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Sumitomo Drive Technologies

IB Series PK1 Type Planetary Gear Reducer for Servo Motor Right Angle Type

Sumitomo Drive Technologies



IB Series PK1 Type

Planetary Gear Reducer for Servo Motor Right Angle Type

Specifications, dimensions, and other items are subject to change without prior notice.

 Sumitomo Heavy Industries, Ltd.

Power Transmission & Controls Group

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Table of Contents

Structure	... 2
Features	... 3
Nomenclature	... 4
Standard Specification, Construction, and Mechanism	... 4
Selection Table 1 (Frame Size Combination Table for Each Motor Rated Speed)	... 5
Selection Table 2 (Frame Size Combination Table for Each Servo Motor Manufacturers)	... 7
1. FANUC Ltd.	... 7
2. Yaskawa Electric Corporation	... 8
3. Mitsubishi Electric Corporation	... 10
Selection Table 3 (Rating Table) (Allowable External Rating)	... 13
Selection Procedure	... 14
Dimension Drawings	... 16
Solid Shaft	... 16
Flange Shaft	... 37
Durability Check of Output Shaft Part	... 58
Formula for Calculation of Moment of Inertia and GD^2	... 61
Formula for Calculation of Moment of Inertia, Load Torque, and Acceleration Torque	... 62
Moment of Inertia (at Motor Shaft)	... 63
GD^2 (at Motor Shaft)	... 64
Mechanical Precision of Output Part of the Reducer	... 65
Motor Attachment Procedure	... 66
Motor Precision	... 67
Warranty and Safety Precautions	... 68

Structure

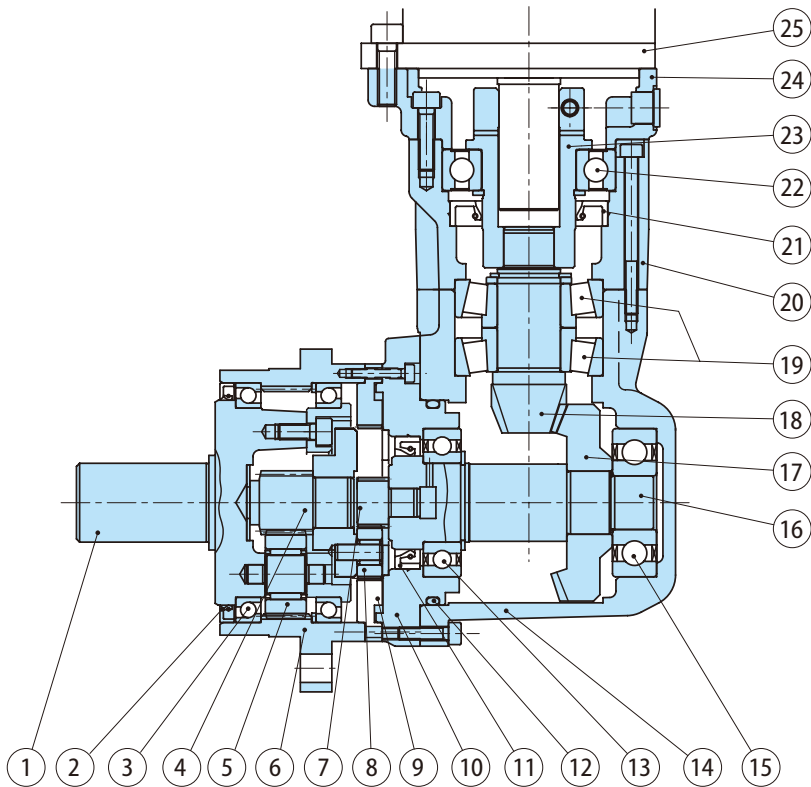
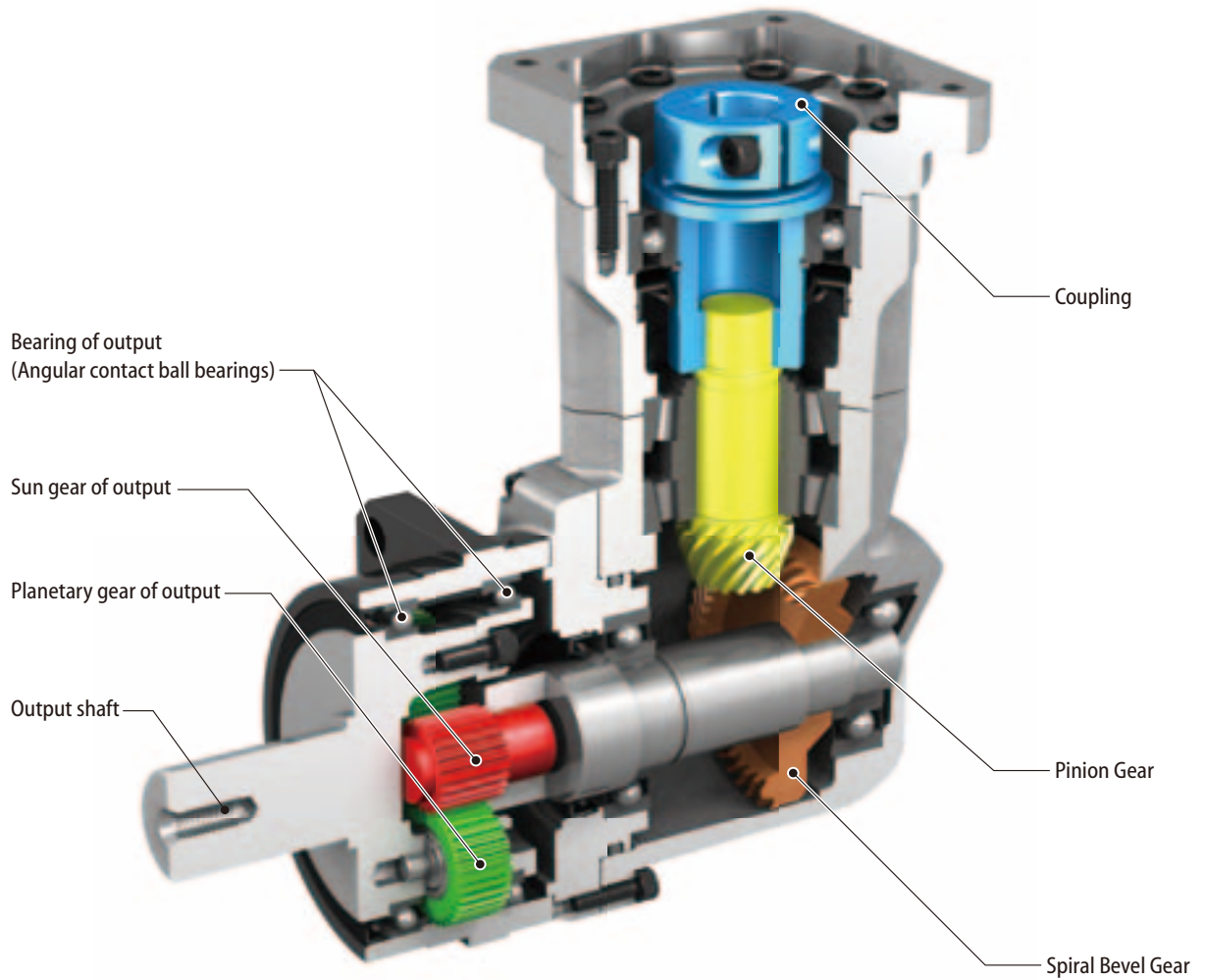


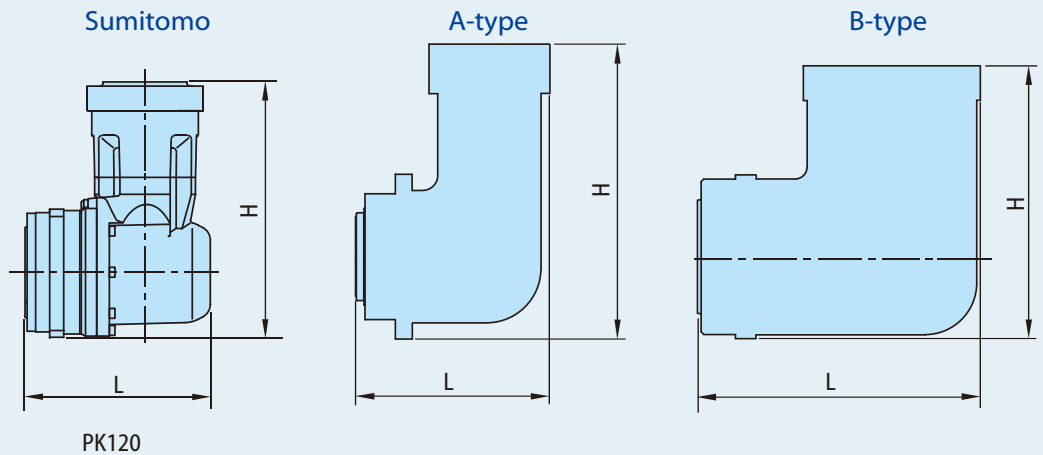
Fig. 1

Number	Part Name
1	Output Shaft
2	Oil Seal
3	Bearing of Output
4	Sun Gear of Output
5	Planetary Gear of Output
6	Casing with Internal Gear
7	Sun Gear of Input
8	Planetary Gear of Input
9	Internal Gear of Input
10	Adaptor (Casing)
11	Oil Seal
12	O-ring
13	Bearing
14	Casing
15	Bearing
16	Intermediate Shaft
17	Spiral Bevel Gear
18	Bevel Pinion Shaft
19	Bearing
20	Cover (Casing)
21	Oil Seal
22	Input Shaft Bearing
23	Coupling
24	Adaptor Plate
25	Motor (Provided by Customers)

Features

Compactness

Large diameter precision angular bearing, supporting output shaft, allows large radial load with compact casing. Spiral Bevel gear concept allows compact design ("L"-dimension)



	L	H	Weight (kg)
Sumitomo	144	194	4.8
A-type	146	212	5.2
B-type	204	200	8.3

1. Comparison with similar ratio and ratings.
2. Our survey estimate.

Output shaft Variation

Three variations available to match customers' needs. Optimal selection possible for your application.



Keyless solid shaft type



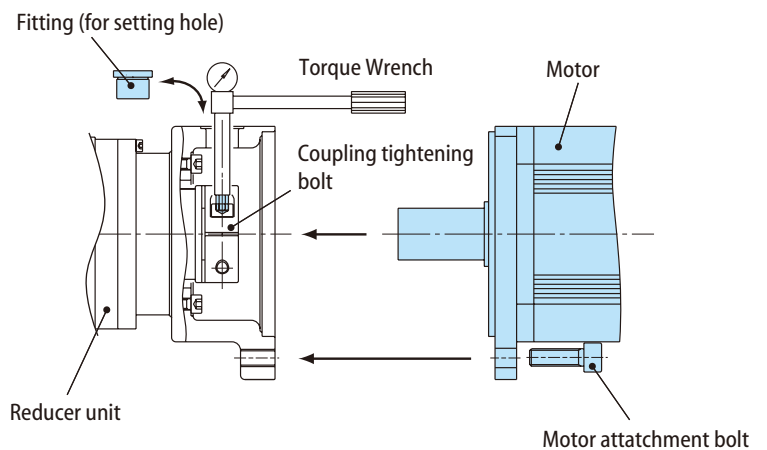
Flange shaft type



Solid shaft type with keyway

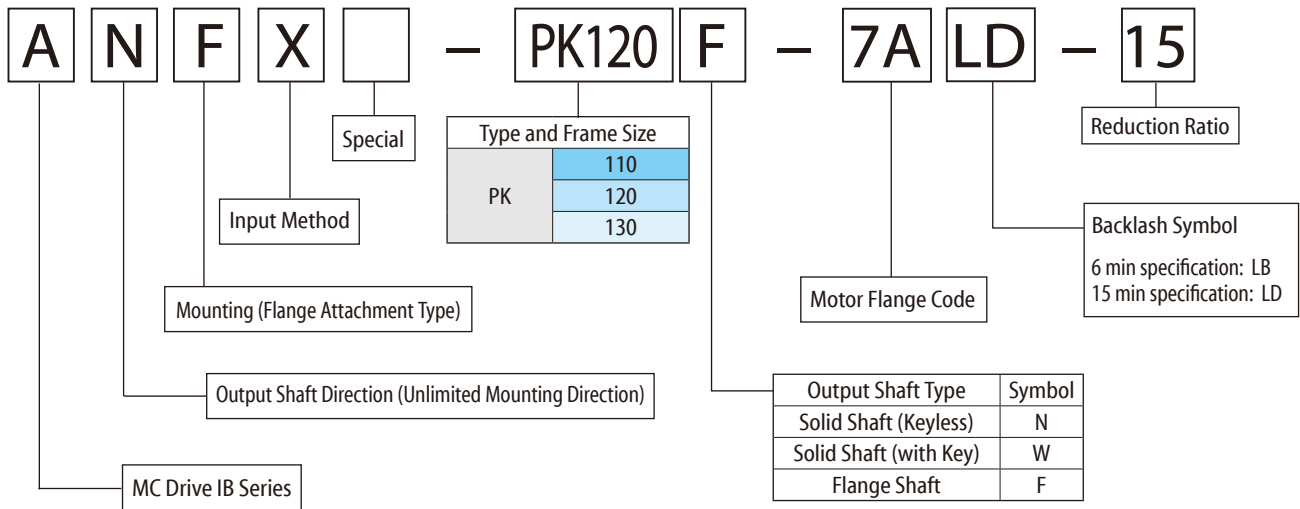
Assembly

Simple assembly. Directly connect servo motor and reducer with bolt (provided by customer) after delivery. Tighten motor shaft with hexagon wrench. Ready for immediate use.



Nomenclature, Standard Specification

Nomenclature



Ratio

Ratio	6	8	11	15	23	27	33	45	50	63	68	99	122	135	243
Actual reduction ratio	5.5	7.5	11	15	22.5	27	33	45	49.5	63	67.5	99	121.5	135	243

Standard Specification

Backlash	Initial backlash setting is 6 or 15-minute.
Efficiency	86% or more at rated output torque (with reduction ratio 6, 8, 11, 15, 27)
Noise Level	70dB(A) 0.5m *Varies depending on models and mounting condition.
Lubrication system	Grease lubrication The unit is filled with grease at the time of shipping. It is ready for immediate use.
Reduction system	Planetary gear mechanism (2nd-stage) Bevel gear mechanism (1st-stage) Double stage type (Reduction Ratio: 6, 8, 11, 15, 27) Triple stage type (Reduction Ratio: 23, 33, 45, 50, 63, 68, 99, 122, 135, 243)
Output shaft rotation direction	Oposite direction as the rotation direction of input gear.
Material	Case with internal gear and gear: Chrome-Molybdenum Steel Joint cover, Adapter prate, Adaptor (Casing), Casing, Cover (Casing): Aluminum alloy Output and input shaft: S45C
Mounting location	Indoor (without dust and water)
Ambient temperature	0~40°C Consult us when the operation condition exceeds the above and when special grease is necessary such as food manufacturing machine.
Ambient humidity	85% or less. There should be no condensation.
Altitude	1000m or below
Ambient atmosphere	There should be no corrosive gases, explosive gases, vapor, or dust.
Mounting angle	All angles possible (no limitation)
Paint	Black oxide coating for housing with internal gear Output shaft comes with rustproof treatment at the time of shipping.
Actual reduction ratio	Please refer ratio table above.
Surface temperature of the reducer	80°C or below. Consult us when operating continuously.

Selection Table 1 (Frame Size Combination Table for Each Motor Rated Speed)

PK1 Type

Rated Motor Speed 1000 [r/min]

Servo Moto Capacity [W]	Reduction Ratio														
	6	8	11	15	23	27	33	45	50	63	68	99	122	135	243
100															
200															
300															
400															
500															
600															
750															
1000															
1200															
1500															
2000															

Rated Motor Speed 1500 [r/min]

Servo Moto Capacity [W]	Reduction Ratio														
	6	8	11	15	23	27	33	45	50	63	68	99	122	135	243
100															
200															
300															
400															
500															
600															
750															
1000															
1200															
1500															
2000															
2500															
3000															

Rated Motor Speed 2000 [r/min]

Servo Moto Capacity [W]	Reduction Ratio														
	6	8	11	15	23	27	33	45	50	63	68	99	122	135	243
100															
200															
300															
400															
500															
600															
750															
1000															
1200															
1500															
2000															
2500															
3000															
3500															
4000															

Rated Motor Speed 3000 [r/min]

Servo Moto Capacity [W]	Reduction Ratio														
	6	8	11	15	23	27	33	45	50	63	68	99	122	135	243
200															
300															
400															
500															
600															
750															
1000															
1200															
1500															
2000															
2500															
3000															
3500															
4000															
4500															
5000															

Rated Motor Speed 4000 [r/min]

Servo Moto Capacity [W]	Reduction Ratio														
	6	8	11	15	23	27	33	45	50	63	68	99	122	135	243
200															
300															
400															
500															
600															
750															
1000															
1200															
1500															
2000															
2500															
3000															
3500															
4000															
4500															
5000															

PK110
 PK120
 PK130

*Refer to Selection Table 2 (on pages 7-10) for frame size combination for each servo motor manufacturer.
 *Refer to Selection Table 3 (on pages 11, 13) for rated torque, allowable maximum input speed, allowable peak torque, and allowable radial load for each frame size.
 *Refer to Selection Table 3 (on page 12) for %ED of each speed.
 *Refer to Selection Table 3 (on page 11) for allowable peak torque at startup for combinations marked ●.
 *Combination in must be used that the average load torque is limited to be less than rated torque in the rating table (Table 1-1, P.11).

Selection Table 1 (Frame Size Combination Table for Each Motor Rated Speed)

No Load Running Torque [SI Unit]

Frame Size	Unit	Reduction Ratio														
		6 (5.5)	8 (7.5)	11 (11)	15 (15)	23 (22.5)	27 (27)	33 (33)	45 (45)	50 (49.5)	63 (63)	68 (67.5)	99 (99)	122 (121.5)	135 (135)	243 (243)
PK110	N·m	0.29	0.27	0.21	0.20	0.27	0.19	0.20	0.20	0.25	0.20	0.25	0.19	0.25	0.19	0.19
PK120		0.42	0.36	0.42	0.39	0.36	0.39	0.39	0.39	0.36	0.39	0.36	0.36	0.36	0.36	0.36
PK130		0.79	0.71	0.68	0.64	0.64	0.64	0.64	0.64	0.61	0.6	0.61	0.61	0.61	0.61	0.61

*Torque necessary at the input side to rotate the reducer at no load condition.

*This is the representative value when the ambient temperature is 20°C.

Selection Table 2 (Frame Size Combination Table for Each Servo Motor Manufacturers)

PK1 Type

1. FANUC Ltd.

β is Series (Rated speed: 6000~1500r/min) ... Applies to torque at rated speed

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	6	8	11	15	23	27	33	45	
500	β iS2/4000	4000	PK110	PK110	PK110	PK120	PK120	PK120	PK120	PK120	2J
750	β iS4/4000	3000	PK120	PK120	PK120	PK120	PK120	PK130	PK130	PK130	0V
1200	β iS8/3000	2000	PK120	PK120	PK130	PK130	PK130	-	-	-	7X
1400	β iS12/2000	2000	PK120	PK120●	PK130	PK130	-	-	-	-	7Z
1800	β iS12/3000	2000	PK120	PK130	-	-	-	-	-	-	7Z
2500	β iS22/2000	2000	PK130	PK130	-	-	-	-	-	-	0X
3000	β iS22/3000	2000	PK130	PK130	-	-	-	-	-	-	0X
3000	β iS30/2000	2000	PK130●	PK130●	-	-	-	-	-	-	0X
3000	β iS40/2000	1500	PK130●	-	-	-	-	-	-	-	0X

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio							Motor Flange Code
	Type	Rated Speed [r/min]	50	63	68	99	122	135	243	
500	β iS2/4000	4000	PK120●	PK120●	PK120●	PK120●	PK120●	PK120●	-	2J
750	β iS4/4000	3000	PK130	PK130●	PK130●	-	-	-	-	0V

β iSc Series (Rated speed: 4000~2000r/min) ... Applies to torque at rated speed

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	6	8	11	15	23	27	33	45	
500	β iSc2/4000	4000	PK110	PK110	PK110	PK120	PK120	PK120	PK120	PK120	2J
750	β iSc4/4000	3000	PK120	PK120	PK120	PK120	PK120	PK130	PK130	PK130	0V
1200	β iSc8/3000	2000	PK120	PK120	PK130	PK130	PK130	-	-	-	7X
1400	β iSc12/2000	2000	PK120	PK120●	PK130	PK130	-	-	-	-	7Z

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio							Motor Flange Code
	Type	Rated Speed [r/min]	50	63	68	99	122	135	243	
500	β iSc2/4000	4000	PK120●	PK120●	PK120●	PK120●	PK120●	PK120●	-	2J
750	β iSc4/4000	3000	PK130	PK130●	PK130●	-	-	-	-	0V
1200	β iSc8/3000	2000	-	-	-	-	-	-	-	7X
1400	β iSc12/2000	2000	-	-	-	-	-	-	-	7Z

β iF Series (Rated speed: 3000~1500r/min) ... Applies to torque at rated speed

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	6	8	11	15	23	27	33	45	
750	β iF4/3000	3000	PK120	PK120	PK120	PK120	PK120	PK130	PK130	PK130	7X
1200	β iF8/2000	2000	PK120	PK120	PK130	PK130	PK130	-	-	-	7Z
1400	β iF12/2000	2000	PK130	PK130	PK130	PK130	-	-	-	-	0X
2500	β iF22/2000	2000	PK130	PK130	-	-	-	-	-	-	0X
3000	β iF30/2000	1500	PK130	-	-	-	-	-	-	-	0X

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio							Motor Flange Code
	Type	Rated Speed [r/min]	50	63	68	99	122	135	243	
750	β iF4/3000	3000	PK130	PK130●	PK130●	-	-	-	-	7X
1200	β iF8/2000	2000	-	-	-	-	-	-	-	7Z
1400	β iF12/2000	2000	-	-	-	-	-	-	-	0X
2500	β iF22/2000	2000	-	-	-	-	-	-	-	0X
3000	β iF30/2000	1500	-	-	-	-	-	-	-	0X

Note 1: Refer to Selection Table 3 (on pages 11-13) for rated torque, allowable maximum input speed, allowable peak torque, and allowable radial load for each frame size.

2: Refer to Selection Table 3 (on page 11) for allowable peak torque at startup for combinations marked ●.

3: Combination in [] must be used that the average load torque is limited to be less than rated torque in the rating table (Table 1-1, P.11).

Selection Table 2 (Frame Size Combination Table for Each Servo Motor Manufacturers)

2. Yaskawa Electric Corporation

Σ-7 Series SGM7J model (Rated speed: 3000r/min)

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	6	8	11	15	23	27	33	45	
200	SGM7J-02A	3000	PK110	PK110	PK110	PK110	PK110	PK110●	PK110●	PK110●	2R
400	SGM7J-04A	3000	PK110	PK110	PK110	PK110●	PK120	PK120	PK120	PK120	2R
600	SGM7J-06A	3000	PK110	PK120	PK120	PK120	PK120	PK120●	PK130	PK130	2R
750	SGM7J-08A	3000	PK120	PK120	PK120	PK120	PK120	PK130	PK130	PK130	1G

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	50	63	68	99	122	135	243		
200	SGM7J-02A	3000	PK110●	PK110●	PK110●	PK110●	PK110●	PK110●	PK110●		2R
400	SGM7J-04A	3000	PK120●	PK120●	PK120●	PK120●	PK120●	PK120●	-		2R
600	SGM7J-06A	3000	PK130	PK130	PK130	-	-	-	-		2R
750	SGM7J-08A	3000	PK130	PK130●	PK130●	-	-	-	-		1G

Σ-7 Series SGM7A model (Rated speed: 3000r/min)

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	6	8	11	15	23	27	33	45	
200	SGM7A-02A	3000	PK110	PK110	PK110	PK110	PK110	PK110●	PK110●	PK110●	2R
400	SGM7A-04A	3000	PK110	PK110	PK110	PK110●	PK120	PK120	PK120	PK120	2R
600	SGM7A-06A	3000	PK110	PK120	PK120	PK120	PK120	PK120●	PK130	PK130	2R
750	SGM7A-08A	3000	PK120	PK120	PK120	PK120	PK120	PK130	PK130	PK130	1G
1000	SGM7A-10A	3000	PK120	PK120	PK120	PK120	PK130	PK130	PK130	PK130●	1G
1500	SGM7A-15A	3000	PK120	PK120	PK130	PK130	PK130	PK130●	-	-	1L
2000	SGM7A-20A	3000	PK120	PK120	PK130	PK130	-	-	-	-	1L
2500	SGM7A-25A	3000	PK120	PK130	PK130	PK130●	-	-	-	-	1L
3000	SGM7A-30A	3000	PK130	PK130	PK130●	-	-	-	-	-	1T
4000	SGM7A-40A	3000	PK130	PK130	-	-	-	-	-	-	1T
5000	SGM7A-50A	3000	PK130	-	-	-	-	-	-	-	1T

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	50	63	68	99	122	135	243		
200	SGM7A-02A	3000	PK110●	PK110●	PK110●	PK110●	PK110●	PK110●	PK110●		2R
400	SGM7A-04A	3000	PK120●	PK120●	PK120●	PK120●	PK120●	PK120●	-		2R
600	SGM7A-06A	3000	PK130	PK130	PK130	-	-	-	-		2R
750	SGM7A-08A	3000	PK130	PK130●	PK130●	-	-	-	-		1G
1000	SGM7A-10A	3000	-	-	-	-	-	-	-		1G
1500	SGM7A-15A	3000	-	-	-	-	-	-	-		1L
2000	SGM7A-20A	3000	-	-	-	-	-	-	-		1L
2500	SGM7A-25A	3000	-	-	-	-	-	-	-		1L
3000	SGM7A-30A	3000	-	-	-	-	-	-	-		1T
4000	SGM7A-40A	3000	-	-	-	-	-	-	-		1T
5000	SGM7A-50A	3000	-	-	-	-	-	-	-		1T

- Note 1: Refer to Selection Table 3 (on pages 11-13) for rated torque, allowable maximum input speed, allowable peak torque, and allowable radial load for each frame size.
- 2: Refer to Selection Table 3 (on page 11) for allowable peak torque at startup for combinations marked ●.
- 3: Combination in [] must be used that the average load torque is limited to be less than rated torque in the rating table (Table 1-1, P.11).

Selection Table 2 (Frame Size Combination Table for Each Servo Motor Manufacturers)

PK1 Type

Yaskawa Electric Corporation

Σ-7 Series SGM7P model (Rated speed: 3000r/min)

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	6	8	11	15	23	27	33	45	
200	SGM7P-02A	3000	PK110	PK110	PK110	PK110	PK110	PK110●	PK110●	PK110●	2T
400	SGM7P-04A	3000	PK110	PK110	PK110	PK110●	PK120	PK120	PK120	PK120	2T
750	SGM7P-08A	3000	PK120	PK120	PK120	PK120	PK120	PK130	PK130	PK130	7X
1500	SGM7P-15A	3000	PK120	PK120	PK130	PK130	PK130	PK130●	-	-	7X

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio							Motor Flange Code	
	Type	Rated Speed [r/min]	50	63	68	99	122	135	243		
200	SGM7P-02A	3000	PK110●	PK110●	PK110●	PK110●	PK110●	PK110●	PK110●	-	2T
400	SGM7P-04A	3000	PK120●	PK120●	PK120●	PK120●	PK120●	PK120●	-	-	2T
750	SGM7P-08A	3000	PK130	PK130●	PK130●	-	-	-	-	-	7X
1500	SGM7P-15A	3000	-	-	-	-	-	-	-	-	7X

Σ-7 Series SGM7G model (Rated speed: 1500r/min)

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	6	8	11	15	23	27	33	45	
300	SGM7G-03A	1500	PK110	PK110	PK120	PK120	PK120	PK120●	PK130	PK130	8E
450	SGM7G-05A	1500	PK120	PK120	PK120	PK120	PK120●	PK130	PK130	PK130	8E
850	SGM7G-09A	1500	PK120	PK120	PK130	PK130	PK130	-	-	-	7Z
1300	SGM7G-13A	1500	PK120	PK120●	PK130	PK130●	-	-	-	-	7Z
1800	SGM7G-20A	1500	PK130	PK130	-	-	-	-	-	-	7Z
2900	SGM7G-30A	1500	PK130●	-	-	-	-	-	-	-	0X

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio							Motor Flange Code	
	Type	Rated Speed [r/min]	50	63	68	99	122	135	243		
300	SGM7G-03A	1500	PK130	PK130	PK130	PK130●	PK130●	PK130●	PK130●	-	8E
450	SGM7G-05A	1500	PK130●	-	-	-	-	-	-	-	8E
850	SGM7G-09A	1500	-	-	-	-	-	-	-	-	7Z
1300	SGM7G-13A	1500	-	-	-	-	-	-	-	-	7Z
1800	SGM7G-20A	1500	-	-	-	-	-	-	-	-	7Z
2900	SGM7G-30A	1500	-	-	-	-	-	-	-	-	0X

Note 1: Refer to Selection Table 3 (on pages 11-13) for rated torque, allowable maximum input speed, allowable peak torque, and allowable radial load for each frame size.

2: Refer to Selection Table 3 (on page 11) for allowable peak torque at startup for combinations marked ●.

3: Combination in [---] must be used that the average load torque is limited to be less than rated torque in the rating table (Table 1-1, P.11).

Selection Table 2 (Frame Size Combination Table for Each Servo Motor Manufacturers)

3. Mitsubishi Electric Corporation

MELSERVO-J4

HG-KR Series (Rated speed: 3000r/min)

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	6	8	11	15	23	27	33	45	
200	HG-KR23(B)	3000	PK110	PK110	PK110	PK110	PK110	PK110●	PK110●	PK110●	2R
400	HG-KR43(B)	3000	PK110	PK110	PK110	PK110●	PK120	PK120	PK120	PK120	2R
750	HG-KR73(B)	3000	PK120	PK120	PK120	PK120	PK120	PK130	PK130	PK130	1G

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio							Motor Flange Code	
	Type	Rated Speed [r/min]	50	63	68	99	122	135	243		
200	HG-KR23(B)	3000	PK110●	PK110●	PK110●	PK110●	PK110●	PK110●	PK110●		2R
400	HG-KR43(B)	3000	PK120●	PK120●	PK120●	PK120●	PK120●	PK120●	-		2R
750	HG-KR73(B)	3000	PK130	PK130●	PK130●	-	-	-	-		1G

MELSERVO-J4

HG-MR Series (Rated speed: 3000r/min)

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	6	8	11	15	23	27	33	45	
200	HG-MR23(B)	3000	PK110	PK110	PK110	PK110	PK110	PK110●	PK110●	PK110●	2R
400	HG-MR43(B)	3000	PK110	PK110	PK110	PK110●	PK120	PK120	PK120	PK120	2R
750	HG-MR73(B)	3000	PK120	PK120	PK120	PK120	PK120	PK130	PK130	PK130	1G

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio							Motor Flange Code	
	Type	Rated Speed [r/min]	50	63	68	99	122	135	243		
200	HG-MR23(B)	3000	PK110●	PK110●	PK110●	PK110●	PK110●	PK110●	PK110●		2R
400	HG-MR43(B)	3000	PK120●	PK120●	PK120●	PK120●	PK120●	PK120●	-		2R
750	HG-MR73(B)	3000	PK130	PK130●	PK130●	-	-	-	-		1G

MELSERVO-J4

HG-SR Series (Rated speed: 2000r/min)

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio								Motor Flange Code
	Type	Rated Speed [r/min]	6	8	11	15	23	27	33	45	
500	HG-SR52(B)	2000	PK120	PK120	PK120	PK120	PK120	PK130	PK130	PK130	7Z
1000	HG-SR102(B)	2000	PK120	PK120	PK130	PK130	PK130	PK130●	-	-	7Z
1500	HG-SR152(B)	2000	PK120	PK120●	PK130	PK130	-	-	-	-	7Z
2000	HG-SR202(B)	2000	PK130	PK130	-	-	-	-	-	-	0X
3500	HG-SR352(B)	2000	PK130	-	-	-	-	-	-	-	0X

Servo motor Capacity [W]	Nomenclature of Servo Motor		Reduction Ratio							Motor Flange Code	
	Type	Rated Speed [r/min]	50	63	68	99	122	135	243		
500	HG-SR52(B)	2000	PK130	PK130●	PK130●	-	-	-	-		7Z
1000	HG-SR102(B)	2000	-	-	-	-	-	-	-		7Z
1500	HG-SR152(B)	2000	-	-	-	-	-	-	-		7Z
2000	HG-SR202(B)	2000	-	-	-	-	-	-	-		0X
3500	HG-SR352(B)	2000	-	-	-	-	-	-	-		0X

Note 1: Refer to Selection Table 3 (on pages 11-13) for rated torque, allowable maximum input speed, allowable peak torque, and allowable radial load for each frame size.

2: Refer to Selection Table 3 (on page 11) for allowable peak torque at startup for combinations marked ●.

3: Combination in [] must be used that the average load torque is limited to be less than rated torque in the rating table (Table 1-1, P.11).

Selection Table 3 (Rating Table)

Table1-1 Rating Table (SI Unit)

Frame Size	Reduction Ratio	Exact Ratio	Rated Torque *1							Allowable Peak Torque at Startup and Stop (Nm) *2, *5	Maximum Torque at Emergency (Nm) *3	Allowable Maximum Input Speed (r/min) *4
			Input Speed (r/min)									
			6000	5000	4000	3000	2000	1500	1000			
PK110	6	(5.5)	9.0	9.0	10.0	11.0	12.0	13.5	13.5	40.0	59.5	6000
	8	(7.5)	9.5	9.5	10.5	12.0	13.0	14.5	14.5	45.0		
	11	(11)	11.0	11.0	12.0	13.5	13.5	13.5	13.5	40.0		
	15	(15)	12.0	12.0	13.0	14.5	14.5	14.5	14.5	45.0		
	23	(22.5)	14.0	14.0	15.5	17.5	19.0	21.5	21.5			
	27	(27)	11.5	11.5	11.5	11.5	11.5	11.5	11.5	35.0		
	33	(33)	17.5	17.5	18.0	18.5	18.5	18.5	18.5	45.0		
	45	(45)	17.5	17.5	19.0	21.5	21.5	21.5	21.5			
	50	(49.5)	18.0	18.0	18.5	18.5	18.5	18.5	18.5			
	63	(63)	19.5	19.5	21.5	22.5	22.5	22.5	22.5			
	68	(67.5)	20.0	20.0	22.0	22.5	22.5	22.5	22.5			
	99	(99)	18.5	18.5	18.5	18.5	18.5	18.5	18.5			
	122	(121.5)	11.5	11.5	11.5	11.5	11.5	11.5	11.5		35.0	
	135	(135)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	45.0		
243	(243)	11.5	11.5	11.5	11.5	11.5	11.5	11.5	35.0			
PK120	6	(5.5)	38.5	38.5	42.0	47.5	52.0	58.5	58.5	140.0	175.0	6000
	8	(7.5)	41.0	41.0	44.5	50.5	55.0	62.0	62.0	145.0	240.0	
	11	(11)	39.0	39.5	40.5	42.0	44.0	45.5	47.5	135.0	175.0	
	15	(15)	50.5	50.5	55.0	57.5	60.0	62.0	62.0	145.0	240.0	
	23	(22.5)	42.5	42.5	46.5	52.5	57.5	64.5	64.5	185.0	250.0	
	27	(27)	43.5	43.5	43.5	43.5	43.5	43.5	43.5	140.0	200.0	
	33	(33)	38.5	38.5	42.0	47.5	47.5	47.5	47.5	135.0	180.0	
	45	(45)	52.5	52.5	57.5	64.5	64.5	64.5	64.5	185.0	250.0	
	50	(49.5)	39.0	39.0	40.5	40.5	40.5	40.5	40.5	135.0	180.0	
	63	(63)	56.0	56.0	61.0	69.0	69.0	69.0	69.0	190.0	250.0	
	68	(67.5)	53.0	53.0	55.0	55.0	55.0	55.5	55.5	180.0		
	99	(99)	40.5	40.5	40.5	40.5	40.5	40.5	40.5	135.0	180.0	
	122	(121.5)	43.5	43.5	43.5	43.5	43.5	43.5	43.5	140.0	200.0	
	135	(135)	55.0	55.0	55.0	55.5	55.5	55.5	55.5	180.0	250.0	
243	(243)	43.5	43.5	43.5	43.5	43.5	43.5	43.5	140.0	200.0		
PK130	6	(5.5)	-	75.0	82.0	92.5	101.0	114.0	114.0	290.0	415.0	5000
	8	(7.5)		79.5	86.5	97.5	106.5	120.5	120.5	325.0	500.0	
	11	(11)		92.5	95.0	98.0	103.0	106.5	111.5	290.0	445.0	
	15	(15)		97.5	106.5	120.5	120.5	120.5	120.5	325.0	500.0	
	23	(22.5)		82.5	90.0	101.5	111.0	125.0	125.0	380.0		
	27	(27)		100.0	100.0	100.5	100.5	100.5	100.5	330.0		
	33	(33)		74.5	81.0	92.0	92.0	92.0	92.0	320.0	395.0	
	45	(45)		101.5	111.0	125.0	125.0	125.0	125.0	380.0	500.0	
	50	(49.5)		75.5	82.0	93.0	101.0	114.5	114.5	355.0	395.0	
	63	(63)		105.5	118.0	133.5	133.5	133.5	133.5	380.0	500.0	
	68	(67.5)		103.0	112.0	126.5	138.0	153.0	153.0	380.0		
	99	(99)		93.0	101.0	114.5	114.5	114.5	114.5	355.0	395.0	
	122	(121.5)		100.5	101.0	101.0	101.0	101.0	101.0	330.0	500.0	
	135	(135)		126.5	138.0	153.0	153.0	153.0	153.0	380.0		
243	(243)	101.0	101.0	101.0	101.0	101.0	101.0	330.0				

PK1 Type

*1: Rated torque is the allowable value of the average load torque at the output shaft. The rated torque for the input speed of 1000 r/min or less is the same as the rated torque of 1000 r/min.

*2: Maximum allowable torque when startup and stop during operation cycle.

*3: Maximum allowable value of the shock torque at emergency stop or external shock torque. Should be less than 1,000 times in one lifetime.

*4: Maximum allowable input speed when not under constant operation condition.

*5: Some values are not allowable depending on the input shaft diameter.

Make sure to follow the method of motor attachment in page 88.

Selection Table 3 (Rating Table)

Table1-2 Allowable Operation Cycle

Input Speed (r/min)			6000		5000		4000		3000		2000		1500		1000									
Frame Size	Reduction Ratio	Exact Ratio	Allowable continuous operation period	Allowable % ED	Allowable continuous operation period	Allowable % ED	Allowable continuous operation period	Allowable % ED	Allowable continuous operation period	Allowable % ED	Allowable continuous operation period	Allowable % ED	Allowable continuous operation period	Allowable % ED	Allowable continuous operation period	Allowable % ED								
			min	%	min	%	min	%	min	%	min	%	min	%	min	%								
PK110	6	(5.5)	2	40	5	5	5	10	10	90	20	90	20	90	20	90								
	8	(7.5)																						
	11	(11)																						
	15	(15)																						
	23	(22.5)																						
	27	(27)																						
	33	(33)		50	70	80	90	20	90	20	90													
	45	(45)																						
	50	(49.5)																						
	63	(63)																						
	68	(67.5)																						
	99	(99)																						
	122	(121.5)																						
	135	(135)																						
243	(243)																							
PK120	6	(5.5)	2	30	5	5	5	10	10	90	20	90	20	90	20	90								
	8	(7.5)																						
	11	(11)																						
	15	(15)																						
	23	(22.5)																						
	27	(27)																						
	33	(33)		40	60	70	80	90	20	90	20	90												
	45	(45)																						
	50	(49.5)																						
	63	(63)																						
	68	(67.5)																						
	99	(99)																						
	122	(121.5)																						
	135	(135)																						
243	(243)																							
PK130	6	(5.5)	-	-	5	5	5	10	10	90	20	90	20	90	20	90								
	8	(7.5)																						
	11	(11)																						
	15	(15)																						
	23	(22.5)																						
	27	(27)																						
	33	(33)															30	50	60	70	80	90	20	90
	45	(45)																						
	50	(49.5)																						
	63	(63)																						
	68	(67.5)																						
	99	(99)																						
	122	(121.5)																						
	135	(135)																						
243	(243)																							

Note: *Allowable constant operation hours for intermittent operation condition (Consult us when exceeding or when continuously operating).

Selection Table 3 (Allowable External Rating)

PK1 Type

Table 2 External Load (SI Unit)

Frame Size	Motor Speed (r/min)		6000		5000		4000		3000		2000		1500		1000		Allowable Moment N·m
	Reduction Ratio	Exact Ratio	Radial Load *1	Axial Load *2	Radial Load *1	Axial Load *2	Radial Load *1	Axial Load *2	Radial Load *1	Axial Load *2	Radial Load *1	Axial Load *2	Radial Load *1	Axial Load *2	Radial Load *1	Axial Load *2	
			N	N	N	N	N	N	N	N	N	N	N	N	N	N	
PK110	6	(5.5)	250	485	265	515	285	555	315	615	360	705	395	775	455	885	70
	8	(7.5)	275	540	295	575	315	620	350	680	400	780	440	860	505	985	
	11	(11)	310	615	330	650	355	700	395	775	450	885	495	975	570	1115	
	15	(15)	350	680	370	725	400	780	440	860	505	985	555	1080	635	1240	
	23	(22.5)	400	780	425	830	460	890	505	980	580	1125	635	1240	730	1420	
	27	(27)	425	830	455	880	490	950	535	1045	615	1195	675	1315	775	1510	
	33	(33)	455	885	485	940	520	1015	575	1115	655	1280	725	1405	830	1610	
	45	(45)	505	985	535	1045	580	1125	635	1240	730	1420	805	1560	920	1785	
	50	(49.5)	520	1010	555	1080	595	1160	660	1275	755	1465	830	1615	950	1845	
	63	(63)	560	1100	600	1170	650	1260	715	1385	815	1590	900	1750	1030	2000	
	68	(67.5)	575	1120	615	1195	665	1290	730	1415	835	1625	920	1790	1050	2050	
	99	(99)	655	1280	700	1360	755	1465	830	1610	950	1845	1045	2030	1050	2325	
	122	(121.5)	700	1370	750	1455	805	1570	890	1725	1015	1975	1050	2175	1050	2490	
	135	(135)	725	1420	775	1510	835	1625	920	1785	1050	2045	1050	2250	1050	2580	
243	(243)	880	1725	945	1835	1015	1975	1050	2170	1050	2485	1050	2735	1050	3140		
PK120	6	(5.5)	770	1435	820	1525	880	1640	965	1805	1105	2070	1220	2275	1400	2605	300
	8	(7.5)	850	1590	905	1690	975	1820	1075	2005	1230	2295	1355	2525	1550	2890	
	11	(11)	965	1800	1025	1915	1105	2060	1220	2270	1395	2595	1535	2860	1760	3270	
	15	(15)	1075	2000	1145	2130	1230	2295	1355	2525	1550	2890	1710	3180	1955	3640	
	23	(22.5)	1220	2290	1310	2435	1410	2625	1550	2890	1780	3310	1955	3640	2240	4170	
	27	(27)	1300	2435	1390	2590	1500	2790	1645	3070	1890	3515	2080	3870	2380	4430	
	33	(33)	1400	2605	1485	2770	1600	2985	1765	3285	2020	3760	2225	4140	2545	4735	
	45	(45)	1550	2890	1650	3070	1775	3305	1955	3640	2240	4170	2465	4585	2825	4800	
	50	(49.5)	1590	2985	1705	3170	1830	3415	2015	3755	2315	4300	2545	4735	2900	4800	
	63	(63)	1720	3235	1845	3435	1985	3700	2185	4070	2505	4660	2760	4800	2900	4800	
	68	(67.5)	1760	3310	1890	3515	2030	3785	2235	4165	2565	4770	2825	4800	2900	4800	
	99	(99)	2000	3760	2145	3995	2310	4305	2540	4735	2900	4800	2900	4800	2900	4800	
	122	(121.5)	2140	4025	2300	4275	2475	4610	2720	4800	2900	4800	2900	4800	2900	4800	
	135	(135)	2220	4170	2380	4430	2565	4775	2820	4800	2900	4800	2900	4800	2900	4800	
243	(243)	2700	4800	2895	4800	2900	4800	2900	4800	2900	4800	2900	4800	2900	4800		
PK130	6	(5.5)	-	-	1095	2315	1180	2495	1300	2745	1485	3145	1635	3460	1875	3960	620
	8	(7.5)	-	-	1215	2570	1310	2765	1440	3045	1650	3485	1815	3835	2080	4390	
	11	(11)	-	-	1375	2910	1480	3135	1630	3450	1865	3945	2050	4345	2350	4975	
	15	(15)	-	-	1530	3230	1650	3480	1815	3830	2075	4380	2285	4825	2620	5520	
	23	(22.5)	-	-	1750	3705	1890	3990	2080	4390	2380	5025	2620	5530	3000	6330	
	27	(27)	-	-	1860	3935	2005	4240	2210	4665	2530	5340	2785	5880	3185	6730	
	33	(33)	-	-	1990	4200	2145	4525	2360	4980	2705	5700	2975	6270	3405	7180	
	45	(45)	-	-	2210	4655	2380	5015	2620	5520	3000	6315	3300	6955	3780	7960	
	50	(49.5)	-	-	2280	4815	2455	5170	2705	5690	3095	6535	3405	7195	3900	8240	
	63	(63)	-	-	2470	5220	2660	5620	2930	6170	3355	7080	3690	7795	4225	8925	
	68	(67.5)	-	-	2530	5340	2725	5750	3000	6310	3430	7245	3775	7975	4325	9130	
	99	(99)	-	-	2875	6070	3095	6535	3405	7170	3900	8225	4295	9060	4500	9400	
	122	(121.5)	-	-	3075	6500	3315	6995	3650	7680	4175	8800	4500	9400	4500	9400	
	135	(135)	-	-	3185	6735	3430	7250	3780	7950	4325	9100	4500	9400	4500	9400	
243	(243)	-	-	3875	8190	4175	8820	4500	9400	4500	9400	4500	9400	4500	9400		

*1: Radial load is the value applied to the middle of the output shaft (at axial load).

*2: Axial load is the value applied to the center of the output shaft (at radial load).

Multiply radial load locating factor to the value in the above table when the radial load is applied to locations other than the middle of the output shaft.

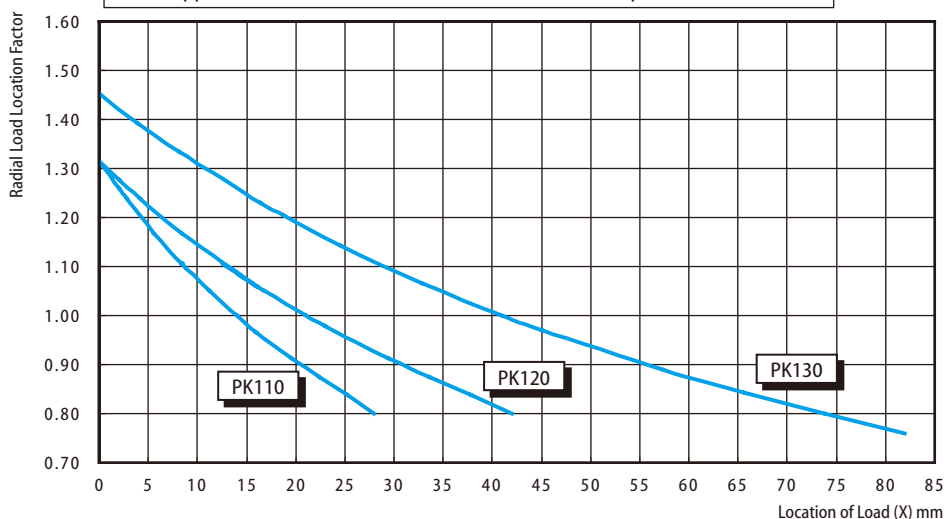


Fig. 2 Radial Load Location Factor

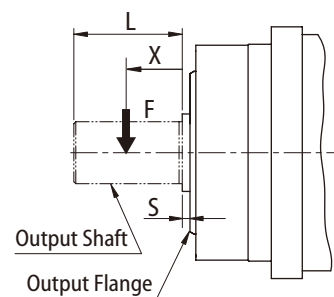
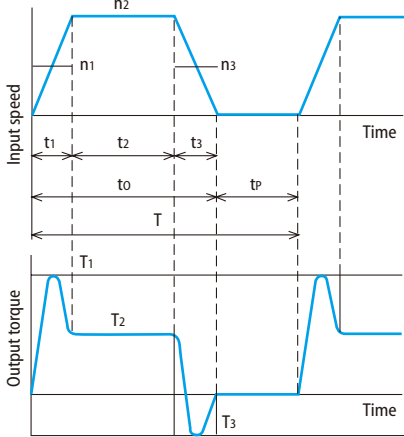


Fig. 3

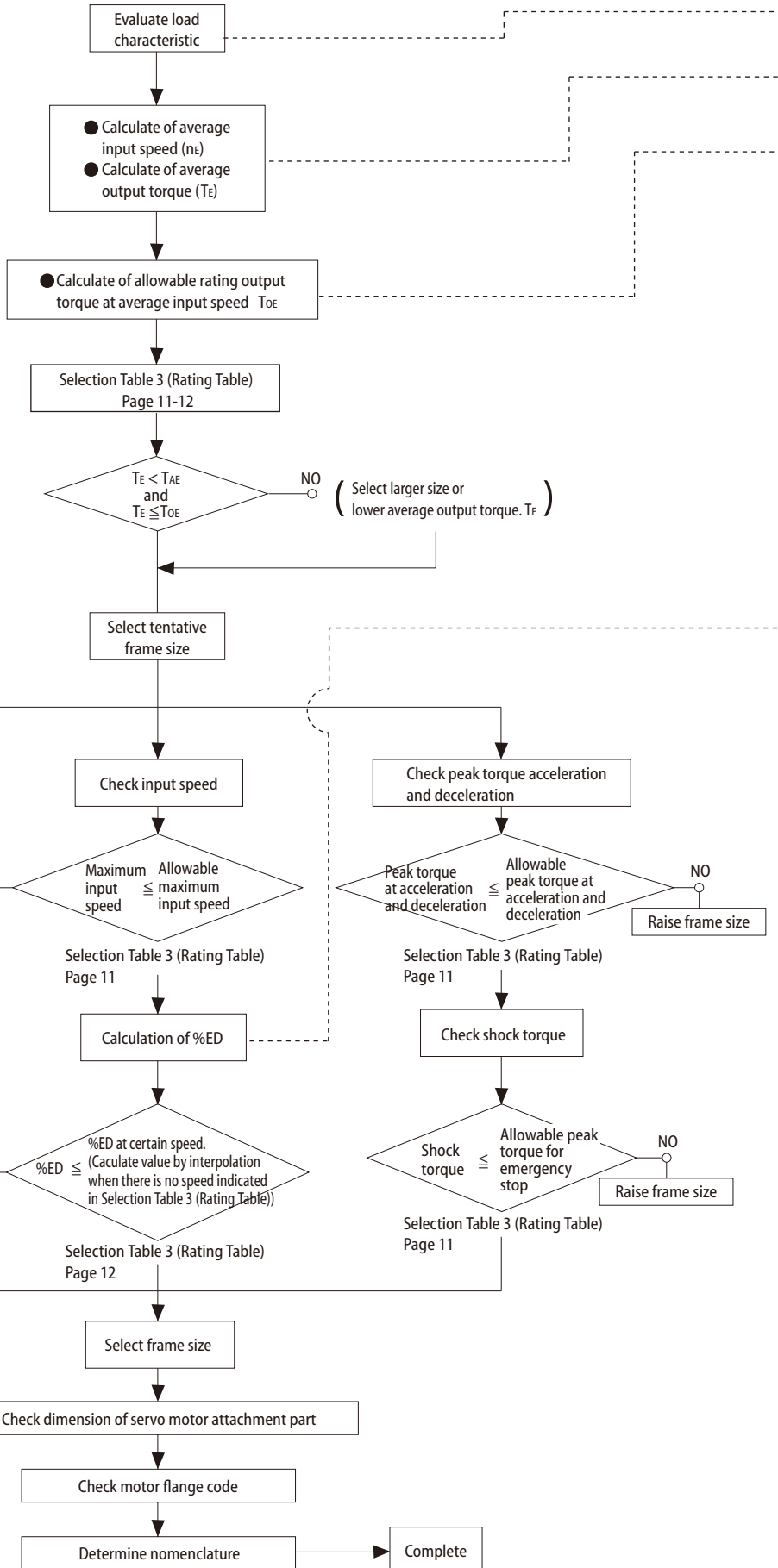
Selection Procedure

Flow Chart and Formula of Selection

Fig. 4 Load Pattern



n_1 : Average input speed at acceleration when as in Fig 4: $n_1 = \frac{n_2}{2}$ [r/min]
 n_2 : Input speed at normal operation
 n_3 : Average input speed at deceleration when as in Fig 4: $n_1 = n_3 = \frac{n_2}{2}$ [r/min]
 t_1 : Acceleration time [s]
 t_2 : Steady operation time [s]
 t_3 : Deceleration time [s]
 t_o : Operation time [s]
 t_p : Stop time [s]
 T : Operation cycle [s]
 T_1 : Starting peak torque [Nm]
 T_2 : Steady operation torque [Nm]
 T_3 : Stopping peak torque [Nm]



Selection Procedure

PK1 Type

Calculation in Load Condition of Fig. 4

- Average input speed $n_E = \frac{t_1 \cdot n_1 + t_2 \cdot n_2 + t_3 \cdot n_3 + \dots + t_n \cdot n_n}{t_o}$ Formula 1 $n = 4, 5, 6 \dots$

- Average output torque $T_E = \left(\frac{t_1 \cdot n_1 \cdot T_1^{10/3} + t_2 \cdot n_2 \cdot T_2^{10/3} + t_3 \cdot n_3 \cdot T_3^{10/3} + \dots + t_n \cdot n_n \cdot T_n^{10/3}}{t_o \cdot n_E} \right)^{0.3} \times F_{s2}$ Formula 2 $n = 4, 5, 6 \dots$
(Table 3)

- Allowable rating output torque at average input speed $T_{oE} = \left(\frac{3000}{n_E} \right)^{0.3} \times T_o$ Formula 3
 To: Rated output torque at input speed 3000 r/min
 Selection Table 3 (Rating Table)
 Page 11

- %ED $\%ED = \frac{t_o}{T} \times 100$ Formula 4

%ED Calculation at Average Input Speed

Interpolation method

$$\%ED(x) = \frac{y_i(x - x_{i+1}) - y_{i+1}(x - x_i)}{x_i - x_{i+1}}$$

%ED(x): Calculated %ED

x: Average input speed

x_i : Speed lower than the average input speed on the rating table

y_i : Allowable %ED at the above speed

x_{i+1} : Speed higher than the average input speed on the rating table

y_{i+1} : Allowable %ED at the above speed

Table 3 Fs2 Load factor

Loading condition	Fs2
Uniform load	1
Moderate shock	1-1.2
Heavy shock	1.4-1.6

Example of Selection

Evaluate ANFX-PK120F-7ZLD-15 for following specification.

- | | |
|--|----------------------------------|
| Specification: T_A : Acceleration peak torque 100 Nm | t_A : Acceleration time 0.2s |
| T_R : Normal running torque 30 Nm | t_R : Normal running time 5.0s |
| T_B : Peak torque at breaking 80 Nm | t_B : Deceleration time 0.2s |
| Shock torque: 200 Nm | t_P : Total running time 3.0s |
| (700 times during overall lifetime) | t_o : Standstill time 5.4s |
| n_A : Average input speed during acceleration 1500 r/min | T : Single cycle time 8.4s |
| n_R : Input speed with normal running 3000 r/min | |
| n_B : Average input speed during deceleration 1500 r/min | |

Application is assumed to have almost no load.

Calculation: Average input speed $n_E = \frac{0.2 \times 1500 + 5.0 \times 3000 + 0.2 \times 1500}{5.4} = 2889$ [r/min]

Average output torque $T_E = \left(\frac{0.2 \times 1500 \times 100^{10/3} + 5.0 \times 3000 \times 30^{10/3} + 0.2 \times 1500 \times 80^{10/3}}{5.4 \times 2889} \right)^{0.3} \times 1 = 39.6$ [Nm]

- Allowable rating output torque at average input speed $T_{oE} = 57.5 \geq 39.6 \rightarrow$ Select ANFX-PK120F-7ZLD-15 temporarily.

- Check Average output torque $39.6 < 57.5 \dots$ OK

- Calculate %ED $\%ED = \frac{5.4}{8.4} \times 100 = 64.3\%$

- Check Average output torque 10 [min] = 600 [s] > 5.4 [s]OK

$$\frac{80(2889 - 3000) - 70(2889 - 2000)}{2000 - 3000} = 71$$

$71\% > 64.3\% \dots$ OK

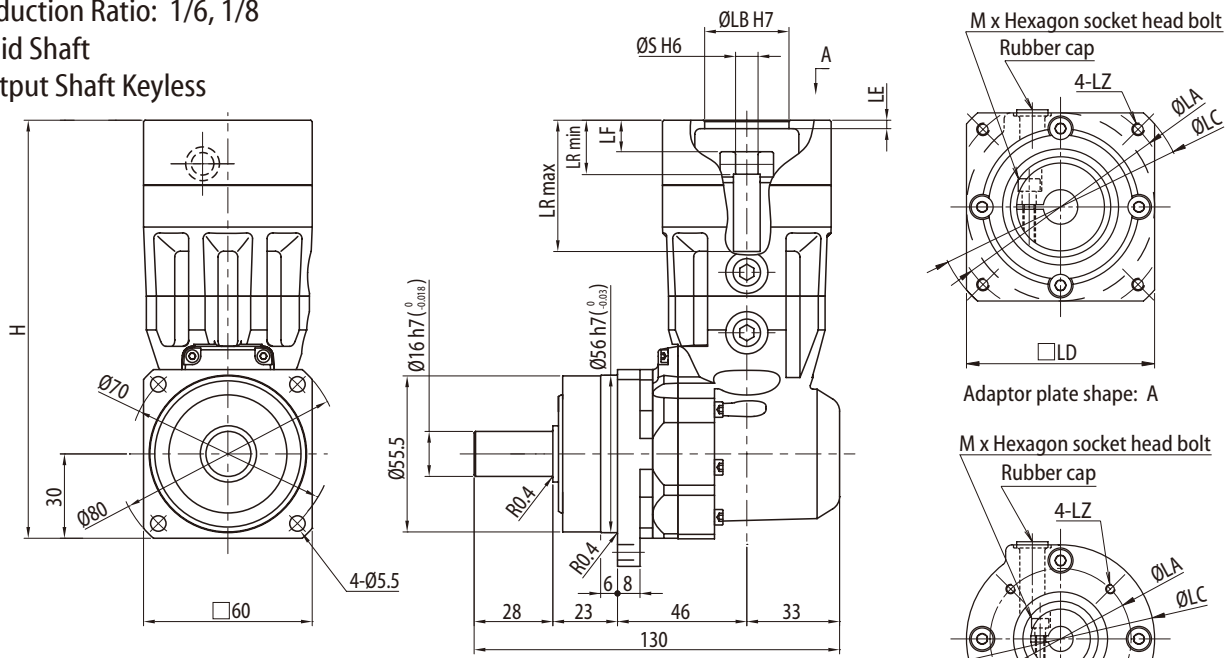
- Evaluate maximum input speed 3000 [r/min] < 6000 [r/min]
- Evaluate peak torque at acceleration and deceleration 100 [Nm] < 145 [Nm]
- Evaluate shock torque 200 [Nm] < 240 [Nm] (1000 times during entire lifetime)

Selection Table 3
(Rating Table)
Page 11

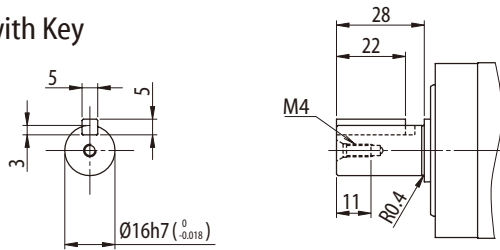
ANFX-PK120F-7ZLD-15 is selected by the process above.

Dimension Drawings

Frame Size: PK110
 Reduction Ratio: 1/6, 1/8
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key

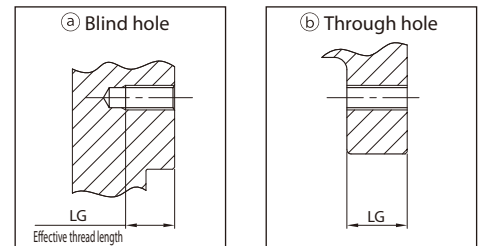


Nomenclature ANFX-PK110

Keyless: N
 With key: W

Output shaft type - Motor flange code - Backlash - Reduction ratio (6, 8)

6 min: LB
 15 min: LD



Detail of thread hole shape for motor attachment

Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
2C	45	30	60	-	5	11	7	(a) Blind hole	B	M3	46.5	19	8	M3	149	1.95	2C
7J	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	6	M3	149	1.95	7J
2D	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	8	M3	149	1.95	2D
2E	60	50	80	60	4	8.5	8	(a) Blind hole	A	M4	44	16.5	8	M3	146.5	1.94	2E
2K	60	50	80	60	4	6	8	(a) Blind hole		M4	44	16.5	11	M4	146.5	1.98	2K
2F	70	50	80	60	4	8.5	10	(b) Through hole		M4	44	16.5	8	M3	146.5	1.94	2F
2L	70	50	80	60	4	6	10	(b) Through hole		M4	44	16.5	11	M4	146.5	1.98	2L
2P	70	50	80	60	4	6	10	(b) Through hole		M4	44	16.5	14	M4	146.5	1.96	2P
2G	70	50	80	60	4	8.5	10	(b) Through hole		M5	44	16.5	8	M3	146.5	1.94	2G
2H	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	9	M4	146.5	1.98	2H
2R	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	14	M4	146.5	1.96	2R
8A	90	70	105	80	6	7.5	12	(b) Through hole	M5	45.5	18	11	M4	148	2.08	8A	
8B	90	70	105	80	6	7.5	12	(b) Through hole	M5	45.5	18	14	M4	148	2.06	8B	
2T	90	70	105	80	6	7.5	12	(b) Through hole	M6	45.5	18	14	M4	148	2.06	2T	
2J	100	80	120	90	5	13	12	(b) Through hole	M6	51	23.5	10	M4	153.5	2.21	2J	
8E	100	80	120	90	6	9.5	12	(b) Through hole	M6	41	22	16	M5	170	2.41	8E	

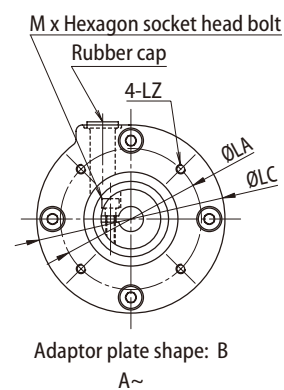
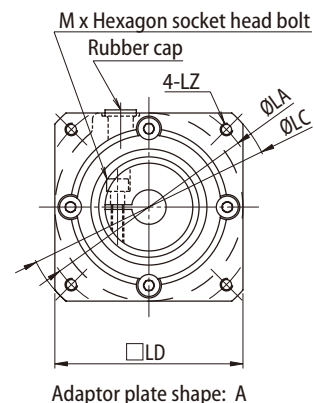
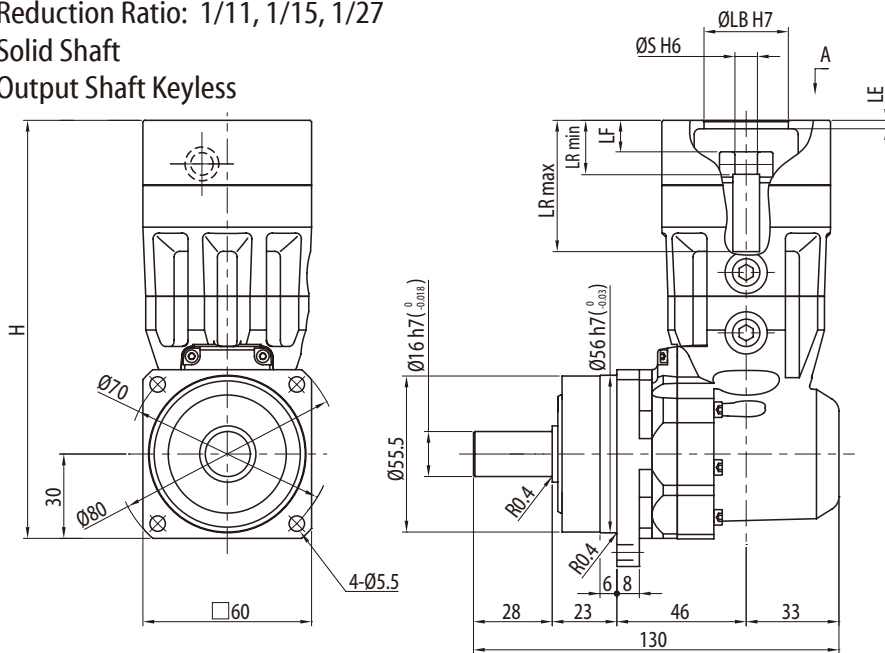
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

Note 2: Dimensions and mass shown in the above figures are subject to change without prior notification.

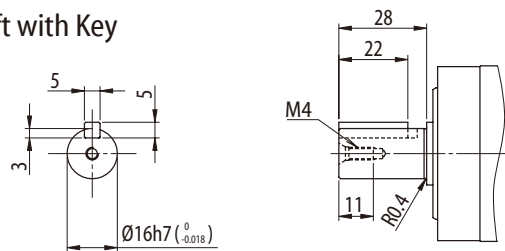
Dimension Drawings

PK1 Type

Frame Size: PK110
 Reduction Ratio: 1/11, 1/15, 1/27
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key

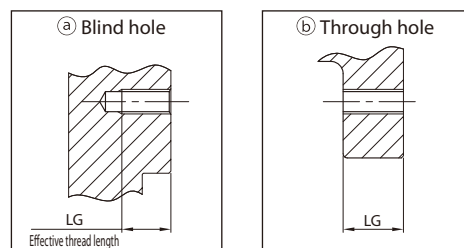


Nomenclature ANFX-PK110

Output shaft type - Motor flange code Backlash — Reduction ratio (11, 15, 27)

Keyless: N
With key: W

6 min: LB
15 min: LD



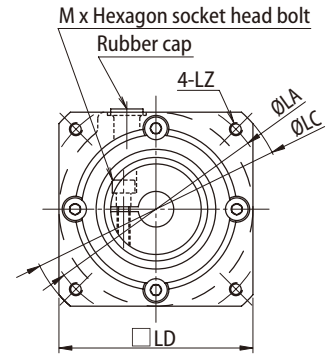
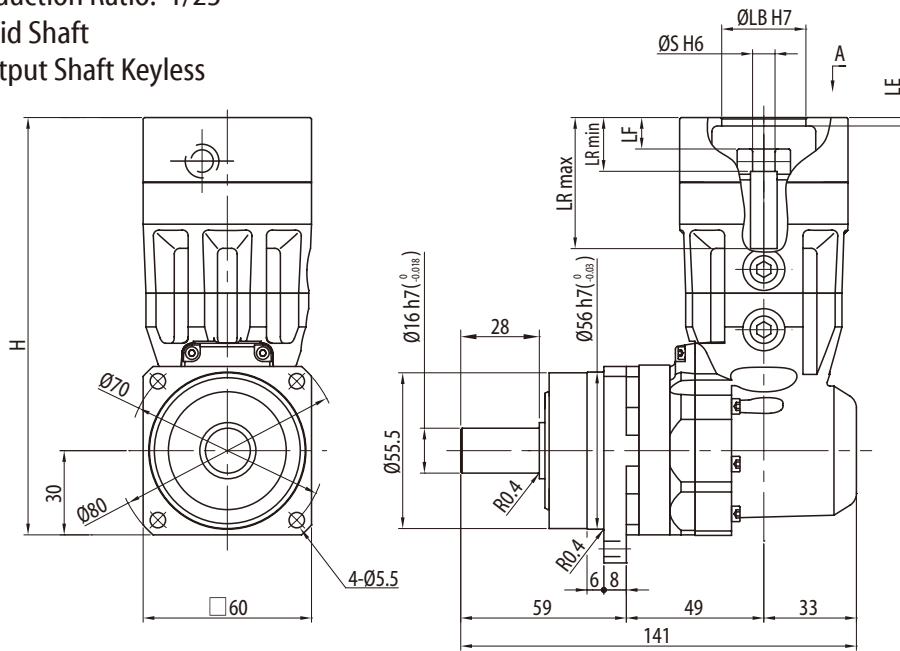
Detail of thread hole shape for motor attachment

Motor flange code	Dimension								Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG	Thread hole Shape for motor attachment			max	min					
2C	45	30	60	-	5	11	7	Ⓐ Blind hole	B	M3	46.5	19	8	M3	149	1.95	2C
7J	46	30	60	-	5	11	9	Ⓐ Blind hole		M4	46.5	19	6	M3	149	1.95	7J
2D	46	30	60	-	5	11	9	Ⓐ Blind hole		M4	46.5	19	8	M3	149	1.95	2D
2E	60	50	80	60	4	8.5	8	Ⓐ Blind hole	A	M4	44	16.5	8	M3	146.5	1.94	2E
2K	60	50	80	60	4	6	8	Ⓐ Blind hole		M4	44	16.5	11	M4	146.5	1.98	2K
2F	70	50	80	60	4	8.5	10	Ⓑ Through hole		M4	44	16.5	8	M3	146.5	1.94	2F
2L	70	50	80	60	4	6	10	Ⓑ Through hole		M4	44	16.5	11	M4	146.5	1.98	2L
2G	70	50	80	60	4	8.5	10	Ⓑ Through hole		M5	44	16.5	8	M3	146.5	1.94	2G
2H	70	50	80	60	4	6	10	Ⓑ Through hole		M5	44	16.5	9	M4	146.5	1.98	2H
2R	70	50	80	60	4	6	10	Ⓑ Through hole		M5	44	16.5	14	M4	146.5	1.96	2R
8A	90	70	105	80	6	7.5	12	Ⓑ Through hole		M5	45.5	18	11	M4	148	2.08	8A
8B	90	70	105	80	6	7.5	12	Ⓑ Through hole		M5	45.5	18	14	M4	148	2.06	8B
2T	90	70	105	80	6	7.5	12	Ⓑ Through hole		M6	45.5	18	14	M4	148	2.06	2T
2J	100	80	120	90	5	13	12	Ⓑ Through hole		M6	51	23.5	10	M4	153.5	2.21	2J
8E	100	80	120	90	6	9.5	12	Ⓑ Through hole		M6	41	22	16	M5	170	2.41	8E

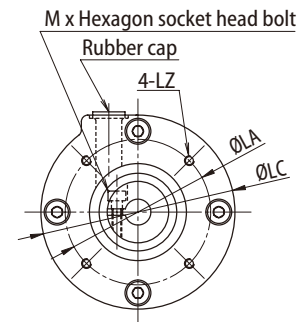
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."
 2: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK110
 Reduction Ratio: 1/23
 Solid Shaft
 Output Shaft Keyless

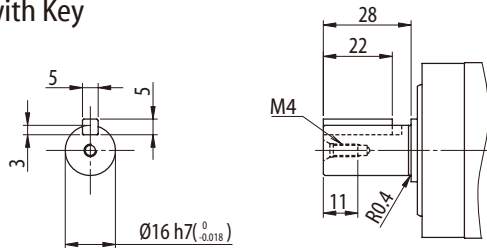


Adaptor plate shape: A



Adaptor plate shape: B
A~

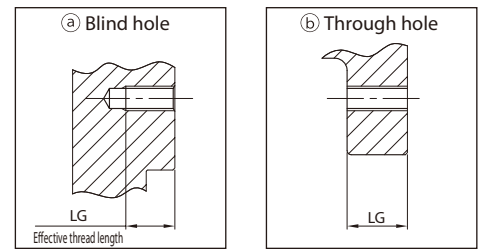
Output Shaft with Key



Keyless: N
 With key: W

Nomenclature ANFX-PK110 Output shaft type Motor flange code Backlash Reduction ratio (23)

6 min: LB
 15 min: LD



Detail of thread hole shape for motor attachment

Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
2C	45	30	60	-	5	11	7	ⓐ Blind hole	B	M3	46.5	19	8	M3	149	1.95	2C
7J	46	30	60	-	5	11	9	ⓐ Blind hole		M4	46.5	19	6	M3	149	1.95	7J
2D	46	30	60	-	5	11	9	ⓐ Blind hole		M4	46.5	19	8	M3	149	1.95	2D
2E	60	50	80	60	4	8.5	9	ⓐ Blind hole	A	M4	44	16.5	8	M3	146.5	1.94	2E
2K	60	50	80	60	4	6	9	ⓐ Blind hole		M4	44	16.5	11	M4	146.5	1.98	2K
2F	70	50	80	60	4	8.5	10	ⓑ Through hole		M4	44	16.5	8	M3	146.5	1.94	2F
2L	70	50	80	60	4	6	10	ⓑ Through hole		M4	44	16.5	11	M4	146.5	1.98	2L
2G	70	50	80	60	4	8.5	10	ⓑ Through hole		M5	44	16.5	8	M3	146.5	1.94	2G
2H	70	50	80	60	4	6	10	ⓑ Through hole		M5	44	16.5	9	M4	146.5	1.98	2H
2R	70	50	80	60	4	6	10	ⓑ Through hole		M5	44	16.5	14	M4	146.5	1.96	2R
8A	90	70	105	80	6	7.5	12	ⓑ Through hole		M5	45.5	18	11	M4	148	2.08	8A
8B	90	70	105	80	6	7.5	12	ⓑ Through hole		M5	45.5	18	14	M4	148	2.06	8B
2T	90	70	105	80	6	7.5	12	ⓑ Through hole		M6	45.5	18	14	M4	148	2.06	2T

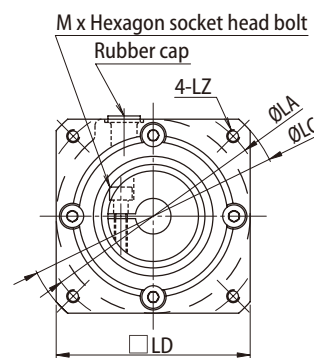
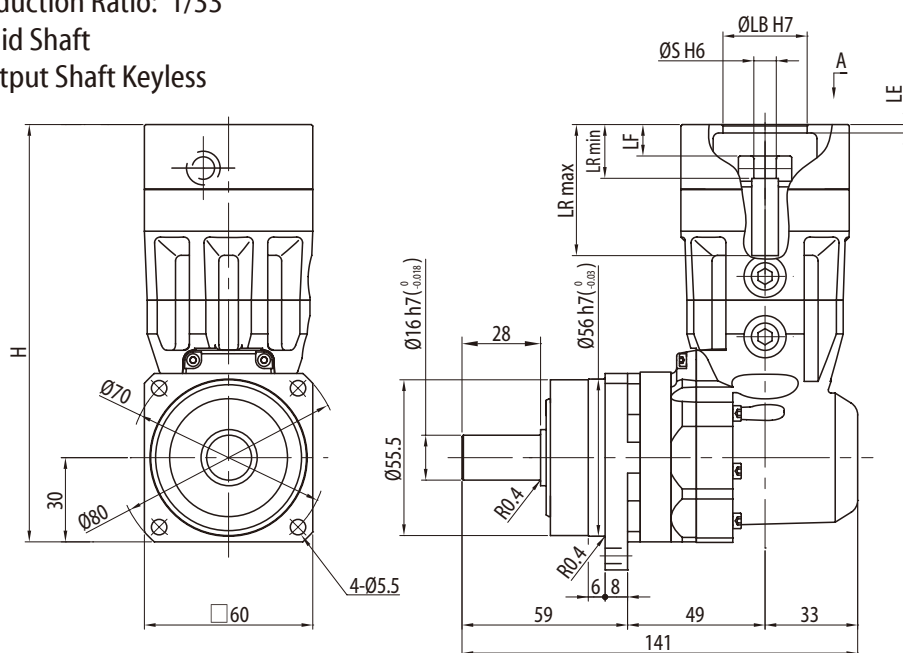
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

Note 2: Dimensions and mass shown in the above figures are subject to change without prior notification.

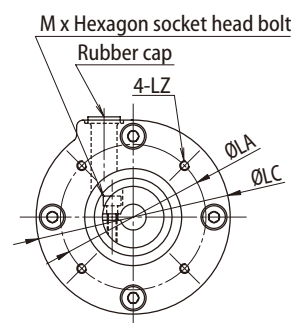
Dimension Drawings

PK1 Type

Frame Size: PK110
 Reduction Ratio: 1/33
 Solid Shaft
 Output Shaft Keyless

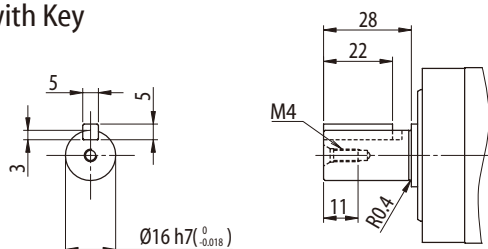


Adaptor plate shape: A



Adaptor plate shape: B
A~

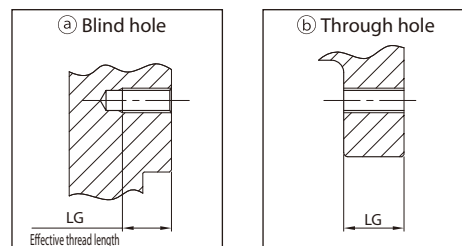
Output Shaft with Key



Keyless: N
 With key: W

Nomenclature ANFX-PK110 Output shaft type Motor flange code Backlash Reduction ratio (33)

6 min: LB
 15 min: LD



Detail of thread hole shape for motor attachment

Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
2C	45	30	60	-	5	11	7	(a) Blind hole	B	M3	46.5	19	8	M3	149	1.95	2C
7J	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	6	M3	149	1.95	7J
2D	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	8	M3	149	1.95	2D
2E	60	50	80	60	4	8.5	9	(a) Blind hole	A	M4	44	16.5	8	M3	146.5	1.94	2E
2K	60	50	80	60	4	6	9	(a) Blind hole		M4	44	16.5	11	M4	146.5	1.98	2K
2F	70	50	80	60	4	8.5	10	(b) Through hole		M4	44	16.5	8	M3	146.5	1.94	2F
2L	70	50	80	60	4	6	10	(b) Through hole		M4	44	16.5	11	M4	146.5	1.98	2L
2G	70	50	80	60	4	8.5	10	(b) Through hole		M5	44	16.5	8	M3	146.5	1.94	2G
2H	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	9	M4	146.5	1.98	2H
2R	70	50	80	60	4	6	10	(b) Through hole		M5	45.5	16.5	14	M4	146.5	1.96	2R
8A	90	70	105	80	6	7.5	12	(b) Through hole		M5	45.5	18	11	M4	148	2.08	8A
2T	90	70	105	80	6	7.5	12	(b) Through hole		M6	45.5	18	14	M4	148	2.06	2T

Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."
 2: Dimensions and mass shown in the above figures are subject to change without prior notification.

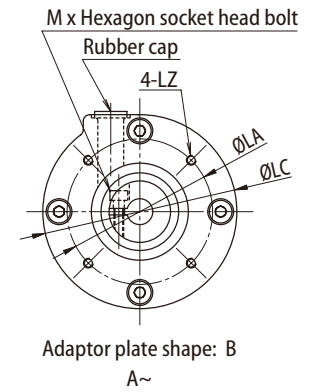
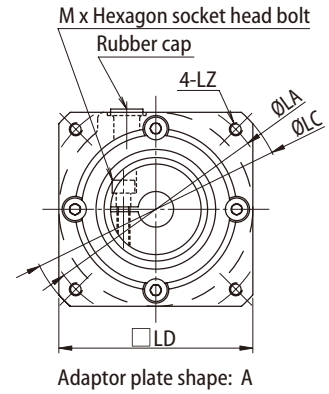
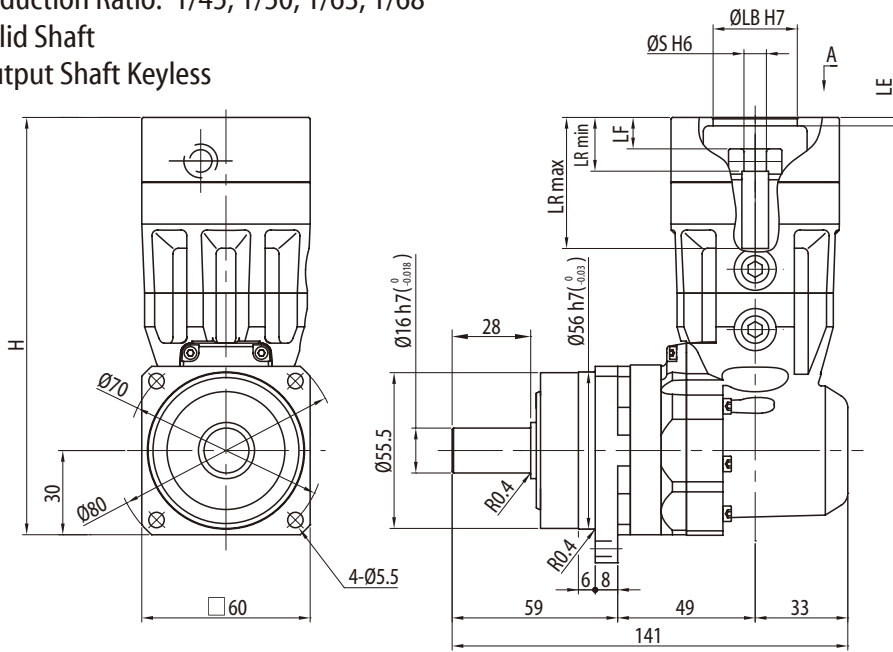
Dimension Drawings

Frame Size: PK110

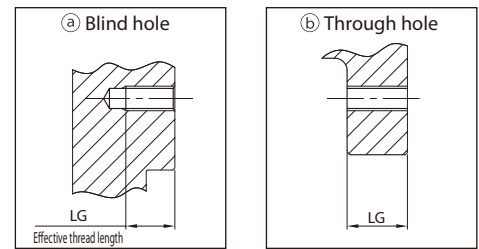
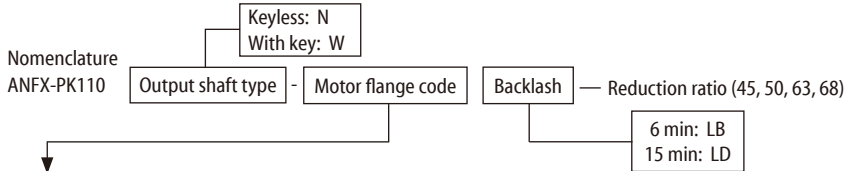
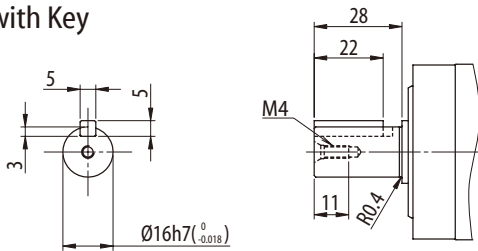
Reduction Ratio: 1/45, 1/50, 1/63, 1/68

Solid Shaft

Output Shaft Keyless



Output Shaft with Key



Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
2C	45	30	60	-	5	11	7	Ⓐ Blind hole	B	M3	46.5	19	8	M3	149	2.20	2C
7J	46	30	60	-	5	11	9	Ⓐ Blind hole		M4	46.5	19	6	M3	149	2.20	7J
2D	46	30	60	-	5	11	9	Ⓐ Blind hole		M4	46.5	19	8	M3	149	2.20	2D
2E	60	50	80	60	4	8.5	9	Ⓐ Blind hole	A	M4	44	16.5	8	M3	146.5	2.19	2E
2F	70	50	80	60	4	8.5	10	Ⓑ Through hole		M4	44	16.5	8	M3	146.5	2.19	2F
2G	70	50	80	60	4	8.5	10	Ⓑ Through hole		M5	44	16.5	8	M3	146.5	2.19	2G
2H	70	50	80	60	4	6	10	Ⓑ Through hole		M5	44	16.5	9	M4	146.5	2.23	2H
2R	70	50	80	60	4	6	10	Ⓑ Through hole		M5	44	16.5	14	M4	146.5	1.96	2R
2T	90	70	105	80	6	7.5	12	Ⓑ Through hole		M6	45.5	18	14	M4	148	2.06	2T

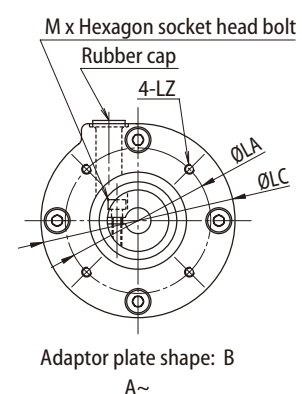
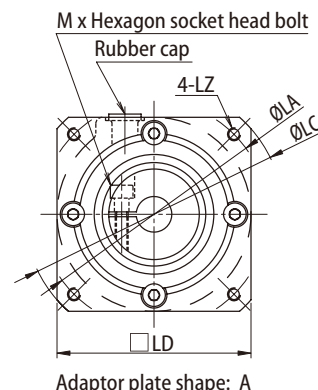
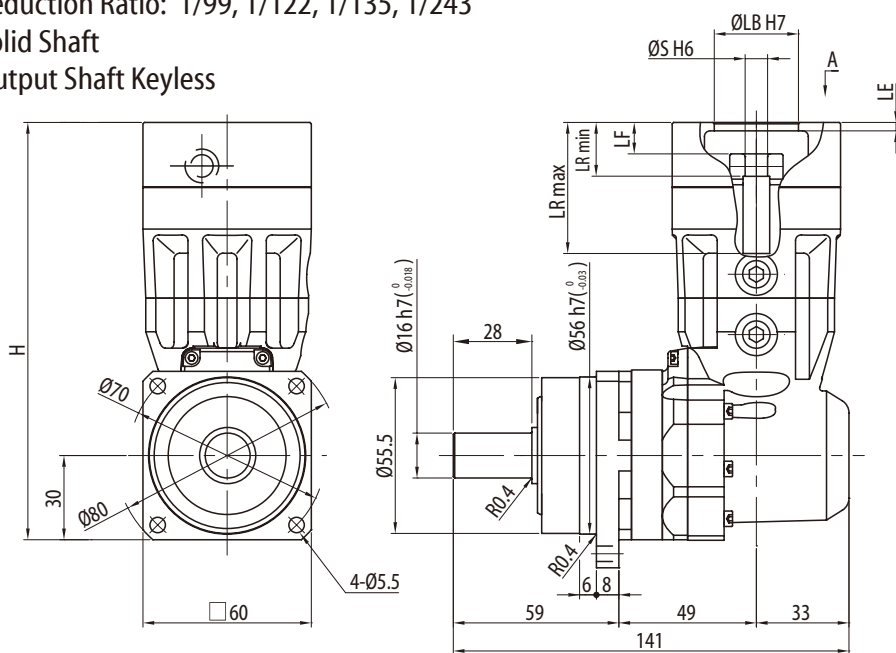
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

Note 2: Dimensions and mass shown in the above figures are subject to change without prior notification.

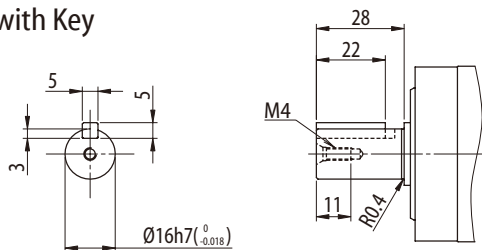
Dimension Drawings

PK1 Type

Frame Size: PK110
 Reduction Ratio: 1/99, 1/122, 1/135, 1/243
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key



Nomenclature ANFX-PK110

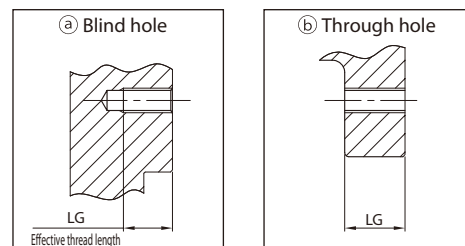
Output shaft type: Keyless: N, With key: W

Motor flange code

Backlash

Reduction ratio (99, 122, 135, 243)

6 min: LB, 15 min: LD

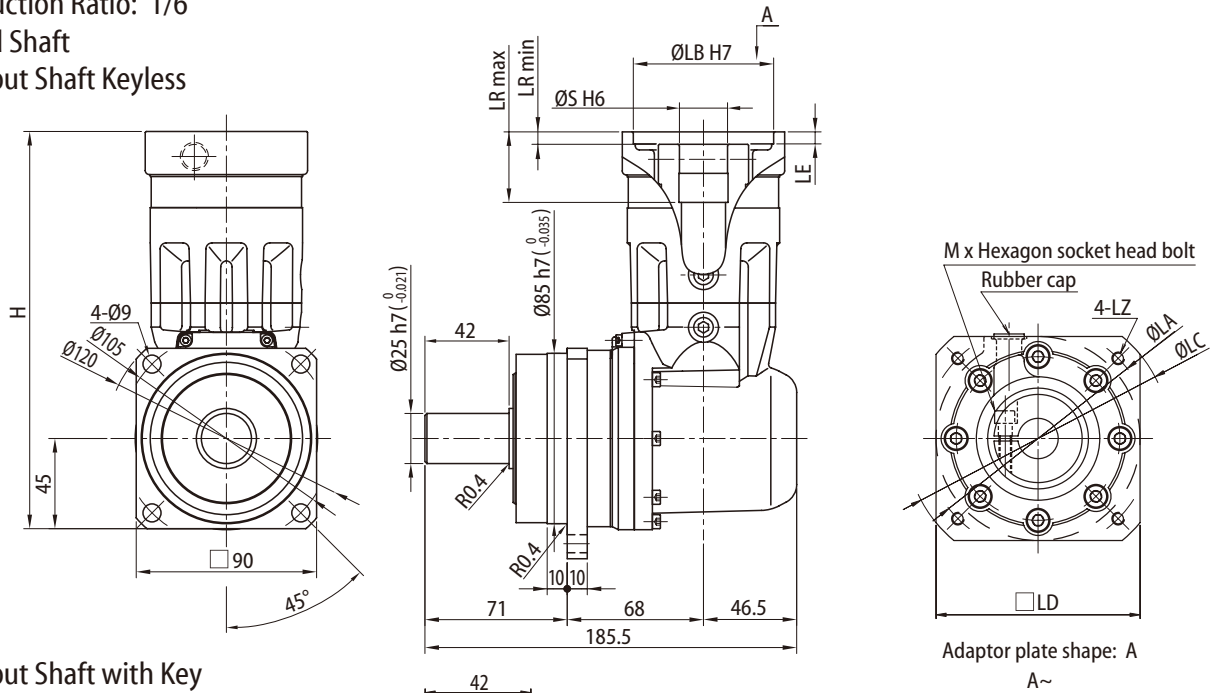


Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
2C	45	30	60	-	5	11	7	(a) Blind hole	B	M3	46.5	19	8	M3	149	2.20	2C
7J	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	6	M3	149	2.20	7J
2D	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	8	M3	149	2.20	2D
2E	60	50	80	60	4	8.5	9	(a) Blind hole	A	M4	44	16.5	8	M3	146.5	2.19	2E
2H	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	9	M4	146.5	2.23	2H
2R	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	14	M4	146.5	1.96	2R
2T	90	70	105	80	6	7.5	12	(b) Through hole		M6	45.5	18	14	M4	148	2.06	2T

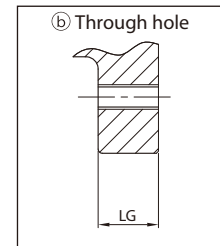
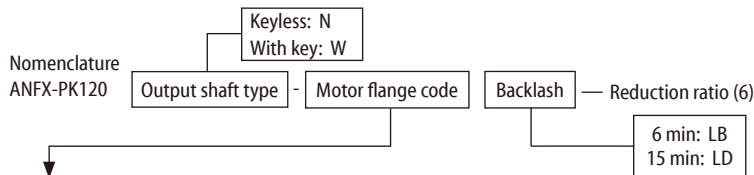
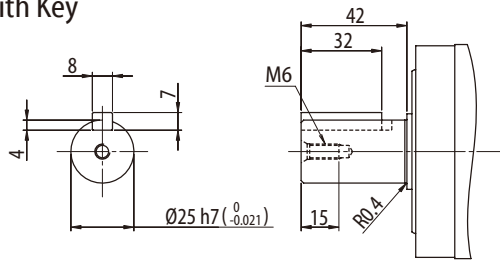
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."
 2: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK120
 Reduction Ratio: 1/6
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key



Detail of thread hole shape for motor attachment

Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
0U	90	70	105	81	6	6	12	(b) Through hole	A	M5	50	18.5	16	M5	183	5.0	0U
7S	90	70	105	81	6	6	12	(b) Through hole		M5	50	18.5	19	M5	183	5.0	7S
7P	90	70	105	81	6	6	12	(b) Through hole		M6	50	18.5	16	M5	183	5.0	7P
1G	90	70	105	81	6	6	12	(b) Through hole		M6	50	18.5	19	M5	183	5.0	1G
0V ^{*2}	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	14	M4	196.5	5.1	0V ^{*2}
8E	100	80	120	90	5	19.5	12	(b) Through hole		M6	63.5	32	16	M5	196.5	5.1	8E
7V	100	80	120	90	5	19.5	12	(b) Through hole		M6	63.5	32	19	M5	196.5	5.1	7V
1L	115	95	135	100	6	17	16	(b) Through hole		M6	46	31.5	24	M6	209.5	5.5	1L
7A	115	95	135	100	6	19.5	16	(b) Through hole		M8	63.5	32	16	M5	196.5	5.2	7A
7B	115	95	135	100	6	19.5	16	(b) Through hole		M8	63.5	32	19	M5	196.5	5.2	7B
0W	115	95	135	100	6	17	16	(b) Through hole		M8	46	31.5	22	M6	209.5	5.5	0W
7Y	115	95	135	100	6	17	16	(b) Through hole		M8	46	31.5	24	M6	209.5	5.5	7Y
0Y	135	110	165	120	7	17	16	(b) Through hole		M8	46	31.5	22	M6	209.5	5.6	0Y
7R	145	110	165	120	7	22.5	16	(b) Through hole		M8	66.5	35	16	M5	199.5	5.4	7R
7X	145	110	165	120	7	22.5	16	(b) Through hole		M8	66.5	35	19	M5	199.5	5.3	7X
1S	145	110	165	120	7	42	16	(b) Through hole		M8	71	56.5	22	M6	234.5	5.8	1S
7Z	145	110	165	120	7	42	16	(b) Through hole	M8	71	56.5	24	M6	234.5	5.8	7Z	

Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

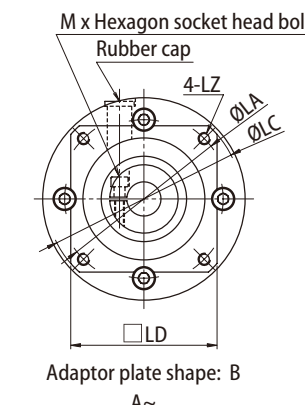
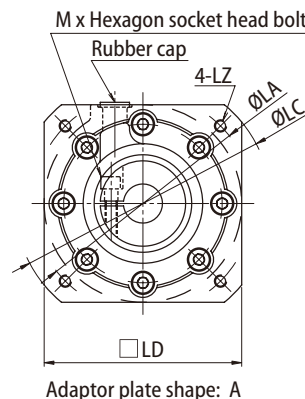
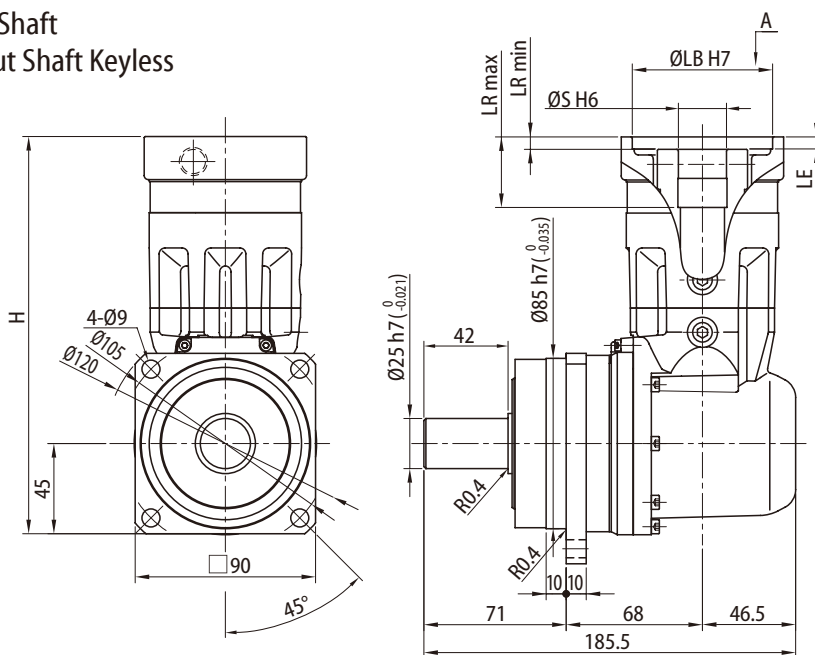
2: Dimension of coupling of motor flange code (0V) includes tolerance (+0.012 ~ +0.023)

3: Dimensions and mass shown in the above figures are subject to change without prior notification.

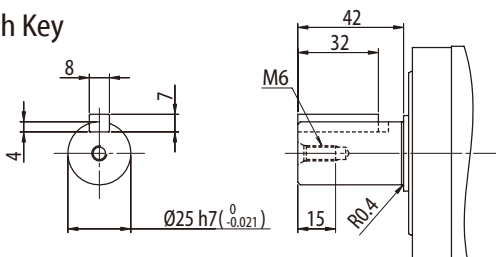
Dimension Drawings

PK1 Type

Frame Size: PK120
 Reduction Ratio: 1/8
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key

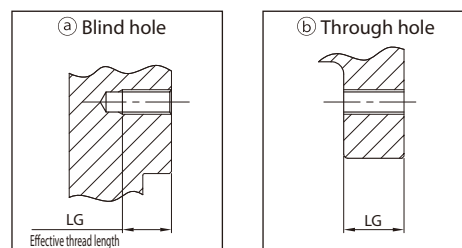


Nomenclature ANFX-PK120

Output shaft type - Motor flange code - Backlash - Reduction ratio (8)

Keyless: N
 With key: W

6 min: LB
 15 min: LD



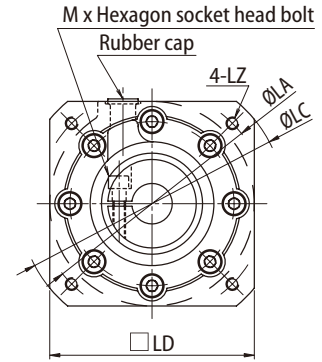
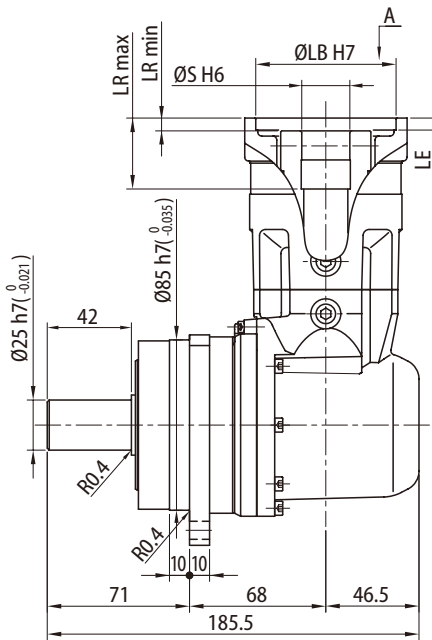
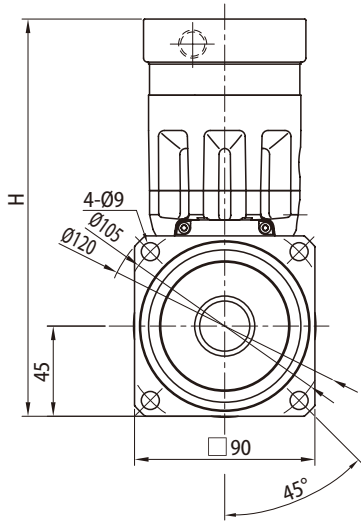
Detail of thread hole shape for motor attachment

Motor flange code	Dimension								Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG	max				min						
2R	70	50	80	60	6	6	11	Ⓐ Blind hole	B	M5	48	16.5	14	M4	181	5.0	2R	
0U	90	70	105	81	6	6	12	Ⓑ Through hole		M5	50	18.5	16	M5	183	5.0	0U	
7S	90	70	105	81	6	6	12	Ⓑ Through hole		M5	50	18.5	19	M5	183	5.0	7S	
7P	90	70	105	81	6	6	12	Ⓑ Through hole		M6	50	18.5	16	M5	183	5.0	7P	
1G	90	70	105	81	6	6	12	Ⓑ Through hole		M6	50	18.5	19	M5	183	5.0	1G	
2J	100	80	120	90	5	21.5	12	Ⓑ Through hole		M6	63.5	32	10	M4	196.5	5.1	2J	
0V ^{*2}	100	80	120	90	5	21.5	12	Ⓑ Through hole		M6	63.5	32	14	M4	196.5	5.1	0V ^{*2}	
8E	100	80	120	90	5	19.5	12	Ⓑ Through hole		M6	63.5	32	16	M5	196.5	5.1	8E	
7V	100	80	120	90	5	19.5	12	Ⓑ Through hole		M6	63.5	32	19	M5	196.5	5.1	7V	
1L	115	95	135	100	6	17	16	Ⓑ Through hole		A	M6	46	31.5	24	M6	209.5	5.5	1L
7A	115	95	135	100	6	19.5	16	Ⓑ Through hole			M8	63.5	32	16	M5	196.5	5.2	7A
7B	115	95	135	100	6	19.5	16	Ⓑ Through hole			M8	63.5	32	19	M5	196.5	5.2	7B
0W	115	95	135	100	6	17	16	Ⓑ Through hole			M8	46	31.5	22	M6	209.5	5.5	0W
7Y	115	95	135	100	6	17	16	Ⓑ Through hole			M8	46	31.5	24	M6	209.5	5.5	7Y
0Y	135	110	165	120	7	17	16	Ⓑ Through hole			M8	46	31.5	22	M6	209.5	5.6	0Y
7R	145	110	165	120	7	22.5	16	Ⓑ Through hole	M8		66.5	35	16	M5	199.5	5.4	7R	
7X	145	110	165	120	7	22.5	16	Ⓑ Through hole	M8		66.5	35	19	M5	199.5	5.3	7X	
1S	145	110	165	120	7	42	16	Ⓑ Through hole	M8		71	56.5	22	M6	234.5	5.8	1S	
7Z	145	110	165	120	7	42	16	Ⓑ Through hole	M8		71	56.5	24	M6	234.5	5.8	7Z	

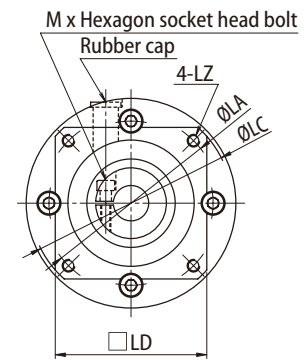
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."
 2: Dimension of coupling of motor flange code (0V) includes tolerance (+0.012 ~ +0.023)
 3: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK120
 Reduction Ratio: 1/11, 1/15
 Solid Shaft
 Output Shaft Keyless



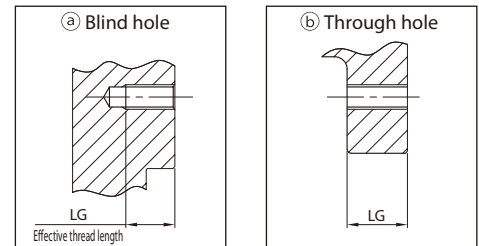
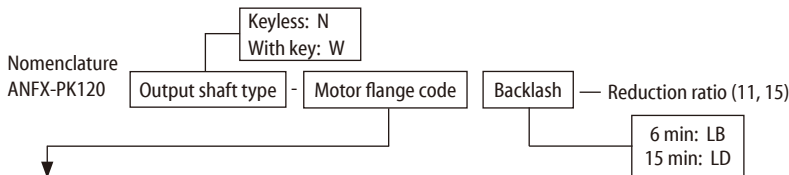
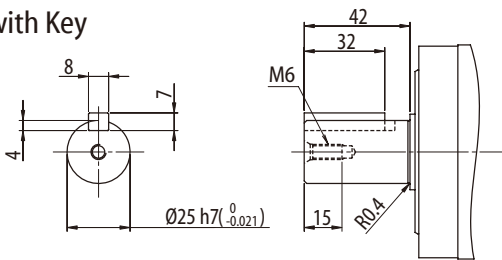
Adaptor plate shape: A



Adaptor plate shape: B

A~

Output Shaft with Key



Detail of thread hole shape for motor attachment

Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
2P	70	50	80	60	6	6	9	ⓐ Blind hole	B	M4	48	16.5	14	M4	181	5.0	2P
2R	70	50	80	60	6	6	11	ⓐ Blind hole		M5	48	16.5	14	M4	181	5.0	2R
8B	90	70	105	81	6	8	12	ⓑ Through hole	A	M5	50	18.5	14	M4	183	5.0	8B
0U	90	70	105	81	6	6	12	ⓑ Through hole		M5	50	18.5	16	M5	183	5.0	0U
7S	90	70	105	81	6	6	12	ⓑ Through hole		M5	50	18.5	19	M5	183	5.0	7S
2T	90	70	105	81	6	8	12	ⓑ Through hole		M6	50	18.5	14	M4	183	5.0	2T
7P	90	70	105	81	6	6	12	ⓑ Through hole		M6	50	18.5	16	M5	183	5.0	7P
1G	90	70	105	81	6	6	12	ⓑ Through hole		M6	50	18.5	19	M5	183	5.0	1G
2J	100	80	120	90	5	21.5	12	ⓑ Through hole		M6	63.5	32	10	M4	196.5	5.1	2J
0V*2	100	80	120	90	5	21.5	12	ⓑ Through hole		M6	63.5	32	14	M4	196.5	5.1	0V*2
8E	100	80	120	90	5	19.5	12	ⓑ Through hole		M6	63.5	32	16	M5	196.5	5.1	8E
7V	100	80	120	90	5	19.5	12	ⓑ Through hole		M6	63.5	32	19	M5	196.5	5.1	7V
1L	115	95	135	100	6	17	16	ⓑ Through hole	M6	46	31.5	24	M6	209.5	5.5	1L	
7A	115	95	135	100	6	19.5	16	ⓑ Through hole	M8	63.5	32	16	M5	196.5	5.2	7A	
0W	115	95	135	100	6	17	16	ⓑ Through hole	M8	46	31.5	22	M6	209.5	5.5	0W	
7Y	115	95	135	100	6	17	16	ⓑ Through hole	M8	46	31.5	24	M6	209.5	5.5	7Y	
0Y	135	110	165	120	7	17	16	ⓑ Through hole	M8	46	31.5	22	M6	209.5	5.6	0Y	
7R	145	110	165	120	7	22.5	16	ⓑ Through hole	M8	66.5	35	16	M5	199.5	5.4	7R	
7X	145	110	165	120	7	22.5	16	ⓑ Through hole	M8	66.5	35	19	M5	199.5	5.3	7X	
7Z	145	110	165	120	7	42	16	ⓑ Through hole	M8	71	56.5	24	M6	234.5	5.8	7Z	

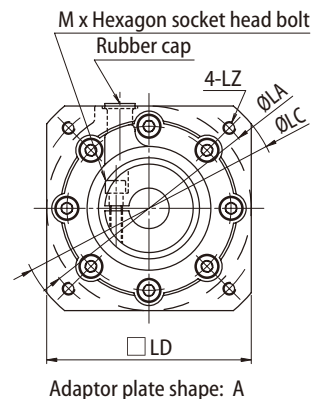
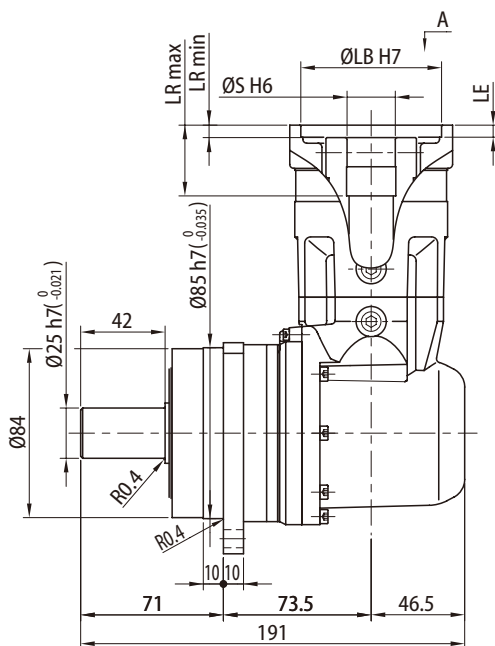
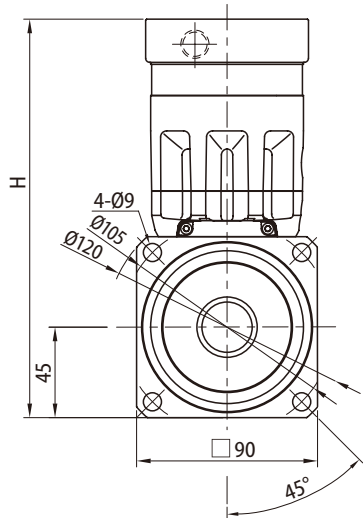
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

2: Dimension of coupling of motor flange code (0V) includes tolerance (+0.012 ~ +0.023)

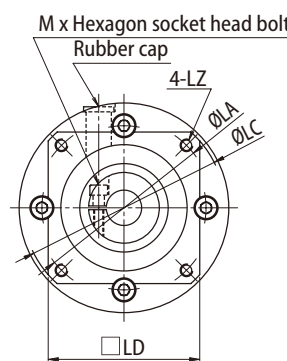
3: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK120
 Reduction Ratio: 1/23
 Solid Shaft
 Output Shaft Keyless



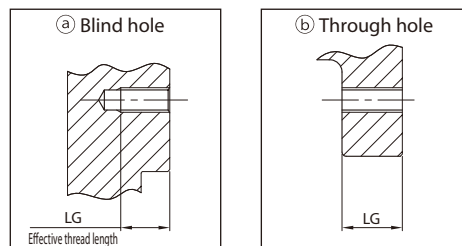
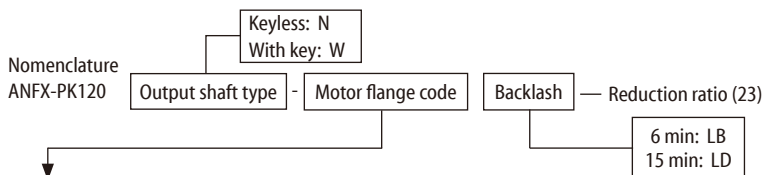
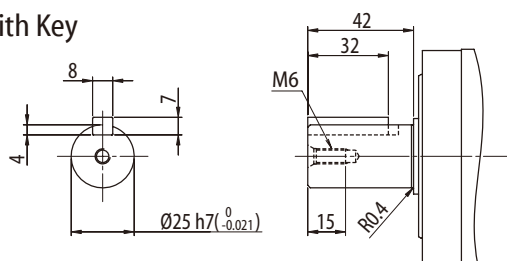
Adaptor plate shape: A



Adaptor plate shape: B

A~

Output Shaft with Key



Detail of thread hole shape for motor attachment

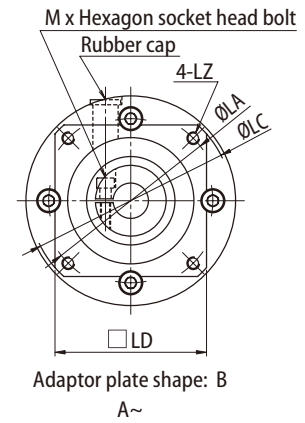
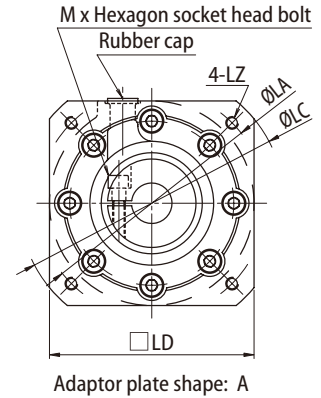
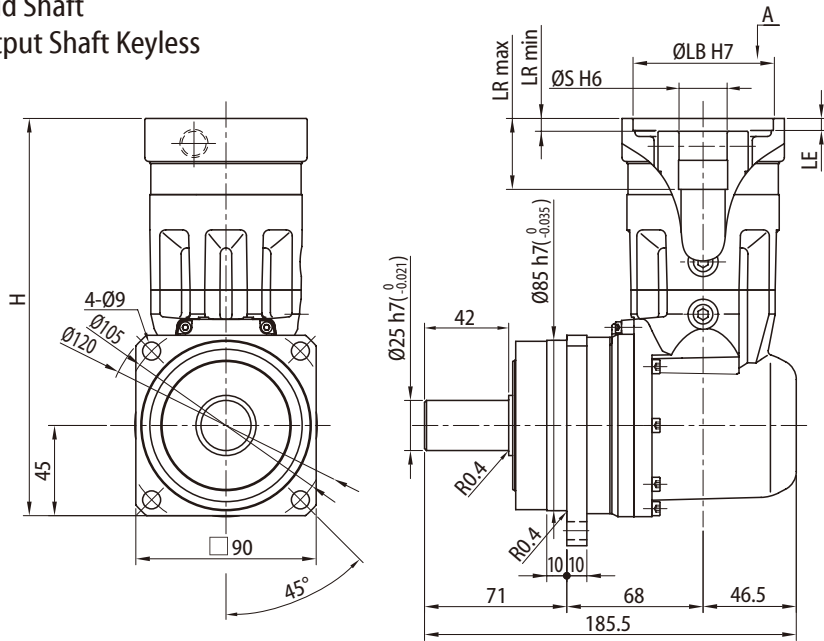
Motor flange code	Dimension								Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG	max				min						
2P	70	50	80	60	6	6	9	(a) Blind hole	B	M4	48	16.5	14	M4	181	5.4	2P	
2H	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	9	M4	181	5.3	2H	
2R	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	14	M4	181	5.4	2R	
8B	90	70	105	81	6	8	12	(b) Through hole	A	M5	50	18.5	14	M4	183	5.4	8B	
0U	90	70	105	81	6	6	12	(b) Through hole		M5	50	18.5	16	M5	183	5.4	0U	
7S	90	70	105	81	6	6	12	(b) Through hole		M5	50	18.5	19	M5	183	5.4	7S	
2T	90	70	105	81	6	8	12	(b) Through hole		M6	50	18.5	14	M4	183	5.4	2T	
7P	90	70	105	81	6	6	12	(b) Through hole		M6	50	18.5	16	M5	183	5.4	7P	
1G	90	70	105	81	6	6	12	(b) Through hole		M6	50	18.5	19	M5	183	5.4	1G	
2J	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	10	M4	196.5	5.5	2J	
0V ^{*2}	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	14	M4	196.5	5.5	0V ^{*2}	
8E	100	80	120	90	5	19.5	12	(b) Through hole		M6	63.5	32	16	M5	196.5	5.5	8E	
7A	115	95	135	100	6	19.5	16	(b) Through hole		M8	63.5	32	16	M5	196.5	5.6	7A	
7R	145	110	165	120	7	22.5	16	(b) Through hole	M8	66.5	35	16	M5	199.5	5.7	7R		
7X	145	110	165	120	7	22.5	16	(b) Through hole	M8	66.5	35	19	M5	199.5	5.7	7X		
7Z	145	110	165	120	7	42	16	(b) Through hole	M8	71	56.5	24	M6	234.5	6.2	7Z		

Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."
 Note 2: Dimension of coupling of motor flange code (0V) includes tolerance (+0.012 ~ +0.023)
 Note 3: Dimensions and mass shown in the above figures are subject to change without prior notification.

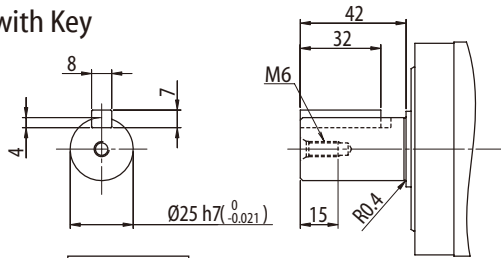
PK1 Type

Dimension Drawings

Frame Size: PK120
 Reduction Ratio: 1/27
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key

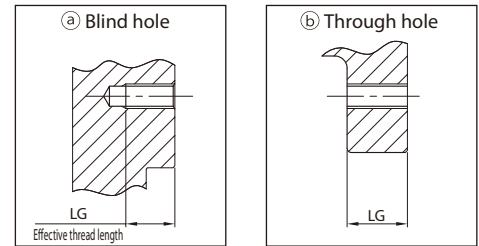


Nomenclature ANFX-PK120

Keyless: N
 With key: W

Output shaft type - Motor flange code - Backlash - Reduction ratio (27)

6 min: LB
 15 min: LD



Detail of thread hole shape for motor attachment

Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
2P	70	50	80	60	6	6	9	Ⓐ Blind hole	B	M4	48	16.5	14	M4	181	5.0	2P
2H	70	50	80	60	6	6	11	Ⓐ Blind hole		M5	48	16.5	9	M4	181	5.0	2H
2R	70	50	80	60	6	6	11	Ⓐ Blind hole		M5	48	16.5	14	M4	181	5.0	2R
8B	90	70	105	81	6	8	12	Ⓑ Through hole	A	M5	50	18.5	14	M4	183	5.0	8B
0U	90	70	105	81	6	6	12	Ⓑ Through hole		M5	50	18.5	16	M5	183	5.0	0U
7S	90	70	105	81	6	6	12	Ⓑ Through hole		M5	50	18.5	19	M5	183	5.0	7S
2T	90	70	105	81	6	8	12	Ⓑ Through hole		M6	50	18.5	14	M4	183	5.0	2T
7P	90	70	105	81	6	6	12	Ⓑ Through hole		M6	50	18.5	16	M5	183	5.0	7P
1G	90	70	105	81	6	6	12	Ⓑ Through hole		M6	50	18.5	19	M5	183	5.0	1G
2J	100	80	120	90	5	21.5	12	Ⓑ Through hole		M6	63.5	32	10	M4	196.5	5.1	2J
0V*2	100	80	120	90	5	21.5	12	Ⓑ Through hole		M6	63.5	32	14	M4	196.5	5.1	0V*2
8E	100	80	120	90	5	19.5	12	Ⓑ Through hole		M6	63.5	32	16	M5	196.5	5.1	8E
7A	115	95	135	100	6	19.5	16	Ⓑ Through hole		M8	63.5	32	16	M5	196.5	5.2	7A
7R	145	110	165	120	7	22.5	16	Ⓑ Through hole	M8	66.5	35	16	M5	199.5	5.4	7R	
7X	145	110	165	120	7	22.5	16	Ⓑ Through hole		66.5	35	19	M5	199.5	5.3	7X	
7Z	145	110	165	120	7	42	16	Ⓑ Through hole		71	56.5	24	M6	234.5	5.8	7Z	

Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

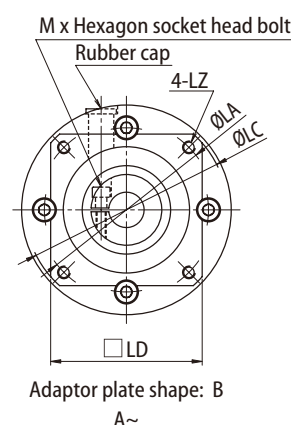
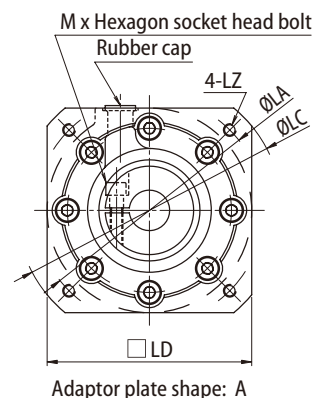
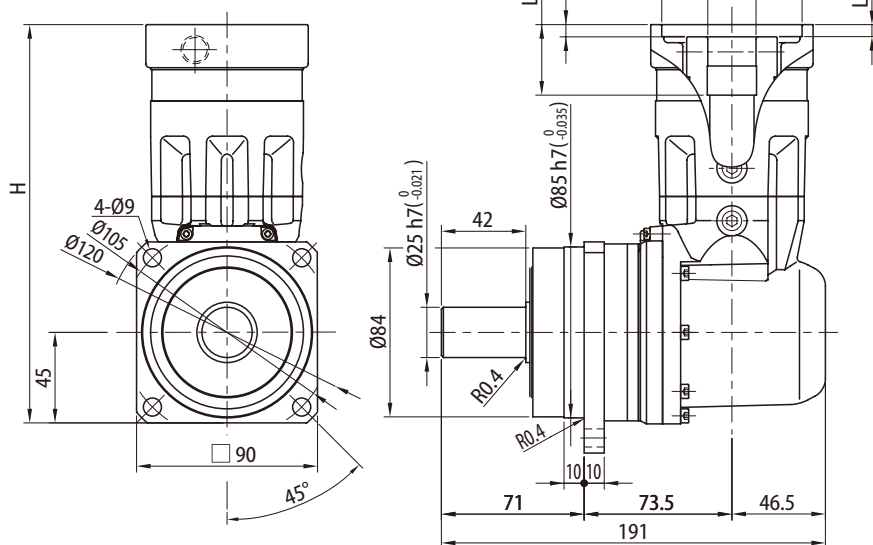
2: Dimension of coupling of motor flange code (0V) includes tolerance (+0.012 ~ +0.023)

3: Dimensions and mass shown in the above figures are subject to change without prior notification.

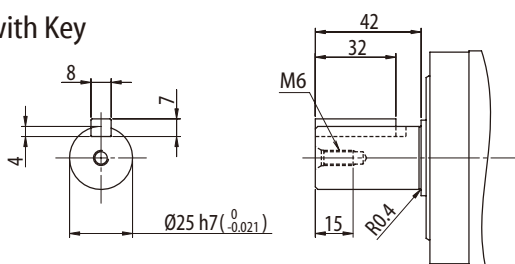
Dimension Drawings

PK1 Type

Frame Size: PK120
 Reduction Ratio: 1/33
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key



Nomenclature ANFX-PK120

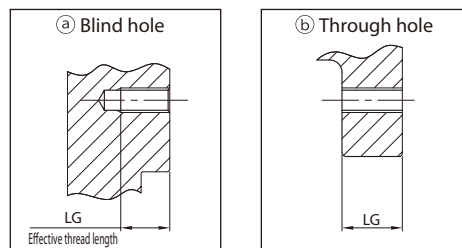
Output shaft type: Keyless: N, With key: W

Motor flange code

Backlash

Reduction ratio (33)

6 min: LB, 15 min: LD



Detail of thread hole shape for motor attachment

Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
2P	70	50	80	60	6	6	9	Ⓐ Blind hole	B	M4	48	16.5	14	M4	181	5.4	2P
2H	70	50	80	60	6	6	11	Ⓐ Blind hole		M5	48	16.5	9	M4	181	5.3	2H
2R	70	50	80	60	6	6	11	Ⓐ Blind hole		M5	48	16.5	14	M4	181	5.4	2R
8B	90	70	105	81	6	8	12	Ⓑ Through hole	A	M5	50	18.5	14	M4	183	5.4	8B
2T	90	70	105	81	6	8	12	Ⓑ Through hole		M6	50	18.5	14	M4	183	5.4	2T
2J	100	80	120	90	5	21.5	12	Ⓑ Through hole		M6	63.5	32	10	M4	196.5	5.5	2J

Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."
 2: Dimensions and mass shown in the above figures are subject to change without prior notification.

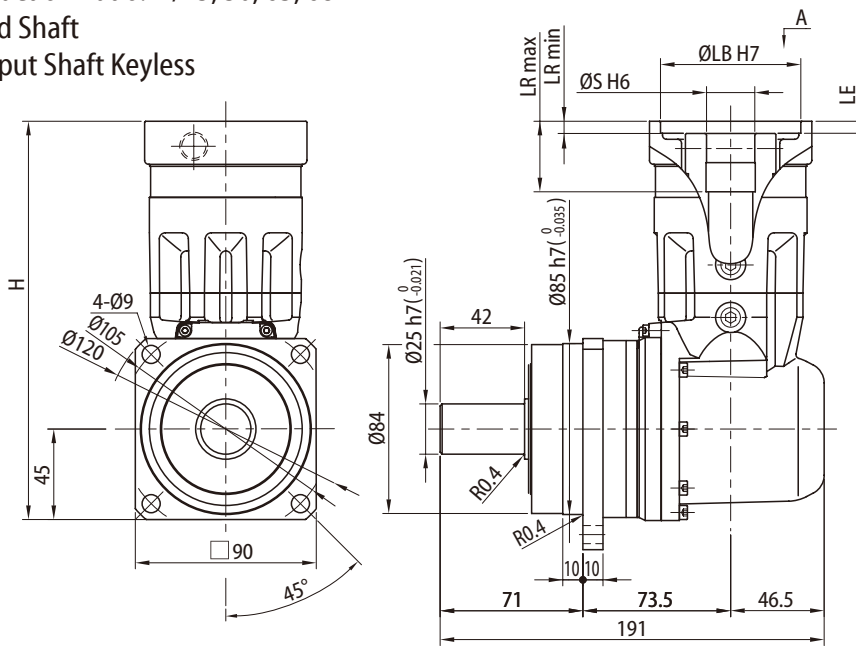
Dimension Drawings

Frame Size: PK120

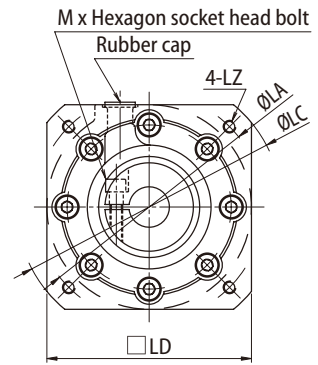
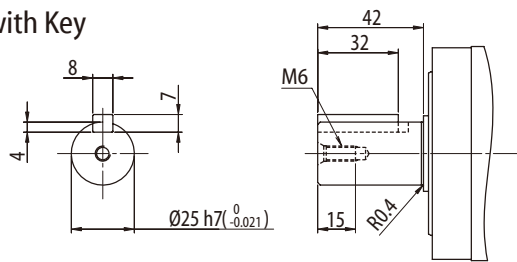
Reduction Ratio: 1/45, 50, 63, 68

Solid Shaft

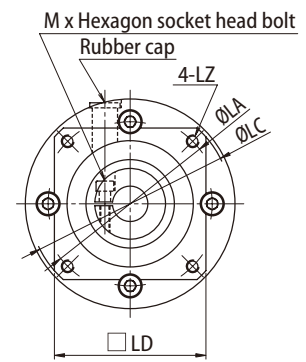
Output Shaft Keyless



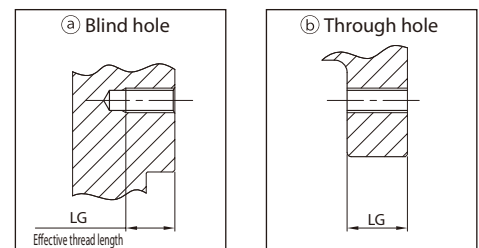
Output Shaft with Key



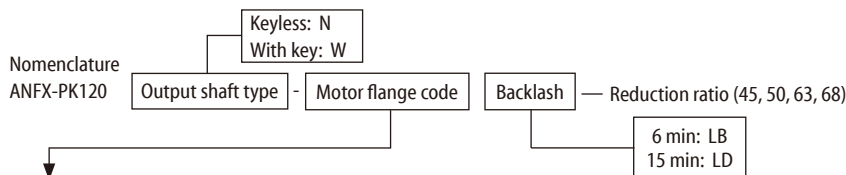
Adaptor plate shape: A



Adaptor plate shape: B
A~



Detail of thread hole shape for motor attachment



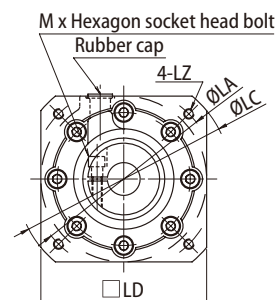
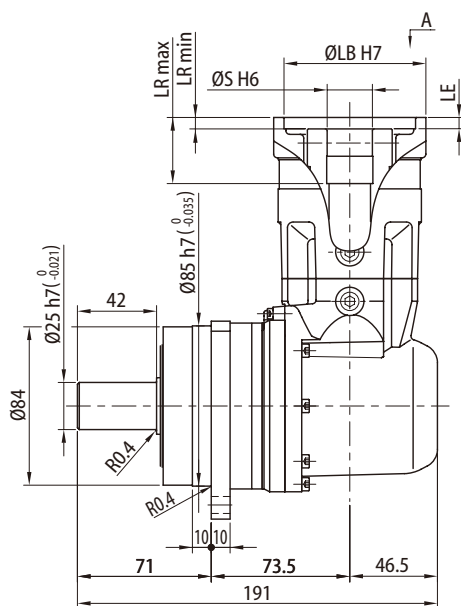
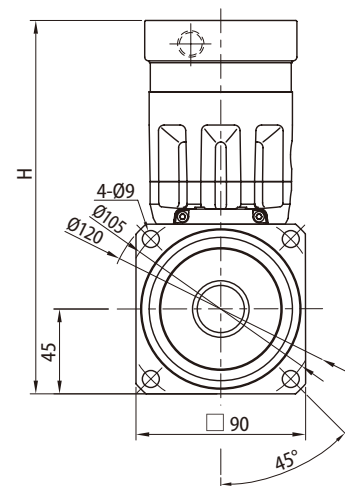
Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
2K	60	50	80	60	6	6	9	ⓐ Blind hole	B	M4	48	16.5	11	M4	181	5.3	2K
2L	70	50	80	60	6	6	9	ⓐ Blind hole		M4	48	16.5	11	M4	181	5.3	2L
2P	70	50	80	60	6	6	9	ⓐ Blind hole		M4	48	16.5	14	M4	181	5.4	2P
2H	70	50	80	60	6	6	11	ⓐ Blind hole		M5	48	16.5	9	M4	181	5.3	2H
2R	70	50	80	60	6	6	11	ⓐ Blind hole		M5	48	16.5	14	M4	181	5.4	2R
8A	90	70	105	81	6	8	12	ⓑ Through hole		A	M5	50	18.5	11	M4	183	5.3
8B	90	70	105	81	6	8	12	ⓑ Through hole	M5		50	18.5	14	M4	183	5.4	8B
2T	90	70	105	81	6	8	12	ⓑ Through hole	M6		50	18.5	14	M4	183	5.4	2T
2J	100	80	120	90	5	21.5	12	ⓑ Through hole	M6		63.5	32	10	M4	196.5	5.5	2J

Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

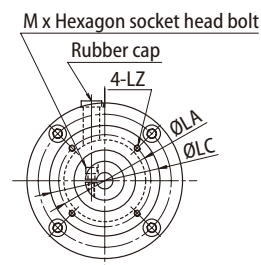
2: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

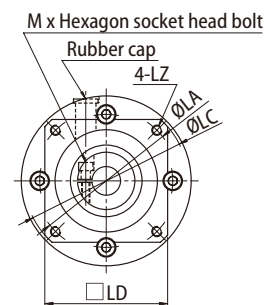
Frame Size: PK120
 Reduction Ratio: 1/99, 122, 135, 243
 Solid Shaft
 Output Shaft Keyless



Adaptor plate shape: A



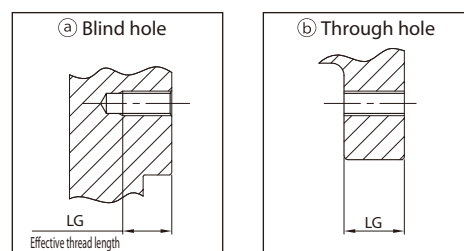
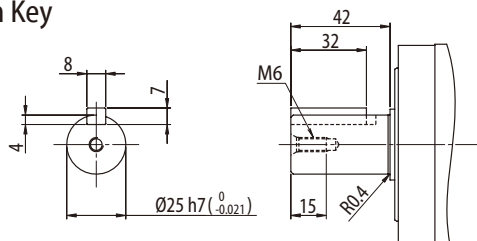
Adaptor plate shape: B



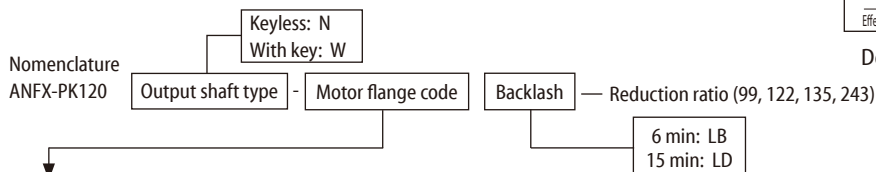
Adaptor plate shape: C

A~

Output Shaft with Key



Detail of thread hole shape for motor attachment



Motor flange code	Dimension								Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG	max				min						
2C	45	30	54	-	4	11	7	(a) Blind hole	B	M3	50.5	19	8	M3	183.5	5.3	2C	
2D	46	30	54	-	4	11	9	(a) Blind hole		M4	50.5	19	8	M3	183.5	5.3	2D	
2E	60	50	80	60	6	8.5	9	(a) Blind hole		M4	48	16.5	8	M3	181	5.3	2E	
2K	60	50	80	60	6	6	9	(a) Blind hole		M4	48	16.5	11	M4	181	5.3	2K	
2F	70	50	80	60	6	8.5	9	(a) Blind hole	C	M4	48	16.5	8	M3	181	5.3	2F	
2G	70	50	80	60	6	8.5	11	(a) Blind hole		M5	48	16.5	8	M3	181	5.3	2G	
2H	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	9	M4	181	5.3	2H	
2R	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	14	M4	181	5.4	2R	
2T	90	70	105	81	6	8	12	(b) Through hole	A	M6	50	18.5	14	M4	183	5.4	2T	
2J	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	10	M4	196.5	5.5	2J	

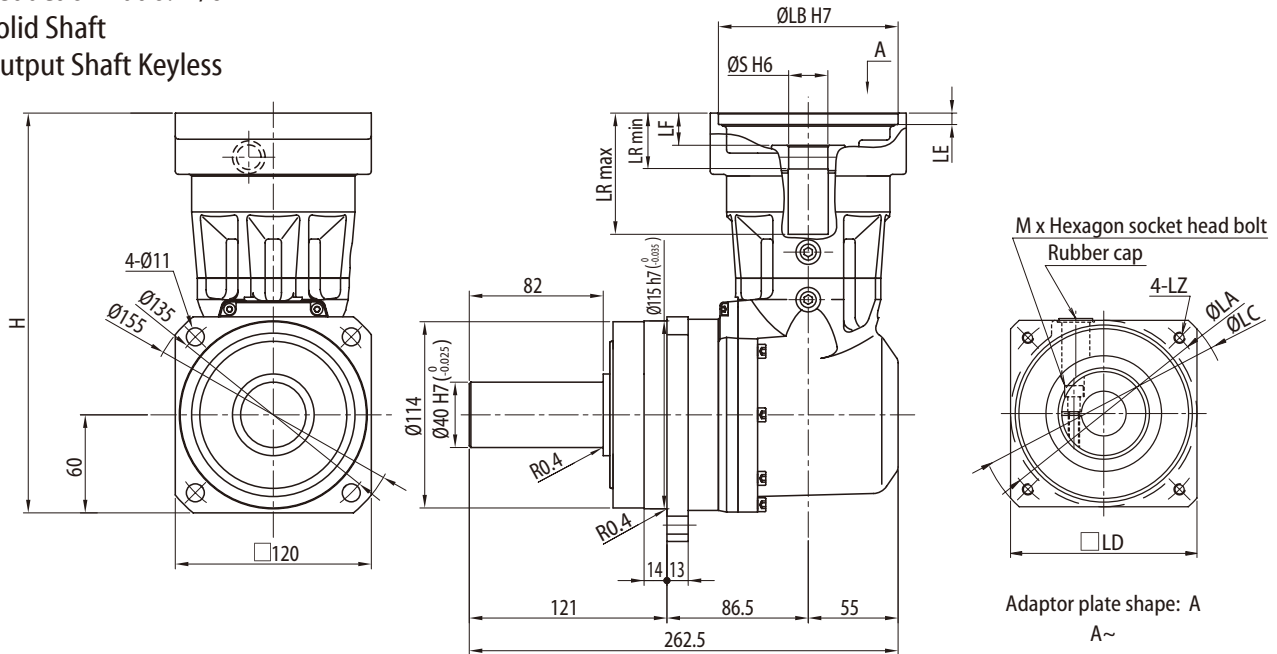
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

2: Dimensions and mass shown in the above figures are subject to change without prior notification.

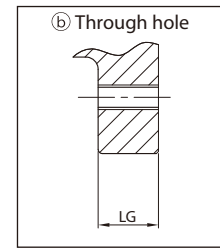
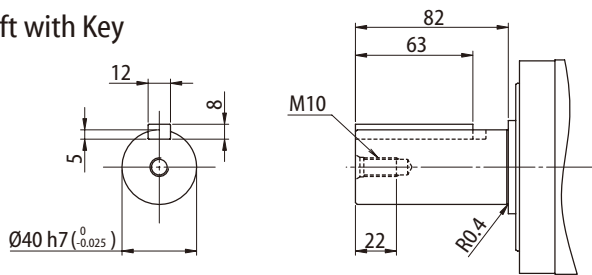
PK1 Type

Dimension Drawings

Frame Size: PK130
 Reduction Ratio: 1/6
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key



Keyless: N
 With key: W

Nomenclature ANFX-PK130

Output shaft type - Motor flange code - Backlash - Reduction ratio (6)

6 min: LB
 15 min: LD

Detail of thread hole shape for motor attachment

Motor flange code	Dimension														Mass [kg]	Motor flange code	
	LA	LB	LC	LD	LE	LF	LG	Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M			H
1S	145	110	165	120	7	19.5	16	ⓑ Through hole	A	M8	74	34	22	M6	245	12.3	1S
7Z	145	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	24	M6	245	12.3	7Z
1T	145	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	28	M6	245	12.3	1T
0Z	135	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	28	M6	245	12.3	0Z
0X ^{*2}	200	114.3	230	180	6	41.5	24	ⓑ Through hole		M12	81	60	35	M8	290	14.0	0X ^{*2}

Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

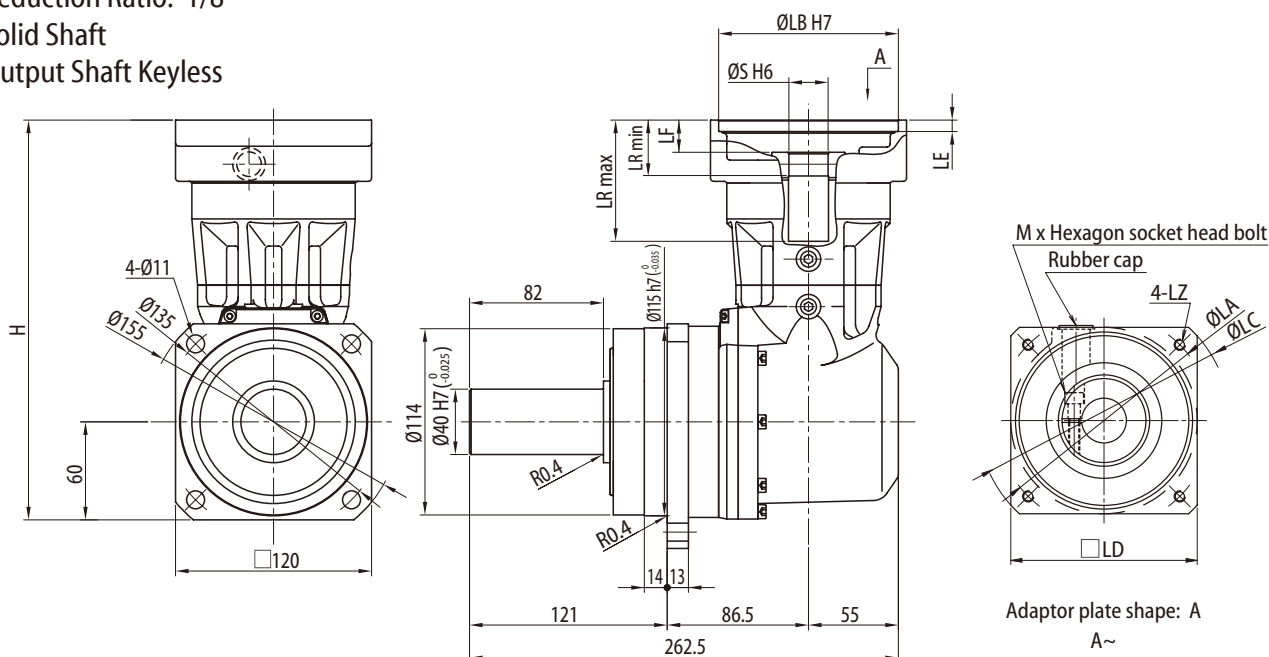
2: Dimension of coupling of motor flange code (0X) includes tolerance (+0.012 ~ +0.023)

3: Dimensions and mass shown in the above figures are subject to change without prior notification.

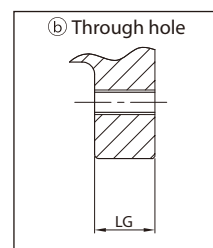
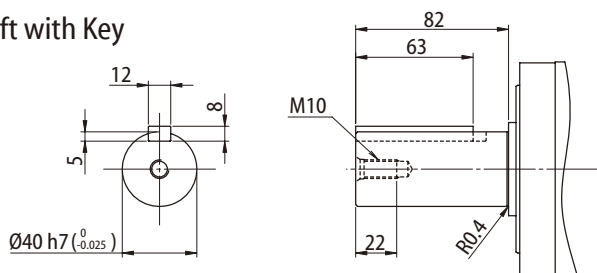
Dimension Drawings

PK1 Type

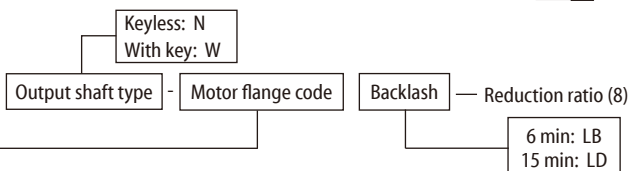
Frame Size: PK130
 Reduction Ratio: 1/8
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key



Nomenclature
 ANFX-PK130



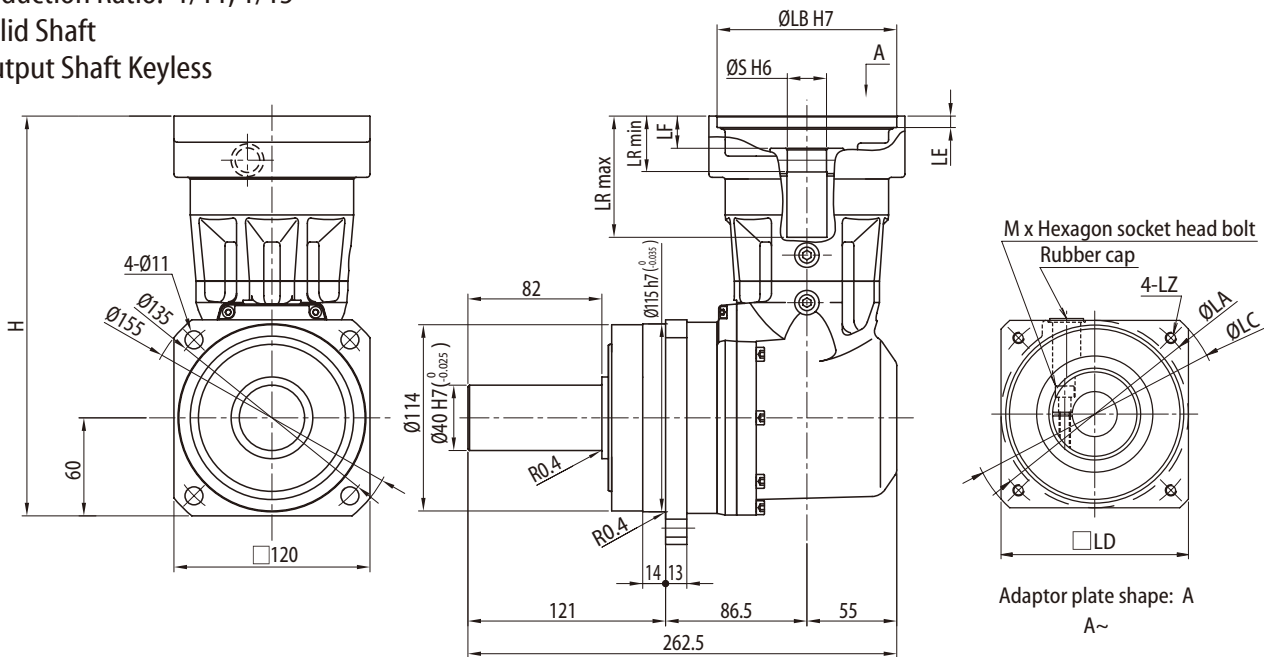
Detail of thread hole shape for motor attachment

Motor flange code	Dimension													Mass [kg]	Motor flange code		
	LA	LB	LC	LD	LE	LF	LG	Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S			M	H
1L	115	95	135	100	6	11.5	16	Ⓟ Through hole	A	M6	66	26	24	M6	237	12.0	1L
7B	115	95	135	100	6	13.5	16	Ⓟ Through hole		M8	66	26	19	M5	237	11.9	7B
0W	115	95	135	100	6	11.5	16	Ⓟ Through hole		M8	66	26	22	M6	237	12.0	0W
7Y	115	95	135	100	6	11.5	16	Ⓟ Through hole		M8	66	26	24	M6	237	12.0	7Y
0Y	135	110	165	120	7	19.5	16	Ⓟ Through hole		M8	74	34	22	M6	245	12.3	0Y
7X	145	110	165	120	7	21.5	16	Ⓟ Through hole		M8	74	34	19	M5	245	12.2	7X
1S	145	110	165	120	7	19.5	16	Ⓟ Through hole		M8	74	34	22	M6	245	12.3	1S
7Z	145	110	165	120	7	19.5	16	Ⓟ Through hole		M8	74	34	24	M6	245	12.3	7Z
1T	145	110	165	120	7	19.5	16	Ⓟ Through hole		M8	74	34	28	M6	245	12.3	1T
0Z	135	110	165	120	7	19.5	16	Ⓟ Through hole		M8	74	34	28	M6	245	12.3	0Z
0X*2	200	114.3	230	180	6	41.5	24	Ⓟ Through hole		M12	81	60	35	M8	290	14.0	0X*2

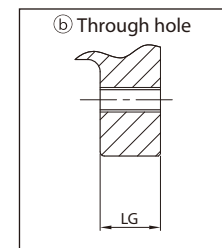
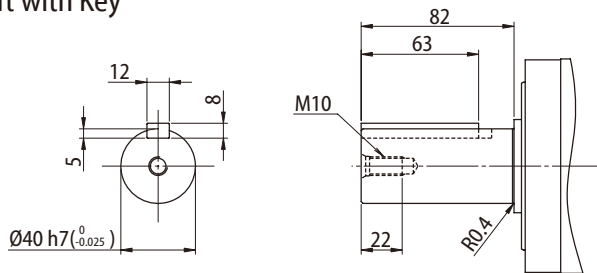
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."
 2: Dimension of coupling of motor flange code (0X) includes tolerance (+0.012 ~ +0.023)
 3: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

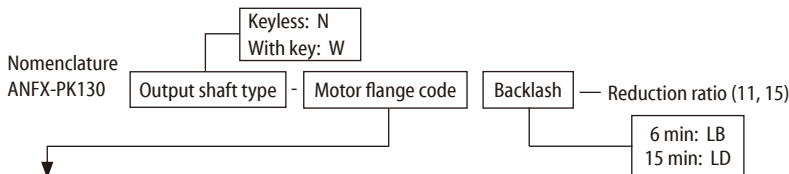
Frame Size: PK130
 Reduction Ratio: 1/11, 1/15
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key



Detail of thread hole shape for motor attachment



Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
1L	115	95	135	100	6	11.5	16	ⓑ Through hole	A	M6	66	26	24	M6	237	12.7	1L
7B	115	95	135	100	6	13.5	16	ⓑ Through hole		M8	66	26	19	M5	237	12.6	7B
0W	115	95	135	100	6	11.5	16	ⓑ Through hole		M8	66	26	22	M6	237	12.7	0W
7Y	115	95	135	100	6	11.5	16	ⓑ Through hole		M8	66	26	24	M6	237	12.7	7Y
0Y	135	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	22	M6	245	13.1	0Y
7X	145	110	165	120	7	21.5	16	ⓑ Through hole		M8	74	34	19	M5	245	13.0	7X
1S	145	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	22	M6	245	13.1	1S
7Z	145	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	24	M6	245	13.0	7Z
1T	145	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	28	M6	245	12.3	1T
0X*2	200	114.3	230	180	6	41.5	24	ⓑ Through hole		M8	81	60	35	M8	290	14.0	0X*2

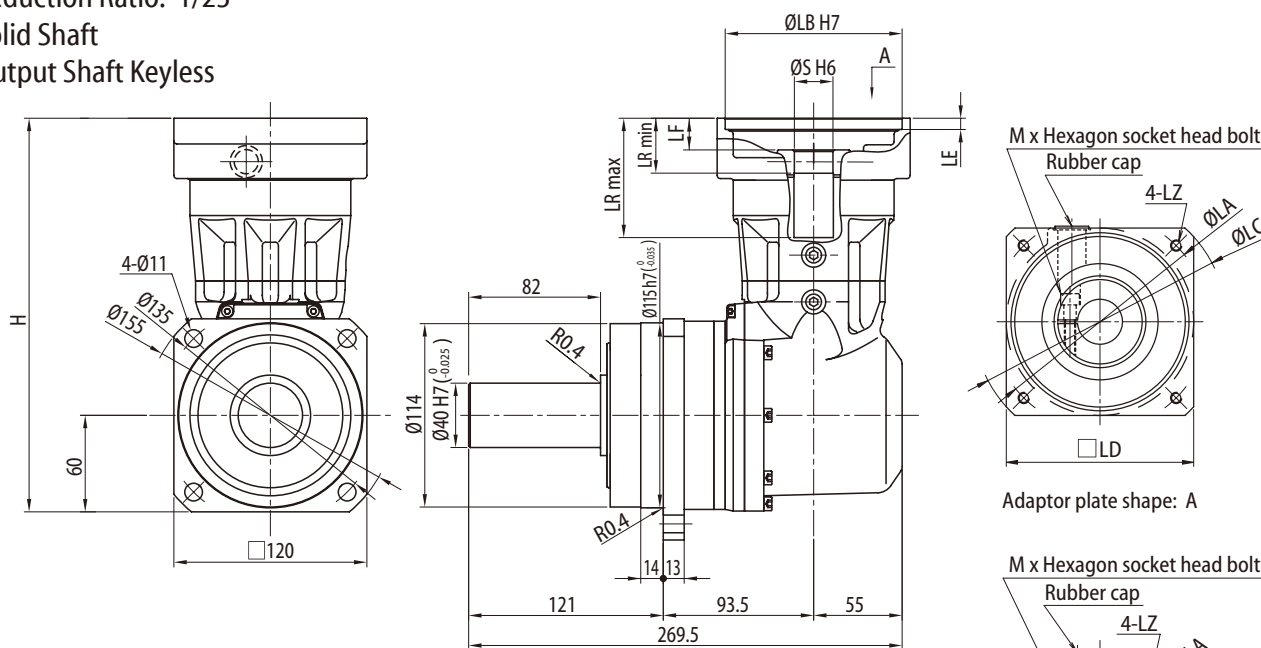
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

2: Tolerance of coupling for motor flange code "0X" is over tolerance (+0.010~+0.026).

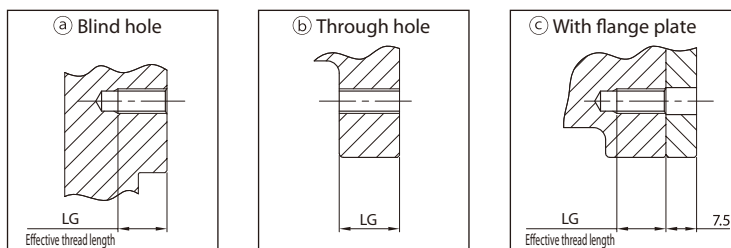
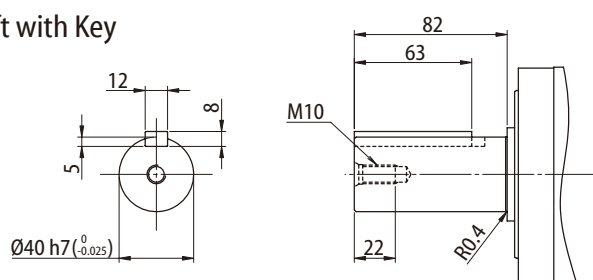
3: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: P130
 Reduction Ratio: 1/23
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key



Nomenclature ANFX-PK130

Output shaft type: Keyless: N, With key: W

Motor flange code

Backlash

Reduction ratio (23)

6 min: LB, 15 min: LD

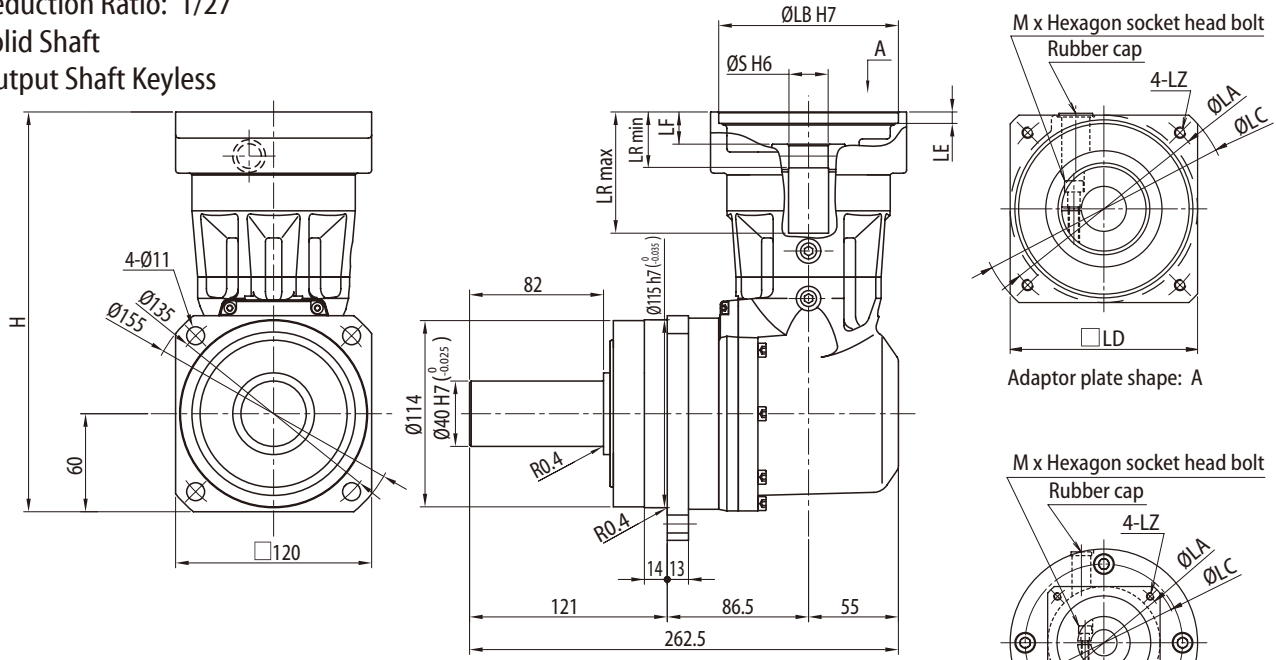
Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
1G	90	70	120	90	6	6	13	(a) Blind hole	B	M6	58.5	18.5	19	M5	229	12.6	1G
8E ^{*2}	100	80	120	90	5	13.5	12	(c) With flange plate	A	M6	66	26	16	M5	237	12.7	8E ^{*2}
7V ^{*2}	100	80	120	90	5	13.5	12	(c) With flange plate		M6	66	26	19	M5	237	12.7	7V ^{*2}
1L	115	95	135	100	6	11.5	16	(b) Through hole		M6	66	26	24	M6	237	12.7	1L
7B	115	95	135	100	6	13.5	16	(b) Through hole		M8	66	26	19	M5	237	12.6	7B
0W	115	95	135	100	6	11.5	16	(b) Through hole		M8	66	26	22	M6	237	12.7	0W
7Y	115	95	135	100	6	11.5	16	(b) Through hole		M8	66	26	24	M6	237	12.7	7Y
0Y	135	110	165	120	7	19.5	16	(b) Through hole		M8	74	34	22	M6	245	13.1	0Y
7X	145	110	165	120	7	21.5	16	(b) Through hole		M8	74	34	19	M5	245	13.0	7X
1S	145	110	165	120	7	19.5	16	(b) Through hole		M8	74	34	22	M6	245	13.1	1S
7Z	145	110	165	120	7	19.5	16	(b) Through hole		M8	74	34	24	M6	245	13.0	7Z

Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."
 2: Flange plate for motor is attached between the motor and the adaptor plate.
 3: Dimensions and mass shown in the above figures are subject to change without prior notification.

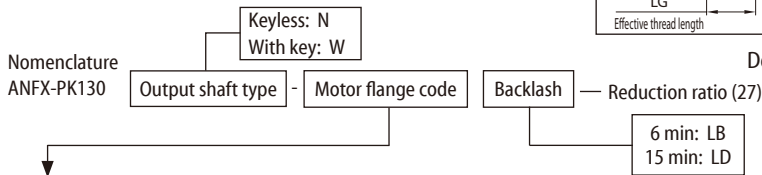
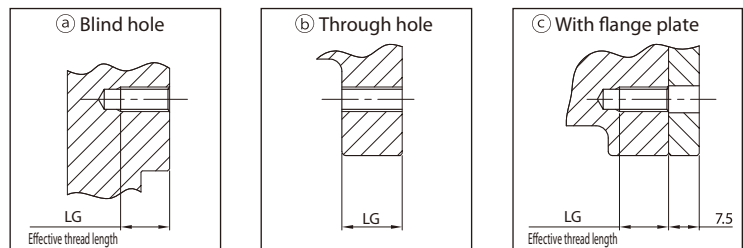
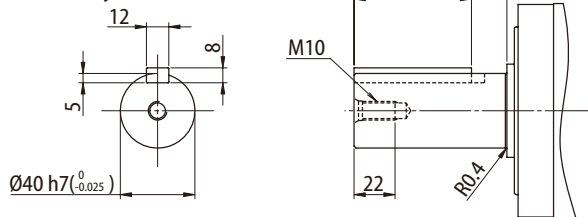
PK1 Type

Dimension Drawings

Frame Size: P130
 Reduction Ratio: 1/27
 Solid Shaft
 Output Shaft Keyless



Output Shaft with Key



Motor flange code	Dimension																Motor flange code
	LA	LB	LC	LD	LE	LF	LG	Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	
											max	min					
1G	90	70	120	90	6	6	13	Ⓐ Blind hole	B	M6	58.5	18.5	19	M5	229	12.6	1G
0V ⁺² / ₋₃	100	80	120	90	5	15.5	12	ⓒ With flange plate	A	M6	66	26	14	M4	237	12.7	0V ⁺² / ₋₃
8E ⁺²	100	80	120	90	5	13.5	12	ⓒ With flange plate		M6	66	26	16	M5	237	12.0	8E ⁺²
7V ⁺²	100	80	120	90	5	13.5	12	ⓒ With flange plate		M6	66	26	19	M5	237	11.9	7V ⁺²
1L	115	95	135	100	6	11.5	16	ⓑ Through hole		M6	66	26	24	M6	237	12.0	1L
7B	115	95	135	100	6	13.5	16	ⓑ Through hole		M8	66	26	19	M5	237	11.9	7B
0W	115	95	135	100	6	11.5	16	ⓑ Through hole		M8	66	26	22	M6	237	12.0	0W
7Y	115	95	135	100	6	11.5	16	ⓑ Through hole		M8	66	26	24	M6	237	12.0	7Y
0Y	135	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	22	M6	245	12.3	0Y
7X	145	110	165	120	7	21.5	16	ⓑ Through hole		M8	74	34	19	M5	245	12.2	7X
1S	145	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	22	M6	245	12.3	1S
7Z	145	110	165	120	7	19.5	16	ⓑ Through hole	M8	74	34	24	M6	245	12.3	7Z	

Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

2: Flange plate for motor is attached between the motor and the adaptor plate.

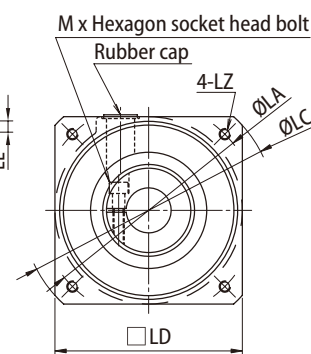
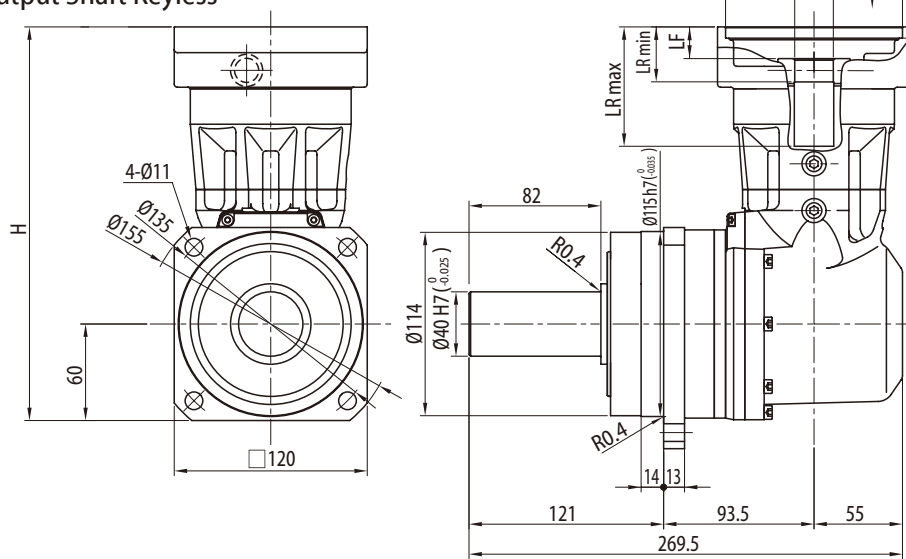
3: Tolerance of coupling for motor flange code "0V" is over tolerance (+0.012~+0.023).

4: Dimensions and mass shown in the above figures are subject to change without prior notification.

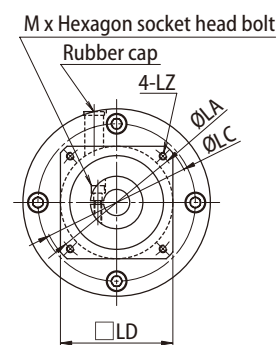
Dimension Drawings

PK1 Type

Frame Size: PK130
 Reduction Ratio: 1/33, 45, 50, 63, 68
 Solid Shaft
 Output Shaft Keyless

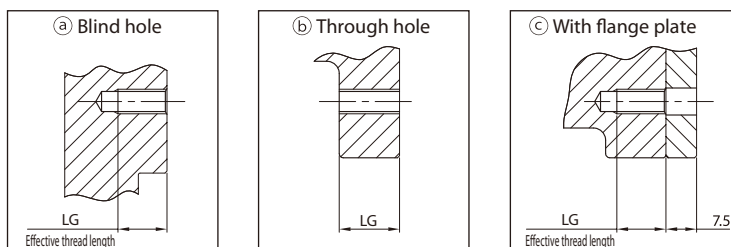
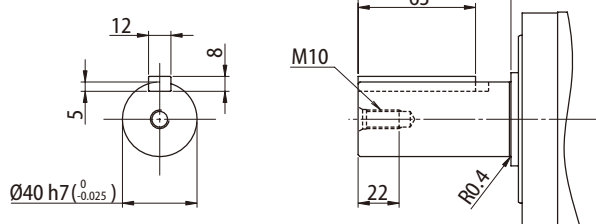


Adaptor plate shape: A



Adaptor plate shape: B
A~

Output Shaft with Key



Detail of thread hole shape for motor attachment

Nomenclature ANFX-PK130

Keyless: N
 With key: W

Output shaft type - Motor flange code - Backlash - Reduction ratio (33, 45, 50, 63, 68)

6 min: LB
 15 min: LD

Motor flange code	Dimension											Mass [kg]	Motor flange code				
	LA	LB	LC	LD	LE	LF	LG	Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR max			LR min	S	M	H
2R	70	50	80	60	4	5	11	(a) Blind hole	B	M5	55.5	15.5	14	M4	226	12.6	2R
0U	90	70	120	90	6	6	11	(a) Blind hole		M5	58.5	18.5	16	M5	229	12.6	0U
7S	90	70	120	90	6	6	11	(a) Blind hole		M5	58.5	18.5	19	M5	229	12.6	7S
7P	90	70	120	90	6	6	13	(a) Blind hole		M6	58.5	18.5	16	M5	229	12.6	7P
1G	90	70	120	90	6	6	13	(a) Blind hole		M6	58.5	18.5	19	M5	229	12.6	1G
2J ^{*2}	100	80	120	90	5	15.5	12	(c) With flange plate		M6	66	26	10	M4	237	12.7	2J ^{*2}
0V ^{*2/3}	100	80	120	90	5	15.5	12	(c) With flange plate	A	M6	66	26	14	M4	237	12.7	0V ^{*2/3}
8E ^{*2}	100	80	120	90	5	15.5	12	(c) With flange plate		M6	66	26	16	M5	237	12.7	8E ^{*2}
7A	115	95	135	100	6	13.5	16	(b) Through hole		M8	66	26	16	M5	237	12.7	7A
7R	145	110	165	120	7	21.5	16	(b) Through hole		M8	74	34	16	M5	245	13.0	7R
7X	145	110	165	120	7	21.5	16	(b) Through hole		M8	74	34	19	M5	245	13.0	7X
7Z	145	110	165	120	7	19.5	16	(b) Through hole	M8	74	34	24	M6	245	13.0	7Z	

Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

2: Flange plate for motor is attached between the motor and the adaptor plate.

3: Dimension of coupling of motor flange code (0V) includes tolerance (+0.012 ~ +0.023)

4: Dimensions and mass shown in the above figures are subject to change without prior notification.

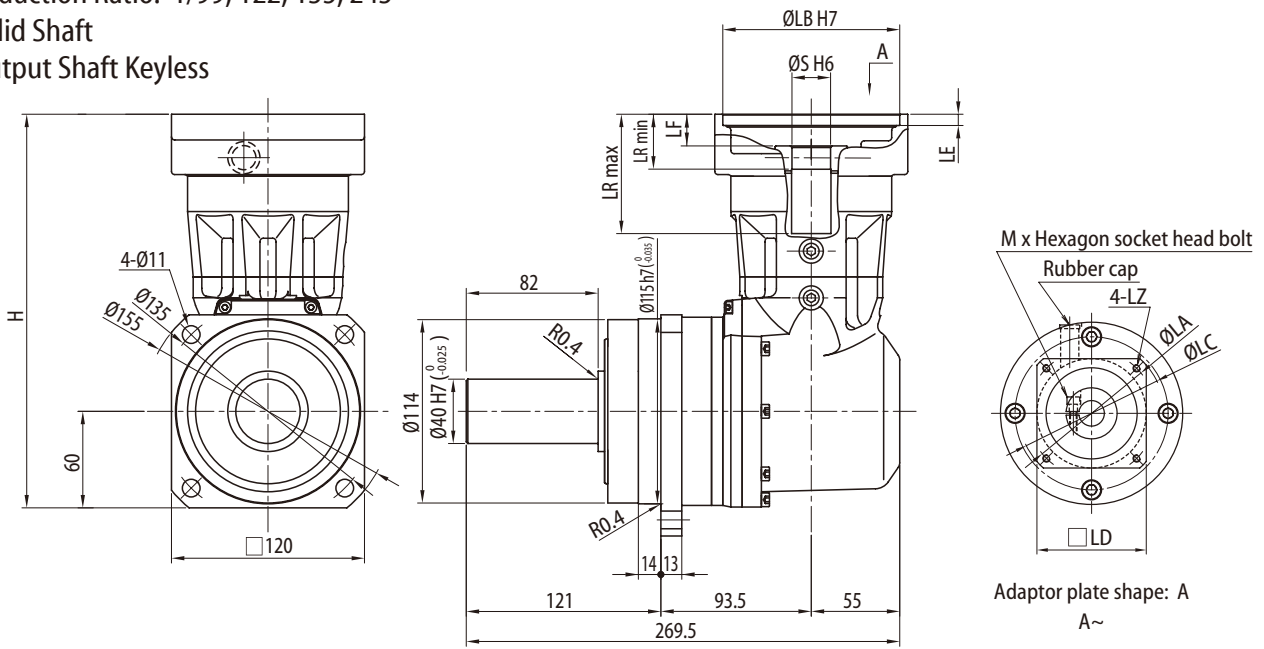
Dimension Drawings

Frame Size: PK130

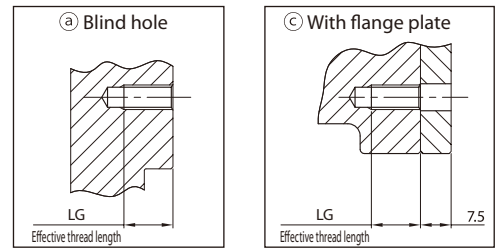
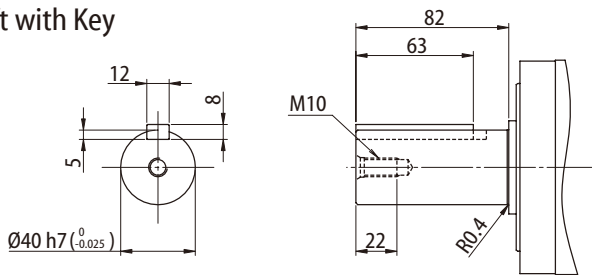
Reduction Ratio: 1/99, 122, 135, 243

Solid Shaft

Output Shaft Keyless



Output Shaft with Key



Detail of thread hole shape for motor attachment

Keyless: N
With key: W

Nomenclature ANFX-PK130 - Output shaft type - Motor flange code - Backlash - Reduction ratio (99, 122, 135, 243)

6 min: LB
15 min: LD

Motor flange code	Dimension											Mass [kg]	Motor flange code				
	LA	LB	LC	LD	LE	LF	LG	Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR max			LR min	S	M	H
2L	70	50	80	60	4	5	9	Ⓐ Blind hole	A	M4	55.5	15.5	11	M4	226	12.6	2L
2P	70	50	80	60	4	5	9	Ⓐ Blind hole		M4	55.5	15.5	14	M4	226	12.6	2P
2H	70	50	80	60	4	5	11	Ⓐ Blind hole		M5	55.5	15.5	9	M4	226	12.6	2H
2R	70	50	80	60	4	5	11	Ⓐ Blind hole		M5	55.5	15.5	14	M4	226	12.6	2R
8A	90	70	120	90	6	8	11	Ⓐ Blind hole		M5	58.5	18.5	11	M4	229	12.6	8A
8B	90	70	120	90	6	8	11	Ⓐ Blind hole		M5	58.5	18.5	14	M4	229	12.6	8B
2T	90	70	120	90	6	8	13	Ⓐ Blind hole		M6	58.5	18.5	14	M4	229	12.6	2T
2J*2	100	80	120	90	5	15.5	12	Ⓒ With flange plate		M6	66	26	10	M4	237	12.7	2J*2
8E*2	100	80	120	90	5	15.5	12	Ⓒ With flange plate		M6	66	26	16	M5	237	12.7	8E*2

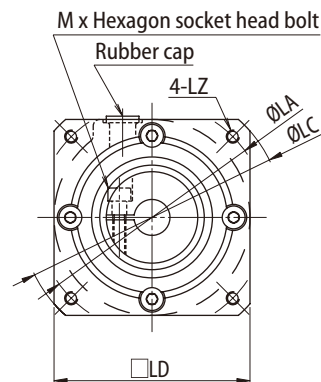
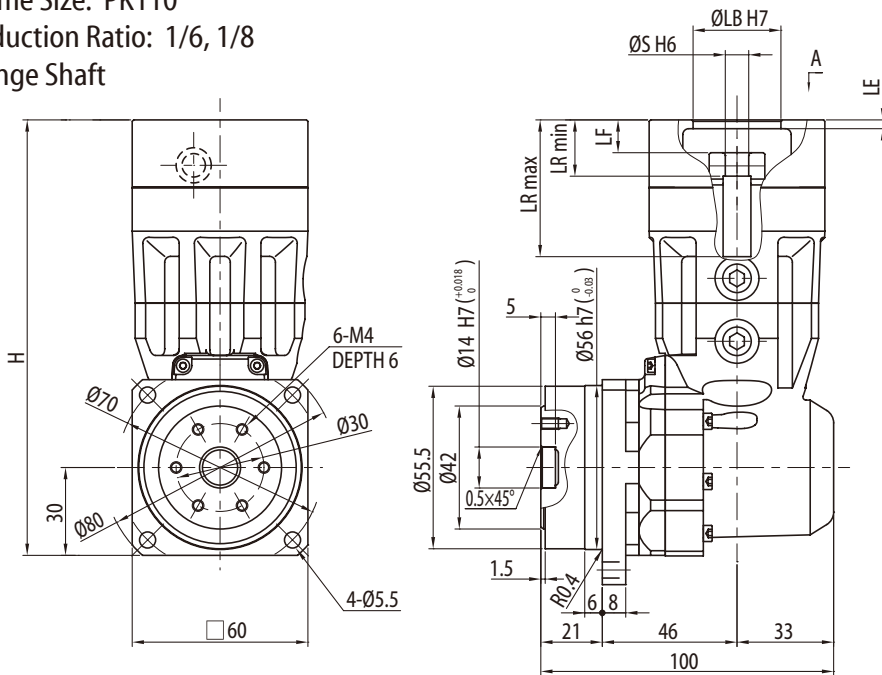
Note 1: Dimension of shaft end key: Dimension tolerance conforms to JIS B 1301-1996 "Parallel Key."

2: Flange plate for motor is attached between the motor and the adaptor plate.

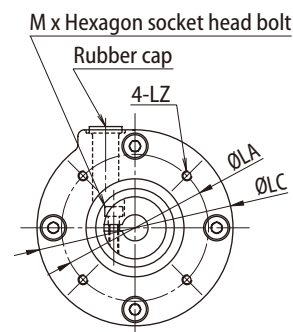
3: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK110
Reduction Ratio: 1/6, 1/8
Flange Shaft

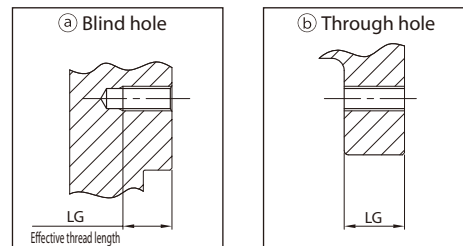


Adaptor plate shape: A



Adaptor plate shape: B

A~



Detail of thread hole shape for motor attachment

Nomenclature
ANFX-PK110F - Motor flange code Backlash — Reduction ratio (6, 8)

6 min: LB
15 min: LD

Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
2C	45	30	60	-	5	11	7	(a) Blind hole	B	M3	46.5	19	8	M3	149	1.91	2C
7J	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	6	M3	149	1.91	7J
2D	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	8	M3	149	1.91	2D
2E	60	50	80	60	4	8.5	8	(a) Blind hole	A	M4	44	16.5	8	M3	146.5	1.90	2E
2K	60	50	80	60	4	6	8	(a) Blind hole		M4	44	16.5	11	M4	146.5	1.94	2K
2F	70	50	80	60	4	8.5	10	(b) Through hole		M4	44	16.5	8	M3	146.5	1.90	2F
2L	70	50	80	60	4	6	10	(b) Through hole		M4	44	16.5	11	M4	146.5	1.94	2L
2P	70	50	80	60	4	6	10	(b) Through hole		M4	44	16.5	14	M4	146.5	1.92	2P
2G	70	50	80	60	4	8.5	10	(b) Through hole		M5	44	16.5	8	M3	146.5	1.90	2G
2H	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	9	M4	146.5	1.94	2H
2R	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	14	M4	146.5	1.92	2R
8A	90	70	105	80	6	7.5	12	(b) Through hole	M5	45.5	18	11	M4	148	2.04	8A	
8B	90	70	105	80	6	7.5	12	(b) Through hole	M5	45.5	18	14	M4	148	2.02	8B	
2T	90	70	105	80	6	7.5	12	(b) Through hole	M6	45.5	18	14	M4	148	2.02	2T	
2J	100	80	120	90	5	13	12	(b) Through hole	M6	51	23.5	10	M4	153.5	2.17	2J	
8E	100	80	120	90	6	9.5	12	(b) Through hole	M6	41	22	16	M5	170	2.37	8E	

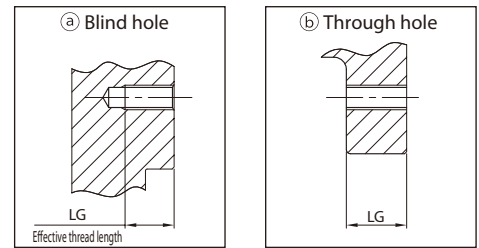
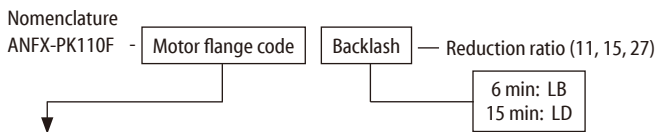
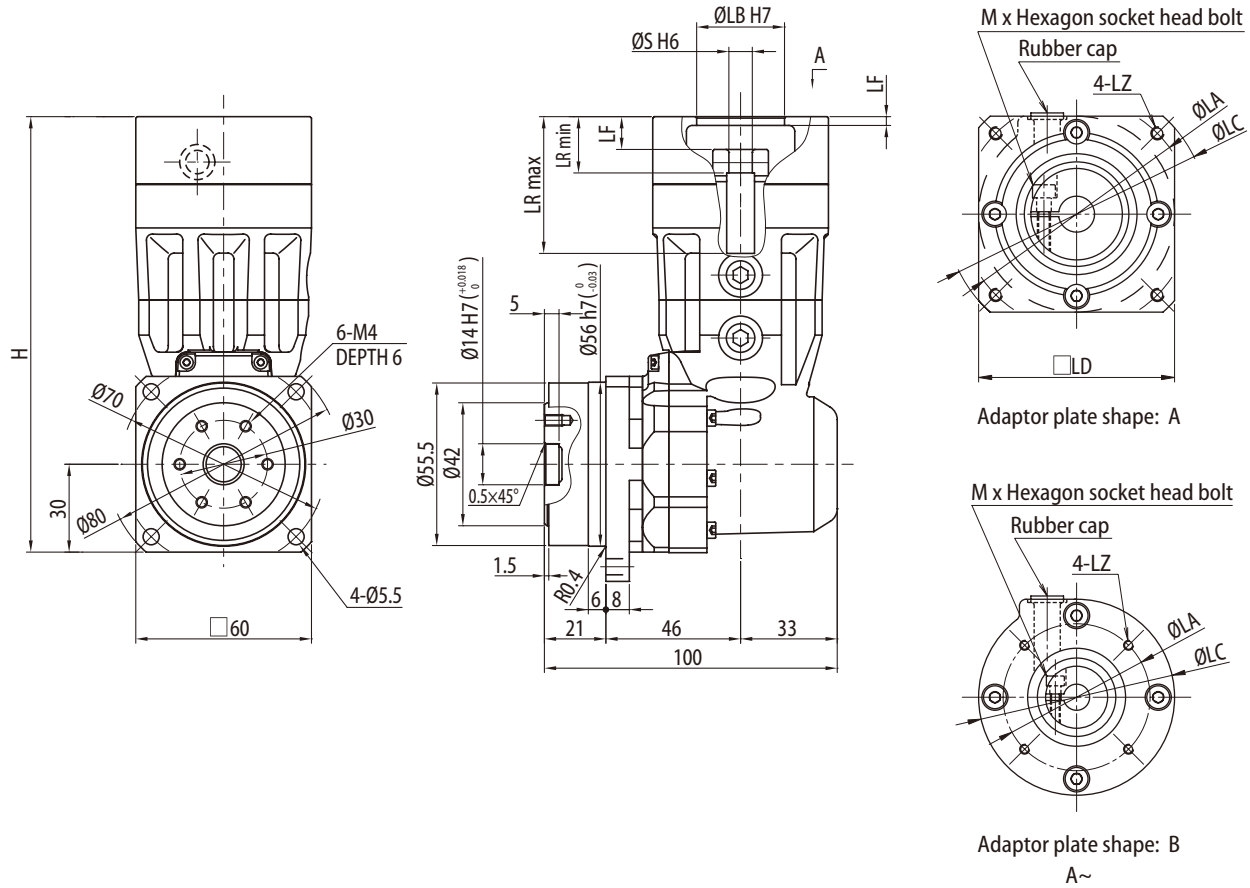
Note 1: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK110

Reduction Ratio: 1/11, 1/15, 1/27

Flange Shaft

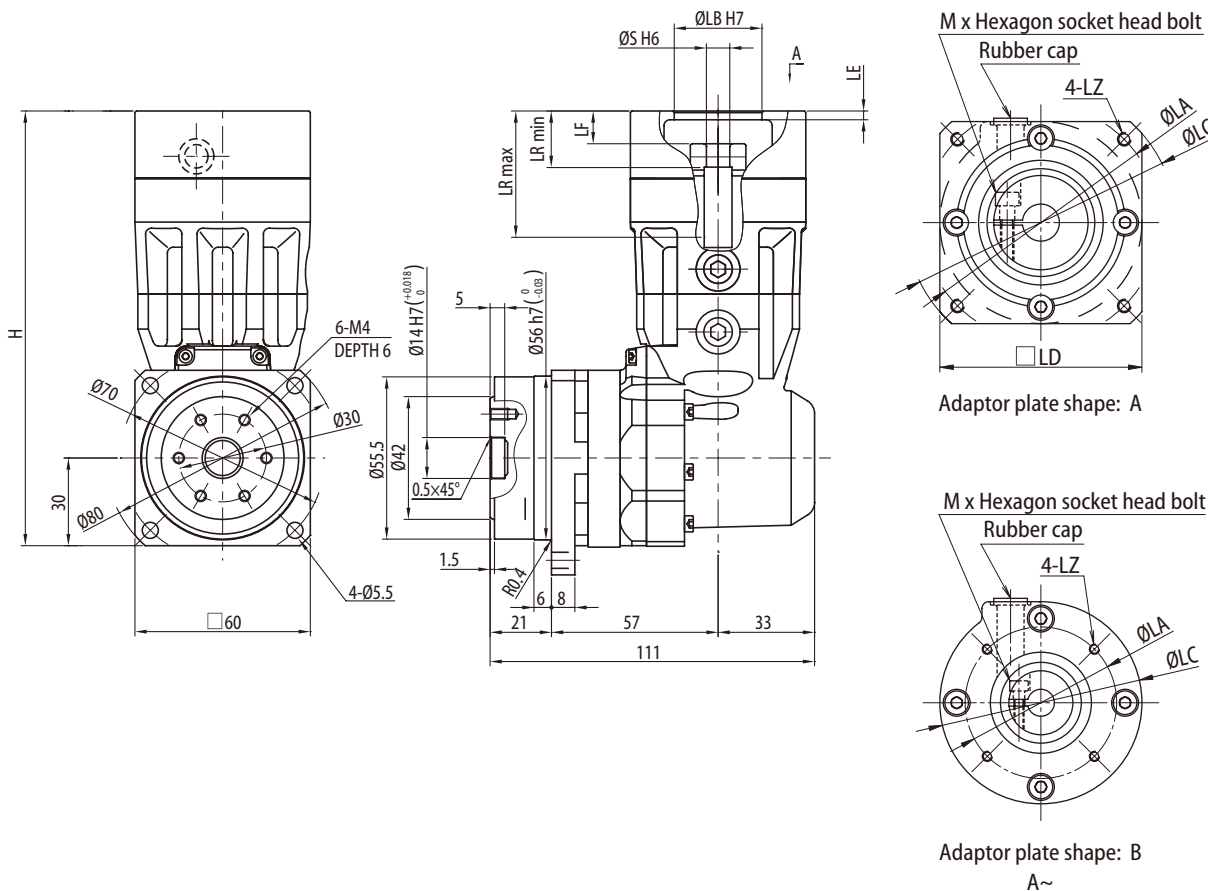


Detail of thread hole shape for motor attachment

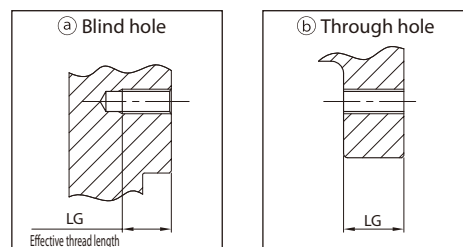
Motor flange code	Dimension								Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG	max				min						
2C	45	30	60	-	5	11	7	(a) Blind hole	B	M3	46.5	19	8	M3	149	1.91	2C	
7J	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	6	M3	149	1.91	7J	
2D	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	8	M3	149	1.91	2D	
2E	60	50	80	60	4	8.5	8	(a) Blind hole	A	M4	44	16.5	8	M3	146.5	1.90	2E	
2K	60	50	80	60	4	6	8	(a) Blind hole		M4	44	16.5	11	M4	146.5	1.94	2K	
2F	70	50	80	60	4	8.5	10	(b) Through hole		M4	44	16.5	8	M3	146.5	1.90	2F	
2L	70	50	80	60	4	6	10	(b) Through hole		M4	44	16.5	11	M4	146.5	1.94	2L	
2G	70	50	80	60	4	8.5	10	(b) Through hole		M5	44	16.5	8	M3	146.5	1.90	2G	
2H	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	9	M4	146.5	1.94	2H	
2R	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	14	M4	146.5	1.92	2R	
8A	90	70	105	80	6	7.5	12	(b) Through hole		M5	45.5	18	11	M4	148	2.04	8A	
8B	90	70	105	80	6	7.5	12	(b) Through hole		M5	45.5	18	14	M4	148	2.02	8B	
2T	90	70	105	80	6	7.5	12	(b) Through hole		M6	45.5	18	14	M4	148	2.02	2T	
2J	100	80	120	90	5	13	12	(b) Through hole	M6	51	23.5	10	M4	153.5	2.21	2J		
8E	100	80	120	90	6	9.5	12	(b) Through hole	M6	41	22	16	M5	170	2.37	8E		

Dimension Drawings

Frame Size: PK110
 Reduction Ratio: 1/23
 Flange Shaft



Nomenclature
 ANFX-PK110F - Motor flange code Backlash — Reduction ratio (23)
 6 min: LB
 15 min: LD



Detail of thread hole shape for motor attachment

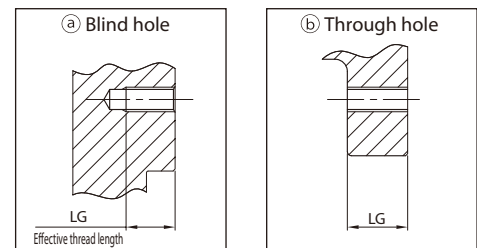
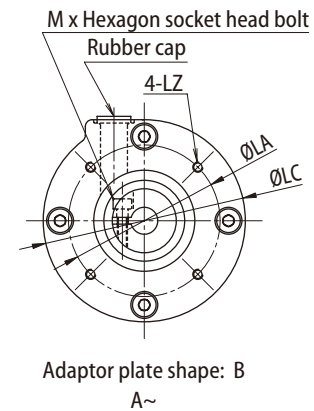
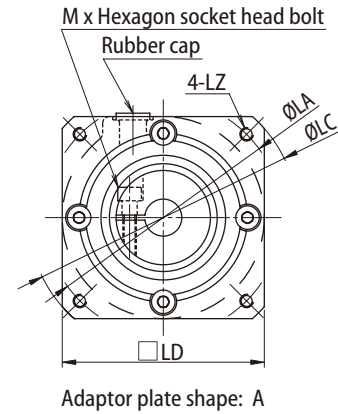
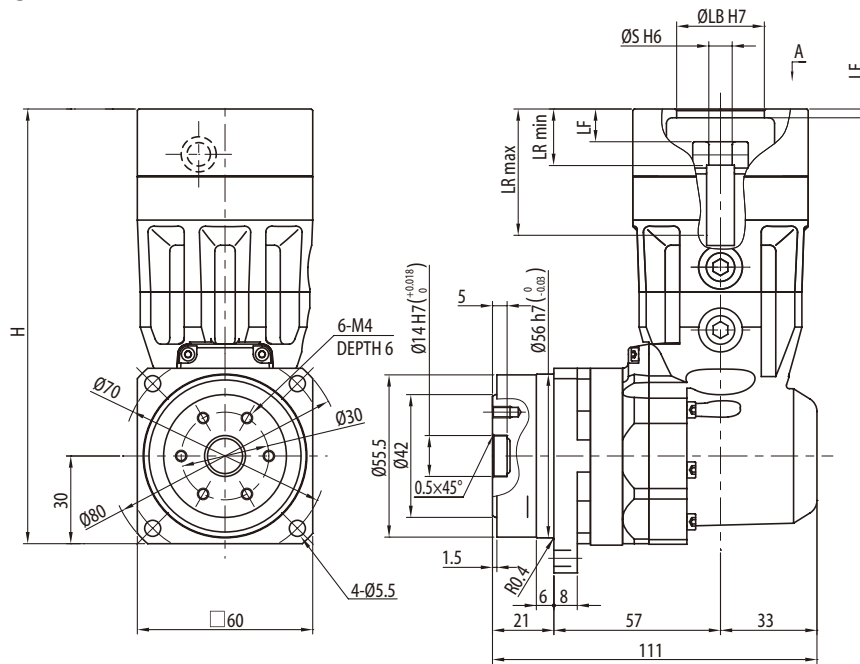
Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
2C	45	30	60	-	5	11	7	(a) Blind hole	B	M3	46.5	19	8	M3	149	1.91	2C
7J	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	6	M3	149	1.91	7J
2D	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	8	M3	149	1.91	2D
2E	60	50	80	60	4	8.5	9	(a) Blind hole	A	M4	44	16.5	8	M3	146.5	1.90	2E
2K	60	50	80	60	4	6	9	(a) Blind hole		M4	44	16.5	11	M4	146.5	1.94	2K
2F	70	50	80	60	4	8.5	10	(b) Through hole		M4	44	16.5	8	M3	146.5	1.90	2F
2L	70	50	80	60	4	6	10	(b) Through hole		M4	44	16.5	11	M4	146.5	1.94	2L
2G	70	50	80	60	4	8.5	10	(b) Through hole		M5	44	16.5	8	M3	146.5	1.90	2G
2H	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	9	M4	146.5	1.94	2H
2R	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	14	M4	146.5	1.92	2R
8A	90	70	105	80	6	7.5	12	(b) Through hole		M5	45.5	18	11	M4	148	2.04	8A
8B	90	70	105	80	6	7.5	12	(b) Through hole		M5	45.5	18	14	M4	148	2.02	8B
2T	90	70	105	80	6	7.5	12	(b) Through hole		M6	45.5	18	14	M4	148	2.02	2T

Note 1: Dimensions and mass shown in the above figures are subject to change without prior notification.

PK1 Type

Dimension Drawings

Frame Size: PK110
 Reduction Ratio: 1/33
 Flange Shaft



Detail of thread hole shape for motor attachment

Nomenclature
 ANFX-PK110F - Motor flange code Backlash Reduction ratio (33)
 6 min: LB
 15 min: LD

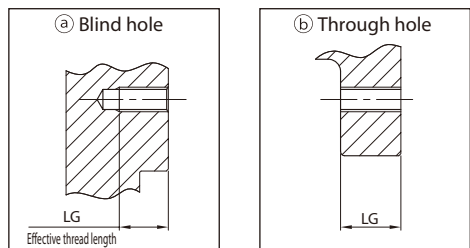
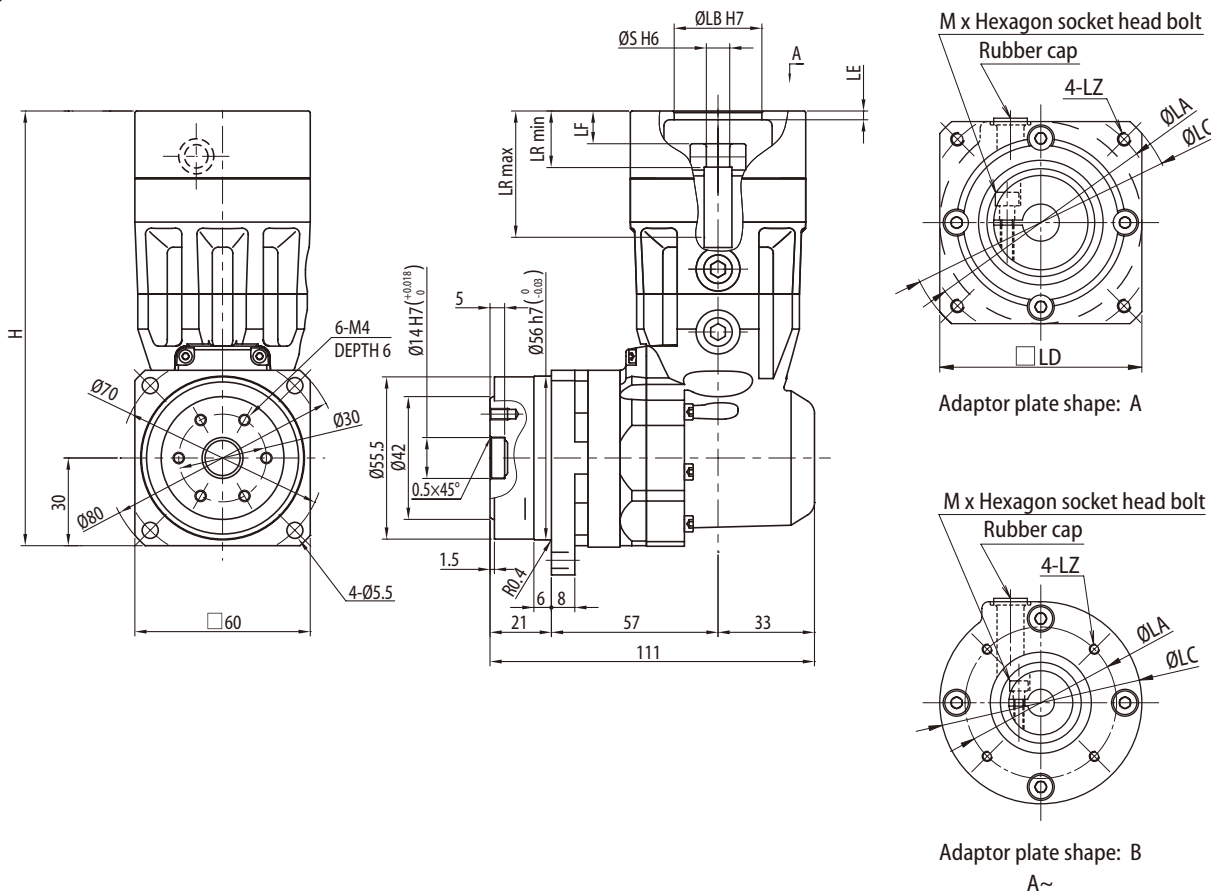
Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
2C	45	30	60	-	5	11	7	(a) Blind hole	B	M3	46.5	19	8	M3	149	1.91	2C
7J	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	6	M3	149	1.91	7J
2D	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	8	M3	149	1.91	2D
2E	60	50	80	60	4	8.5	9	(a) Blind hole	A	M4	44	16.5	8	M3	146.5	1.90	2E
2K	60	50	80	60	4	6	9	(a) Blind hole		M4	44	16.5	11	M4	146.5	1.94	2K
2F	70	50	80	60	4	8.5	10	(b) Through hole		M4	44	16.5	8	M3	146.5	1.90	2F
2L	70	50	80	60	4	6	10	(b) Through hole		M4	44	16.5	11	M4	146.5	1.94	2L
2G	70	50	80	60	4	8.5	10	(b) Through hole		M5	44	16.5	8	M3	146.5	1.90	2G
2H	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	9	M4	146.5	1.94	2H
2R	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	14	M4	148	1.92	2R
8A	90	70	105	80	6	7.5	12	(b) Through hole		M5	45.5	18	11	M4	148	2.04	8A
2T	90	70	105	80	6	7.5	12	(b) Through hole		M6	45.5	18	14	M4	148	2.02	2T

Note 1: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: P110
 Reduction Ratio: 1/45, 1/50, 1/63, 1/68
 Flange Shaft

PK1 Type



Nomenclature
 ANFX-PK110F - Motor flange code Backlash — Reduction ratio (45, 50, 63, 68)
 6 min: LB
 15 min: LD

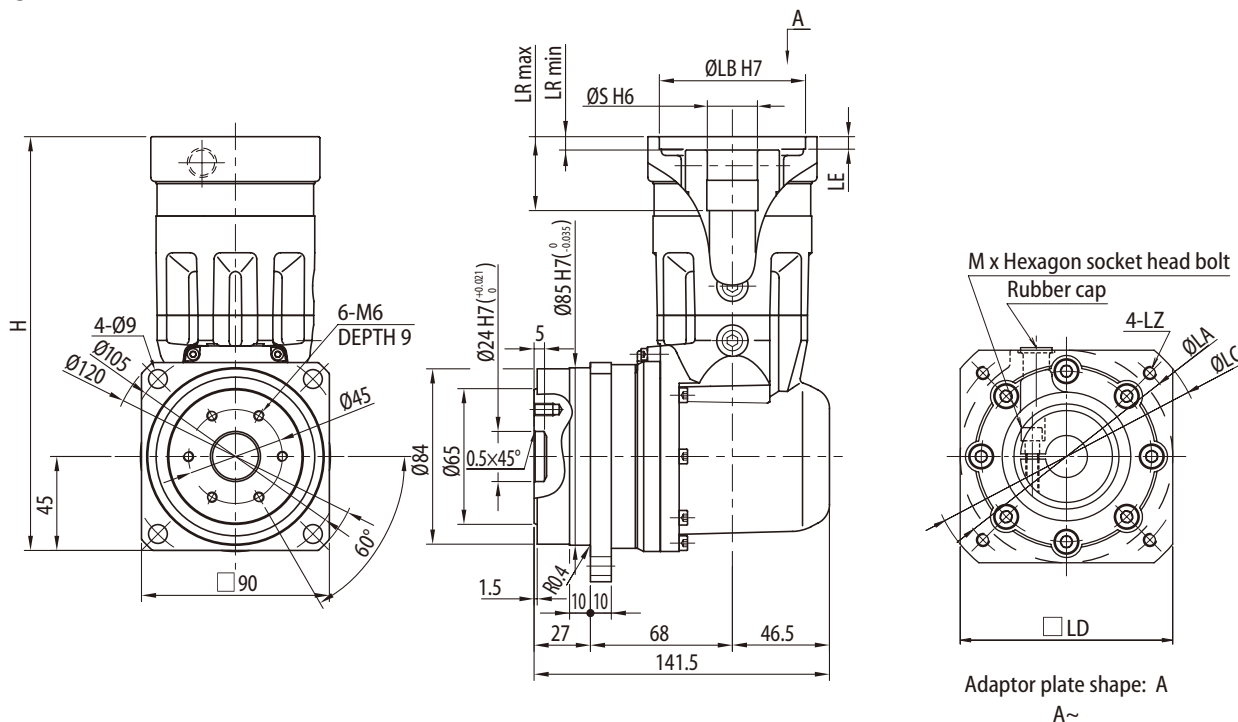
Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
2C	45	30	60	-	5	11	7	(a) Blind hole	B	M3	46.5	19	8	M3	149	2.16	2C
7J	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	6	M3	149	2.16	7J
2D	46	30	60	-	5	11	9	(a) Blind hole		M4	46.5	19	8	M3	149	2.16	2D
2E	60	50	80	60	4	8.5	9	(a) Blind hole	A	M4	44	16.5	8	M3	146.5	2.15	2E
2F	70	50	80	60	4	8.5	10	(b) Through hole		M4	44	16.5	8	M3	146.5	2.15	2F
2G	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	8	M3	146.5	2.15	2G
2H	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	9	M4	146.5	2.19	2H
2R	70	50	80	60	4	6	10	(b) Through hole		M5	44	16.5	14	M4	146.5	1.96	2R
2T	90	70	105	80	6	7.5	12	(b) Through hole	M6	45.5	18	14	M4	148	2.06	2T	

Note 1: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK120
 Reduction Ratio: 1/6
 Flange Shaft

PK1 Type



Nomenclature
 ANFX-PK120F - Motor flange code Backlash — Reduction ratio (6)
 6 min: LB
 15 min: LD

Detail of thread hole shape for motor attachment

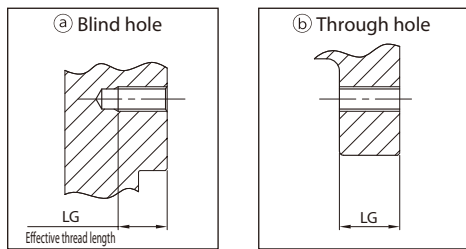
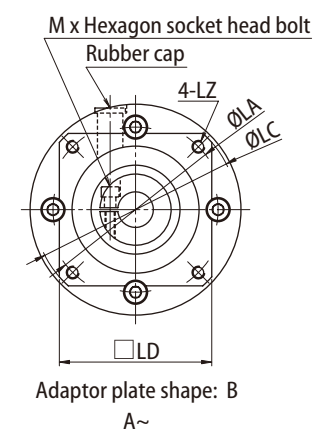
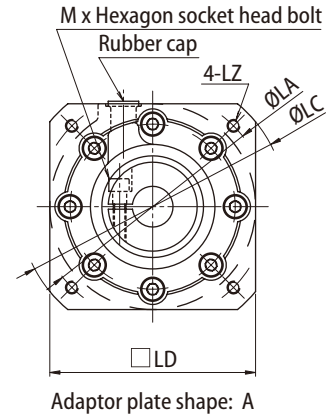
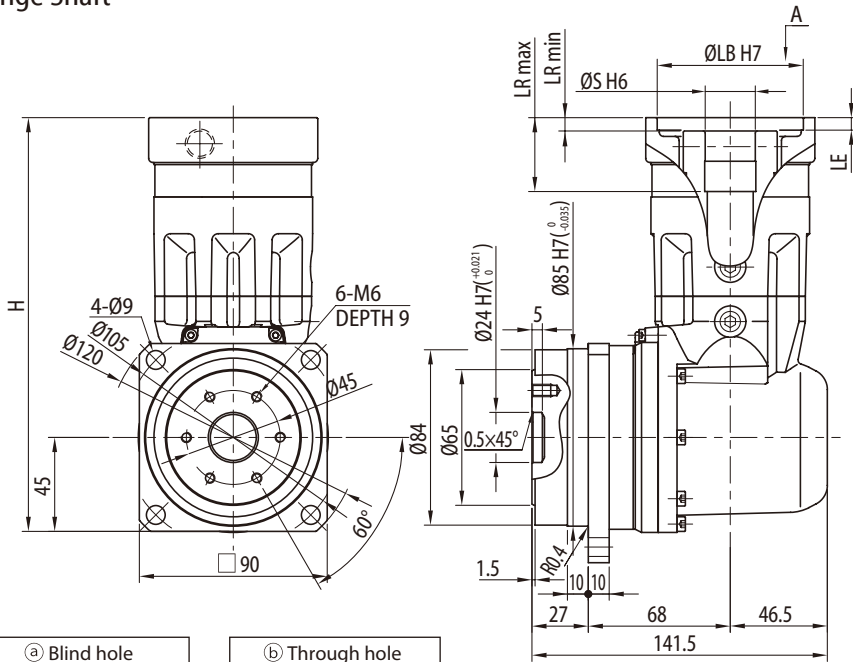
Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
0U	90	70	105	81	6	6	12	ⓑ Through hole	A	M5	50	18.5	16	M5	183	4.9	0U
7S	90	70	105	81	6	6	12	ⓑ Through hole		M5	50	18.5	19	M5	183	4.8	7S
7P	90	70	105	81	6	6	12	ⓑ Through hole		M6	50	18.5	16	M5	183	4.9	7P
1G	90	70	105	81	6	6	12	ⓑ Through hole		M6	50	18.5	19	M5	183	4.8	1G
0V ^{*1}	100	80	120	90	5	21.5	12	ⓑ Through hole		M6	63.5	32	14	M4	196.5	5.0	0V ^{*1}
8E	100	80	120	90	5	19.5	12	ⓑ Through hole		M6	63.5	32	16	M5	196.5	5.0	8E
7V	100	80	120	90	5	19.5	12	ⓑ Through hole		M6	63.5	32	19	M5	196.5	4.9	7V
1L	115	95	135	100	6	17	16	ⓑ Through hole		M6	46	31.5	24	M6	209.5	5.3	1L
7A	115	95	135	100	6	19.5	16	ⓑ Through hole		M8	63.5	32	16	M5	196.5	5.1	7A
7B	115	95	135	100	6	19.5	16	ⓑ Through hole		M8	63.5	32	19	M5	196.5	5.0	7B
0W	115	95	135	100	6	17	16	ⓑ Through hole		M8	46	31.5	22	M6	209.5	5.4	0W
7Y	115	95	135	100	6	17	16	ⓑ Through hole		M8	46	31.5	24	M6	209.5	5.3	7Y
0Y	135	110	165	120	7	17	16	ⓑ Through hole		M8	46	31.5	22	M6	209.5	5.5	0Y
7R	145	110	165	120	7	22.5	16	ⓑ Through hole		M8	66.5	35	16	M5	199.5	5.2	7R
7X	145	110	165	120	7	22.5	16	ⓑ Through hole		M8	66.5	35	19	M5	199.5	5.2	7X
1S	145	110	165	120	7	42	16	ⓑ Through hole		M8	71	56.5	22	M6	234.5	5.7	1S
7Z	145	110	165	120	7	42	16	ⓑ Through hole	M8	71	56.5	24	M6	234.5	5.6	7Z	

Note 1: Tolerance of coupling for motor flange code "0V" is over tolerance (+0.012~+0.023).

2: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK120
 Reduction Ratio: 1/8
 Flange Shaft



Detail of thread hole shape for motor attachment

Nomenclature
 ANFX-PK120F - Motor flange code Backlash — Reduction ratio (8)

6 min: LB
 15 min: LD

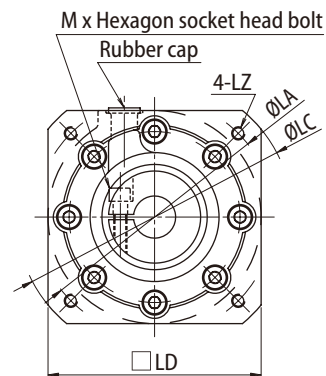
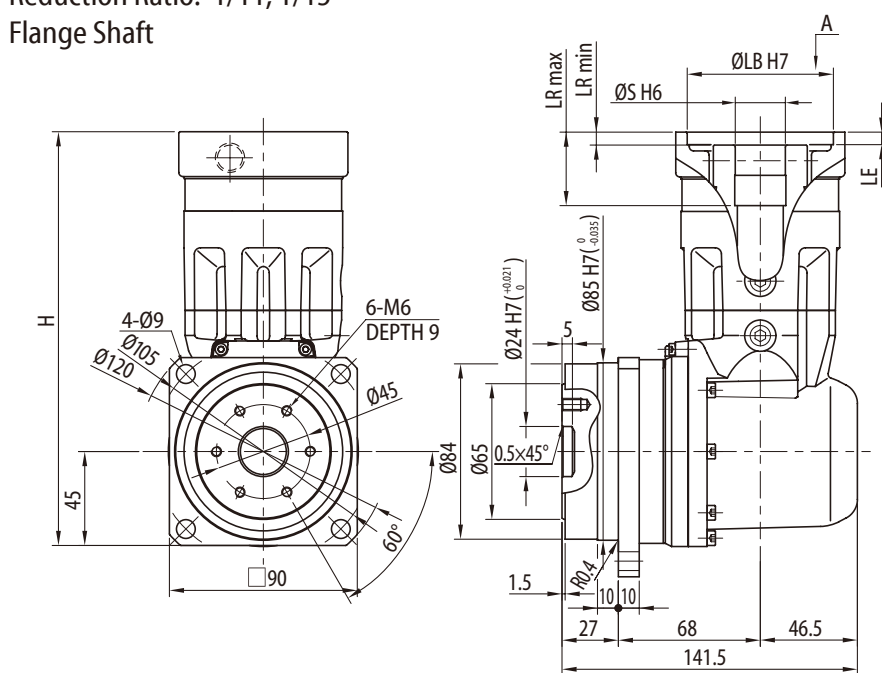
Motor flange code	Dimension								Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG	max				min						
2R	70	50	80	60	6	6	11	ⓐ Blind hole	B	M5	48	16.5	14	M4	181	4.9	2R	
0U	90	70	105	81	6	6	12	ⓑ Through hole		M5	50	18.5	16	M5	183	4.9	0U	
7S	90	70	105	81	6	6	12	ⓑ Through hole		M5	50	18.5	19	M5	183	4.8	7S	
7P	90	70	105	81	6	6	12	ⓑ Through hole		M6	50	18.5	16	M5	183	4.9	7P	
1G	90	70	105	81	6	6	12	ⓑ Through hole		M6	50	18.5	19	M5	183	4.8	1G	
2J	100	80	120	90	5	21.5	12	ⓑ Through hole		M6	63.5	32	10	M4	196.5	5.0	2J	
0V*1	100	80	120	90	5	21.5	12	ⓑ Through hole		M6	63.5	32	14	M4	196.5	5.0	0V*1	
8E	100	80	120	90	5	19.5	12	ⓑ Through hole		M6	63.5	32	16	M5	196.5	5.0	8E	
7V	100	80	120	90	5	19.5	12	ⓑ Through hole		M6	63.5	32	19	M5	196.5	4.9	7V	
1L	115	95	135	100	6	17	16	ⓑ Through hole		A	M6	46	31.5	24	M6	209.5	5.3	1L
7A	115	95	135	100	6	19.5	16	ⓑ Through hole			M8	63.5	32	16	M5	196.5	5.1	7A
7B	115	95	135	100	6	19.5	16	ⓑ Through hole			M8	63.5	32	19	M5	196.5	5.0	7B
0W	115	95	135	100	6	17	16	ⓑ Through hole			M8	46	31.5	22	M6	209.5	5.4	0W
7Y	115	95	135	100	6	17	16	ⓑ Through hole			M8	46	31.5	24	M6	209.5	5.3	7Y
0Y	135	110	165	120	7	17	16	ⓑ Through hole			M8	46	31.5	22	M6	209.5	5.5	0Y
7R	145	110	165	120	7	22.5	16	ⓑ Through hole			M8	66.5	35	16	M5	199.5	5.2	7R
7X	145	110	165	120	7	22.5	16	ⓑ Through hole	M8		66.5	35	19	M5	199.5	5.2	7X	
1S	145	110	165	120	7	42	16	ⓑ Through hole	M8	71	56.5	22	M6	234.5	5.7	1S		
7Z	145	110	165	120	7	42	16	ⓑ Through hole	M8	71	56.5	24	M6	234.5	5.6	7Z		

Note 1: Tolerance of coupling for motor flange code "0V" is over tolerance (+0.012~+0.023).

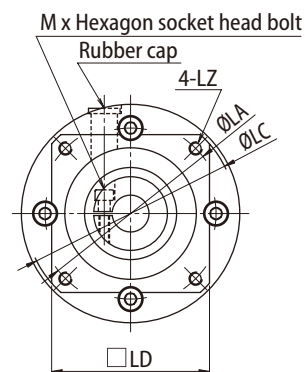
2: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

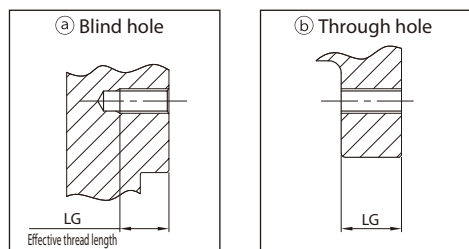
Frame Size: PK120
 Reduction Ratio: 1/11, 1/15
 Flange Shaft



Adaptor plate shape: A



Adaptor plate shape: B
A~



Detail of thread hole shape for motor attachment

Nomenclature
 ANFX-PK120F - Motor flange code Backlash — Reduction ratio (11, 15)

6 min: LB
 15 min: LD

Motor flange code	LA	LB	LC	LD	LE	LF	LG	Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
2P	70	50	80	60	6	6	9	(a) Blind hole	B	M4	48	16.5	14	M4	181	5.2	2P
2R	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	14	M4	181	5.2	2R
8B	90	70	105	81	6	8	12	(b) Through hole		M5	50	18.5	14	M4	183	5.2	8B
0U	90	70	105	81	6	6	12	(b) Through hole		M5	50	18.5	16	M5	183	5.2	0U
7S	90	70	105	81	6	6	12	(b) Through hole		M5	50	18.5	19	M5	183	5.2	7S
2T	90	70	105	81	6	8	12	(b) Through hole		M6	50	18.5	14	M4	183	5.2	2T
7P	90	70	105	81	6	6	12	(b) Through hole		M6	50	18.5	16	M5	183	5.2	7P
1G	90	70	105	81	6	6	12	(b) Through hole		M6	50	18.5	19	M5	183	5.2	1G
2J	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	10	M4	196.5	5.3	2J
0V *1	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	14	M4	196.5	5.3	0V *1
8E	100	80	120	90	5	19.5	12	(b) Through hole		M6	63.5	32	16	M5	196.5	5.3	8E
7V	100	80	120	90	5	19.5	12	(b) Through hole		M6	63.5	32	19	M5	196.5	5.3	7V
1L	115	95	135	100	6	17	16	(b) Through hole		M6	46	31.5	24	M6	209.5	5.7	1L
7A	115	95	135	100	6	19.5	16	(b) Through hole		M8	63.5	32	16	M5	196.5	5.4	7A
0W	115	95	135	100	6	17	16	(b) Through hole		M8	46	31.5	22	M6	209.5	5.7	0W
7Y	115	95	135	100	6	17	16	(b) Through hole		M8	46	31.5	24	M6	209.5	5.7	7Y
0Y	135	110	165	120	7	17	16	(b) Through hole	M8	46	31.5	22	M6	209.5	5.8	0Y	
7R	145	110	165	120	7	22.5	16	(b) Through hole	M8	66.5	35	16	M5	199.5	5.5	7R	
7X	145	110	165	120	7	22.5	16	(b) Through hole	M8	66.5	35	19	M5	199.5	5.5	7X	
7Z	145	110	165	120	7	42	16	(b) Through hole	M8	71	56.5	24	M6	234.5	6.0	7Z	

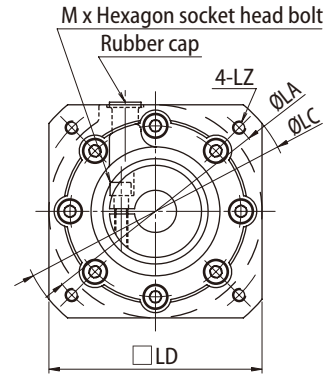
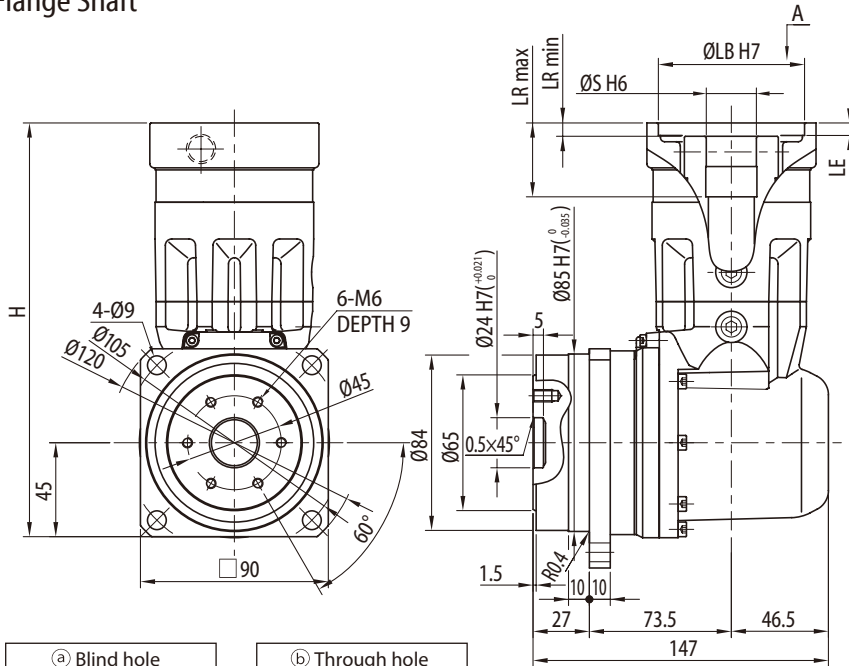
Note 1: Tolerance of coupling for motor flange code "0V" is over tolerance (+0.012~+0.023).

2: Dimensions and mass shown in the above figures are subject to change without prior notification.

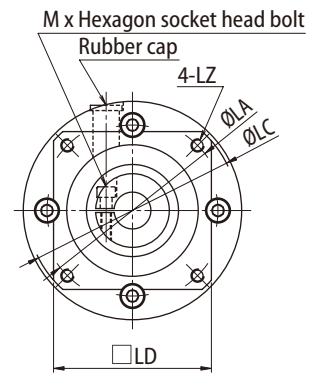
PK1 Type

Dimension Drawings

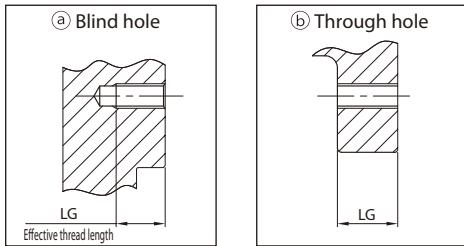
Frame Size: PK120
 Reduction Ratio: 1/23
 Flange Shaft



Adaptor plate shape: A



Adaptor plate shape: B
 A~



Detail of thread hole shape for motor attachment

Nomenclature
 ANFX-PK120F - Motor flange code Backlash — Reduction ratio (23)

6 min: LB
 15 min: LD

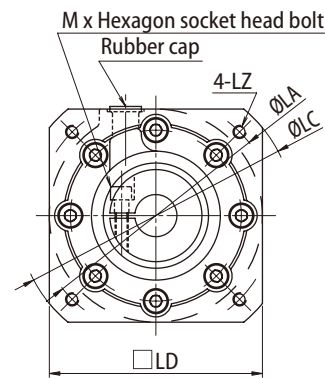
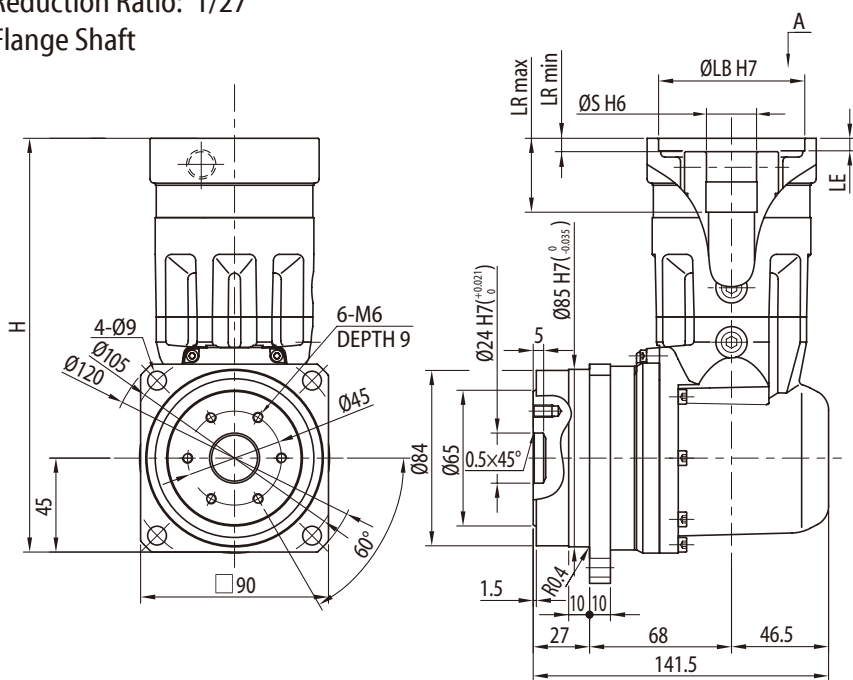
Motor flange code	LA	LB	LC	LD	LE	LF	LG	Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
2P	70	50	80	60	6	6	9	(a) Blind hole	B	M4	48	16.5	14	M4	181	5.2	2P
2H	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	9	M4	181	5.2	2H
2R	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	14	M4	181	5.2	2R
8B	90	70	105	81	6	8	12	(b) Through hole	A	M5	50	18.5	14	M4	183	5.2	8B
0U	90	70	105	81	6	6	12	(b) Through hole		M5	50	18.5	16	M5	183	5.2	0U
7S	90	70	105	81	6	6	12	(b) Through hole		M5	50	18.5	19	M5	183	5.2	7S
2T	90	70	105	81	6	8	12	(b) Through hole		M6	50	18.5	14	M4	183	5.2	2T
7P	90	70	105	81	6	6	12	(b) Through hole		M6	50	18.5	16	M5	183	5.2	7P
1G	90	70	105	81	6	6	12	(b) Through hole		M6	50	18.5	19	M5	183	5.2	1G
2J	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	10	M4	196.5	5.3	2J
0V*1	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	14	M4	196.5	5.3	0V*1
8E	100	80	120	90	5	19.5	12	(b) Through hole		M6	63.5	32	16	M5	196.5	5.3	8E
7A	115	95	135	100	6	19.5	16	(b) Through hole		M8	63.5	32	16	M5	196.5	5.4	7A
7R	145	110	165	120	7	22.5	16	(b) Through hole	M8	66.5	35	16	M5	199.5	5.5	7R	
7X	145	110	165	120	7	22.5	16	(b) Through hole		66.5	35	19	M5	199.5	5.5	7X	
7Z	145	110	165	120	7	42	16	(b) Through hole		71	56.5	24	M6	234.5	6.0	7Z	

Note 1: Tolerance of coupling for motor flange code "0V" is over tolerance (+0.012~+0.023).

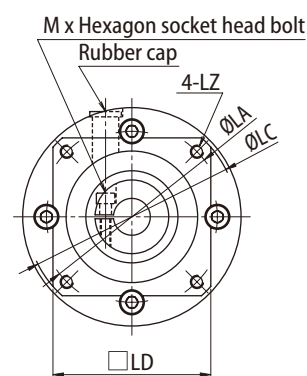
2: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK120
 Reduction Ratio: 1/27
 Flange Shaft

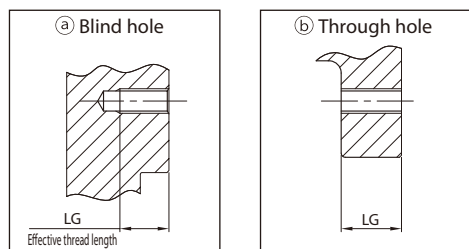


Adaptor plate shape: A



Adaptor plate shape: B

A~



Detail of thread hole shape for motor attachment

Nomenclature
 ANFX-PK120F - Motor flange code Backlash — Reduction ratio (27)

6 min: LB
 15 min: LD

Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
2P	70	50	80	60	6	6	9	(a) Blind hole	B	M4	48	16.5	14	M4	181	4.9	2P
2H	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	9	M4	181	4.8	2H
2R	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	14	M4	181	4.9	2R
8B	90	70	105	81	6	8	12	(b) Through hole	A	M5	50	18.5	14	M4	183	4.9	8B
0U	90	70	105	81	6	6	12	(b) Through hole		M5	50	18.5	16	M5	183	4.9	0U
7S	90	70	105	81	6	6	12	(b) Through hole		M5	50	18.5	19	M5	183	4.8	7S
2T	90	70	105	81	6	8	12	(b) Through hole		M6	50	18.5	14	M4	183	4.9	2T
7P	90	70	105	81	6	6	12	(b) Through hole		M6	50	18.5	16	M5	183	4.9	7P
1G	90	70	105	81	6	6	12	(b) Through hole		M6	50	18.5	19	M5	183	4.8	1G
2J	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	10	M4	196.5	5.0	2J
0V*1	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	14	M4	196.5	5.0	0V*1
8E	100	80	120	90	5	19.5	12	(b) Through hole		M6	63.5	32	16	M5	196.5	5.0	8E
7A	115	95	135	100	6	19.5	16	(b) Through hole		M8	63.5	32	16	M5	196.5	5.1	7A
7R	145	110	165	120	7	22.5	16	(b) Through hole	M8	66.5	35	16	M5	199.5	5.2	7R	
7X	145	110	165	120	7	22.5	16	(b) Through hole	M8	66.5	35	19	M5	199.5	5.2	7X	
7Z	145	110	165	120	7	42	16	(b) Through hole	M8	71	56.5	24	M6	234.5	5.6	7Z	

Note 1: Tolerance of coupling for motor flange code "0V" is over tolerance (+0.012~+0.023).

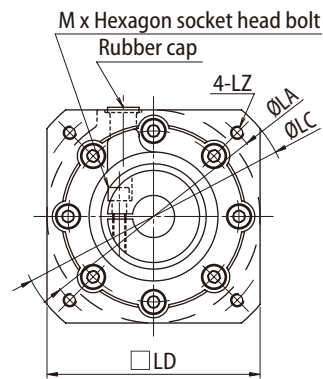
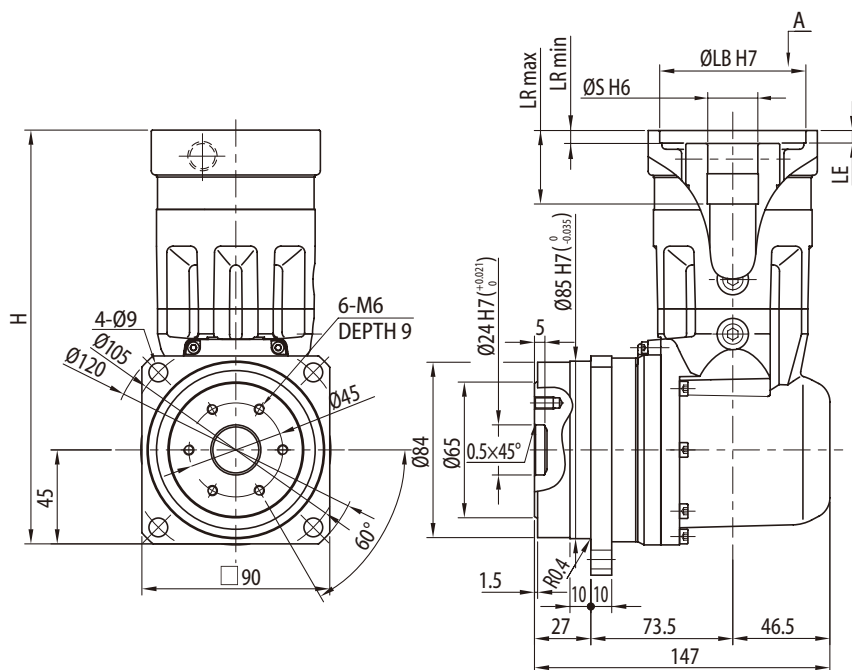
2: Dimensions and mass shown in the above figures are subject to change without prior notification.

PK1 Type

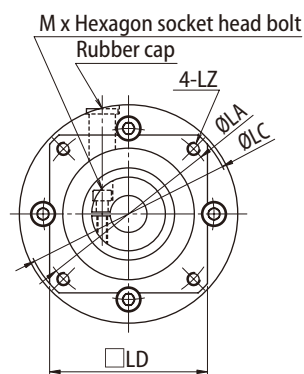
Dimension Drawings

PK1 Type

Frame Size: PK120
 Reduction Ratio: 1/45, 50, 63, 68
 Flange Shaft

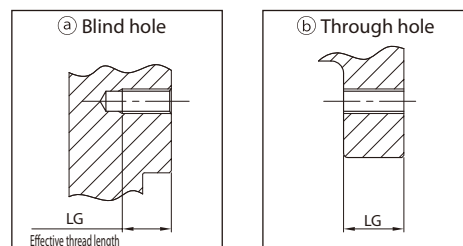


Adaptor plate shape: A



Adaptor plate shape: B

A~



Detail of thread hole shape for motor attachment

Nomenclature
 ANFX-PK120F - Motor flange code Backlash — Reduction ratio (45, 50, 63, 68)

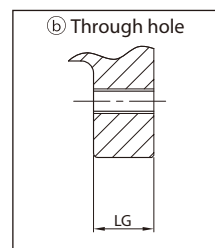
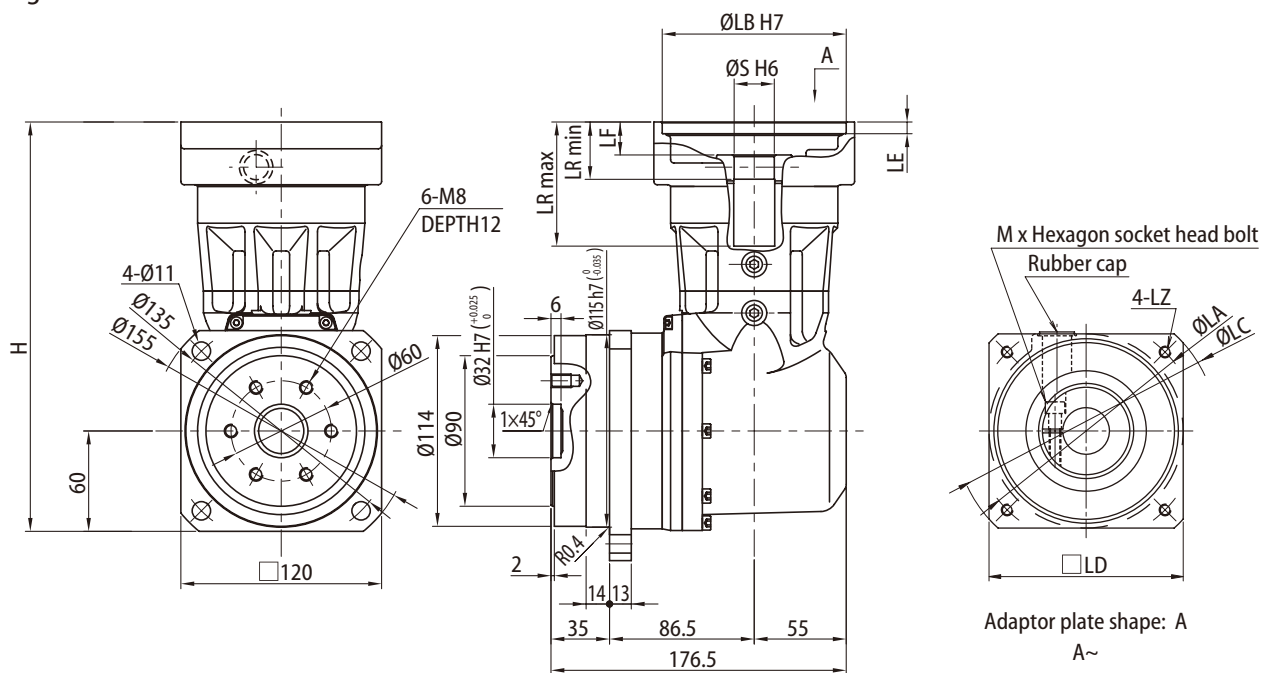
6 min: LB
 15 min: LD

Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
2K	60	50	80	60	6	6	9	(a) Blind hole	B	M4	48	16.5	11	M4	181	5.2	2K
2L	70	50	80	60	6	6	9	(a) Blind hole		M4	48	16.5	11	M4	181	5.2	2L
2P	70	50	80	60	6	6	9	(a) Blind hole		M4	48	16.5	14	M4	181	5.2	2P
2H	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	9	M4	181	5.2	2H
2R	70	50	80	60	6	6	11	(a) Blind hole		M5	48	16.5	14	M4	181	5.2	2R
8A	90	70	105	81	6	8	12	(b) Through hole	A	M5	50	18.5	11	M4	183	5.2	8A
8B	90	70	105	81	6	8	12	(b) Through hole		M5	50	18.5	14	M4	183	5.2	8B
2T	90	70	105	81	6	8	12	(b) Through hole		M6	50	18.5	14	M4	183	5.2	2T
2J	100	80	120	90	5	21.5	12	(b) Through hole		M6	63.5	32	10	M4	196.5	5.3	2J

Note 1: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK130
 Reduction Ratio: 1/6
 Flange Shaft



Detail of thread hole shape for motor attachment

Nomenclature
 ANFX-PK130F - Motor flange code Backlash — Reduction ratio (6)

6 min: LB
 15 min: LD

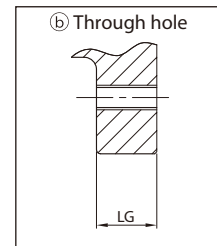
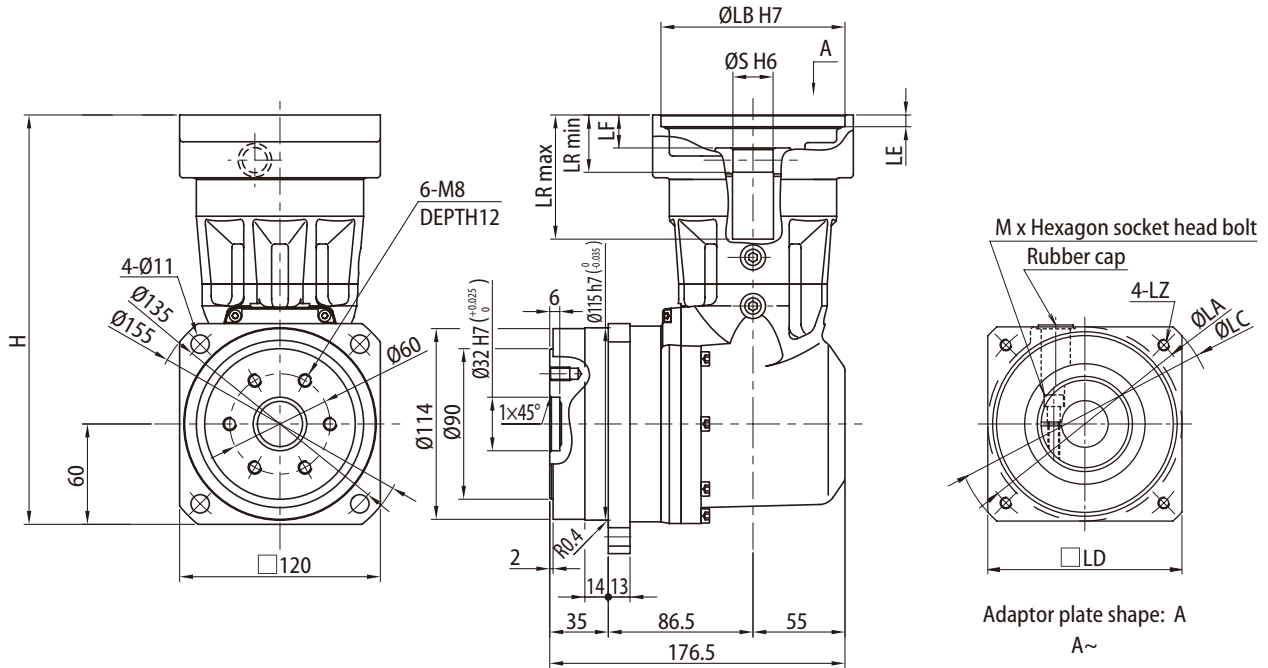
Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
1S	145	110	165	120	7	19.5	16	ⓑ Through hole	A	M8	74	34	22	M6	245	11.5	1S
7Z	145	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	24	M6	245	11.5	7Z
1T	145	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	28	M6	245	11.5	1T
OZ	135	110	165	120	7	19.5	16	ⓑ Through hole		M8	74	34	28	M6	245	11.5	OZ
OX *1	200	114.3	230	180	6	41.5	24	ⓑ Through hole		M12	81	60	35	M8	290	13.1	OX *1

Note 1: Tolerance of coupling for motor flange code "OX" is over tolerance (+0.012~+0.023).

2: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK130
 Reduction Ratio: 1/8
 Flange Shaft



Detail of thread hole shape for motor attachment

Nomenclature
 ANFX-PK130F - Motor flange code Backlash Reduction ratio (8)

6 min: LB
 15 min: LD

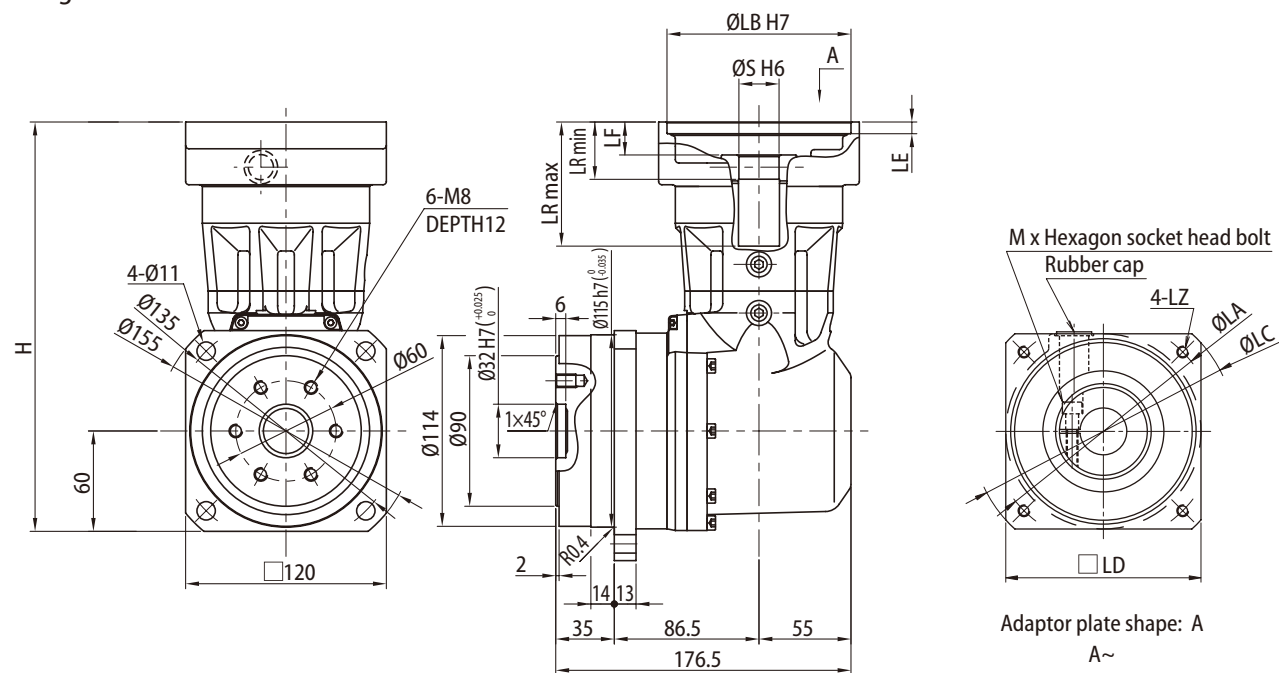
Motor flange code	Dimension							Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG				max	min					
1L	115	95	135	100	6	11.5	16	b) Through hole	A	M6	66	26	24	M6	237	11.1	1L
7B	115	95	135	100	6	13.5	16	b) Through hole		M8	66	26	19	M5	237	11.1	7B
0W	115	95	135	100	6	11.5	16	b) Through hole		M8	66	26	22	M6	237	11.2	0W
7Y	115	95	135	100	6	11.5	16	b) Through hole		M8	66	26	24	M6	237	11.1	7Y
0Y	135	110	165	120	7	19.5	16	b) Through hole		M8	74	34	22	M6	245	11.5	0Y
7X	145	110	165	120	7	21.5	16	b) Through hole		M8	74	34	19	M5	245	11.4	7X
1S	145	110	165	120	7	19.5	16	b) Through hole		M8	74	34	22	M6	245	11.5	1S
7Z	145	110	165	120	7	19.5	16	b) Through hole		M8	74	34	24	M6	245	11.5	7Z
1T	145	110	165	120	7	19.5	16	b) Through hole		M8	74	34	28	M6	245	11.5	1T
0Z	135	110	165	120	7	19.5	16	b) Through hole		M8	74	34	28	M6	245	11.5	0Z
0X*1	200	114.3	230	180	6	41.5	24	b) Through hole		M12	81	60	35	M8	290	13.1	0X*1

Note 1: Tolerance of coupling for motor flange code "0X" is over tolerance (+0.012~+0.023).

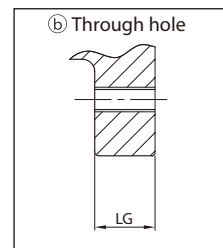
2: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK130
 Reduction Ratio: 1/11, 1/15
 Flange Shaft



Nomenclature
 ANFX-PK130F - Motor flange code Backlash — Reduction ratio (11, 15)
 6 min: LB
 15 min: LD



Detail of thread hole shape for motor attachment

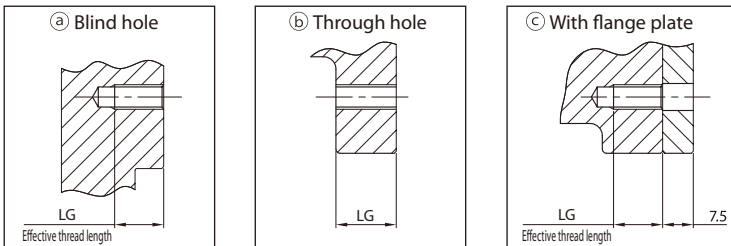
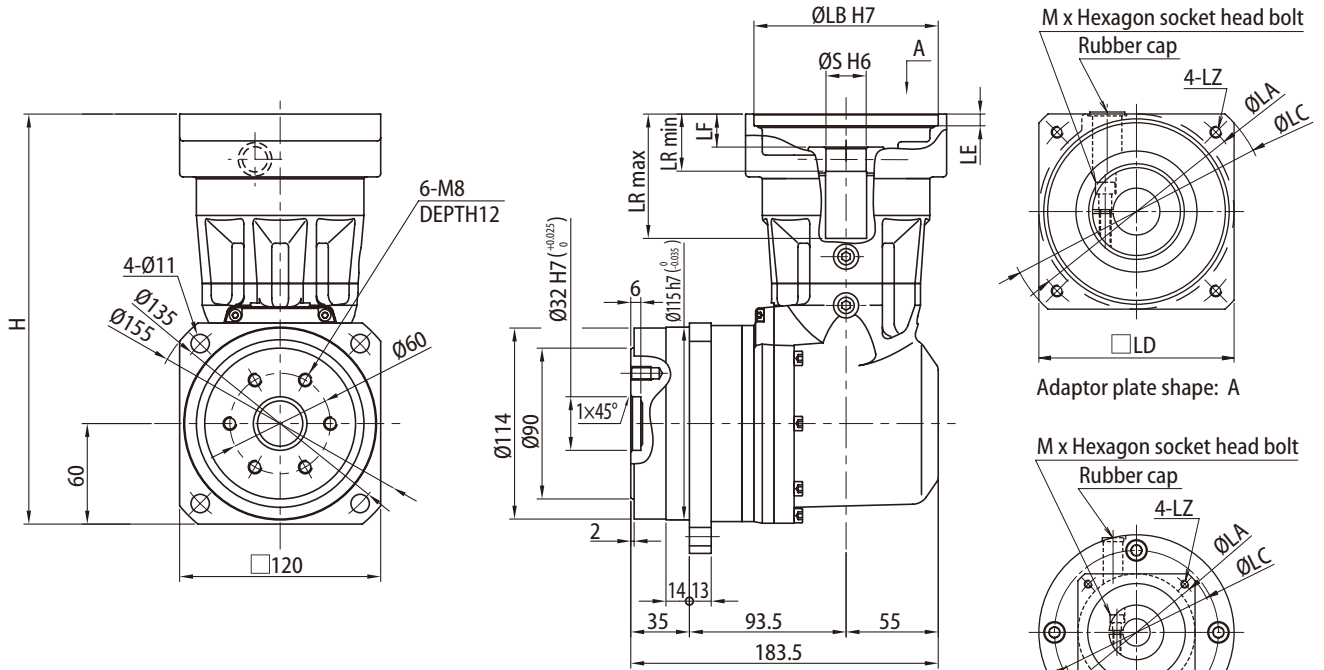
Motor flange code	Dimension								Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
	LA	LB	LC	LD	LE	LF	LG	max				min						
1L	115	95	135	100	6	11.5	16	b) Through hole	A	M6	66	26	24	M6	237	11.9	1L	
7B	115	95	135	100	6	13.5	16	b) Through hole		M8	66	26	19	M5	237	11.8	7B	
0W	115	95	135	100	6	11.5	16	b) Through hole		M8	66	26	22	M6	237	11.9	0W	
7Y	115	95	135	100	6	11.5	16	b) Through hole		M8	66	26	24	M6	237	11.9	7Y	
0Y	135	110	165	120	7	19.5	16	b) Through hole		M8	74	34	22	M6	245	12.3	0Y	
7X	145	110	165	120	7	21.5	16	b) Through hole		M8	74	34	19	M5	245	12.2	7X	
1S	145	110	165	120	7	19.5	16	b) Through hole		M8	74	34	22	M6	245	12.3	1S	
7Z	145	110	165	120	7	19.5	16	b) Through hole		M8	74	34	24	M6	245	12.2	7Z	
1T	145	110	165	120	7	19.5	16	b) Through hole		M8	74	34	28	M6	245	12.3	1T	
0X*1	200	114.3	230	180	6	41.5	24	b) Through hole		M12	81	60	35	M8	290	14.0	0X*1	

Note 1: Tolerance of coupling for motor flange code "0X" is over tolerance (+0.012~+0.023).
 2: Dimensions and mass shown in the above figures are subject to change without prior notification.

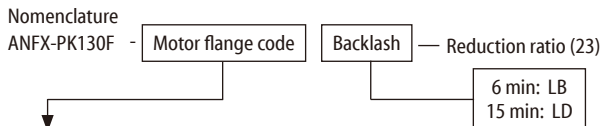
PK1 Type

Dimension Drawings

Frame Size: P130
 Reduction Ratio: 1/23
 Flange Shaft



Detail of thread hole shape for motor attachment

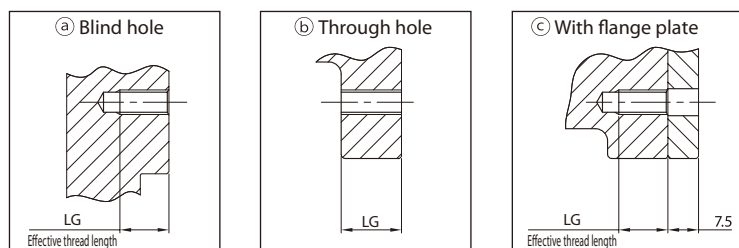
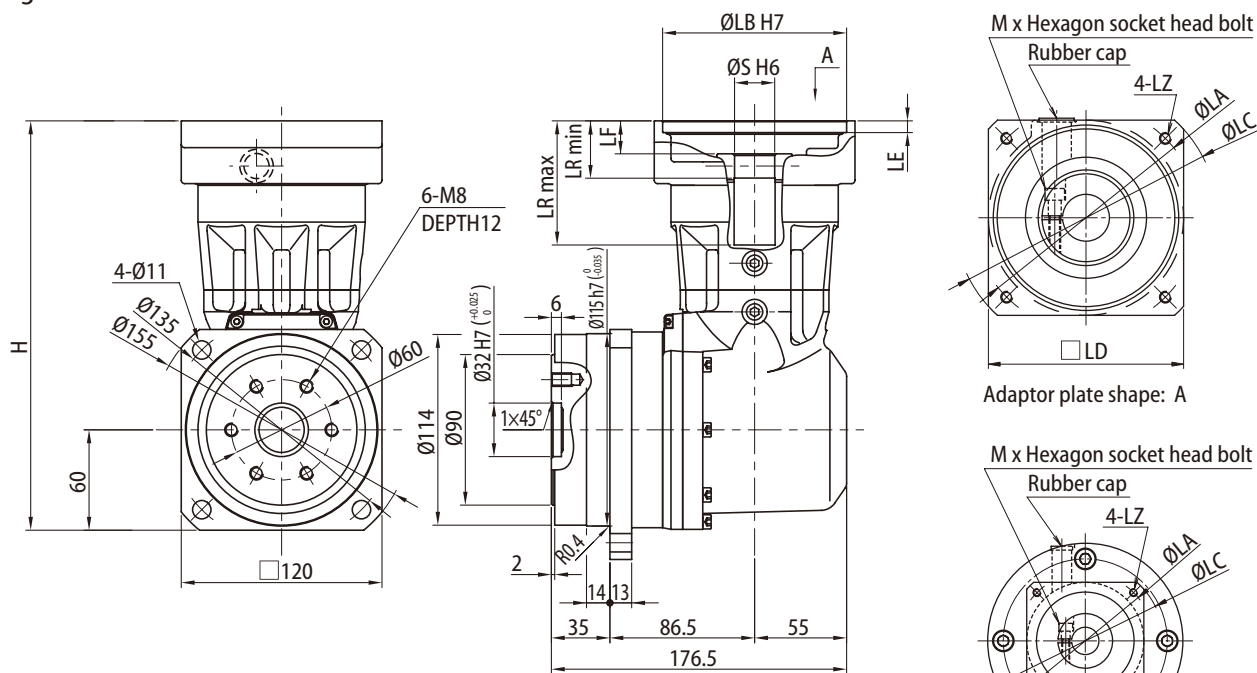


Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
1G	90	70	120	90	6	6	13	(a) Blind hole	B	M6	58.5	18.5	19	M5	229	12.6	1G
8E ^{*1}	100	80	120	90	5	13.5	12	(c) With flange plate	A	M6	66	26	16	M5	237	11.9	8E ^{*1}
7V ^{*1}	100	80	120	90	5	13.5	12	(c) With flange plate		M6	66	26	19	M5	237	11.9	7V ^{*1}
1L	115	95	135	100	6	11.5	16	(b) Through hole		M6	66	26	24	M6	237	11.9	1L
7B	115	95	135	100	6	13.5	16	(b) Through hole		M8	66	26	19	M5	237	11.8	7B
0W	115	95	135	100	6	11.5	16	(b) Through hole		M8	66	26	22	M6	237	11.9	0W
7Y	115	95	135	100	6	11.5	16	(b) Through hole		M8	66	26	24	M6	237	11.9	7Y
0Y	135	110	165	120	7	19.5	16	(b) Through hole		M8	74	34	22	M6	245	12.3	0Y
7X	145	110	165	120	7	21.5	16	(b) Through hole		M8	74	34	19	M5	245	12.2	7X
1S	145	110	165	120	7	19.5	16	(b) Through hole		M8	74	34	22	M6	245	12.3	1S
7Z	145	110	165	120	7	19.5	16	(b) Through hole		M8	74	34	24	M6	245	12.2	7Z

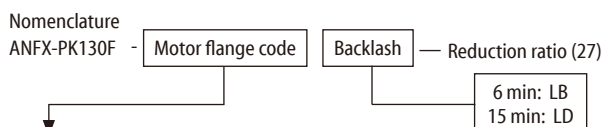
Note 1: Flange plate for motor is attached between the motor and the adaptor plate.
 Note 2: Dimensions and mass shown in the above figures are subject to change without prior notification..

Dimension Drawings

Frame Size: P130
 Reduction Ratio: 1/27
 Flange Shaft



Detail of thread hole shape for motor attachment



Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
1G	90	70	120	90	6	6	13	(a) Blind hole	B	M6	58.5	18.5	19	M5	229	12.6	1G
0V ^{*1} ₂	100	80	120	90	5	15.5	12	(c) With flange plate	A	M6	66	26	14	M4	237	12.7	0V ^{*1} ₂
8E ^{*1}	100	80	120	90	5	13.5	12	(c) With flange plate		M6	66	26	16	M5	237	11.1	8E ^{*1}
7V ^{*1}	100	80	120	90	5	13.5	12	(c) With flange plate		M6	66	26	19	M5	237	11.1	7V ^{*1}
1L	115	95	135	100	6	11.5	16	(b) Through hole		M6	66	26	24	M6	237	11.1	1L
7B	115	95	135	100	6	13.5	16	(b) Through hole		M8	66	26	19	M5	237	11.1	7B
0W	115	95	135	100	6	11.5	16	(b) Through hole		M8	66	26	22	M6	237	11.2	0W
7Y	115	95	135	100	6	11.5	16	(b) Through hole		M8	66	26	24	M6	237	11.1	7Y
0Y	135	110	165	120	7	19.5	16	(b) Through hole		M8	74	34	22	M6	245	11.5	0Y
7X	145	110	165	120	7	21.5	16	(b) Through hole		M8	74	34	19	M5	245	11.4	7X
1S	145	110	165	120	7	19.5	16	(b) Through hole		M8	74	34	22	M6	245	11.5	1S
7Z	145	110	165	120	7	19.5	16	(b) Through hole		M8	74	34	24	M6	245	11.5	7Z

Note 1: Flange plate for motor is attached between the motor and the adaptor plate.
 2: Tolerance of coupling for motor flange code "0V" is over tolerance (+0.012~+0.023).
 3: Dimensions and mass shown in the above figures are subject to change without prior notification.

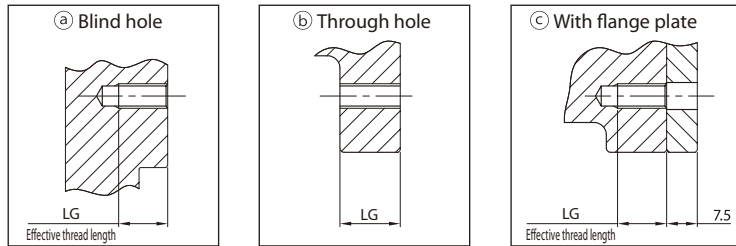
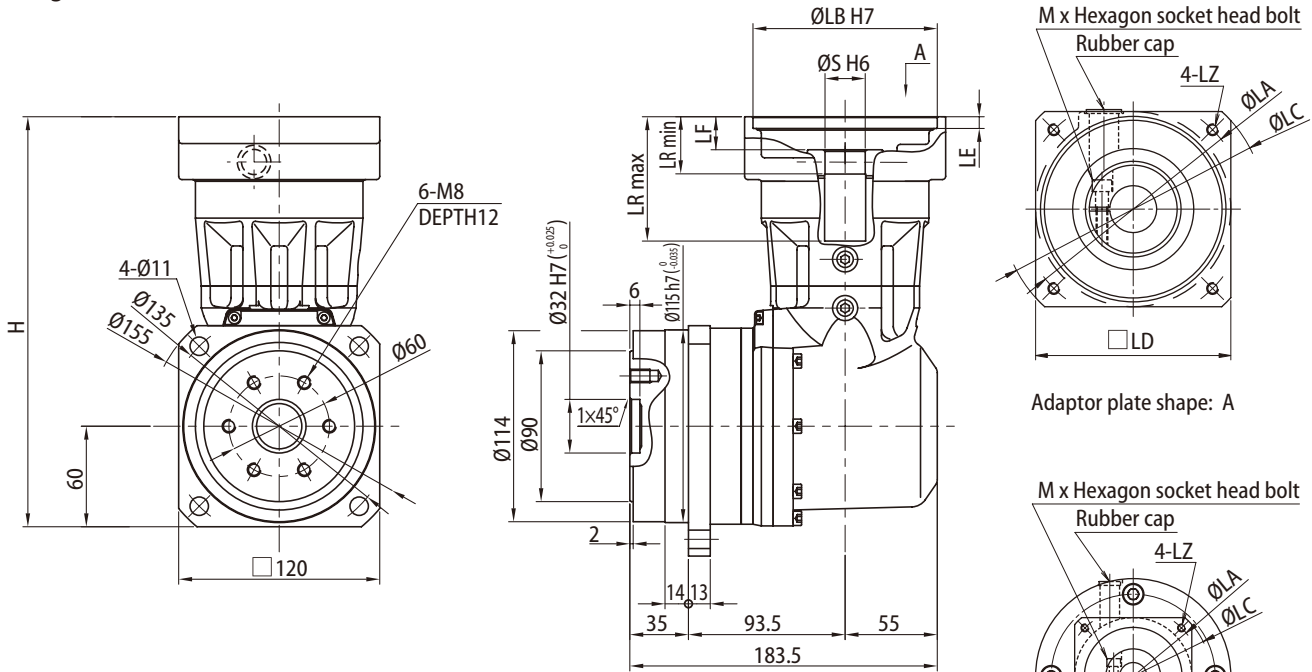
PK1 Type

Dimension Drawings

Frame Size: PK130

Reduction Ratio: 1/33, 45, 50, 63, 68

Flange Shaft



Detail of thread hole shape for motor attachment

Nomenclature

ANFX-PK130F - Motor flange code Backlash — Reduction ratio (33, 45, 50, 63, 68)

6 min: LB
15 min: LD

Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
2R	70	50	80	60	4	5	11	(a) Blind hole	B	M5	55.5	15.5	14	M4	226	11.7	2R
0U	90	70	120	90	6	6	11	(a) Blind hole		M5	58.5	18.5	16	M5	229	11.8	0U
7S	90	70	120	90	6	6	11	(a) Blind hole		M5	58.5	18.5	19	M5	229	11.8	7S
7P	90	70	120	90	6	6	13	(a) Blind hole		M6	58.5	18.5	16	M5	229	11.8	7P
1G	90	70	120	90	6	6	13	(a) Blind hole		M6	58.5	18.5	19	M5	229	11.8	1G
2J ^{*2}	100	80	120	90	5	15.5	12	(c) With flange plate		M6	66	26	10	M4	237	11.8	2J ^{*2}
0V ^{*1} _{*2}	100	80	120	90	5	15.5	12	(c) With flange plate	A	M6	66	26	14	M4	237	11.8	0V ^{*1} _{*2}
8E ^{*2}	100	80	120	90	5	15.5	12	(c) With flange plate		M6	66	26	16	M5	237	11.9	8E ^{*2}
7A	115	95	135	100	6	13.5	16	(b) Through hole		M8	66	26	16	M5	237	11.8	7A
7R	145	110	165	120	7	21.5	16	(b) Through hole		M8	74	34	16	M5	245	12.2	7R
7X	145	110	165	120	7	21.5	16	(b) Through hole		M8	74	34	19	M5	245	12.2	7X
7Z	145	110	165	120	7	19.5	16	(b) Through hole		M8	74	34	24	M6	245	12.2	7Z

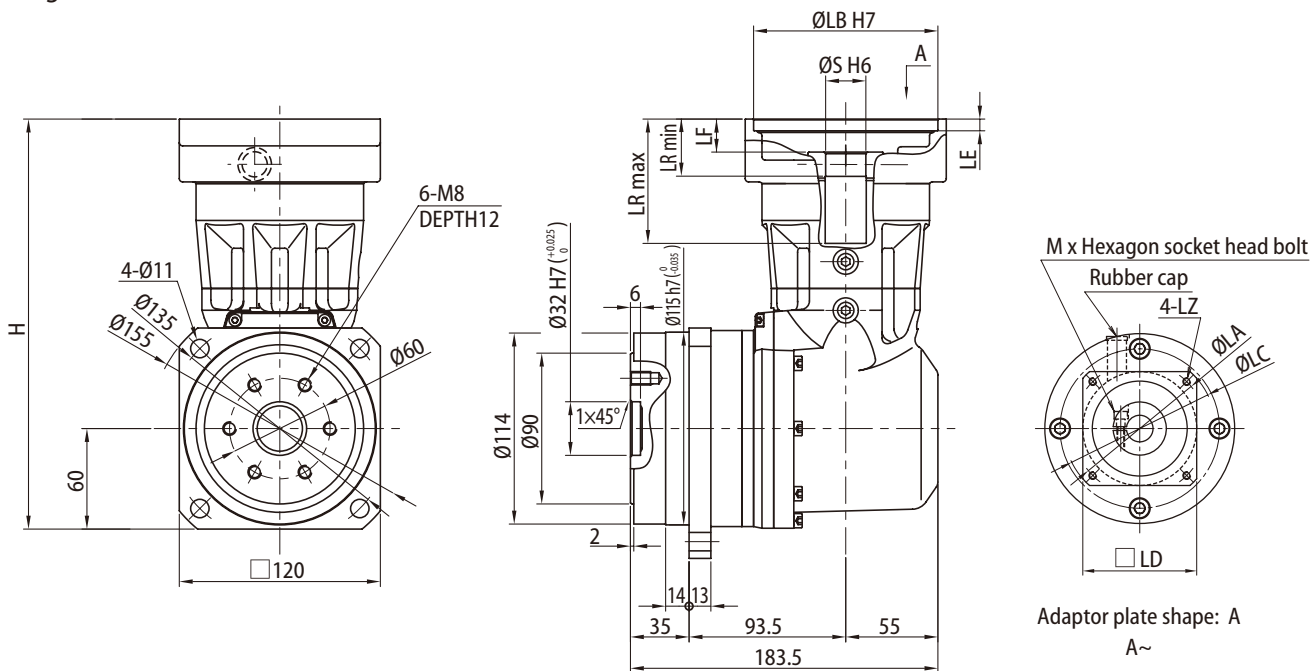
Note 1: Tolerance of coupling for motor flange code "0V" is over tolerance (+0.012~+0.023).

2: Flange plate for motor is attached between the motor and the adaptor plate.

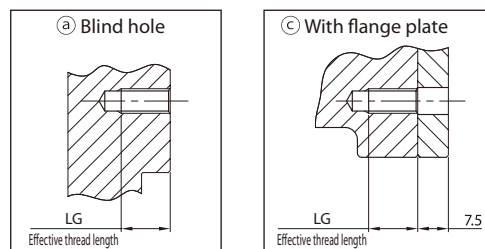
3: Dimensions and mass shown in the above figures are subject to change without prior notification.

Dimension Drawings

Frame Size: PK130
 Reduction Ratio: 1/99, 122, 135, 243
 Flange Shaft



PK1 Type



Detail of thread hole shape for motor attachment

Nomenclature
 ANFX-PK130F - Motor flange code Backlash — Reduction ratio (99, 122, 135, 243)

6 min: LB
 15 min: LD

Motor flange code	LA	LB	LC	LD	LE	LF	LG	Dimension Thread hole Shape for motor attachment	Adaptor plate shape	LZ	LR		S	M	H	Mass [kg]	Motor flange code
											max	min					
2L	70	50	80	60	4	5	9	(a) Blind hole	A	M4	55.5	15.5	11	M4	226	11.7	2L
2P	70	50	80	60	4	5	9	(a) Blind hole		M4	55.5	15.5	14	M4	226	11.7	2P
2H	70	50	80	60	4	5	11	(a) Blind hole		M5	55.5	15.5	9	M4	226	11.7	2H
2R	70	50	80	60	4	5	11	(a) Blind hole		M5	55.5	15.5	14	M4	226	11.7	2R
8A	90	70	120	90	6	8	11	(a) Blind hole		M5	58.5	18.5	11	M4	229	11.8	8A
8B	90	70	120	90	6	8	11	(a) Blind hole		M5	58.5	18.5	14	M4	229	11.8	8B
2T	90	70	120	90	6	8	13	(a) Blind hole		M6	58.5	18.5	14	M4	229	11.8	2T
2J*1	100	80	120	90	5	15.5	12	(c) With flange plate		M6	66	26	10	M4	237	11.8	2J*1
8E*1	100	80	120	90	5	15.5	12	(c) With flange plate		M6	66	26	16	M5	237	12.7	8E*1

Note 1: Flange plate for motor is attached between the motor and the adaptor plate.
 2: Dimensions and mass shown in the above figures are subject to change without prior notification

Durability Check of Output Shaft Part

P1 Type of IB Series uses angular bearing to allow high maximum load moment.

Make sure that your load moment do not exceed the allowable value through the following calculation.

1. Check Maximum Load Moment

$$M_{max} = \frac{F_{rmax} \cdot (L_c + L_r) + F_{amax} \cdot L_a}{10^3} \dots (1)$$

Make sure that: $M_{max} \leq M_c$

Table 4 Symbol in Formula (1)

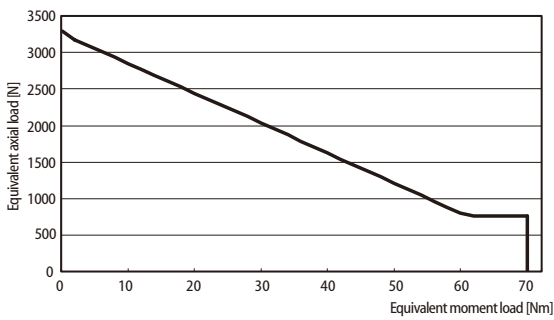
F_{rmax}	Maximum radial load during the operation pattern	N [kgf]	Refer to Fig. 6.
F_{amax}	Maximum axial load during the operation pattern	N [kgf]	
L_r, L_c, L_a	Load application location	mm	

Table 5 Allowable Moment for P1 Type

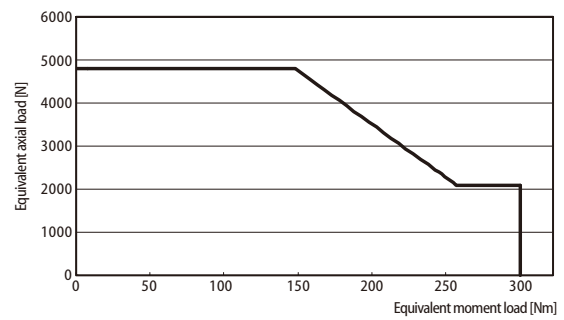
Frame size	Allowable moment M_c	
	Nm	kgfm
P110	70	7.13
P120	300	30.6
P130	620	63.2

Table 6 Dimensions

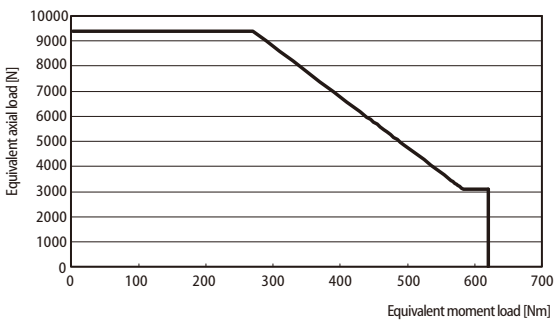
Frame size	Dimension [mm]				
	LB	LC	S	L	Z
P110	52.76	42.38	2	28	19.62
P120	82.56	64.53	2	42	25.97
P130	109.02	86.26	4	82	63.24



P110 Allowable Load Diagram for Moment and Axial Load



P120 Allowable Load Diagram for Moment and Axial Load



P130 Allowable Load Diagram for Moment and Axial Load

- Consult us when the radial load is exerted on the location exceeding the range of "L + S."
- Consult us when the value exceeds the range of allowable load. Units may sometimes be used without problem for some cases, depending on the direction of axial load and the leverage point of the load.

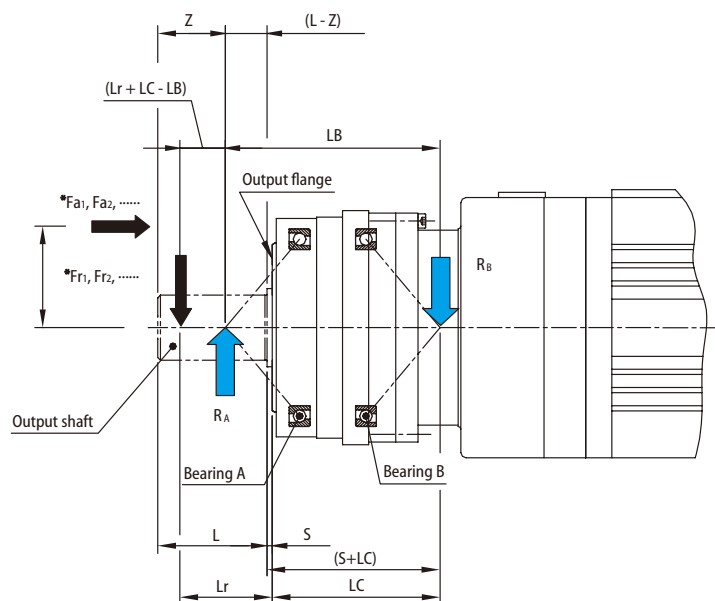


Fig. 5 External Load Effect diagram

*: *Refer to Fig. 6.

Fig. 6 shows the load of each period in the specific operation pattern.

Durability Check of Output Shaft Part

PK1 Type

2. Check Equivalent Load Bearing Lifetime

Check lifetime by converting to equivalent load when radial or axial load varies.

Equivalent radial load: Fre

$$F_{re} = \sqrt[3]{\frac{n_1 \cdot t_1 \cdot (|Fr_1|)^3 + n_2 \cdot t_2 \cdot (|Fr_2|)^3 + \dots + n_n \cdot t_n \cdot (|Fr_n|)^3}{n_1 \cdot t_1 + n_2 \cdot t_2 + \dots + n_n \cdot t_n}} \dots (2)$$

Equivalent axial load: Fae

$$F_{ae} = \sqrt[3]{\frac{n_1 \cdot t_1 \cdot (|Fa_1|)^3 + n_2 \cdot t_2 \cdot (|Fa_2|)^3 + \dots + n_n \cdot t_n \cdot (|Fa_n|)^3}{n_1 \cdot t_1 + n_2 \cdot t_2 + \dots + n_n \cdot t_n}} \dots (3)$$

Equivalent output speed: Neo

$$Neo = \frac{n_1 \cdot t_1 + n_2 \cdot t_2 + \dots + n_n \cdot t_n}{t_1 + t_2 + \dots + t_n} \dots (4)$$

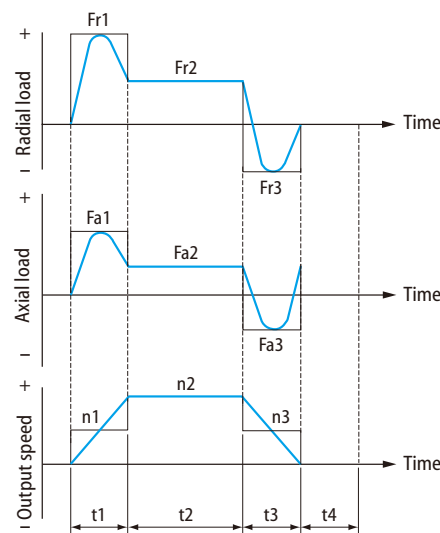


Fig. 6 Example of Load Fluctuation

Table 7 Axial Load Direction and Dynamic Equivalent Load Formula

Axial Load Direction	Load Condition	Bearing Category	Axial Load	Dynamic Equivalent Load
 (Applied to motor side)	$\frac{R_B}{2Y_2} + F_{ae} \geq \frac{R_A}{2Y_2}$	Bearing A	$F_{aA} = \frac{R_B}{2Y_2} + F_{ae}$	$P_A = X \cdot R_A + Y \cdot F_{aA}$ Note: When $P_A < R_A$, use $P_A = R_A$.
		Bearing B	-	$P_B = R_B$
	$\frac{R_B}{2Y_2} + F_{ae} < \frac{R_A}{2Y_2}$	Bearing A	-	$P_A = R_A$
		Bearing B	$F_{aB} = \frac{R_A}{2Y_2} - F_{ae}$	$P_B = X \cdot R_B + Y \cdot F_{aB}$ Note: When $P_B < R_B$, use $P_B = R_B$.
 (Applied to output side)	$\frac{R_B}{2Y_2} \leq \frac{R_A}{2Y_2} + F_{ae}$	Bearing A	-	$P_A = R_A$
		Bearing B	$F_{aB} = \frac{R_A}{2Y_2} + F_{ae}$	$P_B = X \cdot R_B + Y \cdot F_{aB}$ Note: When $P_B < R_B$, use $P_B = R_B$.
	$\frac{R_B}{2Y_2} > \frac{R_A}{2Y_2} + F_{ae}$	Bearing A	$F_{aA} = \frac{R_B}{2Y_2} - F_{ae}$	$P_A = X \cdot R_A + Y \cdot F_{aA}$ Note: When $P_A < R_A$, use $P_A = R_A$.
		Bearing B	-	$P_B = R_B$

Durability Check of Output Shaft Part

Table 8 Main Bearing Specification

Frame size	Dynamic rated load C	Load Factor				e
		X		Y		
	N (kgf)	$F_{aA} / R_A \geq e$ $F_{aB} / R_B \geq e$	$F_{aA} / R_A > e$ $F_{aB} / R_B > e$	$F_{aA} / R_A \geq e$ $F_{aB} / R_B \geq e$	$F_{aA} / R_A > e$ $F_{aB} / R_B > e$	
P110	3050 (310)	1	0.35	0	0.57	1.14
P120	8950 (910)					
P130	13600 (1390)					

Table 9 Symbols in Table 7 & 8

P	Dynamic equivalent load (Either the larger one of dynamic equivalent load P_A or P_B , each influencing bearing A and B)	N (kgf)	Refer to Table 7 in page 81.
R_A, R_B	Support reaction applied to each bearing A and B calculated from equivalent external load F_{re} and F_{ae}	N (kgf)	-
X	Radial load factor	-	Refer to Table 8 below.
Y	Axial load factor		
Y_2	Axial load factor $Y_2 = 0.57$ when $F_{a^*} / R^* > e$		
F_{aA}, F_{aB}	Axial load exerted on each of bearing A and B	N (kgf)	-

Lifetime L_{10h}

$$L_{10h} = \frac{10^6}{60 \cdot N_e \cdot o} \left(\frac{C}{C_f \cdot F_s \cdot P} \right)^3 \dots (5)$$

Table 10 Coupling Factor C_f

Coupling Method	
Chain	1.00
Gears	1.25
V-Belt	1.50

Table 11 Shock Factor F_s

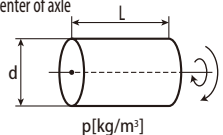
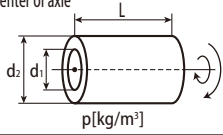
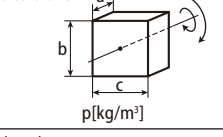
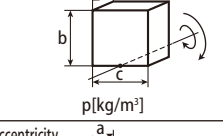
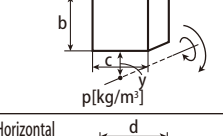
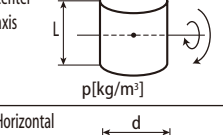
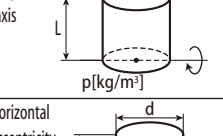
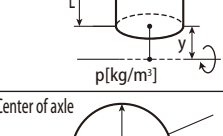
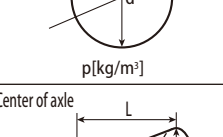
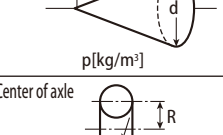
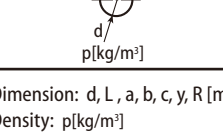
Degree of shock	
Practically no shock	1.0
Light shock	1.0 - 1.2
Severe shock	1.4 - 1.6

Table 12 Symbols in Formula (5)

Neo	Equivalent output speed	r/min	Refer to formula (4).
P	Dynamic equivalent load	N (kgf)	Refer to Table 4.
C	Dynamic rated load	N (kgf)	Refer to Table 5.
C_f	Connected load	-	Refer to Table 7.
F_s	Shock factor	-	Refer to Table 8.

Formula for Calculation of Moment of Inertia and GD^2

• Formula to Calculate Moment of Inertia and GD^2

Location of rotation	Shape	Mass M [kg]	Moment of Inertia J [kgm ²]	GD^2 GD^2 [kgf·m ²]
Center of axle 	Cylinder	$\frac{1}{4} \cdot \pi \cdot d^2 \cdot L \cdot \rho$	$\frac{1}{32} \cdot \pi \cdot d^4 \cdot L \cdot \rho$	$\frac{1}{8} \cdot \pi \cdot d^4 \cdot L \cdot \rho$
Center of axle 	Cylinder hollow	$\frac{1}{4} \cdot \pi \cdot (d_1^2 - d_2^2) \cdot L \cdot \rho$	$\frac{1}{32} \cdot \pi \cdot (d_1^4 - d_2^4) \cdot L \cdot \rho$	$\frac{1}{8} \cdot \pi \cdot (d_1^4 - d_2^4) \cdot L \cdot \rho$
Center of axle 	Rectangular solid	$a \cdot b \cdot c \cdot \rho$	$\frac{a \cdot b \cdot c}{12} \cdot (b^2 + c^2) \cdot \rho$	$\frac{a \cdot b \cdot c}{3} \cdot (b^2 + c^2) \cdot \rho$
Edge axle 	Rectangular solid	$a \cdot b \cdot c \cdot \rho$	$\frac{a \cdot b \cdot c}{12} \cdot (4b^2 + c^2) \cdot \rho$	$\frac{a \cdot b \cdot c}{3} \cdot (4b^2 + c^2) \cdot \rho$
Eccentricity 	Rectangular solid	$a \cdot b \cdot c \cdot \rho$	$\frac{a \cdot b \cdot c}{12} \cdot (4b^2 + c^2 + 12b \cdot y + 12y^2) \cdot \rho$	$\frac{a \cdot b \cdot c}{3} \cdot (4b^2 + c^2 + 12b \cdot y + 12y^2) \cdot \rho$
Horizontal center axis 	Cylinder	$\frac{1}{4} \cdot \pi \cdot d^2 \cdot L \cdot \rho$	$\frac{\pi \cdot d^2 \cdot L}{192} \cdot (4L + 3d^2) \cdot \rho$	$\frac{\pi \cdot d^2 \cdot L}{48} \cdot (4L + 3d^2) \cdot \rho$
Horizontal edge axis 	Cylinder	$\frac{1}{4} \cdot \pi \cdot d^2 \cdot L \cdot \rho$	$\frac{\pi \cdot d^2 \cdot L}{192} \cdot (16L + 3d^2) \cdot \rho$	$\frac{\pi \cdot d^2 \cdot L}{48} \cdot (16L + 3d^2) \cdot \rho$
Horizontal Eccentricity 	Cylinder	$\frac{1}{4} \cdot \pi \cdot d^2 \cdot L \cdot \rho$	$\frac{\pi \cdot d^2 \cdot L}{192} \cdot (16L^2 + 3d^2 + 48y \cdot L + 48y^2) \cdot \rho$	$\frac{\pi \cdot d^2 \cdot L}{48} \cdot (16L^2 + 3d^2 + 48y \cdot L + 48y^2) \cdot \rho$
Center of axle 	Sphere	$\frac{1}{6} \cdot \pi \cdot d^3 \cdot \rho$	$\frac{1}{60} \cdot \pi \cdot d^5 \cdot \rho$	$\frac{1}{15} \cdot \pi \cdot d^5 \cdot \rho$
Center of axle 	Cone	$\frac{1}{12} \cdot \pi \cdot d^2 \cdot L \cdot \rho$	$\frac{1}{160} \cdot \pi \cdot d^4 \cdot L \cdot \rho$	$\frac{1}{40} \cdot \pi \cdot d^4 \cdot L \cdot \rho$
Center of axle 	Torus	$\frac{1}{2} \cdot \pi^2 \cdot R \cdot d^2 \cdot \rho$	$\frac{\pi^2 \cdot R \cdot d^2}{8} \cdot (4R^2 + \frac{3d^2}{4}) \cdot \rho$	$\frac{\pi^2 \cdot R \cdot d^2}{2} \cdot (4R^2 + \frac{3d^2}{4}) \cdot \rho$

Dimension: d, L, a, b, c, y, R [m]
Density: ρ [kg/m³]

Formula for Calculation of Moment of Inertia, Load Torque, and Acceleration Torque

• Formula for Calculation of Moment of Inertia, Load Torque, and Acceleration Torque

Specification	Diagram	Load moment of Inertia J [kgm ²]	Load torque of Reducer Output Shaft T [Nm]	Acceleration Torque Reducer Output Shaft T _a [N · m]	Relation Ship of Output Speed and Speed N [r/min]
Object in linear motion		$M \left(\frac{P}{2\pi}\right)^2 + J_B$ M: Mass of load [kg] P: Pitch of ball screw [m] J _B : Inertia of ball screw [kgm ²]	$\frac{P}{2\pi} (\mu \cdot M \cdot g + F)$ μ: Friction coefficient of ball screw g: Gravity acceleration [9.8m/sec ²] F: External force [N]	$\frac{2\pi \cdot N \cdot J_L}{60t_a}$ J _L : Load inertia converted to output shaft of the reducer [kgm ²] N: Speed [r/min] t _a : Acceleration time [sec]	$\frac{V}{P}$ V: Acceleration [m/min] P: Ball pitch screw [m]
Hoisting object with a pulley		$\frac{M_1 \cdot D^2}{8} + \frac{M_2 \cdot D^2}{4}$ M ₁ : Mass of cylinder [kg] M ₂ : Mass of suspended object [kg] D: Diameter of drum [m] J ₁ : Inertia of drum [kgm ²] J ₂ : Inertia of substance [kgm ²]	$F \cdot \frac{D}{2}$ F: External load [N] = M ₂ g g: Gravity acceleration [9.8m/sec ²]	$\frac{2\pi \cdot N \cdot J_L}{60t_a}$ J _L : Load inertia converted to output shaft of the reducer [kgm ²] N: Speed [r/min] t _a : Acceleration time [sec]	$\frac{V}{\pi \cdot D}$ V: Acceleration [m/min] D: Drum diameter [m]
Transfer by rack or pinion		$\frac{M \cdot D^2}{4}$ M: Mass of rack [kg] D: PCD of pinion [m]	$F \cdot \frac{D}{2} + FL$ F: External force [N] g: Gravity acceleration [9.8m/sec ²] FL: Contact loss [Nm]	$\frac{2\pi \cdot N \cdot J_L}{60t_a}$ J _L : Load inertia converted to output shaft of the reducer [kgm ²] N: Speed [r/min] t _a : Acceleration time [sec]	$\frac{V}{R}$ V: Velocity [m/min] R = πdp or Zp · Lp dp: P, C, D [m] Zp: Teeth number Lp: Pitch
Transfer by belt conveyer		$\frac{M_1 \cdot D_1^2}{8} + \frac{M_2 \cdot D_2^2}{8} \cdot \frac{D_1^2}{D_2^2} + \frac{M_3 \cdot D_1^2}{4} + \frac{M_4 \cdot D_1^2}{4}$ M ₁ : Mass of cylinder 1 [kg] M ₂ : Mass of cylinder 2 [kg] M ₃ : Mass of objec [kg] M ₄ : Mass of belt [kg] D ₁ : Diameter of cylinder 1 [m] D ₂ : Diameter of cylinder 2 [m] J = J ₁ + J ₂ + J ₃ + J ₄ J ₁ : Inertia of cylinder 1 [kgm ²] J ₂ : Inertia of cylinder 2 [kgm ²] J ₃ : Inertia of substance [kgm ²] J ₄ : Inertia of belt [kgm ²]	$\frac{1}{2} D(F + \mu \cdot M_3 \cdot g)$ F: External force [N] g: Gravity acceleration [9.8m/sec ²]	$\frac{2\pi \cdot N \cdot J_L}{60t_a}$ J _L : Load inertia converted to output shaft of the reducer [kgm ²] N: Speed [r/min] t _a : Acceleration time [sec]	$\frac{V}{D_1}$ V: Velocity [m/min] D ₁ : Diameter of cylinder 1 [m]
Transfer by roll field		$J_1 + \left(\frac{D_1}{D_2}\right)^2 \cdot J_2 + \frac{M \cdot D_1^2}{4}$ D ₁ : Diameter of roll 1 [m] D ₂ : Diameter of roll 2 [m] M: Equivalent mass of work [kg] J ₁ : Inertia of roller 1 [kgm ²] J ₂ : Inertia of roller 2 [kgm ²]	$\frac{D(F + N \cdot \mu_1 + Mg \cdot \mu_2)}{2}$ F: Tension [N] g: Gravity acceleration [9.8m/sec ²] N: Welding force [N]	$\frac{2\pi \cdot N \cdot J_L}{60t_a}$ J _L : [kg · m ²] N: [r/min] t _a : [sec]	$\frac{N}{\pi \cdot D_1}$ V: Velocity [m/min] D ₁ : Roll diameter [m]

1. Calculate inertia and make additions when using additional apparatus for each drive part.
2. Calculate each element for frictional force and convert to frictional force at output shaft of reducer if necessary.
3. Calculate each element for external force and convert to external torque at output shaft of reducer if necessary.

Moment of Inertia (at Motor Shaft)

Table 13

Unit: $\times 10^{-4} \text{kg}\cdot\text{m}^2$

PK1 Type

Frame size	Input shaft hollow [mm]	Motor flange code	Reduction ratio									
			6		8		11		15		23	
			Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft
PK110	6	7J	0.311	0.310	0.299	0.299	0.175	0.174	0.172	0.171	0.305	0.305
	8	2C,2D,2E,2F,2G	0.310	0.310	0.299	0.298	0.174	0.174	0.171	0.171	0.304	0.304
	9	2H	0.381	0.381	0.369	0.369	0.245	0.245	0.242	0.242	0.375	0.375
	10	2J	0.380	0.379	0.368	0.368						
	11	2K,2L,8A	0.379	0.378	0.367	0.367	0.243	0.243	0.240	0.240	0.373	0.373
	14	2P,2R,2T,8B	0.371	0.370	0.359	0.359	0.235	0.235	0.232	0.232	0.365	0.365
PK120	16	7P,8E,7A,7R	0.591	0.590	0.579	0.579						
	8	2C,2D,2E,2F,2G									1.141	1.141
	9	2H									1.141	1.141
	10	2J			1.229	1.226	0.875	0.874	0.853	0.852		
	11	2K,2L,8A										
	14	2P,2R,2T,8B,0V	1.323	1.318	1.227	1.224	0.873	0.872	0.850	0.850	1.139	1.138
	16	7A,7P,7R,8E,0U	1.460	1.455	1.370	1.367	1.016	1.015	0.994	0.993	1.282	1.282
	19	1G,7B,7S,7V,7X	1.437	1.432	1.347	1.344	0.993	0.992	0.971	0.970	1.259	1.258
PK130	22	0W,0Y,1S	2.154	2.149	2.064	2.061	1.710	1.709	1.688	1.687	1.976	1.975
	24	1L,7Z,7Y	2.132	2.127	2.041	2.039	1.688	1.686	1.665	1.665	1.954	1.953
	9	2H										
	10	2J										
	11	2K,2L,8A										
	14	2P,2R,2T,8B,0V									4.317	4.311
	16	7A,7P,7R,8E,0U									4.317	4.311
	19	1G,7B,7S,7V,7X			4.479	4.446	3.060	3.044	2.956	2.948	4.311	4.304
PK130	22	0W,0Y,1S	5.265	5.203	4.851	4.818	3.432	3.416	3.328	3.320	4.683	4.676
	24	1L,7Z,7Y	5.254	5.192	4.841	4.807	3.421	3.406	3.318	3.309	4.672	4.666
	28	0Z,1T	5.374	5.312	4.960	4.927						
	35	0X	8.448	8.387	8.035	8.002						

Frame size	Input shaft hollow [mm]	Motor flange code	Reduction ratio									
			27		33		45		50		63	
			Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft
PK110	6	7J	0.169	0.169	0.173	0.173	0.173	0.173	0.284	0.284	0.170	0.170
	8	2C,2D,2E,2F,2G	0.169	0.169	0.173	0.173	0.173	0.173	0.284	0.284	0.169	0.169
	9	2H	0.240	0.240	0.244	0.244	0.244	0.244	0.355	0.355	0.240	0.240
	10	2J										
	11	2K,2L,8A	0.238	0.238	0.242	0.242						
	14	2P,2R,2T,8B	0.230	0.230	0.234	0.234						
PK120	16	7P,8E,7A,7R										
	8	2C,2D,2E,2F,2G										
	9	2H	0.837	0.837	0.831	0.831	0.829	0.828	1.096	1.096	0.823	0.823
	10	2J	0.837	0.836	0.831	0.831	0.828	0.828	1.095	1.095	0.823	0.823
	11	2K,2L,8A					0.828	0.828	1.095	1.095	0.822	0.822
	14	2P,2R,2T,8B,0V	0.834	0.834	0.828	0.828	0.826	0.826	1.093	1.093	0.820	0.820
	16	7A,7P,7R,8E,0U	0.978	0.977								
	19	1G,7B,7S,7V,7X	0.954	0.954								
PK130	22	0W,0Y,1S	1.671	1.671								
	24	1L,7Z,7Y	1.649	1.649								
	9	2H										
	10	2J			2.810	2.808	2.799	2.798	3.963	3.963	2.766	2.766
	11	2K,2L,8A										
	14	2P,2R,2T,8B,0V			2.808	2.806	2.796	2.795	3.961	3.960	2.763	2.877
	16	7A,7P,7R,8E,0U	2.887	2.884	2.921	2.919	2.909	2.908	4.074	4.073	2.877	2.876
	19	1G,7B,7S,7V,7X	2.880	2.878	2.914	2.913	2.903	2.902	4.068	4.067	2.870	2.870
PK130	22	0W,0Y,1S	3.252	3.250								
	24	1L,7Z,7Y	3.241	3.239	3.276	3.274	3.264	3.263	4.429	4.428	3.232	3.231
	28	0Z,1T										
	35	0X										

Frame size	Input shaft hollow [mm]	Motor flange code	Reduction ratio									
			68		99		122		135		243	
			Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft
PK110	6	7J	0.284	0.284	0.168	0.168	0.284	0.284	0.168	0.168	0.168	0.168
	8	2C,2D,2E,2F,2G	0.284	0.284	0.168	0.168	0.284	0.284	0.168	0.168	0.168	0.168
	9	2H	0.355	0.355	0.238	0.238	0.355	0.355	0.238	0.238	0.238	0.238
	10	2J										
	11	2K,2L,8A										
	14	2P,2R,2T,8B										
PK120	16	7P,8E,7A,7R										
	8	2C,2D,2E,2F,2G			0.768	0.768	1.042	1.042	0.768	0.768	0.767	0.767
	9	2H	1.095	1.095	0.820	0.820	1.094	1.094	0.819	0.819	0.819	0.819
	10	2J	1.094	1.094								
	11	2K,2L,8A	1.094	1.094	0.819	0.819	1.093	1.093	0.819	0.819	0.819	0.819
	14	2P,2R,2T,8B,0V	1.092	1.092	0.817	0.817	1.091	1.091	0.817	0.817	0.817	0.817
	16	7A,7P,7R,8E,0U										
	19	1G,7B,7S,7V,7X										
PK130	22	0W,0Y,1S										
	24	1L,7Z,7Y										
	9	2H			2.749	2.749	3.955	3.955	2.748	2.748	2.747	2.747
	10	2J	3.958	3.958	2.749	2.749	3.955	3.955	2.748	2.748	2.747	2.747
	11	2K,2L,8A			2.749	2.749	3.954	3.954	2.748	2.747	2.747	2.747
	14	2P,2R,2T,8B,0V	3.956	3.956	2.747	2.747	3.952	3.952	2.746	2.745	2.745	2.745
	16	7A,7P,7R,8E,0U	4.069	4.069								
	19	1G,7B,7S,7V,7X	4.063	4.062								
PK130	22	0W,0Y,1S										
	24	1L,7Z,7Y	4.424	4.423								
	28	0Z,1T										
	35	0X										

GD² (at Motor Shaft)

Table 14

Unit: x10⁻⁴kg·m²

Frame size	Input shaft hollow [mm]	Motor flange code	Reduction ratio									
			6		8		11		15		23	
			Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft
PK110	6	7J	1.243	1.240	1.196	1.194	0.698	0.697	0.686	0.686	1.218	1.218
	8	2C,2D,2E,2F,2G	1.242	1.240	1.195	1.194	0.697	0.697	0.686	0.685	1.217	1.217
	9	2H	1.525	1.522	1.478	1.477	0.980	0.980	0.968	0.968	1.500	1.500
	10	2J	1.520	1.518	1.473	1.472						
	11	2K,2L,8A	1.516	1.513	1.469	1.468	0.971	0.971	0.959	0.959	1.491	1.491
	14	2P,2R,2T,8B	1.484	1.482	1.437	1.436	0.939	0.939	0.928	0.927	1.459	1.459
PK120	16	7P,8E,7A,7R	2.364	2.362	2.317	2.316						
	8	2C,2D,2E,2F,2G										
	9	2H									4.566	4.563
	10	2J			4.916	4.905	3.501	3.496	3.411	3.408	4.564	4.562
	11	2K,2L,8A										
	14	2P,2R,2T,8B,0V	5.293	5.273	4.907	4.896	3.492	3.487	3.402	3.399	4.555	4.553
	16	7A,7P,7R,8E,0U	5.841	5.821	5.481	5.470	4.066	4.061	3.976	3.973	5.129	5.127
	19	1G,7B,7S,7V,7X	5.748	5.728	5.387	5.376	3.972	3.967	3.882	3.879	5.035	5.033
PK130	22	0W,0Y,1S	8.617	8.596	8.256	8.245	6.841	6.836	6.751	6.748	7.904	7.902
	24	1L,7Z,7Y	8.527	8.506	8.166	8.155	6.751	6.746	6.661	6.658	7.814	7.812
	9	2H										
	10	2J										
	11	2K,2L,8A										
	14	2P,2R,2T,8B,0V									17.270	17.242
	16	7A,7P,7R,8E,0U									17.245	17.217
	19	1G,7B,7S,7V,7X	21.060	20.813	19.406	19.273	13.727	13.666	13.314	13.281	18.733	18.706
PK130	22	0W,0Y,1S	21.016	20.770	19.362	19.230	13.684	13.622	13.270	13.237	18.689	18.662
	24	1L,7Z,7Y	21.495	21.249	19.841	19.709						
	28	0Z,1T	21.495	21.249	19.841	19.709						
	35	0X	33.794	33.547	32.140	32.008						

Frame size	Input shaft hollow [mm]	Motor flange code	Reduction ratio									
			27		33		45		50		63	
			Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft
PK110	6	7J	0.678	0.678	0.693	0.693	0.692	0.692	1.137	1.137	0.679	0.679
	8	2C,2D,2E,2F,2G	0.677	0.677	0.693	0.692	0.691	0.691	1.137	1.137	0.678	0.678
	9	2H	0.960	0.960	0.975	0.975	0.974	0.974	1.420	1.420	0.961	0.961
	10	2J										
	11	2K,2L,8A	0.951	0.951	0.966	0.966						
	14	2P,2R,2T,8B	0.919	0.919	0.935	0.934						
PK120	16	7P,8E,7A,7R										
	8	2C,2D,2E,2F,2G										
	9	2H	3.347	3.346	3.324	3.324	3.314	3.314	4.383	4.383	3.292	3.292
	10	2J	3.346	3.345	3.323	3.323	3.313	3.313	4.382	4.382	3.291	3.290
	11	2K,2L,8A					3.312	3.311	4.380	4.380	3.289	3.289
	14	2P,2R,2T,8B,0V	3.337	3.336	3.314	3.313	3.304	3.304	4.373	4.372	3.281	3.281
	16	7A,7P,7R,8E,0U	3.911	3.910								
	19	1G,7B,7S,7V,7X	3.817	3.816								
PK130	22	0W,0Y,1S	6.686	6.685								
	24	1L,7Z,7Y	6.596	6.595								
	9	2H										
	10	2J			11.240	11.233	11.194	11.190	15.854	15.851	11.065	11.063
	11	2K,2L,8A										
	14	2P,2R,2T,8B,0V			11.231	11.224	11.185	11.181	15.845	15.842	11.055	11.053
	16	7A,7P,7R,8E,0U	11.546	11.536	11.682	11.675	11.636	11.633	16.296	16.293	11.507	11.505
	19	1G,7B,7S,7V,7X	11.521	11.511	11.657	11.651	11.611	11.608	16.271	16.268	11.482	11.480
PK130	22	0W,0Y,1S	13.009	12.999								
	24	1L,7Z,7Y	12.966	12.956	13.102	13.095	13.056	13.052	17.716	17.713	12.927	12.925
	28	0Z,1T										
	35	0X										

Frame size	Input shaft hollow [mm]	Motor flange code	Reduction ratio									
			68		99		122		135		243	
			Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft	Solid shaft	Flange shaft
PK110	6	7J	1.137	1.137	0.672	0.672	1.136	1.136	0.672	0.672	0.671	0.671
	8	2C,2D,2E,2F,2G	1.136	1.136	0.671	0.671	1.136	1.136	0.671	0.671	0.671	0.671
	9	2H	1.419	1.419	0.954	0.954	1.419	1.419	0.954	0.954	0.954	0.954
	10	2J										
	11	2K,2L,8A										
	14	2P,2R,2T,8B										
PK120	16	7P,8E,7A,7R										
	8	2C,2D,2E,2F,2G			3.071	3.071	4.168	4.168	3.070	3.070	3.070	3.070
	9	2H	4.379	4.378	3.279	3.279	4.375	4.375	3.277	3.277	3.277	3.277
	10	2J	4.377	4.377								
	11	2K,2L,8A	4.376	4.376	3.276	3.276	4.373	4.373	3.275	3.275	3.274	3.274
	14	2P,2R,2T,8B,0V	4.368	4.368	3.268	3.268	4.365	4.365	3.267	3.267	3.266	3.266
	16	7A,7P,7R,8E,0U										
	19	1G,7B,7S,7V,7X										
PK130	22	0W,0Y,1S										
	24	1L,7Z,7Y										
	9	2H			10.998	10.997	15.820	15.819	10.993	10.992	10.989	10.989
	10	2J	15.834	15.832	10.997	10.996	15.819	15.818	10.992	10.991	10.988	10.988
	11	2K,2L,8A			10.995	10.994	15.817	15.817	10.990	10.990	10.986	10.986
	14	2P,2R,2T,8B,0V	15.824	15.823	10.987	10.987	15.809	15.809	10.982	10.982	10.979	10.978
	16	7A,7P,7R,8E,0U	16.276	16.274								
	19	1G,7B,7S,7V,7X	16.251	16.249								
PK130	22	0W,0Y,1S										
	24	1L,7Z,7Y	17.696	17.694								
	28	0Z,1T										
	35	0X										

Mechanical Precision of Output Part of the Reducer

Mechanical precision of solid shaft (with and without key) and flange shaft is indicated below.

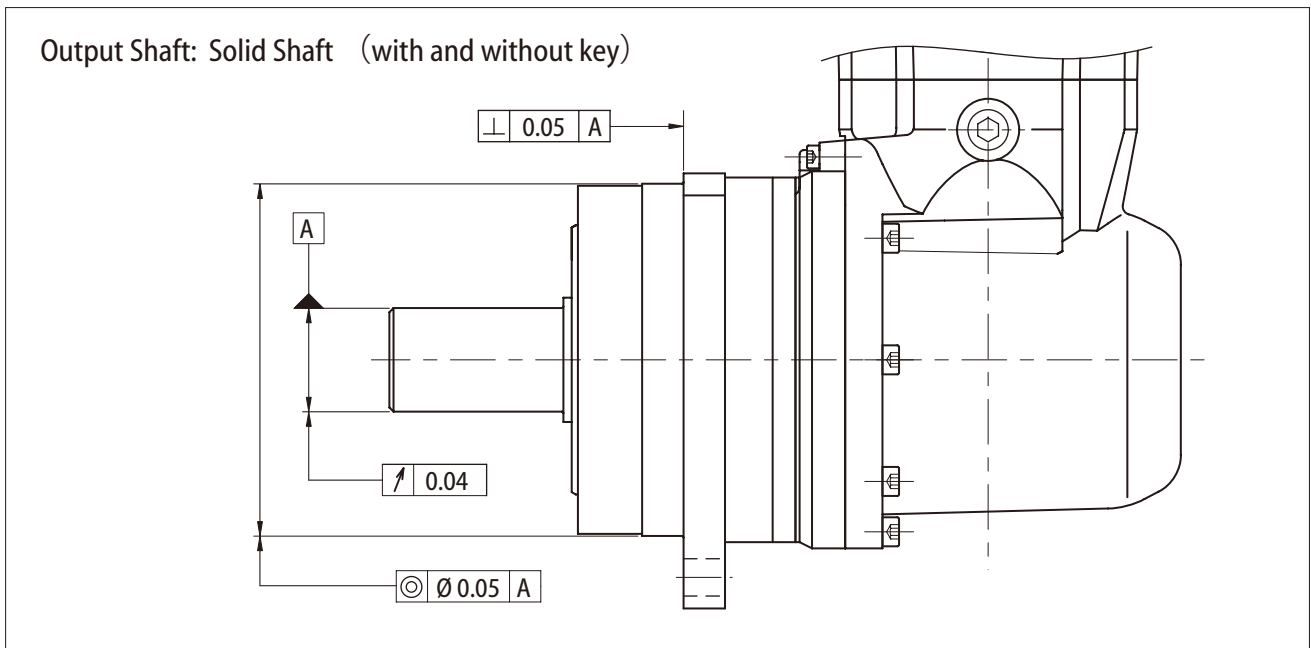


Fig. 7

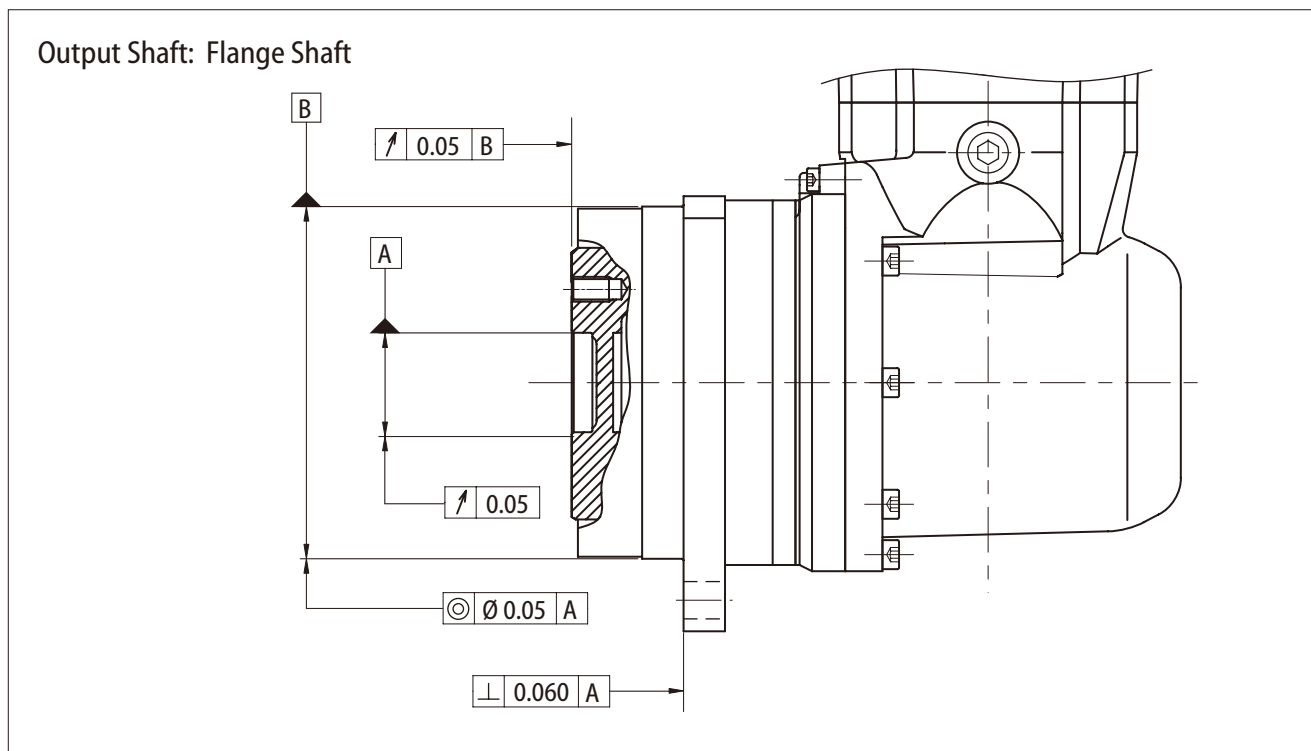


Fig. 8

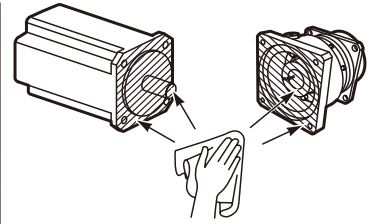
Motor Attachment Procedure

Either straight type, shaft with keyway, or D shaft may be attached to the motor shaft, because special coupling is used for shaft connection part of reducer and motor. Follow the process below from (1) through (7) for assembly. (Remove key while assembly for shaft with keyway.)

- (1) Place reducer on an appropriate worktable with output shaft on the bottom side.
- (2) Remove fitting of the setting hole (1 place) of the reducer unit (① in figure below).
- (3) Match the location by turning by hand to tighten tightening bolt of the coupling into setting hole of the reducer unit (② in figure below).
- (4) Insert motor shaft into the center hole of the coupling, press in vertically and fit the pilot part of the reducer unit and motor.
- (5) Tighten motor and reducer unit with motor attachment bolt (④ in figure below).
- (6) Tighten coupling tightening bolt through the setting hole of the side of the reducer unit using a torque wrench bolt (⑤ in figure below). Refer to Table 12 for necessary tightening torque.

Table 15

Coupling hole diameter	Tightening bolt	Tightening torque	Allowable transmission torque
mm		N·m	N·m
Ø6	M3	1.67	9.18
Ø8			7.93
Ø9			22.0
Ø10	M4	3.92	22.7
Ø11			24.9
Ø14			26.4
Ø16	M5	7.35	49.6
Ø19			52.9
Ø22	M6	8.83	61.8
Ø24			66.2
Ø28			78.3
Ø35	M8	21.6	99.2



Make sure that the selected unit can allow maximum emergency torque (peak torque at start and stop) in your operation cycle.

$$\frac{\text{Maximum emergency torque (Peak torque at start or stop)}}{\text{Reduction ratio}} \leq \text{Allowable transmission torque}$$

- (7) Insert fitting (1 place) in the setting hole of the joint cover.

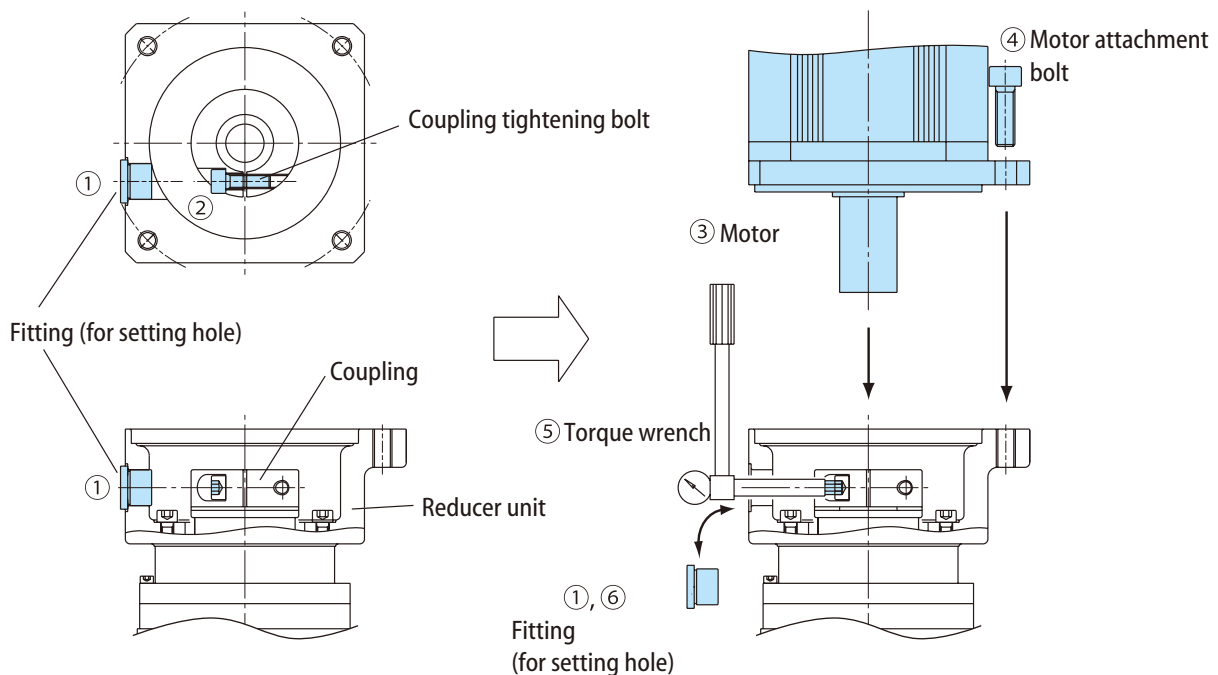
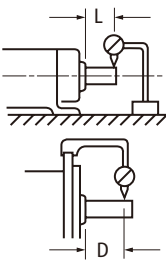
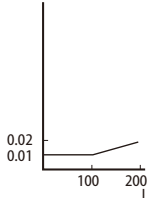
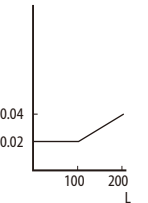
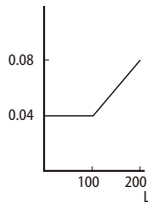
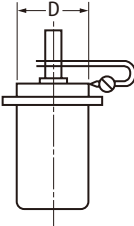
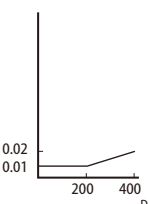
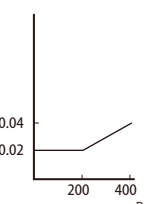
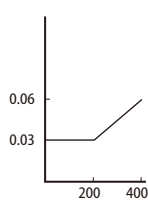
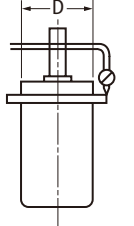
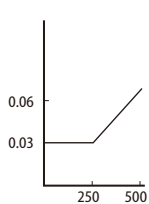
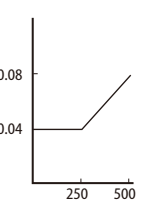
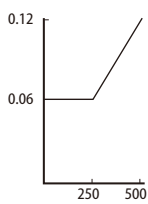


Fig. 9

Motor Precision

Table 16

Type	Measuring item	Measuring method	Sketch of measurement	Measuring Instrument	Work accuracy		
					Grade AA	Grade A	Grade B
Flange type	Run-out of shaft end	Secure the dial gauge on the floor or flange surface. Place the probe of the dial gauge on the circumference close to the shaft end. Turn the shaft once. Difference between the observed maximum and minimum values is the measured value.		Dial gauge	Work accuracy = 0.01 when $L \leq 100$ As below when $L > 100$ 	Work accuracy = 0.02 when $L \leq 100$ As below when $L > 100$ 	Work accuracy = 0.04 when $L \leq 100$ As below when $L > 100$ 
	Eccentricity of flange engagement O.D.	Secure the dial gauge on the shaft close to the flange surface. Place the probe of the dial gauge on the circumference of flange connection. Turn the shaft once. Half of the difference between the observed maximum and minimum values is the measured value.		Dial gauge	Work accuracy = 0.01 when $D \leq 200$ As below when $D > 200$ 	Work accuracy = 0.02 when $D \leq 200$ As below when $D > 200$ 	Work accuracy = 0.03 when $D \leq 200$ As below when $D > 200$ 
Perpendicularity with respect to flange surface	Secure the dial gauge on the shaft close to the flange surface. Place the probe of the dial gauge on the flange surface close to flange circumference. Turn the shaft once. The difference between the observed maximum and minimum values is the measured value.		Dial gauge	Work accuracy = 0.03 when $D \leq 250$ As below when $D > 250$ 	Work accuracy = 0.04 when $D \leq 250$ As below when $D > 250$ 	Work accuracy = 0.06 when $D \leq 250$ As below when $D > 250$ 	

PK1 Type

Warranty

<p>Warranty Period</p>	<p>The warranty period for the Products shall be 18 months after the commencement of delivery or 18 months after the shipment of the Products from the seller's works or 12 months from the Products coming into operation, whichever comes first.</p>
<p>Warranty Condition</p>	<p>In the event that any problem or damage to the Product arises during the "Warranty Period" from defects in the Product whenever the Product is properly installed and combined with the Buyer's equipment or machines, maintained as specified in the maintenance manual, and properly operated under the conditions described in the catalog or as otherwise agree upon in writing between the Seller and the Buyer or its customers; the Seller will provide, at its sole discretion, appropriate repair or replacement of the Product without charge at a designated facility, except as stipulated in the "Warranty Exclusions" as described below. However, if the Product is installed or integrated into the Buyer's equipment or machines, the Seller shall not reimburse the cost of: removal or re-installation of the Product or other incidental costs related thereto, any lost opportunity, any profit loss or other incidental or consequential losses or damages incurred by the Buyer or its customers.</p>
<p>Warranty Exclusions</p>	<p>Notwithstanding the above warranty, the warranty as set forth herein shall not apply to any problem or damage to the Product that is caused by:</p> <ol style="list-style-type: none"> 1. installation, connection, combination or integration of the Product in or to the other equipment or machine that is rendered by any person or entity other than the Seller; 2. insufficient maintenance or improper operation by the Buyer or its customers, such that the Product is not maintained in accordance with the maintenance manual provided or designated by the Seller; 3. improper use or operation of the Product by the Buyer or its customers that is not informed to the Seller, including, without limitation, the Buyer's or its customers, operation of the Product not in conformity with the specifications, or use of lubricating oil in the Product that is not recommended by the Seller; 4. any problem or damage on any equipment or machine to which the Product is installed, connected or combined or on any specifications particular to the Buyer or its customers; 5. any changes, modifications, improvements or alterations to the Product or those functions that are rendered on the Product by any person or entity other than the Seller; 6. any parts in the Product that are supplied or designated by the Buyer or its customers; 7. earthquake, fire, flood, sea-breeze, gas, thunder, acts of God or any other reasons beyond the control of the Seller; 8. normal wear and tear, or deterioration of the Products, parts, such as bearings, oil-seals; 9. any other troubles, problems or damage to the Product that are not attributable to the Seller.



SAFETY PRECAUTIONS

- Observe the safety rules for the installation site and equipment strictly (Industrial safety and health law, technical standard for electric facilities, extension rules, plant explosion guidelines, building standards law, etc).
- Read the maintenance manual carefully before use. Request a copy from the distributor of the Product or our Sales Department if the maintenance manual is not handy. A copy of maintenance manual should always reach the actual user of the Product.
- Select a sufficient product for the usage condition and application.
- Install protective equipment on the machine side when the machine is used for applications which may cause loss of human life or significant loss in facility, such as use for human transportation or elevators.
- Install an oil pan or other preventive devices in case of oil leakage due to failure or termination of service life when the machine is used for food processing equipment, clean room, or other applications that are sensitive to oil.