Fenghua Technology Servo Precision Reducer Products

90 Degree Right Angle Gearbox

RV Reducer

Harmonic Reducer

Fenghua Transmission is committed to offering you quality products
Specializing in R & D and production of
various precision planetary gearboxes
TEL: 400-8040-668
Click www.3fgearbox.com for CAD, 3D, and 2D files of products

FAMED®

Jiangsu Fenghua Transmission Technology Co.,Ltd.

Address: No.985 Jingwang Road, Development Zone,
Kunshan City, Jiangsu Province
Tel.: 0512-50167005 / 18117444109
Email: Info@3fgearbox.com
Website: www.3fgearbox.com

Guangdong Office

Add.: No.158 Zhen'an East Road, Chang'an Town,
Dongguan City, Guangdong Province
Tel.: 0755-23344659 Fax: 0755-23342973
Mob.: 18928431587/18928431697/18038144705

Jinan Office

Add.: Room 2004, Unit 1, Building 3, Lego International
Building, Huayuan East Road, Lixia District, Jinan City
Tel.: 0531-86956362 Fax: 0531-86956362
Mob.: 15689738188

Zhejiang Office

Add.: Room 413, Zhongqing Building, No. 75 Kangqiao Road,
Gongshu District, Hangzhou City, Zhejiang Province
Tel.: 0571-86699905 Fax: 0571-86699905

Operation Center

Fenghua Transmission Technology (Shanghai) Co.,Ltd.

Add.: No.4777 Minfeng Industrial Zone, Jiasong North
Road, Jiading District, Shanghai
Tel.:021-39948832 / 39948836 13701956498

International Trading Department

Tel.: 0512-50167005 / 181 1744 4109
Email: Info@3fgearbox.com
Website: www.3fgearbox.com

Tianjin Office

Add.: No. 118, Inc. 1, Building 6, Block 2, Hardware City,
Miyun Road, Nankai District, Tianjin City
Tel.: 022-87809695 Fax: 022-87809695
Mob.: 15620987332

Fujian Office

Add.: No.50 Tianying Yiwo, Jimei North Industrial Zone,
Xiamen City, Fujian Province
Tel.: 0592-6066458 Fax: 0592-6066432

FAMED

Fenghua Transmission Technology (Shanghai) Co.,Ltd.

Jiangsu Fenghua Transmission Technology Co.,Ltd.

2023

For stepper / servo motor

Planetary Gearbox

Taiwan excellent technology/precision transmission solutions expert

FAMED®

Jiangsu Fenghua Transmission Technology Co.,Ltd.

FAMED® Company Introduction

Fenghua Transmission Technology Co.,Ltd. is developed from a factory which professionally manufactures the gears. All staffs of factory and R & D team have more than 20 years' gear manufacturing and designing experience. The factory cooperated with professional planetary gearbox technology team in the early period, and then established business department of the planetary gearbox , and developed the design and manufacturing process of product line of planetary gearbox series. The servo exclusive-used precision gearbox series the company produced are with three features of low backlash (5~8 arcmin), low noise (60dAB) and high efficiency (≧95%). Products can be compatible with servo motors and stepper motors produced by any servo factory. High precision planetary reducers features of reducing rotating speed, increasing torque greatly, increasing inertia of the motor rotor, improving rigidity, shortening the locating time of start and stop, miniaturizing the motor power and improving the stability of the inertia load and reducing the vibration at the same time.

In order to upgrade products, and adapt to the applicable range of high precision grade products, the factory launched the whole series of high precision helical planetary gearbox in late stage. With ultra-low backlash (1-3 arcmin) precision grade, the newly developed products can directly replace the sizes of the products produced by Germany and Japan. All product series are completed, and sizes and precision can perfectly match with that of Japanese and Germany. While upgrading planetary reducer products, the factory insists on the concept of R&D as the development direction of the company. Then the factory successively developed and launched 90 degree precision right angle gearboxes which are suitable for automation with different installation and output requirements , multi-joint robot industry reducers (RV high precision pin-wheel reducers), and harmonic reducers making use of the principle of the wave gear device invented by American genius inventor C. W. Musser, and precision gear & rack products. The factory can also customize the reducer. The products are widely used in tool machines (Planning Machine Tools), laser cutting machines, woodworking engraving machines, 3C automation, photovoltaic equipment, lithium battery and other fields of new energy equipment. And Fenghua gearboxes can also be found in fully servo paper towel machines, precision concave-convex printing machines, precision coating machines, servo pipe benders, CNC spring machines and other highly automated equipment.

The company matches a large stocks of products to coordinate with servo motor manufacturers and system integration traders, rooting in the domestic market, and determined to serve the domestic automatic industry and robotic field by excellent products and serve for the Chinese robot cause and Industrial 4.0 direction.

Production workshop

Comprehensive catalogue

Planetary reducer series

VRB High Precision Planetary Gearbox — VRB series — 06-09

EVB High Precision Right Angle Planetary Gearbox — EVB series — 10-13

VRL High Precision Planetary Gearbox — VRL series — 14-17

EVL High Precision Right Angle Planetary Gearbox — EVL series — 18-21

VRT High Precision Flange Output Planetray Gearbox — VRT series — 22-26

EVT High Precision Flange Output Right Angle Planetary Gearbox — EVT series — 27-31

VRS European High Precision High Torque Planetary Gearbox — VRS series — 32-35

EVS European High Precsion High Torque Right Angle Planetary Gearbox — EVS series — 36-39

PAB High Precsion High Torque Planetary Gearbox — PAB series — 40-43

PAR High Precision High Torque Right Angle Planetary Gearbox — PAR series — 44-47

VRSF Precision Planetary Gearbox — VRSF series — 48-51

Servo reducer series

FB Precision Planetary Gearbox — FB series — 52-55

FBR Precision Right Angle Planetary Gearbox — FBR series — 56-59

FE Precision Planetary Gearbox — FE series — 60-63

FER Precision Right Angle Planetary Gearbox — FER series — 64-67

PLF Standard Type Planetary Gearbox — PLF series — 68-71

PFR Standard Type Right Angle Planetary Gearbox — PFR series — 72-75

PLE Standard Type Planetary Gearbox — PLE series — 76-79

PER Standard Type Right Angle Planetary Gearbox — PER series — 80-83

ZR/RM Precison Right Angle Gearbox — ZR/RT series — 84-94

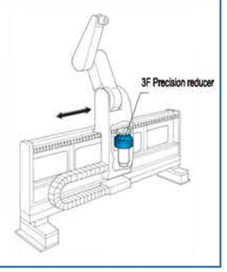
ZK/DG Precision Hollow Rotary Actuator — ZK/DG series — 95-120

DK DK Series Heavy duty rotating platform — DK series — 121-125

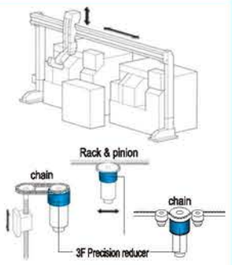
Product Application Industry

Semiconductor liquid crystal manufacturing equipment, robots, machine tools, and other frontier areas requiring precision motion control are widely used.

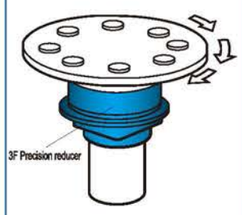
The walking shaft of a robot (rack and pinion)



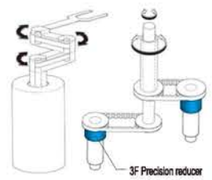
Gantry robot of machine tool



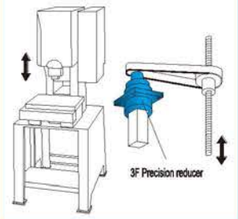
Angle (positioning) control



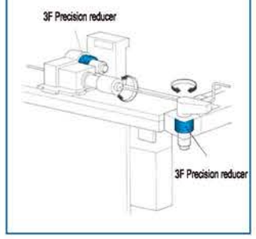
Wafer handling robot



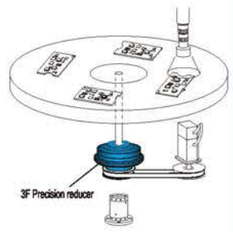
Stamping equipment (riveting)



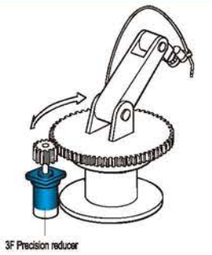
Pipe bending machine



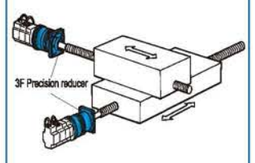
Printed circuit board inspection device



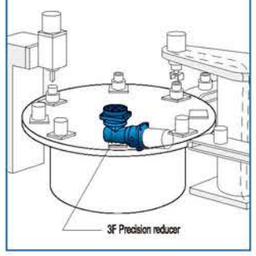
Rotate



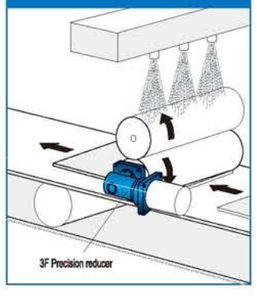
Two axis control (XY workbench)



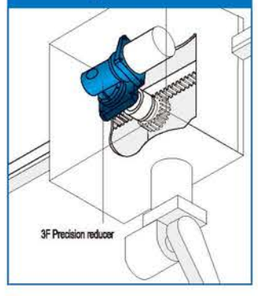
Indexing table drive



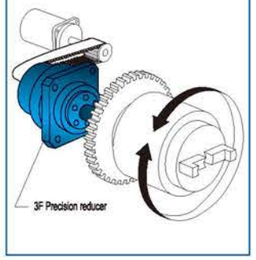
Roller drive for daubing use



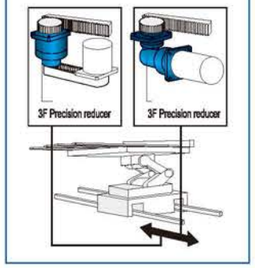
Pulley for loader use



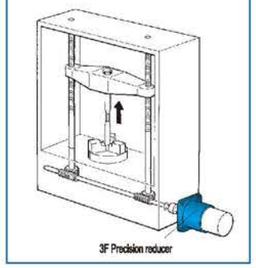
Shaft input belt drive



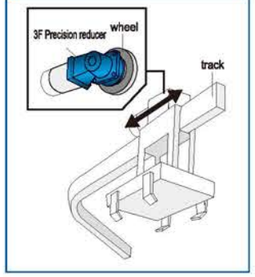
Liquid crystal glass substrate handling robot



Tensile testing machine



Roof walking van



Reference Table of Reducer Selection

Selecting reducer according to the output power of servo motor

Capacity	Model	1/3	1/4	1/5	1/7	1/10	1/12	1/15	1/16	1/20	1/25	1/28	1/30	1/35	1/40	1/50	1/70	1/100
100w	042	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
	060	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
200w	060	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	090	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
400w	060	●	●	●	●	●	●	●	●	●	●	●	●					
	090	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
500w	090	●	●	●	●	●	●	●	●	●	●	●						
	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
750w	090	●	●	●	●	●	●	●	●	●	●	●						
	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1.0kw	090	●	●	●	●	●												
	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1.5kw	090	●	●	●	●	●												
	120	●	●	●	●	●	●	●	●	●	●	●	●					
	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
2.0kw	120	●	●	●	●	●	●	●										
2.0kw	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3.5kw	120	●	●	●	●	●	●	●										
3.5kw	150	●	●	●	●	●	●	●	●	●	●	●	●	●				
	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5.0kw	120	●	●	●	●	●	●	●										
5.0kw	150	●	●	●	●	●	●	●	●	●	●	●						
	180	●	●	●	●	●	●	●	●	●	●	●	●	●				
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7.0kw	180	●	●	●	●	●	●	●	●	●								
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
11.0kw	180	●	●	●	●	●												
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
15.0kw	220	●	●	●	●	●	●	●	●	●	●							

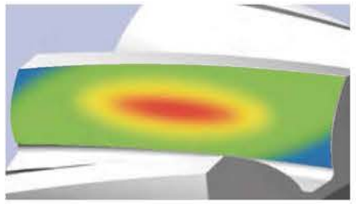
P.S : This mark"●"means available reduction ratio.

Note 1: Three-stage speed reduction ratios are not available in the above stable. If needed, pls inform our sales person.

Note 2: Choose a bigger level of reducer to use when the inertia is bigger.

Product Technology

The 3F series planetary gearbox has two multi-national patent lubricating structure, which is used in the internal spiral gear structure to ensure the highest efficient output.
Patent 1: Reducing the axial thrust of the planetary gear operation.
Patent 2: Increase the lubrication, reduce the frictional resistance and noise.



Finite element analysis of gear strength is carried out by using ANSYS technology. Tooth profile and lead trimming of tooth surface are also made to reduce the impact and noise of gear meshing, and increase the service life of gear system.

Carbon–nitriding heat–treated high quality alloy steel is adopted in gear materials to obtain the best wear resistance and impact toughness.

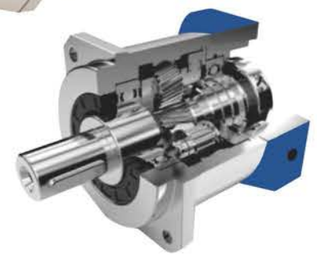
The output planet carrier adopts integral (double support) structure design. The large span of the front and rear bearings is distributed inside the box body, forming a stable integrated structure to ensure high torsion rigidity and accuracy.

An integrated design of the tooth ring and the output shell is adopted, and high quality steel is used to get high material density by hot forging. The integrated design can ensure that all geometric dimensions are finished in one time and have higher precision and strength compared with other embedded and clamped structures.

The input shaft and locking device are designed in an integrated way. The two bolts are symmetrically distributed to achieve dynamic balance. At the same time, through the strong locking of double bolts, the motor shaft transmission is effectively prevented from slipping and the high–precision zero backlash power transmission is achieved.

PRECISION PLANETARY GEARBOX

VRB



- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

VRB Type

VRB090	–	10	–	S1	–	P1	/	Motor

Reducer Model
VRB042, VRB060, VRB090, VRB115
VRB142, VRB180, VRB220

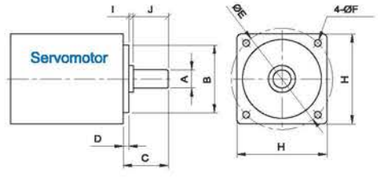
Output Shaft Keyway
S1:(Solid Output Shaft No Keyway)
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3, 4, 5, 6, 7, 8, 9, 10
2–stage: 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

VRB Reducer Specifications

Specs	Unit	Stage	Ratio	VRB042	VRB060	VRB090	VRB115	VRB142	VRB180	VRB220
Rated Output Torque / T2N	Nm	1	3	20	45	130	230	450	900	1500
			4	19	50	140	290	542	1050	1700
			5	22	60	160	330	650	1200	2000
			6	20	55	150	310	600	1100	1900
			7	19	50	140	300	550	1100	1800
			8	17	45	120	260	500	1000	1600
			9	14	40	100	230	450	900	1500
			10	14	40	100	208	342	588	1140
		2	15	20	45	130	230	450	900	1550
			20	19	50	140	290	542	1050	1700
			25	22	60	160	330	650	1200	2000
			30	20	55	150	310	600	1100	1900
			35	19	60	160	330	550	1100	1800
			40	17	45	120	260	500	1000	1600
			45	14	40	100	230	450	900	1500
			50	22	60	160	330	650	1200	2000
			60	20	55	150	310	600	1100	1900
			70	19	50	140	300	550	1100	1800
			80	17	45	120	260	500	1000	1600
			90	14	40	100	230	450	900	1500
			100	14	40	100	208	342	588	1140
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque						
Rated Input Speed / n_{1N}	rpm	1,2	3~100	5000	5000	4000	4000	3000	3000	2000
Max.Input Speed / n_{1B}	rpm	1,2	3~100	10000	10000	8000	8000	6000	6000	4000
Micro Backlash P0	arcmin	1	3~10	≤1	≤1	≤1	≤1	≤1	≤1	≤1
		2	12~100	≤3	≤3	≤3	≤3	≤3	≤3	≤3
Precision Backlash P1	arcmin	1	3~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
		2	12~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5
Precision Backlash P2	arcmin	1	3~10	≤5	≤5	≤5	≤5	≤5	≤5	≤5
		2	12~100	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	7	14	25	50	145	225
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	780	1530	3250	6700	9400	14500	50000
Max.Axial Force / F_{2aB}[2]	N	1,2	3~100	390	765	1625	3350	4700	7250	25000
Service Life	hr	1,2	3~100	20000h						
Efficiency / η	%	1	3~10	≥97%						
		2	15~100	≥94%						
Weight	kg	1	3~10	0.5	1.3	3.3	7.8	15	28	52
		2	15~100	0.8	1.48	3.9	9.6	18.9	33	66
Operating Temperature	℃	1,2	3~100	(–15℃ ~ +90℃)						
Lubrication		1,2	3~100	(Synthetic Grease)						
Protection Class		1,2	3~100	IP65						
Mounting Position		1,2	3~100	(Any Direction)						
Noise Level (n1=3000rpm，No load)	dB(A)	1,2	3~100	≤56	≤58	≤60	≤63	≤65	≤67	≤70

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	VRB042	VRB060	VRB090	VRB115	VRB142	VRB180	VRB220
Rotary Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21	28.98	69.61
			4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
			9	0.03	0.13	0.44	2.57	7.04	22.53	50.63
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	12–40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50–100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

1. Ratio (i=Nin/Nout)　2. When output speed is 100rpm, acting on the output shaft center position
3. The Max. acceleration torque T2B=60% of T2NOT, continuous operation, service life is 10000hrs

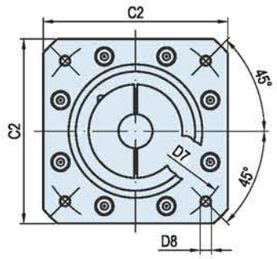
MODEL: VRB

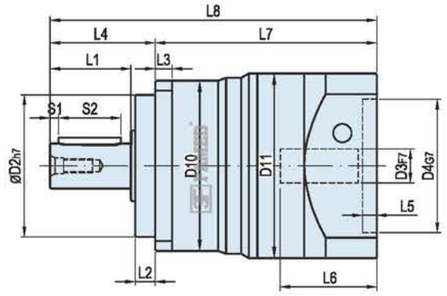
1–Stage

Ratio: 3, 4, 5, 6, 7, 8, 9, 10

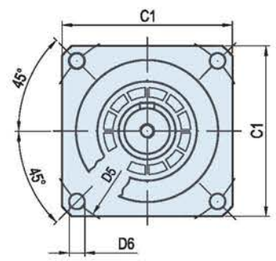
Dimensions:

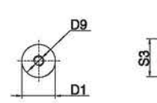
Input



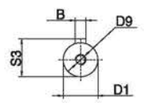


Output

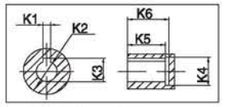




Output shaft type S1



Output shaft type S2



Output hole type S3

Unit:mm

Size	VRB042–L1	VRB060–L1	VRB090–L1	VRB115–L1	VRB142–L1	VRB180–L1	VRB220–L1
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8 (ϕ6.35–11)	ϕ14 (ϕ11–19)	ϕ19 (ϕ16–24)	ϕ22 (ϕ19–35)	ϕ24 (ϕ22–35)	ϕ35 (ϕ35–42)	ϕ42 (ϕ35–55)
D4	ϕ30 (ϕ30–50)	ϕ50 (ϕ50–ϕ70)	ϕ70 (ϕ70–ϕ110)	ϕ110 (ϕ114.3)	ϕ110 (ϕ114.3)	ϕ114.3 (ϕ114.3–200)	ϕ180 (ϕ114.3–200)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ7	4–ϕ9	4–ϕ11	4–ϕ13	4–ϕ17
D7	ϕ46 (ϕ45–70)	ϕ70 (ϕ70–ϕ90)	ϕ90 (ϕ90–145)	ϕ145 (ϕ145–200)	ϕ145 (ϕ145–200)	ϕ200 (ϕ200–235)	ϕ215 (ϕ200–235)
D8	4–M4(M3–M5)	4–M5 (M4–M6)	4–M6 (M5–M8)	4–M8 (M8–M12)	4–M8 (M8–M12)	4–M12	4–M12
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2P	M20X2.5P	M20X2.5P
D10	ϕ42	ϕ60	ϕ87	ϕ114.5	ϕ142	ϕ180	ϕ218
D11	ϕ46	ϕ65	ϕ90	ϕ118	ϕ150	ϕ184	ϕ225.5
L1	19.5	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	5	5	7 (7–8)	6 (6–11)	8 (8–11)	7 (7–10)	8 (8–15)
L6	27.5 (≤32)	34 (≤44)	44 (≤60)	64.5 (≤81.5)	72.5 (≤82)	85 (≤120)	109 (≤119)
L7	65.5 (65.5–70)	78 (78–88)	98 (98–114)	135 (135–153)	154.5 (154.5–164)	179 (179–214)	220 (220–230)
L8	91.5 (91.5–96)	115 (115–125)	146 (146–162)	201 (201–218)	251.5 (251.5–261)	284 (284–319)	358 (358–368)
C1	42	60	90	115	142	180	220
C2	46(46–60)	65(65–80)	90 (90–130)	130 (130–180)	130 (130–180)	180 (180–220)	200 (200–220)
S1	3	3	4	5	5	6	7
S2	14	22	28	40	65	70	90
S3	15	18	24.5	35	43	59	79.5
B	5	5	6	10	12	16	20
K1	–	4	6	8	10	14	18
K2	–	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	–	12.8	24.5	31.3	41.3	53.8	64.4
K4	–	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	–	15	20	27	35	43	60
K6	–	18	24	32	40	50	65

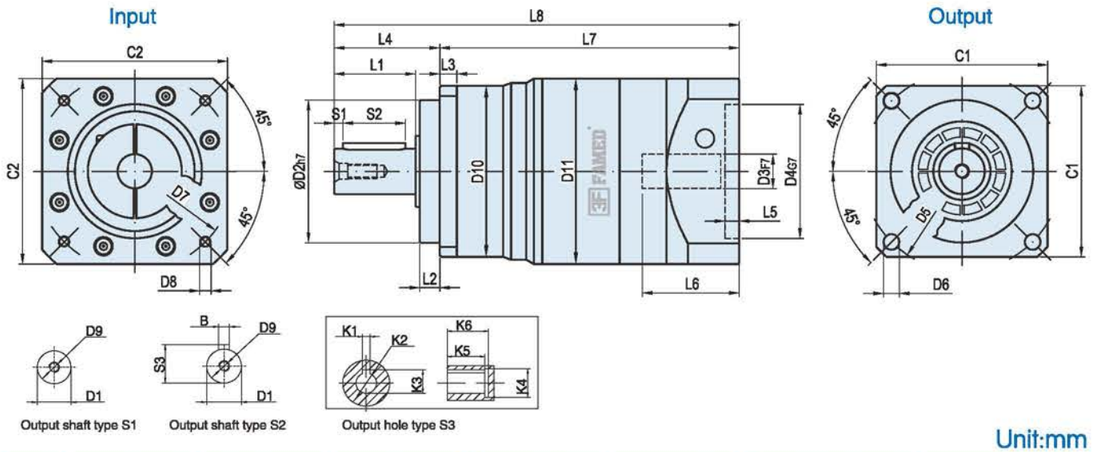
Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL: VRB

2–Stage

Ratio: 15, 20, 25, 30, 35, 40, 45, 50, 60
70, 80, 90, 100

Dimensions:



Unit:mm

Size	VRB042–L2	VRB060–L2	VRB090–L2	VRB115–L2	VRB142–L2	VRB180–L2	VRB220–L2
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8 (ϕ6.35–8)	ϕ14 (ϕ11–14)	ϕ19 (ϕ11–19)	ϕ22 (ϕ16–24)	ϕ24 (ϕ19–35)	ϕ35 (ϕ22–35)	ϕ42 (ϕ35–42)
D4	ϕ30 (ϕ30–38.1)	ϕ50	ϕ70 (ϕ50–ϕ80)	ϕ110 (ϕ70–110)	ϕ110 (ϕ114.3)	ϕ114.3 (ϕ110–114.3)	ϕ180 (ϕ114.3–200)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ7	4–ϕ9	4–ϕ11	4–ϕ13	4–ϕ17
D7	ϕ46 (ϕ45–66.67)	ϕ70	ϕ90 (ϕ70–100)	ϕ145 (ϕ90–145)	ϕ145 (ϕ145–200)	ϕ200 (ϕ145–200)	ϕ215 (ϕ200–235)
D8	4–M4(M3)	4–M5 (M4)	4–M6 (M4–M6)	4–M8 (M5–M8)	4–M8 (M8–M12)	4–M12 (M8–M12)	4–M12
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2P	M20X2.5P	M20X2.5P
D10	ϕ42	ϕ60	ϕ87	ϕ114.5	ϕ142	ϕ180	ϕ218
D11	ϕ46	ϕ65	ϕ90	ϕ118	ϕ150	ϕ184	ϕ225.5
L1	19.5	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	5	5	5	8 (7–8)	11 (6–11)	8 (8–11)	8 (7–10)
L6	27.5	34	34 (≤44)	44 (≤60)	64.5 (≤81.5)	72.5 (≤82	85 (≤120)
L7	86	105	124.5 (114.5–124.5)	165.5 (149.5–165.5)	206 (189–206)	235 (225.5–235)	269 (264–299)
L8	112	142	172.5 (162.5–172.5)	230.5 (214.5–230.5)	303 (286–303)	340 (330.5–340)	407 (402–437)
C1	42	60	90	115	142	180	220
C2	46 (46–57)	65	65 (65–86)	90 (90–130)	130 (130–180)	150 (150–180)	200 (180–220)
S1	3	3	4	5	5	6	7
S2	14	22	28	40	65	70	90
S3	15	18	24.5	35	43	59	79.5
B	5	5	6	10	12	16	20
K1	–	4	6	8	10	14	18
K2	–	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	–	12.8	24.5	31.3	41.3	53.8	64.4
K4	–	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	–	15	20	27	35	43	60
K6	–	18	24	32	40	50	65

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

EVB

- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

EVB Type

EVB090 – 10 – S1 – P1 / Motor

Reducer Model
EVB042, EVB060, EVB090, EVB115
EVB142, EVB180, EVB220

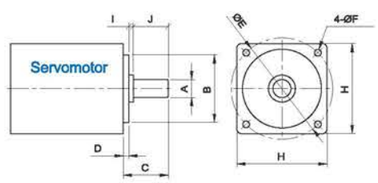
Output Shaft Keyway
S1:(Solid Output Shaft No Keyway)
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3, 4 , 5, 6, 7, 8, 9, 10, 14, 16, 20
2–stage: 15, 20, 25, 30, 35, 40, 50, 70,
80, 100, 120, 140, 160, 180, 200

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

Reducer Specifications

Specs	Unit	Stage	Ratio	EVB042	EVB060	EVB090	EVB115	EVB142	EVB180	EVB220
Rated Output Torque / T2N	Nm	1	3	20	45	130	230	450	900	1500
			4	19	50	140	290	542	1050	1700
			5	22	60	160	330	650	1200	2000
			6	20	55	150	310	600	1100	1900
			7	19	50	140	300	550	1100	1800
			8	17	45	120	260	500	1000	1600
			9	14	40	100	230	450	900	1500
			10	14	40	100	208	342	588	1140
			14	19	50	140	230	450	900	1550
			20	14	40	100	290	542	1050	1700
		2	15	20	55	130	230	650	900	1140
			20	20	55	150	310	600	1100	1900
			25	22	60	160	330	550	1100	1800
			30	20	45	120	260	500	1000	1600
			35	19	40	100	230	450	900	1500
			40	17	60	160	330	650	1200	2000
			50	22	50	140	300	550	1100	1800
			70	19	45	120	260	500	1000	1600
			80	17	40	100	230	450	900	1500
			100	14	40	100	208	342	588	1140
			120	—	—	128	305	495	1095	1895
			140	—	—	128	295	525	1095	1795
			160	—	—	118	255	515	995	1595
			180	—	—	98	225	445	895	1495
			200	—	—	98	225	445	895	1495
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~200	3Times of Nominal Output Torque						
Rated Input Speed / n_{1N}	rpm	1,2	3~200	3000	3000	3000	3000	2500	2000	2000
Max.Input Speed / n_{1B}	rpm	1,2	3~200	6000	6000	6000	5500	4500	4500	4000
Precision Backlash P0	arcmin	1	3~20	≤2	≤2	≤2	≤2	≤2	≤2	≤2
		2	15~200	≤4	≤4	≤4	≤4	≤4	≤4	≤4
Precision Backlash P1	arcmin	1	3~20	≤4	≤4	≤4	≤4	≤4	≤4	≤4
		2	15~200	≤6	≤6	≤6	≤6	≤6	≤6	≤6
Standard Backlash P2	arcmin	1	3~20	≤6	≤6	≤6	≤6	≤6	≤6	≤6
		2	15~200	≤8	≤8	≤8	≤8	≤8	≤8	≤8
Torsional Rigidity	Nm/arcmin	1,2	3~200	3	6	14	25	56	140	220
Max.Radial Force / F_{2rB}[2]	N	1,2	3~200	780	1300	3200	6750	9400	14500	50000
Max.Axial Force / F_{2aB}[2]	N	1,2	3~200	330	700	1580	3300	4700	7200	28000
Service Life	hr	1,2	3~200	21000 h						
Efficiency / η	%	1	3~20	⩾93%						
		2	25~200	⩾90%						
Weight	kg	1	3~20	0.9	1.5	6.4	13	24.5	51	83
		2	25~200	1.2	2.1	7.8	14.2	27.5	54	95
Operating Temperature	℃	1,2	3~200	(–15℃ ~ +90℃)						
Lubrication		1,2	3~200	(Synthetic Grease)						
Protection Class		1,2	3~200	IP65						
Mounting Position		1,2	3~200	(Any Direction)						
Noise Level (n1=3000rpm，No load)	dB(A)	1,2	3~200	≤65	≤65	≤68	≤68	≤70	≤72	≤74

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	EVB042	EVB060	EVB090	EVB115	EVB142	EVB180	EVB220
Moment of Inertia	$kg.cm^2$	1	3~10	0.09	0.35	2.25	6.84	23.4	68.9	135.4
			14~20	0.03	0.07	1.87	6.25	21.8	65.6	119.8
		2	15~100	0.09	0.09	0.35	2.25	6.84	23.4	68.9
			120~200	—	—	0.31	1.87	6.25	21.8	65.6

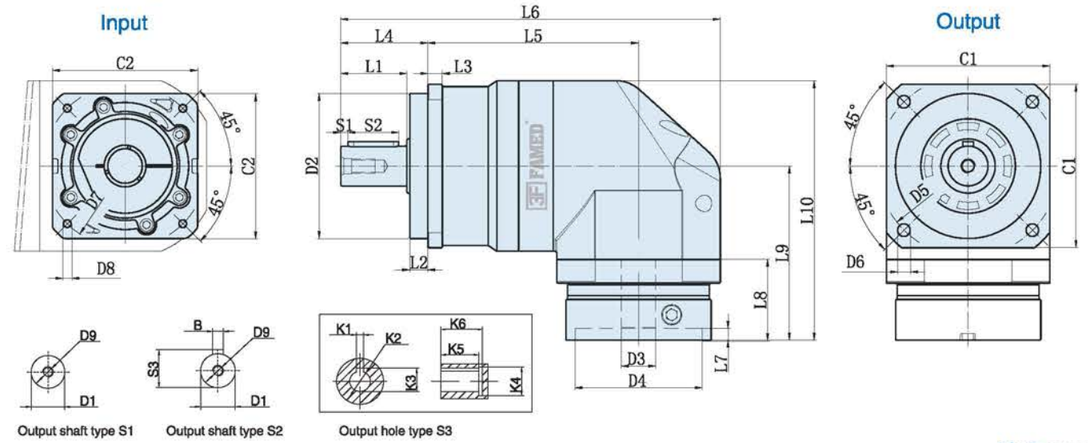
1. The Max. acceleration torque T2B=60% of T2NOT 2. When output speed is 100rpm, inertia acts on the output shaft center position.
3. 3-stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

MODEL：EVB

1–Stage

Ratio：3，4，5，6，7，8，9，10，14，16，20

Dimensions：



Unit:mm

Size	EVB042–L1	EVB060–L1	EVB090–L1	EVB115–L1	EVB142–L1	EVB180–L1	EVB220–L1
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8(⩽11)	ϕ14(⩽14)	ϕ19(⩽24)	ϕ24(⩽32)	ϕ35(⩽42)	ϕ38(⩽50)	ϕ55(⩽55)
D4	ϕ30(30–50)	ϕ50（50–70）	ϕ70（50–110）	ϕ110（50–130）	ϕ114.3(95–180)	ϕ180(95–180)	ϕ215(180–255)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ7	4–ϕ9	4–ϕ11	4–ϕ13	4–ϕ17
D7	ϕ46(22–70)	ϕ70（70–130）	ϕ90（70–145）	ϕ145（70–145）	ϕ200(90–215)	ϕ200(90–300)	ϕ235(200–300)
D8	(4–M3X8L)	（4–M4*8L）	（4–M6*10L）	（4–M8*20L）	(4–M12X30L)	(4–M12X30L)	(4–M12X30L)
D9	M4X0.7P	M5*0.8P*18L	M6*1.25P*19L	M12*1.75P*28L	M16X2.0P	M20X2.5P	M20X2.5P
L1	19	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	96	86	116	137.5	255	289	346
L6	(122)	153	209	260	(352)	(394)	(484)
L7	（3.5）	(5)	(6.5)	(10)	（14）	（15）	（7）
L8	（30）	(33)	(45)	(64)	（81）	（85）	（85）
L9	（69.5）	(77.5)	(96)	(135.5)	（165）	（213.5）	（268.5）
L10	（95.5）	(111.75)	(143)	(195)	（230）	（303.5）	（378.5）
C1	□42	□60	□90	□115	□142	□180	□220
C2	(□42)	（□60）	（□80）	（□130）	(□142)	(□180)	(□220)
S1	2	3	4	5	5	5	7
S2	16	22	28	40	65	70	90
S3	15	18	24.5	35	43	59	79
B	5	5	6	10	12	16	20
K1	–	3	6	8	10	14	16
K2	–	ϕ8	ϕ18	ϕ28	ϕ38	ϕ50	ϕ60
K3	–	9.2	21	31.3	42	53.8	64.4
K4	–	ϕ11	ϕ24	ϕ38	ϕ48	ϕ60	ϕ72
K5	–	16	30	27	35	43	60
K6	–	18	35	32	40	50	65

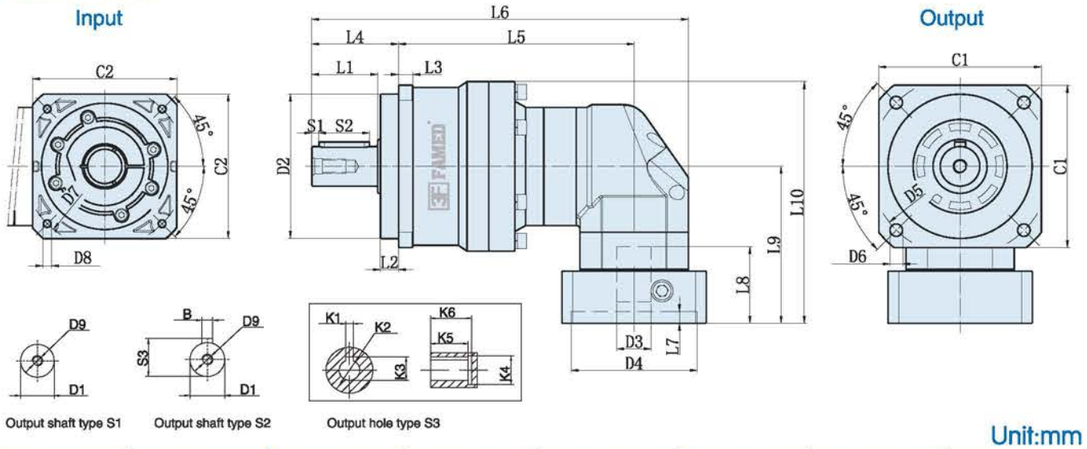
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL: EVB

2–Stage

Ratio: 15, 20, 25, 30, 35, 40, 50, 70, 80
100 , 120, 140, 160, 180, 200

Dimensions:



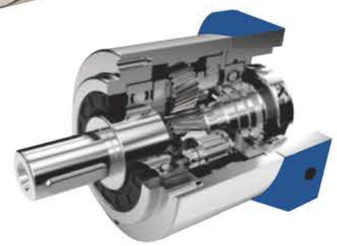
Unit:mm

Size	EVB042–L2	EVB060–L2	EVB090–L2	EVB115–L2	EVB142–L2	EVB180–L2	EVB220–L2
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8(≤11)	ϕ14(≤14)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(≤42)	ϕ38(≤50)	ϕ55(≤55)
D4	ϕ30(30–50)	ϕ50 (50–70)	ϕ70 (50–110)	ϕ110 (50–130)	ϕ114.3(95–180)	ϕ180(95–180)	ϕ215(180–255)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ7	4–ϕ9	4–ϕ11	4–ϕ13	4–ϕ17
D7	ϕ46(22–70)	ϕ70 (70–130)	ϕ90 (70–145)	ϕ145 (70–145)	ϕ200(90–215)	ϕ200(90–300)	ϕ235(200–300)
D8	(4–M3X8L)	(4–M4*8L)	(4–M6*10L)	(4–M8*20L)	(4–M12X30L)	(4–M12X30L)	(4–M12X30L)
D9	M4X0.7P	M5*0.8P*18L	M6*1.25P*19L	M12*1.75P*28L	M16X2.0P	M20X2.5P	M20X2.5P
L1	19	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	113	115	130.5	167.5	282	322	383
L6	139	182	208.5	277.5	(378)	(427)	(521)
L7	(3.5)	(5)	(6.5)	(10)	(14)	(15)	(7)
L8	(30)	(33)	(42.5)	(59)	(81)	(85)	(85)
L9	(69.5)	(77.5)	(87)	(120)	(165)	(213.5)	(268.5)
L10	(90.5)	(111.75)	(134)	(179.5)	(236)	(303.5)	(378.5)
C1	□42	□60	□90	□115	□142	□180	□220
C2	(□42)	(□60)	(□80)	(□130)	(□142)	(□180)	(□220)
S1	2	3	4	5	5	5	7
S2	16	22	28	40	65	70	90
S3	15	18	24.5	35	43	59	79
B	5	5	6	10	12	16	20
K1	–	3	6	8	10	14	16
K2	–	ϕ8	ϕ18	ϕ28	ϕ38	ϕ50	ϕ60
K3	–	9.2	21	31.3	42	53.8	64.4
K4	–	ϕ11	ϕ24	ϕ38	ϕ48	ϕ60	ϕ72
K5	–	20	30	27	35	43	60
K6	–	24	35	32	40	50	65

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

VRL



- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

VRL Type

VRL090 – 10 – S1 – P1 / Motor

Reducer Model
VRL050, VRL070, VRL090, VRL120
VRL155, VRL205, VRL235

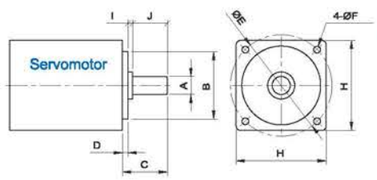
Output Shaft Keyway
S1:(Solid Output Shaft No Keyway)
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3, 4, 5, 6, 7, 8, 9, 10
2–stage: 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

VRL Reducer Specifications

Specs	Unit	Stage	Ratio	VRL050	VRL070	VRL090	VRL120	VRL155	VRL205	VRL235
Rated Output Torque / T2N	Nm	1	3	20	45	130	230	450	900	1500
			4	19	50	140	290	542	1050	1700
			5	22	60	160	330	650	1200	2000
			6	20	55	150	310	600	1100	1900
			7	19	50	140	300	550	1100	1800
			8	17	45	120	260	500	1000	1600
			9	14	40	100	230	450	900	1500
			10	14	40	100	208	342	588	1140
		2	15	20	45	130	230	450	900	1550
			20	19	50	140	290	542	1050	1700
			25	22	60	160	330	650	1200	2000
			30	20	55	150	310	600	1100	1900
			35	19	60	160	330	550	1100	1800
			40	17	45	120	260	500	1000	1600
			45	14	40	100	230	450	900	1500
			50	22	60	160	330	650	1200	2000
			60	20	55	150	310	600	1100	1900
			70	19	50	140	300	550	1100	1800
			80	17	45	120	260	500	1000	1600
			90	14	40	100	230	450	900	1500
			100	14	40	100	208	342	588	1140
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque						
Rated Input Speed / n_{1N}	rpm	1,2	3~100	5000	5000	4000	4000	3000	3000	2000
Max.Input Speed / n_{1B}	rpm	1,2	3~100	10000	10000	8000	8000	6000	6000	4000
Micro Backlash P0	arcmin	1	3~10	≤1	≤1	≤1	≤1	≤1	≤1	≤1
		2	15~100	≤3	≤3	≤3	≤3	≤3	≤3	≤3
Precision Backlash P1	arcmin	1	3~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
		2	15~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5
Precision Backlash P2	arcmin	1	3~10	≤5	≤5	≤5	≤5	≤5	≤5	≤5
		2	15~100	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	7	14	25	50	145	225
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	680	1260	2880	6000	8200	12800	27800
Max.Axial Force / F_{2aB}[2]	N	1,2	3~100	370	760	1580	3360	4660	7250	18500
Service Life	hr	1,2	3~100	20000h						
Efficiency / η	%	1	3~10	≥97%						
		2	15~100	≥94%						
Weight	kg	1	3~10	0.5	1.2	3.5	7.8	14.5	30	50
		2	15~100	0.8	1.4	4.1	9	17.5	33	63
Operating Temperature	℃	1,2	3~100	(–15℃ ~ +90℃)						
Lubrication		1,2	3~100	(Synthetic Grease)						
Protection Class		1,2	3~100	IP65						
Mounting Position		1,2	3~100	(Any Direction)						
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	≤56	≤58	≤60	≤63	≤65	≤67	≤70

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	VRL050	VRL070	VRL090	VRL120	VRL155	VRL205	VRL235
Moment of Inertia	$kg.cm^2$		3	0.03	0.16	0.61	3.25	9.21	28.98	69.61
		1	4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
			9	0.03	0.13	0.44	2.57	7.04	22.53	50.63
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	12–40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50–100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

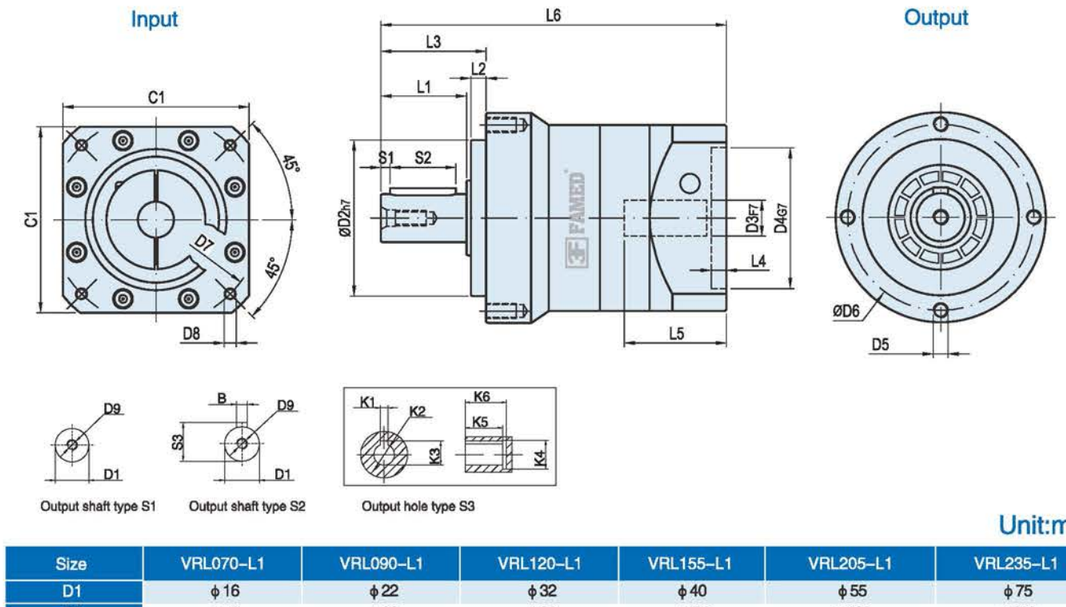
1. Ratio (i=Nin/Nout) 2. Output revolutions 100rpm, acting on the output shaft center position.
3. The Max. acceleration torque T2B=60% of T2NOT, continuous operation, service life is 10000hrs.

MODEL: VRL

1–Stage

Ratio: 3, 4, 5, 6, 7, 8, 9, 10

Dimensions:



Unit:mm

Size	VRL070–L1	VRL090–L1	VRL120–L1	VRL155–L1	VRL205–L1	VRL235–L1
D1	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ52	ϕ68	ϕ90	ϕ120	ϕ160	ϕ180
D3	ϕ14 (ϕ11–14)	ϕ19 (ϕ16–24)	ϕ22 (ϕ19–35)	ϕ24 (ϕ22–35)	ϕ35 (ϕ35–ϕ42)	ϕ42 (ϕ35–55)
D4	ϕ50 (ϕ50–70)	ϕ70 (ϕ70–ϕ110)	ϕ110 (ϕ114.3)	ϕ110 (ϕ114.3)	ϕ114.3 (ϕ114.3–200)	ϕ180 (ϕ114.3–200)
D5	4–M5X10L	4–M6X12L	4–M8X16L	4–M10X20L	4–M12X22L	4–M16X28L
D6	ϕ62	ϕ80	ϕ108	ϕ140	ϕ184	ϕ210
D7	ϕ70 (ϕ70–90)	ϕ90 (ϕ90–145)	ϕ145 (ϕ145–200)	ϕ145 (ϕ145–200)	ϕ200 (ϕ200–235)	ϕ215 (ϕ200–235)
D8	4–M5 (M4–M6)	4–M6 (M5–M8)	4–M8 (M8–M12)	4–M8 (M8–M12)	4–M12	4–M12
D9	M5X0.8P	M8X1.25P	M12X1.75P	M16X2P	M20X2.5P	M20X2.5P
L1	28.5	36.5	51	79	82	105
L2	5	6	9	12	15	18
L3	35	44	62	94	100	126
L4	5	7~8	6~11	8~11	7~10	8~15
L5	34 (≤44)	44 (≤60)	64.5 (≤81.5)	72.5 (≤82)	85 (≤120)	109 (≤119)
L6	115 (115–125)	146 (146–162)	201 (201–218)	251.5 (251.5–261)	284 (284–319)	358 (358–368)
C1	65 (65–80)	90 (90–130)	130 (130–180)	150 (150–180)	180 (180–220)	200 (200–220)
S1	3	4	5	5	6	7
S2	22	28	40	65	70	90
S3	18	24.5	35	43	59	79.5
B	5	6	10	12	16	20
K1	4	6	8	10	14	18
K2	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	12.8	24.5	31.3	41.3	53.8	64.4
K4	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	15	20	27	35	43	60
K6	18	24	32	40	50	65

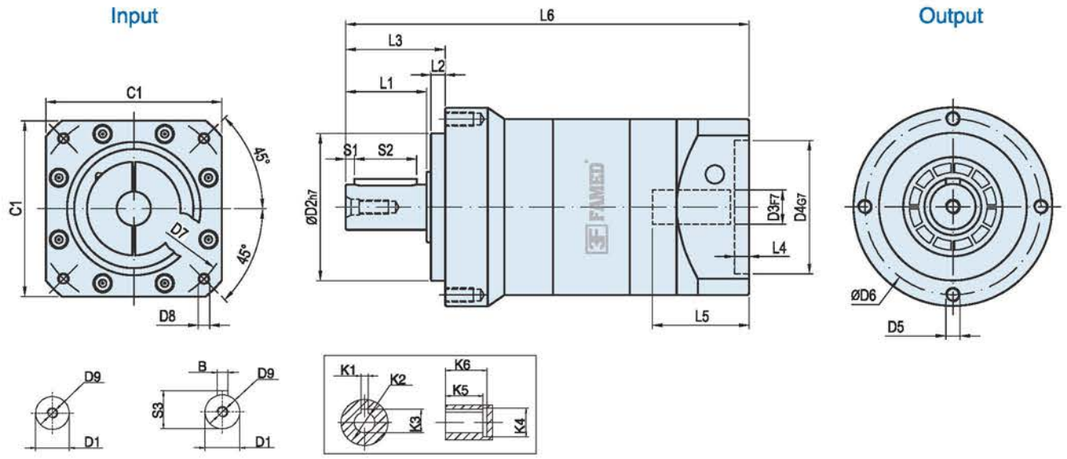
Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL: VRL

2–Stage

Ratio: 15, 20, 25, 30, 35, 40, 45, 50,
60, 70, 80, 90, 100

Dimensions:



Output shaft type S1 Output shaft type S2 Output hole type S3

Unit:mm

Size	VRL070–L1	VRL090–L2	VRL120–L2	VRL155–L2	VRL205–L2	VRL235–L2
D1	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ52	ϕ68	ϕ90	ϕ120	ϕ160	ϕ180
D3	ϕ14 (ϕ11–14)	ϕ19 (ϕ11–19)	ϕ22 (ϕ16–24)	ϕ24 (ϕ19–35)	ϕ35 (ϕ22–35)	ϕ42 (ϕ35–42)
D4	ϕ50	ϕ70 (ϕ50–ϕ80)	ϕ110 (ϕ70–ϕ110)	ϕ110 (ϕ114.3)	ϕ110 (ϕ114.3)	ϕ180 (ϕ114.3–200)
D5	4–M5X10L	4–M6X12L	4–M8X16L	4–M10X20L	4–M12X22L	4–M16X28L
D6	ϕ62	ϕ80	ϕ108	ϕ140	ϕ184	ϕ210
D7	ϕ70	ϕ90 (ϕ70–100)	ϕ145 (ϕ90–145)	ϕ145 (ϕ145–200)	ϕ145 (ϕ145–200)	ϕ215 (ϕ200–235)
D8	4–M5 (M4)	4–M6 (M4–M6)	4–M8 (M5–M8)	4–M8 (M8–M12)	4–M8 (M8–M12)	4–M12
D9	M5X0.8P	M8X1.25P	M12X1.75P	M16X2P	M20X2.5P	M20X2.5P
L1	28.5	36.5	51	79	82	105
L2	5	6	9	12	15	18
L3	35	44	62	94	100	126
L4	5	5	8 (7–8)	11 (6–11)	8 (8–11)	8 (7–10)
L5	34	34 (≤44)	44 (≤60)	64.5 (≤81.5)	72.5 (≤82)	85 (≤120)
L6	142	172.5 (162.5–172.5)	230.5 (214.5–230.5)	286 (286–303)	340 (330.5–340)	407 (402–437)
C1	65	80 (65–86)	130 (90–130)	130 (130–180)	150 (150–180)	200 (180–220)
S1	3	4	5	5	6	7
S2	22	28	40	65	70	90
S3	18	24.5	35	43	59	79.5
B	5	6	10	12	16	20
K1	4	6	8	10	14	18
K2	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	12.8	24.5	31.3	41.3	53.8	64.4
K4	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	15	20	27	35	43	60
K6	18	24	32	40	50	65

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

EVL

- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

EVL Type

EVL090 – 10 – S1 – P1 / Motor

Reducer Model
EVL070, EVL090, EVL120
EVL145, EVL180

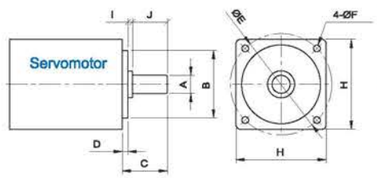
Output Shaft Keyway
S1:(Solid Output Shaft No Keyway)
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3, 4, 5, 6, 7, 8, 9, 10
2–stage: 15, 20, 25, 30, 35, 40, 45, 50,
60, 70, 80, 90, 100

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

EVL Reducer Specifications

Specs	Unit	Stage	Ratio	EVL070	EVL090	EVL120	EVL145	EVL180
Rated Output Torque / T2N	Nm	1	3	45	130	230	450	900
			4	50	140	290	542	1050
			5	60	160	330	650	1200
			6	55	150	310	600	1100
			7	50	140	300	550	1100
			8	45	120	260	500	1000
			9	40	100	230	450	900
			10	40	100	208	342	588
			14	45	130	230	450	900
			20	50	140	290	542	1050
		2	15	60	160	330	650	1200
			20	55	150	310	600	1100
			25	60	160	330	550	1100
			30	45	120	260	500	1000
			35	40	100	230	450	900
			40	60	160	330	650	1200
			50	50	140	300	550	1100
			70	45	120	260	500	1000
			80	40	100	230	450	900
			100	40	100	208	342	588
			120	—	128	305	495	1095
			140	—	128	295	525	1095
			160	—	118	255	515	995
			180	—	98	225	445	895
			200	—	98	225	445	895
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~200	3Times of Nominal Output Torque				
Rated Input Speed / n_{1N}	rpm	1,2	3~200	3000	3000	3000	2500	2000
Max.Input Speed / n_{1B}	rpm	1,2	3~200	6000	6000	5500	4500	4500
Precision Backlash P0	arcmin	1	3~20	≤2	≤2	≤2	≤2	≤2
		2	15~200	≤4	≤4	≤4	≤4	≤4
Precision Backlash P1	arcmin	1	3~20	≤4	≤4	≤4	≤4	≤4
		2	15~200	≤6	≤6	≤6	≤6	≤6
Standard Backlash P2	arcmin	1	3~20	≤6	≤6	≤6	≤6	≤6
		2	15~200	≤8	≤8	≤8	≤8	≤8
Torsional Rigidity	Nm/arcmin	1,2	3~200	6	14	25	56	140
Max.Radial Force / F_{2rB}[2]	N	1,2	3~200	1300	3200	6750	9400	14500
Max.Axial Force / F_{2aB}[2]	N	1,2	3~200	700	1580	3300	4700	7200
Service Life	hr	1,2	3~200	21000 h				
Efficiency / η	%	1	3~20	≥93%				
		2	25~200	≥90%				
Weight	kg	1	3~20	1.5	6.4	13	24.5	51
		2	25~200	2.1	7.8	14.2	27.5	54
Operating Temperature	℃	1,2	3~200	(–15℃ ~ +90℃)				
Lubrication		1,2	3~200	(Synthetic Grease)				
Protection Class		1,2	3~200	IP65				
Mounting Position		1,2	3~200	(Any Direction)				
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~200	≤65	≤68	≤68	≤70	≤72

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	EVL070	EVL090	EVL120	EVL145	EVL180
Moment of Inertia	$kg.cm^2$	1	3~10	0.35	2.25	6.84	23.4	68.9
			14~20	0.07	1.87	6.25	21.8	65.6
		2	15~100	0.09	0.35	2.25	6.84	23.4
			120~200	—	0.31	1.87	6.25	21.8

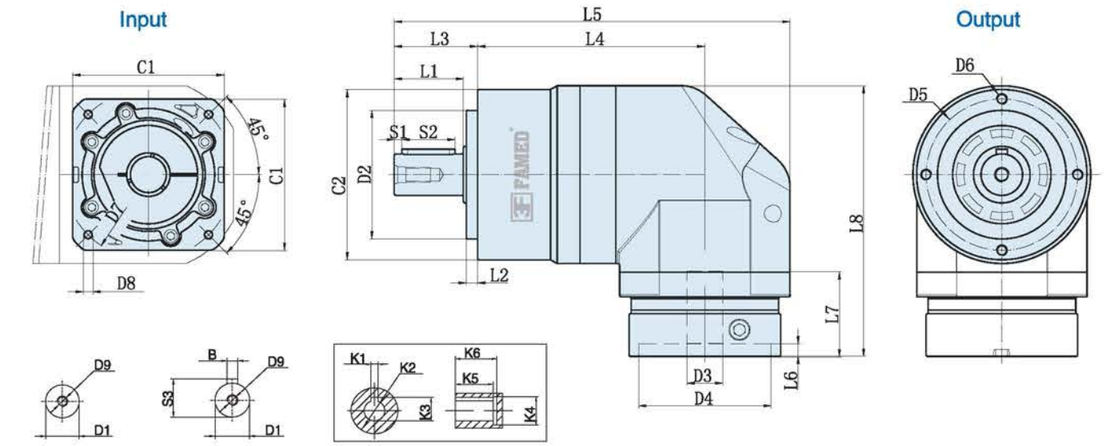
1. The Max. acceleration torque T2B=60% of T2NOT 2. When output speed is 100rpm, inertia acts on the output shaft center position.
3. 3-stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

MODEL: EVL

1–Stage

Ratio: 3, 4, 5, 6, 7, 8, 9, 10

Dimensions:



Output shaft type S1 Output shaft type S2 Output hole type S3

Unit:mm

Size	EVL070–L1	EVL090–L1	EVL120–L1	EVL145–L1	EVL180–L1
D1	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55
D2	ϕ52	ϕ68	ϕ90	ϕ120	ϕ160
D3	ϕ14 (≤19)	ϕ19(11–24)	ϕ24(16–24)	ϕ24 (≤42)	ϕ35 (≤55)
D4	ϕ50 (50–70)	ϕ70 (50–110)	ϕ110 (50–110)	ϕ110 (≤180)	ϕ114.3 (≤180)
D5	ϕ62	ϕ80	ϕ108	ϕ140	ϕ184
D6	4–M5*10	4–M6*12	4–M8*16	4–M10*20L	4–M12*30L
D7	ϕ70 (70–130)	ϕ90 (70–145)	ϕ145 (90–155)	ϕ145 (≤215)	ϕ200 (≤300)
D8	(4–M4*10L)	(4–M5*12L)	(4–M8*20L)	(4–M12*30L)	(4–M12*30L)
D9	M5*0.8P*15L	M6*1.25P*19L	M12*1.75P*28L	M16*36L	M20*42L
L1	28.5	36.5	51	97	100
L2	5	6	9	79	84
L3	35	44	62	15	15
L4	88	120	140.5	172	294
L5	153	209	260	340	365
L6	(5)	(6.5)	(10)	(10)	(19)
L7	(33)	(45)	(64)	(84)	(81)
L8	(112.50)	(143)	(195.5)	(238)	(278)
C1	(□60)	(□80)	(□130)	(□130)	(□180)
C2	ϕ70	ϕ90	ϕ120	ϕ155	ϕ205
S1	3	4	5	5	6
S2	22	28	40	63	70
S3	18	24.5	35	43	59
B	5	6	10	12	16
K1	4	6	8	10	14
K2	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50
K3	12.8	24.5	31.3	42	53.8
K4	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60
K5	15	20	27	35	43
K6	18	24	32	40	50

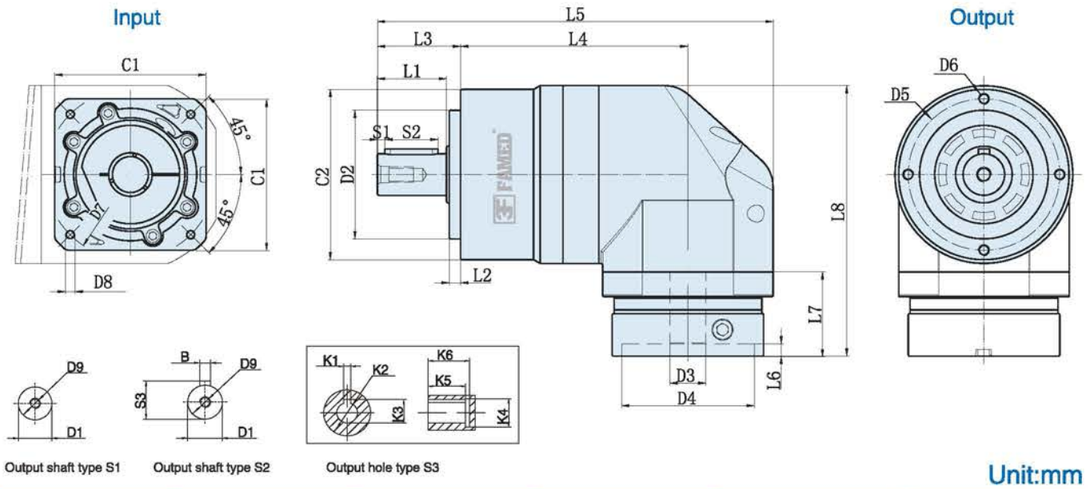
Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL: EVL

2-Stage

Ratio: 15, 20, 25, 30, 35, 40, 45, 50,
60, 70, 80, 90, 100

Dimensions:



Unit:mm

Size	EVL070-L2	EVL090-L2	EVL120-L2	EVL145-L2	EVL180-L2
D1	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55
D2	ϕ52	ϕ68	ϕ90	ϕ120	ϕ160
D3	ϕ14 (≤19)	ϕ19(11-24)	ϕ24(16-24)	ϕ24 (≤42)	ϕ35 (≤55)
D4	ϕ50 (50-70)	ϕ70 (50-110)	ϕ110 (50-110)	ϕ110 (≤180)	ϕ114.3 (≤180)
D5	ϕ62	ϕ80	ϕ108	ϕ140	ϕ184
D6	4-M5*10	4-M6*12	4-M8*16	4-M10*20L	4-M12*30L
D7	ϕ70 (70-130)	ϕ90 (70-145)	ϕ145 (90-155)	ϕ145 (≤215)	ϕ200 (≤300)
D8	(4-M4*10L)	(4-M5*12L)	(4-M8*20L)	(4-M12*30L)	(4-M12*30L)
D9	M5*0.8P*15L	M6*1.25P*19L	M12*1.75P*28L	M16*36L	M20*42L
L1	28.5	36.5	51	97	100
L2	5	6	9	79	84
L3	35	44	62	15	15
L4	117	134.5	170.5	233	362.5
L5	182	208.5	277.5	401	433.5
L6	(5)	(6.5)	(10)	(10)	(19)
L7	(33)	(42.5)	(59)	(84)	(81)
L8	(112.50)	(134)	(180)	(238)	(278)
C1	(□60)	(□80)	(□130)	(□130)	(□180)
C2	ϕ70	ϕ90	ϕ120	ϕ155	ϕ205
S1	3	4	5	5	6
S2	22	28	40	63	70
S3	18	24.5	35	43	59
B	5	6	10	12	16
K1	4	6	8	10	14
K2	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50
K3	12.8	24.5	31.3	42	53.8
K4	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60
K5	15	20	27	35	43
K6	18	24	32	40	50

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

High Precision Flange Output Planetray Gearbox

VRT

- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

VRT Type

VRT090 - 10 - S1 - P1 / Motor

Reducer Model
VRT047, VRT064, VRT090, VRT110
VRT140, VRT200, VRT255

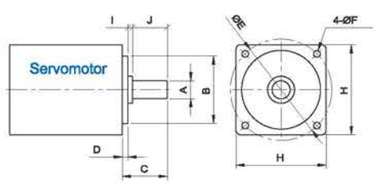
Output flange mode
S1: Standard flange face output
S2: Non standard flange face output

Motor Model
Motor Manufacturer & Model

Ratio
1-stage: 3, 4, 5, 6, 7, 8, 9, 10
2-stage: 12, 15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 80, 100

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

VRT Reducer Specifications

Specs	Unit	Stage	Ratio	VRT047	VRT064	VRT090	VRT110	VRT140	VRT200	VRT255
Rated Output Torque / T2N	Nm	1	4	19	50	133	278	555	1050	1700
			5	22	60	160	330	650	1200	2000
			7	19	50	140	300	550	1100	1800
			10	14	40	100	230	450	900	1500
		2	20	19	50	133	278	555	1050	1700
			25	22	60	160	330	650	1200	2000
			35	19	50	140	300	550	1100	1800
			40	19	45	120	260	500	1000	1600
			50	22	60	160	330	650	1200	2000
			70	19	50	140	300	550	1100	1800
			100	14	40	100	230	450	900	1500
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	4~100	3Times of Nominal Output Torque						
Rated Input Speed / n_{1N}	rpm	1,2	4~100	5000	5000	4000	4000	3000	3000	2000
Max.Input Speed / n_{1B}	rpm	1,2	4~100	10000	10000	8000	8000	6000	6000	4000
Micro Backlash P0	arcmin	1	4~10	≤1	≤1	≤1	≤1	≤1	≤1	≤1
		2	12~100	≤3	≤3	≤3	≤3	≤3	≤3	≤3
Precision Backlash P1	arcmin	1	4~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
		2	20~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5
Standard Backlash P2	arcmin	1	4~10	≤5	≤5	≤5	≤5	≤5	≤5	≤5
		2	20~100	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Torsional Rigidity	Nm/arcmin	1,2	4~100	8	13	30	80	150	450	1010
Max.Radial Force / F_{2rB}[2]	N	1,2	4~100	43	125	235	430	1300	3064	5900
Max.Axial Force / F_{2aB}[2]	N	1,2	4~100	990	1050	2850	2990	10590	16660	29430
Service Life	hr	1,2	4~100	22000h						
Efficiency / η	%	1	4~10	≥97%						
		2	20~100	≥94%						
Weight	kg	1	4~10	0.7	1.3	3.2	5.8	12.3	33	57.9
		2	20~100	1	1.5	4.1	7.6	16.8	38	72.6
Operating Temperature	℃	1,2	4~100	(–15℃ ~ +90℃)						
Lubrication		1,2	4~100	(Synthetic Grease)						
Protection Class		1,2	4~100	IP65						
Mounting Position		1,2	4~100	(Any Direction)						
Noise Level (n1=3000rpm，No load)	dB(A)	1,2	4~100	≤56	≤58	≤60	≤63	≤65	≤67	≤70

Reducer Rotary Inertia

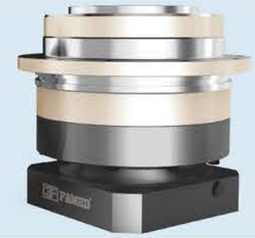
Specs	Unit	Stage	Ratio	VRT047	VRT064	VRT090	VRT110	VRT140	VRT200	VRT255
Moment of Inertia	$kg.cm^2$	1	4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	20–40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50–100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

1. Max. reduction ratio(i=Nin/Nout)　2.The Max. acceleration torque T2B=60% of T2NOT
3. When output speed is 100rpm, acting on the output shaft center position，*Continuous operation, service life is 15000hrs。

MODEL：VRT

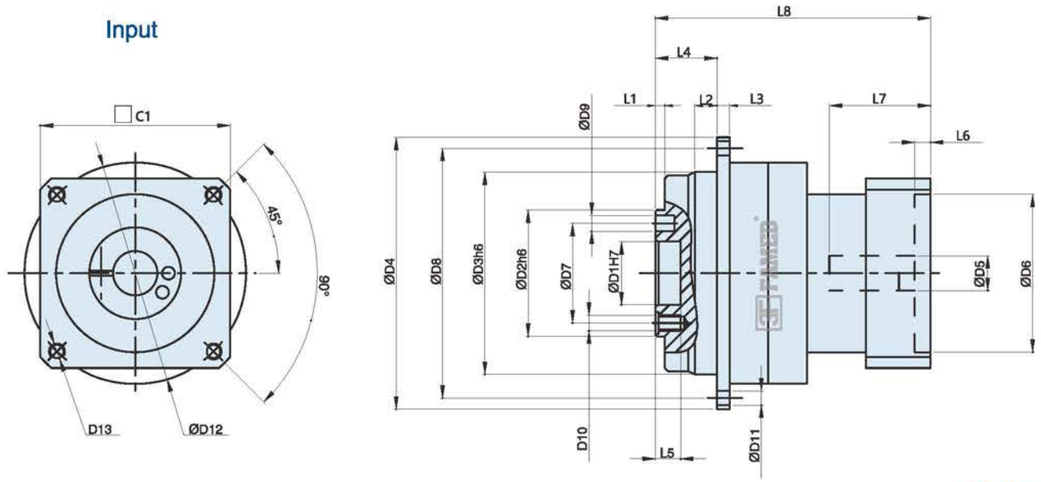
1–Stage

Ratio：3，4，5，6，7，8，9，10



Dimensions：

Input



Unit:mm

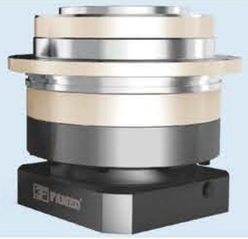
Size	VRT047–L1	VRT064–L1	VRT090–L1	VRT110–L1	VRT140–L1	VRT200–L1	PAD255–L1
D1	12	20	31.5	40	50	80	100
D2	28	40	63	80	100	160	180
D3	47	64	90	110	140	200	255
D4	72	86	118	145	179	247	300
D5	≤11/≤12	11(8 ~ 14)	19(14 ~ 22)	24(22 ~ 28)	24(24 ~ 48)	35(35 ~ 48)	48(48 ~ 55)
D6	30	30(30 ~ 50)	50(50 ~ 110)	110	110(110 ~ 114.3)	114.3(114.3 ~ 200)	200
D7	20	31.5	50	63	80	125	140
D8	67	79	109	135	168	233	280
D9	Ø3	Ø5x深度(D)8	Ø6x深度(D)7	Ø6x深度(D)7	Ø8x深度(D)7	Ø10x深度(D)10	Ø12x深度(D)10
D10	4–M3	7–M5x深度(D)8	8–M6x深度(D)12	11–M6x深度(D)12	11–M8x深度(D)17	11–M10x深度(D)20	12–M16x深度(D)25
D11	8–Ø3.4	8–Ø4.5	8–Ø5.5	8–Ø5.5	12–Ø6.6	12–Ø9	16–Ø13.5
D12	46	45(45 ~ 70)	70(70 ~ 145)	145	145(145 ~ 200)	200(200 ~ 235)	235
D13	M4	M4 ~ M5	M5 ~ M8	M8	M8 ~ M12	M12	M12
L1	3	3	6	6	6	8	12
L2	7	7	10	10	14.5	15	21.5
L3	4	4	7	8	10	12	18
L4	19.5	19.5	30	29	38	50	66
L5	4	8	12	13	12	16	20
L6	3.5	4 ~ 5	5 ~ 10	10	6 ~ 8	6 ~ 10	10
L7	30	28(28 ~ 34)	32(32 ~ 59)	60	73(73 ~ 115)	88(88 ~ 117)	119.5
L8	70	80.5 ~ 87	97(97 ~ 120)	142	159(159 ~ 201)	196(196 ~ 229)	255
C1	48	60(40 ~ 60)	90(60 ~ 130)	130	130(130 ~ 180)	180(180 ~ 220)	220

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL: VRT

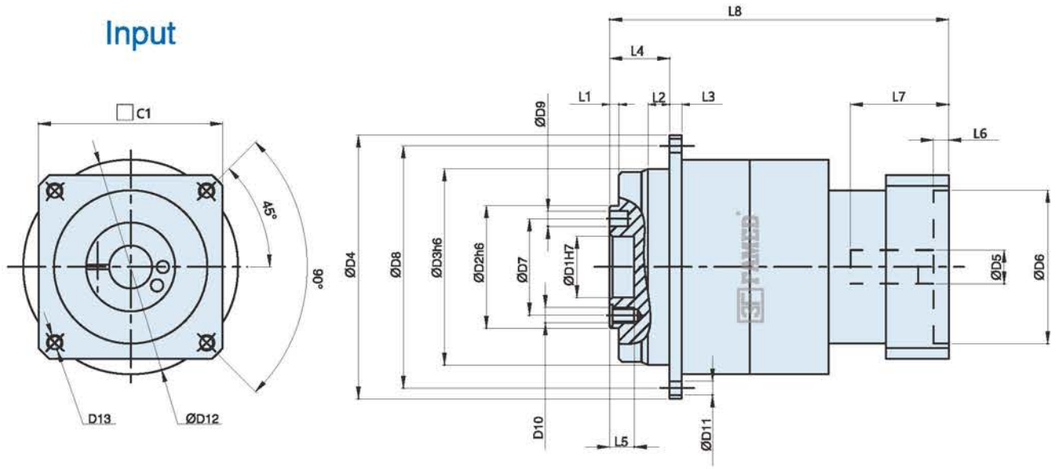
2-Stage

Ratio: 12, 15, 16, 20, 25, 28, 30, 35
40, 50, 70, 80, 100



Dimensions:

Input

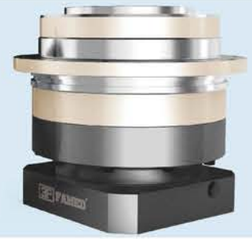


Unit:mm

Size	VRT047-L2	VRT064-L2	VRT090-L2	VRT110-L2	VRT140-L2	VRT200-L2	VRT255-L2
D1	12	20	31.5	40	50	80	100
D2	28	40	63	80	100	160	180
D3	47	64	90	110	140	200	255
D4	72	86	118	145	179	247	300
D5	≤11/≤12	11(8 ~ 14)	19(14 ~ 22)	19(22 ~ 28)	19(19 ~ 38)	35(24 ~ 48)	38(38 ~ 55)
D6	30	30(30 ~ 50)	50(50 ~ 110)	70(70 ~ 110)	70(70 ~ 114.3)	110(110 ~ 200)	114.3(114.3 ~ 200)
D7	20	31.5	50	63	80	125	140
D8	67	79	109	135	168	233	280
D9	Ø3	Ø5x深度(D)8	Ø6x深度(D)7	Ø6x深度(D)7	Ø8x深度(D)7	Ø10x深度(D)10	Ø12x深度(D)10
D10	4-M3	7-M5x深度(D)8	8-M6x深度(D)12	11-M6x深度(D)12	11-M8x深度(D)17	11-M10x深度(D)20	12-M16x深度(D)25
D11	8-Ø3.4	8-Ø4.5	8-Ø5.5	8-Ø5.5	12-Ø6.6	12-Ø9	16-Ø13.5
D12	46	45(45 ~ 70)	70(70 ~ 145)	90(90 ~ 145)	90(90 ~ 200)	145(145 ~ 235)	200(200 ~ 235)
D13	M4	M4 ~ M5	M5 ~ M8	M6 ~ M8	M5 ~ M12	M8 ~ M12	M12
L1	3	3	6	6	6	8	12
L2	7	7	10	10	14.5	15	20
L3	4	4	7	8	10	12	18
L4	19.5	19.5	30	29	38	50	66
L5	4	8	12	13	12	16	20
L6	3.5	4 ~ 5	5 ~ 10	6 ~ 10	6 ~ 8	6 ~ 10	6 ~ 10
L7	30	28(28 ~ 34)	34(34 ~ 59)	43(43 ~ 60)	65(65 ~ 85)	73(73 ~ 117)	73(73 ~ 117)
L8	97.5	103(103 ~ 110)	123(123 ~ 139)	150(150 ~ 176)	195(195 ~ 211)	292(292 ~ 336)	306(306 ~ 322)
C1	48	60(40 ~ 60)	90(60 ~ 130)	90(90 ~ 130)	90(90 ~ 180)	180(130 ~ 220)	180(180 ~ 220)

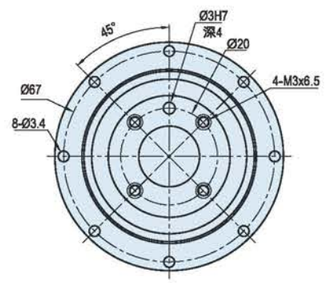
Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL: VRT

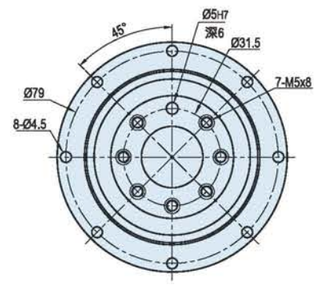


Output Dimensions:

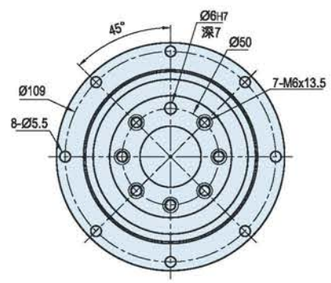
VRT047
OUTPUT



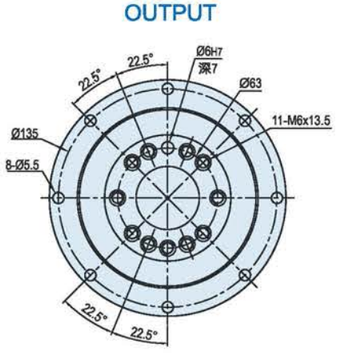
VRT064
OUTPUT



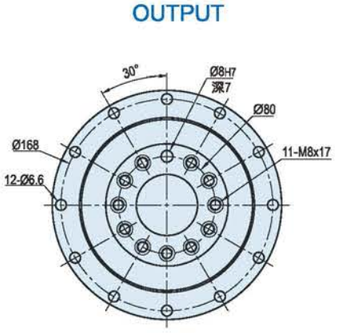
VRT090
OUTPUT



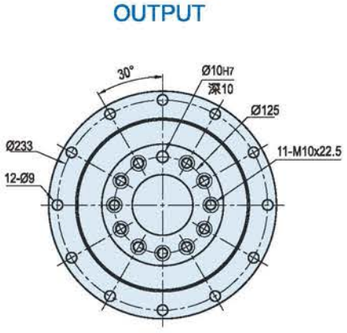
VRT110
OUTPUT



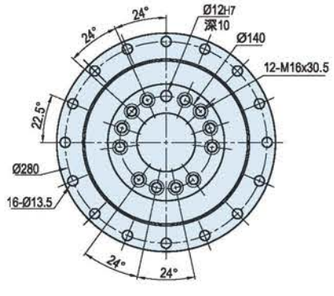
VRT140
OUTPUT



VRT200
OUTPUT



VRT255
OUTPUT



High Precision Flange Output Right Angle Planetary Gearbox

EVT

- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

EVT Type

EVT090 – 10 – S1 – P1 / Motor

Reducer Model
EVT047, EVT064, EVT090
EVT110, EVT140, EVT200
EVT255

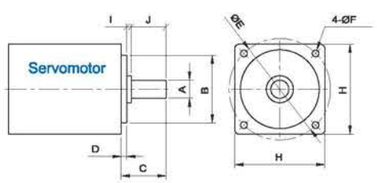
Output flange mode
S1: Standard flange face output
S2: Non standard flange face output

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3, 4, 5, 6, 7, 8, 9, 10
2–stage: 12, 15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 80, 100

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type — Model — Ratio — Output Shaft Keyway — Backlash Class — MOTOR NO.

EVT Reducer Specifications

Specs	Unit	Stage	Ratio	EVT047	EVT064	EVT090	EVT110	EVT140	EVT200	EVT255
Rated Output Torque / T2N	Nm	1	4	19	50	133	278	555	1050	1700
			5	22	60	160	330	650	1200	2000
			7	19	50	140	300	550	1100	1800
			10	14	40	100	230	450	900	1500
		2	20	19	50	133	278	555	1050	1700
			25	22	60	160	330	650	1200	2000
			35	19	50	140	300	550	1100	1800
			40	19	45	120	260	500	1000	1600
			50	22	60	160	330	650	1200	2000
			70	19	50	140	300	550	1100	1800
			100	14	40	100	230	450	900	1500
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	4~100	3Times of Nominal Output Torque						
Rated Input Speed / n_{1N}	rpm	1,2	4~100	5000	5000	4000	4000	3000	3000	2000
Max.Input Speed / n_{1B}	rpm	1,2	4~100	10000	10000	8000	8000	6000	6000	4000
Micro Backlash P0	arcmin	1	4~10	≤2	≤2	≤2	≤2	≤2	≤2	≤2
		2	12~100	≤4	≤4	≤4	≤4	≤4	≤4	≤4
Precision Backlash P1	arcmin	1	4~10	≤4	≤4	≤4	≤4	≤4	≤4	≤4
		2	20~100	≤6	≤6	≤6	≤6	≤6	≤6	≤6
Standard Backlash P2	arcmin	1	4~10	≤6	≤6	≤6	≤6	≤6	≤6	≤6
		2	20~100	≤8	≤8	≤8	≤8	≤8	≤8	≤8
Torsional Rigidity	Nm/arcmin	1,2	4~100	8	13	30	80	150	450	1010
Max.Radial Force / F_{2rB}[2]	N	1,2	4~100	43	125	235	430	1300	3064	5900
Max.Axial Force / F_{2aB}[2]	N	1,2	4~100	990	1050	2850	2990	10590	16660	29430
Service Life	hr	1,2	4~100	22000h						
Efficiency / η	%	1	4~10	≥97%						
		2	20~100	≥94%						
Weight	kg	1	4~10	0.7	1.3	3.2	5.8	12.3	33	57.9
		2	20~100	1	1.5	4.1	7.6	16.8	38	72.6
Operating Temperature	℃	1,2	4~100	(–15℃ ~ +90℃)						
Lubrication		1,2	4~100	(Synthetic Grease)						
Protection Class		1,2	4~100	IP65						
Mounting Position		1,2	4~100	(Any Direction)						
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	4~100	≤58	≤59	≤62	≤65	≤68	≤69	≤70

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	EVT047	EVT064	EVT090	EVT110	EVT140	EVT200	EVT255
Moment of Inertia	$kg.cm^2$	1	4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	20–40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50–100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

1. Ratio (i=Nin/Nout) . 2. 2.The Max. acceleration torque T2B=60% of T2NOT.
3. When output speed is 100rpm, acting on the output shaft center position *Continuous operation, service life is 15000hrs.

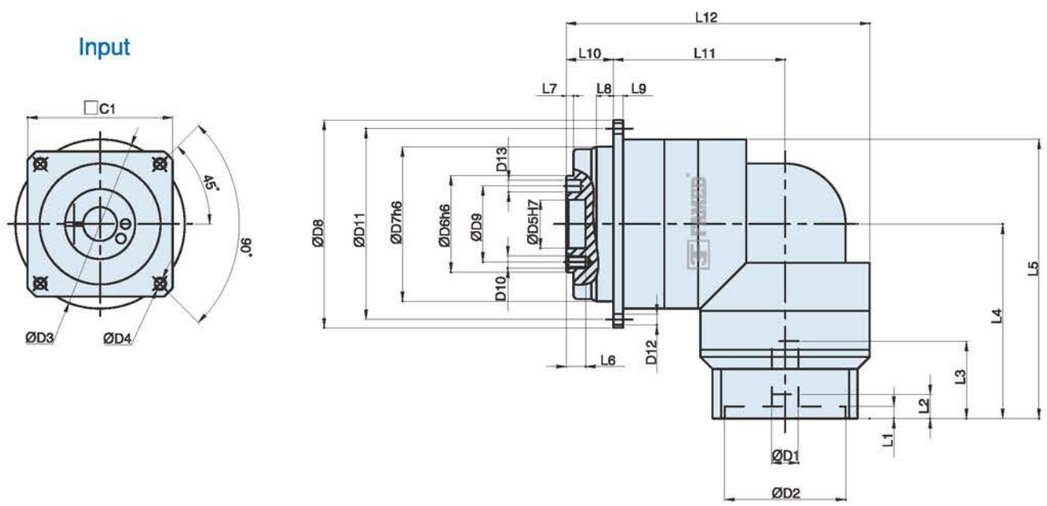
MODEL：EVT

1–Stage

Ratio：3，4，5，6，7，8，9，10

Dimensions：

Input



Unit:mm

Size	EVT047–L1	EVT064–L1	EVT090–L1	EVT110–L1	EVT140–L1	EVT200–L1	EVT255–L1
D1	≤11/≤12	11(11 ~ 14)	19(19 ~ 24)	24(22 ~ 32)	32(24 ~ 35)	≤48	≤55
D2	30	50	70(70 ~ 110)	110(110 ~ 130)	110(110 ~ 114.3)	85	116
D3	46	70	90(90 ~ 145)	145(145 ~ 165)	145(145 ~ 200)	215	235
D4	M4	M4	M8	M8 ~ M10	M8 ~ M12	M12	M12
D5	12	20	31.5	40	50	80	100
D6	28	40	63	80	100	160	180
D7	47	64	90	110	140	200	255
D8	72	86	118	145	179	247	300
D9	20	31.5	50	63	80	125	140
D10	4–M3	7–M5x深度(D)8	8–M6x深度(D)12	11–M6x深度(D)12	11–M8x深度(D)17	11–M10x深度(D)20	12–M16x深度(D)25
D11	67	79	109	135	168	233	280
D12	8–Ø3.4	8–Ø4.5	8–Ø5.5	8–Ø5.5	12–Ø6.6	12–Ø9	16–Ø13.5
D13	Ø3	Ø5x深度(D)8	Ø6x深度(D)7	Ø6x深度(D)7	Ø8x深度(D)7	Ø10x深度(D)10	Ø12x深度(D)10
L1	3.5	5	12	10	8	6	6
L2	8	10	13	19	17	20	24
L3	30	32	42 ~ 47	57 ~ 60	67 ~ 77	85	116
L4	74	80.5	107 ~ 112	134 ~ 147.5	166.5 ~ 167	213.5	268.5
L5	104	115.5	152 ~ 157	195 ~ 208.5	217.5 ~ 241.5	316	398.5
L6	6.5	8	12	13	12	22.5	30.5
L7	3	3	6	6	6	8	12
L8	7	7	10	11	15	15	20
L9	4	4	7	8	10	12	18
L10	19.5	19.5	25	29	38	50	66
L11	60	71	102	130	142.5	189	216
L12	107.5	125.5	172	220	255.5	334.5	392
C1	48	60	90(90 ~ 130)	130 ~ 160	130(130 ~ 220)	190	220

MODEL：EVT

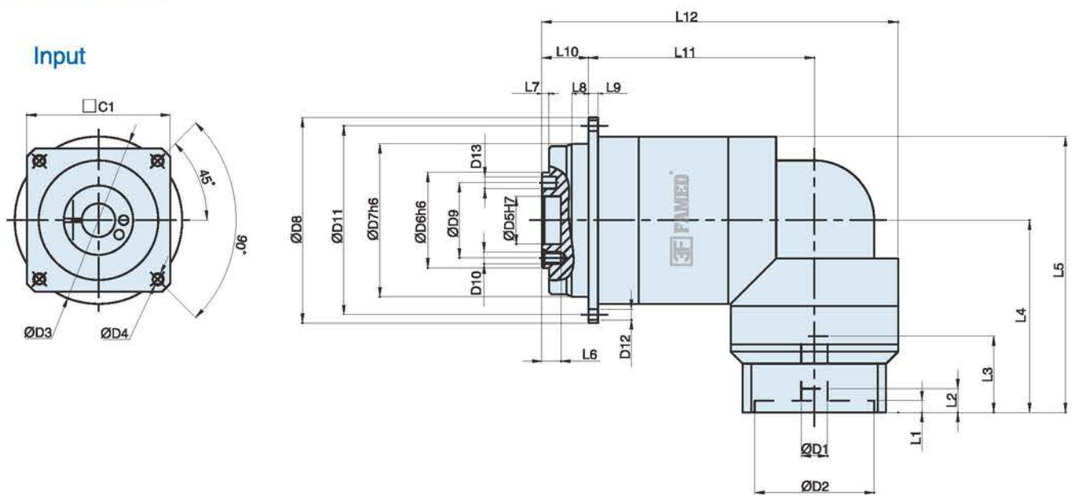
2–Stage

Ratio：12，15，16，20，25，28，30，35

40，50，70，80，100

Dimensions：

Input



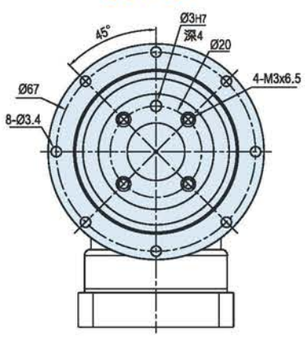
Unit:mm

Size	EVT47–L2	EVT064–L2	EVT090–L2	EVT110–L2	EVT140–L2	EVT200–L2	EVT255–L2
D1	≤11/≤12	11(11 ~ 14)	19(19 ~ 24)	24(22 ~ 32)	32(24 ~ 35)	≤48	≤55
D2	30	50	70(70 ~ 110)	110(110 ~ 130)	110(110 ~ 114.3)	85	116
D3	46	70	90(90 ~ 145)	145(145 ~ 165)	145(145 ~ 200)	215	235
D4	M4	M4	M8	M8 ~ M10	M8 ~ M12	M12	M12
D5	12	20	31.5	40	50	80	100
D6	28	40	63	80	100	160	180
D7	47	64	90	110	140	200	255
D8	72	86	118	145	179	247	300
D9	20	31.5	50	63	80	125	140
D10	4–M3	7–M5x深度(D)8	8–M6x深度(D)12	11–M6x深度(D)12	11–M8x深度(D)17	11–M10x深度(D)20	12–M16x深度(D)25
D11	67	79	109	135	168	233	280
D12	8–Ø3.4	8–Ø4.5	8–Ø5.5	8–Ø5.5	12–Ø6.6	12–Ø9	16–Ø13.5
D13	Ø3	Ø5x深度(D)8	Ø6x深度(D)7	Ø6x深度(D)7	Ø8x深度(D)7	Ø10x深度(D)10	Ø12x深度(D)10
L1	3.5	5	12	10	8	6	6
L2	8	10	13	19	17	20	24
L3	30	32	42 ~ 47	57 ~ 60	67 ~ 77	85	116
L4	74	80.5	107 ~ 112	134 ~ 147.5	166.5 ~ 167	213.5	268.5
L5	103	115.5	152 ~ 157	195 ~ 208.5	217.5 ~ 241.5	269.5	340
L6	4	8	12	13	12	22.5	30.5
L7	3	3	6	6	6	8	12
L8	7	7	10	11	15	15	20
L9	4	4	7	8	10	12	18
L10	19.5	19.5	30	29	38	50	66
L11	79	94.5	117	163.5	187	243	270
L12	122	149	187	253.5	300	382	403
C1	48	60	90(90 ~ 130)	130 ~ 160	130(130 ~ 220)	190	220

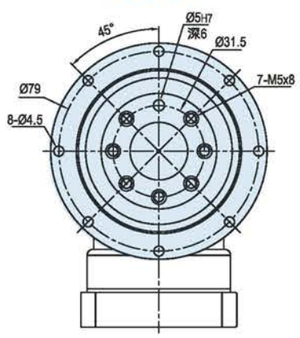
MODEL： EVT

Output Dimensions

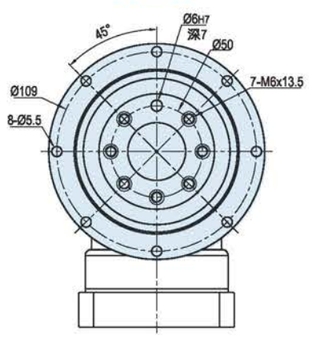
EVT047
OUTPUT



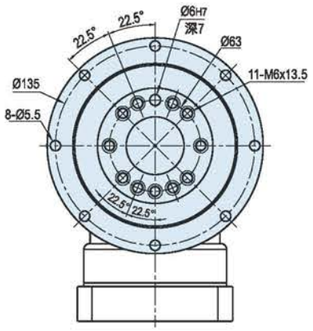
EVT064
OUTPUT



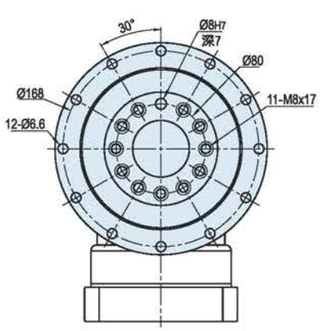
EVT090
OUTPUT



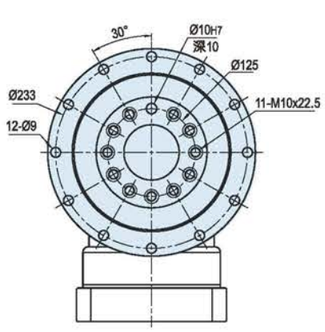
EVT110
OUTPUT



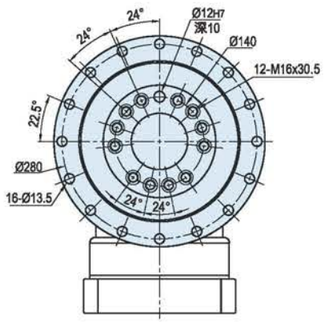
EVT140
OUTPUT



EVT200
OUTPUT



EVT255
OUTPUT



European High Precision High Torque Planetary Gearbox

VRS

- 1.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 2.High rigidity & torque
  The use of integral ball bearings greatly improves the rigidity and torque.
- 3.High load capacity
  The main output shaft adopts taper roller bearing to greater increase the radial and axial force.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5. No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

VRS Type

VRS090 – 10 – S1 – P1 / Motor

Reducer Model
VRS060, VRS075, VRS100, VRS140
VRS180, VRS210, VRS240

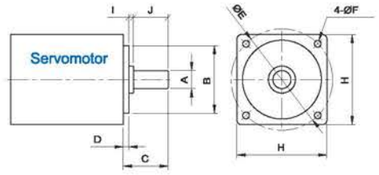
Output Shaft Keyway
S1：Solid Output Shaft No Keyway
S2：Standard (Keyway)
S3：Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1-stage：3, 4, 5, 6, 7, 8, 9, 10
2-stage：12, 15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 80, 100

Backlash Grade
P0：High precision backlash
P1：Precision backlash
P2：Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions：



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

VRS Reducer Specifications

Specs	Unit	Stage	Ratio	VRS060	VRS075	VRS100	VRS140	VRS180	VRS210	VRS240
Rated Output Torque / T2N	Nm	1	3	55	130	208	342	588	1140	1500
			4	50	140	290	542	1050	1700	2500
			5	60	160	330	650	1200	2000	2500
			6	55	150	310	600	1100	1900	2260
			7	50	140	300	550	1100	1800	2300
			8	45	120	260	500	1000	1600	2100
			9	40	100	230	450	900	1500	1800
			10	40	100	230	450	900	1500	1800
		2	15	55	130	208	342	588	1140	2300
			16	55	130	208	342	588	1140	2300
			20	50	140	290	542	1050	1700	2500
			25	60	160	330	650	1200	2000	2500
			28	60	160	330	650	1200	2000	2500
			30	55	150	310	600	1100	1900	2300
			35	50	140	300	550	1100	1800	2200
			40	45	120	260	500	1000	1600	2350
			50	60	160	330	650	1200	2000	2200
			70	50	140	300	550	1100	1800	2200
			100	40	100	230	450	900	1500	1800
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque						
Rated Input Speed / n_{1N}	rpm	1,2	3~100	5000	4000	4000	3000	3000	2000	1000
Max.Input Speed / n_{1B}	rpm	1,2	3~100	10000	8000	8000	6000	6000	4000	2500
Micro Backlash P0	arcmin	1	3~10	≤1	≤1	≤1	≤1	≤1	≤1	≤1
		2	12~100	≤3	≤3	≤3	≤3	≤3	≤3	≤3
Precision Backlash P1	arcmin	1	3~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
		2	15~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5
Torsional Rigidity	Nm/arcmin	1,2	3~100	7	14	25	50	145	225	260
Max.Radial Force / F_{2R}[2]	N	1,2	3~100	2750	4100	6400	9880	15000	20000	27500
Max.Axial Force / F_{2a1B}[2]	N	1,2	3~100	2350	3200	5360	9690	14200	28000	30000
Service Life	hr	1,2	3~100	20000h						
Efficiency / η	%	1	3~10	≥96%						
		2	15~100	≥93%						
Weight	kg	1	3~10	1.8	3.8	7.2	16.8	32	49	65
		2	15~100	2.1	4.1	8.1	17.5	35	53	70
Operating Temperature	℃	1,2	3~100	(-15℃ ~ +90℃)						
Lubrication		1,2	3~100	(Synthetic Grease)						
Protection Class		1,2	3~100	IP65						
Mounting Position		1,2	3~100	(Any Direction)						
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	≤62	≤62	≤65	≤68	≤68	≤70	≤70

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	VRS060	VRS075	VRS100	VRS140	VRS180	VRS210	VRS240
Moment of Inertia	$kg.cm^2$	1	3	0.16	0.61	3.25	9.21	28.98	69.61	82.16
			4	0.14	0.48	2.74	7.54	23.67	54.37	75.58
			5	0.13	0.47	2.71	7.42	23.29	53.27	75.29
			6	0.13	0.45	2.65	7.25	22.75	51.72	72.35
			7	0.13	0.45	2.62	7.14	22.48	50.97	69.13
			8	0.13	0.44	2.58	7.07	22.59	50.84	69.22
			9	0.13	0.44	2.57	7.04	22.53	50.63	66.23
			10	0.13	0.44	2.57	7.03	22.51	50.56	66.23
		2	15–40	0.03	0.13	0.47	2.71	7.42	23.29	48.23
			50–100	0.03	0.13	0.44	2.57	7.03	22.51	45.58

1. Ratio (i=Nin/Nout) 2. When output speed is 100rpm, acting on the output shaft center position
3. *Continuous operation, service life is 10000hrs

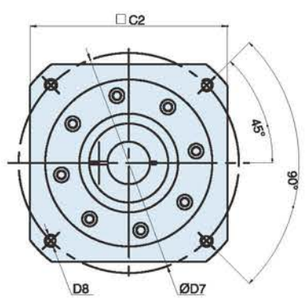
MODEL: VRS

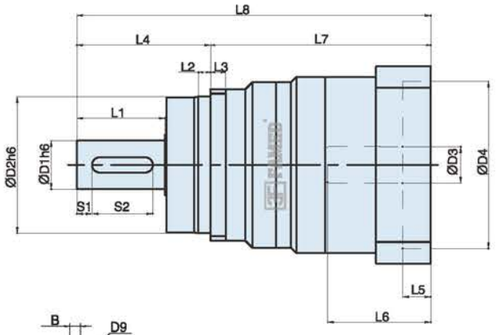
1–Stage

Ratio: 3, 4, 5, 6, 7, 8, 9, 10

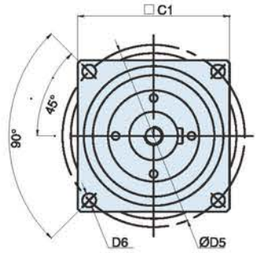
Dimensions:

Input

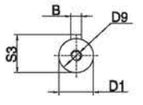




Output



Output shaft type S1



Output shaft type S2

Unit:mm

Size	VRS060–L1	VRS075–L1	VRS100–L1	VRS140–L1	VRS180–L1	VRS210–L1	VRS240–L1
D1	16	22	32	40	55	75	85
D2	60	70	90	130	160	180	200
D3	8(8 ~ 19)	14(14 ~ 24)	19(19 ~ 35)	24(24 ~ 48)	38(38 ~ 48)	48(48 ~ 55)	60
D4	30(30 ~ 70)	50(50 ~ 110)	70(70 ~ 114.3)	110(110 ~ 114.3)	114.3(114.3 ~ 200)	200	220
D5	68	85	120	165	215	250	290
D6	4–Ø5.5	4–Ø6.6	4–Ø9	4–Ø11	4–Ø13.5	4–Ø17	4–Ø17
D7	46(45 ~ 90)	70(70 ~ 145)	90(90 ~ 200)	145(145 ~ 200)	200(200 ~ 235)	235	240
D8	M3 ~ M5	M4 ~ M8	M5 ~ M12	M8 ~ M12	M12	M12	M16
D9	M5	M8	M12	M16	M20	M20	M20
L1	28	36	58	82	82	105	130
L2	5	6	8	10	12	15	20
L3	6	7	10	12	15	17	20
L4	48	56	88	112	112	143	170
L5	7.5 ~ 9	10.5 ~ 16	12 ~ 36.5	8	10	10	12
L6	42 ~ 43.5	50.5 ~ 66	62 ~ 82	69 ~ 115	83 ~ 117	116	55
L7	94.5 ~ 96	117.5 ~ 133	139 ~ 153	170 ~ 216	210 ~ 244	257	295
L8	142.5 ~ 144	173.5 ~ 189	227 ~ 247	282 ~ 328	322 ~ 356	400	465
C1	60	75	100	140	182	215	240
C2	40(40 ~ 80)	60(60 ~ 130)	80(80 ~ 180)	130(130 ~ 180)	180(180 ~ 220)	220	250
S1	2	3	10	5	6	7	3
S2	22	28	40	70	70	90	105
S3	18	24.5	35	43	59	79.5	90
B	5	6	10	12	16	20	22

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

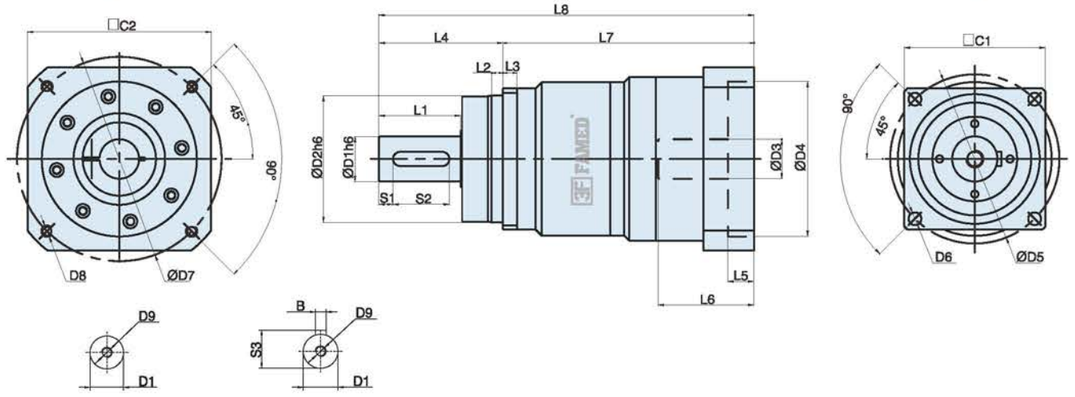
MODEL: VRS

2–Stage

Ratio: 15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 100

Dimensions:

Input



Output shaft type S1　　Output shaft type S2

Output

Unit:mm

Size	VRS060–L2	VRS075–L2	VRS100–L2	VRS140–L2	VRS180–L2	VRS210–L2	VRS240–L2
D1	16	22	32	40	55	75	85
D2	60	70	90	130	160	180	200
D3	8(8 ~ 14)	14(14 ~ 24)	19(19 ~ 28)	24(24 ~ 38)	38(24 ~ 42)	48(48 ~ 55)	48
D4	30(30 ~ 50)	50(50 ~ 110)	50(50 ~ 110)	110(110 ~ 114.3)	114.3(110 ~ 114.3)	200	220
D5	68	85	120	165	215	250	290
D6	4–Ø5.5	4–Ø6.6	4–Ø9	4–Ø11	4–Ø13.5	4–Ø17	4–Ø17
D7	46(45 ~ 70)	70(70 ~ 145)	70(70 ~ 145)	145(145 ~ 200)	200(145 ~ 200)	235	240
D8	M3 ~ M5	M4 ~ M8	M5 ~ M8	M8 ~ M12	M8 ~ M12	M12	M16
D9	M5	M8	M12	M16	M20	M20	M20
L1	28	36	58	82	82	105	130
L2	5	6	8	10	12	15	20
L3	6	7	10	12	15	17	20
L4	48	56	88	112	112	143	170
L5	8 ~ 9	10.5 ~ 16	12 ~ 18.5	6 ~ 8	6 ~ 10	10	12
L6	42.5 ~ 43.5	50.5 ~ 66	61 ~ 68	69 ~ 81	69 ~ 117	116	55
L7	116.5 ~ 117.5	143 ~ 158.5	172 ~ 178	210 ~ 222	236.5 ~ 293.5	257	346
L8	164.5 ~ 165.5	199 ~ 214.5	260 ~ 266	322 ~ 334	348.5 ~ 406.5	400	516
C1	60	75	100	140	182	215	240
C2	40(40 ~ 65)	60(60 ~ 130)	60(60 ~ 130)	130(130 ~ 180)	130(130 ~ 180)	220	250
S1	2	3	10	5	6	7	3
S2	22	28	40	70	70	90	105
S3	18	24.5	35	43	59	79.5	90
B	5	6	10	12	16	20	22

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

European High Precsion High Torque Right Angle Planetary Gearbox

EVS

- 1.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 2.High rigidity & torque
  The use of integral ball bearings greatly improves the rigidity and torque.
- 3.High load capacity
  The main output shaft adopts taper roller bearing to greater increase the radial and axial force.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5. No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

EVS Type

EVS090 – 10 – S1 – P1 / Motor

Reducer Model
EVS062, EVS075, EVS100
EVS142, EVS180

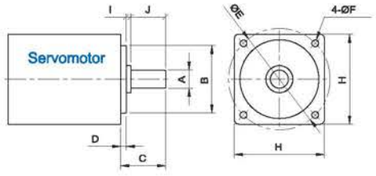
Output Shaft Keyway
S1: Solid Output Shaft No Keyway
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3, 4, 5, 6, 7, 8, 9, 10,12, 14,16, 18, 20
2–stage: 15, 20, 25, 30, 35,40, 50, 60,70, 80
90, 100, 120, 140,160, 180, 200

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type — Model — Ratio — Output Shaft Keyway — Backlash Class — MOTOR NO.

EVS Reducer Specifications

Model No.	Code	Unit	Raito	EVS062	EVS075	EVS100	EVS142	EVS180
Rated Output Torque (Nominal output torque)	T_{2N}	Nm	3	59	165	216	625	1,206
			4	51	146	208	555	1,069
			5	48	155	333	618	1,189
			6	45	150	315	583	1,118
			7	45	142	309	573	1,108
			8	44	141	305	553	1,070
			9	44	140	293	551	1,060
			10	43	138	291	549	1,059
			12	45	150	315	583	1,118
			14	45	142	309	573	1,108
			16	44	141	305	553	1,070
			18	44	140	293	551	1,060
			20	43	138	291	549	1,059
Max. Acceleration Torque	T_{2B}	Nm	3 ~ 20	1.8 Times of Rated Output Torque				
Max. Output Torque Emergency Stop Torque	T_{2NOT}	Nm	3 ~ 20	3 Times of Rated Output Torque				
Rated Input Speed	n_{1N}	rpm	3 ~ 20	3,000	3,000	3,000	3,000	3,000
Max. Input Speed	n_{1B}	rpm	3 ~ 20	6,000	6,000	6,000	5,000	4,000
Backlash Ps		arcmin	3 ~ 20	-	≦2	≦2	≦2	≦2
Backlash P0		arcmin	3 ~ 20	≦4	≦4	≦4	≦4	≦4
Backlash P1		arcmin	3 ~ 20	≦6	≦6	≦6	≦6	≦6
Backlash P2		arcmin	3 ~ 20	≦8	≦8	≦8	≦8	≦8
Torsional Rigidity		Nm/arcmin	3 ~ 20	8	15	27	60	150
Max. Radial Force	F_{2rB}	N	3 ~ 20	2,240	4,150	8,760	12,750	17,860
Max. Axial Force	F_{2aB}	N	3 ~ 20	1,920	3,780	7,500	10,840	15,180
Service Life	L_H	hr	3 ~ 20	S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)				
Efficiency	η	%	3 ~ 20	≧95				
Operating Temperature		℃	3 ~ 20	- 25° C ~ + 90° C				
Lubrication			3 ~ 20	Synthetic Grease				
Protection Class			3 ~ 20	IP65				
Mounting Position			3 ~ 20	Any				
Noise Level		dB	3 ~ 20	≦68	≦70	≦72	≦74	≦76
Weight ±3%		Kg	3 ~ 20	2.7	7.5	10.9	25.6	57.9

Reducer Rotary Inertia

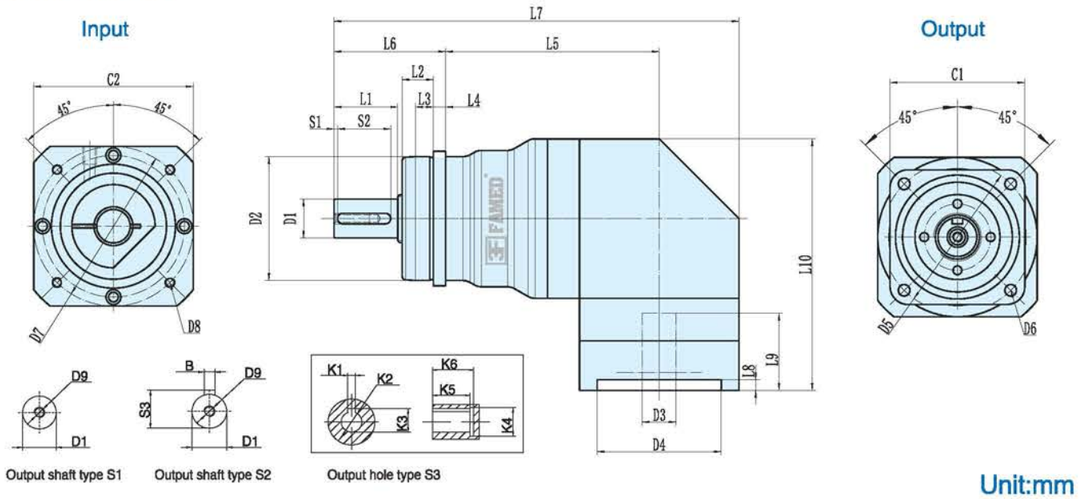
Ratio	EVS062	EVS075	EVS100	EVS142	EVS180
3	0.30	2.11	6.42	18.36	57.65
4	0.28	2.02	5.61	18.02	56.17
5	0.26	2.01	5.42	17.21	55.05
6	0.24	2.00	5.33	16.50	53.44
7	0.24	1.97	5.09	15.85	51.10
8	0.24	1.94	5.06	14.94	49.03
9	0.24	1.94	5.04	14.61	48.08
10	0.24	1.94	5.02	14.02	41.33
12	0.22	1.94	4.98	13.86	41.12
14	0.22	1.94	4.95	13.53	40.50
16	0.21	1.92	4.91	13.03	40.11
18	0.21	1.91	4.87	12.57	39.73
20	0.20	1.88	4.75	12.11	38.65

MODEL： EVS

1–Stage

Ratio： 3, 4, 5, 6, 7, 8, 9, 10, 12, 14,16, 18, 20

Dimensions：



Unit:mm

Size	EVS062–L1	EVS075–L1	EVS100–L1	EVS142–L1	EVS180–L1
D1	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55
D2	ϕ50	ϕ70	ϕ90	ϕ130	ϕ160
D3	ϕ14 (≤19)	ϕ19 (≤24)	ϕ24 (≤35)	ϕ24 (≤42)	ϕ35 (≤42)
D4	ϕ50 (≤70)	ϕ70 (≤110)	ϕ110 (≤114.3)	ϕ110 (≤114.3)	ϕ114.3 (≤180)
D5	ϕ70	ϕ85	ϕ120	ϕ165	ϕ215
D6	4–ϕ5.5	4–ϕ6.6	4–ϕ9	4–ϕ11	4–ϕ13
D7	ϕ70 (≤130)	ϕ90 (≤145)	ϕ145 (≤200)	ϕ145 (≤200)	ϕ200 (≤300)
D8	(4–M4*10L)	(4–M5*12.5L)	(4–M8*20L)	(4–M8*16L)	(4–M12*30L)
D9	M5*12L	M6*15L	M12*25L	M16*36L	M20*42L
L1	28.5	36	56	82	82
L2	18	17.5	27	28	27
L3	10	10	15	10	15
L4	6	7	10	12	15
L5	87	120.5	143.5	163.5	117.5
L6	48	56	88	112	112
L7	171	228.5	299	347.5	394.5
L8	(4)	(6)	(14)	(19)	(10)
L9	(32.5)	(43.5)	(67.5)	(64.5)	(118)
L10	(98)	(142)	(185)	(220)	(276.5)
C1	□62	□76	□100	□140	□180
C2	(□60)	(□90)	(□130)	(□130)	(□180)
S1		2	5	5	6
S2	25	30	40	68	70
S3	18	24.5	35.5	43	59
B	5	6	10	12	16
K1	4	6	8	10	14
K2	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50
K3	12.8	24.5	31.3	42	53.8
K4	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60
K5	15	20	27	35	43
K6	18	24	32	40	50

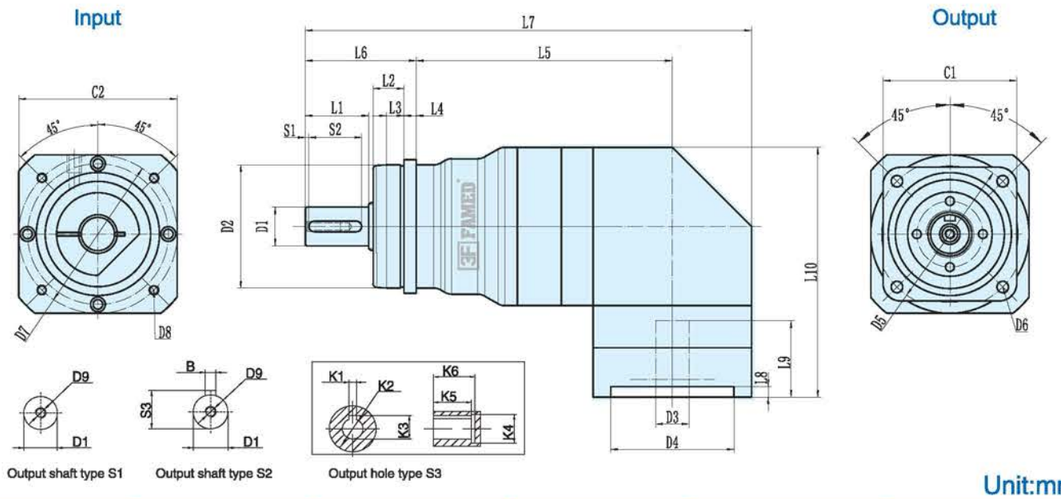
Note 1： Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL： EVS

2–Stage

Ratio： 15, 20, 25, 30, 35, 40, 50, 60,70, 80,90
100, 120, 140, 160, 180, 200

Dimensions：



Unit:mm

Size	EVS062–L2	EVS075–L2	EVS100–L2	EVS142–L2	EVS180–L2
D1	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55
D2	ϕ50	ϕ70	ϕ90	ϕ130	ϕ160
D3	ϕ14 (≤19)	ϕ19 (≤24)	ϕ24 (≤35)	ϕ24 (≤35)	ϕ35 (≤55)
D4	ϕ50 (≤70)	ϕ70 (≤110)	ϕ110 (≤114.3)	ϕ110 (≤114.3)	ϕ114.3 (≤180)
D5	ϕ70	ϕ85	ϕ120	ϕ165	ϕ215
D6	4–ϕ5.5	4–ϕ6.6	4–ϕ9	4–ϕ11	4–ϕ13
D7	ϕ70 (≤130)	ϕ90 (≤145)	ϕ145 (≤200)	ϕ145 (≤200)	ϕ200 (≤300)
D8	(4–M4*10L)	(4–M5*12.5L)	(4–M8*20L)	(4–M8*16L)	(4–M12*30L)
D9	M5*12L	M6*15L	M12*25L	M16*36L	M20*42L
L1	28.5	36	56	82	82
L2	18	17.5	27	28	27
L3	10	10	15	10	15
L4	6	7	10	12	15
L5	103.5	148.5	174.5	194.5	217.5
L6	48	56	88	112	112
L7	187.5	256.5	330	378.5	434.5
L8	(4)	(6)	(14)	(6)	(10)
L9	(32.5)	(43.5)	(67.5)	(55.5)	(118)
L10	(98)	(142)	(185)	(196)	(276.5)
C1	□62	□76	□100	□140	□180
C2	(□60)	(□90)	(□130)	(□130)	(□180)
S1		2	5	5	6
S2	25	30	40	68	70
S3	18	24.5	35.5	43	59
B	5	6	10	12	16
K1	4	6	8	10	14
K2	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50
K3	12.8	24.5	31.3	42	53.8
K4	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60
K5	15	20	27	35	43
K6	18	24	32	40	50

Note 1： Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

High Precsion High Torque Planetary Gearbox

PAB

- The integral structure of the planetary wall frame and the output shaft ensures the maximum torsion rigidity and stability
- The surface of the gear box is treated with electroless Nickel, and the plate is treated with blue anode to improve the tolerance and corrosion resistance of the environment.
- Lowest backlash
- High efficiency 95%
- Life time lubrication

Model Selection of Speed Reducers

PAB Type

PAB090 – 10 – S1 – P1 / Motor

Reducer Model
PAB042, PAB060, PAB090, PAB115
PAB142, PAB180, PAB220, PAB240
PAB280, PAB300

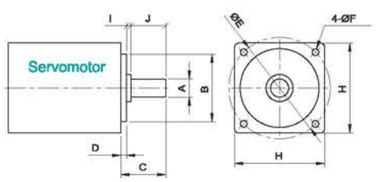
Output Shaft Keyway
S1： Solid Output Shaft No Keyway
S2： Standard (Keyway)
S3： Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage： 3, 4, 5, 6, 7, 8, 9, 10
2–stage： 12, 15, 16, 20, 25, 28, 30, 35, 40, 50, 70, 80, 100

Backlash Grade
P0： High precision backlash
P1： Precision backlash
P2： Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions ：



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

PAB Reducer Specifications

Specs	Unit	Stage	Ratio	PAB042	PAB060	PAB090	PAB115	PAB142	PAB180	PAB220	PAB242	PAB285	PAB330
Rated Output Torque / T2N	Nm	1	3	19	55	130	230	450	950	1220	1900	4230	8200
			4	20	55	160	290	580	1050	2000	3200	5800	10190
			5	21	58	159	330	650	1250	2100	2500	4400	7180
			6	16	48	120	310	600	1100	1350	—	—	—
			7	19	50	148	300	550	1100	1800	1830	3520	9800
			8	13	45	130	260	500	880	1600	1360	2595	4080
			9	12	40	100	220	350	588	1140	—	—	—
			10	15	40	100	208	342	520	1140	1150	1820	5000
		2	12	18	52	130	300	342	588	1220	1820	4230	8200
			15	18	53	130	280	450	950	1650	2420	5620	8200
			16	20	53	158	320	580	1200	2050	3390	6400	10800
			20	20	60	160	320	650	1200	2050	3390	6400	10800
			25	20	60	160	320	650	1200	2100	2650	4710	7550
			28	20	60	150	300	550	1100	1850	2650	4710	7550
			30	18	50	130	230	450	950	1600	1820	4230	7000
			35	20	60	160	390	650	1200	2100	2420	5620	9800
			40	18	50	140	290	542	1100	2000	2650	4710	7550
			50	22	60	160	290	650	1200	2100	2650	4710	7550
			70	19	50	140	280	600	1000	1800	1900	3520	5000
			80	17	43	120	230	500	880	1600	—	—	—
			100	14	40	100	260	342	520	1140	1200	1820	2500
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque									
Rated Input Speed / n_{1N}	rpm	1,2	3~100	4000	4000	4000	3500	3000	2000	2000	1000	1000	1000
Max.Input Speed / n_{1B}	rpm	1,2	3~100	6000	6000	6000	5500	4500	4500	4000	1500	1500	1500
Micro Backlash P0	arcmin	1	3~10	≤1	≤1	≤1	≤1	≤1	≤1	≤1	–	–	–
		2	12~100	≤3	≤3	≤3	≤3	≤3	≤3	≤3	–	–	–
Precision Backlash P1	arcmin	1	3~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3	–	–	–
		2	12~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5	–	–	–
Standard Backlash P2	arcmin	1	3~10	≤5	≤5	≤5	≤5	≤5	≤5	≤5	≤8	≤8	≤8
		2	12~100	≤7	≤7	≤7	≤7	≤7	≤7	≤7	≤10	≤10	≤10
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	7	12	25	50	140	210			
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	780	1300	3200	6750	9400	14500	50000	55000	59000	62000
Max.Axial Force / F_{2a1B}[2]	N	1,2	3~100	330	700	1580	3300	4700	7200	28000	29000	30000	33000
Service Life	hr	1,2	3~100	21000h									
Efficiency / η	%	1	3~10	≥97%									
		2	12~100	≥94%									
Weight	kg	1	3~10	0.5	1.3	3.7	7.8	15	29	52	71	113	245
		2	12~100	0.8	1.48	4.1	9.6	18.9	33	66	75	136	290
Operating Temperature	℃	1,2	3~100	(-15℃ ~ +90℃)									
Lubrication		1,2	3~100	(Synthetic Grease)									
Protection Class		1,2	3~100	IP65									
Mounting Position		1,2	3~100	(Any Direction)									
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	≤63	≤63	≤63	≤65	≤65	≤70	≤70	≤75	≤75	≤75

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	PAB042	PAB060	PAB090	PAB115	PAB142	PAB180	PAB220	PAB242	PAB285	PAB330
Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21	28.98	69.61	70.21	73.29	75.23
			4	0.03	0.14	0.48	2.74	7.54	23.67	54.37	58.21	70.27	73.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27	59.27	70.61	73.29
			6	0.03	0.13	0.45	2.65	7.25	22.75	51.72	53.37	55.72	58.75
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97	51.23	53.97	56.61
			8	0.03	0.13	0.44	2.58	7.07	22.59	50.84	51.72	53.84	56.24
			9	0.03	0.13	0.44	2.57	7.04	22.53	50.63	55.27	58.63	60.54
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56	55.27	58.56	60.72
		2	12~40	0.03	0.03	0.13	0.47	2.71	7.42	23.29	29.20	31.29	24.29
			50~100	0.03	0.03	0.13	0.44	2.57	7.03	22.51	28.20	30.51	35.51

1. The Max. acceleration torque T2B=60% of T2NOT 2. When output speed is 100rpm, inertia acts on the output shaft center position.
3. 3-stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

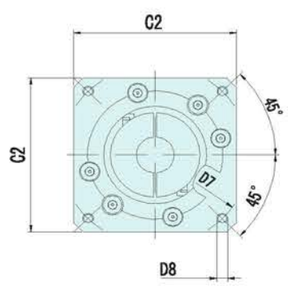
MODEL: PAB

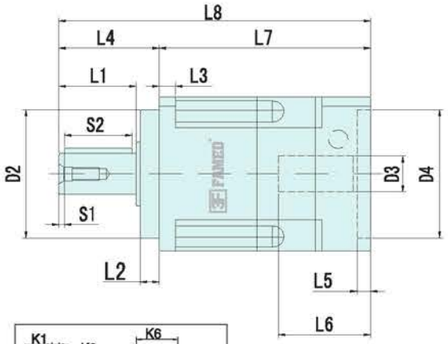
1–Stage

Ratio: 3, 4, 5, 6, 7, 8, 9, 10

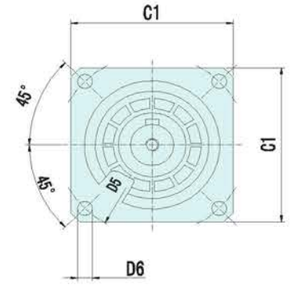
Dimensions:

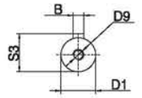
Input

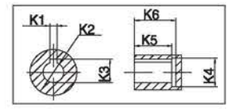




Output







Output shaft type S1 Output shaft type S2 Output hole type S3

Unit:mm

Size	PAB042–L1	PAB060–L1	PAB090–L1	PAB115–L1	PAB142–L1	PAB180–L1	PAB220–L1	PAB242–L1	PAB285–L1	PAB330–L1
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75	ϕ55	ϕ70	ϕ80
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180	ϕ220	ϕ250	ϕ290
D3	ϕ8(≤11)	ϕ14(≤14)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(≤42)	ϕ38(≤50)	ϕ55(≤55)	ϕ42	ϕ55	ϕ60
D4	ϕ30(30–50)	ϕ50(30–70)	ϕ70(50–110)	ϕ110(50–130)	ϕ114.3(95–180)	ϕ180(95–180)	ϕ215(180–255)	ϕ200(114.3–200)	ϕ200	ϕ230
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250	ϕ265	ϕ315	ϕ370
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ6.6	4–ϕ9	4–ϕ11	4–ϕ13	4–ϕ17	4–ϕ18	4–ϕ18	4–ϕ22
D7	ϕ46(22–70)	ϕ70(45–90)	ϕ90(70–145)	ϕ145(70–145)	ϕ200(90–215)	ϕ200(90–300)	ϕ235(200–300)	ϕ200(200–235)	ϕ235	ϕ265
D8	(4–M3X8L)	(4–M5X10L)	(4–M6X12L)	(4–M8X25L)	(4–M12X30L)	(4–M12X30L)	(4–M12X30L)	4–M12	4–M12	4–M12
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2.0P	M20X2.5P	M20X2.5P	M20X40	M16X35	M16X35
L1	19	28.5	36.5	51	79	82	105	105	110	120
L2	5.5	7	10	12	15	20	30	20	20	25
L3	4	6	8	10	12	15	20	22	25	30
L4	26	37	48	65	97	105	138	130	135	150
L5	(4)	(5)	(7)	(11)	(7)	(7)	(12.5)	15	7	10
L6	30	34	45	65	67.5	85	105	118	115	145
L7	(65.5)	(78)	(99)	(135)	(150)	(182)	(226)	262	282	391
L8	(91.5)	(115)	(147)	(200)	(247)	(287)	(365)	392(≤392)	417	541
C1	□42	□60	□90	□115	□142	□180	□220	□242	□285	□330
C2	(□42)	(□60)	(□90)	(□130)	(□142)	(□180)	(□220)	220	285	150
S1	2	2	3	5	5	5	7	5	5	5
S2	16	25	32	40	65	70	90	90	100	110
S3	15	18	24.5	35	43	59	79	74.5	74.5	85
B	5	5	6	10	12	16	20	20	20	22
K1	–	4	6	8	10	14	16	–	–	–
K2	–	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60	–	–	–
K3	–	12.7	25	31.3	42	53.8	64.4	–	–	–
K4	–	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72	–	–	–
K5	–	15	20	27	35	43	60	–	–	–
K6	–	18	24	32	40	50	65	–	–	–

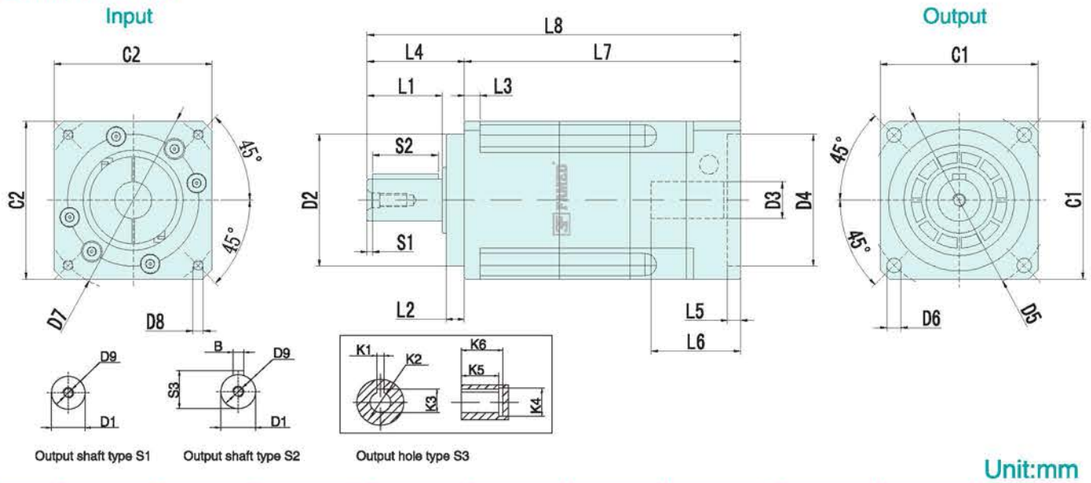
Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL: PAB

2–Stage

Ratio: 12, 15, 16, 20, 25, 28, 30, 35, 40, 50
70, 80, 100

Dimensions:



Unit:mm

Size	PAB042–L2	PAB060–L2	PAB090–L2	PAB115–L2	PAB142–L2	PAB180–L2	PAB220–L2	PAB242–L2	PAB285–L2	PAB330–L2
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75	ϕ55	ϕ70	ϕ80
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180	ϕ220	ϕ250	ϕ290
D3	ϕ8(≤11)	ϕ14(≤14)	ϕ19	ϕ24(≤32)	ϕ35(≤42)	ϕ38(≤50)	ϕ55(≤55)	ϕ38(≤42)	ϕ42	ϕ42
D4	ϕ30(30–50)	ϕ50(30–70)	ϕ70	ϕ110(50–130)	ϕ114.3(95–180)	ϕ180(95–180)	ϕ215(180–255)	ϕ200(114.3–200)	ϕ200(114.3–200)	ϕ200(114.3–200)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250	ϕ265	ϕ315	ϕ370
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ6.6	4–ϕ9	4–ϕ11	4–ϕ13	4–ϕ17	4–ϕ18	4–ϕ18	4–ϕ22
D7	ϕ46(22–70)	ϕ70(45–90)	ϕ90	ϕ145(70–145)	ϕ200(90–215)	ϕ200(90–300)	ϕ235(200–300)	ϕ200(200–235)	ϕ200(200–235)	ϕ200(200–235)
D8	(4–M3X8L)	(4–M5X10L)	(4–M6X12L)	(4–M8X25L)	(4–M12X30L)	(4–M12X30L)	(4–M12X30L)	4–M12	4–M12	4–M12
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2.0P	M20X2.5P	M20X2.5P	M20X40	M16X35	M16X35
L1	19	28.5	36.5	51	79	82	105	105	110	120
L2	5.5	7	10	12	15	20	30	20	20	25
L3	4	6	8	10	12	15	20	22	25	30
L4	26	37	48	65	97	105	138	130	135	150
L5	(4)	(5)	(7)	(11)	(7)	(7)	(12.5)	7	15	15
L6	25	34	45	65	67.5	85	105	120(≤120)	118	118
L7	(93)	(117)	(144)	(161)	(196)	(232)	(277)	325	402.5	459
L8	(114)	(154)	(192)	(226)	(293)	(337)	(415)	455(≤455)	537.5	609
C1	□42	□60	□90	□115	□142	□180	□220	□242	□285	□330
C2	(□42)	(□60)	(□90)	(□130)	(□142)	(□180)	(□220)	180(≤180)	220	220
S1	2	2	3	5	5	5	7	5	5	5
S2	16	25	32	40	65	70	90	90	100	110
S3	15	18	24.5	35	43	59	79	74.5	74.5	85
B	5	5	6	10	12	16	20	20	20	22
K1	–	4	6	8	10	14	16	–	–	–
K2	–	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60	–	–	–
K3	–	12.7	25	31.3	42	53.8	64.4	–	–	–
K4	–	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72	–	–	–
K5	–	15	20	27	35	43	60	–	–	–
K6	–	18	24	32	40	50	65	–	–	–

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

High Precision High Torque Right Angle Planetary Gearbox

PAR

- 1. Space–saving
  The straight cross reducer uses spiral bevel gear. The installation of the motor can achieve 90 degree bending and save the installation space.
- 2. High rigidity & torqueThe use of integral needle roller bearings greatly improves the rigidity and torque.
- 3. Connector and shaft sleeve mode
  It can be installed on any motor in the world.
- 4. No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 5. Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

PAR Type

PAR090 – 10 – S1 – P1 / Motor

Reducer Model
PAR042, PAR060, PAR090, PAR115
PAR142, PAR180, PAR220, PAR240
PAR280, PAR300

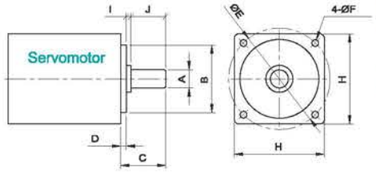
Output Shaft Keyway
S1: Solid Output Shaft No Keyway
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3, 4, 5, 6, 7, 8, 9, 10
2–stage: 15, 20, 25, 30, 35, 40, 50, 70,
80, 100, 120, 140, 160, 180, 200

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type — Model — Ratio — Output Shaft Keyway — Backlash Class — MOTOR NO.

PAR Reducer Specifications

Specs	Unit	Stage	Ratio	PAR042	PAR060	PAR090	PAR115	PAR142	PAR180	PAR220
Rated Output Torque / T2N	Nm	1	3	19	55	130	230	450	950	1220
			4	20	55	160	290	580	1050	2000
			5	21	58	159	330	650	1250	2100
			6	16	48	120	310	600	1100	1350
			7	19	50	148	300	550	1100	1800
			8	13	45	130	260	500	880	1600
			9	12	40	100	220	350	588	1140
			10	15	40	100	208	342	520	1140
			14	18	50	130	300	550	1100	1800
			20	15	40	130	208	342	520	1140
		2	15	20	55	130	320	650	1200	2050
			20	20	60	160	320	650	1200	2100
			25	20	60	150	300	550	1100	1850
			30	18	50	130	230	450	950	1600
			35	20	60	160	390	650	1200	2100
			40	18	50	140	290	542	1100	2000
			50	18	60	160	290	650	1200	2100
			70	16	50	140	280	600	1000	1800
			80	10	43	120	230	500	880	1600
			100	10	40	100	260	342	520	1140
			120	—	—	130	310	500	1100	1900
			140	—	—	130	300	530	1100	1800
			160	—	—	120	260	520	1000	1600
			180	—	—	100	230	450	900	1500
			200	—	—	100	230	450	900	1500
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~200	3Times of Nominal Output Torque						
Rated Input Speed / n_{1N}	rpm	1,2	3~200	3000	3000	3000	3000	2500	2000	2000
Max.Input Speed / n_{1S}	rpm	1,2	3~200	6000	6000	6000	5500	4500	4500	4000
Precision Backlash P0	arcmin	1	3~20	≤1	≤1	≤1	≤1	≤1	≤1	≤1
		2	15~200	≤3	≤3	≤3	≤3	≤3	≤3	≤3
Precision Backlash P1	arcmin	1	3~20	≤3	≤3	≤3	≤3	≤3	≤3	≤3
		2	15~200	≤5	≤5	≤5	≤5	≤5	≤5	≤5
Standard Backlash P2	arcmin	1	3~20	≤5	≤5	≤5	≤5	≤5	≤5	≤5
		2	15~200	≤7	≤7	≤7	≤7	≤7	≤7	≤7
Torsional Rigidity	Nm/arcmin	1,2	3~200	3	6	14	25	56	140	220
Max.Radial Force / F_{2rs}[2]	N	1,2	3~200	780	1300	3200	6750	9400	14500	50000
Max.Axial Force / F_{2aS}[2]	N	1,2	3~200	330	700	1580	3300	4700	7200	28000
Service Life	hr	1,2	3~200	21000 h						
Efficiency / η	%	1	3~20	≥93%						
		2	25~200	≥90%						
Weight	kg	1	3~20	0.9	1.5	6.4	13	24.5	51	83
		2	25~200	1.2	2.1	7.8	14.2	27.5	54	95
Operating Temperature	℃	1,2	3~200	(-15℃ ~ +90℃)						
Lubrication		1,2	3~200	(Synthetic Grease)						
Protection Class		1,2	3~200	IP65						
Mounting Position		1,2	3~200	(Any Direction)						
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~200	≤65	≤65	≤68	≤68	≤70	≤72	≤74

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	PAR042	PAR060	PAR090	PAR115	PAR142	PAR180	PAR220
Moment of Inertia	$kg.cm^2$	1	3~10	0.09	0.35	2.25	6.84	23.4	68.9	135.4
			14~20	0.03	0.07	1.87	6.25	21.8	65.6	119.8
		2	15~100	0.09	0.09	0.35	2.25	6.84	23.4	68.9
			120~200	—	—	0.31	1.87	6.25	21.8	65.6

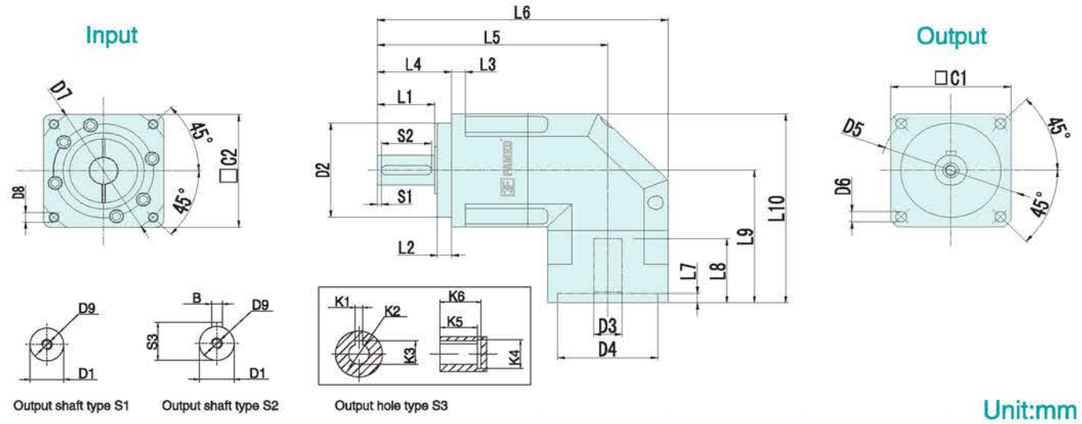
1. The Max. acceleration torque T2B=60% of T2NOT 2. When output speed is 100rpm, inertia acts on the output shaft center position.
3. 3-stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

MODEL: PAR

1–Stage

Ratio: 3, 4, 5, 6, 7, 8, 9, 10, 14, 16, 20

Dimensions:



Unit:mm

Size	PAR042–L1	PAR060–L1	PAR090–L1	PAR115–L1	PAR142–L1	PAR180–L1	PAR220–L1
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8(≤11)	ϕ14(≤14)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(≤42)	ϕ38(≤50)	ϕ55(≤55)
D4	ϕ30(30–50)	ϕ50(30–70)	ϕ70(50–110)	ϕ110(50–130)	ϕ114.3(95–180)	ϕ180(95–180)	ϕ215(180–255)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ6.6	4–ϕ9	4–ϕ11	4–ϕ13	4–ϕ17
D7	ϕ46(22–70)	ϕ70(45–90)	ϕ90(70–145)	ϕ145(70–145)	ϕ200(90–215)	ϕ200(90–300)	ϕ235(200–300)
D8	(4–M3X8L)	(4–M5X10L)	(4–M6X12L)	(4–M8X25L)	(4–M12X30L)	(4–M12X30L)	(4–M12X30L)
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2.0P	M20X2.5P	M20X2.5P
L1	19	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	96	117	175	227	255	289	346
L6	(122)	(154)	(223)	(292)	(352)	(394)	(484)
L7	(3.5)	(5)	(5)	(11)	(14)	(15)	(7)
L8	(30)	(34)	(44)	(60)	(81)	(85)	(85)
L9	(69.5)	(81.5)	(107.5)	(134)	(165)	(213.5)	(268.5)
L10	(95.5)	(110.5)	(158)	(199)	(230)	(303.5)	(378.5)
C1	□42	□60	□90	□115	□142	□180	□220
C2	(□42)	(□60)	(□90)	(□130)	(□142)	(□180)	(□220)
S1	2	2	2	5	5	5	7
S2	16	25	32	40	65	70	90
S3	15	18	24.5	35	43	59	79
B	5	5	6	10	12	16	20
K1	–	4	6	8	10	14	16
K2	–	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	–	12.7	25	31.3	42	53.8	64.4
K4	–	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	–	15	20	27	35	43	60
K6	–	18	24	32	40	50	65

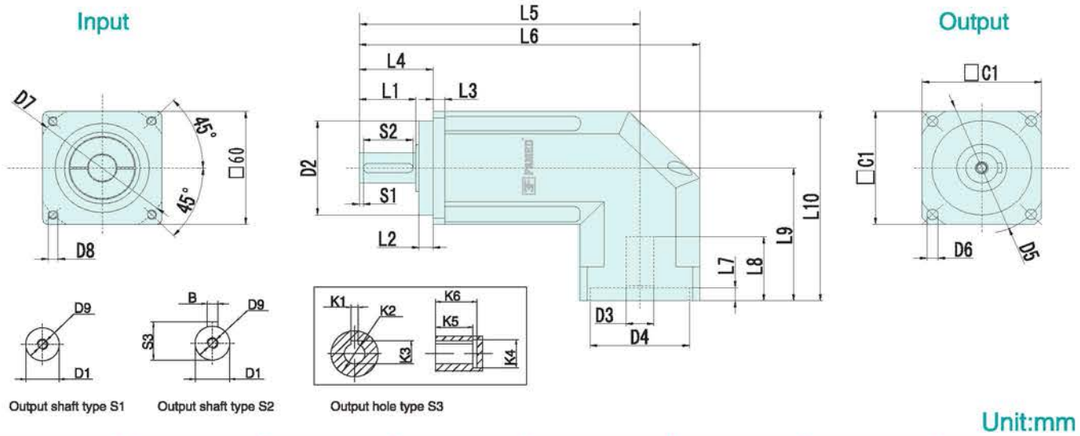
Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL: PAR

2-Stage

Ratio: 15, 20, 25, 30, 35, 40, 50, 70, 80, 100 , 120, 140, 160, 180, 200

Dimensions:



Unit:mm

Size	PAR042-L2	PAR060-L2	PAR090-L2	PAR115-L2	PAR142-L2	PAR180-L2	PAR220-L2
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8(≤11)	ϕ14(≤14)	ϕ14	ϕ24(≤32)	ϕ35(≤42)	ϕ38(≤50)	ϕ55(≤55)
D4	ϕ30(30-50)	ϕ50(30-70)	ϕ50	ϕ110(50-130)	ϕ114.3(95-180)	ϕ180(95-180)	ϕ215(180-255)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4-ϕ3.4	4-ϕ5.5	4-ϕ6.6	4-ϕ9	4-ϕ11	4-ϕ13	4-ϕ17
D7	ϕ46(22-70)	ϕ70(45-90)	ϕ70	ϕ145(70-145)	ϕ200(90-215)	ϕ200(90-300)	ϕ235(200-300)
D8	(4-M3X8L)	(4-M5X10L)	(4-M5X12L)	(4-M8X25L)	(4-M12X30L)	(4-M12X30L)	(4-M12X30L)
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2.0P	M20X2.5P	M20X2.5P
L1	19	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	113	134	157	224	282	322	383
L6	139	171	205	(292)	(378)	(427)	(521)
L7	(3.5)	(5)	(5)	(11)	(14)	(15)	(7)
L8	(30)	(34)	(44)	(60)	(81)	(85)	(85)
L9	(69.5)	(81.5)	(107.5)	(134)	(165)	(213.5)	(268.5)
L10	(90.5)	(111.5)	(152.5)	(191.5)	(236)	(303.5)	(378.5)
C1	□42	□60	□90	□115	□142	□180	□220
C2	(□42)	(□60)	(□90)	(□130)	(□142)	(□180)	(□220)
S1	2	2	2	5	5	5	7
S2	16	25	32	40	65	70	90
S3	15	18	24.5	35	43	59	79
B	5	5	6	10	12	16	20
K1	-	4	6	8	10	14	16
K2	-	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	-	12.7	25	31.3	42	53.8	64.4
K4	-	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	-	15	20	27	35	43	60
K6	-	18	24	32	40	50	65

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

Precision Planetary Gearbox

VRSF

- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

VRST Type

VRST080 - 10 - S1 - P1 / Motro

Reducer Model
VRSF060, VRSF080
VRSF100, VRSF125

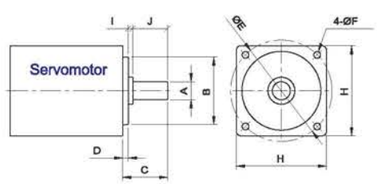
Output Shaft Keyway
S1: Solid Output Shaft No Keyway
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1-stage: 3, 4 , 5, 7, 10
2-stage: 15, 20, 25, 30, 35, 40, 50, 70, 100

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

VRSF Reducer Specifications

Specs	Unit	Stage	Ratio	VRSF060	VRSF080	VRSF100	VRSF125
Rated Output Torque / T2N	Nm	1	3	54	112	165	286
			4	48	110	146	255
			5	45	108	160	264
			7	41	105	149	245
			10	40	100	141	234
		2	15	54	112	165	286
			20	48	110	146	255
			25	45	108	160	264
			30	41	112	165	286
			35	41	105	149	245
			40	39	110	146	255
			50	45	108	160	264
			70	41	105	149	245
			100	40	100	141	234
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque			
Rated Input Speed / n_{1N}	rpm	1,2	3~100	3000	3000	3000	3000
Max.Input Speed / n_{1B}	rpm	1,2	3~100	5000	5000	5000	5000
Precision Backlash P1	arcmin	1	3~10	≤5	≤5	≤5	≤5
		2	12~100	≤7	≤7	≤7	≤7
Standard Backlash P2	arcmin	1	3~10	≤8	≤8	≤8	≤8
		2	12~100	≤10	≤10	≤10	≤10
Torsional Rigidity	Nm/arcmin	1,2	3~100	5	12	14	23
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	800	1200	3200	5220
Max.Axial Force / F_{2aB}[2]	N	1,2	3~100	400	600	1600	2600
Service Life	hr	1,2	3~100	21000 h			
Efficiency / η	%	1	3~10	≥97%			
		2	15~100	≥94%			
Weight	kg	1	3~10	1.2	1.6	3.76	7.43
		2	15~100	2.1	2.8	5.92	10.3
Operating Temperature	℃	1,2	3~100	-25℃~+90℃			
Lubrication		1,2	3~100	Synthetic Grease			
Protection Class		1,2	3~100	Any Direction			
Mounting Position		1,2	3~100				
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	≤60	≤62	≤65	≤67

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	VRSF060	VRSF080	VRSF100	VRSF125
Moment of Inertia	$kg.cm^2$	1	3	0.16	0.61	3.25	9.21
			4	0.14	0.48	2.74	7.54
			5	0.13	0.47	2.71	7.42
			6	0.13	0.45	2.65	7.25
			7	0.13	0.45	2.62	7.14
			8	0.13	0.44	2.58	7.07
			9	0.13	0.44	2.57	7.04
			10	0.13	0.44	2.57	7.03
		2	12–40	0.03	0.13	0.47	2.71
			50–100	0.03	0.13	0.44	2.57

1. Ratio (i=Nin/Nout) 2. The Max. acceleration torque T2B=60% of T2NOT

3. When output speed is 100rpm, inertia acts on the output shaft center position.continuous operation, service life is 15000hrs.

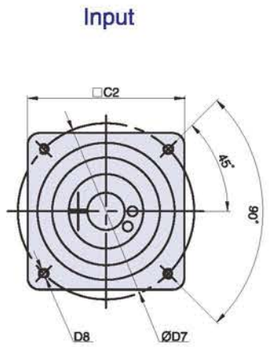
MODEL: VRSF

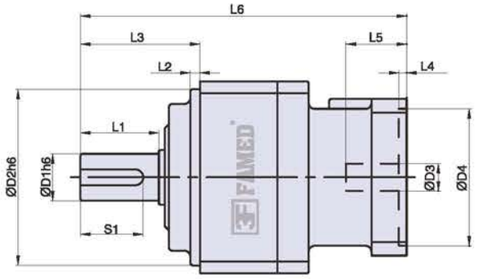
1–Stage

Ratio: 3, 4, 5, 7, 10

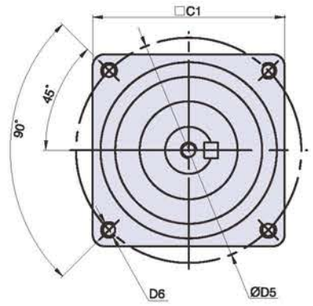
Dimensions

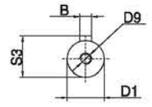
Input





Output





Output shaft type S1 Output shaft type S2

Unit:mm

Size	VRSF060–L1	VRSF080–L1	VRSF100–L1	VRSF125–L1
D1	12	19	24	32
D2	50	70	90	110
D3	8(8 ~ 14)	14(14 ~ 19)	19	22(22 ~ 24)
D4	30(30 ~ 50)	50(50 ~ 70)	70	110
D5	60	90	115	135
D6	M5	M6	M8	M10
D7	45(45 ~ 70)	70(70 ~ 90)	90	145
D8	M4 ~ M5	M4 ~ M5	M6	M8
D9	M4	M6	M8	M12
L1	20	30	40	55
L2	3	3	5	5
L3	32	50	61	75
L4	4	4	4	8
L5	27 ~ 32	32	38	65.5
L6	109	143.5 ~ 148.5	177	215.5
C1	52	78	98	125
C2	40(40 ~ 52)	60(60 ~ 80)	90	125(125 ~ 130)
S1	18	22	32	52
S2	13.5	21.5	27	35
B	4	6	6	10

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.

Note 2: The reducer output shaft size and length can be customized for customers.

Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

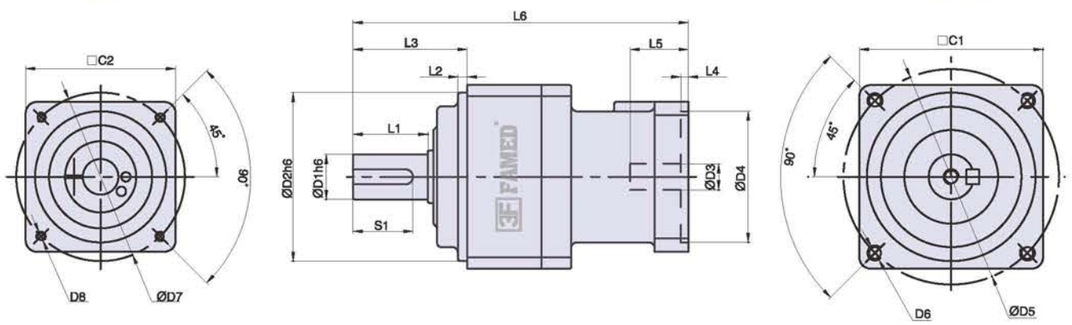
MODEL： VRSF

2–Stage

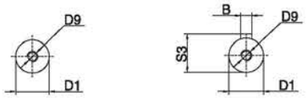
Ratio：15，20，25，30，35，40，50，70，100

Dimensions：

Input



Output



Output shaft type S1

Output shaft type S2

Unit:mm

Size	VRSF060–L2	VRSF080–L2	VRSF100–L2	VRSF125–L2
D1	12	19	24	32
D2	50	70	90	110
D3	11(11 ~ 14)	14(14 ~ 19)	14 ~ 19	22(22 ~ 24)
D4	50	50(50 ~ 70)	50(50 ~ 70)	110
D5	60	90	115	135
D6	M5	M6	M8	M10
D7	45(45 ~ 70)	70(70 ~ 90)	70 ~ 90	145
D8	M4 ~ M5	M4 ~ M5	M4 ~ M5	M8
D9	M4	M6	M8	M12
L1	20	30	40	55
L2	3	3	5	5
L3	32	50	61	75
L4	4	4	4	8
L5	32	32	38	65.5
L6	109	150 ~ 155	165 ~ 179	250.5
C1	52	78	98	125
C2	52	60(60 ~ 80)	60(60 ~ 80)	125(125 ~ 130)
S1	18	22	32	52
S2	13.5	21.5	27	35
B	4	6	8	10

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

Precision Planetary Gearbox

FB

- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

FB Type

FB090 – 10 – S1 – P1 / Motor

Reducer Model
FB040，FB060，FB090
FB120，FB160

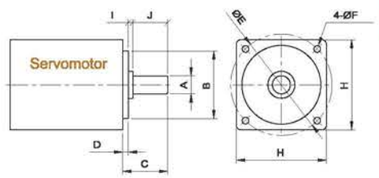
Output Shaft Keyway
S1：Solid Output Shaft No Keyway
S2：Standard (Keyway)
S3：Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage：3,4,5,6,7,8,9,10
2–stage：12,15,16,20,25,28,30,35,40,50,70,80,100
3–stage：60,64,72,80,90,100,120,144,150,160,180,200,
240,258,288,320,384,512,600,800,1000

Backlash Grade
P0：High precision backlash
P1：Precision backlash
P2：Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions：



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

FB Reducer Specifications

Specs	Unit	Stage	Ratio	FB040	FB060	FB090	FB120	FB160
Rated Output Torque / T2N	Nm	1	3	16	45	125	245	615
			4	17	50	135	298	650
			5	18	55	150	300	688
			7	15	50	145	245	645
			10	13	45	135	205	498
		2	15	16	45	120	198	615
			20	16	50	135	245	650
			25	18	55	150	300	688
			30	14	45	125	245	615
			35	18	55	150	300	688
			40	13	50	135	298	650
			50	17	55	140	265	688
			70	14	45	130	256	645
			100	13	40	115	205	498
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque				
Rated Input Speed / n_{1N}	rpm	1,2	3~100	3000	3000	3000	3000	2500
Max.Input Speed / n_{1B}	rpm	1,2	3~100	5000	5000	5000	5000	3600
Precision Backlash P1	arcmin	1	3~10	≤3	≤3	≤3	≤3	≤3
		2	12~100	≤5	≤5	≤5	≤5	≤5
Standard Backlash P2	arcmin	1	3~10	≤5	≤5	≤5	≤5	≤5
		2	12~100	≤7	≤7	≤7	≤7	≤7
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	22	50
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	320	460	1300	3200	6520
Max.Axial Force / F_{2xB}[2]	N	1,2	3~100	160	230	660	1600	3260
Service Life	hr	1,2	3~100	20000 h				
Efficiency / η	%	1	3~10	≥97%				
		2	15~100	≥94%				
Weight	kg	1	3~10	0.73	0.99	2.1	4.98	18.2
		2	15~100	1.05	1.46	3.2	6.92	24.9
Operating Temperature	℃	1,2	3~100	-25℃~+90℃				
Lubrication		1,2	3~100	Synthetic Grease				
Protection Class		1,2	3~100	IP65				
Mounting Position		1,2	3~100	Any				
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	≤62	≤63	≤65	≤67	≤68

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	FB040	FB060	FB090	FB120	FB160
Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21
			4	0.03	0.14	0.48	2.74	7.54
			5	0.03	0.13	0.47	2.71	7.42
			7	0.03	0.13	0.45	2.65	7.25
			10	0.03	0.13	0.45	2.62	7.14
		2	12–40	0.03	0.13	0.44	2.58	7.07
			50–100	0.03	0.13	0.44	2.57	7.04

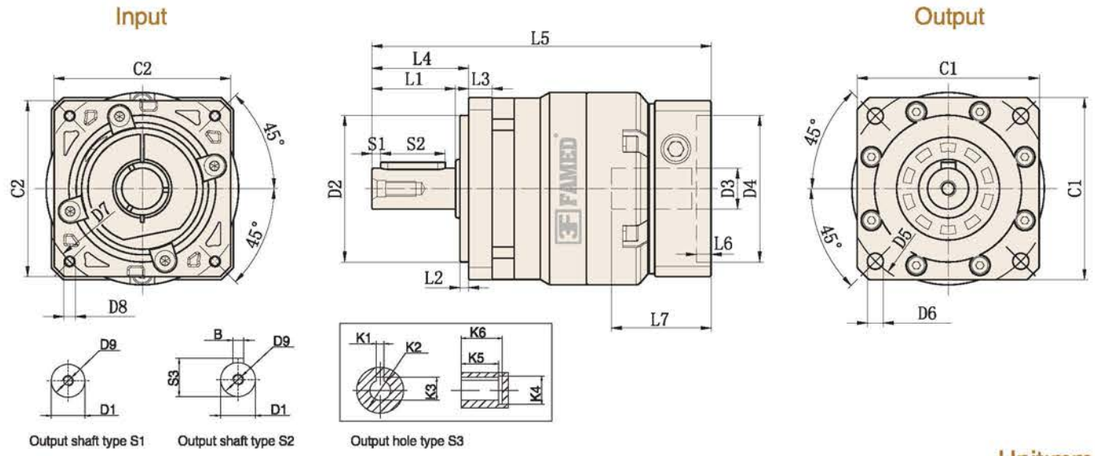
1. Ratio (i=Nin/Nout) 2. Output revolutions 100rpm, acting on the output shaft center position.
3. *Continuous operation, service life is 10000hrs.

MODEL: FB

1–Stage

Ratio: 3, 4, 5, 6, 7, 8, 9, 10

Dimensions:



Unit:mm

Size	FB040–L1	FB060–L1	FB090–L1	FB120–L1	FB160–L1
D1	ϕ12(13)	ϕ14(16)	ϕ20(22)	ϕ25(32)	ϕ40
D2	ϕ26	ϕ50	ϕ80	ϕ110	ϕ130
D3	ϕ8(≤11)	ϕ14(≤19)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(42)
D4	ϕ30(30–50)	ϕ50 (50–70)	ϕ70 (50–110)	ϕ110(70–130)	ϕ114.3(110–150)
D5	ϕ48	ϕ70	ϕ100	ϕ130	ϕ185(165)
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ7	4–ϕ9	4–ϕ11
D7	ϕ46(45–70)	ϕ70 (70–130)	ϕ90 (70–145)	ϕ145(90–165)	ϕ200(145–220)
D8	(4–M4X8L)	(4–M4*10L)	(4–M5*12L)	(4–M8X25L)	(4–M12X25L)
D9	M4X0.7P	M5*0.8P*15L	M6*1.0P*16.5L	M10X1.5P	M16X2.0P
L1	18	28.5	36.5	50	80
L2	3	3	3	4	5
L3	4	8	10	15	16
L4	22.5	33	40.5	55	87
L5	(5)	(115.5)	(147)	(8)	(7)
L6	(32)	(5)	(6.5)	(59)	(86)
L7	(88)	(34)	(42)	(211)	(292)
C1	□45	□62	□90	□124	□175
C2	(□50)	(□60)	(□80)	(□120)	(□176)
S1	2	3	4	5	8
S2	14	22	28	40	65
S3	13.5	16	22.5	28	43
B	4	5	6	8	12
K1	–	3	6	8	10
K2	–	ϕ8	ϕ18	ϕ25	ϕ35
K3	–	9.2	21	28	38.3
K4	–	ϕ11	ϕ24	ϕ32	ϕ42
K5	–	20	30	40	52
K6	–	24	35	48	58

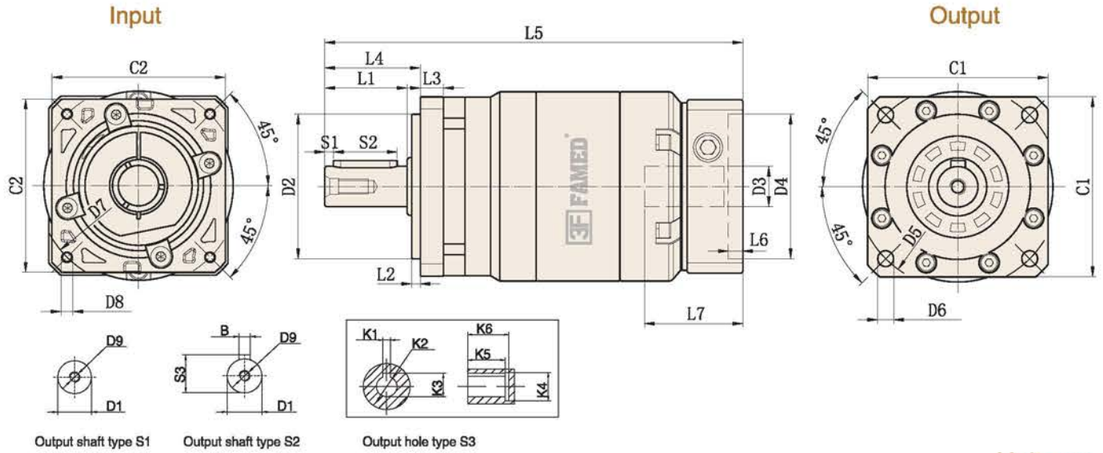
Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL: FB

2–Stage

Ratio: 12, 15, 16, 20, 25, 28, 30, 35, 40, 50
70, 80, 100

Dimensions:



Unit:mm

Size	FB040–L2	FB060–L2	FB090–L2	FB120–L2	FB160–L2
D1	ϕ12(13)	ϕ14(16)	ϕ20(22)	ϕ25(32)	ϕ40
D2	ϕ26	ϕ50	ϕ80	ϕ110	ϕ130
D3	ϕ8(≤11)	ϕ14(≤19)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(42)
D4	ϕ30(30–50)	ϕ50 (50–70)	ϕ70 (50–110)	ϕ110 (70–130)	ϕ114.3(110–150)
D5	ϕ48	ϕ70	ϕ100	ϕ130	ϕ185(165)
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ7	4–ϕ9	4–ϕ11
D7	ϕ46(45–70)	ϕ70 (70–130)	ϕ90 (70–145)	ϕ145 (90–165)	ϕ200(145–220)
D8	(4–M4X8L)	(4–M4*10L)	(4–M5*12L)	(4–M8*20L)	(4–M12X25L)
D9	M4X0.7P	M5*0.8P*15L	M6*1.0P*16.5L	M10*1.5P*23L	M16X2.0P
L1	18	28.5	36.5	50	80
L2	3	3	3	4	5
L3	4	8	10	15	16
L4	22.5	33	40.5	55	87
L5	(5)	(144.5)	(177.5)	(232.5)	(7)
L6	(32)	(5)	(6.5)	(11)	(86)
L7	(105)	(34)	(42)	(59)	(295)
C1	□45	□62	□90	□120	□175
C2	(□50)	(□60)	(□80)	(□130)	(□176)
S1	2	3	4	5	8
S2	14	22	28	40	65
S3	13.5	16	22.5	28	43
B	4	5	6	8	12
K1	–	3	6	8	10
K2	–	ϕ8	ϕ18	ϕ25	ϕ35
K3	–	9.2	21	28	38.3
K4	–	ϕ11	ϕ24	ϕ32	ϕ42
K5	–	20	30	40	52
K6	–	24	35	48	58

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

Precision Right Angle Planetary Gearbox

FBR

- 1. Space–saving
  The straight cross reducer uses spiral bevel gear. The installation of the motor can achieve 90 degree bending and save the installation space.
- 2.High rigidity & torque
  The use of integral ball bearings greatly improves the rigidity and torque.
- 3. Connector and shaft sleeve mode
  It can be installed on any motor in the world.
- 4. No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 5.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

FBR Type

FBR090 – 10 – S1 – P1 / Motor

Reducer Model
FBR040, FBR060, FBR090
FBR120, FBR160

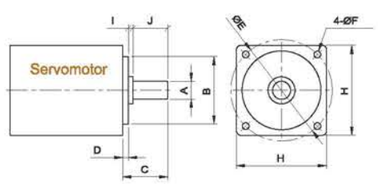
Output Shaft Keyway
S1: Solid Output Shaft No Keyway
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3,4,5,6,7,8,9,10
2–stage: 12,15,16,20,25,28,30,35,40,50,70,80,100
3–stage: 60,64,72,80,90,100,120,144,150,160,180,200
240,258,288,320,384,512,600,800,1000

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

FBR Reducer Specifications

Specs	Unit	Stage	Ratio	FBR040	FBR060	FBR090	FBR120	FBR160
Rated Output Torque / T2N	Nm	1	3	16	45	125	245	615
			4	17	50	135	298	650
			5	18	55	150	300	688
			7	15	50	145	245	645
			10	13	45	135	205	498
		2	15	16	45	120	198	615
			20	16	50	135	245	650
			25	18	55	150	300	688
			30	14	45	125	245	615
			35	18	55	150	300	688
			40	13	50	135	298	650
			50	17	55	140	265	688
			70	14	45	130	256	645
			100	13	40	115	205	498
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque				
Rated Input Speed / n_{1N}	rpm	1,2	3~100	3000	3000	3000	3000	2500
Max.Input Speed / n_{1B}	rpm	1,2	3~100	5000	5000	5000	5000	3600
Precision Backlash P1	arcmin	1	3~10	≤8	≤8	≤8	≤8	≤8
		2	12~100	≤10	≤10	≤10	≤10	≤10
Standard Backlash P2	arcmin	1	3~10	≤11	≤11	≤11	≤11	≤11
		2	12~100	≤13	≤13	≤13	≤13	≤13
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	22	50
Max.Radial Force / F_{2R}[2]	N	1,2	3~100	320	460	1300	3200	6520
Max.Axial Force / F_{2A}[2]	N	1,2	3~100	160	230	660	1600	3260
Service Life	hr	1,2	3~100	20000 h				
Efficiency / η	%	1	3~10	≥97%				
		2	15~100	≥94%				
Weight	kg	1	3~10	0.73	0.99	2.1	4.98	18.2
		2	15~100	1.05	1.46	3.2	6.92	24.9
Operating Temperature	℃	1,2	3~100	-25℃~+90℃				
Lubrication		1,2	3~100	Synthetic Grease				
Protection Class		1,2	3~100	IP65				
Mounting Position		1,2	3~100	Any Direction				
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	≤62	≤63	≤65	≤67	≤68

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	FBR040	FBR060	FBR090	FBR120	FBR160
Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21
			4	0.03	0.14	0.48	2.74	7.54
			5	0.03	0.13	0.47	2.71	7.42
			7	0.03	0.13	0.45	2.65	7.25
			10	0.03	0.13	0.45	2.62	7.14
		2	12-40	0.03	0.13	0.44	2.58	7.07
			50-100	0.03	0.13	0.44	2.57	7.04

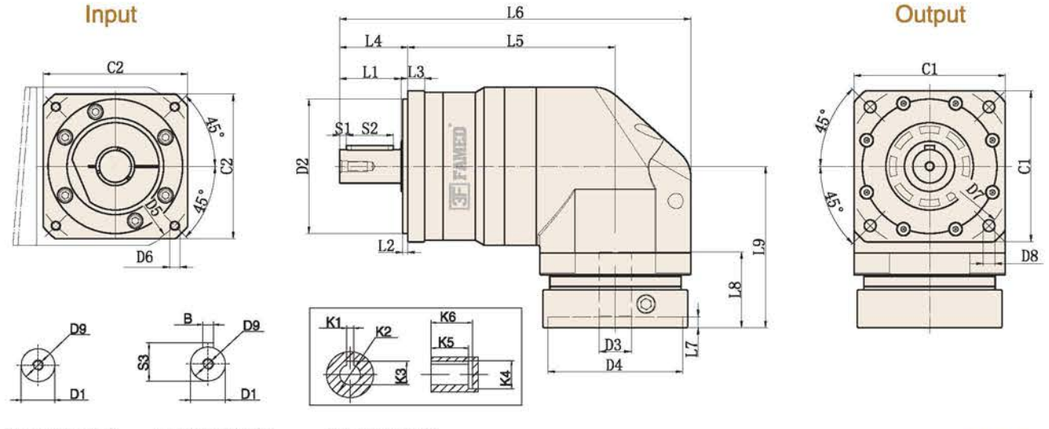
1. The Max. acceleration torque T2B=60% 2.When output speed is 100rpm, acting on the output shaft center position
3. 3-stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

MODEL: FBR

1-Stage

Ratio: 3, 4, 5, 6, 7, 8, 9, 10

Dimensions:



Unit:mm

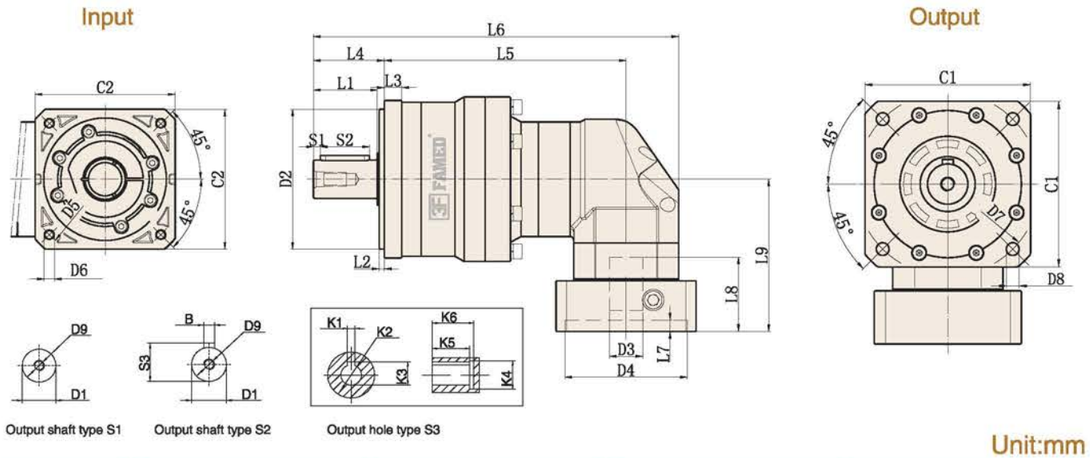
Size	FBR060-L1	FBR090-L1	FBR120-L1	FBR160-L1
D1	ϕ14	ϕ20 (22)	ϕ25	ϕ40
D2	ϕ50	ϕ80	ϕ110	ϕ130
D3	ϕ14(6.35-19)	ϕ19 (ϕ11-24)	ϕ22(16-24)	ϕ35 (ϕ22-38)
D4	ϕ50 (50-70)	ϕ80 (50-110)	ϕ80 (50-110)	ϕ114.3 (ϕ110-114.3)
D5	ϕ70 (70-130)	ϕ100 (70-145)	ϕ145 (90-155)	ϕ200 (ϕ145-200)
D6	(4-M4*10L)	(4-M6*14L)	(4-M8*20L)	4-M12 (M8-M12)
D7	ϕ70	ϕ100	ϕ130	ϕ185
D8	4-ϕ5.5	4-ϕ7	4-ϕ9	4-ϕ11
D9	M5*0.8P*15L	M6*1.0P*16.5L	M10*1.5P*23L	M16X2P
L1	28.5	36.5	50	87
L2	3	3	4	78
L3	8	10	15	5
L4	33	40.5	55	20
L5	90	123.5	146.5	111
L6	153	209	259	295
L7	(5)	(6.5)	(10)	5 (5-7)
L8	(33)	(45)	(64)	86 (62-86)
L9	(77.5)	(96)	(135.5)	165.5 (165.5-189.5)
C1	□62	□90	□120	□160
C2	(□60)	(□86)	(□130)	□175 (142)
S1	3	4	5	5
S2	22	28	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	3	6	8	10
K2	ϕ8	ϕ18	ϕ28	ϕ38
K3	9.2	21	31.3	41.3
K4	ϕ11	ϕ24	ϕ38	ϕ48
K5	20	30	27	35
K6	24	35	32	40

MODEL: FBR

2–Stage

Ratio: 12, 15, 16, 20, 25, 28, 30, 35, 40, 50
70, 80, 100

Dimensions:



Unit:mm

Size	FBR060–L2	FBR090–L2	FBR120–L2	FBR160–L2
D1	ϕ14	ϕ20 (22)	ϕ25 (32)	ϕ40
D2	ϕ50	ϕ80	ϕ110	ϕ130
D3	ϕ19(6.35–19)	ϕ19 (ϕ11–24)	ϕ22 (ϕ16–24)	ϕ35 (ϕ22–38)
D4	ϕ70 (50–70)	ϕ70 (50–110)	ϕ110 (ϕ55.5–110)	ϕ114.3 (ϕ110–114.3)
D5	ϕ90 (70–130)	ϕ90 (70–145)	ϕ145 (ϕ90–155)	ϕ200 (ϕ145–200)
D6	(4–M4*10L)	(4–M6*14L)	4–M8 (M6–M12)	4–M12 (M8–M12)
D7	ϕ70	ϕ100	ϕ130	ϕ185
D8	4–ϕ5.5	4–ϕ7	4–ϕ8.5	4–ϕ11
D9	M5*0.8P*15L	M6*1.0P*16.5L	M10X1.5P	M16X2P
L1	28.5	36.5	55	87
L2	3	3	49	78
L3	8	10	4	5
L4	33	40.5	15	20
L5	119	138	110	149
L6	182	208.5	303	333
L7	(6.5)	(6.5)	8(5–8)	5 (5–7)
L8	(42.5)	(42.5)	70 (59–70)	86 (62–86)
L9	(87)	(87)	130 (119–130)	165.5 (165.5–189.5)
C1	□62	□90	□120	□160
C2	(□80)	(□86)	130 (120)	175 (142)
S1	3	4	5	5
S2	22	28	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	3	6	8	10
K2	ϕ8	ϕ18	ϕ28	ϕ38
K3	9.2	21	31.3	41.3
K4	ϕ11	ϕ24	ϕ38	ϕ48
K5	20	30	27	35
K6	24	35	32	40

Precision Planetary Gearbox

FE

- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High precision
  The backlash is less than 3 arcmin and the positioning is accurate.
- 3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 4.Methods of flange and connector
  It can be installed on any motor in the world.
- 5.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 6.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

FE Type

FE090 – 10 – S1 – P1 / Motor

Reducer Model
FE040, FE060, FE090
FE120, FE160

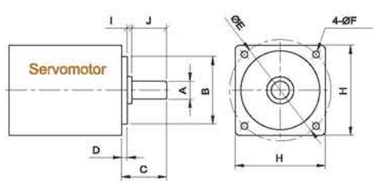
Output Shaft Keyway
S1: Solid Output Shaft No Keyway
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3,4,5,6,7,8,9,10
2–stage: 12,15,16,20,25,28,30,35,40,50,70,80,100
3–stage: 60,64,72,80,90,100,120,144,150,160,180,200
240,258,288,320,384,512,600,800,1000

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type — Model — Ratio — Output Shaft Keyway — Backlash Class — MOTOR NO.

FE Reducer Specifications

Specs	Unit	Stage	Ratio	FE040	FE060	FE090	FE120	FE160
Rated Output Torque / T2N	Nm	1	3	16	45	125	245	615
			4	17	50	135	298	650
			5	18	55	150	300	688
			7	15	50	145	245	645
			10	13	45	135	205	498
		2	15	16	45	120	198	615
			20	16	50	135	245	650
			25	18	55	150	300	688
			30	14	45	125	245	615
			35	18	55	150	300	688
			40	13	50	135	298	650
			50	17	55	140	265	688
			70	14	45	130	256	645
			100	13	40	115	205	498
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque				
Rated Input Speed / n_{1N}	rpm	1,2	3~100	3000	3000	3000	3000	2500
Max.Input Speed / n_{1B}	rpm	1,2	3~100	5000	5000	5000	5000	3600
Precision Backlash P1	arcmin	1	3~10	≤3	≤3	≤3	≤3	≤3
		2	12~100	≤5	≤5	≤5	≤5	≤5
Standard Backlash P2	arcmin	1	3~10	≤5	≤5	≤5	≤5	≤5
		2	12~100	≤7	≤7	≤7	≤7	≤7
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	22	50
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	320	460	1300	3200	6520
Max.Axial Force / F_{2aB}[2]	N	1,2	3~100	160	230	660	1600	3260
Service Life	hr	1,2	3~100	20000 h				
Efficiency / η	%	1	3~10	≥97%				
		2	15~100	≥94%				
Weight	kg	1	3~10	0.73	0.99	2.1	4.98	18.2
		2	15~100	1.05	1.46	3.2	6.92	24.9
Operating Temperature	℃	1,2	3~100	-25℃~+90℃				
Lubrication		1,2	3~100	Synthetic Grease				
Protection Class		1,2	3~100	IP65				
Mounting Position		1,2	3~100	Any Direction				
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	≤62	≤63	≤65	≤67	≤68

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	FE040	FE060	FE090	FE120	FE160
Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21
			4	0.03	0.14	0.48	2.74	7.54
			5	0.03	0.13	0.47	2.71	7.42
			7	0.03	0.13	0.45	2.65	7.25
			10	0.03	0.13	0.45	2.62	7.14
		2	12-40	0.03	0.13	0.44	2.58	7.07
			50-100	0.03	0.13	0.44	2.57	7.04

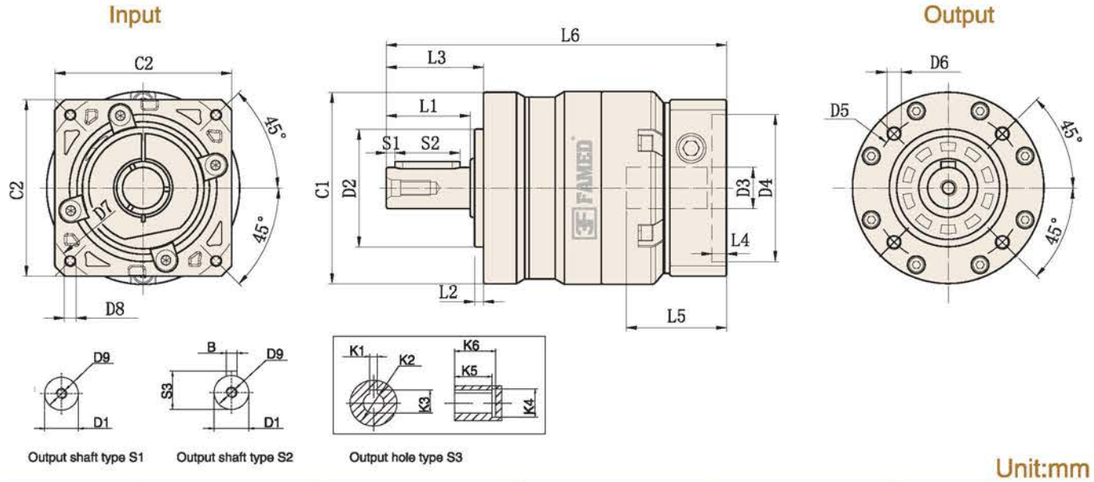
1. Ratio (i=Nin/Nout) 2. Output revolutions 100rpm, acting on the output shaft center position.
3. *Continuous operation, service life is 10000hrs.

MODEL: FE

1-Stage

Ratio: 3, 4, 5, 6, 7, 8, 9, 10

Dimensions:



Unit:mm

Size	FE040-L1	FE060-L1	FE090-L1	FE120-L1	FE160-L1
D1	φ12(13)	φ14(16)	φ20(22)	φ25(32)	φ40
D2	φ26	φ40	φ60	φ80	φ130
D3	φ8(≤11)	φ14(≤19)	φ19(≤24)	φ24(≤32)	φ35(42)
D4	φ30(30-50)	φ50 (50-70)	φ70 (50-70)	φ110 (70-130)	φ114.3(110-150
D5	φ34	φ52	φ70	φ100	φ145
D6	4-M4	4-M5*10	4-M6*12	4-M10*20	4-M12
D7	φ46(45-70)	φ70 (70-130)	φ90 (70-130)	φ145 (90-165)	φ200(145-220)
D8	(4-M4X8L)	(4-M4*10L)	(4-M5*12L)	(4-M8*20L)	(4-M12X25L)
D9	M4X0.7P	M5*0.8P*15L	M6*1.0P*16.5L	M10*1.5P*23L	M16X2.0P
L1	18	28.5	36.5	50	80
L2	2	3	3	4	5
L3	26	33	36.5	55	87
L4	(4)	(5)	(6.5)	(10)	(7)
L5	26	(34)	(42)	(59)	86
L6	88	(115.5)	(147)	(193)	282
C1	φ42	φ65	φ91	φ120	φ160
C2	(□50)	(□60)	(□80)	(□130)	(□176)
S1	2	3	4	5	8
S2	14	22	28	40	65
S3	13.5	16	22.5	28	43
B	4	5	6	8	12
K1	-	3	6	8	10
K2	-	φ8	φ18	φ25	φ35
K3	-	9.2	21	28	38.3
K4	-	φ11	φ24	φ32	φ42
K5	-	20	30	40	52
K6	-	24	35	48	58

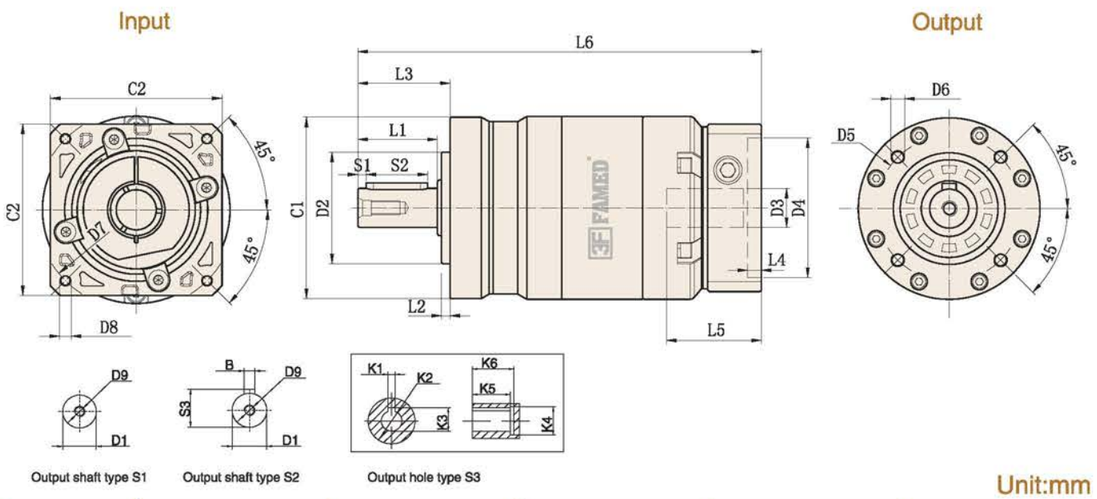
Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL: FE

2–Stage

Ratio: 12, 15, 16, 20, 25, 28, 30, 35
40, 50, 70, 80, 100

Dimensions:



Unit:mm

Size	FE040–L2	FE060–L2	FE090–L2	FE120–L2	FE160–L2
D1	ϕ12(13)	ϕ14(16)	ϕ20(22)	ϕ25(32)	ϕ40
D2	ϕ26	ϕ40	ϕ60	ϕ80	ϕ130
D3	ϕ8(≤11)	ϕ14(≤19)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(42)
D4	ϕ30(30–50)	ϕ50 (50–70)	ϕ70 (50–70)	ϕ110 (70–130)	ϕ114.3(110–150)
D5	ϕ34	ϕ52	ϕ70	ϕ100	ϕ145
D6	4–M4	4–M5*10	4–M6*12	4–M10*20	4–M12
D7	ϕ46(45–70)	ϕ70 (70–130)	ϕ90 (70–130)	ϕ145 (90–165)	ϕ200(145–220)
D8	(4–M4X8L)	(4–M4*10L)	(4–M5*12L)	(4–M8*20L)	(4–M12X25L)
D9	M4X0.7P	M5*0.8P*15L	M6*1.0P*16.5L	M10*1.5P*23L	M16X2.0P
L1	18	28.5	36.5	50	80
L2	2	3	3	4	5
L3	26	33	36.5	55	87
L4	(4)	(5)	(6.5)	(10)	(7)
L5	26	(34)	(42)	(59)	86
L6	104.5	(144.5)	(177.5)	(232.5)	331.5
C1	ϕ42	ϕ65	ϕ91	ϕ120	ϕ160
C2	(□50)	(□60)	(□80)	(□130)	(□176)
S1	2	3	4	5	8
S2	14	22	28	40	65
S3	13.5	16	22.5	28	43
B	4	5	6	8	12
K1	–	3	6	8	10
K2	–	ϕ8	ϕ18	ϕ25	ϕ35
K3	–	9.2	21	28	38.3
K4	–	ϕ11	ϕ24	ϕ32	ϕ42
K5	–	20	30	40	52
K6	–	24	35	48	58

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

Precision Right Angle Planetary Gearbox

FER

- 1. Space–saving
  The straight cross reducer uses spiral bevel gear. The installation of the motor can achieve 90 degree bending and save the installation space.
- 2.High rigidity & torque
  The use of integral ball bearings greatly improves the rigidity and torque.
- 3. Connector and shaft sleeve mode
  It can be installed on any motor in the world.
- 4. No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 5.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

FER Type

FER090 – 10 – S1 – P1 / Motor

Reducer Model
FER040, FER060, FER090
FER120, FER160

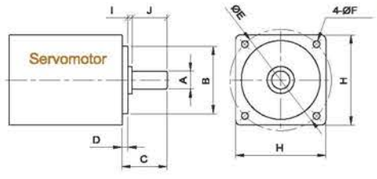
Output Shaft Keyway
S1: Solid Output Shaft No Keyway
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3,4,5,6,7,8,9,10
2–stage: 12,15,16,20,25,28,30,35,40,50,70,80,100
3–stage: 60,64,72,80,90,100,120,144,150,160,180,200
240,258,288,320,384,512,600,800,1000

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

FER Reducer Specifications

Specs	Unit	Stage	Ratio	FER040	FER060	FER090	FER120	FER160
Rated Output Torque / T2N	Nm	1	3	16	45	125	245	615
			4	17	50	135	298	650
			5	18	55	150	300	688
			7	15	50	145	245	645
			10	13	45	135	205	498
		2	15	16	45	120	198	615
			20	16	50	135	245	650
			25	18	55	150	300	688
			30	14	45	125	245	615
			35	18	55	150	300	688
			40	13	50	135	298	650
			50	17	55	140	265	688
			70	14	45	130	256	645
			100	13	40	115	205	498
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque				
Rated Input Speed / n_{1N}	rpm	1,2	3~100	3000	3000	3000	3000	2500
Max.Input Speed / n_{1B}	rpm	1,2	3~100	5000	5000	5000	5000	3600
Precision Backlash P1	arcmin	1	3~10	≤8	≤8	≤8	≤8	≤8
		2	12~100	≤10	≤10	≤10	≤10	≤10
Standard Backlash P2	arcmin	1	3~10	≤11	≤11	≤11	≤11	≤11
		2	12~100	≤13	≤13	≤13	≤13	≤13
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	22	50
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	320	460	1300	3200	6520
Max.Axial Force / F_{2aB}[2]	N	1,2	3~100	160	230	660	1600	3260
Service Life	hr	1,2	3~100	20000 h				
Efficiency / η	%	1	3~10	≥97%				
		2	15~100	≥94%				
Weight	kg	1	3~10	0.73	0.99	2.1	4.98	18.2
		2	15~100	1.05	1.46	3.2	6.92	24.9
Operating Temperature	℃	1,2	3~100	-25℃~+90℃				
Lubrication		1,2	3~100	Synthetic Grease				
Protection Class		1,2	3~100	IP65				
Mounting Position		1,2	3~100	Any Direction				
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	≤62	≤63	≤65	≤67	≤68

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	FER040	FER060	FER090	FER120	FER160
Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21
			4	0.03	0.14	0.48	2.74	7.54
			5	0.03	0.13	0.47	2.71	7.42
			7	0.03	0.13	0.45	2.65	7.25
			10	0.03	0.13	0.45	2.62	7.14
		2	12–40	0.03	0.13	0.44	2.58	7.07
			50–100	0.03	0.13	0.44	2.57	7.04

1. The Max. acceleration torque T2B=60% of T2NOT 2. When output speed is 100rpm, acting on the output shaft center position.
3. 3–stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

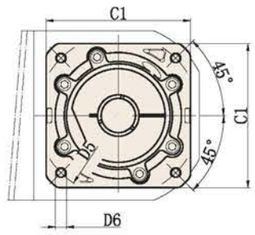
MODEL: FER

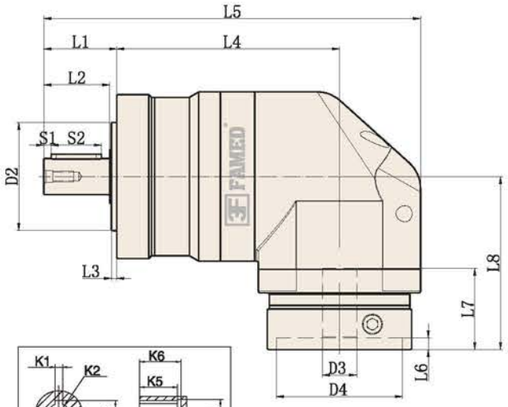
1–Stage

Ratio: 3, 4 , 5, 6, 7, 8, 9, 10

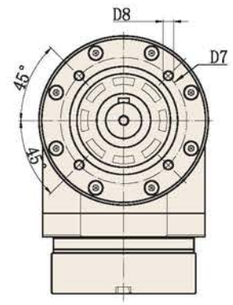
Dimensions:

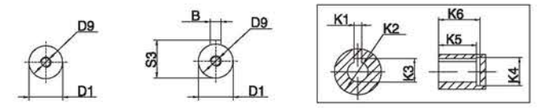
Input





Output





Output shaft type S1 Output shaft type S2 Output hole type S3

Unit:mm

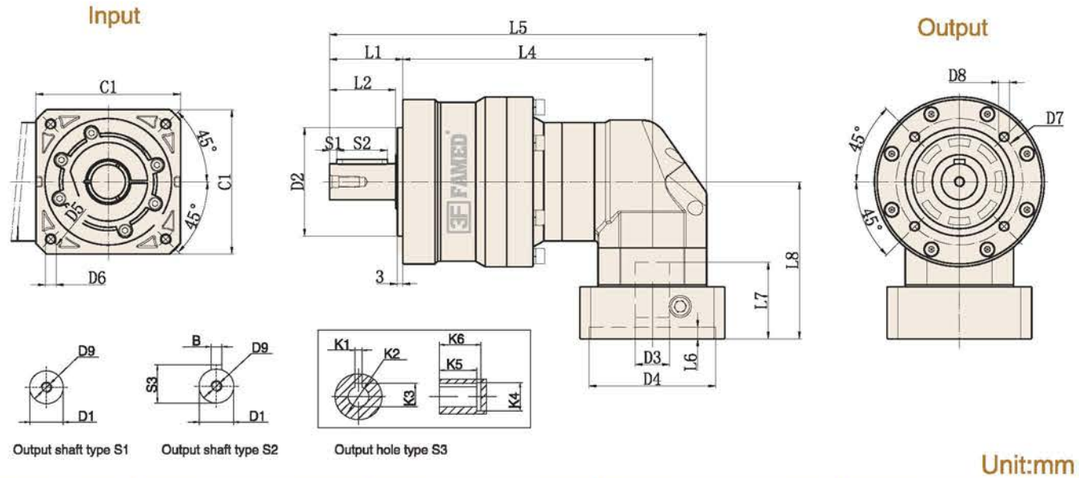
Size	FER060–L1	FER090–L1	FER120–L1	FER160–L1
D1	ϕ14(16)	ϕ20(22)	ϕ25(32)	ϕ40
D2	ϕ40	ϕ60	ϕ80	ϕ130
D3	ϕ14(6.35–19)	ϕ19(11–24)	ϕ22(16–24)	ϕ35 (ϕ22–38)
D4	ϕ50 (30–70)	ϕ70 (50–110)	ϕ110 (50–110)	ϕ114.3 (ϕ110–114.3)
D5	ϕ70(45–90)	ϕ90 (70–145)	ϕ145 (90–155)	ϕ200 (ϕ145–200)
D6	(4–M5*12L)	(4–M6*14L)	(4–M8*20L)	4–M12 (M8–M12)
D7	ϕ52	ϕ70	ϕ100	ϕ145
D8	4–M5*10L	4–M6*12L	4–M8*20L	4–M12X24L
D9	M5*0.8P*15L	M6*1.0P*16.5L	M10*1.5P*23L	M16X2P
L1	33	40.5	55	87
L2	28.5	36.5	50	80
L3	3	3	4	5
L4	90	123.5	146.5	111
L5	153	209	259	295
L6	(5)	6.5	(10)	5 (5–7)
L7	(33)	(45)	(64)	86 (62–86)
L8	(77.5)	(96)	(135.5)	165.5 (165.5–189.5)
C1	(□60)	(□80)	(□130)	175 (142)
S1	3	4	5	5
S2	22	28	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	4	6	8	10
K2	ϕ11	ϕ22	ϕ28	ϕ38
K3	12.8	24.5	31.3	41.3
K4	ϕ16	ϕ32	ϕ38	ϕ48
K5	15	20	27	35
K6	18	24	32	40

MODEL: FER

2–Stage

Ratio: 12, 15, 16, 20, 25, 28, 30, 35
40, 50, 70, 80, 100

Dimensions:



Unit:mm

Size	FER060–L2	FER090–L2	FER120–L2	FER160–L2
D1	ϕ14(16)	ϕ20(22)	ϕ25(32)	ϕ40
D2	ϕ40	ϕ60	ϕ80	ϕ130
D3	ϕ14(6.35–19)	ϕ19(11–24)	ϕ22(16–24)	ϕ35 (ϕ22–38)
D4	ϕ50 (30–70)	ϕ70 (50–110)	ϕ110 (50–110)	ϕ114.3 (ϕ110–114.3)
D5	ϕ70(45–90)	ϕ90 (70–145)	ϕ145 (90–155)	ϕ200 (ϕ145–200)
D6	(4–M5*12L)	(4–M6*14L)	(4–M8*20L)	4–M12 (M8–M12)
D7	ϕ52	ϕ70	ϕ100	ϕ145
D8	4–M5*10L	4–M6*12L	4–M8*20L	4–M12X24L
D9	M5*0.8P*15L	M6*1.0P*16.5L	M10*1.5P*23L	M16X2P
L1	33	40.5	55	87
L2	28.5	36.5	50	80
L3	3	3	4	5
L4	119	138	176.5	149
L5	182	208.5	276.5	333
L6	(5)	6.5	(10)	5 (5–7)
L7	(33)	(42.5)	(59)	86 (62–86)
L8	(77.5)	(87)	(120)	165.5 (165.5–189.5)
C1	(□60)	(□80)	(□130)	175 (142)
S1	3	4	5	5
S2	22	28	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	4	6	8	10
K2	ϕ11	ϕ22	ϕ28	ϕ38
K3	12.8	24.5	31.3	41.3
K4	ϕ16	ϕ32	ϕ38	ϕ48
K5	15	20	27	35
K6	18	24	32	40

Standard Type Planetary Gearbox

PLF

- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 3.Methods of flange and connector
  It can be installed on any motor in the world.
- 4.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 5.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

PLF Type

PLF080 – 10 – S1 – P1 / Motor

Reducer Model
PLF040, PLF060, PLF080, PLF090
PLF120, PLF160

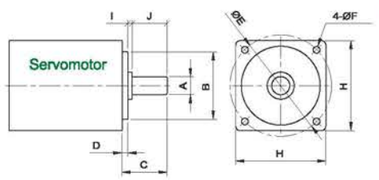
Output Shaft Keyway
S1: Solid Output Shaft No Keyway
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3,4,5,6,7,8,9,10
2–stage: 12,15,16,20,25,28,30,35,40,50,70,80,100
3–stage: 60,64,72,80,90,100,120,144,150,160,180,200
240,258,288,320,384,512,600,800,1000

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

PLF Reducer Specifications

Specs	Unit	Stage	Ratio	PLF040	PLF060	PLF080	PLF090	PLF120	PLF160
Rated Output Torque / T2N	Nm	1	3	14	28	105	113	150	323
			4	15	38	108	115	160	364
			5	17	40	112	118	160	423
			7	13	35	105	110	149	358
			10	12	25	100	105	141	293
		2	15	14	28	105	113	150	323
			20	15	38	108	120	160	364
			25	17	40	112	118	160	423
			30	13	28	105	113	150	323
			35	17	35	112	118	160	358
			40	12	38	110	115	146	364
			50	15	40	108	118	160	423
			70	13	35	105	110	149	358
			100	12	25	100	110	141	293
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque					
Rated Input Speed / n_{1N}	rpm	1,2	3~100	3000	3000	3000	3000	3000	2500
Max.Input Speed / n_{1B}	rpm	1,2	3~100	5000	5000	5000	5000	5000	3600
Precision Backlash P1	arcmin	1	3~10	≤6	≤6	≤6	≤6	≤6	≤6
		2	12~100	≤8	≤8	≤8	≤8	≤8	≤8
Standard Backlash P2	arcmin	1	3~10	≤7	≤7	≤7	≤7	≤7	≤7
		2	12~100	≤10	≤10	≤10	≤10	≤10	≤10
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	12	22	50
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	320	460	1300	1300	3200	6520
Max.Axial Force / F_{2aB}[2]	N	1,2	3~100	160	230	660	660	1600	3260
Service Life	hr	1,2	3~100	20000 h					
Efficiency / η	%	1	3~10	≥97%					
		2	15~100	≥94%					
Weight	kg	1	3~10	0.73	0.99	2.1	2.5	4.98	18.2
		2	15~100	1.05	1.46	3.2	3.5	6.92	24.9
Operating Temperature	℃	1,2	3~100	-25℃~+90℃					
Lubrication		1,2	3~100	Synthetic Grease					
Protection Class		1,2	3~100	IP65					
Mounting Position		1,2	3~100	Any Direction					
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	≤62	≤63	≤65	≤65	≤67	≤68

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	PLF040	PLF060	PLF080	PLF090	PLF120	PLF160
Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	0.61	3.25	9.21
			4	0.03	0.14	0.48	0.48	2.74	7.54
			5	0.03	0.13	0.47	0.47	2.71	7.42
			7	0.03	0.13	0.45	0.45	2.65	7.25
			10	0.03	0.13	0.45	0.45	2.62	7.14
		2	12–40	0.03	0.13	0.44	0.44	2.58	7.07
			50–100	0.03	0.13	0.44	0.44	2.57	7.04

1. Ratio (i=Nin/Nout) 2. Output revolutions 100rpm, acting on the output shaft center position.
3. *Continuous operation, service life is 10000hrs.

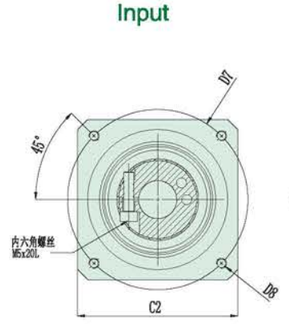
MODEL: PLF

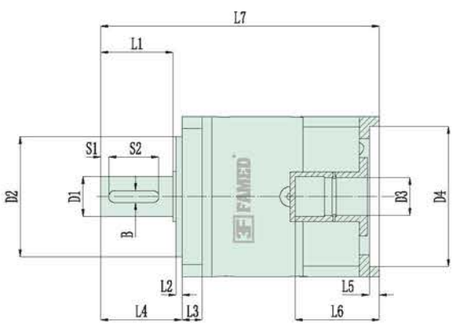
1–Stage

Ratio: 3, 4, 5, 6, 7, 8, 9, 10

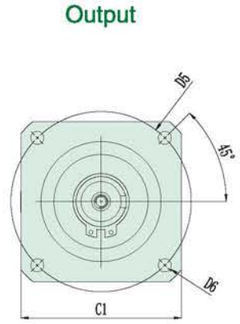
Dimensions:

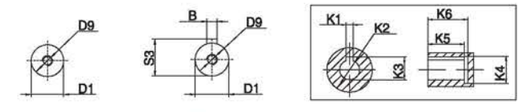
Input





Output





Output shaft type S1 Output shaft type S2 Output hole type S3

Unit:mm

Size	PLF040–L1	PLF060–L1	PLF080–L1	PLF090–L1	PLF120–L1	PLF160–L1
D1	ϕ10	ϕ14	ϕ20	ϕ20	ϕ25	ϕ40
D2	ϕ35	ϕ50	ϕ80	ϕ80	ϕ110	ϕ130
D3	ϕ8 (≤8)	ϕ14 (≤19)	ϕ19 (≤19)	ϕ19 (≤22)	ϕ22 (≤24)	ϕ35 (≤35)
D4	ϕ30 (30–50)	ϕ50 (50–70)	ϕ70 (50–110)	ϕ70 (50–110)	ϕ110 (70–130)	ϕ114.3 (110–150)
D5	ϕ50	ϕ70	ϕ100	ϕ100	ϕ130	ϕ185
D6	4–ϕ3.5	4–ϕ5.5	4–ϕ6.5	4–ϕ6.5	4–ϕ8.5	4–ϕ11
D7	ϕ46 (45–70)	ϕ70 (70–130)	ϕ90 (70–145)	ϕ90 (70–145)	ϕ145 (90–165)	ϕ200 (145–220)
D8	(4–M4*12L)	(4–M4*8L)	(4–M6*10L)	(4–M6*10L)	(4–M8*16L)	(4–M12*20L)
D9	M3*9L	M5*18L	M6*18L	M6*18L	M10*25L	M16*36L
L1	23	30	36	36	50	80
L2	2	3	3	3	4	5
L3	5	11	10	10	18	20
L4	26	35	40.5	40.5	55.5	87
L5	(3.5)	(4)	(5)	(6)	(10)	(10)
L6	(27)	(31)	(42)	(47)	(62.5)	(81)
L7	(88)	(115)	(139)	(150)	(210)	(276)
C1	□42	□60	□90	□90	□120	□165
C2	(□42)	(□60)	(□80)	(□90)	(□120)	(□176)
S1	2	3	3	3	5	5
S2	16	20	25	25	40	65
S3	11.2	16	22.5	22.5	28	43
B	3	5	6	6	8	12
K1	–	3	5	5	6	10
K2	–	ϕ10	ϕ15	ϕ15	ϕ20	ϕ35
K3	–	11.4	17.3	17.3	22.8	38.3
K4	–	20	30	30	38	58
K5	–	15	20	20	27	35
K6	–	18	24	24	32	40

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

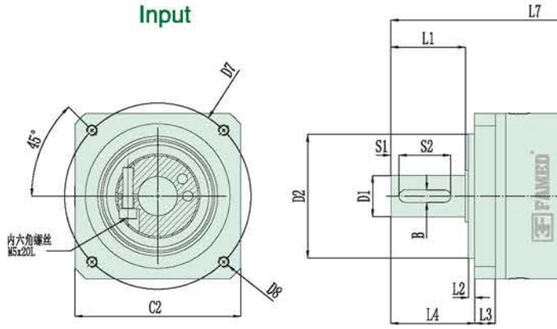
MODEL: PLF

2–Stage

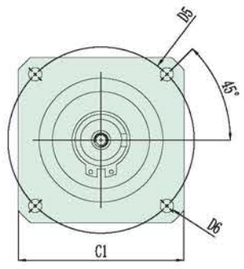
Ratio: 12, 15, 16, 20, 25, 28, 30, 35
40, 50, 70, 80, 100

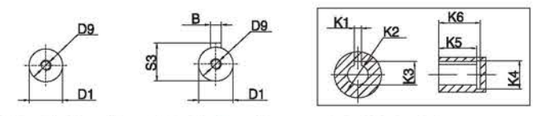
Dimensions:

Input



Output





Output shaft type S1 | Output shaft type S2 | Output hole type S3

Unit:mm

Size	PLF040–L2	PLF060–L2	PLF080–L2	PLF090–L2	PLF120–L2	PLF160–L2
D1	ϕ10	ϕ14	ϕ20	ϕ20	ϕ25	ϕ40
D2	ϕ35	ϕ50	ϕ80	ϕ80	ϕ110	ϕ130
D3	ϕ8 (≤8)	ϕ14 (≤19)	ϕ19 (≤19)	ϕ19 (≤22)	ϕ22 (≤24)	ϕ35 (≤35)
D4	ϕ30 (30–50)	ϕ50 (50–70)	ϕ70 (50–110)	ϕ70 (50–110)	ϕ110 (70–130)	ϕ114.3 (110–150)
D5	ϕ50	ϕ70	ϕ100	ϕ100	ϕ130	ϕ185
D6	4–ϕ3.5	4–ϕ5.5	4–ϕ6.5	4–ϕ6.5	4–ϕ8.5	4–ϕ11
D7	ϕ46 (45–70)	ϕ70 (70–130)	ϕ90 (70–145)	ϕ90 (70–145)	ϕ145 (90–165)	ϕ200 (145–220)
D8	(4–M4*12L)	(4–M4*8L)	(4–M6*10L)	(4–M6*10L)	(4–M8*16L)	(4–M12*20L)
D9	M3*9L	M5*18L	M6*18L	M6*18L	M10*25L	M16*36L
L1	23	30	36	36	50	80
L2	2	3	3	3	4	5
L3	5	11	10	10	18	20
L4	26	35	40.5	40.5	55.5	87
L5	(3.5)	(4)	(5)	(6)	(10)	(10)
L6	(27)	(31)	(42)	(47)	(62.5)	(81)
L7	(103)	(133)	(159)	(170)	(240)	(317)
C1	□42	□60	□90	□90	□120	□165
C2	(□42)	(□60)	(□80)	(□90)	(□120)	(□176)
S1	2	3	3	3	5	5
S2	16	20	25	25	40	65
S3	11.2	16	22.5	22.5	28	43
B	3	5	6	6	8	12
K1	–	3	5	5	6	10
K2	–	ϕ10	ϕ15	ϕ15	ϕ20	ϕ35
K3	–	11.4	17.3	17.3	22.8	38.3
K4	–	20	30	30	38	58
K5	–	15	20	20	27	35
K6	–	18	24	24	32	40

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

Standard Type Right Angle Planetary Gearbox

PFR

- 1. Space–saving
  The straight cross reducer uses spiral bevel gear. The installation of the motor can achieve 90 degree bending and save the installation space.
- 2.High rigidity & torque
  The use of integral ball bearings greatly improves the rigidity and torque.
- 3. Connector and shaft sleeve mode
  It can be installed on any motor in the world.
- 4. No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 5.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

PFR Type

PFR090 – 10 – S1 – P1 / Motor

Reducer Model
PFR040, PFR060, PFR090
PFR120, PFR160

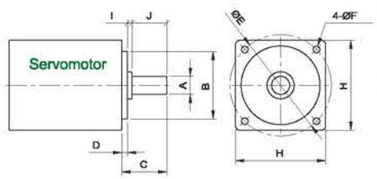
Output Shaft Keyway
S1: Solid Output Shaft No Keyway
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3,4,5,6,7,8,9,10
2–stage: 12,15,16,20,25,28,30,35,40,50,70,80,100
3–stage: 60,64,72,80,90,100,120,144,150,160,180,200
240,258,288,320,384,512,600,800,1000

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type — Model — Ratio — Output Shaft Keyway — Backlash Class — MOTOR NO.

PFR Reducer Specifications

Specs	Unit	Stage	Ratio	PFR040	PFR060	PFR090	PFR120	PFR160
Rated Output Torque / T2N	Nm	1	3	14	28	113	150	323
			4	15	38	115	160	364
			5	17	40	118	160	423
			7	13	35	110	149	358
			10	12	25	105	141	293
		2	15	14	28	113	150	323
			20	15	38	120	160	364
			25	17	40	118	160	423
			30	13	28	113	150	323
			35	17	35	118	160	358
			40	12	38	115	146	364
			50	15	40	118	160	423
			70	13	35	110	149	358
			100	12	25	110	141	293
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque				
Rated Input Speed / n_{1N}	rpm	1,2	3~100	3000	3000	3000	3000	2500
Max.Input Speed / n_{1B}	rpm	1,2	3~100	5000	5000	5000	5000	3600
Precision Backlash P1	arcmin	1	3~10	≤10	≤10	≤10	≤10	≤10
		2	12~100	≤12	≤12	≤12	≤12	≤12
Standard Backlash P2	arcmin	1	3~10	≤12	≤12	≤12	≤12	≤12
		2	12~100	≤14	≤14	≤14	≤14	≤14
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	22	50
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	320	460	1300	3200	6520
Max.Axial Force / F_{2aB}[2]	N	1,2	3~100	160	230	660	1600	3260
Service Life	hr	1,2	3~100	20000 h				
Efficiency / η	%	1	3~10	≥97%				
		2	15~100	≥94%				
Weight	kg	1	3~10	0.73	0.99	2.1	4.98	18.2
		2	15~100	1.05	1.46	3.2	6.92	24.9
Operating Temperature	℃	1,2	3~100	-25℃~+90℃				
Lubrication		1,2	3~100	Synthetic Grease				
Protection Class		1,2	3~100	IP65				
Mounting Position		1,2	3~100	Any Direction				
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	≤62	≤63	≤65	≤67	≤68

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	PFR040	PFR060	PFR090	PFR120	PFR160
Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21
			4	0.03	0.14	0.48	2.74	7.54
			5	0.03	0.13	0.47	2.71	7.42
			7	0.03	0.13	0.45	2.65	7.25
			10	0.03	0.13	0.45	2.62	7.14
		2	12-40	0.03	0.13	0.44	2.58	7.07
			50-100	0.03	0.13	0.44	2.57	7.04

1. The Max. acceleration torque T2B=60% 2.When output speed is 100rpm, acting on the output shaft center position
3. 3-stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

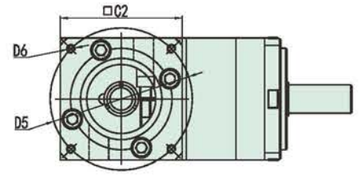
MODEL: PFR

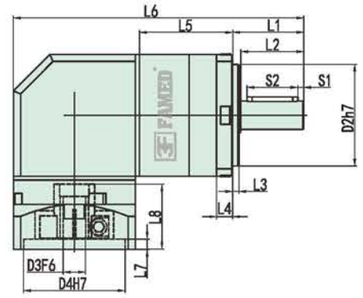
1-Stage

Ratio: 3, 4 , 5, 6, 7, 8, 9, 10

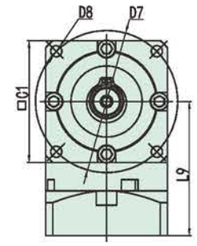
Dimensions:

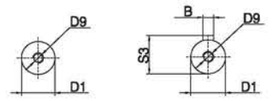
Input





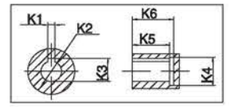
Output





Output shaft type S1

Output shaft type S2



Output hole type S3

Unit:mm

Size	PFR060-L1	PFR080-L1	PFR120-L1	PFR160-L1
D1	φ14(16)	φ20 (22)	φ25 (32)	φ40
D2	φ50	φ80	φ110	φ130
D3	φ14 (φ6.35-19)	φ19 (φ11-24)	φ22 (φ16-24)	φ35 (φ22-38)
D4	φ50 (φ30-70)	φ70 (φ50-110)	φ110 (φ55.5-110)	φ114.3 (φ110-114.3)
D5	φ70 (φ45-90)	φ90 (φ70-145)	φ145 (φ90-155)	φ200 (φ145-200)
D6	4-M4 (M3-M6)	4-M5 (M4-M8)	4-M8 (M6-M12)	4-M12 (M8-M12)
D7	φ70	φ100	φ130	φ185
D8	4-φ5.5	4-φ6.5	4-φ8.5	4-φ11
D9	M5X0.8P	M8X1.25P	M10X1.5P	M16X2P
L1	35	40	55	87
L2	31	35	49	78
L3	3	3	4	5
L4	8	12	15	20
L5	46	55	80	111
L6	143	190	273	295
L7	5(4-6)	8(5-8)	8(5-8)	5 (5-7)
L8	32(32-44)	42(42-60)	70 (59-70)	86 (62-86)
L9	66(66-88)	95.5(95.5-113.5)	130 (119-130)	165.5 (165.5-189.5)
C1	60	90	120	160
C2	60(60-90)	90(90-130)	130 (120)	175 (142)
S1	3	3	5	5
S2	25	30	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	4	6	8	10
K2	φ11	φ22	φ28	φ38
K3	12.8	24.5	31.3	41.3
K4	φ16	φ32	φ38	φ48
K5	15	20	27	35
K6	18	24	32	40

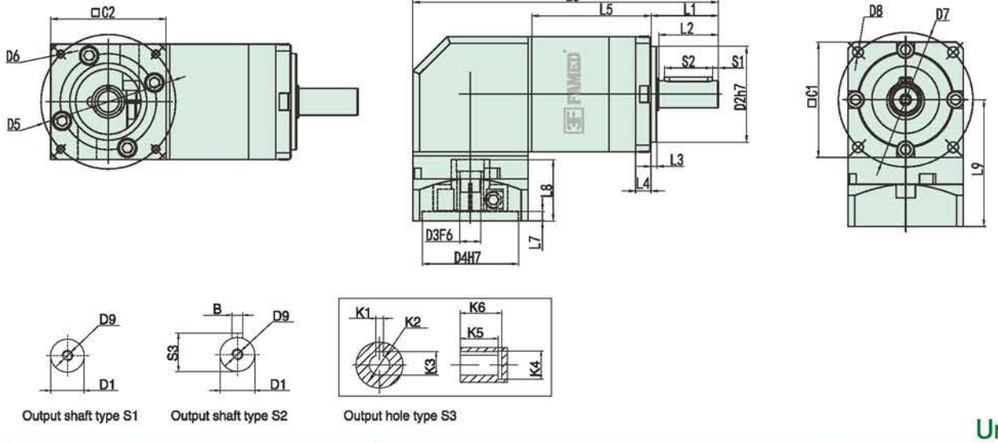
MODEL: PFR

2-Stage

Ratio: 12, 15, 16, 20, 25, 28, 30, 35
40, 50, 70, 80, 100

Dimensions:

Input



Output shaft type S1 | Output shaft type S2 | Output hole type S3

Unit:mm

Size	PFR060-L2	PFR080-L2	PFR120-L2	PFR160-L2
D1	ϕ14(16)	ϕ20 (22)	ϕ25 (32)	ϕ40
D2	ϕ50	ϕ80	ϕ110	ϕ130
D3	ϕ14 (ϕ6.35-19)	ϕ19 (ϕ11-24)	ϕ22 (ϕ16-24)	ϕ35 (ϕ22-38)
D4	ϕ50 (ϕ30-70)	ϕ70 (ϕ50-110)	ϕ110 (ϕ55.5-110)	ϕ114.3 (ϕ110-114.3)
D5	ϕ70 (ϕ45-90)	ϕ90 (ϕ70-145)	ϕ145 (ϕ90-155)	ϕ200 (ϕ145-200)
D6	4-M4 (M3-M6)	4-M5 (M4-M8)	4-M8 (M6-M12)	4-M12 (M8-M12)
D7	ϕ70	ϕ100	ϕ130	ϕ185
D8	4-ϕ5.5	4-ϕ6.5	4-ϕ8.5	4-ϕ11
D9	M5X0.8P	M8X1.25P	M10X1.5P	M16X2P
L1	35	40	55	87
L2	31	35	49	78
L3	3	3	4	5
L4	8	12	15	20
L5	62	78.5	110	149
L6	159	213.5	303	333
L7	5(4-6)	8(5-8)	8(5-8)	5 (5-7)
L8	32(32-44)	42(42-60)	70 (59-70)	86 (62-86)
L9	66(66-88)	95.5(95.5-113.5)	130 (119-130)	165.5 (165.5-189.5)
C1	60	90	120	160
C2	60(60-90)	90(90-130)	130 (120)	175 (142)
S1	3	3	5	5
S2	25	30	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	4	6	8	10
K2	ϕ11	ϕ22	ϕ28	ϕ38
K3	12.8	24.5	31.3	41.3
K4	ϕ16	ϕ32	ϕ38	ϕ48
K5	15	20	27	35
K6	18	24	32	40

Standard Type Planetary Gearbox

PLE

- 1.Quiet operation
  Helical gears are used to achieve smooth and quiet operation.
- 2.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
- 3.Methods of flange and connector
  It can be installed on any motor in the world.
- 4.No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 5.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

PLE Type

PLE080 - 10 - S1 - P1 / Motor

Reducer Model
PLE040, PLE060, PLE080, PLE090
PLE120, PLE160

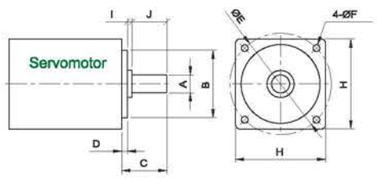
Output Shaft Keyway
S1: Solid Output Shaft No Keyway
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1-stage: 3,4,5,6,7,8,9,10
2-stage: 12,15,16,20,25,28,30,35,40,50,70,80,100
3-stage: 60,64,72,80,90,100,120,144,150,160,180,200
240,258,288,320,384,512,600,800,1000

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

PLE Reducer Specifications

Specs	Unit	Stage	Ratio	PLE040	PLE060	PLE080	PLE090	PLE120	PLE160
Rated Output Torque / T2N	Nm	1	3	14	28	105	113	150	323
			4	15	38	108	115	160	364
			5	17	40	112	118	160	423
			7	15	35	105	110	149	358
			10	12	25	100	105	141	293
		2	15	14	28	105	113	150	323
			20	15	38	108	120	160	364
			25	17	40	112	118	160	423
			30	13	28	105	113	150	323
			35	17	35	112	118	160	358
			40	12	38	110	115	146	364
			50	15	40	108	118	160	423
			70	13	35	105	110	149	358
			100	12	25	100	110	141	293
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque					
Rated Input Speed / n_{1N}	rpm	1,2	3~100	3000	3000	3000	3000	3000	2500
Max.Input Speed / n_{1B}	rpm	1,2	3~100	5000	5000	5000	5000	5000	3600
Precision Backlash P1	arcmin	1	3~10	≤6	≤6	≤6	≤6	≤6	≤6
		2	12~100	≤8	≤8	≤8	≤8	≤8	≤8
Standard Backlash P2	arcmin	1	3~10	≤8	≤8	≤8	≤8	≤8	≤8
		2	12~100	≤10	≤10	≤10	≤10	≤10	≤10
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	12	22	50
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	320	460	1300	1300	3200	6520
Max.Axial Force / F_{2aB}[2]	N	1,2	3~100	160	230	660	660	1600	3260
Service Life	hr	1,2	3~100	20000 h					
Efficiency / η	%	1	3~10	≥97%					
		2	15~100	≥94%					
Weight	kg	1	3~10	0.73	0.99	2.1	2.4	4.98	18.2
		2	15~100	1.05	1.46	3.2	3.6	6.92	24.9
Operating Temperature	℃	1,2	3~100	-25℃~+90℃					
Lubrication		1,2	3~100	Synthetic Grease					
Protection Class		1,2	3~100	IP65					
Mounting Position		1,2	3~100	Any Direction					
Noise Level (n1=3000rpm，No load)	dB(A)	1,2	3~100	≤62	≤63	≤65	≤65	≤67	≤68

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	PLE040	PLE060	PLE080	PLE090	PLE120	PLE160
Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	0.61	3.25	9.21
			4	0.03	0.14	0.48	0.48	2.74	7.54
			5	0.03	0.13	0.47	0.47	2.71	7.42
			7	0.03	0.13	0.45	0.45	2.65	7.25
			10	0.03	0.13	0.45	0.45	2.62	7.14
		2	12–40	0.03	0.13	0.44	0.44	2.58	7.07
			50–100	0.03	0.13	0.44	0.44	2.57	7.04

1. Ratio (i=Nin/Nout) 2. Output revolutions 100rpm, acting on the output shaft center position.
3. *Continuous operation, service life is 10000hrs.

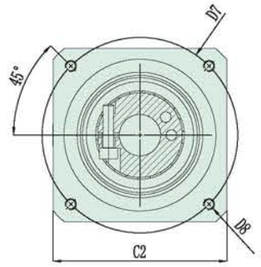
MODEL：PLE

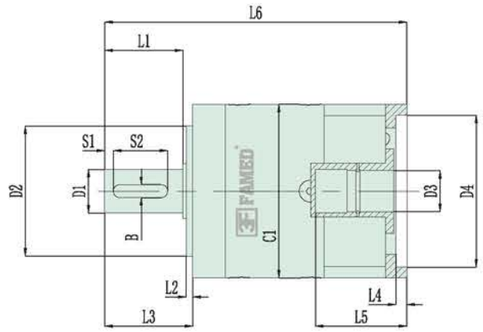
1–Stage

Ratio：3，4，5，6，7，8，9，10

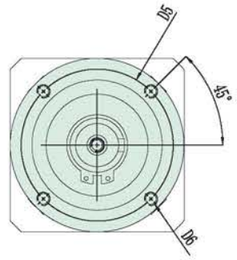
Dimensions：

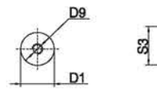
Input



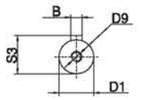


Output

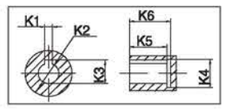




Output shaft type S1



Output shaft type S2



Output hole type S3

Unit:mm

Size	PLE040–L1	PLE060–L1	PLE080–L1	PLE090–L1	PLE120–L1	PLE160–L1
D1	ϕ10	ϕ14	ϕ20	ϕ20	ϕ25	ϕ40
D2	ϕ26	ϕ40	ϕ60	ϕ60	ϕ80	ϕ130
D3	ϕ8（≤8）	ϕ14（≤14）	ϕ19（≤19）	ϕ19（≤24）	ϕ22（≤24）	ϕ35（≤35）
D4	ϕ30（30–50）	ϕ50（50–70）	ϕ70（50–110）	ϕ70（50–110）	ϕ110（70–130）	ϕ114.3（110–150）
D5	ϕ34	ϕ52	ϕ70	ϕ70	ϕ100	ϕ145
D6	(4–M4*8L)	(4–M5*15L)	(4–M6*12L)	(4–M6*20L)	(4–M10*18L)	(4–M12*24L)
D7	ϕ46（45–70）	ϕ70（70–130）	ϕ90（70–145）	ϕ90（70–145）	ϕ145（90–165）	ϕ200（145–220）
D8	（4–M4*12L)	（4–M5*10L)	（4–M6*15L)	（4–M6*15L)	（4–M8*16L)	（4–M12*20L)
D9	M3*9L	M5*16L	M6*18L	M6*18L	M10*25L	M16*30L
L1	23	30	36	36	50	80
L2	2	3	3	3	4	5
L3	26	35	40.5	40.5	55.5	87
L4	(3.5)	(4)	(5)	(6)	(10)	(10)
L5	(27)	(31)	(42)	(47)	(62.5)	(81)
L6	(88)	(115)	(139.0)	(150)	(210)	(276)
C1	ϕ42	ϕ60	ϕ80		ϕ120	ϕ165
C2	（□42）	（□60）	（□80）	（□90）	（□120）	（□176）
S1	2	3	4	3	5	5
S2	16	20	25	25	40	65
S3	11.2	16	22.5	22.5	28	43
B	3	5	6	6	8	12
K1	–	3	5	5	6	10
K2	–	ϕ10	ϕ15	ϕ15	ϕ20	ϕ35
K3	–	11.4	17.3	17.3	22.8	38.3
K4	–	20	30	30	38	58
K5	–	15	20	20	27	35
K6	–	18	24	24	32	40

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

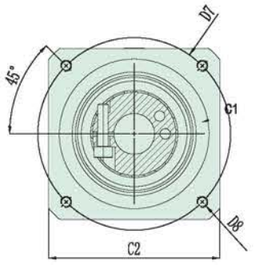
MODEL: PLE

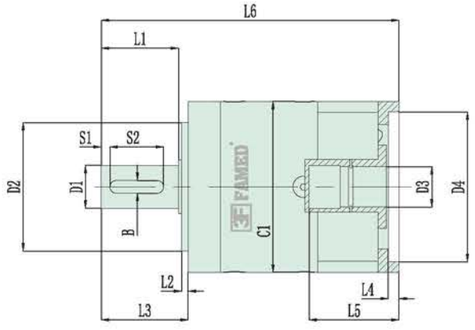
2–Stage

Ratio: 12, 15, 16, 20, 25, 28, 30, 35
40, 50, 70, 80, 100

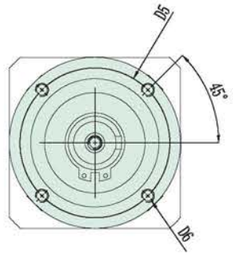
Dimensions:

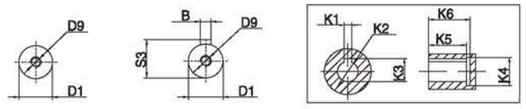
Input





Output





Output shaft type S1

Output shaft type S2 Output hole type S3

Unit:mm

Size	PLE040–L2	PLE060–L2	PLE080–L2	PLE090–L2	PLE120–L2	PLE160–L2
D1	ϕ10	ϕ14	ϕ20	ϕ20	ϕ25	ϕ40
D2	ϕ26	ϕ40	ϕ60	ϕ60	ϕ80	ϕ130
D3	ϕ8 (≤8)	ϕ14 (≤14)	ϕ19 (≤19)	ϕ19 (≤24)	ϕ22 (≤24)	ϕ35 (≤35)
D4	ϕ30 (30–50)	ϕ50 (50–70)	ϕ70 (50–110)	ϕ70 (50–110)	ϕ110 (70–130)	ϕ114.3 (110–150)
D5	ϕ34	ϕ52	ϕ70	ϕ70	ϕ100	ϕ145
D6	(4–M4*8L)	(4–M5*15L)	(4–M6*12L)	(4–M6*20L)	(4–M10*18L)	(4–M12*24L)
D7	ϕ46 (45–70)	ϕ70 (70–130)	ϕ90 (70–145)	ϕ90 (70–145)	ϕ145 (90–165)	ϕ200 (145–220)
D8	(4–M4*12L)	(4–M5*10L)	(4–M6*15L)	(4–M6*15L)	(4–M8*16L)	(4–M12*20L)
D9	M3*9L	M5*16L	M6*18L	M6*18L	M10*25L	M16*30L
L1	23	30	36	36	50	80
L2	2	3	3	3	4	5
L3	26	35	40.5	40.5	55.5	87
L4	(3.5)	(4)	(5)	(6)	(10)	(10)
L5	(27)	(31)	(42)	(47)	(62.5)	(81)
L6	(103)	(133)	(159.0)	(170)	(239.5)	(317)
C1	ϕ42	ϕ60	ϕ80		ϕ120	ϕ165
C2	(□42)	(□60)	(□80)	(□90)	(□120)	(□176)
S1	2	3	4	3	5	5
S2	16	20	25	25	40	65
S3	11.2	16	22.5	22.5	28	43
B	3	5	6	6	8	12
K1	–	3	5	5	6	10
K2	–	ϕ10	ϕ15	ϕ15	ϕ20	ϕ35
K3	–	11.4	17.3	17.3	22.8	38.3
K4	–	20	30	30	38	58
K5	–	15	20	20	27	35
K6	–	18	24	24	32	40

Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

Standard Type Right Angle Planetary Gearbox

PER

- 1. Space–saving
  The straight cross reducer uses spiral bevel gear. The installation of the motor can achieve 90 degree bending and save the installation space.
- 2.High rigidity & torque
  The use of integral ball bearings greatly improves the rigidity and torque.
- 3. Connector and shaft sleeve mode
  It can be installed on any motor in the world.
- 4. No grease leakage
  The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
- 5.Convenient maintenance
  No need to replace the grease in the product life period , and the installation is more convenient.

Model Selection of Speed Reducers

PER Type

PER090 – 10 – S1 – P1 / Motor

Reducer Model
PER040, PER060, PER090
PER120, PER160

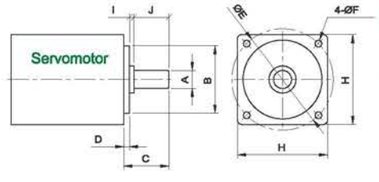
Output Shaft Keyway
S1: Solid Output Shaft No Keyway
S2: Standard (Keyway)
S3: Output for holes

Motor Model
Motor Manufacturer & Model

Ratio
1–stage: 3,4,5,6,7,8,9,10
2–stage: 12,15,16,20,25,28,30,35,40,50,70,80,100
3–stage: 60,64,72,80,90,100,120,144,150,160,180,200
240,258,288,320,384,512,600,800,1000

Backlash Grade
P0: High precision backlash
P1: Precision backlash
P2: Standard backlash

The gearbox matching motor needs to be confirmed with following dimensions :



A	B	C	D	E	F	H	I	J

Naming Scheme:

Type	Model	Ratio	Output Shaft Keyway	Backlash Class	MOTOR NO.

PER Reducer Specifications

Specs	Unit	Stage	Ratio	PER040	PER060	PER090	PER120	PER160
Rated Output Torque / T2N	Nm	1	3	14	28	113	150	323
			4	15	38	115	160	364
			5	17	40	118	160	423
			7	13	35	110	149	358
			10	12	25	105	141	293
		2	15	14	28	113	150	323
			20	15	38	120	160	364
			25	17	40	118	160	423
			30	13	28	113	150	323
			35	17	35	118	160	358
			40	12	38	115	146	364
			50	15	40	118	160	423
			70	13	35	110	149	358
			100	12	25	110	141	293
Max.Output Torque / T_{2NOT}[1]	Nm	1,2	3~100	3Times of Nominal Output Torque				
Rated Input Speed / n_{1N}	rpm	1,2	3~100	3000	3000	3000	3000	2500
Max.Input Speed / n_{1B}	rpm	1,2	3~100	5000	5000	5000	5000	3600
Precision Backlash P1	arcmin	1	3~10	⩽10	⩽10	⩽10	⩽10	⩽10
		2	12~100	⩽12	⩽12	⩽12	⩽12	⩽12
Standard Backlash P2	arcmin	1	3~10	⩽12	⩽12	⩽12	⩽12	⩽12
		2	12~100	⩽14	⩽14	⩽14	⩽14	⩽14
Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	22	50
Max.Radial Force / F_{2rB}[2]	N	1,2	3~100	320	460	1300	3200	6520
Max.Axial Force / F_{2aB}[2]	N	1,2	3~100	160	230	660	1600	3260
Service Life	hr	1,2	3~100	20000 h				
Efficiency / η	%	1	3~10	⩾97%				
		2	15~100	⩾94%				
Weight	kg	1	3~10	0.73	0.99	2.1	4.98	18.2
		2	15~100	1.05	1.46	3.2	6.92	24.9
Operating Temperature	℃	1,2	3~100	-25℃~+90℃				
Lubrication		1,2	3~100	Synthetic Grease				
Protection Class		1,2	3~100	IP65				
Mounting Position		1,2	3~100	Any Direction				
Noise Level (n1=3000rpm, No load)	dB(A)	1,2	3~100	⩽62	⩽63	⩽65	⩽67	⩽68

Reducer Rotary Inertia

Specs	Unit	Stage	Ratio	PER040	PER060	PER090	PER120	PER160
Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21
			4	0.03	0.14	0.48	2.74	7.54
			5	0.03	0.13	0.47	2.71	7.42
			7	0.03	0.13	0.45	2.65	7.25
			10	0.03	0.13	0.45	2.62	7.14
		2	12–40	0.03	0.13	0.44	2.58	7.07
			50–100	0.03	0.13	0.44	2.57	7.04

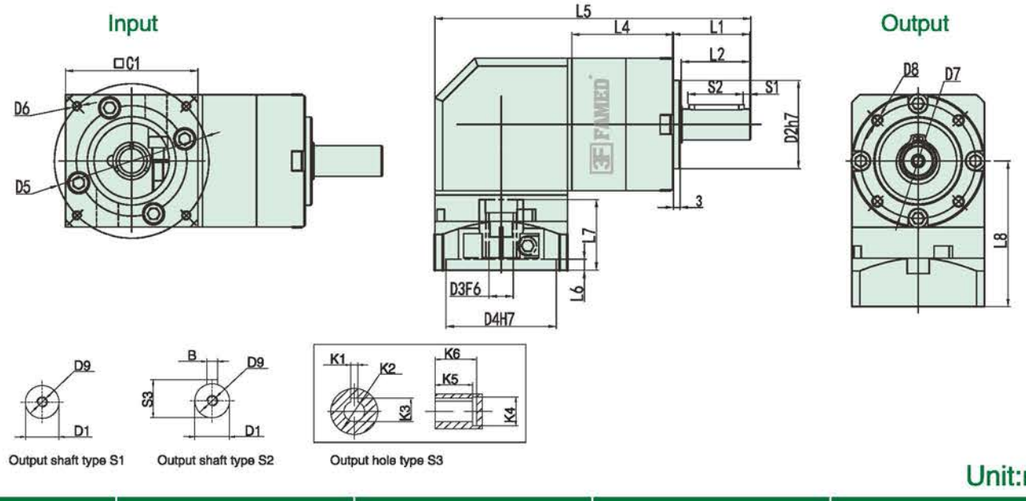
1. The Max. acceleration torque T2B=60% of T2NOT 2. When output speed is 100rpm, acting on the output shaft center position.
3. 3–stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

MODEL: PER

1–Stage

Ratio: 3, 4 , 5, 6, 7, 8, 9, 10

Dimensions:



Unit:mm

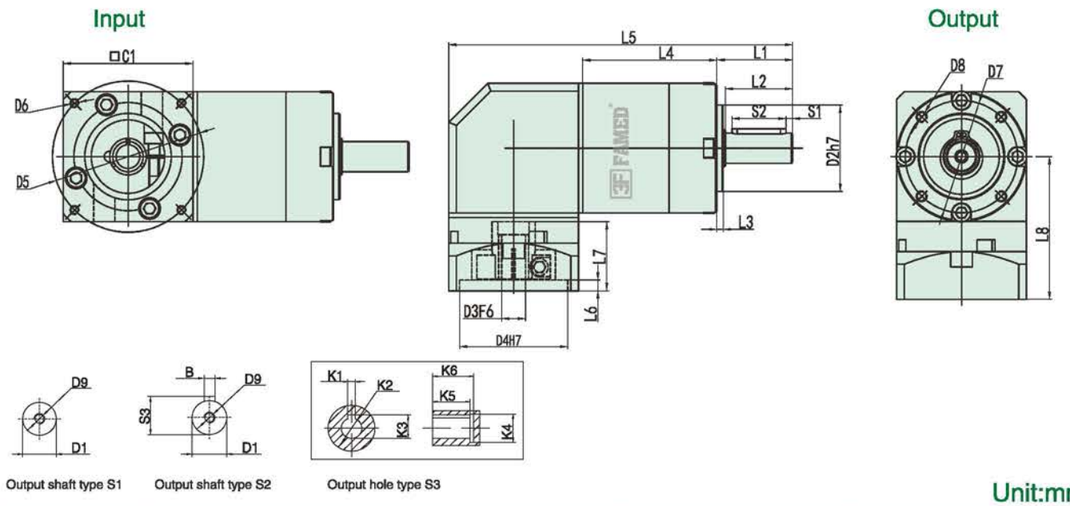
Size	PER060–L1	PER090–L1	PER120–L1	PER160–L1
D1	ϕ14(16)	ϕ20 (22)	ϕ25 (32)	ϕ40
D2	ϕ40	ϕ60	ϕ80	ϕ130
D3	ϕ14 (ϕ6.35–19)	ϕ19 (ϕ11–24)	ϕ22 (ϕ16–24)	ϕ35 (ϕ22–38)
D4	ϕ50 (ϕ30–70)	ϕ70 (ϕ50–110)	ϕ110 (ϕ55.5–110)	ϕ114.3 (ϕ110–114.3)
D5	ϕ70 (ϕ45–90)	ϕ90 (ϕ70–145)	ϕ145 (ϕ90–155)	ϕ200 (ϕ145–200)
D6	4–M4 (M3–M6)	4–M5 (M4–M8)	4–M8 (M6–M12)	4–M12 (M8–M12)
D7	ϕ52	ϕ70	ϕ100	ϕ145
D8	4–M5X10L	4–M6X12L	4–M10X20L	4–M12X24L
D9	M5X0.8P	M8X1.25P	M10X1.5P	M16X2P
L1	35	40	55	87
L2	31	35	49	80
L3	3	3	4	5
L4	46	55	80	111
L5	143	190	273	295
L6	5(4–6)	8(5–8)	8(5–8)	5 (5–7)
L7	32(32–44)	42(42–60)	70 (59–70)	86 (62–86)
L8	66(66–88)	95.5(95.5–113.5)	130 (119–130)	165.5 (165.5–189.5)
C1	60(60–90)	90(90–130)	130 (120)	175 (142)
S1	3	3	5	5
S2	25	30	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	4	6	8	10
K2	ϕ11	ϕ22	ϕ28	ϕ38
K3	12.8	24.5	31.3	41.3
K4	ϕ16	ϕ32	ϕ38	ϕ48
K5	15	20	27	35
K6	18	24	32	40

MODEL: PER

2–Stage

Ratio: 12, 15, 16, 20, 25, 28, 30, 35
40, 50, 70, 80, 100

Dimensions:



Unit:mm

Size	PER060–L2	PER090–L2	PER120–L2	PER160–L2
D1	ϕ14(16)	ϕ20 (22)	ϕ25 (32)	ϕ40
D2	ϕ40	ϕ60	ϕ80	ϕ130
D3	ϕ14 (ϕ6.35–19)	ϕ19 (ϕ11–24)	ϕ22 (ϕ16–24)	ϕ35 (ϕ22–38)
D4	ϕ50 (ϕ30–70)	ϕ70 (ϕ50–110)	ϕ110 (ϕ55.5–110)	ϕ114.3 (ϕ110–114.3)
D5	ϕ70 (ϕ45–90)	ϕ90 (ϕ70–145)	ϕ145 (ϕ90–155)	ϕ200 (ϕ145–200)
D6	4–M4 (M3–M6)	4–M5 (M4–M8)	4–M8 (M6–M12)	4–M12 (M8–M12)
D7	ϕ52	ϕ70	ϕ100	ϕ145
D8	4–M5X10L	4–M6X12L	4–M10X20L	4–M12X24L
D9	M5X0.8P	M8X1.25P	M10X1.5P	M16X2P
L1	35	40	55	87
L2	31	35	49	80
L3	3	3	4	5
L4	62	78.5	110	149
L5	159	213.5	303	333
L6	5(4–6)	8(5–8)	8(5–8)	5 (5–7)
L7	32(32–44)	42(42–60)	70 (59–70)	86 (62–86)
L8	66(66–88)	95.5(95.5–113.5)	130 (119–130)	165.5 (165.5–189.5)
C1	60(60–90)	90(90–130)	130 (120)	175 (142)
S1	3	3	5	5
S2	25	30	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	4	6	8	10
K2	ϕ11	ϕ22	ϕ28	ϕ38
K3	12.8	24.5	31.3	41.3
K4	ϕ16	ϕ32	ϕ38	ϕ48
K5	15	20	27	35
K6	18	24	32	40

RIGHT ANGLE GEARBOX

ZR

Low rotating backlash less than 10 seconds

- The right angle reducer is processed using a high precision six axial machine. It is clamped and and finished all in one process.
- Transmission gears can achieve low rotating backlash and high accuracy through precision grinding.
- Precision transmission and quiet, stable operation can realize low noise, high rigidity and other requirements.

ZR–P
Solid shaft

ZR–H
Hollow shaft

ZR–2P
Double output shaft

Features

- The reducer body with a compact structure and small volume to save the mounting space.
- Although the reducer is small in volume and light in weight, and it features of high torque output and low backlash.
- When ordering, please inform the sizes of motor flange and shaft.

Model Identification

ZR — 042 — 3 — P

Right Angle Reducer | Specifications | Ratio | Output mode

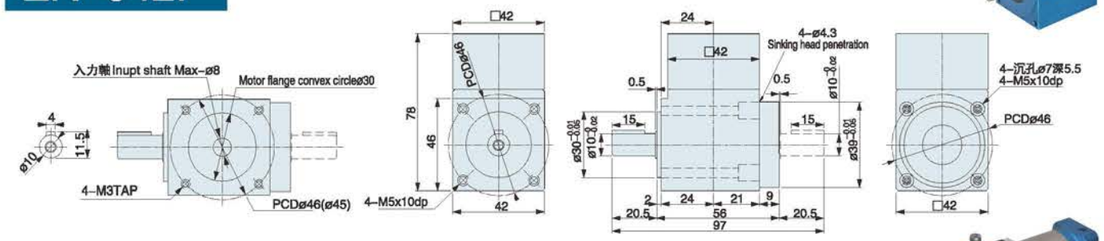
P: Single output shaft
2P: Double output shaft
H: Hole output
S: with planetary gearbox

Specification

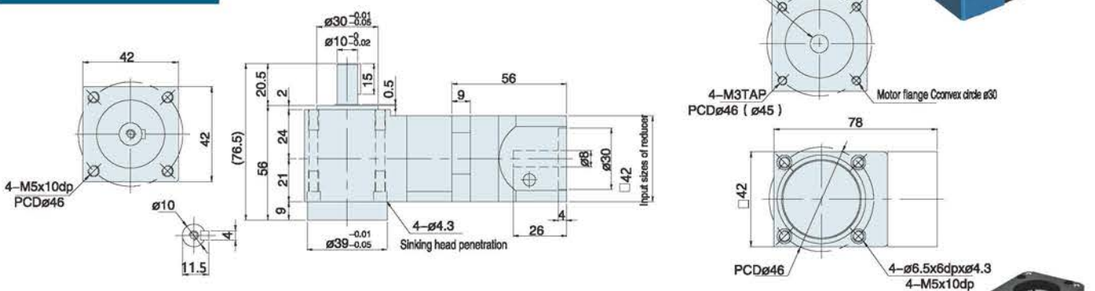
Model No. \ Description	Ratio	Allowable Max Torque (kgf.m/N.m)	Breaking Torque (kgf.m/N.m)	Allowable Max Speed (rpm/min)	Backlash (min-arc)	Weight (kg)
ZR042	3	1.5/15	4/40	2500	0.5	0.5
ZR042S	9.12.15.21.30	1.5/15	4/40	2500	2	0.9

Dimensions Unit: mm

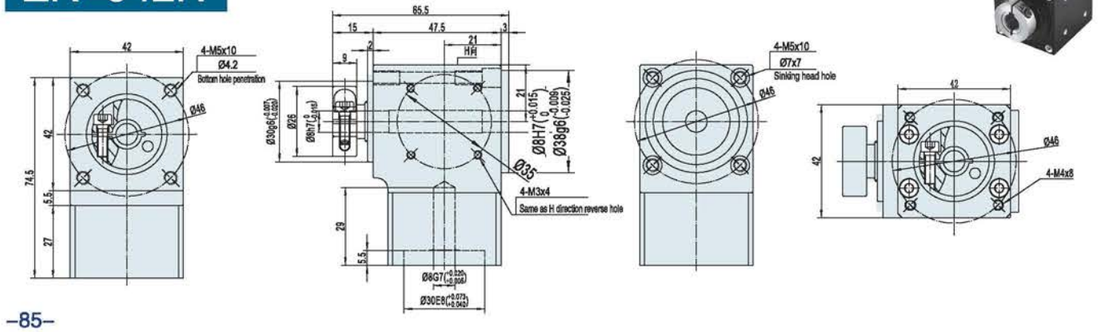
ZR-042P Single output shaft



ZR-042S with planetary gearbox



ZR-042H Hole output



Model Identification

ZR — 060 — 3 — P

Right Angle Reducer | Specifications | Ratio | Output mode

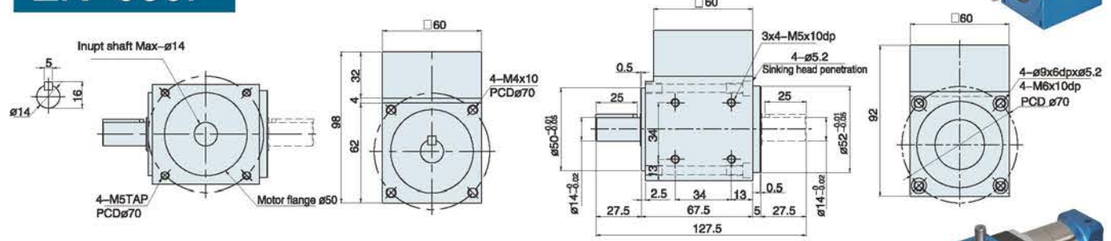
P: Single output shaft
2P: Double output shaft
H: Hole output
S: with planetary gearbox

Specification

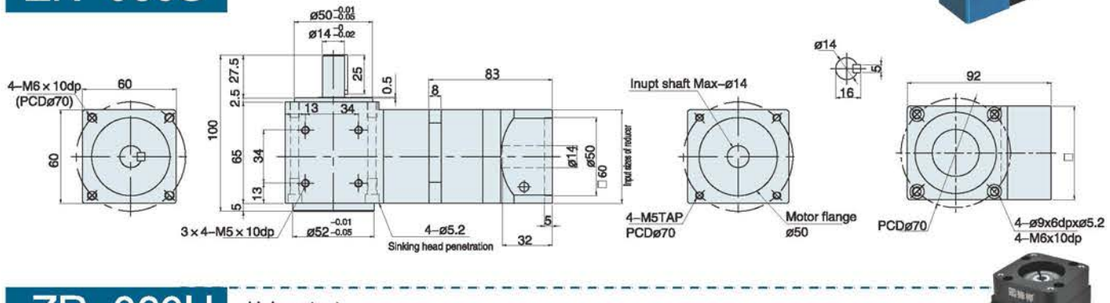
Model No. \ Description	Ratio	Allowable Max Torque (kgf.m/N.m)	Breaking Torque (kgf.m/N.m)	Allowable Max Speed (rpm/min)	Backlash (min-arc)	Weight (kg)
ZR060	2 / 3	4.5/45	12/120	2500	0.5	1.2
ZR060S	6.8.10.14.20	4.5/45	12/120	2500	2	2

Dimensions Unit: mm

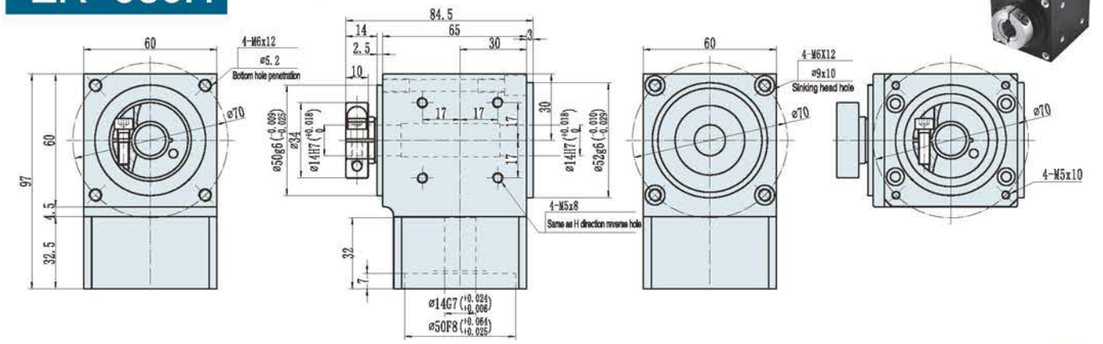
ZR-060P Single output shaft



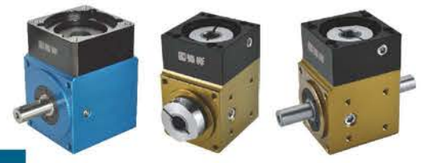
ZR-060S with planetary gearbox



ZR-060H Hole output



Model Identification



ZR — 090 — 3 — P

Right Angle Reducer | Specifications | Ratio | Output mode

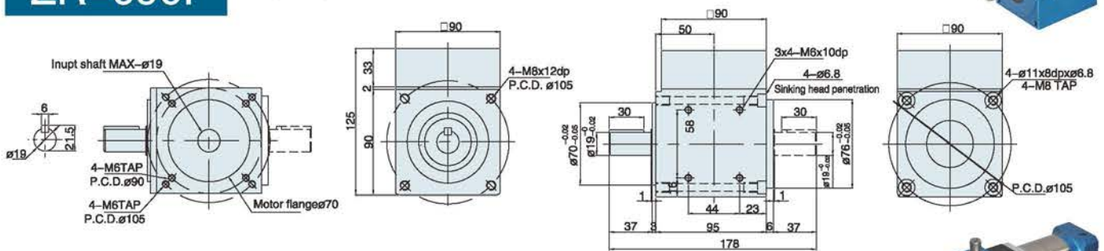
P: Single output shaft
2P: Double output shaft
H: Hole output
S: with planetary gearbox

Specification

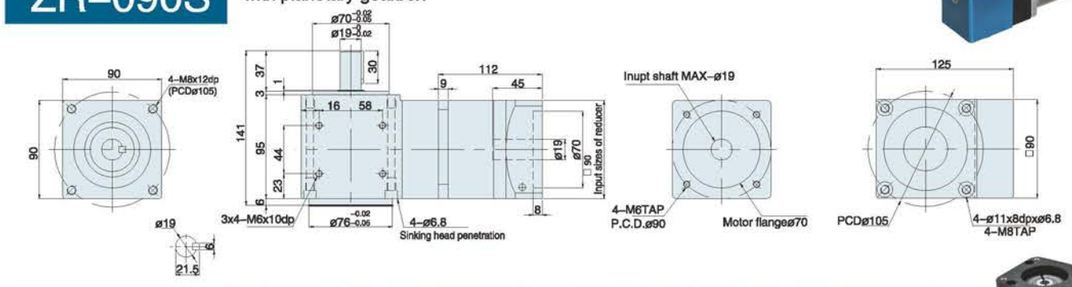
Model No. \ Description	Ratio	Allowable Max Torque (kgf.m/N.m)	Breaking Torque (kgf.m/N.m)	Allowable Max Speed (rpm/min)	Backlash (min-arc)	Weight (kg)
ZR090	2 / 3	12/120	32/320	2500	0.5	3.6
ZR090S	6.8.10.14.20	12/120	32/320	2500	2	6.5

Dimensions Unit: mm

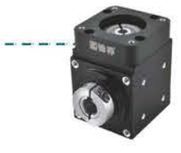
ZR-090P Single output shaft

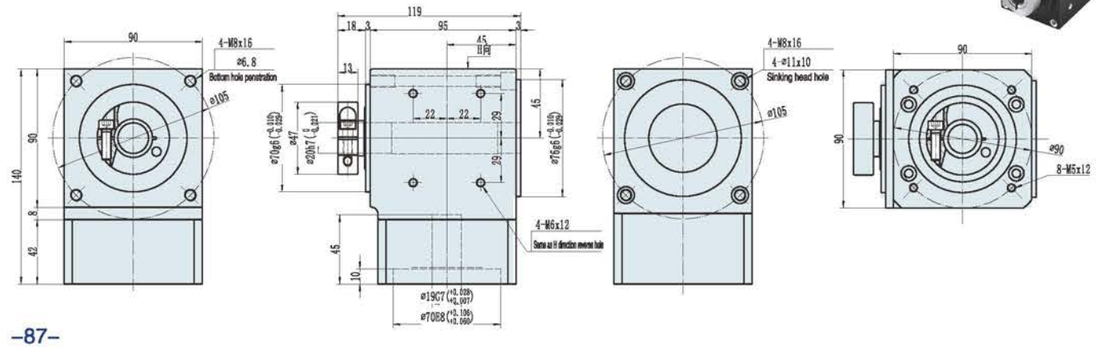


ZR-090S with planetary gearbox

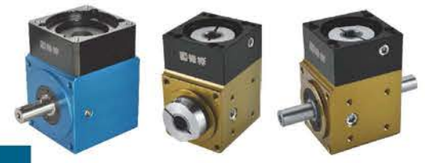


ZR-090H Hole output





Model Identification



ZR — 120 — 3 — P

Right Angle Reducer | Specifications | Ratio | Output mode

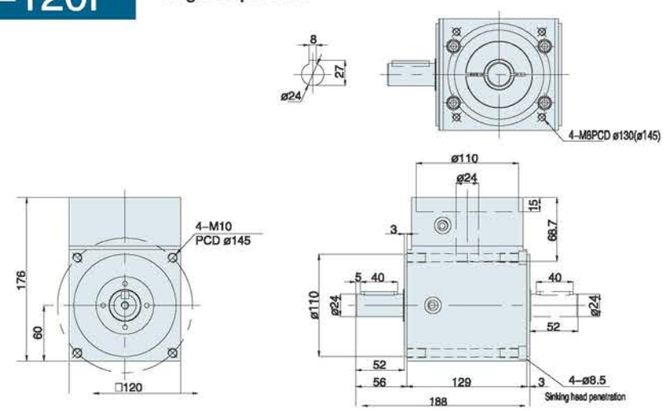
P: Single output shaft
2P: Double output shaft
H: Hole output
S: with planetary gearbox

Specification

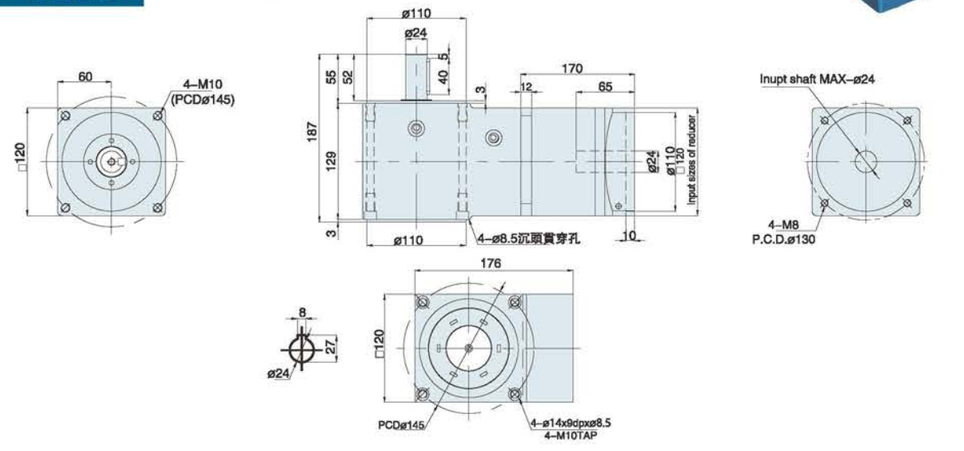
Model No. \ Description	Ratio	Allowable Max Torque (kgf.m/N.m)	Breaking Torque (kgf.m/N.m)	Allowable Max Speed (rpm/min)	Backlash (min-arc)	Weight (kg)
ZR120	2	16/160	45/450	2500	0.5	8
ZR120S	6.8.10.14.20	16/160	45/450	2500	2	15.5

Dimensions Unit: mm

ZR-120P Single output shaft



ZR-120S with planetary gearbox



Model Identification

RA — 042 — 2 — V2

Right Angle Reducer | Specification | Ratio | Motor

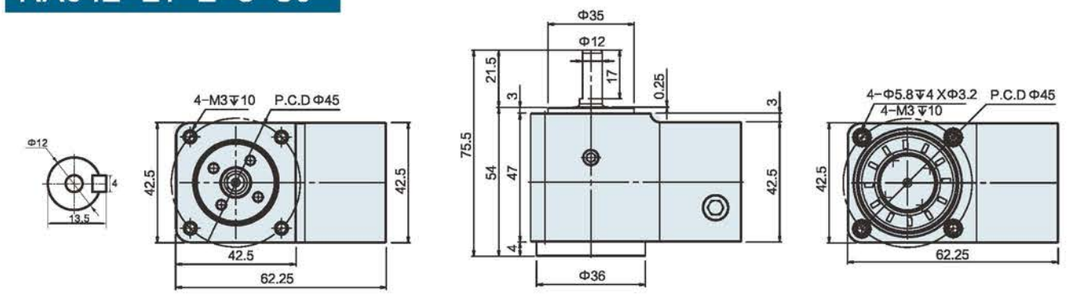
Specification

Product model	Unit	RA□042	RA□060	RA□090	RA□120
Ratio	I	1:2/1:3	1:2/1:3	1:2/1:3	1:2/1:3
Rated output torque T_{2N}	Nm	14	22	45	95
Max. Torque T_{2Not}	Nm	42	65	130	200
Rated speed n_{1n}	rpm	1500	1500	1500	1500
Max.speed n_{1B}	rpm	2000	2000	2000	2000
Backlash jt	arcmin	8	8	8	8
Allowable radial force F_{2RB}	N	300	500	900	1800
Allowable axial force $_{2AB}$	N	150	200	480	1100
Moment inertia J_1	$Kg.cm^2$	0.025	0.07	0.07	0.12
Working efficiency N	%	95%	95%	95%	95%
Service life Lh	h	≥20000	≥20000	≥20000	≥20000
Temperature T	℃	-15℃~90℃	-15℃~90℃	-15℃~90℃	-15℃~90℃
Noise level	Db	≤65	≤65	≤66	≤66
Lubricant	Lub	Synthetic grease	Synthetic grease	Synthetic grease	Synthetic grease
Protection class	PC	IP65	IP65	IP65	IP65
Mounting direction	MP	Any direction	Any direction	Any direction	Any direction
Weight	kg	0.7	1.3	4.0	8.5

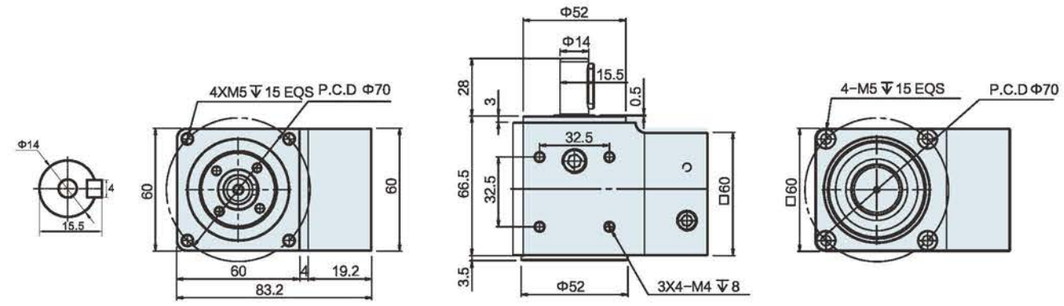
* The above technical parameters are for reference only, and the actual specs and dimensions are issued according to the data provided by customers.

Dimensions Unit: mm

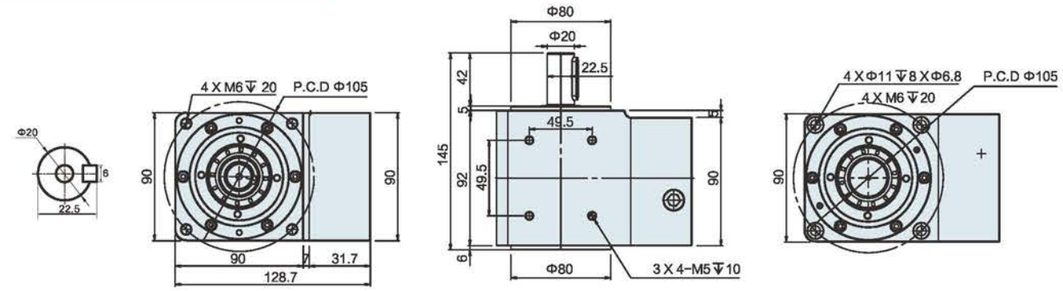
RA042-L1-2-8-30



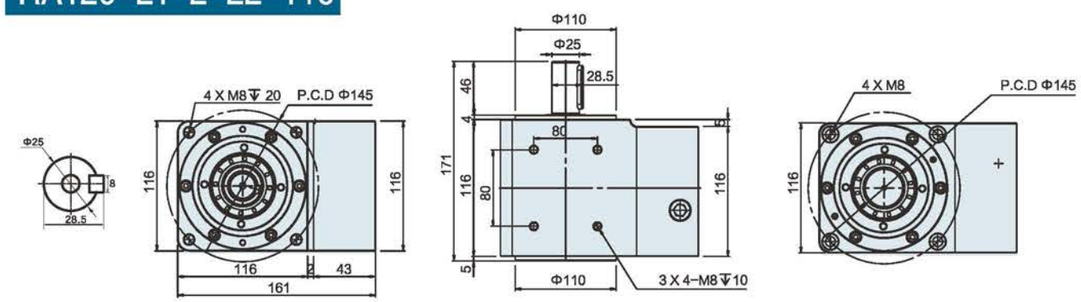
RA060-L1-2-14-50



RA090-L1-2-19-70



RA120-L1-2-22-110



Model Identification

RT – 042 – K – 05 – N

Hollow Rotating Series	Specifications		Ratio	Optional
	42 90 130 200	K: Planetary reducer T: Right angle reducer	03、05 09、15 20、21 25、30 50	N: Servo Motor B: Stepper Motor S: Closed loop stepper motor

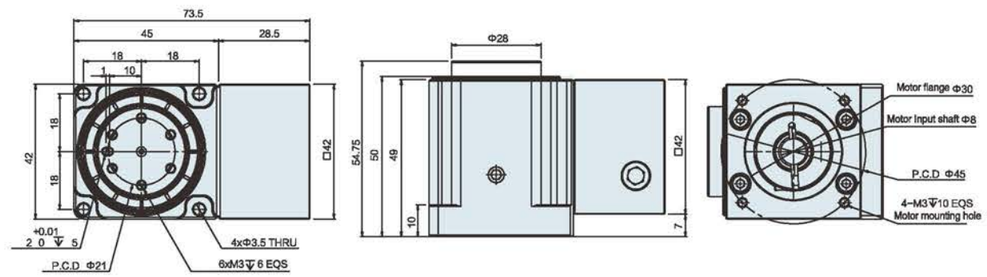
Specification

Product model	Unit	RT042-03-N	RT090-03-N	RT130-03-N	RT200-05-N
Ratio		3	3	3	5
Matching servo motor	W	100	100	400	750
Bearing structure		Tapered roller bearing	Tapered roller bearing	Tapered roller bearing	Tapered roller bearing
Allowable torque	N.M	14	35	60	100
Moment of inertia	$kg.m^2$	3610×10^{-7}	68540×10^{-7}	110725×10^{-7}	876410×10^{-7}
Allowable input speed	r/min	2500	2500	2500	2500
Allowable inertia moment load	N.M	20	76	90	160
Allowable axial load	N	250	1000	2000	4000
Repeat positioning accuracy	arc-sec	±5	±5	±5	±5
Positioning accuracy	arc-min	±0.5	±0.5	±0.5	±0.5
Rotating platform surface deviation (plane bounce)	mm	±0.01	±0.005	±0.005	±0.005
Rotating platform concentricity	mm	±0.01	±0.005	±0.005	±0.005
Rotating platform parallelism	mm	±0.02	±0.015	±0.015	±0.015
Accuracy life	h	25000	25000	25000	25000
Protection class		IP40	IP40	IP40	IP40
Mass	kg	1.2	3.3	6.5	28

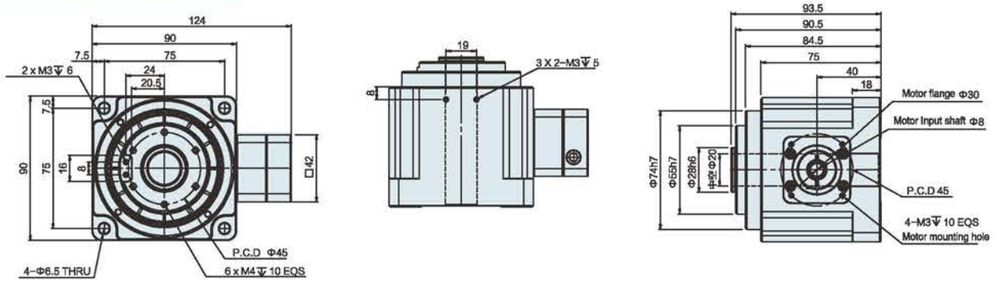
* The above technical parameters are for reference only, and the actual specs and dimensions are issued according to the data provided by customers.

Dimensions Unit: mm

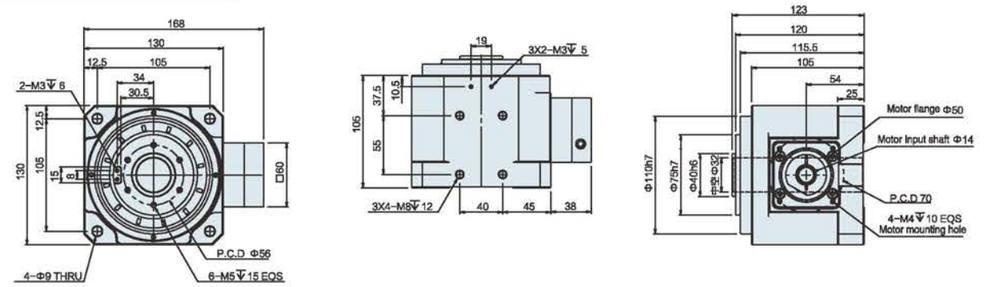
RT042-03-N



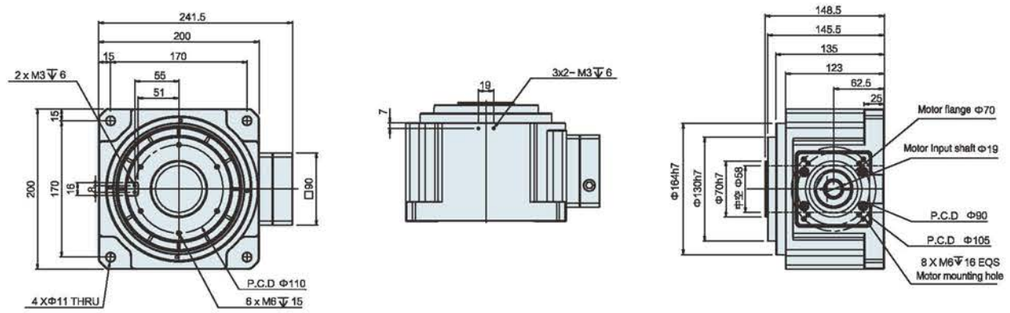
RT090-03-N



RT130-03-N



RT200-05-N



* The above drawings are for reference only, and the actual specs and dimensions are issued according to the data provided by customers.

RM Series

Right-angle Hollow Rotating Platform

Ordering Representation

RM - 130 - 30 - 14 - 50 - 70

Series	Model	Ratio	Motor Shaft Diameter	Motor Pilot Diameter	Motor P.C.D
RM	130 180 260	LI：15/21/30 L2：60/75/105/120 150/210/300			Attention: (Servo Motor P.C.D) (Stepper Motor P.C.D)

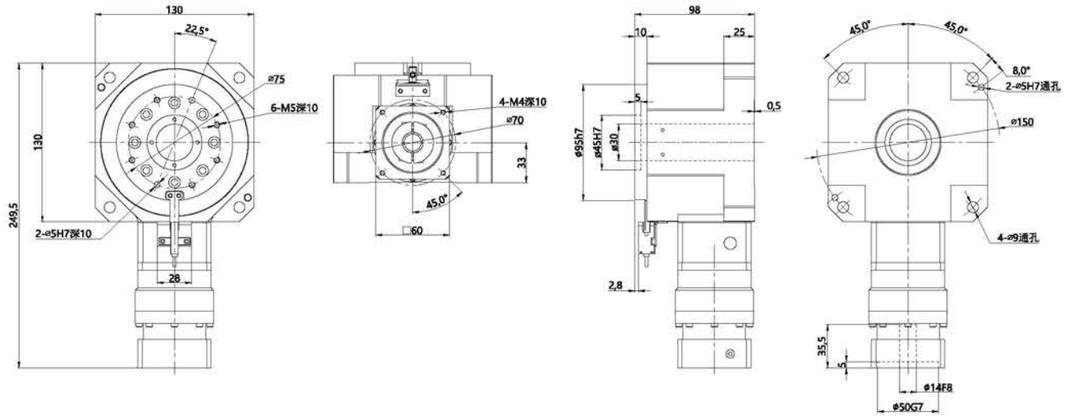
Technical Parameter

Model		RM130			RM180			RM260		
Bearing strudure		Cross roller bearing								
Reduction ratio	i	15	21	30	15	21	30	15	21	30
Rated output torque	N.m	150	130	105	430	400	360	2950	2650	2200
Qutput torque	N.m	3 Times rated torque								
Positioning accuracy	arc-min	≤2								
Repeated postioning acouracy	arc-sec	≤30								
Allowable disk speed	rpm	200 Intermittent operation								
Adapt to servo motor	W	200–400			750–1500			2000–5000		
Suitable for stepping motor		57 Stepper			86/110 Stepper			130/150 Stepper		
Allowable axial load	N	7300			13500			29600		
Allowable radial load	N	7300			13500			29600		
Design load	Kg	50			150			1000		
Allowable moment of inertia	N.m	50			110			750		
Torsional rigidity	N.m/arcmin	25			45			175		
Overturning moment	N.m	520			1420			6300		
Accuracy life	h	20000h Intermittent operation								
Probection level	IP	54								
Lubricabion method		Long–term lubrication								
Installation method		Arbitrary								
Concentbricity of rotating platform	mm	≤0.01								
Parallelsm of rotating platform	mm	≤0.01								
Transmission efficiency	%	95			95			95		
Nolse	db	≤57			≤63			≤63		
Weight	Kg	7			17			17		

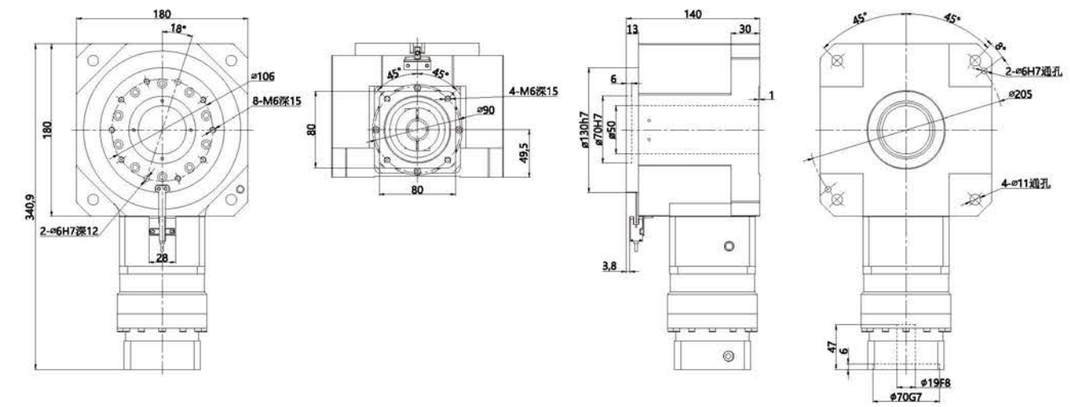
Attention： If the parallelism of the rotating platform has higher requirements, please contact our sales staff

Outline Dimensional

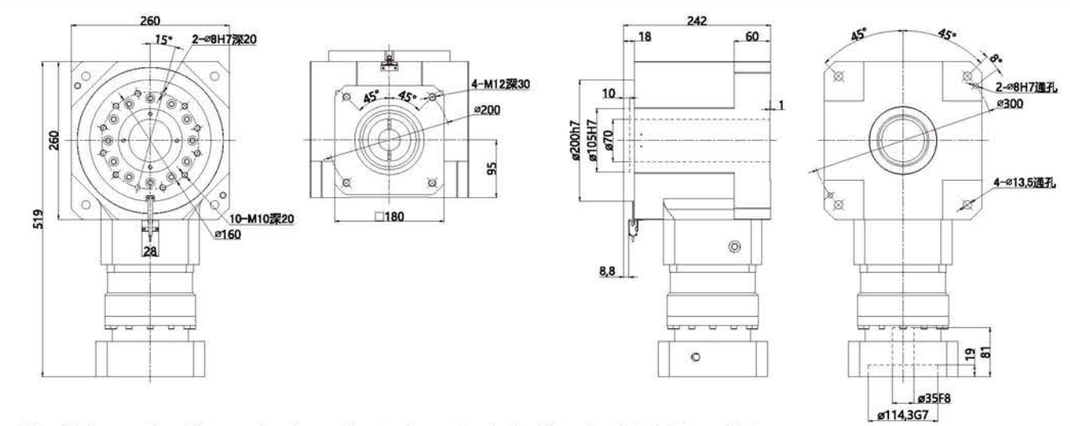
RM130– (15/21/30 Ratio for Servo Motor 200–400W, 57 Stepper Motor)



RM180– (15/21/30 Ratio for Servo Motor 750–1500W, 86/110 Stepper Motor)



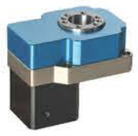
RM260– (15/21/30 Ratio for Servo Motor 2000–5000W、130/150 Stepper Mot



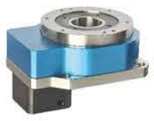
* Specifications mentioned above are for reference, the actual parameter situation is based on the tech data provided

Hollow Rotary Actuator

ZK

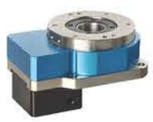


ZK60–5–5A

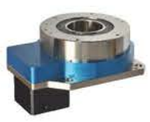


ZK100–8

ZK130–10



ZK200–10



ZK275–10

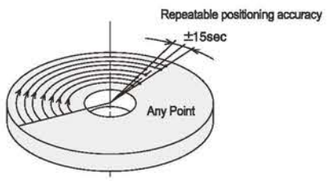
- Working objects can be locked directly
  The rotating disk surface can directly lock the working objects, and
- therefore improve the convenience of the workpiece transfer.
  Wiring convenience
  Featured with a hollow design, the rotating platform is convenient for wiring or piping.

- Alternative D.D motor and cam splitter

Straight lines motions and circular motions are two kinds of mechanical movements. Linear motion are mainly based on various types of slides, while circular motions are the most representative motion of cam indexers. And due to the maturity of technology and the accuracy requirement of equipment, D.D motor is becoming more and more popular. However, the traditional splitter has been unable to meet the needs of any segmentation. Though D. D Motor can be applied in multiple ways and with high precision, its high price is the main factors that make user reconsider. ZK series hollow rotating table has successfully got a balance between the cam indexers and D.D motor. It fills the functional requirements that not only can greatly reduce the cost of D.D Motor, but also can meet the high–precision and digital control that the cam divider can't provide.

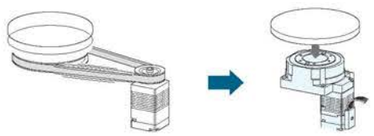
- High positioning accuracy. Repeatable positioning accuracy is ± 15 sec and idling accuracy is 2 min

Ultra-precision machined gears are used in the speed reduction mechanism to eliminate the backlash through its own adjustment mechanism, thus there will be no backlash in the part of mechanism. As repeated positioning accuracy is ±15 sec in one direction and idling precision is 2 min in two directions, positioning with high accuracy is possible.



- Direct connection – simple design enhances trust

The worktable and robot arm of the equipment can be installed directly on the hollow output platform. When the general equipment positions and operates by means of pulleys and other mechanical parts. It is mostly affected by the transmission efficiency of the mechanical parts and therefore the accuracy is reduced, or there is a need to maintain the parts of the mechanism. While the ZK series hollow rotary actuators can be installed directly without intermediate parts. Therefore, in addition to the direct use of the accuracy of the actuator itself, maintenance can be avoided.



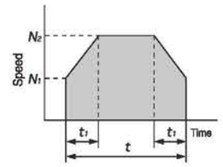
Calculation of Selection

Pre–calculation should be done in order to select suitable products of equipment. The introduction of calculation methods of the ZK series are as follow.

The calculation of the necessary torque

1 Firstly, calculate the inertia of the working object.
The work inertia should be under the 30 times of the inertia of the transmission equipment.
2 Determine the positioning angle
3 If there is no friction torque, please refer to the positioning time chart of ZK series to confirm the positioning time.
4 Determine the positioning time and acceleration and deceleration time.
Observe the following two conditions:
Positioning time ⩾Calculating the shortest positioning time according to the positioning time chart.
Time of acceleration and deceleration t x 2 ⩽ Positioning time
5 Determine the start speed N1, then calculate the speed N2 according to the following formula. Please set N1 to low speed 0~ number r/min]. Be careful not to set it too large.

$$N_2\,[\mathrm{r/min}] = \frac{\theta - 6N_1t_1}{6(t - t_1)}$$



N_2 : Speed (r/min) [r/min]
θ : Positioning angle[°]
N_1 : Start speed[r/min]
t : Positioning time [s]
t_1 : Acceleration (deceleration) time [s]

If the result calculated by the above formula can not satisfy the condition of N1 < N2 <⩽200 (r/min), please return to procedure 4 and confirm the conditions again.

6 Calculate the acceleration torque according to the following formula

$$\text{Acceleration torque } Ta\,[\mathrm{N\cdot m}] = (J_1 + J_L) \times \frac{\pi}{30} \times \frac{(N_2 - N_1)}{t}$$

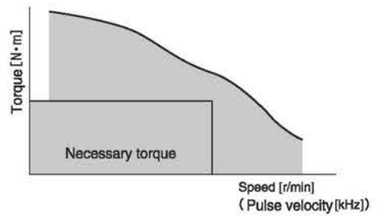
J_1 : Inertia of a rotating drive [kg·m²]
J_L : Inertia [kg·m²]
N_2 : [r/min]
N_1 : Starting speed [r/min]
t_1 : Acceleration (deceleration) time [s]

7 Calculate the necessary torque, the necessary torque is the load torque caused by the friction impedance plus the acceleration torque caused by the inertia, and then multiplied by the safety factor.

$$\text{Necessary torque} = (\text{Load torque } [\mathrm{N\cdot m}] + \text{Acceleration torque } [\mathrm{N\cdot m}]) \times \text{Safety factor} = (T_L + Ta) \times S$$

Please set safety factor S above 1.5.

8 Verify that the necessary torque T is included in the range of speed and torque characteristics. If not, please turn back to step 4, then change the conditions and recalculate.



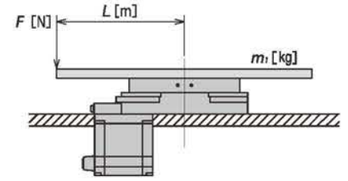
In addition, when the speed is converted to the pulse speed, please calculate the following the below formula.

$$f\,[\mathrm{Hz}] = \frac{6N}{\theta s}$$

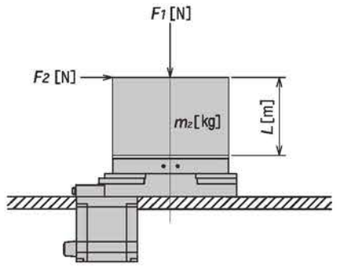
f : Pulse velocity [Hz]
N : speed [r/min]
θs : The step angle of the rotating platform[° /step]

The calculation method of the steering load and the inertia load

As shown below, when the load is loaded on the rotary platform, please calculate the axial load and mass load according to the formula below, and confirm whether it is within the specification value.



Axial load [N] $Fs = F + m_1 \times g$
Inertial load [N·m] $M = F \times L$

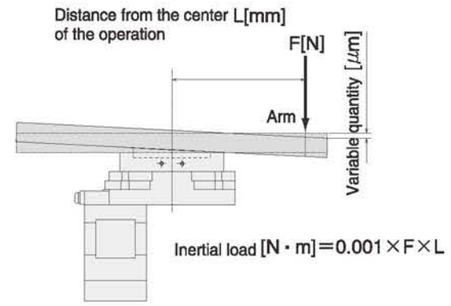


Product Name	a
ZK–60	0.01
ZK–100	0.02
ZK–130	0.03
ZK–200	0.04
ZK–275	0.05

$Fs = F_1 + m_2 \times g$
$M = F_2 \times (L + a)$

Variable quantity (reference value) caused by an inertial load

When attaching the inertia load to the rotating platform, the position will change. The variable quantity in the chart shows the change of inertia load on the L position of the center of rotation from the rotating platform to a fixed direction. If the inertia load acts on the positive and negative two directions, the variable quantity will be about 2 times.

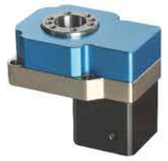


Inertial load [N · m] = 0.001 × F × L

Model Identification

ZK — 60 — R — 5 — 5A

ZK	60	R	5	5A
Hollow Rotating Series	Specifications	Optional	Ratio	Motor



Weight: 2kg

R: Right angle steering deceleration F: with motor connection seat		
	V1: Servo Ø8 PCD45,M3 V2: Servo Ø8 PCD46,M4	T1: Stepper Ø5 PCD43.8, M3 T2: Stepper Ø6 PCD43.8, M3 5A: 42H5K-2A
	100W AC servo motor for each brand	42 stepper motor for each brand

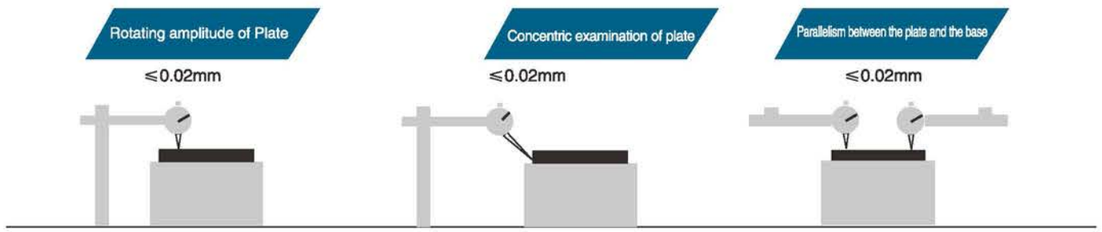
Specification

Model	ZK60	ZK60R
Bearing of rotate table	Deep groove ball+Thrust ball bearing	
Allowable torque (N.m)	5	
Precision lifetime	15000Hrs	
Allowable speed (rpm)	200(Plate)	
Ratio	5	15
Repeated accuracy(arc-sec)	≤15	≤20
Positioning accuracy(arc-min)	≤1	≤1
Parallelism of rotate plate(mm)	≤0.02	
Coaxiality of rotate plate(mm)	≤0.02	
Protection Class	IP40	

P.S: Circumferential unit: 1 rpm=360° 1° =60'(arc-min) 1'=60"(arc-sec)
Circumferential error conversion linear error:Disc diameter × 3.14159 ÷ (360° × 60' × 60")The value of backlash

Positioning Accuracy Examination

The accuracy of this specification is tested by this ratio



Positioning precision radius of any point of outer diameter 19mm≤1min

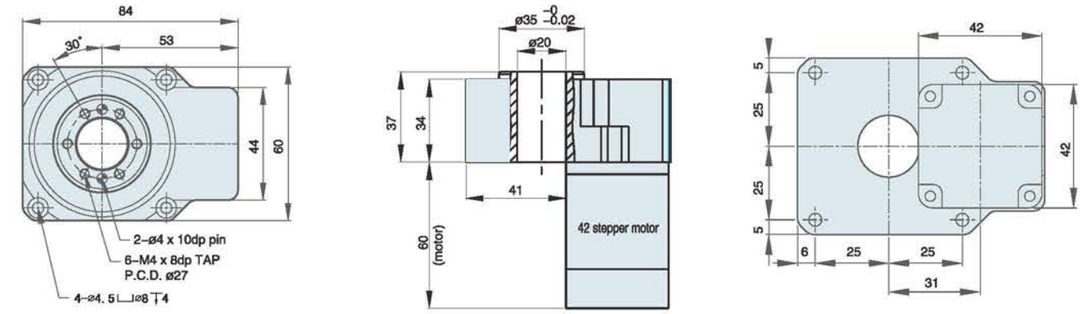
Precision radius of repeated positioning 19mm≤15sec

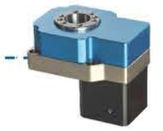
Radius arm 200mm
When the force gravity at 5kg
The outer edge of ZK60
was measured ≤0.02mm

Dimensions Unit:mm

ZK60-5-5A

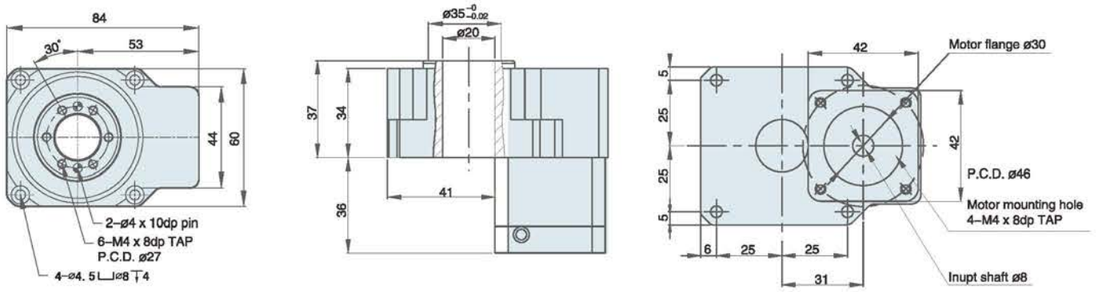
(This model contains stepper motor 42H5K-2A)





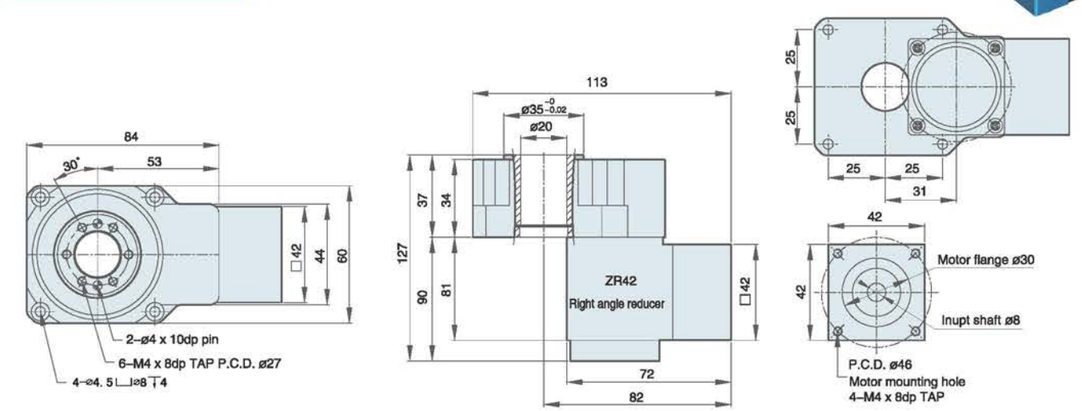
ZK60F-5

(A self assembled motor with a connecting seat)



ZK60R-15

(Right angle steering 1:15)



※ Please provide the size of the motor flange when ordering

P.S: Origin Sensor specification (selection) OMRON EE-SX672

Model Identification

ZK — 100 — R — 8 — V2

ZK	100	R	8	V2
Hollow Rotating Series	Specifications	Optional	Ratio	Motor

Weight: 2.5kg

Optional
R：Right angle steering deceleration P：Attached planetary reducer

Motor	
V1: Servo Ø14 PCD70 M4 V2: Servo Ø14 PCD70 M5	T1: Stepper Ø8 PCD66.67,M4 T2: Stepper Ø8 PCD70,M4 T3: Stepper Ø10 PCD70,M4
200~400W AC servo motor for each brand	60 stepper motor for each brand

Specification

Model	ZK100	ZK100R	ZK100P
Bearing of rotate table	Tapered roller bearing		
Allowable torque (N.m)	45		
Precision lifetime	20000Hrs		
Allowable speed (rpm)	200(Plate)		
Ratio	8	16,24	24,32,40
Repeated accuracy(arc-sec)	≤10	≤20	≤60
Positioning accuracy(arc-min)	≤1	≤1	≤2
Parallelism of rotate plate(mm)	≤0.02		
Coaxiality of rotate plate(mm)	≤0.015		
Protection Class	IP40		

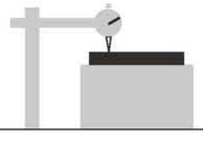
P.S: Circumferential unit：1 rpm=360°　1° =60'(arc-min) 1'=60"(arc-sec)
Circumferential error conversion linear error:Disc diameter × 3.14159 ÷ (360° × 60' × 60")The value of backlash

Positioning Accuracy Examination

The accuracy of this specification is tested by this ratio

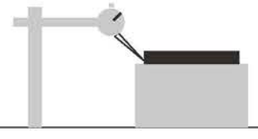
Rotating amplitude of Plate

≤0.005mm



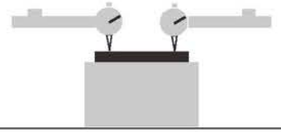
Concentric examination of plate

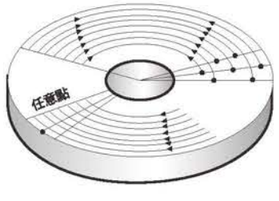
≤0.015mm



Parallelism between the plate and the base

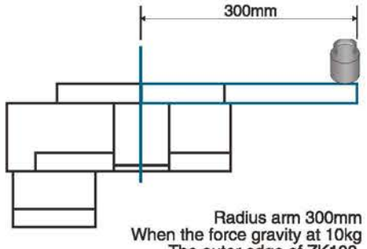
≤0.02mm





Positioning precision radius of any point of outer diameter 50mm≤1min

Precision radius of repeated positioning 50mm≤10sec

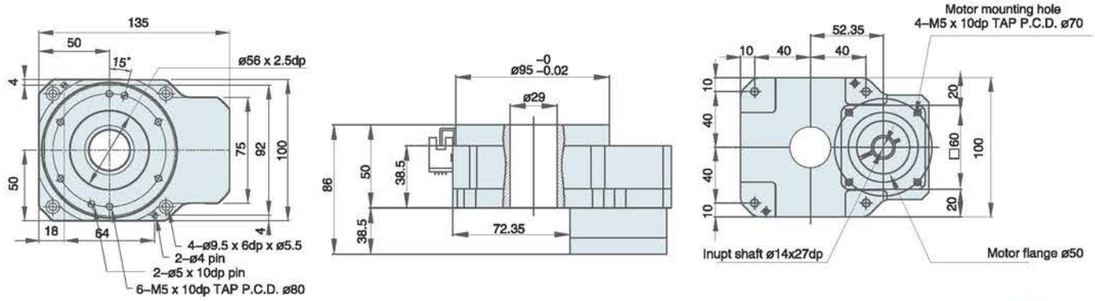


Radius arm 300mm
When the force gravity at 10kg
The outer edge of ZK100
was measured ≤0.01mm

Dimensions Unit:mm

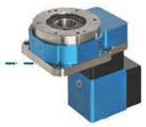
ZK 100

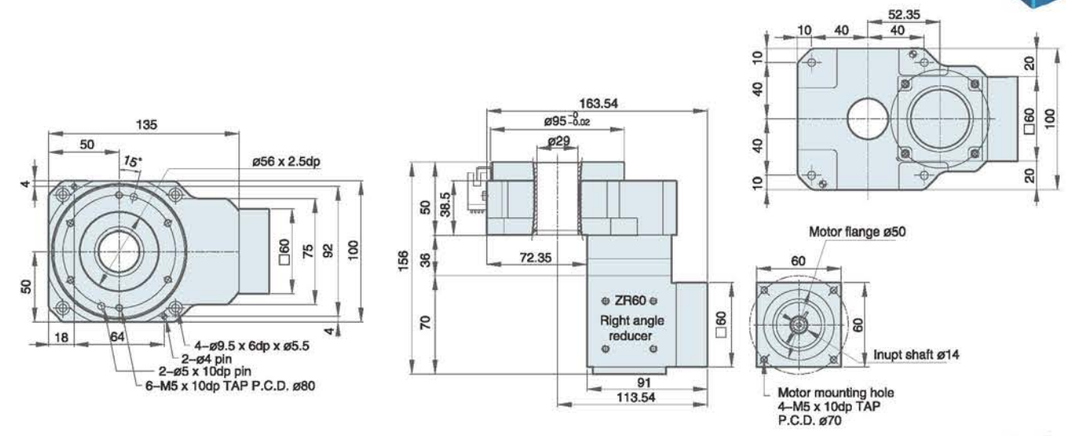
(A self assembled motor with a connecting seat)



ZK 100R

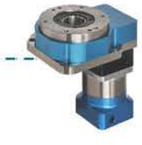
(Right angle steering 1:16)

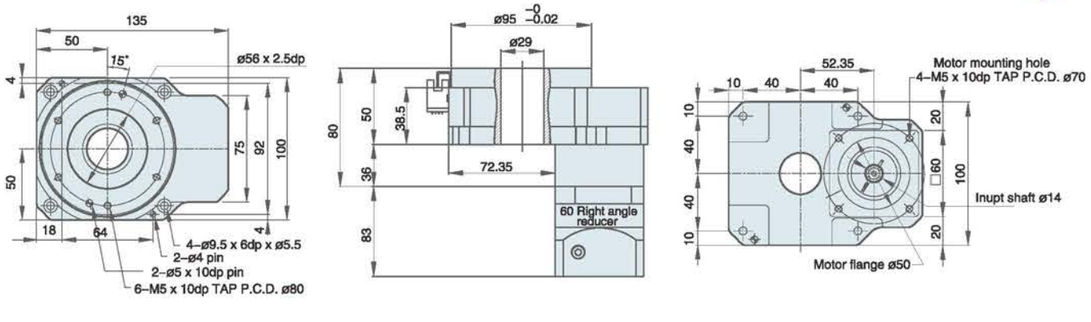




ZK 100P

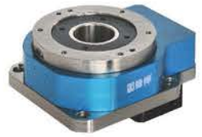
(Attached planetary reducer ratio 24,32,40)





※ Please provide the size of the motor flange when ordering
P.S：Origin Sensor specification (selection) OMRON EE-SX672

Model Identification



ZK — 130 — R — 10 — V2

Hollow Rotating Series	Specifications	Optional	Ratio	Motor

Weight:4.5kg

Optional
R: Right angle steering deceleration P: Attached planetary reducer

Motor	
V1: Servo Ø14 PCD70 M4 V2: Servo Ø14 PCD70 M5	T1: Stepper Ø8 PCD66.67,M4 T2: Stepper Ø8 PCD70,M4 T3: Stepper Ø10 PCD70,M4
200~400W AC servo motor for each brand	60 stepper motor for each brand

Specification

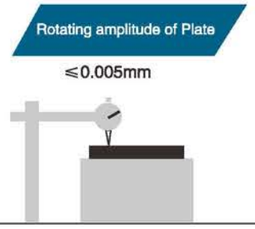
Model	ZK130	ZK130R	ZK130P
Bearing of rotate table	Tapered roller bearing		
Allowable torque (N.m)	45		
Precision lifetime	20000Hrs		
Allowable speed (rpm)	200(Plate)		
Ratio	10	20,30	30,40,50
Repeated accuracy(arc-sec)	≤10	≤20	≤60
Positioning accuracy(arc-min)	≤1	≤1	≤2
Parallelism of rotate plate(mm)	≤0.02		
Coaxiality of rotate plate(mm)	≤0.015		
Protection Class	IP40		

P.S: Circumferential unit：1 rpm=360°　1°　=60'(arc-min)　1'=60"(arc-sec)
Circumferential error conversion linear error:Disc diameter × 3.14159 ÷ (360°　× 60' × 60")The value of backlash

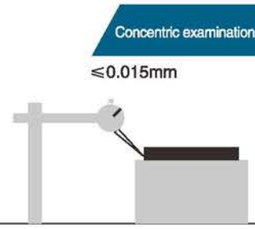
Positioning Accuracy Examination

The accuracy of this specification is tested by this ratio

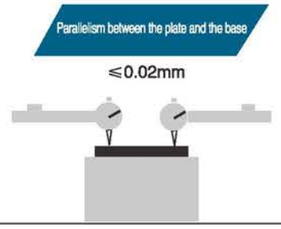
Rotating amplitude of Plate
≤0.005mm

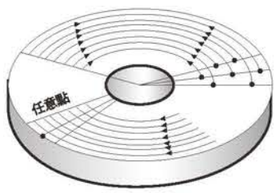


Concentric examination of plate
≤0.015mm

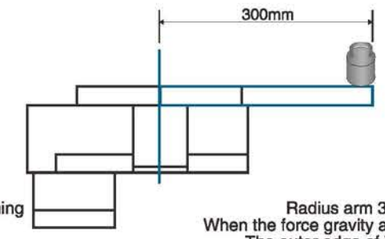


Parallelism between the plate and the base
≤0.02mm





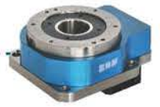
Positioning precision radius of any point of outer diameter 60mm≤1min



Precision radius of repeated positioning 60mm≤10sec

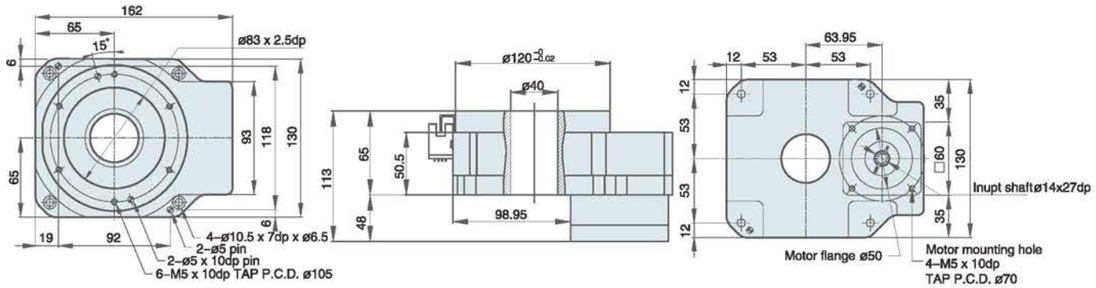
Radius arm 300mm
When the force gravity at 15kg
The outer edge of ZK130
was measured ≤0.01mm

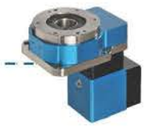
Dimensions Unit:mm



ZK 130

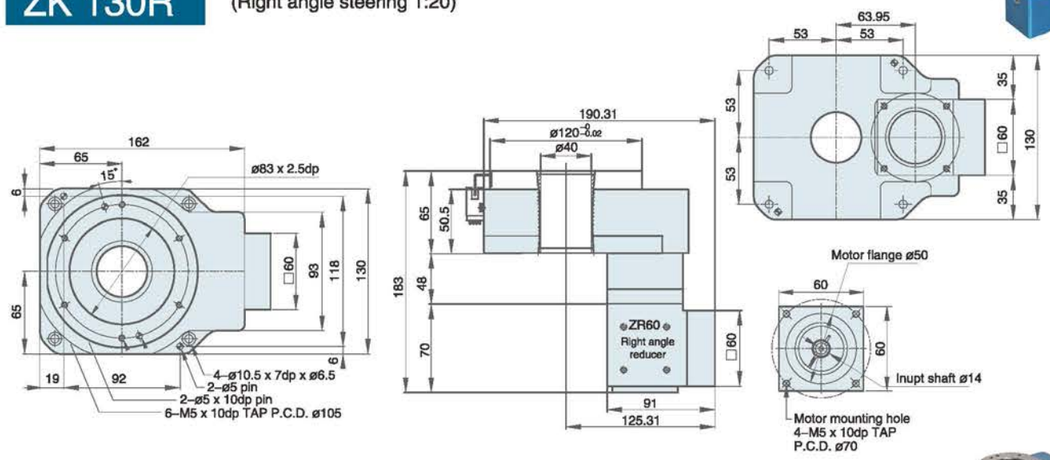
(A self assembled motor with a connecting seat)

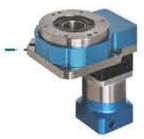




ZK 130R

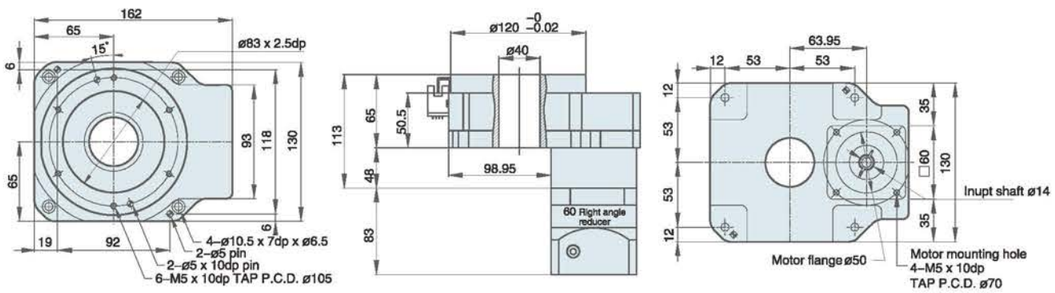
(Right angle steering 1:20)





ZK 130P

(Attached planetary reducer ratio 30,40,50)

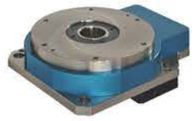


※ Please provide the size of the motor flange when ordering
P.S：Origin Sensor specification (selection) OMRON EE-SX672

Model Identification

ZK — 200 — R — 10 — V2

Hollow Rotating Series	Specifications	Optional	Ratio	Motor



Weight:11.5kg

R: Right angle steering deceleration P: Attached planetary reducer	V1: Servo Ø19 PCD90 M5 V2: Servo Ø19 PCD90 M6	T1: Stepper Ø14 PCD98.4, M5
	750W AC servo motor for each brand	86 stepper motor for each brand

Specification

Model	ZK200	ZK200R	ZK200P
Bearing of rotate table	Tapered roller bearing		
Allowable torque (N.m)	80		
Precision lifetime	20000Hrs		
Allowable speed (rpm)	200(Plate)		
Ratio	10	20,30	30,40,50
Repeated accuracy(arc-sec)	≤10	≤20	≤60
Positioning accuracy(arc-min)	≤1	≤1	≤2
Parallelism of rotate plate(mm)	≤0.02		
Coaxiality of rotate plate(mm)	≤0.015		
Protection Class	IP40		

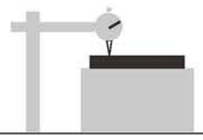
P.S: Circumferential unit: 1 rpm=360° 1° =60'(arc-min) 1'=60"(arc-sec)
Circumferential error conversion linear error:Disc diameter × 3.14159 ÷ (360° × 60' × 60")The value of backlash

Positioning Accuracy Examination

The accuracy of this specification is tested by this ratio

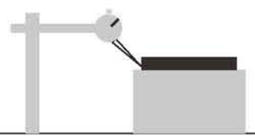
Rotating amplitude of Plate

≤0.005mm



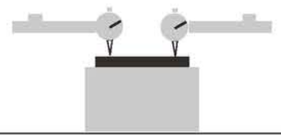
Concentric examination of plate

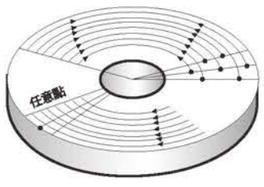
≤0.015mm



Parallelism between the plate and the base

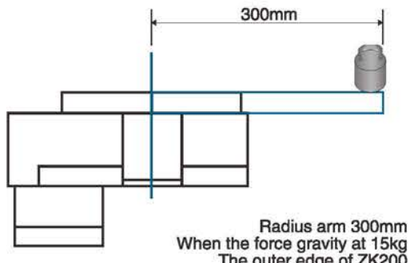
≤0.02mm





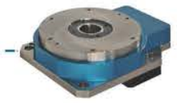
Positioning precision radius of any point of outer diameter 100mm≤1min

Precision radius of repeated positioning 100mm≤10sec



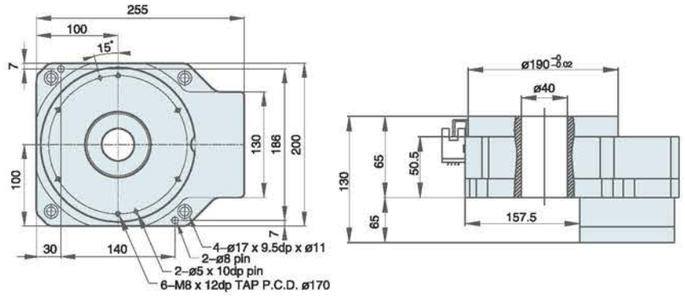
Radius arm 300mm
When the force gravity at 15kg
The outer edge of ZK200
was measured ≤0.01mm

Dimensions Unit:mm



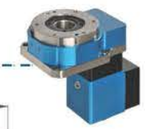
ZK 200

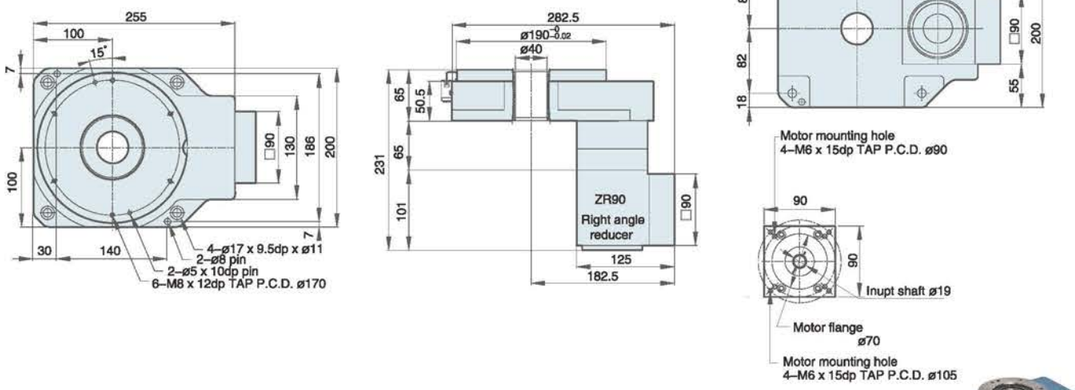
(A self assembled motor with a connecting seat)



ZK 200R

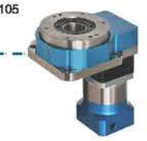
(Right angle steering 1:20)

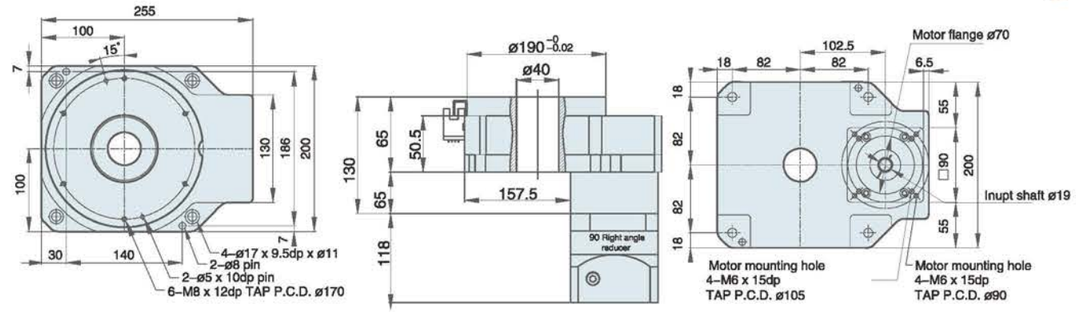




ZK 200P

(Attached planetary reducer ratio 30,40,50)



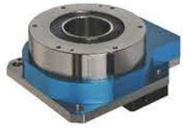


※ Please provide the size of the motor flange when ordering

P.S: Origin Sensor specification (selection) OMRON EE-SX672

Model Identification

ZK — 275 — R — 10 — V2



Weight:16kg

Hollow Rotating Series	Specifications	Optional	Ratio	Motor
		R: Right angle steering deceleration P: Attached planetary reducer		V1: Servo Ø19 PCD90 M5 V2: Servo Ø19 PCD90 M6 750W AC servo motor for each brand T1: Stepper Ø14 PCD98.4，M5 86 stepper motor for each brand

Specification

Model	ZK275	ZK275R	ZK275P
Bearing of rotate table	Tapered roller bearing		
Allowable torque (N.m)	80		
Precision lifetime	20000Hrs		
Allowable speed (rpm)	200(Plate)		
Ratio	10	20,30	30,40,50
Repeated accuracy(arc-sec)	≤10	≤20	≤60
Positioning accuracy(arc-min)	≤1	≤1	≤2
Parallelism of rotate plate(mm)	≤0.02		
Coaxiality of rotate plate(mm)	≤0.015		
Protection Class	IP40		

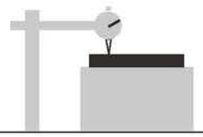
P.S: Circumferential unit：1 rpm=360°　1°　=60'(arc-min)　1'=60"(arc-sec)
Circumferential error conversion linear error:Disc diameter × 3.14159 ÷ (360°　× 60' × 60")The value of backlash

Positioning Accuracy Examination

The accuracy of this specification is tested by this ratio

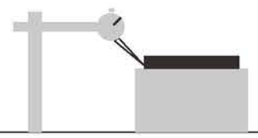
Rotating amplitude of Plate

≤0.005mm



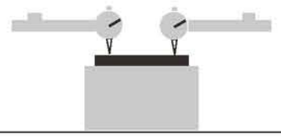
Concentric examination of plate

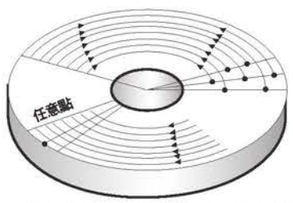
≤0.015mm



Parallelism between the plate and the base

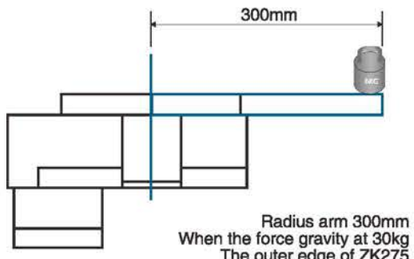
≤0.02mm





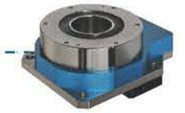
Positioning precision radius of any point of outer diameter 100mm≤1min

Precision radius of repeated positioning 100mm≤10sec



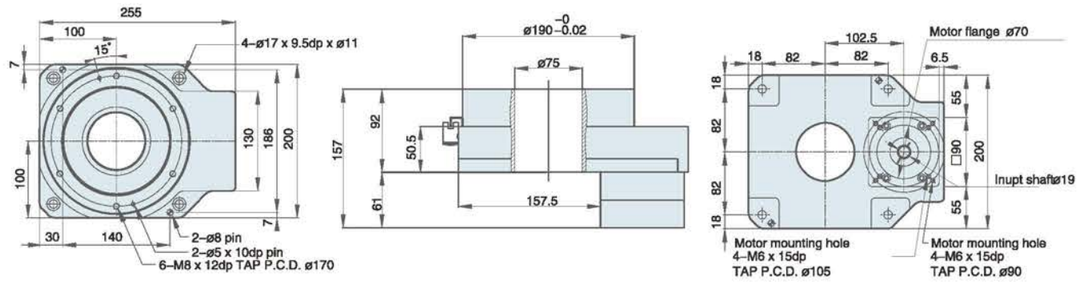
Radius arm 300mm
When the force gravity at 30kg
The outer edge of ZK275
was measured ≤0.01mm

Dimensions Unit:mm



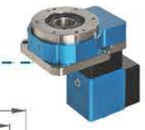
ZK 275

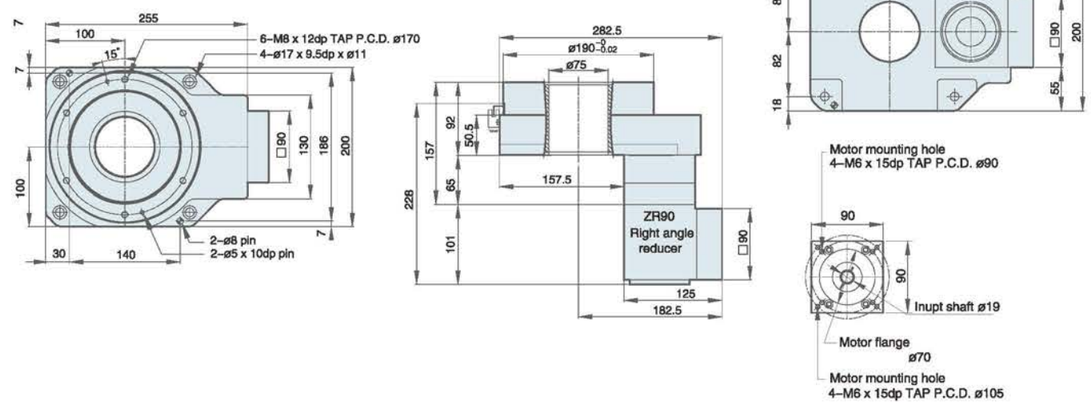
(A self assembled motor with a connecting seat)



ZK 275R

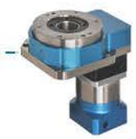
(Right angle steering 1:20)

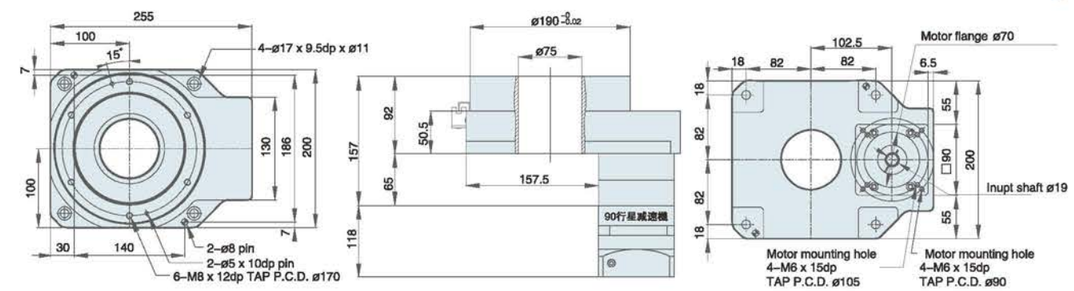




ZK 275P

(Attached planetary reducer ratio 30,40,50)





※ Please provide the size of the motor flange when ordering

P.S：Origin Sensor specification (selection) OMRON EE-SX672

Precision Hollow Rotary Actuator

DG

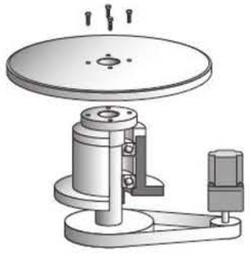
Hollow rotary transmission device with large diameter Simple wiring and piping

Direct connection Simple design to improve trust

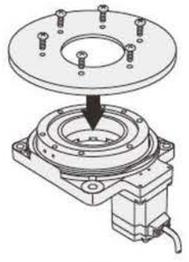
High positioning precision The accuracy of repeated positioning is + 15sec Lost motion is 2mins Angle transmission error is 4mins

Easy of origin regression regression thanks to the using the origin sensor kit (Choose and purchase accessories)

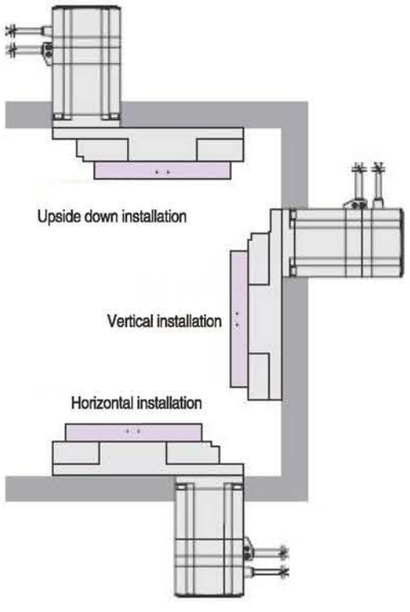
Short time positioning The positioning of the inertial load can be realized in a short time



Motor + mechanism components (separate design * procurement)



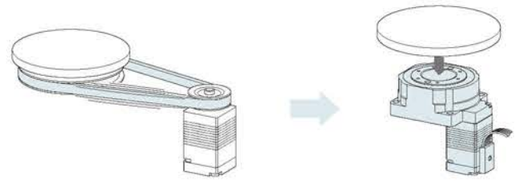
DGII series (Integrated product)



Hollow rotary transmission device

● Direct connection→Simple design to improve trust

The hollow output platform can directly install the worktable and machine arm of the equipment. When the general equipment is positioned and run through the belt pulley and other parts, the precision of the transmission efficiency of the mechanism is reduced, or the necessity of maintaining the parts of the mechanism.
The DG series can be directly installed because it does not pass through the intermediate parts, except that the accuracy of the product itself, it can also realize free–maintenance.



● Hollow rotary platform with large diameter→ simple wiring and piping

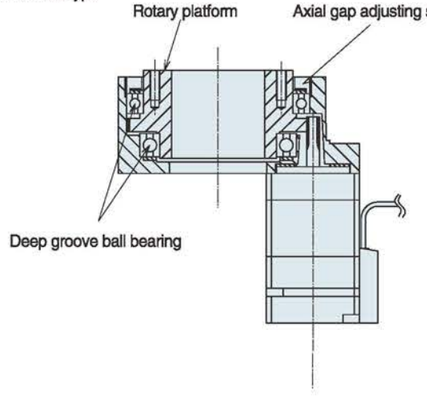
The design of a large diameter hollow hole (penetration) is realized by using one stage reduction gear mechanism to increase the diameter of the driven gear. It is suitable for the complicated wiring and piping application and so on, which makes the equipment design more succinct.

	Size(mm)	Hollow diameter
DG60	60	28
DG85R	85	33
DG130R	130	62

Eg：The application of DG130R.

Structure drawing

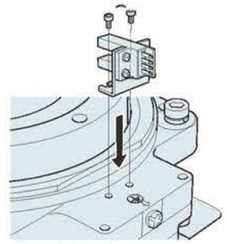
● Standard type



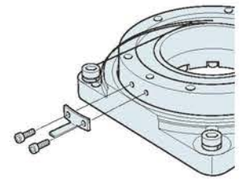
● Simple origin regression→ save time and labor for design and parts procurement.

In order to simplify the operation of the origin regression, the company also prepares the original sensor kit for customers(Choose and purchase accessories).
The kit includes all the parts required to mark the original point. It can save the users' time and labor of installing the sensor for the design, production, and part purchase.

(DG130R sensor, example of shading plate installation)



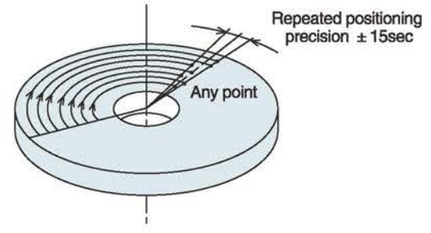
Installation of sensor



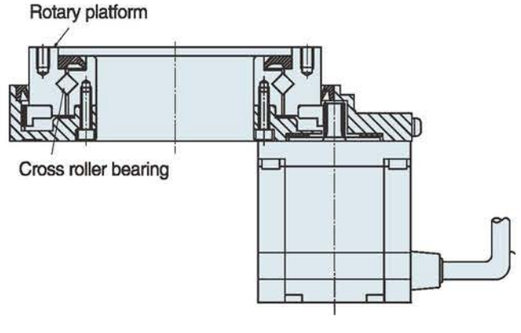
Installation of shading plate

● High Positioning accuracy → repeated positioning accuracy is + 15sec Lost Motion is 2mins

The mechanism part have no backlash, because the gearbox adopts micro precision gear, and it can eliminate the backlash through its own adjusting mechanism. The repeated positioning accuracy of single direction is 15sec; while the lost motion is 2mins of two direction positioning, so it can achieve high precision positioning.



● High rigidity type (DG85R、DG130R)



Model Identification

DG — 60 — R — 5 — V2

DG	60	R	5	V2
Hollow Rotating Series	Specifications	Optional	Ratio	Motor

Optional:
- R: Standard servo motor interface
- B: Integrated with stepper motor
- ZR: Plus right angle gearbox
- F: Plus planetary gearbox

Motor:

V1: Servo Ø8 PCD30 M3 V2: Servo Ø8 PCD30 M4	T1: Stepper Ø8 PCD43.8，M4
100W AC servo motor for each brand	42 stepper motor for each brand

Specification

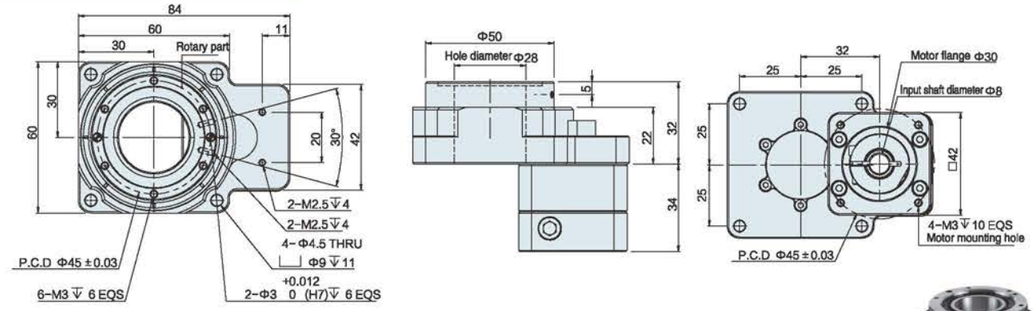
Product model	Unit	DG060–R–5	DG060–B–10	DG060–ZR–15	DG060–F–10
Ratio		5	10	15	30/40/50
Matching servo motor	W	100	Stepper	100	400/100
Bearing structure		Crossed roller bearing	Crossed roller bearing	Crossed roller bearing	Crossed roller bearing
Allowable torque	N.M	5	5	5	5
Moment of inertia	$kg.m^2$	4500×10^{-7}	4500×10^{-7}	4500×10^{-7}	21090×10^{-7}
Allowable plate output speed	r/min	200	200	200	200
Allowable inertia moment load	N.M	9	9	9	62/27
Allowable axial load	N	300	300	300	800
Repeat positioning accuracy	arc–sec	±5	±5	±5	±5
Positioning accuracy	arc–min	±0.5	±0.5	±0.5	⩾3
Rotating platform surface deviation (plane bounce)	mm	±0.005	±0.005	±0.005	±0.005
Rotating platform concentricity	mm	±0.01	±0.01	±0.01	±0.01
Rotating platform parallelism	mm	±0.015	±0.015	±0.015	±0.015
Accuracy life	h	25000	25000	25000	25000
Protection class		IP40	IP40	IP40	IP40
Mass	kg	0.55	1.04	1	1.23

* The above technical parameters are for reference only, and the actual specs and dimensions are issued according to the data provided by customers.

Dimensions Unit: mm

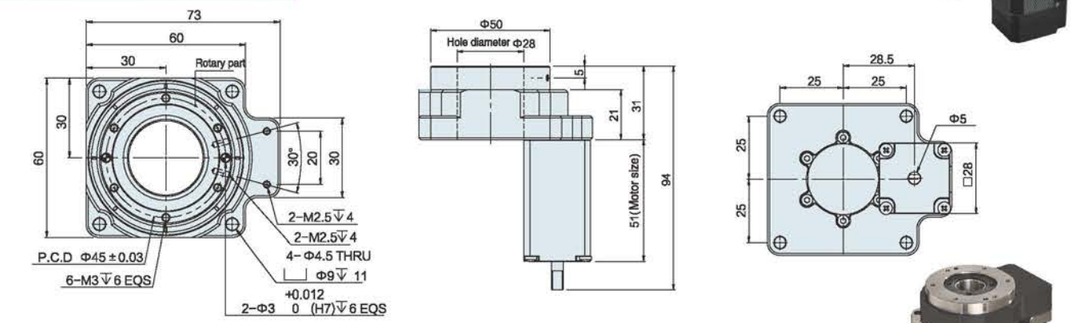
DG060–R–5

(A self assembled motor with a connecting seat)



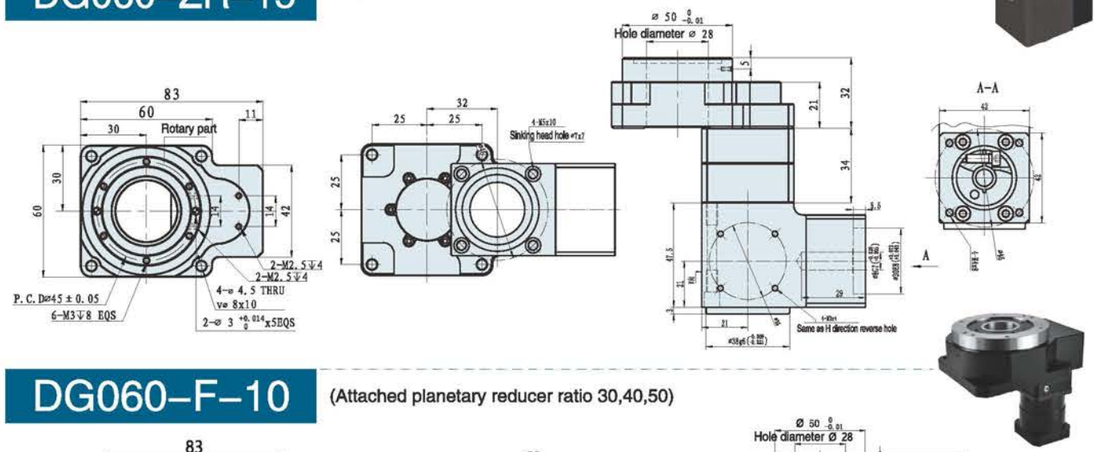
DG060–B–10

(This model contains stepper motor 42H5K–2A)



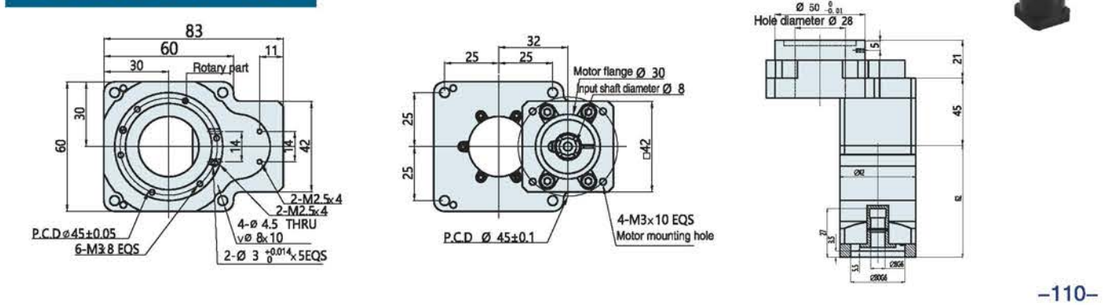
DG060–ZR–15

(Right angle steering 1:15)



DG060–F–10

(Attached planetary reducer ratio 30,40,50)



Model Identification

DG — 85 — R — 5/10 — V2

DG	85	R	5/10	V2
Hollow Rotating Series	Specifications	Optional	Ratio	Motor

Optional:
R: Standard servo motor interface
B: Integrated with stepper motor
S: Integrated with servo motor
ZR: Plus right angle gearbox
F: Plus planetary gearbox

Motor:

V1: Servo Ø1 4 PCD70 M4 V2: Servo Ø1 4 PCD70 M5	T1: Stepper Ø8 PCD66.7, M5
200W AC servo motor for each brand	86 stepper motor for each brand

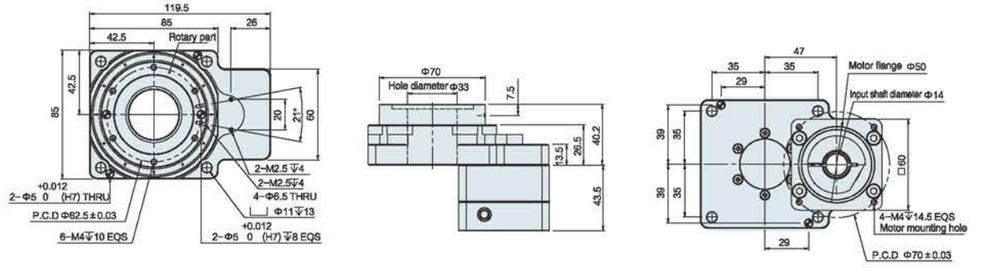
Specification

Product model	Unit	DG085–R–5	DG085–B–10	DG085–S–10	DG085–ZR–10	DG085–F–10
Ratio		5/10	10	10	20/30	30/40/50
Matching servo motor	W	400/100	400/100	400/100	400/100	400/100
Bearing structure		Crossed roller bearing	Crossed roller bearing	Crossed roller bearing	Crossed roller bearing	Crossed roller bearing
Allowable torque	N.M	40/18	40/18	40/18	40/18	40/18
Moment of inertia	$kg.m^2$	21090×10^{-7}	21090×10^{-7}	21090×10^{-7}	21090×10^{-7}	21090×10^{-7}
Allowable plate output speed	r/min	200	200	200	200	200
Allowable inertia moment load	N.M	62/27	62/27	62/27	62/27	62/27
Allowable axial load	N	800	800	800	800	800
Repeat positioning accuracy	arc–sec	±5	±5	±5	±5	±5
Positioning accuracy	arc–min	±0.5	±0.5	±0.5	⩾3	⩾3
Rotating platform surface deviation (plane bounce)	mm	±0.005	±0.005	±0.005	±0.005	±0.005
Rotating platform concentricity	mm	±0.01	±0.01	±0.01	±0.01	±0.01
Rotating platform parallelism	mm	±0.015	±0.015	±0.015	±0.015	±0.015
Accuracy life	h	25000	25000	25000	25000	25000
Protection class		IP40	IP40	IP40	IP40	IP40
Mass	kg	1.15	1.85	2.1	2.05	2.1

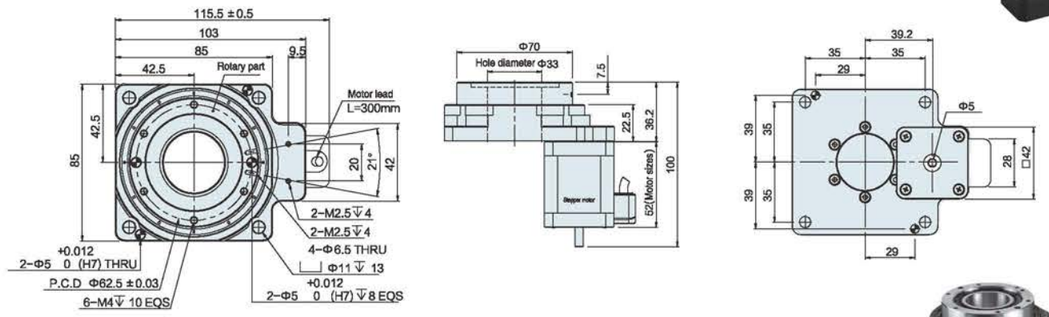
* The above technical parameters are for reference only, and the actual specs and dimensions are issued according to the data provided by customers.

Dimensions Unit: mm

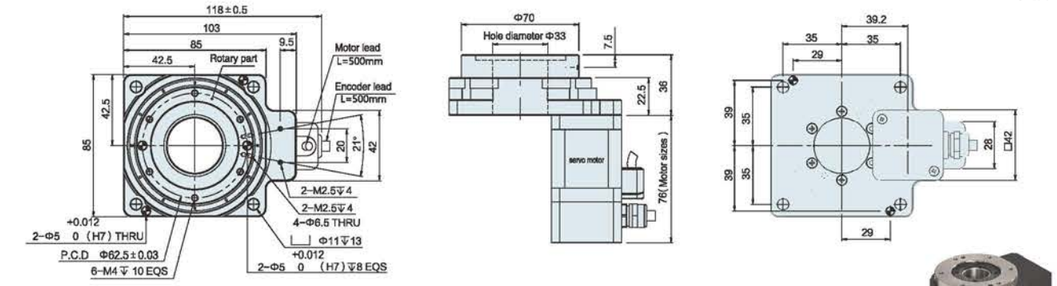
DG085–R–(5/10) (A self assembled motor with a connecting seat)



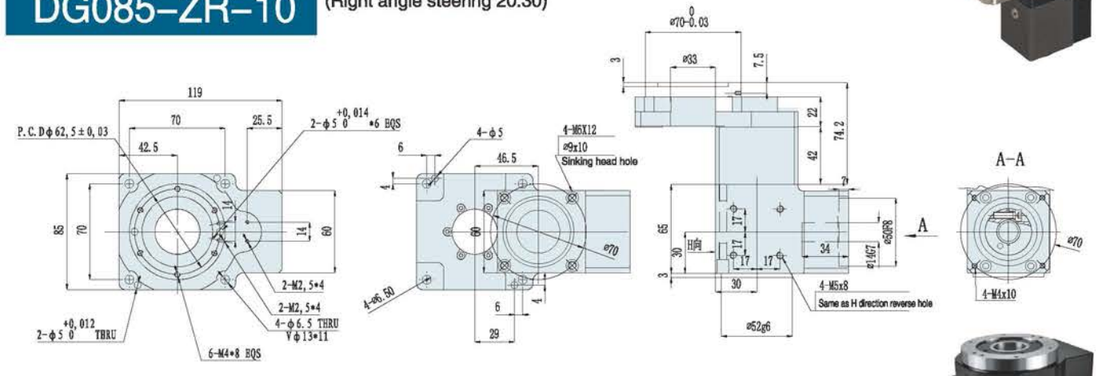
DG085–B–10 (This model contains stepper motor 57H5K–2A)



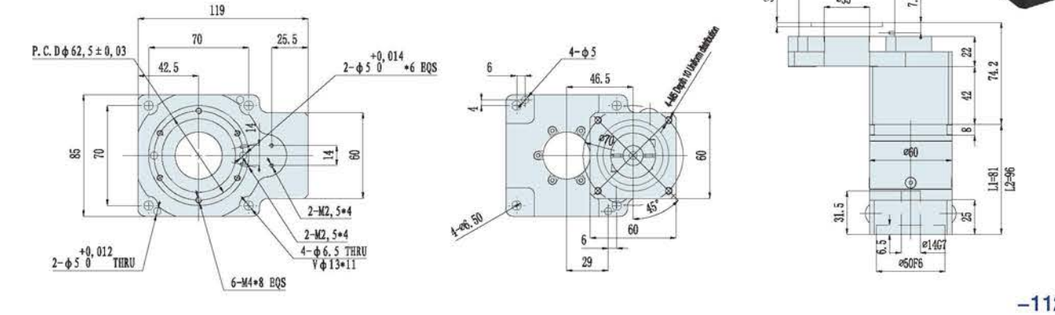
DG085–S–10 (200W This model contains Servo motor)



DG085–ZR–10 (Right angle steering 20:30)



DG085–F–10 (Attached planetary reducer ratio 30,40,50)



Model Identification

DG — 130 — R — 10/18 — V2

- DG: Hollow Rotating Series
- 130: Specifications
- R: Optional
  - R: Standard servo motor interface
  - B: Integrated with stepper motor
  - S: Integrated with servo motor
  - ZR: Plus right angle gearbox
  - F: Plus planetary gearbox
- 10/18: Ratio
- V2: Motor

V1: Servo Ø1 4 PCD70 M4 V2: Servo Ø1 4 PCD70 M5	T1: Stepper Ø8 PCD66.7, M5
400W AC servo motor for each brand	57 stepper motor for each brand

Specification

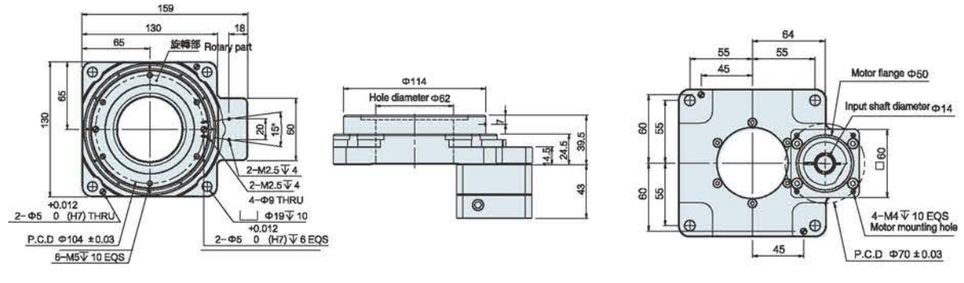
Product model	Unit	DG0130–R–10	DG130–B–18	DG130–S–18	DG130–ZR–20	DG130–F–10
Ratio		6/10/18	18	18	20/30	30/40/50
Matching servo motor	W	400	400	400	400	400
Bearing structure		Crossed roller bearing	Crossed roller bearing	Crossed roller bearing	Crossed roller bearing	Crossed roller bearing
Allowable torque	N.M	55/35	35	35	55/35	55/35
Moment of inertia	kg.m²	110725×10^{-7}	110725×10^{-7}	110725×10^{-7}	110725×10^{-7}	110725×10^{-7}
Allowable plate output speed	r/min	200	200	200	200	200
Allowable inertia moment load	N.M	90/58	90/58	90/58	90/58	90/58
Allowable axial load	N	2500	2500	2500	2500	2500
Repeat positioning accuracy	arc–sec	±5	±5	±5	±5	±5
Positioning accuracy	arc–min	±0.5	±0.5	±0.5	⩾3	⩾3
Rotating platform surface deviation (plane bounce)	mm	±0.005	±0.005	±0.005	±0.005	±0.005
Rotating platform concentricity	mm	±0.01	±0.01	±0.01	±0.01	±0.01
Rotating platform parallelism	mm	±0.015	±0.015	±0.015	±0.015	±0.015
Accuracy life	h	25000	25000	25000	25000	25000
Protection class		IP40	IP40	IP40	IP40	IP40
Mass	kg	2.3	3.3	3.85	4.1	4.5

* The above technical parameters are for reference only, and the actual specs and dimensions are issued according to the data provided by customers.

Dimensions Unit: mm

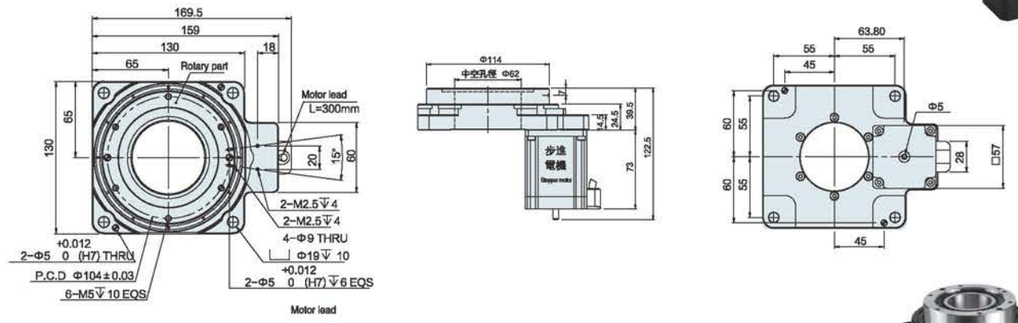
DG130–R–(6/10/18)

(A self assembled motor with a connecting seat)



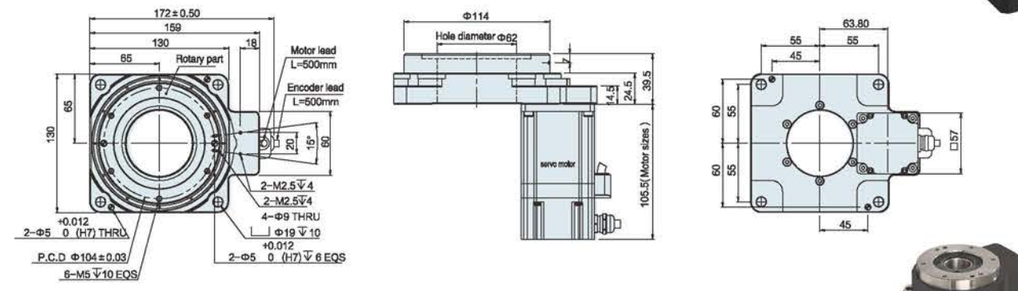
DG130–B–18

(This model contains stepper motor 57H5K–2A)



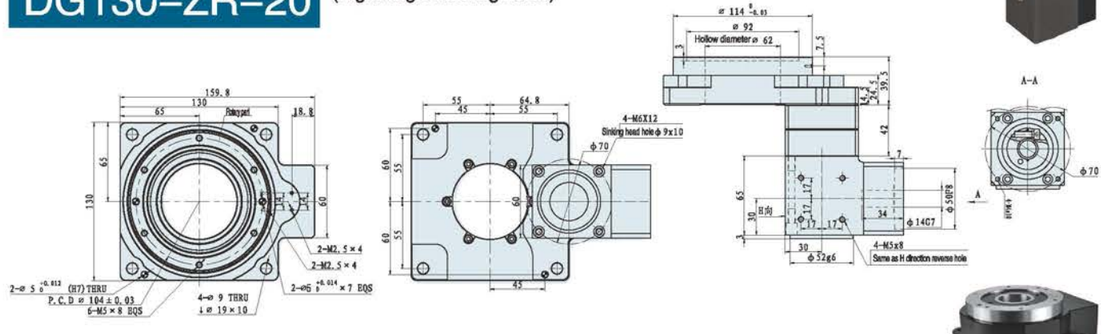
DG130–S–18

(400W This model contains Servo motor)



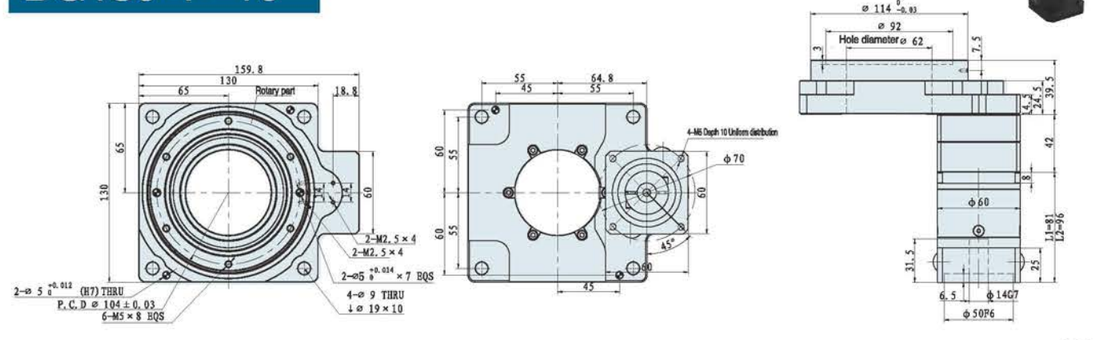
DG130–ZR–20

(Right angle steering 20:30)



DG130–F–10

(Attached planetary reducer ratio 30、40、50)



Model Identification

DG — 200 — R — 5/18 — V2

DG	200	R	5/18	V2
Hollow Rotating Series	Specifications	Optional	Ratio	Motor

R: Standard servo motor interface
B: Integrated with stepper motor
S: Integrated with servo motor
ZR: Plus right angle gearbox
F: Plus planetary gearbox

V1: Servo Ø19 PCD90 M5 V2: Servo Ø19 PCD90 M6	T1: Stepper Ø14 PCD98.4, M5
750W AC servo motor for each brand	86 stepper motor for each brand

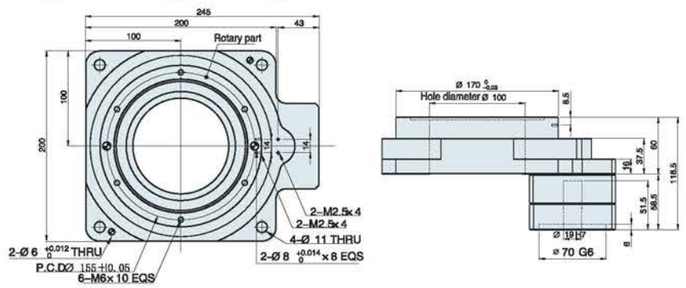
Specification

Product model	Unit	DG0200–R–10	DG200–B–18	DG200–S–18	DG200–ZR–20	DG200–F–30
Ratio		10/18	18	18	20/30	30/40/50
Matching servo motor	W	750	750	750	750	750
Bearing structure		Crossed roller bearing	Crossed roller bearing	Crossed roller bearing	Crossed roller bearing	Crossed roller bearing
Allowable torque	N.M	90/60	60	60	90/60	90/60
Moment of inertia	kg.m^2	876410 × 10^{-7}	876410 × 10^{-7}	876410 × 10^{-7}	876410 × 10^{-7}	876410 × 10^{-7}
Allowable plate output speed	r/min	200	200	200	200	200
Allowable inertia moment load	N.M	140/96	140/96	140/96	140/96	140/96
Allowable axial load	N	4500	4500	4500	4500	4500
Repeat positioning accuracy	arc–sec	± 5	± 5	± 5	± 5	± 5
Positioning accuracy	arc–min	± 0.5	± 0.5	± 0.5	⩾3	⩾3
Rotating platform surface deviation (plane bounce)	mm	± 0.005	± 0.005	± 0.005	± 0.005	± 0.005
Rotating platform concentricity	mm	± 0.01	± 0.01	± 0.01	± 0.01	± 0.01
Rotating platform parallelism	mm	± 0.015	± 0.015	± 0.015	± 0.015	± 0.015
Accuracy life	h	25000	25000	25000	25000	25000
Protection class		IP40	IP40	IP40	IP40	IP40
Mass	kg	7.85	10.3	11	12.5	9.9

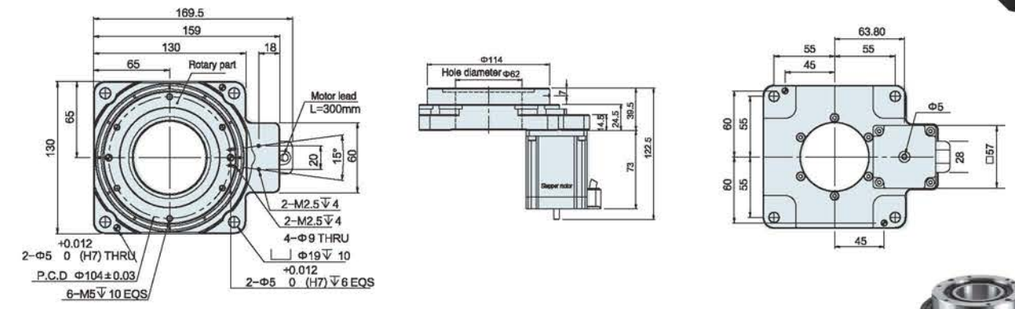
* The above technical parameters are for reference only, and the actual specs and dimensions are issued according to the data provided by customers.

Dimensions Unit: mm

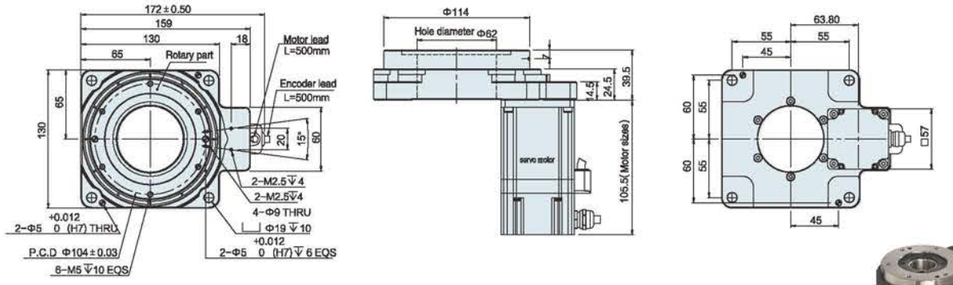
DG200–R–(10/18) (A self assembled motor with a connecting seat)



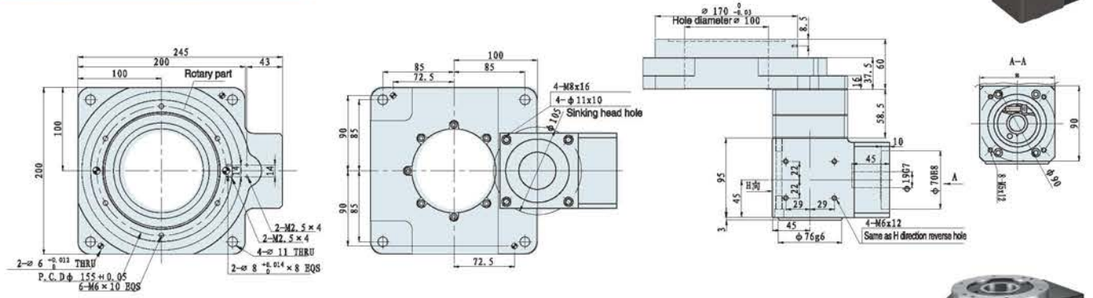
DG200–B–18 (This model contains stepper motor 86H5K–2A)



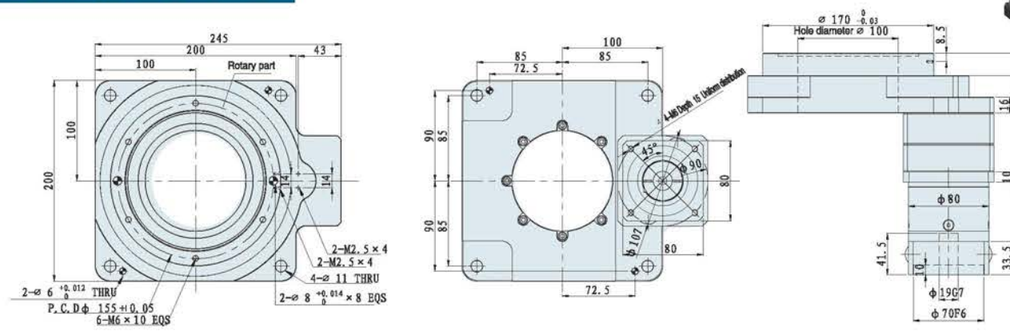
DG200–S–18 (750W This model contains Servo motor)



DG200–ZR–20 (Right angle steering 20:30)



DG200–F–30 (Attached planetary reducer ratio 30,40,50)



Model Identification

DG — 280 — R — 10/18 — V2

Hollow Rotating Series	Specifications	Optional	Ratio	Motor
		R: Standard servo motor interface B: Integrated with stepper motor S: Integrated with servo motor F: Plus planetary gearbox	V1: Servo Ø24 PCD145 M8 1500W AC servo motor for each brand	T1: Stepper Ø19 PCD93.3, M8 110 stepper motor for each brand

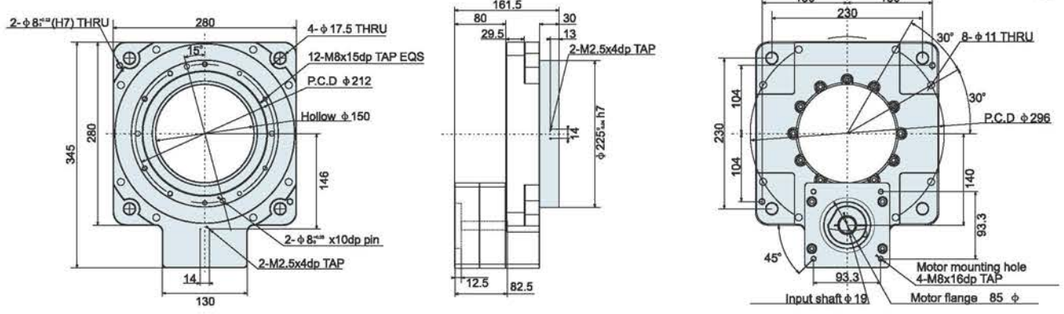
Specification

Motor Model	110 Stepping Motor	1500W AC Servo Motor
Bearings of Rotating table	Crossed Roller Bearing	
Ratio	1:10 / 1:18	
Max.Torque	180Nm	180Nm
Moment of Inertia	146000*10^{-6}kg.m^2	146000*10^{-6}kg.m^2
Max.Speed	200r/min	200r/min
Max.Load of Inertia	216Nm	216Nm
Max.Axial Force	7000Nm	7000Nm
Positioning Accuracy	0.5arcmin	0.5arcmin
Repeatability	5arcsec	5arcsec
Table Play Eccentricity	0.005mm	0.005mm
Parallelism of rotating table	0.015mm	0.015mm
Concentricity of rotating table	0.01mm	0.01mm
Life	20000	20000
Degree of Protection	IP40	IP40
Weight	21.5Kg	22.2Kg

* All specifications, dimensions and design characteristics shown in this catalogue are subject to change without notice.

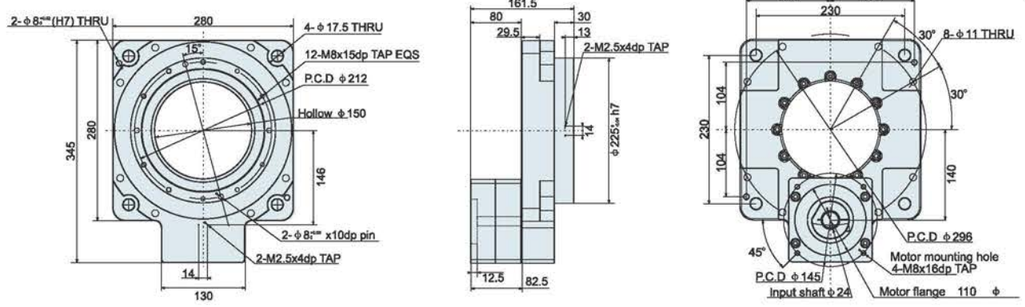
Dimensions Unit: mm

DG280–B–(10/18) (This model contains stepper motor 110H5K–2A)



Dimensions Unit: mm

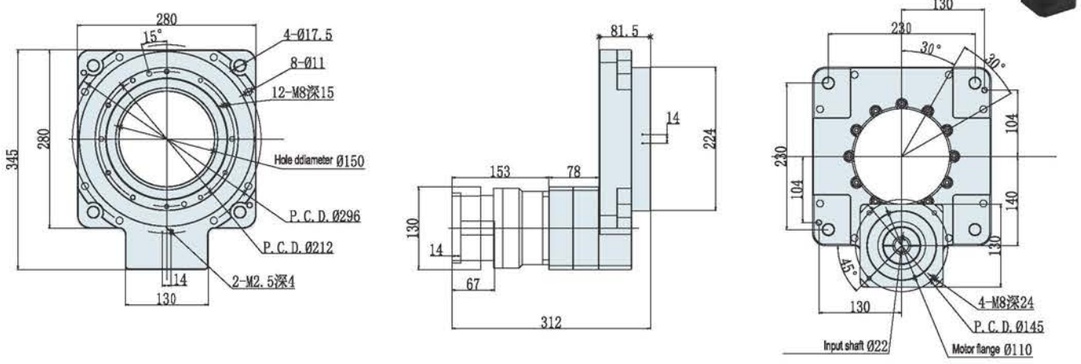
DG280–S–(10/18) (1500W This model contains Servo motor)



Application Examples Technical Data

Description		i^2	VRB115
Nominal Output Torque T2N^3	Nm	3	208
		4	290
		5	330
		7	300
		10	230
Emergency stop torque T2Not	Nm		2.5 times of Nominal Output Torque
Nominal Input Speed	rpm		4000
Max. Input speed	rpm		8000
Backlash	Nm		≤3
Torsional Stiffness	Nm/arcmin		25
Max. Radial Force^4	N		6700
Max. Axial Force^4	N		3350
Service Life	Hr		20000(Continuous operation reduces service life 50%)
Efficiency	%		96%
Operating Temp	℃		-15℃ ~ +90℃
Degree of Protection			IP 65
Lubrication			Synthetic Lubricating Grease
Noise	dB(A)		≤63

DG280–S–30 (Attached planetary reducer ratio 30、40、50)



Model Identification

DG — 450 — R — 10/18 — V2

- DG: Hollow Rotating Series
- 450: Specifications
- R: Optional
  - R: Standard servo motor interface
  - S: Integrated with servo motor
  - F: Plus planetary gearbox
- 10/18: Ratio
- V2: Motor
  - V1: Servo Ø35 PCD200 M12
  - 3000W AC servo motor for each brand

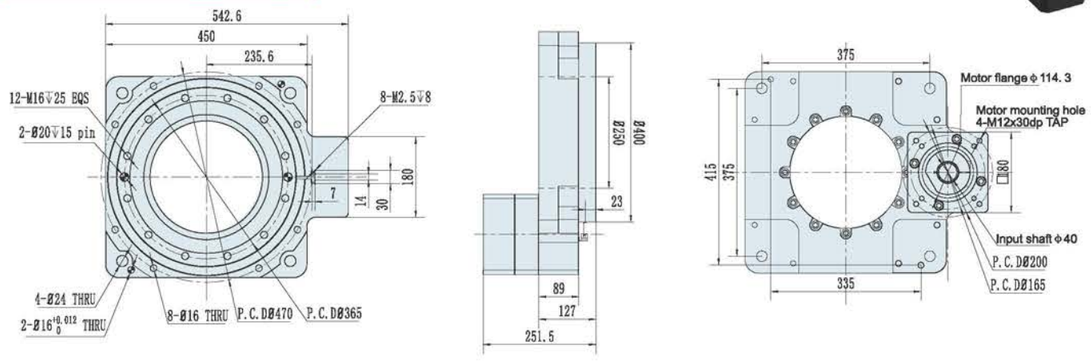
Specification

Motor Model	3KW AC Servo Motor
Bearings of Rotating table	Crossed Roller Bearing
Ratio	1:10
Max.Torque	387Nm
Moment of Inertia	380230*10⁶kg.m²
Max.Speed	200r/min
Max.Load of Inertia	767Nm
Max.Axial Force	7000Nm
Positioning Accuracy	0.5arcmin
Repeatability	5arcsec
Table Play Eccentricity	0.005mm
Parallelism of rotating table	0.015mm
Concentricity of rotating table	0.01mm
Life	20000
Degree of Protection	IP40
Weight	80Kg

* All specifications, dimensions and design characteristics shown in this catalogue are subject to change without notice.

Dimensions Unit: mm

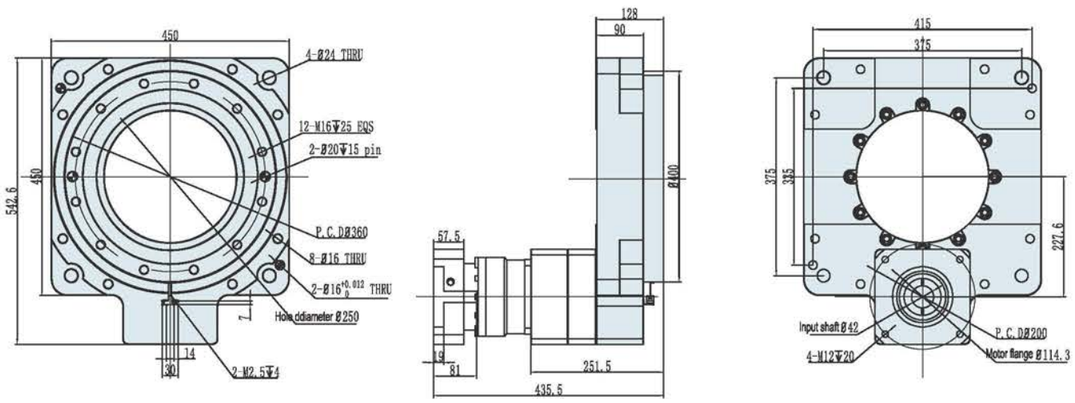
DG450-S-(1/10) (3000W This model contains Servo motor)



Application Examples Technical Data

Description		i²	VRB142
Nominal Output Torque T2N[3]	Nm	3	342
		4	540
		5	650
		7	550
		10	450
Emergency stop torque T2Not	Nm		2.5 times of Nominal Output Torque
Nominal Input Speed	rpm		3000
Max. Input speed	rpm		6000
Backlash	Nm		≤3
Torsional Stiffness	Nm/arcmin		50
Max. Radial Force[4]	N		9400
Max. Axial Force[4]	N		4000
Service Life	Hr		20000(Continuous operation reduces service life 50%)
Efficiency	%		96%
Operating Temp	℃		-15℃ ~ +90℃
Degree of Protection			IP 65
Lubrication			Synthetic Lubricating Grease
Noise	dB(A)		≤65

DG450-S-30 (Attached planetary reducer ratio 30、40、50)



Safety Precautions

Cautions for storage

Whenever temporarily keeping the product, keep the following directions:

1.Keep in a clean and dry place.
2.Whenever storing outdoors or in a humid place, put in a box so that it does not directly contact rain or external air and cover with a vinyl sheet (Take a measure to prevent rust.)

Cautions for operation

When the reducer is delivered to you……

When the product delivered, please con rm that you received the exact same model you have ordered.
Please wipe out the input and output shaft of the reducer which is covered by anti–corrosive oil.
※Please remove the rubber cap on the input shaft before you wipe the shafts.
※Lubricant(grease) is already lled in the reducer. It is available as it is.

Fixation & installation

Avoid use in a place where rain or water drops directly.
In case of use outdoors or in a place where dust and water drops, consult in advance.
Install at 0℃~40℃ of surrounding temperature.
In case of use at temperature out of the above–mentioned range, contact the headquarters and consult on this.
Firmly x with a bolt onto a solid stand without vibration.
Install in consideration of convenience in repair and inspection.

Cautions prior to starting the operation

Reducer can be used soon after arrival, since it has already been lled out with lubrication.
At initial operation, check the rotating direction of the output shaft and then gradually apply load.

Cautions during operation

Avoid overload. Ensure that input speed shall not be the number of revolutions beyond the speci cation.
In the following cases, stop the operation and check the following points:

- If temperature sharply increases
- If an abnormal noise appears sharply
- If the number of revolutions becomes unstable sharply

Regulations

The scope of warranty only includes the product.
The following costs and damages are not covered by the warranty.
1) Shipping cost of this product.
2) The cost of removing, installing or other incidental construction of the product from other devices after connection or installation.
3) Due to the failure of this product, indirect damage caused to the user due to loss of use opportunities or business interruption.
4) All other derived or consequential damages.

Installation

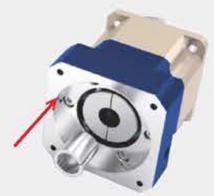
Mounting procedure to the motor

1 Wipe off anti–rust agent and oil on the motor shaft.

2 Remove the plug

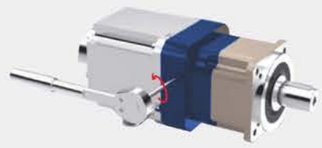
3 Turn the input shaft until the cap screw is seen. Make sure the cap screw is loosened.

In case the bushing has been attached, Please fix it to the reducer as the drawing below.



4 Please place reducer vertically on the flat surface so the motor mounting part faces up. Carefully insert the motor shaft into the input shaft. (It should be inserted smoothly) Make sure the motor flange is perfectly fit to the reducer's flange. Tighten the motor installing bolts to the proper torque.(See table1)

5 Tighten the clamping bolt of the input shaft with torque wrench to the proper torque.(See table1)



6 Reinstall the plug. The procedure is done.

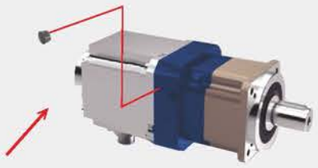


Table1

Bolt size			Clamping bolt	
	Nm	kgfm	Nm	kgfm
M3	1.1	0.11	1.9	0.18
M4	2.5	0.26	4.3	0.44
M5	5.1	0.52	8.7	0.89
M6	8.7	0.89	15	1.5
M8	21	2.1	36	3.7
M10	42	4.3	71	7.2
M12	72	7.3	125	13
M16	134	14	–	–

Table 2

Bolt size	Tightening torque	
	Nm	kgfm
M3	1.9	0.18
M4	4.3	0.44
M5	8.7	0.89
M6	15	1.5
M8	36	3.7
M10	71	7.2
M12	125	13
M16	310	32
M20	603	62

※Recommended bolt：Strength 12.9