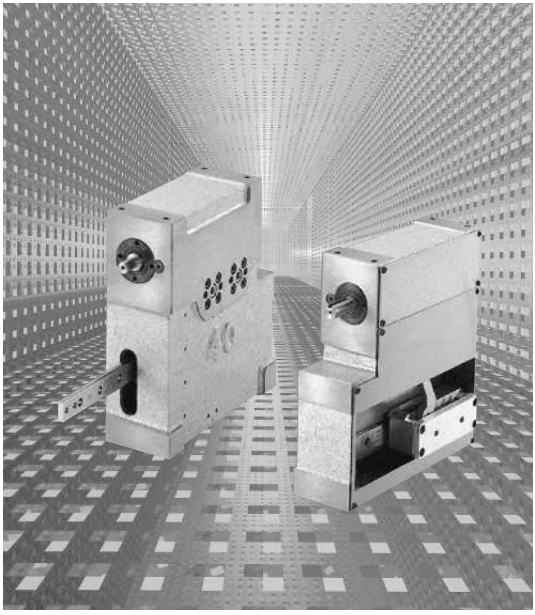
PPLX



CONTENTS

High reliability/High speed transfer of 0.5 sec. per cycle

High speed production line compatible

High speed tact time of 0.5 sec. per piece. Compatible with high speed production lines of 7,200 pieces per hour.

High accuracy of ±0.02 mm

Repetitive positioning accuracy of ±0.02 mm. Suitable for a production line of precision parts or electronic parts for which accuracy is required.

Compact and thin

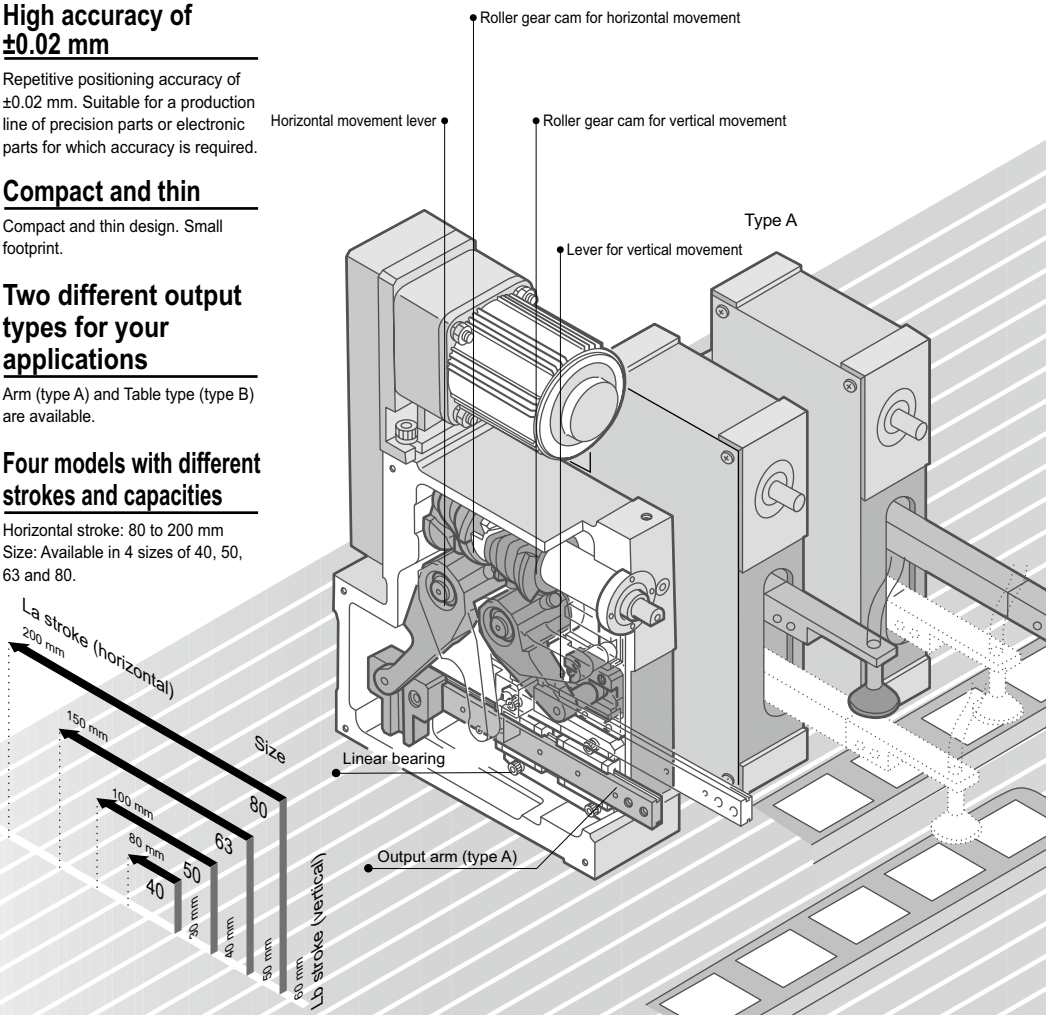
Compact and thin design. Small footprint.

Two different output types for your applications

Arm (type A) and Table type (type B) are available.

Four models with different strokes and capacities

Horizontal stroke: 80 to 200 mm
Size: Available in 4 sizes of 40, 50, 63 and 80.

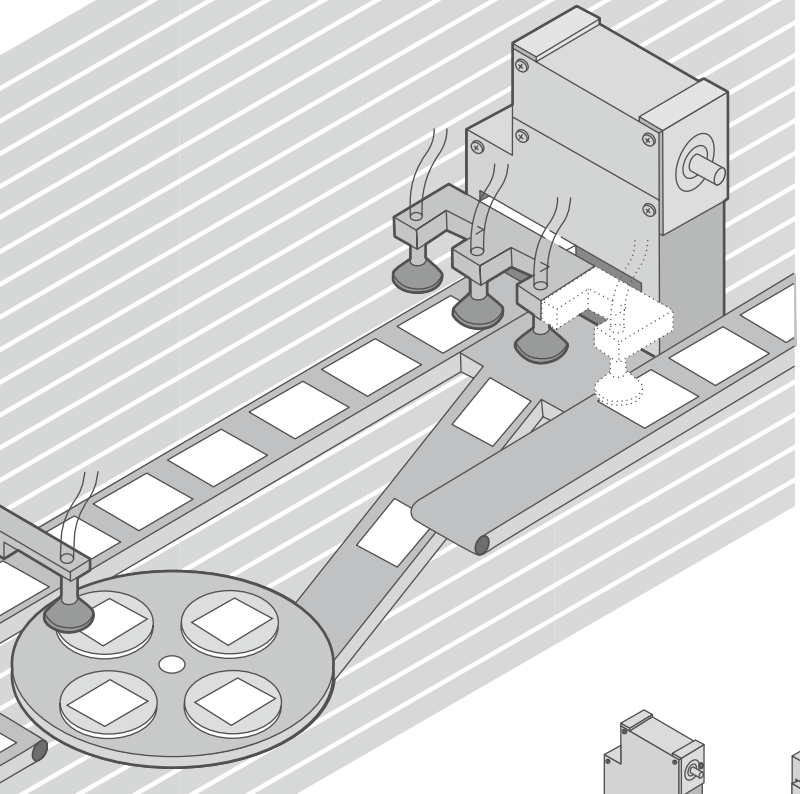


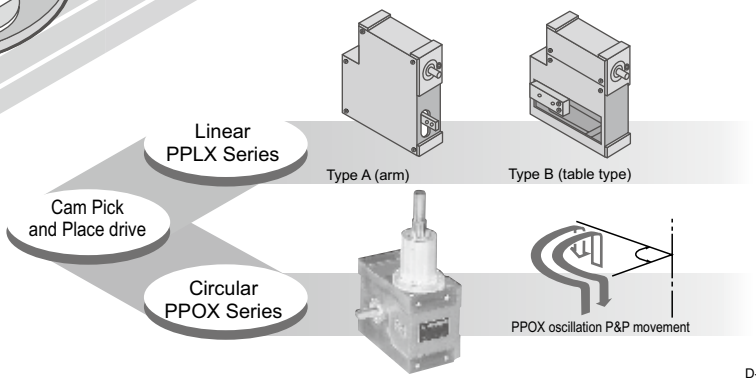
PICK & PLACE

Achieving high speed drive and high positioning accuracy.
Compact and thin straight P&P drive, PPLX Series.

Index drives in the PPLX Series are compact and thin and are Pick & Place units that move in straight lines. Roller gear cams, proven to yield high positioning accuracy with high speed drive are utilized.
The two models, the Arm (Type A) with a small footprint and the Table type (Type B) high load and high rigidity, exhibit their powerful attributes in transporting small works in a straight line to conveyors, etc.

Type B





Motion and explanation

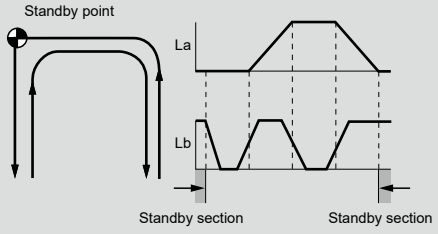
Timing chart

- The timing chart is essential when determining the specifications of a cam P&P drive as well as the model number. Create the timing chart referring to the examples below.
- When you drive the input shaft intermittently, set up dwell angle as a standby point as in the following examples, and determine the timing so that the cycle can be stopped within the dwell interval.
- Use overlap effectively so that load is reduced and work time (dwell interval) is ensured.
- Calculate overlap referring to "Index drive Catalog (Cam curve characteristics table)." (The standard cam curve for PPLX is MS curve.)
- The min. index angle in the rated dynamic payload table is for the chart examples 1 and 2. For the min. index angle in example 3 in the chart below, contact CKD.

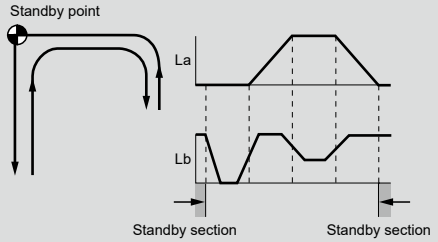
Timing chart example

Pick & place

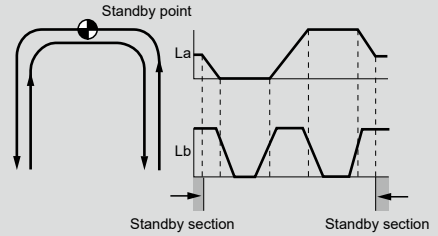
1 Standard chart



2 Chart for a different path level (different amount of lift)

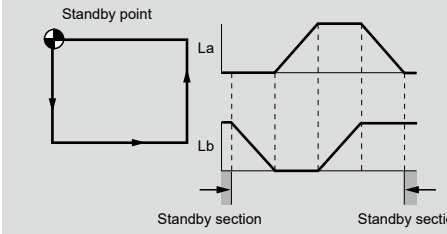


3 Chart with a standby point (dwell angle) in movement

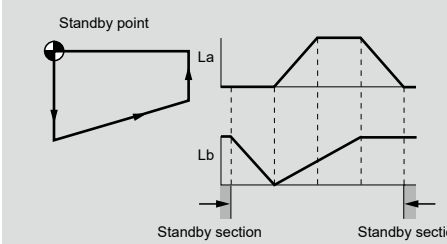


Transfer

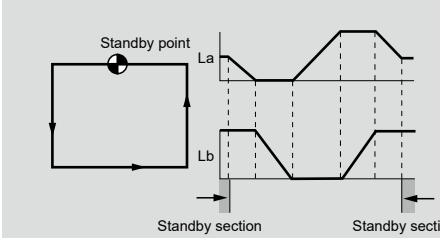
1 Standard chart



2 Chart for a different path level (different amount of lift)

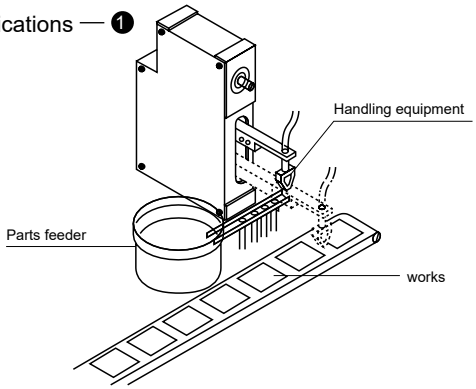


3 Chart with a standby point (dwell angle) in movement



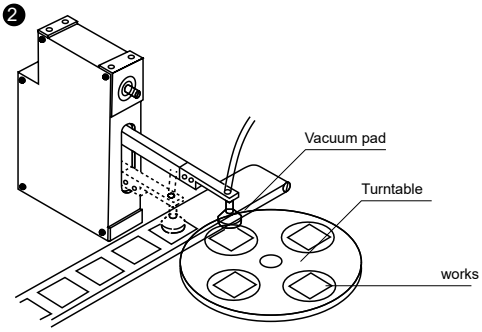
Type A (arm)

Applications — ❶



Using the handling attachment, parts from the parts feeder are transferred onto the conveyor line.

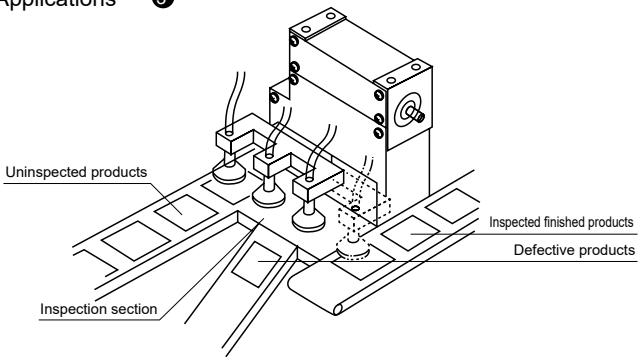
Applications — ❷



The vacuum pad attachment transfers parts on the straight conveyor line to a turntable to go to antoher process, and puts them back to the original line after the processing is done.

Type B (table type)

Applications — ❸



The attachment with 3 vacuum pads transfers uninspected products to the inspection process, and transfers the inspected products to the next process line while discarding the defective products.

PPLX Series
Size selection method

When you select specifications and model of a P&P drive, first determine the following primary specifications.

Operating conditions

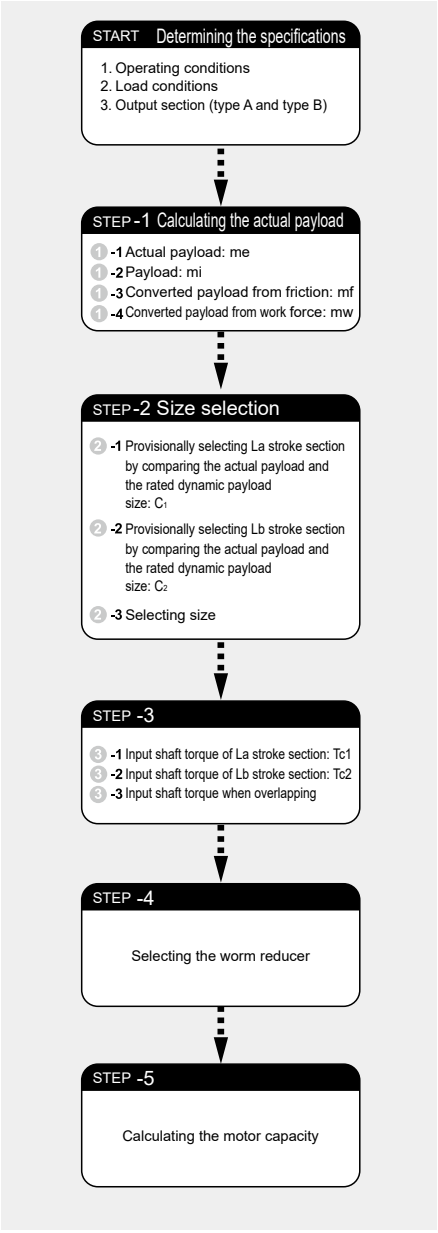
- La stroke length
- Lb stroke length
- Index angle
- Input shaft speed
- Driving method

Load conditions

- Payload
- External load

Compare the actual payload calculated from the payload determined from above and the external load with the rated dynamic payload based on the La and Lb stroke sections, index angle and input shaft speed, and choose the size.

Size selection flow chart



1 Calculating the actual payload

1 - 1. Calculating the actual payload: me

The actual payload is the total of payload, converted payload from friction and converted payload from work force.

$$me = mi + mf + mw \ (kg)$$

Here, mi : Payload (kg)
mf : Converted payload from friction (kg)
mw : Converted payload from work force (kg)

1 - 2. Payload: mi

This is the weight of the jig and workpiece determined for the specifications.

1 - 3. Converted payload from friction: mf

Frictional force is the force which applies to the output arm or table because of friction of bearings and sliding surfaces, and this force is converted to payload.

$$mf = \frac{\mu \cdot F}{g} \ (kg)$$

Here, g : Gravitational acceleration 9.81 m/s^2
F : Force applying to sliding surfaces and bearings (N)
μ : Coefficient of friction

Rolling friction	Sliding friction
μ = 0.03 to 0.05	μ = 0.1 to 0.3

1 - 4. Converted payload from work force: mw

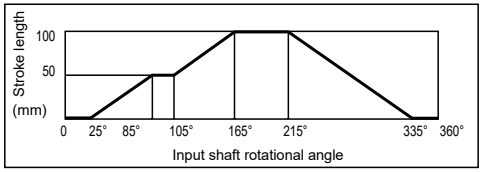
Work force is the external load which is applied to the output arm or table as load when the system is running, and this work force is converted to payload.

$$mw = \frac{Fw}{g} \ (kg)$$

Here, Fw : Work force (N)
g : Gravitational acceleration 9.81 (m/s^2)

2 Size selection

Create a timing chart. Calculate the min. rated dynamic payload from the payload table for each lead range as Mm, and choose this value.



Compare the rated dynamic payload Mm and the actual payload me, and select the size.

$$Mm \geq me \ (kg)$$

Here, Mm : Rated dynamic payload (kg)
me: Actual payload (kg)

2 - 1. Provisionally selecting the size by comparing the rated dynamic payload of the La stroke section and the actual payload: C_1

$$Mma \geq mea \ (kg)$$

Here, Mma : Rated dynamic payload of La stroke (kg)
mea: Actual payload of La stroke (kg)

2 - 2. Provisionally selecting the size by comparing the rated dynamic payload of the Lb stroke section and the actual payload: C_2

$$Mmb \geq meb \ (kg)$$

Here, Mmb : Rated dynamic payload of Lb stroke (kg)
meb: Actual payload of Lb stroke (kg)

2 - 3. Selecting the size

Selecting the larger P&P size between C1 and C2, which are obtained by comparing the rated dynamic payload of La stroke and Lb stroke with the actual payload.

3 Calculating the input shaft torque

For general P&P motions, calculate the input shaft torque for La stroke section and Lb stroke section, and choose the larger value.
If La stroke motion and Lb stroke motion overlap, choose the sum of these 2 values.

③ - 1. Input shaft torque of La stroke section: Tc1

$$Tc1 = \frac{2.06 \times 10^{-3} \cdot Am \cdot Qm \cdot (mi+moa) \cdot Loa^2 \cdot N^2}{\theta h^3} + \frac{0.057 \cdot Vm \cdot \{(mi+moa) \times 9.81 + Ff + Fw\} \cdot Loa}{\theta h} + Tin$$

③ - 2. Input shaft torque of Lb stroke section: Tc2

$$Tc2 = \frac{2.06 \times 10^{-3} \cdot Am \cdot Qm \cdot (mi+mob) \cdot Lob^2 \cdot N^2}{\theta h^3} + \frac{0.057 \cdot Vm \cdot \{(mi+mob) \times 9.81 + Ff + Fw\} \cdot Lob}{\theta h} + Tin$$

Here, Loa : La stroke (mm)
Lob : Lb stroke (mm)
N : Input shaft rotational speed (rpm)
θh : Index angle (°)
moa : Internal weight of La stroke section (kg)
mob : Internal weight of Lb stroke section (kg)
Ff : Frictional force (N)
Fw : work force (N)
Am : 5.53
Vm : 1.76
Qm : 0.99
Tin : Internal frictional torque (N·m)

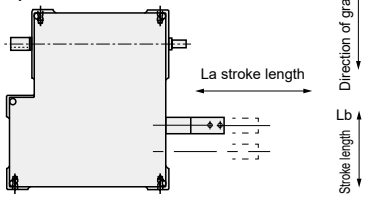
③ - 3. Input shaft torque when overlapping: Tc

Tc = Tc1 + Tc2 - Tin

(CAUTION)
(1) Calculate (mi + moa) × 9.81 and
(mi + mob) × 9.81 in the formula
only when the direction of motion is the same as gravity.

(2) The input shaft torque obtained here is a torque required to drive the P&P drive. You also have to consider a torque externally applied as load to the input shaft.

Example



* You just have to calculate this for Lb stroke; there is no need to calculate this for La stroke.

4 Selecting the worm reducer

Calculate a torque Ter of the output shaft of the reducer (TE series) using the following formula.

$$Ter = Tc \cdot fr \ (N \cdot m)$$

Here, Ter : Load torque (N·m) of the reducer
Tc: PPLX input shaft torque (N·m)
fr: Reducer usage factor

	Operational hours per day		
	2 time	10 time	24 time
Continuous operation	0.90	1.25	1.50
Intermittent operation	1.25	1.50	1.75

Compare Ter obtained here in the worm reducer (TE series) rated output torque table to verify that the reducer can be used in combination with the P&P drive.
If Ter is greater than the worm reducer rated output torque in the standard combination, the size of the reducer should be increased. For details, contact CKD.

5 Calculating the motor capacity

You can obtain the motor capacity for the P&P drive itself from the input shaft torque and input shaft rotational speed of the P&P drive.

$$P = \frac{Tc \cdot N}{9550 \cdot \eta} \ (kW)$$

Here, P : motor capacity (kW)
Tc: Input shaft torque (N·m)
N: Input shaft rotational speed (rpm)
η: Efficiency of the reducer ($\eta < 1$)

* Add Pr (motor capacity of the worm reducer itself) to the above formula when you use a work reducer.

$$Pr = \frac{Tinr \cdot Nr}{9550} \ (kW)$$

Here, Tinr = Internal frictional torque of the reducer (N·m).

TE reducer size	Oil level			
	5°C	10°C	15°C	20°C
TE35	0.38	0.33	0.29	0.26
TE42	0.61	0.52	0.45	0.40

Nr: Worm shaft rotational speed (rpm)

- When we make calculations, we assume the oil temperature to be 10 degrees C unless otherwise stated.
- When you use a worm reducer other than TE series, add to Pr the value obtained by converting the internal frictional torque given in the technical data into the motor capacity.
- In addition, since the viscosity of the lubricating oil in the reducer becomes high in the cold climate region or during cold winter mornings, a higher motor capacity will become necessary. As a result, the motor capacity may become insufficient. This may lead to a speed lower than expected, or in the worst case, the motor may become unable to start or get seized.
- Therefore, select a motor with sufficient margin for the calculation.

PPLX

Specification check sheet for selecting a P&P drive

Date

CKD Corporation
TO:

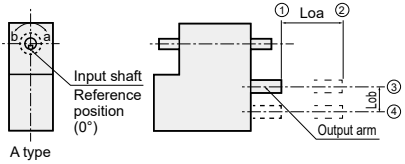
Company name: Name:

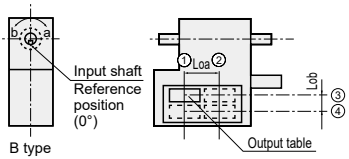
Department/Section:

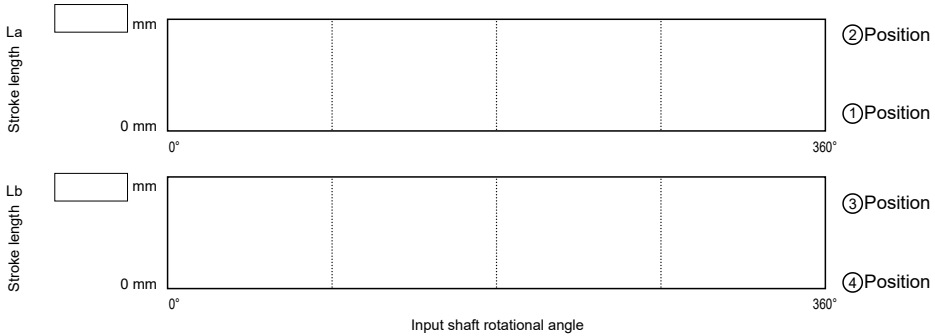
TEL: FAX:

Operating conditions

1. Output section: ☐ Type A ☐ Type B
2. Installation position: ☐ 1 ☐ 2
3. La stroke length : Loa = ☐ mm
4. Lb stroke length : Lob = ☐ mm
5. Input shaft rotating direction: ☐ Direction a ☐ Direction b
6. Input shaft rotational speed N = ☐ rpm
7. Input shaft driving method: ☐ Worm reducer direct connection (with TE reducer)
   ☐ Geared motor
8. Timing chart
   * Create the timing chart referring to the following points.
   • Input shaft reference point (keyway position)
   • Input shaft rotating direction
   • Relationship between the output sections 1, 2, 3 and 4, positions and the input shaft rotational angle







Load conditions and others

● MEMO

PPLX Series

How to order

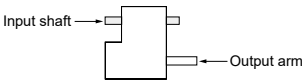
CAD

PPLX (A) 080 (B) - 060 (C) 030 (D) - A (E) - 1 (F) - X012345 (G)

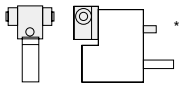
(A) Model No.	(B) Size	(C) Horizontal stroke (La)		(D) Vertical stroke (Lb)	
PPLX	040 050 063 080	010 to 200	10 mm to 200 mm	005 to 060	5 mm to 60 mm

About Input shaft specifications

Standard

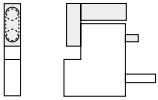


With the worm reducer

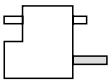
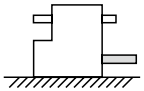
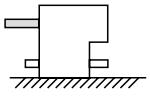


* The specification of the worm reducer (TE reducer) to be mounted is required.

With C/B motor

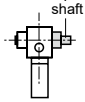


With input shaft position detection cam and photo micro sensor

	Ⓔ Output type	Ⓕ Installation position	Ⓖ Special specification No.
	A Type A: Arm 	1 	* To place an order for a P&P drive, a "Special specification number" is required. The special specification model number shall be determined after a consultation with the customer. Mounting options are available upon request. Please provide CKD with the specifications.
	B Type B: Table type 	2  Contact CKD for details.	

*The standard cam curve for PPLX Series is the MS curve.

Worm reducer installation specification

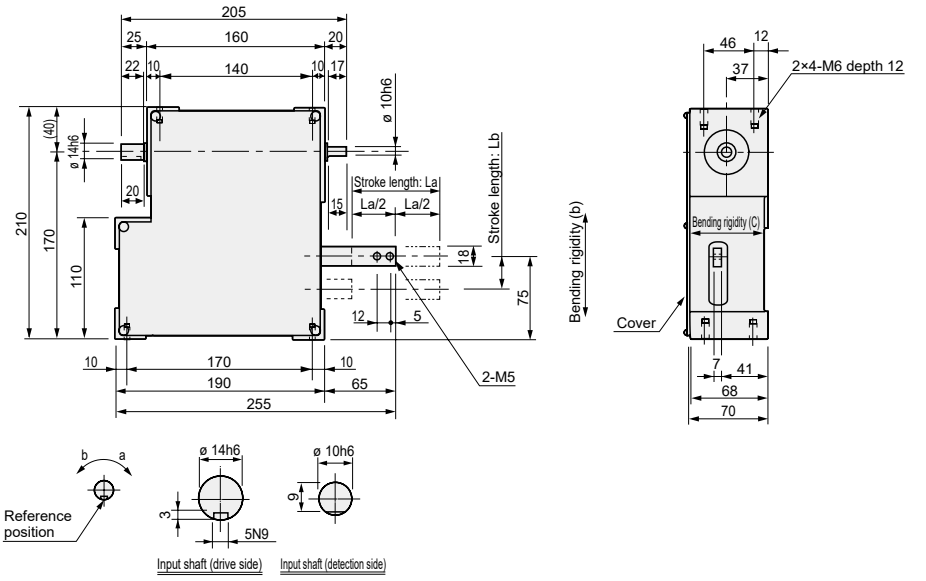
Standard reducer size		Reduction ratio	Clutch/Brake:	Mounting direction	
P&P drive Size	TE reducer size	1 / 10 1 / 20 1 / 30 1 / 40 1 / 50 1 / 60	Clutch/Brake Yes	A Input shaft 	J 
PPLX040	TE35				
PPLX050	TE35		Clutch/Brake No	L 	C 
PPLX063	TE42				
PPLX080	TE42				

* Mounting positions L and C are not available for PPLX040.

Dimensions

CAD

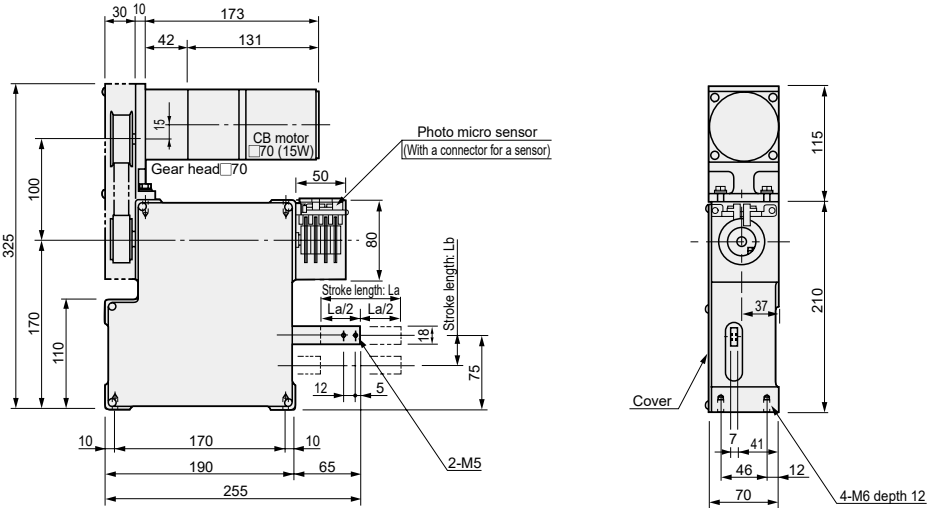
● PPLX040A (arm)



Dimensions with options

CAD

With C/B motor + photo micro sensor



Characteristics

Descriptions			Characteristics
La stroke length		mm	max.80
Lb stroke length		mm	max.30
Internal weight of La stroke section (moa)		kg	0.5
Internal weight of Lb stroke section (mob)		kg	1.0
Bending rigidity of the output section	b direction	mm/N	0.004
	c direction	mm/N	0.015
Lubrication method			Grease lubrication

Descriptions		Characteristics
Allowable thrust force N of the input shaft		800
Allowable radial force N for the input shaft		750
Moment of inertia of the input shaft	$kg \cdot m^2$	2.7×10^{-4}
Internal frictional torque (Tin)	N·m	1.9
Repeatability	mm	±0.02
Product weight	kg	10
Paint color		Silver

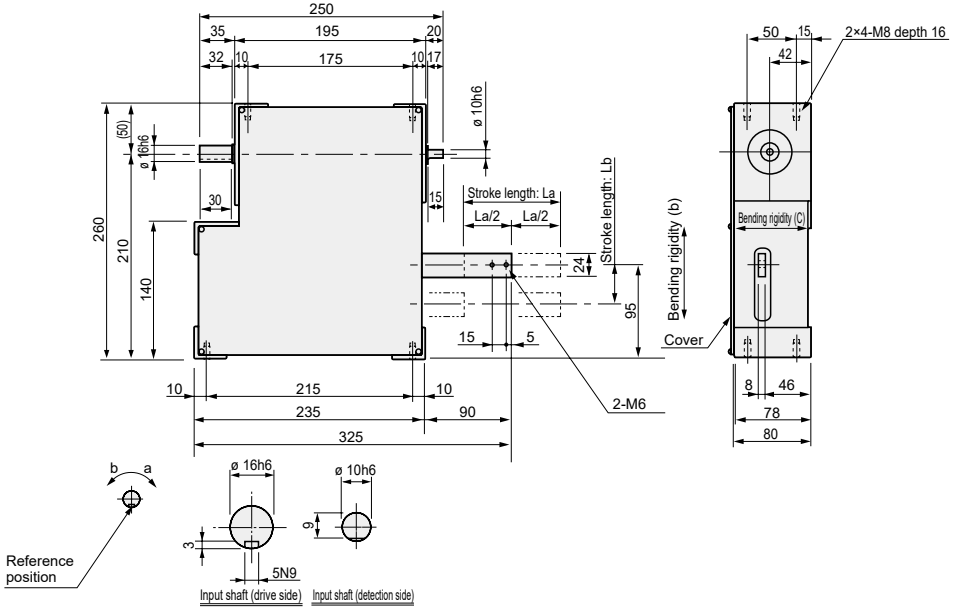
Rated dynamic payload table

Stroke direction	Stroke length (mm)	Index angle (°)	Rated dynamic payload (kg) Input shaft rotational speed (rpm)							
			20	30	40	50	60	80	100	120
La	10	24	2.9	2.5	2.2	2.0	1.7	1.3	0.8	0.4
		35	3.3	2.8	2.6	2.3	2.1	1.8	1.6	1.3
	15	30	2.5	2.1	1.9	1.7	1.5	1.2	0.7	0.4
		40	2.7	2.3	2.1	1.9	1.7	1.5	1.2	1.0
	20	34	2.2	1.9	1.6	1.5	1.3	1.0	0.6	0.3
		45	2.3	2.0	1.8	1.7	1.5	1.3	1.1	0.9
	25	38	2.0	1.7	1.5	1.3	1.2	1.0	0.6	0.2
		50	2.1	1.9	1.7	1.5	1.4	1.2	1.0	0.8
	30	41	1.8	1.6	1.4	1.2	1.1	0.9	0.5	0.2
		50	1.9	1.7	1.5	1.3	1.2	1.0	0.8	0.6
	35	44	1.7	1.5	1.3	1.2	1.0	0.8	0.5	0.2
		55	1.8	1.6	1.4	1.3	1.2	1.0	0.8	0.6
	40	47	1.6	1.4	1.2	1.1	1.0	0.8	0.4	0.1
		55	1.7	1.5	1.3	1.2	1.1	0.9	0.7	0.4
	45	50	1.6	1.3	1.2	1.0	0.9	0.7	0.4	0.1
		60	1.6	1.4	1.3	1.1	1.0	0.8	0.7	0.4
	50	52	1.5	1.3	1.1	1.0	0.9	0.7	0.3	0.1
		60	1.5	1.3	1.2	1.1	1.0	0.8	0.6	0.3
	55	57	1.5	1.3	1.1	1.0	0.9	0.7	0.4	0.1
		65	1.5	1.3	1.2	1.0	0.9	0.8	0.6	0.3
	60	62	1.4	1.2	1.1	1.0	0.9	0.7	0.5	0.2
		70	1.5	1.3	1.1	1.0	0.9	0.8	0.6	0.4
	65	69	1.4	1.2	1.1	1.0	0.9	0.7	0.6	0.3
		80	1.4	1.2	1.1	1.0	0.9	0.8	0.7	0.6
	70	75	1.4	1.2	1.1	0.9	0.9	0.7	0.6	0.3
		85	1.4	1.2	1.1	1.0	0.9	0.8	0.6	0.5
	75	80	1.3	1.2	1.0	0.9	0.8	0.7	0.6	0.4
		90	1.4	1.2	1.1	1.0	0.9	0.8	0.6	0.5
	80	84	1.3	1.1	1.0	0.9	0.8	0.7	0.6	0.4
		95	1.3	1.2	1.0	1.0	0.9	0.7	0.6	0.5
Lb	5	24	3.5	3.0	2.7	2.5	2.3	1.9	1.7	1.1
		35	3.9	3.4	3.1	2.9	2.7	2.4	2.1	1.9
	10	31	2.5	2.2	2.0	1.8	1.6	1.4	1.1	0.6
		40	2.7	2.4	2.1	2.0	1.8	1.6	1.4	1.2
	15	38	2.1	1.9	1.7	1.5	1.4	1.2	1.0	0.5
		50	2.3	2.0	1.8	1.7	1.5	1.3	1.2	1.0
	20	43	1.9	1.6	1.5	1.3	1.2	1.0	0.8	0.3
		55	2.0	1.8	1.6	1.4	1.3	1.2	1.0	0.9
	25	50	1.7	1.5	1.4	1.2	1.1	0.9	0.8	0.3
		60	1.8	1.6	1.4	1.3	1.2	1.0	0.9	0.8
	30	54	1.6	1.4	1.3	1.1	1.0	0.9	0.7	0.2
		65	1.7	1.5	1.3	1.2	1.1	1.0	0.8	0.7

Dimensions

CAD

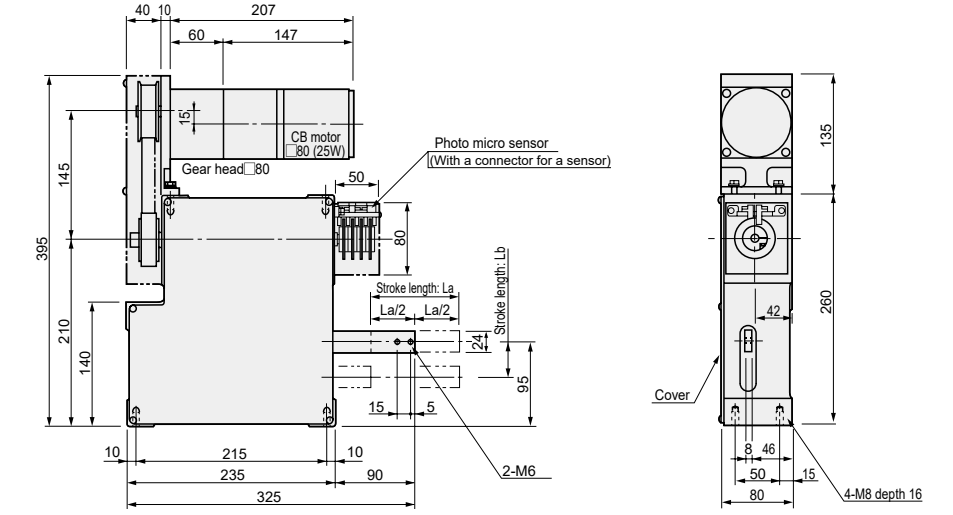
● PPLX050A (arm)



Dimensions with options

CAD

With C/B motor + photo micro sensor



Characteristics

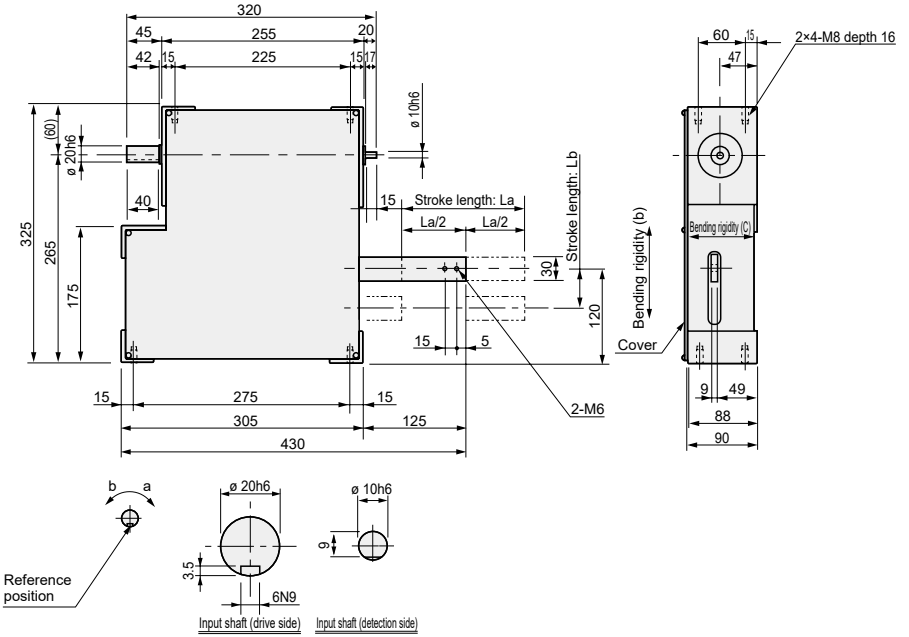
Descriptions			Characteristics
La stroke length		mm	max.100
Lb stroke length		mm	max.40
Internal weight of La stroke section (moa)		kg	0.8
Internal weight of Lb stroke section (mob)		kg	1.8
Bending rigidity of the output section	b direction	mm/N	0.0035
	c direction	mm/N	0.0150
Lubrication method			Grease lubrication

Descriptions		Characteristics
Allowable thrust force N of the input shaft		1200
Allowable radial force N for the input shaft		900
Moment of inertia of the input shaft	$kg \cdot m^2$	7.3×10^{-4}
Internal frictional torque (Tin)	N·m	3.0
Repeatability	mm	±0.02
Product weight	kg	15
Paint color		Silver

Rated dynamic payload table

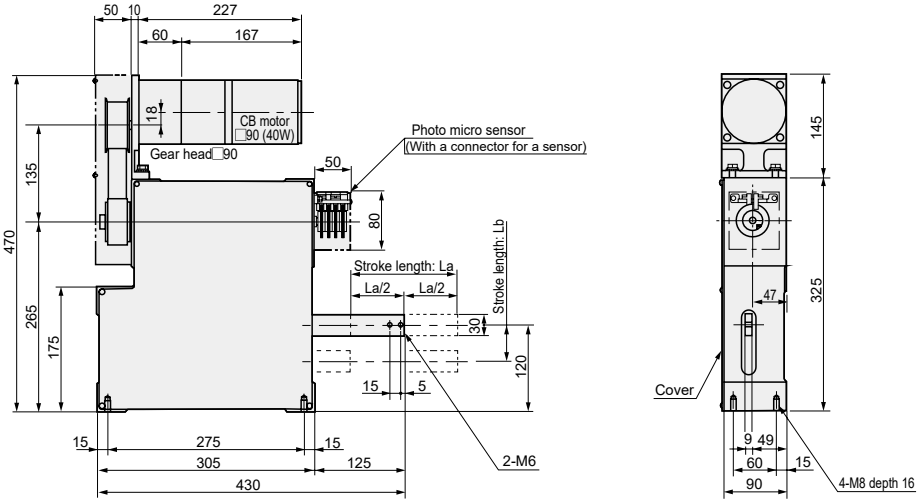
Stroke direction	Stroke length (mm)	Index angle (°)	Rated dynamic payload (kg) Input shaft rotational speed (rpm)						
			20	30	40	50	60	80	100
La	10	22	4.0	3.4	3.0	2.6	2.3	1.7	0.7
		30	4.4	3.9	3.4	3.1	2.8	2.4	2.0
	20	30	3.0	2.5	2.2	1.9	1.7	1.3	0.5
		40	3.2	2.8	2.5	2.2	2.0	1.7	1.4
	30	37	2.5	2.1	1.9	1.6	1.4	1.1	0.4
		45	2.7	2.3	2.0	1.8	1.6	1.3	1.1
	40	42	2.2	1.9	1.6	1.4	1.3	1.0	0.3
		50	2.3	2.0	1.8	1.6	1.4	1.1	0.9
	50	47	2.0	1.7	1.5	1.3	1.2	0.9	0.2
		55	2.1	1.8	1.6	1.4	1.3	1.0	0.7
	60	52	1.9	1.6	1.4	1.2	1.1	0.8	0.2
		60	2.0	1.7	1.5	1.3	1.2	1.0	0.6
	70	58	1.8	1.5	1.3	1.2	1.0	0.8	0.2
		70	1.9	1.6	1.4	1.3	1.2	0.9	0.8
	80	65	1.7	1.5	1.3	1.2	1.0	0.8	0.3
		75	1.8	1.5	1.4	1.2	1.1	0.9	0.7
	90	75	1.7	1.4	1.3	1.1	1.0	0.8	0.5
		85	1.7	1.5	1.3	1.2	1.1	0.9	0.7
	100	82	1.6	1.4	1.2	1.1	1.0	0.8	0.6
		90	1.7	1.4	1.3	1.2	1.0	0.9	0.7
Lb	10	27	3.6	3.1	2.7	2.5	2.2	1.8	0.9
		35	3.9	3.4	3.0	2.8	2.5	2.2	1.9
	20	38	2.7	2.3	2.0	1.8	1.7	1.4	0.6
		50	2.9	2.5	2.3	2.1	1.9	1.6	1.4
	30	46	2.3	2.0	1.7	1.5	1.4	1.1	0.2
		55	2.4	2.0	1.8	1.7	1.5	1.3	1.1
	40	54	2.0	1.7	1.5	1.4	1.3	1.0	0.1
		65	2.1	1.8	1.6	1.5	1.4	1.1	1.0

Dimensions



Dimensions with options

With C/B motor + photo micro sensor



Characteristics

Descriptions			Characteristics
La stroke length		mm	max.150
Lb stroke length		mm	max.50
Internal weight of La stroke section (moa)		kg	1.7
Internal weight of Lb stroke section (mob)		kg	3.0
Bending rigidity of the output section	b direction	mm/N	0.003
	c direction	mm/N	0.020
Lubrication method			Grease lubrication

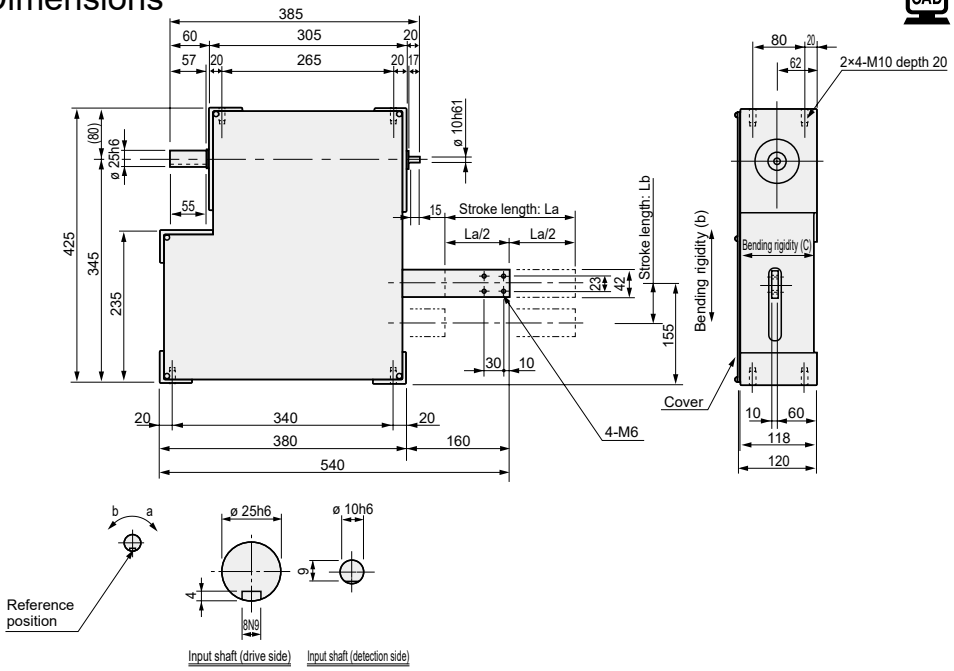
Descriptions		Characteristics
Allowable thrust force N of the input shaft		2000
Allowable radial force N for the input shaft		1600
Moment of inertia of the input shaft	$kg \cdot m^2$	2.4×10^{-4}
Internal frictional torque (Tin)	N·m	4.8
Repeatability	mm	±0.02
Product weight	kg	25
Paint color		Silver

Rated dynamic payload table

Stroke direction	Stroke length (mm)	Index angle (°)	Rated dynamic payload (kg) Input shaft rotational speed (rpm)							
			10	20	30	40	50	60	70	80
La	10	21	8.0	6.4	5.4	4.7	4.1	3.6	3.2	2.8
	20	30	6.0	4.7	4.0	3.5	3.1	2.7	2.4	2.1
	30	36	5.0	4.0	3.4	2.9	2.6	2.3	2.0	1.8
	40	41	4.4	3.5	3.0	2.6	2.3	2.0	1.7	1.5
	50	46	4.0	3.2	2.7	2.4	2.1	1.8	1.6	1.4
	60	50	3.7	3.0	2.5	2.2	1.9	1.7	1.5	1.3
	70	54	3.5	2.8	2.4	2.1	1.8	1.6	1.4	1.2
	80	58	3.3	2.6	2.2	2.0	1.7	1.5	1.3	1.2
	90	60	3.2	2.5	2.1	1.8	1.6	1.4	1.2	1.1
	100	64	3.1	2.4	2.1	1.8	1.6	1.4	1.2	1.0
	110	71	3.0	2.4	2.0	1.8	1.5	1.4	1.2	1.1
	120	77	2.9	2.3	2.0	1.7	1.5	1.3	1.2	1.1
	130	84	2.8	2.3	1.9	1.7	1.5	1.3	1.2	1.1
	140	92	2.8	2.2	1.9	1.7	1.5	1.3	1.2	1.1
	150	99	2.7	2.2	1.9	1.7	1.5	1.3	1.2	1.1
Lb	10	27	6.7	5.4	4.6	4.1	3.7	3.3	3.0	2.7
	20	37	5.0	4.0	3.4	3.0	2.7	2.4	2.2	2.0
	30	45	4.2	3.3	2.9	2.6	2.3	2.1	1.9	1.7
	40	52	3.7	3.0	2.6	2.3	2.0	1.8	1.6	1.5
	50	58	3.4	2.7	2.3	2.1	1.9	1.7	1.5	1.4

Dimensions

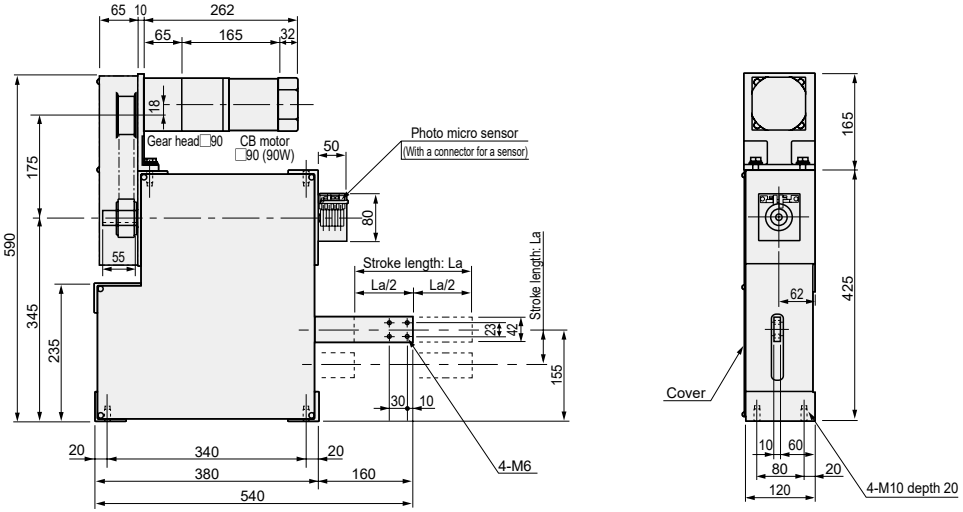
CAD



Dimensions with options

CAD

With C/B motor + photo micro sensor



Characteristics

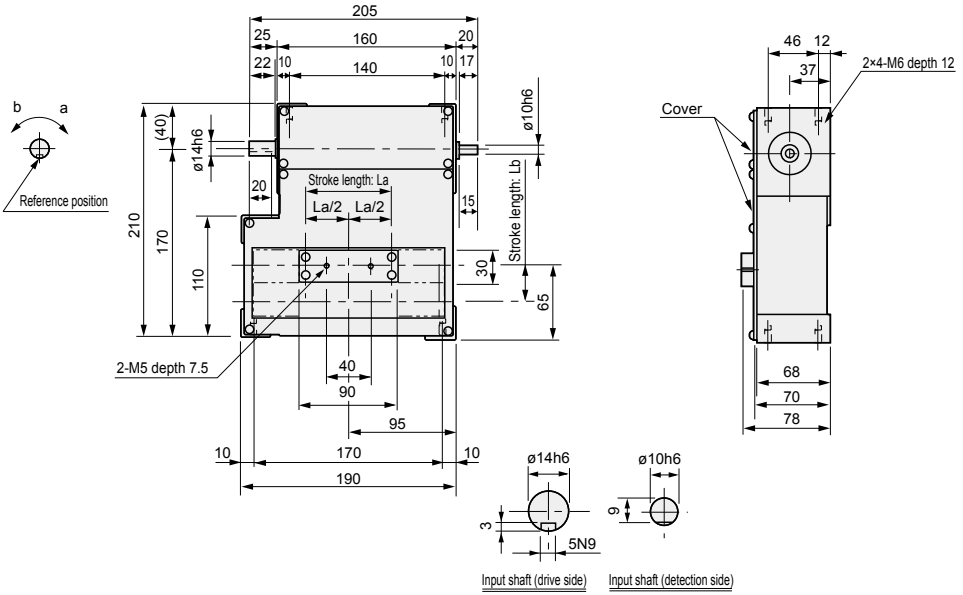
Descriptions			Characteristics
La stroke length		mm	max.200
Lb stroke length		mm	max.60
Internal weight of La stroke section (moa)		kg	3.2
Internal weight of Lb stroke section (mob)		kg	5.3
Bending rigidity of the output section	b direction	mm/N	0.0025
	c direction	mm/N	0.0250
Lubrication method			Grease lubrication

Descriptions		Characteristics
Allowable thrust force N of the input shaft		2500
Allowable radial force N for the input shaft		2700
Moment of inertia of the input shaft	$kg \cdot m^2$	8.6×10^{-3}
Internal frictional torque (Tin)	N·m	7.8
Repeatability	mm	±0.02
Product weight	kg	50
Paint color		Silver

Rated dynamic payload table

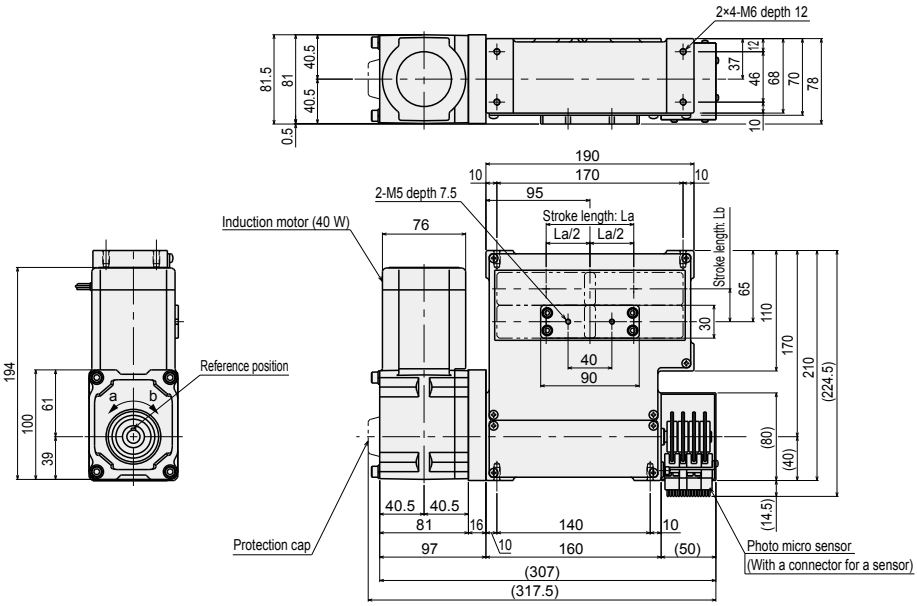
Stroke direction	Stroke length (mm)	Index angle (°)	Rated dynamic payload (kg) Input shaft rotational speed (rpm)							
			10	20	30	40	50	60	70	80
La	10	20	11.2	8.9	7.5	6.5	5.7	5.0	4.4	3.8
	20	28	8.2	6.5	5.5	4.8	4.2	3.6	3.2	2.8
	30	33	6.9	5.4	4.6	3.9	3.4	3.0	2.6	2.3
	40	38	6.1	4.8	4.0	3.5	3.0	2.6	2.3	2.0
	50	43	5.5	4.4	3.7	3.2	2.8	2.4	2.1	1.8
	60	47	5.1	4.0	3.4	2.9	2.6	2.2	1.9	1.7
	70	50	4.8	3.8	3.2	2.7	2.4	2.1	1.8	1.6
	80	53	4.5	3.6	3.0	2.6	2.2	1.9	1.7	1.5
	90	57	4.3	3.4	2.9	2.5	2.2	1.9	1.6	1.4
	100	60	4.2	3.3	2.8	2.4	2.1	1.8	1.6	1.4
	110	62	4.0	3.1	2.6	2.3	2.0	1.7	1.5	1.3
	120	65	3.9	3.0	2.6	2.2	1.9	1.7	1.4	1.3
	130	68	3.7	2.9	2.5	2.1	1.9	1.6	1.4	1.2
	140	70	3.6	2.9	2.4	2.1	1.8	1.6	1.4	1.2
	150	73	3.5	2.8	2.4	2.0	1.8	1.5	1.3	1.2
	160	78	3.5	2.7	2.3	2.0	1.7	1.5	1.3	1.2
	170	83	3.4	2.7	2.3	2.0	1.7	1.5	1.3	1.2
	180	88	3.4	2.7	2.3	2.0	1.7	1.5	1.3	1.2
	190	94	3.3	2.6	2.2	1.9	1.7	1.5	1.3	1.2
	200	99	3.3	2.6	2.2	1.9	1.7	1.5	1.3	1.2
Lb	10	27	8.9	7.2	6.2	5.5	4.9	4.4	4.0	3.6
	20	36	6.5	5.2	4.5	4.0	3.5	3.2	2.9	2.6
	30	44	5.5	4.4	3.8	3.3	3.0	2.7	2.4	2.2
	40	51	4.9	3.9	3.4	3.0	2.7	2.4	2.1	1.9
	50	57	4.4	3.5	3.1	2.7	2.4	2.2	2.0	1.8
	60	63	4.1	3.3	2.8	2.5	2.2	2.0	1.8	1.6

Dimensions



Dimensions with options

Hollow shaft geared motor (40 W) + micro sensor



Characteristics

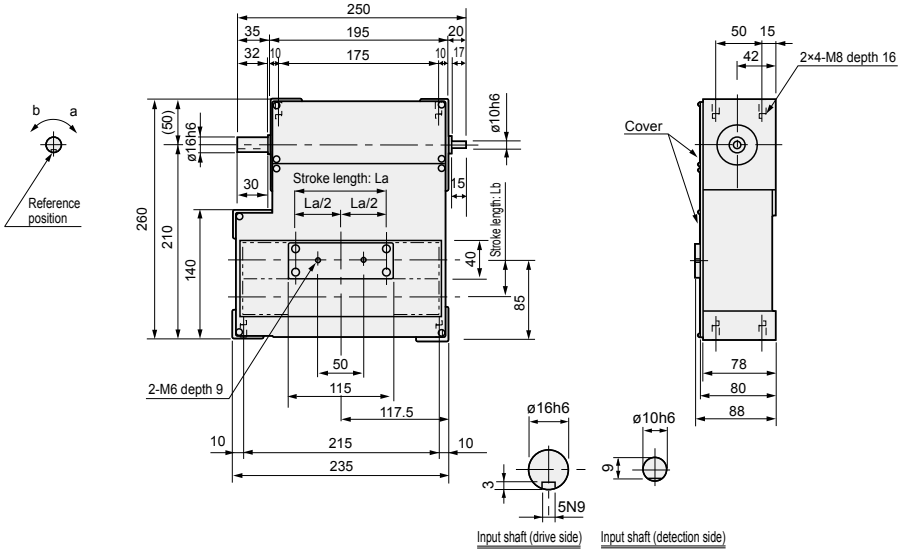
Descriptions		Characteristics
La stroke length	mm	max.80
Lb stroke length	mm	max.30
Internal weight of La stroke section (moa)	kg	0.6
Internal weight of Lb stroke section (mob)	kg	1.2
Product weight	kg	10
Lubrication method		Grease lubrication

Descriptions		Characteristics
Allowable thrust force N of the input shaft		800
Allowable radial force N for the input shaft		750
Moment of inertia of the input shaft	$kg \cdot m^2$	2.7×10^{-4}
Internal frictional torque (Tin)	N·m	1.9
Repeatability	mm	±0.02
Paint color		Silver

Rated dynamic payload table

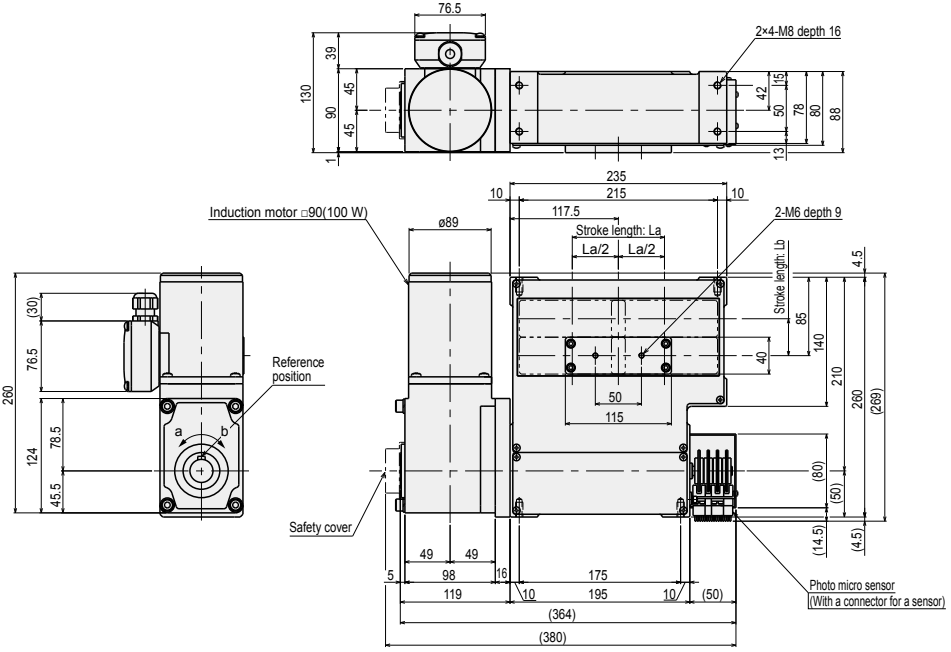
Stroke direction	Stroke length (mm)	Index angle (°)	Rated dynamic payload (kg) Input shaft rotational speed (rpm)							
			20	30	40	50	60	80	100	120
La	10	24	3.8	3.3	2.9	2.6	2.3	1.2	0.6	0.2
		35	4.3	3.7	3.4	3.1	2.8	2.4	1.9	1.2
	15	30	3.7	3.2	2.8	2.5	2.2	1.2	0.6	0.2
		40	4.0	3.5	3.1	2.8	2.6	2.2	1.5	0.9
	20	34	3.5	3.0	2.7	2.4	2.0	1.1	0.5	0.2
		45	3.8	3.3	3.0	2.7	2.5	2.1	1.4	0.8
	25	38	3.4	3.0	2.6	2.3	1.9	1.0	0.5	0.1
		50	3.7	3.2	2.9	2.6	2.4	2.0	1.3	0.7
	30	41	3.4	2.9	2.5	2.3	1.7	0.9	0.4	0.1
		50	3.5	3.1	2.7	2.5	2.2	1.6	0.9	0.5
	35	44	3.3	2.8	2.5	2.2	1.6	0.8	0.3	-
		55	3.5	3.0	2.7	2.4	2.2	1.6	0.9	0.5
	40	47	3.3	2.8	2.5	2.2	1.5	0.7	0.3	-
		55	3.4	2.9	2.6	2.3	2.1	1.3	0.7	0.3
	45	50	3.2	2.8	2.4	2.1	1.5	0.7	0.3	-
		60	3.4	2.9	2.6	2.3	2.1	1.3	0.7	0.3
	50	52	3.2	2.7	2.4	1.9	1.3	0.6	0.2	-
		60	3.3	2.8	2.5	2.3	2.0	1.1	0.6	0.2
	55	57	3.2	2.8	2.4	2.1	1.5	0.7	0.3	-
		65	3.3	2.8	2.5	2.3	2.1	1.1	0.6	0.2
	60	62	3.2	2.8	2.4	2.2	1.6	0.8	0.3	0.1
		70	3.3	2.8	2.5	2.3	2.1	1.2	0.7	0.3
	65	69	3.2	2.8	2.5	2.2	1.8	1.0	0.5	0.1
		80	3.3	2.9	2.6	2.3	2.1	1.5	0.9	0.4
	70	75	3.2	2.8	2.5	2.2	2.0	1.1	0.6	0.2
		85	3.3	2.9	2.6	2.3	2.1	1.6	0.9	0.5
	75	80	3.2	2.8	2.5	2.3	2.0	1.1	0.6	0.2
		90	3.3	2.9	2.6	2.3	2.1	1.6	1.0	0.5
	80	84	3.2	2.8	2.5	2.3	2.0	1.2	0.6	0.3
		95	3.3	2.9	2.6	2.3	2.2	1.7	1.0	0.5
Lb	5	24	4.1	3.6	3.2	2.9	2.7	2.3	1.8	0.9
		35	4.6	4.0	3.6	3.4	3.1	2.8	2.5	2.2
	10	31	3.6	3.2	2.8	2.6	2.3	2.0	1.1	0.4
		40	3.9	3.4	3.1	2.8	2.6	2.3	2.0	1.4
	15	38	3.5	3.0	2.7	2.4	2.2	1.9	0.9	0.2
		50	3.7	3.3	2.9	2.7	2.5	2.2	1.9	1.4
	20	43	3.4	2.9	2.6	2.4	2.1	1.7	0.7	0.1
		55	3.5	3.1	2.8	2.6	2.4	2.0	1.8	1.0
	25	50	3.3	2.9	2.6	2.3	2.1	1.7	0.7	0.1
		60	3.4	3.0	2.7	2.5	2.3	2.0	1.6	0.7
	30	54	3.2	2.8	2.5	2.3	2.1	1.4	0.5	-
		65	3.4	2.9	2.6	2.4	2.2	1.9	1.3	0.6

Dimensions



Dimensions with options

Hollow shaft geared motor (100 W) + micro sensor



Characteristics

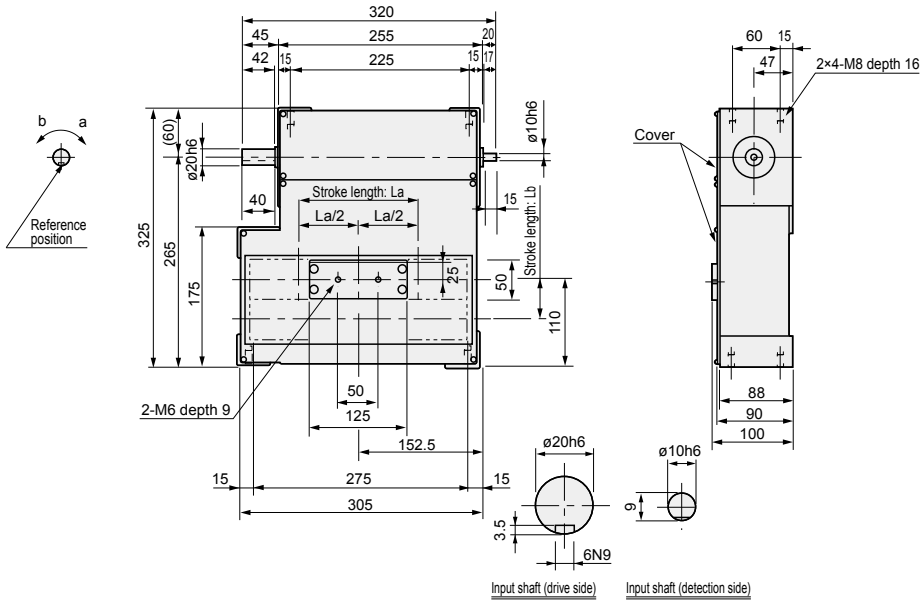
Descriptions		Characteristics
La stroke length	mm	max.100
Lb stroke length	mm	max.40
Internal weight of La stroke section (moa)	kg	1.1
Internal weight of Lb stroke section (mob)	kg	2.3
Product weight	kg	15
Lubrication method		Grease lubrication

Descriptions		Characteristics
Allowable thrust force N of the input shaft		1200
Allowable radial force N for the input shaft		900
Moment of inertia of the input shaft	$kg \cdot m^2$	7.3×10^{-4}
Internal frictional torque (Tin)	N·m	3.0
Repeatability	mm	±0.02
Paint color		Silver

Rated dynamic payload table

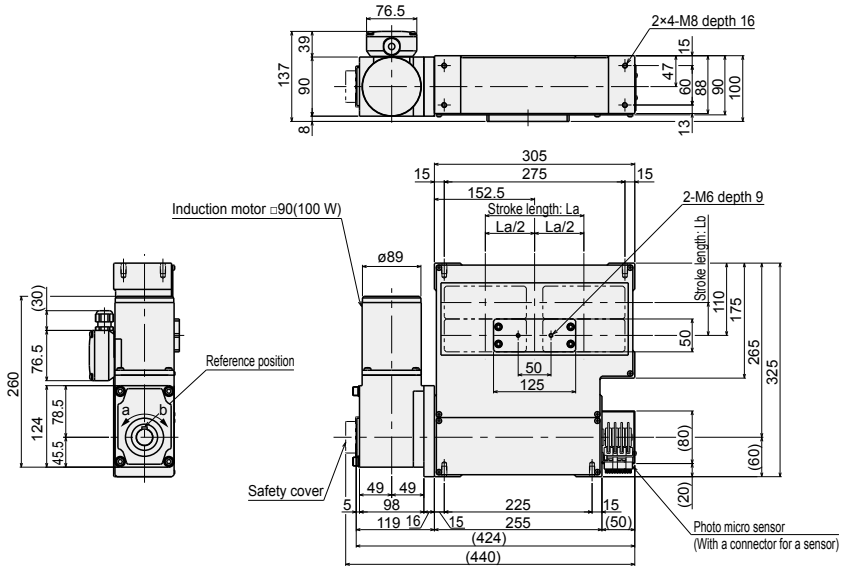
Stroke direction	Stroke length (mm)	Index angle (°)	Rated dynamic payload (kg) Input shaft rotational speed (rpm)						
			20	30	40	50	60	80	100
La	10	22	5.0	4.2	3.7	3.3	2.9	1.5	0.5
		30	5.5	4.8	4.2	3.8	3.5	2.9	1.8
	20	30	4.5	3.8	3.3	2.9	2.6	1.1	0.3
		40	4.9	4.2	3.8	3.4	3.1	2.5	1.4
	30	37	4.3	3.7	3.2	2.8	2.5	1.0	0.2
		45	4.5	3.9	3.5	3.1	2.8	2.0	0.9
	40	42	4.2	3.5	3.1	2.7	2.2	0.8	0.1
		50	4.4	3.7	3.3	3.0	2.6	1.6	0.6
	50	47	4.1	3.5	3.0	2.6	2.1	0.7	-
		55	4.2	3.6	3.2	2.9	2.6	1.4	0.5
	60	52	4.0	3.4	3.0	2.6	1.9	0.6	-
		60	4.2	3.6	3.1	2.8	2.5	1.3	0.4
	70	58	4.0	3.4	3.0	2.6	2.0	0.7	-
		70	4.2	3.6	3.2	2.9	2.6	1.6	0.6
	80	65	4.0	3.4	3.0	2.7	2.2	0.8	0.1
		75	4.1	3.5	3.1	2.8	2.5	1.5	0.6
	90	75	4.0	3.5	3.1	2.7	2.4	1.1	0.3
		85	4.1	3.6	3.2	2.9	2.6	1.8	0.8
	100	82	4.0	3.5	3.1	2.7	2.5	1.2	0.3
		90	4.1	3.5	3.1	2.8	2.6	1.7	0.7
Lb	10	27	4.7	4.1	3.6	3.2	2.9	2.0	0.4
		35	5.1	4.4	4.0	3.6	3.3	2.9	2.2
	20	38	4.3	3.8	3.3	3.0	2.7	1.4	0.1
		50	4.7	4.1	3.7	3.3	3.1	2.6	1.9
	30	46	4.1	3.6	3.2	2.8	2.6	0.9	-
		55	4.3	3.8	3.4	3.0	2.8	2.3	0.7
	40	54	4.0	3.5	3.1	2.8	2.5	0.6	-
		65	4.2	3.7	3.3	3.0	2.7	2.1	0.6

Dimensions



Dimensions with options

Hollow shaft geared motor (100 W) + micro sensor



Characteristics

Descriptions		Characteristics
La stroke length	mm	max.150
Lb stroke length	mm	max.50
Internal weight of La stroke section (moa)	kg	1.8
Internal weight of Lb stroke section (mob)	kg	3.8
Product weight	kg	25
Lubrication method		Grease lubrication

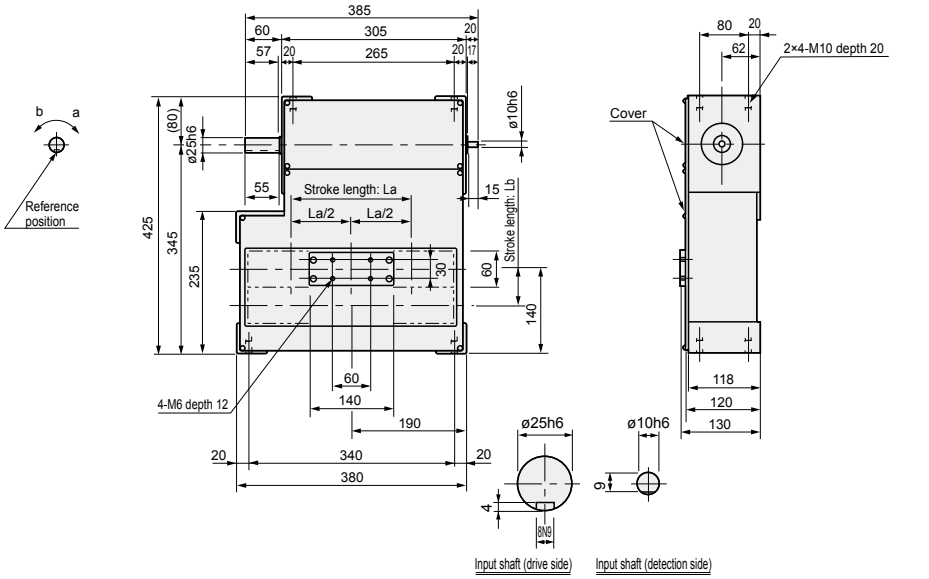
Descriptions		Characteristics
Allowable thrust force N of the input shaft		2000
Allowable radial force N for the input shaft		1600
Moment of inertia of the input shaft	$kg \cdot m^2$	2.4×10^{-3}
Internal frictional torque (Tin)	N·m	4.8
Repeatability	mm	±0.02
Paint color		Silver

Rated dynamic payload table

Stroke direction	Stroke length (mm)	Min. index angle (°)	Rated dynamic payload (kg) Input shaft rotational speed (rpm)							
			10	20	30	40	50	60	70	80
La	10	21	8.8	7.0	5.9	5.2	4.5	4.0	3.5	2.6
	20	30	8.0	6.4	5.4	4.7	4.1	3.7	3.2	2.4
	30	36	7.6	6.0	5.1	4.4	3.9	3.4	3.0	2.1
	40	41	7.3	5.8	4.9	4.3	3.7	3.3	2.9	1.8
	50	46	7.2	5.7	4.8	4.2	3.7	3.2	2.7	1.6
	60	50	7.0	5.5	4.7	4.1	3.6	3.1	2.4	1.4
	70	54	6.9	5.5	4.6	4.0	3.5	3.1	2.3	1.3
	80	58	6.8	5.4	4.6	4.0	3.5	3.1	2.1	1.2
	90	60	6.7	5.3	4.5	3.9	3.4	3.0	1.8	0.9
	100	64	6.7	5.3	4.5	3.9	3.4	3.0	1.7	0.9
	110	71	6.7	5.3	4.5	3.9	3.5	3.1	2.1	1.1
	120	77	6.7	5.3	4.5	4.0	3.5	3.1	2.3	1.3
	130	84	6.7	5.3	4.6	4.0	3.5	3.2	2.6	1.6
	140	92	6.7	5.3	4.6	4.0	3.6	3.2	2.9	1.9
	150	99	6.7	5.3	4.6	4.1	3.6	3.3	2.9	2.0
Lb	10	27	8.3	6.6	5.7	5.1	4.6	4.1	3.7	3.4
	20	37	7.5	6.0	5.2	4.6	4.1	3.7	3.3	3.0
	30	45	7.2	5.7	4.9	4.4	3.9	3.5	3.2	2.8
	40	52	7.0	5.6	4.8	4.2	3.8	3.4	3.1	2.2
	50	58	6.8	5.4	4.7	4.1	3.7	3.3	3.0	1.6

Dimensions

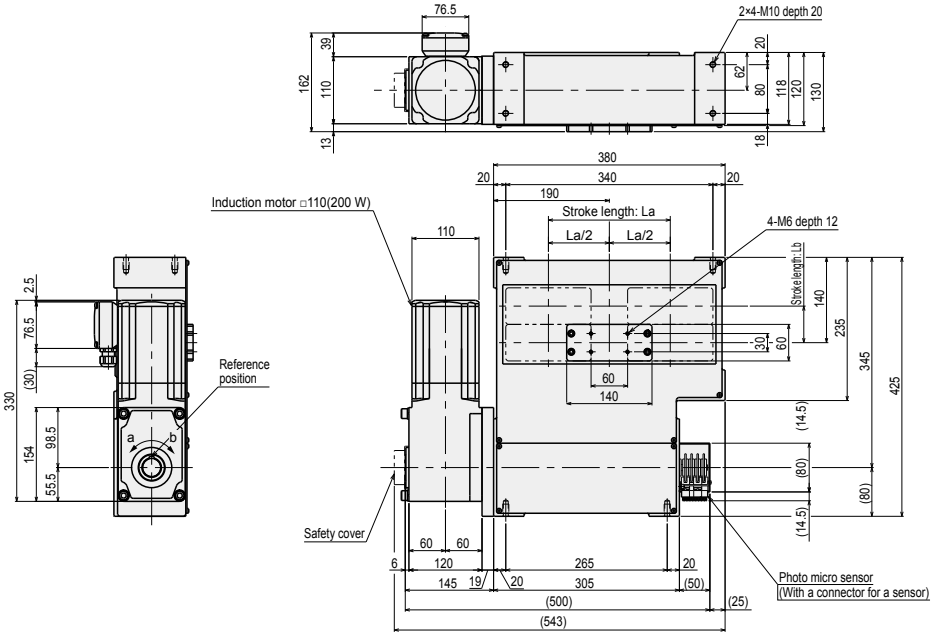
CAD



Dimensions with options

CAD

Hollow shaft geared motor (200 W) + micro sensor



Characteristics

Descriptions		Characteristics
La stroke length	mm	max.200
Lb stroke length	mm	max.60
Internal weight of La stroke section (moa)	kg	3.6
Internal weight of Lb stroke section (mob)	kg	6.9
Product weight	kg	50
Lubrication method		Grease lubrication

Descriptions		Characteristics
Allowable thrust force N of the input shaft		2500
Allowable radial force N for the input shaft		2700
Moment of inertia of the input shaft	$kg \cdot m^2$	8.6×10^{-3}
Internal frictional torque (Tin)	N·m	7.8
Repeatability	mm	±0.02
Paint color		Silver

Rated dynamic payload table

Stroke direction	Stroke length (mm)	Min. index angle (°)	Rated dynamic payload (kg) Input shaft rotational speed (rpm)							
			10	20	30	40	50	60	70	80
La	10	20	14.0	11.1	9.4	8.2	7.1	6.2	5.5	4.7
	20	28	12.7	10.1	8.5	7.4	6.4	5.6	4.9	4.2
	30	33	11.9	9.4	7.9	6.8	5.9	5.2	4.5	3.3
	40	38	11.5	9.1	7.7	6.6	5.7	5.0	4.3	3.0
	50	43	11.2	8.9	7.5	6.5	5.6	4.9	4.3	3.0
	60	47	11.0	8.7	7.3	6.3	5.5	4.8	4.2	2.7
	70	50	10.8	8.5	7.2	6.2	5.3	4.6	4.0	2.3
	80	53	10.6	8.4	7.0	6.1	5.2	4.5	3.9	2.0
	90	57	10.5	8.3	7.0	6.0	5.2	4.5	3.9	2.0
	100	60	10.4	8.2	6.9	6.0	5.2	4.5	3.6	1.9
	110	62	10.3	8.1	6.8	5.9	5.1	4.4	3.2	1.5
	120	65	10.2	8.0	6.8	5.8	5.0	4.4	3.1	1.4
	130	68	10.1	8.0	6.7	5.8	5.0	4.4	3.0	1.4
	140	70	10.0	7.9	6.7	5.7	5.0	4.3	2.7	1.1
	150	73	10.0	7.9	6.6	5.7	4.9	4.3	2.6	1.1
	160	78	10.0	7.9	6.7	5.8	5.0	4.4	3.0	1.4
	170	83	10.0	7.9	6.7	5.8	5.1	4.4	3.3	1.6
	180	88	10.0	7.9	6.7	5.8	5.1	4.5	3.6	1.9
	190	94	10.0	7.9	6.8	5.9	5.2	4.6	4.1	2.3
	200	99	10.0	7.9	6.8	5.9	5.2	4.6	4.1	2.5
Lb	10	27	13.1	10.4	9.0	8.0	7.2	6.5	5.9	5.3
	20	36	11.7	9.4	8.1	7.1	6.4	5.7	5.1	4.6
	30	44	11.2	8.9	7.7	6.8	6.1	5.4	4.9	4.4
	40	51	10.8	8.6	7.4	6.6	5.9	5.3	4.7	4.3
	50	57	10.5	8.4	7.2	6.4	5.7	5.1	4.6	4.2
	60	63	10.3	8.2	7.1	6.3	5.6	5.0	4.5	4.1