7	189.2	-
L9	3	4	4.5	-
L10	9	16.5	16.5	-
L11	26.5	36	40.7	-
L12	50	70	98	-
C1[2]	46	70	90	-
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	-
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	-
C4[2]	33	44	57	-
C5[2]F6	30	50	70	-
C6[2]	4	4	6	-
C7[2]	42.6	60	90	-
C8[2]	18.5	20	26	-
C9[2]	83	111.4	149.2	-
B	3	5	6	-
H	11.2	16	22.5	-

*2. C1~C9 are motor specific dimensions (metric std shown). Sizes may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PNSR Double Stage Dimensions-1



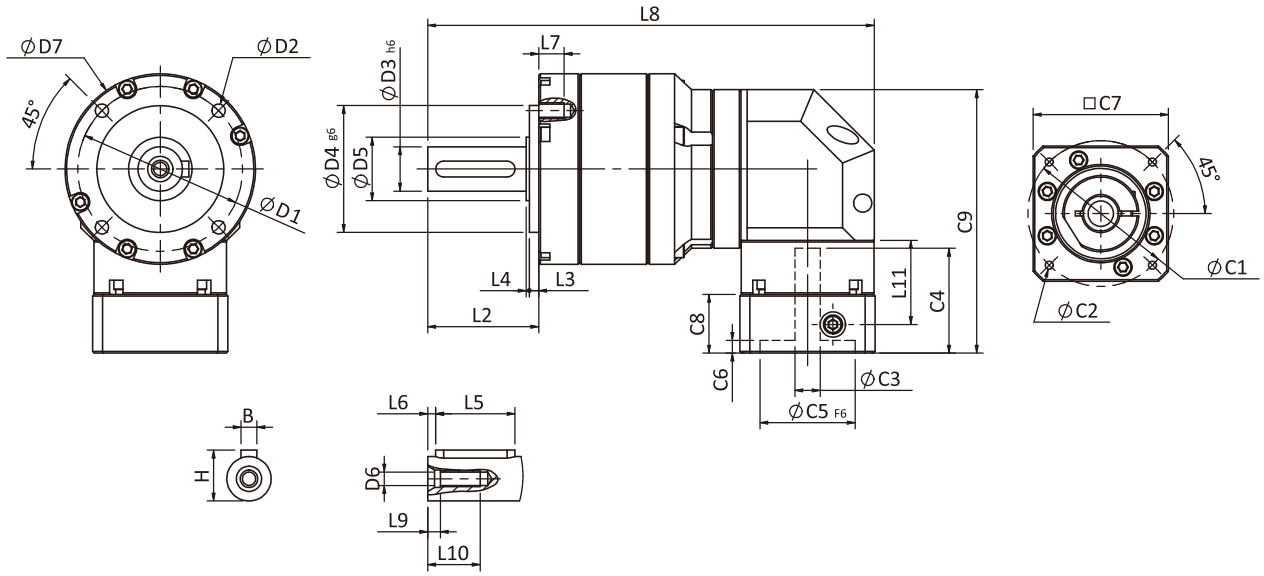
Specifications

Unit:mm

Dimensions	PNSR40	PNSR60	PNSR80	PNSR120
D1	34	52	70	-
D2	M4x0.7P	M5x0.8P	M6x1.0P	-
D3 h6	10	14	20	-
D4 g6	26	40	60	-
D5	15	20	35	-
D6	M3x0.5P	M5x0.8P	M6x1.0P	-
D7[1]	44 (45)	60	90	-
L2	26	35	40	-
L3	2	3	3	-
L4	1	1	1	-
L5	18	25	28	-
L6	2.5	2.5	4	-
L7	6	8	10	-
L8	127.9	166.7	223	-
L9	3	4	4.5	-
L10	9	16.5	16.5	-
L11	26.5	36	40.7	-
L12	50	70	98	-
C1[2]	46	70	90	-
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	-
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	-
C4[2]	33	44	57	-
C5[2] F6	30	50	70	-
C6[2]	4	4	6	-
C7[2]	42.6	60	90	-
C8[2]	18.5	20	26	-
C9[2]	83	111.4	149.2	-
B	3	5	6	-
H	11.2	16	22.5	-

*1. D7=45 when gear ratios are 100, 200, and 300.
*2. C1~C9 are motor specific dimensions (metric std shown). Sizes may vary according to the motor flange chosen.
★ Specification subject to change without notice.

PNSR Double Stage Dimensions-2



Specifications Unit:mm

Dimensions	PNSR60T	PNSR80T	PNSR120T
D1	52	70	100
D2	M5x0.8P	M6x1.0P	M10x1.5P
$D3_{h6}$	14	20	25
$D4_{g6}$	40	60	80
D5	20	35	40
D6	M5x0.8P	M6x1.0P	M10x1.5P
D7	60	90	116
L2	35	40	55
L3	3	3	4
L4	1	1	1
L5	25	28	40
L6	2.5	4	5
L7	8	10	15
L8	140.7	181.8	268.9
L9	4	4.5	6
L10	16.5	16.5	26
L11	26.5	36	40.7
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24
C4[2]	33	44	57
$C5^{2}{}_{F6}$	30	50	70
C6[2]	4	4	6
C7[2]	42.6	60	90
C8[2]	18.5	20	26
C9[2]	88	121.4	157.7
B	5	6	8
H	16	22.5	28

*2. C1~C9 are motor specific dimensions (metric std shown). Sizes may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PNSR Specifications

Specifications		Stage	Ratio	PNSR40	PNSR60	PNSR80	PNSR120
Nominal Output Torque T_{2N}	N•m	1	3	9	28	85	135
			4	10	32	80	180
			5	11	35	95	215
			7	10	28	85	200
			8	10	32	80	195
			9	9	25	75	195
			10	11	35	95	210
			12	10	32	80	-
			14	10	28	85	200
			15	11	35	95	-
			16	8	23	75	195
		Stage	Ratio	PNSR40	PNSR60/ PNSR60T	PNSR80/ PNSR80T	PNSR120T
		2	20	11	35/31	95/95	215
			25	11	35/30	95/95	215
			30	11	35/30	95/95	215
			35	11	35/28	95/95	215
			40	11	35/31	95/95	215
			50	11	35/30	95/95	215
			60	11	35/30	95/95	215
			70	11	35/28	95/95	215
			80	11	35/27	95/92	215
			100	8	35/27	95/82	205
			120	11	35/27	95/92	215
			160	-	23/23	75/75	195
			200	8	21/21	65/65	180
			243	8	23/23	75/75	195
			300	8	21/21	65/65	180
Emergency Stop Torque T_{2NOT}	N•m	(2.5 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-300	4500	4000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-300	7500	7000	6000	5000
Standard Backlash P2	arcmin	1	3-16	≦18	≦15	≦13	≦11
		2	20-300	≦20	≦17	≦15	≦13
Torsional Rigidity	N•m /arcmin	1,2	3-300	1.2	3.5	8.5	17
Max. Radial Load F_{2rB} [1]	N	1,2	3-300	580	890	2050	4370
Max. Axial Load F_{2aB} [1]	N	1,2	3-300	410	430	1100	2630
Operating Temp.	°C	1,2	3-300	-10°C ~ +90°C			
Service Life	hr	1,2	3-300	20,000(10,000 Continuous Operation)			
Efficiency	%	1	3-16	≧95%			
		2	20-300	≧90%			
Weight	kg	1	3-16	1.0	2.4	6.1	12.2
		2	20-300	1.2	2.9/2.7	8.1/6.5	13.8
Mounting Position	-	1,2	3-300	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-300	66	68	70	73
Protection Class	-	1,2	3-300	IP65			
Lubrication	-	1,2	3-300	Synthetic Lubricant			

Inertia (J1)

Stage	Ratio	unit	PNSR40(ϕ8)	PNSR60(ϕ14)	PNSR80(ϕ19)	PNSR120(ϕ24)
1	3, 4, 5, 7	kg•cm²	0.07	0.40	2.00	2.7
	Other ratios		0.05	0.30	1.50	2.2
Stage	Ratio		PNSR40(ϕ8)	PNSR60(ϕ14)/ PNSR60T(ϕ8)	PNSR80(ϕ19)/ PNSR80T(ϕ14)	PNSR120T(ϕ19)
2	20, 25, 35		0.07	0.40/0.07	2.0/0.40	2.0
	Other ratios		0.05	0.30/0.05	1.5/0.30	1.5

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PUL

High Radial Load Planetary Gearboxes

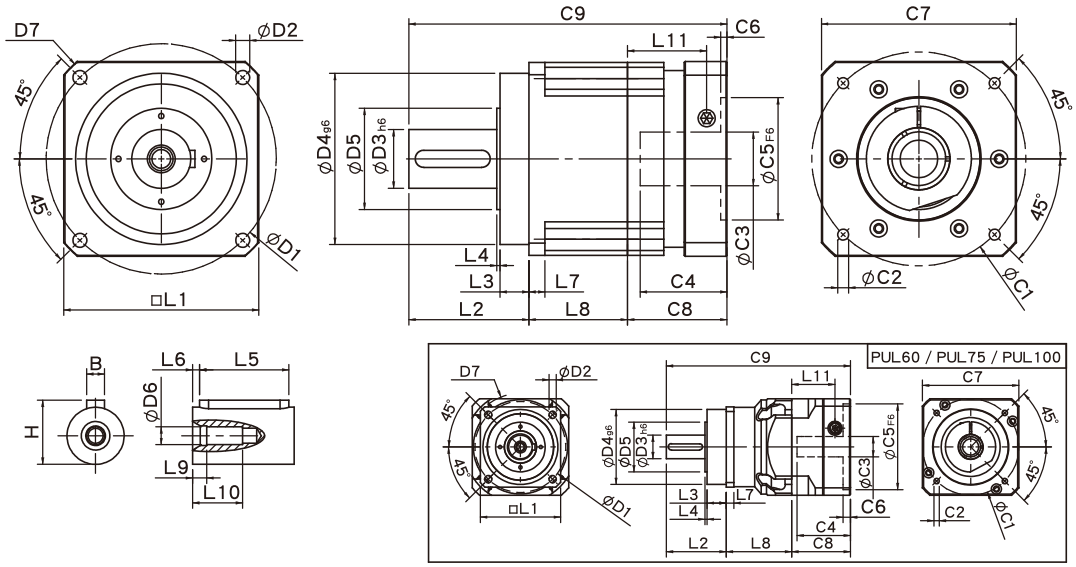
The PUL series of output shaft inline helical gearbox provide a wide range of performance levels to high positioning accuracy and motion control applications, particularly when high radial loading is required. The performance of this precision planetary gearbox is reinforced based on the PUA series. The maximum radial force is increased by an average of 155%. Frame sizes 60-220 mm with the best level of backlash < 1 arcmin. Taper roller bearings with maximum radial load capacity up to 27800N (PUL-220), and axial load capacity up to 16200N. The PUL gearboxes are specially well suited to work with pinion and rack for linear operation. Commonly adapted in metal cutting machines, wood processing equipment, machine centers and highly dynamic motion control systems. Right angle configuration (PUR) is also available with max. frame size 220 mm.

Frame Size (mm)	60,75, 100, 140, 180, 220
Ratio	3:1 - 100 : 1
Nominal Input Speed (rpm)	2,000 - 5,000
Max Input Speed (rpm)	4,000 - 10,000
Backlash (arc-min)	1 Stage : 1 - 6 2 Stages : 3 - 8
Noise Level (dBA / 1m)	58 - 70

Features

- ▶ 3 levels of backlash, 6 frame sizes from 60-220 mm.
- ▶ Premium and precision gear design, ratios from 3-100:1.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ Taper Roller Bearings deliver radial load capacity as high as 27800 N, and axial capacities up to 16200 N.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PUL Single Stage Dimensions



Specifications

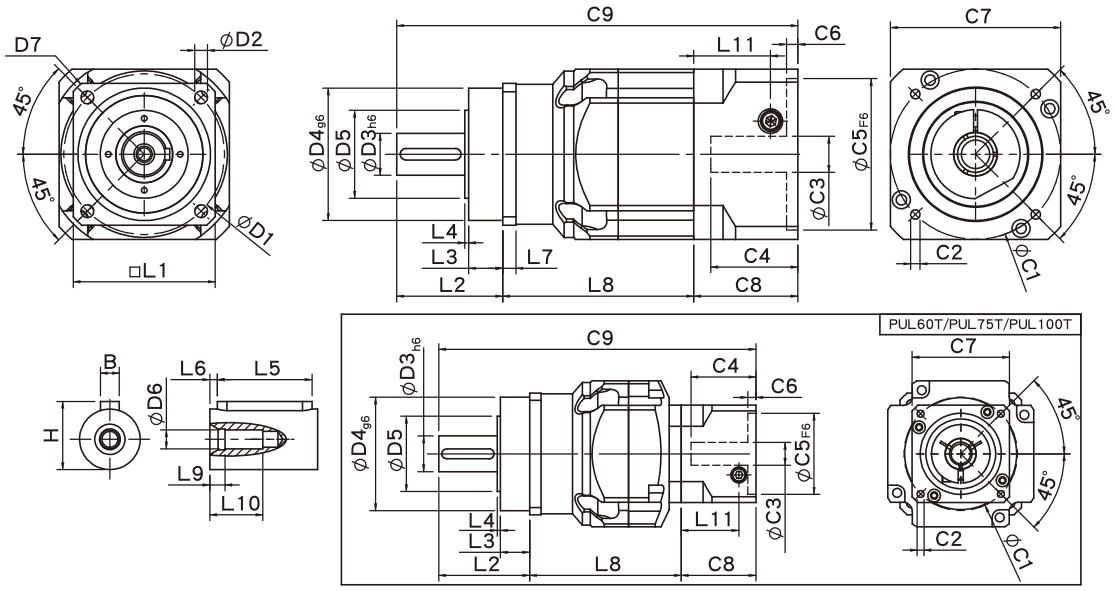
Unit:mm

Dimensions	PUL60	PUL75	PUL100	PUL140	PUL180	PUL220
D1	68	85	120	165	215	250
D2	5.5	6.8	9	11	13	17
$D3_{h6}$	16	22	32	40	55	75
$D4_{g6}$	60	70	90	130	160	180
D5	34.6	46.4	59.6	79.2	94.5	114.4
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	80	100	138	186	239	292
L1	62	76	105	142	180	220
L2	48.5	56	88	112	112	138
L3	18.5	18	28	27	27	30
L4	1.5	2	2	3	3	3
L5	25	32	40	60	70	90
L6	2	2	5	5	6	7
L7	6	7	10	12	15	20
L8	44	61	46	64.5	92	111
L9	4	4.5	6	6	8	15
L10	16.5	20.5	30	38	48	42
L11	35.5	40.5	41.8	70	74	96
$C1^{2}$	70	90	115	165	200	235
$C2^{2}$	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P	M12x1.75P
$C3^{2}$	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38	≦50	≦55
$C4^{2}$	37	47	51	66.7	81	112
$C5^{2}{}_{F6}$	50	70	95	130	114.3	200
$C6^{2}$	4	6	6	5.5	6	6
$C7^{2}$	60	90	115	140	182	220
$C8^{2}$	46	55	58	87.2	93	120
$C9^{2}$	138.5	172	192	263.7	297	369
B	5	6	10	12	16	20
H	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PUL Double Stage Dimensions-1



Specifications

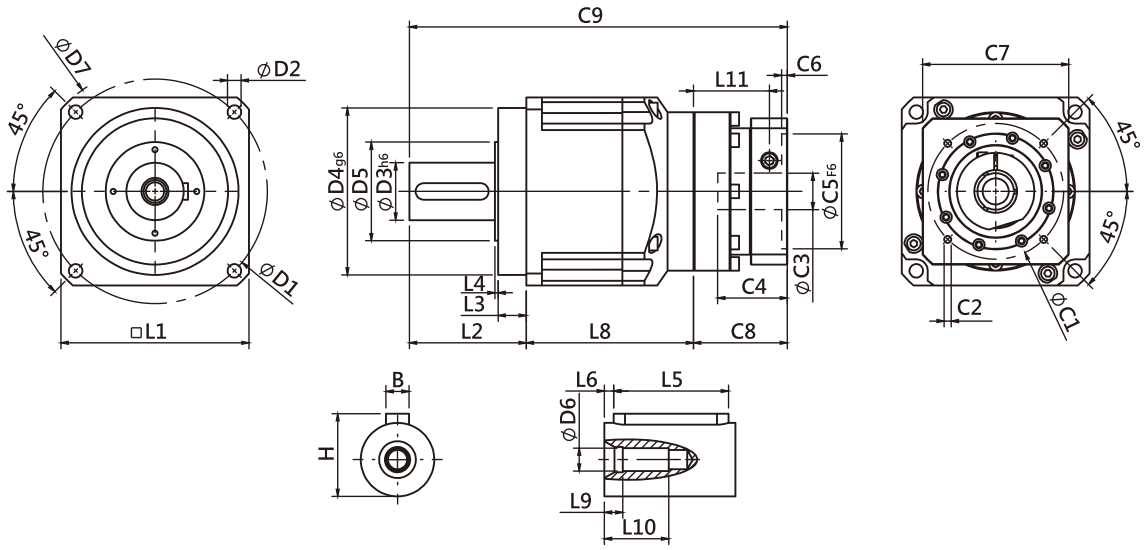
Unit:mm

Dimensions	PUL60/PUL60T		PUL75/PUL75T		PUL100T
D1	68		85		120
D2	5.5		6.8		9
$D3_{h6}$	16		22		32
$D4_{g6}$	60		70		90
D5	34.6		46.4		59.6
D6	M5x0.8P		M8x1.25P		M12x1.75P
D7	80		100		138
L1	62		76		105
L2	48.5		56		88
L3	18.5		18		28
L4	1.5		2		2
L5	25		32		40
L6	2		2		5
L7	6		7		10
L8	77	72.5	101	93.5	88.5
L9	4		4.5		6
L10	16.5		20.5		30
L11	35.5	29	40.5	35.5	40.5
$C1^{2}$	70	46	90	70	90
$C2^{2}$	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P	M6x1.0P
$C3^{2}$	≦14/≦19	≦8/≦11	≦19/≦24	≦14/≦19	≦19/≦24
$C4^{2}$	37	27	47	37	47
$C5^{2}{}_{F6}$	50	30	70	50	70
$C6^{2}$	4	4	6	4	6
$C7^{2}$	60	42.6	90	60	90
$C8^{2}$	46	38.5	55	46	55
$C9^{2}$	171.5	159.5	212	195.5	231.5
B	5		6		10
H	18		24.5		35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PUL Double Stage Dimensions-2



Specifications Unit:mm

Dimensions	PUL140T	PUL180T	PUL220T
D1	165	215	250
D2	11	13	17
$D3_{h6}$	40	55	75
$D4_{g6}$	130	160	180
D5	79.2	94.5	114.4
D6	M16x2.0P	M20x2.5P	M20x2.5P
D7	186	239	292
L1	142	180	220
L2	112	112	138
L3	27	27	30
L4	3	3	3
L5	60	70	90
L6	5	6	7
L7	12	15	20
L8	120	160.2	202
L9	6	8	15
L10	38	48	42
L11	41.8	72.6	74
$C1^{2}$	130	130	200
$C2^{2}$	M8x1.25P	M8x1.25P	M12x1.75P
$C3^{2}$	≦24/≦32/≦38	≦35/≦38	≦50
$C4^{2}$	51	66.7	81
$C5^{2}{}_{F6}$	110	110	114.3
$C6^{2}$	6	5.5	6
$C7^{2}$	115	140	180
$C8^{2}$	58	89.8	93
$C9^{2}$	290	362	433
B	12	16	20
H	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PUL Specifications

Specifications		Stage	Ratio	PUL60	PUL75	PUL100	PUL140	PUL180	PUL220
Nominal Output Torque T_{2N}	N•m	1	3	53	145	180	340	580	1100
			4	55	150	240	500	1100	1700
			5	54	140	290	600	1200	2000
			6	46	135	280	560	1100	1850
			7	44	125	270	530	1100	1750
			8	41	110	240	480	1000	1550
			9	37	95	220	430	900	1500
			10	37	95	220	430	900	1450
		Stage	Ratio	PUL60(T)	PUL75(T)	PUL100T	PUL140T	PUL180T	PUL220T
		2	15	53	145	180	520	1200	2000
			20	55	150	240	600	1200	2000
			25	54	140	290	600	1200	2000
			30	54	140	290	600	1200	2000
			35	54	140	290	600	1200	2000
			40	54	140	290	600	1200	2000
			45	54	140	290	600	1200	2000
			50	54	140	290	600	1200	2000
			60	46	135	280	560	1200	1850
			70	44	125	270	530	1100	1750
			80	41	110	240	480	1000	1550
			90	37	95	220	430	900	1500
			100	37	95	220	430	900	1450
Emergency Stop Torque T_{2NOT}	N•m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)						
Nominal Input Speed n_{1N}	rpm	1,2	3-100	5000	4000	4000	3000	3000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	10000	8000	8000	6000	6000	4000
Micro Backlash P0	arcmin	1 2	3-10 12-100	≦2 ≦4	≦2 ≦4	≦1 ≦3	≦1 ≦3	≦1 ≦3	≦1 ≦3
Precision Backlash P1	arcmin	1 2	3-10 12-100	≦4 ≦6	≦4 ≦6	≦3 ≦5	≦3 ≦5	≦3 ≦5	≦3 ≦5
Standard Backlash P2	arcmin	1 2	3-10 12-100	≦6 ≦8	≦6 ≦8	≦5 ≦7	≦5 ≦7	≦5 ≦7	≦5 ≦7
Torsional Rigidity	N•m /arcmin	1,2	3-100	7	14	25	50	150	220
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	4130	5220	10650	17600	22000	27800
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	2500	3300	5700	11300	14000	16200
Operating Temp.	°C		3-100	-10°C ~ +90°C					
Service Life	hr		3-100	30,000 (15,000 Continuous Operation)					
Efficiency	%	1 2	3-10 12-100	≧97% ≧94%					
Weight	kg	1 2	3-10 12-100	1.8 2.4/2.0	4.0 5.7/4.5	6.7 8.2	15.1 17.5	30.8 37	55 68.5
Mounting Position	-	1,2	3-100	Any Direction					
Noise Level [2]	dBA/1m	1,2	3-100	58	60	63	65	67	70
Protection Class	-	1,2	3-100	IP65					
Lubrication	-	1,2	3-100	Synthetic Lubricant					

Inertia (J1)

Stage	Ratio	unit	PUL60	PUL75	PUL100	PUL140	PUL180	PUL220
1	3	kg•cm²	0.23	0.97	2.35	10.00	30.50	79.50
	4		0.18	0.67	1.66	7.17	25.86	58.21
	5		0.17	0.65	1.50	6.52	23.63	54.36
	6/7/8		0.14	0.60	1.45	6.17	22.92	54.12
	9/10		0.14	0.58	1.41	6.1	22.73	53.98
Stage	Ratio		PUL60(T)	PUL75(T)	PUL100T	PUL140T	PUL180T	PUL220T
2	15/20		0.17 (0.02)	0.65 (0.17)	0.65	1.50	6.52	30.50
	25/30/35/40		0.14 (0.02)	0.60 (0.14)	0.60	1.45	6.17	22.92
	45/50/60/70/80/90/100		0.14 (0.02)	0.58 (0.14)	0.58	1.41	6.10	22.73

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PUA

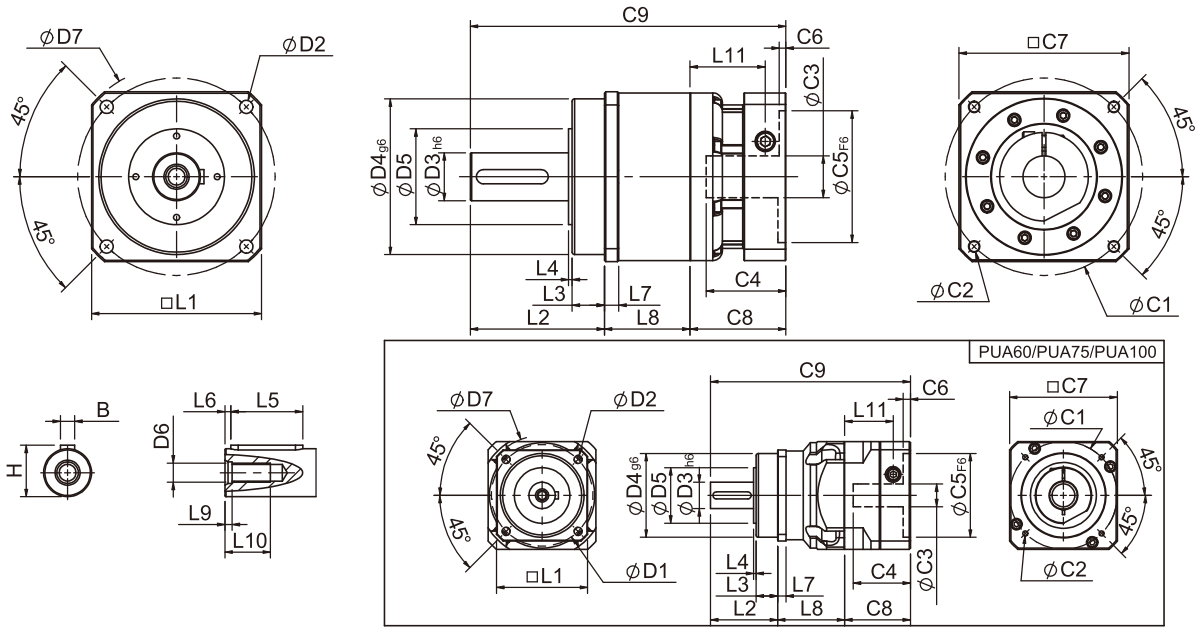
The PUA series of output shaft in-line helical gearbox provide a wide range of performance levels to high positioning accuracy and motion control applications, particularly when high radial loading is required. Frame sizes 60-140 mm with the best level of backlash < 1 arc-min. Maximum radial load capacity up to 11380N (PUA-140), and axial load capacity up to 8830N. The PUA is specially well suited to work with pinion and rack for linear operation. Commonly adapted in metal cutting machines, wood processing equipment, machine centers and highly dynamic motion control systems. The reinforced model PUL series are available with extra high radial loading performance.

Frame Size (mm)	60, 75, 100, 140
Ratio	3:1 - 100 : 1
Nominal Input Speed (rpm)	2,500 - 4,000
Max Input Speed (rpm)	4,500 - 6,000
Backlash (arc-min)	1 Stage : 1 - 6 2 Stages : 3 - 8
Noise Level (dBA / 1m)	58 - 65

Features

- ▶ 3 levels of backlash, 4 frame sizes from 60-140 mm.
- ▶ Premium and precision gear design, ratios from 3:1-100:1.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ Radial load capacity as high as 11380 N, and axial capacities up to 8830 N.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PUA Single Stage Dimensions



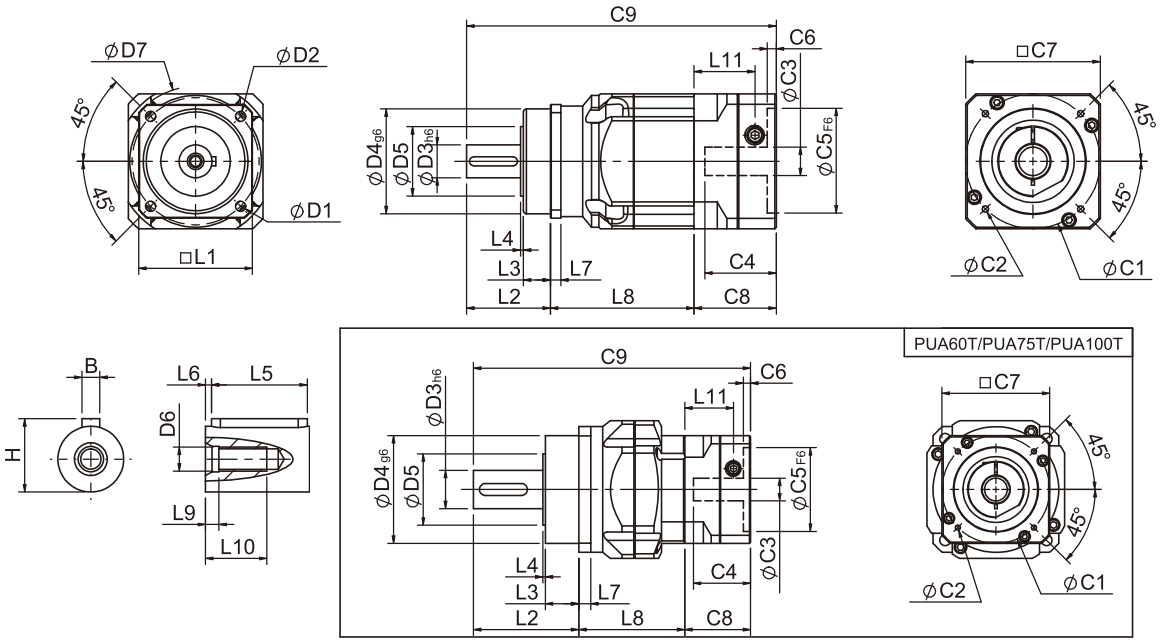
Specifications Unit:mm

Dimensions	PUA60	PUA75	PUA100	PUA140
D1	68	85	120	165
D2	5.5	6.8	9	11
$D3_{h6}$	16	22	32	40
$D4_{g6}$	60	70	90	130
D5	34.4	46.4	59.6	79.2
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P
D7	80	100	138	186
L1	62	76	105	142
L2	48.5	56	88	112
L3	18.5	18	28	27
L4	1.5	2	2	3
L5	25	32	40	60
L6	2	2	5	5
L7	6	7	10	12
L8	32.5	56	46	71.5
L9	4	4.5	6	6
L10	16.5	20.5	30	38
L11	35.5	40.5	41.8	62.8
C1[2]	70	90	115	165
C2[2]	M5x0.8P	M6x1P	M8x1.25P	M10x1.5P
C3[2]	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38
C4[2]	37	47.8	51	66.5
$C5^{2}{}_{F6}$	50	70	95	130
C6[2]	4	6	6	5.5
C7[2]	60	90	115	140
C8[2]	46	55	58	80
C9[2]	127	167	192	263.5
B	5	6	10	12
H	18	24.5	35	43

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PUA Double Stage Dimensions-1



Specifications

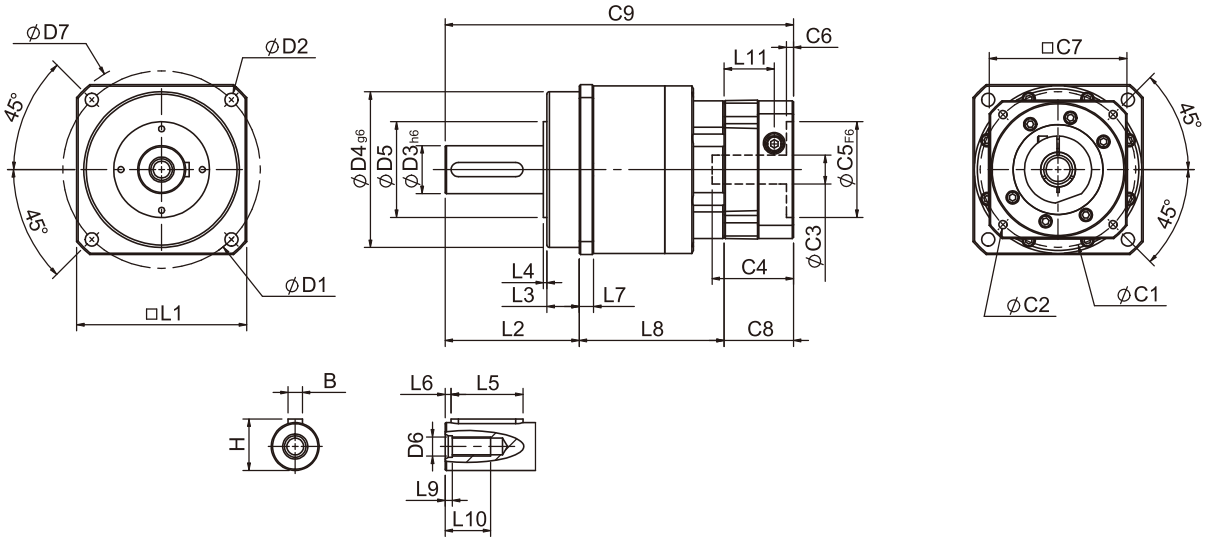
Unit:mm

Dimensions	PUA60	PUA60T	PUA75	PUA75T	PUA100T
D1	68		85		120
D2	5.5		6.8		9
$D3_{h6}$	16		22		32
$D4_{g6}$	60		70		90
D5	34.4		46.4		59.6
D6	M5x0.8P		M8x1.25P		M12x1·75P
D7	80		100		138
L1	62		76		105
L2	48.5		56		88
L3	18.5		18		28
L4	1.5		2		2
L5	25		32		40
L6	2		2		5
L7	6		7		10
L8	65.5	61	96	88.5	88.5
L9	4		4.5		6
L10	16.5		20.5		30
L11	35.5	29	40.5	35.5	40.5
C1[2]	70	46	90	70	90
C2[2]	M5x0.8P	M4x0.7P	M6x1P	M5x0.8P	M6x1P
C3[2]	≦14/≦19	≦8/≦14	≦19/≦24	≦14/≦19	≦19/≦24
C4[2]	37	27	47.8	37	47.8
$C5^{2}_{F6}$	50	30	70	50	70
C6[2]	4	4	6	4	6
C7[2]	60	42.6	90	60	90
C8[2]	46	38.5	55	46	55
C9[2]	160	148	207	190.5	231.5
B	5		6		10
H	18		24.5		35

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PUA Double Stage Dimensions-2



Specifications Unit:mm

Dimensions	PUA140T	-	-
D1	165	-	-
D2	11	-	-
$D3_{h6}$	40	-	-
$D4_{g6}$	130	-	-
D5	79.2	-	-
D6	M16x2.0P	-	-
D7	186	-	-
L1	142	-	-
L2	112	-	-
L3	27	-	-
L4	3	-	-
L5	60	-	-
L6	5	-	-
L7	12	-	-
L8	121	-	-
L9	6	-	-
L10	38	-	-
L11	41.8	-	-
$C1^{2}$	130	-	-
$C2^{2}$	M8x1.25P	-	-
$C3^{2}$	≦24/≦32/≦38	-	-
$C4^{2}$	51	-	-
$C5^{2}{}_{F6}$	110	-	-
$C6^{2}$	6	-	-
$C7^{2}$	115	-	-
$C8^{2}$	58	-	-
$C9^{2}$	291	-	-
B	12	-	-
H	43	-	-

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PUA Specifications

Specifications		Stage	Ratio	PUA60	PUA-75	PUA-100	PUA-140
Nominal Output Torque T_{2N}	N•m	1	3	53	145	180	340
			4	55	150	240	500
			5	54	140	290	600
			6	46	135	280	560
			7	44	125	270	530
			8	41	110	240	480
			9	37	95	220	430
			10	37	95	220	430
		Stage	Ratio	PUA-60 / PUA-60T	PUA-75 / PUA-75T	PUA-100T	PUA-140T
		2	15	53	145	180	520
			20	55	150	240	600
			25	54	140	290	600
			30	54	140	290	600
			35	54	140	290	600
			40	54	140	290	600
			45	54	140	290	600
			50	54	140	290	600
			60	46	135	280	560
			70	44	125	270	530
			80	41	110	240	480
			90	37	95	220	430
			100	37	95	220	430
Emergency Stop Torque T_{2NOT}	N•m	(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-100	4000	3500	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-100	6000	6000	5000	4500
Micro Backlash P0	arcmin	1	3-10	≦ 2	≦ 2	≦ 1	≦ 1
		2	12-100	≦ 4	≦ 4	≦ 3	≦ 3
Precision Backlash P1	arcmin	1	3-10	≦ 4	≦ 4	≦ 3	≦ 3
		2	12-100	≦ 6	≦ 6	≦ 5	≦ 5
Standard Backlash P2	arcmin	1	3-10	≦ 6	≦ 6	≦ 5	≦ 5
		2	12-100	≦ 8	≦ 8	≦ 7	≦ 7
Torsional Rigidity	N•m /arcmin	1,2	3-100	7	14	25	50
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	1900	5000	7410	11380
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	1500	3080	4500	8830
Operating Temp.	°C		3-100	-10°C ~ +90°C			
Service Life	hr		3-100	30,000 (15,000 Continuous Operation)			
Efficiency	%	1	3-10	≧ 97%			
		2	12-100	≧ 94%			
Weight	kg	1	3-10	1.5	3.5	6.6	14.5
		2	12-100	2.0/1.7	5.2/4.0	8.1	17.5
Mounting Position	-	1,2	3-100	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-100	58	60	63	65
Protection Class	-	1,2	3-100	IP65			
Lubrication	-	1,2	3-100	Synthetic Lubricant			

Inertia (J1)

Stage	Ratio	unit	PUA60	PUA-75	PUA-100	PUA-140
1	3	kg•cm²	0.23	0.97	2.35	10.00
	4		0.18	0.67	1.66	7.17
	5		0.17	0.65	1.50	6.52
	6/7/8		0.14	0.60	1.45	6.17
	9/10		0.14	0.58	1.41	6.10
Stage	Ratio		PUA60(T)	PUA75(T)	PUA100T	PUA140T
2	15/20		0.17(0.02)	0.65(0.17)	0.65	2.35
	25/30/35/40		0.14(0.02)	0.60(0.14)	0.60	1.45
	45/50/60/70/80/90/100		0.14(0.02)	0.58(0.14)	0.58	1.41

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PUR

High Radial Load Capacity Planetary Gearboxes

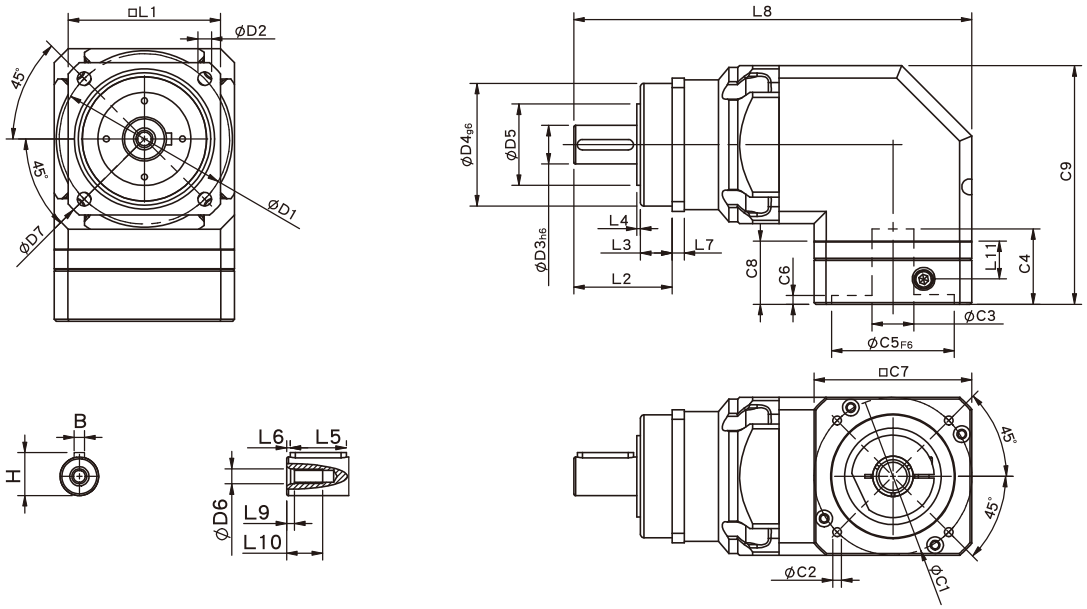
The PUR series of output shaft right angle helical gearbox provide a wide range of performance levels to high positioning accuracy and motion control applications, particularly when high precision and high torsional rigidity are required. Frame sizes 60-220 mm with the best level of backlash ≦ 2 arc-min. Taper roller bearings with maximum radial load capacity up to 27800 N, and axial load capacity up to 16200 N. The PUR is specially well suited to work with pinion and rack for linear operation. Commonly adapted in metal cutting machines, wood processing equipment, machine centers and highly dynamic motion control systems. In-line configuration (PUL series) is also available with max. Frame size 220 mm.

Frame Size (mm)	60, 75, 100, 140, 180, 220
Ratio	3:1 - 200 : 1
Nominal Input Speed (rpm)	2,000 - 5,000
Max Input Speed (rpm)	4,000 - 10,000
Backlash (arc-min)	1 Stage : 2 - 7 2 Stages : 4 - 9
Noise Level (dBA / 1m)	64 - 74

Features

- ▶ 3 Levels of backlash, 6 frame sizes from 60-220 mm.
- ▶ Premium and precision gear design, ratios from 3-200:1.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PUR Single Stage Dimensions



Specifications

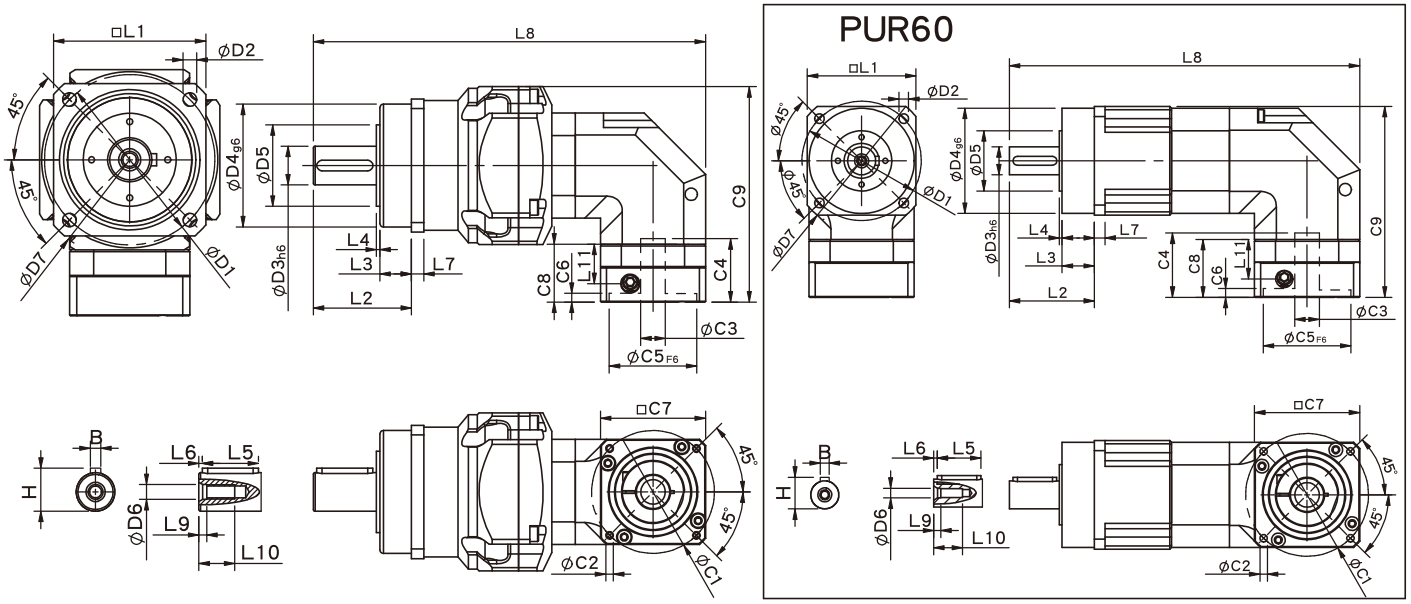
Unit:mm

Dimensions	PUR60	PUR75	PUR100	PUR140	PUR180	PUR220
D1H7	68	85	120	165	215	250
D2	5.5	6.8	9	11	13	17
D3h6	16	22	32	40	55	75
D4g6	60	70	90	130	160	180
D5	34.4	46.4	59.6	79.2	94.5	114.4
D6	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20x2.5P
D7	80	100	138	186	239	292
L1	62	76	105	142	180	220
L2	48.5	56	88	112	112	138
L3	18.5	18	28	27	27	30
L4	1.5	2	2	3	3	3
L5	25	32	40	60	70	90
L6	2	2	5	5	6	7
L7	6	7	10	12	15	20
L8	166.7	227	260.5	346.2	414.7	490.2
L9	4	4.5	6	6	8	15
L10	16.5	20.5	30	38	48	42
L11	22.5	21.5	31.8	44.7	44	60
C1[2]	70	90	115	145	200	215
C2[2]	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦14/≦19	≦19/≦24	≦24/≦32	≦35	≦50	≦55
C4[2]	34	45	53.5	76.8	78.8	98.7
C5[2]F6	50	70	95	110	114.3	180
C6[2]	4	4	6	5.5	6	6
C7[2]	60	90	115	140	180	220
C8[2]	33	36	48	65	65	85
C9[2]	108.8	136	174.5	207	247.5	287.5
B	5	6	10	12	16	20
H	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PUR Double Stage Dimensions



Specifications

Unit:mm

Dimensions	PUR60	PUR60T	PUR75T	PUR100T	PUR140T	PUR180T	PUR220T
D1	68	68	85	120	165	215	250
D2	5.5	5.5	6.8	9	11	13	17
D3h6	16	16	22	32	40	55	75
D4g6	60	60	70	90	130	160	180
D5	34.4	34.6	46.4	59.6	79.2	94.5	114.4
D6	M5x0.8P	M5x0.8P	M8x1.25P	M12x1.75P	M16x2.0P	M20x2.5P	M20X2.5P
D7	80	80	100	138	186	239	292
L1	62	62	76	105	142	180	220
L2	48.5	48.5	56	88	112	112	138
L3	18.5	18.5	18	28	27	27	30
L4	1.5	1.5	2	2	3	3	3
L5	25	25	32	40	60	70	90
L6	2	2	2	5	5	6	7
L7	6	6	7	10	12	15	20
L8	199.7	170.3	223.7	286.5	358.5	445.4	537.2
L9	4	4	4.5	6	6	8	15
L10	16.5	16.5	20.5	30	38	48	42
L11	22.5	15.5	22.5	21.5	31.8	44.7	44
C1[2]	70	46	70	90	115	145	200
C2[2]	M5x0.8P	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3[2]	≦14/≦19	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32	≦35	≦50
C4[2]	34	29	34	45	53.5	76.8	78.8
C5[2]F6	50	30	50	70	95	110	114.3
C6[2]	4	4	4	6	6	5.5	6
C7[2]	60	42.6	60	90	115	140	180
C8[2]	33	25	33	36	48	65	65
C9[2]	108.8	80.5	122.8	148.5	188	223.5	267.5
B	6	5	6	10	12	16	20
H	18	18	24.5	35	43	59	79.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PUR Specifications

Specifications		Stage	Ratio	PUR60	PUR75	PUR100	PUR140	PUR180	PUR220
Nominal Output Torque T_{2N}	N•m	1	3	53	145	180	340	580	950
			4	55	150	240	500	1100	1500
			5	54	140	290	600	1200	1800
			6	46	135	280	500	1100	1620
			7	44	125	270	530	1100	1750
			8	41	110	240	470	1000	1550
			9	37	95	220	430	900	1500
			10	50	130	260	540	900	1500
			14	44	125	270	530	1100	1750
			20	37	95	220	430	900	1450
		Stage	Ratio	PUR60(T)	PUR75T	PUR100T	PUR140T	PUR180T	PUR220T
		2	15	53	145	180	600	1200	2000
			20	55	150	240	600	1200	2000
			25	54	140	290	600	1200	2000
			30	53	145	180	600	1200	2000
			35	54	140	290	600	1200	2000
			40	55	150	240	600	1200	2000
			45	54	140	290	600	1200	2000
			50	54	140	290	600	1200	2000
			60	46	135	280	560	1100	1850
			70	44	125	270	530	1100	1750
			80	41	110	240	480	1000	1550
			90	37	95	220	430	900	1500
			100	37	95	220	430	900	1450
			120	46	135	280	560	1100	1850
			140	44	125	270	530	1100	1750
			160	41	110	240	480	1000	1550
			180	37	95	220	430	900	1500
			200	37	95	220	430	900	1450
Emergency Stop Torque T_{2NOT}	N•m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)						
Nominal Input Speed n_{1N}	rpm	1,2	3-200	5000	4000	4000	3000	3000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-200	10000	8000	8000	6000	6000	4000
Micro Backlash P0	arcmin	1 2	3-20 15-200	- -	≦3 ≦5	≦2 ≦4	≦2 ≦4	≦2 ≦4	≦2 ≦4
Precision Backlash P1	arcmin	1 2	3-20 15-200	≦5 ≦7	≦5 ≦7	≦4 ≦7	≦4 ≦7	≦4 ≦7	≦4 ≦7
Standard Backlash P2	arcmin	1 2	3-20 15-200	≦7 ≦9	≦7 ≦9	≦6 ≦9	≦6 ≦9	≦6 ≦9	≦6 ≦9
Torsional Rigidity	N•m /arcmin	1,2	3-200	7	14	25	50	150	220
Max. Radial Load F_{2rB} [1]	N	1,2	3-200	4130	5220	10650	17600	22000	27800
Max. Axial Load F_{2aB} [1]	N	1,2	3-200	2500	3300	5700	11300	14000	16200
Operating Temp.	°C		3-200	-10°C ~ +90°C					
Service Life	hr		3-200	30,000 (15,000 Continuous Operation)					
Efficiency	%	1 2	3-20 15-200	≧95% ≧92%					
Weight	kg	1 2	3-20 15-200	3.1 3.7(3.3)	5.5 4.9	12.5 13.6	25.5 27	46 50	75 88
Mounting Position	-	1,2	3-200	Any Direction					
Noise Level [2]	dBA/1m	1,2	3-200	64	66	68	70	72	74
Protection Class	-	1,2	3-200	IP65					
Lubrication	-	1,2	3-200	Synthetic Lubricant					

Inertia (J1)

Stage	Ratio	unit	PUR60	PUR75	PUR100	PUR140	PUR180	PUR220
1	3/4/5/7/9	kg•cm²	0.40	2.28	6.87	24.2	69.8	138.2
	6/8/10/14/20		0.30	1.45	4.76	14.5	50.3	103.6
Stage	Ratio		PUR60(T)	PUR75T	PUR100T	PUR140T	PUR180T	PUR220T
2	15/20/25/35/45		0.40 (0.08)	0.72	3.02	7.83	27.7	80.3
	others		0.30 (0.06)	0.38	1.64	5.00	15.9	55.3

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

SESAME Planetary Gearboxes Q&A

Q7. What are Sesame Motor's advantage in Engineering & Custom Design?

Sesame products are all made in Taiwan and 90% of the key components are self-made. The machining department, assembly lines, warehouses and offices are integrated in one facility to offer flexibility in order arrangement and on-time delivery. With decades of experience in manufacturing gear motors and gearboxes, we established the project development capabilities supported by R&D teams and production related departments to provide feasible suggestions and customization based on customer requirements.

PHF

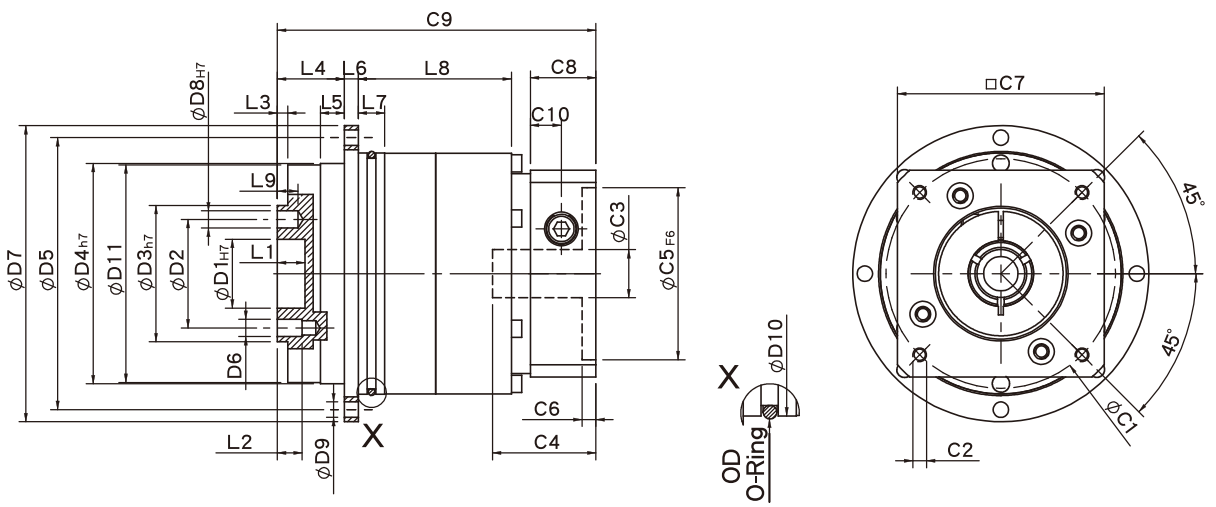
PHF rotary flange planetary gearheads conform to ISO 9409-1 robotic flange standards, provide wide range of performance levels to satisfy industry motion control application requirements. Taper roller bearings with bending moment load capacity up to 6080 N, and axial load capacities up to 21850 N.

Frame Size (mm)	42, 60, 90, 115, 142, 200, 255
Ratio	3:1 - 100 : 1
Nominal Input Speed (rpm)	2,000 - 5,000
Max Input Speed (rpm)	4,000 - 10,000
Backlash (arc-min)	1 Stage : 1 - 6 2 Stages : 3 - 8
Noise Level (dBA / 1m)	56 - 70

Features

- ▶ 7 Frame sizes available, 42~255 mm, in-line or right angle configuration.
- ▶ Backlash as low as 1 arc-minute, ultimate performance.
- ▶ One-piece planet carrier/output shaft, large torsional rigidity.
- ▶ Tapered roller bearings, high moment and radial load capacity.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ ISO 9409-1 robotic flange mounting dimensions.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.
- ▶ Adapters for all servo motors.

PHF Single Stage Dimensions



Specifications

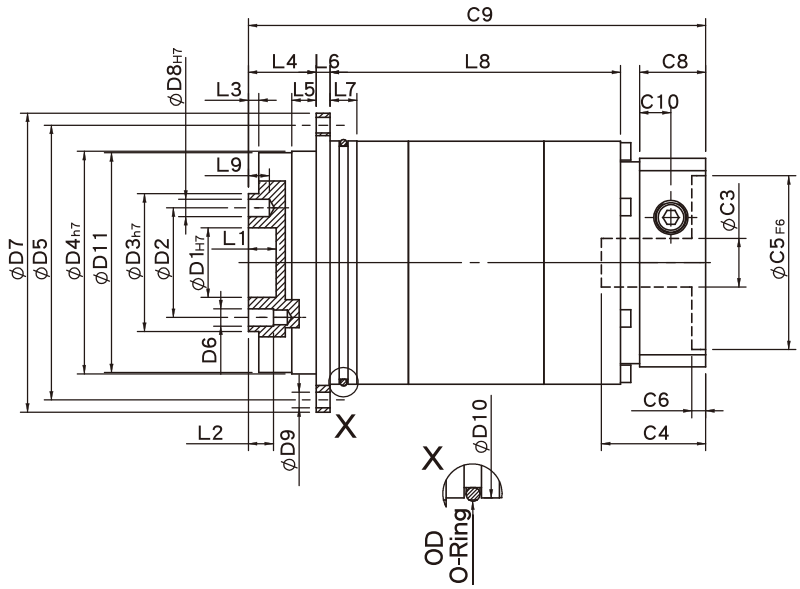
Unit:mm

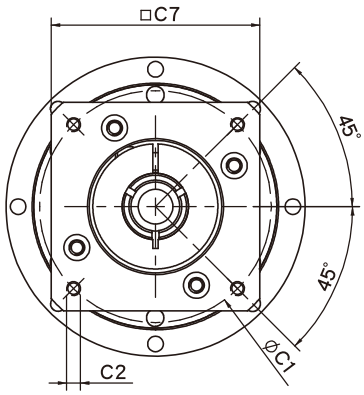
Dimensions	PHF42	PHF60	PHF90	PHF115	PHF142	PHF200	PHF255
D1H7	12	20	31.5	40	50	80	100
D2	20	31.5	50	63	80	125	140
D3h7	28	40	63	80	100	160	180
D4h7	47	64	90	110	140	200	255
D5	67	79	109	135	168	233	280
D6	M3x0.5P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M16x2.0P
D7	72	86	118	145	179	247	300
D8H7	3	5	6	6	8	10	12
D9	3.4	4.5	5.5	5.5	6.6	9	13.5
D10	60	70	95	120	152	212	255
D11	46.2	63.2	89.2	109.2	139.2	199.2	254.2
L1	4	8	12	12	12	12	20
L2	6	7.2	12	13.5	16	22.5	30.5
L3	3	3	6	6	6	8	12
L4	19.5	19.5	30	29	38	50	66
L5	7	7	10	10	14.6	15	20
L6	4	4	7	8	10	12	18
L7	5	7.7	8	10	12	17	39.5
L8	25	37.5	36.5	54.5	65	92	118
L9	4	6	7	7	7	10	10
C1[2]	46	70	90	115	145	200	235
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38	≦50	≦55
C4[2]	28.1	36.5	41.2	51.1	69.7	81	112
C5[2]F6	30	50	70	95	110	114.3	200
C6[2]	4	4	6.7	6	8.5	6	6
C7[2]	42	60	90	115	140	182	220
C8[2]	16.5	19	25.5	30	38	40	50
C9[2]	74.8	92.5	107	131.5	171.5	215	271
C10[2]	7.4	9	11.3	13.9	17.8	21	21
OD	56x2	66x2	90x3	110x3	145x3	200x5	238x5

★ C1~C10 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PHF Double Stage Dimensions-1





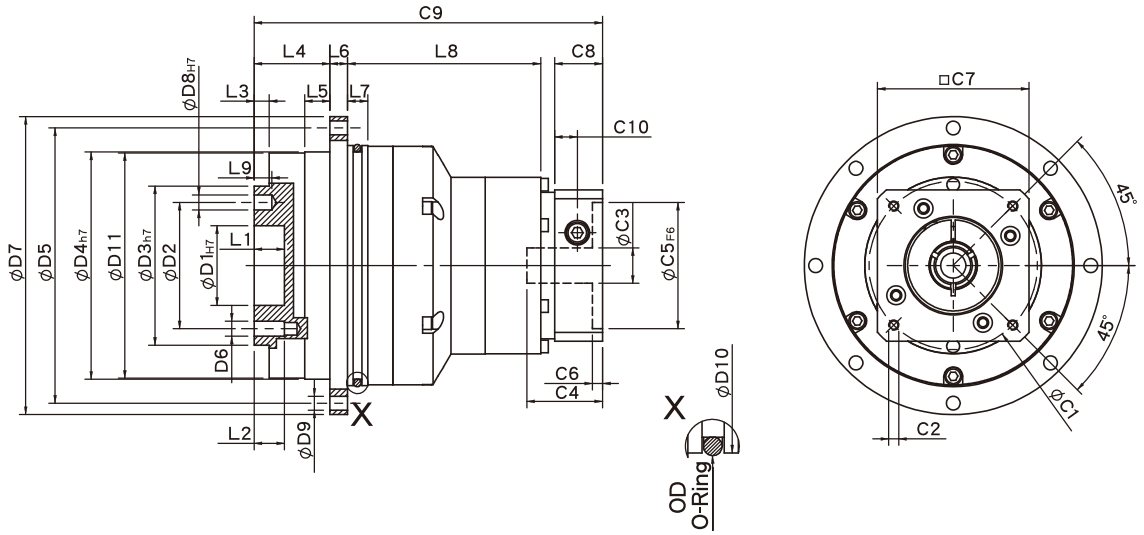
Specifications Unit:mm

Dimensions	PHF42	PHF60	PHF90
D1H7	12	20	31.5
D2	20	31.5	50
D3h7	28	40	63
D4h7	47	64	90
D5	67	79	109
D6	M3x0.5P	M5x0.8P	M6x1.0P
D7	72	86	118
D8H7	3	5	6
D9	3.4	4.5	5.5
D10	60	70	95
D11	46.2	63.2	89.2
L1	4	8	12
L2	6	7.2	12
L3	3	3	6
L4	19.5	19.5	30
L5	7	7	10
L6	4	4	7
L7	5	7.7	8
L8	54.5	72.5	81.5
L9	4	6	7
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24
C4[2]	28.1	36.4	41.2
C5[2]F6	30	50	70
C6[2]	4	4	6.7
C7[2]	42	60	90
C8[2]	16.5	19	25.5
C9[2]	102.5	127.5	151.5
C10[2]	7.4	9	11.3
OD	56x2	66x2	90x3

★ C1~C10 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PHF Double Stage Dimensions-2



Specifications

Unit:mm

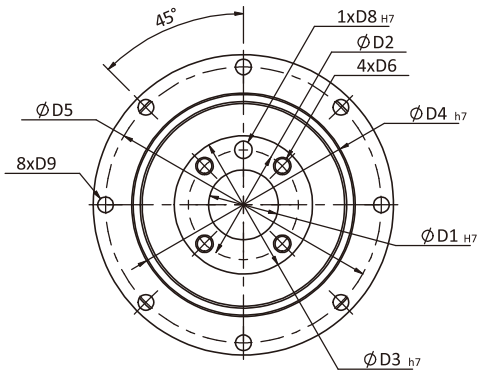
Dimensions	PHF60T	PHF90T	PHF115T	PHF142T	PHF200T	PHF255T
D1H7	20	31.5	40	50	80	100
D2	31.5	50	63	80	125	140
D3h7	40	63	80	100	160	180
D4h7	64	90	110	140	200	255
D5	79	109	135	168	233	280
D6	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M16x2.0P
D7	86	118	145	179	247	300
D8H7	5	6	6	8	10	12
D9	4.5	5.5	5.5	6.6	9	13.5
D10	70	95	120	152	212	255
D11	63.2	89.2	109.2	139.2	199.2	254.2
L1	8	12	12	12	12	20
L2	7.2	12	13.5	16	22.5	30.5
L3	3	6	6	6	8	12
L4	19.5	30	29	38	50	66
L5	7	10	10	14.6	15	20
L6	4	7	8	10	12	18
L7	7.7	8	10	12	17	39.5
L8	65.2	69.5	93.5	110	161.7	192
L9	6	7	7	7	10	10
C1[2]	46	70	90	115	145	200
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P	M12x1.75P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38	≦50
C4[2]	28.1	36.5	41.2	51.1	69.7	81
C5[2]F6	30	50	70	95	110	114.3
C6[2]	4	4	6.7	6	8.5	6
C7[2]	42	60	90	115	140	180
C8[2]	16.5	19	25.5	30	38	40
C9[2]	113.2	138	163.1	198	281	335
C10[2]	7.4	9	11.3	13.9	17.8	21
OD	66x2	90x3	110x3	145x3	200x5	238x5

★ C1~C10 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

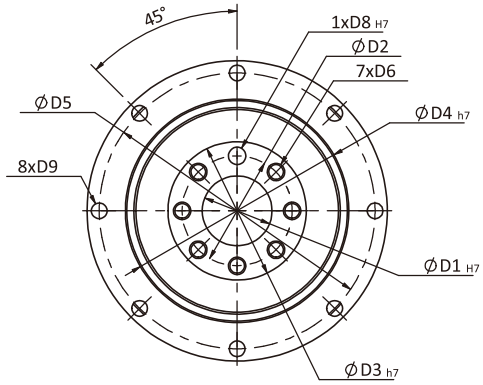
★ Specification subject to change without notice.

PHF Flange Dimensions

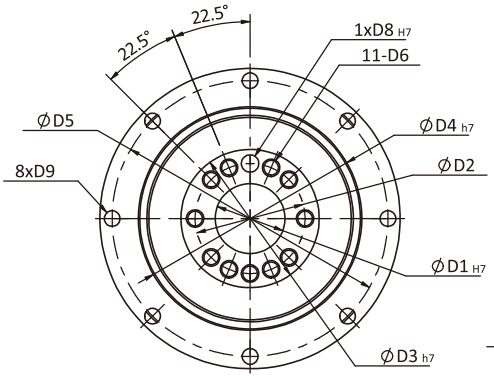
PHF42



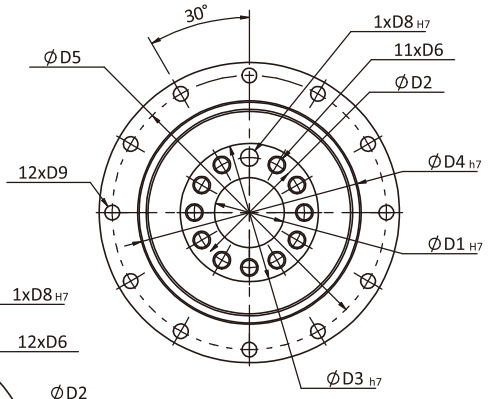
PHF60/PHF90



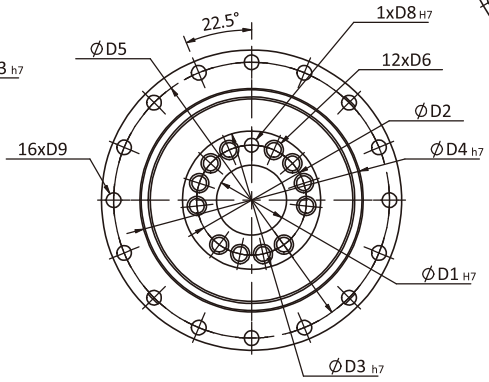
PHF115



PHF142/PHF200



PHF255



Specifications

Unit:mm

Dimensions	PHF42	PHF60	PHF90	PHF115	PHF142	PHF200	PHF255
D1H7	12	20	31.5	40	50	80	100
D2	20	31.5	50	63	80	125	140
D3h7	28	40	63	80	100	160	180
D4h7	47	64	90	110	140	200	255
D5	67	79	109	135	168	233	280
D6	M3x0.5P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M16x2.0P
D8H7	3	5	6	6	8	10	12
D9	3.4	4.5	5.5	5.5	6.6	9	13.5

★ Specification subject to change without notice.

PHF Specifications

Specifications		Stage	Ratio	PHF42	PHF60	PHF90	PHF115	PHF142	PHF200	PHF255
Nominal Output Torque T_{2N}	N•m	1	3	-	40	105	180	340	580	1100
			4	16	43	110	240	500	1100	1700
			5	17	50	130	290	600	1200	2000
			7	14	44	125	270	530	1100	1750
			10	11	37	95	220	430	900	1450
		Stage	Ratio	PHF42	PHF60(T)	PHF90(T)	PHF115T	PHF142T	PHF200T	PHF255T
		2	15	-	40	105	180	600	1200	2000
			20	16	43	110	240	600	1200	2000
			25	17	50	130	290	600	1200	2000
			30	17	50	130	290	600	1200	2000
			35	17	50	130	290	600	1200	2000
			40	17	50	130	290	600	1200	2000
			50	17	50	130	290	600	1200	2000
			70	14	44	125	270	530	1100	1750
			100	11	37	95	220	430	900	1450
Emergency Stop Torque T_{2NOT}	N•m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)							
Nominal Input Speed n_{1N}	rpm	1,2	3-100	5000	5000	4000	4000	3000	3000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-100	10000	10000	8000	8000	6000	5000	4000
Micro Backlash P0	arcmin	1 2	3-10 12-100	≦2 ≦4	≦2 ≦4	≦2 ≦4	≦1 ≦3	≦1 ≦3	≦1 ≦3	≦1 ≦3
Precision Backlash P1	arcmin	1 2	3-10 12-100	≦4 ≦6	≦4 ≦6	≦4 ≦6	≦3 ≦5	≦3 ≦5	≦3 ≦5	≦3 ≦5
Standard Backlash P2	arcmin	1 2	3-10 12-100	≦6 ≦8	≦6 ≦8	≦6 ≦8	≦5 ≦7	≦5 ≦7	≦5 ≦7	≦5 ≦7
Torsional Rigidity	N•m /arcmin	1,2	3-100	6	12	30	80	150	450	1000
Max. Bending Moment M_{2kB} [1]	N•m	1,2	3-100	43	125	288	503	1470	2950	6080
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	1015	1340	2868	3890	9850	12560	21850
Operating Temp.	℃		3-100	-10℃ ~ +90℃						
Service Life	hr		3-100	30,000 (15,000 Continuous Operation)						
Efficiency	%	1 2	3-10 12-100	≧97% ≧94%						
Weight	kg	1 2	3-10 12-100	0.7 1.1	1.5 2.3 (1.8)	3.5 6.0 (4.1)	6.2 8.1	13.6 17.9	32.1 38.6	63.3 79.5
Mounting Position	-	1,2	3-100	Any Direction						
Noise Level [2]	dBA/1m	1,2	3-100	56	58	60	63	65	67	70
Protection Class	-	1,2	3-100	IP65						
Lubrication	-	1,2	3-100	Synthetic Lubricant						

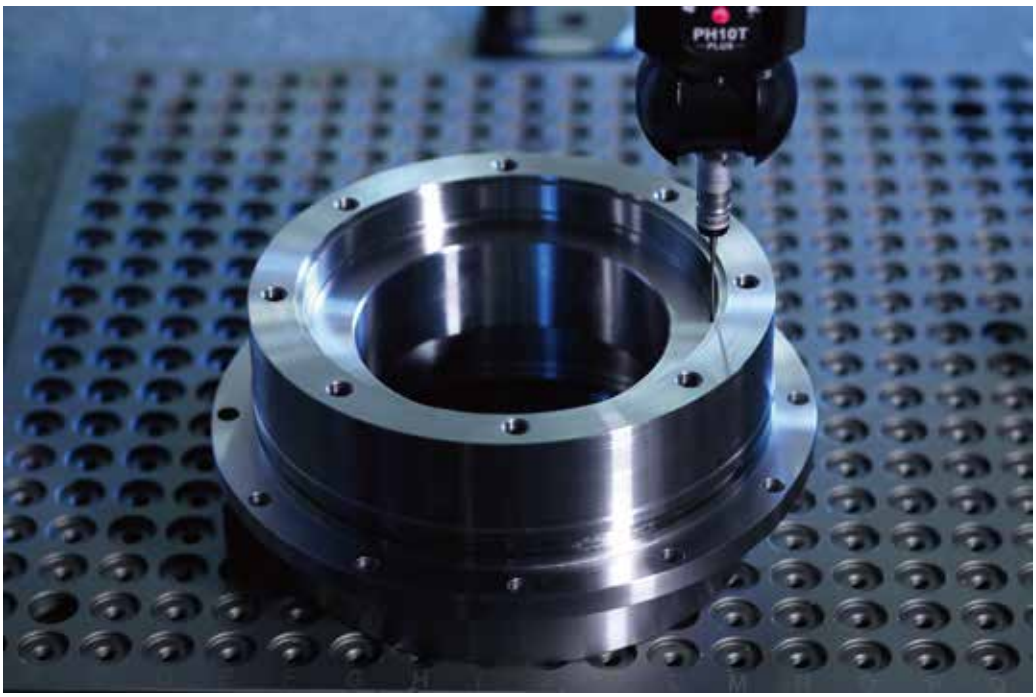
Inertia (J1)

Stage	Ratio	unit	PHF42	PHF60	PHF90	PHF115	PHF142	PHF200	PHF255
1	3	kg•cm²	-	0.19	0.72	2.35	9.05	29.80	72.50
	4		0.02	0.18	0.67	1.66	7.17	25.86	58.21
	5		0.02	0.17	0.65	1.50	6.52	23.63	54.36
	7		0.02	0.14	0.60	1.45	6.17	22.92	54.12
	10		0.02	0.14	0.58	1.41	6.10	22.73	53.98
Stage	Ratio		PHF42	PHF60(T)	PHF90(T)	PHF115T	PHF142T	PHF200T	PHF255T
2	15/20		0.02	0.17 (0.02)	0.65 (0.17)	0.65	2.35	9.05	29.8
	25/30/35/40		0.02	0.14 (0.02)	0.60 (0.14)	0.60	1.45	6.17	22.92
	50/70/100		0.02	0.14 (0.02)	0.58 (0.14)	0.58	1.41	6.10	22.73

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

Q8. Is stainless steel planetary gearbox available?



The stainless steel planetary gearbox SGC and SGE series are specially developed and constructed for use in food, pharmaceutical, chemical, biotechnology, aerospace, anti-magnetic applications and those environments require corrosion protection exist. Sesame stainless steel planetary gearboxes are precision inline gearheads with smooth appearance and permanent laser engraving label to provide outstanding corrosion resistance in washdown environments. Customized requirements such as high level IP protection or surface treatment are available to apply high temperature and pressure washdown or hygienic environments. Feel free to contact us for further information.

PGF

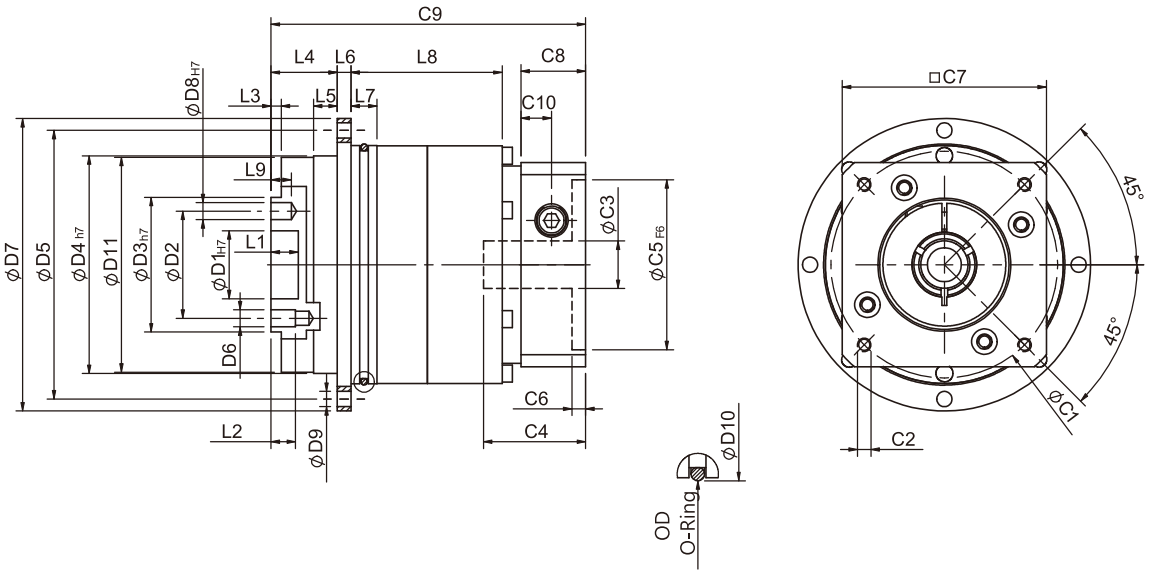
Sesame PGF series overall designs are suitable for combined operation with servo motor and achieve maximum torque output. Hollow out-put shaft connects perfectly with circular flange drastically to reduce installation space. Precision gear design and gear processing create a planetary gearhead with low backlash operation, low noise, high efficiency and long service life.

Frame Size (mm)	42, 60, 90, 115, 142
Ratio	3 : 1 - 100 : 1
Nominal Input speed (rpm)	3,000 - 5,000
Max Input Speed (rpm)	5,000 - 10,000
Backlash (arc-min)	1 Stage : 1 - 7 2 Stages : 3 - 9
Noise Level (dBA / 1m)	56 - 65

Features

- ▶ 5 frame sizes available, 42~142 mm.
- ▶ Backlash as low as 1 arc-minute, ultimate performance.
- ▶ One-piece planet carrier/output shaft, large torsional rigidity.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Angular contact ball bearings with bending moment capacity up to 950 Nm, and axial load capacities up to 6400 N.
- ▶ Planets with full needle bearing support.
- ▶ ISO mounting dimensions.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PGF Single Stage Dimensions



Specifications

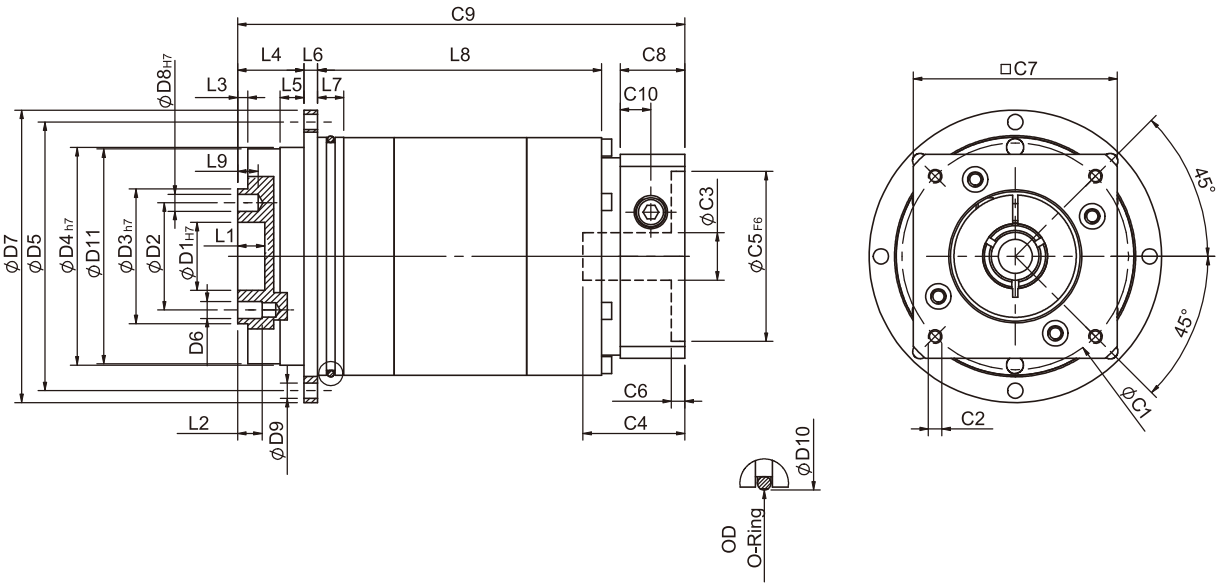
Unit:mm

Dimensions	PGF42	PGF60	PGF90	PGF115	PGF142
D1H7	12	20	31.5	40	50
D2	20	31.5	50	63	80
D3h7	28	40	63	80	110
D4h7	47	64	90	110	140
D5	67	79	109	135	168
D6	M3x0.5P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P
D7	72	86	118	145	179
D8H7	3	5	6	6	8
D9	3.4	4.5	5.5	5.5	6.6
D10	60	70	95	120	152
D11	46.2	63.2	89.2	109.2	139.2
L1	4	8	12	12	12
L2	6	7.2	12	13.5	16
L3	3	3	6	6	6
L4	19.5	19.5	29	29	38
L5	7	7	10	10	14.6
L6	4	4	7	8	10
L7	5	7.7	8	12	12
L8	25	29.5	35	50.5	65
L9	4	6	5	7	7
C1[2]	46	70	90	115	145
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M8x1.25P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32/≦38	≦35/≦38
C4[2]	28.5	37.5	41.7	51.1	66.7
C5[2]F6	30	50	70	95	110
C6[2]	4.1	4.5	6	6	5.5
C7[2]	42	60	90	115	140
C8[2]	17	20	26	30	35
C9[2]	75.3	85.5	105	127.5	168.5
C10[2]	7.4	9	11.3	13.9	17.9
OD	56x2	66x2	90x3	110x3	145x3

★ C1~C10 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGF Double Stage Dimensions-1



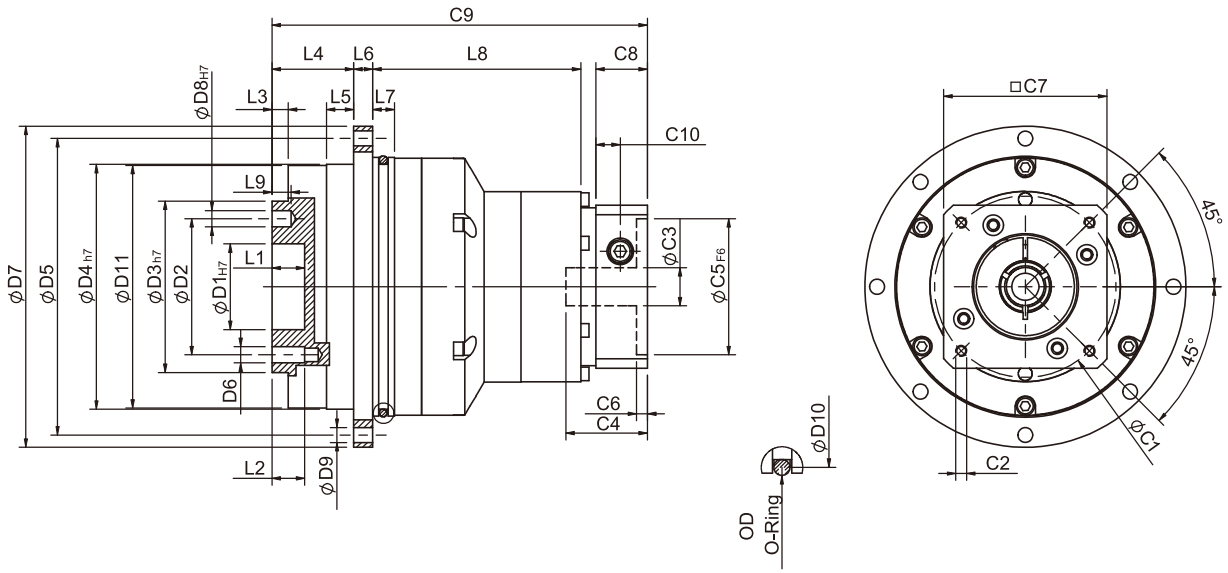
Specifications Unit:mm

Dimensions	PGF42	PGF60	PGF90
D1H7	12	20	31.5
D2	20	31.5	50
D3h7	28	40	63
D4h7	47	64	90
D5	67	79	109
D6	M3x0.5P	M5x0.8P	M6x1.0P
D7	72	86	118
D8H7	3	5	6
D9	3.4	4.5	5.5
D10	60	70	95
D11	46.2	63.2	89.2
L1	4	8	12
L2	6	7.2	12
L3	3	3	6
L4	19.5	19.5	29
L5	7	7	10
L6	4	4	7
L7	5	7.7	8
L8	54.5	68.5	80
L9	4	6	7
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x0.8P	M6x1.0P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24
C4[2]	28.6	37.5	41.7
C5[2]F6	30	50	70
C6[2]	4.1	4.5	6
C7[2]	42	60	90
C8[2]	17	20	26
C9[2]	103	124.5	149.1
C10[2]	7.4	9	11.3
OD	56x2	66x2	90x3

★ C1~C10 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGF Double Stage Dimensions-2



Specifications Unit:mm

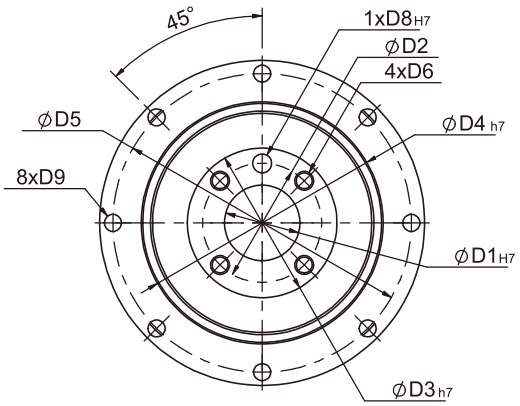
Dimensions	PGF60T	PGF90T	PGF115T	PGF142T
$D1_{H7}$	20	31.5	40	50
D2	31.5	50	63	80
$D3_{h7}$	40	63	80	100
$D4_{h7}$	64	90	110	140
D5	79	109	135	168
D6	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P
D7	86	118	145	179
$D8_{H7}$	5	6	6	8
D9	4.5	5.5	5.5	6.6
D10	70	95	120	152
D11	63.2	89.2	109.2	139.2
L1	8	12	12	12
L2	7.2	12	13.5	16
L3	3	6	6	6
L4	19.5	29	29	38
L5	7	10	10	14.6
L6	4	7	8	10
L7	7.7	8	10	12
L8	61.2	68	89.5	110
L9	6	7	7	7
$C1^{2}$	46	70	90	115
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32/≦38
$C4^{2}$	28.6	37.5	41.7	51.1
$C5^{2}{}_{F6}$	30	50	70	95
$C6^{2}$	4.1	4.5	6	6
$C7^{2}$	42	60	90	115
$C8^{2}$	17	20	26	30
$C9^{2}$	109.7	136.5	159.6	198
$C10^{2}$	7.4	9	11.3	13.9
OD	66x2	90x3	110x3	145x3

★ C1~C10 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

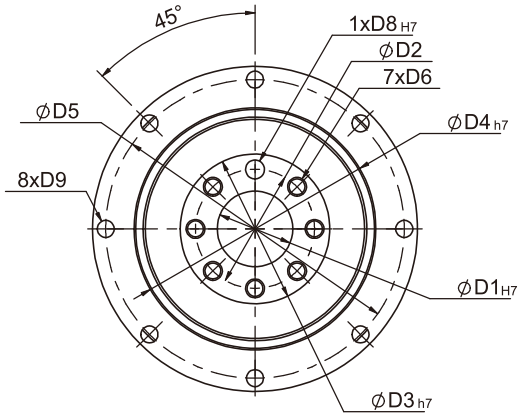
★ Specification subject to change without notice.

PGF Flange Dimensions

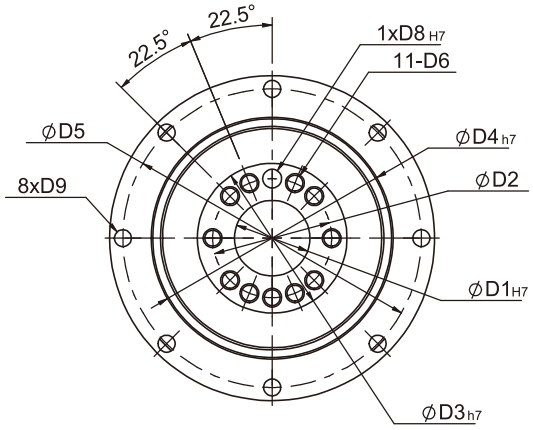
PGF42



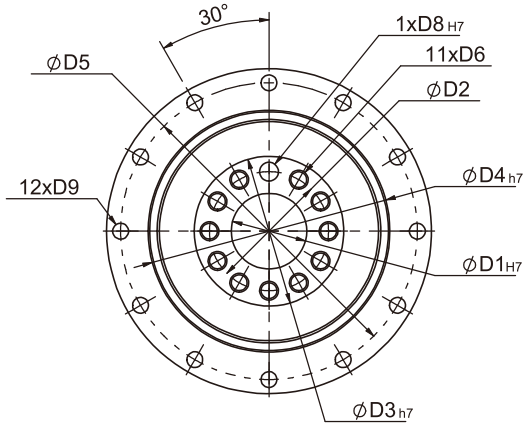
PGF60
PGF90



PGF115



PGF142



Specifications

Unit:mm

Dimensions	PGF42	PGF60	PGF90	PGF115	PGF115
$D1_{H7}$	12	20	31.5	40	50
D2	20	31.5	50	63	80
$D3_{h7}$	28	40	63	80	100
$D4_{h7}$	47	64	90	110	140
D5	67	79	109	135	168
D6	M3x0.5P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P
$D8_{H7}$	3	5	6	6	8
D9	3.4	4.5	5.5	5.5	6.6

★ Specification subject to change without notice.

PGF Specifications

Specifications		Stage	Ratio	PGF-42	PGF-60	PGF-90	PGF-115	PGF-142
Nominal Output Torque T_{2N}	N • m	1	3	-	40	105	180	340
			4	16	43	110	240	500
			5	17	50	130	290	600
			7	14	44	125	270	530
			10	11	37	95	220	430
		Stage	Ratio	PGF-42	PGF-60(T)	PGF-90(T)	PGF-115T	PGF-142T
		2	15	-	40	105	180	600
			20	16	43	110	240	600
			25	17	50	130	290	600
			30	17	50	130	290	600
			35	17	50	130	290	600
			40	17	50	130	290	600
			50	17	50	130	290	600
			70	14	44	125	270	530
			100	11	37	95	220	430
Emergency Stop Torque T_{2NOT}	N · m		(3 0 times of Nominal Output Torque) (* Max. Output Torque T_{2B} =60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-100	5000	5000	4000	4000	3000
Max. Input Speed n_{1max}	rpm	1,2	3-100	10000	10000	8000	8000	5000
Micro Backlash P0	arcmin	1 2	3-10 12-100	≦ 3 ≦ 5	≦ 3 ≦ 5	≦ 3 ≦ 5	≦1 ≦3	≦1 ≦3
Precision Backlash P1	arcmin	1 2	3-10 12-100	≦ 5 ≦ 7	≦ 5 ≦ 7	≦ 5 ≦ 7	≦3 ≦5	≦3 ≦5
Standard Backlash P2	arcmin	1 2	3-10 12-100	≦7 ≦9	≦7 ≦9	≦7 ≦9	≦5 ≦7	≦5 ≦7
Torsional Rigidity	N· m /arcmin	1,2	3-100	6	12	28	75	145
Max. Bending Moment M_{2kB} [1]	N	1,2	3-100	22.5	36	76	140	950
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	465	635	1060	1580	6400
Operating Temp.	℃		3-100	-10℃ ~ +90℃				
Service Life	hr		3-100	20,000 (10,000 Continuous operation)				
Efficiency	%	1 2	3-10 12-100	≧97% ≧94%				
Weight	kg	1 2	3-10 12-100	0.7 1.1	14 2.2(1.7)	3.2 5.0(4.0)	6.0 7.9	13.6 17.9
Mounting Position	-	1,2	3-100	Any Direction				
Noise Level [2]	dBA/1m	1,2	3-100	56	58	60	63	65
Protection Class	-	1,2	3-100	IP65				
Lubrication	-	1,2	3-100	Synthetic Lubricant				

Inertia (J1)

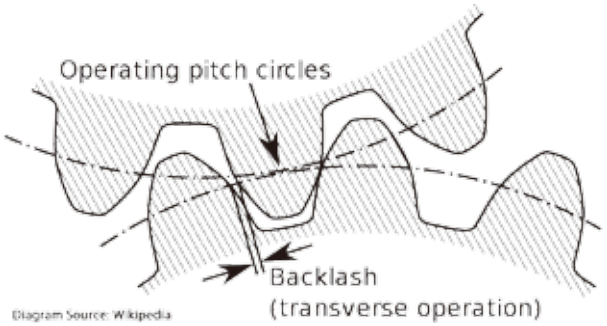
Stage	Ratio	unit	PGF-42	PGF-60	PGF-90	PGF-115	PGF-142
1	3	$Kg \cdot cm^2$	-	0.19	0.72	2.35	9.05
	4		0.02	0.18	0.67	1.66	7.17
	5		0.02	0.17	0.65	1.50	6.52
	7		0.02	0.14	0.60	1.45	6.17
	10		0.02	0.14	0.58	1.41	6.10
Stage	Ratio		PGF-42	PGF-60(T)	PGF-90(T)	PGF-115T	PGF-142T
2	15/20/25		0.02	0.17(0.02)	0.65(0.17)	0.65	2.35
	30/35/40		0.02	0.14(0.02)	0.60(0.14)	0.60	1.45
	50/70/100		0.02	0.14(0.02)	0.58(0.14)	0.58	1.41

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

Q9. What is backlash?



Backlash, sometimes called lost motion or play, is the gap or clearance between two work pieces when they are combined. Here it refers to a clearance between meshed gear teeth. Backlash is commonly measured in arc minute (arc-min) or arc second (arc-sec). 1 arc minute = 1/60 of one degree = 0.0167 degree. Taking the planetary gearbox as an example, the backlash can be divided into ≦1arc-min, ≦3 arc-min, ≦5 arc-min, ≦7 arc-min. There is no international standard to follow for the test method for a gearbox or a speed reducer backlash. Backlash is one of the important index data to measure the performance of gearboxes or speed reducers. The smaller the backlash, the higher the precision and the higher the relative price. Therefore, controlling and reducing the backlash of the gearbox or speed reducer is a serious issue of the manufacturers.

To summarize, backlash is the gap between the teeth of the gears in the gearbox. The impact of backlash is actually limited, and it can be compensated in other ways. For applications requiring the highest positioning control accuracy, such as multi-axis robotics, a harmonic speed reducer is recommended. If a little backlash is acceptable on the application, a planetary gearbox can be used. Of course, higher accuracy costs more. In fact, the planetary gearbox with excellent performance has been able to reduce the backlash to less than 1 arc minute. This is the requirement for precision instruments, robotics or machine tools. Moreover, the planetary gearbox has the characteristics of high torsional rigidity, high reduction ratio and compact design, and has infinite potential uses in industrial applications.

PHFR

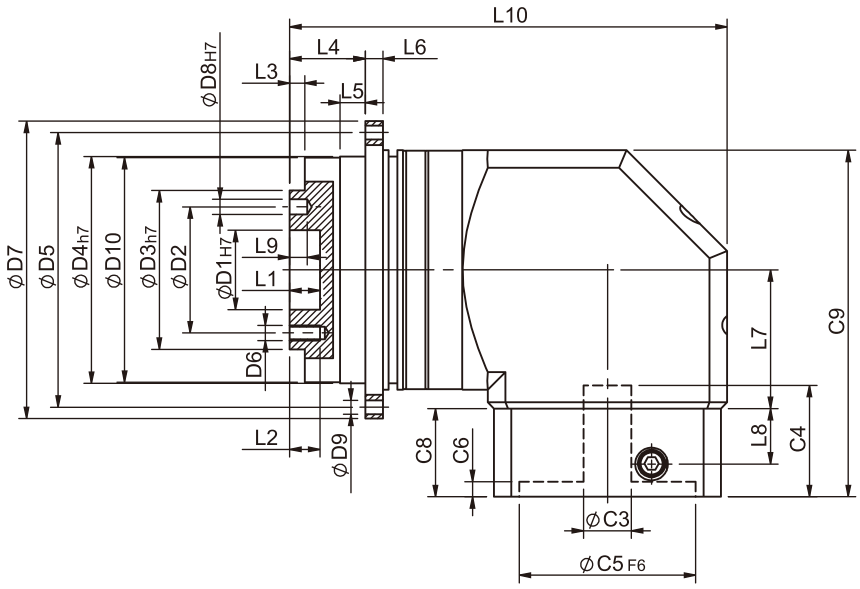
The PHFR Precision Round mounting flange, caged precision class helical planetary speed reducer in a right-angle housing through sizes 255. ISO-9409 flange output, high torque capacity, quiet operation with backlash as low as <2 arc-min. This gearbox provide a wide range of performance levels to high positioning accuracy and motion control applications, particularly when high precision and high torsional rigidity are required. Taper roller bearings with bending moment load capacity up to 6500 N.m, and axial load capacity up to 21850 N. The PHFR is specially well suited to work with pinion and rack for linear operation. Commonly adapted in metal cutting machines, wood processing equipment, machine centers and highly dynamic motion control systems. In-line configuration (PHF series) is also available with max. Frame size 255 mm.

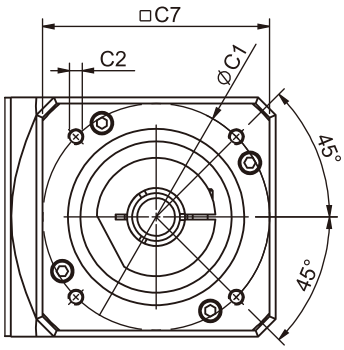
Frame Size (mm)	42, 60, 90, 115, 142, 200, 255
Ratio	3 : 1 - 200 : 1
Nominal Input Speed (rpm)	2,000 - 5,000
Max Input Speed (rpm)	4,000 - 10,000
Backlash (arc-min)	1 Stage : 2 - 7 2 Stages : 4 - 9
Noise Level (dBA / 1m)	62 - 74

Features

- ISO 9409 Flange Output.
- 3 levels of backlash, 7 frame sizes from 42-255 mm.
- Premium and precision gear design, ratios from 3-200:1.
- One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- Hardened and ground gearing, high wear resistance and impact toughness.
- One-piece ring gear/housing, high precision and torque output.
- Planets with full needle bearing support.
- IP65 enclosure and synthetic lubricant, maintenance-free service life.

PHFR Single Stage Dimensions





Specifications

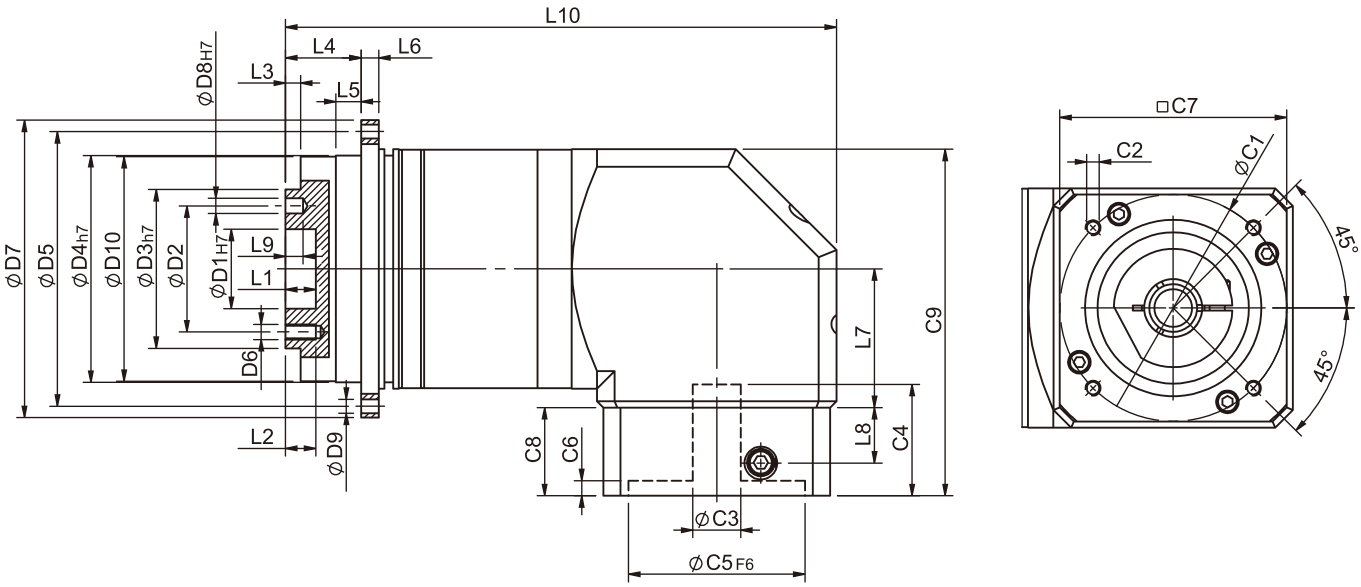
Unit:mm

Dimensions	PHFR42	PHFR60	PHFR90	PHFR115	PHFR142	PHFR200	PHFR255
D1H7	12	20	31.5	40	50	80	100
D2	20	31.5	50	63	80	125	140
D3h7	28	40	63	80	100	160	180
D4h7	47	64	90	110	140	200	255
D5	67	79	109	135	168	233	280
D6	M3x0.5P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M16x2.0P
D7	72	86	118	145	179	247	300
D8H7	3	5	6	6	8	10	12
D9	3.4	4.5	5.5	5.5	6.6	9	13.5
D10	46.2	63.2	89.2	109.2	139.2	199.2	254.2
L1	4	8	12	12	12	16	20
L2	6	7.2	12	13.5	16	22.5	30.5
L3	3	3	6	6	6	8	12
L4	19.5	19.5	30	29	38	50	66
L5	7	7	10	10	14.6	15	20
L6	4	4	7	8	10	12	18
L7	32.2	44.8	55	69	71	92.5	92.5
L8	13.5	21.5	22	32	44.7	44	60
L9	4	6	7	7	7	10	10
L10	92.2	128.3	173.6	204.2	250.7	330.7	392.2
C1[2]	46	70	90	90	145	200	215
C2[2]	M4x0.7P	M5x08P	M6x1.0P	M6x1.0P	M8x1.25P	M12x1.75P	M12x1.75P
C3[2]	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32	≦35	≦50	≦55
C4[2]	29	34	44	53.5	76.8	78.8	98.7
C5[2]F6	30	50	70	70	110	114.3	180
C6[2]	6	5	5	5.5	9	6	6
C7[2]	42.6	60	90	115	140	180	220
C8[2]	25	33	35	48	65	65	85
C9[2]	78.5	112.8	137.5	176.5	225.5	246.5	266.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PHFR Double Stage Dimensions-1



Specifications

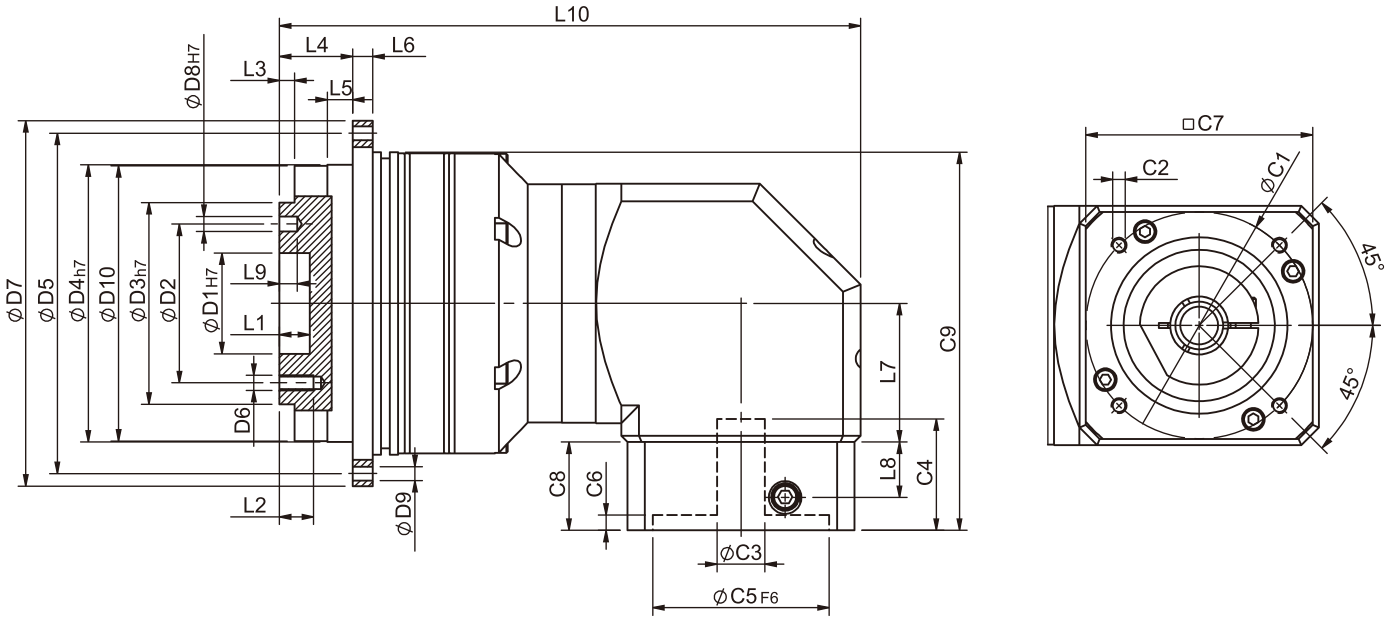
Unit:mm

Dimensions	PHFR42	PHFR60	PHFR90
D1H7	12	20	31.5
D2	20	31.5	50
D3h7	28	40	63
D4h7	47	64	90
D5	67	79	109
D6	M3x0.5P	M5x0.8P	M6x1.0P
D7	72	86	118
D8H7	3	5	6
D9	3.4	4.5	5.5
D10	46.2	63.2	89.2
L1	4	8	12
L2	6	7.2	12
L3	3	3	6
L4	19.5	19.5	30
L5	7	7	10
L6	4	4	7
L7	32.2	44.8	55
L8	13.5	21.5	22
L9	4	6	7
L10	119.9	163.3	218.6
C1[2]	46	70	90
C2[2]	M4x0.7P	M5x08P	M6x1.0P
C3[2]	≦8	≦14	≦19/≦24
C4[2]	29	34	44
C5[2]F6	30	50	70
C6[2]	6	5	5
C7[2]	42.6	60	90
C8[2]	25	33	35
C9[2]	78.5	112.8	137.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PHFR Double Stage Dimensions-2



Specifications

Unit:mm

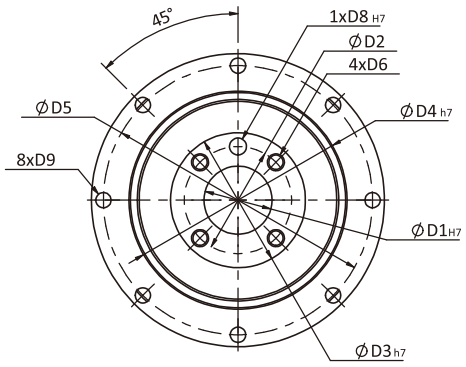
Dimensions	PHFR60T	PHFR90T	PHFR115T	PHFR142T	PHFR200T	PHFR255T
D1H7	20	31.5	40	50	80	100
D2	31.5	50	63	80	125	140
D3h7	40	63	80	100	160	180
D4h7	64	90	110	140	200	255
D5	79	109	135	168	233	280
D6	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M16x2.0P
D7	86	118	145	179	247	300
D8H7	5	6	6	8	10	12
D9	4.5	5.5	5.5	6.6	9	13.5
D10	63.2	89.2	109.2	139.2	199.2	254.2
L1	8	12	12	12	16	20
L2	7.2	12	13.5	16	22.5	30.5
L3	3	6	6	6	8	12
L4	19.5	30	29	38	50	66
L5	7	10	10	14.6	15	20
L6	4	7	8	10	12	18
L7	32.2	44.8	55	69	71	92.5
L8	13.5	21.5	22	32	44.7	44
L9	6	7	7	7	10	10
L10	130.6	173.8	230.6	270.7	361.4	439.2
C1²	46	70	90	90	145	200
C2²	M4x0.7P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P	M12x1.75P
C3²	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32	≦35	≦50
C4²	29	34	44	53.5	76.8	78.8
C5²F6	30	50	70	70	110	114.3
C6²	6	5	5	5.5	9	6
C7²	42.6	60	90	115	140	92.5
C8²	25	33	35	48	65	65
C9²	84.4	125.3	150	176.5	259.5	284

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

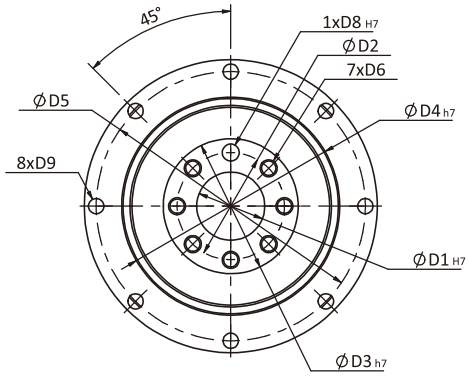
★ Specification subject to change without notice.

PHFR Flange Dimensions

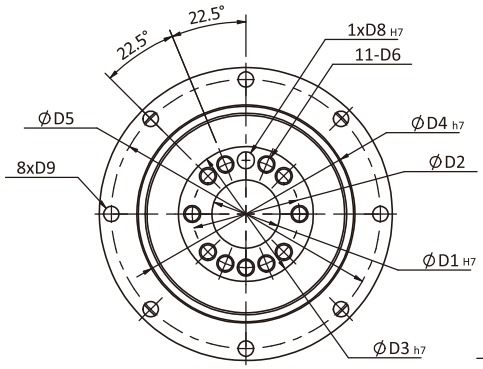
PHFR42



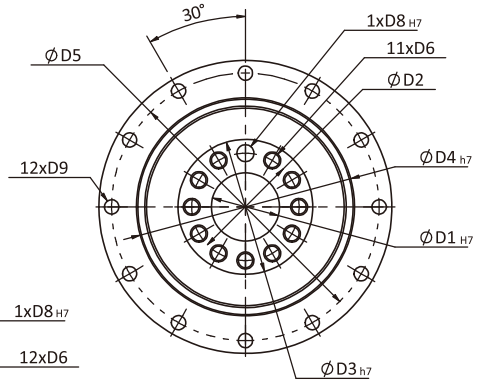
PHFR60/PHFR90



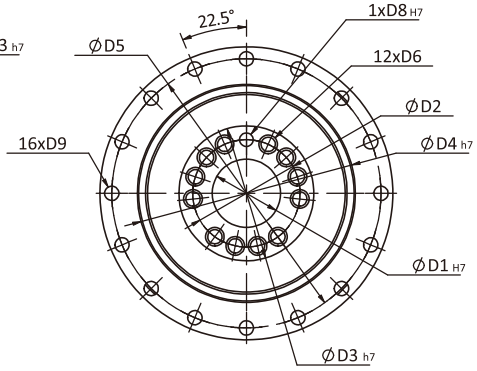
PHFR115



PHFR142/PHFR200



PHFR255



Specifications

Unit:mm

Dimensions	PHFR42	PHFR60	PHFR90	PHFR115	PHFR142	PHFR200	PHFR255
D1H7	12	20	31.5	40	50	80	100
D2	20	31.5	50	63	80	125	140
D3h7	28	40	63	80	100	160	180
D4h7	47	64	90	110	140	200	255
D5	67	79	109	135	168	233	280
D6	M3x0.5P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M16x2.0P
D8H7	3	5	6	6	8	10	12
D9	3.4	4.5	5.5	5.5	6.6	9	13.5

★ Specification subject to change without notice.

PHFR Specifications

Specifications		Stage	Ratio	PHFR42	PHFR60	PHFR90	PHFR115	PHFR142	PHFR200	PHFR255
Nominal Output Torque T_{2N}	N•m	1	3	-	40	105	180	340	580	950
			4	16	43	110	240	500	1100	1500
			5	17	50	130	290	600	1200	1800
			7	14	44	125	270	530	1100	1750
			10	17	50	130	260	540	900	1500
			14	14	44	125	270	530	1100	1750
			20	11	37	95	220	430	900	1450
		Stage	Ratio	PHFR42	PHFR60(T)	PHFR90(T)	PHFR115T	PHFR142T	PHFR200T	PHFR255T
		2	15	-	40	105	180	600	1200	2000
			20	16	43	110	240	600	1200	2000
			25	17	50	130	290	600	1200	2000
			30	17	40	105	180	600	1200	2000
			35	17	50	130	290	600	1200	2000
			40	16	43	110	240	600	1200	2000
			50	17	50	130	290	600	1200	2000
			70	14	44	125	270	530	1100	1750
			100	11	37	95	220	430	900	1450
			140	14	44	125	270	530	1100	1750
			200	11	37	95	220	430	900	1450
Emergency Stop Torque T_{2NOT}	N•m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)							
Nominal Input Speed n_{1N}	rpm	1,2	3-200	5000	5000	4000	4000	3000	3000	2000
Max. Input Speed n_{1max}	rpm	1,2	3-200	10000	10000	8000	8000	6000	6000	4000
Micro Backlash P0	arcmin	1 2	3-20 15-200	- -	- -	≦ 3 ≦ 5	≦ 2 ≦ 4	≦ 2 ≦ 4	≦ 2 ≦ 4	≦ 2 ≦ 4
Precision Backlash P1	arcmin	1 2	3-20 15-200	≦ 5 ≦ 7	≦ 5 ≦ 7	≦ 5 ≦ 7	≦ 4 ≦ 7	≦ 4 ≦ 7	≦ 4 ≦ 7	≦ 4 ≦ 7
Standard Backlash P2	arcmin	1 2	3-20 15-200	≦ 7 ≦ 9	≦ 7 ≦ 9	≦ 7 ≦ 9	≦ 6 ≦ 9	≦ 6 ≦ 9	≦ 6 ≦ 9	≦ 6 ≦ 9
Torsional Rigidity	N•m /arcmin	1,2	3-200	6	12	30	80	150	450	1000
Max. Bending Moment M_{2kB} [1]	N•m	1,2	3-200	43	125	288	503	1470	2950	6500
Max. Axial Load F_{2aB} [1]	N	1,2	3-200	1015	1340	2868	3890	9850	12560	21850
Operating Temp.	°C		3-200	-10°C ~ +90°C						
Service Life	hr		3-200	20,000 (10,000 Continuous Operation)						
Efficiency	%	1 2	3-20 15-200	≧ 95% ≧ 92%						
Weight	kg	1 2	3-20 15-200	1.1 1.6	2.3 3.2/2.2	6.6 8.6/5.3	13.5 14.8	25.1 26.7	50 55	85 88
Mounting Position	-	1,2	3-200	Any Direction						
Noise Level [2]	dBA/1m	1,2	3-200	62	64	66	68	70	72	74
Protection Class	-	1,2	3-200	IP65						
Lubrication	-	1,2	3-200	Synthetic Lubricant						

Inertia (J1)

Stage	Ratio	unit	PHFR42	PHFR60	PHFR90	PHFR115	PHFR142	PHFR200	PHFR255
1	3/4/5/7/9	kg•cm²	0.06	0.40	2.28	6.87	24.2	69.8	138.2
	10/14/20		0.05	0.30	1.45	4.76	14.5	50.3	103.6
Stage	Ratio		PHFR42	PHFR60(T)	PHFR90(T)	PHFR115T	PHFR142T	PHFR200T	PHFR255T
2	15/20/25/35		0.06	0.40 (0.08)	2.28 (0.72)	3.02	7.83	27.7	80.3
	Others		0.05	0.30 (0.06)	1.45 (0.38)	1.64	5.00	15.9	55.3

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

Why backlash can't be zero?

Gear backlash is required to keep gears meshing without getting stuck and to provide enough space for lubricating and thermo expansion. Backlash is reserved to prevent overheating and teeth damage, and to ensure the smooth operation of a gear set or gearboxes. The existence of backlash is also helpful to the assembly and maintenance of a gear set or gearbox, to prolong the service life. Besides, this gap is essential to absorb the gear machining error and the gear deformation under loading.

In practice, when a gearbox or a speed reducer reciprocates back and forth, the backlash effect will accumulate with the increase of the running distance. Such mechanical play causes significant lost motion between speed reducer input and output shafts, making it difficult to achieve accurate positioning in some applications such as precision inspection instruments, machine tools, robotics and other equipment. For these applications that require special accuracy, it is necessary to increase the precision in gear design, machining and assembly, or to use special types of non-traditional gear drive speed reducers. This speed reducer unit can achieve very low or zero backlash and is suitable for applications where performance outweighs cost.

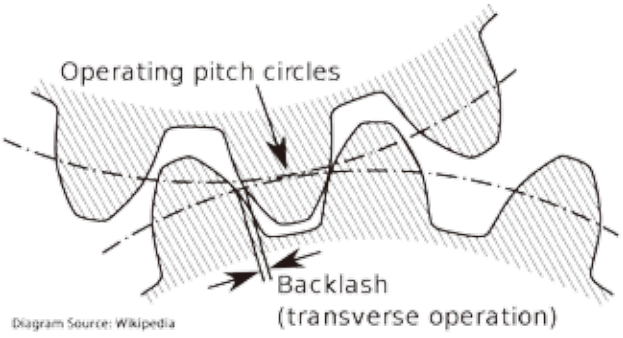


Diagram Source: Wikipedia

PGFR

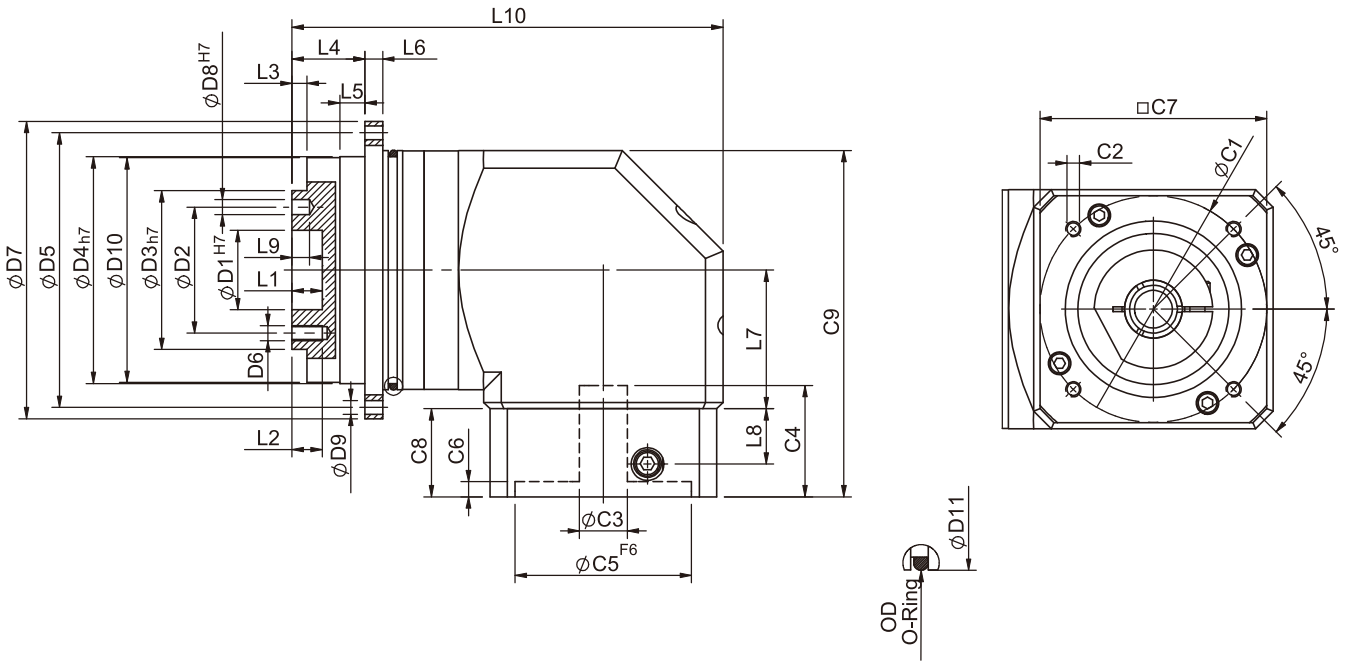
The PGFR series of flange type right angle helical gearbox provide a wide range of performance levels to high positioning accuracy and motion control applications, particularly when high precision and high torsional rigidity are required. Frame sizes 42-142 mm with the best level of backlash ≦ 2 arc-min. Nominal input speed up to 10000 rpm. The PGFR is specially well suited to work with pinion and rack for linear operation. Commonly adapted in metal cutting machines, wood processing equipment, machine centers and highly dynamic motion control systems. In-line configuration (PGF series) is also available with max. Frame size 142 mm.

Frame Size (mm)	42, 60, 90, 115, 142
Ratio	3 : 1 - 200 : 1
Nominal Input Speed (rpm)	3,000 - 5,000
Max Input Speed (rpm)	5,000 - 10,000
Backlash (arc-min)	1 Stage : 2 - 8 2 Stages : 4 - 10
Noise Level (dBA / 1m)	62 - 70

Features

- ▶ 3 levels of backlash, 5 frame sizes available from 42-142 mm.
- ▶ Premium and precision gear design, ratios from 3-200:1.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PGFR Single Stage Dimensions



Specifications

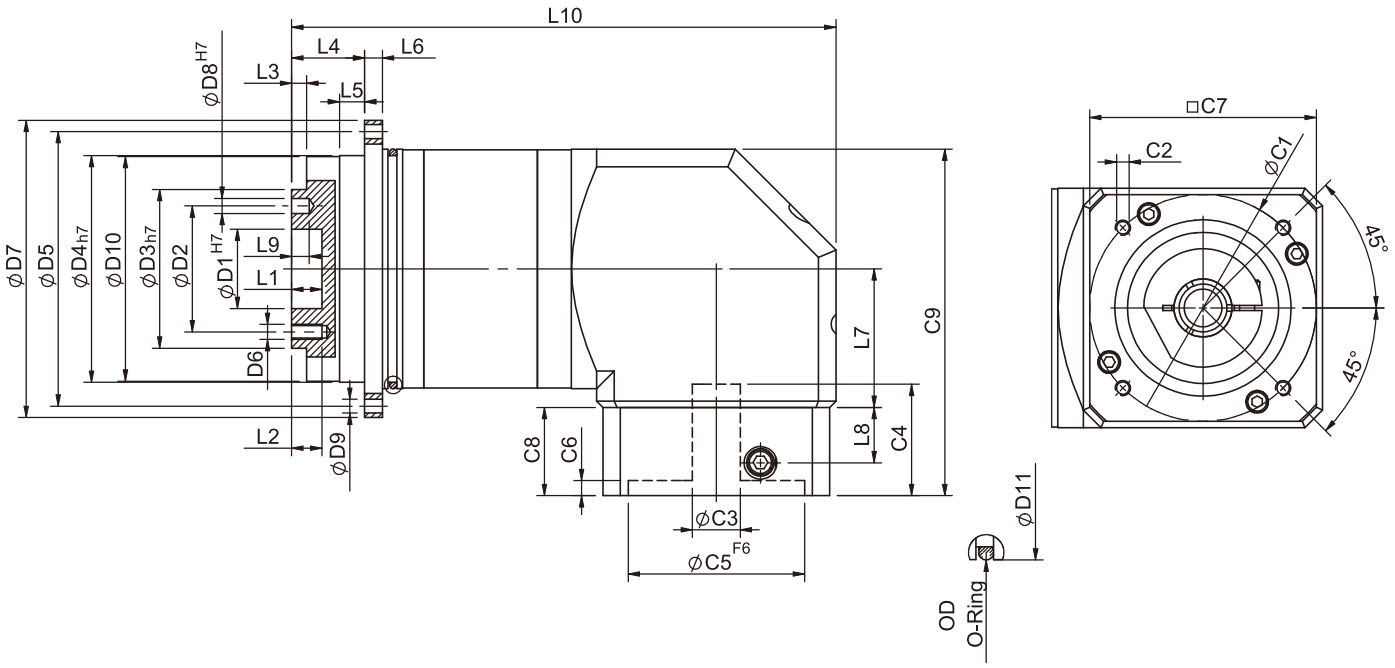
Unit:mm

Dimensions	PGFR42	PGFR60	PGFR90	PGFR115	PGFR142
$D1_{H7}$	12	20	31.5	40	50
D2	20	31.5	50	63	80
$D3_{h7}$	28	40	63	80	110
$D4_{h7}$	47	64	90	110	140
D5	67	79	109	135	168
D6	M3x0.5P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P
D7	72	86	118	145	179
$D8_{H7}$	3	5	6	6	8
D9	3.4	4.5	5.5	5.5	6.6
D10	46.2	63.2	89.2	109.2	139.2
D11	60	70	95	120	152
L1	4	8	12	12	12
L2	6	7.2	12	13.5	16
L3	3	3	6	6	6
L4	19.5	19.5	29	29	38
L5	7	7	10	10	14.6
L6	4	4	7	8	10
L7	32.2	44.8	55	69	71
L8	13.5	21.5	22	32	44.7
L9	4	6	7	7	7
L10	92.2	123.9	171.1	200.2	250.7
$C1^{2}$	46	70	90	90	145
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32	≦35
$C4^{2}$	29	34	44	53.5	76.8
$C5^{2}{}_{F6}$	30	50	70	70	110
$C6^{2}$	6	5	5	5.5	9
$C7^{2}$	42.6	60	90	115	140
$C8^{2}$	25	33	35	48	65
$C9^{2}$	75.3	112.8	137.5	176.5	225.5
OD	56x2	66x2	90x3	110x3	145x3

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGFR Double Stage Dimensions-1



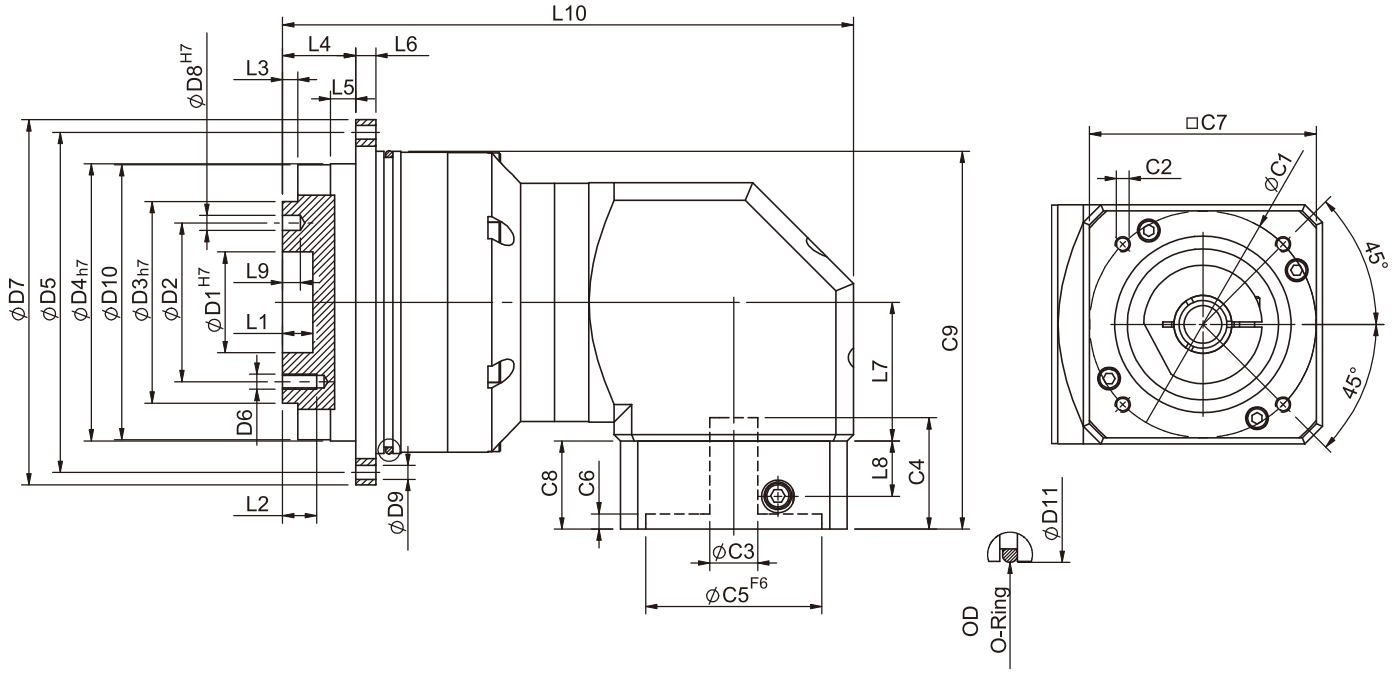
Specifications Unit:mm

Dimensions	PGFR42	PGFR60	PGFR90
$D1_{H7}$	12	20	31.5
D2	20	31.5	50
$D3_{h7}$	28	40	63
$D4_{h7}$	47	64	90
D5	67	79	109
D6	M3x0.5P	M5x0.8P	M6x1.0P
D7	72	86	118
$D8_{H7}$	3	5	6
D9	3.4	4.5	5.5
D10	46.2	63.2	89.2
D11	60	70	95
L1	4	8	12
L2	6	7.2	12
L3	3	3	6
L4	19.5	19.5	29
L5	7	7	10
L6	4	4	7
L7	32.2	44.8	55
L8	13.5	21.5	22
L9	4	6	7
L10	119.9	159.3	216.1
C1 [2]	46	70	90
C2 [2]	M4x0.7P	M5x0.8P	M6x1.0P
C3 [2]	≦8/≦11	≦14/≦19	≦19/≦24
C4 [2]	29	34	44
$C5_{F6}$ [2]	30	50	70
C6 [2]	6	5	5
C7 [2]	42.6	60	90
C8 [2]	25	33	35
C9 [2]	78.5	112.8	137.5
OD	56x2	66x2	90x3

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGFR Double Stage Dimensions-2



Specifications Unit:mm

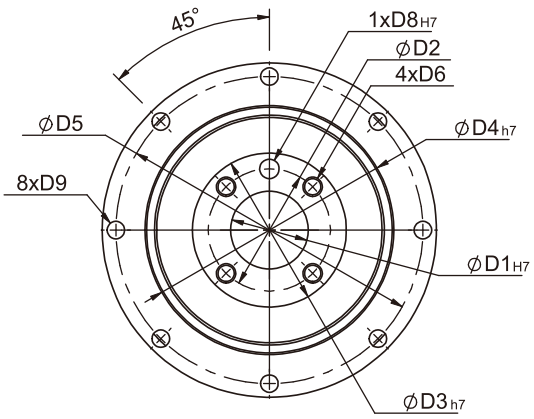
Dimensions	PGFR60T	PGFR90T	PGFR115T	PGFR142T
$D1_{H7}$	20	31.5	40	50
D2	31.5	50	63	80
$D3^{h7}$	40	63	80	100
$D4^{h7}$	64	90	110	140
D5	79	109	135	168
D6	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P
D7	86	118	145	179
$D8_{H7}$	5	6	6	8
D9	4.5	5.5	5.5	6.6
D10	63.2	89.2	109.2	139.2
D11	70	95	120	152
L1	8	12	12	12
L2	7.2	12	13.5	16
L3	3	6	6	6
L4	19.5	29	29	38
L5	7	10	10	14.6
L6	4	7	8	10
L7	32.2	44.8	55	69
L8	13.5	21.5	22	32
L9	6	7	7	7
L10	126.6	171.3	226.6	270.7
$C1^{2}$	46	70	90	90
$C2^{2}$	M4x0.7P	M5x0.8P	M6x1.0P	M6x1.0P
$C3^{2}$	≦8/≦11	≦14/≦19	≦19/≦24	≦24/≦32
$C4^{2}$	29	34	44	53.5
$C5^{2}_{F6}$	30	50	70	70
$C6^{2}$	6	5	5	5.5
$C7^{2}$	42.6	60	90	115
$C8^{2}$	25	33	35	48
$C9^{2}$	84.4	125.3	150	176.5
OD	66x2	90x2	110x3	145x3

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

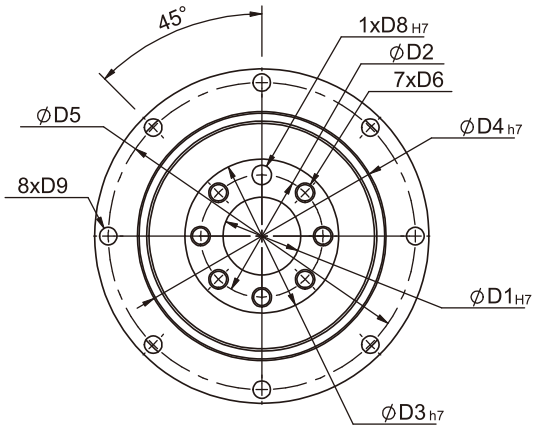
★ Specification subject to change without notice.

PGFR Flange Dimensions

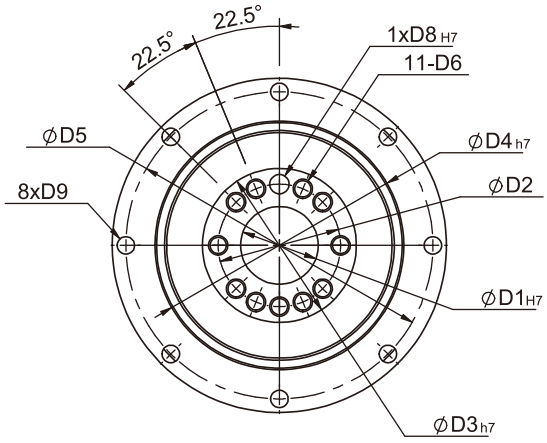
PGFR42



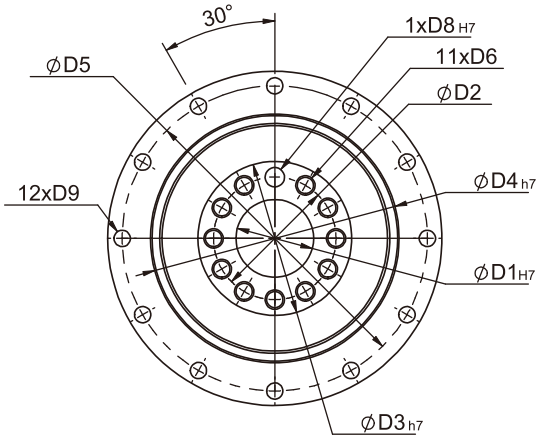
PGFR60
PGFR90



PGFR115



PGFR142



Specifications

Unit:mm

Dimensions	PGFR42	PGFR60	PGFR90	PGFR115	PGFR142
D1H7	12	20	31.5	40	50
D2	20	31.5	50	63	80
D3h7	28	40	63	80	100
D4h7	47	64	90	110	140
D5	67	79	109	135	168
D6	M3x0.5P	M5x0.8P	M6x1.0P	M6x1.0P	M8x1.25P
D8H7	3	5	6	6	8
D9	3.4	4.5	5.5	5.5	6.6

★ Specification subject to change without notice.

PGFR Specifications

Specifications		Stage	Ratio	PGFR-42	PGFR-60	PGFR-90	PGFR-115	PGFR-142
Nominal Output Torque T_{2N}	N • m	1	3	-	40	105	180	340
			4	16	43	110	240	500
			5	17	50	130	290	600
			7	14	44	125	270	530
			10	17	50	130	260	540
			14	14	44	125	270	530
			20	11	37	95	220	430
		Stage	Ratio	PGFR-42	PGFR-60/ PGFR-60T	PGFR-90/ PGFR-90T	PGFR-115T	PGFR-142T
		2	15	-	40	105	180	600
			20	16	43	110	240	600
			25	17	50	130	290	600
			30	17	40	105	180	600
			35	17	50	130	290	600
			40	16	43	110	240	600
			50	17	50	130	290	600
			70	14	44	125	270	530
			100	11	37	95	220	430
			140	14	44	125	270	530
			200	11	37	95	220	430
Emergency Stop Torque T_{2NOT}	N · m		(3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-200	5000	5000	4000	4000	3000
Max. Input Speed n_{1max}	rpm	1,2	3-200	10000	10000	8000	8000	5000
Micro Backlash P0	arcmin	1	3-20	-	-	≦4	≦2	≦2
		2	15-200	-	-	≦6	≦4	≦4
Precision Backlash P1	arcmin	1	3-20	≦6	≦6	≦6	≦4	≦4
		2	15-200	≦8	≦8	≦8	≦7	≦7
Standard Backlash P2	arcmin	1	3-20	≦8	≦8	≦8	≦6	≦6
		2	15-200	≦10	≦10	≦10	≦9	≦9
Torsional Rigidity	N · m /arcmin	1,2	3-200	6	12	28	75	145
Max. Bending Moment M_{2kB}[1]	N	1,2	3-200	22.5	36	76	140	950
Max. Axial Load F_{2aB}[1]	N	1,2	3-200	465	635	1060	1580	6400
Operating Temp.	℃		3-200	-10℃ ~ +90℃				
Service Life	hr		3-200	20,000 (10,000 Continuous Operation)				
Efficiency	%	1	3-20	≧95%				
		2	15-200	≧92%				
Weight	kg	1	3-20	1.1	2.2	6.3	13.5	25.1
		2	15-200	1.6	2.9/2.1	8.3/5.0	14.8	26.7
Mounting Position	-	1,2	3-200	Any Direction				
Noise Level [2]	dBA/1m	1,2	3-200	62	64	66	68	70
Protection Class	-	1,2	3-200	IP65				
Lubrication	-	1,2	3-200	Synthetic Lubricant				

Intertia(J1)

Stage	Ratio	unit	PGFR-42	PGFR-60	PGFR-90	PGFR-115	PGFR-142
1	3/4/5/7	Kg · cm^2	0.06	0.40	2.28	6.87	24.2
	10/14/20		0.05	0.30	1.45	4.76	14.5
Stage	Ratio		PGFR-42	PGRF-60(T)	PGFR-90(T)	PGFR-115T	PGFR-142T
2	15/20/25/35		0.06	0.40(0.08)	2.28(0.72)	3.02	7.83
	Others		0.05	0.30(0.06)	1.45(0.38)	1.64	5.00

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

Q11. Do I need to change speed reducer oil?

No oil filling or lubricant change is required.

Sesame speed reducers and gearboxes are designed so that there is no need to worry about oil change or fill for service life, which reduces maintenance time and cost. Every speed reducer or gearbox needs lubrication. Lubricant (oil or grease) is used to ensure the gears and other components inside the gearbox function well and to prevent wear. It also helps to reduce noise, vibration and provide cooling function.

SGC
SGE

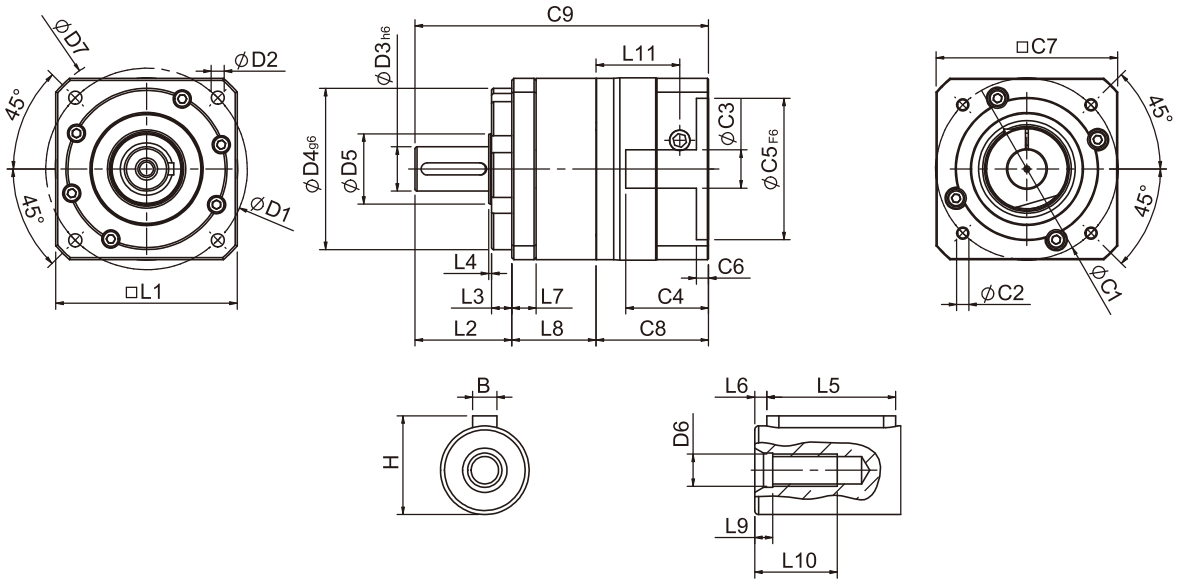
The stainless steel planetary gearboxes SGC series and SGE series are specially developed and constructed for use in food, pharmaceutical, chemical, biotechnology, aerospace, anti-magnetic applications and those environments require corrosion protection exist. They are precision in-line servo gearboxes with smooth appearance and permanent laser engraving label to provide outstanding corrosion resistance in wash-down environments. Customized requirements such as high level IP protection or surface treatment are available to apply high temperature and pressure wash-down or hygienic environments. Feel free to contact us for further information.

	SGC	SGE
Frame Size (mm)	50, 70, 90, 120	42, 60, 90, 115
Ratio	3 : 1-100:1	
Nominal Input Speed (rpm)	2,500 - 4,000	
Max Input Speed (rpm)	5,000 - 6,000	
Backlash (arc-min)	1 Stage: 6 - 9 2 Stages: 8 -12	
Noise Level (dBA / 1m)	61 - 67	

SGC/ SGE Features

- ▶ Corrosion resistance.
- ▶ One-piece constructed output shaft and gear carrier.
- ▶ Permanent laser engraving label.
- ▶ Lubricated for life.
- ▶ Customization available.
- ▶ Taiwan patent no. M524896.

SGE Single Stage Dimensions



Specifications

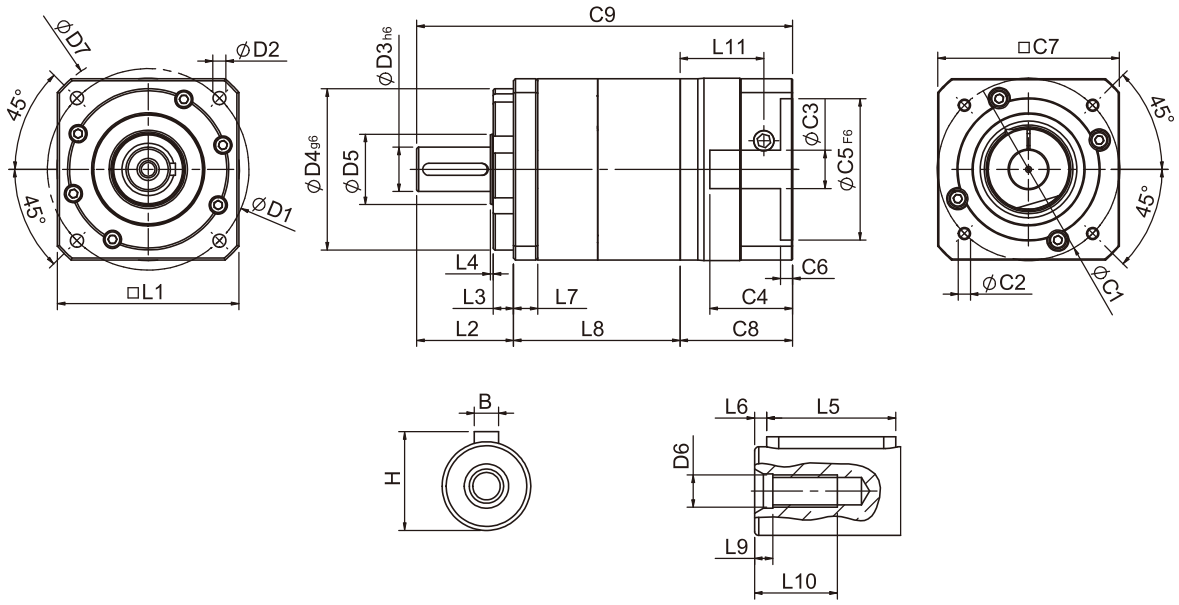
Unit:mm

Dimensions	SGE-42	SGE-60	SGE-90
D1	-	70	100
D2	-	5.5	6.5
$D3_{h6}$	-	16	22
$D4_{g6}$	-	50	80
D5	-	20	35
D6	-	M5x0.8P	M8x1.25P
D7	-	80	118
L1	-	62.5	90
L2	-	37	48
L3	-	7	10
L4	-	1.5	1.5
L5	-	25	32
L6	-	2	3
L7	-	10	12.1
L8	-	36.3	41.8
L9	-	4	4.5
L10	-	16.5	20.5
L11	-	34.3	41.5
C1[2]	-	70	90
C2[2]	-	M5x0.8P	M6x1.0P
C3[2]	-	≦14/≦19	≦19/≦24/≦28
C4[2]	-	33.5	41
$C5^{2}_{F6}$	-	50	70
C6[2]	-	4	6
C7[2]	-	60	90
C8[2]	-	44.8	55.8
C9[2]	-	118.1	145.6
B	-	5	6
H	-	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

SGE Double Stage Dimensions



Specifications Unit:mm

Dimensions	SGE-42	SGE-60	SGE-90
D1	-	70	100
D2	-	5.5	6.5
D3 h6	-	16	22
D4 g6	-	50	80
D5	-	20	35
D6	-	M5x0.8P	M8x1.25P
D7	-	80	118
L1	-	62.5	90
L2	-	37	48
L3	-	7	10
L4	-	1.5	1.5
L5	-	25	32
L6	-	2	3
L7	-	10	12.1
L8	-	66.9	82.7
L9	-	4	4.5
L10	-	16.5	20.5
L11	-	34.3	41.5
C1[2]	-	70	90
C2[2]	-	M5x0.8P	M6x1.0P
C3[2]	-	≦14/≦19	≦19/≦24/≦28
C4[2]	-	33.5	41
C5[2]F6	-	50	70
C6[2]	-	4	6
C7[2]	-	60	90
C8[2]	-	44.8	55.8
C9[2]	-	148.7	186.5
B	-	5	6
H	-	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

SGE Specifications

Specifications		Stage	Ratio	SGE-42	SGE-60	SGE-90	SGE-115
Nominal Output Torque T_{2N}	N · m	1	3	9	28	85	220
			4	10	32	80	240
			5	11	35	95	270
			7	10	28	85	220
			9	8	23	75	210
			10	8	21	65	190
		Stage	Ratio	SGE-42	SGE-60(T)	SGE-90(T)	SGE-115(T)
		2	15	11	34	90	250
			20	10	32	80	240
			25	11	35	95	270
			35	11	35	95	270
			45	11	35	95	270
			49	10	28	85	220
			63	10	28	85	220
			81	8	23	75	210
			100	8	21	65	190
Emergency Stop Torque T_{2NOT}	N · m	(3.0 t imes of Nominal Output Torque) (*Max. Output Torque T_{2B} =60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-100	4000	4000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-100	6000	6000	6000	5000
Standard Backlash P2	arcmin	1	3-10	≦9	≦8	≦7	≦6
		2	15-100	≦12	≦10	≦9	≦8
Torsional Rigidity	N · m /arcmin	1,2	3-100	1.5	4.0	8.5	17
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	760	1250	2030	4200
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	410	700	1200	2600
Operating Temp.	℃	1,2	3-100	-10℃ ~ +90℃			
Service Life	hr	1,2	3-100	20,000 (10,000 Continuous operation)			
Efficiency	%	1	3-100	≧95%			
		2	15-100	≧90%			
Weight	kg	1	3-10	0.9	1.9	4.8	11.5
		2	15-100	1.1	2.4(2.2)	6.5(5.4)	13.5
Mounting Position	-	1,2	3-100	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-100	61	63	66	67
Protection Class	-	1,2	3-100	IP65 (Optional : IP67)			
Lubrication	-	1,2	3-100	Synthetic Lubricant (Optional: Food Grade Grease)			

Inertia (J1)

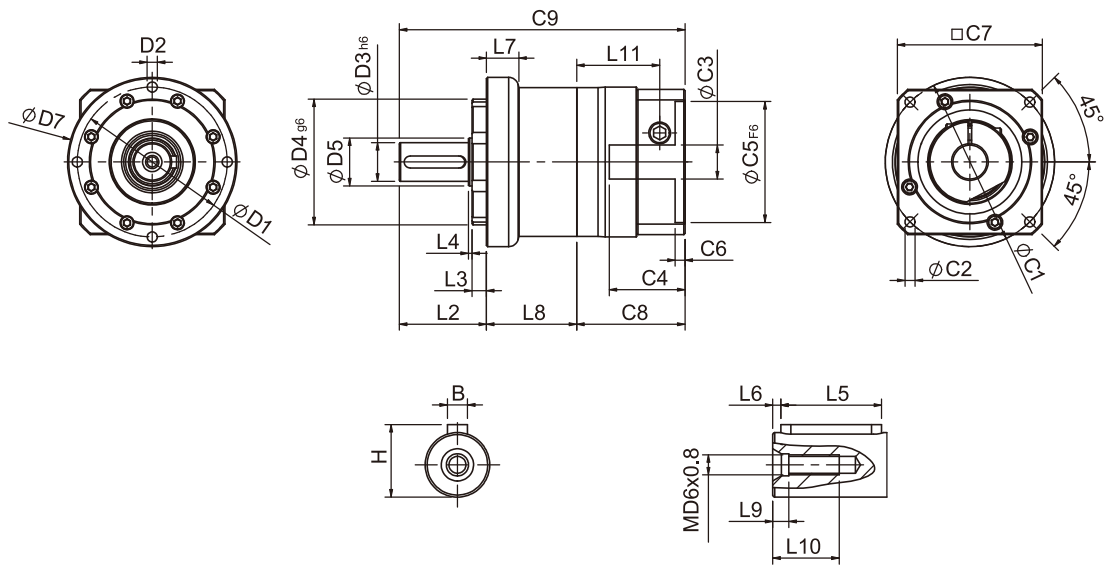
Stage	Ratio	unit	SGE-42(ψ8)	SGE-60(ψ14)	SGE-90(ψ19)	SGE-115(ψ24)
1	3	$Kg \cdot cm^2$	0.04	0.23	0.77	2.30
	4		0.03	0.21	0.67	1.92
	5		0.03	0.21	0.61	1.71
	7		0.03	0.21	0.60	1.65
	9/10		0.03	0.21	0.60	1.63
Stage	Ratio		SGE-42(ψ8)	SGE-60(ψ14)/ SGE-60T(ψ8)	SGE-90(ψ19)/ SGE-90T(ψ14)	SGE-115(ψ19)
2	15/20/25		0.03	0.21(0.03)	0.61(0.21)	0.61
	35/49		0.03	0.21(0.03)	0.60(0.21)	0.60
	45/63/81/100		0.03	0.21(0.03)	0.60(0.21)	0.60

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

SGC Single Stage Dimensions



Specifications

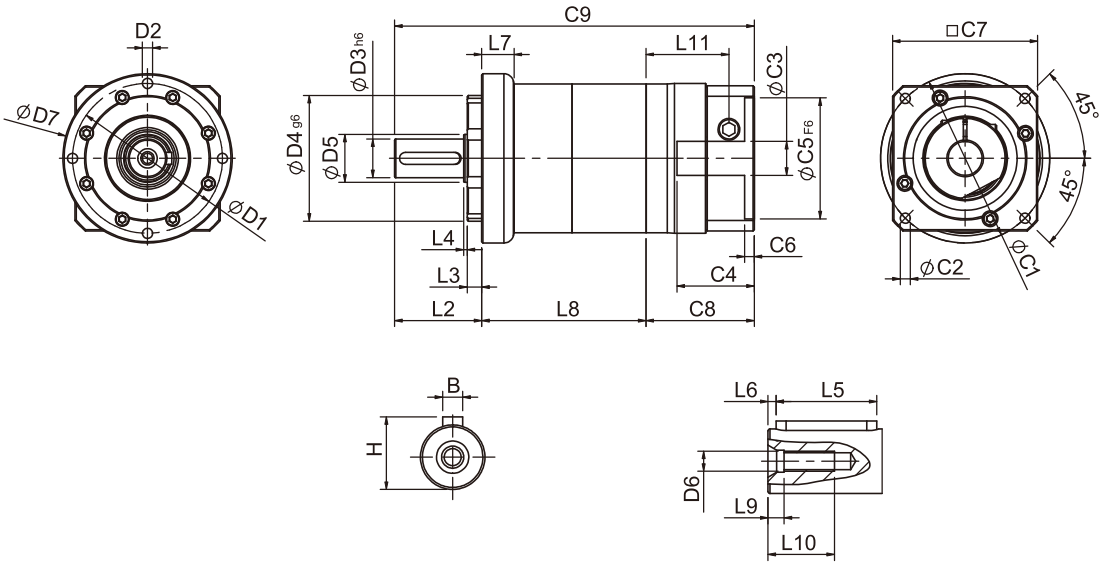
Unit:mm

Dimensions	SGC-50	SGC-70	SGC-90
D1	-	62	80
D2	-	M5x0.8P	M6x1.0P
D3h6	-	16	22
D4g6	-	52	68
D5	-	20	35
D6	-	M5x0.8P	M8x1.25P
D7	-	70	90
L2	-	36	46
L3	-	6	7
L4	-	1.5	2.5
L5	-	25	32
L6	-	2	3
L7	-	13.4	14.1
L8	-	37.3	43.8
L9	-	4	4.5
L10	-	16.5	20.5
L11	-	34.3	41.5
C1[2]	-	70	90
C2[2]	-	M5x0.8P	M6x1.0P
C3[2]	-	≦14/≦19	≦19/≦24/≦28
C4[2]	-	33.5	41
C5[2]F6	-	50	70
C6[2]	-	4	6
C7[2]	-	60	90
C8[2]	-	44.8	55.8
C9[2]	-	118.1	145.6
B	-	5	6
H	-	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

SGC Double Stage Dimensions



Specifications Unit:mm

Dimensions	SGC-50	SGC-70	SGC-90
D1	-	62	80
D2	-	M5x0.8P	M6x1.0P
$D3_{h6}$	-	16	22
$D4_{g6}$	-	52	68
D5	-	20	35
D6	-	M5x0.8P	M8x1.25P
D7	-	70	90
L2	-	36	46
L3	-	6	7
L4	-	1.5	2.5
L5	-	25	32
L6	-	2	3
L7	-	13.4	14.1
L8	-	67.9	84.7
L9	-	4	4.5
L10	-	16.5	20.5
L11	-	34.3	41.5
C1 [2]	-	70	90
C2 [2]	-	M5x0.8P	M6x1.0P
C3 [2]	-	≦14/≦19	≦19/≦24/≦28
C4 [2]	-	33.5	41
$C5^{2}_{F6}$	-	50	70
C6 [2]	-	4	6
C7 [2]	-	60	90
C8 [2]	-	44.8	55.8
C9 [2]	-	148.7	186.5
B	-	5	6
H	-	18	24.5

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

SGC Specifications

Specifications		Stage	Ratio	SGC-50	SGC-70	SGC-90	SGC-120
Nominal Output Torque T_{2N}	N · m	1	3	9	28	85	220
			4	10	32	80	240
			5	11	35	95	270
			7	10	28	85	220
			9	8	23	75	210
			10	8	21	65	190
		Stage	Ratio	SGC-50(T)	SGC-70(T)	SGC-90(T)	SGC-120(T)
		2	15	11	34	90	250
			20	10	32	80	240
			25	11	35	95	270
			35	11	35	95	270
			45	11	35	95	270
			49	10	28	85	220
			63	10	28	85	220
			81	8	23	75	210
			100	8	21	65	190
Emergency Stop Torque T_{2NOT}	N · m	(3.0 t imes of Nominal Output Torque) (*Max. Output Torque T_{2B} =60% of Emergency Stop Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-100	4000	4000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2	3-100	6000	6000	6000	5000
Standard Backlash P2	arcmin	1	3-10	≦9	≦8	≦7	≦6
		2	15-100	≦12	≦10	≦9	≦8
Torsional Rigidity	N · m /arcmin	1,2	3-100	1.5	4.0	8.5	17
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	760	1250	2030	4200
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	410	700	1200	2600
Operating Temp.	℃	1,2	3-100	-10℃ ~ +90℃			
Service Life	hr	1,2	3-100	20,000 (10,000 Continuous Operation)			
Efficiency	%	1	3-100	≧95%			
		2	15-100	≧90%			
Weight	kg	1	3-10	0.9	1.9	4.8	11.5
		2	15-100	1.1	2.4(2.2)	6.5(5.4)	13.5
Mounting Position	-	1,2	3-100	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-100	61	63	66	67
Protection Class	-	1,2	3-100	IP65 (Optional : IP67)			
Lubrication	-	1,2	3-100	Synthetic Lubricant (Optional: Food Grade Grease)			

Inertia (J1)

Stage	Ratio	unit	SGC-50(ψ8)	SGC-70(ψ14)	SGC-90(ψ19)	SGC-120(ψ24)
1	3	$Kg \cdot cm^2$	0.04	0.23	0.77	2.30
	4		0.03	0.21	0.67	1.92
	5		0.03	0.21	0.61	1.71
	7		0.03	0.21	0.60	1.65
	9/10		0.03	0.21	0.60	1.63
Stage	Ratio		SGC-50(ψ8)	SGC-70(ψ14)/ SGC-70T(ψ8)	SGC-90(ψ19)/ SGC-90T(ψ14)	SGC-120(ψ19)
2	15/20/25		0.03	0.21(0.03)	0.61(0.21)	0.61
	35/49		0.03	0.21(0.03)	0.60(0.21)	0.60
	45/63/81/100		0.03	0.21(0.03)	0.60(0.21)	0.60

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

PGW

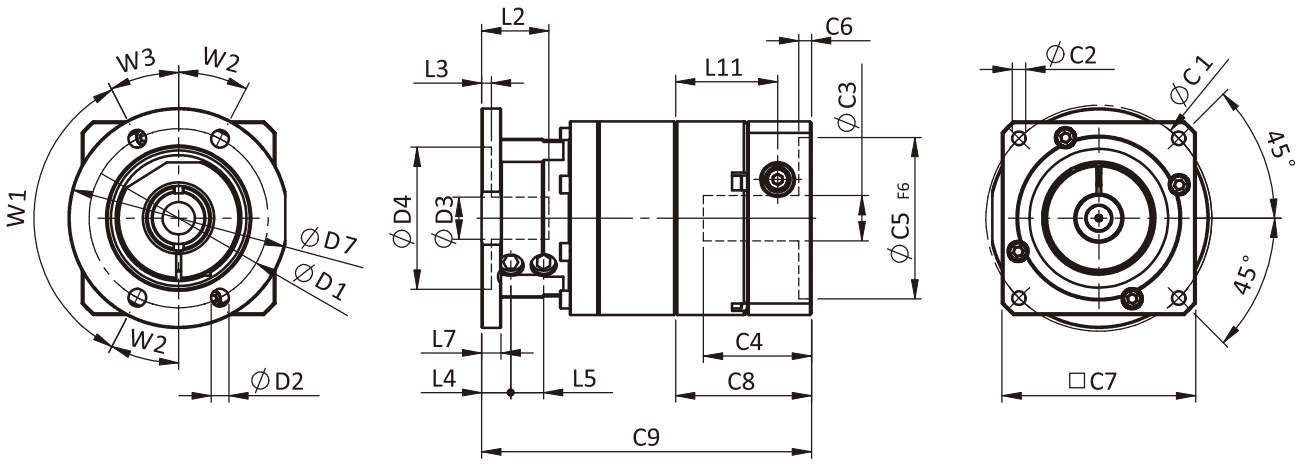
Sesame Motor PGW in-line planetary gearheads are designed to bolt-on linear actuator drive systems to shorten powertrain length. Dynamic balanced collar clamping mechanism to actuator and motor shaft ensuring interfaces concentrically and zero slip power transmission at high speed. High quality gears and components are utilized to create compact and rigid unit with low backlash and maintenance-free operation.

Frame Size (mm)	60, 90, 115
Ratio	3 : 1-1000:1
Nominal Input Speed (rpm)	2,500 - 4,000
Max Input Speed (rpm)	5,000 - 6,000
Backlash (arc-min)	1 Stage: 6 - 8 2 Stages: 8 - 10 3 Stages: 12
Noise Level (dBA / 1m)	63 - 67

Features

- ▶ In-line planetary gearhead with zero slip clamping mechanism.
- ▶ Hollow output shaft and flange are ready to mount to belt or ball screw modules.
- ▶ One-piece planet carrier/output shaft.
- ▶ Alloy steel precision gears.
- ▶ Ratios up to 1000:1.
- ▶ Lubricated for life and IP65 sealing.
- ▶ Low noise, low vibration, maintenance-free under normal operating conditions.

PGW Single Stage Dimensions



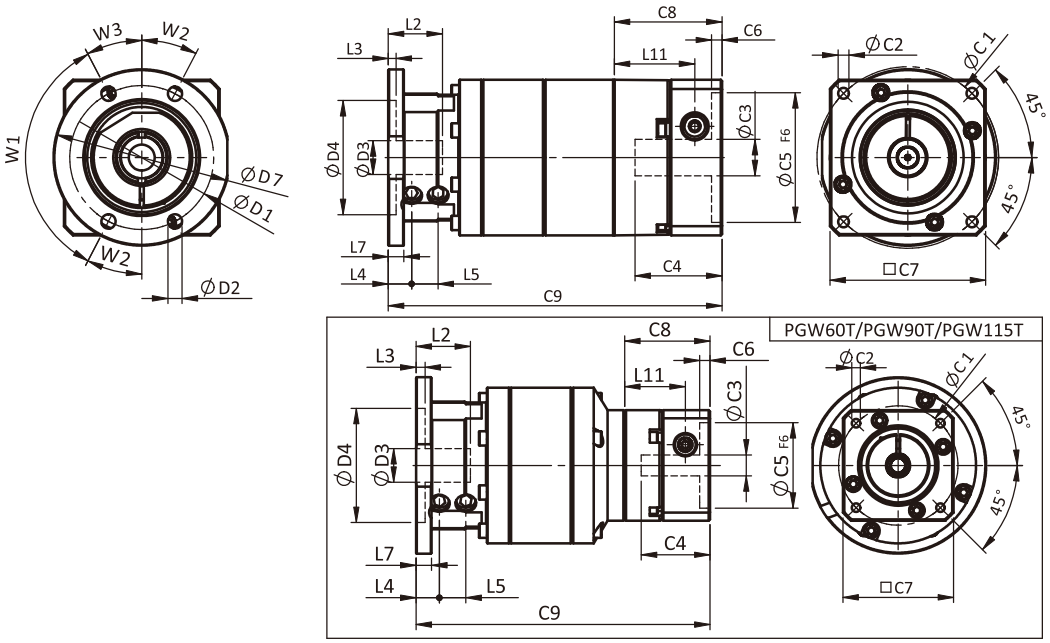
Specifications Unit:mm

Dimensions	PGW60	PGW90	PGW115
D1	55.5	73	105
D2	5.5	5.5	6.6
D3	16	20	30
D4	44	60	80
D7	70	84	118
L2	31	31	37
L3	3.5	3.5	3.5
L4	9	10.2	12.5
L5	10.2	10.9	13
L7	6	6	10
L11	31.6	37.3	51.8
W1	125°	90°	90°
W2	27.5°	22.5°	22.5°
W3	27.5°	67.5°	67.5°
C1[2]	70	90	145
C2[2]	M5x0.8P	M6x1.0P	M8x1.25P
C3[2]	≦14/≦19	≦19/≦24/≦28	≦24/≦32/≦38
C4[2]	33.5	41	51.5
C5[2]F6	50	70	110
C6[2]	4	6	6
C7[2]	60	90	130
C8[2]	42.1	51.5	68
C9[2]	102.2	126.5	172

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGW Double Stage Dimensions



Specifications

Unit:mm

Dimensions	PGW60	PGW60T	PGW90	PGW90T	PGW115T
D1	55.5		73		105
D2	5.5		5.5		6.6
D3	16		20		30
D4	44		60		80
D7	70		84		118
L2	31		31		37
L3	3.5		3.5		3.5
L4	9		10.2		12.5
L5	10.2		10.9		13
L7	6		6		10
L11	31	23.4	37.3	31	37.3
W1	125°		90°		90°
W2	27.5°		22.5°		22.5°
W3	27.5°		67.5°		67.5°
C1[2]	70	46	90	70	90
C2[2]	M5x0.8P	M4x0.7P	M6x1.0P	M5x0.8P	M6x1.0P
C3[2]	≦14/≦19	≦8/≦11	≦19/≦24/≦28	≦14/≦19	≦19/≦24/≦28
C4[2]	33.5	26.5	41	33.5	41
C5[2]F6	50	30	70	50	70
C6[2]	4	4	6	4	6
C7[2]	60	42.6	90	60	90
C8[2]	41.5	32.9	51.5	41.5	51.5
C9[2]	128.6	113.3	160.3	145.8	193.6

★ C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PGW Specifications

Specifications		Stage	Ratio	PGW60	PGW90	PGW115
Nominal Output Torque T_{2N}	N•m	1	3	28	85	200
			4	32	80	215
			5	35	95	215
			7	28	85	200
			9	23	75	195
			10	21	65	180
		Stage	Ratio	PGW60/PGW60T	PGW90/PGW90T	PGW115T
		2	15	35/24	95/68	168
			20	35/31	95/95	215
			25	35/30	95/95	215
			35	35/28	95/95	215
			45	35/27	95/92	215
			50	35/27	95/82	205
			70	28/28	85/85	200
			90	23/23	75/75	195
			100	21/21	65/65	180
		Stage	Ratio	PGW60T	PGW90T	PGW115T
		3	125	35	95	215
			175	35	95	215
			225	35	95	215
			245	35	95	215
			315	35	95	215
			405	35	95	215
			567	28	85	200
			729	23	75	195
			1000	21	65	180
Emergency Stop Torque T_{2NOT}	N•m	(2.5 times of Nominal Output Torque) (*Max. Output Torque T_{2B}=60% of Emergency Stop Torque)				
Nominal Input Speed n_{1N}	rpm	1,2,3	3-1000	4000	3000	2500
Max. Input Speed n_{1max}	rpm	1,2,3	3-1000	6000	6000	5000
Standard Backlash P2	arcmin	1	3-10	≦8	≦7	≦6
		2	15-100	≦10	≦9	≦8
		3	125~1000	≦12	≦12	≦12
Operating Temp.	℃	1,2,3		-10℃ ~ +90℃		
Service Life	hr	1,2,3	3-1000	20,000 (10,000 Continuous operation)		
Efficiency	%	1	3-10	≧95%		
		2	15-100	≧90%		
		3	125~1000	≧85%		
Weight	kg	1	3-10	1.2	2.9	6.4
		2	15-100	1.6/1.4	4.3/3.2	8.0
		3	125~1000	1.8	4.6	9.4
Mounting Position	-	1,2,3	3-1000	Any Direction		
Noise Level [2]	dBA/1m	1,2,3	3-1000	63	66	67
Protection Class	-	1,2,3	3-1000	IP65		
Lubrication	-	1,2,3	3-1000	Synthetic Lubricant		

Inertia (J1)

Stage	Ratio	unit	PGW60(ϕ14)	PGW90(ϕ19)	PGW115(ϕ24)
1	3	kg•cm²	0.23	0.77	2.30
	4		0.21	0.67	1.92
	5~10		0.21	0.61	1.71
Stage	Ratio		PGW60(ϕ14)/ PGW60T(ϕ8)	PGW90(ϕ19)/ PGW90T(ϕ14)	PGW115T(ϕ19)
2	15		0.23/(0.04)	0.77/(0.23)	0.77
	Other Ratios		0.21/(0.03)	0.61/(0.21)	0.61
Stage	Ratio		PGW60T(ϕ8)	PGW90T(ϕ14)	PGW115T(ϕ19)
3	All Ratios		0.03	0.21	0.61

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

Q12. Can I purchase parts to repair my gearbox when it fails?

Do not disassemble the gearbox by yourself when it is broken, damaged or abnormal. Please contact Sesame, tell us the damage condition and how the gearbox is used. The information is helpful for further repair or maintenance evaluation. We do not provide parts or components for customers to repair the broken gearbox or replace damaged parts by themselves. Self repair of the damaged gearbox may result in the following problems:

- ▶ To damage other parts or components of the gearbox
- ▶ Missing parts
- ▶ Incorrect disassemble, clean and assemble procedures will result in parts damage
- ▶ Lubricant or grease is not available or fails to meet specification
- ▶ Unable to confirm the product function recovery after repair
- ▶ Causes failure or damage to other equipment

Sesame products are designed by engineers, manufactured and assembled by well-trained technicians, verified countless times to ensure the specifications meet the industry standards, and can be installed and used by customers to perform normal functions. The components or accessories used in the gearboxes are also designed, calculated, selected, matched and verified by engineers before use. In addition, the key components are machined and inspected by advanced machine tools and testing equipment to confirm the precision is in line with international standard. The assemble technicians can work only after long-term training and passing regular assessments. There are complete and standardized product assembly and maintenance processes in Sesame to ensure the quality of products after assembly and repair, as well as the rights and interests of customers and users.

PGHA
PGHX

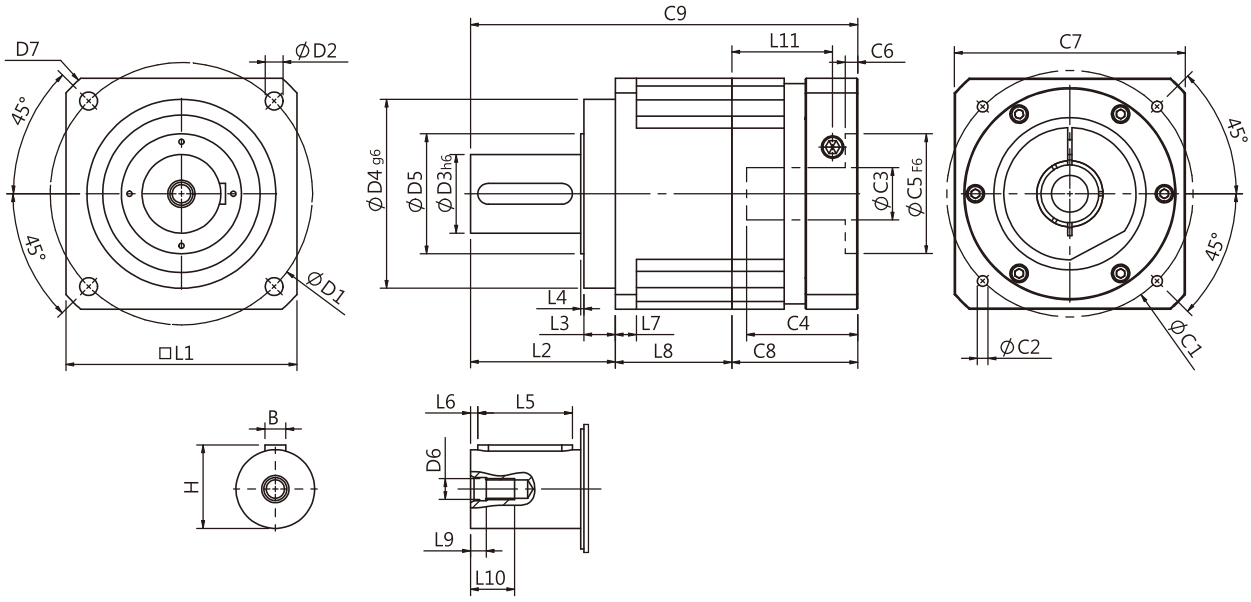
The high rigidity model is mainly used for extremely large double column machine center or horizontal machine tools. The planetary gearboxes will not be distorted or shaken under high torque and emergency stop condition. The turret can be edited instantly without waiting. This rugged gearbox is not only able to withstand the challenges of harsh, high and low temperature environments, but also retains the original low backlash, low noise and other properties of the servo planetary gearbox.

Frame Size (mm)	220, 240
Ratio	3 : 1 - 100:1
Nominal Input Speed (rpm)	1,500 - 2,000
Max Input Speed (rpm)	2,500 - 4,000
Backlash (arc-min)	1 Stage: 1 - 5 2 Stages: 3 - 7
Noise Level (dBA / 1m)	70 - 72

Features

- ▶ Designed for large double column machine center or horizontal machine tools.
- ▶ Backlash as low as 1 arc-minute, ultimate performance.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PGHA & PGHX Single Stage Dimensions



Specifications

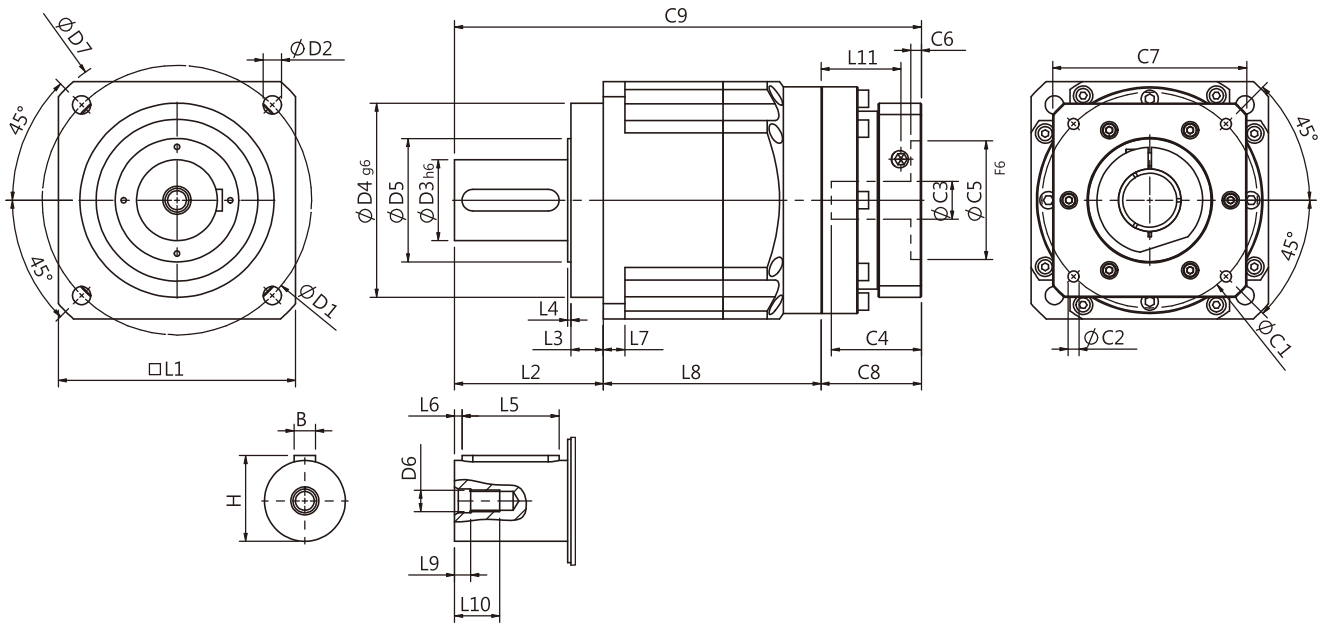
Unit:mm

Dimensions	PGHA220	PGHA240	PGHX220	PGHX240
D1	250	-	250	-
D2	17	-	17	-
D3 h6	75	-	75	-
D4 g6	180	-	180	-
D5	114.4	-	114.4	-
D6	M20x2.5P	-	M20x2.5P	-
D7	292	-	292	-
L1	220	-	220	-
L2	138	-	138	-
L3	30	-	30	-
L4	3	-	3	-
L5	90	-	90	-
L6	7	-	7	-
L7	20	-	20	-
L8	111	-	111	-
L9	15	-	15	-
L10	42	-	42	-
L11	96	-	96	-
C1[2]	235	-	235	-
C2[2]	M12x1.75P	-	M12x1.75P	-
C3[2]	≦55	-	≦55	-
C4[2]	112	-	112	-
C5[2] F6	200	-	200	-
C6[2]	6	-	6	-
C7[2]	220	-	220	-
C8[2]	120	-	120	-
C9[2]	369	-	369	-
B	20	-	20	-
H	79.5	-	79.5	-

*2. C1~C9 are motor specific dimensions (metric std shown). Sizes may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PGHA & PGHX Double Stage Dimensions



Specifications

Unit:mm

Dimensions	PGHA220T	PGHA240T	PGHX220T	PGHX240T
D1	250	-	250	-
D2	17	-	17	-
D3 h6	75	-	75	-
D4 g6	180	-	180	-
D5	114.4	-	114.4	-
D6	M20x2.5P	-	M20x2.5P	-
D7	292	-	292	-
L1	220	-	220	-
L2	138	-	138	-
L3	30	-	30	-
L4	3	-	3	-
L5	90	-	90	-
L6	7	-	7	-
L7	20	-	20	-
L8	202	-	202	-
L9	15	-	15	-
L10	42	-	42	-
L11	74	-	74	-
C1[2]	200	-	200	-
C2[2]	M12x1.75P	-	M12x1.75P	-
C3[2]	≦50	-	≦50	-
C4[2]	81	-	81	-
C5[2] F6	114.3	-	114.3	-
C6[2]	6	-	6	-
C7[2]	180	-	180	-
C8[2]	93	-	93	-
C9[2]	433	-	433	-
B	20	-	20	-
H	79.5	-	79.5	-

*2. C1~C9 are motor specific dimensions (metric std shown). Sizes may vary according to the motor flange chosen.

★ Specification subject to change without notice.

PGHA & PGHX Specifications

Specifications		Stage	Ratio	PGHA-220	PGHA-240	PGHX-220	PGHX-240
Nominal Output Torque T_{2N}	N • m	1	3	1200	1500	1650	2000
			4	1850	2550	2600	3500
			5	2200	3020	3020	4100
			6	2050	2800	2900	3900
			7	1900	2600	-	-
			8	1750	2400	-	-
			9	1600	2200	-	-
			10	1600	2200	-	-
		Stage	Ratio	PGHA-220T	PGHA-240T	PGHX-220T	PGHX-240T
		2	15	2200	3020	2800	4100
			20	2200	3020	3020	4100
			25	2200	3020	3020	4100
			30	2200	3020	3020	4100
			35	2200	3020	3020	4100
			40	2200	3020	3020	4100
			45	2200	3020	3020	4100
			50	2200	3020	3020	4100
			60	2050	2800	2900	3900
			70	1900	2600	-	-
			80	1750	2400	-	-
			90	1600	2200	-	-
			100	1600	2200	-	-
Emergency Stop Torque T_{2NOT}	N • m	3.0 Times of Nominal Output Torque) (* Max. Output Torque T_{2B} =60% of Nominal Output Torque)					
Nominal Input Speed n_{1N}	rpm	1,2	3-300	2000	1500	2000	1500
Max. Input Speed n_{1max}	rpm	1,2	3-300	4000	2500	4000	2500
Micro Backlash P0	arcmin	1	3-10	≦1	≦1	≦1	≦1
		2	15-100	≦3	≦3	≦3	≦3
Precision Backlash P1	arcmin	1	3-10	≦3	≦3	≦3	≦3
		2	15-100	≦5	≦5	≦5	≦5
Standard Backlash P2	arcmin	1	3-10	≦5	≦5	≦5	≦5
		2	15-100	≦7	≦7	≦7	≦7
Torsional Rigidity	N • m /arcmin	1,2	3-100	350	500	460	650
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	33000	46500	33000	46500
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	18530	27000	18530	27000
Operating Temp.	℃		3-300	-10℃ ~ +90℃			
Service Life	hr		3-300	20,000 (10,000 Continuous Operation)			
Efficiency	%	1	3-10	≧97%			
		2	15-100	≧94%			
Weight	kg	1	3-10	57	-	58	-
		2	15-100	71.5	-	72.5	-
Mounting Position	-	1,2	3-300	Any Direction			
Noise Level [2]	dBA/1m	1,2	3-300	70	72	70	72
Protection Class	-	1,2	3-300	IP65			
Lubrication	-	1,2	3-300	Synthetic Lubricant			

Inertia (J1)

Stage	Ratio	unit	PGHA-220	PGHA-240	PGHX-220	PGHX-240
1	3	Kg • cm^2	79.50	-	79.50	-
	4		58.21	-	58.21	-
	5		54.36	-	54.36	-
	6/7/8		54.12	-	54.12	-
	9/10		53.98	-	53.98	-
Stage	Ratio		PGHA-220T	PGHA-240T	PGHX-220T	PGHX-240T
2	15		30.5	79.50	30.5	79.50
	20/25/30/35/40		25.86	58.21	25.86	58.21
	45/50/60/70/80/90/100		22.73	53.98	22.73	53.98

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

Q13. What does IP65 mean in specification table?

IP rating refers to International Protection Marking, also known as Ingress Protection Rating or IP Code. It is often called "dustproof and waterproof level". A common IP code consists of IP followed by two-digits number. The IP rating defines the protection degree of machine and electronic equipment against solid foreign objects, liquid ingress and accidental contact. The IP rating code is formulated in accordance with IEC60529 and IEC60034-5 of the International Electrotechnical Commission to classified dust proof and water proof capabilities into different levels by numbers. For example, IP54 or IP65 represents different protection ability. The first digit represents the protection ability of solid particle. The second digit indicates the enclosure level against ingress of water or liquid. The IP level and protection described as follows.

First digit: solid particle protection

1st Digit	Intrusion Protection
0	No protection.
1	Protected against solid object >50 mm (2.0 in), e.g. back of a hand.
2	Protected against solid objects >12.5 mm (0.49 in), e.g. fingers or similar objects.
3	Protected against solid objects >2.5 mm (0.098 in), e.g. tools, thick wires.
4	Protected against solid objects >1 mm (0.039 in), e.g. wires, slender screws.
5	Dust protected.
6	Dust-tight.

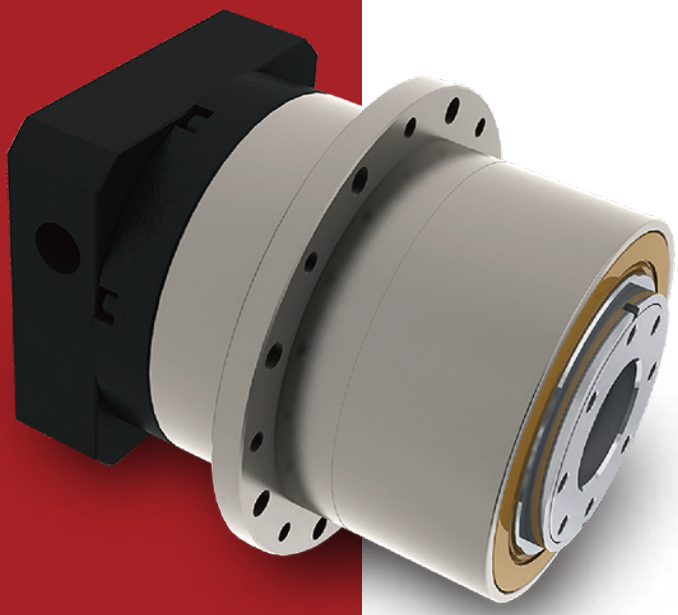
2nd Digit	Intrusion Protection
0	No protection.
1	Protected against vertically falling drops of water, e.g. condensation.
2	Protected against dripping water when the tested sample tilted at 15°.
3	Protected against direct spraying water up to 60° from the vertical.
4	Protected against water splashed from all directions, limited ingress permitted.
5	Protected against low pressure water jets from any direction, limited ingress permitted.
6	Power water jets from any direction shall not have harmful effect.
7	Protection against submersion in water, 30 min. at a depth up to 1 meter.
8	Protection against permanent submersion, depth up to 1 meter or more.
9K	Protected against close-range high pressure, high-temperature spray downs.

PGV

AGV & AMR Gearboxes

The function of automated guided vehicles (AGVs) or autonomous mobile robots (AMRs) is to transport material and operate continuously. The specific structure and mechanical requirements are extremely high due to their work loading and long term operation. SESAME planetary gearbox PGV series provide the most suitable solution for the drive module of AGV and AMR.

Compact design and reliable performance in precision, high loading capacity and efficiency benefit AGVs and AMRs to move smoothly while carrying the maximum weight. Quality power transmission components and service-life lubricant further reduce downtime and production costs as well.

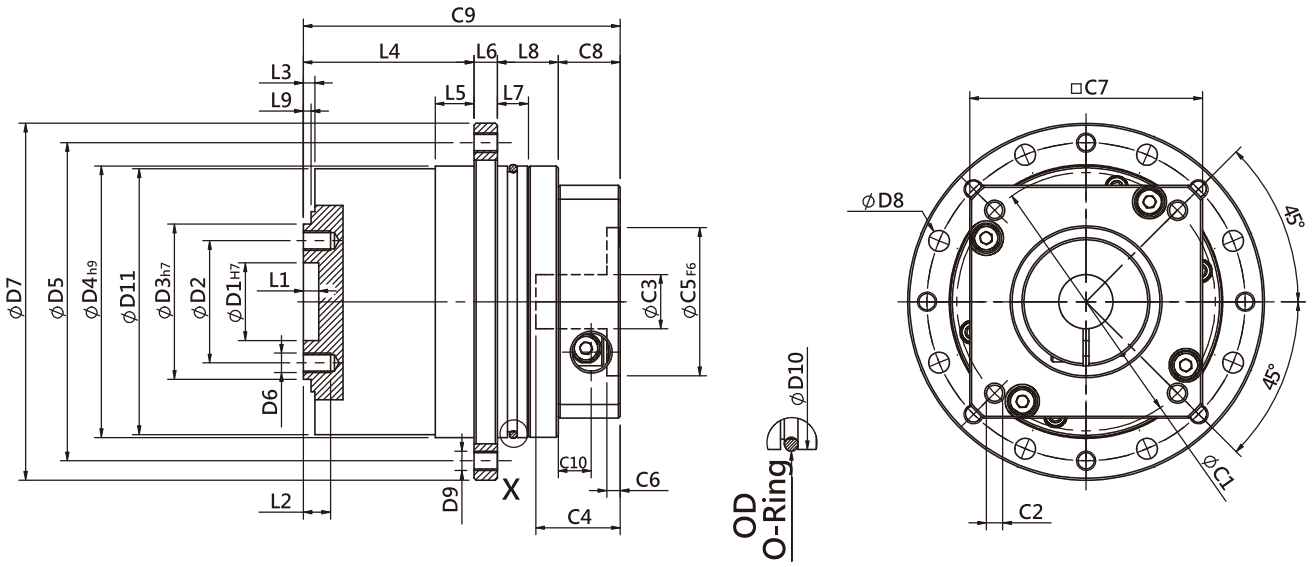


Frame Size(mm)	60, 90, 115
Ratio	3 : 1 - 100:1
Nominal Input Speed (rpm)	3,500 - 4,500
Max Input Speed (rpm)	6,500 - 7,500
Backlash (arc-min)	1 Stage: 7 - 9 2 Stages: 9 - 12
Noise Level (dBA / 1m)	58 - 63

Features

- ▶ Designed for AGVs and AMRs driving units.
- ▶ Direct mounting of motor and wheel to save installation space.
- ▶ Low backlash, low noise, high efficiency.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.
- ▶ Customized bracket for all servo motors and DC motors.

PGV Single Stage Dimensions

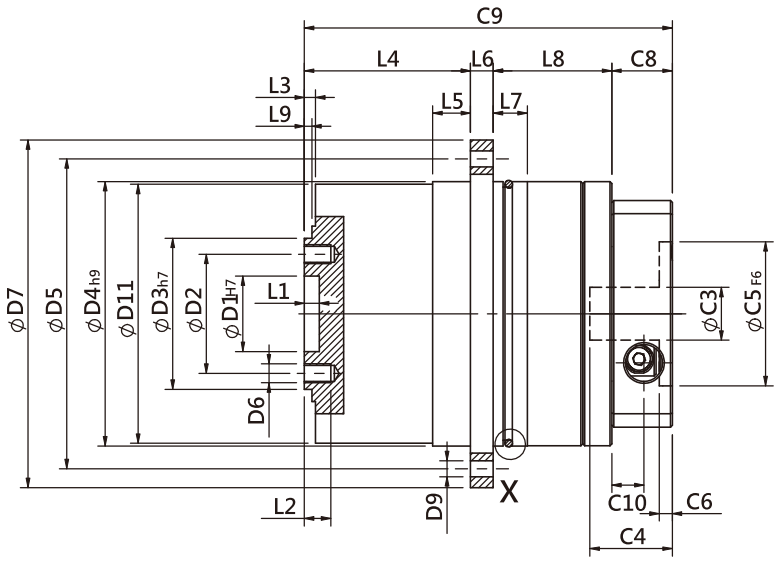


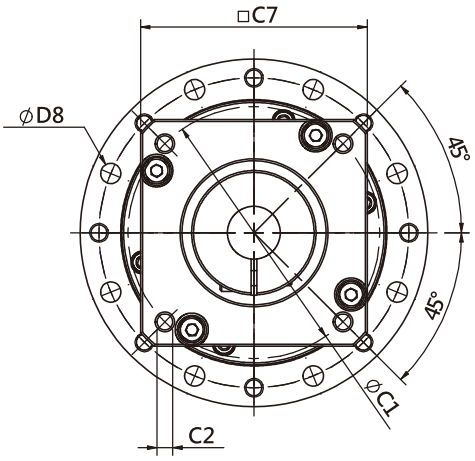
Specifications Unit:mm

Dimensions	PGV60	PGV90	PGV115
D1H7	20	31.5	40
D2	31.5	50	63
D3h7	40	63	80
D4h7	70	94	120
D5	82	108	142
D6	M5x0.8P	M6x1.0P	M6x1.0P
D7	92	120	158
D8	5.4	6.6	9
D9	M5x0.8P	M6x1.0P	M8x1.25P
D10	70	95	120
D11	69.9	93.9	119.9
L1	4	6	6.5
L2	7	10	12
L3	3	6	6.5
L4	44	59.5	80
L5	10	15	21
L6	6	8	10
L7	8	-	-
L8	15.7	22.9	18
L9	2	5	5.5
C1[2]	66.67	90	115
C2[2]	M5x0.8P	M6x1.0P	M8x1.25P
C3[2]	≦11/≦14/≦19	≦14/≦19/≦24	≦19/≦24/≦38
C4[2]	21.8	41.3	42.9
C5[2]F6	38.15	70	95
C6[2]	3.5	6	6
C7[2]	60	90	115
C8[2]	16	26	30
C9[2]	81.7	116.4	138
C10[2]	8.5	11.3	13.8
OD	66x2	-	-

★ C1~C10 are motor specific dimensions(metric std shown), Size may vary according to motor flange.
★ Specification subject to change without notice.

PGV Double Stage Dimensions





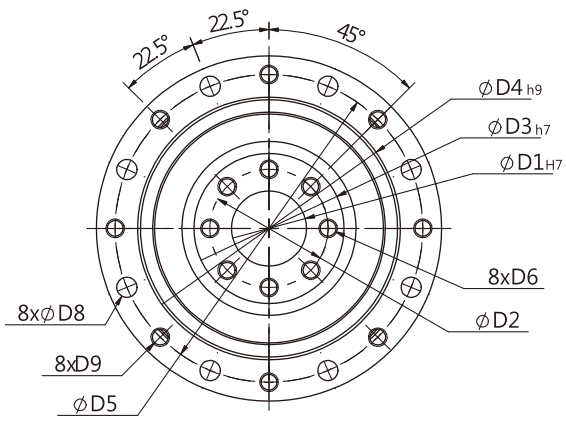
Specifications Unit:mm

Dimensions	PGV60	PGV90	PGV115
D1H7	20	31.5	40
D2	31.5	50	63
D3h7	40	63	80
D4h7	70	94	120
D5	82	108	142
D6	M5x0.8P	M6x1.0P	M6x1.0P
D7	92	120	158
D8	5.4	6.6	9
D9	M5x0.8P	M6x1.0P	M8x1.25P
D10	70	95	120
D11	69.9	93.9	119.9
L1	4	6	6.5
L2	7	10	12
L3	3	6	6.5
L4	44	59.5	80
L5	10	15	21
L6	6	8	10
L7	9	7.7	10
L8	31.4	42.7	45.8
L9	2	5	5.5
C1[2]	66.67	90	115
C2[2]	M5x0.8P	M6x1.0P	M8x1.25P
C3[2]	≦11/≦14/≦19	≦14/≦19/≦24	≦19/≦24/≦38
C4[2]	21.8	41.3	42.9
C5[2]F6	38.15	70	95
C6[2]	3.5	6	6
C7[2]	60	90	115
C8[2]	16	26	30
C9[2]	97.4	136.2	165.8
C10[2]	8.5	11.3	13.8
OD	66x2	86x3	110x3

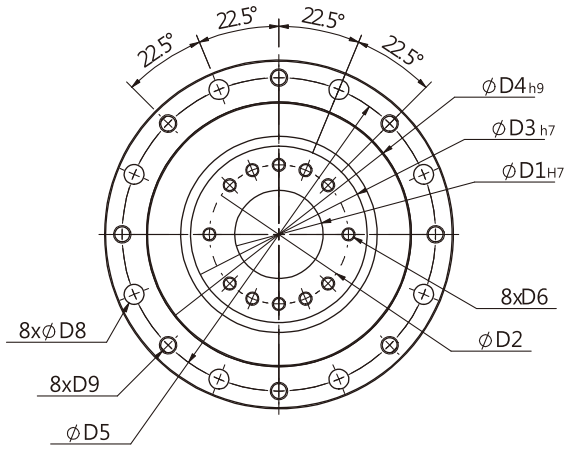
★ C1~C10 are motor specific dimensions(metric std shown), Size may vary according to the motor flange.
★ Specification subject to change without notice.

PGV Flange Dimensions

PGV60
PGV90



PGV125



Specifications Unit:mm

Dimensions	PGV60	PGV90	PGV115
D1H7	20	31.5	40
D2	31.5	50	63
D3h7	40	63	80
D4h9	70	94	120
D5	82	108	142
D6	M5x0.8P	M6x1.0P	M6x1.0P
D8	5.4	6.6	9
D9	M5x0.8P	M6x1.0P	M8x1.25P

★ Specification subject to change without notice.

PGV Specifications

Specifications		Stage	Ratio	PGV-60	PGV-90	PGV-115
Nominal Output Torque T_{2N}	N · m	1	3	41	110	250
			4	44	120	270
			5	45	120	280
			7	38	100	260
			8	35	95	240
			10	32	85	210
		Stage	Ratio	PGV-60	PGV-90	PGV-115
		2	9	41	110	250
			12	44	120	270
			15	45	120	280
			16	44	120	270
			20	44	120	270
			25	45	120	280
			30	41	110	280
			35	45	120	280
			40	44	120	270
			50	45	120	280
			64	35	95	240
			70	38	100	260
			100	32	85	210
Emergency Stop Torque T_{2NOT}	N · m	(2.5 times of Nominal Output Torque) (Max. Output Torque T_{2B} =60% of Emergency Stop Torque)				
Starting Torque	N · m	1	3-10	0.11	0.3	0.55
		2	9-100	0.09	0.25	0.5
Nominal Input Speed n_{1N}	N	1,2	3-100	4500	4000	3500
Max. Input Speed n_{1max}	N	1,2	3-100	7500	7000	6500
Standard Backlash P2	arcmin	1	3-10	≦9	≦8	≦7
		2	9-100	≦12	≦10	≦9
Torsional Rigidity	N · m /arcmin	1,2	3-100	8	22	55
Max. Radial Load F_{2rB} [1]	N	1,2	3-100	3300	5300	7100
Max. Axial Load F_{2aB} [1]	N	1,2	3-100	3120	5000	7000
Max. Bending Moment M_{2KB} [1]	N · m	1,2	3-100	110	220	350
Operating Temp.	℃	1,2	3-100	-20℃ ~ +90℃		
Service Life	hr	1,2	3-100	30,000 (10,000 Continuous Operation)		
Efficiency	%	1	3-10	≧ 97%		
		2	9-100	≧ 94%		
Weight	kg	1	3-10	1.8	4.3	8.6
		2	9-100	2.2	5.3	10.6
Mounting Position	-	1,2	3-100	Any Direction		
Noise Level [2]	dBA/1m	1,2	3-100	58	60	63
Protection Class	-	1,2	3-100	IP65		
Lubrication	-	1,2	3-100	Synthetic Lubricant		

Inertia (J1)

Stage	Ratio	unit	PGV-60		PGV-90		PGV-115	
			(ψ19)	(ψ14)(ψ11)	(ψ24)(ψ19)	(ψ14)	(ψ24)	(ψ19)
1	3	Kg · cm^2	0.46	0.23	0.77	0.33	2.2	1.87
	4		0.42	0.21	0.67	0.23	1.51	1.18
	5~8,10		0.42	0.21	0.61	0.21	1.26	0.93
Stage	Ratio		PGV-60		PGV-90		PGV-115	
			(ψ19)	(ψ14)(ψ11)	(ψ24)(ψ19)	(ψ14)	(ψ24)	(ψ19)
2	9,12,15		0.46	0.23	0.77	0.33	2.2	1.87
	Other Ratios		0.42	0.21	0.67	0.23	1.51	1.18

* 1. Applied to the output shaft center at 100 rpm.
* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).
※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

Strain Wave Gearboxes

The strain wave gearing provide zero backlash and high output torque power transmission in a light-weight and compact gearbox for robotic and high positional accuracy applications. This gearing system is used in industrial robotics, aerospace, medical equipment, machine tools, milling machines, measuring and testing equipment, printing machines, semiconductor equipment and so on.

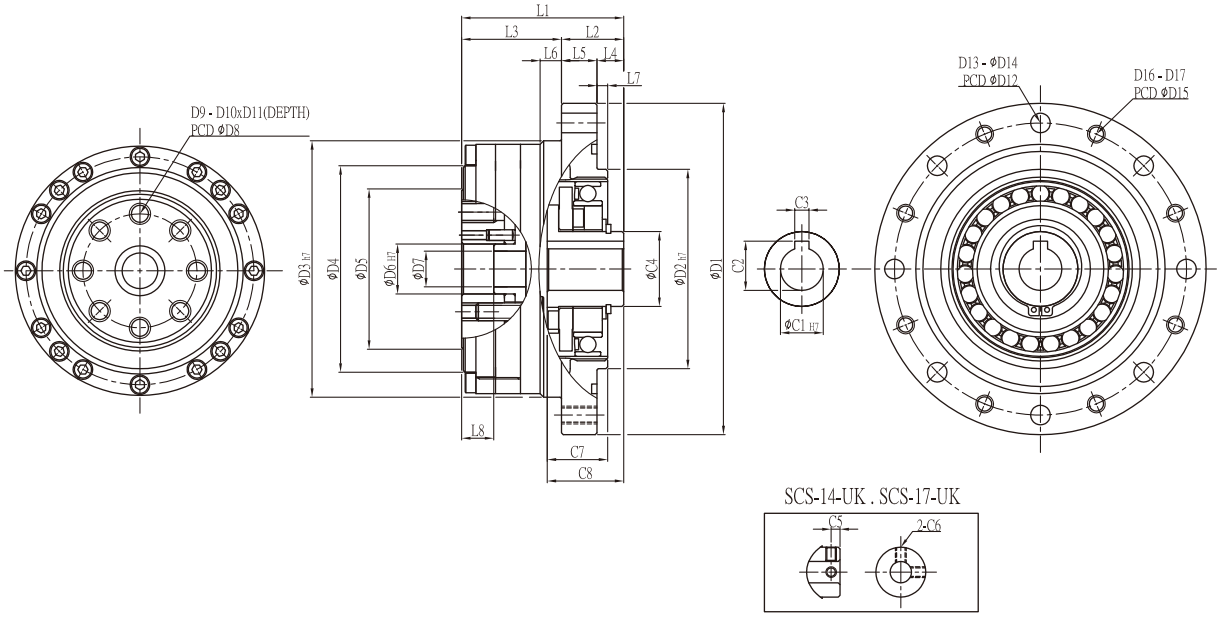
SESAME strain wave gearboxes are available in two types depending on installation requirements, enclosed in a housing to drop in industry standards or as a component set integrated into customer's configuration.

Frame Size (mm)	14 to 32
Ratio	50 : 1 - 120 : 1
Backlash (arc-min)	Zero Backlash

Features

- ▶ Zero Backlash
- ▶ Peak Torque: 46 Nm to 892 Nm.
- ▶ Accuracy <1 arc-min, excellent repeatability.
- ▶ Reduction ratios 50:1 to 120:1.
- ▶ High torsional stiffness & high torque density.
- ▶ Robust cross roller output bearing.
- ▶ High reliability and long service life

SCS-UK

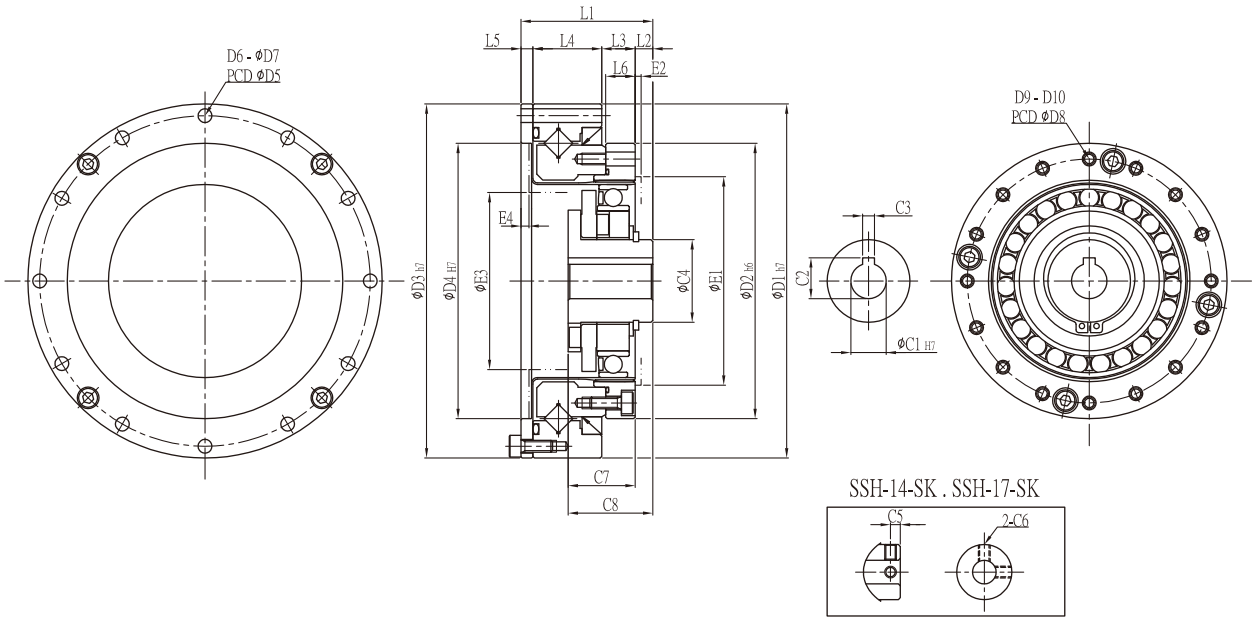


Specifications

Unit:mm

Dimensions	14	17	20	25	32
D1	73	79	93	107	138
D2	38	48	56	67	90
D3	56	63	72	86	113
D4	42.5	49.5	58	73	96
D5	31	38	45	58	78
D6	11	10	14	20	26
D7	8	7	10	15	20
D8	23	27	32	42	55
D9	6	6	8	8	8
D10	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M10x1.5P
D11	8	10	9	12	15.5
D12	65	71	82	96	125
D13	8	8	8	10	12
D14	4.5	4.5	5.5	5.5	6.6
D15	65	71	82	96	125
D16	8	8	8	10	12
D17	M4	M4	M5	M5	M6
L1	41	45	45.5	52	62
L2	14	16	17.5	16	17
L3	27	29	28	36	45
L4	7	8	7.5	6	5
L5	7	8	10	10	12
L6	4	4	6	5	5
L7	2	2	3	3	3
L8	9.4	9.5	9	12	15
C1	6	8	12	14	14
C2	-	-	13.8	16.3	16.3
C3	-	-	4	5	5
C4	14	18	21	26	26
C5	2.5	3	-	-	-
C6	M3	M3	-	-	-
C7	13.5	14.7	17	18.6	18.6
C8	18.5	20.7	21.5	21.6	23.6

SSH-SK

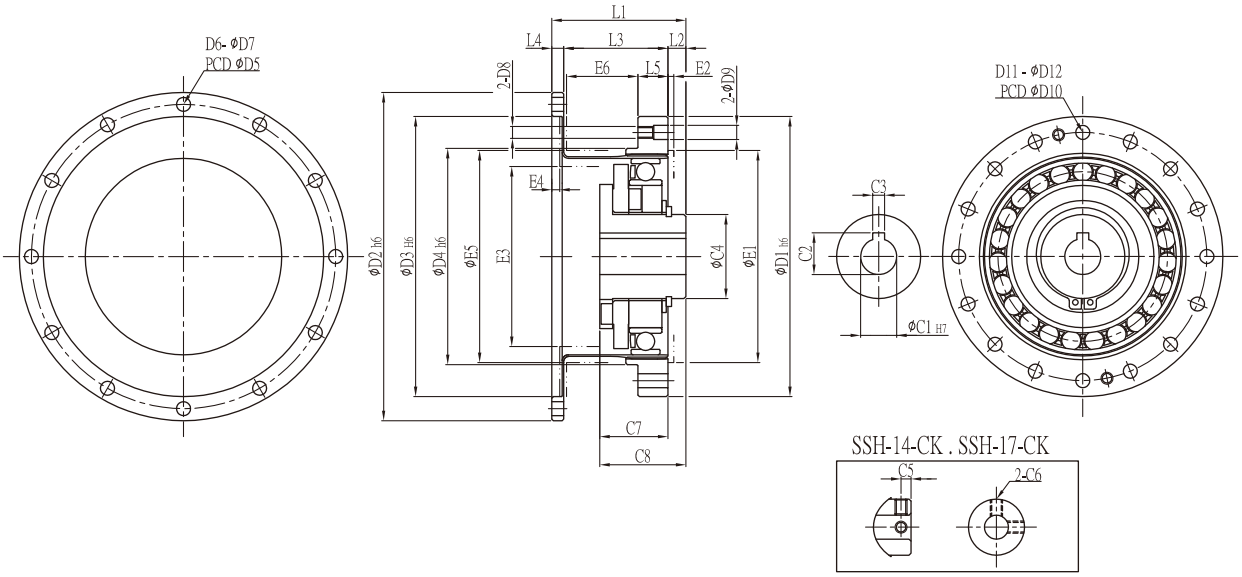


Specifications

Unit:mm

Dimensions	14	17	20	25	32
D1	70	80	90	110	142
D2	50	60	70	85	110
D3	70	80	90	110	142
D4	48	60	70	88	114
D5	64	74	84	102	132
D6	8	12	12	12	12
D7	3.5	3.5	3.5	4.5	5.5
D8	44	54	62	77	100
D9	8	16	16	16	16
D10	M3	M3	M3	M4	M5
L1	28.5	32.5	33.5	37	44
L2	5	6	4.5	3	2
L3	7	7.5	8.5	12	15
L4	14.1	16	17.5	18.7	23.4
L5	2.4	3	3	3.3	3.6
L6	6	6.5	7.5	10	14
C1	6	8	9	11	14
C2	-	-	10.4	12.8	16.3
C3	-	-	3	4	5
C4	14	18	21	26	26
C5	2.5	M3	-	-	-
C6	3	M3	-	-	-
C7	13.5	14.7	17	18.6	21.6
C8	18.5	20.7	21.5	21.6	23.6
E1	38	45	53	66	86
E2	1	1	1.5	1.5	1.5
E3	31	38	45	56	73
E4	1.7	2.1	2	2	2

SSH-CK

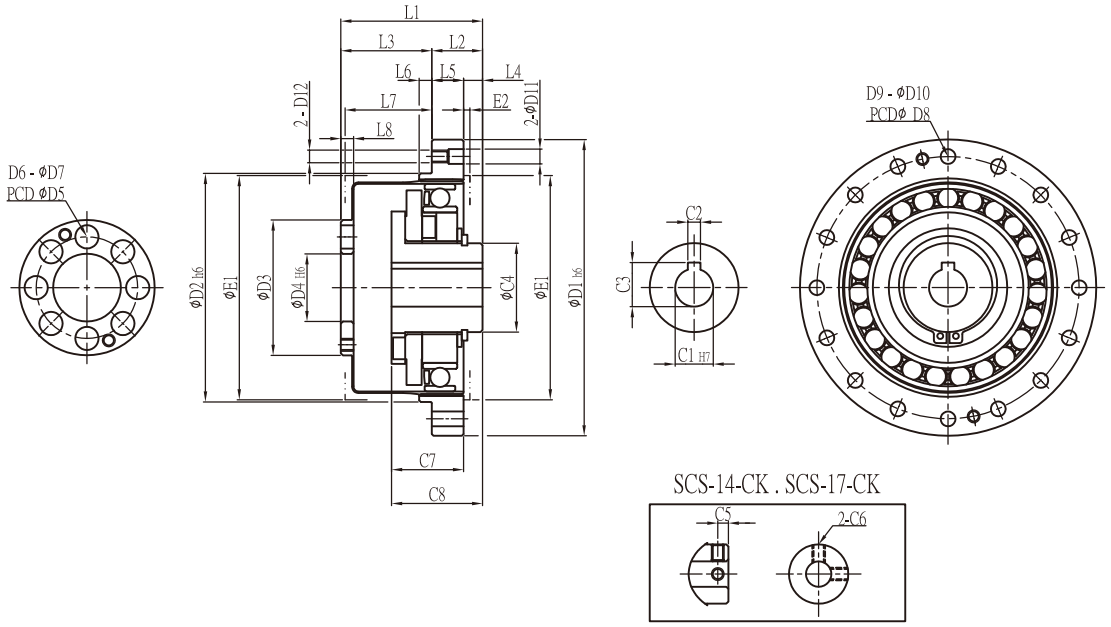


Specifications

Unit:mm

Dimensions	14	17	20	25	32
D1	50	60	70	85	110
D2	60	72	82	104	134
D3	48	60	70	88	114
D4	38	48	54	67	90
D5	54	66	76	96	124
D6	8	12	12	12	12
D7	3.5	3.5	3.5	4.5	5.5
D8	M3x0.5P	M3x0.5P	M3x0.5P	M4x0.7P	M5x0.8P
D9	-	-	3.5	4.5	5.5
D10	44	54	62	75	100
D11	8	16	16	16	16
D12	3.5	3.5	3.5	4.5	5.5
L1	28.5	32.5	33.5	37	44
L2	5	6	4.5	3	2
L3	21.1	23.5	26	30.7	38.4
L4	2.4	3	3	3.3	3.6
L5	6	6.5	7.5	10	14
C1	6	8	9	11	14
C2	-	-	10.4	12.8	16.3
C3	-	-	3	4	5
C4	14	18	21	26	26
C5	2.5	3	-	-	-
C6	M3x0.5P	M3x0.5P	-	-	-
C7	13.5	14.7	17	18.6	21.6
C8	18.5	20.7	21.8	21.6	23.6
E1	38	45	53	66	86
E2	1	1	1.5	1.5	1.5
E3	31	38	45	56	73
E4	1.7	2.1	2	2	2
E5	38	45	53	66	86
E6	14.6	16.4	17.8	19.8	23.2

SCS-CK Simple Unit Type

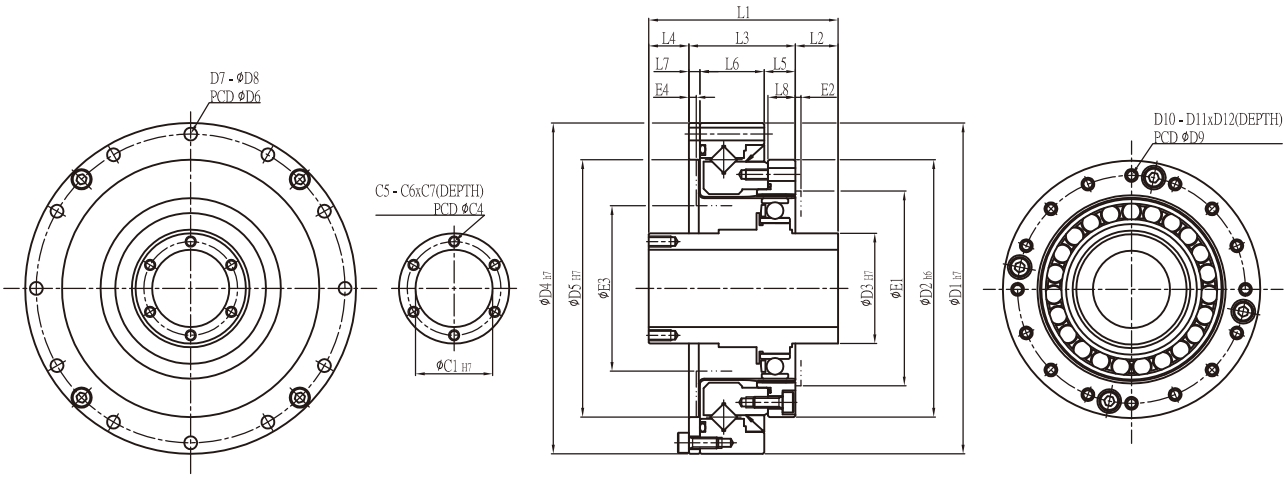


Specifications

Unit:mm

Dimensions	14	17	20	25	32
D1	50	60	70	85	110
D2	38	48	54	67	90
D3	23	27.2	32	40	52
D4	11	10	16	20	26
D5	17	19	24	30	40
D6	6	6	8	8	8
D7	4.5	5.5	5.5	6.6	9
D8	44	54	62	75	100
D9	8	16	16	16	16
D10	3.5	3.5	3.5	4.5	5.5
D11	-	-	3.5	4.5	5.5
D12	M3	M3	M3	M4	M5
L1	28.5	32.5	33.5	37	44
L2	11	12.5	12	13	16
L3	17.5	20	21.5	24	28
L4	5	6	4.5	3	2
L5	6	6.5	7.5	10	14
L6	2	2.5	3	3	3
L7	17.1	19	20.5	23	26.8
L8	2.4	3	3	3	3.2
C1	6	8	9	11	14
C2	-	-	10.4	12.8	16.3
C3	-	-	3	4	5
C4	14	18	21	26	26
C5	2.5	3	-	-	-
C6	M3x0.5P	M3x0.5P	-	-	-
C7	13.5	14.7	17	18.6	21.6
C8	18.5	20.7	21.5	21.6	23.6
E1	38	45	53	66	86
E2	1	1	1.5	1.5	1.5

SSH-SH



Specifications

Unit:mm

Dimensions	14	17	20	25	32
D1	70	80	90	110	142
D2	50	60	70	85	110
D3	20	25	30	38	45
D4	70	80	90	110	142
D5	48	60	70	88	114
D6	64	74	84	102	132
D7	8	12	12	12	12
D8	3.5	3.5	3.5	4.5	5.5
D9	44	54	62	77	100
D10	8	16	16	16	16
D11	M3x0.5P	M3x0.5P	M3x0.5P	M4x0.7P	M5x0.8P
D12	5	5	6	8	8
L1	52.5	56.5	51.5	55.5	65.5
L2	12	12.7	11.6	10.1	9.8
L3	23.5	26.5	29	34	42
L4	17	17.3	10.9	11.4	13.7
L5	7	7.5	8.5	12	15
L6	14.1	16	17.5	18.7	23.4
L7	2.4	3	3	3.3	3.6
L8	6	6.5	7.5	10	14
C1	14	19	21	29	36
C2	2.5	2.5	-	-	-
C3	M3x0.5P	M3x0.5P	-	-	-
C4	-	-	25.5	33.5	40.5
C5	-	-	6	6	6
C6	-	-	M3x0.5P	M3x0.5P	M3x0.5P
C7	-	-	6	6	6
E1	38	45	53	66	86
E2	1	1	1.5	1.5	1.5
E3	31	38	45	56	73
E4	1.7	2.1	2	2	2

Strain Wave Gearboxes Specifications

Size	Ratio	Rated Torque at 2000rpm	Limit for Repeated Peak Torque	Limit for Average Torque	Limit for Momentary Peak Torque	Maximum Input Speed (rpm)	Limit for Average Input Speed (rpm)	Service Life
		Nm	Nm	Nm	Nm	RPM	RPM	Hours
14	50	7	23	9	46	8500	3500	10000
	80	10	30	14	58			
	100	10	36	14	58			
17	50	21	44	34	91	7300		
	80	29	56	35	109			
	100	31	70	51	109			
	120	31	70	51	109			
20	50	33	73	44	127	6500		
	80	44	96	61	165			
	100	52	107	64	191			
	120	52	113	64	191			
25	50	51	127	72	242	5600		
	80	82	178	113	332			
	100	87	204	140	369			
	120	87	217	140	395			
32	50	99	281	140	497	4800		
	80	153	395	217	738			
	100	178	433	281	841			
	120	178	459	281	892			

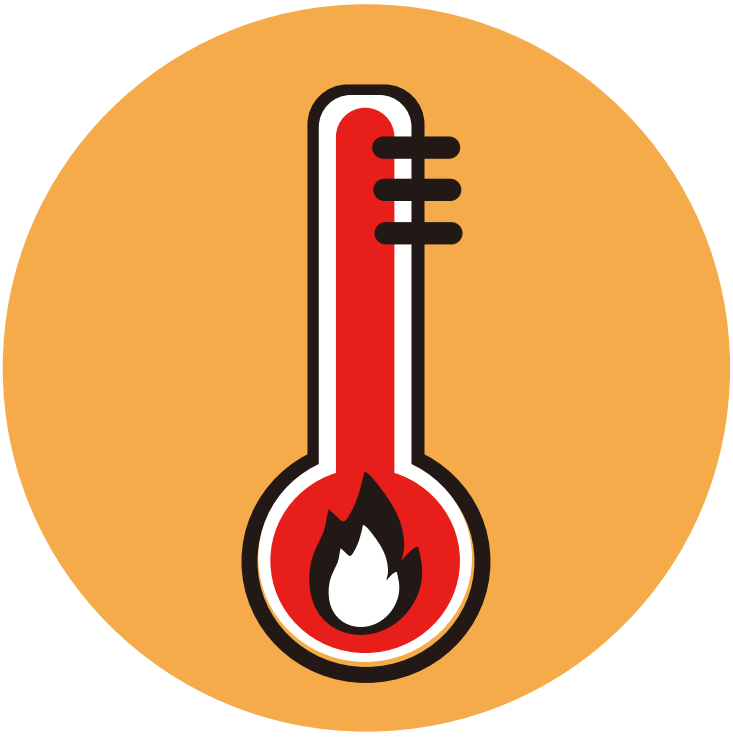
SESAME Planetary Gearboxes Q&A

Q14.

Sometimes we hear from customers that the gearbox is very hot that can be barely touched, it must be faulty. Is it true?

In fact, it is not a failure of the gearbox. First of all, human body feelings are very subjective, and everyone's description of temperature is different. In case the gearbox seems to be hot, we will first measure its temperature with a thermometer. According to our experience, when the gearbox surface can be barely touched by hand, usually the temperature is around 50°C to 60°C (122°F to 140°F). It is a normal working temperature for machine components. The working temperature of the planetary gearbox is subject to the load, ambient temperature, operating conditions, etc... It usually falls between 40°C to 65°C (104°F to 149°F). In some occasions with poor heat dissipation or extreme loads, it may even be as high as 70°C (158°F) or 80°C (176°F). However, the allowable operating temperature of the gearbox is -10°C to 90°C (14°F to 194°F). Although the user feels it's hot when touching the gearbox, it is actually still within the normal working temperature.

To use a thermometer to measure the gearbox surface temperature is recommended if you have doubts about overheating. There is no need to worry overheating as long as it is within the allowable temperature. Contact Sesame Motor at any time for any abnormal situation, we will assist you to analyze and solve your concerns.



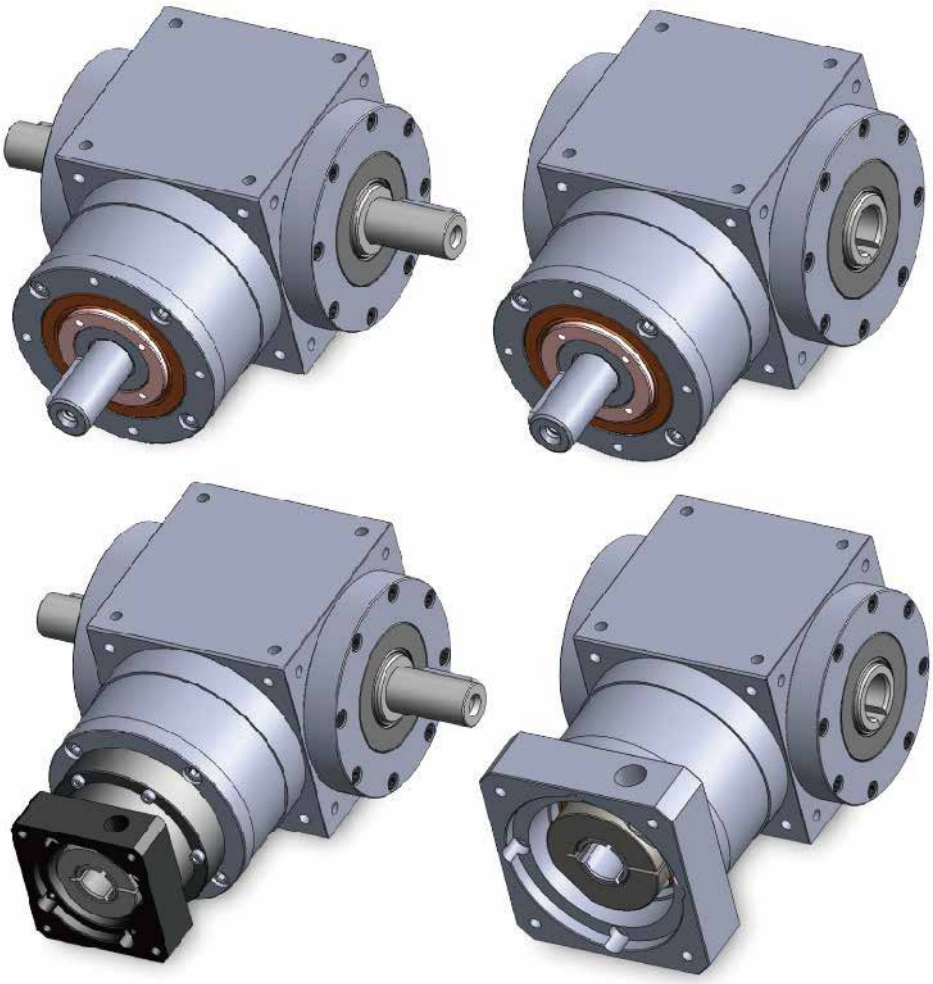
NOTES

PT

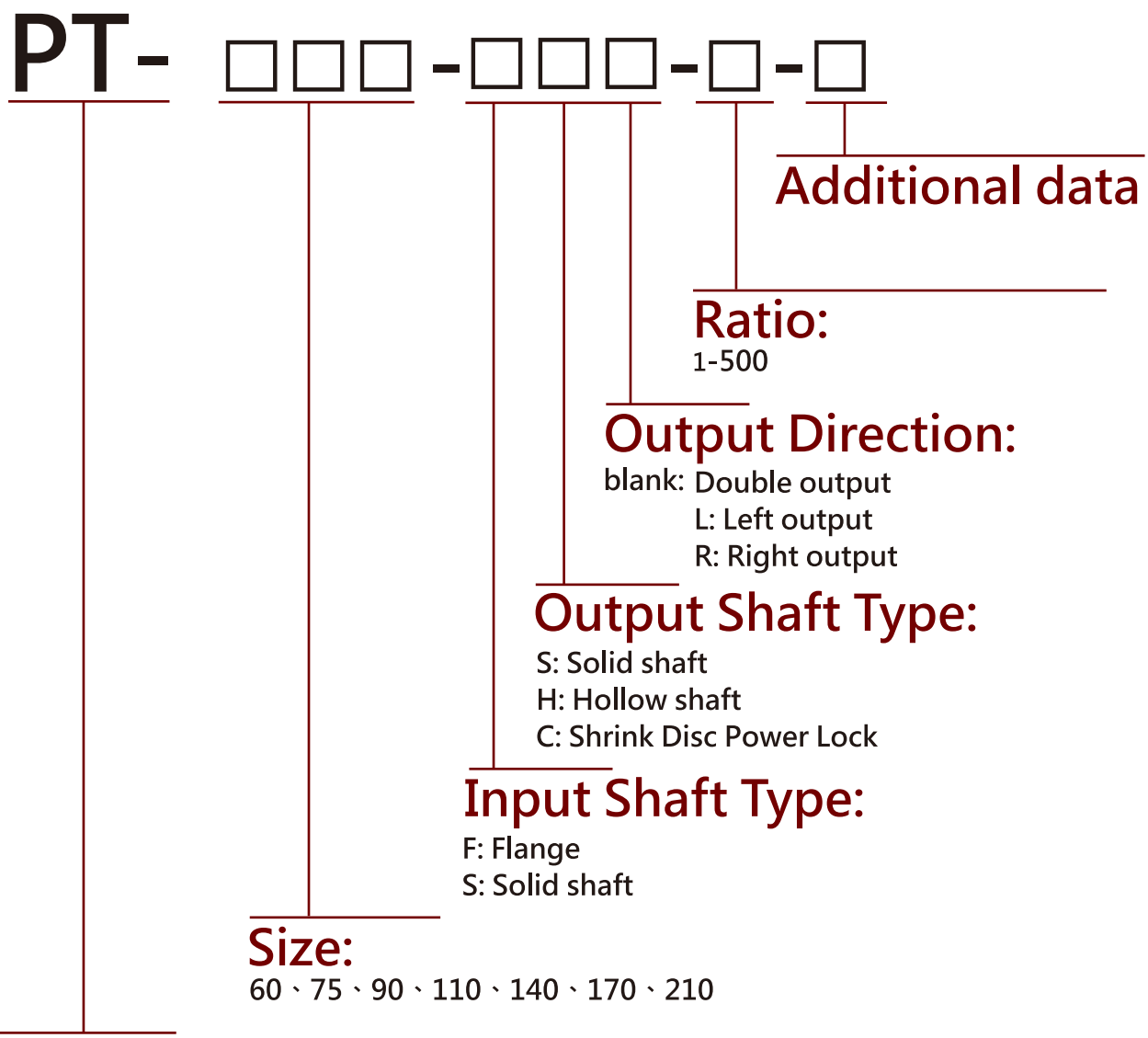
Sesame servo spiral bevel speed reducers (gearboxes) are ideal for use in applications that require high dynamic motion control. Compact and rigid gearbox design ensure good performance with space and weight efficient at the same time. Low noise, low vibration, lubricated for life and IP65 sealing benefit virtually maintenance-free operation for 20,000 hours. They are provided in seven sizes with flange or shaft inputs/outputs. Servo motor input speed up to 8,000 rpm. Multi flange or shaft outputs in standard backlash less than 6 arc-minutes. Maximum gear ratio 500:1, maximum frame size 210 mm. A wide range of motor adapter are available for installation to virtually all servo motors.

Features

- ▶ Compact and rigid design ensure performance within light and small gearbox size.
- ▶ High rigidity, low noise, low vibration.
- ▶ 7 Frame sizes, 22 ratios, 3 stages, multi configurations.
- ▶ Unique heat treatment alloy steel gears.
- ▶ High axial and radial load capacity.
- ▶ One-piece gearbox for high precision and high torque requirements.
- ▶ Lubricated for life and IP65 sealing.
- ▶ High operating efficiency more than 98%.



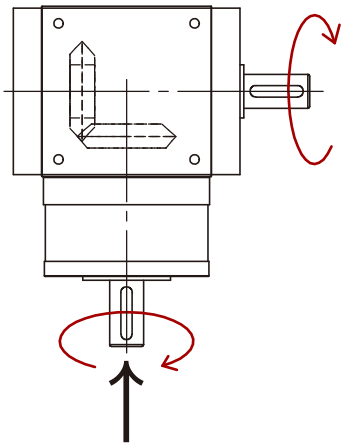
CODING SYSTEM



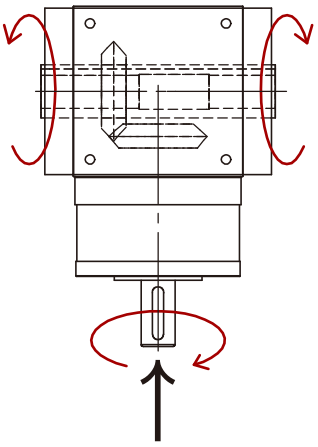
Note:
The additional data include mounting position, input speed, input torque and options. Please indicate the input shaft diameter, flange version and flange dimension when you order your SESAME servo gearbox.

PT Shaft Type Series Rotating Direction Drawing

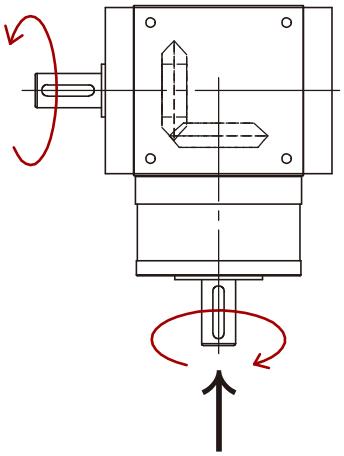
PT-SSR



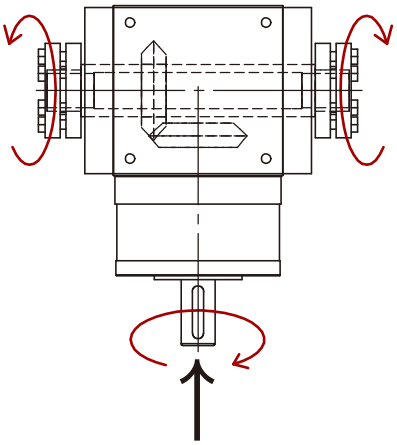
PT-SH



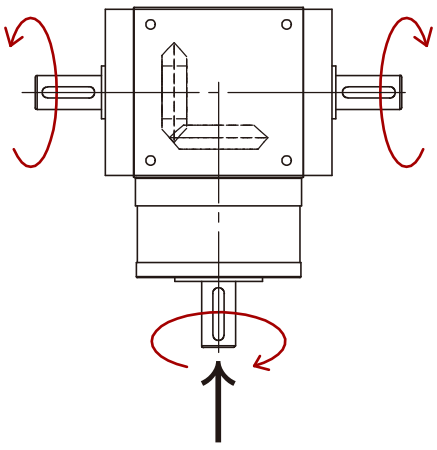
PT-SSL



PT-SC



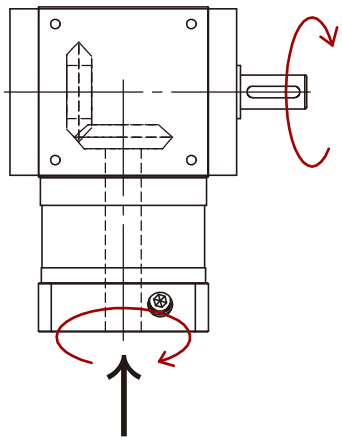
PT-SS



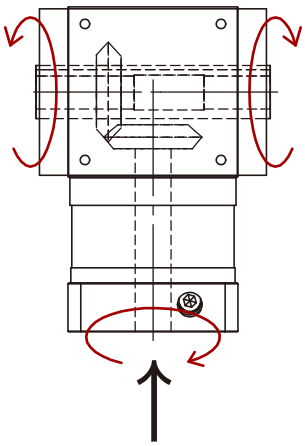
※Specification subject to change without notice

PT Flange Type Series Rotating Direction Drawing

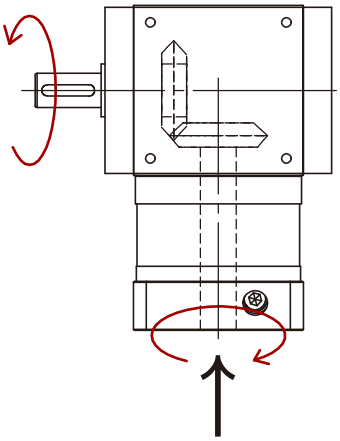
PT-FSR



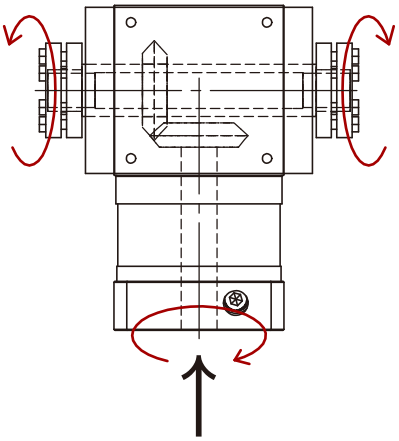
PT-FH



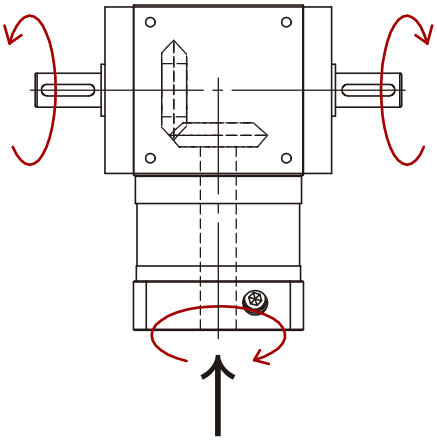
PT-FSL



PT-FC

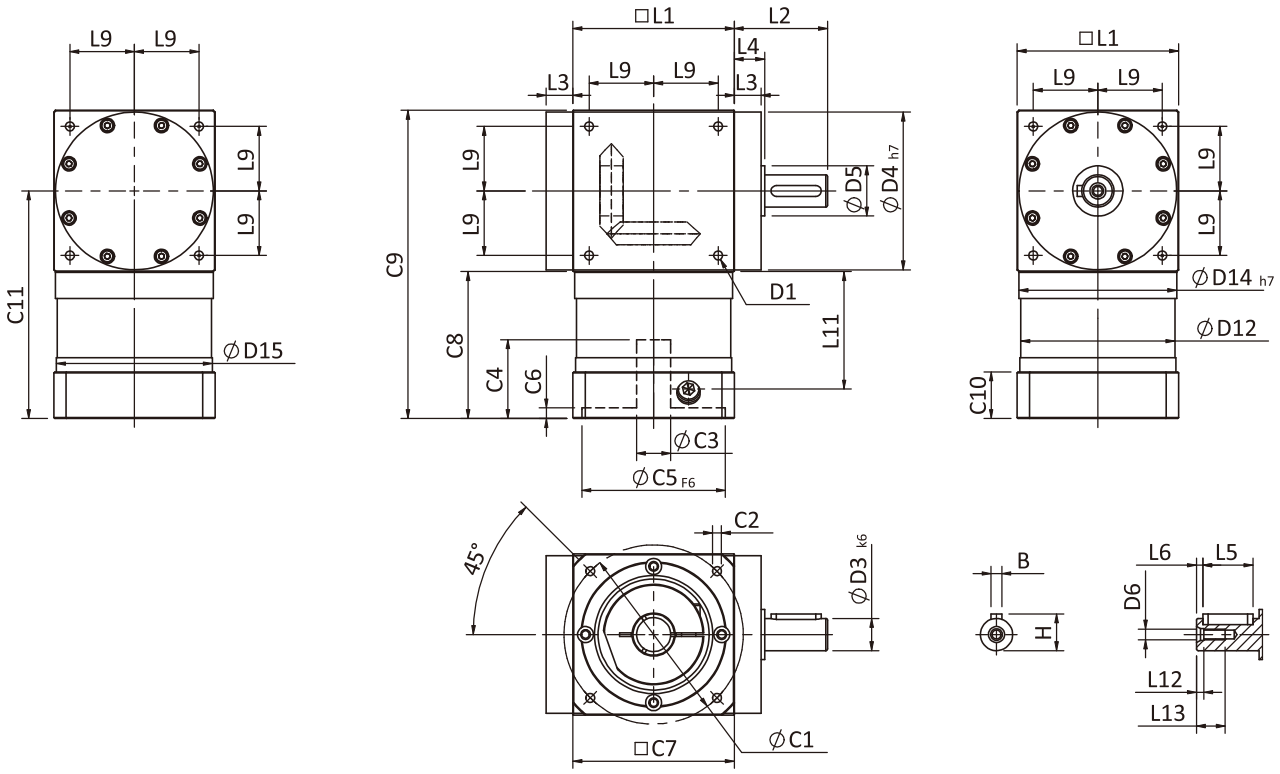


PT-FS



※Specification subject to change without notice

PT-FSR Single Stage Dimensions



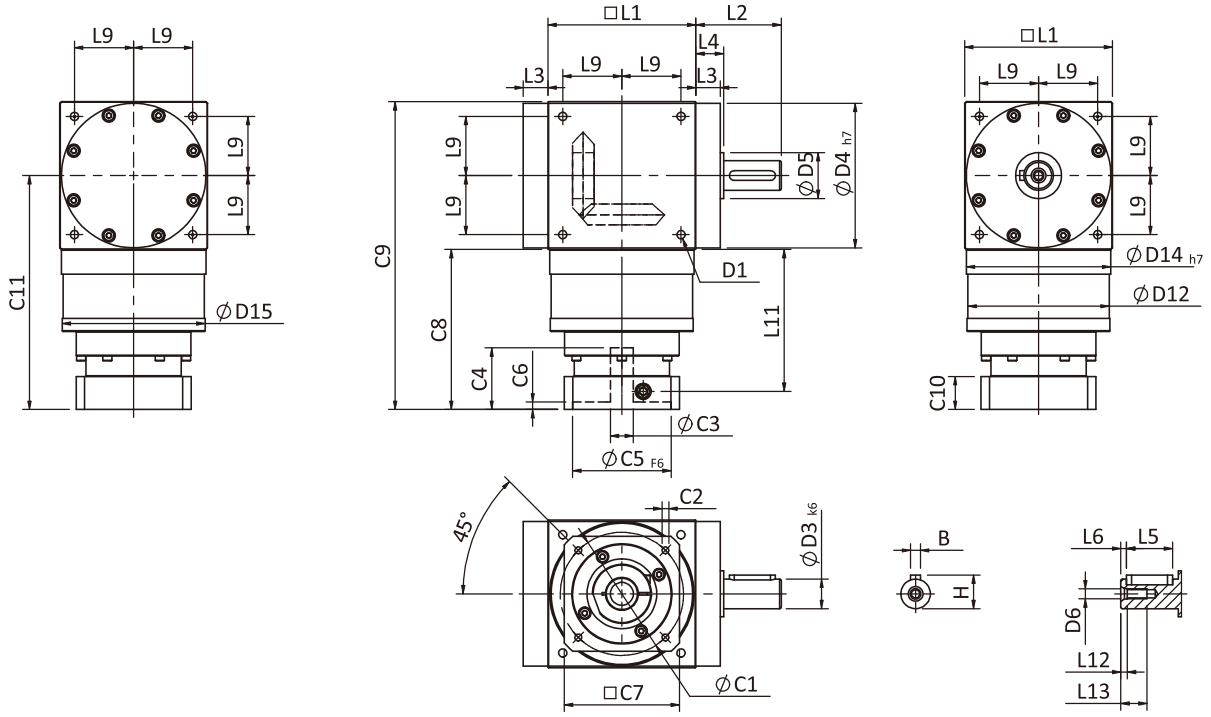
Specifications

Unit:mm

Dimensions	PT60-FSR	PT75-FSR	PT90-FSR	PT110-FSR	PT140-FSR	PT170-FSR	PT210-FSR
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D3k6	13	16	18	22	32	40	50
D4h7	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D6	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D12	59.8	72	86	106	104	128	160
D14h7	60.2	73	88	108	135	165	205
D15	41.8	72.9	87	107	103	127	158
L1	60.8	75	90	110	140	170	210
L2	34.5	46.5	52	57	67	77	97
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L5	16	25	28	32	45	50	70
L6	2	2.5	3.5	4	2.5	5	2.5
L9	24.75	30	36	44	55	67	85
L11	38.2	57.7	65.5	77	86.4	94.1	127
L12	4	4	4	4.5	6	6	6
L13	12	14	16	20.5	30	36	38
C1[1]	46	66.67	100	100	130	165	200
C2[1]	M4x0.7P	M4x0.7P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P
C3[1]	≦11/≦14/≦19	≦14/≦19	≦19/≦24	≦24	≦32	≦38	≦42/≦48
C4[1]	32	38	44	47	56.1	67	77
C5[1]F6	30	38.15	80	80	110	130	114.3
C6[1]	4	4	6	5	5	6	6
C7[1]	42.6	60	90	90	115	140	180
C8[1]	47.2	67.7	82	93	106	118	152
C9[1]	108	142.7	172	203	246	288	362
C10[1]	18.5	20	26	23	27	35	40
C11[1]	77.6	105.2	127	148	176	203	257
B	5	5	6	6	10	12	14
H	15	18	20.5	24.5	35	43	53.5

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.
★ Specification subject to change without notice.

PT-FSR Double Stage Dimensions



Specifications

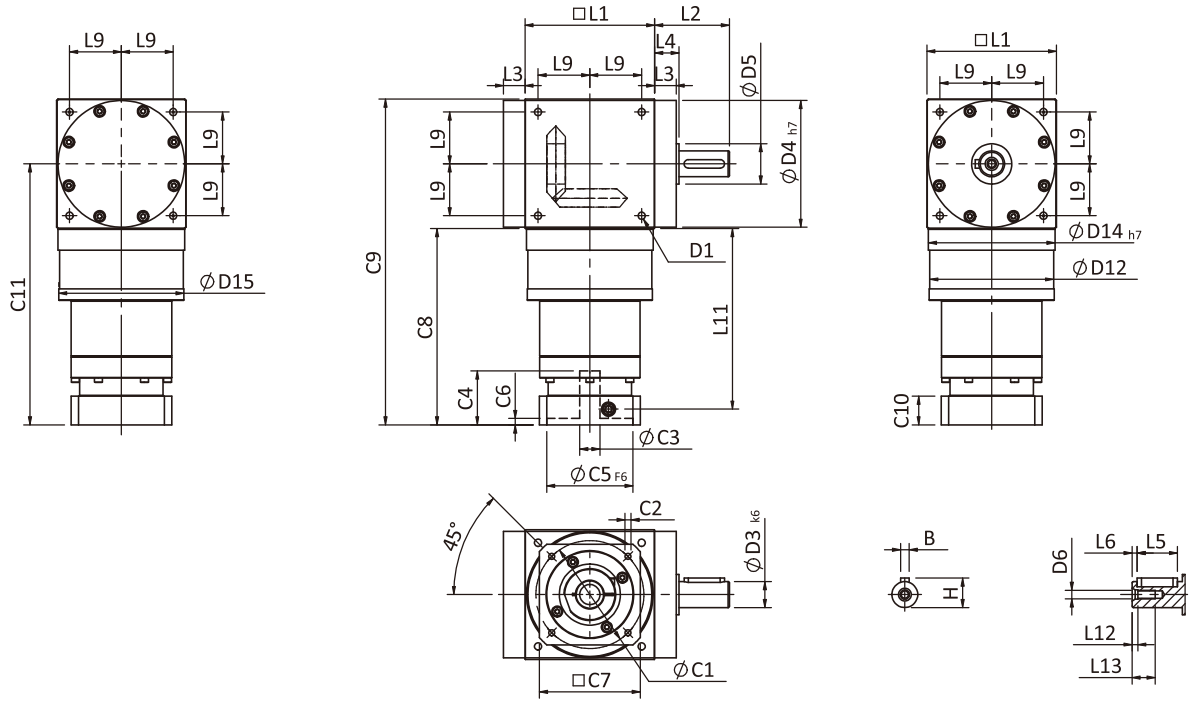
Unit:mm

Dimensions	PT60-FSR	PT75-FSR	PT90-FSR	PT110-FSR	PT140-FSR	PT170-FSR	PT210-FSR
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D3k6	13	16	18	22	32	40	50
D4h7	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D6	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D12	59.8	72	86	106	104	128	160
D14h7	60.2	73	88	108	135	165	205
D15	60	72.9	87	107	103	127	158
L1	60.8	75	90	110	140	170	210
L2	34.5	46.5	52	57	67	77	97
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L5	16	25	28	32	45	50	70
L6	2	2.5	3.5	4	2.5	5	2.5
L9	24.75	30	36	44	55	67	85
L11	63.7	74.2	86.4	104.8	120.8	114.8	192.8
L12	4	4	4	4.5	6	6	6
L13	12	14	16	20.5	30	36	38
C1[1]	46	63	70	90	90	90	165
C2[1]	M4x0.7P	M4x0.7P	M5x0.8P	M6x1.0P	M6x1.0P	M6x1.0P	M10x1.5P
C3[1]	≦8/≦11	≦8/≦11	≦14/≦19	≦24	≦24	≦24	≦35/≦38
C4[1]	28.6	28.6	37.5	48.2	48.2	48.2	66.7
C5[1]F6	30	40	50	70	70	70	130
C6[1]	4.1	4.1	4.5	6	6	6	5.5
C7[1]	42	60	60	90	90	90	140
C8[1]	73.3	83.8	97.4	119.5	135.5	129.5	210
C9[1]	134.1	158.8	187.4	229.5	275.5	299.5	420
C10[1]	17	17	20	26	26	26	35
C11[1]	103.7	121.3	142.4	174.5	205.5	214.5	315
B	5	5	6	6	10	12	14
H	15	18	20.5	24.5	35	43	53.5

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.

★ Specification subject to change without notice.

PT-FSR Triple Stage Dimensions

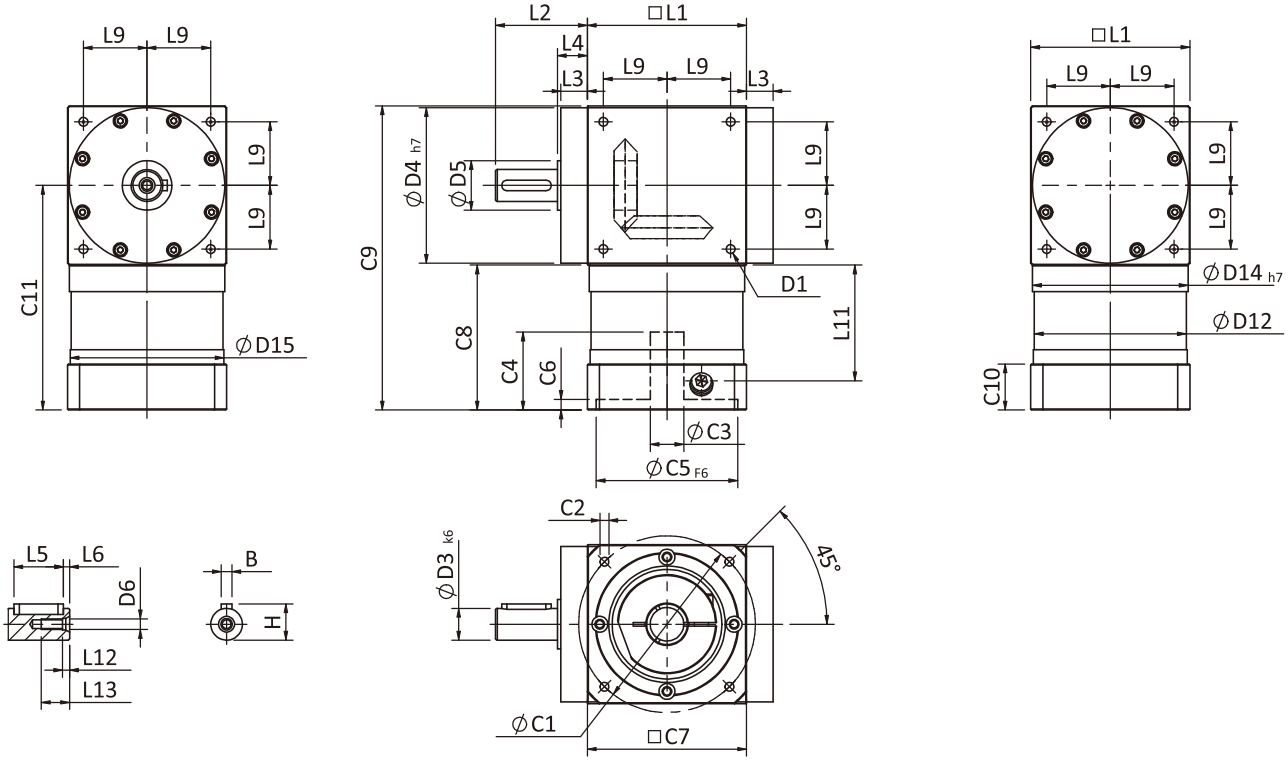


Specifications Unit:mm

Dimensions	PT110-FSR	PT140-FSR	PT170-FSR	PT210-FSR
D1	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
$D3_{k6}$	22	32	40	50
$D4_{h7}$	108	135	165	205
D5	32.3	46.4	54.4	74
D6	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D12	106	104	128	160
$D14_{h7}$	108	135	165	205
D15	107	103	127	158
L1	110	140	170	210
L2	57	67	77	97
L3	15	15	15	20
L4	17	17	17	22
L5	32	45	50	70
L6	4	2.5	5	2.5
L9	44	55	67	85
L11	131	147	143.7	223.4
L12	4.5	6	6	6
L13	20.5	30	36	38
C1[1]	70	70	90	130
C2[1]	M5x0.8P	M5x0.8P	M6x1.0P	M8x1.25P
C3[1]	≦14/≦19	≦14/≦19	≦19	≦24/≦32/≦38
C4[1]	37.5	37.5	41.6	51.1
$C5^{1}{}_{F6}$	50	50	70	110
C6[1]	4.5	4.5	6	6
C7[1]	60	60	80	115
C8[1]	142	158	157.8	239.5
C9[1]	252	298	327.8	449.5
C10[1]	20	20	25	30
C11[1]	197	228	242.8	344.5
B	6	10	12	14
H	24.5	35	43	53.5

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.
★ Specification subject to change without notice.

PT-FSL Single Stage Dimensions



Specifications

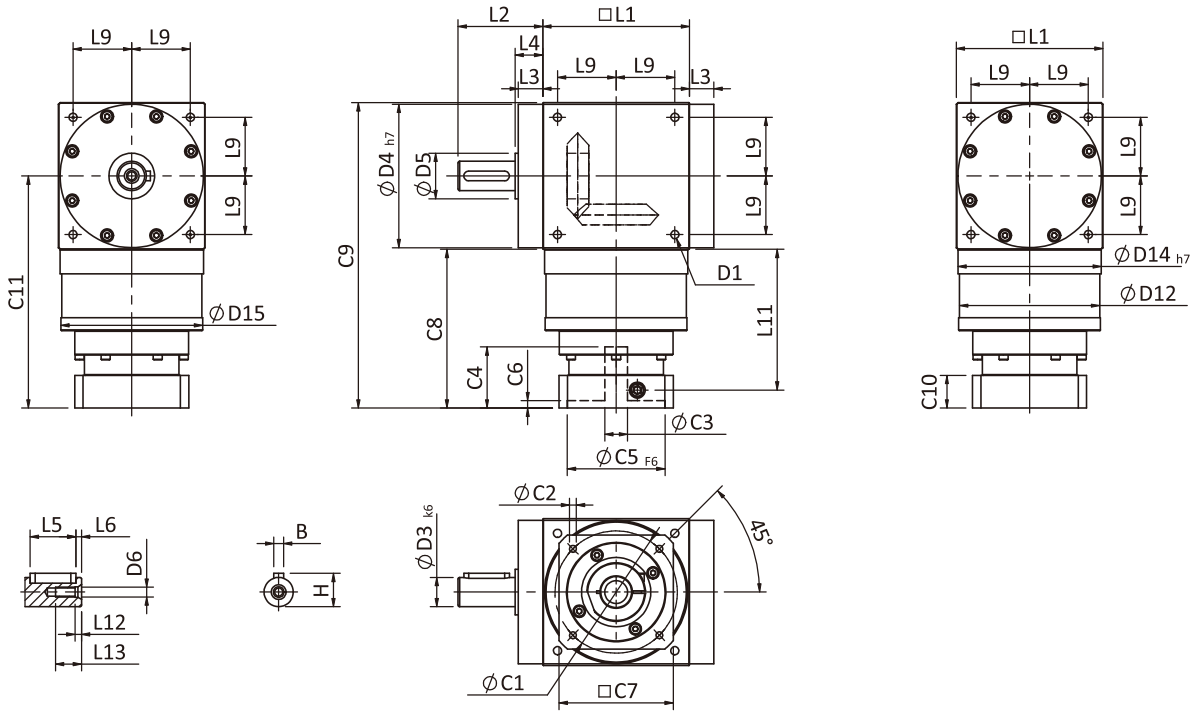
Unit:mm

Dimensions	PT60-FSL	PT75-FSL	PT90-FSL	PT110-FSL	PT140-FSL	PT170-FSL	PT210-FSL
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
$D3_{k6}$	13	16	18	22	32	40	50
$D4_{h7}$	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D6	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D12	59.8	72	86	106	104	128	160
$D14_{h7}$	60.2	73	88	108	135	165	205
D15	41.8	72.9	87	107	103	127	158
L1	60.8	75	90	110	140	170	210
L2	34.5	46.5	52	57	67	77	97
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L5	16	25	28	32	45	50	70
L6	2	2.5	3.5	4	2.5	5	2.5
L9	24.75	30	36	44	55	67	85
L11	38.2	57.7	65.5	77	86.4	94.1	127
L12	4	4	4	4.5	6	6	6
L13	12	14	16	20.5	30	36	38
C1 [1]	46	66.67	100	100	130	165	200
C2 [1]	M4x0.7P	M4x0.7P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P
C3 [1]	≦11/≦14/≦19	≦14/≦19	≦19/≦24	≦24	≦32	≦38	≦42/≦48
C4 [1]	32	38	44	47	56.1	67	77
$C5\ ^{1}{}_{F6}$	30	38.15	80	80	110	130	114.3
C6 [1]	4	4	6	5	5	6	6
C7 [1]	42.6	60	90	90	115	140	180
C8 [1]	47.2	67.7	82	93	106	118	152
C9 [1]	108	142.7	172	203	246	288	362
C10 [1]	18.5	20	26	23	27	35	40
C11 [1]	77.6	105.2	127	148	176	203	257
B	5	5	6	6	10	12	14
H	15	18	20.5	24.5	35	43	53.5

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.

★ Specification subject to change without notice.

PT-FSL Double Stage Dimensions



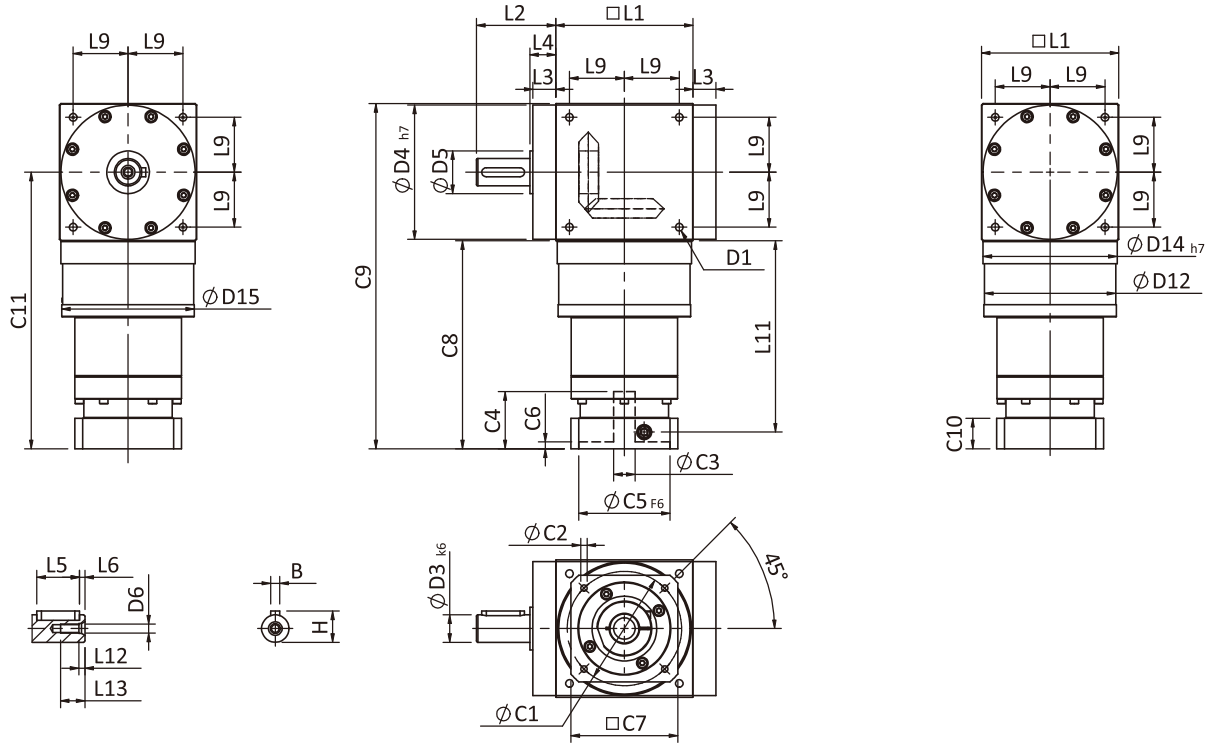
Specifications

Unit:mm

Dimensions	PT60-FSL	PT75-FSL	PT90-FSL	PT110-FSL	PT140-FSL	PT170-FSL	PT210-FSL
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D3k6	13	16	18	22	32	40	50
D4h7	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D6	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D12	59.8	72	86	106	104	128	160
D14h7	60.2	73	88	108	135	165	205
D15	60	72.9	87	107	103	127	158
L1	60.8	75	90	110	140	170	210
L2	34.5	46.5	52	57	67	77	97
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L5	16	25	28	32	45	50	70
L6	2	2.5	3.5	4	2.5	5	2.5
L9	24.75	30	36	44	55	67	85
L11	63.7	74.2	86.4	104.8	120.8	114.8	192.8
L12	4	4	4	4.5	6	6	6
L13	12	14	16	20.5	30	36	38
C1[1]	46	63	70	90	90	90	165
C2[1]	M4x0.7P	M4x0.7P	M5x0.8P	M6x1.0P	M6x1.0P	M6x1.0P	M10x1.5P
C3[1]	≦8/≦11	≦8/≦11	≦14/≦19	≦24	≦24	≦24	≦35/≦38
C4[1]	28.6	28.6	37.5	48.2	48.2	48.2	66.7
C5[1]F6	30	40	50	70	70	70	130
C6[1]	4.1	4.1	4.5	6	6	6	5.5
C7[1]	42	60	60	90	90	90	140
C8[1]	73.3	83.8	97.4	119.5	135.5	129.5	210
C9[1]	134.1	158.8	187.4	229.5	275.5	299.5	420
C10[1]	17	17	20	26	26	26	35
C11[1]	103.7	121.3	142.4	174.5	205.5	214.5	315
B	5	5	6	6	10	12	14
H	15	18	20.5	24.5	35	43	53.5

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.
★ Specification subject to change without notice.

PT-FSL Triple Stage Dimensions

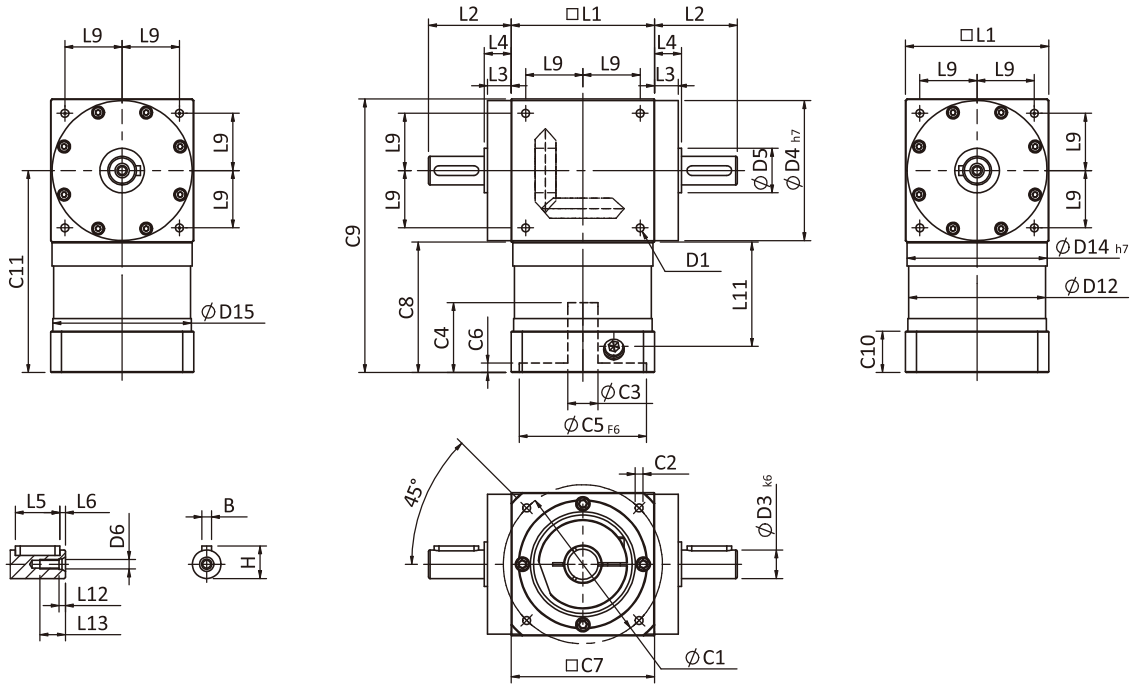


Specifications Unit:mm

Dimensions	PT110-FSL	PT140-FSL	PT170-FSL	PT210-FSL
D1	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D3k6	22	32	40	50
D4h7	108	135	165	205
D5	32.3	46.4	54.4	74
D6	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D12	106	104	128	160
D14h7	108	135	165	205
D15	107	103	127	158
L1	110	140	170	210
L2	57	67	77	97
L3	15	15	15	20
L4	17	17	17	22
L5	32	45	50	70
L6	4	2.5	5	2.5
L9	44	55	67	85
L11	131	147	143.7	223.4
L12	4.5	6	6	6
L13	20.5	30	36	38
C1[1]	70	70	90	130
C2[1]	M5x0.8P	M5x0.8P	M6x1.0P	M8x1.25P
C3[1]	≦14/≦19	≦14/≦19	≦19	≦24/≦32/≦38
C4[1]	37.5	37.5	41.6	51.1
C5[1]F6	50	50	70	110
C6[1]	4.5	4.5	6	6
C7[1]	60	60	80	115
C8[1]	142	158	157.8	239.5
C9[1]	252	298	327.8	449.5
C10[1]	20	20	25	30
C11[1]	197	228	242.8	344.5
B	6	10	12	14
H	24.5	35	43	53.5

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.
★ Specification subject to change without notice.

PT-FS Single Stage Dimensions



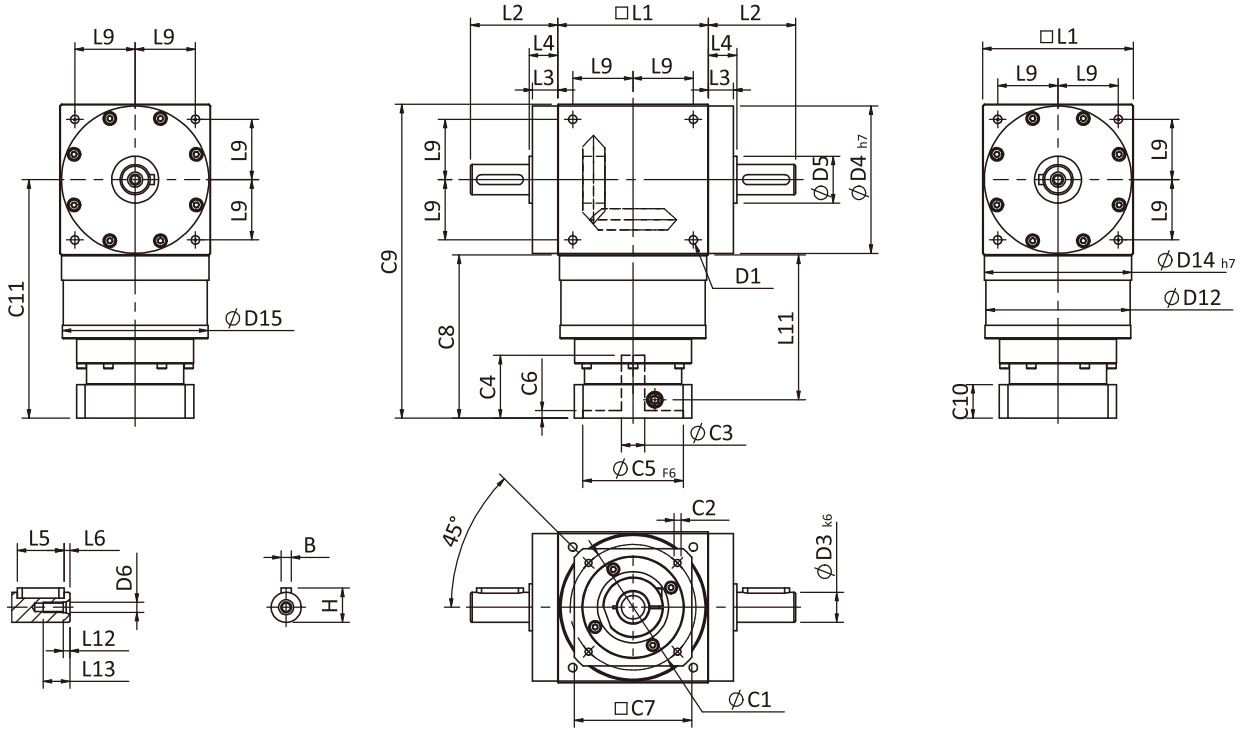
Specifications

Unit:mm

Dimensions	PT60-FS	PT75-FS	PT90-FS	PT110-FS	PT140-FS	PT170-FS	PT210-FS
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
$D3_{k6}$	13	16	18	22	32	40	50
$D4_{h7}$	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D6	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D12	59.8	72	86	106	104	128	160
$D14_{h7}$	60.2	73	88	108	135	165	205
D15	41.8	72.9	87	107	103	127	158
L1	60.8	75	90	110	140	170	210
L2	34.5	46.5	52	57	67	77	97
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L5	16	25	28	32	45	50	70
L6	2	2.5	3.5	4	2.5	5	2.5
L9	24.75	30	36	44	55	67	85
L11	38.2	57.7	65.5	77	86.4	94.1	127
L12	4	4	4	4.5	6	6	6
L13	12	14	16	20.5	30	36	38
C1 [1]	46	66.67	100	100	130	165	200
C2 [1]	M4x0.7P	M4x0.7P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P
C3 [1]	≦11/≦14/≦19	≦14/≦19	≦19/≦24	≦24	≦32	≦38	≦42/≦48
C4 [1]	32	38	44	47	56.1	67	77
$C5\ ^{1}_{F6}$	30	38.15	80	80	110	130	114.3
C6 [1]	4	4	6	5	5	6	6
C7 [1]	42.6	60	90	90	115	140	180
C8 [1]	47.2	67.7	82	93	106	118	152
C9 [1]	108	142.7	172	203	246	288	362
C10 [1]	18.5	20	26	23	27	35	40
C11 [1]	77.6	105.2	127	148	176	203	257
B	5	5	6	6	10	12	14
H	15	18	20.5	24.5	35	43	53.5

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.
★ Specification subject to change without notice.

PT-FS Double Stage Dimensions



Specifications

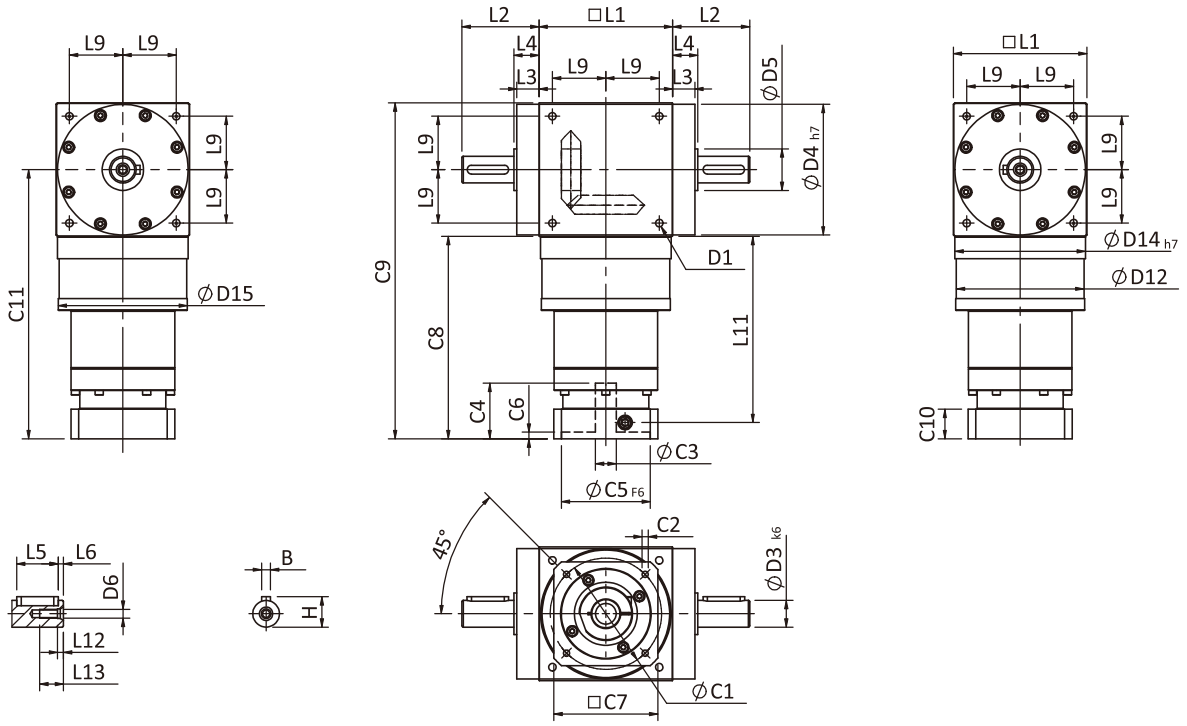
Unit:mm

Dimensions	PT60-FS	PT75-FS	PT90-FS	PT110-FS	PT140-FS	PT170-FS	PT210-FS
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
$D3_{k6}$	13	16	18	22	32	40	50
$D4_{h7}$	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D6	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D12	59.8	72	86	106	104	128	160
$D14_{h7}$	60.2	73	88	108	135	165	205
D15	60	72.9	87	107	103	127	158
L1	60.8	75	90	110	140	170	210
L2	34.5	46.5	52	57	67	77	97
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L5	16	25	28	32	45	50	70
L6	2	2.5	3.5	4	2.5	5	2.5
L9	24.75	30	36	44	55	67	85
L11	63.7	74.2	86.4	104.8	120.8	114.8	192.8
L12	4	4	4	4.5	6	6	6
L13	12	14	16	20.5	30	36	38
C1[1]	46	63	70	90	90	90	165
C2[1]	M4x0.7P	M4x0.7P	M5x0.8P	M6x1.0P	M6x1.0P	M6x1.0P	M10x1.5P
C3[1]	≦8/≦11	≦8/≦11	≦14/≦19	≦24	≦24	≦24	≦35/≦38
C4[1]	28.6	28.6	37.5	48.2	48.2	48.2	66.7
$C5^{1}_{F6}$	30	40	50	70	70	70	130
C6[1]	4.1	4.1	4.5	6	6	6	5.5
C7[1]	42	60	60	90	90	90	140
C8[1]	73.3	83.8	97.4	119.5	135.5	129.5	210
C9[1]	134.1	158.8	187.4	229.5	275.5	299.5	420
C10[1]	17	17	20	26	26	26	35
C11[1]	103.7	121.3	142.4	174.5	205.5	214.5	315
B	5	5	6	6	10	12	14
H	15	18	20.5	24.5	35	43	53.5

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.

★ Specification subject to change without notice.

PT-FS Triple Stage Dimensions

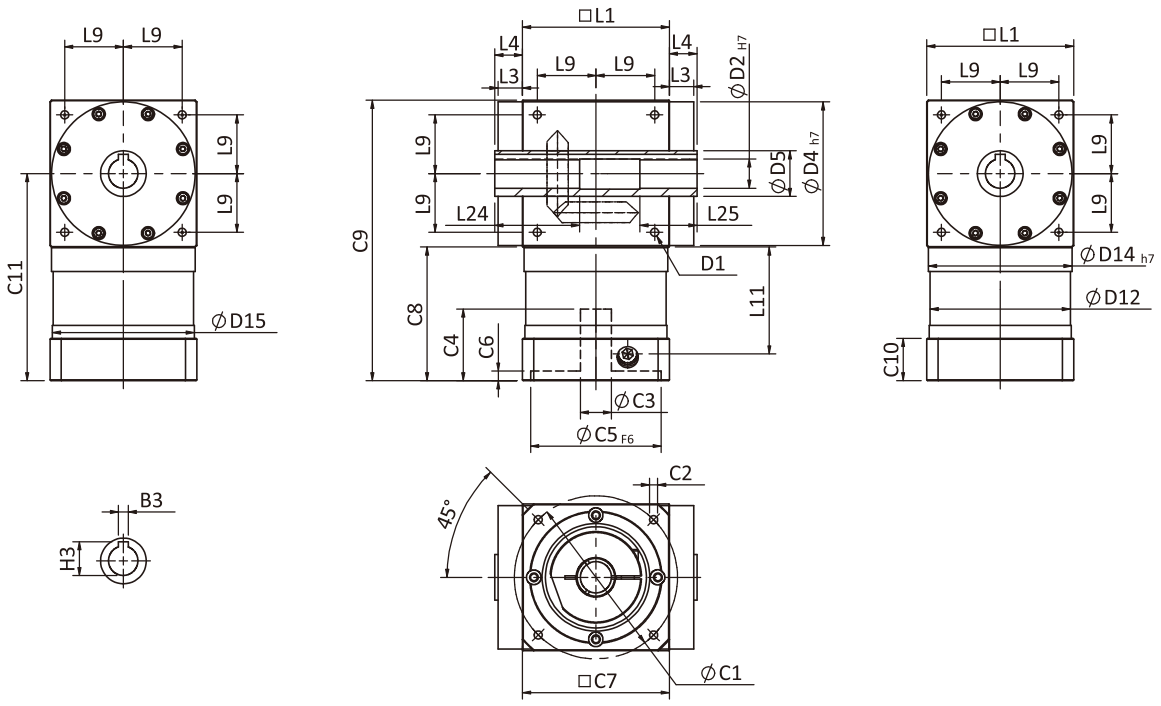


Specifications Unit:mm

Dimensions	PT110-FS	PT140-FS	PT170-FS	PT210-FS
D1	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
$D3_{k6}$	22	32	40	50
$D4_{h7}$	108	135	165	205
D5	32.3	46.4	54.4	74
D6	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D12	106	104	128	160
$D14_{h7}$	108	135	165	205
D15	107	103	127	158
L1	110	140	170	210
L2	57	67	77	97
L3	15	15	15	20
L4	17	17	17	22
L5	32	45	50	70
L6	4	2.5	5	2.5
L9	44	55	67	85
L11	131	147	143.7	223.4
L12	4.5	6	6	6
L13	20.5	30	36	38
$C1^1$	70	70	90	130
$C2^1$	M5x0.8P	M5x0.8P	M6x1.0P	M8x1.25P
$C3^1$	≦14/≦19	≦14/≦19	≦19	≦24/≦32/≦38
$C4^1$	37.5	37.5	41.6	51.1
$C5^{1}{}_{F6}$	50	50	70	110
$C6^1$	4.5	4.5	6	6
$C7^1$	60	60	80	115
$C8^1$	142	158	157.8	239.5
$C9^1$	252	298	327.8	449.5
$C10^1$	20	20	25	30
$C11^1$	197	228	242.8	344.5
B	6	10	12	14
H	24.5	35	43	53.5

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.
★ Specification subject to change without notice.

PT-FH Single Stage Dimensions



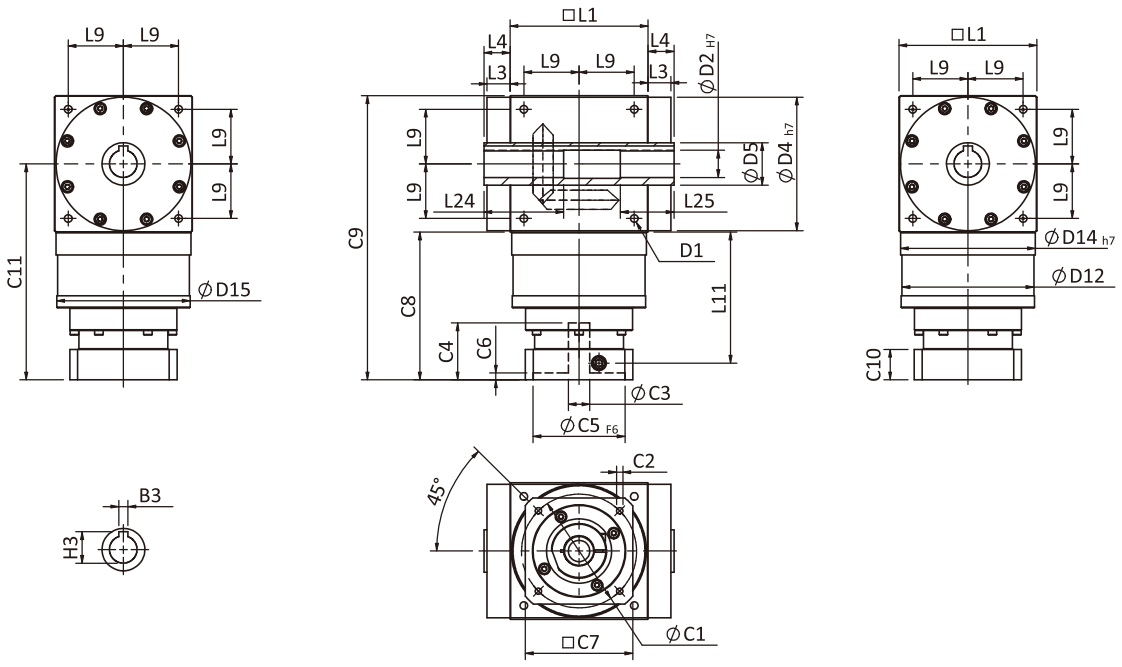
Specifications

Unit:mm

Dimensions	PT60-FH	PT75-FH	PT90-FH	PT110-FH	PT140-FH	PT170-FH	PT210-FH
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D2H7	13	14	18	22	32	40	50
D4h7	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D12	59.8	72	86	106	104	128	160
D14h7	60.2	73	88	108	135	165	205
D15	41.8	72.9	87	107	103	127	158
L1	60.8	75	90	110	140	170	210
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L9	24.75	30	36	44	55	67	85
L11	38.2	57.7	65.5	77	86.4	94.1	127
L24	30	40	40	40	55	60	70
L25	30	32	35	35	50	55	65
C1[1]	46	66.67	100	100	130	165	200
C2[1]	M4x0.7P	M4x0.7P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P
C3[1]	≦11/≦14/≦19	≦14/≦19	≦19/≦24	≦24	≦32	≦38	≦42/≦48
C4[1]	32	38	44	47	56.1	67	77
C5[1]F6	30	38.15	80	80	110	130	114.3
C6[1]	4	4	6	5	5	6	6
C7[1]	42.6	60	90	90	115	140	180
C8[1]	47.2	67.7	82	93	106	118	152
C9[1]	108	142.7	172	203	246	288	362
C10[1]	18.5	20	26	23	27	35	40
C11[1]	77.6	105.2	127	148	176	203	257
B3	5	5	6	6	10	12	14
H3	15.3	16.3	20.8	24.8	35.3	43.3	53.8

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.
★ Specification subject to change without notice.

PT-FH Double Stage Dimensions



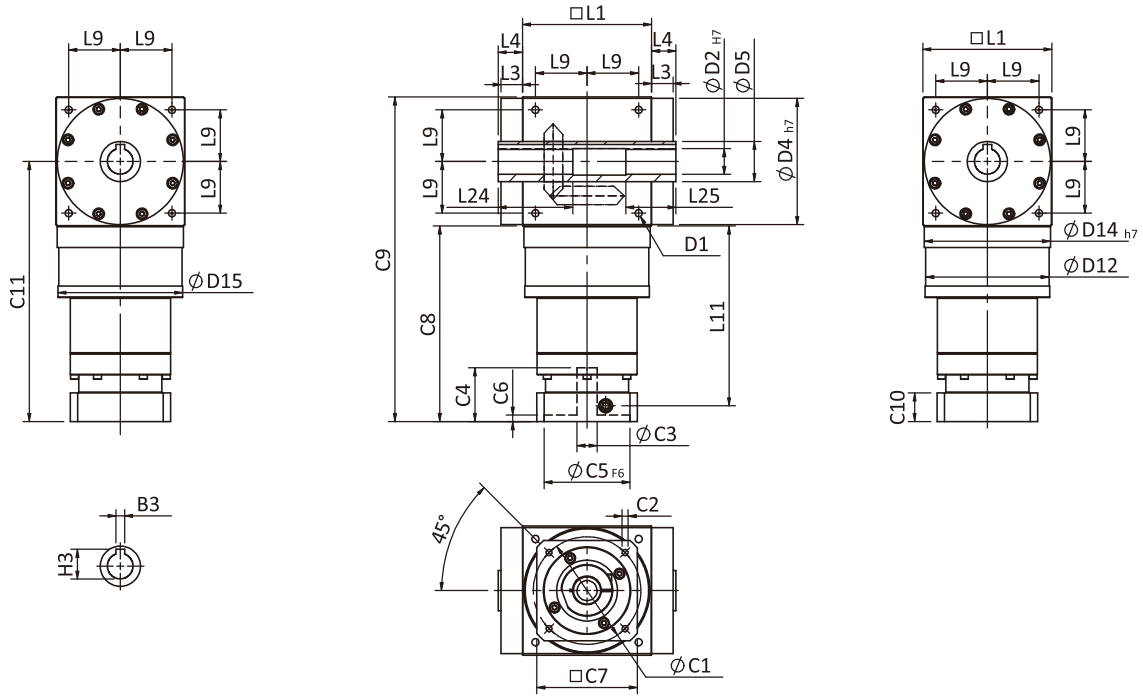
Specifications

Unit:mm

Dimensions	PT60-FH	PT75-FH	PT90-FH	PT110-FH	PT140-FH	PT170-FH	PT210-FH
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
$D3_{K6}$	13	14	18	22	32	40	50
$D4_{h7}$	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D12	59.8	72	86	106	104	128	160
$D14_{h7}$	60.2	73	88	108	135	165	205
D15	41.8	72.9	87	107	103	127	158
L1	60.8	75	90	110	140	170	210
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L9	24.75	30	36	44	55	67	85
L11	63.7	74.2	86.4	104.8	120.8	114.8	192.8
L24	30	40	40	40	55	60	70
L25	30	32	35	35	50	55	65
C1 [1]	46	63	70	90	90	90	165
C2 [1]	M4x0.7P	M4x0.7P	M5x0.8P	M6x1.0P	M6x1.0P	M6x1.0P	M10x1.5P
C3 [1]	≦8/≦11	≦8/≦11	≦14/≦19	≦24	≦24	≦24	≦35/≦38
C4 [1]	28.6	28.6	37.5	48.2	48.2	48.2	66.7
$C5\ ^{1}_{F6}$	30	40	50	70	70	70	130
C6 [1]	4.1	4.1	4.5	6	6	6	5.5
C7 [1]	42	60	60	90	90	90	140
C8 [1]	73.3	83.8	97.4	119.5	135.5	129.5	210
C9 [1]	134.1	158.8	187.4	229.5	275.5	299.5	420
C10 [1]	17	17	20	26	26	26	35
C11 [1]	103.7	121.3	142.4	174.5	205.5	214.5	315
B3	5	5	6	6	10	12	14
H3	15.3	16.3	20.8	24.8	35.3	43.3	53.8

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.
★ Specification subject to change without notice.

PT-FH Triple Stage Dimensions



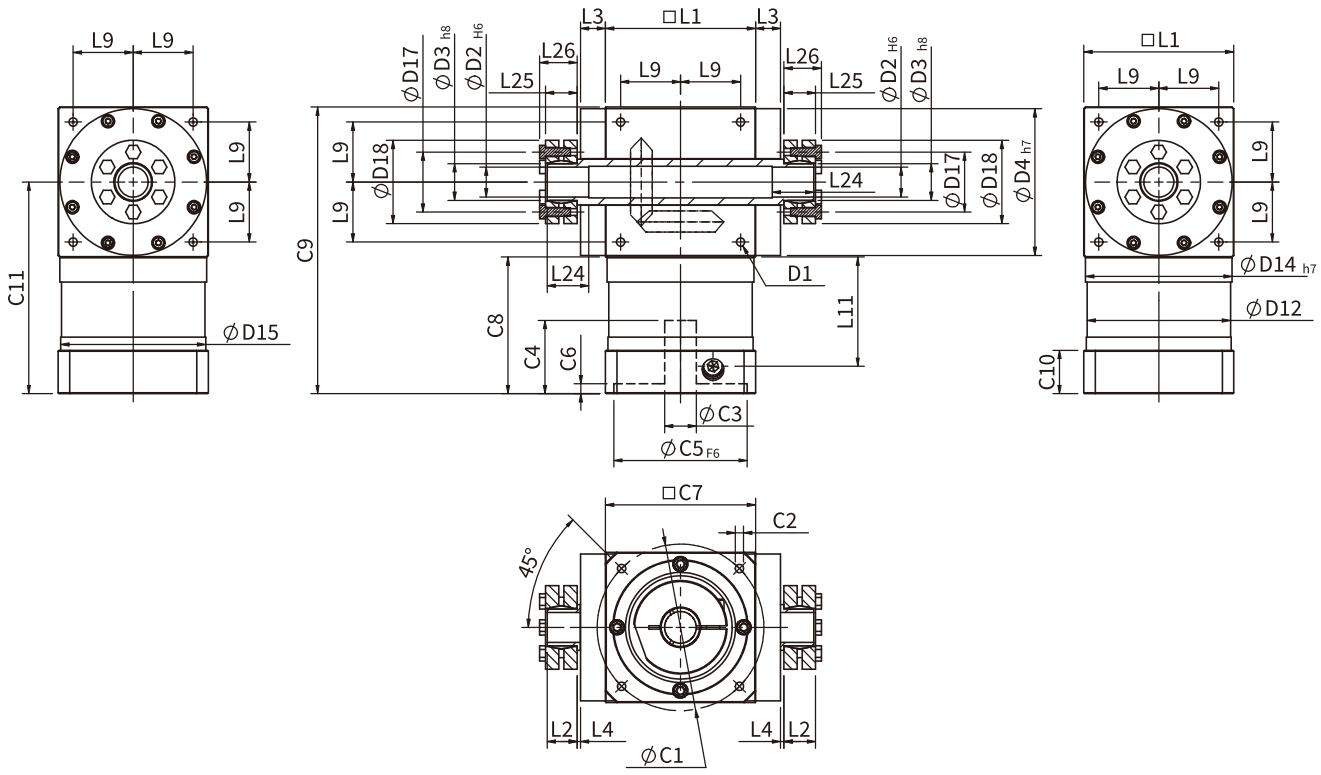
Specifications

Unit:mm

Dimensions	PT110-FH	PT140-FH	PT170-FH	PT210-FH
D1	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D2H7	22	32	40	50
D4h7	108	135	165	205
D5	32.3	46.4	54.4	74
D12	106	104	128	160
D14h7	108	135	165	205
D15	107	103	127	158
L1	110	140	170	210
L3	15	15	15	20
L4	17	17	17	22
L9	44	55	67	85
L11	131	147	143.7	223.4
L24	40	55	60	70
L25	35	50	55	65
C1[1]	70	70	90	115
C2[1]	M5x0.8P	M5x0.8P	M6x1.0P	M8x1.25P
C3[1]	≦14/≦19	≦14/≦19	≦19	≦24/≦32/≦38
C4[1]	37.5	37.5	41.6	51.1
C5[1]F6	50	50	70	95
C6[1]	4.5	4.5	6	6
C7[1]	60	60	80	115
C8[1]	142	158	157.8	239.5
C9[1]	252	298	327.8	449.5
C10[1]	20	20	25	30
C11[1]	197	228	242.8	344.5
B3	6	10	12	14
H3	24.5	35.3	43.3	53.8

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.
★ Specification subject to change without notice.

PT-FC Single Stage Dimensions

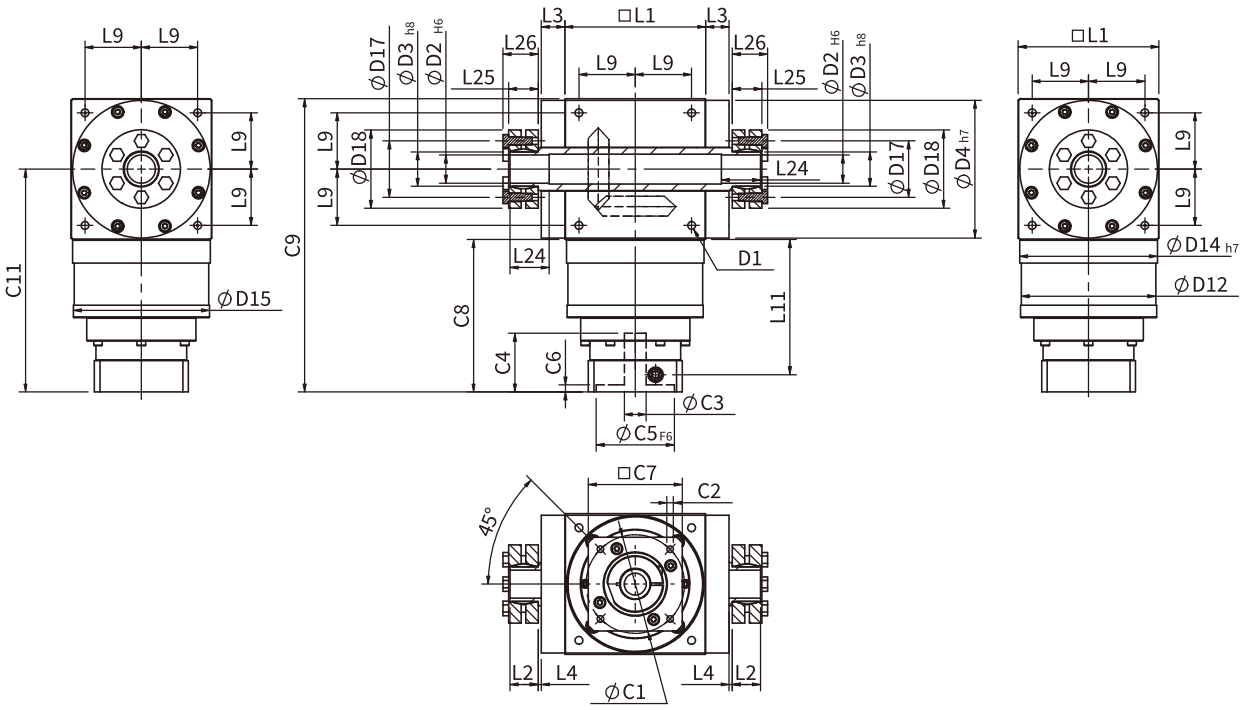


Specifications

Unit:mm

Dimensions	PT60-FC	PT75-FC	PT90-FC	PT110-FC	PT140-FC	PT170-FC	PT210-FC
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D2H6	13	14	18	22	32	40	50
D3h8	16	16	22	25	44	50	62
D4h7	60	73	88	108	135	165	205
D12	59.8	72	86	106	104	128	160
D14h7	60.2	73	88	108	135	165	205
D15	41.8	72.9	87	107	103	127	158
D17	26	26	36	44	61	70	86
D18	41	41	50	60	80	90	110
L1	60.8	75	90	110	140	170	210
L2	15	14	18	20	25	27	29
L3	13	14.5	15	15	15	15	20
L4	2	2	2	2	2	2	2
L9	24.75	30	36	44	55	67	85
L11	38.2	57.7	65.5	77	86.4	94.1	107
L24	18	18	25	25	30	32	31
L25	15	15	19	21	25	27	30
L26	18.5	18.5	22.5	24.5	29	31	34
C1[1]	46	66.67	100	100	130	165	200
C2[1]	M4x0.7P	M4x0.7P	M6x1.0P	M6x1.0P	M8x1.25P	M10x1.5P	M12x1.75P
C3[1]	≦11/≦14/≦19	≦14/≦19	≦19/≦24	≦24	≦32	≦38	≦42/≦48
C4[1]	32	38	44	47	56.1	67	77
C5[1]F6	30	38.15	80	80	110	130	114.3
C6[1]	4	4	6	5	5	6	6
C7[1]	42.6	60	90	90	115	140	180
C8[1]	47.2	67.7	82	93	106	118	152
C9[1]	108	142.7	172	203	246	288	362
C10[1]	18.5	20	26	23	27	35	40
C11[1]	77.6	105.2	127	148	176	203	257

PT-FC Double Stage Dimensions



Specifications

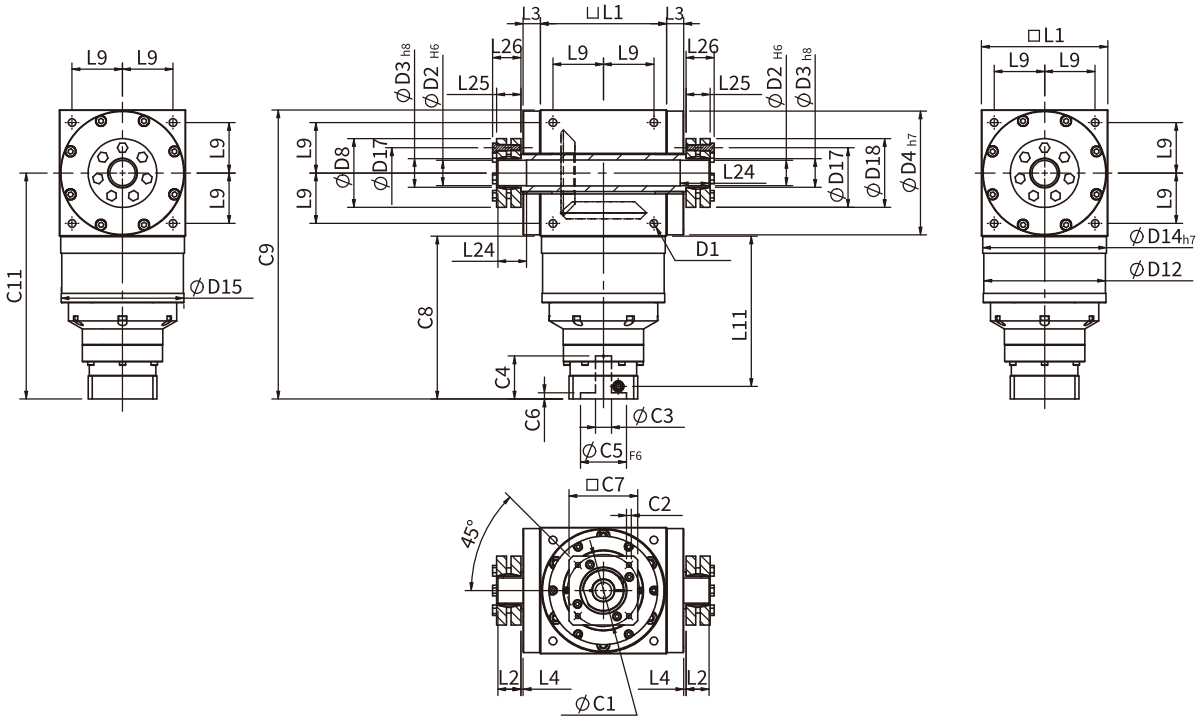
Unit:mm

Dimensions	PT60-FC	PT75-FC	PT90-FC	PT110-FC	PT140-FC	PT170-FC	PT210-FC
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D2H6	8	14	18	22	32	40	50
D3h8	16	16	22	25	44	50	62
D4h7	60	73	88	108	135	165	205
D12	59.8	72	86	106	104	128	160
D14h7	60.2	73	88	108	135	165	205
D15	60	72.9	87	107	103	127	158
D17	26	26	36	44	61	70	86
D18	41	41	50	60	80	90	110
L1	60.8	75	90	110	140	170	210
L2	15	14	18	20	25	27	29
L3	13	14.5	15	15	15	15	20
L4	2	2	2	2	2	2	2
L9	24.75	30	36	44	55	67	85
L11	63.7	74.2	86.4	104.8	120.8	114.8	192.8
L24	18	18	25	25	30	32	31
L25	15	15	19	21	25	27	30
L26	18.5	18.5	22.5	24.5	29	31	34
C1[1]	46	63	70	90	90	90	165
C2[1]	M4x0.7P	M4x0.7P	M5x0.8P	M6x1.0P	M6x1.0P	M6x1.0P	M10x1.5P
C3[1]	≦8/≦11	≦8/≦11	≦14/≦19	≦24	≦24	≦24	≦35/≦38
C4[1]	28.6	28.6	37.5	48.2	48.2	48.2	66.7
C5[1]F6	30	40	50	70	70	70	130
C6[1]	4.1	4.1	4.5	6	6	6	5.5
C7[1]	42	60	60	90	90	90	140
C8[1]	73.3	83.8	97.4	119.5	135.5	129.5	210
C9[1]	134.1	158.8	187.4	229.5	275.5	299.5	420
C10[1]	17	17	20	26	26	26	35
C11[1]	103.7	121.3	142.4	174.5	205.5	214.5	315

*1. C1~C11 are motor specific dimensions (metric std shown), sizse may vary according to motor flange.

★ Specification subject to change without notice.

PT-FC Triple Stage Dimensions



Specifications

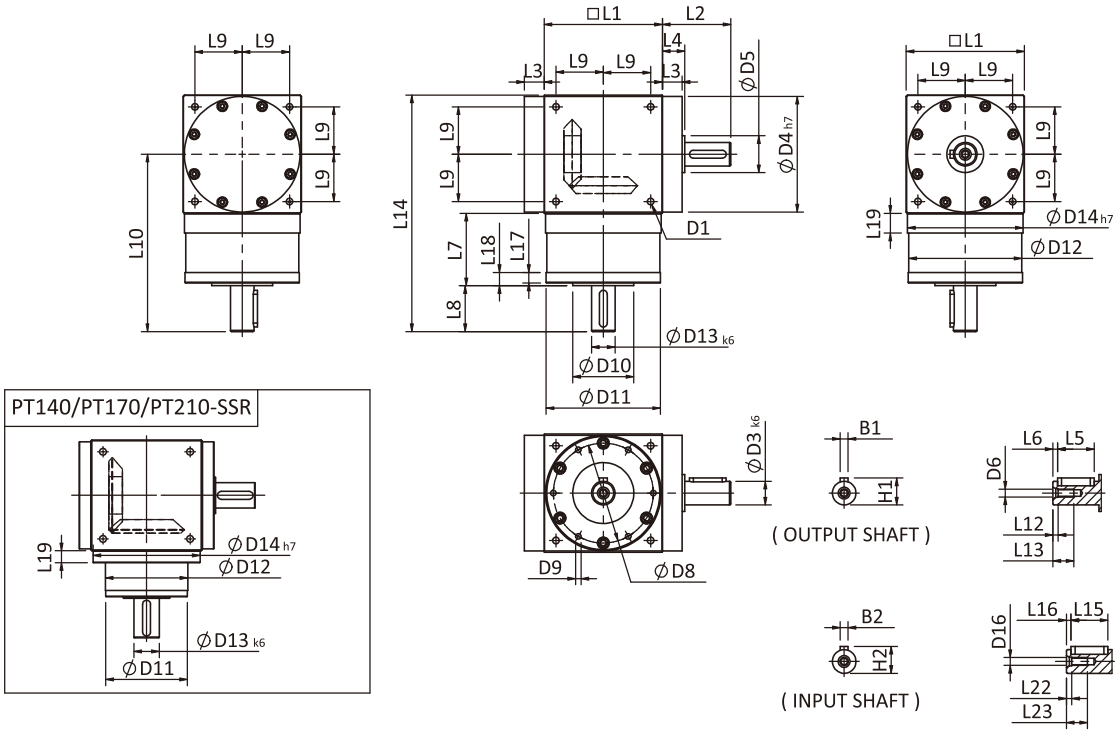
Unit:mm

Dimensions	PT110-FC	PT140-FC	PT170-FC	PT210-FC
D1	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
$D2_{H6}$	22	32	40	50
$D3_{h8}$	25	44	50	62
$D4_{h7}$	108	135	165	205
D12	106	104	128	160
$D14_{h7}$	108	135	165	205
D15	107	103	127	158
D17	44	61	70	86
D18	60	80	90	110
L1	110	140	170	210
L2	20	25	27	29
L3	15	15	15	20
L4	2	2	2	2
L9	44	55	67	85
L11	131	147	143.7	223.4
L24	25	30	32	31
L25	21	25	27	30
L26	24.5	29	31	34
$C1^1$	70	70	90	130
$C2^1$	M5x0.8P	M5x0.8P	M6x1.0P	M8x1.25P
$C3^1$	≦14/≦19	≦14/≦19	≦19	≦24/≦32/≦38
$C4^1$	37.5	37.5	41.6	51.1
$C5^1{}_{F6}$	50	50	70	110
$C6^1$	4.5	4.5	6	6
$C7^1$	60	60	80	115
$C8^1$	142	158	157.8	239.5
$C9^1$	252	298	327.8	449.5
$C10^1$	20	20	25	30
$C11^1$	197	228	242.8	344.5

★ C1~C10 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

★ Specification subject to change without notice.

PT-SSR Single Stage Dimensions

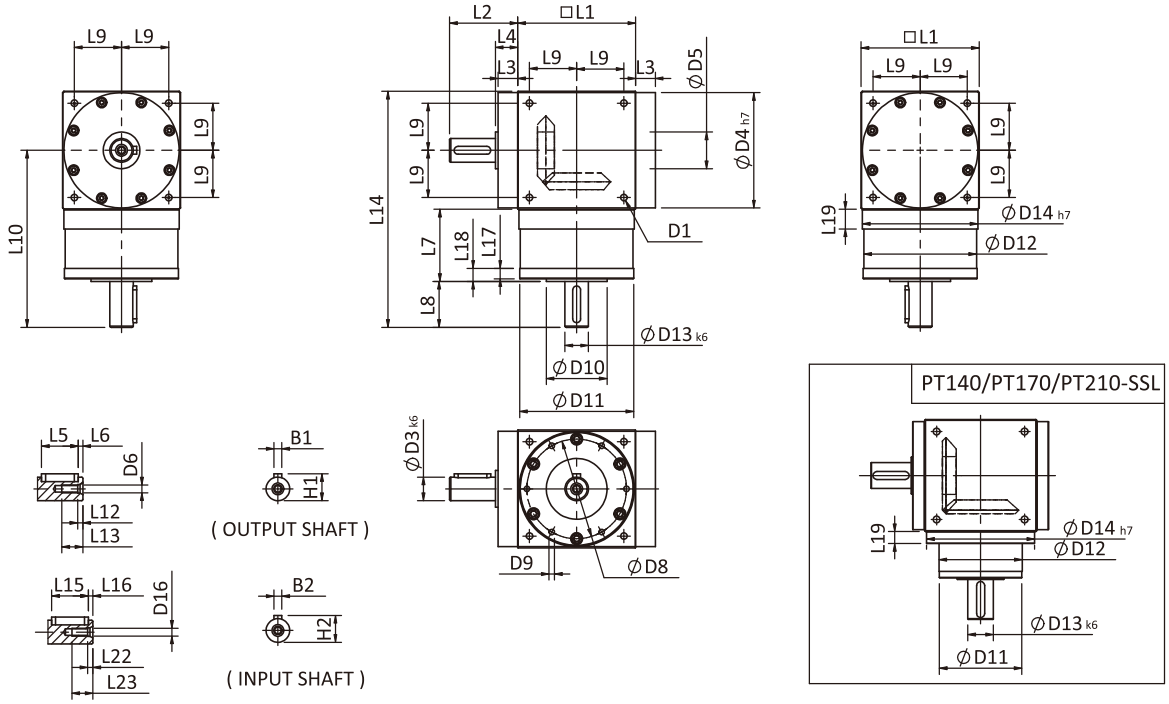


Specifications

Unit:mm

Dimensions	PT60-SSR	PT75-SSR	PT90-SSR	PT110-SSR	PT140-SSR	PT170-SSR	PT210-SSR
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D3k6	13	16	18	22	32	40	50
D4h7	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D6	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D8	53	62	76	95	92	114	142
D9	4-M4x0.7P	4-M5x0.8P	4-M5x0.8P	6-M6x1.0P	6-M6x1.0P	6-M8x1.25P	6-M8x1.25P
D10	34	34	46	59	59	74	90
D11g6	60	72.9	87	107	103	127	158
D12	59.8	72	86	106	104	128	160
D13k6	13	16	18	22	32	40	50
D14h7	60.2	73	88	108	135	165	205
D16	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
L1	60.8	75	90	110	140	170	210
L2	34.5	46.5	52	57	67	77	97
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L5	16	25	28	32	45	50	70
L6	2	2.5	3.5	4	2.5	5	2.5
L7	43	52.5	55	60	60	70	90
L8	19.5	30	35	40	50	60	75
L9	24.75	30	36	44	55	67	85
L10	92.9	120	135	155	180	215	270
L12	4	4	4	4.5	6	6	6
L13	12	14	16	20.5	30	36	38
L14	123.3	157.5	180	210	250	300	375
L15	16	25	28	32	45	50	70
L16	2	2.5	3.5	4	2.5	5	2.5
L17	6	8	8	8	10	10	10
L18	8	10	10	10	12	12	12
L19	13	15	15	15	15	15	20
L22	4	4	4	4.5	6	6	6
L23	12	14	16	20.5	30	36	38
B1	5	5	6	6	10	12	14
B2	5	5	6	6	10	12	14
H1	15	18	20.5	24.5	35	43	53.5
H2	15	18	20.5	24.5	35	43	53.5

PT-SSL Single Stage Dimensions

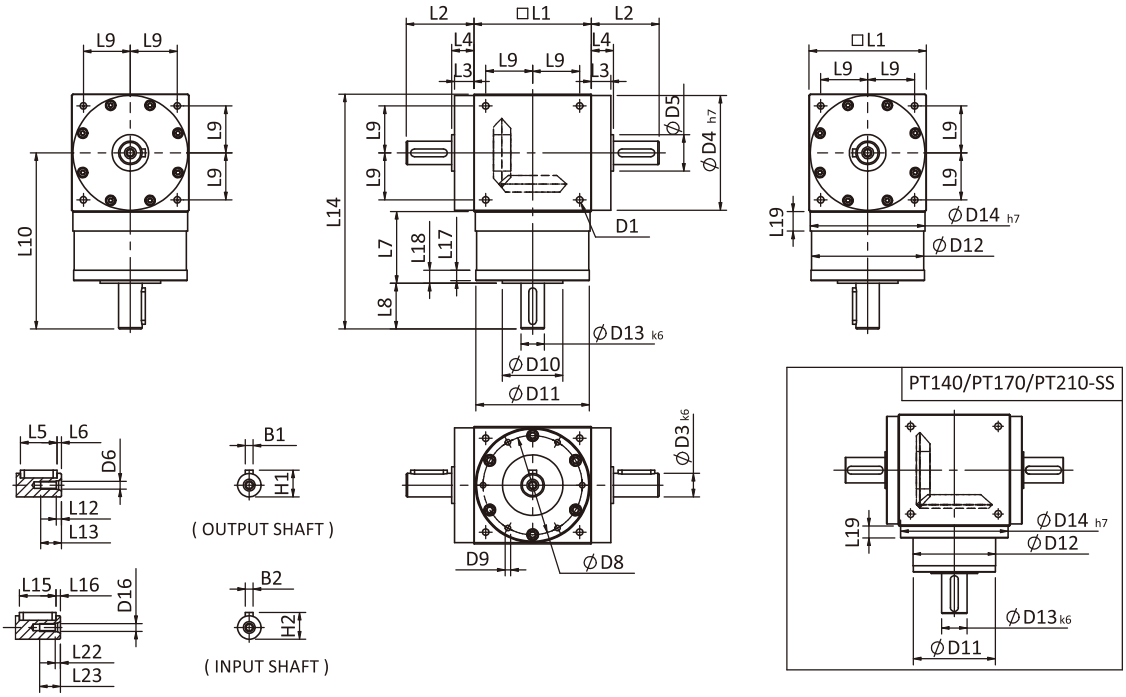


Specifications

Unit:mm

Dimensions	PT60-SSL	PT75-SSL	PT90-SSL	PT110-SSL	PT140-SSL	PT170-SSL	PT210-SSL
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D3k6	13	16	18	22	32	40	50
D4h7	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D6	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D8	53	62	76	95	92	114	142
D9	4-M4x0.7P	4-M5x0.8P	4-M5x0.8P	6-M6x1.0P	6-M6x1.0P	6-M8x1.25P	6-M8x1.25P
D10	34	34	46	59	59	74	90
D11g6	60	72.9	87	107	103	127	158
D12	59.8	72	86	106	104	128	160
D13k6	13	16	18	22	32	40	50
D14h7	60.2	73	88	108	135	165	205
D16	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
L1	60.8	75	90	110	140	170	210
L2	34.5	46.5	52	57	67	77	97
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L5	16	25	28	32	45	50	70
L6	2	2.5	3.5	4	2.5	5	2.5
L7	43	52.5	55	60	60	70	90
L8	19.5	30	35	40	50	60	75
L9	24.75	30	36	44	55	67	85
L10	92.9	120	135	155	180	215	270
L12	4	4	4	4.5	6	6	6
L13	12	14	16	20.5	30	36	38
L14	123.3	157.5	180	210	250	300	375
L15	16	25	28	32	45	50	70
L16	2	2.5	3.5	4	2.5	5	2.5
L17	6	8	8	8	10	10	10
L18	8	10	10	10	12	12	12
L19	13	15	15	15	15	15	20
L22	4	4	4	4.5	6	6	6
L23	12	14	16	20.5	30	36	38
B1	5	5	6	6	10	12	14
B2	5	5	6	6	10	12	14
H1	15	18	20.5	24.5	35	43	53.5
H2	15	18	20.5	24.5	35	43	53.5

PT-SS Single Stage Dimensions

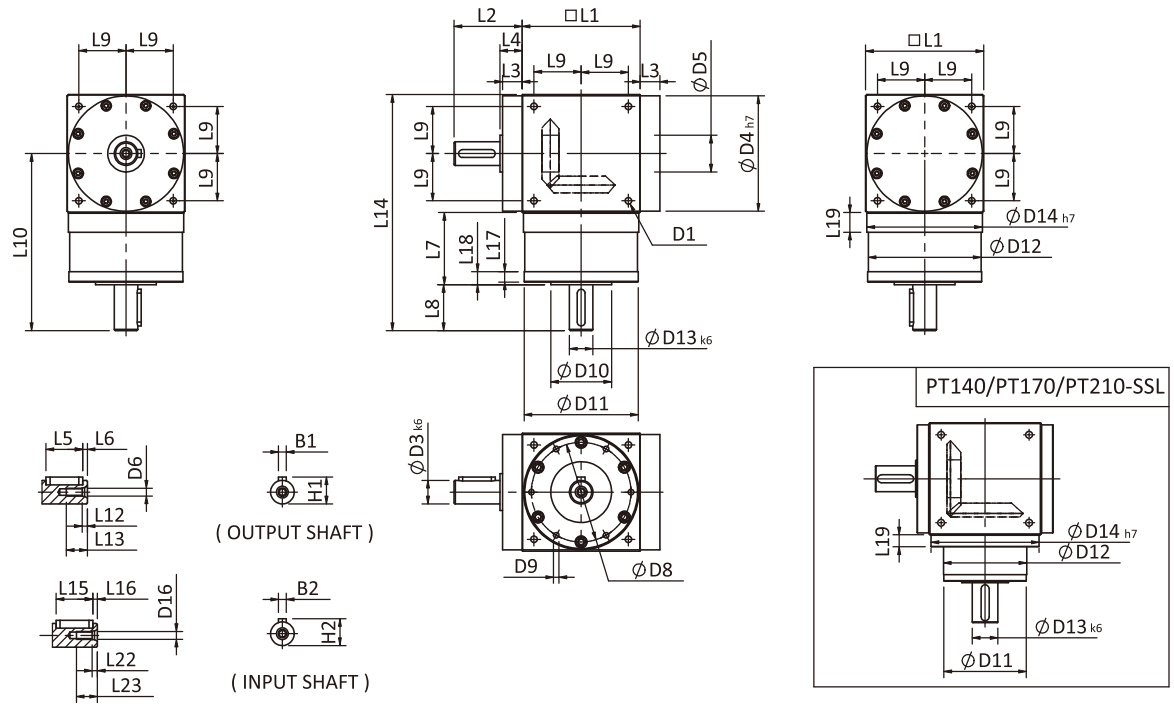


Specifications

Unit:mm

Dimensions	PT60-SS	PT75-SS	PT90-SS	PT110-SS	PT140-SS	PT170-SS	PT210-SS
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D3k6	13	16	18	22	32	40	50
D4h7	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D6	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D8	53	62	76	95	92	114	142
D9	4-M4x0.7P	4-M5x0.8P	4-M5x0.8P	6-M6x1.0P	6-M6x1.0P	6-M8x1.25P	6-M8x1.25P
D10	34	34	46	59	59	74	90
D11g6	60	72.9	87	107	103	127	158
D12	59.8	72	86	106	104	128	160
D13k6	13	16	18	22	32	40	50
D14h7	60.2	73	88	108	135	165	205
D16	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
L1	60.8	75	90	110	140	170	210
L2	34.5	46.5	52	57	67	77	97
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L5	16	25	28	32	45	50	70
L6	2	2.5	3.5	4	2.5	5	2.5
L7	43	52.5	55	60	60	70	90
L8	19.5	30	35	40	50	60	75
L9	24.75	30	36	44	55	67	85
L10	92.9	120	135	155	180	215	270
L12	4	4	4	4.5	6	6	6
L13	12	14	16	20.5	30	36	38
L14	123.3	157.5	180	210	250	300	375
L15	16	25	28	32	45	50	70
L16	2	2.5	3.5	4	2.5	5	2.5
L17	6	8	8	8	10	10	10
L18	8	10	10	10	12	12	12
L19	13	15	15	15	15	15	20
L22	4	4	4	4.5	6	6	6
L23	12	14	16	20.5	30	36	38
B1	5	5	6	6	10	12	14
B2	5	5	6	6	10	12	14
H1	15	18	20.5	24.5	35	43	53.5
H2	15	18	20.5	24.5	35	43	53.5

PT-SH Single Stage Dimensions

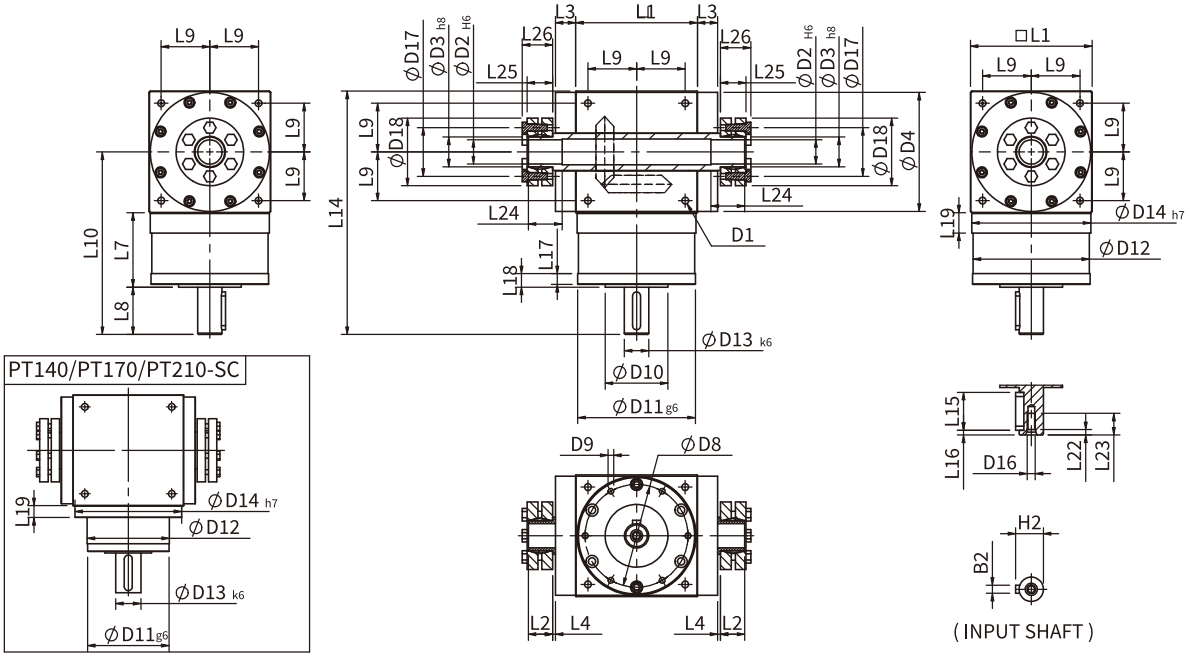


Specifications

Unit:mm

Dimensions	PT60-SH	PT75-SH	PT90-SH	PT110-SH	PT140-SH	PT170-SH	PT210-SH
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D2H7	13	14	18	22	32	40	50
D4h7	60	73	88	108	135	165	205
D5	20.6	21.5	27.5	32.3	46.4	54.4	74
D8	53	62	76	95	92	114	142
D9	4-M4x0.7P	4-M5x0.8P	4-M5x0.8P	6-M6x1.0P	6-M6x1.0P	6-M8x1.25P	6-M8x1.25P
D10	34	34	46	59	59	74	90
D11g6	60	72.9	87	107	103	127	158
D12	59.8	72	86	106	104	128	160
D13k6	13	16	18	22	32	40	50
D14h7	60.2	73	88	108	135	165	205
D16	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
L1	60.8	75	90	110	140	170	210
L3	13	14.5	15	15	15	15	20
L4	15	16.5	17	17	17	17	22
L7	43	52.5	55	60	60	70	90
L8	19.5	30	35	40	50	60	75
L9	24.75	30	36	44	55	67	85
L10	92.9	120	135	155	180	215	270
L14	123.3	157.5	180	210	250	300	375
L15	16	25	28	32	45	50	70
L16	2	2.5	3.5	4	2.5	5	2.5
L17	6	8	8	8	10	10	10
L18	8	10	10	10	12	12	12
L19	13	15	15	15	15	15	20
L22	4	4	4	4.5	6	6	6
L23	12	14	16	20.5	30	36	38
L24	30	40	40	40	55	60	70
L25	30	32	35	35	50	55	65
B2	5	5	6	6	10	12	14
B3	5	5	6	6	10	12	14
H2	15	18	20.5	24.5	35	43	53.5
H3	15.3	16.3	20.8	24.8	35.3	43.3	53.8

PT-SC Single Stage Dimensions



Specifications

Unit:mm

Dimensions	PT60-SC	PT75-SC	PT90-SC	PT110-SC	PT140-SC	PT170-SC	PT210-SC
D1	24-M5x0.8P	24-M6x1.0P	24-M6x1.0P	24-M8x1.25P	24-M10x1.5P	24-M12x1.75P	24-M16x2.0P
D2H6	13	14	18	22	32	40	50
D3h8	16	16	22	25	44	50	62
D4h7	60	73	88	108	135	165	205
D8	53	62	76	95	92	114	142
D9	4-M4x0.7P	4-M5x0.8P	4-M5x0.8P	6-M6x1.0P	6-M6x1.0P	6-M8x1.25P	6-M8x1.25P
D10	34	34	46	59	59	74	90
D11g6	60	72.9	87	107	103	127	158
D12	59.8	72	86	106	104	128	160
D13k6	13	16	18	22	32	40	50
D14h7	60.2	73	88	108	135	165	205
D16	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M16x2.0P	M16x2.0P
D17	26	26	36	44	61	70	86
D18	41	41	50	60	80	90	110
L1	60.8	75	90	110	140	170	210
L2	15	14	18	20	25	27	29
L3	13	14.5	15	15	15	15	20
L4	2	2	2	2	2	2	2
L7	43	52.5	55	60	60	70	90
L8	19.5	30	35	40	50	60	75
L9	24.75	30	36	44	55	67	85
L10	92.9	120	135	155	180	215	270
L14	123.3	157.5	180	210	250	300	375
L15	16	25	28	32	45	50	70
L16	2	2.5	3.5	4	2.5	5	2.5
L17	6	8	8	8	10	10	10
L18	8	10	10	10	12	12	12
L19	13	15	15	15	15	15	20
L22	4	4	4	4.5	6	6	6
L23	12	14	16	20.5	30	36	38
L24	18	18	25	25	30	32	31
L25	15	15	19	21	25	27	30
L26	18.5	18.5	22.5	24.5	29	31	34
B2	5	5	6	6	10	12	14
H2	15	18	20.5	24.5	35	43	53.5

PT-(FS/FSL/FSR/FH/FC Hollow Shaft Input Spec.) Specifications

Specifications			Stage	Ratio	PT60	PT75	PT90	PT110	PT140	PT170	PT210
Nominal Output Torque T_{2N}		N · m	1	1	25	45	78	150	360	585	1300
				1.5	25	45	78	150	360	585	1300
				2	24	42	68	150	330	544	1220
				3	18	33	54	120	270	450	1020
				4	13	28	48	100	224	376	860
				5	12	25	40	85	196	320	740
			2	7	13	13	40	100	100	100	450
				9	-	33	54	120	250	250	750
				10	24	42	68	150	208	208	950
				15	18	33	54	120	270	312	1020
				20	13	28	48	100	224	376	860
				25	12	25	40	85	196	320	740
				35	12	25	40	85	196	320	740
				50	12	25	40	85	196	320	740
			3	75	-	-	-	120	270	312	1020
				100	-	-	-	100	224	376	860
				125	-	-	-	85	196	320	740
				150	-	-	-	120	270	312	1020
				200	-	-	-	100	224	376	860
				250	-	-	-	85	196	320	740
				350	-	-	-	85	196	320	740
				500	-	-	-	85	196	320	740
Emergency Stop Torque T_{2NOT}		N · m	2.0 Times of Nominal Output Torque) (* Max. Output Torque T_{2B} =1.5 Times of Nominal Output Torque)								
Nominal Input Speed n_{1N}		rpm	1	1	2500	2000	1700	1400	1100	1000	800
				1.5, 2	3000	2500	2000	1600	1400	1300	1050
				3, 4, 5	3500	3000	2500	2100	2000	1800	1600
			2	7-50	5000	5000	4000	4000	4000	3500	3000
			3	75-500	-	-	-	5000	4500	4000	3500
Max. Input Speed n_{1max}		rpm	1	1-5	7500	6500	5500	4500	3500	3000	2200
			2	7-50	8000	8000	6000	6000	6000	6000	4800
			3	75-500	-	-	-	8000	8000	6000	6000
Standard Backlash P2		arcmin	1	1-5	≦6	≦6	≦6	≦6	≦6	≦6	≦6
			2	7-50	≦8	≦8	≦8	≦8	≦8	≦8	≦8
			3	75-500	-	-	-	≦10	≦10	≦10	≦10
Max. Radial Load F_{2rB} [1]		N	1,2,3	1-500	900	1100	1700	2700	4800	6600	11500
Max. Axial Load F_{2aB} [1]		N	1,2,3	1-500	450	550	850	1350	2400	3300	5750
Operating Temp.		℃	1,2,3	-10℃ ~ +90℃							
Service Life		hrs	1,2,3	20,000 (10,000 Continuous Operation)							
Efficiency		%	1	≧ 98%							
			2	≧ 94%							
			3	≧ 94%							
Weight	FS/FSL/FSR	kg	1	1-5	2.8	4.6	7.5	12.8	21.8	38.3	72.6
			2	7-50	3.2	5.2	8.5	15.3	25.1	40.7	77.3
			3	75-500	-	-	-	16.1	25.9	42.0	79.2
	FH	kg	1	1-5	2.6	4.3	7.1	12.1	20.0	34.9	66.1
			2	7-50	3.1	4.9	8.1	14.6	23.5	37.3	70.8
			3	75-500	-	-	-	15.4	24.3	38.5	72.4
Mounting Position		-	1,2,3	Any Direction							
Noise Level [2]		dBA/1m	1,2,3	1-500	68	70	74	75	76	77	79
Protection Class		-	1,2,3	IP65							
Lubrication		-	1,2,3	Synthetic Lubricant							

Inertia (J1)

Stage	Ratio	unit	PT60	PT75	PT90	PT110	PT140	PT170	PT210
1	1	Kg · cm^2	0.51	1.35	3.21	7.82	25.1	61.5	198.9
	1.5		0.46	1.18	2.9	6.85	20.3	51.2	158.2
	2		0.44	1.15	2.75	6.52	18.7	47.3	142.5
	3-5		0.43	1.11	2.71	6.21	18.1	45.2	136.5
2	7-50		0.04	0.07	0.32	1.0	1.6	3.1	9.8
3	75-500		-	-	-	0.23	0.26	0.75	1.0

1. Applied to the output shaft center at 400 rpm.
2. Measured at 1500 rpm with no load.

※ The above figures/specifications are subject to change without prior notice.

PT-(SS/SSL/SSR/SH/SC) Solied Shaft Input Specs.

Specifications			Stage	Ratio	PT60	PT75	PT90	PT110	PT140	PT170	PT210
Nominal Output Torque T_{2N}		N · m	1	1	25	45	78	150	360	585	1300
				1.5	25	45	78	150	360	585	1300
				2	24	42	68	150	330	544	1220
				3	18	33	54	120	270	450	1020
				4	13	28	48	100	224	376	860
				5	12	25	40	85	196	320	740
Emergency Stop Torque T_{2NOT}		N · m	2.0 Times of Nominal Output Torque (*Max. Output Torque T_{2B} = 1.5 Times of Nominal Output Torque)								
Nominal Input Speed n_{1N}		rpm	1	1	2500	2000	1700	1400	1100	1000	800
			1	1.5, 2	3000	2500	2000	1600	1400	1300	1050
			1	3, 4, 5	3500	3000	2500	2100	2000	1800	1600
Max. Input Speed n_{1max}		rpm	1	1-5	7500	6500	5500	4500	3500	3000	2200
Standard Backlash P2		arcmin	1	1-5	≦6	≦6	≦6	≦6	≦6	≦6	≦6
Max. Radial Load on Output Shaft F_{2rB}[1]		N	1	1-5	900	1100	1700	2700	4800	6600	11500
Max. Axial Load on Output Shaft F_{2aB}[1]		N	1	1-5	450	550	850	1350	2400	3300	5750
Max. Radial Load on Input Shaft F_{1rB}[2]		N	1	1-5	700	950	1450	2100	2700	3800	7800
Max. Axial Load on Input Shaft F_{1aB}[2]		N	1	1-5	350	425	725	1050	1350	1900	3900
Operating Temp.		℃	-10℃ ~ +90℃								
Service Life		hrs	20,000 (10,000 Continuous Operation)								
Efficiency		%	≧98%								
Weight	SS	kg	1	1-5	2.6	4.4	7.2	12.2	20.8	36.5	69.2
	SSL	kg	1	1-5	2.5	4.3	7.1	12.1	20.5	35.9	68.1
	SSR	kg	1	1-5	2.5	4.3	7.1	12.1	20.5	35.9	68.1
	SH	kg	1	1-5	2.4	4.1	6.8	11.6	19.1	33.3	63.0
Mounting Position		-	1	1-5	Any Direction						
Noise Level [2]		dBA/1m	1	1-5	66	68	72	74	75	76	78
Protection Class		-	1	1-5	IP65						
Lubrication		-	1	1-5	Synthetic Lubricant						

Inertia (J1)

Stage	Ratio	unit	PT60	PT75	PT90	PT110	PT140	PT170	PT210
1	1	Kg · cm^2	0.51	1.35	3.21	7.82	25.1	61.5	198.9
	1.5		0.46	1.18	2.9	6.85	20.3	51.2	158.2
	2		0.44	1.15	2.75	6.52	18.7	47.3	142.5
	3-5		0.43	1.11	2.71	6.21	18.1	45.2	136.5

*1. Applied to the output shaft center @400rpm.

*2. Measured at 1500rpm with no load.

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.

SESAME Planetary Gearboxes Q&A

Q15. My planetary gearbox is noisy and abnormal, is it a malfunction?

The operating principle of the gearbox is to rely on the internal gears to mesh with each other to achieve power transmission. Any mechanical components that are in contact with each other will inevitably produce certain sounds during operation, whether it is a sprocket, rack and pinion, rail or ball screw. The manufacturers are in their efforts to control the sounds and prevent bad effect on the operator.

Generally, users often judge the sound level of the gearbox subjectively by ears, and everyone feels and describes the sound differently. In order to have a common standard with global users to define the sound level, we use decibel (dB) as a unit of measurement, and state the volume of sound produced by the gearbox under certain conditions in the catalogue. The gearboxes will be tested and confirmed in accordance with the standards recorded in the catalogue before delivery, so that the products purchased by users can fully comply with the specification.

So how do we measure the sound level of our products before leaving the factory? The gearboxes are tested under the conditions of environmental noise 30 dBA at a input speed of 3000 rpm without load, by a accurate noise meter measured at a distance of one meter, to ensure the consistency of shipment quality.

Feel free to contact Sesame Motor if you have any questions about the noise of your gearbox, we will confirm the quality of the gearbox by the inspection process consistent with the standard of leaving our factory.

CODING SYSTEM

P G H □ □ 9 0 T - 1 0 0 - P 2

Backlash
P0: Micro backlash, P1: Precision backlash,
P2: Standard backlash

Ratio
3~10/15~10/125~1000

Type
T (2 Stage_T type)

Size

Model

< Example >

P H F 60 - 10 - P2

- P2: Standard backlash
- Ratio: 10:1
- Frame Size: 60mm
- Model: PHF

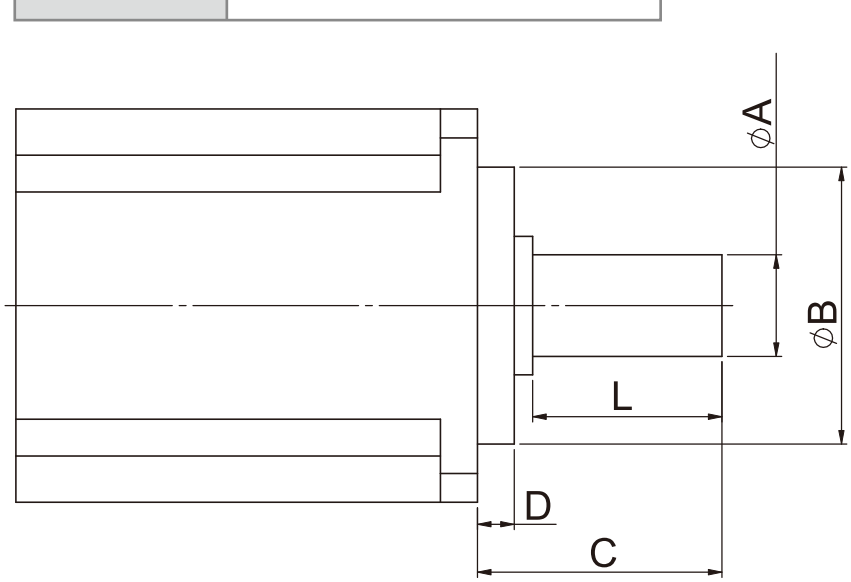
P G R H 60 - 5 - P2

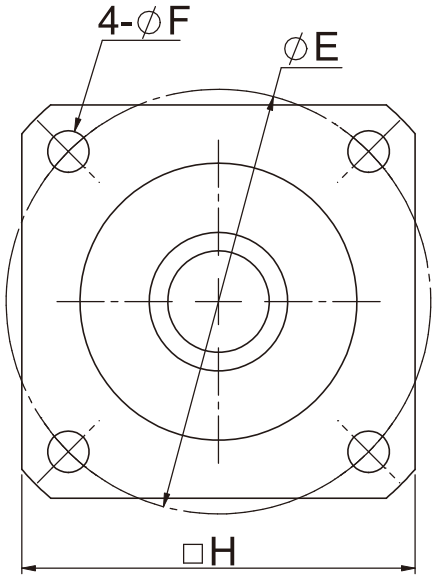
- P2: Standard backlash
- Ratio: 5:1
- Frame Size: 60mm
- Model: PGRH

MOTOR FLANGE DIMENSIONS FORM

* The following motor shaft and flange dimensions are required to prevent selection error when ordering gearhead.

Motor	
Brand	
Model	





Dimensions							
Shaft Diameter	Pilot Diameter	Shaft Length	Pilot Height	P.C.D of Mounting Holes	Mounting Holes	Frame Size	Actual Shaft Length
øA	øB	C	D	øE	øF	□H	L

Installation Instructions

1. NOTE

1-1 Preparation before installation

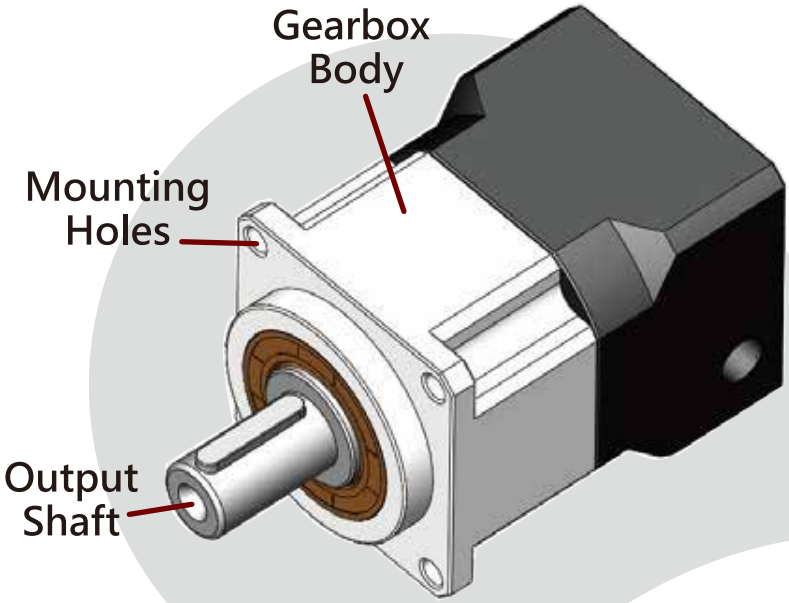
- Please read this operation manual before using gearheads. Any problems caused by inappropriate operation contrary with the manual, or damage caused by natural disasters, or restructure the gearheads without our permission, Sesame will not hold any responsibility nor will the gearheads be covered by warranty.
- Warranty is one year after purchase of the gearheads. Within warranty period, if gearheads damage is not caused by operation error nor by natural disaster, then please send back the gearheads, we should replace the damage spare part at free of charge.
- Installation, disassemble, maintenance on the gearheads, needed to be performed by trained technicians.
- According to the application and operation environment, the gearheads temperature might be raising after period of running. Please do not touch the gearheads directly during operation, or right off from operation.
- Do not touch any rotating components when the gearheads are running. Ensure that the plugs of the gearheads were inserted after installation. Avoid any small object fall into the gearheads.
- Handle the gearheads gently during installation, do not knock the gearheads by any tool, to avoid the influence of running accuracy.
- Do not disassemble or modify gearheads to prevent injury or equipment damage.
- Synthetic lubricant is sealed in gearheads, there is no need to change lubricant.

1-2 Installation environment limitation

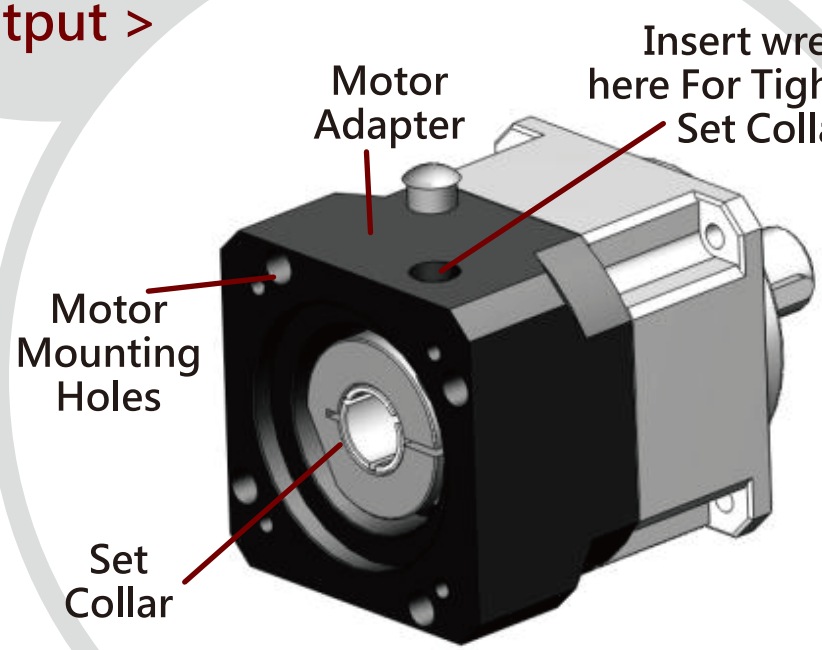
Gearheads must be installed under following terms to prevent damages which are not covered by warranty.

- Gearheads are designed or manufactured to be used with other mechanical equipment assembly.
- Operate temperature is between -10 C to +90 C
- Operate altitude may not be higher than 1000m above sea-level.
- Avoid continuity vibration or impact.
- Avoid gearheads used in flammable gas or corrosion gas environment.
- Humidity: no more than 85%, in order to avoid condensation.
- Avoid direct sunlight,dust accumulation.
- Avoid water or oil splashed.
- Used in good ventilated place.

2. Gearhead Introduction



< Output >



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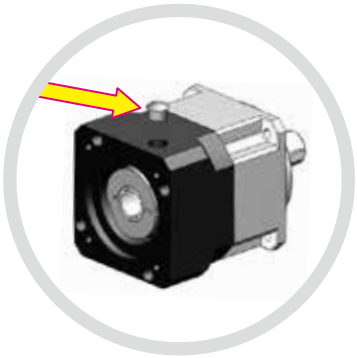
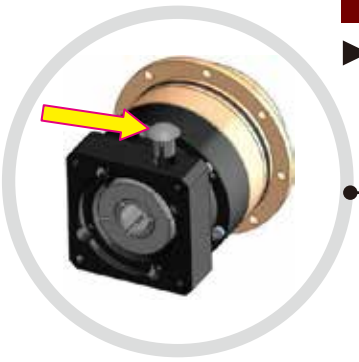
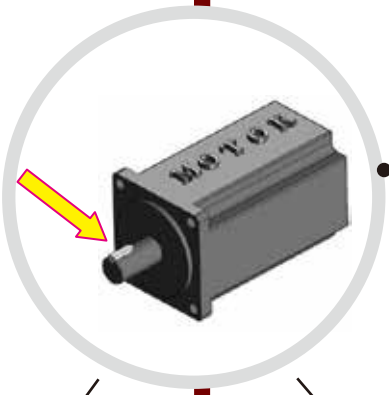
PLANETARY GEARHEADS WITH MOTOR MOUNTING INSTRUCTIONS





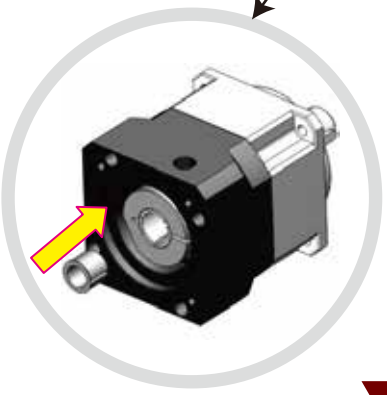
Step 1.

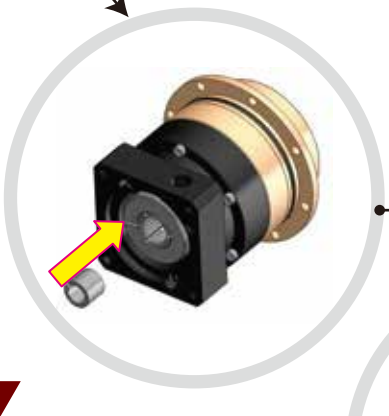
▶ Check the motor and gearbox size. Take off the plug from the bracket. Revolve the set collar the set collar until the bolt is aligned with the hole.



Step 2.

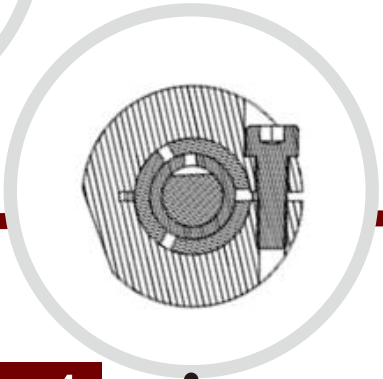
▶ Remove the key from the motor shaft. Mounting the balance key if necessary.





Step 3.

▶ Make sure the motor shaft size. Choose the right bushing if necessary.



Step 4.

▶ As installing on flatted shaft, be sure to align the collet gap over the flat and the set collar bolt perpendicular to the flat.

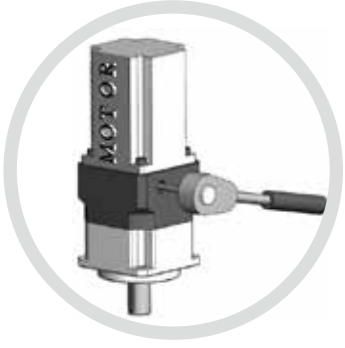
Recommended Tightening Torque

Screw Size	Wrench Size	Tightening Torque	
	mm	N-m	In-lbs
M3×0.5P	2.5	2.1	19
M4×0.7P	3	4.9	44
M5×0.8P	4	9.8	87
M6×1P	5	17	151
M8×1.25P	6	41	364
M10×1.5P	8	80	709
M12×1.75P	10	139	1232
M14×2P	12	223	1976
M16×2P	14	343	3038

Note
1. Tightening torques is allowed to be 20% higher for increased holding.
2. Above tightening torque based on Metric class 12.9 hexagon cap screw.

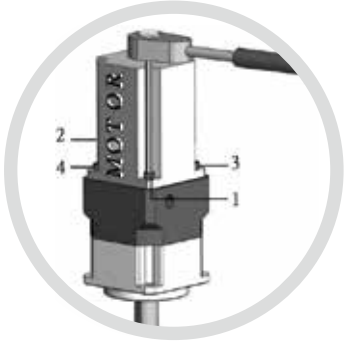
Step 5.

▶ Install gearbox and motor vertically. Tighten the set collar bolt with torque wrench to 5% of specified torque.



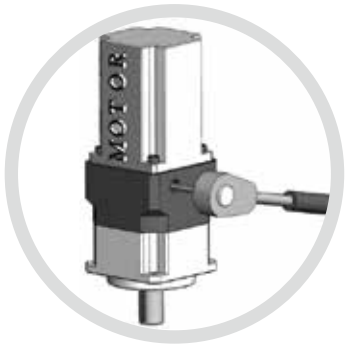
Step 6.

▶ Tighten the mounting screws 1~4 by sequence according to recommended torque.

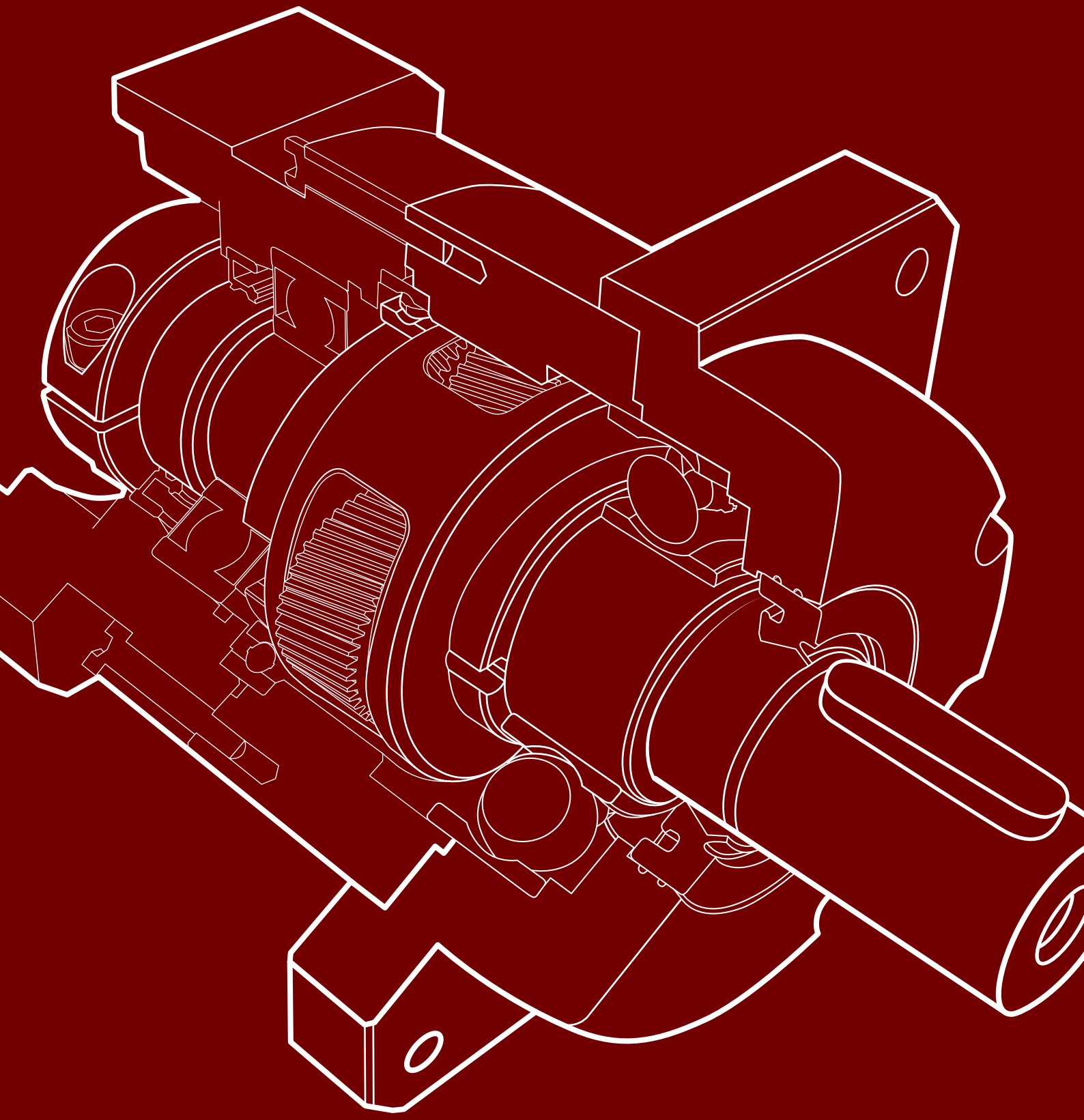


Step 7.

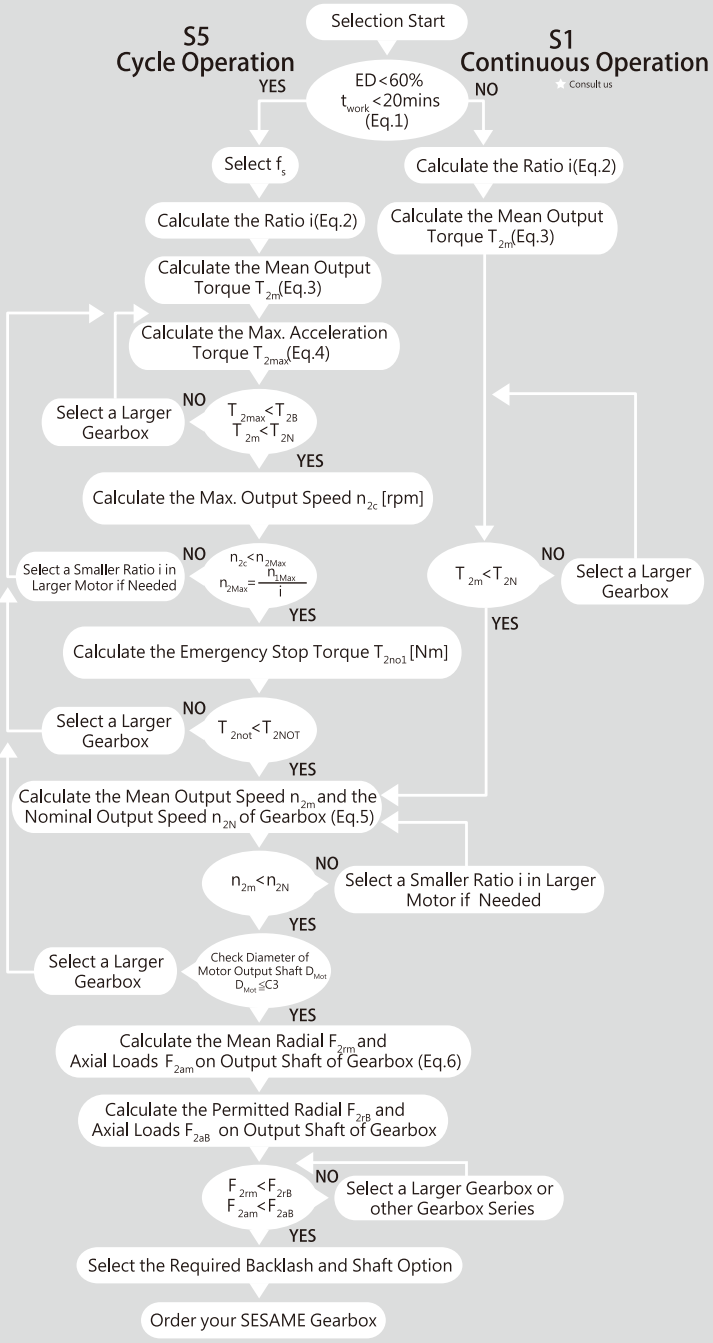
▶ Tighten the set collar bolt according to recommending torque. Put the plug back.



SELECTION OF THE OPTIMUM GEARBOXES



Selection of the Optimum Gearhead



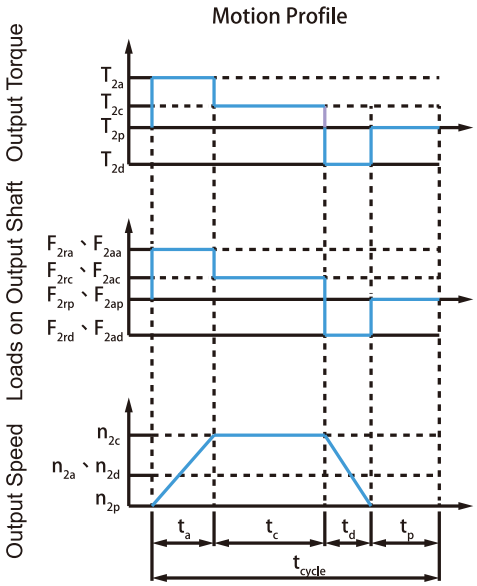
Recommended (for S5 Cycle Operation)

The general design is given for $\frac{J_L}{i^2} \leqq 4 \times J_m$

The optimal design is given for $\frac{J_L}{i^2} \backsimeq J_m$

J_L Load Inertia
J_m Motor Inertia

Motion Profile



1. $ED = \frac{t_{work}}{t_{cycle}} \times 100\%$, $t_{work} = t_a + t_c + t_d$

Index：a. Acceleration, c. Constant, d. Deceleration, p. Pause (Eq.1)

2. $i \backsimeq \frac{n_m}{n_{work}}$

n_m Output Speed of the Motor
n_{work} Working Speed (Eq.2)

3. $T_{2m} = \sqrt[3]{\frac{n_{2a} \times t_a \times T_{2a}^3 \times n_{2c} \times t_c \times T_{2c}^3 + n_{2d} \times t_d \times T_{2d}^3}{n_{2a} \times t_a + n_{2c} \times t_c + n_{2d} \times t_d}}$ (Eq.3)

4. $T_{2max} = T_{mB} \times i \times f_s \times \eta$

Where f_s is

f_s	No. of Cycles / hr
1.0	0 ~ 1,000
1.1	1,000 ~ 1,500
1.3	1,500 ~ 2,000
1.6	2,000 ~ 3,000
1.8	3,000 ~ 5,000

T_{mB} Max. Output Torque of the Motor
η Efficiency of the Gearbox (Eq.4)

5. $n_{2a} = n_{2d} = \frac{1}{2} \times n_{2c}$

$n_{2m} = \frac{n_{2a} \times t_a + n_{2c} \times t_c + n_{2d} \times t_d}{t_a + t_c + t_d}$

$n_{2N} = \frac{n_{1N}}{i}$ (Eq.5)

6. $F_{2rm} = \sqrt[3]{\frac{n_{2a} \times t_a \times F_{2ra}^3 \times n_{2c} \times t_c \times F_{2rc}^3 + n_{2d} \times t_d \times F_{2rd}^3}{n_{2a} \times t_a + n_{2c} \times t_c + n_{2d} \times t_d}}$

$F_{2am} = \sqrt[3]{\frac{n_{2a} \times t_a \times F_{2aa}^3 \times n_{2c} \times t_c \times F_{2ac}^3 + n_{2d} \times t_d \times F_{2ad}^3}{n_{2a} \times t_a + n_{2c} \times t_c + n_{2d} \times t_d}}$ (Eq.6)

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