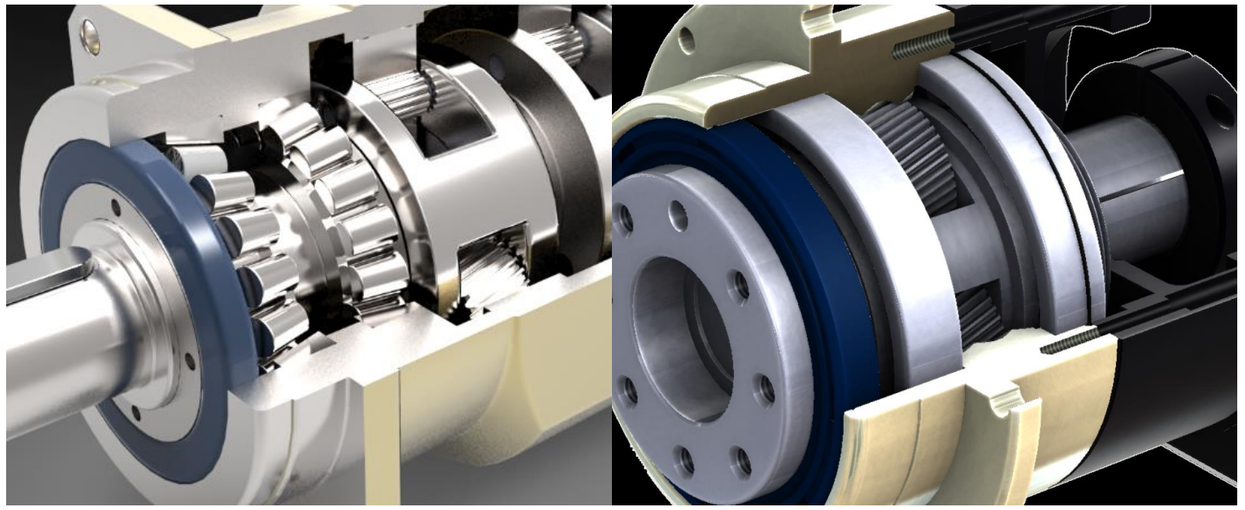
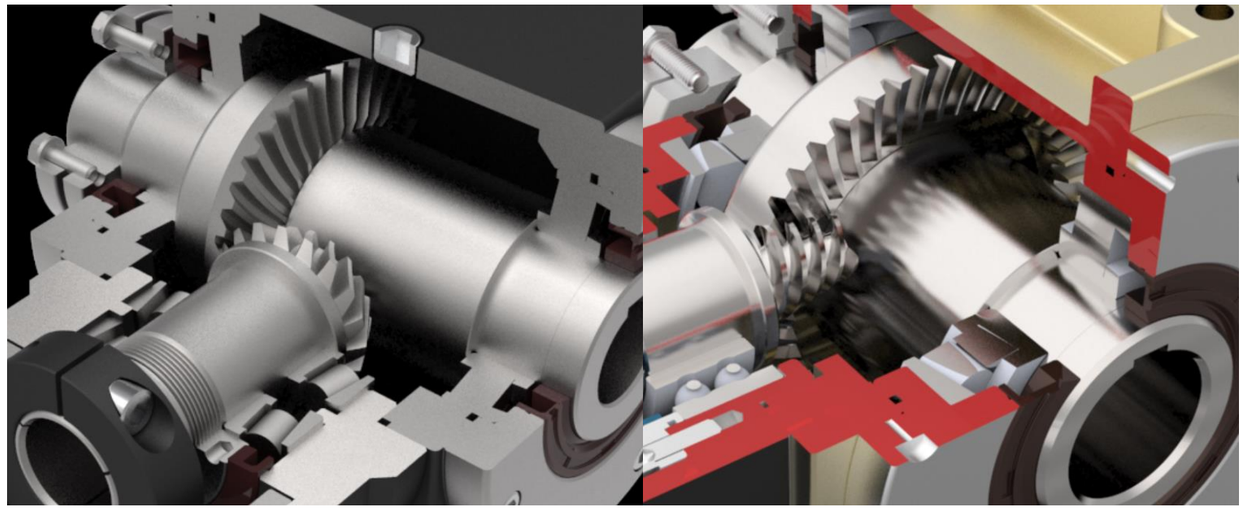




SERVOBOX HIGH PRECISION IN-LINE SERVO GEAR REDUCER

DB Planetary ServoBox
Backlash : 1 ≤ 8arcmin ▪ Gear reduction ratio 3 ~ 1000
Maximum Output Torque : 3-times of Rated Torque
Maximum Acceleration Torque : 1.8-times of Rated Torque
Efficiency ≥ 97% ▪ Service Life up to 30,000 hours

GT Hollow Rotary Actuator ServoBox
Backlash up to 1arcmin ▪ Gear Ratio : 5, 10, 18 , 25, 50, 100
Repetitive Positioning Accuracy ±10 Arcsec
Lost Motion 2arcmin (0.033°) ▪ Torsional Backlash ≤ 2arcmin
Available in Ball Bearing and Crossed Roller Bearing design

LDS-LM In-line ServoBox series

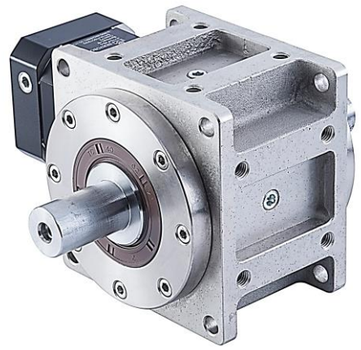
SF Planetary ServoBox
Double Taper Bearing design
High axial and radial forces
Backlash up to 1arcmin
Efficiency ≥ 97%

FE Planetary ServoBox
Backlash up to 8arcmin
Gear Reduction Ratio 3 ~ 1000
Efficiency ≥ 97%
Service Life up to 30,000 hours

SE Planetary ServoBox
Backlash up to 3arcmin
Gear Reduction Ratio 3 ~ 1000
Efficiency ≥ 97%
Service Life up to 30,000 hours

SD Planetary ServoBox
Rotary output flange and taper bearing design for optimum radial load
Backlash up to 1arcmin

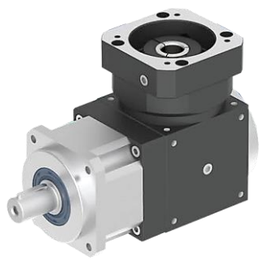
RIGHT ANGLE HIGH PRECISION SERVO GEAR REDUCER



ST Spiral Bevel Gear ServoBox
Backlash up to 2arcmin ▪ Gear Reduction Ratio 1 ~ 50
Efficiency ≥ 98%
Service Life : 30,000 hours (S5) / 15,000 hours (S1)
Available in Ball Bearing and Taper Bearing design

HY Hypoid Bevel Gear ServoBox
Backlash up to 2arcmin ▪ Gear Reduction Ratio : 3 ~ 50
Service Life : 30,000 hours (S5) / 15,000 hours (S1)
Heavy duty housing in aluminium die-cast alloy
Available in Ball Bearing and Taper Bearing design

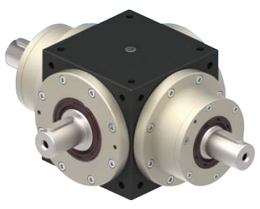
LDS-LM Right Angle ServoBox series



PBT ServoBox
Helical & Spiral Bevel Gear
Gear Reduction Ratio : 3 to 50
Backlash up to 2arcmin
Service Life up to 30,000 hours

SDH Series ServoBox
Helical & Hypoid Bevel Gear
Rotary output flange
Gear Reduction Ratio : 3 to 50
Backlash up to 4arcmin

WE Worm Gear ServoBox
Cost competitive package
Backlash up to 8arcmin
Gear Reduction Ratio : 5 to 60
Aluminium Alloy housing



ST-YS Spiral Bevel Gear ServoBox
Multiple output shaft
Gear Reduction Ratio : 1 to 5
Backlash up to 2arcmin
Efficiency ≥ 98%

Remark : Application and technical data are available upon request. More information please log on : www.oriental-dm.com

GLOSSARY OF TERMS

Acceleration Torque (*T*2B) [Nm]
The acceleration torque *T*2B is the maximum permissible torque that can briefly be transmitted at the gearbox output end under the duty cycle < 1000/h cycles. For > 1000/h cycles, the impact factor must be taken into account. *T*2B is the max. parameter in cyclic operation. Application acceleration torque (*T*2b) shall be smaller than *T*2B; otherwise the gearbox service life will be reduced.

Angular Minute [arcmin]
A degree is subdivided into 60 angular minutes (= 60 arcmin = 60').
In other words, if the torsional backlash is specified as 1 arcmin, for example, the output can be turned 1/60º. The repercussions for the actual application are determined by the arc length. EX: A pinion with a radius *r* = 500 mm on a gearhead with standard torsional backlash *jt*= 3'can be turned *b* = 0.44 mm.

Average Service Life [h]
Average service life is the working time of gearbox running at rated loading and nominal input speed at cyclic operation.
The service life is not a guarantee of the actual service life of the gear reducer. It is an average calculated life derived from industry formulas (*), and other factors such as running test results, CAE (Computer Aided Engineering) software and so on. These factors take into consideration the metal composition, heat treatment, the design of the gearing and bearings, as well as calculated loads. Service life calculations are not based on actual field conditions or applications, and do not represent a guarantee with respect to expected life, performance, or other characteristics of gear reducer in any given application or use. The actual service life could vary substantially from the nominal service life.

Axial Force (*F*2A) [N]
The axial force *F*2A acting on a gearbox runs parallel to its output shaft. The force runs perpendicular to its output shaft. It may be applied with axial offset via a lever arm *y*2 under certain circumstances, in which case it also generates a bending moment. If the axial force exceeds the permissible catalogue values, additional design features (e.g. couplings) must be implemented to absorb these forces.

Bushing
If the motor shaft diameter is smaller than the default input bore of gearbox, a bushing is used to compensate the difference in diameter.

Collet Clamping
The Collet Clamping ensure a frictional between motor shaft and gearbox. It has passed dynamical balance analysis to assure concentricity and no backlash at high input speed operation.

Degree of Protection (IP – Ingress Protection)
The protective class IP65 sealed design avoids leakage problem. The various degrees of protection are defined in IEC 60529 “Degrees of protection offered by enclosure (IP code)”.

Duty Cycle (ED)
The duty cycle ED is determined by one cycle. The times for acceleration (*t*b), constant travel if applicable (*t*c) and deceleration (*t*d) combined yield the duty cycle in minutes.

Emergency Stop Torque (Max. Output Torque) (*T*2NOT) [Nm]
The emergency stop torque *T*2NOT is the maximum permissible torque at the gearbox output end and must not be reached more than 1000 times during the service life of the gearbox. It must never be exceeded to prevent inside parts from damage.

Inertia Moment [kg.m2]
This is the total sum of the inertial moment of the speed reduction mechanism converted to a moment on the output table.

Lost Motion [arcmin]
This is the difference in stopped angles achieved when the output table is positioned to the same position in the forward and reverse directions.

Mass Moment of Inertia (*J*) [Kg.cm2]
The mass moment of inertia *J* is a measurement of the effort applied by an object to maintain its momentary condition (at rest or moving).

Max. Output Torque / Emergency Stop Torque [N.m]
The emergency stop torque *T*2NOT is the maximum permissible torque at the gearbox output end and must not be reached more than 1000 times during the service life of the gearbox. It must never be exceeded to prevent inside parts from damage.

Noise Level [dB]
The operating noise specified in our catalogue relates to gearboxes with the ratio *i*=10 or *i*=100 (2 stage) at input speed 3,000 rpm and no loading running. Noise level is measured at 1M distance from the gearbox. Higher speed results to higher noise level; higher loading results to higher noise level.

Nominal torque (Rated Output Torque) (*T*2N) [Nm]
The nominal torque *T*2N is the torque continuously transmitted by a gearbox during a long period of time, i.e. in continuous operation (without wear).

Operating Modes (continuous operation S1 and cyclic operation S5)
When selecting a gearbox, it is important to consider whether the motion profile is characterized by frequent acceleration and deceleration phases in cyclic operation (S5) as well as pauses, or whether it is designed for continuous operation (S1), i.e. with long phases of constant motion.
(**Continuous operation (S1)** is defined by the duty cycle. If the duty cycle is greater than 60% or longer than 20 minutes, this qualifies as continuous operation.
Cyclic operation (S5) is defined by the duty cycle. If the duty cycle is less than 60% and shorter than 20 minutes, it qualified as cyclic operation).

Output Permissible Speed [rpm]
This is the output table speed that can be tolerated by the mechanical strength of the speed reduction mechanism.

Permissible Moment Load [N.m]
When a load is applied to a position away from the center of the output table, the output table receives a tilting force. The permissible moment load refers to the permissible value of moment load calculated by the eccentricity from the center by the applied load.

Permissible Thrust Load [N]
This is the permissible value of thrust load applied to the output table in the axial direction.

Permitted Axial Force (*F*2aB) [N]
The maximum allowed axial force in the condition of output speed 100 RPM

Permitted Radial Force (*F*2rB) [N]
The maximum allowed radial force in the 1/2 position of output shaft in the condition of output speed 100 RPM. This value is decreasing when the running speed is increasing.

Radial Force (*F*2R) [N]
The radial force is the force acting at right angles to axial force. It acts perpendicular to the axial force and can assume an axial distance of (d) in relation to the shaft end, which acts as a lever arm. The radial force produces a bending moment.

Rated Output Torque [N.m]
This is the limit of mechanical strength of the speed reduction mechanism. Make sure that the applied torque, including the acceleration torque and load fluctuation, does not exceed the permissible torque.

ABOUT
SERVOBOX
GLOSSARY OF TERMS
PERMISSIBLE RADIAL LOAD

Repetitive Positioning Accuracy [arcsec]
This is a value indicating the degree of error that generates when positioning is performed repeatedly to the same position in the same direction.

Runout of Output Table Surface [mm]
This is the max. value of runout of the installation surface of the output table when the output table is rotated under no load.

Runout of Output Table Inner / Outer Diameter [mm]
This is the max. value of runout of the inner diameter or outer diameter of the table when the output table is rotated under no load.

Speed (*n*) [rpm]
Two speeds are of relevance when selecting a gearbox: the maximum speed and the nominal speed at the input. The maximum permissible speed *n*1B must not be exceeded because it serves as the basis at cyclic operation. The nominal speed *n*1N must not be exceeded at continuous operation. The housing temperature limits the nominal speed, which must not exceed 90° C. The nominal input speed specified in the catalogue applies to an ambient temperature of 25°C.

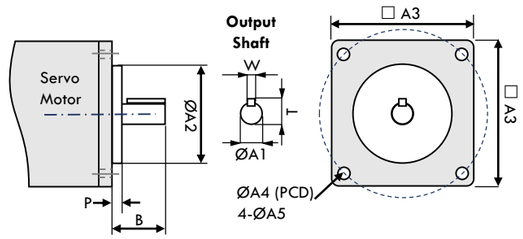
Stage (1Stage / 2Stage / 3Stage)
The sun gear and planetary gear forms an independent speed reduction gear system. If the there is only one gear system in the gear reducer, it is defined as one stage transmission. In order to achieve higher speed reduction ratio, multiple stages transmission is required. LDS's standard gear reducers are classified into one stage and two-stage transmission. Speed reduction ratio range is from 3 to 100. The modular construction combined with multiple stages transmission allows speed reduction ratio 100~100,000 and over.

Torsional Backlash (*jt*) [arcmin]
Torsional backlash *jt* is the maximum angle of torsion of the output shaft in relation to the input. Torsional backlash is measured with the input shaft locked. The output is then loaded with a defined test torque (2% rated output torque) in order to overcome the internal gearhead friction. The main factor affecting torsional backlash is the face clearance between the gear teeth.

Torsional rigidity (*Ct*21) [Nm/Arcmin]
Torsional rigidity is defined as the quotient of applied torque and generated torsion angle. It consequently shows the torque required to turn the output shaft by one angular minute. The torsional rigidity can be determined from the hysteresis curve. Only the area between 50% and 100% of T2B is considered because this area of the curve profile can be considered linear.

Transmission efficiency η [%]
Efficiency (η) is the ratio of output power to input power. Power lost through friction reduces efficiency to less than 1 or 100%.

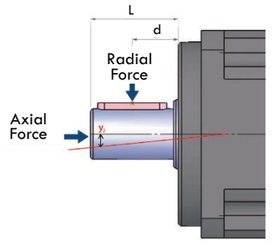
*** SERVO MOTOR DIMENSION TO ATTACH TO SERVOBOX**



A1 (Output Shaft Diameter)
A2 (Pilot Diameter)
A3 (Frame Size)
A4 (Mounting PCD)
A5 (Mounting Bolt Hole Diameter)
B (Shaft Length)
P (Pilot Thickness)
T (Overall Shaft Height)
W (Keyway Width)

PERMISSIBLE RADIAL LOADS ON OUTPUT SHAFT OF THE SERVOBOX
The gearbox will bear radial force while its output shaft connected with transmission machinery, such as chain wheel. The OHL formula of radial force is as below:

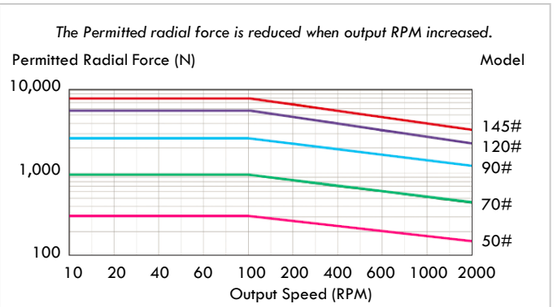
Over Hung Load = (T x s x f x p) / R
T: Torque of transmission machinery
s: Service factor
f: Driven coefficient
p: Position Position less than d, p=1
Position larger than d, p=1.5
R: Radius of pulley or chain wheel



SERVICE FACTOR (sf)	Service factor			
	Operation Hour/Day			
Type of Load	0.5Hr	2Hr	8~10Hr	10~24Hr
Uniform	0.80	0.90	1.00	1.25
Medium shock	0.90	1.00	1.25	1.50
Heavy shock	1.00	1.25	1.50	1.75

DRIVEN COEFFICIENT (f)	Driven Coefficient
Driving Mode	(f)
Chain pulley	1.00
Gear	1.25
V-belt	1.50
Flat belt	2.50

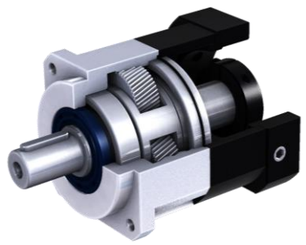
FB Permitted Radial Force On Center Position of Shaft [N] FB



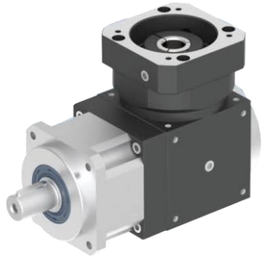
HIGH PRECISION SERVOBOX

LDS
LEADERDRIVES

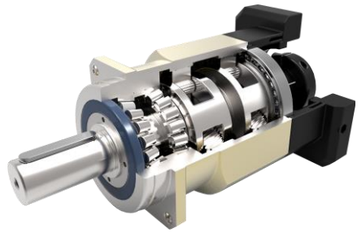
SERVOBOX PRODUCT FAMILIES
DESIGNS AND FEATURES



DB ▪ SB Series Planetary ServoBox
- Most cost effective in-line planetary design
- Precise (low backlash between 1~12arcmin)
- High torque capability and torsional stiffness
- Gear ratio from 1/3 ~ 1/1000
- Universal housing and is suitable for all servo and stepper applications



PBT Series
Right Angle Planetary ServoBox
- Spiral Bevel Gear Design
- Backlash less than 10arcmin
- High torque capability and torsional stiffness
- Gear ratio from 1/3 ~ 1/50

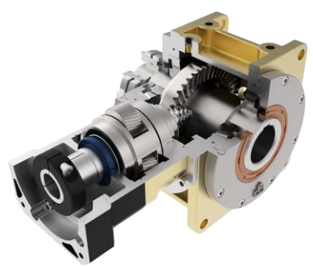


SF Series Planetary ServoBox
- Higher radial and axial load capacity.
- Double taper bearing design with full needle roller bearings without retainer
- One-piece constructed planetary arm bracket
- Universal housing and is suitable for all servo and stepper applications

SD Series Planetary ServoBox
- Precise in-line planetary system with rotary flange design
- Low backlash between 1~12arcmin
- Ball bearing and taper bearing option
- Universal housing and is suitable for rotary and turntable applications

HK Series
Right Angle Planetary ServoBox
- Precise space saving right angle planetary system with rotary flange design
- Ball bearing and taper bearing option
- Universal housing and is suitable for rotary and turntable applications

GT Series Hollow Rotary Actuator ServoBox
- Solid hollow output table that allows simple wiring and piping on your equipment design
- Ball bearing and crossed roller bearing option
- Repetitive Positioning Accuracy ±10 sec
- Lost Motion 2arcmin (0.033°)
- Torsional Backlash ≤ 2arcmin

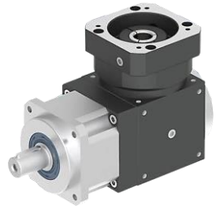
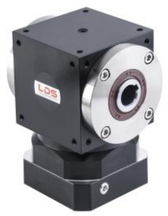
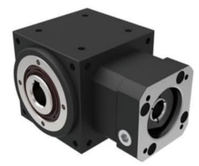
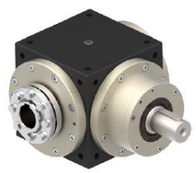
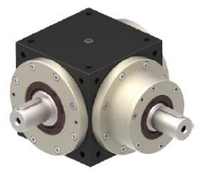


HY Series Hypoid Bevel Gear ServoBox
- Compact design to transmit rotational motion at right angles with higher torque capability
- Ball bearing and taper bearing option
- Heavy duty housing in aluminium die-cast alloy to withstand highest operating temperature
- Hollow/Single/Double output shaft available

ST Series Spiral Bevel Gear ServoBox
- High efficiency design (≥98%) to transmit rotational motion at right angles
- Ball bearing and taper bearing option
- Max gear reduction ratios up to 1/500
- Hollow/Single/Double/Multiple shaft configurations are available

WE Series Worm Gear ServoBox
- An economic series with optimized worm gear tooth design (Low backlash between ≤ 8arcmin)
- Heavy duty housing in aluminium die-cast alloy
- An inherent safety mechanism design as it cannot function in the reverse order
- Hollow/Single/Double output shaft available

HIGH PRECISION SERVO GEAR REDUCER (0.1kW ~ 30kW)

 DB Series Planetary ServoBox	 DB-A Series Planetary ServoBox	 DBL Series Right Angle Planetary ServoBox	 PBT Series Right Angle Spiral Bevel Gear ServoBox
 SE Series Planetary ServoBox	 SF Series Planetary ServoBox	 SD Series Planetary ServoBox	 SDL Series Right Angle Planetary ServoBox
 ST-FO Series Spiral Bevel Gear ServoBox	 FT-FO Series Ultra Compact Size Spiral Bevel Gear ServoBox	 ST-DN Series Spiral Bevel Gear ServoBox With Single Input Shaft	 ST-DS Series Spiral Bevel Gear ServoBox With Multiple Shaft
 HY-FV Series Hypoid Bevel Gear ServoBox	 HY-FO Series Hypoid Bevel Gear ServoBox	 WEO Series Aluminium Alloy Worm Gear ServoBox	 GT Series Hollow Rotary Actuator ServoBox

PLANETARY SERVOBOX

DB SERIES

UNIVERSAL DESIGN
HIGH PRECISION

High Precision Planetary ServoBox in compact design and universal housing with precision bearings and planetary gearing provides high torque density while offering high positioning performance.

- DB Series 1-Stage Planetary ServoBox in Gear Reduction Ratio 3 ~ 10
- DB-A Series 2-Stage Planetary ServoBox in Gear Reduction Ratio 15 ~ 100
- DB Series 3-Stage Planetary ServoBox in Gear Reduction Ratio 125 ~ 1000

GENERAL SPECIFICATIONS	Unit	Ratio	Model : DB (1 Stage)								
			#44	#62	#90	#120	#142	#180	#220	#270	#330
Frame Size	MM	3~10	44 x 44	62 x 62	90 x 90	120 x 120	142 x 142	180 x 180	220 x 220	270 X 270	330 x 330
Mounting PCD	MM	3~10	Ø50	Ø70	Ø100	Ø130	Ø165	Ø215	Ø250	Ø300	Ø380
Output Shaft Diameter	MM	3~10	Ø13	Ø16	Ø22	Ø32	Ø40	Ø55	Ø75	Ø85	Ø100
Output Shaft Length	MM	3~10	20	28	36	50	74	82	104	130	140
Rated Output Torque	Nm	3	19	59	165	335	625	1,206	2,030	4,770	8,790
		4	16	51	146	300	555	1,069	1,804	4,730	8,730
		5	16	48	160	333	618	1,189	2,010	4,680	8,660
		6	15	45	151	311	583	1,118	1,911	4,620	8,610
		7	15	45	149	309	573	1,108	1,870	4,570	8,520
		8	14	43	143	298	553	1,070	1,824	4,520	8,440
		9	13	44	145	278	516	993	1,694	4,450	8,370
		10	14	43	141	294	549	1,059	1,779	4,420	8,310
Max. Acceleration Torque	Nm	3~10	1.8 Times of Rated Output Torque								
Max. Output Torque Emergency Stop Torque	Nm	3~10	3 Times of Rated Output Torque								
Rated Input Speed	RPM	3~10	5,000	5,000	4,000	4,000	3,000	3,000	2,000	2,000	2,000
Maximum Input Speed	RPM	3~10	10,000	10,000	8,000	8,000	6,000	6,000	4,000	3,000	3,000
Backlash (arcmin)	PS	3~10	-	-	≤ 1arcmin	≤ 1arcmin	≤ 1arcmin	≤ 1arcmin	≤ 1arcmin	≤ 1arcmin	≤ 1arcmin
	P0 / P1 / P2	3~10	P0 ≤ 3arcmin ▪ P1 ≤ 5arcmin ▪ P2 ≤ 7arcmin								
Torsional Rigidity	Nm/arcmin	3~10	3	6	14	27	60	140	240	140	220
Maximum Radial Force	N	3~10	380	1180	3,200	6,800	9,300	15,600	51,000	107,100	224,910
Maximum Axial Force	N	3~10	190	590	1,600	3,400	4,650	7,800	25,500	53,550	112,455
Service Life	Hr	3~10	Intermittent Periodic Duty S5 > 30,000 hours Continuous Duty S1 > 15,000 hours								
Efficiency	%	3~10	≥ 97%								
Operating Temperature	ºC	3~10	-25ºC ~ +90ºC								
Lubrication		3~10	Synthetic oil								
Degree of Protection		3~10	IP65								
Mounting Position		3~10	Any								
Noise Level	dB(A)	3~10	≤ 56	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67	≤ 70	≤ 72	≤ 74
Weight ± 3%	Kg	3~10	0.6	1.28	3.6	8	15.5	29.3	39.2	--	--
Mass Moments Of Inertia (Kg .cm²)		3	0.03	0.16	0.61	3.25	9.21	28.98	59.61	122.20	252.96
		4	0.03	0.14	0.48	2.74	7.54	23.67	54.37	111.46	230.72
		5	0.03	0.13	0.47	2.71	7.42	23.29	53.27	109.20	226.05
		6	0.03	0.13	0.45	2.65	7.25	22.75	51.72	106.03	219.47
		7	0.03	0.13	0.45	2.62	7.14	22.48	50.97	104.49	216.29
		8	0.03	0.13	0.44	2.58	7.07	22.59	50.84	104.22	215.74
		9	0.03	0.13	0.44	2.57	7.04	22.53	50.63	103.79	214.85
		10	0.03	0.13	0.44	2.57	7.03	22.51	50.56	103.65	214.55

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

PLANETARY SERVOBOX

DB-A SERIES

UNIVERSAL DESIGN
HIGH PRECISION

Features :

- Most cost effective in-line planetary servobox design.
- Precise (low backlash between 1~12arcmin).
- High torque capability and torsional stiffness.
- Gear Reduction Ratio up to 1/1000 (3Stage).
- Universal housing and is suitable for all servo and stepper applications.

GENERAL SPECIFICATIONS	Unit	Ratio	Model : DB-A (2 Stage)						
			#44A	#62A	#90A	#120A	#142A	#180A	#220A
Frame Size	MM	15~100	44 x 44	62 x 62	90 x 90	120 x 120	142 x 142	180 x 180	220 x 220
Mounting PCD	MM	15~100	Ø50	Ø70	Ø100	Ø130	Ø165	Ø215	Ø250
Output Shaft Diameter	MM	15~100	Ø13	Ø16	Ø22	Ø32	Ø40	Ø55	Ø75
Output Shaft Length	MM	15~100	20	28	36	50	74	82	104
Rated Output Torque	Nm	15	19	59	165	335	625	1,206	2,030
		20	16	51	146	300	555	1,069	1,804
		25	16	48	160	333	618	1,189	2,010
		30	15	45	151	311	583	1,118	1,911
		35	15	45	149	309	573	1,108	1,870
		40	14	43	143	298	553	1,070	1,824
		50	16	48	160	333	618	1,189	2,010
		60	15	45	151	311	583	1,118	1,911
		70	15	45	149	309	573	1,108	1,870
		80	14	43	143	298	553	1,070	1,824
		90	13	44	145	278	516	993	1,694
		100	14	43	141	294	549	1,059	1,779
Max. Acceleration Torque	Nm	15~100	1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	Nm	15~100	3 Times of Rated Output Torque						
Rated Input Speed	RPM	15~100	5,000	5,000	4,000	4,000	3,000	3,000	2,000
Maximum Input Speed	RPM	15~100	10,000	10,000	8,000	8,000	6,000	6,000	4,000
Backlash (arcmin)	PS	15~100	-	-	≤ 3arcmin	≤ 3arcmin	≤ 3arcmin	≤ 3arcmin	≤ 3arcmin
	P0 / P1 / P2	15~100	P0 ≤ 5arcmin ▪ P1 ≤ 7arcmin ▪ P2 ≤ 9arcmin						
Torsional Rigidity	Nm/arcmin	15~100	3	6	14	27	60	140	240
Maximum Radial Force	N	15~100	380	1180	3,200	6,800	9,300	15,600	51,000
Maximum Axial Force	N	15~100	190	590	1,600	3,400	4,650	7,800	25,500
Service Life	Hr	15~100	Intermittent Periodic Duty S5 > 30,000 hours Continuous Duty S1 > 15,000 hours						
Efficiency	%	15~100	≥ 94%						
Operating Temperature	ºC	15~100	-25ºC ~ +90ºC						
Lubrication		15~100	Synthetic oil						
Degree of Protection		15~100	IP65						
Mounting Position		15~100	Any						
Noise Level	dB(A)	15~100	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67	≤ 70	≤ 72
Weight ± 3%	Kg	15~100	0.9	2	5.5	11	21	42	59

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – DB PLANETARY SERVOBOX

Fig. 1 DB44 DB44A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	5 ~ 11
A2	Input Pilot Bore Ø	30 ~ 70
A3	Adapter Frame Size ☐ (Square dimension)	46, 55, 60, 70
A4	Mounting PCDØ	46 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8
L	DB Overall Length Gear Ratio 3~10	95
	DB-A Overall Length Gear Ratio 15~100	124

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

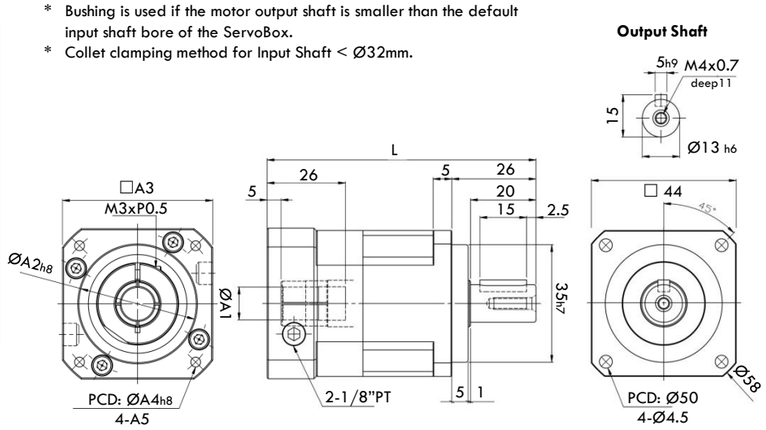


Fig. 2 DB62 DB62A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	11 ~ 19
A2	Input Pilot Bore Ø	50 ~ 70
A3	Adapter Frame Size ☐ (Square dimension)	64, 70, 80
A4	Mounting PCDØ	70 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0
L	DB Overall Length Gear Ratio 3~10	115, 123
	DB-A Overall Length Gear Ratio 15~100	148, 157

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

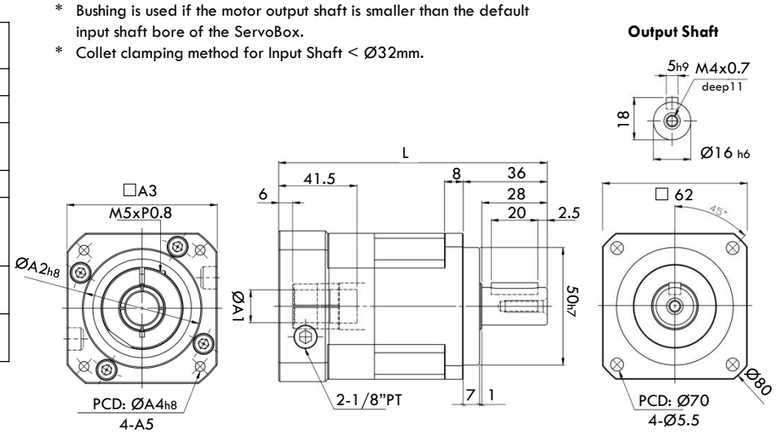
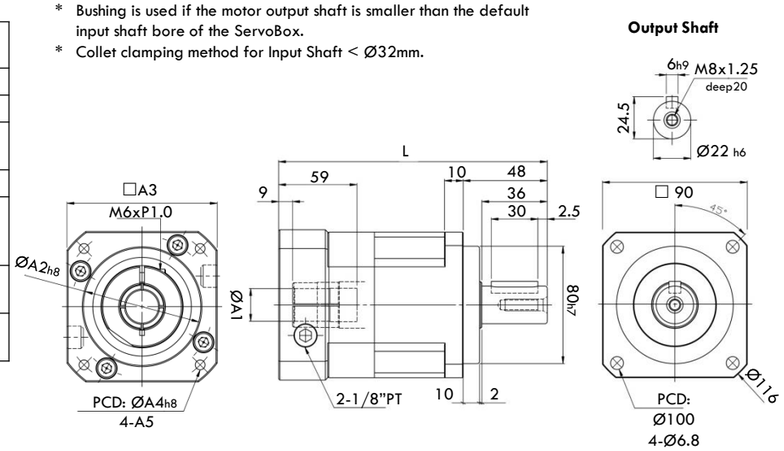


Fig. 3 DB90 DB90A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	14 ~ 24
A2	Input Pilot Bore Ø	70 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	92, 110, 130, 142
A4	Mounting PCDØ	90 ~ 145
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5
L	DB Overall Length Gear Ratio 3~10	165, 179
	DB-A Overall Length Gear Ratio 15~100	208, 223

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.



DIMENSION – DB PLANETARY SERVOBOX

Fig. 4 DB120 DB120A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	19 ~ 32
A2	Input Pilot Bore Ø	110 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	130, 150
A4	Mounting PCDØ	145 ~ 165
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5
L	DB Overall Length Gear Ratio 3~10	205, 215
	DB-A Overall Length Gear Ratio 15~100	261, 271

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

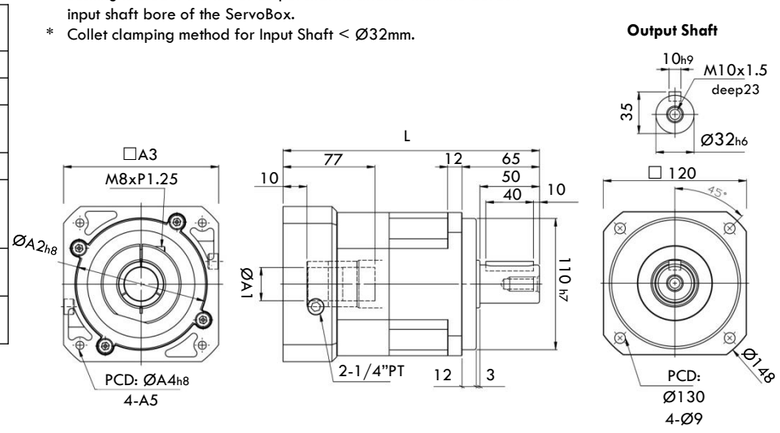


Fig. 5 DB142 DB142A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	22 ~ 38
A2	Input Pilot Bore Ø	110 ~ 180
A3	Adapter Frame Size ☐ (Square dimension)	146, 180, 190
A4	Mounting PCDØ	145 ~ 215
A5	Mounting Bolt Size	M8xP1.25 M10xP1.5 M12xP1.75
L	DB Overall Length Gear Ratio 3~10	261
	DB-A Overall Length Gear Ratio 15~100	327

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

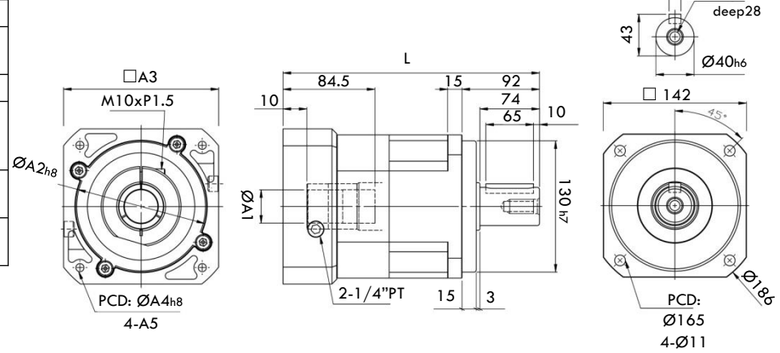
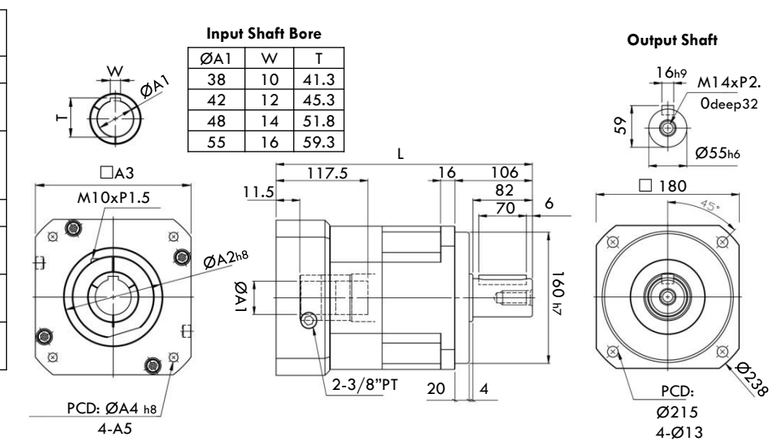


Fig. 6 DB180 DB180A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	35 ~ 55
A2	Input Pilot Bore Ø	114.3 ~ 250
A3	Adapter Frame Size ☐ (Square dimension)	182, 200, 220, 250, 265
A4	Mounting PCDØ	200 ~ 235
A5	Mounting Bolt Size	M12xP1.75 M16xP2.0
L	DB Overall Length Gear Ratio 3~10	324
	DB-A Overall Length Gear Ratio 15~100	405

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – DB PLANETARY SERVOBOX

Fig. 7 DB220 DB220A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	42 ~ 55
A2	Input Pilot Bore Ø	114.3 ~ 250
A3	Adapter Frame Size ☐ (Square dimension)	222, 250, 265
A4	Mounting PCDØ	200 ~ 300
A5	Mounting Bolt Size	M12xP1.75 M16xP2.0
L	DB Overall Length Gear Ratio 3~10	367.5
	DB-A Overall Length Gear Ratio 15~100	461

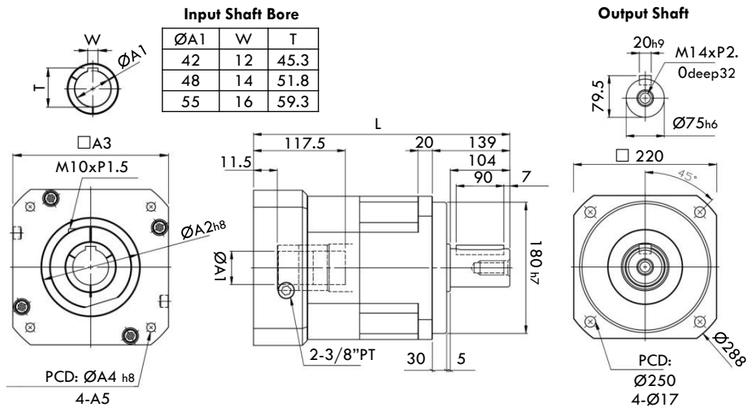
(Unit: mm)

Specification:

* Standard output shaft is keyed shaft (Round shaft is optional).

Input Shaft Bore

ØA1	W	T
42	12	45.3
48	14	51.8
55	16	59.3



Output Shaft

Fig. 8 DB270 SB270

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	48 ~ 60
A2	Input Pilot Bore Ø	250 ~ 300
A3	Adapter Frame Size ☐ (Square dimension)	300, 330
A4	Mounting PCDØ	300, 350
A5	Mounting Bolt Size	M16xP2.0 M20xP2.5
L	DB/SB Overall Length Gear Ratio 3~10	464.5, 474.5
	DB-A Overall Length Gear Ratio 15~100	N/A

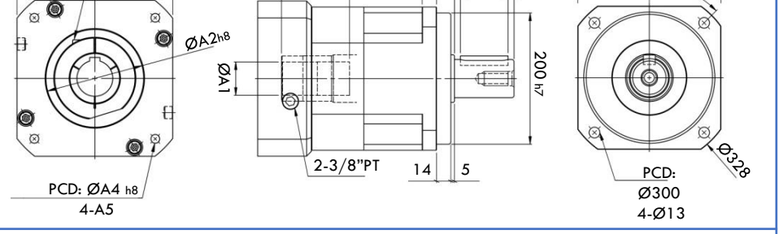
(Unit: mm)

Specification:

* Standard output shaft is keyed shaft (Round shaft is optional).

Input Shaft Bore

ØA1	W	T
48	14	51.8
55	16	59.3
60	18	64.5



Output Shaft

Fig. 9 DB330 SB330

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	55 ~ 75
A2	Input Pilot Bore Ø	250 ~ 300
A3	Adapter Frame Size ☐ (Square dimension)	300, 330
A4	Mounting PCDØ	300, 350
A5	Mounting Bolt Size	M16xP2.0 M20xP2.5
L	DB/SB Overall Length Gear Ratio 3~10	492, 502
	DB-A Overall Length Gear Ratio 15~100	N/A

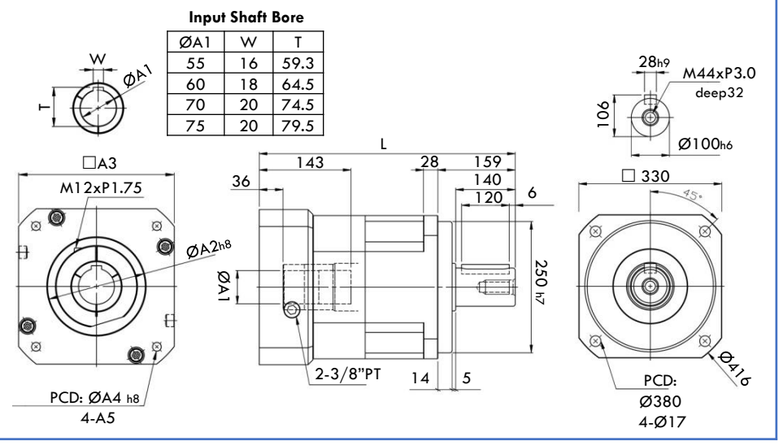
(Unit: mm)

Specification:

* Standard output shaft is keyed shaft (Round shaft is optional).

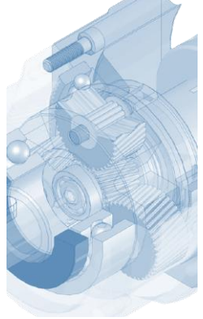
Input Shaft Bore

ØA1	W	T
55	16	59.3
60	18	64.5
70	20	74.5
75	20	79.5



Output Shaft

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.



ABOUT SERVOBOX

GLOSSARY OF TERMS

PERMISSIBLE RADIAL LOAD

Repetitive Positioning Accuracy [arcsec]
This is a value indicating the degree of error that generates when positioning is performed repeatedly to the same position in the same direction.

Runout of Output Table Surface [mm]
This is the max. value of runout of the installation surface of the output table when the output table is rotated under no load.

Runout of Output Table Inner / Outer Diameter [mm]
This is the max. value of runout of the inner diameter or outer diameter of the table when the output table is rotated under no load.

Speed (*n*) [rpm]
Two speeds are of relevance when selecting a gearbox: the maximum speed and the nominal speed at the input. The maximum permissible speed *n*1B must not be exceeded because it serves as the basis at cyclic operation. The nominal speed *n*1N must not be exceeded at continuous operation. The housing temperature limits the nominal speed, which must not exceed 90° C. The nominal input speed specified in the catalogue applies to an ambient temperature of 25°C.

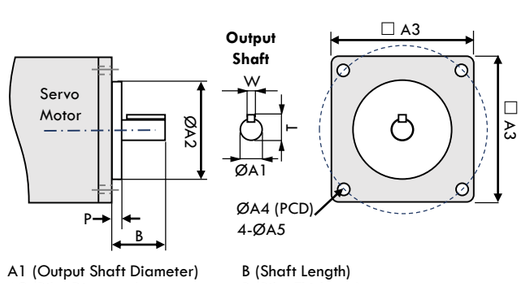
Stage (1Stage / 2Stage / 3Stage)
The sun gear and planetary gear forms an independent speed reduction gear system. If the there is only one gear system in the gear reducer, it is defined as one stage transmission. In order to achieve higher speed reduction ratio, multiple stages transmission is required. LDS's standard gear reducers are classified into one stage and two-stage transmission. Speed reduction ratio range is from 3 to 100. The modular construction combined with multiple stages transmission allows speed reduction ratio 100~100,000 and over.

Torsional Backlash (*jt*) [arcmin]
Torsional backlash *jt* is the maximum angle of torsion of the output shaft in relation to the input. Torsional backlash is measured with the input shaft locked. The output is then loaded with a defined test torque (2% rated output torque) in order to overcome the internal gearhead friction. The main factor affecting torsional backlash is the face clearance between the gear teeth.

Torsional rigidity (Ct21) [Nm/Arcmin]
Torsional rigidity is defined as the quotient of applied torque and generated torsion angle. It consequently shows the torque required to turn the output shaft by one angular minute. The torsional rigidity can be determined from the hysteresis curve. Only the area between 50% and 100% of *T*2B is considered because this area of the curve profile can be considered linear.

Transmission efficiency η [%]
Efficiency (η) is the ratio of output power to input power. Power lost through friction reduces efficiency to less than 1 or 100%.

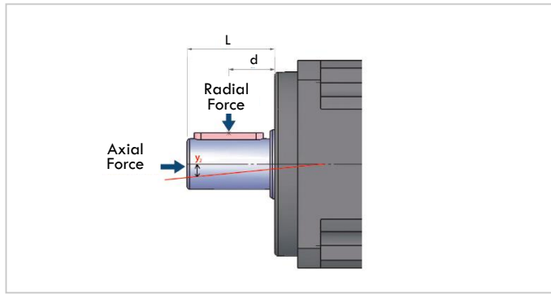
*** SERVO MOTOR DIMENSION TO ATTACH TO SERVOBOX**



A1 (Output Shaft Diameter)
A2 (Pilot Diameter)
A3 (Frame Size)
A4 (Mounting PCD)
A5 (Mounting Bolt Hole Diameter)
B (Shaft Length)
P (Pilot Thickness)
T (Overall Shaft Height)
W (Keyway Width)

PERMISSIBLE RADIAL LOADS ON OUTPUT SHAFT OF THE SERVOBOX
The gearbox will bear radial force while its output shaft connected with transmission machinery, such as chain wheel. The OHL formula of radial force is as below:

Over Hung Load = (T x s x f x p) / R
T: Torque of transmission machinery
s: Service factor
f: Driven coefficient
p: Position Position less than d, p=1
Position larger than d, p=1.5
R: Radius of pulley or chain wheel



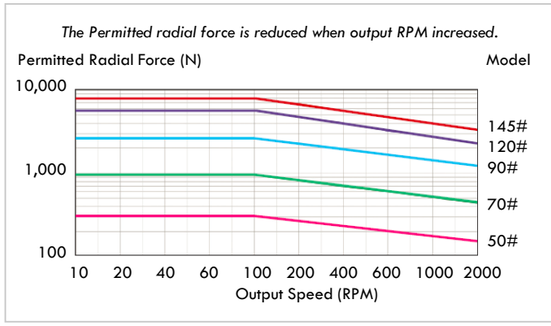
SERVICE FACTOR (sf)

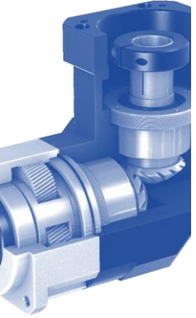
	Service factor			
	Operation Hour/Day			
Type of Load	0.5Hr	2Hr	8~10Hr	10~24Hr
Uniform	0.80	0.90	1.00	1.25
Medium shock	0.90	1.00	1.25	1.50
Heavy shock	1.00	1.25	1.50	1.75

DRIVEN COEFFICIENT (f)

	Driven Coefficient
Driving Mode	(f)
Chain pulley	1.00
Gear	1.25
V-belt	1.50
Flat belt	2.50

FB Permitted Radial Force On Center Position of Shaft [N] FB

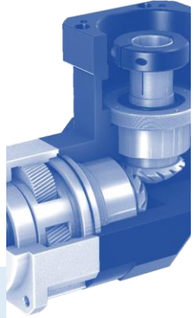




PLANETARY SERVOBOX

DBL SERIES

RIGHT ANGLE PLANETARY SOLUTION
UNIVERSAL DESIGN



High Precision Planetary ServoBox in right-angle solution and universal housing with precision bearings planetary gearing provides high torque density while offering high positioning performance.

- DBL Series 1-Stage Planetary ServoBox in Gear Reduction Ratio 3 ~ 20.
- DBL-A Series 2-Stage Planetary ServoBox in Gear Reduction Ratio 25 ~ 200.

GENERAL SPECIFICATIONS	Unit	Ratio	Model : DBL (1 Stage)						
			#44	#62	#90	#120	#142	#180	#220
Frame Size	MM	3~20	44 x 44	62 x 62	90 x 90	120 x 120	142 x 142	180 x 180	220 x 220
Mounting PCD	MM	3~20	Ø50	Ø70	Ø100	Ø130	Ø165	Ø215	Ø250
Output Shaft Diameter	MM	3~20	Ø13	Ø16	Ø22	Ø32	Ø40	Ø55	Ø75
Output Shaft Length	MM	3~20	20	28	36	50	74	82	104
Rated Output Torque	Nm	3	19	59	165	335	625	1,206	2,030
		4	16	51	146	300	555	1,069	1,804
		5	16	48	160	333	618	1,189	2,010
		6	15	45	151	311	583	1,118	1,911
		7	15	45	149	309	573	1,108	1,870
		8	14	43	143	298	553	1,070	1,824
		9	13	44	145	278	516	993	1,694
		10	13	43	141	294	549	1,059	1,179
		12	15	45	151	311	583	1,118	1,911
		14	15	45	149	309	573	1,108	1,870
		16	14	43	143	298	553	1,070	1,824
		18	13	44	145	278	516	993	1,694
		20	14	43	141	294	549	1,059	1,779
Max. Acceleration Torque	Nm	3~20	1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	Nm	3~20	3 Times of Rated Output Torque						
Rated Input Speed	RPM	3~20	3,000	3,000	3,000	3,000	3,000	3,000	2,000
Maximum Input Speed	RPM	3~20	6,000	6,000	6,000	5,000	5,000	4,000	3,000
Backlash (arcmin)	PS	3~20	-	-	≤ 2arcmin	≤ 2arcmin	≤ 2arcmin	≤ 2arcmin	≤ 2arcmin
	P0 / P1 / P2	3~20	P0 ≤ 4arcmin ▪ P1 ≤ 6arcmin ▪ P2 ≤ 8arcmin						
Torsional Rigidity	Nm/arcmin	3~20	3	6	14	27	60	140	240
Maximum Radial Force	N	3~20	380	1180	3,200	6,800	9,300	15,600	51,000
Maximum Axial Force	N	3~20	190	590	1,600	3,400	4,650	7,800	25,500
Service Life	Hr	3~20	Intermittent Periodic Duty S5 > 30,000 hours Continuous Duty S1 > 15,000 hours						
Efficiency	%	3~20	≥ 94%						
Operating Temperature	ºC	3~20	-25ºC ~ +90ºC						
Lubrication		3~20	Synthetic oil						
Degree of Protection		3~20	IP65						
Mounting Position		3~20	Any						
Noise Level	dB(A)	3~20	≤ 65	≤ 68	≤ 70	≤ 72	≤ 74	≤ 76	≤ 78
Weight ± 3%	Kg	3~20	1	2.3	6.6	13.8	52.8	--	--

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

PLANETARY SERVOBOX

DBL-A SERIES

RIGHT ANGLE PLANETARY SOLUTION
UNIVERSAL DESIGN

High Precision Planetary ServoBox in right-angle solution and universal housing with precision bearings planetary gearing provides high torque density while offering high positioning performance.

- DBL Series 1-Stage Planetary ServoBox in Gear Reduction Ratio 3 ~ 20.
- DBL-A Series 2-Stage Planetary ServoBox in Gear Reduction Ratio 25 ~ 200.

GENERAL SPECIFICATIONS	Unit	Ratio	Model : DBL (2 Stage)						
			#44A	#62A	#90A	#120A	#142A	#180A	#220A
Frame Size	MM	15~200	44 x 44	62 x 62	90 x 90	120 x 120	142 x 142	180 x 180	220 x 220
Mounting PCD	MM	15~200	Ø50	Ø70	Ø100	Ø130	Ø165	Ø215	Ø250
Output Shaft Diameter	MM	15~200	Ø13	Ø16	Ø22	Ø32	Ø40	Ø55	Ø75
Output Shaft Length	MM	15~200	20	28	36	50	74	82	104
Rated Output Torque	Nm	15	19	59	165	335	625	1,206	2,030
		20	16	51	146	300	555	1,069	1,804
		25	16	48	160	333	618	1,189	2,010
		30	15	45	151	311	583	1,118	1,911
		35	15	45	149	309	573	1,108	1,870
		40	14	43	143	298	553	1,070	1,824
		50	16	48	160	278	516	993	2,010
		60	15	45	151	294	549	1,059	1,911
		70	15	45	149	311	583	1,118	1,870
		80	14	43	143	309	573	1,108	1,824
		90	13	44	145	298	553	1,070	1,694
		100	14	43	141	278	516	993	1,179
		120	15	45	151	311	549	1,059	1,911
		140	15	45	149	309	583	1,118	1,870
		160	14	43	143	298	573	1,108	1,824
		180	13	44	145	278	553	1,070	1,694
		200	14	43	141	294	516	993	1,779
Max. Acceleration Torque	Nm	15~200	1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	Nm	15~200	3 Times of Rated Output Torque						
Rated Input Speed	RPM	15~200	3,000	3,000	3,000	3,000	3,000	3,000	2,000
Maximum Input Speed	RPM	15~200	6,000	6,000	6,000	5,000	5,000	4,000	3,000
Backlash (arcmin)	PS	15~200	-	-	≤ 4arcmin	≤ 4arcmin	≤ 4arcmin	≤ 4arcmin	≤ 4arcmin
	P0 / P1 / P2	15~200	P0 ≤ 7arcmin ▪ P1 ≤ 9arcmin ▪ P2 ≤ 12arcmin						
Torsional Rigidity	Nm/arcmin	15~200	3	6	14	27	60	140	240
Maximum Radial Force	N	15~200	380	1180	3,200	6,800	9,300	15,600	51,000
Maximum Axial Force	N	15~200	190	590	1,600	3,400	4,650	7,800	25,500
Service Life	Hr	15~200	Intermittent Periodic Duty S5 > 30,000 hours Continuous Duty S1 > 15,000 hours						
Efficiency	%	15~200	≥ 92%						
Operating Temperature	ºC	15~200	-25ºC ~ +90ºC						
Lubrication		15~200	Synthetic oil						
Degree of Protection		15~200	IP65						
Mounting Position		15~200	Any						
Noise Level	dB(A)	15~200	≤ 65	≤ 68	≤ 70	≤ 72	≤ 74	≤ 76	≤ 78
Weight ± 3%	Kg	15~200	1	3	8.2	13.8	23.5	--	--

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – DBL PLANETARY SERVOBOX

Fig. 10 DBL44 DBL44A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	5 ~ 11
A2	Input Pilot Bore Ø	30 ~ 70
A3	Adapter Frame Size □ (Square dimension)	46, 55, 60, 70
A4	Mounting PCDØ	46 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8
L1	DBL44 Gear Ratio 3~20	124
L2		98
C1		76
L1	DBL44A Gear Ratio 15~10	150
L2		124
C1		102

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

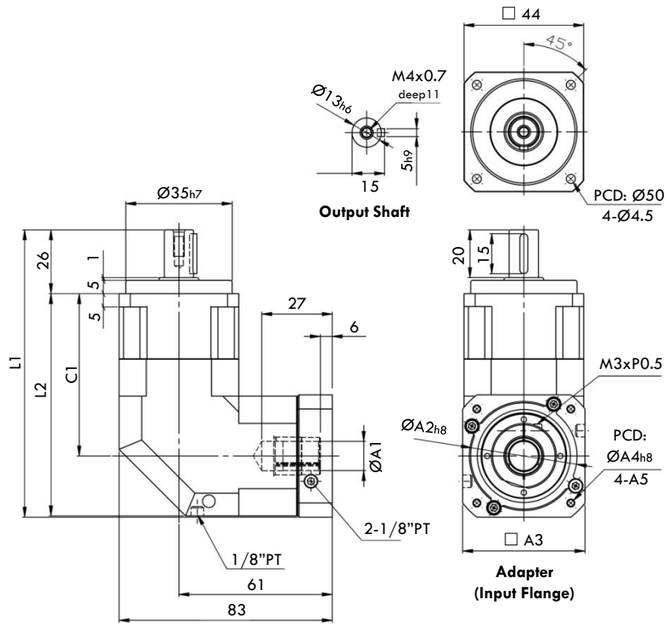
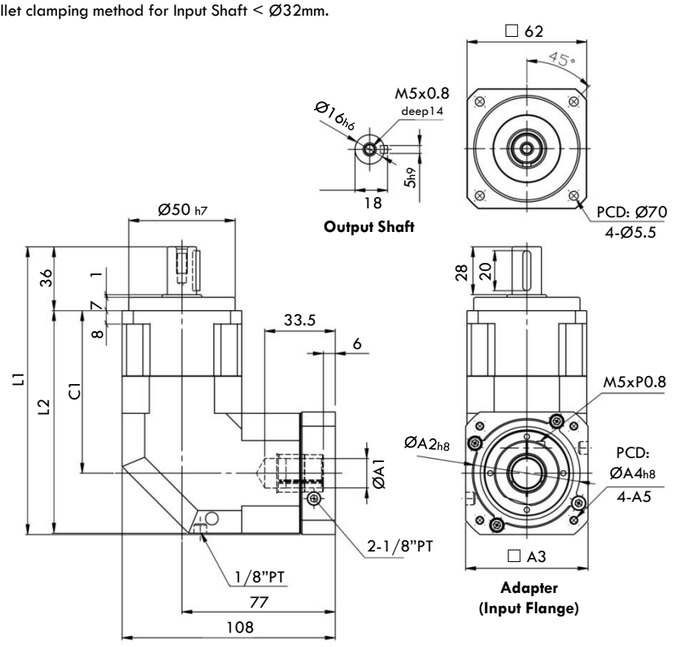


Fig. 11 DBL62 DBL62A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	11 ~ 19
A2	Input Pilot Bore Ø	50 ~ 70
A3	Adapter Frame Size □ (Square dimension)	64, 70, 80
A4	Mounting PCDØ	70 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0
L1	DBL62 Gear Ratio 3~20	152
L2		115.5
C1		84.5
L1	DBL62A Gear Ratio 15~10	185.3
L2		149.3
C1		118.3

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – DBL PLANETARY SERVOBOX

Fig. 12 DBL90 DBL90A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	14 ~ 24
A2	Input Pilot Bore Ø	70 ~ 130
A3	Adapter Frame Size □ (Square dimension)	92, 110, 130, 142
A4	Mounting PCDØ	90 ~ 145
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5
L1	DBL90 Gear Ratio 3~20	215
L2		167.1
L3		160.3, 174.8
C1		122.1
C2		115.3, 129.8
L1	DBL90A Gear Ratio 15~10	258.6
L2		210.6
L3		160.3, 174.8
C1		165.6
C2		115.3, 129.8

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

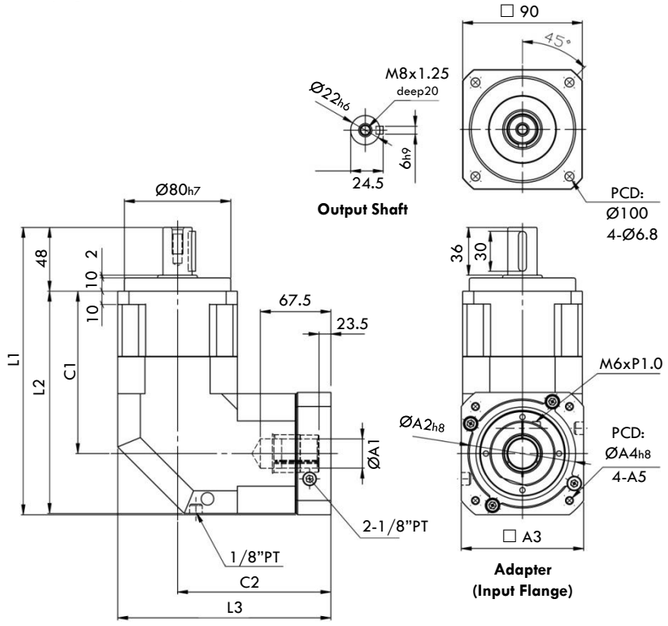
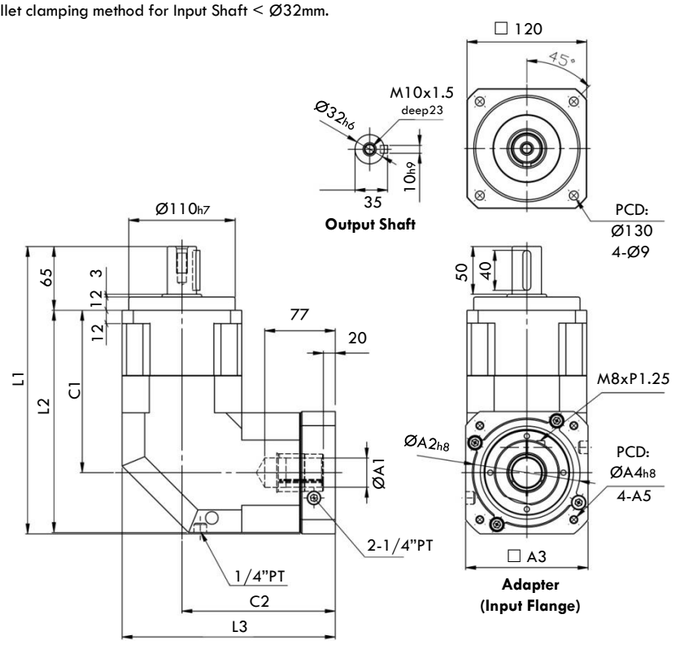


Fig. 13 DBL120 DBL120A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	19 ~ 32
A2	Input Pilot Bore Ø	110 ~ 130
A3	Adapter Frame Size □ (Square dimension)	130, 150
A4	Mounting PCDØ	145 ~ 165
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5
L1	DBL120 Gear Ratio 3~20	273
L2		208
L3		201, 211
C1		148
C2		141, 151
L1	DBL120A Gear Ratio 15~10	329
L2		264
L3		201, 211
C1		204
C2		141, 151

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – DBL PLANETARY SERVOBOX

Fig. 14 DBL142 DBL142A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	22 ~ 38
A2	Input Pilot Bore Ø	110 ~ 180
A3	Adapter Frame Size ☐ (Square dimension)	146, 180, 190
A4	Mounting PCDØ	145 ~ 215
A5	Mounting Bolt Size	M8xP1.25 M10xP1.5 M12xP1.75
L1	DBL142 Gear Ratio 3~20	328.5
L2		236.5
C1		165.5
L1	DBL142A Gear Ratio 15~10	395
L2		303
C1		232

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

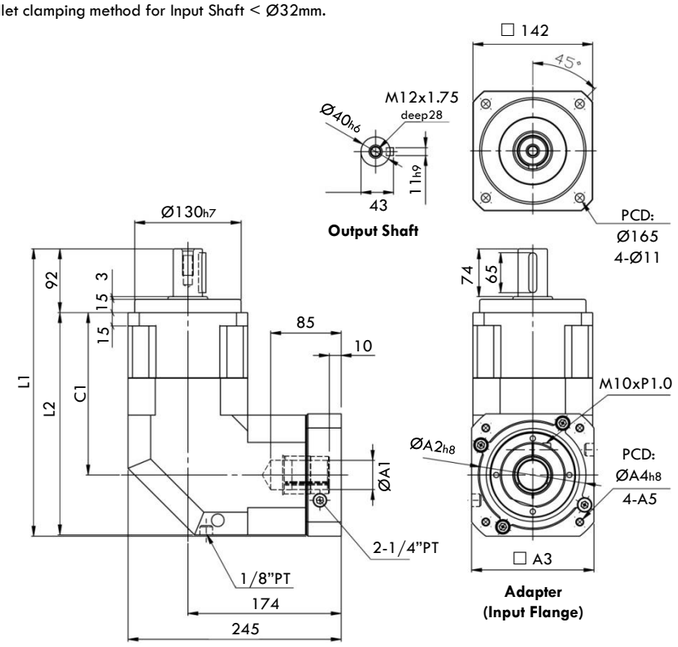
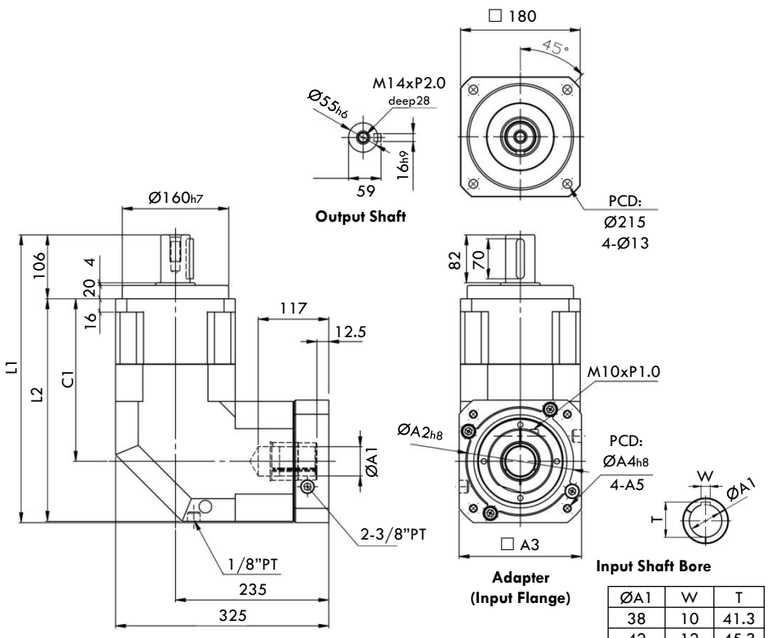


Fig. 15 DBL180 DBL180A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	35 ~ 55
A2	Input Pilot Bore Ø	114.3 ~ 250
A3	Adapter Frame Size ☐ (Square dimension)	182, 200, 220, 250, 265
A4	Mounting PCDØ	200 ~ 235
A5	Mounting Bolt Size	M12xP1.75 M16xP2.0
L1	DBL180 Gear Ratio 3~20	419.6
L2		313.6
C1		223.6
L1	DBL180A Gear Ratio 15~10	500.6
L2		394.6
C1		304.6

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).



ØA1	W	T
38	10	41.3
42	12	45.3
48	14	51.8
55	16	59.3

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

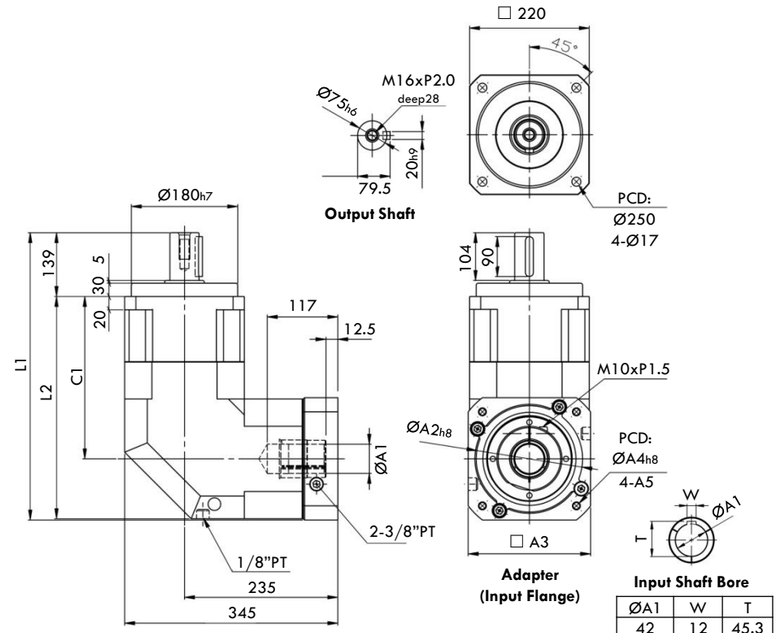
DIMENSION – DBL PLANETARY SERVOBOX

Fig. 16 DBL220 DBL220A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	42 ~ 55
A2	Input Pilot Bore Ø	114.3 ~ 250
A3	Adapter Frame Size ☐ (Square dimension)	222, 250, 265
A4	Mounting PCDØ	200 ~ 300
A5	Mounting Bolt Size	M12xP1.75 M16xP2.0
L1	DBL220 Gear Ratio 3~20	480.6
L2		341.6
C1		231.6
L1	DBL220A Gear Ratio 15~10	573.6
L2		434.6
C1		324.6

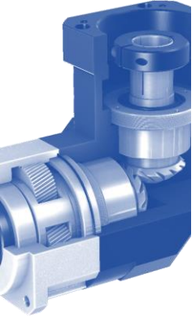
(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).



ØA1	W	T
42	12	45.3
48	14	51.8
55	16	59.3

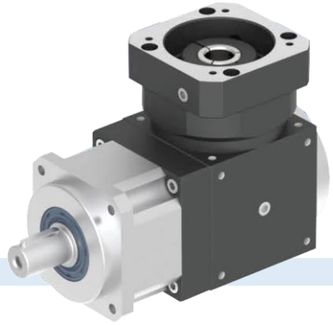
Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.



PLANETARY SERVOBOX

PBT SERIES

RIGHT ANGLE PLANETARY SOLUTION
HELICAL GEAR & SPIRAL BEVEL GEAR



Spiral Bevel Gear ServoBox offer more compact right-angle solution and universal housing with precision bearings planetary gearing provides high torque density while offering high positioning performance.

▪ PBT Series in Gear Reduction Ratio 3 ~ 50.

GENERAL SPECIFICATIONS	Unit	Ratio	Model : DBL (1 Stage)					
			#44	#62	#90	#120	#142	#180
Frame Size	MM	3~50	44 x 44	62 x 62	90 x 90	120 x 120	142 x 142	180 x 180
Mounting PCD	MM	3~50	Ø50	Ø70	Ø100	Ø130	Ø165	Ø215
Output Shaft Diameter	MM	3~50	Ø13	Ø16	Ø22	Ø32	Ø40	Ø55
Output Shaft Length	MM	3~50	20	28	36	50	74	82
Rated Output Torque	Nm	3	17	54	145	301	553	1,067
		4	15	48	128	269	491	940
		5	14	45	132	278	510	1,050
		6	13	41	125	252	466	985
		7	13	41	123	258	473	975
		8	12	39	115	241	442	942
		9	11	40	120	227	412	875
		10	14	45	132	278	510	1,050
		15	14	45	132	278	510	1,050
		20	14	45	132	278	510	1,050
		25	14	45	132	278	510	1,050
		30	13	41	125	252	466	965
		35	13	41	123	258	473	975
		40	12	39	115	241	442	942
		50	12	40	116	246	452	930
Max. Acceleration Torque	Nm	3~50	1.8 Times of Rated Output Torque					
Max. Output Torque Emergency Stop Torque	Nm	3~50	3 Times of Rated Output Torque					
Rated Input Speed	RPM	3~50	3,000	3,000	3,000	3,000	3,000	3,000
Maximum Input Speed	RPM	3~50	6,000	6,000	6,000	5,000	5,000	5,000
Backlash (arcmin)	P2	3~50	P2 ≤ 10arcmin					
Torsional Rigidity	Nm/arcmin	3~50	3	6	14	27	60	140
Maximum Radial Force	N	3~50	380	1180	3,200	6,800	9,300	15,600
Maximum Axial Force	N	3~50	190	590	1,600	3,400	4,650	7,800
Service Life	Hr	3~50	Intermittent Periodic Duty S5 > 20,000 hours Continuous Duty S1 > 10,000 hours					
Efficiency	%	3~50	≥ 95%					
Operating Temperature	ºC	3~50	-25ºC ~ +90ºC					
Lubrication		3~50	Synthetic oil					
Degree of Protection		3~50	IP65					
Mounting Position		3~50	Any					
Noise Level	dB(A)	3~50	≤ 65	≤ 68	≤ 70	≤ 72	≤ 74	≤ 76
Weight ± 3%	Kg	3~50	1.4	2.2	7.1	13	24	48

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – PBT SPIRAL BEVEL GEAR SERVOBOX

Fig. 17 PBT44

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	5 ~ 11
A2	Input Pilot Bore Ø	30 ~ 70
A3	Adapter Frame Size ☐ (Square dimension)	46, 55, 60, 70
A4	Mounting PCDØ	46 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm (round input shaft bore).

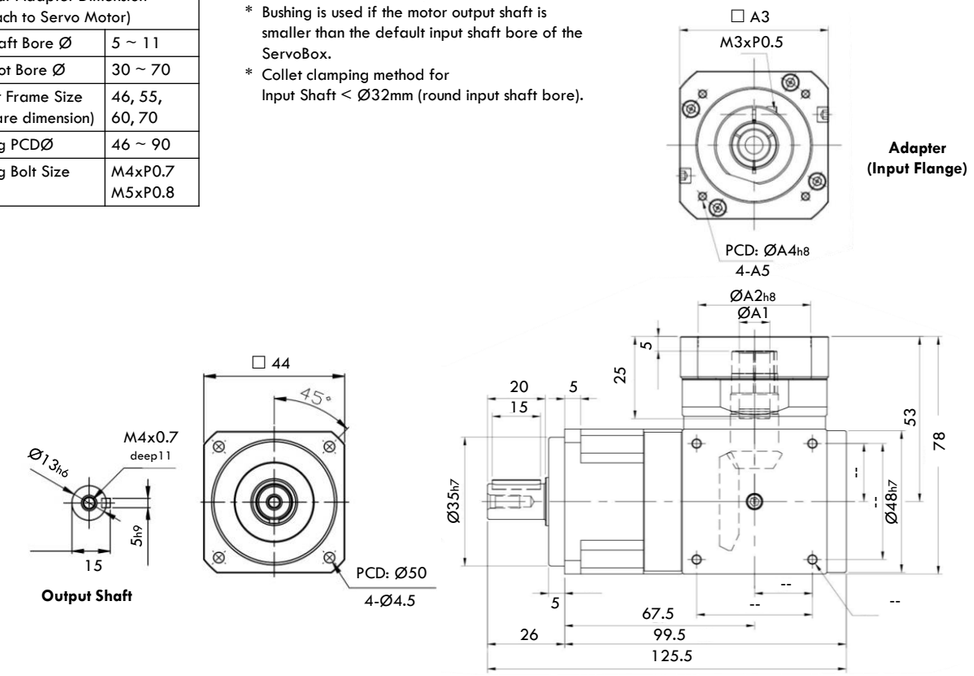
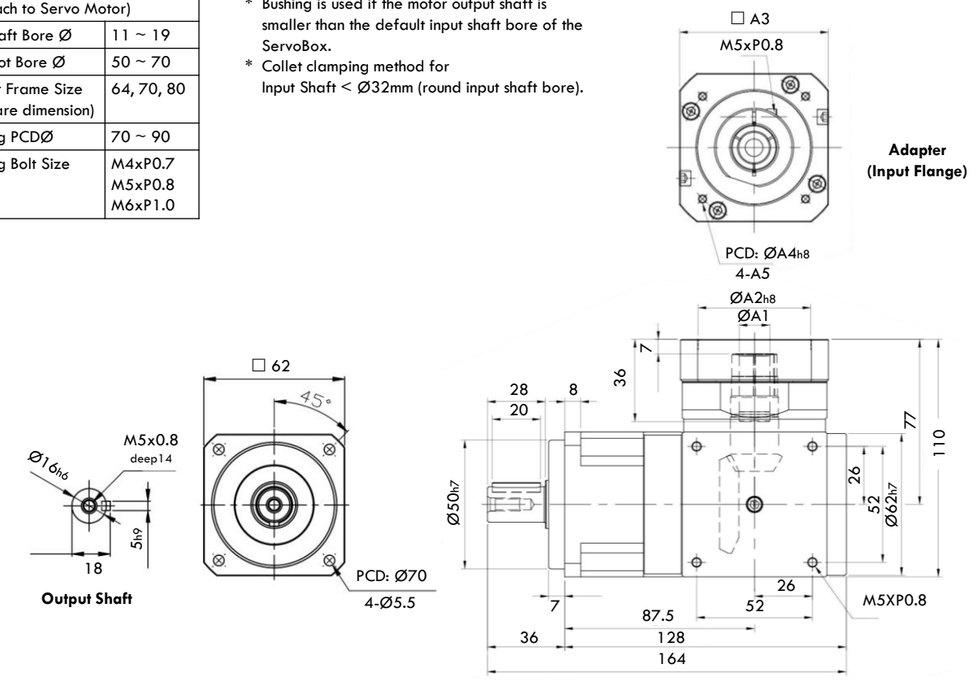


Fig. 18 PBT62

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	11 ~ 19
A2	Input Pilot Bore Ø	50 ~ 70
A3	Adapter Frame Size ☐ (Square dimension)	64, 70, 80
A4	Mounting PCDØ	70 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm (round input shaft bore).



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

Fig. 19 PBT90

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	14 ~ 24
A2	Input Pilot Bore Ø	70 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	92, 110, 130, 142
A4	Mounting PCDØ	90 ~ 145
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm (round input shaft bore).

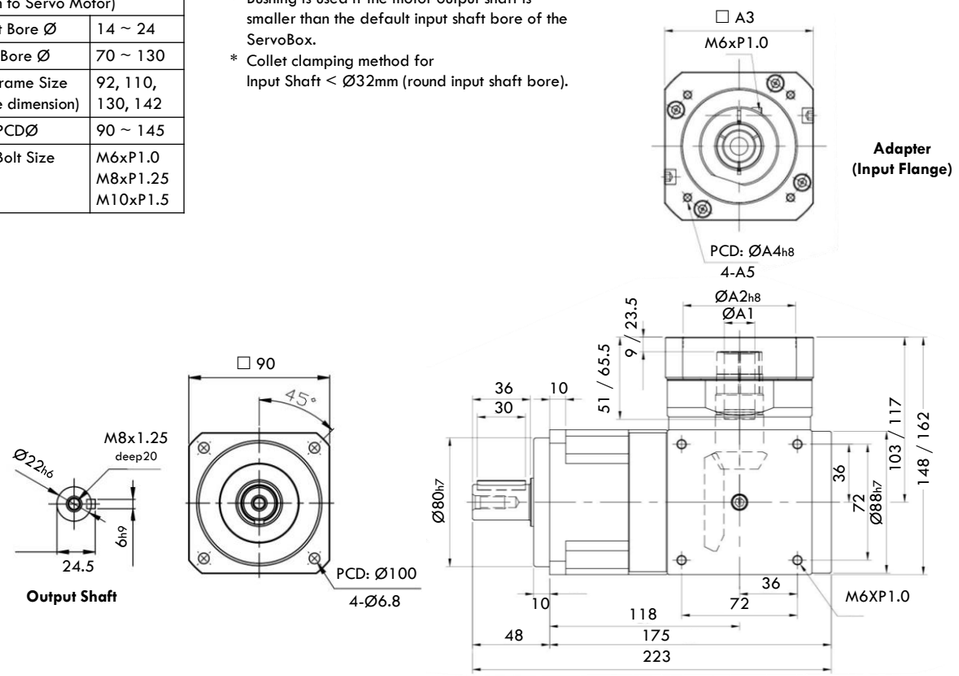
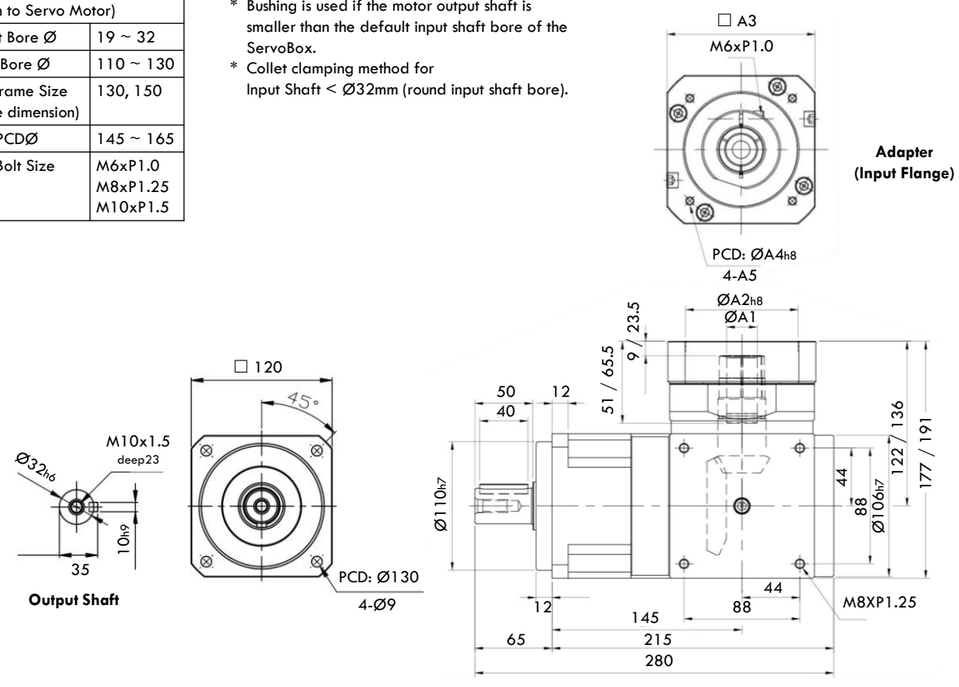


Fig. 20 PBT120

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	19 ~ 32
A2	Input Pilot Bore Ø	110 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	130, 150
A4	Mounting PCDØ	145 ~ 165
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm (round input shaft bore).



DIMENSION – PBT SPIRAL BEVEL GEAR SERVOBOX

Fig. 21 PBT142

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	22 ~ 38
A2	Input Pilot Bore Ø	110 ~ 180
A3	Adapter Frame Size ☐ (Square dimension)	146, 180, 190
A4	Mounting PCDØ	145 ~ 215
A5	Mounting Bolt Size	M8xP1.25 M10xP1.5 M12xP1.75

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm (round input shaft bore).
* Input Shaft ≥ Ø32mm (Optional : input shaft bore with keyslot).

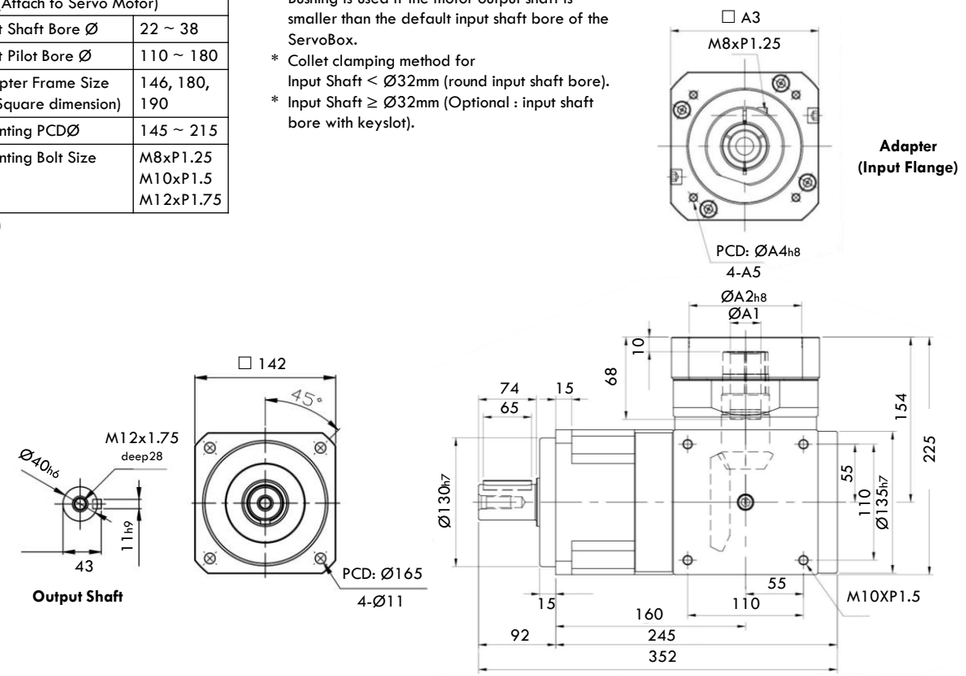


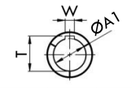
Fig. 22 PBT180

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	35 ~ 55
A2	Input Pilot Bore Ø	114.3 ~ 250
A3	Adapter Frame Size ☐ (Square dimension)	182, 200, 220, 250, 265
A4	Mounting PCDØ	200 ~ 235
A5	Mounting Bolt Size	M12xP1.75 M16xP2.0

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm (round input shaft bore).
* Input Shaft ≥ Ø32mm (Optional : input shaft bore with keyslot).

Adapter (Input Flange) Input Shaft Bore With keyslot



ØA1	W	T
38	10	41.3
42	12	45.3
48	14	51.8
55	16	59.3

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

PLANETARY SERVOBOX

FE SERIES

E-SERIES DESIGN
HIGH PRECISION

E-Series ServoBox
FE Series 1-Stage ServoBox in Gear Ratio 4, 5, 7 and 10
FE Series 2-Stage ServoBox in Gear Ratio 20, 25, 35, 40, 50, 70 and 100

GENERAL SPECIFICATION	Unit	Ratio	Model : FE (1 Stage) / (2 Stage)						
			#50	#70	#90	#120	#145	#180	#220
Output Flange Frame Size	MM	3~100	Ø50	Ø70	Ø93	Ø122	Ø148	Ø205	Ø242
Mounting PCD	MM	3~100	Ø42	Ø60	Ø80	Ø105	Ø130	Ø184	Ø218
Output Shaft Diameter	MM	3~100	Ø13	Ø16	Ø22	Ø32	Ø40	Ø55	Ø75
Output Shaft Length	MM	3~100	20	28	36	50	74	82	104
Rated Output Torque	Nm (1Stage)	3	17	50	125	268	482	940	1,420
		4	15	45	111	238	426	860	1,300
		5	14	42	104	223	401	835	1,270
		7	13	39	98	208	373	790	1,180
		10	12	37	92	198	356	760	1,140
	Nm (2Stage)	15	17	50	125	268	482	940	1,420
		20	15	45	111	238	426	860	1,300
		25	14	42	104	223	401	835	1,270
		35	13	39	98	208	373	790	1,180
		40	15	45	111	238	427	860	1,300
		50	14	42	104	223	402	835	1,270
		70	13	40	98	208	373	790	1,180
		100	12	37	92	198	357	760	1,100
Max. Acceleration Torque	Nm	3~100	1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	Nm	3~100	3 Times of Rated Output Torque						
Rated Input Speed	RPM	3~100	3,000	3,000	3,000	3,000	3,000	2,000	2,000
Maximum Input Speed	RPM	3~100	5,000	5,000	5,000	5,000	5,000	3,000	3,000
Backlash	Arcmin	3~100	≤ 8arcmin						
		3~100	≤ 12arcmin						
Torsional Rigidity	Nm/arcmin	3~100	2.3	5	15	45	69	140	220
Maximum Radial Force	N	3~100	750	1,180	3,000	6,500	9,100	11,150	35,000
Maximum Axial Force	N	3~100	325	590	1,500	3,250	4,550	5,575	17,500
Service Life	Hr	3~100	Intermittent Periodic Duty S5 > 20,000 hours Continuous Duty S1 > 10,000 hours						
Efficiency	%	3~10	≥ 97%						
		15~100	≥ 94%						
Operating Temperature	ºC	3~100	-25ºC ~ +90ºC						
Lubrication		3~100	Synthetic Grease						
Degree of Protection		3~100	IP65						
Mounting Position		3~100	Any						
Noise Level	dB(A)	3~10	≤ 62	≤ 62	≤ 65	≤ 68	≤ 70	≤ 70	≤ 70
		15~100	≤ 65	≤ 65	≤ 68	≤ 70	≤ 72	≤ 72	≤ 72
Weight ± 3%	Kg	3~10	0.63	1.57	3.22	8	16	33	54
		15~100	0.9	2.24	4.59	11.2	22.5	46.4	75

* The contents of this data sheet are subject to change without notice in advance for the purpose of continuous product improvement.
* Please contact us for customized model.

DIMENSION – FE PLANETARY SERVOBOX

Fig. 23 FE50

Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	8 ~ 11
A2	Input Pilot Bore Ø	30 ~ 50
A3	Adapter Frame Size ☐ (Square dimension)	46, 55
A4	Mounting PCDØ	46 ~ 63
A5	Mounting Bolt Size	M3XP0.5 M4xP0.7 M5xP0.8
L	FE Overall Length Gear Ratio 3~10	101
	FE Overall Length Gear Ratio 25~100	127

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

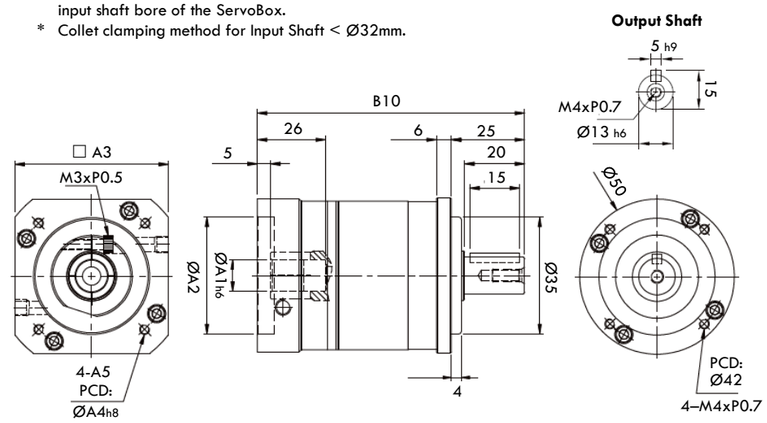


Fig. 24 FE70

Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	14 ~ 19
A2	Input Pilot Bore Ø	40 ~ 60
A3	Adapter Frame Size ☐ (Square dimension)	64, 70, 80
A4	Mounting PCDØ	70 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0
L	FE Overall Length Gear Ratio 3~10	131, 141
	FE Overall Length Gear Ratio 15~100	167

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

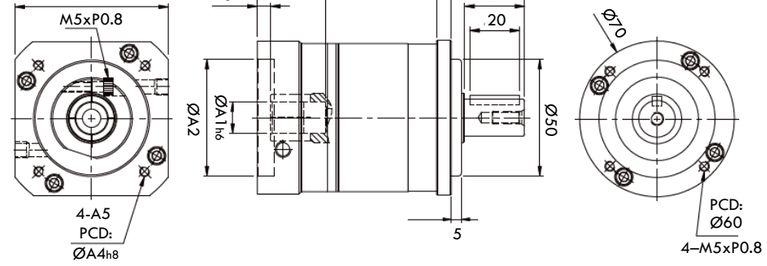
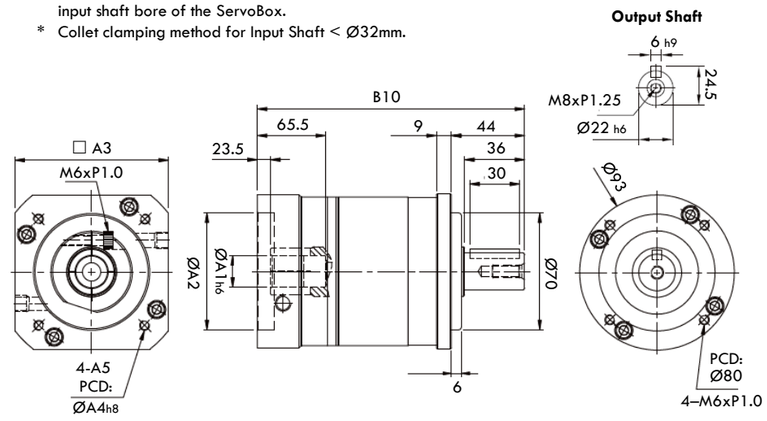


Fig. 25 FE90

Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	19 ~ 24
A2	Input Pilot Bore Ø	70 ~ 110
A3	Adapter Frame Size ☐ (Square dimension)	92, 110, 130, 142
A4	Mounting PCDØ	90 ~ 145
A5	Mounting Bolt Size	M5xP0.8 M6xP1.0 M8xP1.25
L	FE Overall Length Gear Ratio 3~10	171, 185
	FE Overall Length Gear Ratio 15~100	210, 225

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.



* The contents of this data sheet are subject to change without notice in advance for the purpose of continuous product improvement.

DIMENSION – FE PLANETARY SERVOBOX

Fig. 26 FE120

Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	19 ~ 32
A2	Input Pilot Bore Ø	95 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	95, 110, 130, 150
A4	Mounting PCDØ	115 ~ 165
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5
L	FE Overall Length Gear Ratio 3~10	228, 238
	FE Overall Length Gear Ratio 15~100	282, 292

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

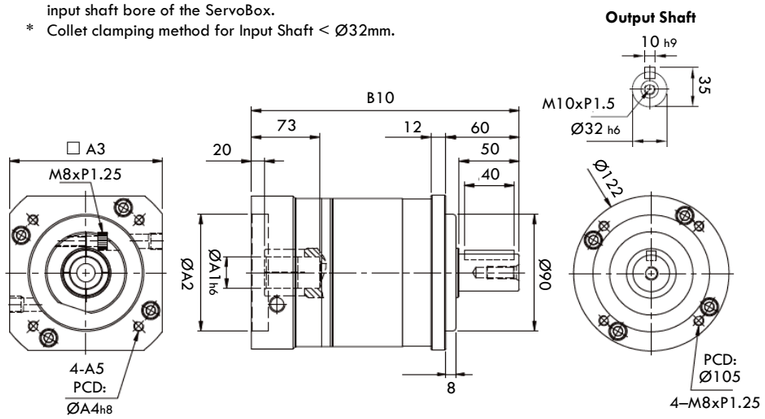


Fig. 27 FE145

Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	32 ~ 38
A2	Input Pilot Bore Ø	110 ~ 180
A3	Adapter Frame Size ☐ (Square dimension)	146, 180, 190
A4	Mounting PCDØ	145 ~ 200
A5	Mounting Bolt Size	M8xP1.25 M10xP1.5 M12xP1.75
L	FE Overall Length Gear Ratio 3~10	291
	FE Overall Length Gear Ratio 15~100	355

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

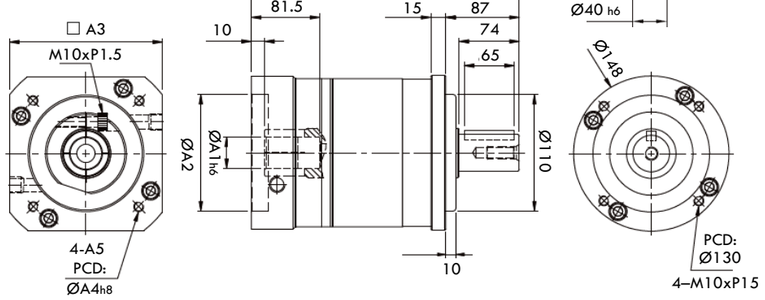


Fig. 28 FE180

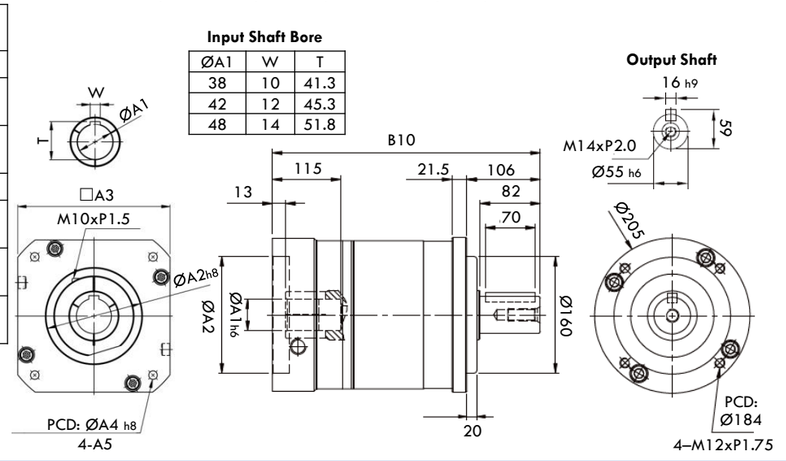
Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	35 ~ 48
A2	Input Pilot Bore Ø	114.3 ~ 230, 250
A3	Adapter Frame Size ☐ (Square dimension)	182, 200, 220, 250
A4	Mounting PCDØ	200 ~ 265
A5	Mounting Bolt Size	M10xP1.5 M12xP1.75
L	FE Overall Length Gear Ratio 3~10	325
	FE Overall Length Gear Ratio 15~100	395

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).

Input Shaft Bore

ØA1	W	T
38	10	41.3
42	12	45.3
48	14	51.8



* The contents of this data sheet are subject to change without notice in advance for the purpose of continuous product improvement.

DIMENSION – FE PLANETARY SERVOBOX

Fig. 29 FE220

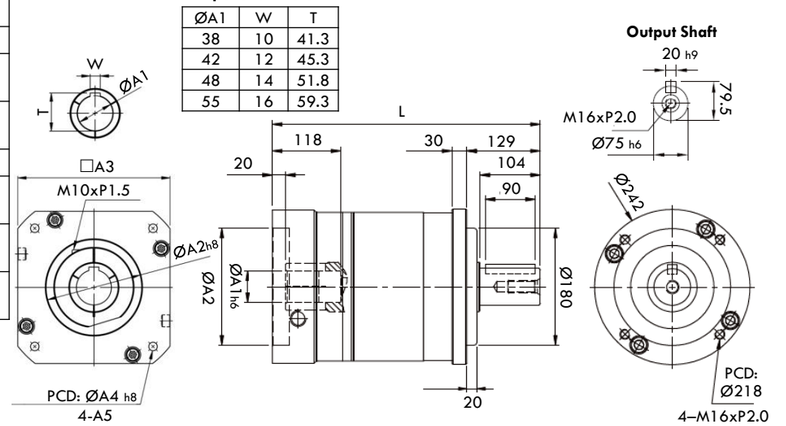
Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	38 ~ 55
A2	Input Pilot Bore Ø	114.3 ~ 250
A3	Adapter Frame Size ☐ (Square dimension)	222, 250, 265
A4	Mounting PCDØ	200 ~ 300
A5	Mounting Bolt Size	M12xP1.75 M16xP2.0
L	FE Overall Length Gear Ratio 3~10	377
	FE Overall Length Gear Ratio 15~100	464

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).

Input Shaft Bore

ØA1	W	T
38	10	41.3
42	12	45.3
48	14	51.8
55	16	59.3



* The contents of this data sheet are subject to change without notice in advance for the purpose of continuous product improvement.

PLANETARY SERVOBOX

PE SERIES

E-SERIES DESIGN
PRECISION SERVOBOX

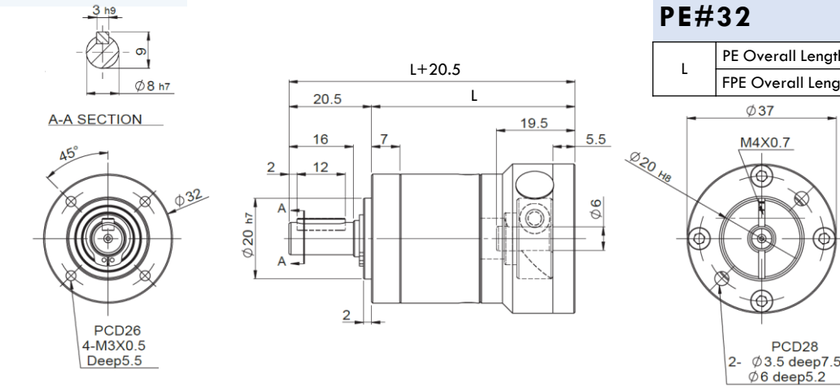
E-Series ServoBox
PE Series 1-Stage ServoBox in Gear Ratio 3 ~ 10
PE Series 2-Stage ServoBox in Gear Ratio 12 ~ 64

GENERAL SPECIFICATION	Unit	Ratio	PE#32	PE#40	PE#60	PE#80
Output Flange Frame Size	MM	3~64	Ø32	Ø40	Ø60	Ø122
Mounting PCD	MM	3~64	Ø26	Ø32	Ø52	Ø105
Output Shaft Diameter	MM	3~64	Ø8	Ø10	Ø14	Ø32
Output Shaft Length	MM	3~64	16	23	29.5	50
Rated Output Torque	Nm (1Stage)	3	8	12	30	90
		4	10	16	38	120
		5	11	17	41	130
		7	9		32	110
		8		12		
		9	7			
		10		10	25	80
	Nm (2Stage)	12		11	30	90
		15	8	11	30	90
		20	10	16	38	120
		25	11	17	41	130
		32	9	16		
		35	9	16	32	110
		40		16	38	120
		45	7			
		50			41	130
		63	9			
		64		17		
Max. Acceleration Torque	Nm	3~63	1.8 Times of Rated Output Torque			
Max. Output Torque Emergency Stop Torque	Nm	3~63	3 Times of Rated Output Torque			
Rated Input Speed	RPM	3~63	5,000	5,000	4,500	4,000
Maximum Input Speed	RPM	3~63	10,000	10,000	9,000	8,000
Backlash	Arcmin	3~9	≤ 12arcmin			
		12~64	≤ 20arcmin			
Torsional Rigidity	Nm/arcmin	3~64	0.8	1	2.3	6
Maximum Radial Force	N	3~64	130	300	689	1,750
Maximum Axial Force	N	3~64	65	150	340	875
Service Life	Hr	3~64	Intermittent Periodic Duty S5 > 20,000 hours Continuous Duty S1 > 10,000 hours			
Efficiency	%	3~9	≥ 96%			
		12~64	≥ 94%			
Operating Temperature	ºC	3~64	-25ºC ~ +90ºC			
Lubrication		3~64	Synthetic Grease			
Degree of Protection		3~64	IP54			
Mounting Position		3~64	Any			
Noise Level	dB(A)	3~10	≤ 56	≤ 58	≤ 62	≤ 60
		12~64	≤ 58	≤ 58	≤ 60	≤ 62
Weight ± 3%	Kg	3~10	0.2	0.35	0.9	2.1
		12~64	0.3	0.45	1.1	2.6

* The contents of this data sheet are subject to change without notice in advance for the purpose of continuous product improvement.
* Please contact us for customized model.

DIMENSION – PE PLANETARY SERVOBOX

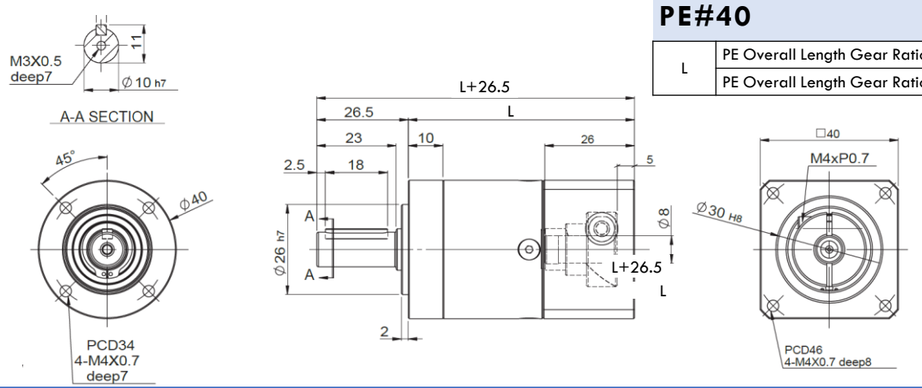
PE#32



L	PE Overall Length Gear Ratio 3~9	50.5
	FPE Overall Length Gear Ratio 15~63	65.5

(Unit: mm)

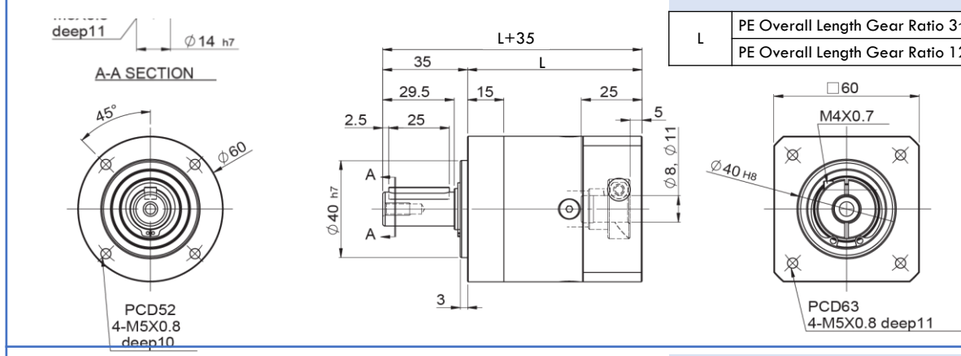
PE#40



L	PE Overall Length Gear Ratio 3~10	65.5
	PE Overall Length Gear Ratio 12~64	83.5

(Unit: mm)

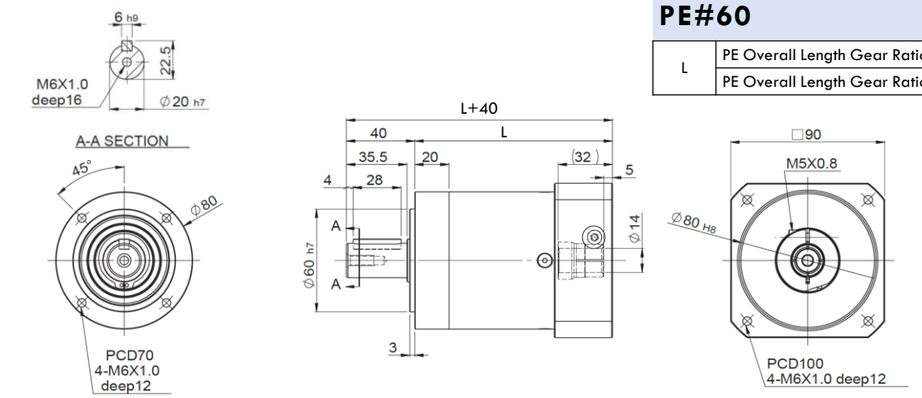
PE#60



L	PE Overall Length Gear Ratio 3~10	72
	PE Overall Length Gear Ratio 12~50	90.5

(Unit: mm)

PE#60



L	PE Overall Length Gear Ratio 3~10	94
	PE Overall Length Gear Ratio 12~50	115.5

(Unit: mm)

PLANETARY SERVOBOX

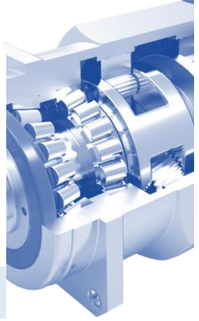
SF SERIES

HIGH RADIAL AND AXIAL FORCE
DOUBLE TAPER BEARING DESIGN

Features :
- SF Series 1-Stage Planetary ServoBox in Gear Reduction Ratio 3 ~ 10.
- SF-A Series 2-Stage Planetary ServoBox in Gear Reduction Ratio 15 ~ 100.

GENERAL SPECIFICATIONS	Unit	Ratio	Model : SF (1 Stage)				
			#62	#75	#100	#142	#180
Frame Size	MM	3~10	62 x 62	76 x 76	106 x 106	142 x 142	180 x 180
Mounting PCD	MM	3~10	Ø68	Ø85	Ø120	Ø165	Ø215
Output Shaft Diameter	MM	3~10	Ø16	Ø22	Ø32	Ø40	Ø55
Output Shaft Length	MM	3~10	28	36	58	82	82
Rated Output Torque	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	136	294	549	1,059
Max. Acceleration Torque	Nm	3~10	1.8 Times of Rated Output Torque				
Max. Output Torque Emergency Stop Torque	Nm	3~10	3 Times of Rated Output Torque				
Rated Input Speed	RPM	3~10	3,000	3,000	3,000	3,000	3,000
Maximum Input Speed	RPM	3~10	6,000	6,000	6,000	6,000	6,000
Backlash (arcmin)	PS	3~10	≤ 1arcmin	≤ 1arcmin	≤ 1arcmin	≤ 1arcmin	≤ 1arcmin
	P0 / P1 / P2	3~10	P0 ≤ 3arcmin ▪ P1 ≤ 5arcmin ▪ P2 ≤ 7arcmin				
Torsional Rigidity	Nm/arcmin	3~10	8	15	27	60	150
Maximum Radial Force	N	3~10	2,240	4,150	8,760	12,750	17,860
Maximum Axial Force	N	3~10	1,920	3,780	7,500	10,840	15,180
Service Life	Hr	3~10	Intermittent Periodic Duty S5 > 30,000 hours Continuous Duty S1 > 15,000 hours				
Efficiency	%	3~10	≥ 97%				
Operating Temperature	ºC	3~10	-25ºC ~ +90ºC				
Lubrication		3~10	Synthetic Grease				
Degree of Protection		3~10	IP65				
Mounting Position		3~10	Any				
Noise Level	dB(A)	3~10	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67
Weight ± 3%	Kg	3~10	0.6	1.28	3.6	8	--
Mass Moments Of Inertia (Kg .cm²)		3	0.15	0.60	3.21	9.18	28.82
		4	0.14	0.51	2.80	7.51	23.56
		5	0.13	0.45	2.71	7.40	23.74
		6	0.13	0.45	2.65	7.15	22.65
		7	0.12	0.42	2.54	7.15	22.40
		8	0.12	0.42	2.51	7.01	22.35
		9	0.12	0.42	2.51	7.01	22.35
		10	0.12	0.42	2.51	7.01	22.35

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.



PLANETARY SERVOBOX

SF-A SERIES

HIGH RADIAL AND AXIAL FORCE
DOUBLE TAPER BEARING DESIGN

Features :
- Higher radial and axial load capacity.
- Double taper bearing design with full needle roller bearings without retainer.
- One-piece constructed planetary arm bracket.
- Universal housing and is suitable for all servo and stepper applications.

GENERAL SPECIFICATIONS	Unit	Ratio	Model : SF (2 Stage)				
			#62A	#75A	#100A	#142A	#180A
Frame Size	MM	15~100	62 x 62	76 x 76	106 x 106	142 x 142	180 x 180
Mounting PCD	MM	15~100	Ø68	Ø85	Ø120	Ø165	Ø215
Output Shaft Diameter	MM	15~100	Ø16	Ø22	Ø32	Ø40	Ø55
Output Shaft Length	MM	15~100	28	36	58	82	82
Rated Output Torque	Nm	15	59	142	298	625	1,206
		20	51	126	267	555	1,069
		25	48	158	296	618	1,189
		30	45	130	278	583	1,118
		35	45	128	275	573	1,108
		40	43	123	265	553	1,070
		50	48	138	296	618	1,189
		60	45	130	277	583	1,118
		70	45	128	275	573	1,108
		80	43	123	265	553	1,070
		90	44	125	247	516	993
		100	43	121	262	549	1,059
Max. Acceleration Torque	Nm	15~100	1.8 Times of Rated Output Torque				
Max. Output Torque Emergency Stop Torque	Nm	15~100	3 Times of Rated Output Torque				
Rated Input Speed	RPM	15~100	3,000	3,000	3,000	3,000	3,000
Maximum Input Speed	RPM	15~100	6,000	6,000	6,000	6,000	6,000
Backlash (arcmin)	PS	15~100	≤ 3arcmin	≤ 3arcmin	≤ 3arcmin	≤ 3arcmin	≤ 3arcmin
	P0 / P1 / P2	15~100	P0 ≤ 5arcmin ▪ P1 ≤ 7arcmin ▪ P2 ≤ 9arcmin				
Torsional Rigidity	Nm/arcmin	15~100	8	15	27	60	150
Maximum Radial Force	N	15~100	2,240	4,150	8,760	12,750	17,860
Maximum Axial Force	N	15~100	1,920	3,780	7,500	10,840	15,180
Service Life	Hr	15~100	Intermittent Periodic Duty S5 > 30,000 hours Continuous Duty S1 > 15,000 hours				
Efficiency	%	15~100	≥ 94%				
Operating Temperature	ºC	15~100	-25ºC ~ +90ºC				
Lubrication		15~100	Synthetic Grease				
Degree of Protection		15~100	IP65				
Mounting Position		15~100	Any				
Noise Level	dB(A)	15~100	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67
Weight ± 3%	Kg	15~100	0.6	1.28	3.6	8	--

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

Fig. 30 SF62 SF62A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	8 ~ 19
A2	Input Pilot Bore Ø	50 ~ 70
A3	Adapter Frame Size ☐ (Square dimension)	64, 70, 80
A4	Mounting PCDØ	70 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0
L	SF Overall Length Gear Ratio 3~10	140
	SF-A Overall Length Gear Ratio 15~100	174

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

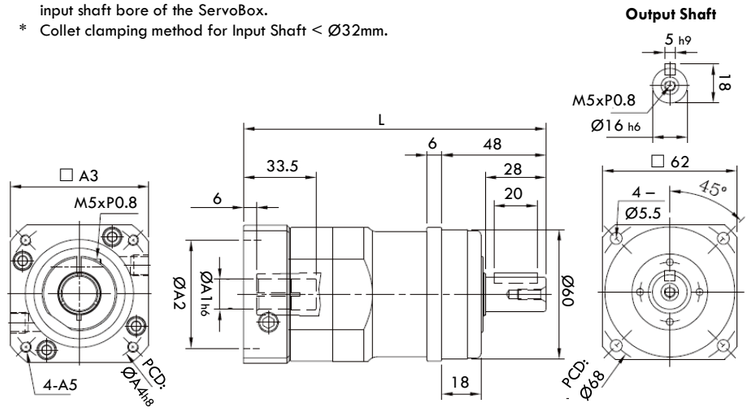


Fig. 31 SF75 SF75A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	14 ~ 24
A2	Input Pilot Bore Ø	70 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	92, 110, 130, 142
A4	Mounting PCDØ	90 ~ 145
A5	Mounting Bolt Size	M5xP0.8 M6xP1.0 M8xP1.25
L	SF Overall Length Gear Ratio 3~10	191
	SF-A Overall Length Gear Ratio 15~100	214

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

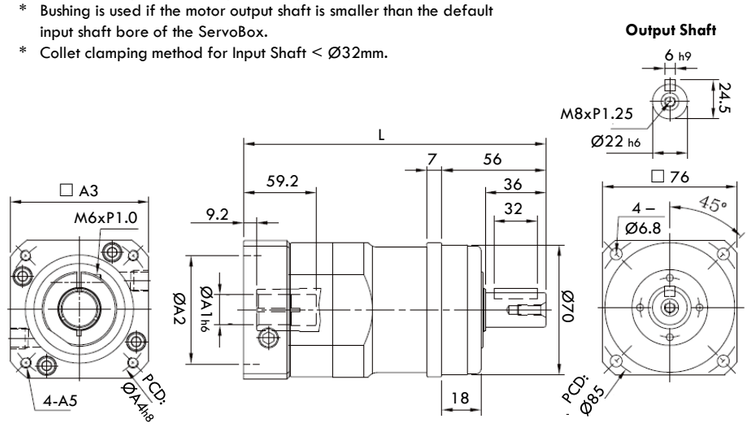
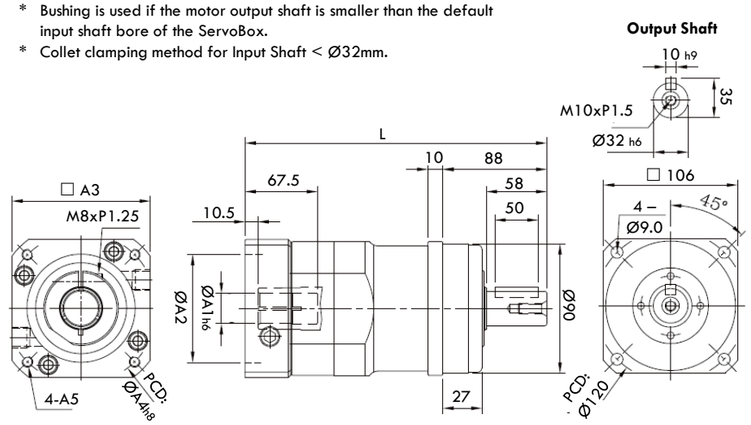


Fig. 32 SF90 SF90A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	19 ~ 32
A2	Input Pilot Bore Ø	110 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	122, 130, 150
A4	Mounting PCDØ	115 ~ 165
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5
L	SF Overall Length Gear Ratio 3~10	243
	SF-A Overall Length Gear Ratio 15~100	283

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – SF PLANETARY SERVOBOX

Fig. 33 SF142 SF142A

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	22 ~ 42
A2	Input Pilot Bore Ø	110 ~ 180
A3	Adapter Frame Size ☐ (Square dimension)	146, 180, 190
A4	Mounting PCDØ	145 ~ 215
A5	Mounting Bolt Size	M8xP1.25 M10xP1.5 M12xP1.75
L	SF Overall Length Gear Ratio 3~10	306
	SF-A Overall Length Gear Ratio 15~100	373

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

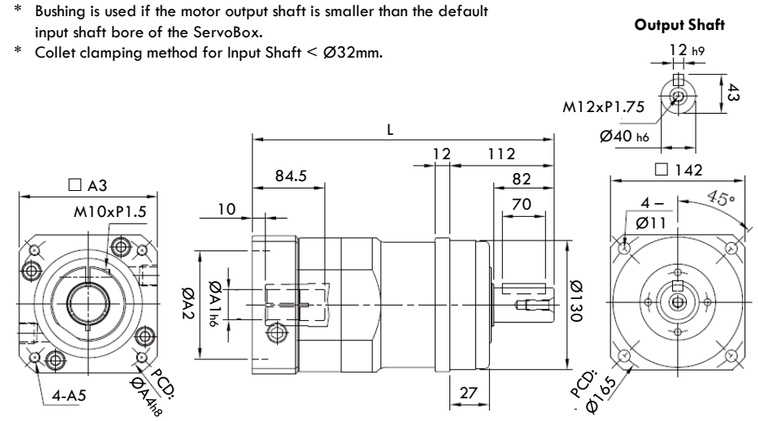


Fig. 34 SF180 SF180A

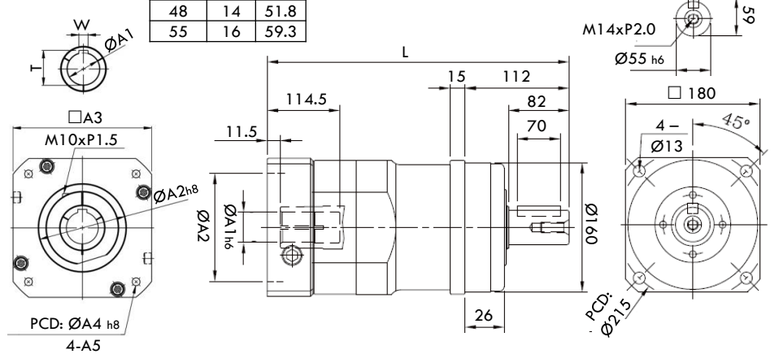
Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	35 ~ 55
A2	Input Pilot Bore Ø	114.3 ~ 250
A3	Adapter Frame Size ☐ (Square dimension)	182, 200, 220, 250, 265
A4	Mounting PCDØ	200 ~ 265
A5	Mounting Bolt Size	M10xP1.5 M12xP1.75 M16xP2.0
L	SF Overall Length Gear Ratio 3~10	360
	SF-A Overall Length Gear Ratio 15~100	441

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).

Input Shaft Bore

ØA1	W	T
38	10	41.3
42	12	45.3
48	14	51.8
55	16	59.3



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

PLANETARY SERVOBOX

SD SERIES

HIGH PRECISION ROTARY OUTPUT FLANGE
OPTIMUM RADIAL LOAD

Features :
- Precise in-line planetary system with rotary flange design.
- Low backlash between 1~12arcmin.
- Ball bearing and taper bearing option.
- Universal housing and is suitable for rotary and turntable applications.

Ball Gearing Design (SD-B) / Taper Bearing Design (SD-T)
- 1-Stage ServoBox in Gear Ratio 4, 5, 7 and 10.
- 2-Stage ServoBox in Gear Ratio 20, 25, 35, 40, 50, 70 and 100.

GENERAL SPECIFICATIONS	Unit	Ratio	Model : SD (1 Stage) / (2 Stage)						
			#47	#64	#90	#110	#140	#200	#255
Frame Size Ø	MM	4~100	Ø72	Ø86	Ø118	Ø146	Ø179	Ø248	Ø300
Mounting PCD	MM	4~100	Ø67	Ø79	Ø109	Ø135	Ø168	Ø233	Ø280
Rotary Mounting PCD	MM	4~100	Ø20	Ø31.5	Ø50	Ø63	Ø80	Ø125	Ø140
Rated Output Torque	Nm (1Stage)	4	22	60	160	335	650	1,200	2,020
		5	20	50	155	333	618	1,189	2,010
		7	19	47	142	309	573	1,108	1,870
		10	16	43	136	294	549	1,059	1,779
	Nm (2Stage)	20	22	60	160	335	650	1,200	2,020
		25	20	50	155	333	618	1,189	2,010
		35	19	47	142	309	573	1,108	1,870
		40	22	60	160	335	650	1,200	2,020
		50	20	50	155	333	618	1,189	2,010
		70	19	47	142	309	573	1,108	1,870
		100	16	43	136	294	549	1,059	1,779
Max. Acceleration Torque	Nm	4~100	1.8 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	Nm	4~100	3 Times of Rated Output Torque						
Rated Input Speed	RPM	4~100	3,000	3,000	3,000	3,000	3,000	3,000	2,000
Maximum Input Speed	RPM	4~100	6,000	6,000	6,000	6,000	5,000	4,000	3,000
Backlash	Arcmin	4~10	Ps ≤ 1arcmin ▪ P0 ≤ 3arcmin ▪ P1 ≤ 5arcmin ▪ P2 ≤ 7arcmin						
		20~100	Ps ≤ 3arcmin ▪ P0 ≤ 5arcmin ▪ P1 ≤ 7arcmin ▪ P2 ≤ 9arcmin						
Torsional Rigidity	Nm/arcmin	4~100	6	14	30	86	155	450	1,126
Maximum Axial Force	N (Ball Bearing)	4~100	340	590	1,970	2,970	4,690	6,700	8,800
	N (Taper Bearing)	4~100	--	--	2,670	4,260	6,240	8,100	10,610
Service Life	Hr	15~200	Intermittent Periodic Duty S5 > 30,000 hours Continuous Duty S1 > 15,000 hours						
Efficiency	%	4~10	≥ 97%						
		20~100	≥ 94%						
Operating Temperature	ºC	15~200	-25ºC ~ +90ºC						
Lubrication		15~200	Synthetic Grease						
Degree of Protection		15~200	IP65						
Mounting Position		15~200	Any						
Noise Level	dB(A)	4~10	≤ 56	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67	≤ 70
		20~100	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67	≤ 70	≤ 72

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – SD PLANETARY SERVOBOX

Fig. 35 SD-47-B SD-47-T

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	6 ~ 11
A2	Input Pilot Bore Ø	30 ~ 50
A3	Adapter Frame Size ☐ (Square dimension)	46, 55
A4	Mounting PCDØ	46 ~ 63
A5	Mounting Bolt Size	M3xP0.5 M4xP0.7 M5xP0.8
L	SD Overall Length Gear Ratio 4~10	73
	SD Overall Length Gear Ratio 20~100	99

(Unit: mm)

Specification:
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

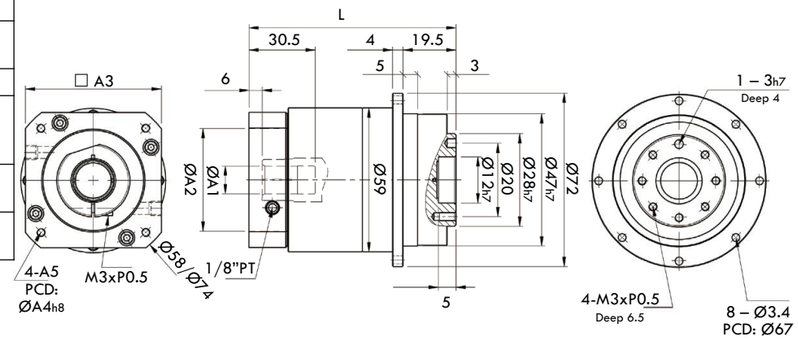


Fig. 36 SD-64-B SD-64-T

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	11 ~ 19
A2	Input Pilot Bore Ø	50 ~ 70
A3	Adapter Frame Size ☐ (Square dimension)	64, 70, 80
A4	Mounting PCDØ	70 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0
L	SD Overall Length Gear Ratio 4~10	85
	SD Overall Length Gear Ratio 20~100	109

(Unit: mm)

Specification:
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

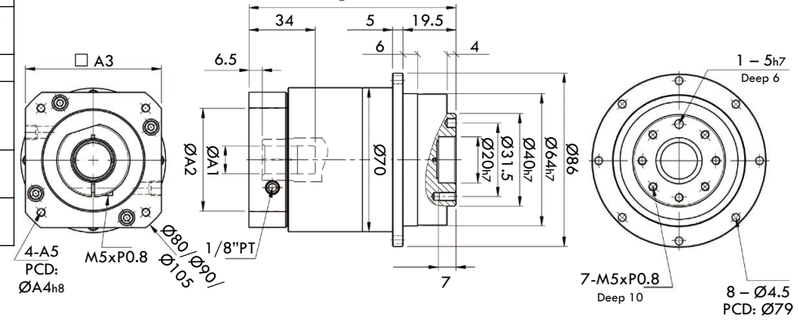
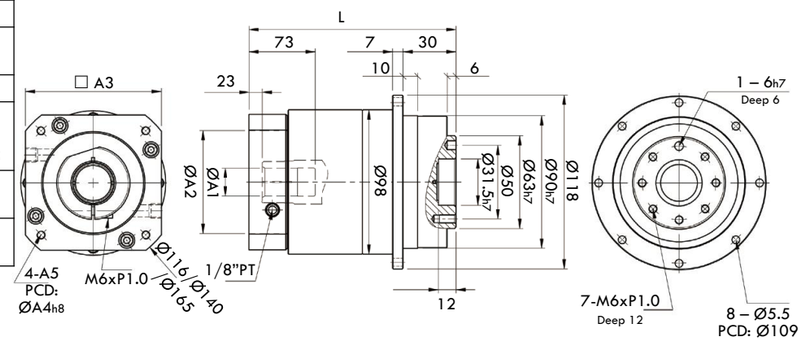


Fig. 37 SD-90-B SD-90-T

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	14 ~ 24
A2	Input Pilot Bore Ø	70 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	92, 110, 130, 142
A4	Mounting PCDØ	90 ~ 145
A5	Mounting Bolt Size	M5xP0.8 M6xP1.0 M8xP1.25
L	SD Overall Length Gear Ratio 4~10	133, 148
	SD Overall Length Gear Ratio 20~100	145

(Unit: mm)

Specification:
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

Fig. 38 SD-110-B SD-110-T

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	19 ~ 32
A2	Input Pilot Bore Ø	110 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	130, 150
A4	Mounting PCDØ	145 ~ 165
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5
L	SD Overall Length Gear Ratio 4~10	153, 163
	SD Overall Length Gear Ratio 20~100	189, 204

(Unit: mm)

Specification:
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

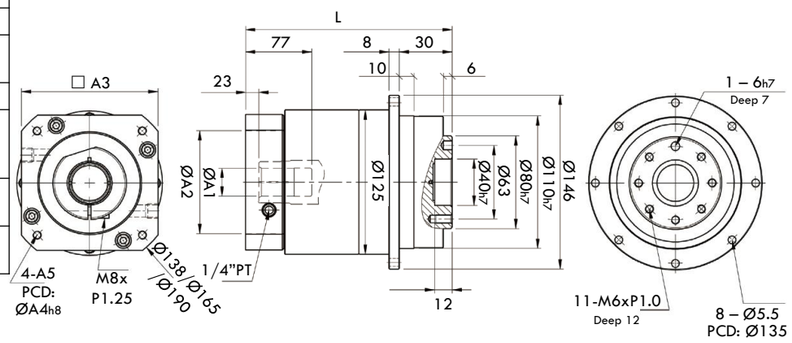


Fig. 39 SD-140-B SD-140-T

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	22 ~ 38
A2	Input Pilot Bore Ø	110 ~ 180
A3	Adapter Frame Size ☐ (Square dimension)	146, 180, 190
A4	Mounting PCDØ	145 ~ 215
A5	Mounting Bolt Size	M8xP1.25 M10xP1.5 M12xP1.75
L	SD Overall Length Gear Ratio 4~10	187
	SD Overall Length Gear Ratio 20~100	235

(Unit: mm)

Specification:
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

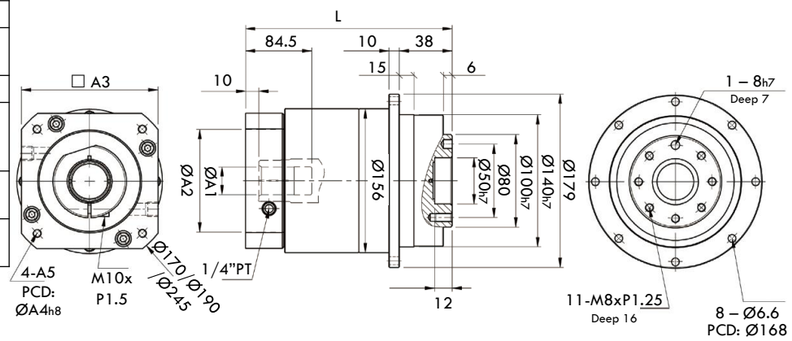


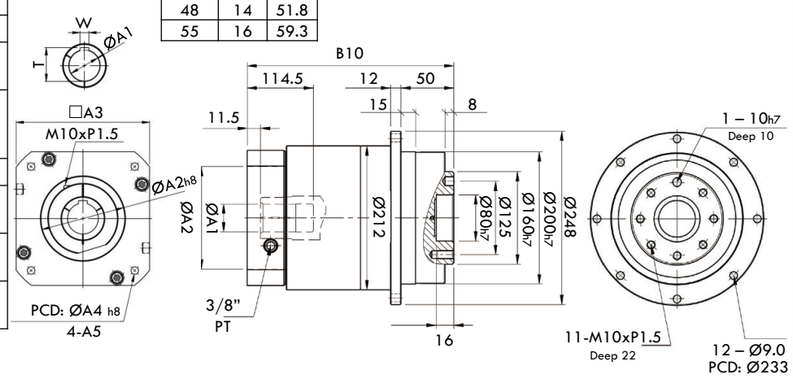
Fig. 40 SD-200-B SD-200-T

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	35 ~ 55
A2	Input Pilot Bore Ø	114.3 ~ 250
A3	Adapter Frame Size ☐ (Square dimension)	182, 200, 220, 250, 265
A4	Mounting PCDØ	200 ~ 235
A5	Mounting Bolt Size	M12xP1.75 M16xP2.0
L	SD Overall Length Gear Ratio 4~10	251
	SD Overall Length Gear Ratio 20~100	291

(Unit: mm)

Input Shaft Bore

ØA1	W	T
38	10	41.3
42	12	45.3
48	14	51.8
55	16	59.3



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – SD PLANETARY SERVOBOX

Fig. 41 SD-255-B SD-255-T

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	42 ~ 55
A2	Input Pilot Bore Ø	114.3 ~ 250
A3	Adapter Frame Size ☐ (Square dimension)	222, 265
A4	Mounting PCDØ	200,2650
A5	Mounting Bolt Size	M12xP1.75 M16xP2.0
L	SD Overall Length Gear Ratio 4~10	263
	SD Overall Length Gear Ratio 20~100	349

(Unit: mm)

Input Shaft Bore

ØA1	W	T
42	12	45.3
48	14	51.8
55	16	59.3

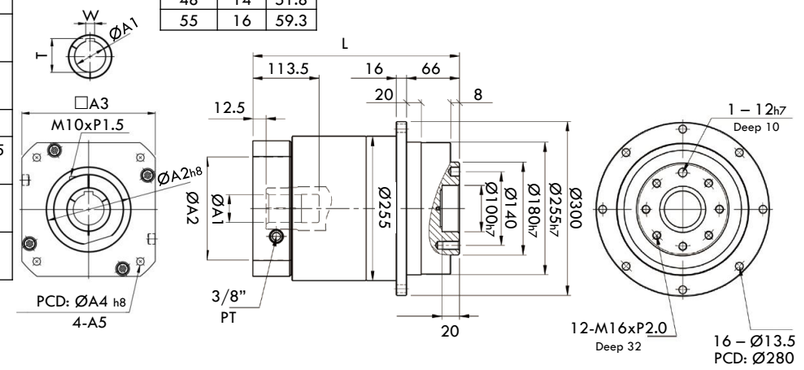
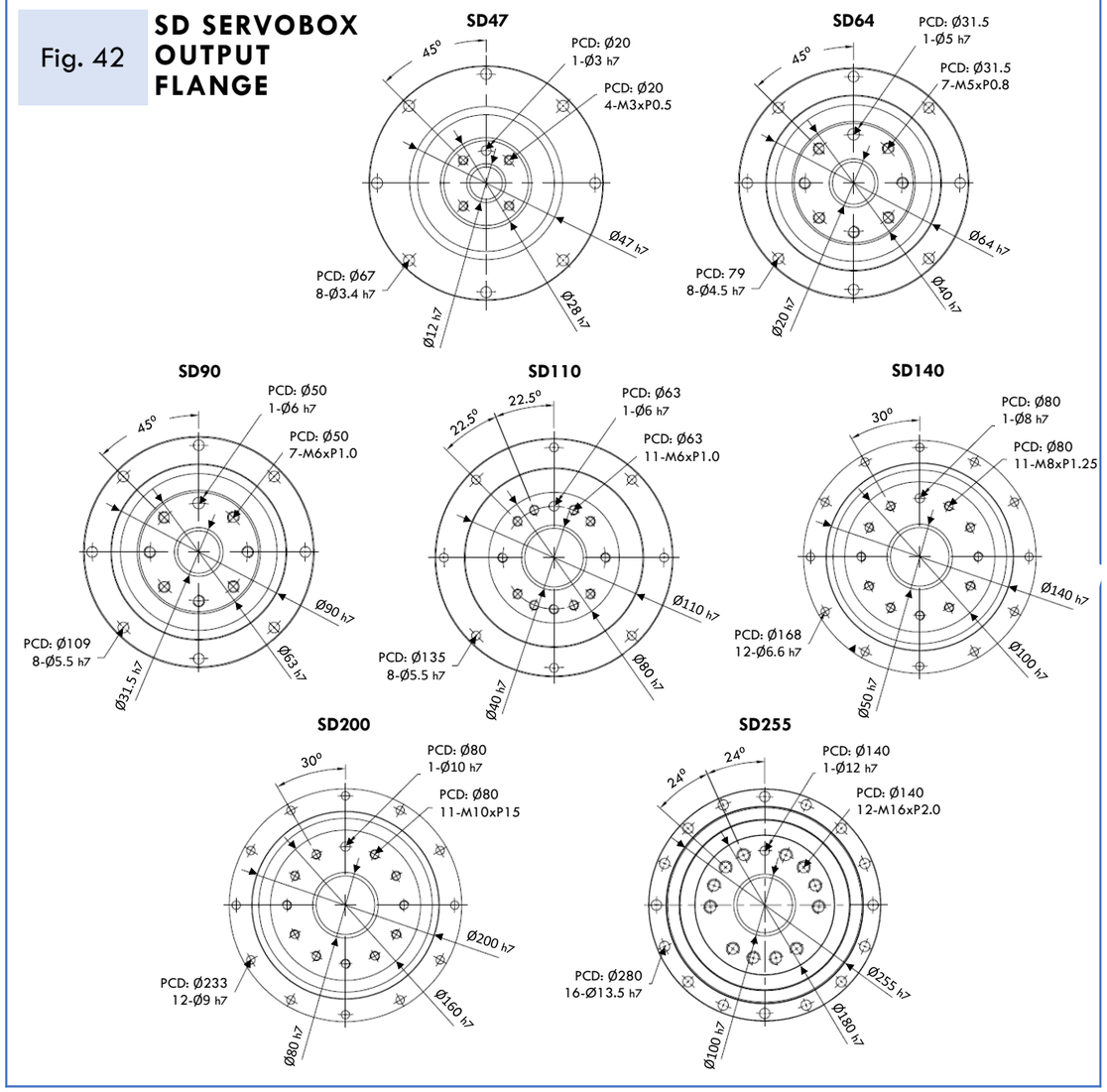


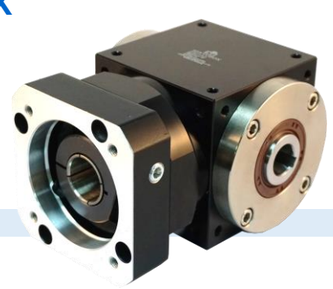
Fig. 42 SD SERVOBOX OUTPUT FLANGE



SPIRAL BEVEL GEAR SERVOBOX

ST-FO/RO SERIES

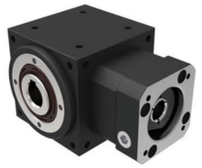
COMPACT RIGHT ANGLE SOLUTION
HIGHEST EFFICIENCY DESIGN



Features :
- Employ high precision grinded and carburized spiral bevel gears to meet standard AGMA12.
- High efficiency design (≥98%) to transmit rotational motion at right angles
- Max gear reduction ratio up to 1/500.
- Hollow output shaft / single output shaft / double outputs shaft and multiple shaft configurations are available.

Ball Bearing Design (ST-FO-B / ST-RO-B) / Taper Bearing Design (ST-FO-T / ST-RO-T)
- ST-FO: 1-Stage ServoBox in Gear Ratio 1, 2, 3, 4 and 5.
- ST-RO: 2-Stage ServoBox in Gear Ratio 10, 15, 20, 25, 30, 40 and 50.

* FT-FO/RO – Ultra Compact Spiral Bevel Gear ServoBox



FT-FO SERIES

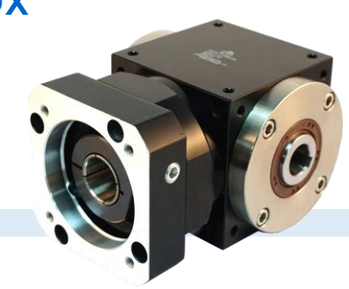
GENERAL SPECIFICATIONS	Unit	Ratio	Model : ST (1 Stage) / (2 Stage)						
			#65	#75	#90	#110	#140	#170	#210
Frame Size	MM	1~50	65 x 65	75 x 75	90 x 90	110 x 100	140 x 140	170 x 170	210 x 210
Mounting Dimension	MM	1~50	52 x 52	60 x 60	72 x 72	88 x 88	110 x 110	134 x 134	170 x 170
Hollow Output Shaft Bore Diameter	MM	1~50	Ø14	Ø14	Ø18	Ø22	Ø32	Ø40	Ø50
Rated Output Torque	Nm (1Stage)	1	25	45	78	150	360	585	1,300
		2	24	42	68	150	330	544	1,220
		3	18	33	54	120	270	450	1,020
		4	13	28	52	100	224	376	860
		5	12	25	40	85	196	320	740
	Nm (2Stage)	10	24	42	68	150	330	544	1,220
		15	18	33	54	120	270	450	1,020
		20	13	28	48	100	224	376	860
		25	12	25	40	85	196	320	740
		30	18	33	54	120	270	450	1,020
		40	13	28	52	100	224	376	860
		50	12	25	40	85	196	320	740
Max. Acceleration Torque	Nm	1~50	1.5 Times of Rated Output Torque						
Max. Output Torque Emergency Stop Torque	Nm	1~50	3 Times of Rated Output Torque						
Rated Input Speed	RPM	1~50	3,000	3,000	3,000	2,500	2,500	2,000	2,000
Maximum Input Speed	RPM	1~50	7,500	6,500	5,500	4,500	3,500	3,000	3,000
Backlash (arcmin)	Arcmin	1~5	P0 ≤ 2 arcmin / P1 ≤ 5 arcmin / P2 ≤ 8 arcmin						
		10~50	P0 ≤ 3 arcmin / P1 ≤ 6 arcmin / P2 ≤ 9 arcmin						
Maximum Radial Force	N (Ball Bearing)	1~50	600	700	1,000	2,000	3,000	5,000	8,000
	N (Taper Bearing)	1~50	--	1,100	1,700	2,700	4,800	6,600	11,500
Maximum Axial Force	N (Ball Bearing)	1~50	300	400	500	1,000	1,500	2,500	4,000
	N (Taper Bearing)	1~50	--	600	800	1,400	2,400	3,300	5,800
Service Life	Hr	1~50	Intermittent Periodic Duty S5 > 20,000 hours Continuous Duty S1 > 10,000 hours						
Efficiency	%	1~5	≥ 98%						
		10~50	≥ 94%						
Operating Temperature	ºC	1~50	-10ºC ~ +100ºC						
Lubrication		1~50	Synthetic oil						
Degree of Protection		1~50	IP65						
Mounting Position		1~50	Any						
Noise Level	dB(A)	1~5	≤ 68	≤ 70	≤ 74	≤ 76	≤ 77	≤ 78	≤ 80
		10~50	≤ 71	≤ 72	≤ 76	≤ 77	≤ 78	≤ 79	≤ 81

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

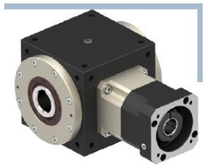
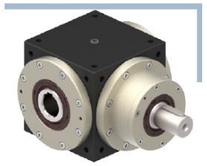
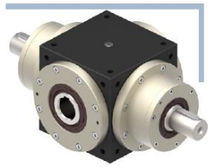
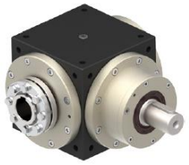
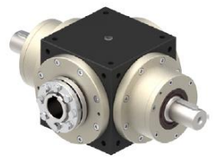
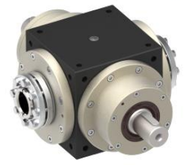
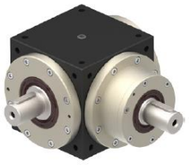
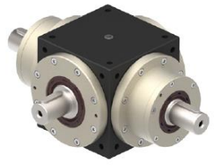
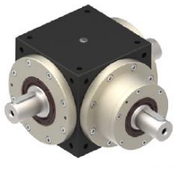
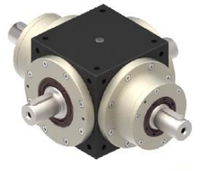
SPIRAL BEVEL GEAR SERVOBOX

ST SERIES

SPIRAL BEVEL GEAR SERVOBOX
DESIGN SELECTION



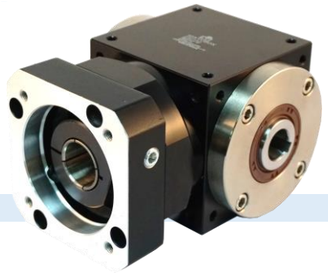
INPUT TYPE

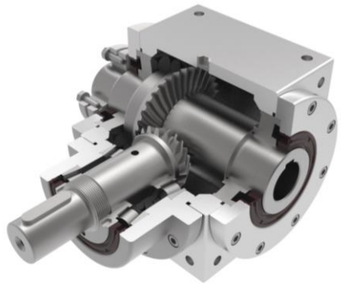
OUTPUT TYPE	F Input Flange Ratio 1 ~ 5	RO Input Flange Ratio 10 ~ 50	D Single Input Shaft	Y Double Input Shaft
O HollowOutput Shaft	 FO	 RO	 DO	 YO
N HollowOutput Shaft with Single Clamping	 FN	 RN	 DN	 YN
M HollowOutput Shaft with Double Clamping	 FM	 RM	 DM	 YM
S Single Output Shaft	 FS	 RS	 DS	 YS
V Double Output Shaft	 FV	 RV	 DV	 YV
P For Ball Screw	 FP	 RP	 DP	 YP

SPIRAL BEVEL GEAR SERVOBOX

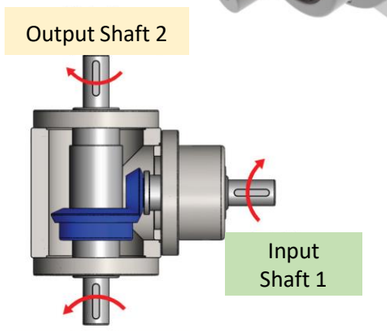
ST SERIES

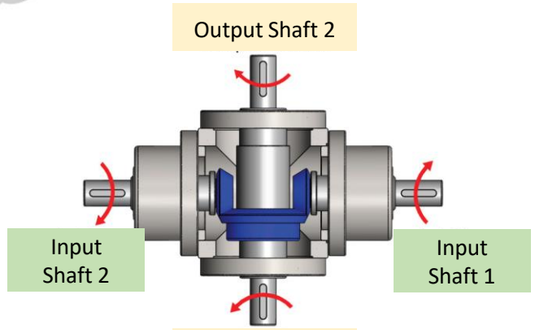
SPIRAL BEVEL GEAR SERVOBOX
SHAFT ROTATION DIRECTION



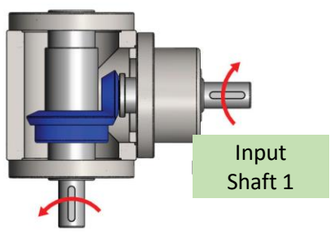


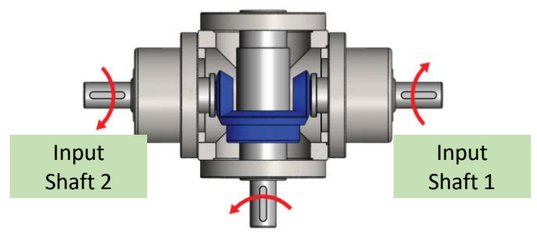
L-Shaft Direction



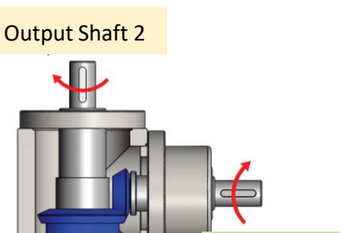


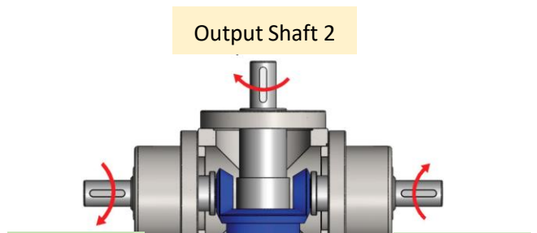
L-Shaft Direction





R-Shaft Direction

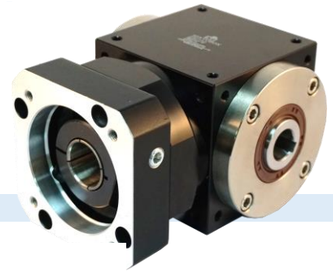


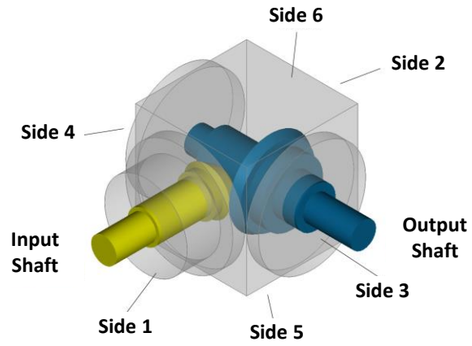


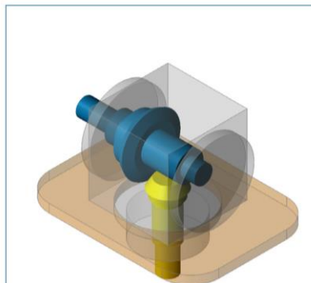
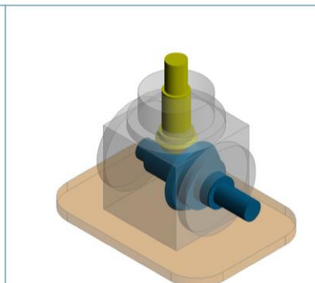
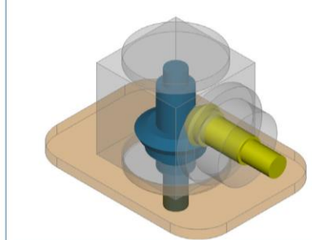
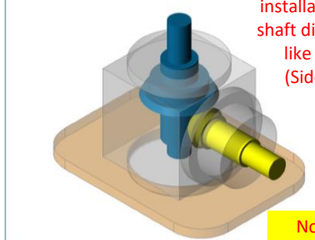
SPIRAL BEVEL GEAR SERVOBOX

ST SERIES

SPIRAL BEVEL GEAR SERVOBOX
MOUNTING DIRECTION





	
Side 1	Side 2
	
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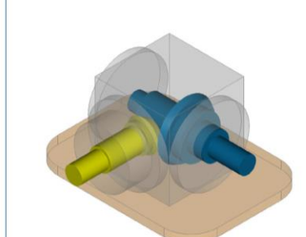
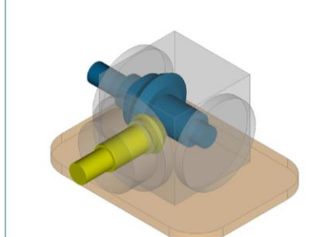
	
Side 5	Side 6

Note 1 Please avoid installation of shaft direction like this (Side 4)

Fig. 43 ST-65-FO-B Gear Ratio 1

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	11 ~ 19
A2	Input Pilot Bore Ø	50 ~ 70
A3	Adapter Frame Size □ (Square dimension)	64, 70, 80
A4	Mounting PCDØ	70 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.

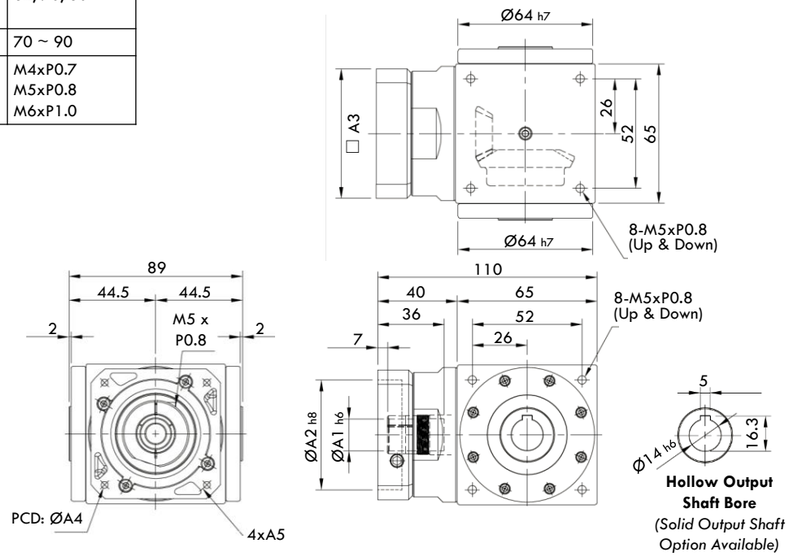


Fig. 44 ST-65-(FO/RO)-B ST-65-(FO/RO)-T Gear Ratio 2 ~ 5 Gear Ratio 10 ~ 50

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 2~5	Gear Ratio 10~50
A1	Input Shaft Bore Ø	11 ~ 19	6 ~ 11
A2	Input Pilot Bore Ø	50 ~ 70	30 ~ 50
A3	Adapter Frame Size □ (Square dimension)	64, 70, 80	46, 55
A4	Mounting PCDØ	70 ~ 90	46 ~ 63
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0	M3xP0.5 M4xP0.7 M5xP0.8
L1	ST Overall Length	110	132
L2	Body Length	45	67

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* ST-RO Series Ratio 10~50 is fitted with Planetary ServoBox.

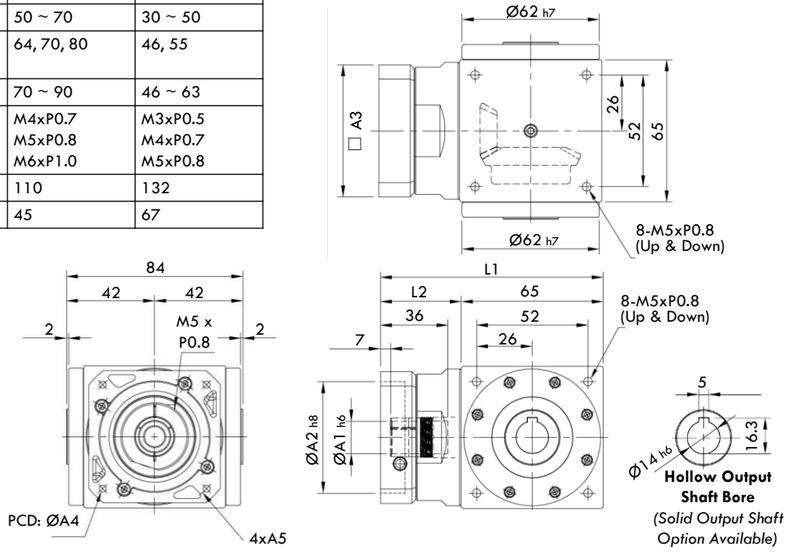


Fig. 45 ST-75-(FO/RO)-B ST-75-(FO/RO)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 1~5	Gear Ratio 10~50
A1	Input Shaft Bore Ø	11 ~ 19	6 ~ 11
A2	Input Pilot Bore Ø	50 ~ 70	30 ~ 50
A3	Adapter Frame Size □ (Square dimension)	64, 70, 80	46, 55
A4	Mounting PCDØ	70 ~ 90	50 ~ 63
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0	M3xP0.5 M4xP0.7 M5xP0.8
L1	ST Overall Length	115	137
L2	Body Length	40	62

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* ST-RO Series Ratio 10~50 is fitted with Planetary ServoBox.

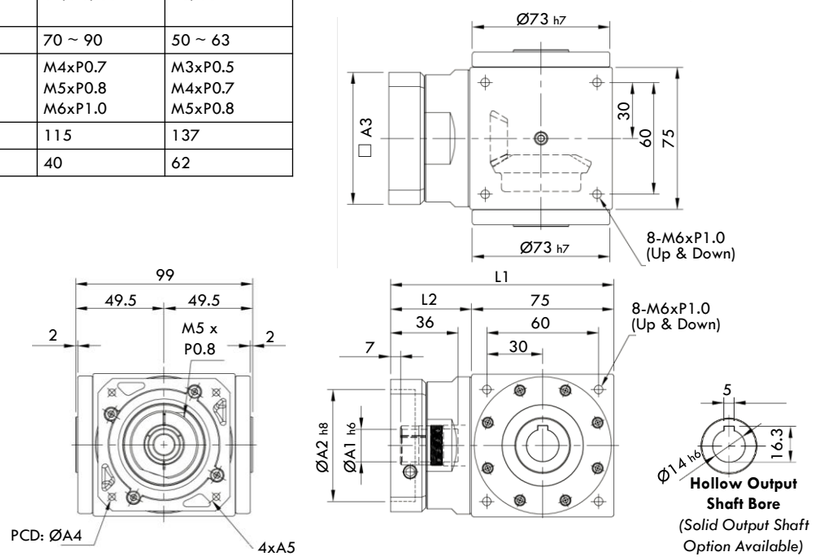


Fig. 46 ST-90-(FO/RO)-B ST-90-(FO/RO)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 1~5	Gear Ratio 10~50
A1	Input Shaft Bore Ø	14 ~ 24	11 ~ 19
A2	Input Pilot Bore Ø	70 ~ 130	50 ~ 70
A3	Adapter Frame Size □ (Square dimension)	92, 110, 130, 142	64, 70, 80
A4	Mounting PCDØ	90 ~ 145	70 ~ 90
A5	Mounting Bolt Size	M5xP0.8 M6xP1.0 M8xP1.25	M4xP0.7 M5xP0.8 M6xP1.0
L1	ST Overall Length	148, 162	165
L2	Body Length	58, 72	75

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* ST-RO Series Ratio 10~50 is fitted with Planetary ServoBox.

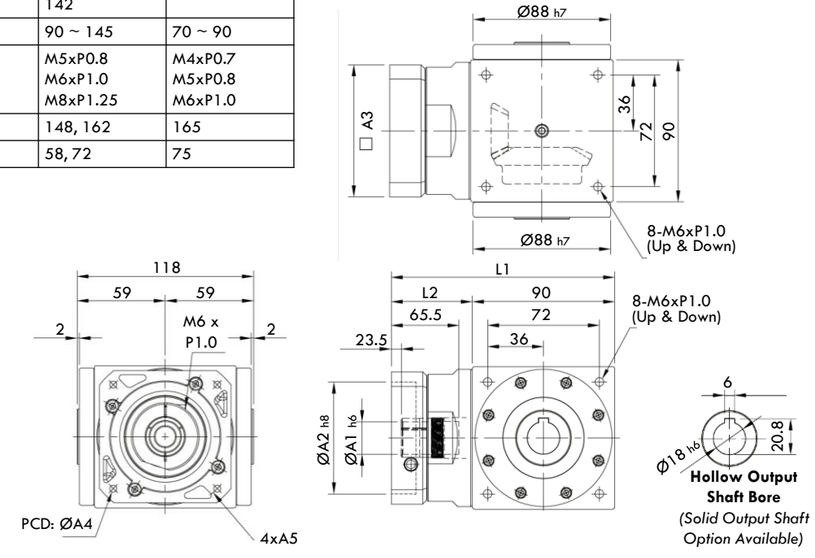


Fig. 47 ST-110-(FO/RO)-B ST-110-(FO/RO)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 1~5	Gear Ratio 10~50
A1	Input Shaft Bore Ø	14 ~ 24	11 ~ 19
A2	Input Pilot Bore Ø	70 ~ 130	50 ~ 70
A3	Adapter Frame Size □ (Square dimension)	92, 110, 130, 142	64, 70, 80
A4	Mounting PCDØ	90 ~ 145	64 ~ 90
A5	Mounting Bolt Size	M5xP0.8 M6xP1.0 M8xP1.25	M4xP0.7 M5xP0.8 M6xP1.0
L1	ST Overall Length	177, 191	191
L2	Body Length	67, 81	81

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* ST-RO Series Ratio 10~50 is fitted with Planetary ServoBox.

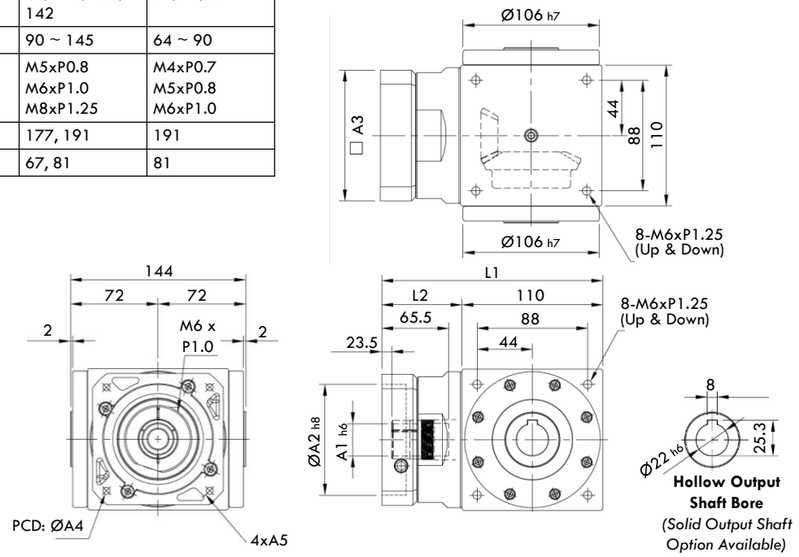
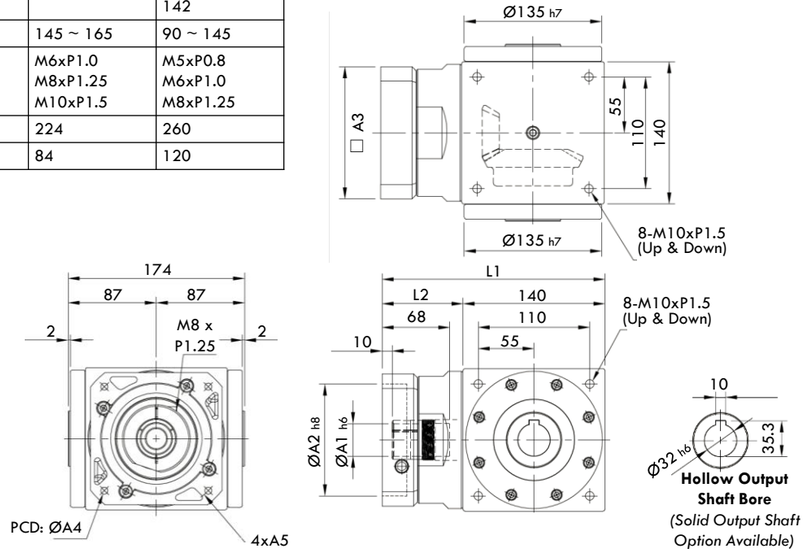


Fig. 48 ST-140-(FO/RO)-B ST-140-(FO/RO)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 1~5	Gear Ratio 10~50
A1	Input Shaft Bore Ø	19 ~ 32	14 ~ 24
A2	Input Pilot Bore Ø	110 ~ 130	70 ~ 130
A3	Adapter Frame Size □ (Square dimension)	130, 150	92, 110, 130, 142
A4	Mounting PCDØ	145 ~ 165	90 ~ 145
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5	M5xP0.8 M6xP1.0 M8xP1.25
L1	ST Overall Length	224	260
L2	Body Length	84	120

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* ST-RO Series Ratio 10~50 is fitted with Planetary ServoBox.



DIMENSION – ST SPIRAL BEVEL GEAR SERVOBOX

Fig. 49 ST-170-(FO/RO)-B ST-170-(FO/RO)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 1~5	Gear Ratio 10~50
A1	Input Shaft Bore Ø	22 ~ 38	19 ~ 32
A2	Input Pilot Bore Ø	110 ~ 180	110 ~ 130
A3	Adapter Frame Size □ (Square dimension)	146, 180, 190	130, 150
A4	Mounting PCDØ	145 ~ 215	145 ~ 165
A5	Mounting Bolt Size	M8xP1.25 M10xP1.5 M12xP1.75	M6xP1.0 M8xP1.25 M10xP1.5
L1	ST Overall Length	274	313
L2	Body Length	104	143

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* ST-RO Series Ratio 10~50 is fitted with Planetary ServoBox.

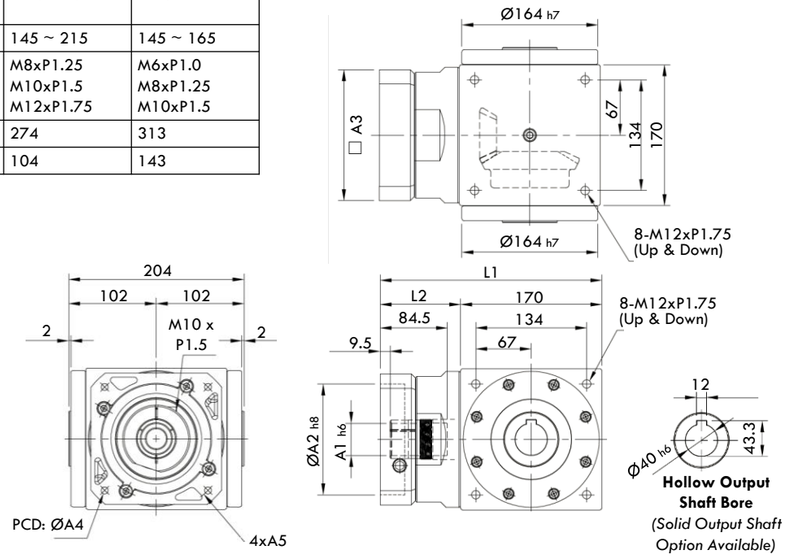
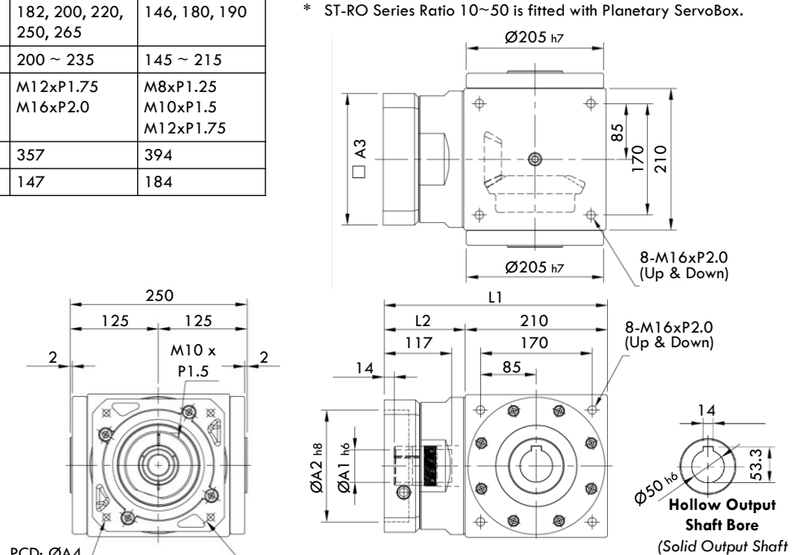


Fig. 50 ST-210-(FO/RO)-B ST-210-(FO/RO)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 1~5	Gear Ratio 10~50
A1	Input Shaft Bore Ø	35 ~ 55	24 ~ 35
A2	Input Pilot Bore Ø	114.3 ~ 250	110 ~ 180
A3	Adapter Frame Size □ (Square dimension)	182, 200, 220, 250, 265	146, 180, 190
A4	Mounting PCDØ	200 ~ 235	145 ~ 215
A5	Mounting Bolt Size	M12xP1.75 M16xP2.0	M8xP1.25 M10xP1.5 M12xP1.75
L1	ST Overall Length	357	394
L2	Body Length	147	184

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* ST-RO Series Ratio 10~50 is fitted with Planetary ServoBox.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

SPIRAL BEVEL GEAR SERVOBOX

FT-FO/RO SERIES

ULTRA COMPACT RIGHT ANGLE SOLUTION
HIGHEST EFFICIENCY DESIGN

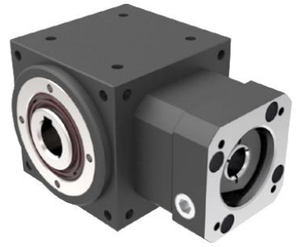
Features :

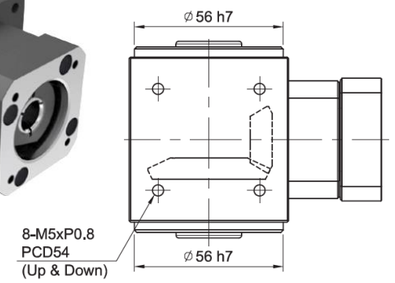
- Employ high precision grinded and carburized spiral bevel gears to meet standard AGMA12.
- High efficiency design (≥98%) to transmit rotational motion at right angles
- Hollow output shaft / single output shaft / double outputs shaft and multiple shaft configurations are available.
- Ball Bearing Design
- ST-FO: 1-Stage ServoBox in Gear Ratio 2, 3, 4 and 5.
- ST-RO: 2-Stage ServoBox in Gear Ratio 10, 15, 20, 25, 30, 40 and 50.

GENERAL SPECIFICATIONS	Unit	Ratio	FT60	FT70
Frame Size	MM	2~50	60 x 60	75 x 75
Hollow Output Shaft Bore Diameter	MM	2~50	Ø14	Ø14
Rated Output Torque	Nm (1Stage)	2	15	22
		3	13	18
		4	13	18
		5	12	16
	Nm (2Stage)	10	15	22
		15	13	18
		20	13	18
		25	12	16
		30	13	18
		40	13	18
		50	12	16
Max. Output Torque Emergency Stop Torque	Nm	2~50	2 Times of Rated Output Torque	
Rated Input Speed	RPM	2~50	3,000	3,000
Maximum Input Speed	RPM	2~50	7,000	7,000
Backlash (arcmin)	Arcmin	2~5	≤ 10 arcmin	≤ 10 arcmin
		10~50	≤ 12 arcmin	≤ 12 arcmin
Maximum Radial Force	N	2~5	600	800
		10~50	600	800
Maximum Axial Force	N	2~5	300	400
		10~50	300	400
Service Life	Hr	2~50	Intermittent Periodic Duty S5 > 20,000 hours Continuous Duty S1 > 10,000 hours	
Efficiency	%	1~5	≥ 98%	≥ 98%
		10~50	≥ 94%	≥ 94%
Operating Temperature	ºC	1~50	-10ºC ~ +90ºC	
Lubrication		1~50	Synthetic oil	
Degree of Protection	IP	1~50	IP65	
Mounting Position		1~50	Any	
Noise Level	dB(A)	1~5	≤ 68	≤ 70
		10~50	≤ 70	≤ 72

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – FT COMPACT SPIRAL BEVEL GEAR SERVOBOX

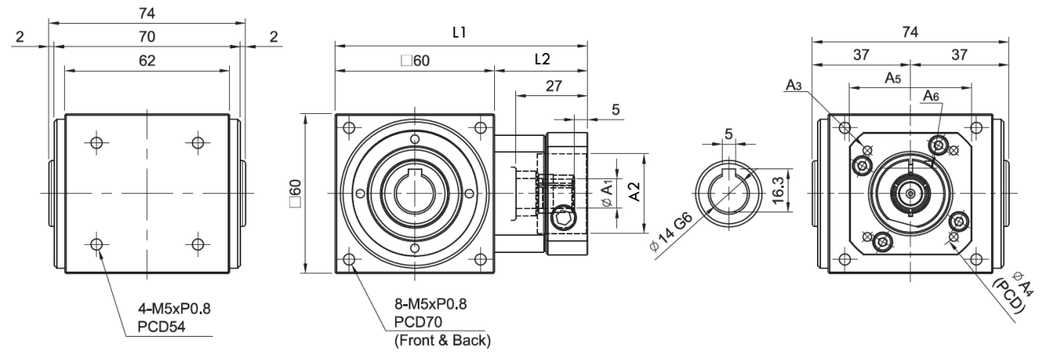


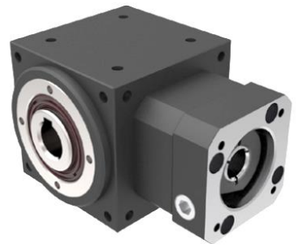


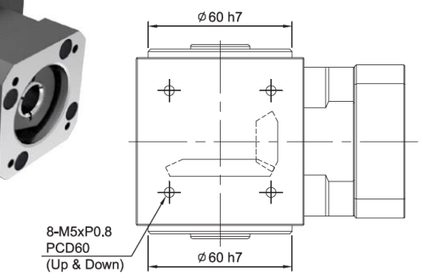
FT-60-(FO/RO)-B

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 2~5	Gear Ratio 10~50
A1	Input Shaft Bore Ø	8, 11	8, 11
A2	Input Pilot Bore Ø	30, 40, 50	30, 40, 50
A3	Adapter Frame Size □ (Square dimension)	46, 55	46, 55
A4	Mounting PCDØ	46, 60, 63	46, 60, 63
L1	FT Overall Length	95	127
L2	Body Length	35	67

(Unit: mm)



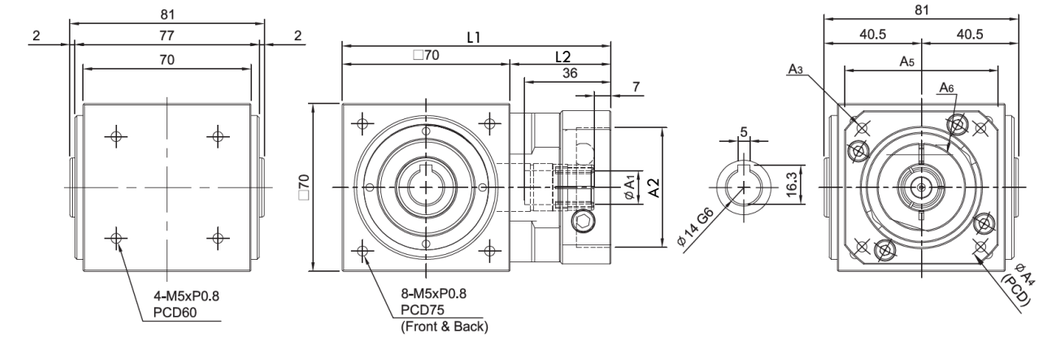




FT-70-(FO/RO)-B

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 2~5	Gear Ratio 10~50
A1	Input Shaft Bore Ø	11, 14	11, 14
A2	Input Pilot Bore Ø	50, 60, 70	50, 60, 70
A3	Adapter Frame Size □ (Square dimension)	64, 70, 80	64, 70, 80
A4	Mounting PCDØ	70, 75, 90	70, 75, 90
L1	FT Overall Length	112	146
L2	Body Length	42	76

(Unit: mm)

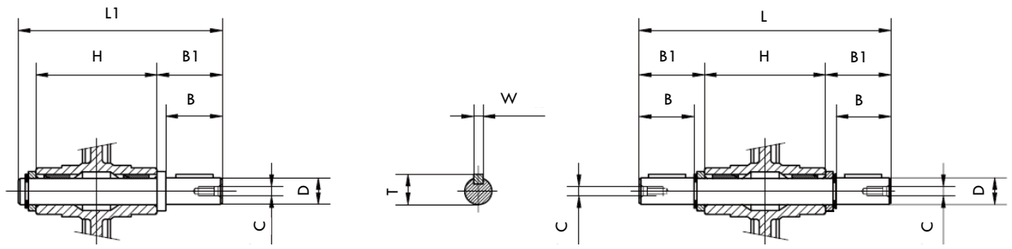


Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – ST SPIRAL BEVEL GEAR SERVOBOX

Fig. 51

ST SERVOBOX
OUTPUT SHAFT OPTION



(unit : mm)	D	W	T	B	B1	H	L1	L	C
#65	14	5	16	20	22	98	104	124	M6xP1.0
#75	16	5	18	32	34	122	128	160	M5xP0.8
#90	18	6	20.5	35	37	147	153	188	M8xP1.25
#110	22	6	24.5	40	42	178	184	224	M8xP1.25
#140	32	10	35	50	52	218	224	274	M10xP1.5
#170	40	12	43	60	62	258	264	324	M12xP1.75
#210	50	14	53.5	75	77	319	325	400	M12xP1.75

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

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WORM GEAR SERVOBOX

WE-O SERIES

ALUMINIUM DIE-CAST ALLOY DESIGN
AN INHERENT SAFETY MECHANISM SOLUTION

Features :
- An optimized worm gear tooth design with backlash less than 8 arc-minutes.
- The modular aluminium alloy housing offers solid design with excellent heat dissipation.
- An inherent safety mechanism design as it cannot function in the reverse order.
- Hollow, single and double output shafts configurations are available.

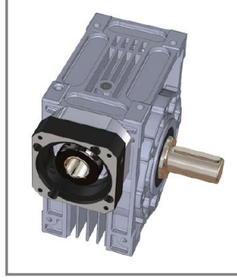
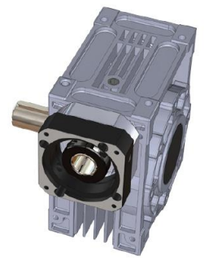
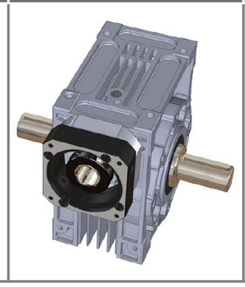
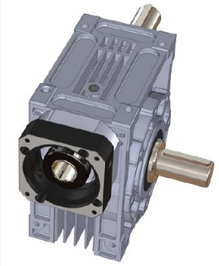
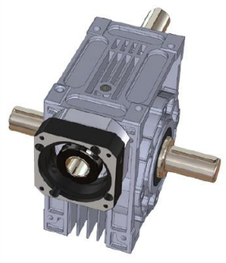
GENERAL SPECIFICATIONS	Unit	Ratio	Model : WE				
			#30	#40	#50	#60	#70
Frame Size L x H x W	mm	5~60	80x98x65	102x122x88	120x145x100	146x180x104	170x200x128
Flange Mounting PCD	mm	5~60	Ø65	Ø77	Ø95	Ø120	Ø140
Hollow Output Shaft Bore Diameter x Length	mm	5~60	Ø14 x 65	Ø20 x 88	Ø25 x 98	Ø25 x 108	Ø30 x 128
Rated Output Torque (Efficiency %)	Nm (%)	5	8.3	22.3	30.6	41.2	70.6
		(%)	90.3%	92.3%	92.6%	92.6%	93.6%
		10	8.	20.7	41.9	65.9	92.0
		(%)	83.7%	86.6%	89.6%	90.1%	90.5%
		15	11.4	26.2	40.9	64.5	90.0
		(%)	81.9%	83.7%	85.3%	86.1%	86.6%
		20	9.52	22.6	40.7	63.5	106
		(%)	72.3%	76.6%	81.7%	82.4%	85.1%
		30	12.1	27.4	43.2	67.9	95.0
		(%)	69.6%	72.3%	74.5%	75.9%	76.7%
		40	9.20	24.3	43.8	69.1	111
		(%)	56.8%	66.3%	69.2%	70.3%	74.3%
		50	10.4	24.0	43.6	69.2	105.6
		(%)	58.7%	64.6%	67.7%	68.9%	71.2%
		60	9.60	20.5	36.1	58.3	100.5
		(%)	54.6%	56.8%	59.3%	61.3%	68.8%
Max. Output Torque	Nm	2 Times of Rated Output Torque					
Rated Input Speed	RPM	5~60	2,000				
Maximum Input Speed	RPM	5~60	3,000				
Backlash	Arcmin	5~60	≤ 8arcmin				
Maximum Radial Force	N	5~60	1,830	3,490	4,840	6,270	7,380
Maximum Axial Force	N	5~60	915	1,745	2,420	3,135	3,690
Service Life	Hr	5~60	Intermittent Periodic Duty S5 > 12,000 hours Continuous Duty S1 > 6,000 hours				
Efficiency	%	5~60	Maximum 93.6% / Minimum 54.6%				
Operating Temperature	ºC	5~60	-5ºC ~ +40ºC				
Lubrication		5~60	Synthetic Oil				
Degree of Protection		5~60	IP65				
Mounting Position		5~60	Any				

DESIGN OPTION

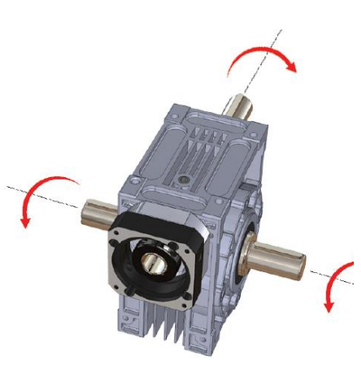
WEO	WENF	WEOF
Hollow Output Shaft	Hollow Output Shaft with Clamping	Hollow Output Shaft with Output Flange

WESF	WES
With Solid Output Shaft and Output Flange	With Solid Output Shaft

OUTPUT SHAFT DIRECTION

R	L	V	W	WV
				

OUTPUT SHAFT ROTATION DIRECTION



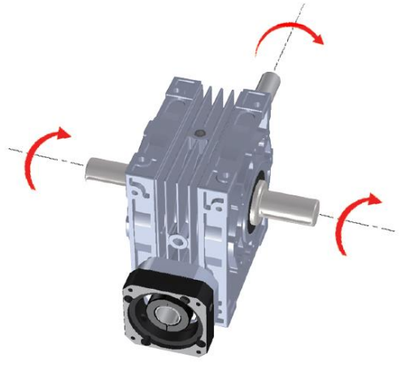


Fig. 61 WE-O#30

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	6~ 8
A2	Input Pilot Bore Ø	30 ~ 50
A3	Adapter Frame Size ☐ (Square dimension)	46, 55, 60

Modular Adapter Dimension (Attach to Servo Motor)		
A4	Mounting PCDØ	46 ~ 70
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8

(Unit: mm)

Specification:
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid Output Shaft Option is available.

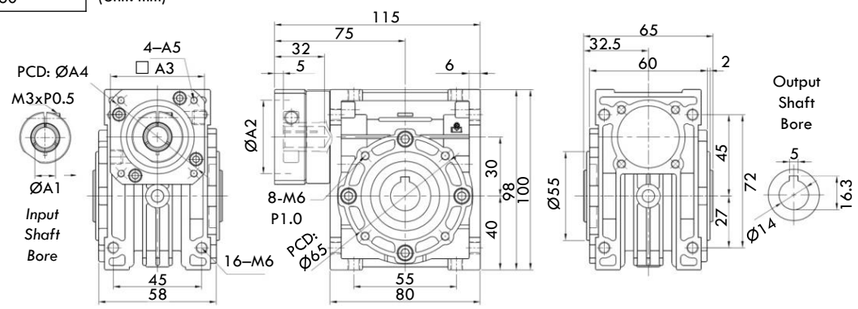


Fig. 62 WE-O#40

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	11 ~ 19
A2	Input Pilot Bore Ø	50 ~ 70
A3	Adapter Frame Size ☐ (Square dimension)	64, 70, 80

Modular Adapter Dimension (Attach to Servo Motor)		
A4	Mounting PCDØ	70 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0

(Unit: mm)

Specification:
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid Output Shaft Option is available.

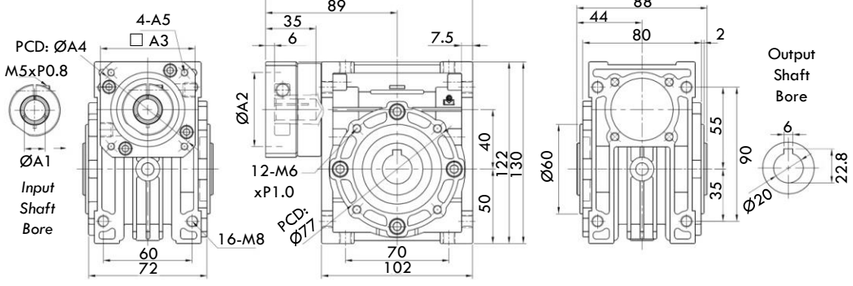


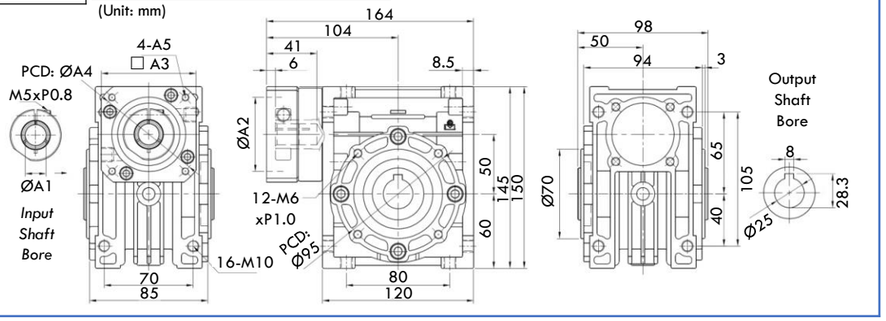
Fig. 63 WE-O#50

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	11 ~ 19
A2	Input Pilot Bore Ø	50 ~ 70
A3	Adapter Frame Size ☐ (Square dimension)	64, 70, 80

Modular Adapter Dimension (Attach to Servo Motor)		
A4	Mounting PCDØ	70 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0

(Unit: mm)

Specification:
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid Output Shaft Option is available.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – WE WORM GEAR SERVOBOX

Fig. 64 WE-O#60

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	14 ~ 24
A2	Input Pilot Bore Ø	70 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	92, 110, 130, 142

Modular Adapter Dimension (Attach to Servo Motor)		
A4	Mounting PCDØ	90 ~ 145
A5	Mounting Bolt Size	M6xP1.0 M8xP1.25 M10xP1.5

(Unit: mm)

Specification:
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid Output Shaft Option is available.

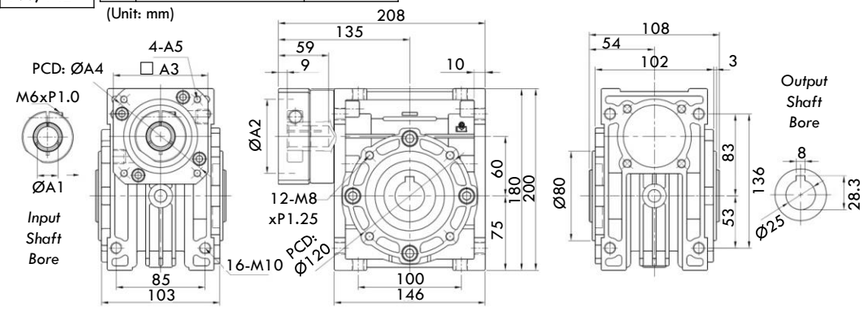


Fig. 65 WE-O#70

Modular Adapter Dimension (Attach to Servo Motor)		
A1	Input Shaft Bore Ø	14 ~ 24
A2	Input Pilot Bore Ø	70 ~ 130
A3	Adapter Frame Size ☐ (Square dimension)	92, 110, 130, 142

Modular Adapter Dimension (Attach to Servo Motor)		
A4	Mounting PCDØ	70 ~ 90
A5	Mounting Bolt Size	M4xP0.7 M5xP0.8 M6xP1.0

(Unit: mm)

Specification:
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid Output Shaft Option is available.

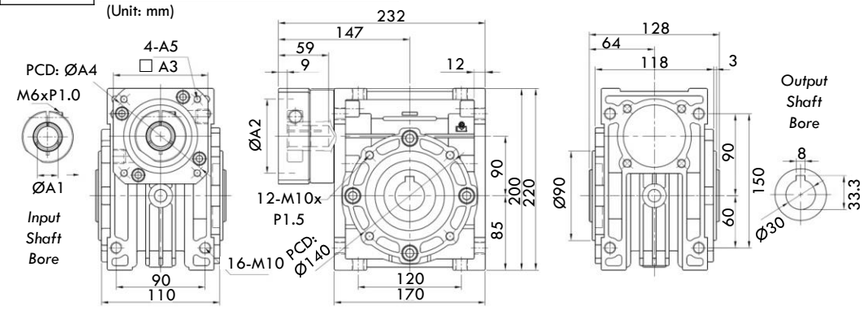
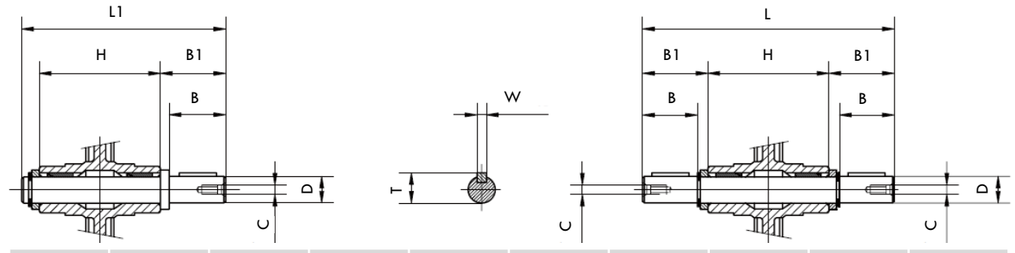


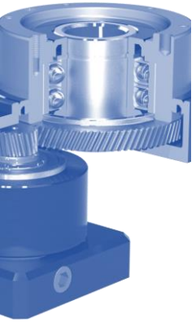
Fig. 66 WE SERVOBOX BUILT-IN OUTPUT SHAFT OPTION



(unit : mm)	D	W	T	B	B1	H	L1	L	C
#30	16h6 (14h6*)	5	18 (16*)	33	35	64.5	99.5	132.5	M6xP1.0
#40	20h6	6	22.5	37	40	87	127	164	M5xP0.8
#50	25h6	8	28	47	50	100	150	197	M8xP1.25
#60	25h6	8	28	47	50	109	159	206	M8xP1.25
#70	30h6	8	33	56	60	127	187	243	M10xP1.5

* Separated Low Speed Output Shaft (separate installation)

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.



HOLLOW ROTARY ACTUATOR SERVOBOX

GT SERIES

HOLLOW ROTARY TABLE
PRECISE POSITIONING AND REPEATABILITY

Features :
- Solid hollow output table that allows simple wiring and piping on your equipment design.
- Ball bearing and crossed roller bearing option.
- Repetitive Positioning Accuracy ±10 sec.
- Lost Motion 2arcmin (0.033°).
- Torsional Backlash ≤ 2arcmin.

Ball Bearing Design (GT-B) / Crossed Roller Bearing Design (GT-C)
- 1-Stage ServoBox in Gear Ratio 5, 10 and 18.
- 2-Stage ServoBox in Gear Ratio 25, 50 and 100 (fitted with planetary gear).

GENERAL SPECIFICATIONS	Unit	Bearing Type (Ratio 5, 10, 18) (Ratio 25, 50, 100)	Model : GT (1 Stage) / (2 Stage)				
			#60	#85	#110	#135	#200
Frame Size	MM	Ball / Crossed Roller	60 x 60	85 x 85	110 x 110	135 x 135	200 x 200
Mounting Dimension	MM	Ball / Crossed Roller	50 x 50	70 x 70	90 x 90	110 x 110	170 x 170
Rotary Table Diameter	MM	Ball / Crossed Roller	Ø45	Ø70	Ø95	Ø115	Ø170
Hollow Rotary Table Dia.	MM	Ball / Crossed Roller	Ø20	Ø22	Ø30	Ø50	Ø75
Rated Output Torque	Nm	Ball / Crossed Roller	59	165	216	625	1,206
Max. Output Torque Emergency Stop Torque	Nm	Ball / Crossed Roller	3 Times of Rated Output Torque				
Inertia Moment	$Kg.m^2$	Ball	777×10^{-7}	1268×10^{-6}	1562×10^{-6}	2918×10^{-6}	29072×10^{-6}
		Crossed Roller	735×10^{-7}	1203×10^{-6}	1483×10^{-6}	2772×10^{-6}	27619×10^{-6}
Permissible Output Speed	RPM	Ball	300				
		Crossed Roller	200				
Torsional Backlash	Arcmin	Ball / Crossed Roller	≤ 1arcmin				
Lost Motion	Arcmin	Ball / Crossed Roller	2 (0.033°)				
Repetitive Positioning Accuracy	Arcsec	Ball / Crossed Roller	±10 (0.0028°)				
Permissible Trust Load	N	Ball Bearing	350	600	800	1,450	2,500
		Crossed Roller Bearing	500	900	1,200	2,200	4,000
Permissible Moment Load	Nm	Ball Bearing	7	12	16	30	50
	Nm	Crossed Roller Bearing	10	18	24	45	80
Runout of Output Table Surface	MM	Ball / Crossed	0.01	0.01	0.015	0.015	0.02
Runout of Output Table Inner / Outer Diameter	MM	Ball / Crossed	0.01	0.01	0.015	0.015	0.02
Parallelism of Output Table	MM	Ball / Crossed	0.02	0.02	0.025	0.025	0.03
Protection Class		Ball / Crossed	IP 65				

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – GT HOLLOW ROTARY ACTUATOR SERVOBOX

Fig. 67 GT-60-B

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 5, 10, 18	Gear Ratio 25, 50, 100
A1	Input Shaft Bore Ø	6 ~ 11	
A2	Input Pilot Bore Ø	30 ~ 50	
A3	Adapter Frame Size □ (Square dimension)	46, 55	
A4	Mounting PCDØ	46 ~ 63	
A5	Mounting Bolt Size	M3xP0.5, M4xP0.7, M5xP0.8	
L1	GT Overall Length	66	103

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

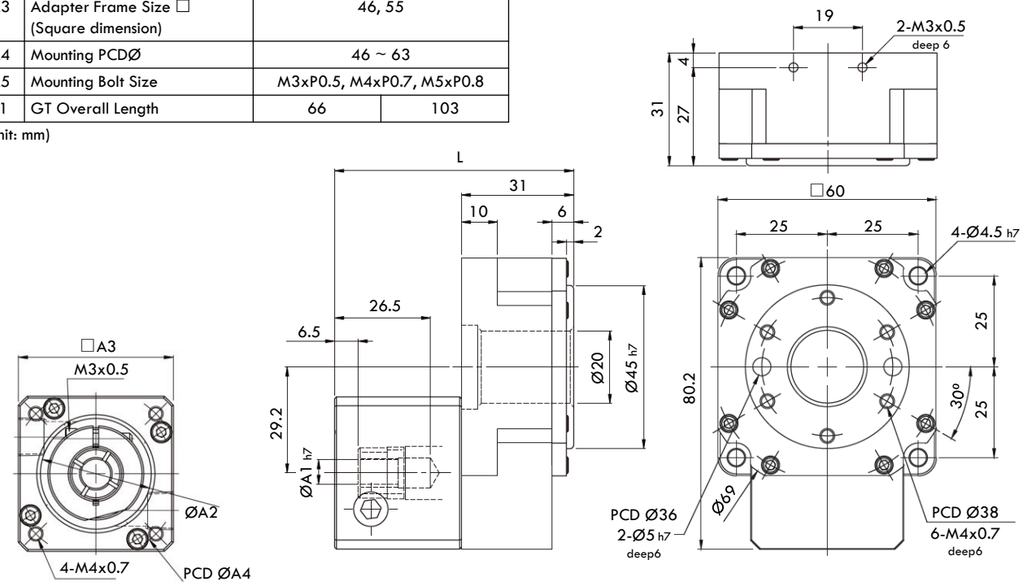
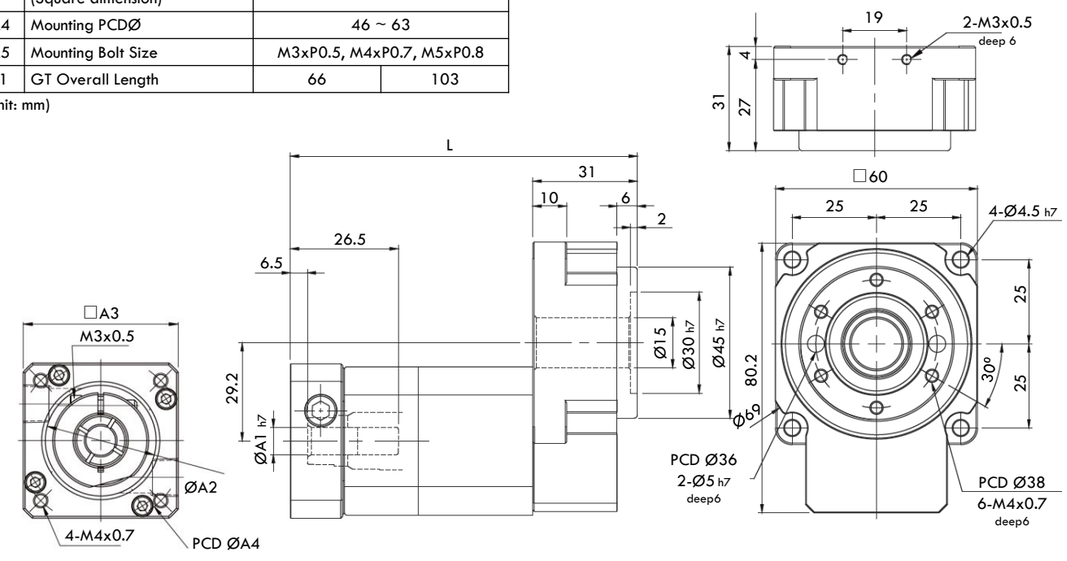


Fig. 68 GT-60-C

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 5, 10, 18	Gear Ratio 25, 50, 100
A1	Input Shaft Bore Ø	6 ~ 11	
A2	Input Pilot Bore Ø	30 ~ 50	
A3	Adapter Frame Size □ (Square dimension)	46, 55	
A4	Mounting PCDØ	46 ~ 63	
A5	Mounting Bolt Size	M3xP0.5, M4xP0.7, M5xP0.8	
L1	GT Overall Length	66	103

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

Fig. 69 GT-85-B

SERVOBOX P.21

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 5, 10, 18	Gear Ratio 25, 50, 100
A1	Input Shaft Bore Ø	9 ~ 14	
A2	Input Pilot Bore Ø	40 ~ 70	
A3	Adapter Frame Size □ (Square dimension)	46, 55, 70	
A4	Mounting PCDØ	60 ~ 90	
A5	Mounting Bolt Size	M3xP0.5, M4xP0.7, M5xP0.8	
L1	GT Overall Length	85.5	116.5

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

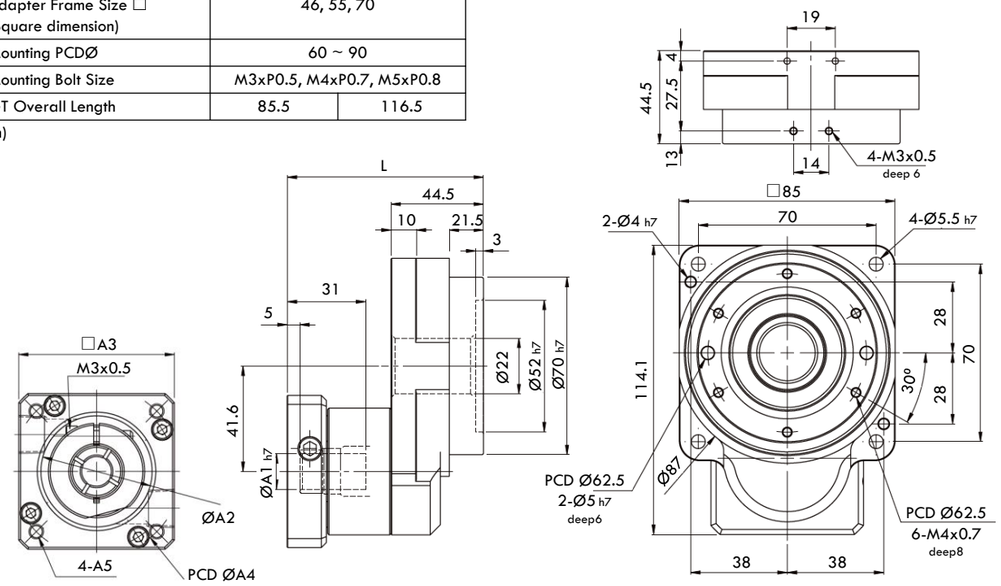
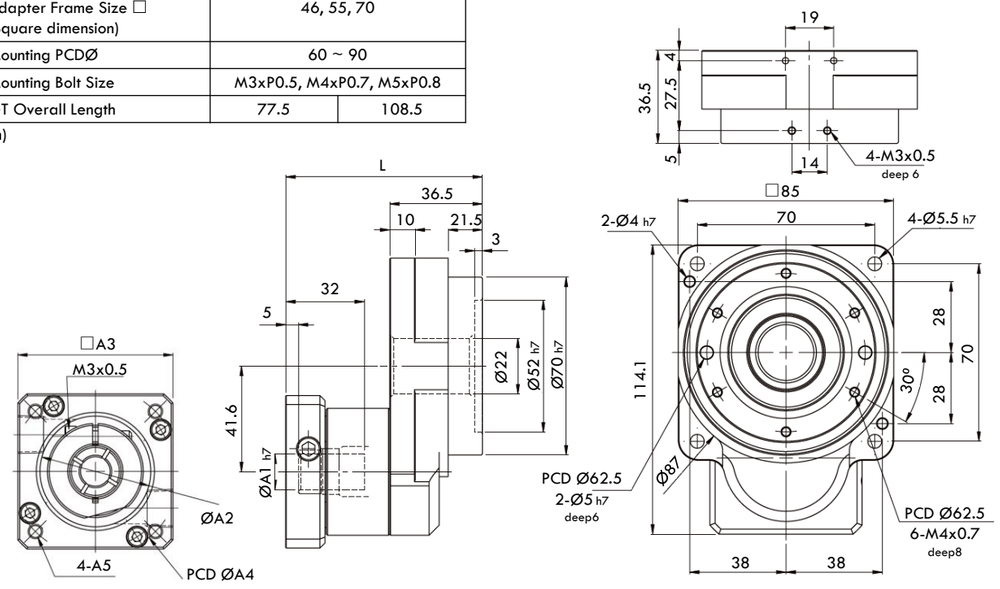


Fig. 70 GT-85-C

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 5, 10, 18	Gear Ratio 25, 50, 100
A1	Input Shaft Bore Ø	9 ~ 14	
A2	Input Pilot Bore Ø	40 ~ 70	
A3	Adapter Frame Size □ (Square dimension)	46, 55, 70	
A4	Mounting PCDØ	60 ~ 90	
A5	Mounting Bolt Size	M3xP0.5, M4xP0.7, M5xP0.8	
L1	GT Overall Length	77.5	108.5

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.



DIMENSION – GT HOLLOW ROTARY ACTUATOR SERVOBOX

Fig. 71 GT-110-B

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 5, 10, 18	Gear Ratio 25, 50, 100
A1	Input Shaft Bore Ø	11 ~ 19	
A2	Input Pilot Bore Ø	50 ~ 70	
A3	Adapter Frame Size □ (Square dimension)	64, 70, 80	
A4	Mounting PCDØ	70 ~ 90	
A5	Mounting Bolt Size	M4xP0.7, M5xP0.8, M6xP1.0	
L1	GT Overall Length	88.5	131

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

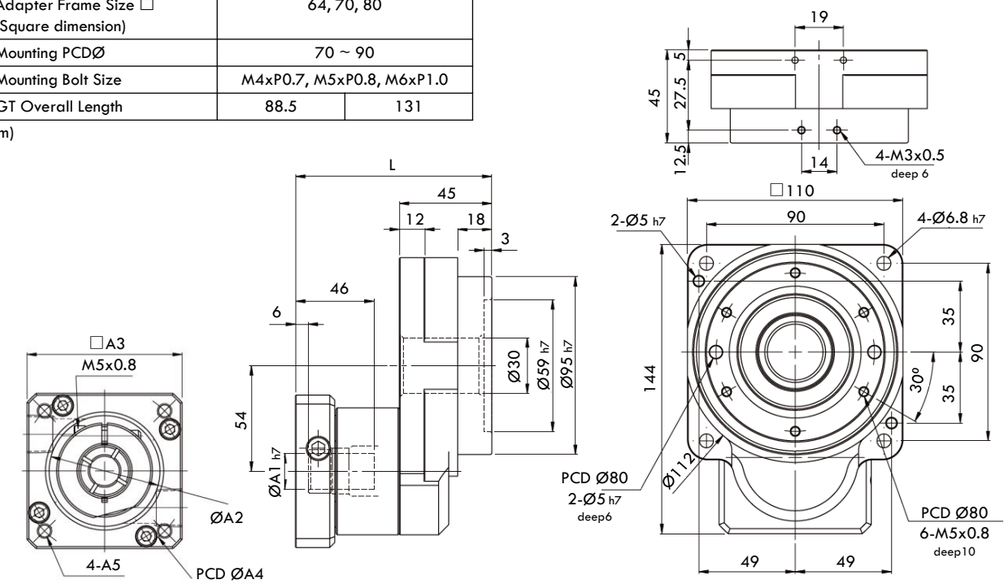
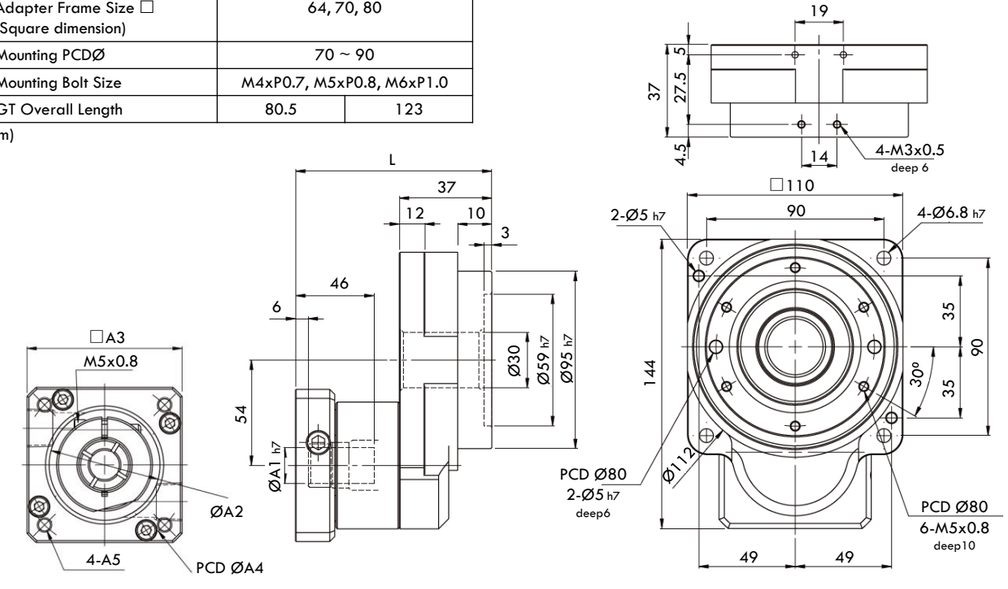


Fig. 72 GT-110-C

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 5, 10, 18	Gear Ratio 25, 50, 100
A1	Input Shaft Bore Ø	11 ~ 19	
A2	Input Pilot Bore Ø	50 ~ 70	
A3	Adapter Frame Size □ (Square dimension)	64, 70, 80	
A4	Mounting PCDØ	70 ~ 90	
A5	Mounting Bolt Size	M4xP0.7, M5xP0.8, M6xP1.0	
L1	GT Overall Length	80.5	123

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

Fig. 73 GT-135-B

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 5, 10, 18	Gear Ratio 25, 50, 100
A1	Input Shaft Bore Ø	11 ~ 19	
A2	Input Pilot Bore Ø	50 ~ 70	
A3	Adapter Frame Size □ (Square dimension)	64, 70, 80	
A4	Mounting PCDØ	70 ~ 90	
A5	Mounting Bolt Size	M4xP0.7, M5xP0.8, M6xP1.0	
L1	GT Overall Length	108	149

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

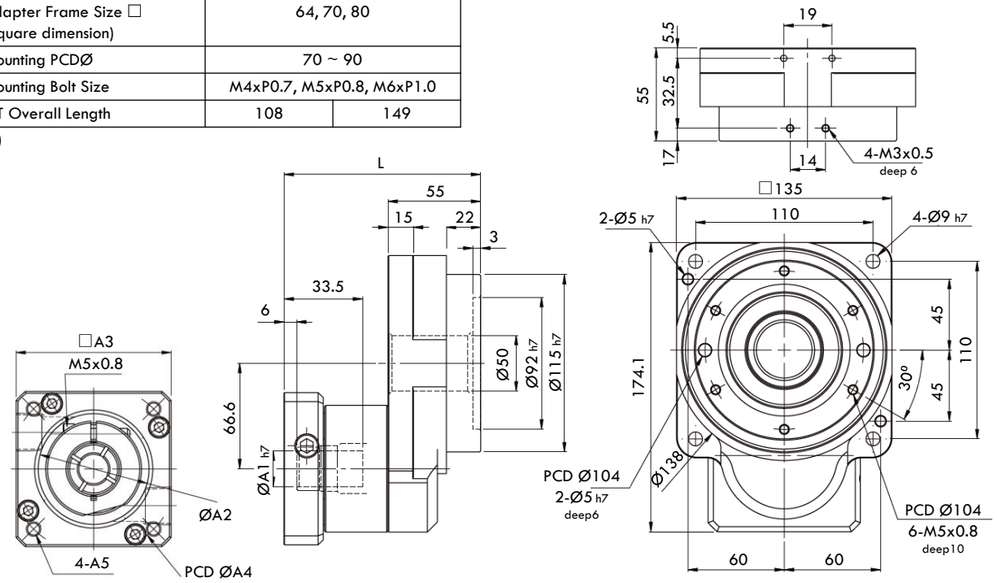
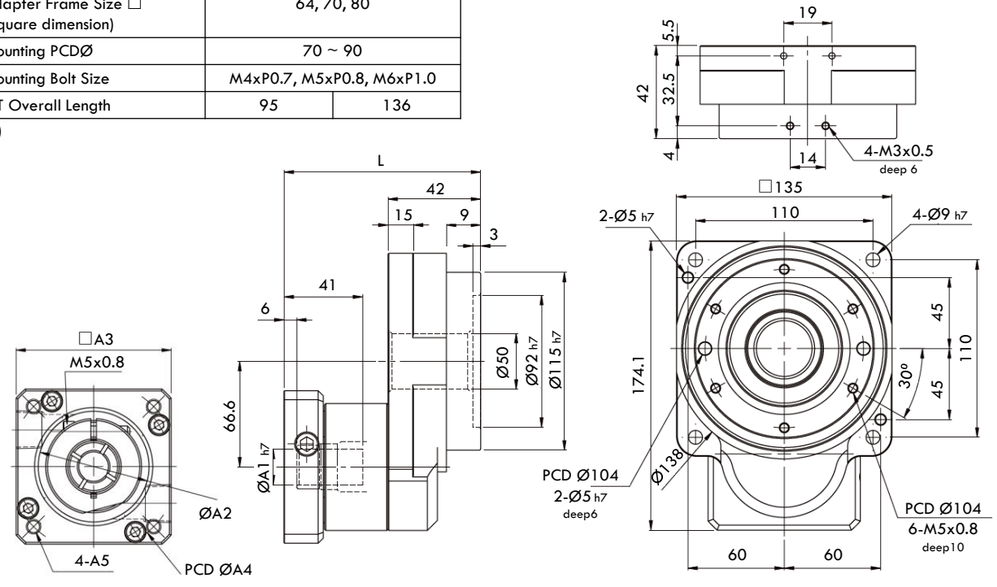


Fig. 74 GT-135-C

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 5, 10, 18	Gear Ratio 25, 50, 100
A1	Input Shaft Bore Ø	11 ~ 19	
A2	Input Pilot Bore Ø	50 ~ 70	
A3	Adapter Frame Size □ (Square dimension)	64, 70, 80	
A4	Mounting PCDØ	70 ~ 90	
A5	Mounting Bolt Size	M4xP0.7, M5xP0.8, M6xP1.0	
L1	GT Overall Length	95	136

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – GT HOLLOW ROTARY ACTUATOR SERVOBOX

Fig. 75 GT-200-B

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 5, 10, 18	Gear Ratio 25, 50, 100
A1	Input Shaft Bore Ø	14 ~ 24	
A2	Input Pilot Bore Ø	70 ~ 130	
A3	Adapter Frame Size □ (Square dimension)	80, 92, 110, 130, 142	
A4	Mounting PCDØ	90 ~ 145	
A5	Mounting Bolt Size	M6xP1.0, M8xP1.25, M10xP1.5	
L1	GT Overall Length	125.5	166.5

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

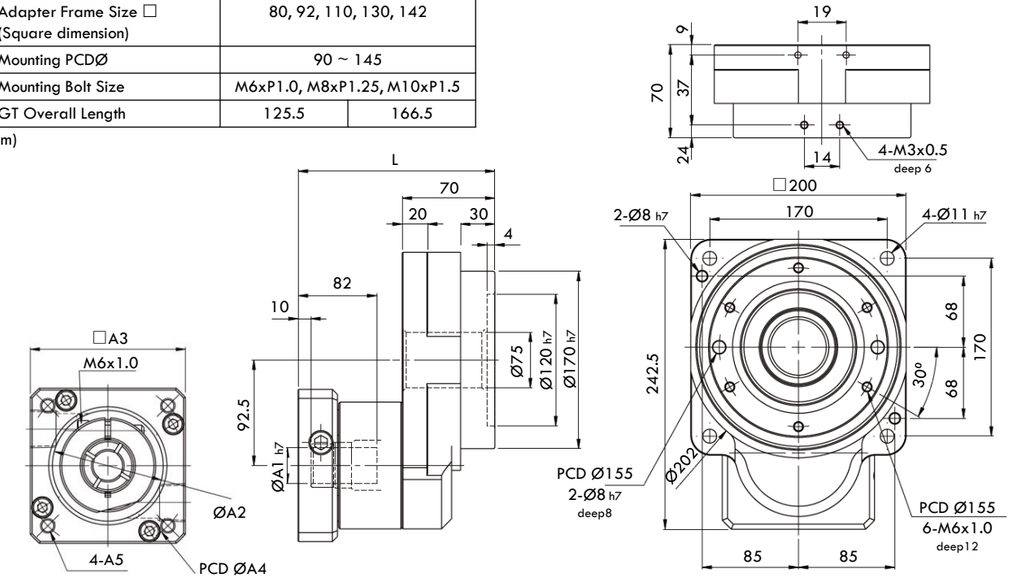
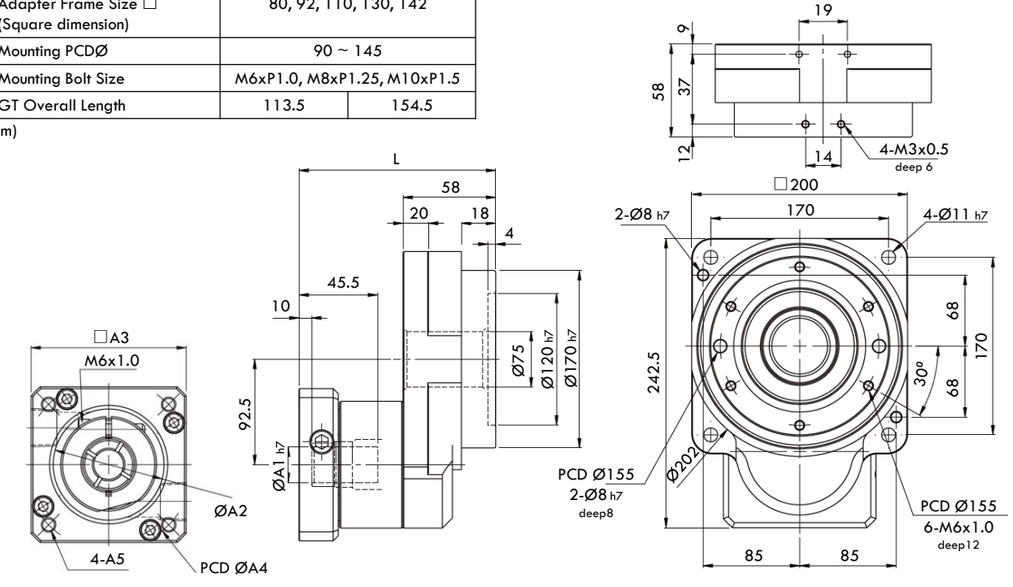


Fig. 76 GT-200-C

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 5, 10, 18	Gear Ratio 25, 50, 100
A1	Input Shaft Bore Ø	14 ~ 24	
A2	Input Pilot Bore Ø	70 ~ 130	
A3	Adapter Frame Size □ (Square dimension)	80, 92, 110, 130, 142	
A4	Mounting PCDØ	90 ~ 145	
A5	Mounting Bolt Size	M6xP1.0, M8xP1.25, M10xP1.5	
L1	GT Overall Length	113.5	154.5

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.

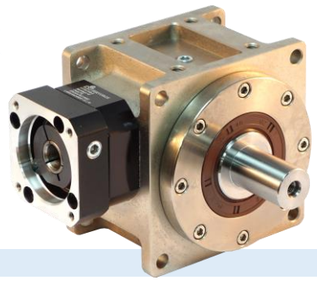


Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

SPIRAL BEVEL GEAR SERVOBOX

HY-FV/RV SERIES

HYPOID BEVEL GEAR DESIGN
ALUMINIUM DIE-CAST ALLOY HOUSING



Features :
- Compact design to transmit rotational motion at right angles with higher torque capability
- Ball bearing and taper bearing option
- Heavy duty housing in aluminium die-cast alloy to withstand highest operating temperature
- Single stage gear ratio 1/20 ~ 1/60 available upon request.
- Hollow output shaft / single output shaft / double outputs shaft and multiple shaft configurations are available.

Ball Bearing Design (HY-FV/RV-B) / Taper Bearing Design (HY-FV/RV-T)
- 1-Stage ServoBox in Gear Ratio 3, 4, 5, 6, 8, 10, 12 and 15.
- 2-Stage ServoBox in Gear Ratio 20, 30, 40, 50, 60, 80, 100, 120 and 150.

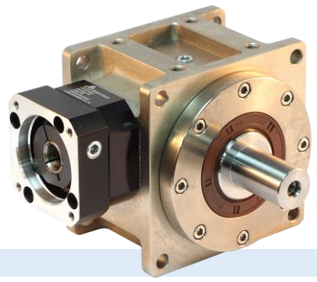
GENERAL SPECIFICATIONS	Unit	Ratio	Model : ST (1 Stage) / (2 Stage)							
			#55	#75	#90	#115	#130	#140	#160	#190
Frame Size	MM	3~50	90 x 90	115 x 115	140 x 140	170 x 170	192 x 192	215 x 215	240 x 240	264 x 264
Mounting Dimension	MM	3~50	78 x 78	98 x 98	118 x 118	144 x 144	164 x 164	182 x 182	206 x 206	224 x 224
Output Shaft Diameter	MM	3~50	Ø20	Ø24	Ø32	Ø40	Ø48	Ø55	Ø60	Ø70
Output Shaft Length	MM	3~50	35	35	50	60	70	80	100	110
Rated Output Torque	Nm (1Stage)	3/4/5	35	70	140	260	430	720	1,100	1,440
		6/8/10	30	60	117	220	365	615	957	1,230
		12/15	25	50	95	180	300	510	815	10,20
	Nm (2stage)	20~150	35	70	140	260	430	720	1,100	1,440
Max. Acceleration Torque	Nm	3~50	1.5 Times of Rated Output Torque							
Max. Output Torque Emergency Stop Torque	Nm	3~150	3 Times of Rated Output Torque							
Rated Input Speed	RPM	3/4/5	2,100	1,800	1,500	1,150	1,000	700	600	550
		6/8/10	3,200	2,700	2,200	1,800	1,500	1,200	1,100	1,000
		12/15	3,900	3,300	2,800	2,300	2,000	1,600	1,350	1,300
		20~150	3,500	3,000	3,000	2,500	2,500	2,500	2,500	2,500
Maximum Input Speed	RPM	3~15	8,000	8,000	7,000	6,000	5,000	5,000	4,500	4,500
		20~150	6,000	6,000	6,000	6,000	5,000	5,000	4,500	4,500
Backlash (arcmin)	Arcmin	3~15	P0 ≤ 2 arcmin / P1 ≤ 5 arcmin / P2 ≤ 8 arcmin							
		20~150	P0 ≤ 3 arcmin / P1 ≤ 6 arcmin / P2 ≤ 9 arcmin							
Maximum Radial Force	N (Ball Bearing)	3~15	1,150	1,820	2,080	3,700	4,500	5,400	7,300	9,450
		20~150	1,820	2,700	3,960	5,500	6,930	8,250	9,900	12,375
	N (Taper Bearing)	3~15	--	9,450	8,000	12,700	16,500	20,400	27,200	34,500
		20~150	3,300	4,900	7,200	10,000	12,600	15,000	18,000	22,500
Maximum Axial Force	N (Ball Bearing)	3~15	575	910	1,040	1,850	2,250	2,700	3,650	4,725
		20~150	910	1,350	1,980	2,750	3,810	4,540	5,450	6,190
	N (Taper Bearing)	3~15	--	4,725	4,000	6,350	8,250	10,200	13,600	17,250
		20~150	1,650	2,450	3,600	5,000	6,300	7,500	9,000	11,250
Service Life	Hr	3~150	Intermittent Periodic Duty S5 > 30,000 hours Continuous Duty S1 > 15,000 hours							
Efficiency	%	3~15	≥ 92%							
		20~150	≥ 90%							
Operating Temperature	ºC	3~150	-10ºC ~ +100ºC							
Lubrication		3~150	Synthetic oil							
Degree of Protection		3~150	IP65							
Mounting Position		3~150	Any							
Noise Level	dB(A)	3~8 / 20~80	≤ 67	≤ 67	≤ 69	≤ 69	≤ 71	≤ 71	≤ 72	≤ 72
		10~15 / 100~150	≤ 66	≤ 66	≤ 68	≤ 68	≤ 70	≤ 70	≤ 71	≤ 71

Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

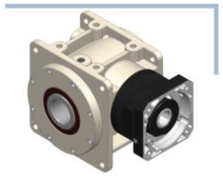
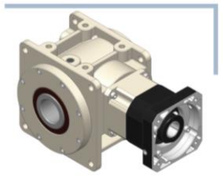
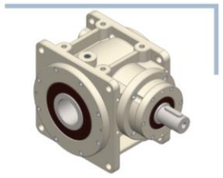
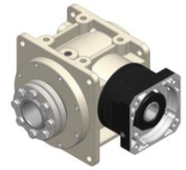
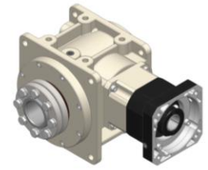
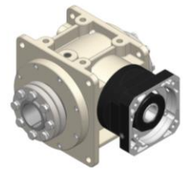
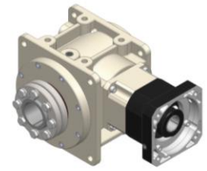
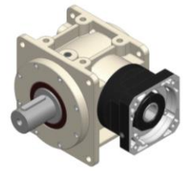
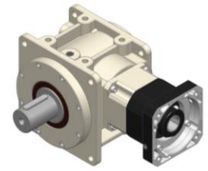
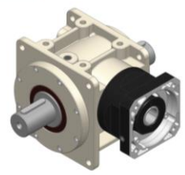
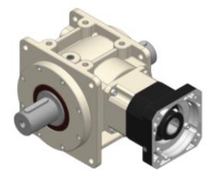
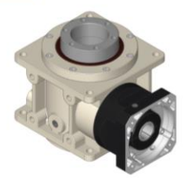
SPIRAL BEVEL GEAR SERVOBOX

HY SERIES

HYPOID BEVEL GEAR SERVOBOX
DESIGN SELECTION



INPUT TYPE

OUTPUT TYPE	F Input Flange Ratio 3 ~ 15	RO Input Flange Ratio 20 ~ 150	D Single Input Shaft
O HollowOutput Shaft	 FO	 RO	 DO
N HollowOutput Shaft with Single Clamping	 FN	 RN	 DN
M HollowOutput Shaft with Double Clamping	 FM	 RM	 DM
S Single Output Shaft	 FS	 RS	 DS
V Double Output Shaft	 FV	 RV	 DV
P For Ball Screw	 FP	 RP	 DP

DIMENSION – HY HYPOID BEVEL GEAR SERVOBOX

Fig. 53 HY-55-(FV/RV)-B HY-55-(FV/RV)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 3~15	Gear Ratio 20~150
A1	Input Shaft Bore Ø	5 ~ 11	
A2	Input Pilot Bore Ø	30 ~ 70	
A3	Adapter Frame Size □ (Square dimension)	46, 55, 60, 70	
A4	Mounting PCDØ	46 ~ 90	
A5	Mounting Bolt Size	M4xP0.7, M5xP0.8	
L1	ST Overall Length	123	151
L2	Body Length	33	67

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* HY-RV Series Ratio 20~150 is fitted with Planetary ServoBox.

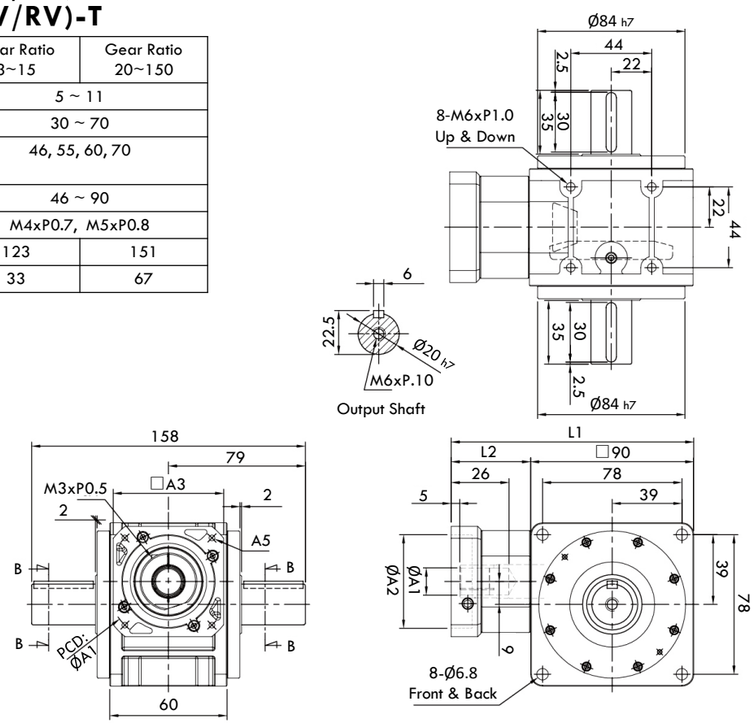
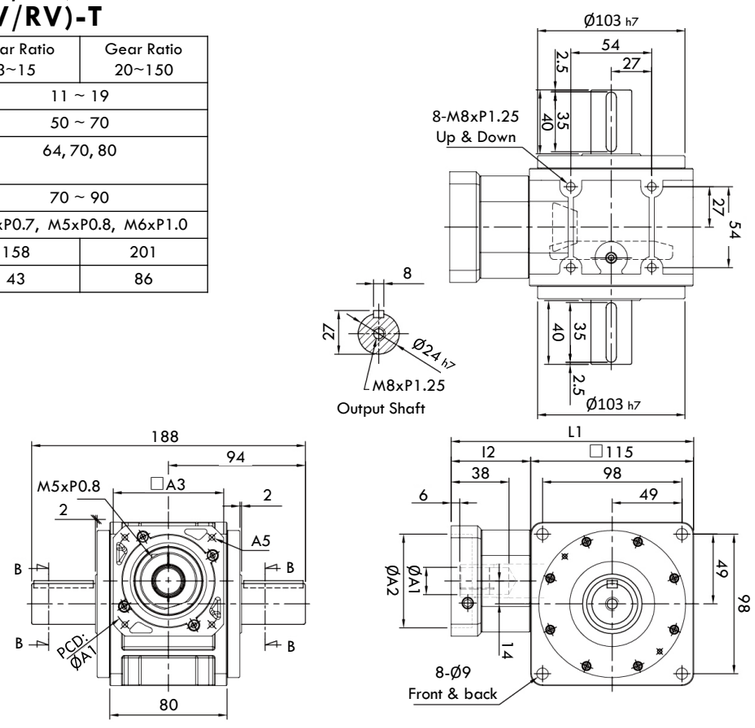


Fig. 54 HY-75-(FV/RV)-B HY-75-(FV/RV)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 3~15	Gear Ratio 20~150
A1	Input Shaft Bore Ø	11 ~ 19	
A2	Input Pilot Bore Ø	50 ~ 70	
A3	Adapter Frame Size □ (Square dimension)	64, 70, 80	
A4	Mounting PCDØ	70 ~ 90	
A5	Mounting Bolt Size	M4xP0.7, M5xP0.8, M6xP1.0	
L1	ST Overall Length	158	201
L2	Body Length	43	86

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* HY-RV Series Ratio 20~150 is fitted with Planetary ServoBox.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

DIMENSION – HY HYPOID BEVEL GEAR SERVOBOX

Fig. 55 HY-90-(FV/RV)-B HY-90-(FV/RV)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 3~15	Gear Ratio 20~150
A1	Input Shaft Bore Ø	14 ~ 24	
A2	Input Pilot Bore Ø	70 ~ 130	
A3	Adapter Frame Size □ (Square dimension)	92, 110, 130, 142	
A4	Mounting PCDØ	90 ~ 145	
A5	Mounting Bolt Size	M6xP1.0, M8xP1.25, M10xP1.5	
L1	ST Overall Length	202	237
L2	Body Length	62	97

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* HY-RV Series Ratio 20~150 is fitted with Planetary ServoBox.

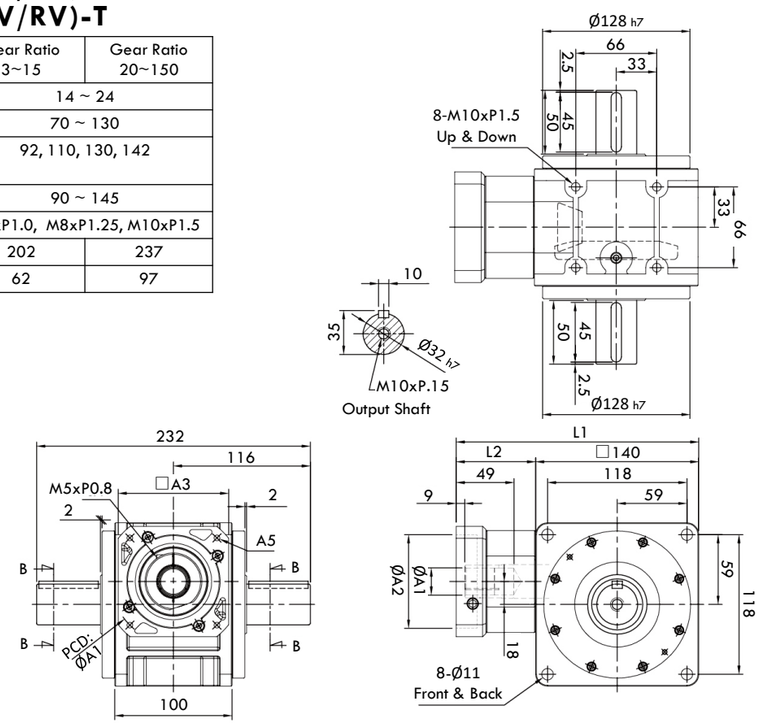
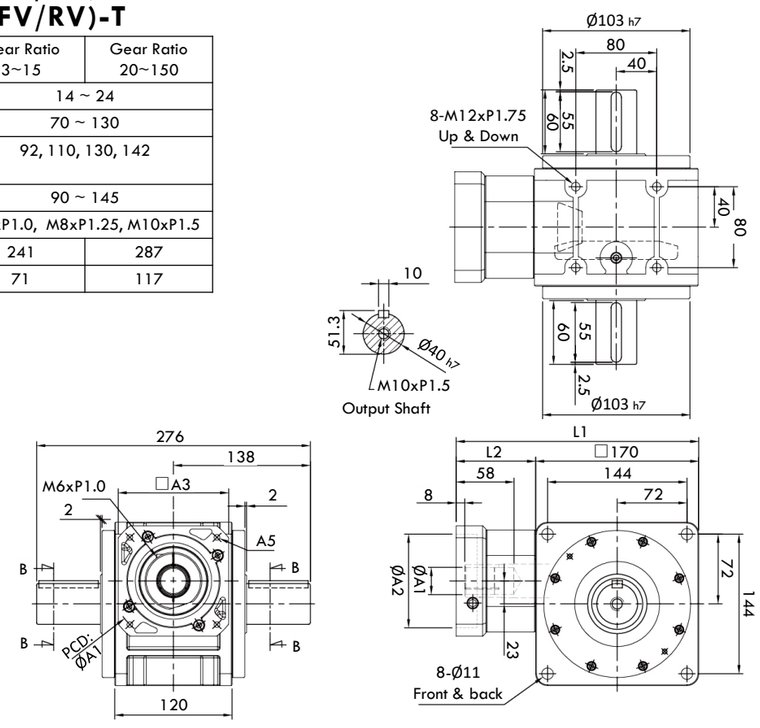


Fig. 56 HY-115-(FV/RV)-B HY-115-(FV/RV)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 3~15	Gear Ratio 20~150
A1	Input Shaft Bore Ø	14 ~ 24	
A2	Input Pilot Bore Ø	70 ~ 130	
A3	Adapter Frame Size □ (Square dimension)	92, 110, 130, 142	
A4	Mounting PCDØ	90 ~ 145	
A5	Mounting Bolt Size	M6xP1.0, M8xP1.25, M10xP1.5	
L1	ST Overall Length	241	287
L2	Body Length	71	117

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* HY-RV Series Ratio 20~150 is fitted with Planetary ServoBox.



Note: The contents of this data sheet are subject to change without prior notice for the purpose of continuous product improvement.

Fig. 57 HY-130-(FV/RV)-B HY-130-(FV/RV)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 3~15	Gear Ratio 20~150
A1	Input Shaft Bore Ø	19 ~ 32	
A2	Input Pilot Bore Ø	110 ~ 130	
A3	Adapter Frame Size □ (Square dimension)	130, 150	
A4	Mounting PCDØ	145 ~ 165	
A5	Mounting Bolt Size	M6xP1.0, M8xP1.25, M10xP1.5	
L1	ST Overall Length	286	340
L2	Body Length	94	148

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* HY-RV Series Ratio 20~150 is fitted with Planetary ServoBox.

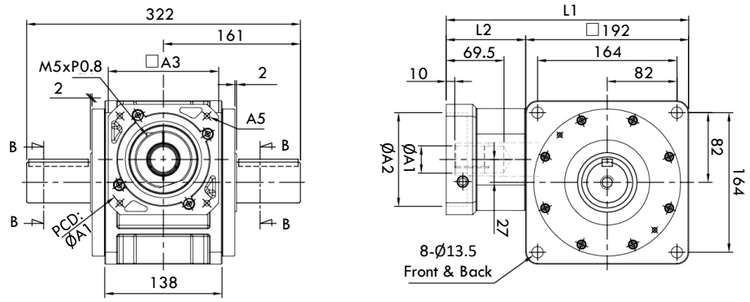


Fig. 58 HY-140-(FV/RV)-B HY-140-(FV/RV)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 3~15	Gear Ratio 20~150
A1	Input Shaft Bore Ø	22 ~ 38	
A2	Input Pilot Bore Ø	110 ~ 180	
A3	Adapter Frame Size □ (Square dimension)	146, 180, 190	
A4	Mounting PCDØ	145 ~ 215	
A5	Mounting Bolt Size	M8xP1.25 M10xP1.5 M12xP1.75	
L1	ST Overall Length	336	405
L2	Body Length	121	190

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* HY-RV Series Ratio 20~150 is fitted with Planetary ServoBox.

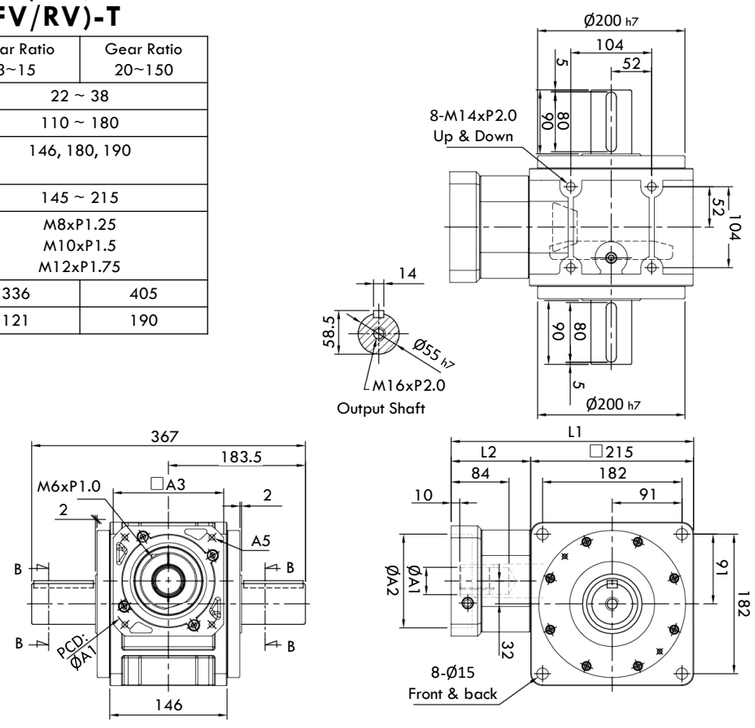


Fig. 59 HY-160-(FV/RV)-B HY-160-(FV/RV)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 3~15	Gear Ratio 20~150
A1	Input Shaft Bore Ø	22 ~ 38	
A2	Input Pilot Bore Ø	110 ~ 180	
A3	Adapter Frame Size □ (Square dimension)	146, 180, 190	
A4	Mounting PCDØ	145 ~ 215	
A5	Mounting Bolt Size	M8xP1.25 M10xP1.5 M12xP1.75	
L1	ST Overall Length	358	430
L2	Body Length	118	190

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* HY-RV Series Ratio 20~150 is fitted with Planetary ServoBox.

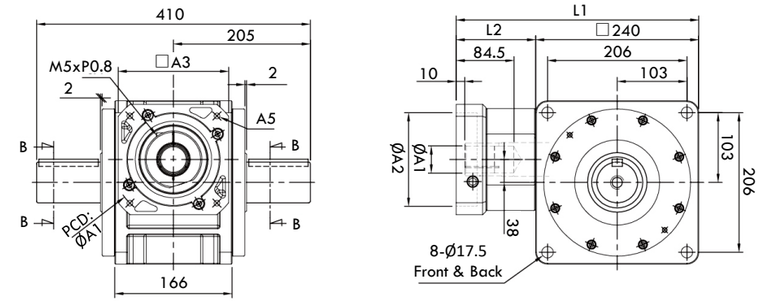


Fig. 60 HY-190-(FV/RV)-B HY-190-(FV/RV)-T

Modular Adapter Dimension (Attach to Servo Motor)		Gear Ratio 3~15	Gear Ratio 20~150
A1	Input Shaft Bore Ø	35 ~ 55	
A2	Input Pilot Bore Ø	114.3 ~ 250	
A3	Adapter Frame Size □ (Square dimension)	182, 200, 220, 250, 265	
A4	Mounting PCDØ	200 ~ 235	
A5	Mounting Bolt Size	M12xP1.75, M16xP2.0	
L1	ST Overall Length	417	508
L2	Body Length	153	244

(Unit: mm)

Specification:
* Standard output shaft is keyed shaft (Round shaft is optional).
* Bushing is used if the motor output shaft is smaller than the default input shaft bore of the ServoBox.
* Collet clamping method for Input Shaft < Ø32mm.
* Solid output shaft option is available.
* HY-RV Series Ratio 20~150 is fitted with Planetary ServoBox.