HIWIN®
Motion Control and System Technology

Industrial Robot

Technical Information

HIWIN®

Motion Control and System Technology

High speed | High precision | Multifunctional integration | Ecology first | Humanistic technology

TAIWAN EXCELLENCE 2012
TAIWAN EXCELLENCE 2006

TAIWAN EXCELLENCE
GOLD AWARD 2012, 2011, 2009, 2008, 2005
SILVER AWARD 2006, 2001, 1993

Ballscrews

Ground/Rolled

- High Speed (High Dm-N Value/Super S Series)
- For Heavy-Load Drive
- Ecological & Economical lubrication Module E2
- Rotating Nut (R1)
- Energy-Saving & Thermal-Controlling (C1)
- Recirculation Divide Series

AC Servo Motors
AC Servo Drives

TAIWAN EXCELLENCE 2004

TAIWAN EXCELLENCE
GOLD AWARD 2004

Linear Synchronous Motor

- Coreless Type (LMC)

TAIWAN EXCELLENCE 2002

TAIWAN EXCELLENCE 2002

Linear Actuator

- LAN for Hospital
- LAM for Industrial
- LAS Compact Size
- LAK Controller

TAIWAN EXCELLENCE 2010

TAIWAN EXCELLENCE
GOLD AWARD 2010, 2003

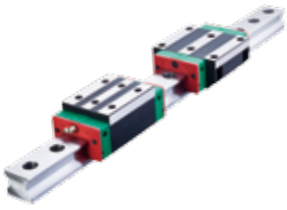
Industrial Robot

- For Semiconductor & Electronic (KK Series)
- For Automation (KS, KA Series)

TAIWAN EXCELLENCE 2009

TAIWAN EXCELLENCE
SILVER AWARD 2009

Linear Motor Air Bearing Platform



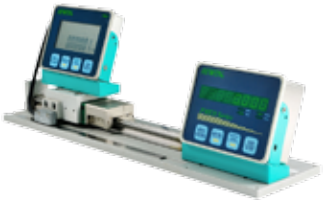
TAIWAN EXCELLENCE 2008
TAIWAN EXCELLENCE 2007

TAIWAN EXCELLENCE
GOLD AWARD 2008
SILVER AWARD 2007, 2002

Linear Guideway

HG/EG/RG/MG Type

- Ecological & Economical lubrication Module E2
- Low Noise (Q1)
- Air Jet (A1)

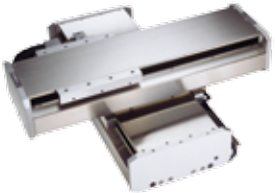


Positioning Measurement System

TAIWAN EXCELLENCE 2004

TAIWAN EXCELLENCE 2004

Positioning Guideway



Linear Motor X-Y Robot

TAIWAN EXCELLENCE 2006

TAIWAN EXCELLENCE
SILVER AWARD 2006

TMS Torque Motor Rotary Table

Linear Motor Gantry

HIWIN®
Motion Control and System Technology

Industrial Robot

Technical Information

(The specifications in this catalogue are subject to change without notification.)

Industrial Robot Explanation

Warning

Since the IR products are electrical and mechanical equipments, for the safety of users, please be sure to read and follow all of the related catalog and the following precautions before choosing and using the products. Any dysfunctions, damages or other accidents caused by disobedience of the instruction, the company shall not be responsible.

Personal Safety

- ○The products are designed for industrial purpose; the application cannot be directly related to the elements including the well-being of human life or personnel security.
- ○During the operation of the products, people should stay out of the mechanical range of motion to avoid injuries or other accidents.
- ○When the products access to the motor with power on, people with pacemaker should at least maintain the distance of one meter to prevent disturbance.
- ○To prevent the fire alarm, the products should not be places away from the ignition or flammable gas.

Storage and Installation

- ○Avoid fall or collision in the transportation.
- ○Highly recommend to lie flat and well packed in the storage. Do not expose the products in the hot or low temperature, humid environment
- ○Do not dissemble or modify the products on your own to prevent foreign object or damages causing malfunctions or occupational accidents.
- ○It is necessary to firmly fix the products in the installation to prevent loosening by the vibration.
- ○Pay attention to choose the proper components to Install the coupling and the motor and beware of the alignment to the centerline of the shaft to tighten the screws. Do not force to install.

Operation

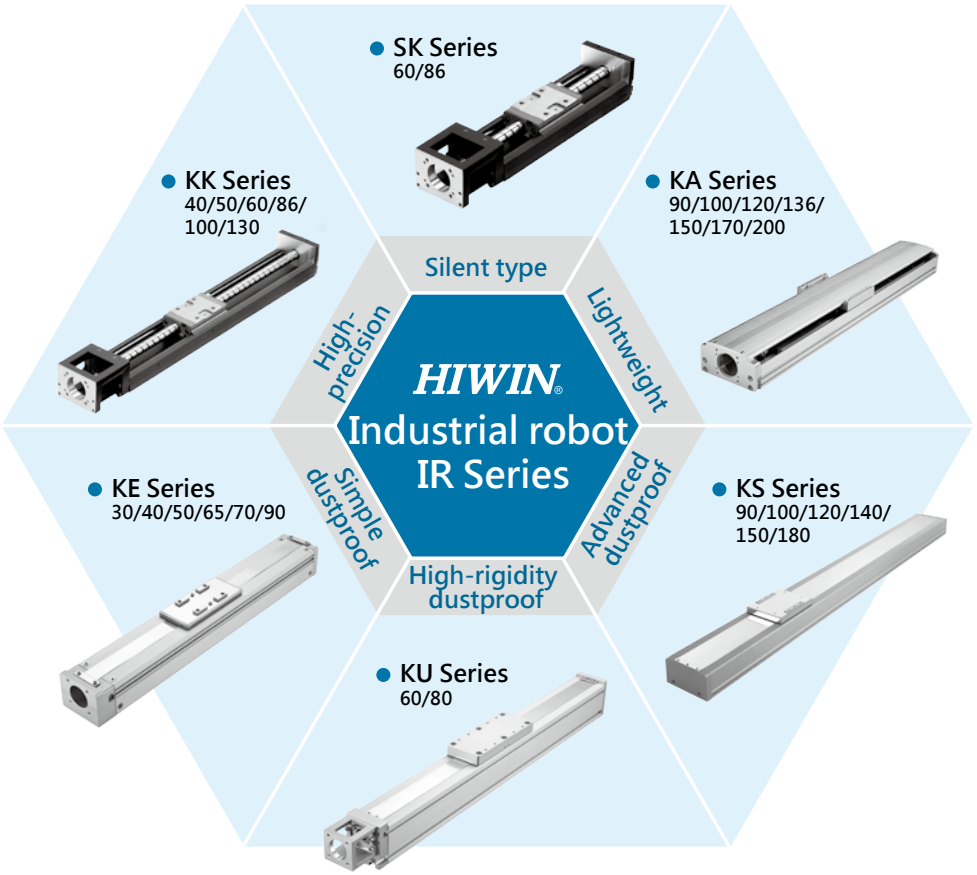
- ○Operation need to be accorded to the rated conditions in the technical information, for examples: high RPM, loadings… etc., avoiding malfunctions and Industrial safety accidents.
- ○It is necessary to avoid the dusts, scraps and foreign objects into the ball returning system causing some damages, life shortening and malfunctions.
- ○Operational temperature should be under 80 ˚C. If the products will be used in the environment of high temperature, please contact with HIWIN sales.
- ○For using in the special environments, for examples: great vibrating, vacuum, clean room, corrosive chemicals, organic solvents or pharmacies, extreme high or low temperature, humid and splashing, oil drop or mist, high salt, heavy load, vertical or cantilever installation, please confirmfirst with HIWIN sales for applicable conditions.
- ○For vertical installation, there is possible danger of falling by loading. We recommend to add proper brakes and make sure them functioning before operation.

Maintenance

- ○Please fulfill the grease before the first use. And notice the type of the grease; do not mix different types together.
- ○In the normal using conditions, it is recommended to check the operation for every 100 km, and clean dirt retention and supply grease on the rail and shaft.

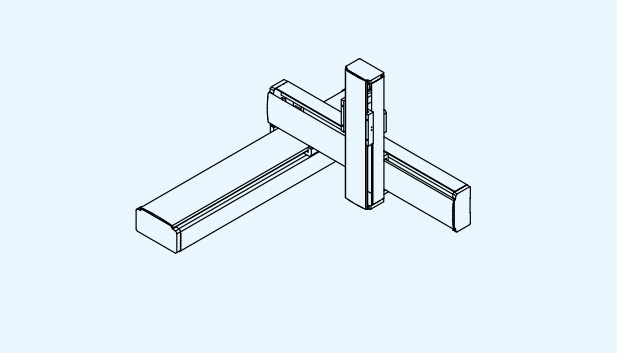
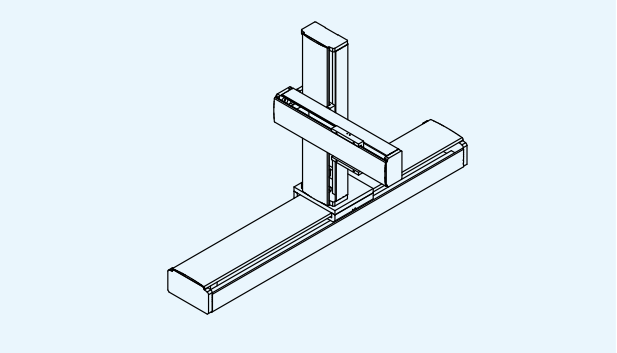
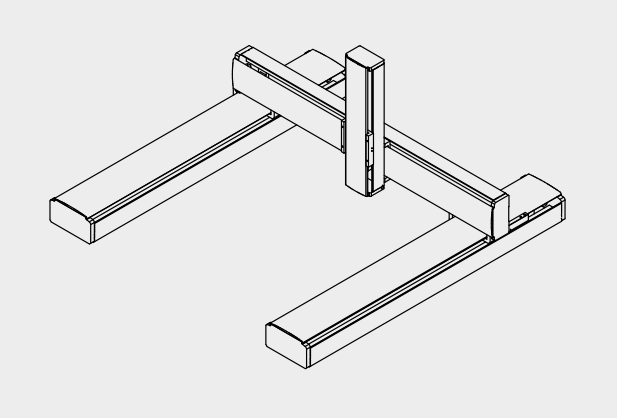
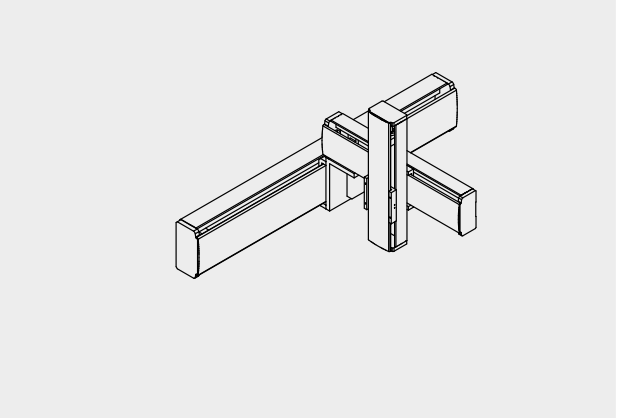
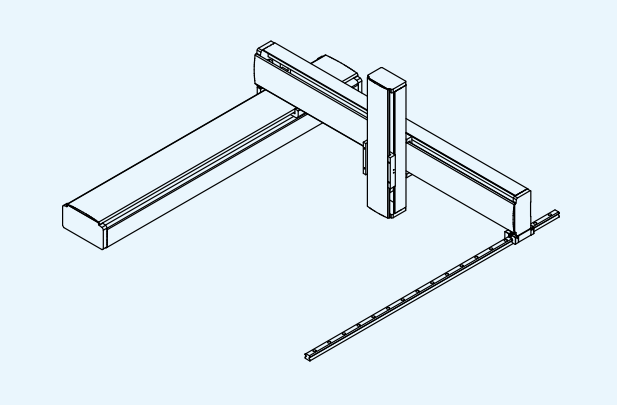
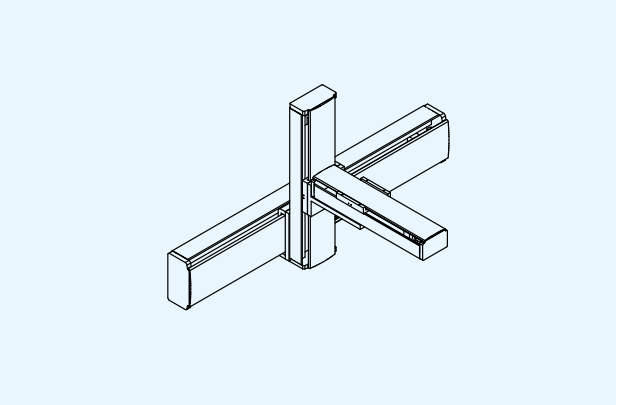
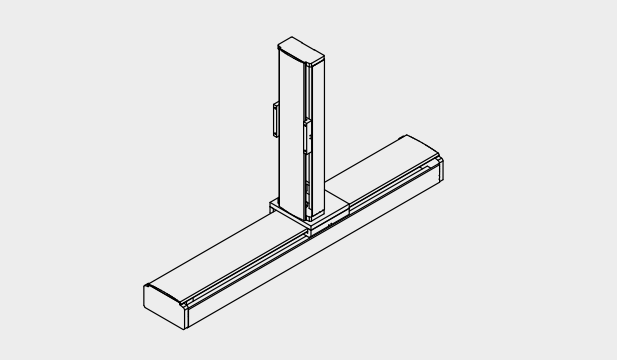
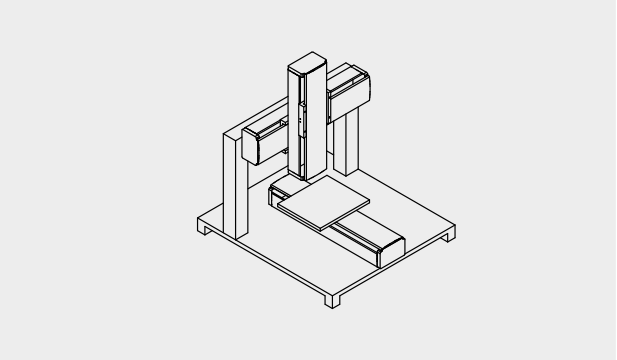
Introduction

The HIWIN industrial robot module utilizes professional standard manufacturing technology over the years, with the ball screw and magnetic slide design module developed and produced by ourselves, it’ s applicable to all types of automation equipment due to its features of easy installation, small size, high-precision and various specifications.



Features

- ○ Complete selection of modules and accessories for most applications.
  Driven Type：ballscrew, toothed belt
  AC motor output：30W～750W servo motor or step motor
  Motor connection type (depends on available space)：direct, bottom, internal, left, right
  Max stroke：100mm～2000mm
- ○ Easy installation and maintenance.
- ○ Customized designs available for different applications.
- ○ Easy transformation into a multi-axis robot.

Applications

KA single axis robots can be used in a wide range of applications. The following are examples of applicable systems：Automatic soldering system, screw feeding machine, adhesive laminating machine, CCD lens shifting, automatic paint spray machine, cutting machine, semiconductor manufacturing equipment, assembly equipment, press machine, spot welding machine, surface processing automation, self adhesive labeling machine, packaging machine, marking press machine, conveying equipment, and more.

Classification

SPEC	KK High-precision	SK Silent type	KA Lightweight	KS Advanced dustproof	KU High-rigidity dustproof	KE Simple dustproof
30						●
40	●					●
50	●					●
60	●	●			●	
65						●
70						●
80					●	
86	●	●				
90			●	●		●
100	●		●	●		
120			●	●		
130	●					
136			●			
140				●		
150			●	●		
170			●			
180				●		
200			●			

Note: KA100/136/170 and KS100/140/180 also provide timing belt driver in addition, which can be used in high-speed long stroke.

System Components

Industrial Robot components include a motor, drive, and upper controller as demonstrated below. Our customers may choose from Hiwin's selection of excellent servo motors, stepping motors, and drives.

Steps in choosing product types

According to different conditions and restrictions, when choosing industrial robot products, you may refer to the following selection process:

1. The conditions of use
- ○Effective stroke
- ○Spatial location restrictions (width, height, length)
- ○Installation (horizontal, vertical, side mount)
- ○Gravity position center of loading
- ○Operating conditions (lead, speed, acceleration and deceleration, duty cycle)
- ○Environment of use (high temperature, vibration, oil, water, corrosion)

2. Demand for precision
- ○Position precision
- ○Repeatability
- ○Running parallelism

3. Forms of application
- ○Single axis
- ○Multi-axis
- ○Special combination

4. Motor selection
- ○AC servomotor
- ○Stepper motor
- ○With brake or not (included, plug-in)

5. Motor load calculation
- ○Maximum speed
- ○Motor resolution
- ○Motor torque calculation

6. Operation analysis
- ○Acceleration
- ○Actual operation mode (V-T diagram)

7. Other accessories
- ○The use of related accessories (limit switches, adapter plate, retractable sheath, the slip ring protection tube)

8. Final confirmation
- ○Conditions of use should be confirmed
- ○Price, deadline
- ○Alteration
- ○Special requirements

Please refer to following characteristics of HIWIN IR products for preliminary selection:

	KK	KA	KS	KU	KE
Precision	Great (repetition, positioning, parallel)	Normal (repetition)	Normal (repetition)	Normal (repetition)	Normal (repetition)
Load	Heavy	Medium	Medium	Medium	Low
Weight	Heavy	Light	Light	Light	Light
Customized (stroke, table)	Yes	Yes	Yes	Yes	Yes
stiffness	Good (steel structure)	Normal (aluminum alloy base)	Normal (aluminum alloy base)	Normal (aluminum alloy base)	Bad (guide way base)
cover	Aluminum	Aluminum	Stainless belt	Stainless belt	Stainless belt
cleanliness	Normal	Normal	Great (class 10-100 with vacuum)	Good	Good
Dust-proof	Normal	Normal	Good (fully covered)	Good (fully covered)	Good (fully covered)
Driven approach	Ball screw (heavy load, good precision)	Ball screw, belt (long stroke, high speed)	Ball screw, belt (long stroke, high speed)	Ball screw (heavy load, good precision)	Ball screw (good precision)
Connection between motor and ball screw	Direct, by side belt	Direct, by side belt	Direct, by side belt	Direct	Direct
Inside motor	No	Yes	Yes	No	No
Bellow	Yes (standard)	Yes (customized)	No	No	No
Mounting	Top	Bottom (or top)	Bottom	Bottom (any position), side	Bottom

Precision

Precision includes accuracy and precision, described as follows:

1. Positioning accuracy

The maximum difference (absolute value) between final actual arrival distance and the reaching distance of original setting.

2. Reproducibility of round-trip position (precision)

The maximum difference in the whole stroke -- the positioning difference value measured at a setting position during the round-trip moving process of the IR slider.

3. Running parallelism

(1) The parallelism between IR module platform plane and module installation plane. Position the scale at the center of the slider, and then put the pointer on the installation plane; finally take the maximum difference value measured in the full stroke as the result.

(2) The parallelism between IR module slider and module installation plane. Position the scale at the center of the slider, and then put the pointer over the installation plane on the side of the module; finally take the maximum difference value measured in the full stroke as the result.

Speed

1. Maximum linear velocity

IR slider maximum linear velocity (V) is calculated from the ball screw speed (S) multiplied by the lead (L)
V（mm/sec）=S（rpm）÷60×L（mm）

2. Maximum rotational speed

Maximum allowable rotational speed of the ball screw is decided by its critical rotational speed. Screw speed exceeds the critical speed may result in resonance. Since critical speed is related with the screw length, the critical speed of the ball screw also indirectly determines the effective stroke and the total length of the product.
The maximum allowable rotational speed of the ball screw is calculated as follows:

$$Np = 0.8 \times 2.71 \times 10^{8} \times \frac{M_f d_r}{L_t^2}$$

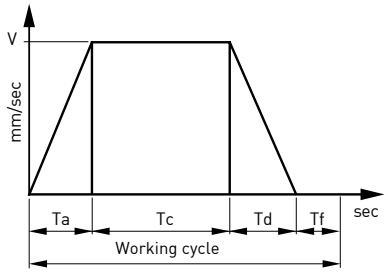
Np = the maximum allowable rotation speed (rpm)
Mf = breakdown of the assembly type; KA uses fixed-support type; Mf=0.689
dr = screw root diameter (mm)
Lt = screw span between bearings (mm)

3. Acceleration/Deceleration

Speed is specified as the working speed of the sliding table. The sliding table must accelerate to the designated speed to move to the target place, in opposite, it must decelerate before it comes to a stop.
Acceleration/deceleration is programmed by the operator according to the conditions. The acceleraton on a KA system is set at：0.15G calculated for lead = 5, 0.3G is calculated for all other leads. 1G = 9.8m/s2, therefore 0.15G = 1470mm/s2, 0.3G = 2940mm/s2. The maximum load shown in the catalog is based in this acceleration/deceleration.
＊Attention：Acceleration/deceleration will generate an inertia force on the load. For higher acceleration/deceleration, load will increase accordingly. Moreover, the higher acceleration/deceleration could generate a serious impact, which should be noted.

4. Working Cycle

The KA system’s working cycle is determined by the operator. Generally, the working cycle is calculated as shown on the below diagram. The variables include acceleration time Ta, constant speed time Tc, deceleration time Td, and idling time Tf.



Accelerating Speed＝V/Ta
Decelerating Speed＝V/Td
Working cycle（sec）＝ Ta + Tc + Td + Tf
Working time＝working cycle × frequency
Operating ratio＝working time /
（working time＋off time）
Operating ratio is closely related to the load of the motor. Normally, the operating ratio is not recommended to exceed 0.5 for long, continuous work.

Motor Loading Calculation

1. Confirm the moving conditions required by the loading mechanism, including acceleration, deceleration, weight of mechanism, moving of mechanism.
2. Momentum calculation of loading:
   Momentum calculation for loads moving along straight line

$$J_L = W \times \left(\frac{V}{2 \times \pi \times N \times 10} \right)^2 = W \times \left(\frac{\Delta S}{20 \times \pi} \right)^2$$

J_L ： Momentum of load, calculated to the output axial of motor (kg.cm^2)
V ： Velocity of load along straight line(mm/min)
ΔS ： Displacement of load per a rotation of motor(mm)
W ： Weight of load (kg)
N ： Rotational speed of motor[r/min]

3. Select suitable specification of motor with the proportional principle per the momentums between load and motor.
4. Calculate the acceleration and deceleration torques per the momentum of the selected motor combined with the momentum of load.

Acceleration torque: $T_a = \frac{(J_L + J_M) \times N}{9.55 \times 10^4 \times T_{psa}}$

Deceleration torque: $T_d = \frac{(J_L + J_M) \times N}{9.55 \times 10^4 \times T_{psd}}$

J_L ： Momentum of load, calculated to the output axial of motor (kg.cm^2)
J_M ： Momentum of motor (kg.cm^2)
N ： Rotational speed of motor (r/min)
T_{psa} ： Acceleration time (s) Deceleration
T_{psd} ： time (s)

5. Per the weights of loads, installation methods, friction coefficients, and motor efficiency, calculate the torque at uniform motion of the load.

$$T_L = \frac{F \times V}{2 \times 10^3 \times \pi \times \eta \times N} = \frac{F \times \Delta S}{2 \times 10^3 \times \pi \times \eta}$$

F ： Axial force at moving along straight line
F=FC + μ ×(W×g+FO)
T_L ： Load torque (N.m)
F_C ： External force exerted on the axial direction (N)
F_O ： External positive pressure exerted by load on IR module (N)
W ： Load weight (including sliding platform) (kg)
μ ： Friction coefficient
η ： Mechanical efficiency
V ： Velocity of load on straight line (mm/min)
N ： Rotational speed of motor (r/min)
g ： Gravity acceleration (9.8m/s^2)
ΔS ： Displacement of load at a rotation of motor (mm)

6. The maximum output torque of selected motor should be larger than the sum of accelerative torque and load torque; if this condition is not compliant, the model number needs to be changed and calculated until the requirement is compliant.
7. Obtain the continuous actual effective torque per load torque, accelerative torque, deceleration torque, and maintaining torque.

$$T_{RMS} = \sqrt{\frac{T_a^{\,2} \times T_{psa} + T_L^{\,2} \times t_c + T_d^{\,2} \times T_{psd} + T_{LH}^{\,2} \times t_h}{T_f}}$$

T_{psa} ： Acceleration time　t_c ： Constant Speed Time
T_{psd} ： Deceleration time　t_h ： Stop time
T_f ： Cycle time　T_a ： Acceleration torque
T_L ： Load torque　T_d ： Deceleration torque
T_{LH} ： Maintaining torque (horizontal movement, T_{LH}=0)

8. The rated output torque of selected motor should be larger than the continuous actual effective torque; if this condition is not compliant, the model number needs to be changed and calculated until the requirement is compliant.

Installation

If BS is used in vertical direction (Z axis), please notice the vertical installation is a special use. The load should be within the (vertical) maximum, in addition, vertical installation bytiming belts is forbidden.

＊Attention：To prevent the load from slipping off, a brake system is recommended on the motor when the KA module is installed vertically.

Service life

For installation of horizontal, side, sloping (less than 30 degree), the service life of IR is depended on GW; as for installation of vertical, sloping (over 30 degree), the service life of IR is depended on BW or fixed bearing (which is shorter).
Listed dynamic load (Fy, Fz, Mx, My, Mz) is according to service life of 10,000 Km of module stroke. If load is less than listed loading condition (Fy/Fyd + Fz/Fzd + Mx/Mxd + My/Myd + Mz/Mzd)≦1), the service life could be extended. On the contrary, if load is over the listed volume, the service life will less than 10,000 Km. In order to ensure long term use of IR, we suggest customers to use within the listed loading range as far as possible.

Maintenance

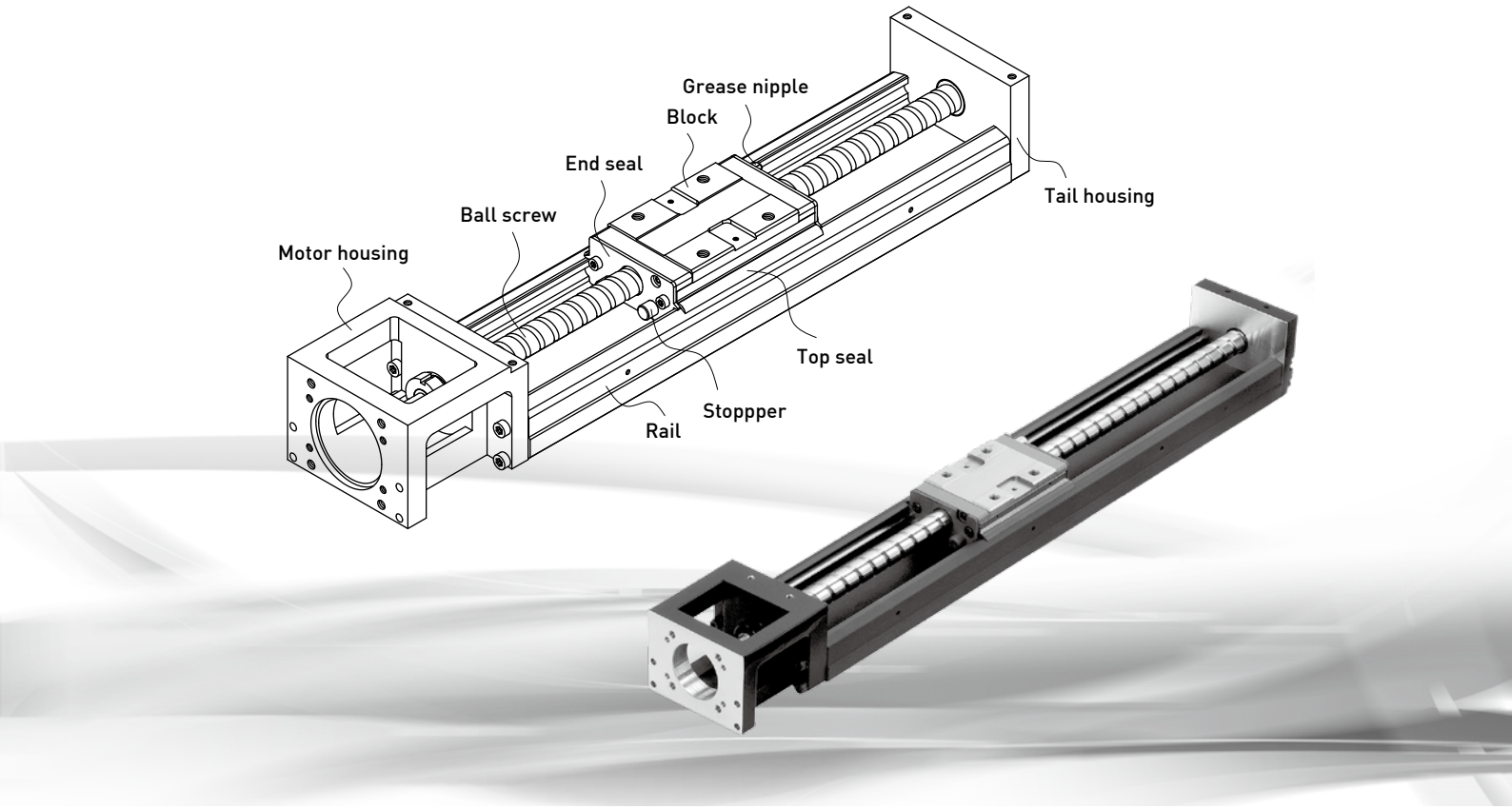
The parts of IR module, which need to bemaintained, are including BS, GW and related accessories. After every 3 months or 100 Km distance it is necessary to add the grease for BS and GW, and check is there any dust or scrap in the system. If the grease becomes colored, please replace the grease. If you have any special question for maintenance, please contact with HIWIN.

Industrial Robot
KK Series

HIWIN KK industrial robot modularizes both ballscrew and guideway to achieve better performance on accuracy, stiffness, raipd installation, and space saving.
With the block of KK driven by ballscrew and sliding on the optimized U-rail, greater stiffness and high accuracy are therefore performed.

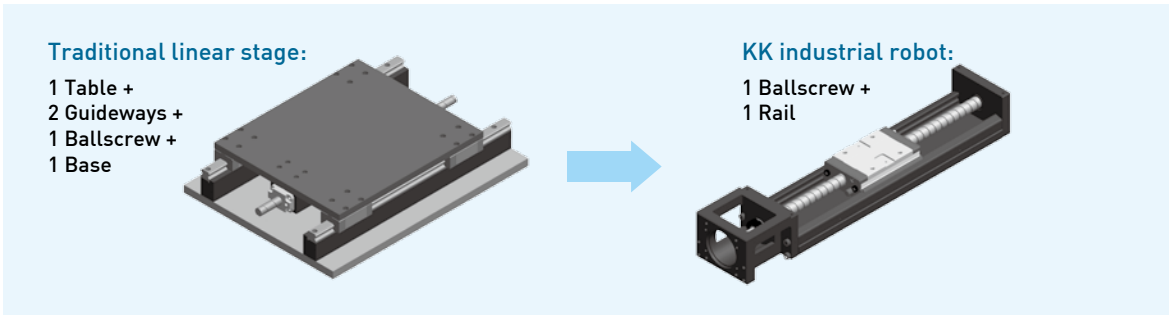
1.1 Features

- An integrated system
- Easy installation and maintenance
- Compact and lightweight
- High accuracy
- High stiffness
- Complete selection of accessories for most applications.



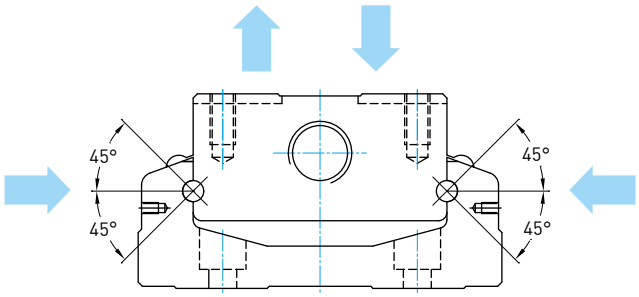
1.1.1 Modurization

The KK industrial robot integrating ballscrew and guideways becomes a modularized product. The modularized design can help customers saving time, cost and system inspection; therefore, installation efficiency and space-saving are also promoted.



1.1.2 Equivalent Load

Gothic arch contact design sustains load from all direction and offers high rigidity and accuracy.



1.1.3 High Stiffness

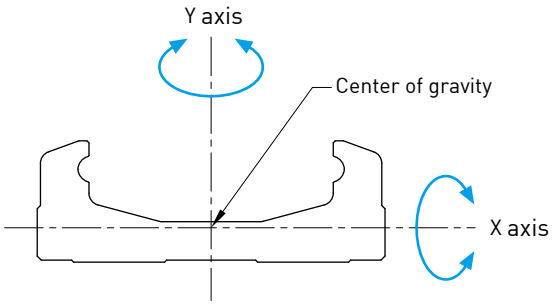
By U-shaped cross-section and analysis with software of finite element method, volume and rigidity are made balanced; therefore, rail for high rigidity, compact design and light weight are also accomplished simultaneously.

Moment of inertial Unit:mm⁴

Model no.	I_X	I_Y
KK40	3.533 x 10^3	5.317 x 10^4
KK50	9.6 x 10^3	1.34 x 10^5
KK60	2.056 x 10^4	2.802 x 10^5
KK86	7.445 x 10^4	1.134 x 10^6
KK100	1.296 x 10^5	2.035 x 10^6
KK130	2.546 x 10^5	5.073 x 10^6

I_X : Moment of inertial computed about X axis

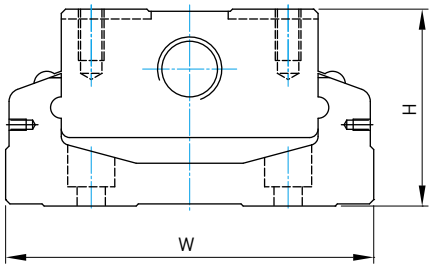
I_Y : Moment of inertial computed about Y axis



1.1.4 Various Specification

KK industrial robots of various specification are developed, providing customers with choices in different space and loading conditions.

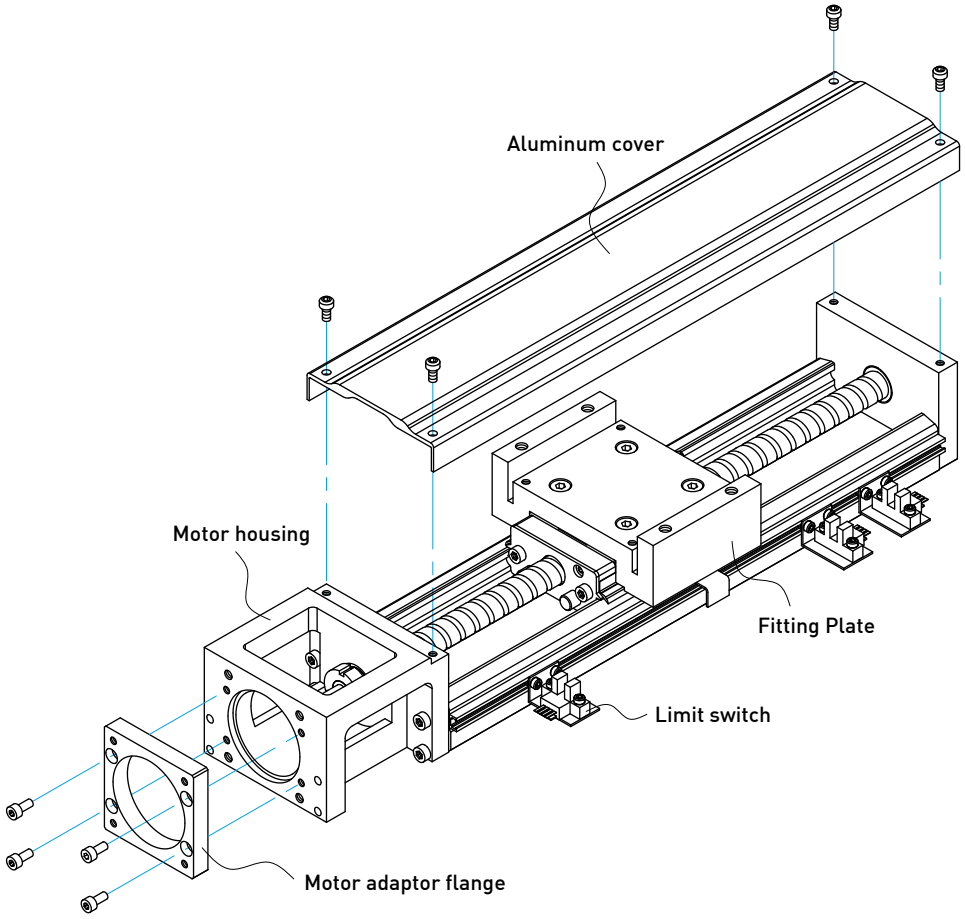
Model no.	W	H
KK40	40	20
KK50	50	26
KK60	60	33
KK86	86	46
KK100	100	55
KK130	130	65



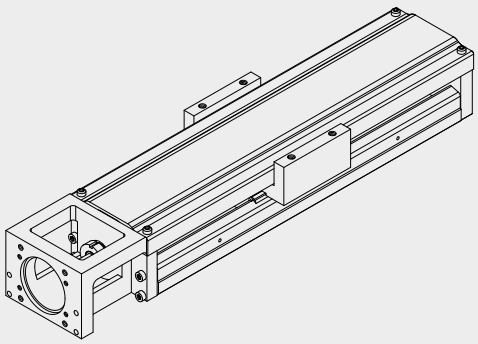
1.2 Accessories

Accessories of KK industrial robot are also supported for specific demands, such as alluminum cover, bellows, motor adaptor flange and limit switch.

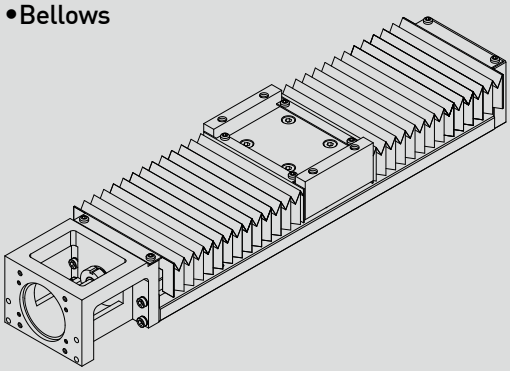
- Alluminum cover and bellow: contamination protection.
- Motor adaptor flange: connection for different types of motors.
- Limit switch: starting point, positioning and other safety matters.



•Cover



•Bellows



1.3 Model Number of KK Series

Example: KK6010P-400A1-F1CS0

KK	60	10	P	E	-	400	E	A	2	E	-	F0	C	S0	M

KK Stage

Nominal Width:
40, 50, 60, 86,
100, 130

Ballscrew Lead:
KK 40 : 1
KK 50 : 2
KK 60 : 5, 10
KK 86 : 10, 20
KK 100 : 20
KK 130 : 25

Accuracy Grade:
P: Precision, C: Normal

E: Ballscrew Special Order
None: Normal Type

Rail Length (unit : mm)
KK40 : 100, 150, 200
KK50 : 150, 200, 250, 300
KK60 : 150, 200, 300, 400, 500, 600
KK86 : 340, 440, 540, 640, 740, 940
KK100 : 980, 1080, 1180, 1280, 1380
KK130 : 980, 1180, 1380, 1680

E: Rail Special Order
None: Normal Type

Block Type:
A: Normal
S: Short

Number of Blocks: 1 or 2

E: Block Special Order
None: Normal Type

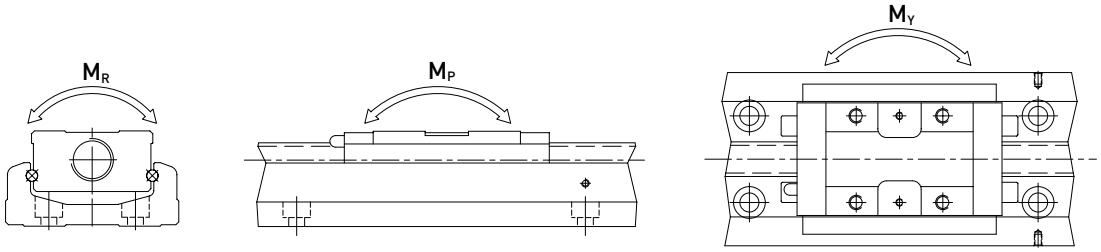
Motor Adaptor Flange
ref. catalog (P.6~P.9)

C: Aluminum Cover
B: Bellows
None: Normal Type

Limit Switch:
S0: Switch Rail Only
S1: Omron SX671
S2: Omron SX674
S3: SUNX GX-F12A
S4: SUNX GX-F12A-P
None: No Limit Switch and Rail

M:Supply With Motor
None:Without Motor

1.4 Specifications



Model No.		Ballscrew				Guideway															
		Nominal Diameter (mm)	Lead (mm)	Basic Dynamic Load (N)	Basic Static Load (N)	Basic Dynamic Load Rating (N)		Basic Static Load Rating (N)		Static Rated Moment											
										Allowable Static Moment M_P (N-m) (pitching)				Allowable Static Moment M_Y (N-m) (yawing)				Allowable Static Moment M_R(N-m) (rolling)			
						Block A	Block S	Block A	Block S	Block A1	Block A2	Block S1	Block S2	Block A1	Block A2	Block S1	Block S2	Block A1	Block A2	Block S1	Block S2
KK4001	Precision	8	1	735	1538	3920	-	6468	-	33	182	-	-	33	182	-	-	81	162	-	-
	Normal			676	1284																
KK5002	Precision	8	2	2136	3489	8007	-	12916	-	116	545	-	-	116	545	-	-	222	444	-	-
	Normal			1813	2910																
KK6005	Precision	12	5	3744	6243	13230	7173	21462	11574	152	760	72	367	152	760	72	367	419	838	241	482
	Normal			3377	5625																
KK6010	Precision	12	10	2410	3743	13230	7173	21462	11574	152	760	72	367	152	760	72	367	419	838	241	482
	Normal			2107	3234																
KK8610	Precision	15	10	7144	12642	31458	21051	50764	29475	622	3050	166	1309	622	3050	166	1309	1507	3014	847	1694
	Normal			6429	11387																
KK8620	Precision	15	20	4645	7655	31458	21051	50764	29475	622	3050	166	1309	622	3050	166	1309	1507	3014	847	1694
	Normal			4175	6889																
KK10020	Precision	20	20	7046	12544	39200	-	63406	-	960	4763	-	-	960	4763	-	-	2205	4410	-	-
	Normal			4782	9163																
KK13025	Precision	25	25	7897	15931	48101	-	84829		1536	7350	-	-	1536	7350	-	-	3885	7770	-	-
	Normal			7092	14352																

1.5 Accuracy Grade

Unit : mm

Model	Rail Length	Repeatability		Accuracy		Running Parallelism		Starting Torque(N-cm)	
		Precision	Normal	Precision	Normal	Precision	Normal	Precision	Normal
KK40	100	±0.003	±0.01	0.020	-	0.010	-	1.2	0.8
	150								
	200								
KK50	150	±0.003	±0.01	0.020	-	0.010	-	4	2
	200								
	250								
	300								
KK60	150	±0.003	±0.01	0.020	-	0.010	-	15	7
	200								
	300								
	400								
	500	±0.003	±0.01	0.025	-	0.015	-	15	7
	600								
KK86	340	±0.003	±0.01	0.025	-	0.015	-	15	10
	440								
	540								
	640								
	740	±0.003	±0.01	0.030	-	0.020	-	17	10
	940	±0.003	±0.01	0.040	-	0.030	-	25	10
KK100	980	±0.005	±0.01	0.035	-	0.025	-	17	12
	1080								
	1180	±0.005	±0.01	0.040	-	0.03	-	20	12
	1280	±0.005	±0.01	0.045	-	0.035	-	23	15
	1380			0.05		0.04		25	
KK130	980	±0.005	±0.01	0.035	-	0.025	-	25	15
	1180			0.04		0.03		25	15
	1380								
	1680	±0.007	±0.012	0.05	-	0.04	-	27	18

1.6 Maximum Speed Limit

Model	Ballscrew Lead (mm)	Rail Length (mm)	Speed (mm/sec)	
			Precision	Normal
KK40	01	100	190	190
		150	190	190
		200	190	190
KK50	02	150	270	270
		200	270	270
		250	270	270
		300	270	270
KK60	05	150	550	390
		200	550	390
		300	550	390
		400	550	390
		500	550	390
		600	340	340
	10	150	1100	790
		200	1100	790
		300	1100	790
		400	1100	790
		500	1100	790
		600	670	670
KK86	10	340	740	520
		440	740	520
		540	740	520
		640	740	520
		740	740	520
		940	610	430
	20	340	1480	1050
		440	1480	1050
		540	1480	1050
		640	1480	1050
		740	1480	1050
		940	1220	870
KK100	20	980	1120	800
		1080	980	800
		1180	750	750
		1280	510	630
		1380	440	530
KK130	25	980	1120	800
		1180	1120	800
		1380	830	800
		1680	550	550

1.7 Life Calculations

1.7.1 Service Life

Under repeated stress between raceway and rolling elements, pitting and flaking occurs while reaching fatigue failure. Service life of KK industrial robot is defined as the distance traveled before any failure of raceway and rolling elements appears.

1.7.2 Nominal Life (L)

The service life varies greatly even when the KK units are manufactured in the same way or operated under the same conditions. For this reason, nominal life is used as the criteria for predicting the service life of a KK unit.

1.7.3 Nominal Life Calculation of KK Unit

The calulating formulas is divided into two parts, including guideway and ball screw which will obtain two different values. The smaller value would be suitable for the nominal life of KK unit.
Formulas of guideway and ball screw nominal life depend on several parameters and are shown as follow:

Guideway

$$L = \left(\frac{f_t}{f_w} \cdot \frac{C}{P_n} \right)^3 \times 50 \text{ km}$$

L : Life Rating (km)
f_t : Contact Coefficient (ref. Table 1)
f_w : Loading Coefficient (ref. Table 2)
C : Basic Dynamic Load Rating (N)
P_n : Calculated Loading (N)

Table 1

Block type	Contact Coefficient f_t
A1, S1	1.0
A2, S2	0.81

Table 2

Operating Condition		Loading Coefficient f_w
Thrust and Vibration	Velocity (V)	
No Thrust	V < 15m/min	1.0 ~ 1.5
Low Vibration	15m/min < V < 60m/min	1.5 ~ 2.0
High Vibration	V > 60m/min	2.0 ~ 3.5

Ballscrew and Bearing

$$L = \left(\frac{1}{f_w} \cdot \frac{C_a}{P_{a,n}} \right)^3 \times 10^6 \text{ rev}$$

L : Life Rating (rev.)
f_w : Loading Coefficient (ref. Table 2)
C_a : Basic Dynamic Load Rating (N)
$P_{a,n}$: Axial Loading (N)

1.8 Lubrication

Insufficient lubricating of guideway would lead to reduction of service life.
The lubricant provides functions including:
- Reducing rolling friction and avoiding abrasion
- Providing lubricating film and extending service life
- Anti-rusting

1.8.1 Lubricating Grease

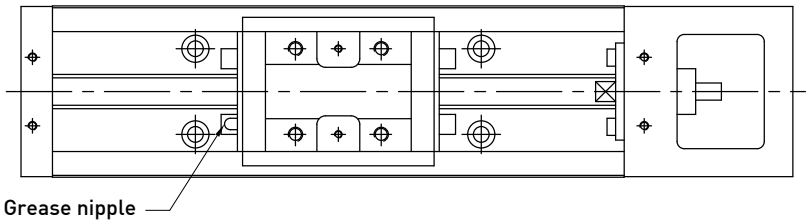
Re-lubricating KK industrial robot for every 100 km is recommened. Generally, lubricating grease is applied for speed under 60 m/min. For operating speed over 60 m/min, grease with higher viscosity could be used.

$$T = \frac{100 \times 1000}{V_e \times 60}$$

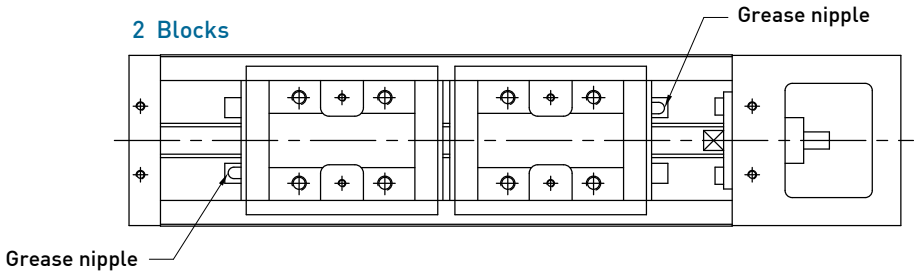
T : Lubricating frequency (hrs)
Ve : Speed (m/min)

1.8.2 Grease Nipple

1 Block



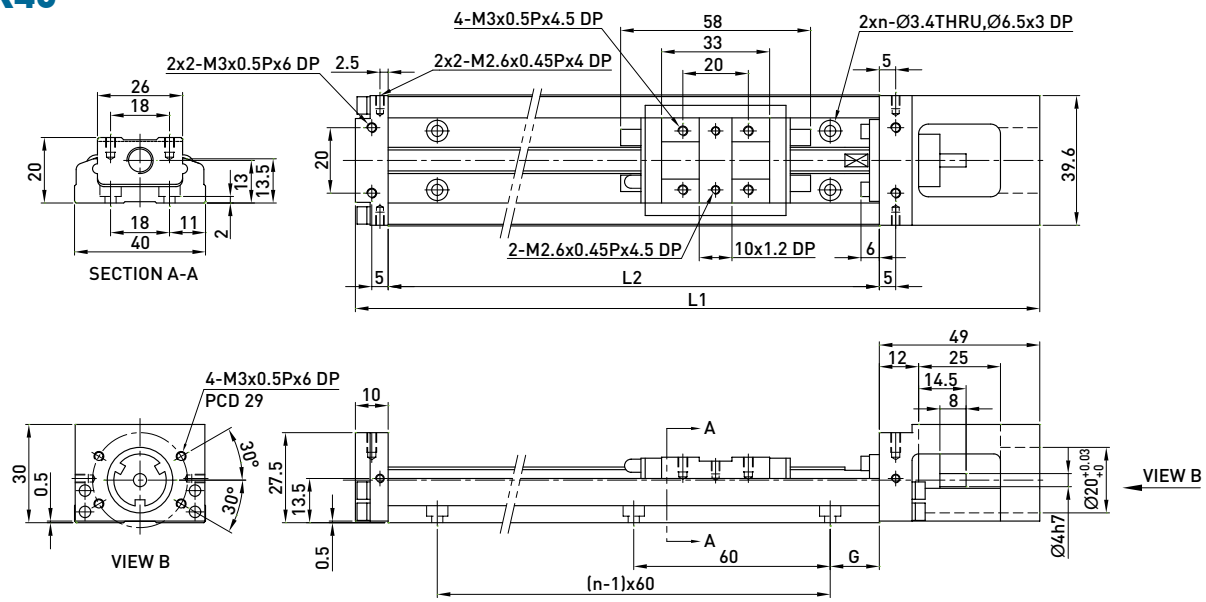
2 Blocks



1.9 Dimension

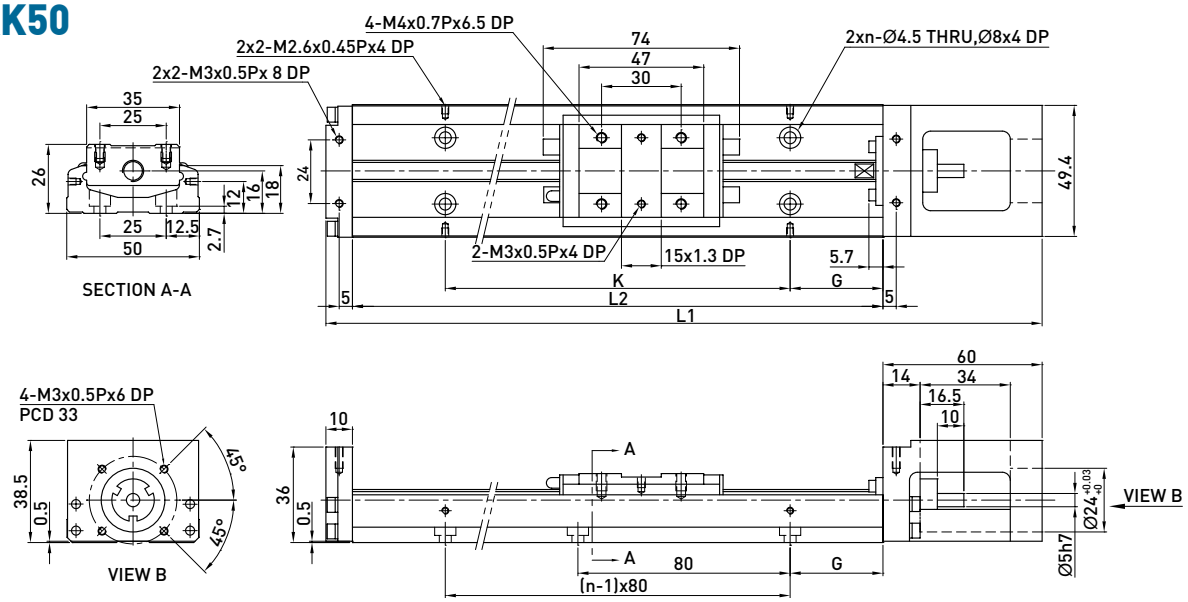
1.9.1 Without cover

KK40



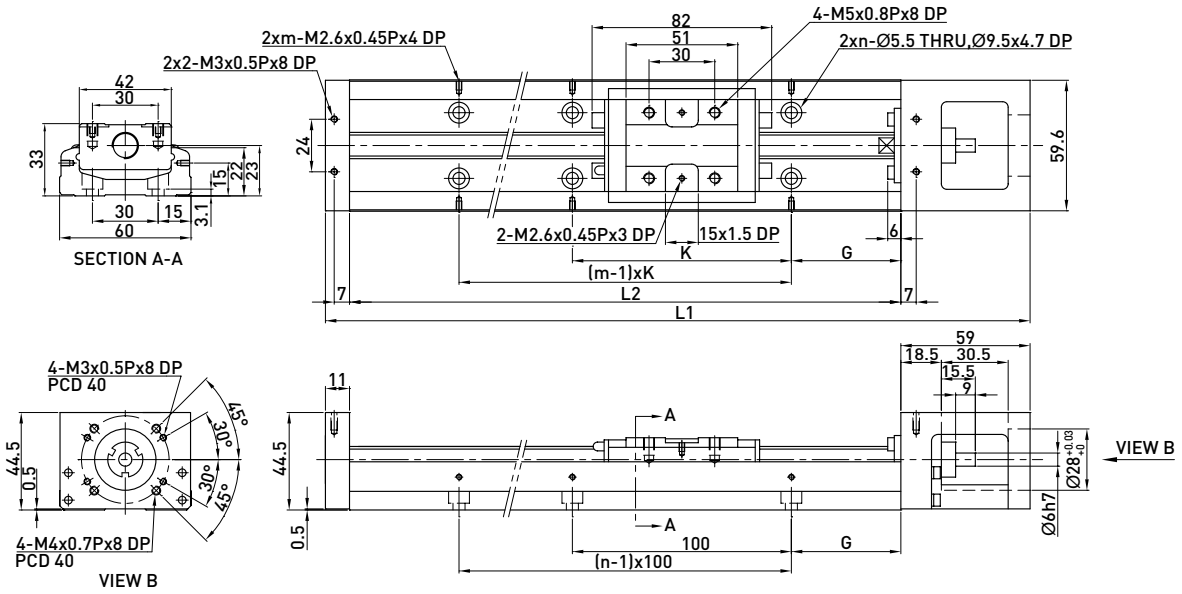
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	n	Mass (kg)	
		A1 Block	A2 Block			A1 Block	A2 Block
100	159	36	-	20	2	0.48	-
150	209	86	34	15	3	0.6	0.67
200	259	136	84	40	3	0.72	0.79

KK50



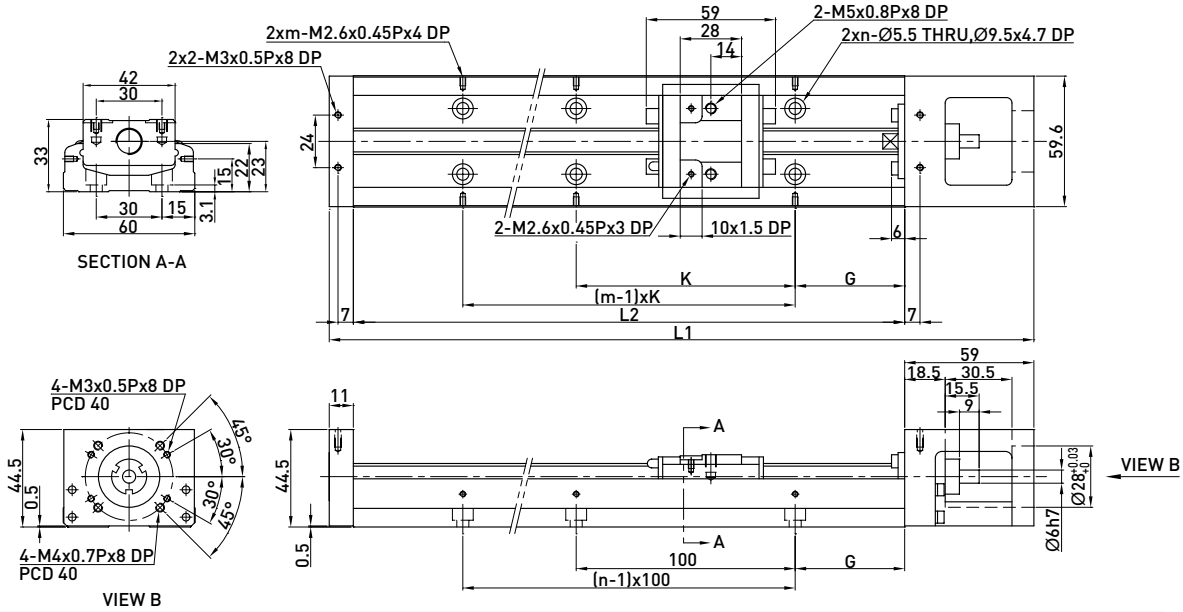
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	K (mm)	n	Mass (kg)	
		A1 Block	A2 Block				A1 Block	A2 Block
150	220	70	-	35	80	2	1	-
200	270	120	55	20	160	3	1.2	1.4
250	320	170	105	45	160	3	1.4	1.6
300	370	220	155	30	240	4	1.6	1.8

KK60 (Standard)



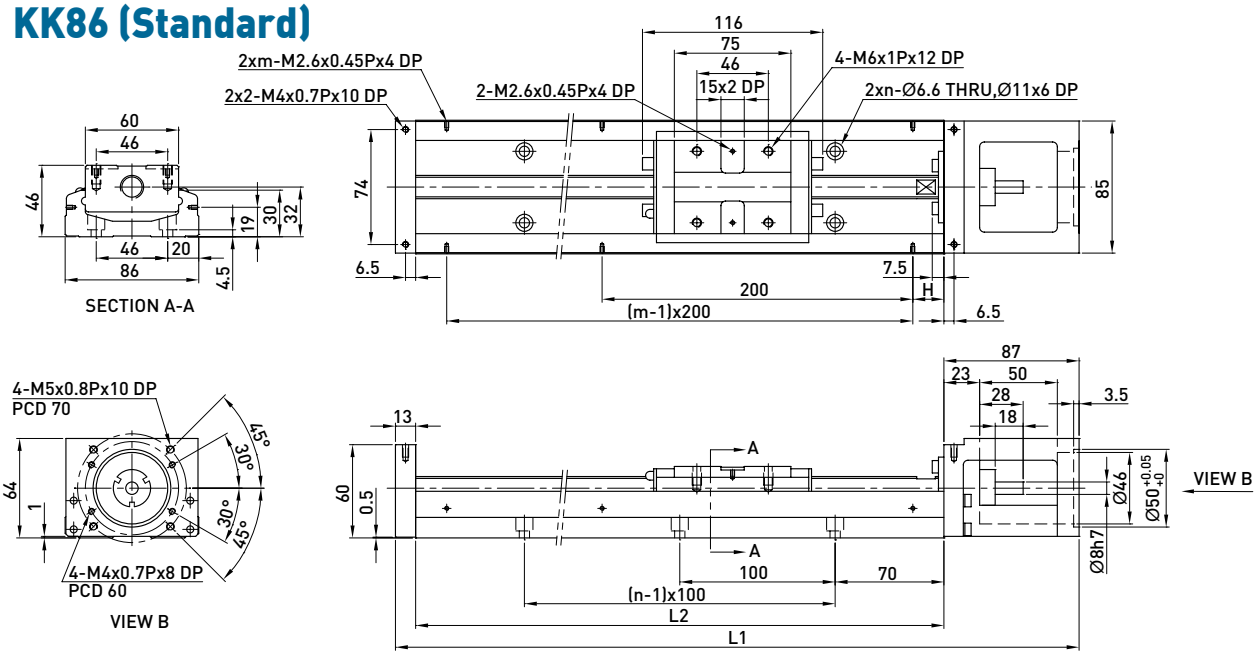
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	K (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block					A1 Block	A2 Block
150	220	60	-	25	100	2	2	1.5	-
200	270	110	-	50	100	2	2	1.8	-
300	370	210	135	50	200	3	2	2.4	2.7
400	470	310	235	50	100	4	4	3	3.3
500	570	410	335	50	200	5	3	3.6	3.9
600	670	510	435	50	100	6	6	4.2	4.6

KK60 (Light Duty)



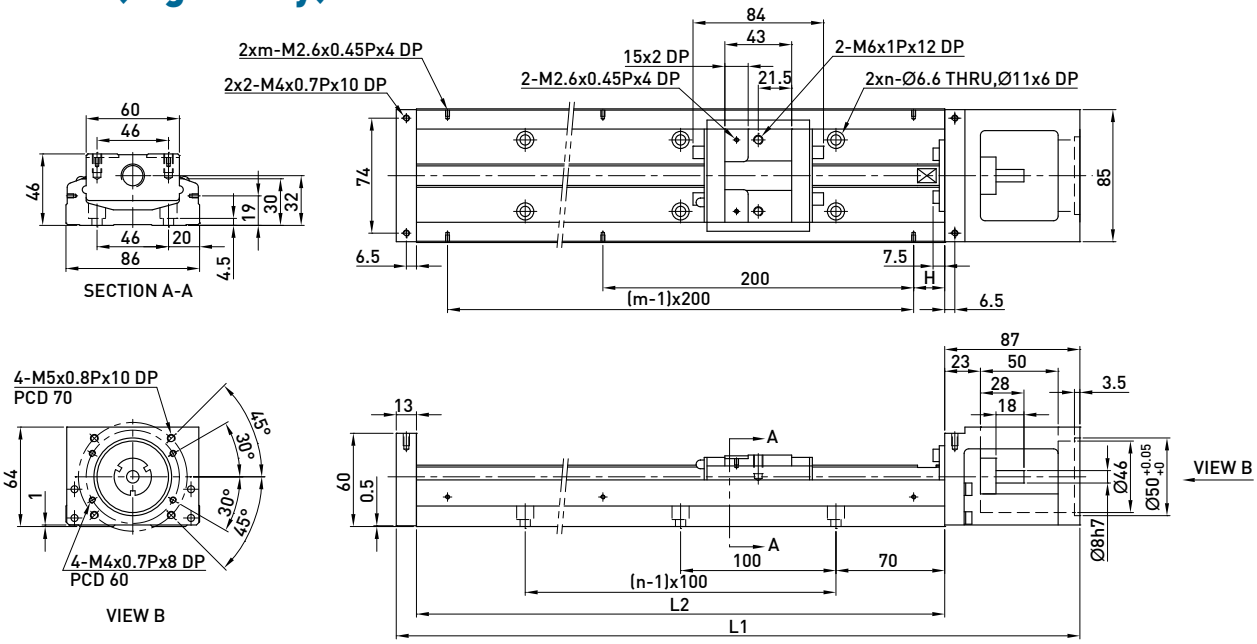
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	K (mm)	n	m	Mass (kg)	
		S1 Block	S2 Block					S1 Block	S2 Block
150	220	85	34	25	100	2	2	1.4	1.6
200	270	135	84	50	100	2	2	1.7	1.9
300	370	235	184	50	200	3	2	2.3	2.5
400	470	335	284	50	100	4	4	2.9	3.1
500	570	435	384	50	200	5	3	3.5	3.7
600	670	535	484	50	100	6	6	4.1	4.3

KK86 (Standard)



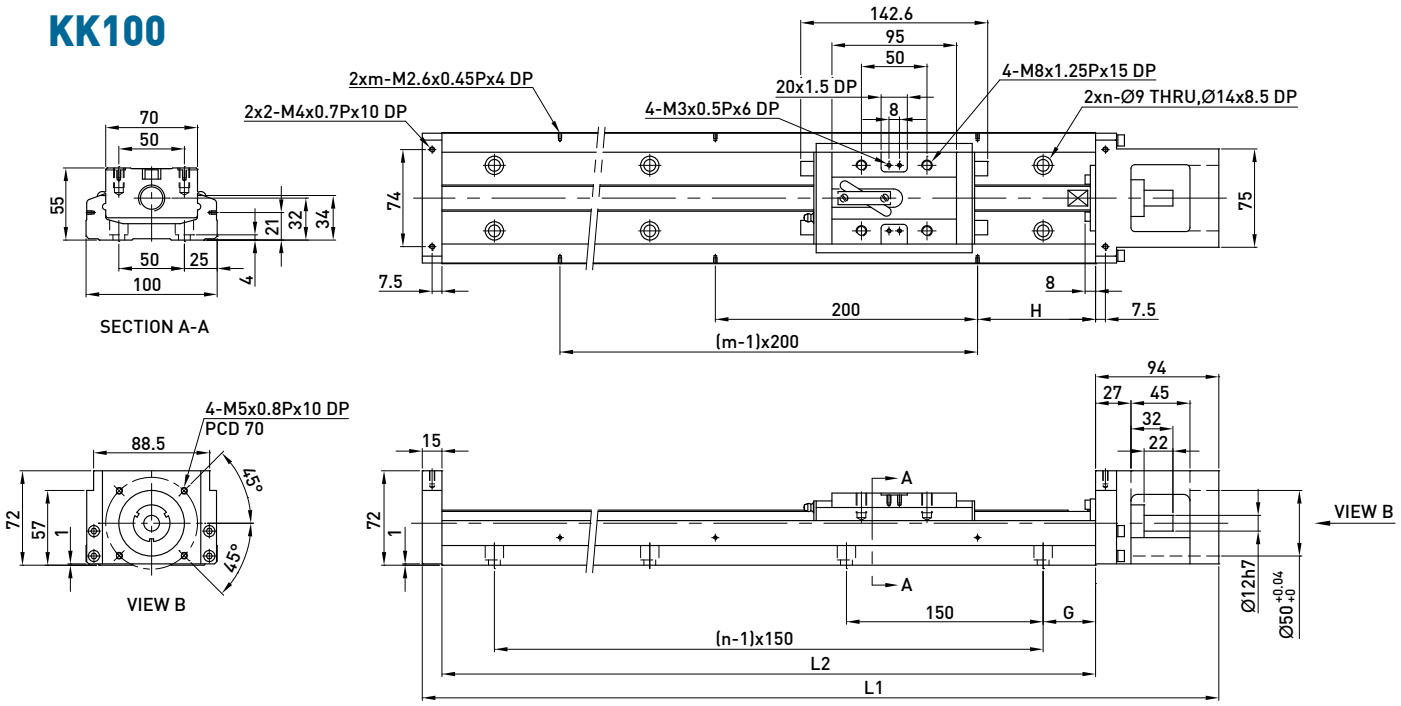
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block				A1 Block	A2 Block
340	440	210	100	70	3	2	5.7	6.5
440	540	310	200	20	4	3	6.9	7.7
540	640	410	300	70	5	3	8.0	8.8
640	740	510	400	20	6	4	9.2	10.0
740	840	610	500	70	7	4	10.4	11.2
940	1040	810	700	70	9	5	11.6	12.4

KK86 (Light Duty)



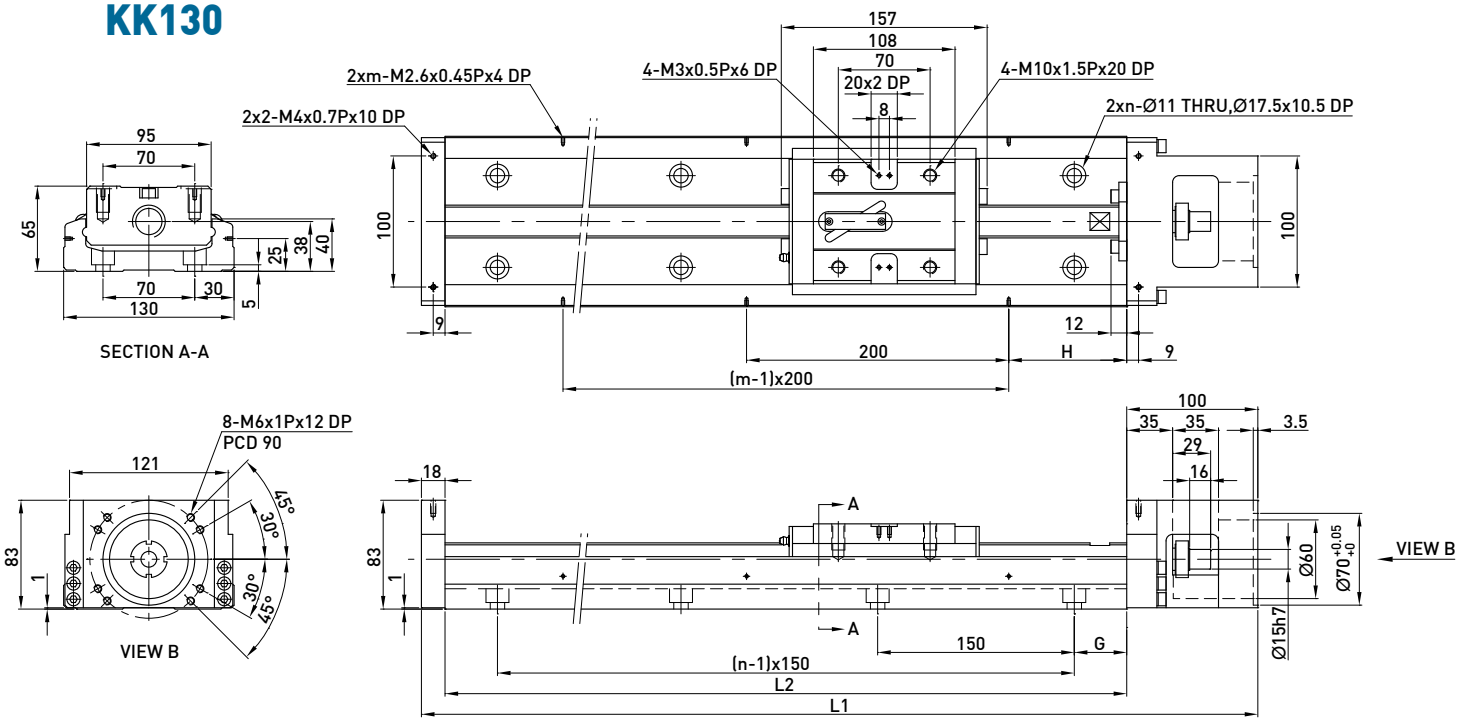
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		H (mm)	n	m	Mass (kg)	
		S1 Block	S2 Block				S1 Block	S2 Block
340	440	246	170	70	3	2	5.4	5.9
440	540	346	270	20	4	3	6.6	7.1
540	640	446	370	70	5	3	7.7	8.2
640	740	546	470	20	6	4	8.9	9.4
740	840	646	570	70	7	4	10.1	10.6
940	1040	846	770	70	9	5	11.3	11.8

KK100



Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block					A1 Block	A2 Block
980	1089	828	700	40	90	7	5	18.6	20.3
1080	1189	928	800	15	40	8	6	20.3	22.0
1180	1289	1028	900	65	90	8	6	22.0	23.7
1280	1389	1128	1000	40	40	9	7	23.6	25.3
1380	1489	1228	1100	15	90	10	7	25.3	27.0

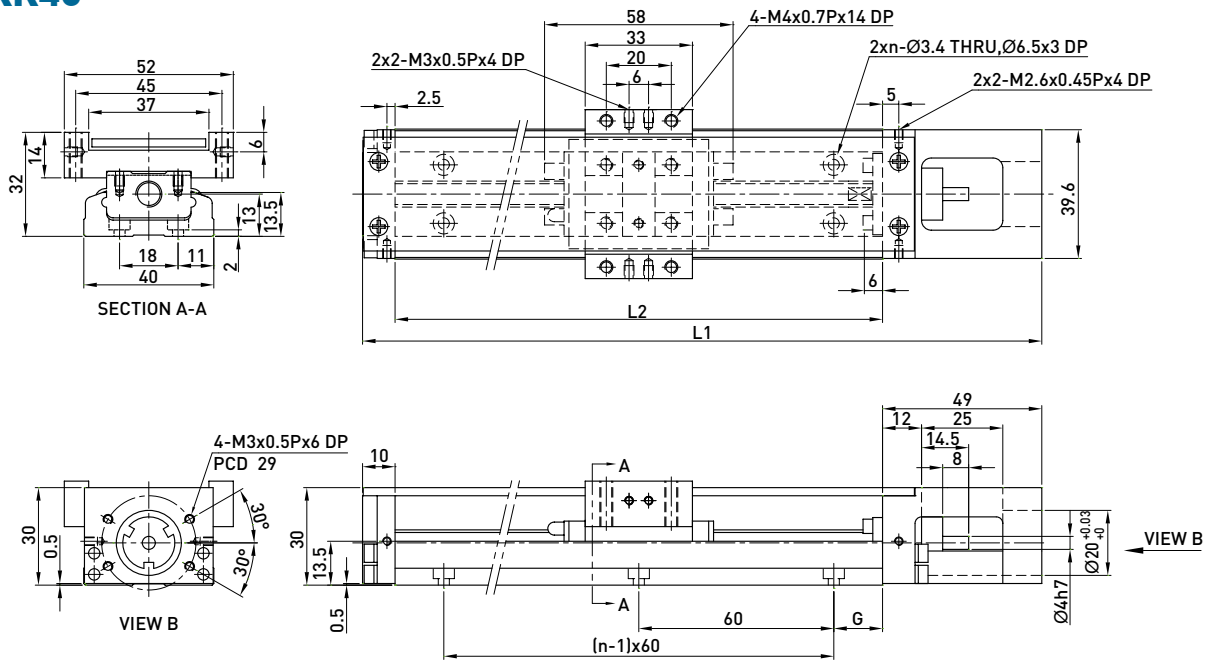
KK130



Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block					A1 Block	A2 Block
980	1098	811	659	40	90	7	5	29.4	32.3
1180	1298	1011	859	65	90	8	6	34.3	37.2
1380	1498	1211	1059	90	90	9	7	39.2	42.1
1680	1798	1511	1359	90	40	11	9	46.5	49.4

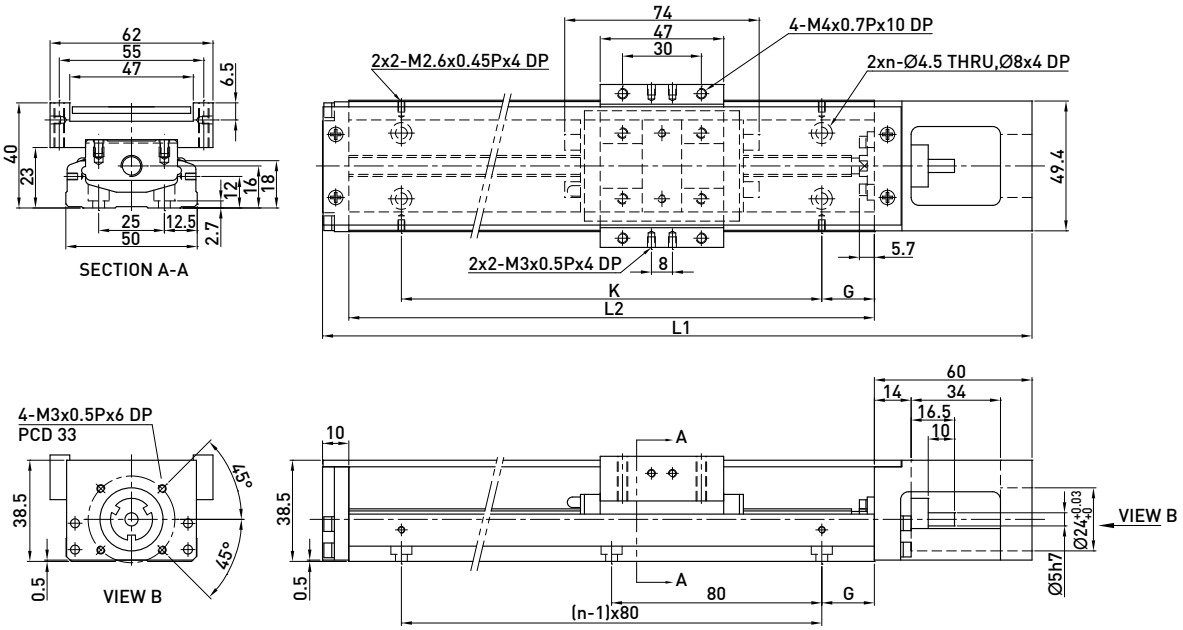
1.9.2 With cover

KK40



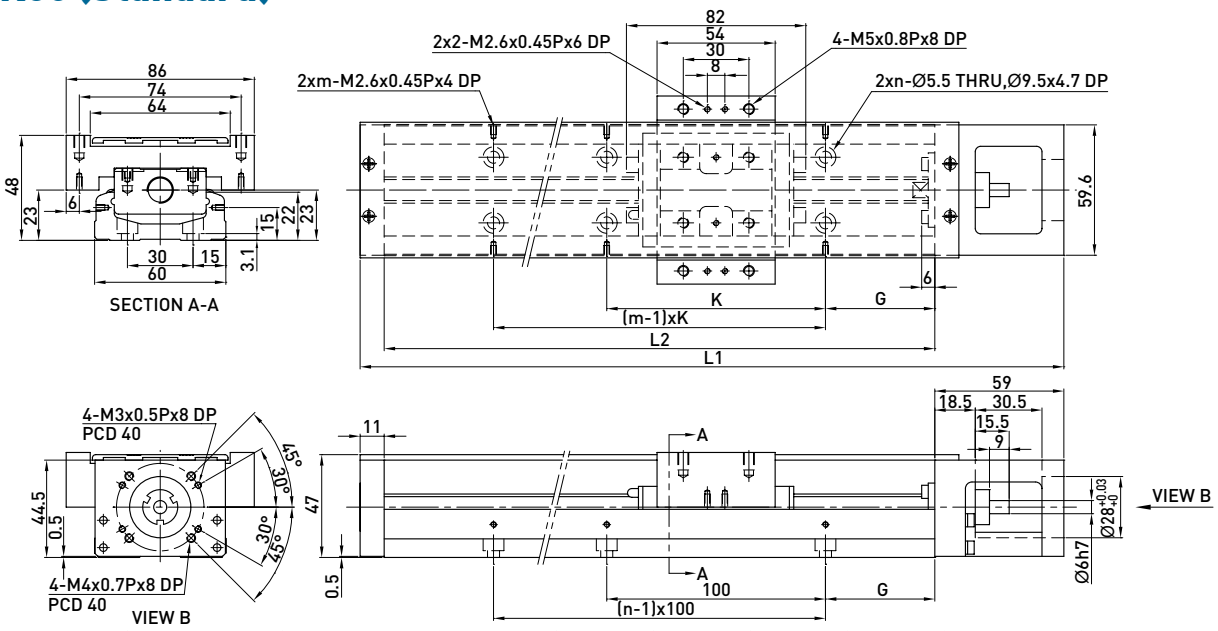
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	n	Mass (kg)	
		A1 Block	A2 Block			A1 Block	A2 Block
100	159	36	-	20	2	0.55	-
150	209	86	34	15	3	0.68	0.76
200	259	136	84	40	3	0.82	0.89

KK50



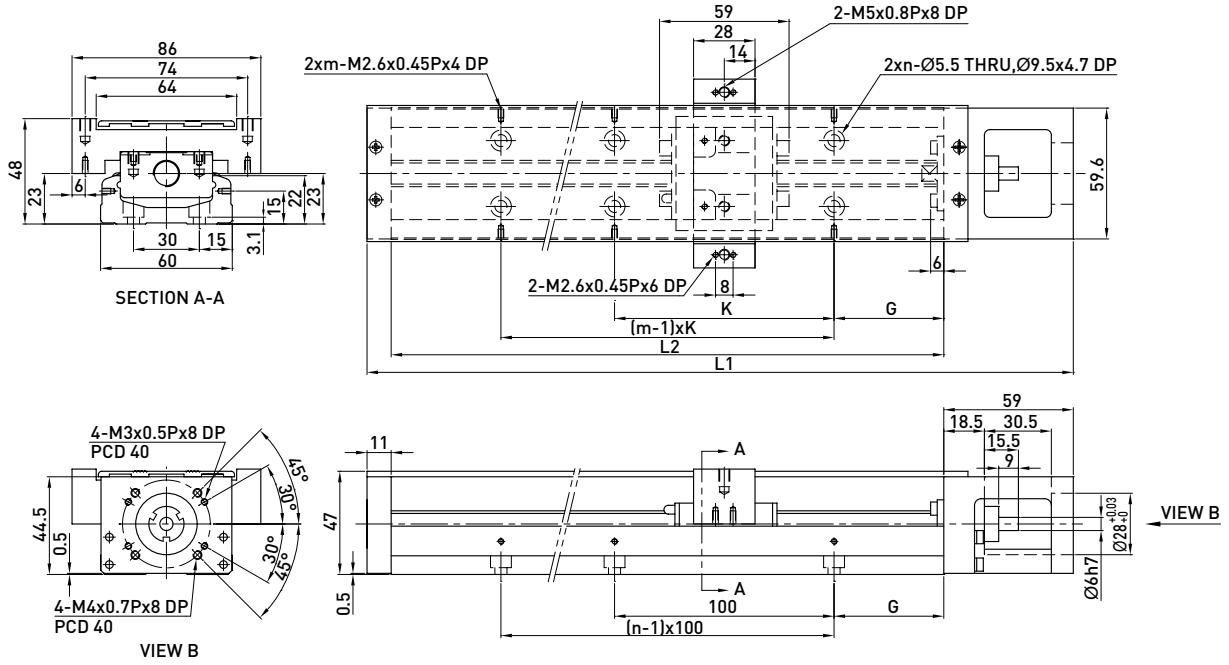
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	K (mm)	n	Mass (kg)	
		A1 Block	A2 Block				A1 Block	A2 Block
150	220	70	-	35	80	2	1.1	-
200	270	120	55	20	160	3	1.3	1.5
250	320	170	105	45	160	3	1.6	1.8
300	370	220	155	30	240	4	1.8	2.0

KK60 (Standard)



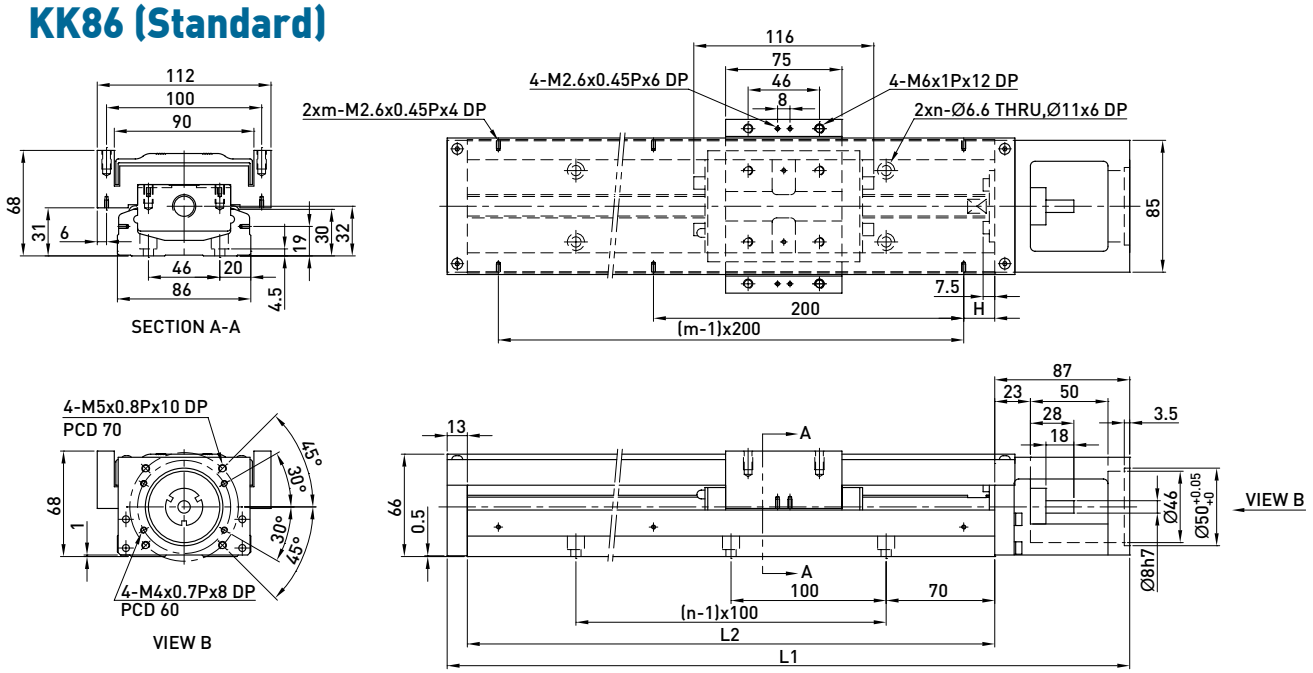
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	K (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block					A1 Block	A2 Block
150	220	60	-	25	100	2	2	1.7	-
200	270	110	-	50	100	2	2	2.1	-
300	370	210	135	50	200	3	2	2.7	3.0
400	470	310	235	50	100	4	4	3.3	3.6
500	570	410	335	50	200	5	3	3.9	4.2
600	670	510	435	50	100	6	6	4.6	5.0

KK60 (Light Duty)



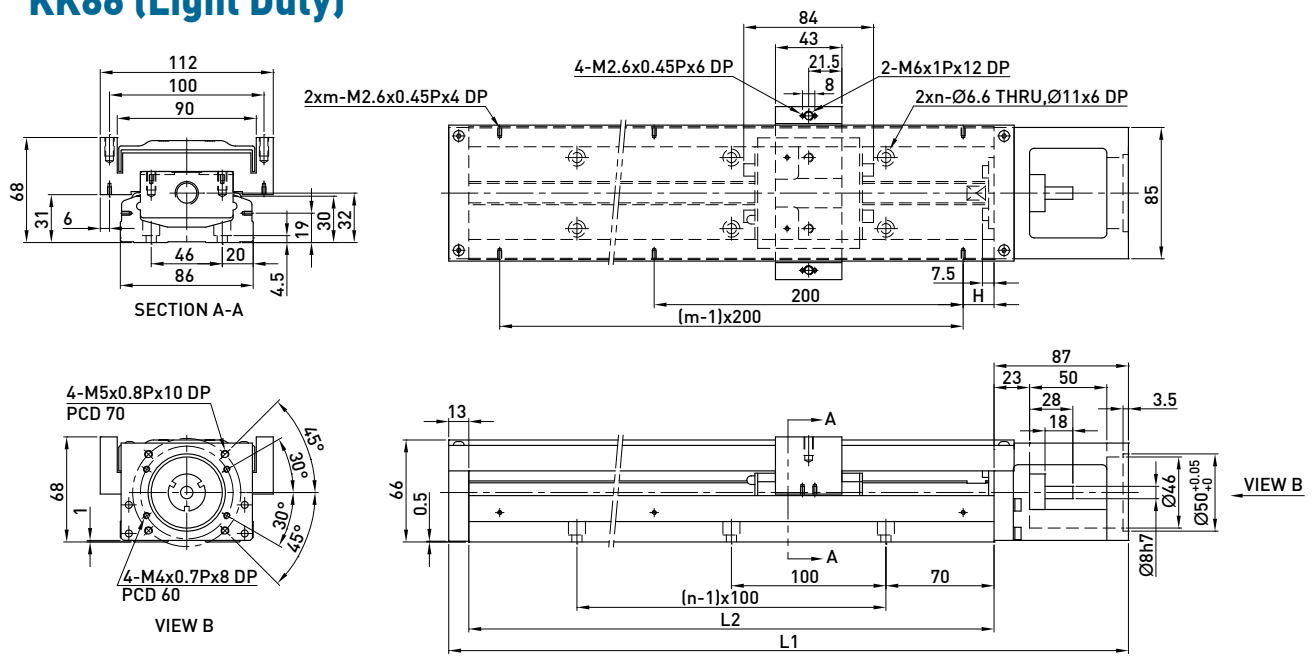
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	K (mm)	n	m	Mass (kg)	
		S1 Block	S2 Block					S1 Block	S2 Block
150	220	85	34	25	100	2	2	1.6	1.8
200	270	135	84	50	100	2	2	1.9	2.1
300	370	235	184	50	200	3	2	2.5	2.7
400	470	335	284	50	100	4	4	3.1	3.3
500	570	435	384	50	200	5	3	3.7	3.9
600	670	535	484	50	100	6	6	4.4	4.6

KK86 (Standard)



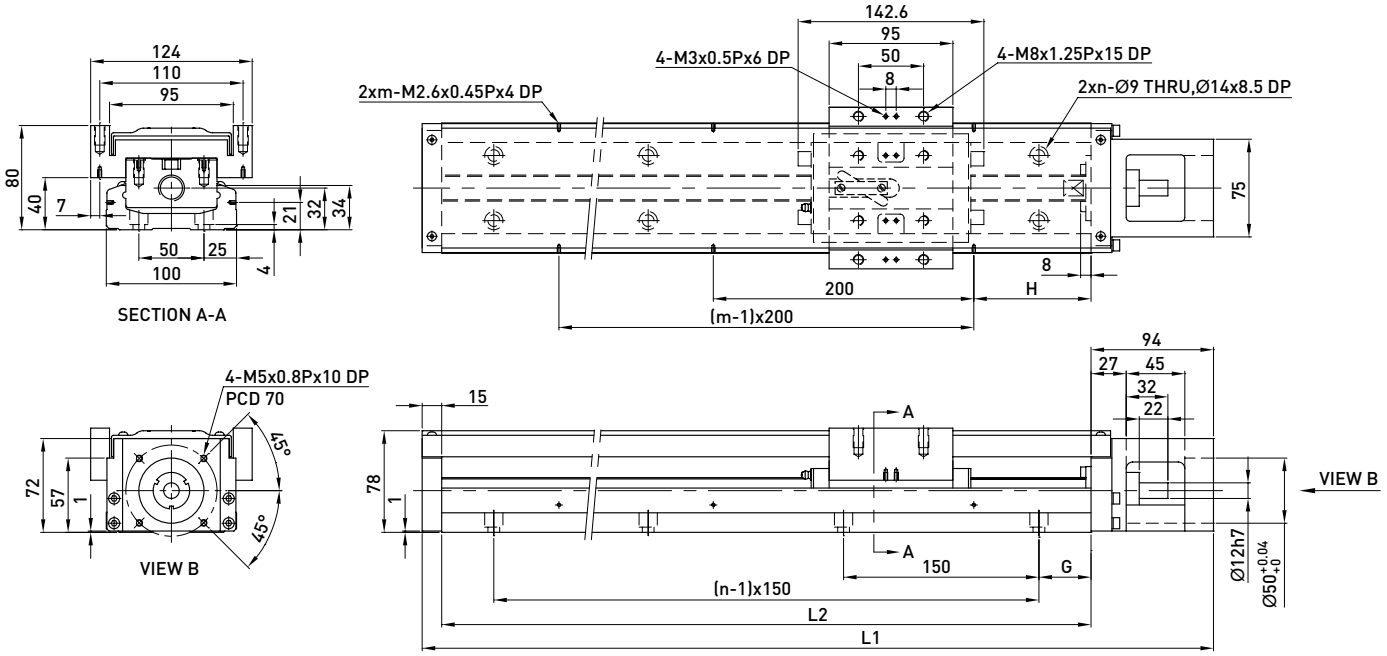
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block				A1 Block	A2 Block
340	440	210	100	70	3	2	6.5	7.3
440	540	310	200	20	4	3	7.8	8.6
540	640	410	300	70	5	3	9.0	9.8
640	740	510	400	20	6	4	10.3	11.3
740	840	610	500	70	7	4	11.6	12.4
940	1040	810	700	70	9	5	13.0	13.8

KK86 (Light Duty)



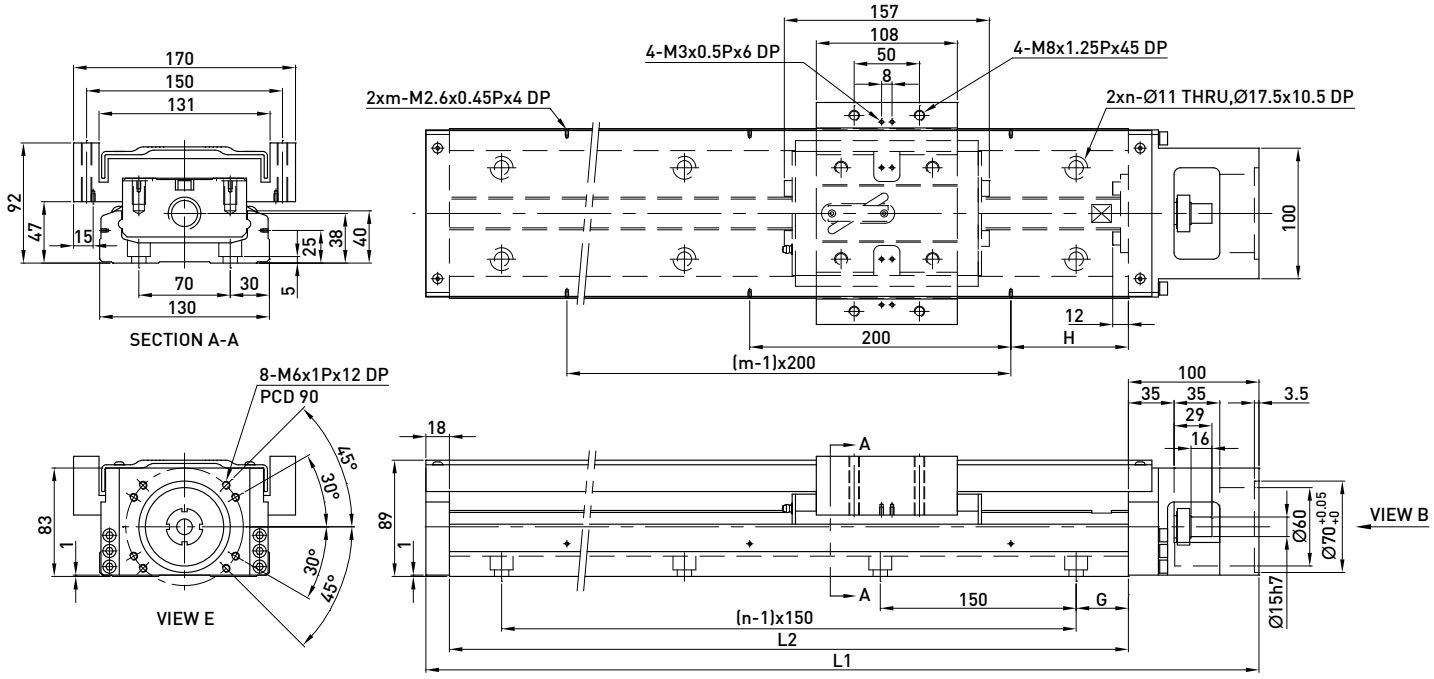
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		H (mm)	n	m	Mass (kg)	
		S1 Block	S2 Block				S1 Block	S2 Block
340	440	246	170	70	3	2	6.3	7.1
440	540	346	270	20	4	3	7.6	8.4
540	640	446	370	70	5	3	8.8	9.6
640	740	546	470	20	6	4	10.1	11.1
740	840	646	570	70	7	4	11.4	12.2
940	1040	846	770	70	9	5	12.8	13.6

KK100



Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block					A1 Block	A2 Block
980	1089	828	700	40	90	7	5	20.4	22.1
1080	1189	928	800	15	40	8	6	22.2	23.9
1180	1289	1028	900	65	90	8	6	24.0	25.7
1280	1389	1128	1000	40	40	9	7	25.7	27.4
1380	1489	1228	1100	15	90	10	7	27.5	29.2

KK130



Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block					A1 Block	A2 Block
980	1098	811	659	40	90	7	5	31.9	35.9
1180	1298	1011	859	65	90	8	6	37.1	41.1
1380	1498	1211	1059	90	90	9	7	42.2	46.2
1680	1798	1511	1359	90	40	11	9	49.9	53.9

1.10 Motor Housing and Motor Adaptor Flange

1.10.1 Motor Selection

HIWIN Mikrosystem Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection						+Brake Weight (kg)	Driver	Weight (kg)	Remarks
			KK40	KK50	KK60	KK86	KK100	KK130				
100W	FRAC101022	0.6	F2	F2	F2	F3	-	-	-	MD-36-S	1.25	220V
200W	FRAC102022	1	-	-	-	F0	F0	F1	-			220V
400W	FRAC104022	1.45	-	-	-	F0	F0	F1	-			220V
750W	FRAC107522	2.66	-	-	-	-	F1	F2	-			220V

Mitsubishi Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection						+Brake Weight (kg)	Driver	Weight (kg)	Remarks
			KK40	KK50	KK60	KK86	KK100	KK130				
50W	HF-KP053	0.35	F1	F1	F1	F2	-	-	0.75	MR-J3S-10A	0.8	220V
100W	HF-KP13	0.56	F1	F1	F1	F2	-	-	0.89	MR-J3S-10A	0.8	220V
200W	HF-KP23	0.94	-	-	-	F0	F0	F1	1.6	MR-J3S-20A	0.8	220V
400W	HF-KP43	1.5	-	-	-	F0	F0	F1	2.1	MR-J3S-40A	1	220V
750W	HF-KP73	2.9	-	-	-	-	F1	F2	4	MR-J3S-70A	1.4	220V

Panasonic Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection						+Brake Weight (kg)	Driver	Weight (kg)	Remarks
			KK40	KK50	KK60	KK86	KK100	KK130				
50W	MSMD5AZP1	0.32	F2	F2	F2	F3	-	-	0.53	MADDT1105	0.8	110V
50W	MSMD5AZP1	0.32	F2	F2	F2	F3	-	-	0.53	MADDT1205	0.8	220V
100W	MSMD011P1	0.47	F2	F2	F2	F3	-	-	0.68	MADDT1107	0.8	110V
100W	MSMD012P1	0.47	F2	F2	F2	F3	-	-	0.68	MADDT1205	0.8	220V
200W	MSMD021P1	0.82	-	-	-	F1	-	-	1.3	MADDT2110	1.1	110V
200W	MSMD022P1	0.82	-	-	-	F1	-	-	1.3	MADDT1207	0.8	220V
400W	MSMD041P1	1.2	-	-	-	F1	-	-	1.7	MADDT3120	1.5	110V
400W	MSMD042P1	1.2	-	-	-	F1	-	-	1.7	MADDT2210	1.1	220V
750W	MSMD082S1	2.3	-	-	-	F4	F2	F4	3.1	MADDT3520	1.5	220V

Yasukawa Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection						+Brake Weight (kg)	Driver	Weight (kg)	Remarks
			KK40	KK50	KK60	KK86	KK100	KK130				
50W	SGMAV-A5ADA61	0.3	F1	F1	F1	F2	-	-		SGDV-R70A01A	0.9	with key
50W	SGMAV-A5ADA2C	0.3	F1	F1	F1	F2	-	-		SGDV-R70A01A	0.9	no key
50W	SGMAV-A5ADA21	0.3	F1	F1	F1	F2	-	-	0.75	SGDV-R70A01A	0.9	Mid inertia
100W	SGMAV-01ADA64	0.4	F1	F1	F1	F2	-	-	0.89	SGDV-R90A01A	0.9	
200W	SGMAV-02ADA65	0.9	-	-	-	F0	F0	F1	1.6	SGDV-1R6A01A	0.9	
400W	SGMAV-04ADA66	1.2	-	-	-	F0	F0	F1	2.1	SGDV-2R8A01A	1	
750W	SGMAV-08ADA67	2.6	-	-	-		F1	F2	4	SGDV-5R5A01A	1.5	

HIWIN Mikosystem Step Motor

Series	Model	Flange Selection						Weight (kg)	Built in Motor	Weight (kg)	Remarks
		KK40	KK50	KK60	KK86	KK100	KK130				
ST40	FRST011024	F3	F3	F5	-	-	-	0.3	STD-24A	0.09	single axis
ST55	FRST021024	F3	F3	F5	-	-	-	0.55			single axis
	FRST022024				-	-	-	0.8			
	FRST023024				-	-	-	1.18			
	FRST121024	F3	F3	F5	-	-	-	0.58			axis of symmetry
	FRST122024				-	-	-	0.83			
	FRST123024				-	-	-	0.21			

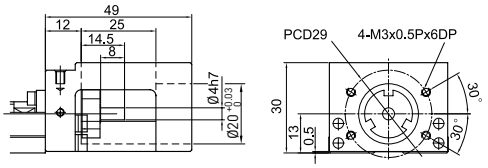
Oriental Step Motor

Series	Model	Flange Selection						Built in Motor	Weight (kg)	Built in Driver	Weight (kg)
		KK40	KK50	KK60	KK86	KK100	KK130				
CSK 2 phase	CSK243-AP	F3	F3	F5	-	-	-	PK243-01A	0.21	CSD2109-P	0.12
	CSK244-AP	F3	F3	F5	-	-	-	PK244-01A	0.27	CSD2112-P	0.12
	CSK245-AP	F3	F3	F5	-	-	-	PK245-01A	0.35	CSD2112-P	0.12
	CSK264-AP	-	-	F4	F6	-	-	PK264-02A	0.45	CSD2120-P	0.12
	CSK266-AP	-	-	F4	F6	-	-	PK266-02A	0.7	CSD2120-P	0.12
	CSK268-AP	-	-	F4	F6	-	-	PK268-02A	1	CSD2120-P	0.12
	CSK296-AP	-	-	-	-	F4	F3	PK296-03A	1.7	CSD2145P	0.2
	CSK299-AP	-	-	-	-	F4	F3	PK299-03A	2.8	CSD2145P	0.2
	CSK2913-AP	-	-	-	-	F4	F3	PK2913-02A	3.8	CSD2140P	0.2
CFKII 5 phase micro stepping	CFK543AP2	F3	F3	F5	-	-	-	PK543NAW	0.21	DFC5107P	0.2
	CFK544AP2	F3	F3	F5	-	-	-	PK544NAW	0.27	DFC5107P	0.2
	CFK545AP2	F3	F3	F5	-	-	-	PK545NAW	0.35	DFC5107P	0.2
	CFK564AP2	-	-	-	F5	-	-	PK564NAW	0.6	DFC5114P	0.2
	CFK566AP2	-	-	-	F5	-	-	PK566NAW	0.8	DFC5114P	0.2
	CFK569AP2	-	-	-	F5	-	-	PK569NAW	1.3	DFC5114P	0.2
	CFK566HAP2	-	-	-	F5	-	-	PK566HNAW	0.8	DFC5128P	0.22
	CKF569HAP2	-	-	-	F5	-	-	PK569HNAW	1.3	DFC5128P	0.22
	CFK596HAP2	-	-	-	-	F3	-	PK596HNAW	1.7	DFC5128P	0.22
	CFK599HAP2	-	-	-	-	F3	-	PK599HNAW	2.8	DFC5128P	0.22
	CFK5913HAP2	-	-	-	-	F3	-	PK5913HNAW	3.8	DFC5128P	0.22
UMK 2 phase	UMK243A	F3	F3	F5	-	-	-	PK243-01	0.21	UDK2109	0.47
	UMK244A	F3	F3	F5	-	-	-	PK244-01	0.27	UDK2112	0.47
	UMK245A	F3	F3	F5	-	-	-	PK245-01	0.35	UDK2112	0.47
	UMK264A	-	-	F4	F6	-	-	PK264-02	0.45	UDK2120	0.47
	UMK266A	-	-	F4	F6	-	-	PK266-02	0.7	UDK2120	0.47
	UMK268A	-	-	F4	F6	-	-	PK268-02	1	UDK2120	0.47
RK 5 phase	RK543AA	F3	F3	F5	-	-	-	PK543W	0.25	RKD507-A	0.4
	RK544AA	F3	F3	F5	-	-	-	PK544W	0.3	RKD507-A	0.4
	RK545AA	F3	F3	F5	-	-	-	PK545W	0.4	RKD507-A	0.4
	RK566AA	-	-	-	F5	-	-	PK566W	0.8	RKD514L-A	0.85
	RK569AA	-	-	-	F5	-	-	PK569W	1.3	RKD514L-A	0.85
	RK596AA	-	-	-	-	F3	-	PK596W	1.7	RKD514H-A	0.85
	RK599AA	-	-	-	-	F3	-	PK599W	2.8	RKD514H-A	0.85
	RK5913AA	-	-	-	-	F3	-	PK5913W	3.8	RKD514H-A	0.85

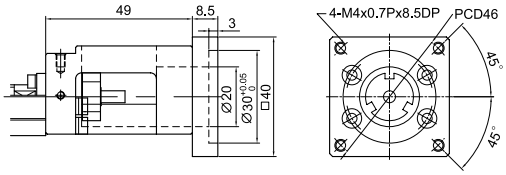
1.10.2 Motor housing and Motor adaptor Flange

KK40

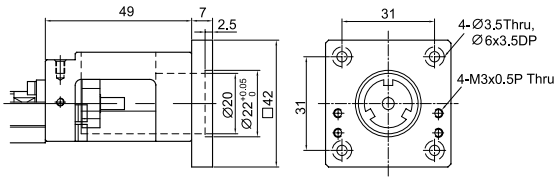
Motor housing F0



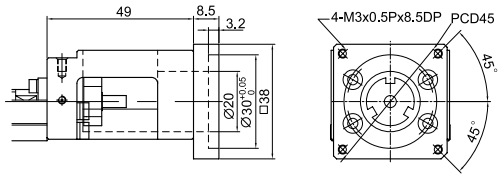
Motor adaptor Flange F1



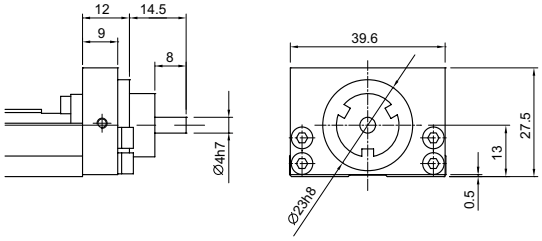
Motor adaptor Flange F3



Motor adaptor Flange F2

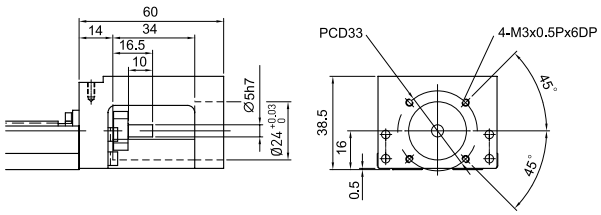


Mount Housing H0

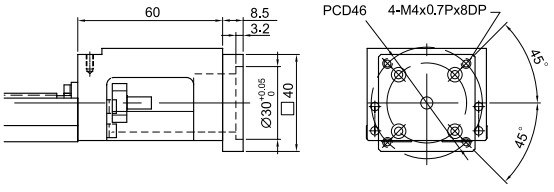


KK50

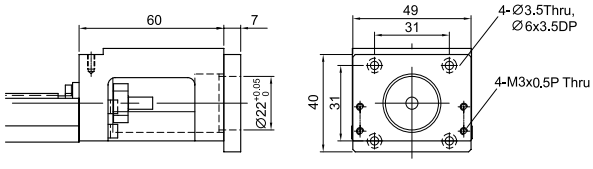
Motor housing F0



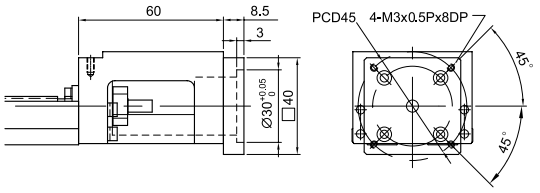
Motor adaptor Flange F1



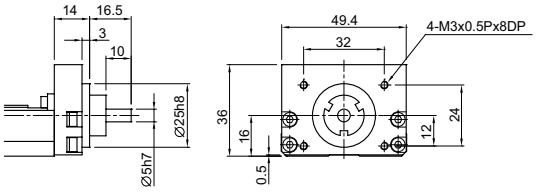
Motor adaptor Flange F3



Motor adaptor Flange F2

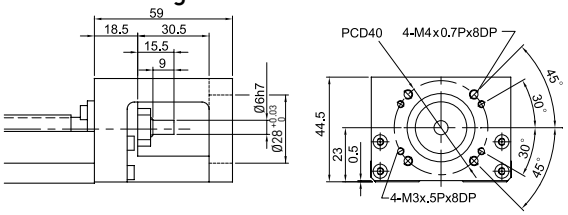


Mount Housing H0

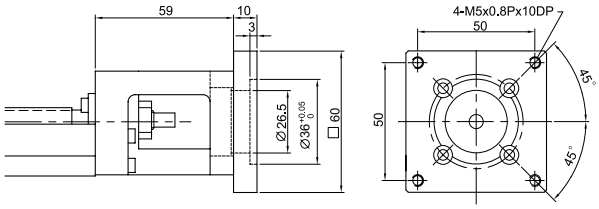


KK60

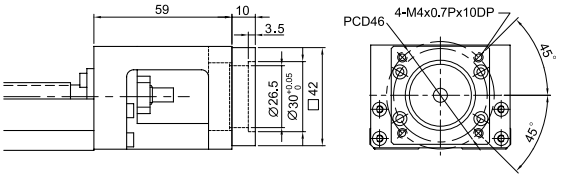
Motor housing F0



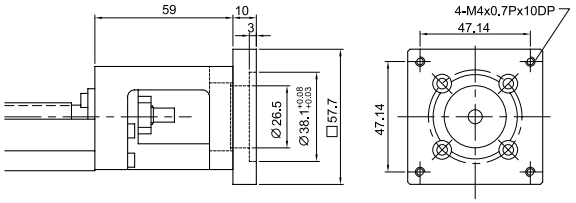
Motor adaptor Flange F3



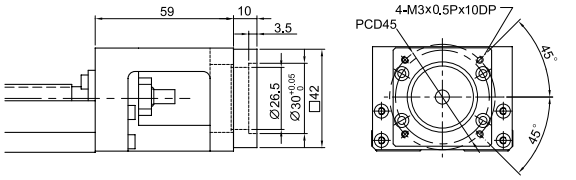
Motor adaptor Flange F1



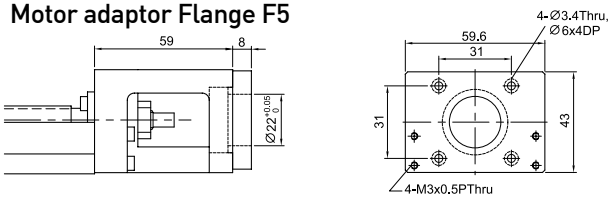
Motor adaptor Flange F4



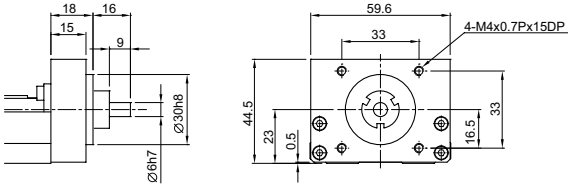
Motor adaptor Flange F2



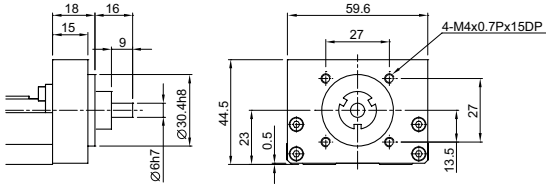
Motor adaptor Flange F5



Mount Housing H0

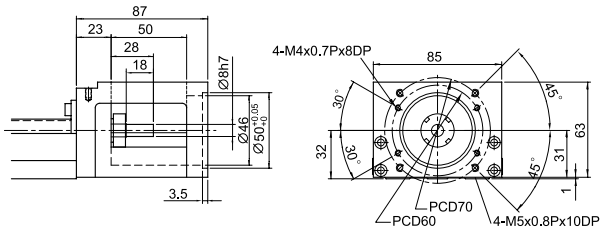


Mount Housing H1

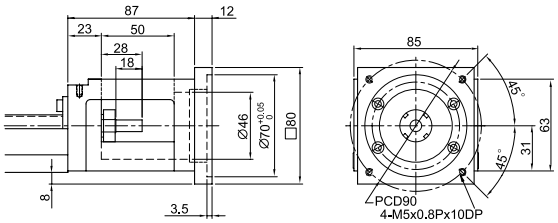


KK86

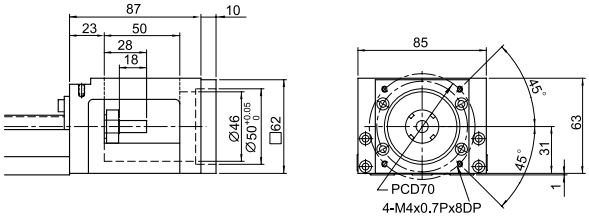
Motor housing F0



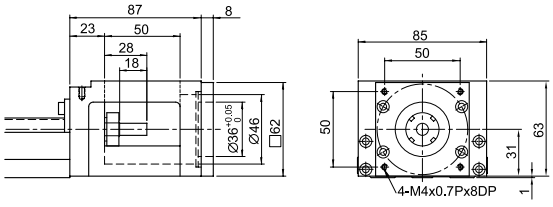
Motor adaptor Flange F4



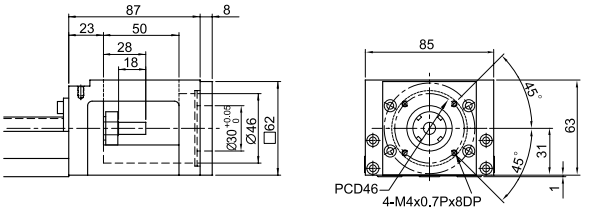
Motor adaptor Flange F1



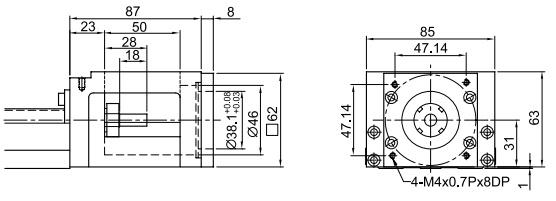
Motor adaptor Flange F5



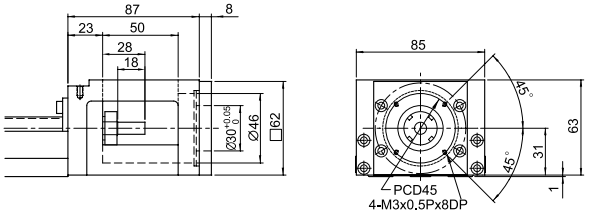
Motor adaptor Flange F2



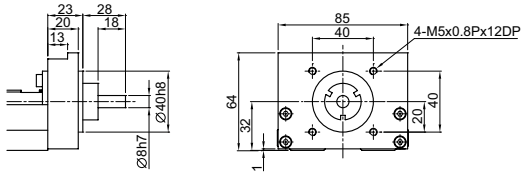
Motor adaptor Flange F6



Motor adaptor Flange F3

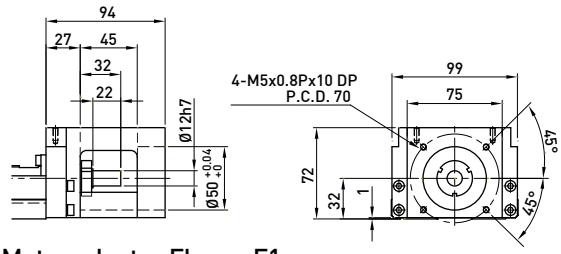


Mount Housing H0

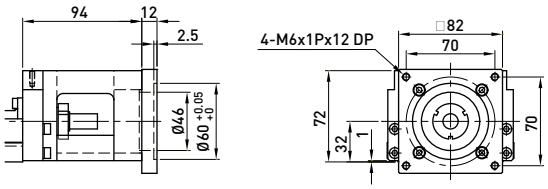


KK100

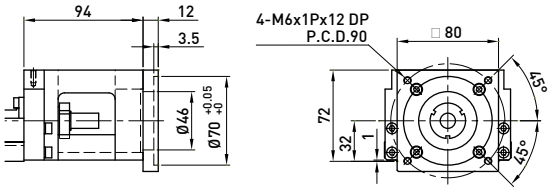
Motor housing F0



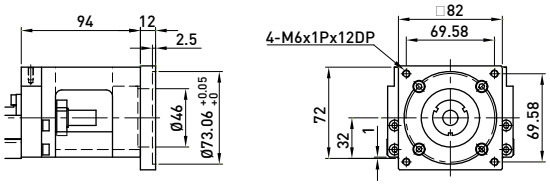
Motor adaptor Flange F3



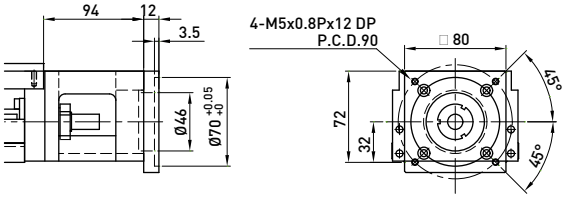
Motor adaptor Flange F1



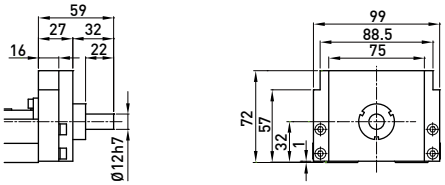
Motor adaptor Flange F4



Motor adaptor Flange F2

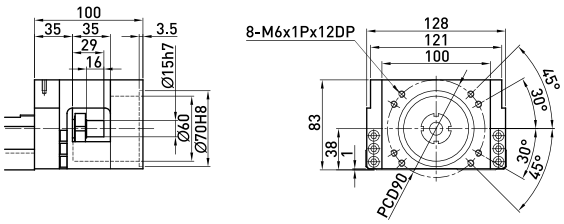


Mount Housing H0

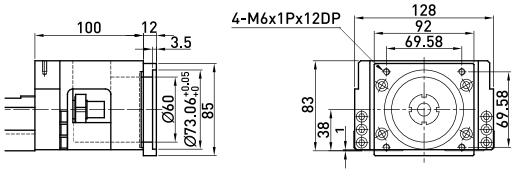


KK130

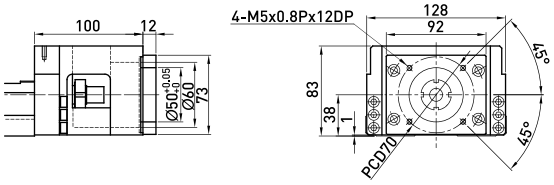
Motor housing F0



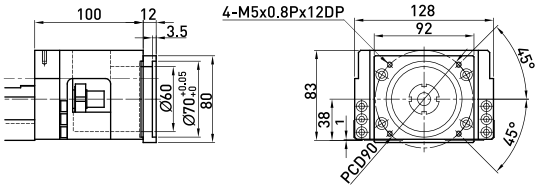
Motor adaptor Flange F3



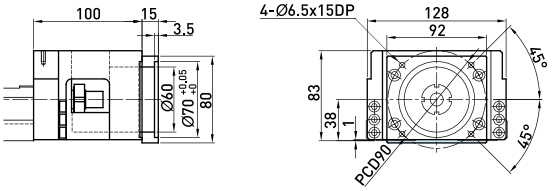
Motor adaptor Flange F1



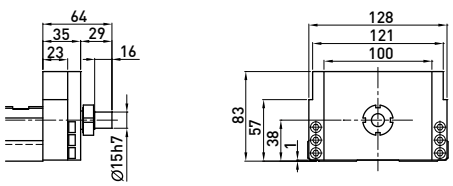
Motor adaptor Flange F4



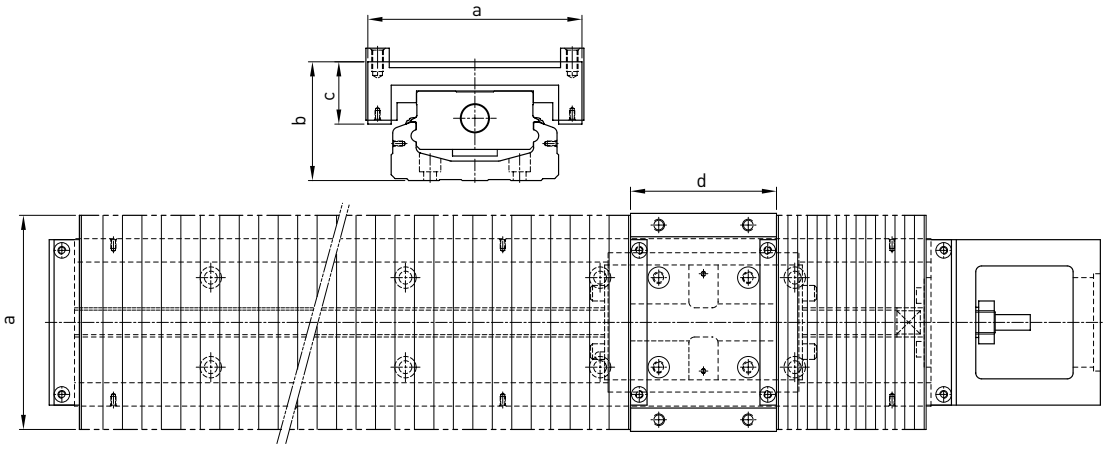
Motor adaptor Flange F2



Mount Housing H0



1.11 Optional Accessories

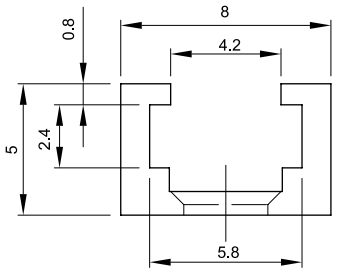


Unit : mm

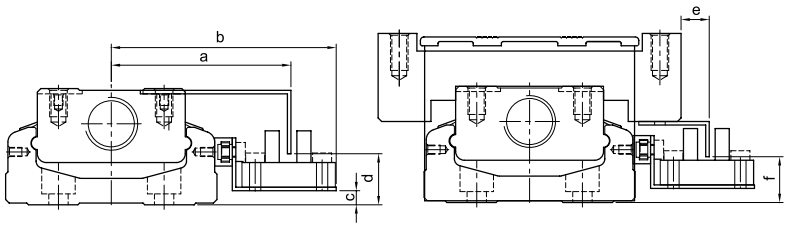
Nominal Width	Rail Length	Stroke	Min.	Max.	a	b	c	d
KK40	100	35	16	51	60	29.5	19	33
	150	63	27	90				
	200	93	37	130				
KK50	150	60	21.5	81.5	62	37	19	47
	200	95	29	124				
	250	130	36.5	166.5				
	300	160	46.5	206.5				
KK60	150	56	16	80	84	45.5	24	54
	200	106	20	126				
	300	166	40	206				
	400	234	56	290				
	500	306	70	376				
	600	366	90	456				
KK86	340	188	36	224	110	61	32	75
	440	260	50	310				
	540	336	62	398				
	640	408	76	484				
	740	480	90	570				
	940	640	110	750				
KK100	980	769	58	827	150	73	41	95
	1080	855	65	920				
	1180	945	70	1015				
	1280	1029	78	1107				
	1380	1115	85	1200				
KK130	980	748	62	810	180	89	53	108
	1180	916	78	994				
	1380	1084	94	1178				
	1680	1346	113	1459				

1.12 Switch

Switch rail

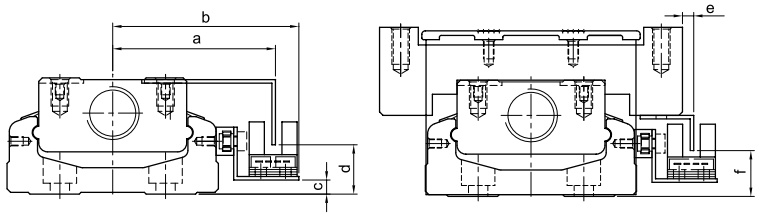


Switch



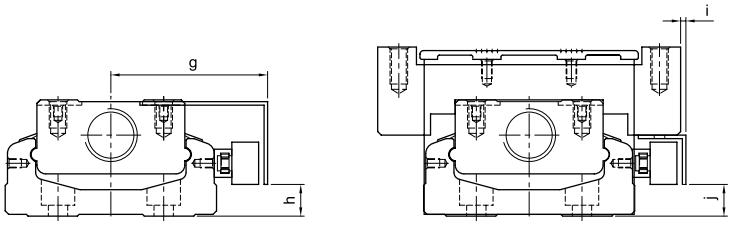
Nominal Width	a	b	c	d	e	f
KK40	41.5	54.1	0.5	10.8	15.3	12
KK50	45.5	59	1	10	15	11
KK60	51	63.8	4	14.5	8	13
KK86	63.5	76.7	8	18	8	18
KK100	71	84	10	20	9	20
KK130	85.5	98.5	14	24	0.5	23

Switch 1 : Omron EE-SX671



Nominal Width	a	b	c	d	e	f
KK40	36.5	44.3	1	9.8	10.5	12
KK50	41.3	48	1	10.5	10.2	11
KK60	46.2	52.8	4	14	3.2	13
KK86	59	65.7	8	18	3	18
KK100	66	73	10	20	4.2	20
KK130	80.8	87.5	14	23.5	-4.1	23.5

Switch 2 : Omron EE-SX674



Nominal Width	g	h	i	j
KK40	40	5.5	13.5	5.5
KK50	39.5	5.7	7	19.5
KK60	44.5	9	2	9
KK86	57	13	1	13
KK100	64.5	15	2.5	15
KK130	79	19	-6	19

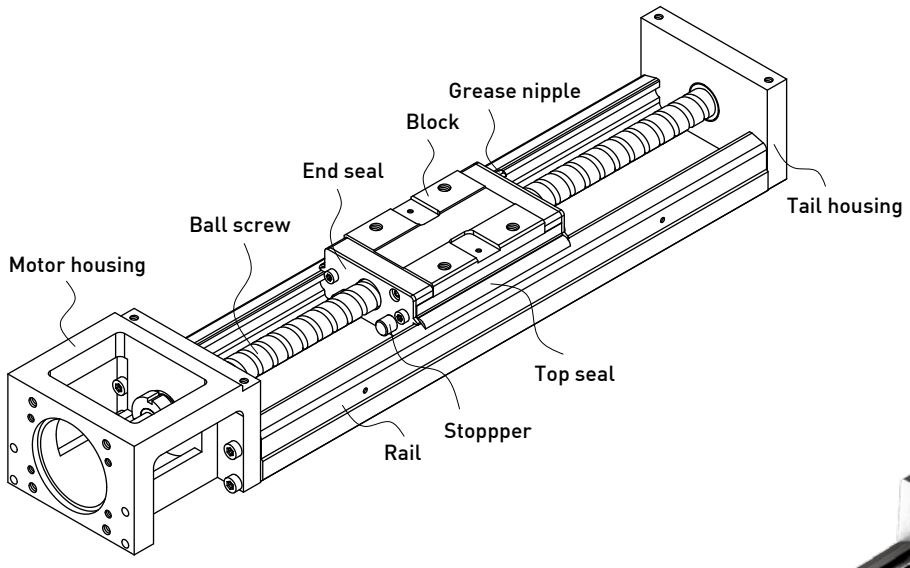
Switch 3, 4 : SUNX GX-F12A, SUNX GX-F12A-P

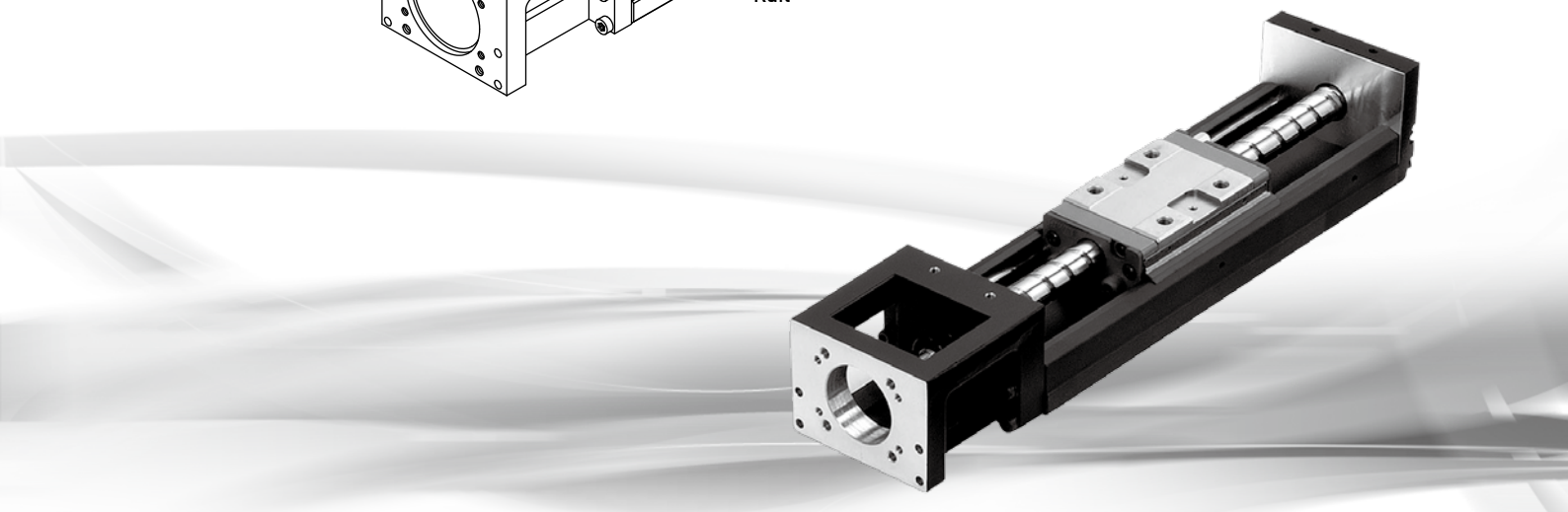
Industrial Robot
SK Series

The quiet industrial robot with SynchMotionTM Technology offers quieter operation, smooth movement, low particle emitting rate, longer service life and superior lubrication.
With the SynchMotionTM Technology, SK industrial robots will be more suitable for industries which need higher speed and quiet performance.

2.1 Features

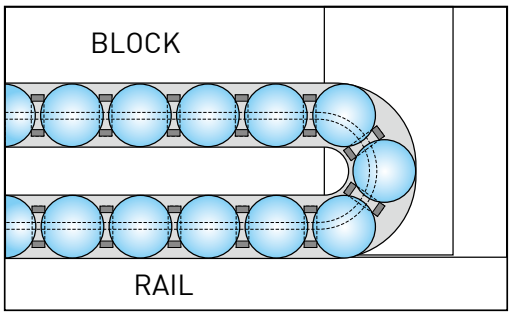
- Low noise
- Low particle emitting rate
- Longer service life
- Superior lubrication
- Easy installation and maintenance





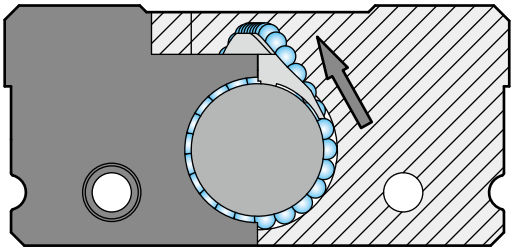
2.1.1 SynchMotion™ Technology

With SynchMotionTM Technology, rolling elements are interposed between the partitions of SynchMotionTM to provide improved circulation. Due to the elimination of contact between the rolling elements, collision noise and sound levels are efficiently reduced.



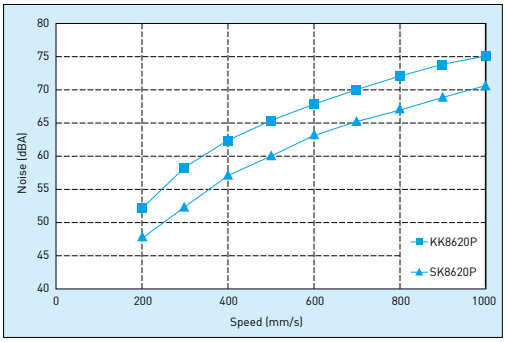
2.1.2 Tangent Circulation Technology

Balls enter circulation system by following spiral pathway. It can diminish the impact while balls are entering the circulation system, improve the speed, acceleration, smoothness of traditional external circulation, and reduce the noise while balls are entering the circulation system. Through the advantages above, high speed and low noise performance of SK are therefore achieved.

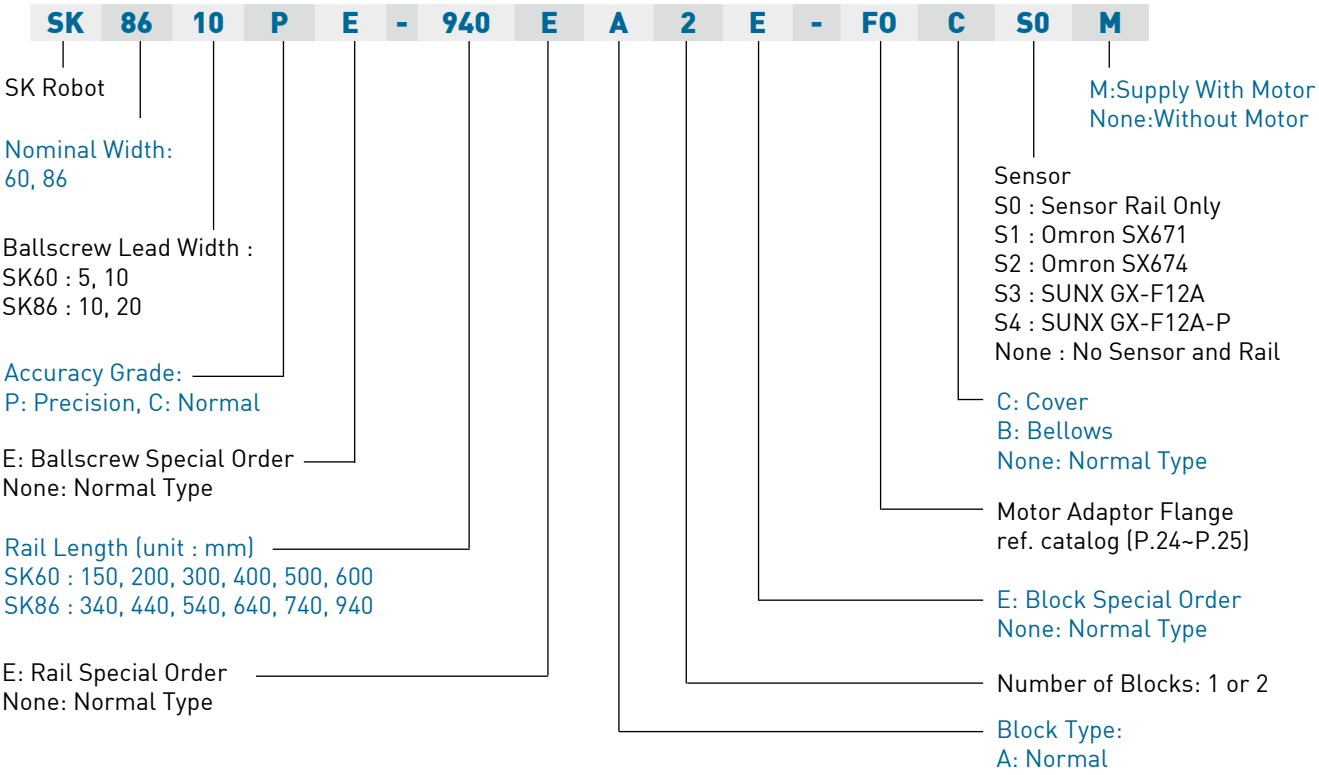


2.1.3 Noise Test

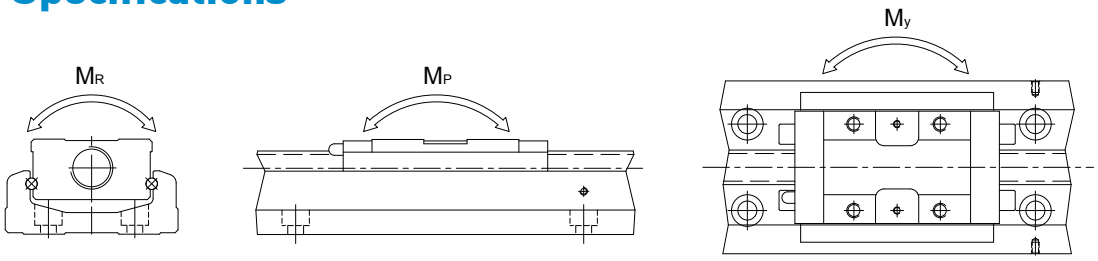
With the application of SynchMotionTM Technology and Tangent Circulation Technology, noise about 3~5 dB during operation is experimentally subsided.



2.2 Model Number of SK Series



2.3 Specifications



Model No.		Ballscrew				Guideway							
		Nominal Diameter (mm)	Lead (mm)	Basic Dynamic Load (N)	Basic Static Load (N)	Basic Dynamic Load Rating (N)	Basic Static Load Rating (N)	Static Rated Moment					
								Allowable Static Moment M_P (N-m) (pitching)		Allowable Static Moment M_Y (N-m) (yawing)		Allowable Static Moment M_R(N-m) (rolling)	
						Block A	Block A	Block A1	Block A2	Block A1	Block A2	Block A1	Block A2
SK6005	Precision	12	5	3744	6243	15132	19811	168	891	168	891	413	826
	Normal			3377	5626								
SK6010	Precision	12	10	2410	3743	15132	19811	168	891	168	891	413	826
	Normal			2107	3234								
SK8610	Precision	15	10	7144	12642	26011	35793	565	2481	565	2481	1063	2126
	Normal			6429	11387								
SK8620	Precision	15	20	4645	7655	26011	35793	565	2481	565	2481	1063	2126
	Normal			4175	6889								

2.4 Accuracy Grade

Unit : mm

Model	Rail Length	Repeatability		Accuracy		Running Parallelism		Starting Torque(N-cm)	
		Precision	Normal	Precision	Normal	Precision	Normal	Precision	Normal
SK60	150	±0.003	±0.01	0.020	-	0.010	-	15	7
	200								
	300								
	400								
	500	±0.003	±0.01	0.025	-	0.015	-	15	7
	600								
SK86	340	±0.003	±0.01	0.025	-	0.015	-	15	10
	440								
	540								
	640								
	740	±0.003	±0.01	0.030	-	0.020	-	17	10
	940		±0.01	0.040	-	0.030	-	25	10

2.5 Maximum Speed Limit

Model	Ballscrew Lead (mm)	Rail Length (mm)	Speed (mm/sec)	
			Precision	Normal
SK60	05	150	550	390
		200	550	390
		300	550	390
		400	550	390
		500	550	390
		600	340	340
	10	150	1100	790
		200	1100	790
		300	1100	790
		400	1100	790
		500	1100	790
		600	670	670
SK86	10	340	740	520
		440	740	520
		540	740	520
		640	740	520
		740	740	520
		940	610	430
	20	340	1480	1050
		440	1480	1050
		540	1480	1050
		640	1480	1050
		740	1480	1050
		940	1220	870

2.6 Life Calculations

2.6.1 Service Life

Under repeated stress between raceway and rolling elements, pitting and flaking occurs while reaching fatigue failure. Service life of KK industrial robot is defined as the distance traveled before any failure of raceway and rolling elements appears.

2.6.2 Nominal Life (L)

The service life varies greatly even when the KK units are manufactured in the same way or operated under the same conditions. For this reason, nominal life is used as the criteria for predicting the service life of a KK unit.

2.6.3 Nominal Life Calculation of KK Unit

The calulating formulas is divided into two parts, including guideway and ball screw which will obtain two different values. The smaller value would be suitable for the nominal life of KK unit.
Formulas of guideway and ball screw nominal life depend on several parameters and are shown as follow:

Guideway

$$L = \left(\frac{f_t}{f_w} \cdot \frac{C}{P_n} \right)^3 \times 50 \text{ km}$$

L : Life Rating (km)
f_t : Contact Coefficient (ref. Table 1)
f_w : Loading Coefficient (ref. Table 2)
C : Basic Dynamic Load Rating (N)
P_n : Calculated Loading (N)

Table 1

Block type	Contact Coefficient f_t
A1	1.0
A2	0.81

Table 2

Operating Condition		Loading Coefficient f_w
Thrust and Vibration	Velocity (V)	
No Thrust	V < 15m/min	1.0 ~ 1.5
Low Vibration	15m/min < V < 60m/min	1.5 ~ 2.0
High Vibration	V > 60m/min	2.0 ~ 3.5

Ballscrew and Bearing

$$L = \left(\frac{1}{f_w} \cdot \frac{C_a}{P_{a,n}} \right)^3 \times 10^6 \text{ rev}$$

L : Life Rating (rev.)
f_w : Loading Coefficient (ref. Table 2)
C_a : Basic Dynamic Load Rating (N)
$P_{a,n}$: Axial Loading (N)

2.7 Lubrication

Insufficient lubricating of guideway would lead to reduction of service life.
The lubricant provide functions including:
- Reducing rolling friction and avoiding abrasion
- Providing lubricating film and extending service life
- Anti-rusting

2.7.1 Lubricating grease

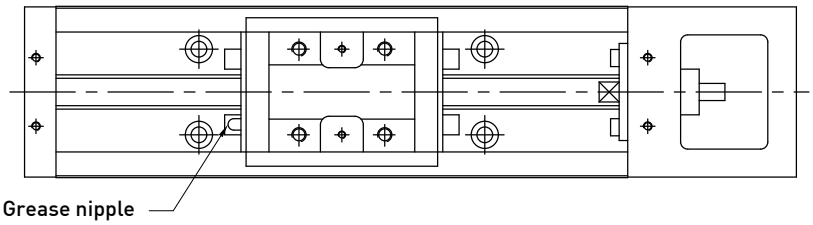
Re-lubricating KK industrial robot every 100 km is recommened. Generally, lubricating grease is applied for speed under 60 m/min. For operating speed over 60 m/min, grease with higher viscosity could be used.

$$T = \frac{100 \times 1000}{V_e \times 60}$$

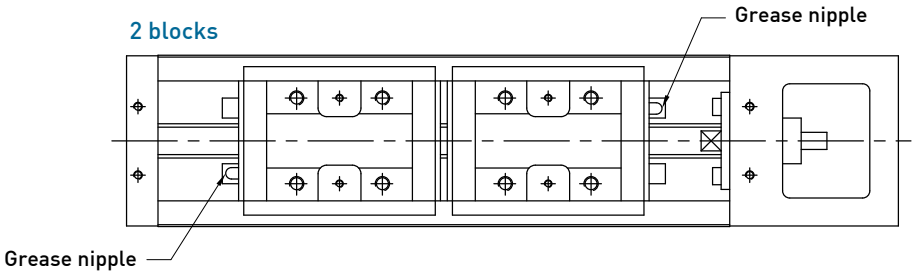
T : Lubricating frequncy (hrs)
Ve : Speed (m/min)

2.7.2 Grease nipple

1 block



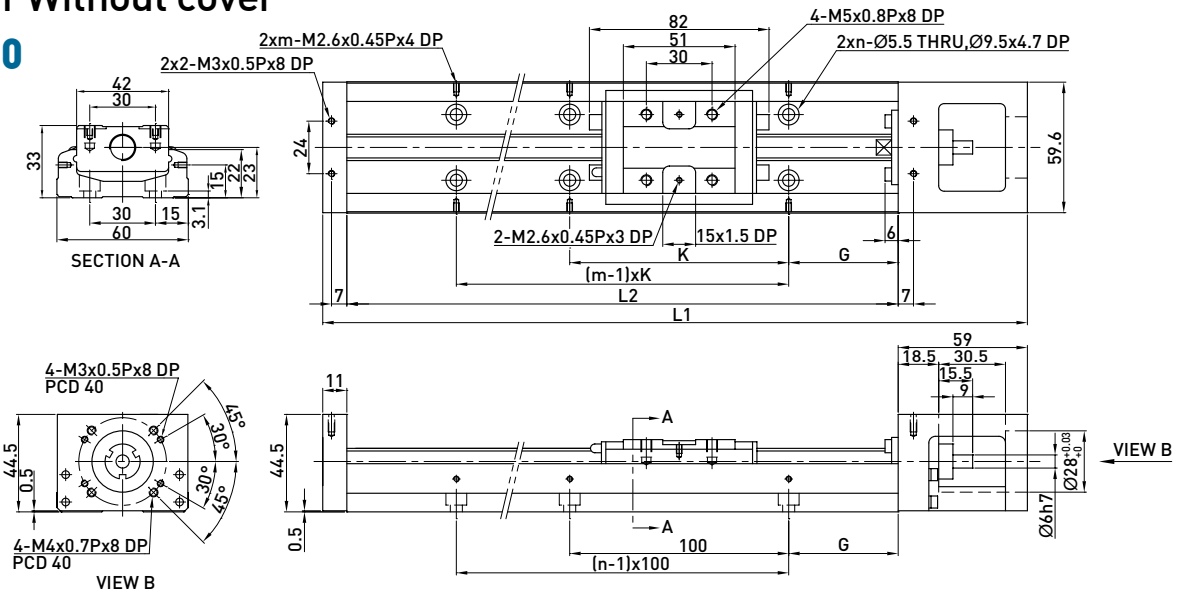
2 blocks



2.8 Dimension

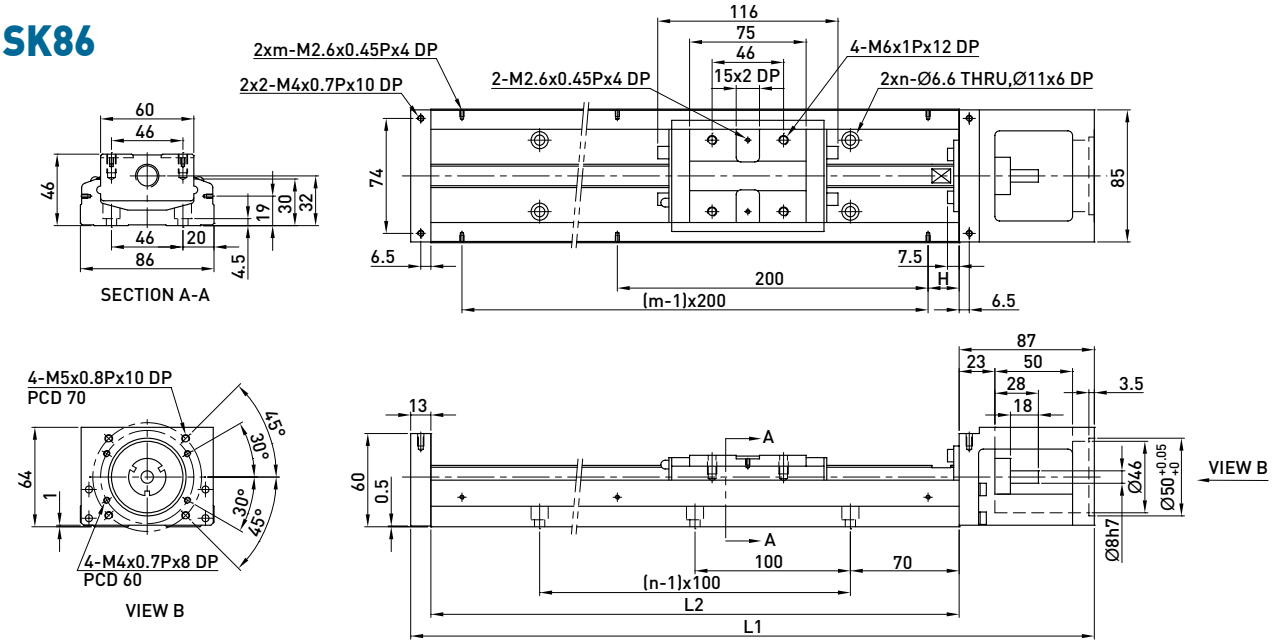
2.8.1 Without cover

SK60



Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	K (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block					A1 Block	A2 Block
150	220	60	-	25	100	2	2	1.5	-
200	270	110	-	50	100	2	2	1.8	-
300	370	210	135	50	200	3	2	2.4	2.7
400	470	310	235	50	100	4	4	3	3.3
500	570	410	335	50	200	5	3	3.6	3.9
600	670	510	435	50	100	6	6	4.2	4.6

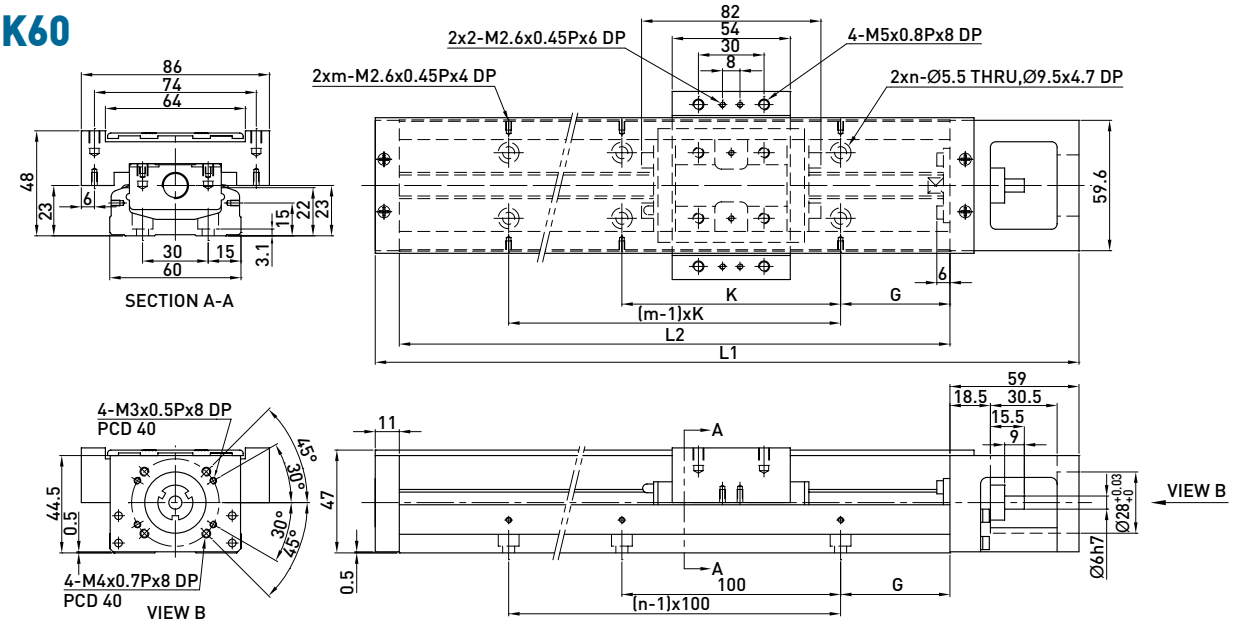
SK86



Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block				A1 Block	A2 Block
340	440	210	100	70	3	2	5.7	6.5
440	540	310	200	20	4	3	6.9	7.7
540	640	410	300	70	5	3	8.0	8.8
640	740	510	400	20	6	4	9.2	10.0
740	840	610	500	70	7	4	10.4	11.2
940	1040	810	700	70	9	5	11.6	12.4

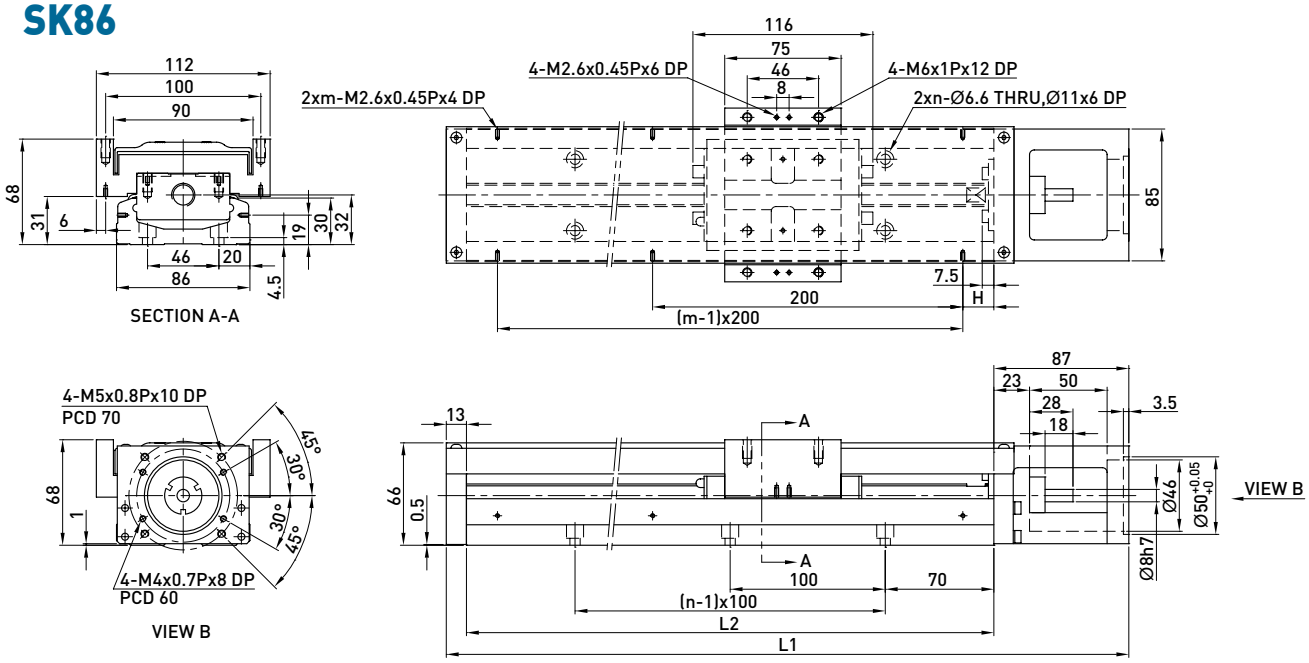
2.8.2 With cover

SK60



Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	K (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block					A1 Block	A2 Block
150	220	60	-	25	100	2	2	1.7	-
200	270	110	-	50	100	2	2	2.1	-
300	370	210	135	50	200	3	2	2.7	3.0
400	470	310	235	50	100	4	4	3.3	3.6
500	570	410	335	50	200	5	3	3.9	4.2
600	670	510	435	50	100	6	6	4.6	5.0

SK86



Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block				A1 Block	A2 Block
340	440	210	100	70	3	2	6.5	7.3
440	540	310	200	20	4	3	7.8	8.6
540	640	410	300	70	5	3	9.0	9.8
640	740	510	400	20	6	4	10.3	11.3
740	840	610	500	70	7	4	11.6	12.4
940	1040	810	700	70	9	5	13.0	13.8

2.9 Motor housing and Motor Adaptor Flange

2.9.1 Motor Selection

HIWIN Mikrosystem Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection		+Brake Weight (kg)	Driver	Weight (kg)	Remarks
			SK60	SK86				
100W	FRAC101022	0.6	F2	F3	-	MD-36-S	1.25	220V
200W	FRAC102022	1	-	F0	-			220V
400W	FRAC104022	1.45	-	F0	-			220V
750W	FRAC107522	2.66	-	-	-			220V

Mitsubishi Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection		+Brake Weight (kg)	Driver	Weight (kg)	Remarks
			SK60	SK86				
50W	HF-KP053	0.35	F1	F2	0.75	MR-J3S-10A	0.8	220V
100W	HF-KP13	0.56	F1	F2	0.89	MR-J3S-10A	0.8	220V
200W	HF-KP23	0.94	-	F0	1.6	MR-J3S-20A	0.8	220V
400W	HF-KP43	1.5	-	F0	2.1	MR-J3S-40A	1	220V
750W	HF-KP73	2.9	-	-	4	MR-J3S-70A	1.4	220V

Panasonic Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection		+Brake Weight (kg)	Driver	Weight (kg)	Remarks
			SK60	SK86				
50W	MSMD5AZP1	0.32	F2	F3	0.53	MADDT1105	0.8	110V
50W	MSMD5AZP1	0.32	F2	F3	0.53	MADDT1205	0.8	220V
100W	MSMD011P1	0.47	F2	F3	0.68	MADDT1107	0.8	110V
100W	MSMD012P1	0.47	F2	F3	0.68	MADDT1205	0.8	220V
200W	MSMD021P1	0.82	-	F1	1.3	MADDT2110	1.1	110V
200W	MSMD022P1	0.82	-	F1	1.3	MADDT1207	0.8	220V
400W	MSMD041P1	1.2	-	F1	1.7	MADDT3120	1.5	110V
400W	MSMD042P1	1.2	-	F1	1.7	MADDT2210	1.1	220V
750W	MSMD082S1	2.3	-	F4	3.1	MADDT3520	1.5	220V

Yasukawa Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection		+Brake Weight (kg)	Driver	Weight (kg)	Remarks
			SK60	SK86				
50W	SGMAV-A5ADA61	0.3	F1	F2		SGDV-R70A01A	0.9	with key
50W	SGMAV-A5ADA2C	0.3	F1	F2		SGDV-R70A01A	0.9	no key
50W	SGMAV-A5ADA21	0.3	F1	F2	0.75	SGDV-R70A01A	0.9	Mid inertia
100W	SGMAV-01ADA64	0.4	F1	F2	0.89	SGDV-R90A01A	0.9	
200W	SGMAV-02ADA65	0.9	-	F0	1.6	SGDV-1R6A01A	0.9	
400W	SGMAV-04ADA66	1.2	-	F0	2.1	SGDV-2R8A01A	1	

HIWIN Mikosystem Step Motor

Series	Model	Flange Selection		Weight (kg)	Built in Motor	Weight (kg)	Remarks
		SK60	SK86				
ST40	FRST011024	F5	-	0.3	STD-24A	0.09	single axis
ST55	FRST021024	F5	-	0.55			single axis
	FRST022024			0.8			
	FRST023024			1.18			
	FRST121024	F5	-	0.58			axis of symmetry
	FRST122024			0.83			
	FRST123024			0.21			

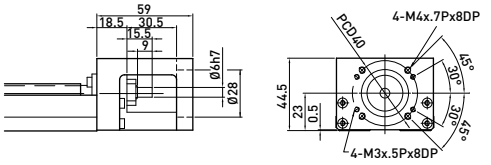
Oriental Step Motor

Series	Model	Flange Selection		Built in Motor	Weight (kg)	Built in Driver	Weight (kg)
		SK60	SK86				
CSK 2 phase	CSK243-AP	F5	-	PK243-01A	0.21	CSD2109-P	0.12
	CSK244-AP	F5	-	PK244-01A	0.27	CSD2112-P	0.12
	CSK245-AP	F5	-	PK245-01A	0.35	CSD2112-P	0.12
	CSK264-AP	F4	F6	PK264-02A	0.45	CSD2120-P	0.12
	CSK266-AP	F4	F6	PK266-02A	0.7	CSD2120-P	0.12
	CSK268-AP	F4	F6	PK268-02A	1	CSD2120-P	0.12
CFKII 5 phase micro stepping	CFK543AP2	F5	-	PK543NAW	0.21	DFC5107P	0.2
	CFK544AP2	F5	-	PK544NAW	0.27	DFC5107P	0.2
	CFK545AP2	F5	-	PK545NAW	0.35	DFC5107P	0.2
	CFK564AP2	-	F5	PK564NAW	0.6	DFC5114P	0.2
	CFK566AP2	-	F5	PK566NAW	0.8	DFC5114P	0.2
	CFK569AP2	-	F5	PK569NAW	1.3	DFC5114P	0.2
	CFK566HAP2	-	F5	PK566HNAW	0.8	DFC5128P	0.22
	CKF569HAP2	-	F5	PK569HNAW	1.3	DFC5128P	0.22
UMK 2 phase	UMK243A	F5	-	PK243-01	0.21	UDK2109	0.47
	UMK244A	F5	-	PK244-01	0.27	UDK2112	0.47
	UMK245A	F5	-	PK245-01	0.35	UDK2112	0.47
	UMK264A	F4	F6	PK264-02	0.45	UDK2120	0.47
	UMK266A	F4	F6	PK266-02	0.7	UDK2120	0.47
	UMK268A	F4	F6	PK268-02	1	UDK2120	0.47
RK 5 phase	RK543AA	F5	-	PK543W	0.25	RKD507-A	0.4
	RK544AA	F5	-	PK544W	0.3	RKD507-A	0.4
	RK545AA	F5	-	PK545W	0.4	RKD507-A	0.4
	RK566AA	-	F5	PK566W	0.8	RKD514L-A	0.85
	RK569AA	-	F5	PK569W	1.3	RKD514L-A	0.85

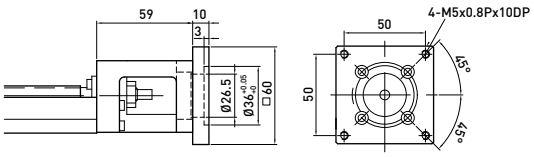
2.9.2 Motor housing and Motor Adaptor Flange

SK60

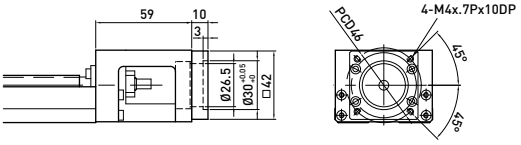
Motor housing F0



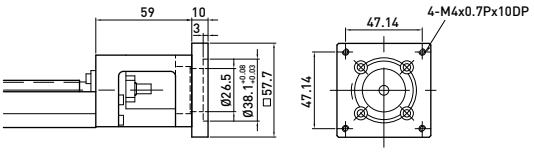
Motor adaptor Flange F3



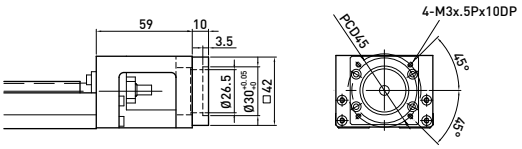
Motor adaptor Flange F1



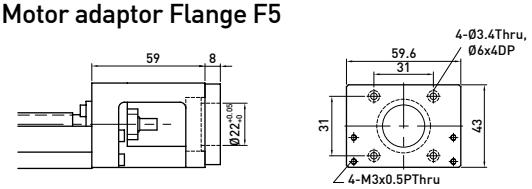
Motor adaptor Flange F4



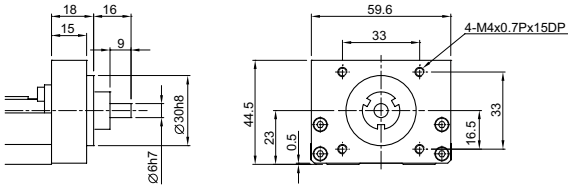
Motor adaptor Flange F2



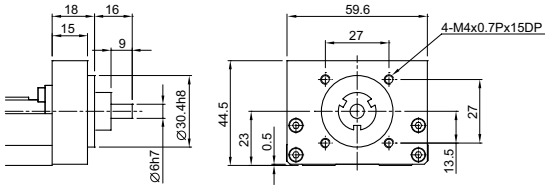
Motor adaptor Flange F5



Mount Housing H0

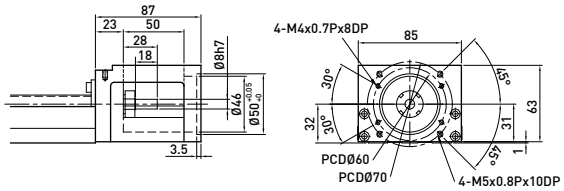


Mount Housing H1

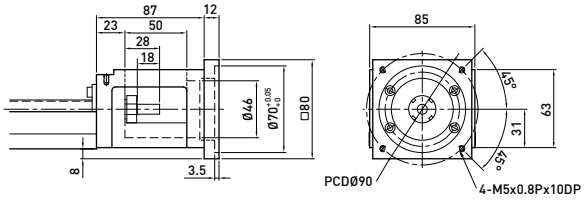


SK86

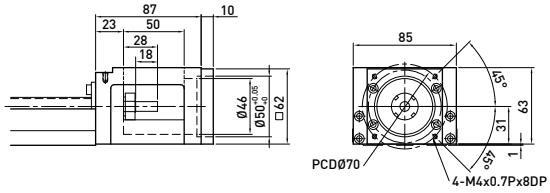
Motor housing F0



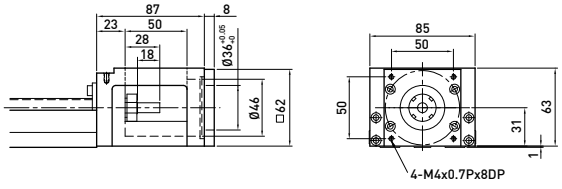
Motor adaptor Flange F4



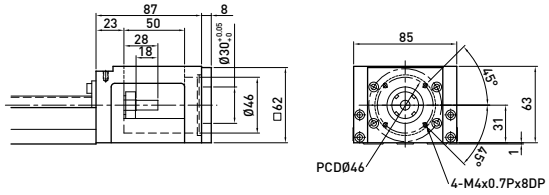
Motor adaptor Flange F1



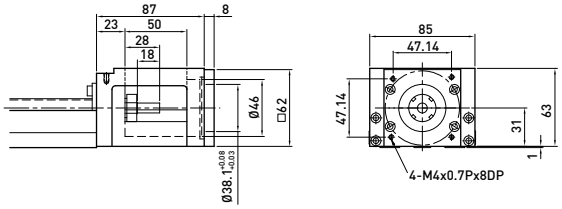
Motor adaptor Flange F5



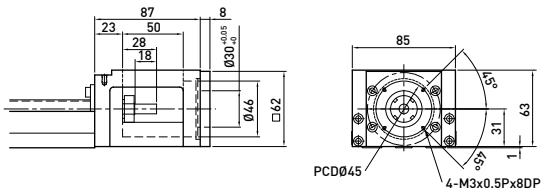
Motor adaptor Flange F2



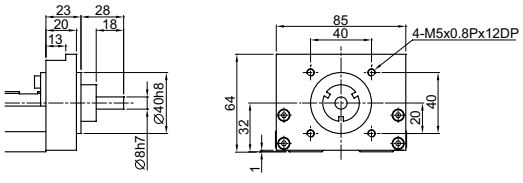
Motor adaptor Flange F6



Motor adaptor Flange F3

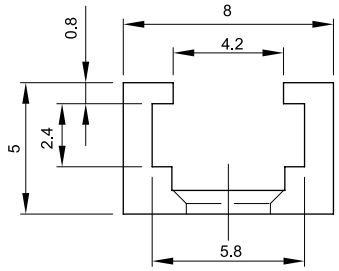


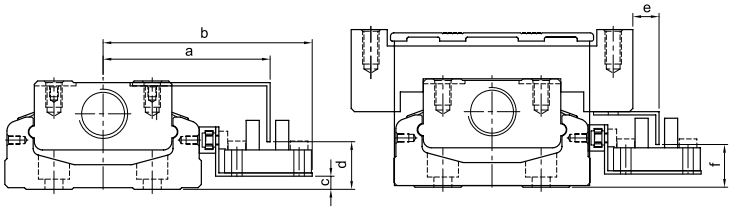
Mount Housing H0



2.10 Switch

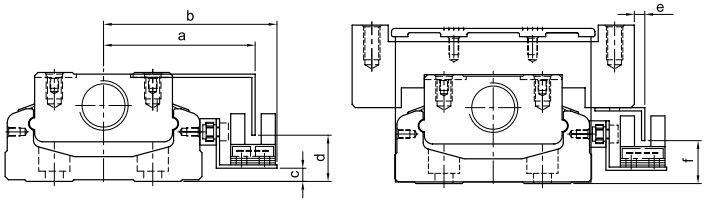
Switch rail





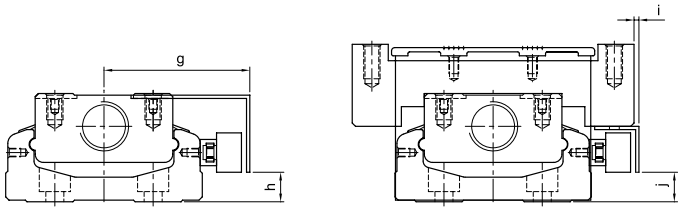
Nominal Width	a	b	c	d	e	f
SK60	51	63.8	4	14.5	8	13
SK86	63.5	76.7	8	18	8	18

Switch 1 : Omron EE-SX671



Nominal Width	a	b	c	d	e	f
SK60	46.2	52.8	4	14	3.2	13
SK86	59	65.7	8	18	3	18

Switch 2 : Omron EE-SX674



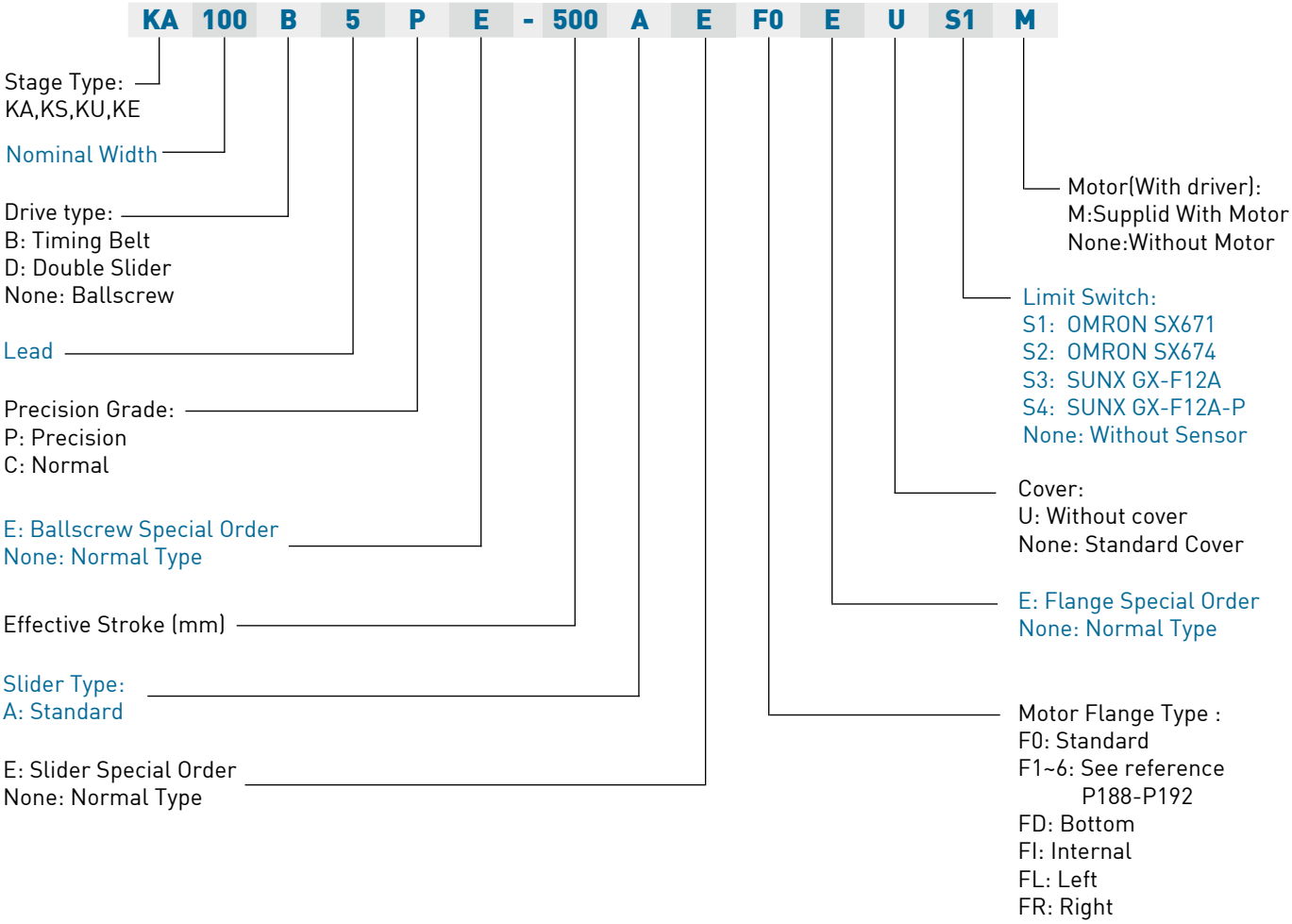
Nominal Width	g	h	i	j
SK60	44.5	9	2	9
SK86	57	13	1	13

Switch 3, 4 : SUNX GX-F12A, GX-F12A-P

Industrial Robot

KA Series

3. 1 Model Number of Industrial Robot Series



3.2 Specification

The KA series designation is represented as the following:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Aluminum Cover	Limit Switch	Motor

(1) Model

KA is the designation for all KA models and the number represents the width of the aluminum module base.

(2) Lead

The lead on the ballscrew, in millimeters, indicates how far a sliding table travels with a complete rotation of the ballscrew. The following table shows the current available ballscrews for the KA series：

KA Model	KA136															
	KA100						KA170								KA200	
Ballscrew diameter (Φ)	15			16			20				25		32		25	
Lead (P)	10	20	40	5	10	32	5	10	20	40	25	50	32	40	10	25
L (available in left hand thread)			*	L	L	*	L		L	*	*	*	*	*	*	*
*Please contact HIWIN for high lead screws, left-hand thread screws, or any unlisted ballscrew.																

(3) Precision Grade

The precision grade for the sliding table to repeat the same position after traveling back and forth.
C; Normal grade :±0.02mm, P; Precision grade ： ±0.01mm.
The repeatability is measured by the largest error occurred at any point when the sliding table is traveling back and forth.
＊Attention ： KA products do not mark the absolute position accuracy.

(4) Effective Stroke

The travel range for the KA sliding table (in millimeters).
＊Attention ： Vibration might occur when the effective stroke is longer than listed in the catalog. The RPM's should be decreased to improve the situation, please refer to the “Speed” section for RPM description.

(5) Slider Type

Currently, the KA series is designed to only support the listed standard load. Please contact a HIWIN sales representative for inquiries on greater dynamic load or heavy load models.

(6) Motor Flange

Direct connection is the standard type on the KA series (coupling driven). There are different flange options for adapting different types of motors, please refer to the following table.

	KA100		KA136		KA170		KA200	
	Screw	PCD	Screw	PCD	Screw	PCD	Screw	PCD
F0	M3	40	M4	60	M5	70	M6	90
	M4	46	M5	70				
F1	M3	45	M4	70	M6	90	M5	70
F2			M4	46	M5	90	M5	90
F3			M3	45	M6	□70		
F4			M5	90	M6	□69.58		
F5			M4	□50				
F6			M4	□47.14				

FD ： Bottom connected motor (belt pulley drive).
FI ： Internal connected motor (coupling drive).
FL ： Left connected motor (belt pulley drive).
FR ： Right connected motor (belt pulley drive).
Please refer to the Appendix for different flange sizes.

(7) Aluminum Cover

All standard KA models are equipped with an aluminum protection cover. U ： without aluminum cover.

(8) Limit Switch

HIWIN provides some options for limit switches in this catalog. Please contact a HIWIN sales representative for any other type not listed.

(9) Motor

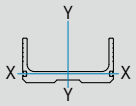
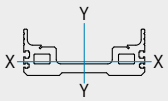
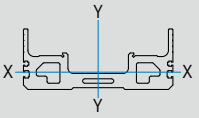
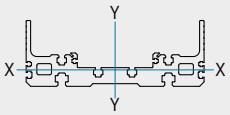
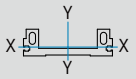
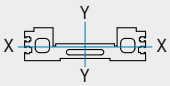
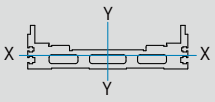
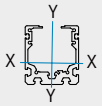
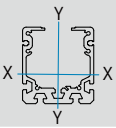
No mark ： motor not included. Please inform HIWIN in advance when installing a motor provided by the customer.
M ： motor included. Please refer to the Appendix for motor selection, for other customized motors please contact a HIWIN sales representative.

3.3 KA Specifications

Series	Driven Type	Aluminum Module Base Width	Motor Choice	Maximum Load (Kg)								Motor Connection Type	Model
				Lead (mm)									
				5	10	20	25	5	10	20	25		
				Horizontal				Vertical					
KA	Ballscrew	100	100W (3150 rpm)	61	42	21		20	12	4		Direct	KA100
				61	42	21		20	12	4		Bottom	KA100-FD
				61	42	21		20	12	4		Internal	KA100-FI
				61	42	21		20	12	4		Left	KA100-FL
				61	42	21		20	12	4		Right	KA100-FR
		136	200W (3150 rpm)	120	84	42		40	23	8		Direct	KA136
				120	84	42		40	23	8		Bottom	KA136-FD
				120	84	42		40	23	8		Internal	KA136-FI
				120	84	42		40	23	8		Left	KA136-FL
				120	84	42		40	23	8		Right	KA136-FR
		170	400W (2400 rpm)		221	110	88		61	22	16	Direct	KA170
					221	110	88		61	22	16	Bottom	KA170-FD
					221	110	88		61	22	16	Internal	KA170-FI
					221	110	88		61	22	16	Left	KA170-FL
					221	110	88		61	22	16	Right	KA170-FR
		200	750W (3150rpm)		315		126		90		23	Direct	KA200
					315		126		90		23	Bottom	KA200-FD
					315		126		90		23	Internal	KA200-FI
					315		126		90		23	Left	KA200-FL
					315		126		90		23	Right	KA200-FR
	Belt*	100	100W	10								Left	KA100B-FL
				10								Right	KA100B-FR
		136	200W	19								Left	KA136B-FL
				19								Right	KA136B-FR
		170	400W	39								Left	KA170B-FL
				39								Right	KA170B-FR

*Belt driven KA is preferred to be used in horizontal applications. Maximum linear velocity of 1800 mm/sec.

3.4 U-shaped aluminum base features a light weight construction and high rigidity.

Series	Moment of Inertia (mm^4)	Ixx	Iyy	
KA	KA100	2.17×10^5	1.81×10^6	
	KA136	3.37×10^5	5.36×10^6	
	KA170	8.84×10^5	1.24×10^7	
	KA200	9.52×10^5	1.90×10^7	
KS	KS10	8.67×10^4	1.45×10^6	
	KS14	2.34×10^5	4.4×10^6	
	KS18	3.7×10^5	1.2×10^7	
KU	KU60	5.24×10^5	5.48×10^5	
	KU80	1.56×10^5	1.67×10^6	

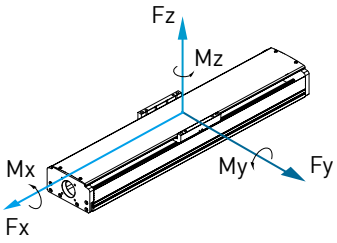
3.5 Table for the operating speed and stroke of KA

	KA Model				KA136							
					KA100				KA170		KA200	
	Ballscrew D (mm)				15		16		20		25	
	Ballscrew dr (mm)				12.364	12.399	12.899	12.684	16.624	17.084	21.824	22.094
Lead(mm)	5	10	20	25	10	20	5	10	10	20	10	25
RPM: S(rpm)	Maximum Linear Velocity V: (mm/sec)				Maximum Stroke							
100	8	17	33	42	4142	4148	4234	4197	4723	4792	5449	5484
200	17	33	67	83	2883	2887	2948	2922	3264	3312	3776	3801
300	25	50	100	125	2325	2329	2378	2357	2617	2657	3035	3056
400	33	67	133	167	1993	1996	2039	2020	2232	2266	2594	2611
500	42	83	167	208	1766	1769	1807	1791	1969	1999	2292	2308
600	50	100	200	250	1598	1601	1636	1621	1774	1802	2070	2084
700	58	117	233	292	1468	1471	1503	1489	1623	1649	1897	1910
800	67	133	267	333	1363	1366	1396	1383	1502	1526	1758	1770
900	75	150	300	375	1277	1279	1307	1295	1401	1424	1642	1654
1000	83	167	333	417	1203	1205	1232	1220	1316	1337	1545	1556
1100	92	183	367	458	1140	1142	1167	1156	1242	1263	1461	1471
1150	96	192	383	479	1111	1113	1138	1128	1209	1230	1423	1433
1200	100	200	400	500	1085	1086	1111	1101	1179	1198	1387	1397
1300	108	217	433	542	1036	1038	1061	1051	1122	1141	1323	1332
1400	117	233	467	583	993	994	1017	1007	1072	1090	1265	1274
1500	125	250	500	625	954	955	977	968	1027	1044	1213	1222
1600	133	267	533	667	918	920	941	932	986	1003	1166	1175
1700	142	283	567	708	886	888	909	900	949	965	1124	1132
1800	150	300	600	750	857	858	879	870	915	931	1085	1093
1900	158	317	633	792	830	831	851	843	883	899	1049	1057
2000	167	333	667	833	805	806	826	817	854	870	1016	1024
2100	175	350	700	875	782	783	802	794	827	842	985	993
2200	183	367	733	917	760	762	780	772	802	817	956	964
2300	192	383	767	958	740	741	759	752	779	793	930	937
2400	200	400	800	1000	721	722	740	733	757	771	904	912
2500	208	417	833	1042	704	705	722	715	737	750	881	888
2600	217	433	867	1083	687	688	705	698	717	731	859	866
2700	225	450	900	1125	671	672	689	682	699	712	838	845
2800	233	467	933	1167	656	657	674	667	682	695	818	825
2900	242	483	967	1208	642	643	659	652	665	678	799	806
3000	250	500	1000	1250	629	630	645	639	650	662	781	788

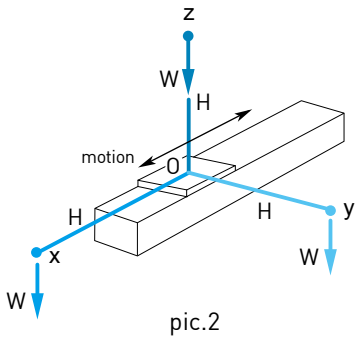
3.6 Dynamic Load

Several factors affect the calculation of loads acting on a KA system as shown in the figure below. The dynamic load indicated in the catalog（Fy, Fz, Mx, My, Mz）are calculated based on 10,000 km of travel distance. To obtain the correct load value and maintain the service life of the KA, each load condition should be carefully considered.

The below figure shows that the load is applied on the center of the KA sliding table. In fact, the load is not necessarily in the middle during it's operation If the load is not on the center, there could be potential vibrations, over torque ,or slow reaction.



pic.1



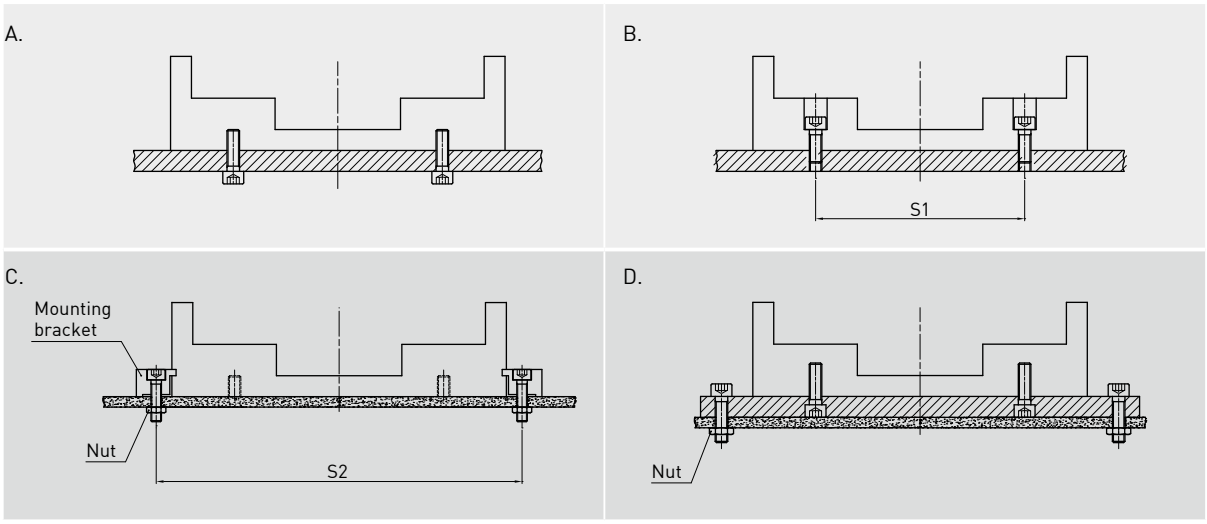
pic.2

To avoid these circumstances, please keep the loading (W) close to the center of the sliding table(O) within the distance(H).

	H (mm)		
Off Center Distance	x	y	z
KA100	550	550	550
KA136	550	550	550
KA170	780	780	780
KA200	900	900	900

3.7 Installation Method

There are several installation methods for the KA series as shown in the following figures.



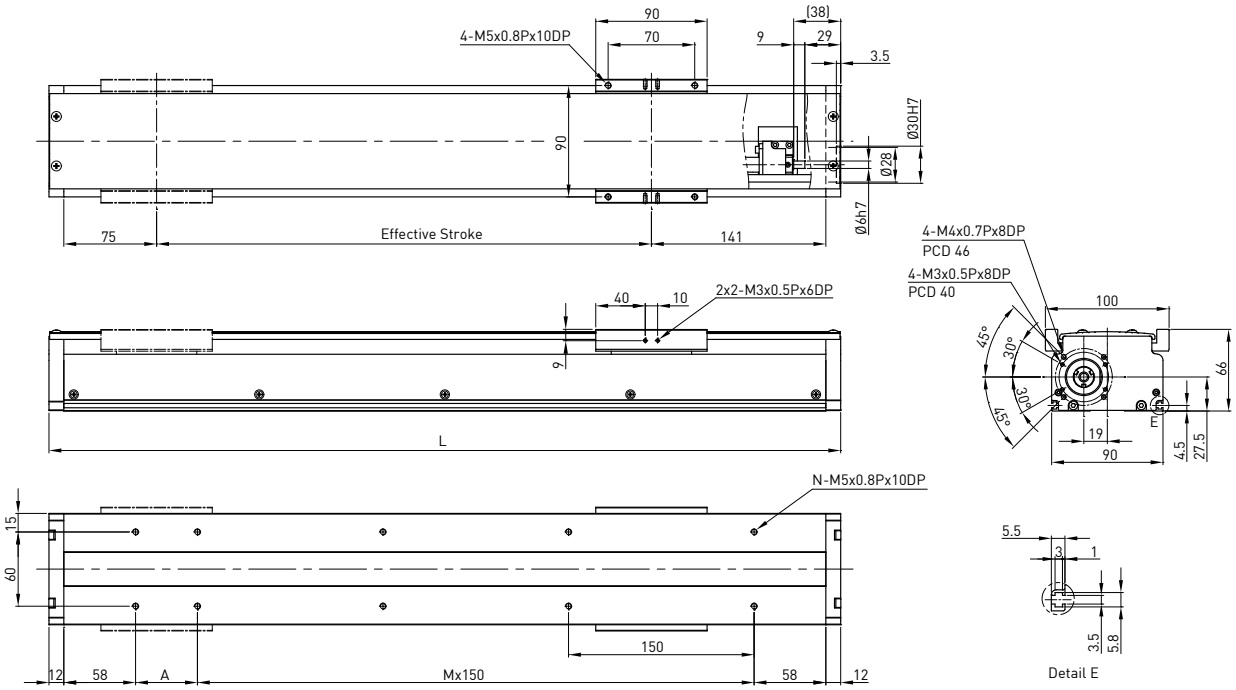
The table indicates the distance between fixing screws (S1) on type B (fixing from above):

KA Model	S1	S2	Screw
KA100	80	116	M5
KA136	112	150	M6
KA170	136	186	M8
KA200	162	218	M8

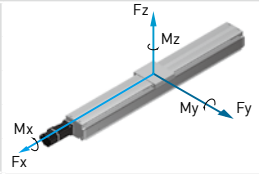
3.8 KA Series

Model Number for KA090

KA090	-10	P	-0600	A	F0	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm	C: Normal P: Precision		A: Standard	F0:Direct	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



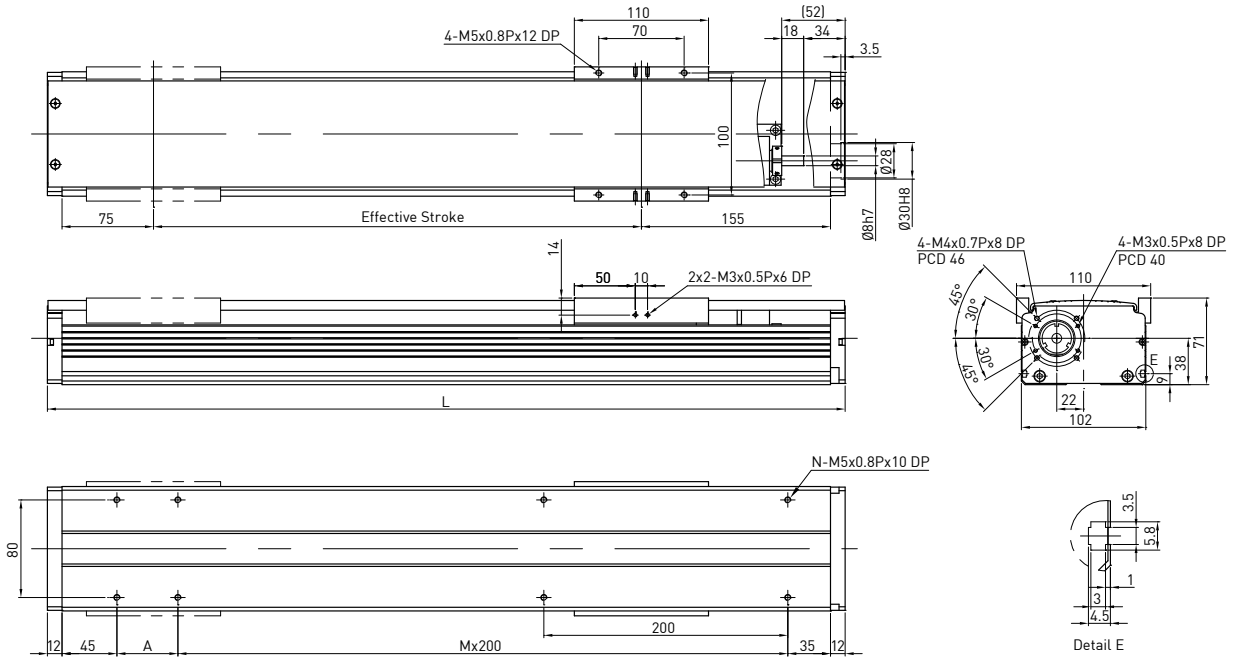
Effective stroke (mm)	L	A	M	N	Weight (kg)
50	290	150	0	4	3.38Z
100	340	50	1	6	3.78
150	390	100	1	6	4.18
200	440	150	1	6	4.58
250	490	50	2	8	4.98
300	540	100	2	8	5.38
350	590	150	2	8	5.78
400	640	50	3	10	6.18
450	690	100	3	10	6.58
500	740	150	3	10	6.98
550	790	50	4	12	7.38
600	840	100	4	12	7.78

AC motor output		W	100	
Drive			Ballscrew C7(normal)	
Lead		mm	5	10
Rated RPM		RPM	3000	3000
Max linear speed*		mm/sec	250	500
Rated thrust		N	280	140
Repeatability		mm	±0.02	
Effective stroke		mm	150~1250	
Max load (H)		kg	24	16
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	240	160
		Mxd	N-m	4.5	4.2
		Myd	N-m	2.8	2.7
		Mzd	N-m	2.2	2
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

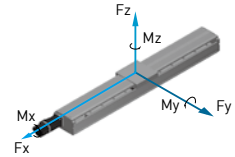
* Vibration might occur when the effective stroke is longer than 550mm.
The maximum speed should be decreased by 15% for every 50mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA100

KA100	-20	P	-1050	A	F0	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	F0:Direct	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



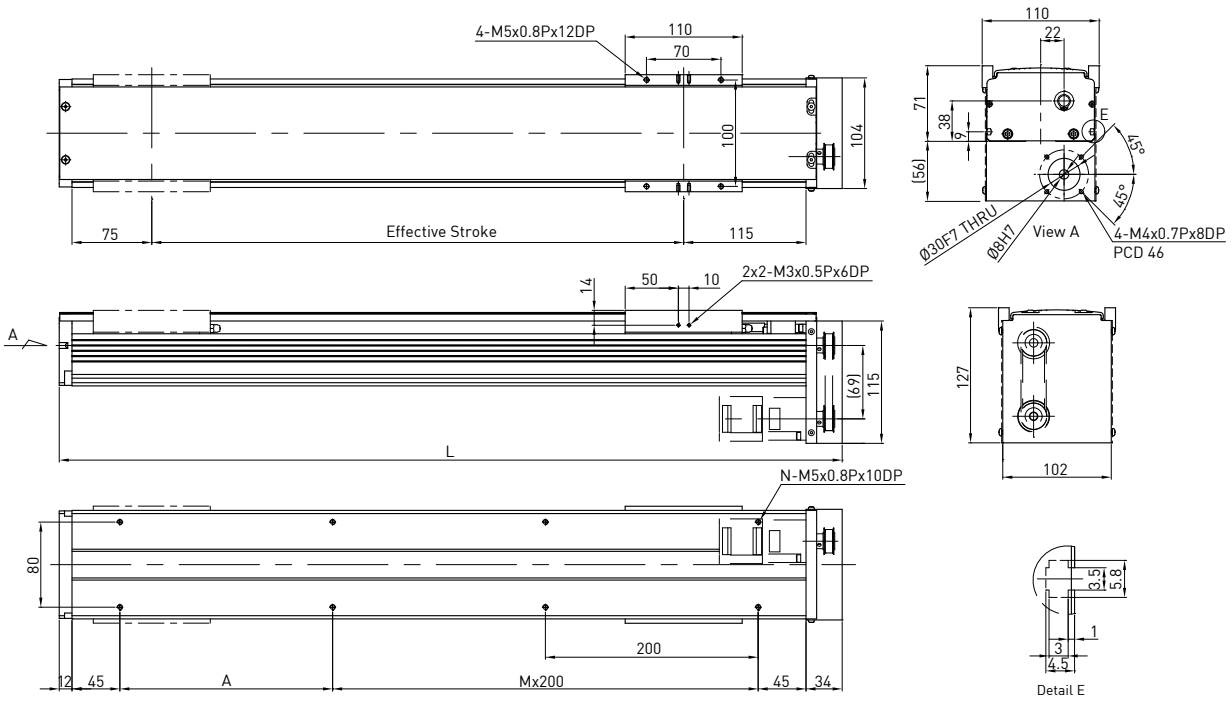
Effective stroke (mm)	L	A	M	N	Weight (kg)
100	354	50	1	6	4.86
150	404	100	1	6	5.34
200	454	150	1	6	5.81
250	504	200	1	6	6.29
300	554	50	2	8	6.77
350	604	100	2	8	7.25
400	654	150	2	8	7.73
450	704	200	2	8	8.2
500	754	50	3	10	8.67
550	804	100	3	10	9.15
600	854	150	3	10	9.63
650	904	200	3	10	10.11
700	954	50	4	12	10.59
750	1004	100	4	12	11.06
800	1054	150	4	12	11.54
850	1104	200	4	12	12.02
900	1154	50	5	14	12.49
950	1204	100	5	14	12.97
1000	1254	150	5	14	13.45
1050	1304	200	5	14	13.93

AC motor output			W	100		
Drive				Ballscrew C7(normal)		
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	280	140	70
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	47	32	16
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	470	320	160
		Mxd	N-m	16	15	15
		Myd	N-m	21	20	20
		Mzd	N-m	7	7	6
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads					

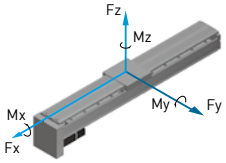
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA100-FD

KA100	-20	P	-1050	A	FD	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	FD: Bottom	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	A	M	N	Weight (kg)
100	336	200	0	4	4.91
150	386	50	1	6	5.41
200	436	100	1	6	5.88
250	486	150	1	6	6.36
300	536	200	1	6	6.85
350	586	50	2	8	7.33
400	636	100	2	8	7.82
450	686	150	2	8	8.29
500	736	200	2	8	8.76
550	786	50	3	10	9.25
600	836	100	3	10	9.73
650	886	150	3	10	10.22
700	936	200	3	10	10.71
750	986	50	4	12	11.19
800	1036	100	4	12	11.67
850	1086	150	4	12	12.15
900	1136	200	4	12	12.63
950	1186	50	5	14	13.12
1000	1236	100	5	14	13.6
1050	1286	150	5	14	14.08

AC motor output			W	100	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	280	140	70
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	47	32	16
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	470	320	160
		Mxd	N-m	16	15	15
		Myd	N-m	21	20	20
		Mzd	N-m	7	7	6

Permitted load condition***

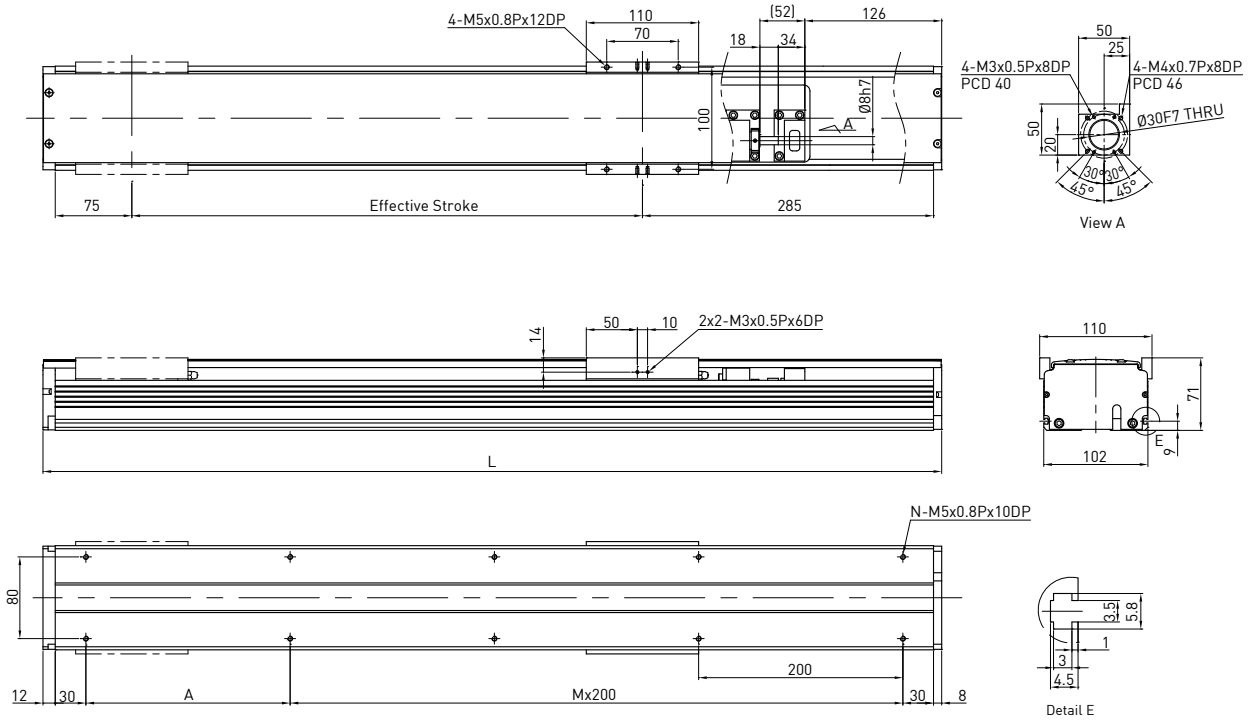
$$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$$

Fy, Fz, Mx, My, Mz are working loads

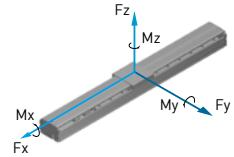
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA100-FI

KA100	-20	P	-1050	A	FI	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	FI : Direct	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



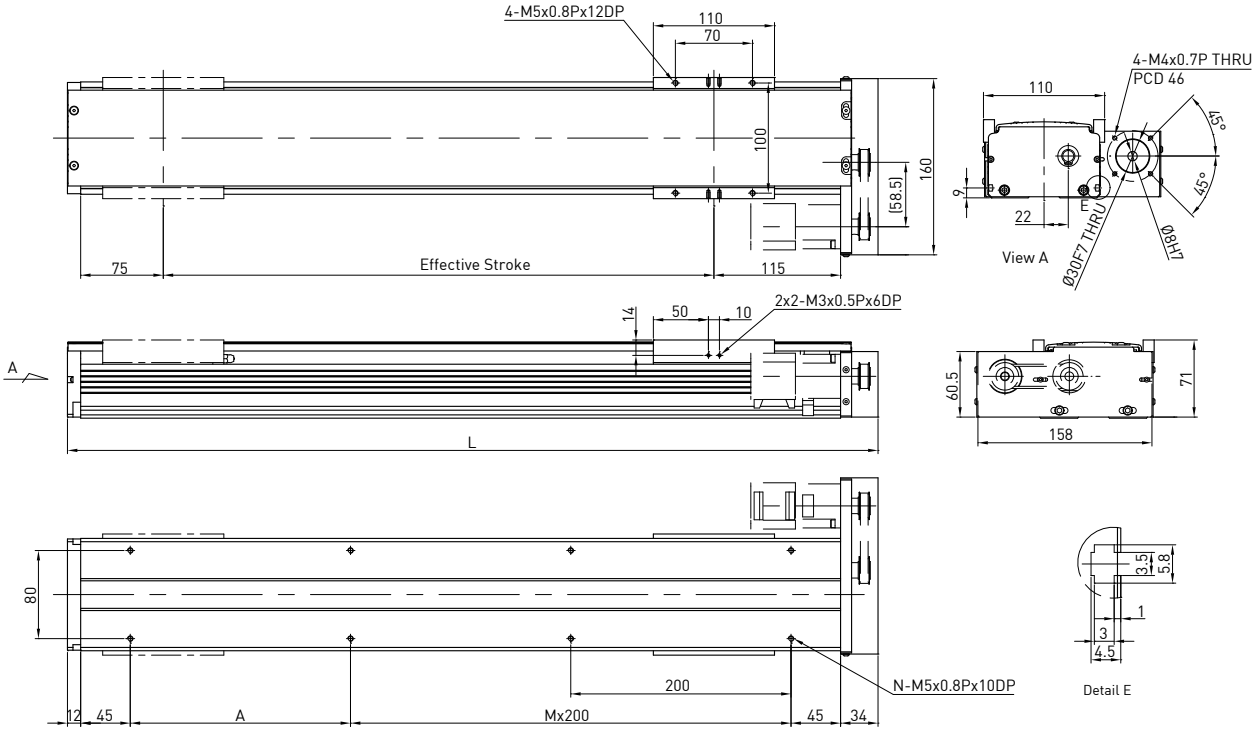
Effective stroke (mm)	L	A	M	N	Weight (kg)
100	480	200	1	6	5.2
150	530	50	2	8	5.71
200	580	100	2	8	6.22
250	630	150	2	8	6.73
300	680	200	2	8	7.24
350	730	50	3	10	7.76
400	780	100	3	10	8.27
450	830	150	3	10	8.77
500	880	200	3	10	9.28
550	930	50	4	12	9.79
600	980	100	4	12	10.31
650	1030	150	4	12	10.82
700	1080	200	4	12	11.33
750	1130	50	5	14	11.83
800	1180	100	5	14	12.35
850	1230	150	5	14	12.86
900	1280	200	5	14	13.37
950	1330	50	6	16	13.88
1000	1380	100	6	16	14.39
1050	1430	150	6	16	14.91

AC motor output			W	100	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	280	140	70
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	47	32	16
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	470	320	160
		Mxd	N-m	16	15	15
		Myd	N-m	21	20	20
		Mzd	N-m	7	7	6
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads					

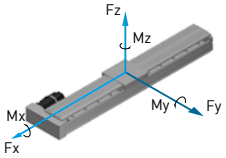
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA100-FL

KA100	-20	P	-1050	A	FL	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	FL: Left	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



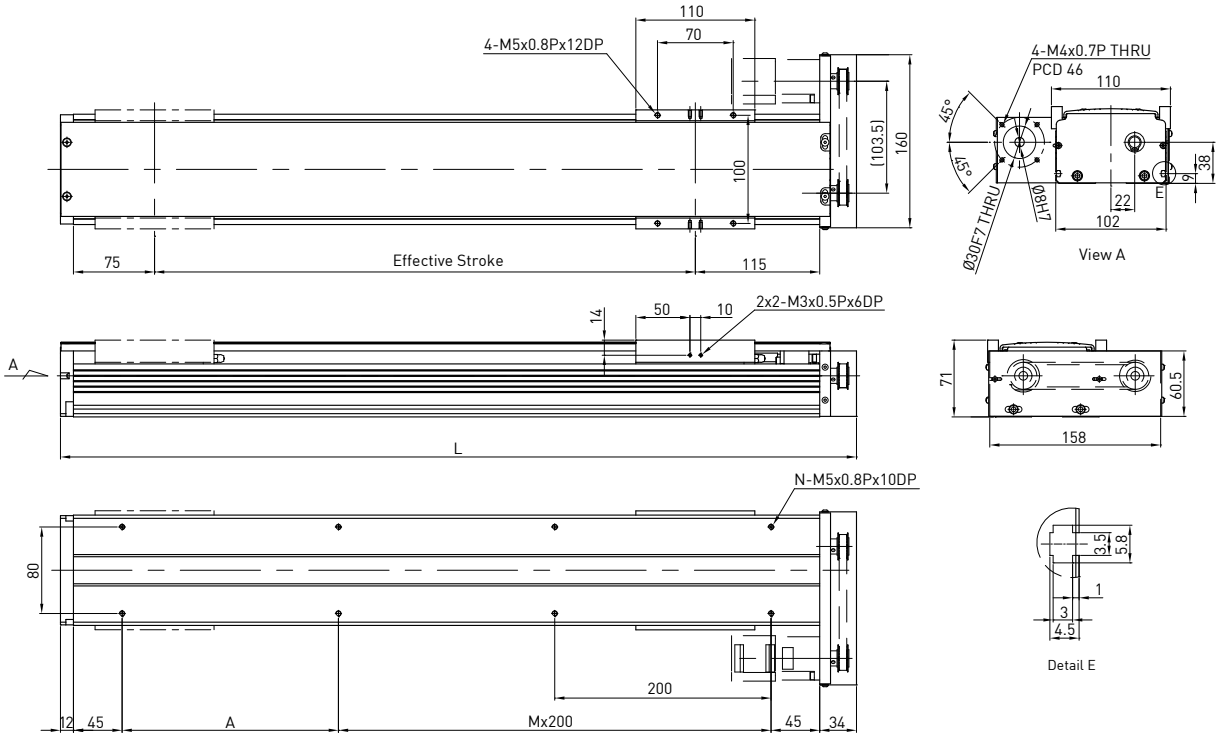
Effective stroke (mm)	L	A	M	N	Weight (kg)
100	336	200	0	4	4.91
150	386	50	1	6	5.41
200	436	100	1	6	5.88
250	486	150	1	6	6.36
300	536	200	1	6	6.85
350	586	50	2	8	7.33
400	636	100	2	8	7.82
450	686	150	2	8	8.29
500	736	200	2	8	8.76
550	786	50	3	10	9.25
600	836	100	3	10	9.73
650	886	150	3	10	10.22
700	936	200	3	10	10.71
750	986	50	4	12	11.19
800	1036	100	4	12	11.67
850	1086	150	4	12	12.15
900	1136	200	4	12	12.63
950	1186	50	5	14	13.12
1000	1236	100	5	14	13.6
1050	1286	150	5	14	14.08

AC motor output			W	100	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	280	140	70
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	47	32	16
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	470	320	160
		Mxd	N-m	16	15	15
		Myd	N-m	21	20	20
		Mzd	N-m	7	7	6
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

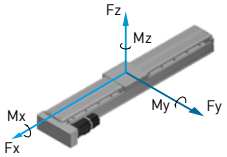
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA100-FR

KA100	-20	P	-1050	A	FR	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	FR: Right	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



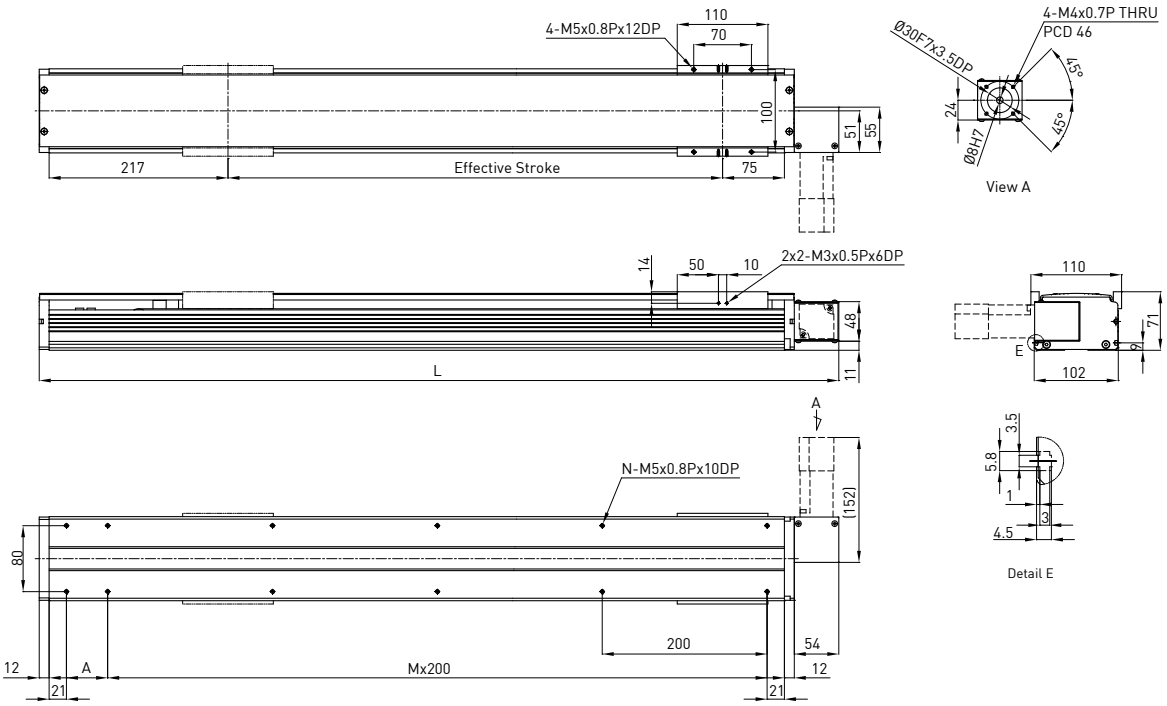
Effective stroke (mm)	L	A	M	N	Weight (kg)
100	336	200	0	4	4.91
150	386	50	1	6	5.41
200	436	100	1	6	5.88
250	486	150	1	6	6.36
300	536	200	1	6	6.85
350	586	50	2	8	7.33
400	636	100	2	8	7.82
450	686	150	2	8	8.29
500	736	200	2	8	8.76
550	786	50	3	10	9.25
600	836	100	3	10	9.73
650	886	150	3	10	10.22
700	936	200	3	10	10.71
750	986	50	4	12	11.19
800	1036	100	4	12	11.67
850	1086	150	4	12	12.15
900	1136	200	4	12	12.63
950	1186	50	5	14	13.12
1000	1236	100	5	14	13.6
1050	1286	150	5	14	14.08

AC motor output			W	100	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	280	140	70
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	47	32	16
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	470	320	160
		Mxd	N-m	16	15	15
		Myd	N-m	21	20	20
		Mzd	N-m	7	7	6
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads					

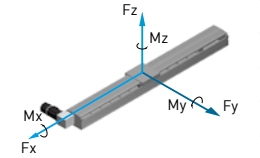
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA100B-FL

KA100	B	-84	C	-3000	A	FL	U	S1	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
			C: Normal		A: Standard	FL: Left	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



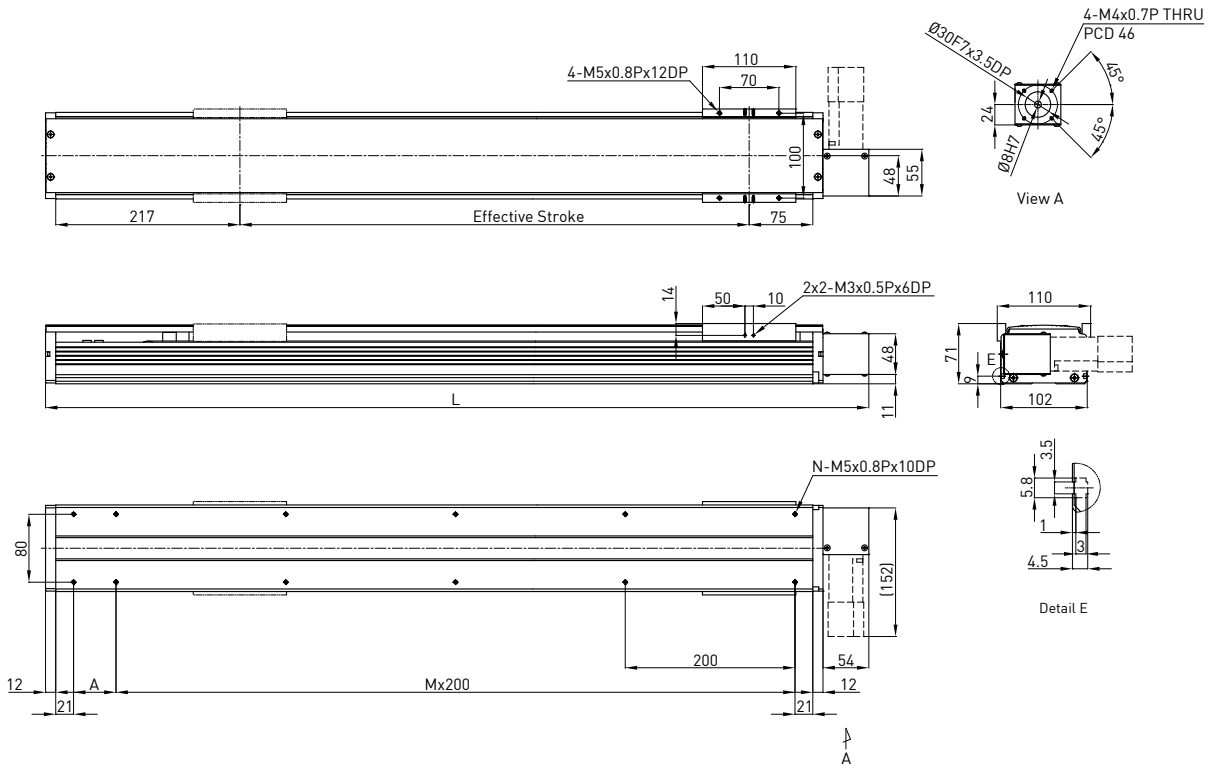
Effective stroke (mm)	L	A	M	N	Weight (kg)
200	570	50	2	8	5.41
400	770	50	3	10	7.07
600	970	50	4	12	8.83
800	1170	50	5	14	10.49
1000	1370	50	6	16	12.15
1200	1570	50	7	18	13.91
1400	1770	50	8	20	15.57
1600	1970	50	9	22	17.33
1800	2170	50	10	24	18.99
2000	2370	50	11	26	20.65
2200	2570	50	12	28	22.41
2400	2770	50	13	30	24.07
2600	2970	50	14	32	25.83
2800	3170	50	15	34	27.49
3000	3370	50	16	36	29.15

AC motor output			W	100
Drive				Timing Belt
Pulley Perimeter			mm	84
Pulley RPM			RPM	1286
Max linear speed			mm/sec	1800
Rated thrust			N	33
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	7.5
Rated dynamic load*		Fyd	N	50
		Fzd	N	75
		Mxd	N-m	14
		Myd	N-m	20
		Mzd	N-m	6
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

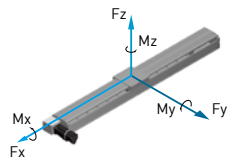
*The load condition is based on 10,000km operation
**For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KA100B-FR

KA100	B	-84	C	-3000	A	FR	U	S1	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
			C: Normal		A: Standard	FR: Right	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



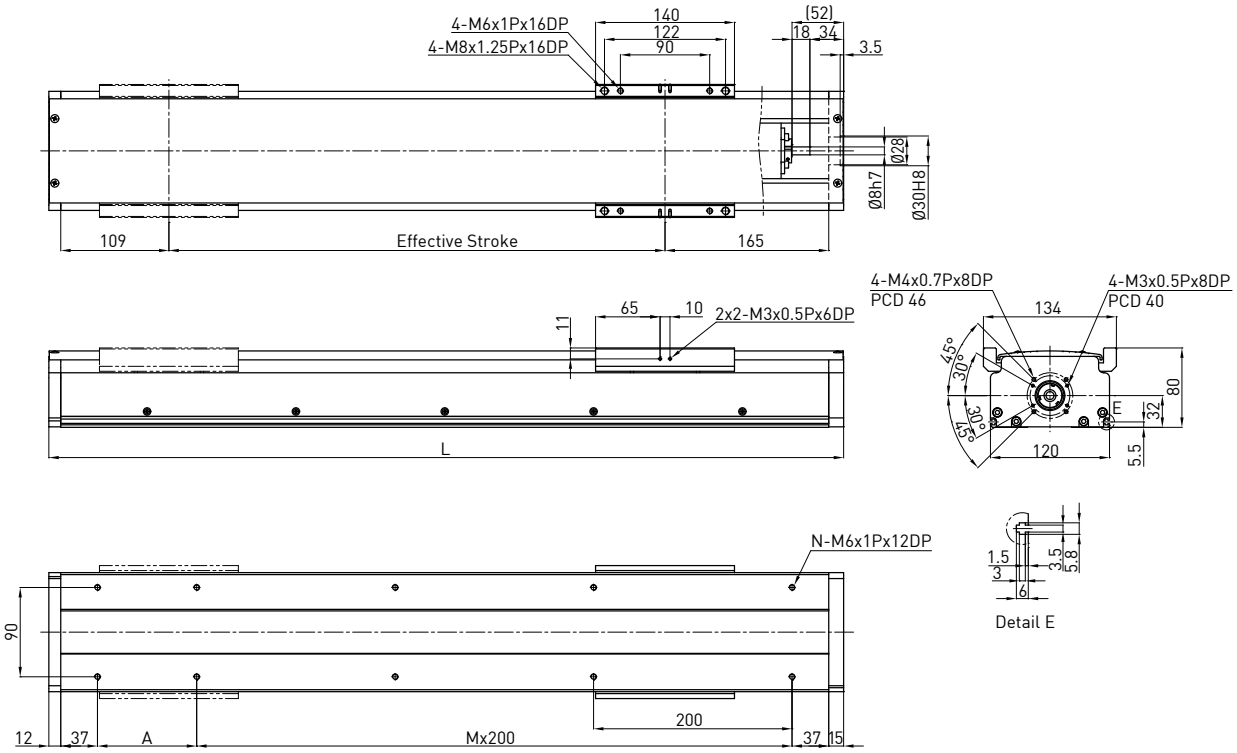
Effective stroke (mm)	L	A	M	N	Weight (kg)
200	570	50	2	8	5.41
400	770	50	3	10	7.07
600	970	50	4	12	8.83
800	1170	50	5	14	10.49
1000	1370	50	6	16	12.15
1200	1570	50	7	18	13.91
1400	1770	50	8	20	15.57
1600	1970	50	9	22	17.33
1800	2170	50	10	24	18.99
2000	2370	50	11	26	20.65
2200	2570	50	12	28	22.41
2400	2770	50	13	30	24.07
2600	2970	50	14	32	25.83
2800	3170	50	15	34	27.49
3000	3370	50	16	36	29.15

AC motor output			W	100
Drive				Timing Belt
Pulley Perimeter			mm	84
Pulley RPM			RPM	1286
Max linear speed			mm/sec	1800
Rated thrust			N	33
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	7.5
Rated dynamic load*		Fyd	N	50
		Fzd	N	75
		Mxd	N-m	14
		Myd	N-m	20
		Mzd	N-m	6
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

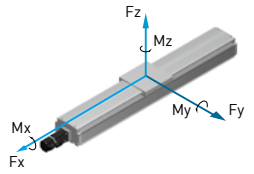
*The load condition is based on 10,000km operation
**For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KA120

KA120	-20	P	-1050	A	F0	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	F0 : Direct	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



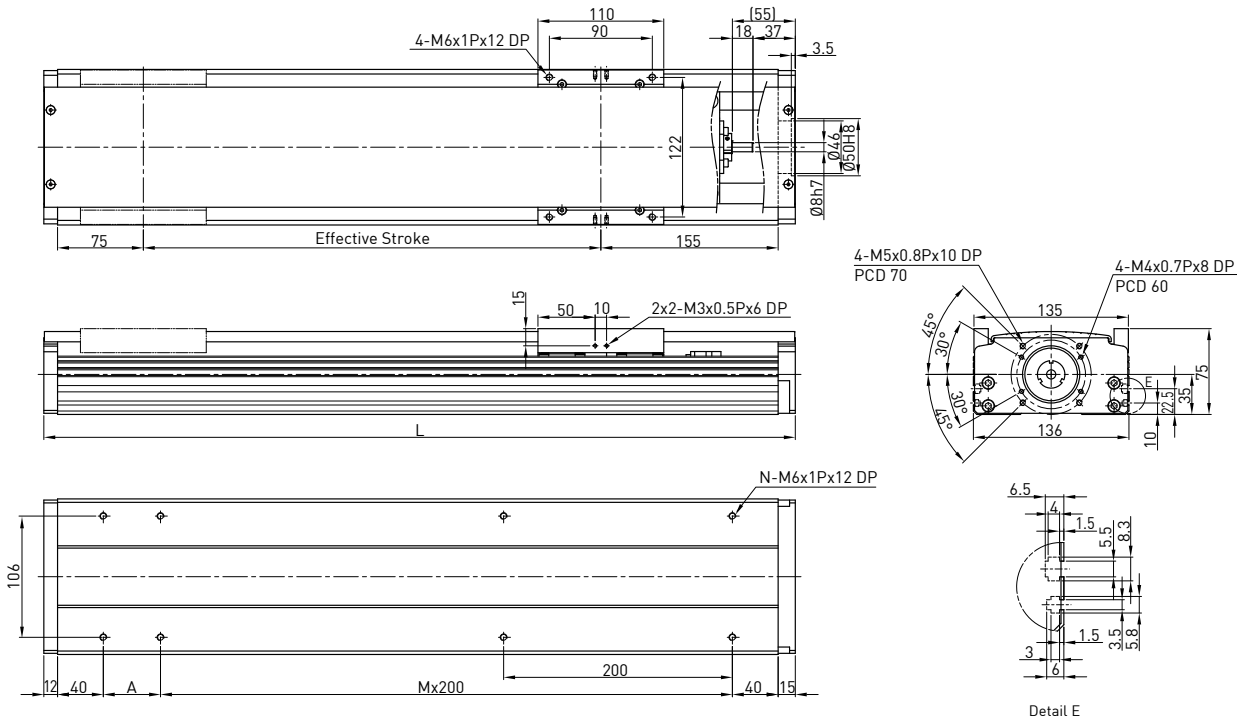
Effective stroke (mm)	L	A	M	N	Weight (kg)
100	401	100	1	6	7.5
150	451	150	1	6	8.13
200	501	200	1	6	8.76
250	551	50	2	8	9.39
300	601	100	2	8	10.02
350	651	150	2	8	10.65
400	701	200	2	8	11.28
450	751	50	3	10	11.91
500	801	100	3	10	12.54
550	851	150	3	10	13.17
600	901	200	3	10	13.8
650	951	50	4	12	14.43
700	1001	100	4	12	15.06
750	1051	150	4	12	15.69
800	1101	200	4	12	16.32
850	1151	50	5	14	16.95
900	1201	100	5	14	17.58
950	1251	150	5	14	18.21
1000	1301	200	5	14	18.84
1050	1351	50	6	16	19.47

AC motor output			W	200		
Drive				Ballscrew C7(normal)		
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	560	280	140
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	47	32	16
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	470	320	160
		Mxd	N-m	31	31	31
		Myd	N-m	23	23	23
		Mzd	N-m	17	17	17
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads					

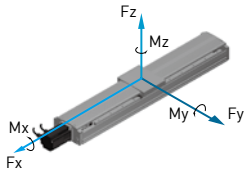
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA136

KA136	-20	P	-1050	A	F0	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	F0 : Direct	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	A	M	N	Weight (kg)
100	357	50	1	6	6.19
150	407	100	1	6	6.74
200	457	150	1	6	7.29
250	507	200	1	6	7.84
300	557	50	2	8	8.39
350	607	100	2	8	8.94
400	657	150	2	8	9.49
450	707	200	2	8	10.05
500	757	50	3	10	10.6
550	807	100	3	10	11.15
600	857	150	3	10	11.7
650	907	200	3	10	12.25
700	957	50	4	12	12.8
750	1007	100	4	12	13.35
800	1057	150	4	12	13.9
850	1107	200	4	12	14.45
900	1157	50	5	14	15
950	1207	100	5	14	15.55
1000	1257	150	5	14	16.1
1050	1307	200	5	14	16.65

AC motor output			W	200	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	560	280	140
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	95	64	32
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	950	640	320
		Mxd	N-m	20	24	28
		Myd	N-m	26	30	35
		Mzd	N-m	8	10	13

Permitted load condition***

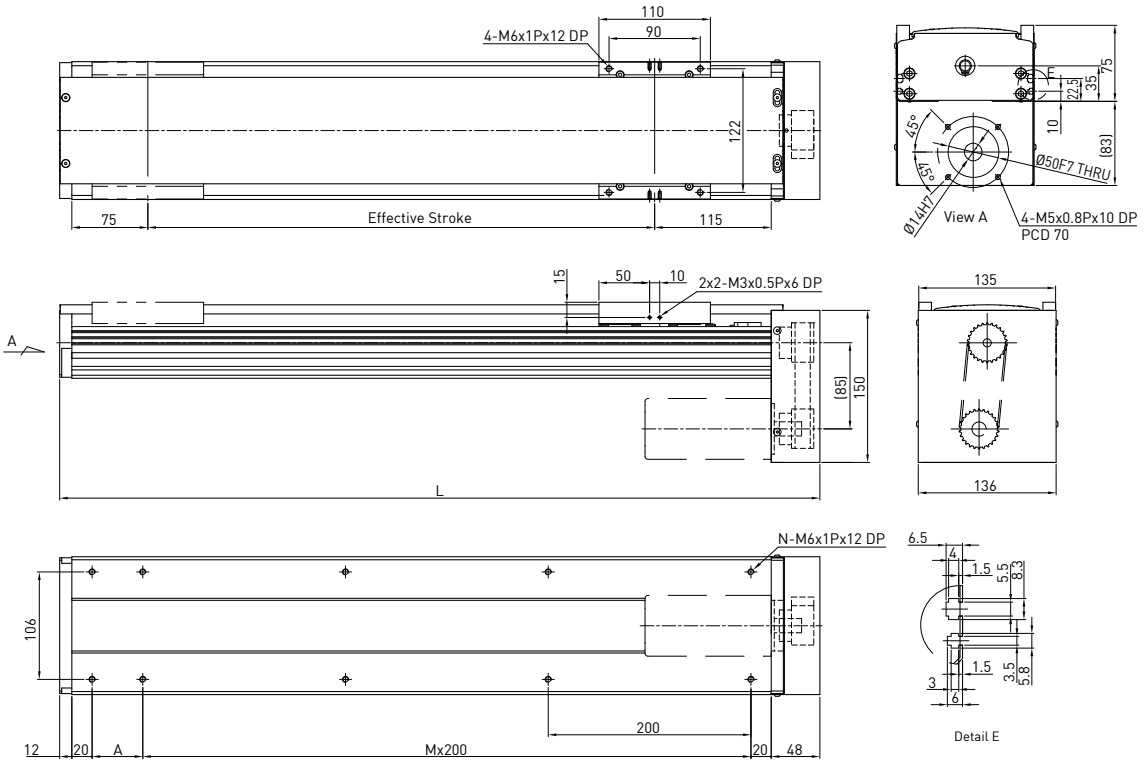
$$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$$

Fy, Fz, Mx, My, Mz are working loads

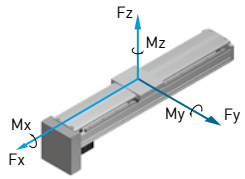
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA136-FD

KA136	-20	P	-1050	A	FD	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	FD: Bottom	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



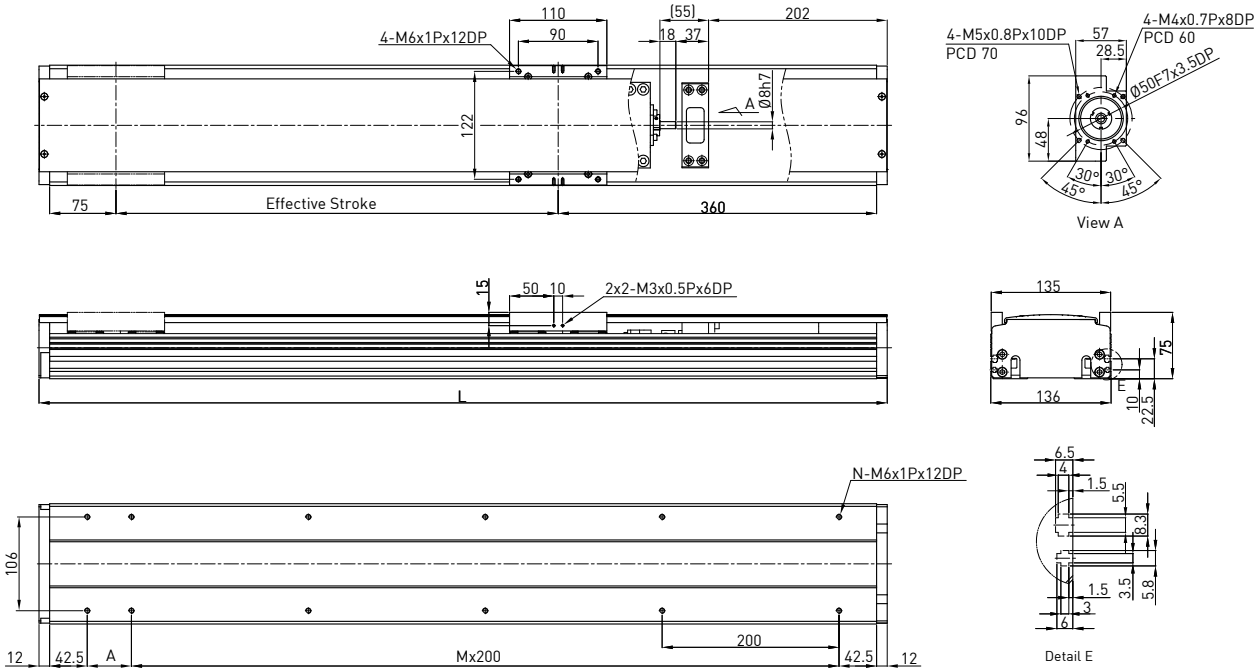
Effective stroke (mm)	L	A	M	N	Weight (kg)
100	350	50	1	6	6.31
150	400	100	1	6	6.88
200	450	150	1	6	7.44
250	500	200	1	6	8.01
300	550	50	2	8	8.56
350	600	100	2	8	9.12
400	650	150	2	8	9.68
450	700	200	2	8	10.25
500	750	50	3	10	10.81
550	800	100	3	10	11.37
600	850	150	3	10	11.94
650	900	200	3	10	12.51
700	950	50	4	12	13.06
750	1000	100	4	12	13.62
800	1050	150	4	12	14.18
850	1100	200	4	12	14.74
900	1150	50	5	14	15.3
950	1200	100	5	14	15.86
1000	1250	150	5	14	16.42
1050	1300	200	5	14	16.98

AC motor output			W	200	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	560	280	140
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	95	64	32
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	950	640	320
		Mxd	N-m	20	24	28
		Myd	N-m	26	30	35
		Mzd	N-m	8	10	13
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads					

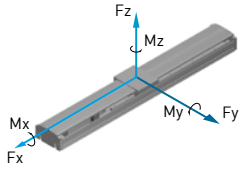
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA136-FI

KA136	-20	P	-1050	A	FI	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	FI : Internal	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	A	M	N	Weight (kg)
100	559	50	2	8	6.62
150	609	100	2	8	7.21
200	659	150	2	8	7.8
250	709	200	2	8	8.39
300	759	50	3	10	8.98
350	809	100	3	10	9.57
400	859	150	3	10	10.15
450	909	200	3	10	10.75
500	959	50	4	12	11.34
550	1009	100	4	12	11.93
600	1059	150	4	12	12.52
650	1109	200	4	12	13.11
700	1159	50	5	14	13.71
750	1209	100	5	14	14.29
800	1259	150	5	14	14.87
850	1309	200	5	14	15.46
900	1359	50	6	16	16.05
950	1409	100	6	16	16.64
1000	1459	150	6	16	17.23
1050	1509	200	6	16	17.82

AC motor output			W	200	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	560	280	140
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	95	64	32
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	950	640	320
		Mxd	N-m	20	24	28
		Myd	N-m	26	30	35
		Mzd	N-m	8	10	13

Permitted load condition***

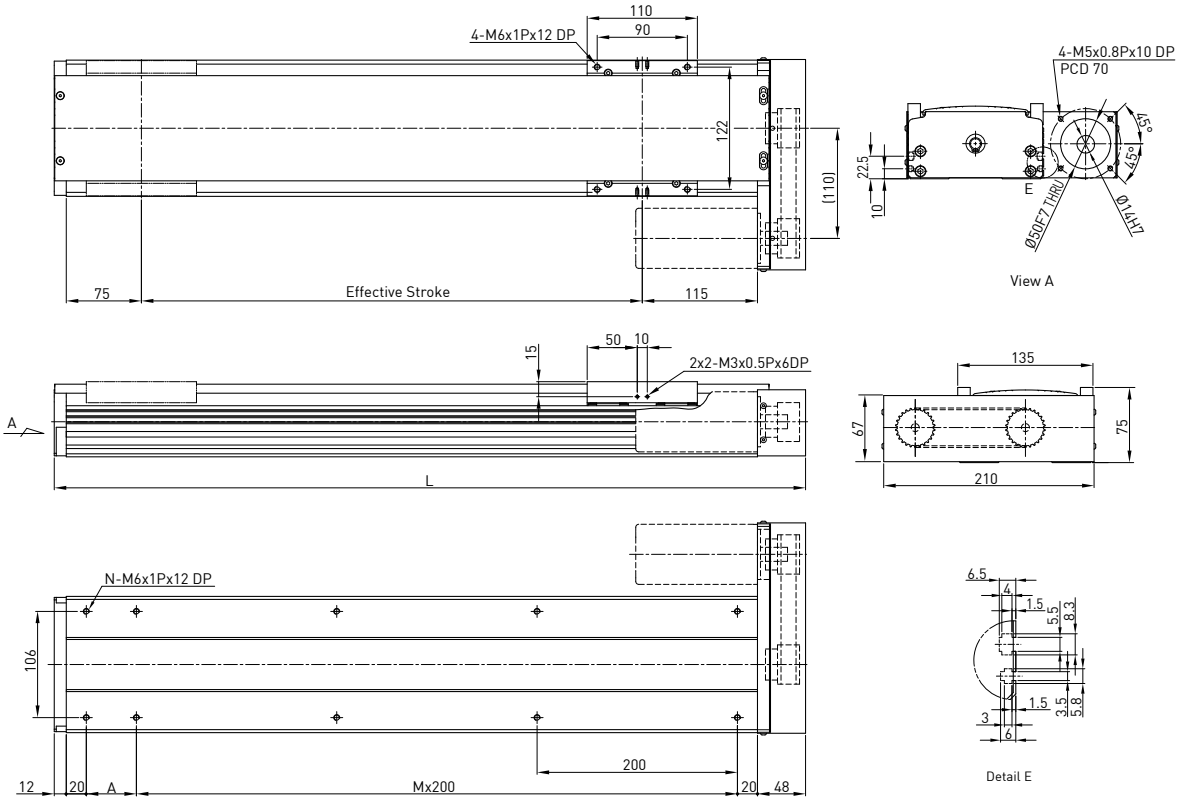
$$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$$

Fy, Fz, Mx, My, Mz are working loads

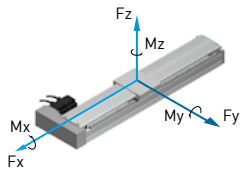
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA136-FL

KA136	-20	P	-1050	A	FL	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	FL: Left	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	A	M	N	Weight (kg)
100	350	50	1	6	6.31
150	400	100	1	6	6.88
200	450	150	1	6	7.44
250	500	200	1	6	8.01
300	550	50	2	8	8.56
350	600	100	2	8	9.12
400	650	150	2	8	9.68
450	700	200	2	8	10.25
500	750	50	3	10	10.81
550	800	100	3	10	11.37
600	850	150	3	10	11.94
650	900	200	3	10	12.51
700	950	50	4	12	13.06
750	1000	100	4	12	13.62
800	1050	150	4	12	14.18
850	1100	200	4	12	14.74
900	1150	50	5	14	15.3
950	1200	100	5	14	15.86
1000	1250	150	5	14	16.42
1050	1300	200	5	14	16.98

AC motor output			W	200		
Drive				Ballscrew C7(normal)		
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	560	280	140
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	95	64	32
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	950	640	320
		Mxd	N-m	20	24	28
		Myd	N-m	26	30	35
		Mzd	N-m	8	10	13

Permitted load condition***

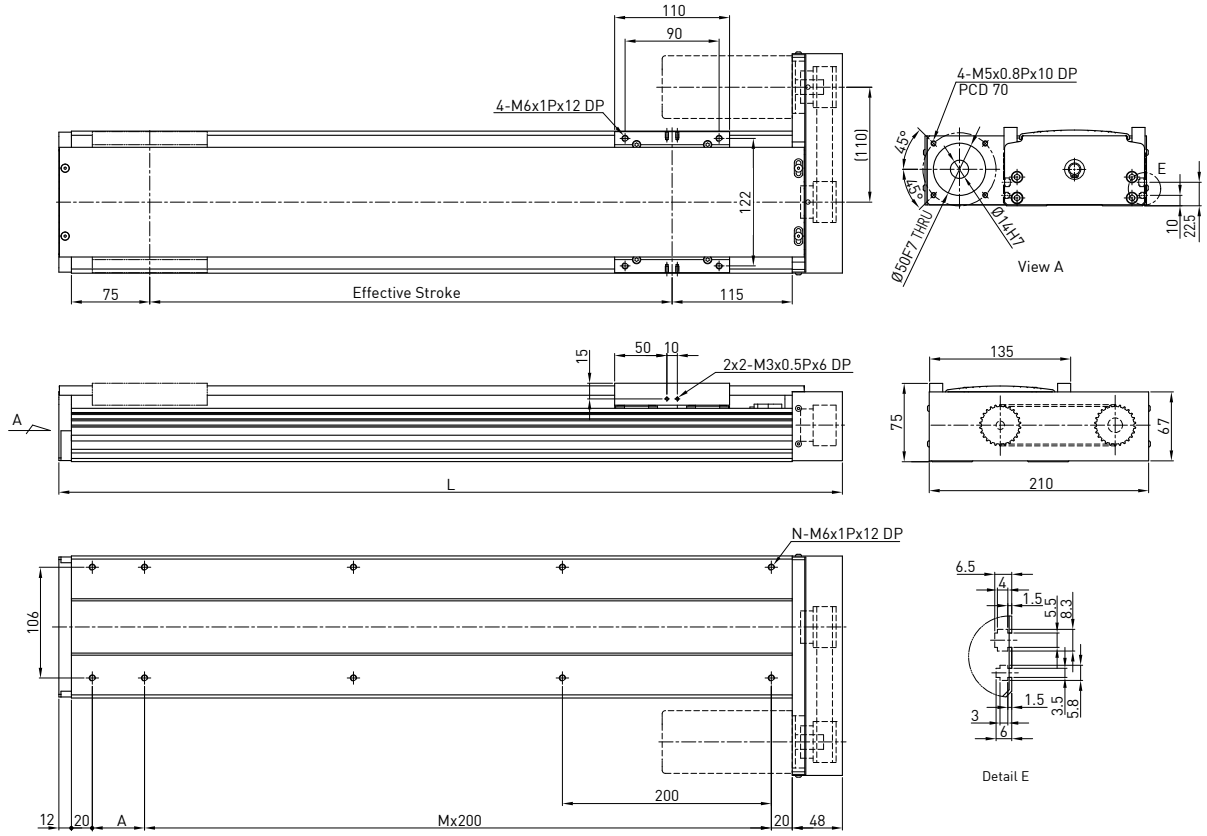
$$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$$

Fy, Fz, Mx, My, Mz are working loads

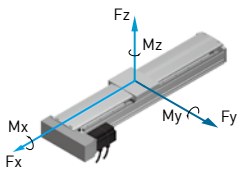
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA136-FR

KA136	-20	P	-1050	A	FR	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	FR: Right	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



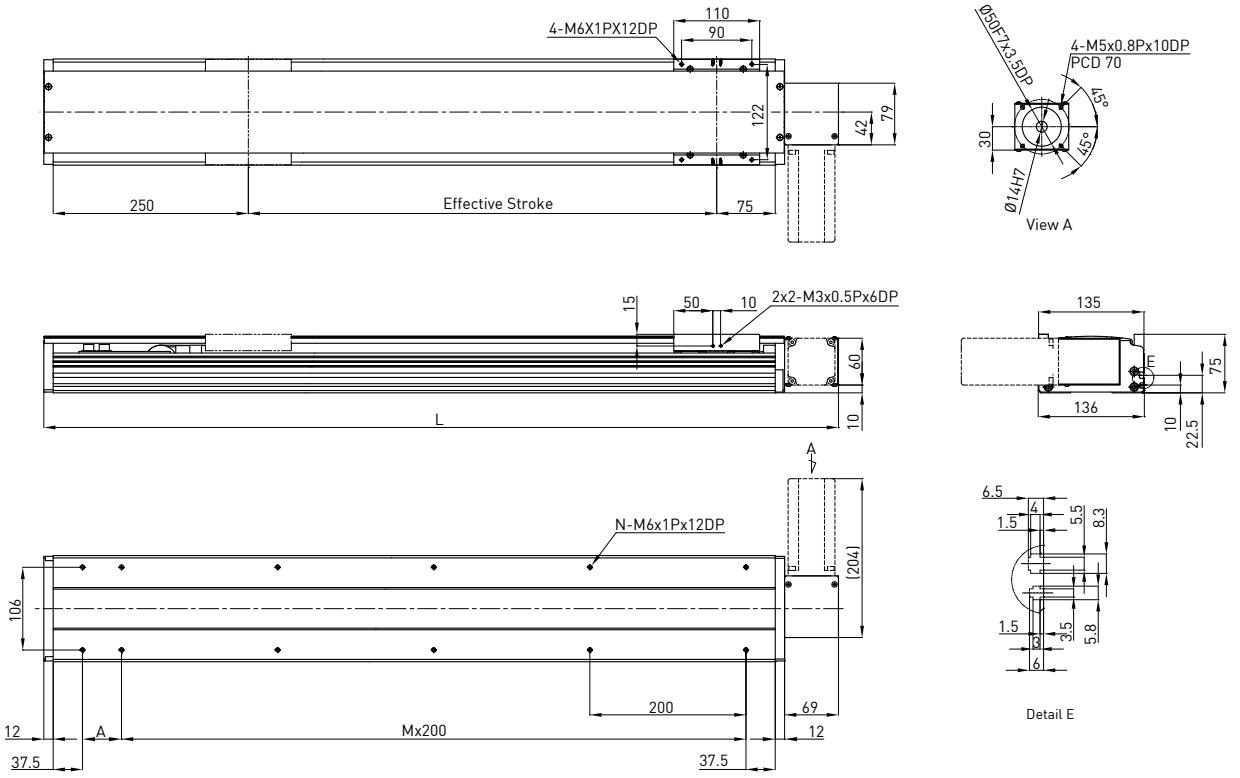
Effective stroke (mm)	L	A	M	N	Weight (kg)
100	350	50	1	6	6.31
150	400	100	1	6	6.88
200	450	150	1	6	7.44
250	500	200	1	6	8.01
300	550	50	2	8	8.56
350	600	100	2	8	9.12
400	650	150	2	8	9.68
450	700	200	2	8	10.25
500	750	50	3	10	10.81
550	800	100	3	10	11.37
600	850	150	3	10	11.94
650	900	200	3	10	12.51
700	950	50	4	12	13.06
750	1000	100	4	12	13.62
800	1050	150	4	12	14.18
850	1100	200	4	12	14.74
900	1150	50	5	14	15.3
950	1200	100	5	14	15.86
1000	1250	150	5	14	16.42
1050	1300	200	5	14	16.98

AC motor output			W	200		
Drive				Ballscrew C7(normal)		
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	560	280	140
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	95	64	32
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	950	640	320
		Mxd	N-m	20	24	28
		Myd	N-m	26	30	35
		Mzd	N-m	8	10	13
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads					

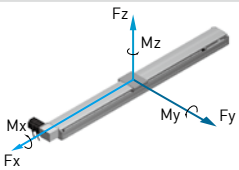
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA136B-FL

KA136	B	-120	C	-3000	A	FL	U	S1	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
			C: Normal		A: Standard	FL: Left	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



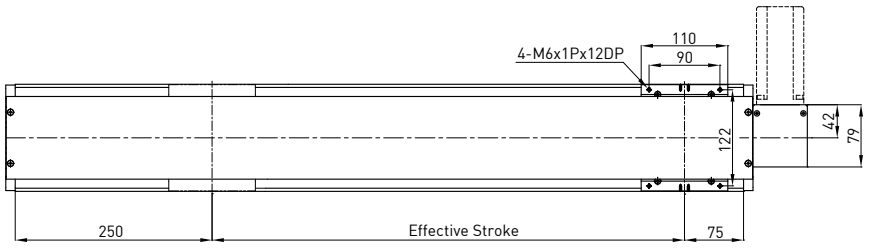
Effective stroke (mm)	L	A	M	N	Weight (kg)
200	618	50	2	8	6.97
400	818	50	3	10	8.93
600	1018	50	4	12	11.01
800	1218	50	5	14	12.97
1000	1418	50	6	16	14.93
1200	1618	50	7	18	16.99
1400	1818	50	8	20	18.95
1600	2018	50	9	22	21.01
1800	2218	50	10	24	22.97
2000	2418	50	11	26	24.93
2200	2618	50	12	28	26.99
2400	2818	50	13	30	28.95
2600	3018	50	14	32	31.01
2800	3218	50	15	34	32.97
3000	3418	50	16	36	34.93

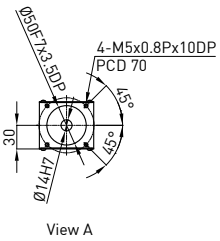
AC motor output			W	200
Drive				Timing Belt
Pulley Perimeter			mm	120
Pulley RPM			RPM	900
Max linear speed			mm/sec	1800
Rated thrust			N	67
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	15
Rated dynamic load*		Fyd	N	50
		Fzd	N	150
		Mxd	N-m	42
		Myd	N-m	31
		Mzd	N-m	13
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

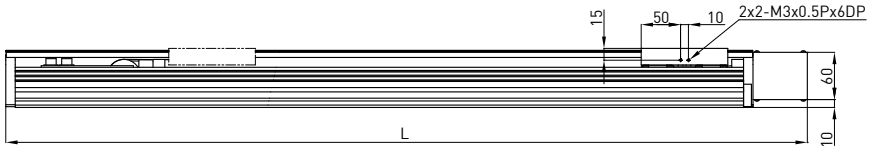
*The load condition is based on 10,000km operation
**For horizontal application only. If used in special condition, please contact HIWIN.

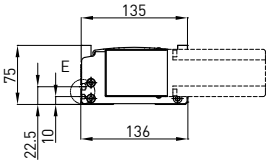
Model Number for KA136B-FR

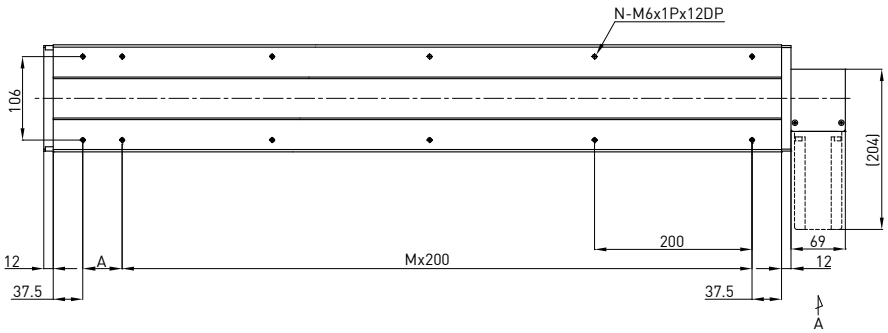
KA136	B	-120	C	-3000	A	FR	U	S1	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
			C: Normal		A: Standard	FR: Right	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor

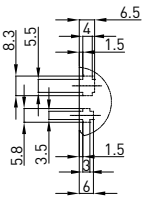




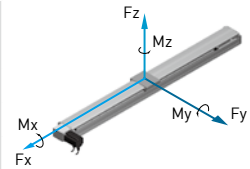








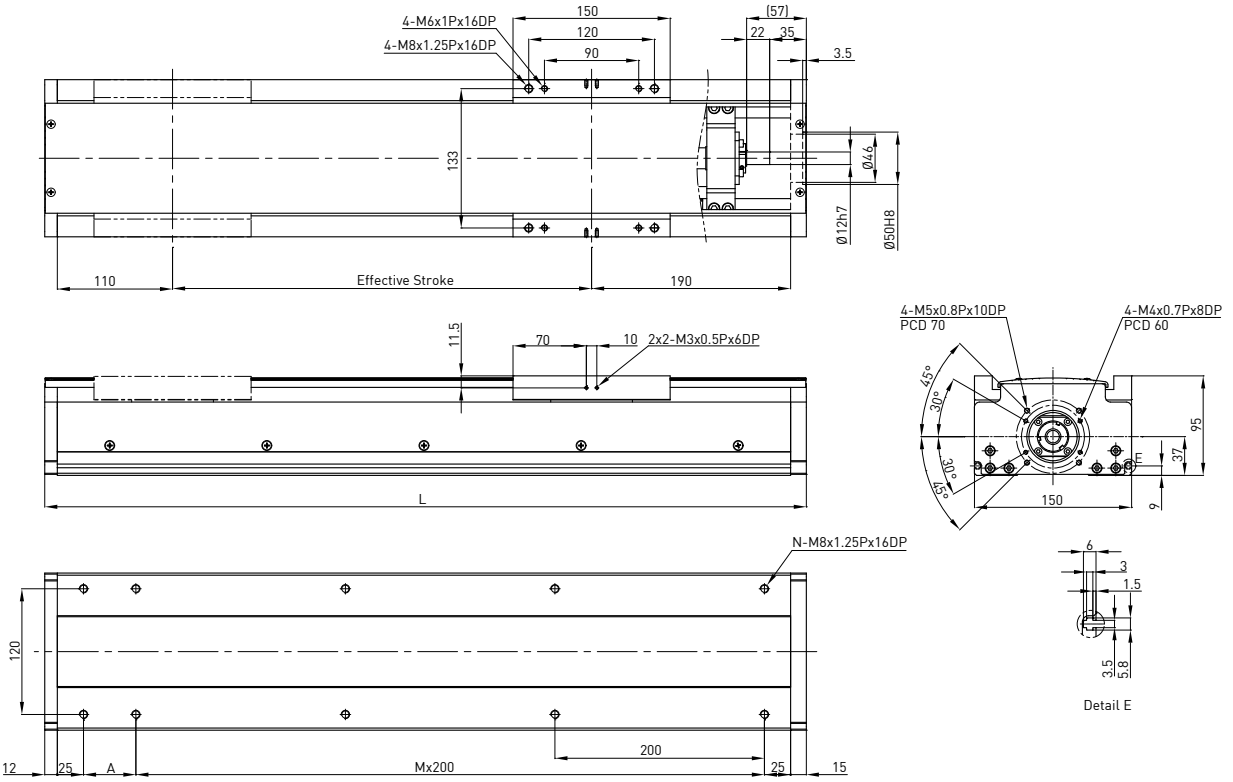
Effective stroke (mm)	L	A	M	N	Weight (kg)
200	618	50	2	8	6.97
400	818	50	3	10	8.93
600	1018	50	4	12	11.01
800	1218	50	5	14	12.97
1000	1418	50	6	16	14.93
1200	1618	50	7	18	16.99
1400	1818	50	8	20	18.95
1600	2018	50	9	22	21.01
1800	2218	50	10	24	22.97
2000	2418	50	11	26	24.93
2200	2618	50	12	28	26.99
2400	2818	50	13	30	28.95
2600	3018	50	14	32	31.01
2800	3218	50	15	34	32.97
3000	3418	50	16	36	34.93

AC motor output			W	200
Drive				Timing Belt
Pulley Perimeter			mm	120
Pulley RPM			RPM	900
Max linear speed			mm/sec	1800
Rated thrust			N	67
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	15
Rated dynamic load*		Fyd	N	50
		Fzd	N	150
		Mxd	N-m	42
		Myd	N-m	31
		Mzd	N-m	13
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads			

*The load condition is based on 10,000km operation
**For horizontal application only. If used in special condition, please contact HIWIN.

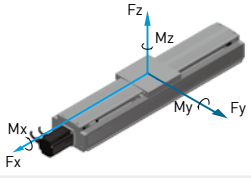
Model Number for KA150

KA150	-10	P	-1250	A	F0	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10 mm 20 mm	C: Normal P: Precision		A: Standard	F0 : Direct	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	A	M	N	Weight (kg)
150	477	200	1	6	12.71
200	527	50	2	8	13.59
250	577	100	2	8	14.47
300	627	150	2	8	15.35
350	677	200	2	8	16.23
400	727	50	3	10	17.11
450	777	100	3	10	17.99
500	827	150	3	10	18.87
550	877	200	3	10	19.75
600	927	50	4	12	20.63
650	977	100	4	12	21.51
700	1027	150	4	12	22.39
750	1077	200	4	12	23.27
800	1127	50	5	14	24.15
850	1177	100	5	14	25.03
900	1227	150	5	14	25.91
950	1277	200	5	14	26.79
1000	1327	50	6	16	27.67
1050	1377	100	6	16	28.55
1100	1427	150	6	16	29.43
1150	1477	200	6	16	30.31
1200	1527	50	7	18	31.19
1250	1577	100	7	18	32.07

AC motor output		W	200	
Drive			Ballscrew C7(normal)	
Lead		mm	10	20
Rated RPM		RPM	3000	3000
Max linear speed*		mm/sec	500	1000
Rated thrust		N	280	140
Repeatability		mm	±0.02	
Effective stroke		mm	100~1050	
Max load (H)		kg	64	32
Rated dynamic load**	Fyd	N	50	50
	Fzd	N	640	320
	Mxd	N-m	62	66
	Myd	N-m	81	86
	Mzd	N-m	30	33



Permitted load condition***

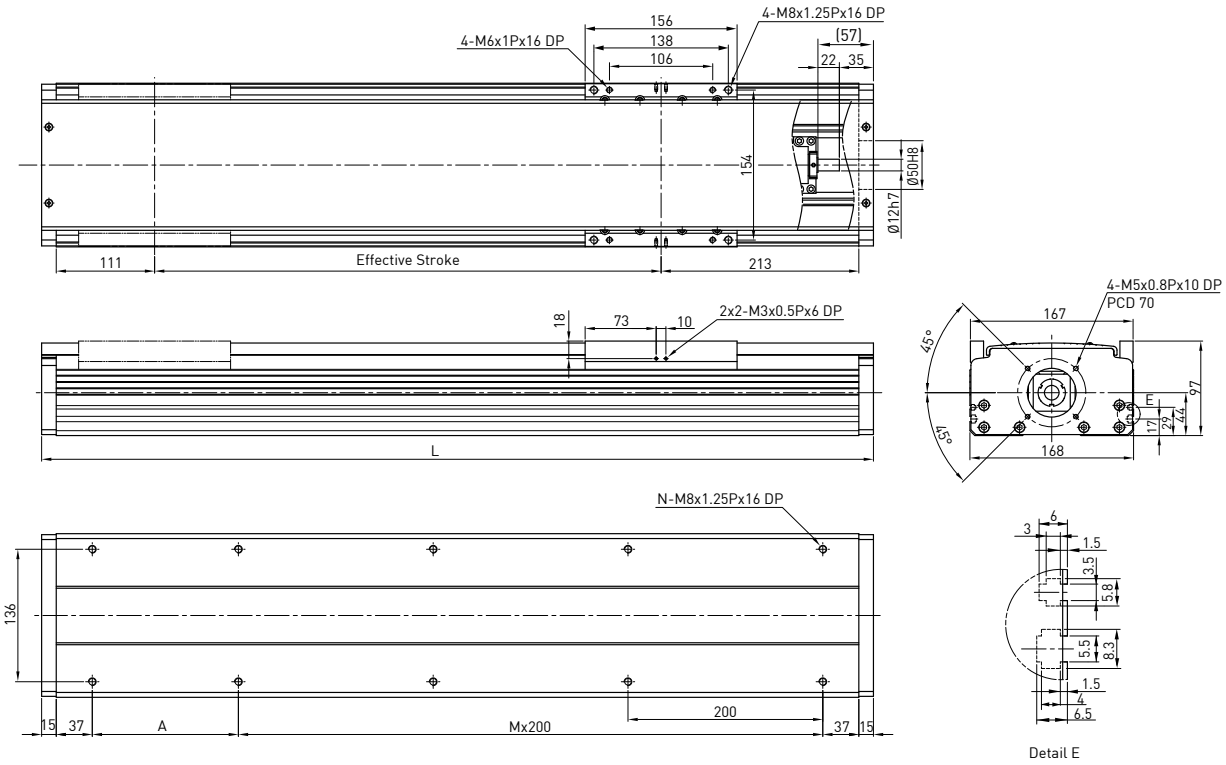
$$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$$

Fy, Fz, Mx, My, Mz are working loads

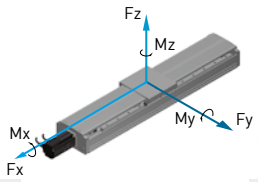
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA170

KA170	-20	P	-1250	A	F0	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10 mm 20 mm	C: Normal P: Precision		A: Standard	F0 : Direct	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



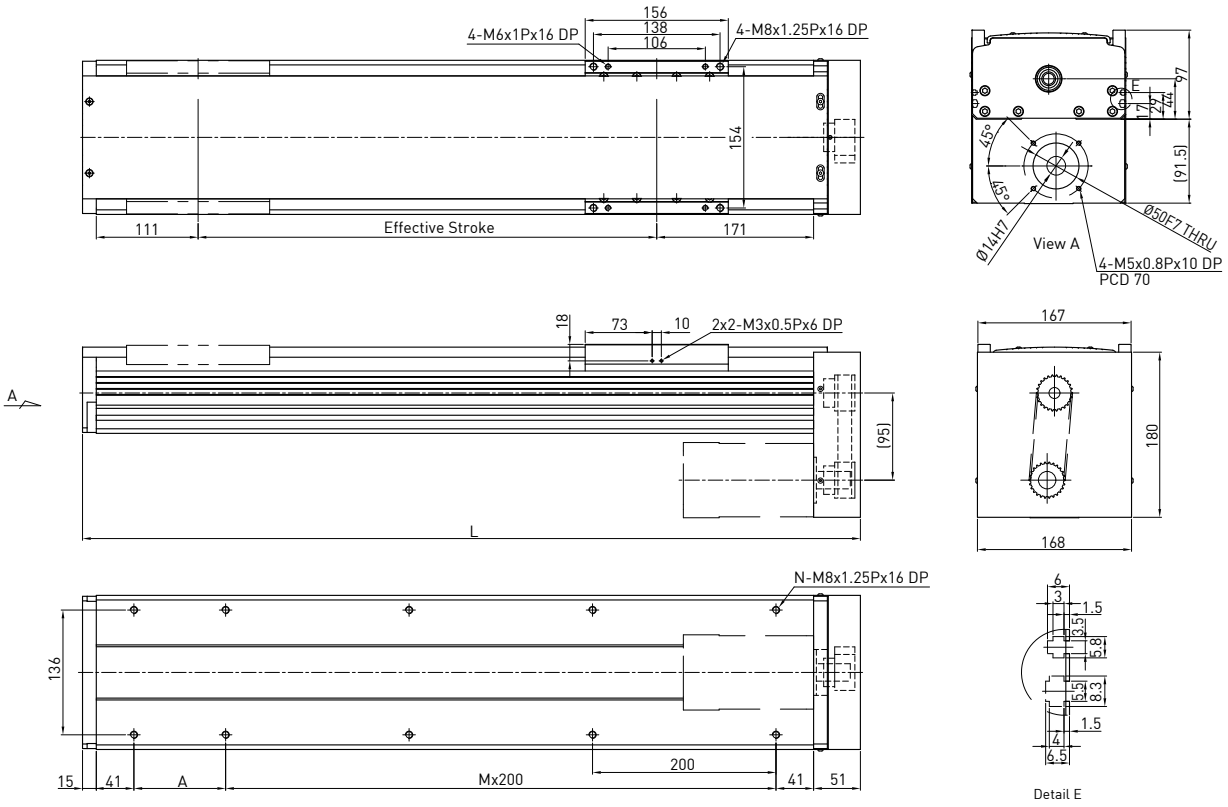
Effective stroke (mm)	L	A	M	N	Weight (kg)
150	504	200	1	6	14.57
200	554	50	2	8	15.45
250	604	100	2	8	16.33
300	654	150	2	8	17.21
350	704	200	2	8	18.09
400	754	50	3	10	18.97
450	804	100	3	10	19.85
500	854	150	3	10	20.73
550	904	200	3	10	21.61
600	954	50	4	12	22.49
650	1004	100	4	12	23.37
700	1054	150	4	12	24.25
750	1104	200	4	12	25.13
800	1154	50	5	14	26.01
850	1204	100	5	14	26.89
900	1254	150	5	14	27.77
950	1304	200	5	14	28.65
1000	1354	50	6	16	29.53
1050	1404	100	6	16	30.41
1100	1454	150	6	16	31.29
1150	1504	200	6	16	32.17
1200	1554	50	7	18	33.05
1250	1604	100	7	18	33.92

AC motor output			W	400	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	560	280
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	127	64
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	1270	640
		Mxd	N-m	108	118
		Myd	N-m	155	167
		Mzd	N-m	30	35
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

* Vibration might occur when the effective stroke is longer than 800mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

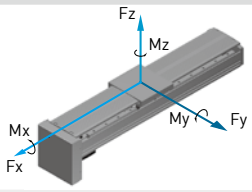
Model Number for KA170-FD

KA170	-20	P	-1250	A	FD	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10 mm 20 mm	C: Normal P: Precision		A: Standard	FD: Bottom	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	A	M	N	Weight (kg)
150	498	150	1	6	15.01
200	548	200	1	6	15.92
250	598	50	2	8	16.82
300	648	100	2	8	17.73
350	698	150	2	8	18.63
400	748	200	2	8	19.54
450	798	50	3	10	20.45
500	848	100	3	10	21.35
550	898	150	3	10	22.26
600	948	200	3	10	23.17
650	998	50	4	12	24.07
700	1048	100	4	12	24.98
750	1098	150	4	12	25.89
800	1148	200	4	12	26.79
850	1198	50	5	14	27.71
900	1248	100	5	14	28.61
950	1298	150	5	14	29.51
1000	1348	200	5	14	30.42
1050	1398	50	6	16	31.33
1100	1448	100	6	16	32.23
1150	1498	150	6	16	33.14
1200	1548	200	6	16	34.04
1250	1598	50	7	18	34.94

AC motor output		W	400	
Drive			Ballscrew C7(normal)	
Lead		mm	10	20
Rated RPM		RPM	3000	3000
Max linear speed*		mm/sec	500	1000
Rated thrust		N	560	280
Repeatability		mm	±0.02	
Effective stroke		mm	150~1250	
Max load (H)		kg	127	64
Rated dynamic load**	Fyd	N	50	50
	Fzd	N	1270	640
	Mxd	N-m	108	118
	Myd	N-m	155	167
	Mzd	N-m	30	35



Permitted load condition***

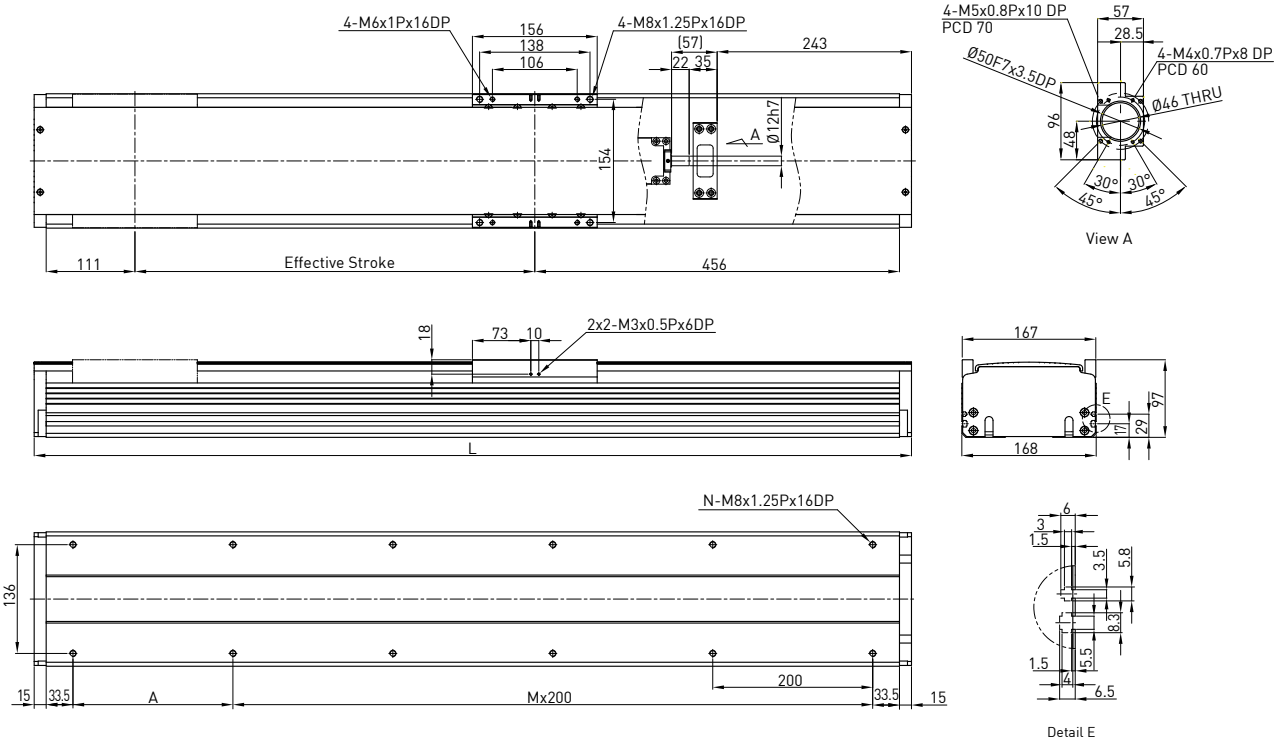
$$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$$

Fy, Fz, Mx, My, Mz are working loads

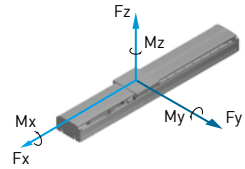
* Vibration might occur when the effective stroke is longer than 800mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA170-FI

KA170	-20	P	-1250	A	FI	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10 mm 20 mm	P: Precision C: Normal		A: Standard	FI : Internal	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	A	M	N	Weight (kg)
150	747	50	3	10	15.59
200	797	100	3	10	16.53
250	847	150	3	10	17.47
300	897	200	3	10	18.42
350	947	50	4	12	19.36
400	997	100	4	12	20.31
450	1047	150	4	12	23.24
500	1097	200	4	12	22.18
550	1147	50	5	14	23.12
600	1197	100	5	14	24.06
650	1247	150	5	14	25.01
700	1297	200	5	14	25.95
750	1347	50	6	16	26.89
800	1397	100	6	16	27.83
850	1447	150	6	16	28.77
900	1497	200	6	16	29.71
950	1547	50	7	18	30.66
1000	1597	100	7	18	31.61
1050	1647	150	7	18	32.54
1100	1697	200	7	18	33.48
1150	1747	50	8	20	34.42
1200	1797	100	8	20	35.36
1250	1847	150	8	20	36.31

AC motor output			W	400	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	560	280
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	127	64
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	1270	640
		Mxd	N-m	108	118
		Myd	N-m	155	167
		Mzd	N-m	30	35

Permitted load condition***

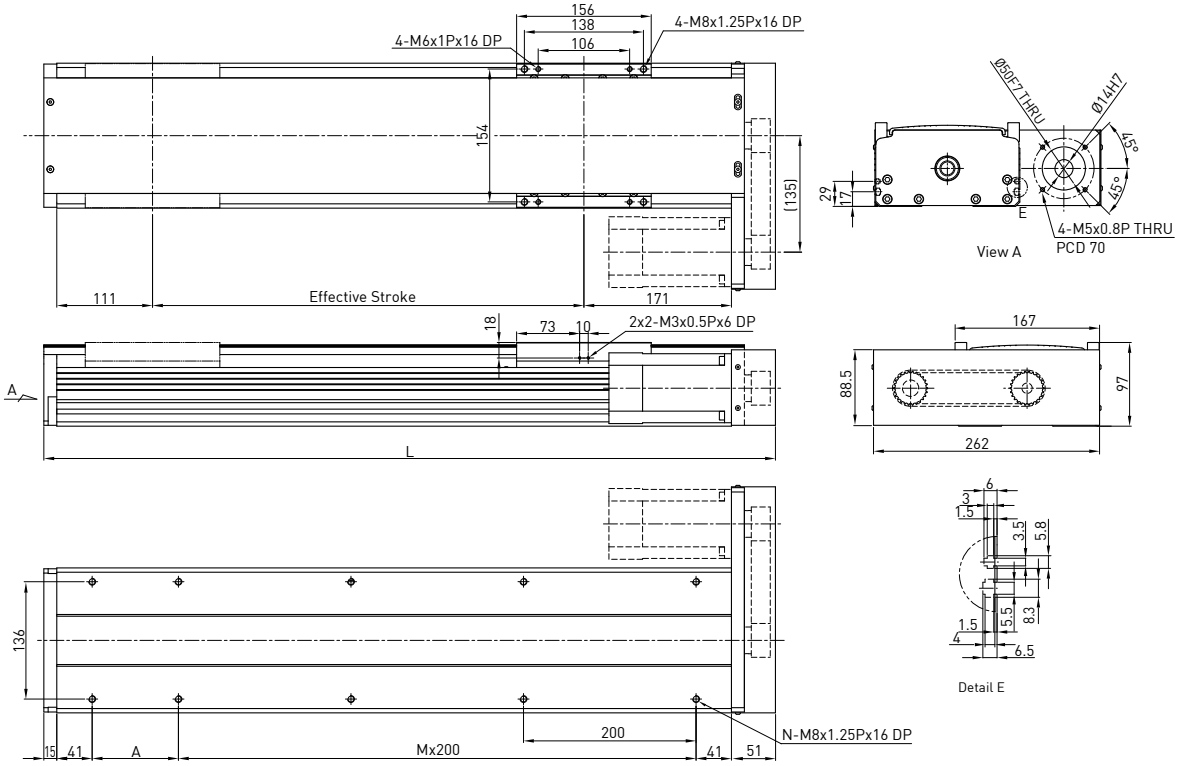
$$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$$

Fy, Fz, Mx, My, Mz are working loads

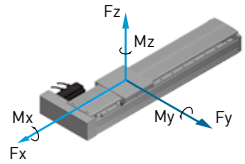
* Vibration might occur when the effective stroke is longer than 800mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA170-FL

KA170	-20	P	-1250	A	FL	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10 mm 20 mm	C: Normal P: Precision		A: Standard	FL: Left	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	A	M	N	Weight (kg)
150	498	150	1	6	15.01
200	548	200	1	6	15.92
250	598	50	2	8	16.82
300	648	100	2	8	17.73
350	698	150	2	8	18.63
400	748	200	2	8	19.54
450	798	50	3	10	20.45
500	848	100	3	10	21.35
550	898	150	3	10	22.26
600	948	200	3	10	23.17
650	998	50	4	12	24.07
700	1048	100	4	12	24.98
750	1098	150	4	12	25.89
800	1148	200	4	12	26.79
850	1198	50	5	14	27.71
900	1248	100	5	14	28.61
950	1298	150	5	14	29.51
1000	1348	200	5	14	30.42
1050	1398	50	6	16	31.33
1100	1448	100	6	16	32.23
1150	1498	150	6	16	33.14
1200	1548	200	6	16	34.04
1250	1598	50	7	18	34.94

AC motor output			W	400	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	560	280
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	127	64
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	1270	640
		Mxd	N-m	108	118
		Myd	N-m	155	167
		Mzd	N-m	30	35

Permitted load condition***

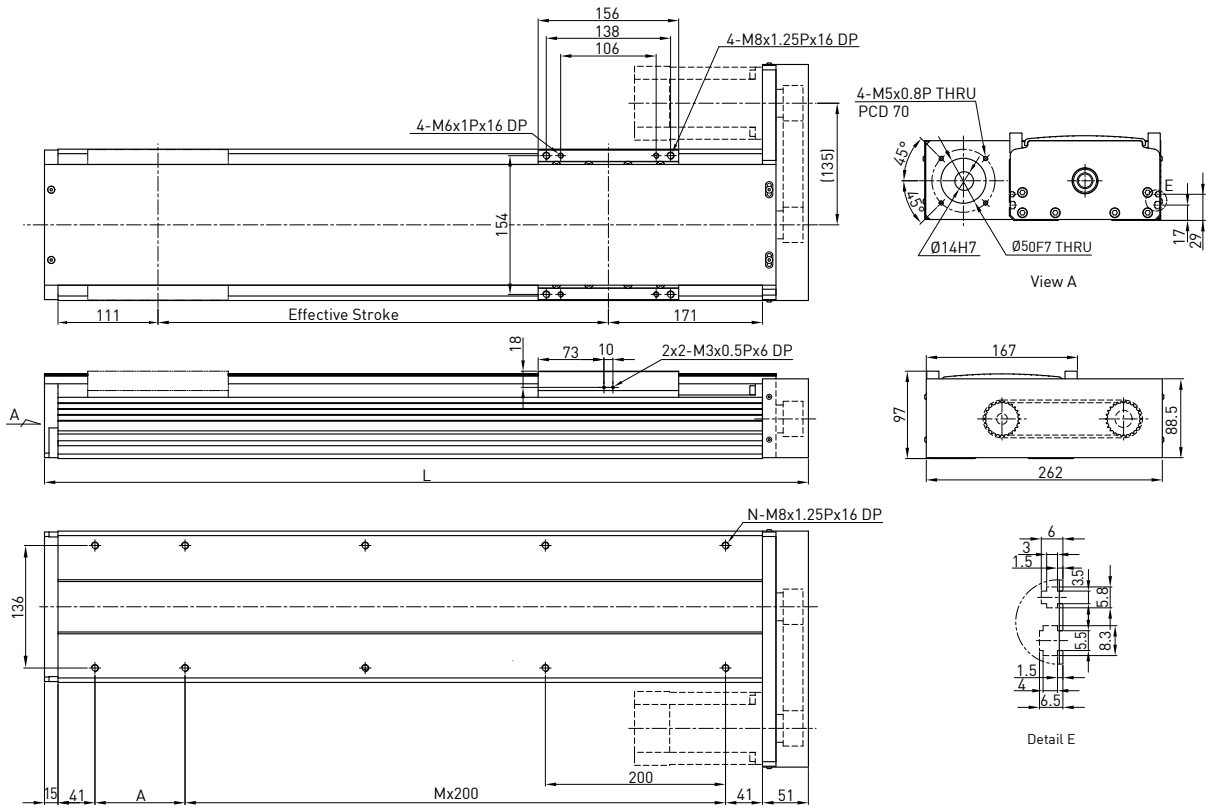
$$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$$

Fy, Fz, Mx, My, Mz are working loads

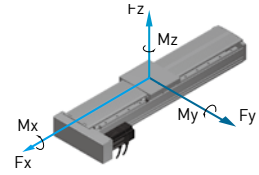
* Vibration might occur when the effective stroke is longer than 800mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA170-FR

KA170	-20	P	-1250	A	FR	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10 mm 20 mm	C: Normal P: Precision		A: Standard	FR: Right	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



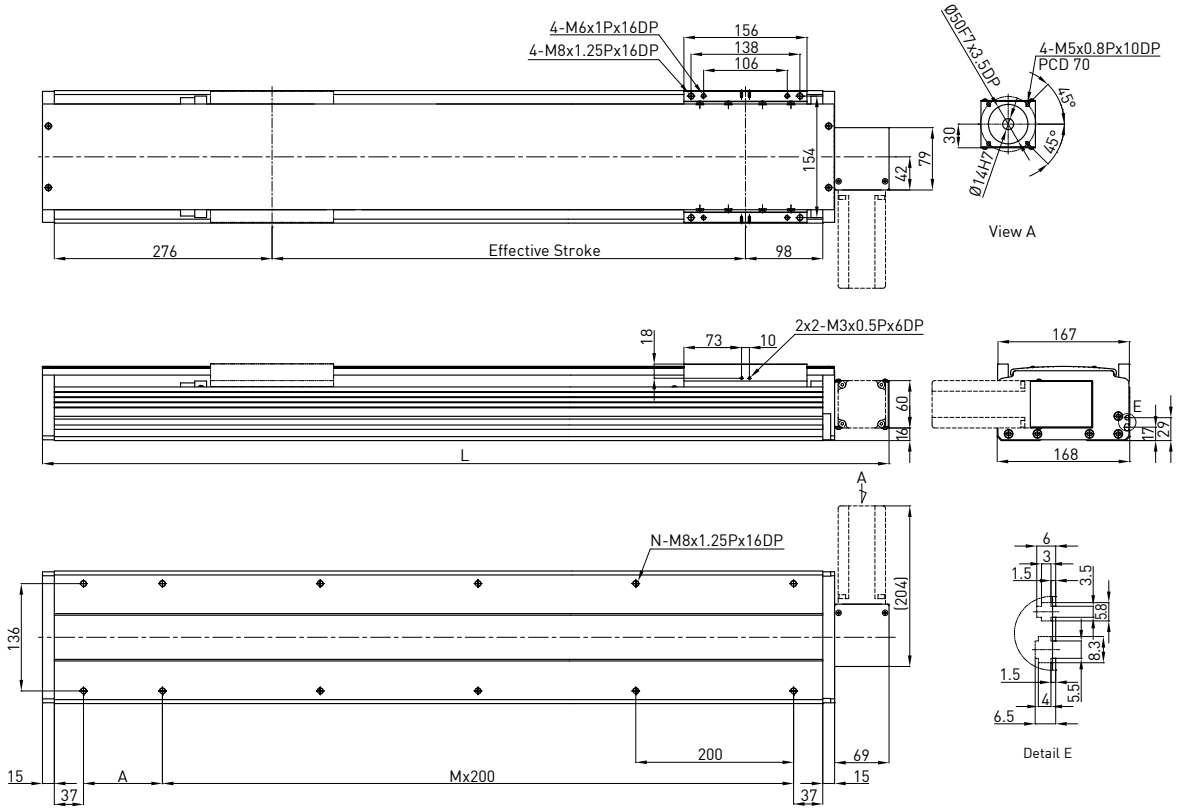
Effective stroke (mm)	L	A	M	N	Weight (kg)
150	498	150	1	6	15.01
200	548	200	1	6	15.92
250	598	50	2	8	16.82
300	648	100	2	8	17.73
350	698	150	2	8	18.63
400	748	200	2	8	19.54
450	798	50	3	10	20.45
500	848	100	3	10	21.35
550	898	150	3	10	22.26
600	948	200	3	10	23.17
650	998	50	4	12	24.07
700	1048	100	4	12	24.98
750	1098	150	4	12	25.89
800	1148	200	4	12	26.79
850	1198	50	5	14	27.71
900	1248	100	5	14	28.61
950	1298	150	5	14	29.51
1000	1348	200	5	14	30.42
1050	1398	50	6	16	31.33
1100	1448	100	6	16	32.23
1150	1498	150	6	16	33.14
1200	1548	200	6	16	34.04
1250	1598	50	7	18	34.94

AC motor output			W	400	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	560	280
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	127	64
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	1270	640
		Mxd	N-m	108	118
		Myd	N-m	155	167
		Mzd	N-m	30	35
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

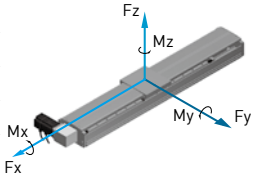
* Vibration might occur when the effective stroke is longer than 800mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KA170B-FL

KA170	B	-120	C	-3000	A	FL	U	S1	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
			C: Normal		A: Standard	FL: Left	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



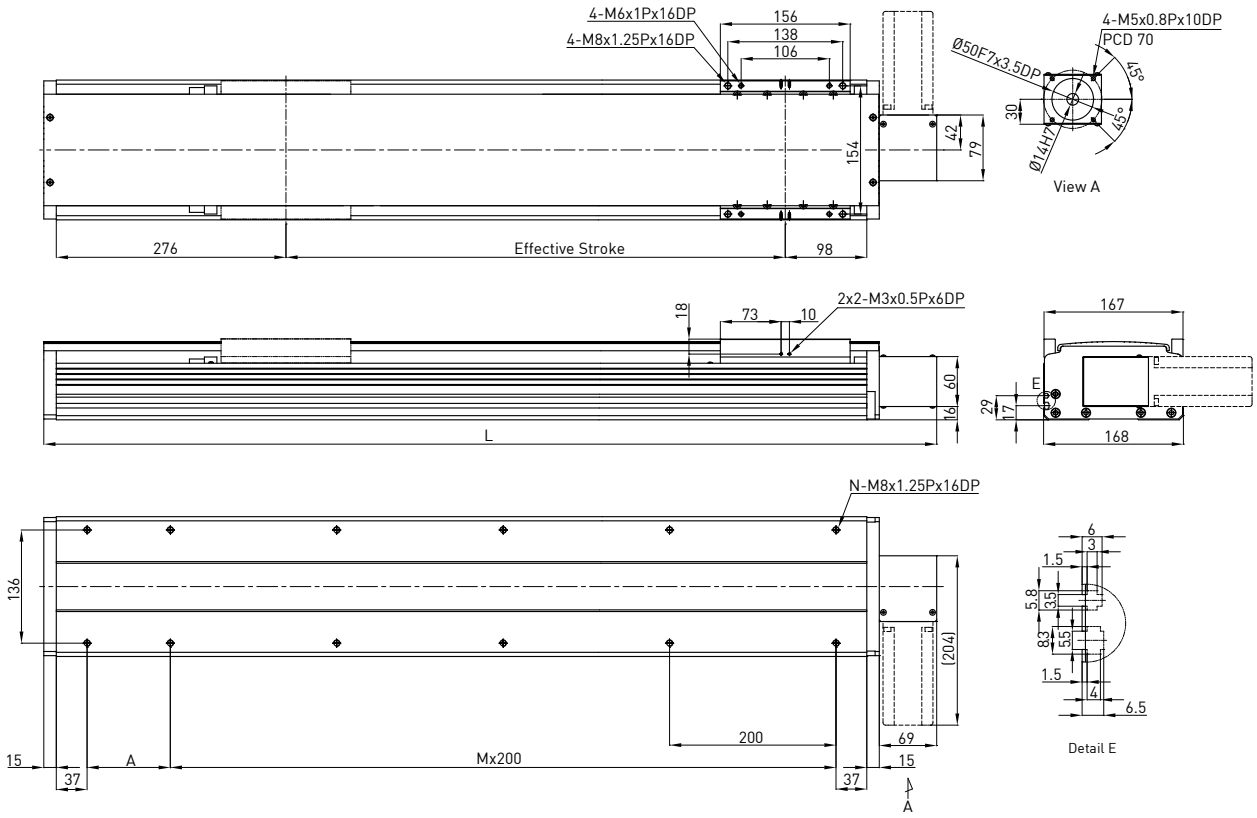
Effective stroke (mm)	L	A	M	N	Weight (kg)
200	673	100	2	8	14.74
400	873	100	3	10	17.88
600	1073	100	4	12	21.13
800	1273	100	5	14	24.37
1000	1473	100	6	16	27.52
1200	1673	100	7	18	30.77
1400	1873	100	8	20	34.01
1600	2073	100	9	22	37.07
1800	2273	100	10	24	40.3
2000	2473	100	11	26	43.54
2200	2673	100	12	28	46.68
2400	2873	100	13	30	49.92
2600	3073	100	14	32	53.07
2800	3273	100	15	34	56.2
3000	3473	100	16	36	59.44

AC motor output			W	400
Drive				Timing Belt
Pulley Perimeter			mm	120
Pulley RPM			RPM	900
Max linear speed			mm/sec	1800
Rated thrust			N	133
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	30
Rated dynamic load*		Fyd	N	50
		Fzd	N	300
		Mxd	N-m	123
		Myd	N-m	174
		Mzd	N-m	38
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

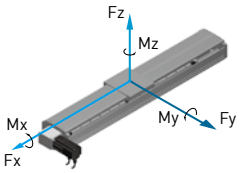
*The load condition is based on 10,000km operation
**For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KA170B-FR

KA170	B	-120	C	-3000	A	FR	U	S1	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
			C: Normal		A: Standard	FR: Right	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



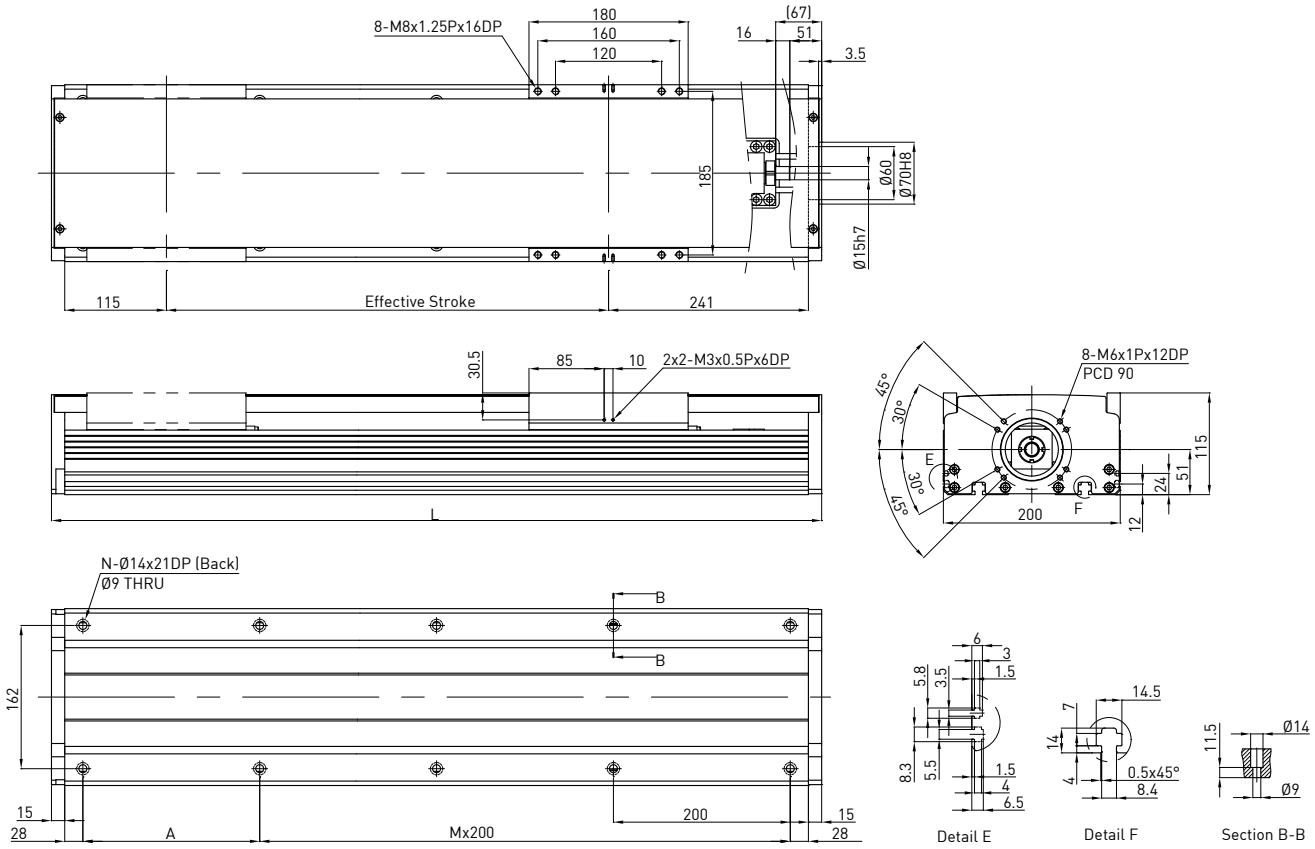
Effective stroke (mm)	L	A	M	N	Weight (kg)
200	673	100	2	8	14.74
400	873	100	3	10	17.88
600	1073	100	4	12	21.13
800	1273	100	5	14	24.37
1000	1473	100	6	16	27.52
1200	1673	100	7	18	30.77
1400	1873	100	8	20	34.01
1600	2073	100	9	22	37.07
1800	2273	100	10	24	40.3
2000	2473	100	11	26	43.54
2200	2673	100	12	28	46.68
2400	2873	100	13	30	49.92
2600	3073	100	14	32	53.07
2800	3273	100	15	34	56.2
3000	3473	100	16	36	59.44

AC motor output			W	400
Drive				Timing Belt
Pulley Perimeter			mm	120
Pulley RPM			RPM	900
Max linear speed			mm/sec	1800
Rated thrust			N	133
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	30
Rated dynamic load*		Fyd	N	50
		Fzd	N	300
		Mxd	N-m	123
		Myd	N-m	174
		Mzd	N-m	38
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads			

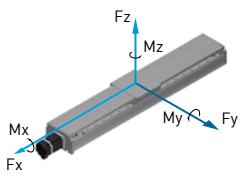
*The load condition is based on 10,000km operation
**For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KA200

KA200	-25	P	-1250	A	F0	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10mm 25mm	C: Normal P: Precision		A: Standard	F0 : Direct	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



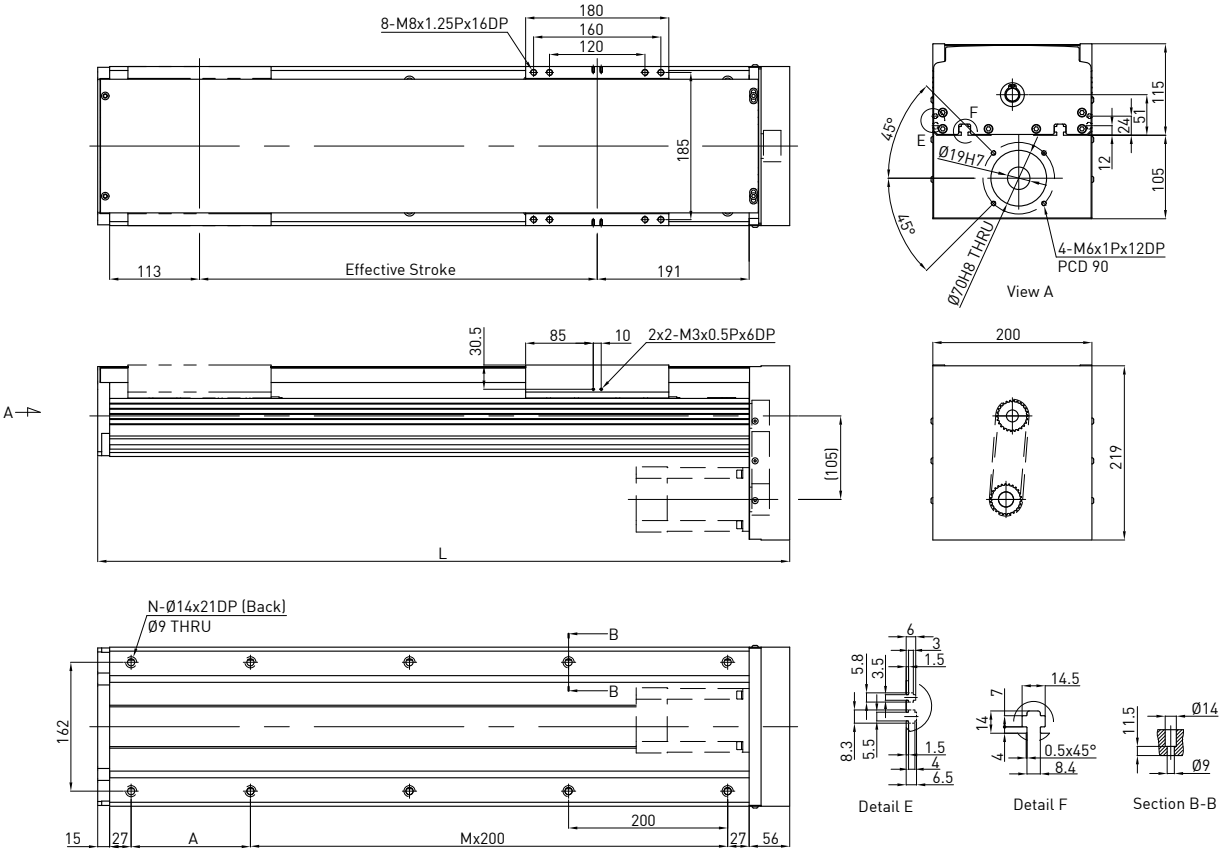
Effective stroke (mm)	L	A	M	N	Weight (kg)
150	536	50	2	8	17.66
200	586	100	2	8	18.99
250	636	150	2	8	20.32
300	686	200	2	8	21.65
350	736	50	3	10	22.98
400	786	100	3	10	24.31
450	836	150	3	10	25.64
500	886	200	3	10	26.97
550	936	50	4	12	28.3
600	986	100	4	12	29.63
650	1036	150	4	12	30.96
700	1086	200	4	12	32.29
750	1136	50	5	14	33.62
800	1186	100	5	14	34.95
850	1236	150	5	14	36.28
900	1286	200	5	14	37.61
950	1336	50	6	16	38.94
1000	1386	100	6	16	40.27
1050	1436	150	6	16	41.61
1100	1486	200	6	16	42.93
1150	1536	50	7	18	44.26
1200	1586	100	7	18	45.59
1250	1636	150	7	18	46.92

AC motor output			W	750	
Drive				Ballscrew C7(normal)	
Lead			mm	10	25
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1250
Rated thrust			N	1050	420
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	239	95
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	2390	950
		Mxd	N-m	154	178
		Myd	N-m	266	302
		Mzd	N-m	41	52
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

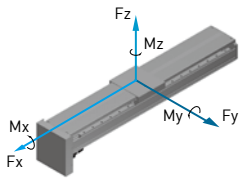
* Vibration might occur when the effective stroke is longer than 800mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
**The load condition is based on 10,000km operation
***For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KA200-FD

KA200	-25	P	-1250	A	FD	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10mm 25mm	C: Normal P: Precision		A: Standard	FD: Bottom	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



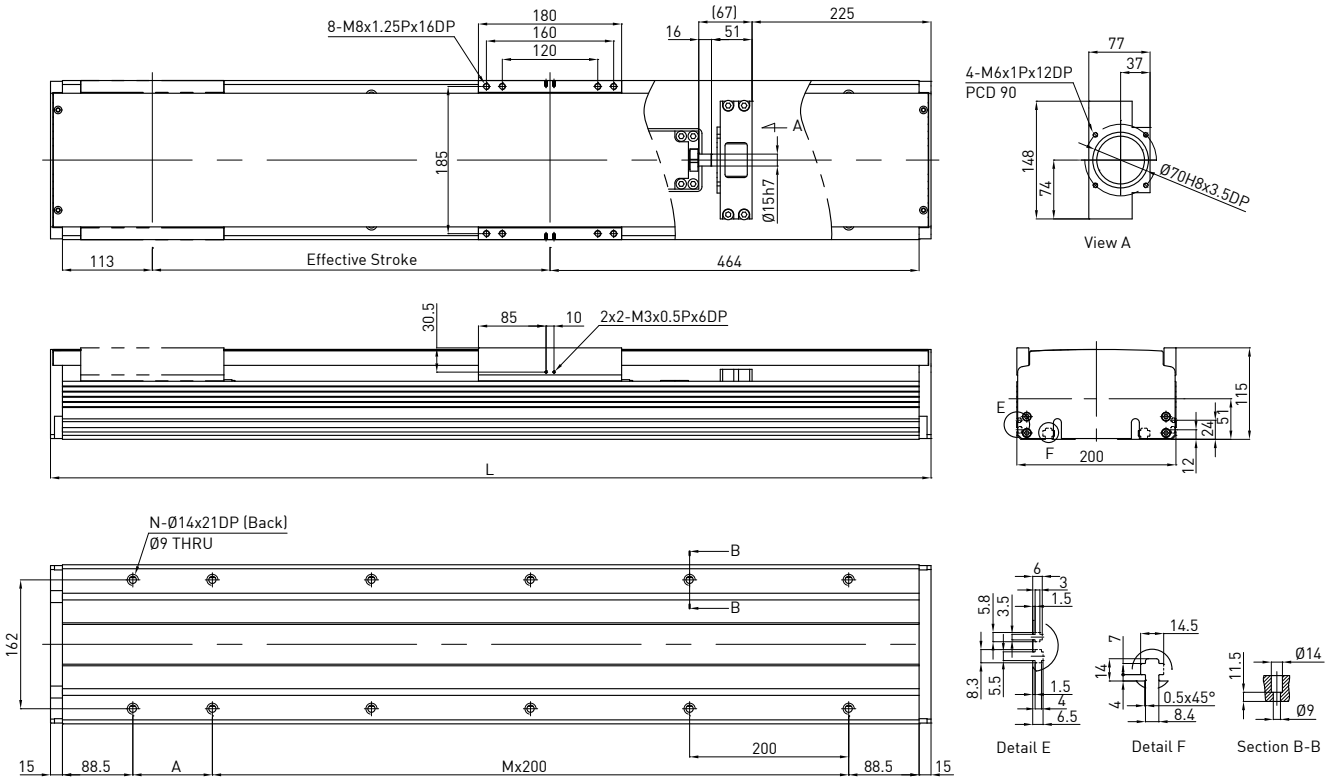
Effective stroke (mm)	L	A	M	N	Weight (kg)
150	525	200	1	6	18.46
200	575	50	2	8	19.79
250	625	100	2	8	21.12
300	675	150	2	8	22.45
350	725	200	2	8	23.78
400	775	50	3	10	25.11
450	825	100	3	10	26.44
500	875	150	3	10	27.77
550	925	200	3	10	29.1
600	975	50	4	12	30.43
650	1025	100	4	12	31.76
700	1075	150	4	12	33.09
750	1125	200	4	12	34.42
800	1175	50	5	14	35.75
850	1225	100	5	14	37.08
900	1275	150	5	14	38.41
950	1325	200	5	14	39.74
1000	1375	50	6	16	41.07
1050	1425	100	6	16	42.41
1100	1475	150	6	16	43.73
1150	1525	200	6	16	45.06
1200	1575	50	7	18	46.39
1250	1625	100	7	18	47.72

AC motor output			W	750	
Drive				Ballscrew C7(normal)	
Lead			mm	10	25
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1250
Rated thrust			N	1050	420
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	239	95
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	2390	950
		Mxd	N-m	154	178
		Myd	N-m	266	302
		Mzd	N-m	41	52
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

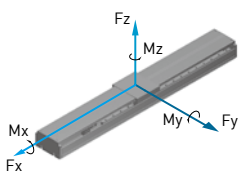
* Vibration might occur when the effective stroke is longer than 800mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
**The load condition is based on 10,000km operation
***For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KA200-FI

KA200	-25	P	-1250	A	FI	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10mm 25mm	C: Normal P: Precision		A: Standard	FI: Internal	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



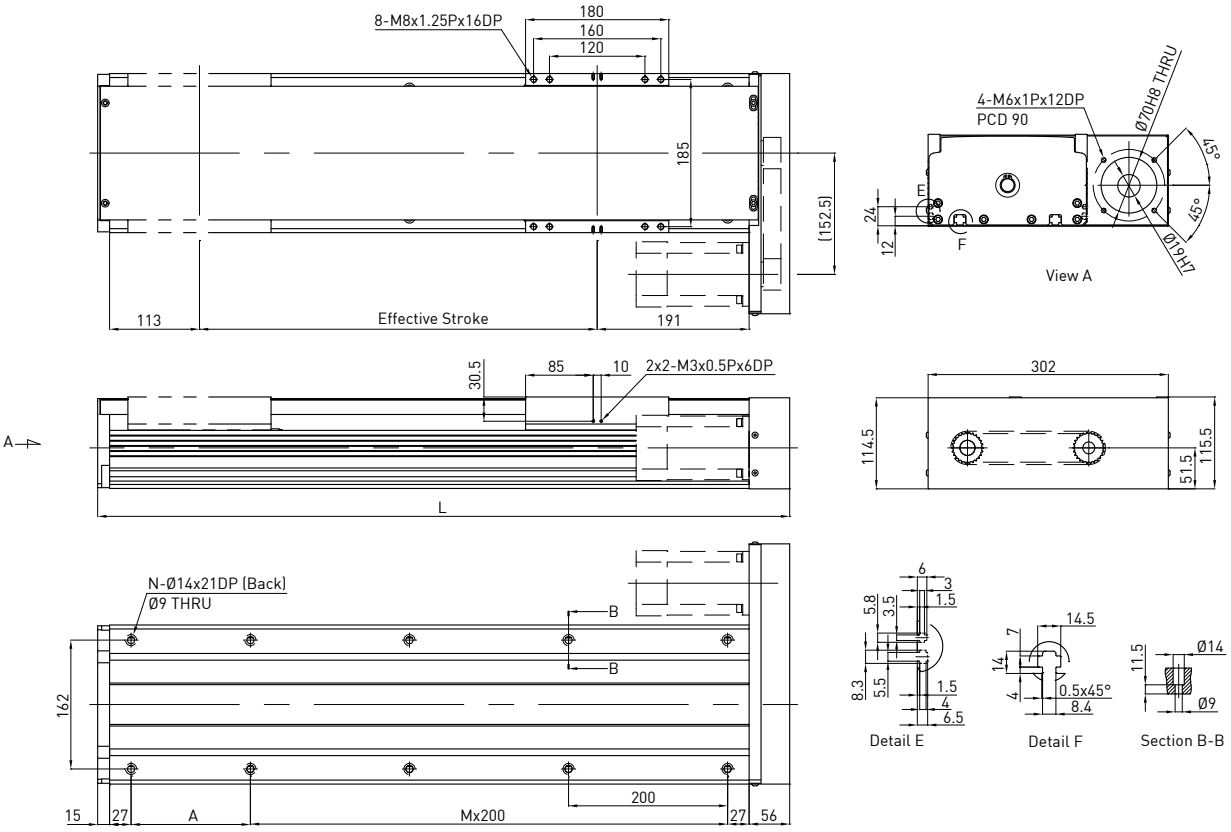
Effective stroke (mm)	L	A	M	N	Weight (kg)
150	757	150	2	8	19.83
200	807	200	2	8	21.32
250	857	50	3	10	22.82
300	907	100	3	10	24.31
350	957	150	3	10	25.81
400	1007	200	3	10	27.3
450	1057	50	4	12	28.79
500	1107	100	4	12	30.29
550	1157	150	4	12	31.78
600	1207	200	4	12	33.27
650	1257	50	5	14	34.77
700	1307	100	5	14	36.26
750	1357	150	5	14	37.76
800	1407	200	5	14	39.25
850	1457	50	6	16	40.74
900	1507	100	6	16	42.24
950	1557	150	6	16	43.73
1000	1607	200	6	16	45.22
1050	1657	50	7	18	46.73
1100	1707	100	7	18	48.21
1150	1757	150	7	18	49.7
1200	1807	200	7	18	51.2
1250	1857	50	8	19	52.69

AC motor output			W	750	
Drive				Ballscrew C7(normal)	
Lead			mm	10	25
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1250
Rated thrust			N	1050	420
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	239	95
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	2390	950
		Mxd	N-m	154	178
		Myd	N-m	266	302
		Mzd	N-m	41	52
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

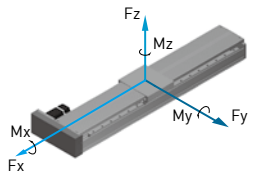
* Vibration might occur when the effective stroke is longer than 800mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
**The load condition is based on 10,000km operation
***For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KA200-FL

KA200	-25	P	-1250	A	FL	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10mm 25mm	C: Normal P: Precision		A: Standard	FL: Left	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



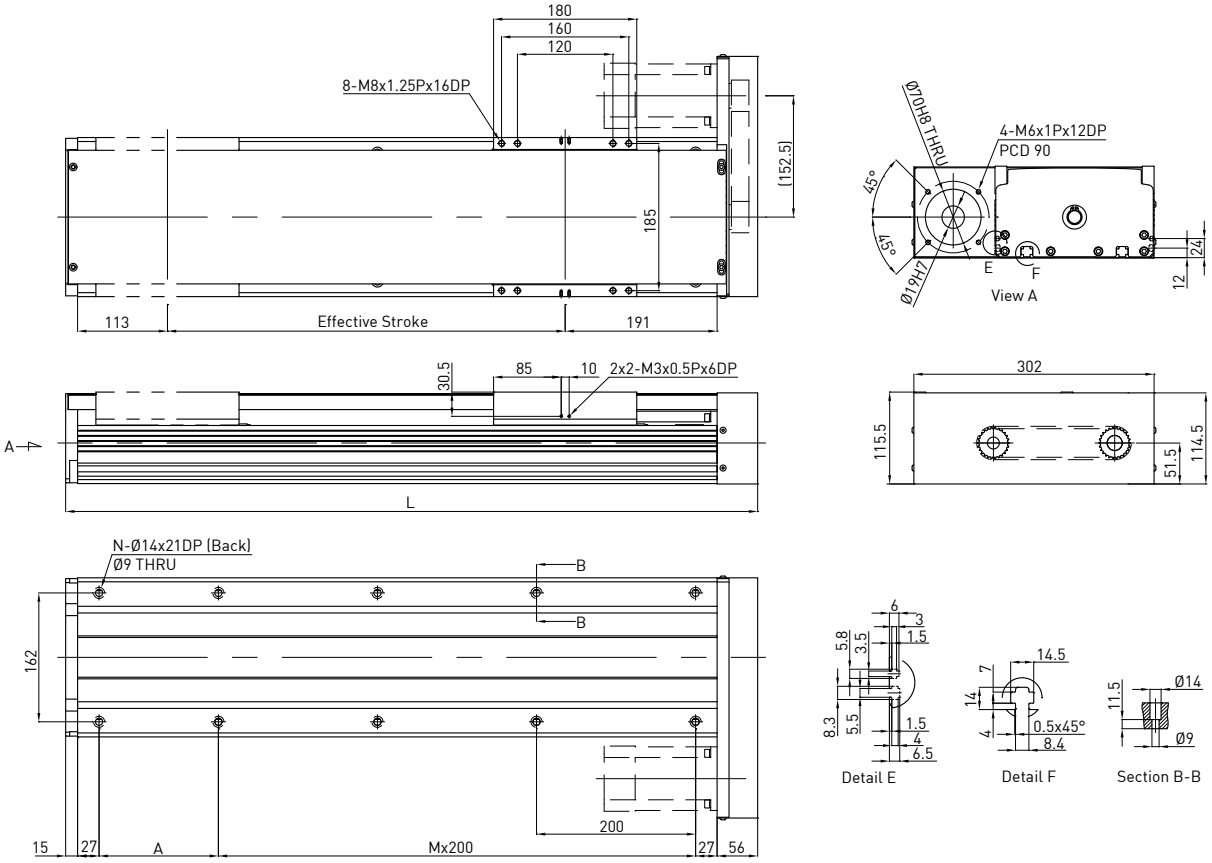
Effective stroke (mm)	L	A	M	N	Weight (kg)
150	525	200	1	6	18.46
200	575	50	2	8	19.79
250	625	100	2	8	21.12
300	675	150	2	8	22.45
350	725	200	2	8	23.78
400	775	50	3	10	25.11
450	825	100	3	10	26.44
500	875	150	3	10	27.77
550	925	200	3	10	29.1
600	975	50	4	12	30.43
650	1025	100	4	12	31.76
700	1075	150	4	12	33.09
750	1125	200	4	12	34.42
800	1175	50	5	14	35.75
850	1225	100	5	14	37.08
900	1275	150	5	14	38.41
950	1325	200	5	14	39.74
1000	1375	50	6	16	41.07
1050	1425	100	6	16	42.41
1100	1475	150	6	16	43.73
1150	1525	200	6	16	45.06
1200	1575	50	7	18	46.39
1250	1625	100	7	18	47.72

AC motor output			W	750	
Drive				Ballscrew C7(normal)	
Lead			mm	10	25
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1250
Rated thrust			N	1050	420
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	239	95
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	2390	950
		Mxd	N-m	154	178
		Myd	N-m	266	302
		Mzd	N-m	41	52
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

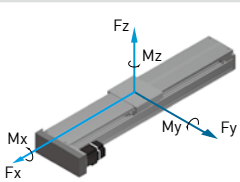
* Vibration might occur when the effective stroke is longer than 800mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
**The load condition is based on 10,000km operation
***For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KA200-FR

KA200	-25	P	-1250	A	FR	U	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Cover	Limit Switch	Motor
	10mm 25mm	C: Normal P: Precision		A: Standard	FR: Right	U: Without Cover None : Standard Cover	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	A	M	N	Weight (kg)
150	525	200	1	6	18.46
200	575	50	2	8	19.79
250	625	100	2	8	21.12
300	675	150	2	8	22.45
350	725	200	2	8	23.78
400	775	50	3	10	25.11
450	825	100	3	10	26.44
500	875	150	3	10	27.77
550	925	200	3	10	29.1
600	975	50	4	12	30.43
650	1025	100	4	12	31.76
700	1075	150	4	12	33.09
750	1125	200	4	12	34.42
800	1175	50	5	14	35.75
850	1225	100	5	14	37.08
900	1275	150	5	14	38.41
950	1325	200	5	14	39.74
1000	1375	50	6	16	41.07
1050	1425	100	6	16	42.41
1100	1475	150	6	16	43.73
1150	1525	200	6	16	45.06
1200	1575	50	7	18	46.39
1250	1625	100	7	18	47.72

AC motor output			W	750	
Drive				Ballscrew C7(normal)	
Lead			mm	10	25
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1250
Rated thrust			N	1050	420
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	239	95
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	2390	950
		Mxd	N-m	154	178
		Myd	N-m	266	302
		Mzd	N-m	41	52

Permitted load condition**

$$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$$

Fy, Fz, Mx, My, Mz are working loads

* Vibration might occur when the effective stroke is longer than 800mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
**The load condition is based on 10,000km operation
***For horizontal application only. If used in special condition, please contact HIWIN.

Industrial Robot
KS Series

4.1 Features

- Reasonable price
- Use in Clean room
- Stainless covers
- Already installed AC servo motor (optional)
- High repeatability ±0.02mm
- Dust proof
- Support different strokes

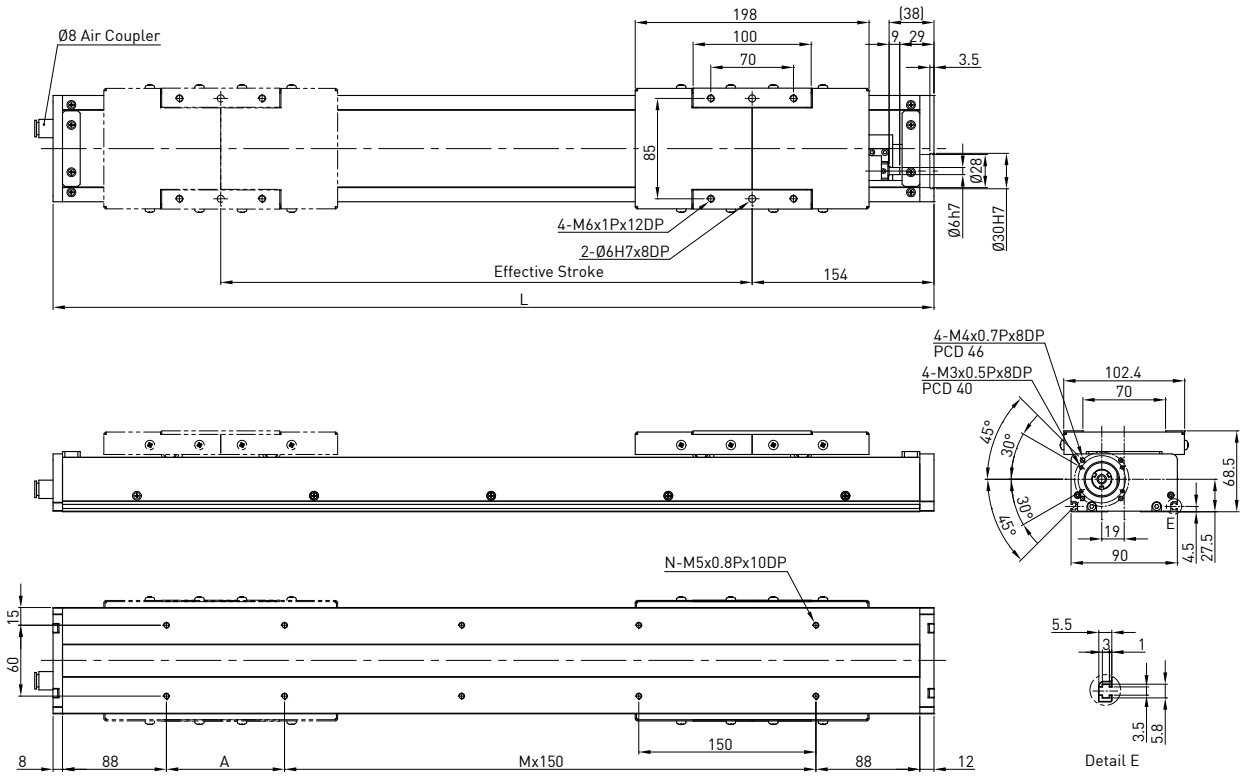
4.2 Applications

- FPD industry
- Semiconductor
- Medical applications
- FPD glass transfer
- Inspection & testing equipment

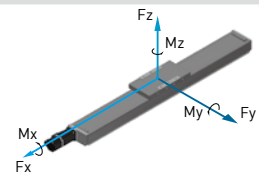
4.3 KS Series

Model Number for KS90

KS090	-10	P	-0600	A	F0	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	5mm 10mm	P: Precision C: Normal		A: Standard	FI: Internal	S1:OMRON SX671 S2:OMRON SX674 S3:SUNX GX-F12A S4:SUNX GL-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



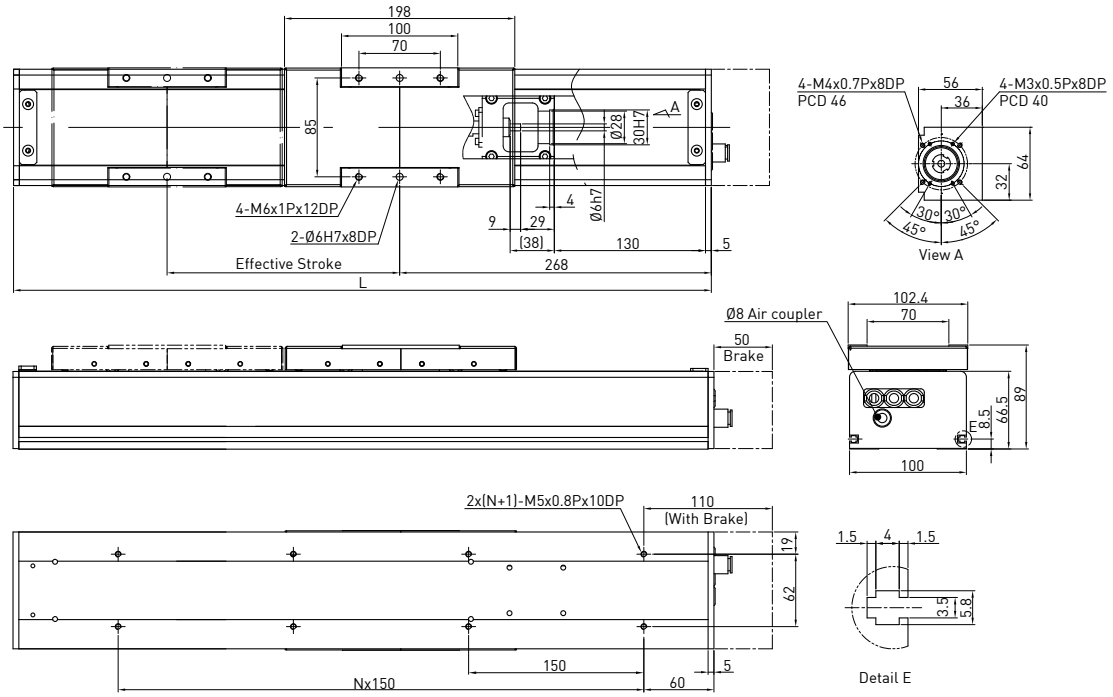
Effective stroke (mm)	L	A	M	N	Weight (kg)
50	346	150	0	4	3.38
100	396	50	1	6	3.78
150	446	100	1	6	4.18
200	496	150	1	6	4.58
250	546	50	2	8	4.98
300	596	100	2	8	5.38
350	646	150	2	8	5.78
400	696	50	3	10	6.18
450	746	100	3	10	6.58
500	796	150	3	10	7.19
550	846	50	4	12	7.38
600	896	100	4	12	7.78

AC motor output			W	100	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	250	500
Rated thrust			N	280	140
Repeatability			mm	±0.02	
Effective stroke			mm	50~600	
Max load (H)			kg	24	16
Rated dynamic load**		Fyd	N	20	20
		Fzd	N	240	160
		Mxd	N-m	5	4.8
		Myd	N-m	3	3
		Mzd	N-m	2.2	2.2
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

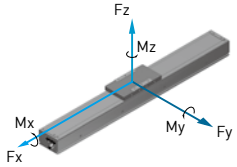
Model Number for KS100-FI

KS100	-20	P	-800	A	FI	S2	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	10mm 20mm	P: Precision C: Normal		A: Standard	FI: Internal	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	N	Weight (kg)
200	600	3	9.1
300	700	4	9.8
400	800	4	10.5
500	900	5	11.2
600	1000	6	11.9
700	1100	6	12.6
800	1200	7	13.3

AC motor output		W	100		
Drive			Ballscrew C7(normal)		
Lead		mm	5	10	20
Rated RPM		RPM	3000	3000	3000
Max linear speed*		mm/sec	250	500	1000
Rated thrust		N	280	140	70
Repeatability		mm	±0.02		
Effective stroke		mm	100~1050		
Max load (H)		kg	9.6	6.2	3.1
Rated dynamic load**	Fyd	N	20	20	20
	Fzd	N	96	62	31
	Mxd	N-m	1	1.1	1.2
	Myd	N-m	1	1	1.1
	Mzd	N-m	0.9	0.9	1



Permitted load condition***

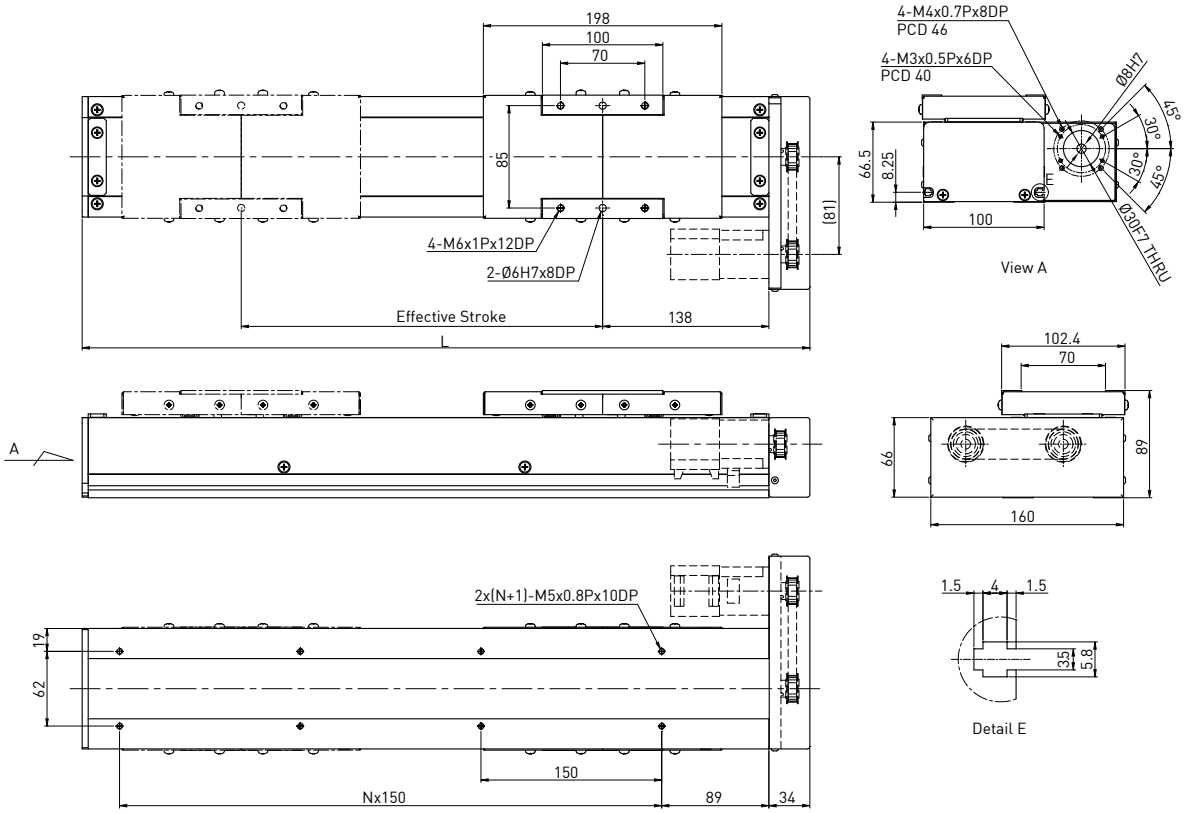
$$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$$

Fy, Fz, Mx, My, Mz are working loads

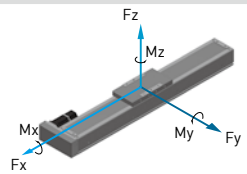
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS100-FL

KS100	-20	P	-800	A	FL	S2	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	10mm 20mm	P: Precision C: Normal		A: Standard	FL: Left	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



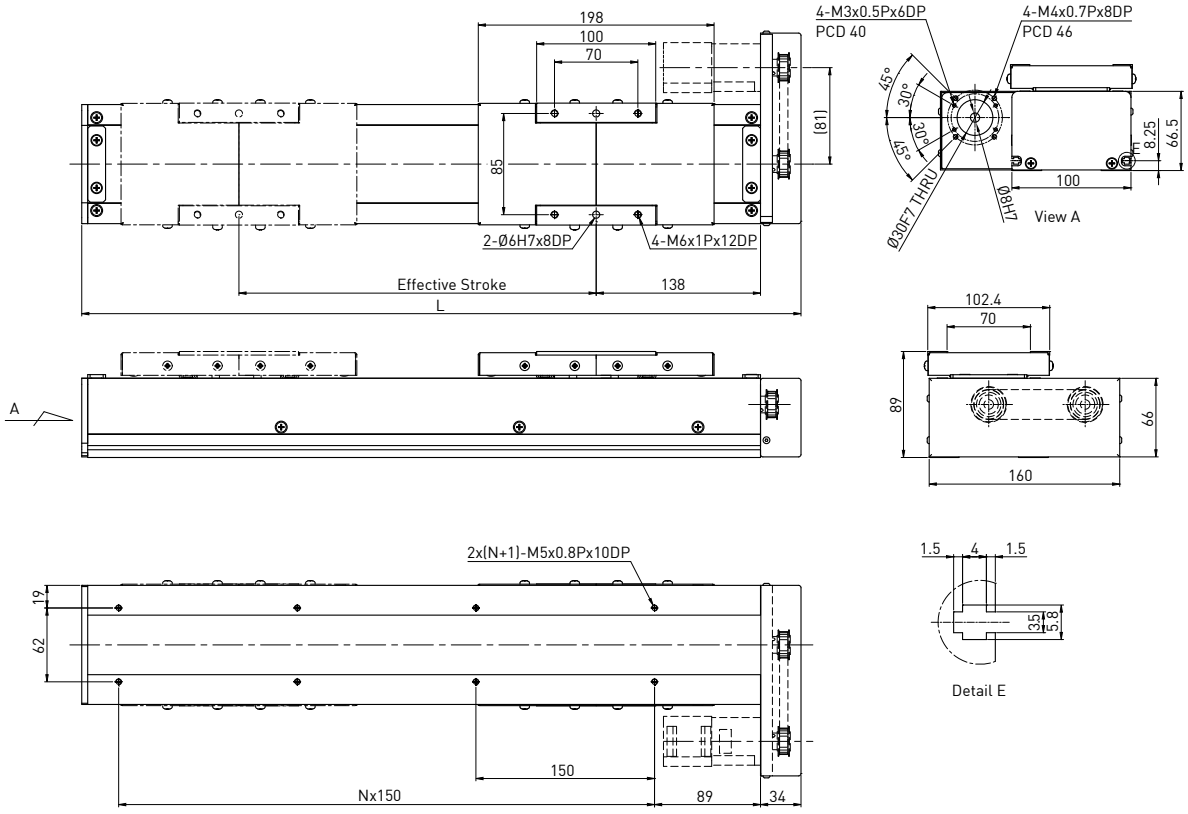
Effective stroke (mm)	L	N	Weight (kg)
200	504	2	6.0
300	604	3	6.9
400	704	3	7.8
500	804	4	8.7
600	904	5	9.6
700	1004	5	10.5
800	1104	6	11.4

AC motor output			W	100	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	280	140	70
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	9.6	6.2	3.1
Rated dynamic load**		Fyd	N	20	20	20
		Fzd	N	96	62	31
		Mxd	N-m	1	1.1	1.2
		Myd	N-m	1	1	1.1
		Mzd	N-m	0.9	0.9	1
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

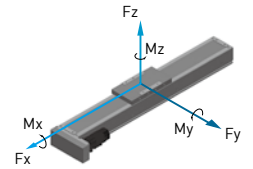
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS100-FR

KS100	-20	P	-800	A	FR	S2	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	10mm 20mm	P: Precision C: Normal		A: Standard	FR: Right	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



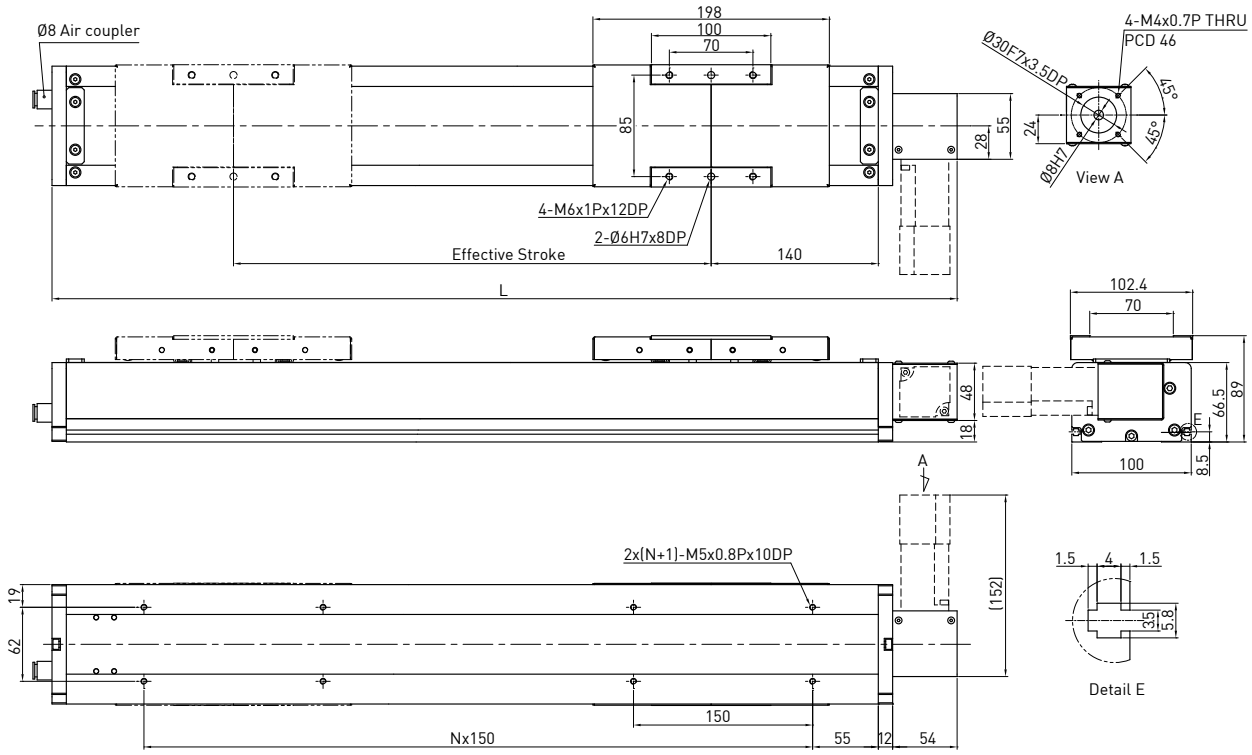
Effective stroke (mm)	L	N	Weight (kg)
200	504	2	6.0
300	604	3	6.9
400	704	3	7.8
500	804	4	8.7
600	904	5	9.6
700	1004	5	10.5
800	1104	6	11.4

AC motor output			W	100		
Drive				Ballscrew C7(normal)		
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	280	140	70
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	9.6	6.2	3.1
Rated dynamic load**		Fyd	N	20	20	20
		Fzd	N	96	62	31
		Mxd	N-m	1	1.1	1.2
		Myd	N-m	1	1	1.1
		Mzd	N-m	0.9	0.9	1
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads					

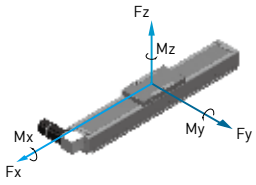
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS100B-FL

KS100	B	-84	C	-3000	A	FL	S2	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
			C: Normal		A: Standard	FL: Left	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



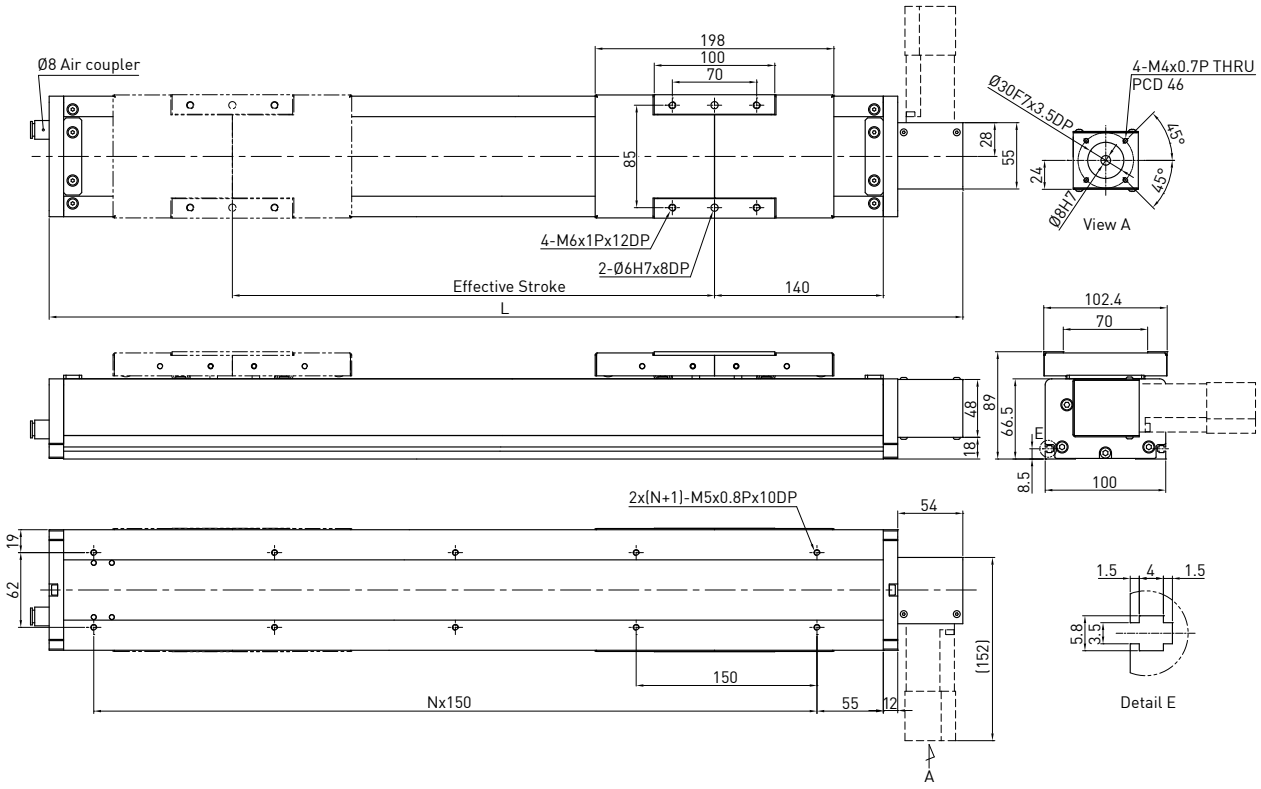
Effective stroke (mm)	L	N	Weight (kg)
200	558	2	6.1
400	758	4	7.6
600	958	5	9.1
800	1158	6	10.6
1000	1358	8	12.1
1200	1558	9	13.6
1400	1758	10	15.1
1600	1958	12	16.6
1800	2158	13	18.1
2000	2358	14	19.6
2200	2558	16	21.1
2400	2758	17	22.6
2600	2958	18	24.1
2800	3158	20	25.6
3000	3358	21	27.1

AC motor output			W	100
Drive				Timing Belt
Pulley Perimeter			mm	84
Pulley RPM			RPM	1286
Max linear speed			mm/sec	1800
Rated thrust			N	33
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	7.5
Rated dynamic load*		Fyd	N	20
		Fzd	N	75
		Mxd	N-m	1
		Myd	N-m	0.9
		Mzd	N-m	0.5
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

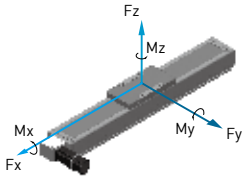
*The load condition is based on 10,000km operation.
**For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KS100B-FR

KS100	B	-84	C	-3000	A	FR	S2	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
			C: Normal		A: Standard	FR: Right	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



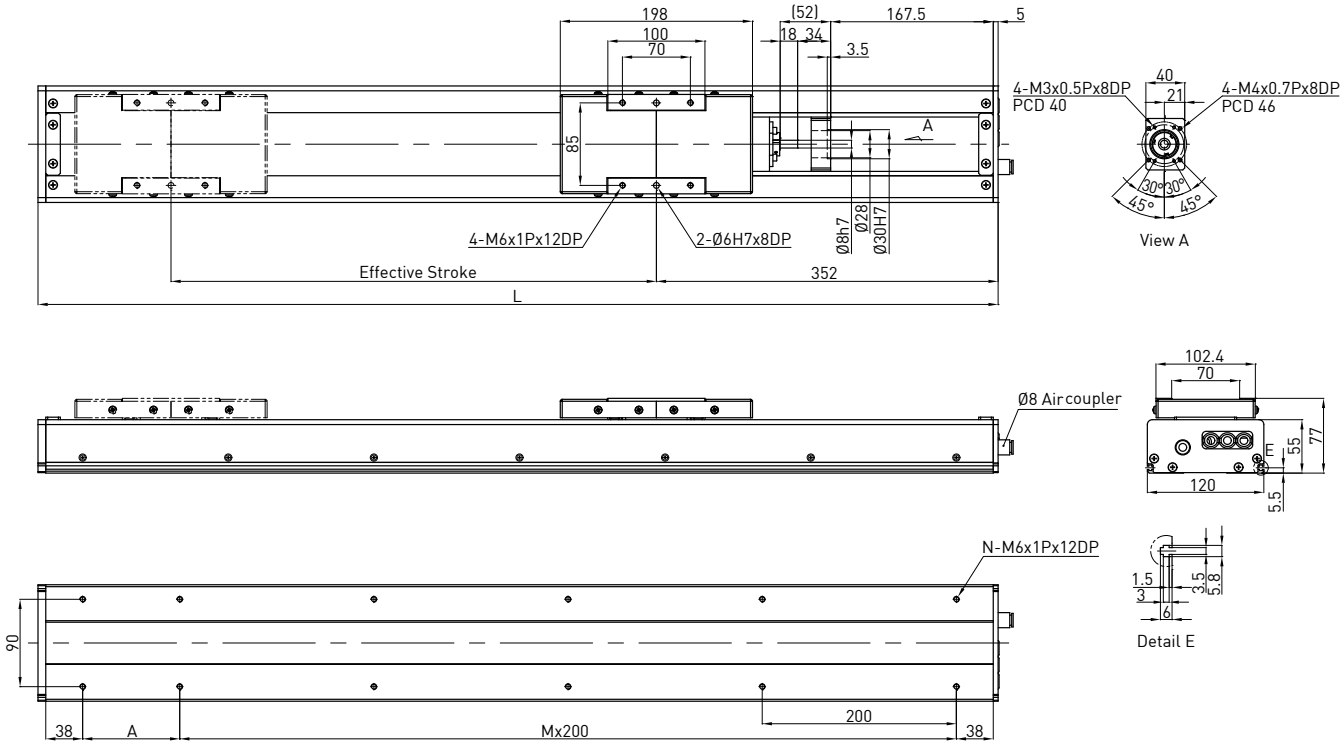
Effective stroke (mm)	L	N	Weight (kg)
200	558	2	6.1
400	758	4	7.6
600	958	5	9.1
800	1158	6	10.6
1000	1358	8	12.1
1200	1558	9	13.6
1400	1758	10	15.1
1600	1958	12	16.6
1800	2158	13	18.1
2000	2358	14	19.6
2200	2558	16	21.1
2400	2758	17	22.6
2600	2958	18	24.1
2800	3158	20	25.6
3000	3358	21	27.1

AC motor output			W	100
Drive				Timing Belt
Pulley Perimeter			mm	84
Pulley RPM			RPM	1286
Max linear speed			mm/sec	1800
Rated thrust			N	33
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	7.5
Rated dynamic load*		Fyd	N	20
		Fzd	N	75
		Mxd	N-m	1
		Myd	N-m	0.9
		Mzd	N-m	0.5
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

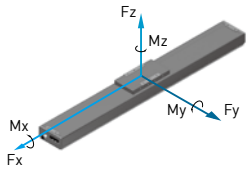
*The load condition is based on 10,000km operation.
**For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KS120

KS120	-20	P	-1050	A	FI	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	FI: Internal	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



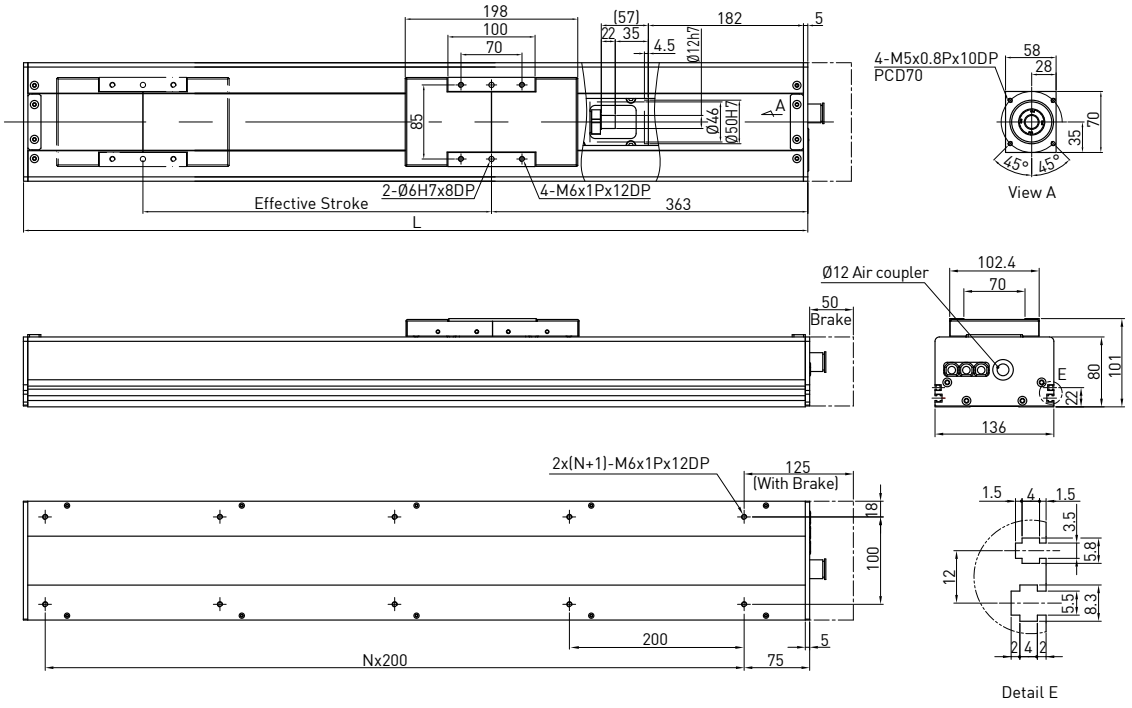
Effective stroke (mm)	L	A	M	N	Weight (kg)
100	589	100	2	8	6.32
150	639	150	2	8	6.94
200	689	200	2	8	7.57
250	739	50	3	10	8.2
300	789	100	3	10	8.83
350	839	150	3	10	9.46
400	889	200	3	10	10.09
450	939	50	4	12	10.72
500	989	100	4	12	11.35
550	1039	150	4	12	11.98
600	1089	200	4	12	12.61
650	1139	50	5	14	13.24
700	1189	100	5	14	13.87
750	1239	150	5	14	14.5
800	1289	200	5	14	15.13
850	1339	50	6	16	15.76
900	1389	100	6	16	16.39
950	1439	150	6	16	17.02
1000	1489	200	6	16	17.65
1050	1539	50	7	18	18.28

AC motor output			W	100	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	280	140	70
Repeatability			mm	±0.02		
Effective stroke			mm	100~1050		
Max load (H)			kg	47	32	16
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	470	320	160
		Mxd	N-m	31	33	35
		Myd	N-m	23	25	27
		Mzd	N-m	17	18	19
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

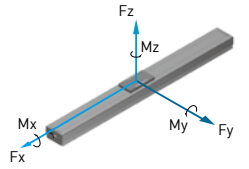
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS140-FI

KS140	-20	P	-1100	A	FI	S2	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	10mm 20mm	P: Precision C: Normal		A: Standard	FI: Internal	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



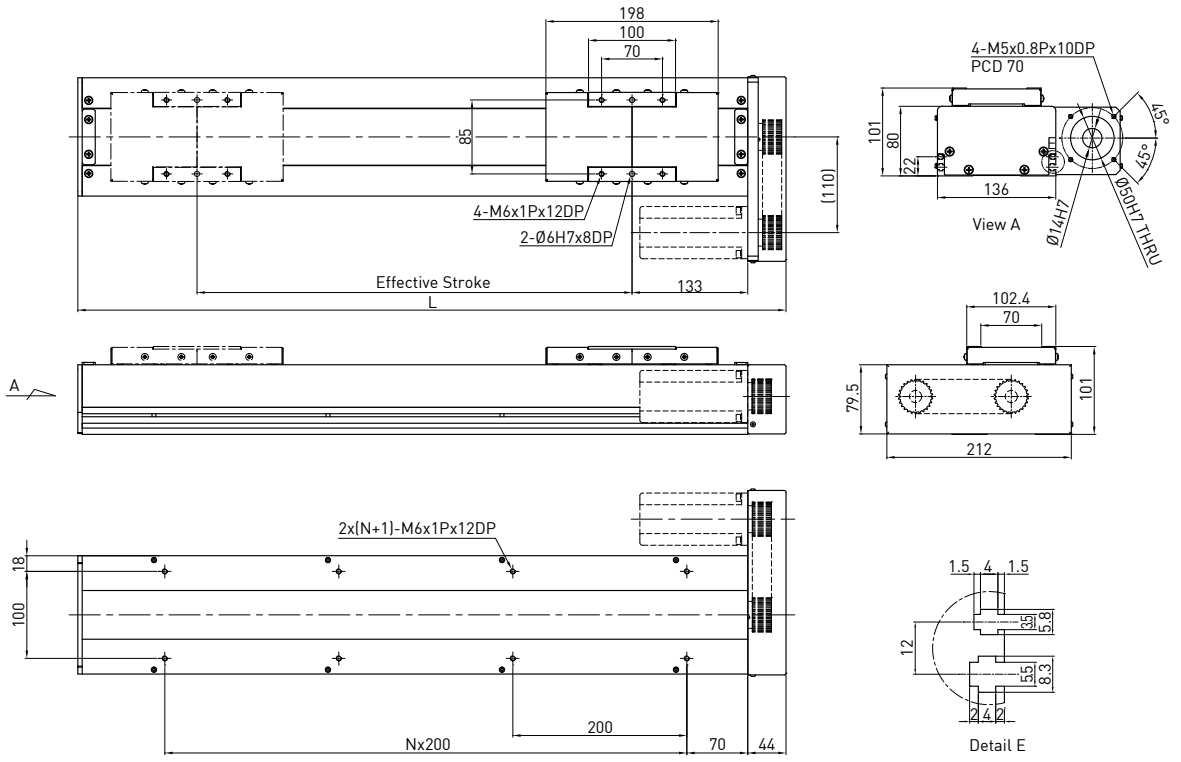
Effective stroke (mm)	L	N	Weight (kg)
200	700	3	13.5
300	800	3	14.7
400	900	4	15.9
500	1000	4	17.1
600	1100	5	18.3
700	1200	5	19.5
800	1300	6	20.7
900	1400	6	21.9
1000	1500	7	23.2
1100	1600	7	24.4

AC motor output			W	200	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	280	140
Repeatability			mm	±0.02	
Effective stroke			mm	100~1050	
Max load (H)			kg	82	40
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	820	400
		Mxd	N-m	60	66
		Myd	N-m	80	86
		Mzd	N-m	20	26
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads				

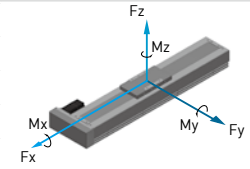
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS140-FL

KS140	-20	P	-1100	A	FL	S2	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	10mm 20mm	P: Precision C: Normal		A: Standard	FL: Left	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



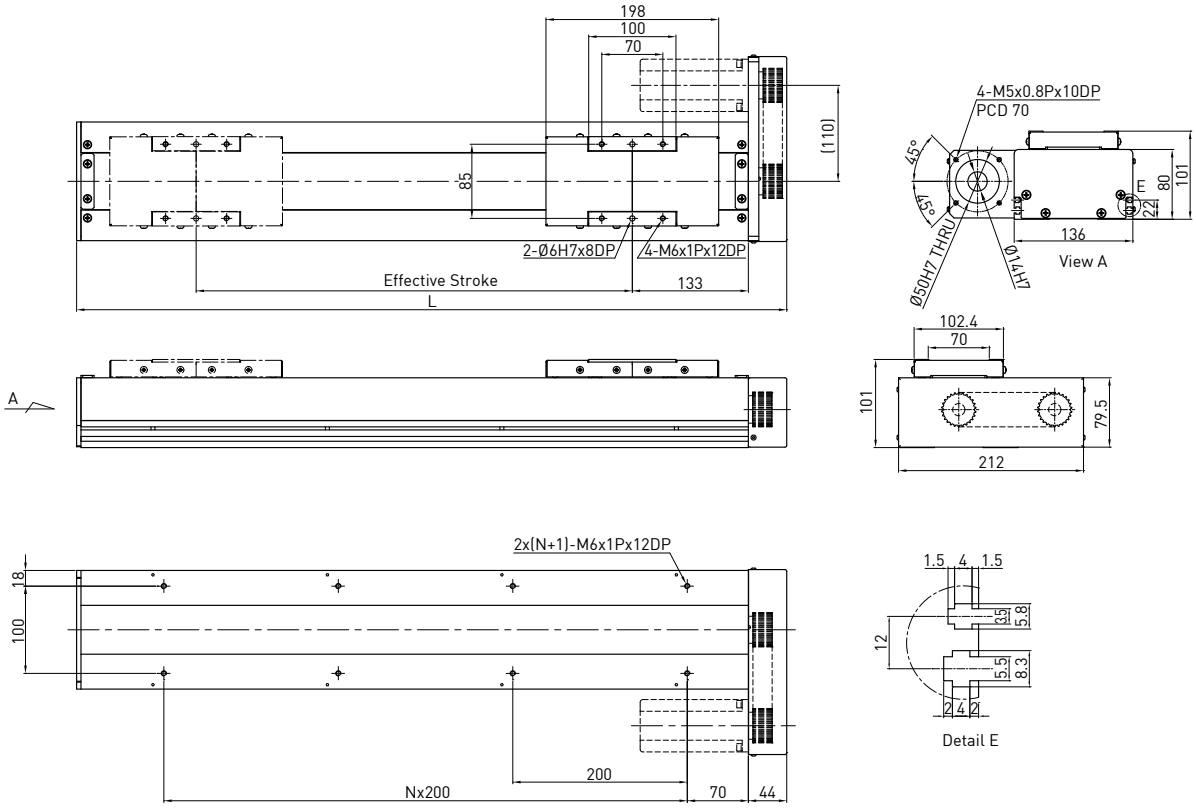
Effective stroke (mm)	L	N	Weight (kg)
200	514	1	11.5
300	614	2	13.0
400	714	2	14.5
500	814	3	16.0
600	914	3	17.5
700	1014	4	19.0
800	1114	4	20.5
900	1214	5	22.0
1000	1314	5	23.5
1100	1414	6	25.0

AC motor output			W	200	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	280	140
Repeatability			mm	±0.02	
Effective stroke			mm	100~1050	
Max load (H)			kg	82	40
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	820	400
		Mxd	N-m	60	66
		Myd	N-m	80	86
		Mzd	N-m	20	26
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads				

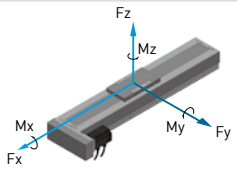
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS140-FR

KS140	-20	P	-1100	A	FR	S2	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	10mm 20mm	P: Precision C: Normal		A: Standard	FR: Right	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



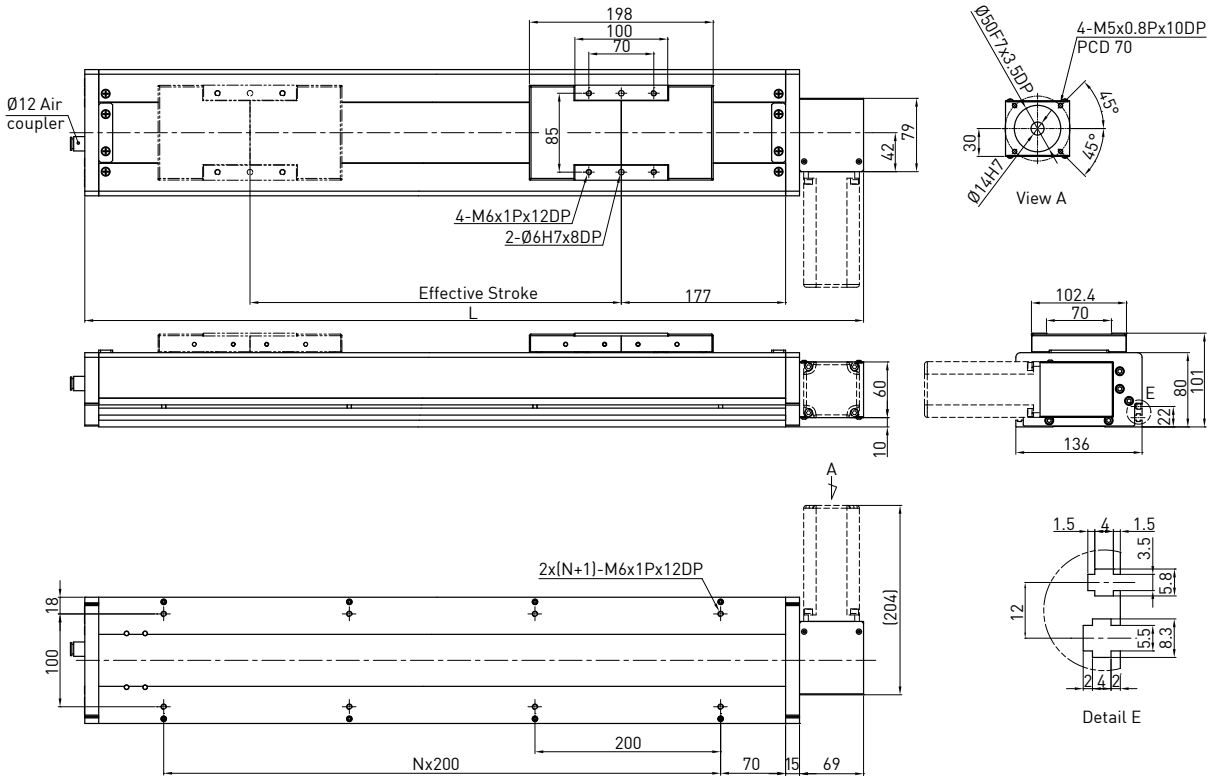
Effective stroke (mm)	L	N	Weight (kg)
200	514	1	11.5
300	614	2	13.0
400	714	2	14.5
500	814	3	16.0
600	914	3	17.5
700	1014	4	19.0
800	1114	4	20.5
900	1214	5	22.0
1000	1314	5	23.5
1100	1414	6	25.0

AC motor output			W	200	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	280	140
Repeatability			mm	±0.02	
Effective stroke			mm	100~1050	
Max load (H)			kg	82	40
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	820	400
		Mxd	N-m	60	66
		Myd	N-m	80	86
		Mzd	N-m	20	26
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads				

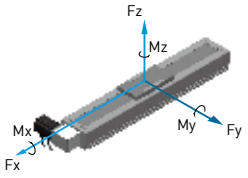
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS140B-FL

KS140	B	-120	C	-3000	A	FL	S2	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
			C: Normal		A: Standard	FL: Left	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



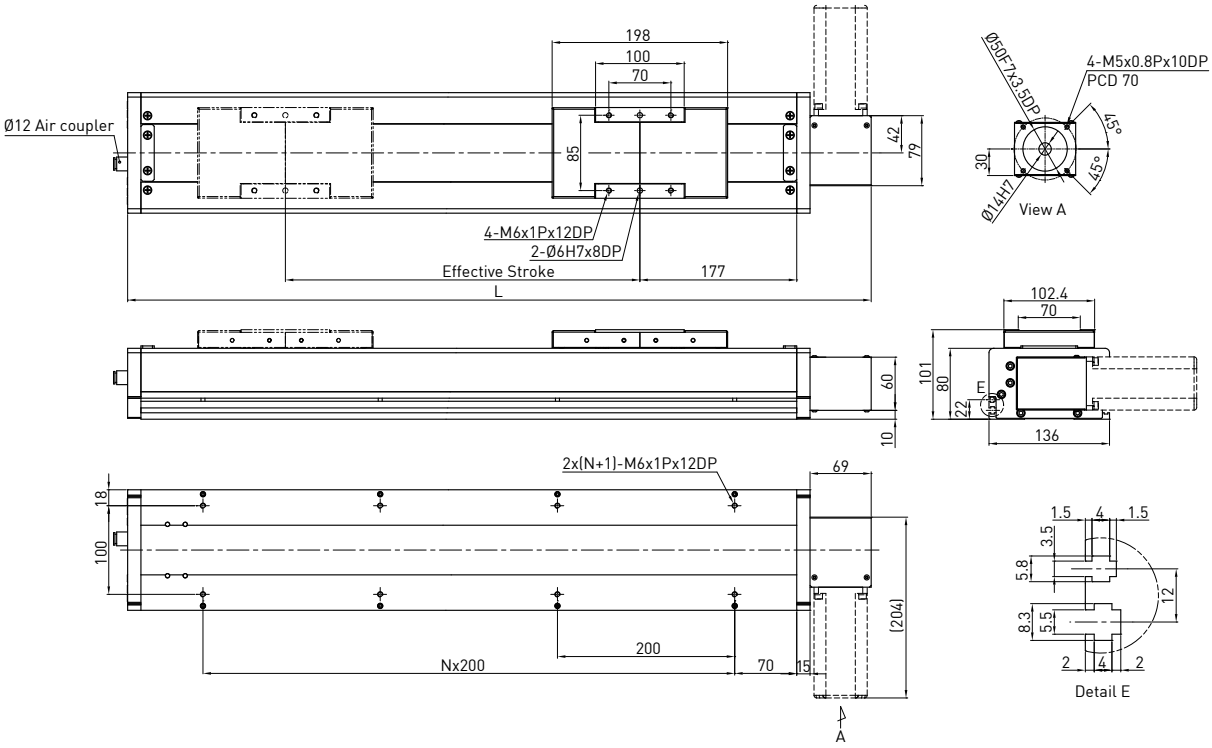
Effective stroke (mm)	L	N	Weight (kg)
200	639	2	10.4
400	839	3	12.6
600	1039	4	14.8
800	1239	5	17.0
1000	1439	6	19.2
1200	1639	7	21.4
1400	1839	8	23.6
1600	2039	9	25.8
1800	2239	10	28.0
2000	2439	11	30.2
2200	2639	12	32.4
2400	2839	13	34.6
2600	3039	14	36.8
2800	3239	15	39.0
3000	3439	16	41.2

AC motor output			W	200
Drive				Timing Belt
Pulley Perimeter			mm	120
Pulley RPM			RPM	900
Max linear speed			mm/sec	1800
Rated thrust			N	67
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	15
Rated dynamic load*		Fyd	N	50
		Fzd	N	150
		Mxd	N-m	70
		Myd	N-m	86
		Mzd	N-m	26
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

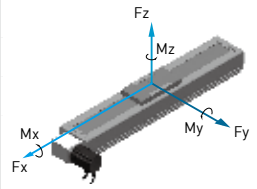
*The load condition is based on 10,000km operation.
**For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KS140B-FR

KS140	B	-120	C	-3000	A	FR	S2	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
			C: Normal		A: Standard	FR: Right	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



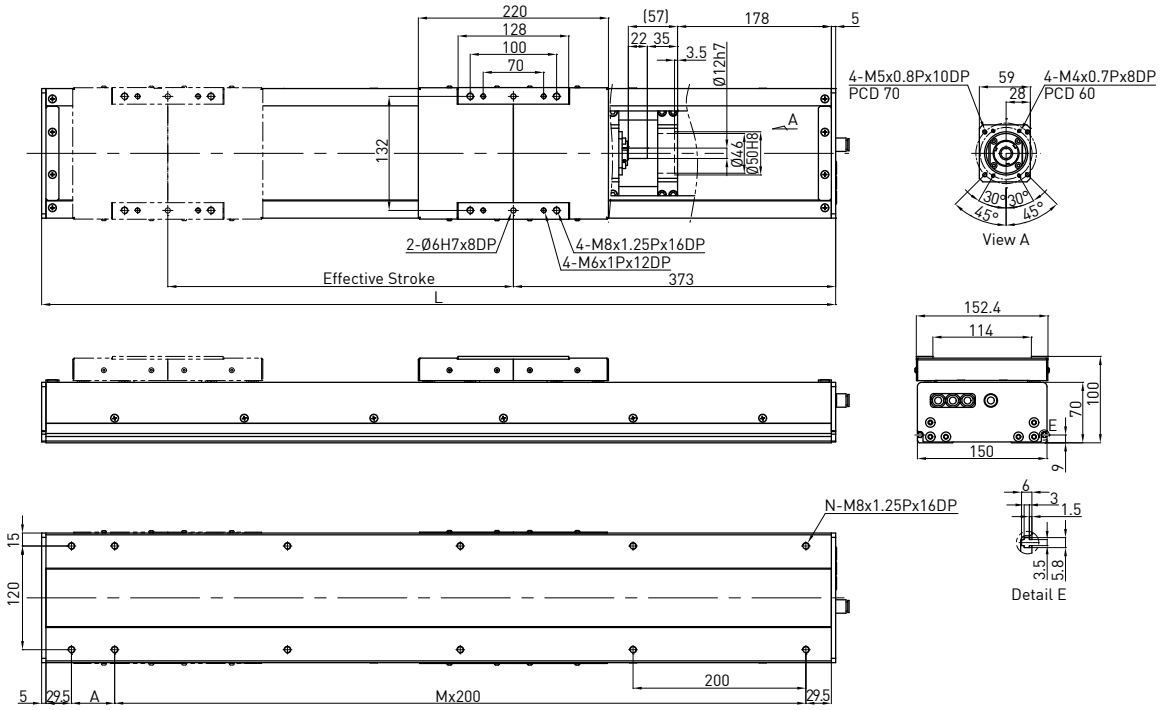
Effective stroke (mm)	L	N	Weight (kg)
200	639	2	10.4
400	839	3	12.6
600	1039	4	14.8
800	1239	5	17.0
1000	1439	6	19.2
1200	1639	7	21.4
1400	1839	8	23.6
1600	2039	9	25.8
1800	2239	10	28.0
2000	2439	11	30.2
2200	2639	12	32.4
2400	2839	13	34.6
2600	3039	14	36.8
2800	3239	15	39.0
3000	3439	16	41.2

AC motor output			W	200
Drive				Timing Belt
Pulley Perimeter			mm	120
Pulley RPM			RPM	900
Max linear speed			mm/sec	1800
Rated thrust			N	67
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	15
Rated dynamic load*		Fyd	N	50
		Fzd	N	150
		Mxd	N-m	70
		Myd	N-m	86
		Mzd	N-m	26
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

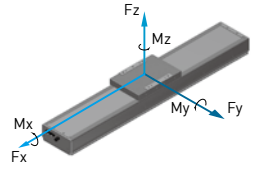
*The load condition is based on 10,000km operation.
**For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KS150

KS150	-10	P	-1250	A	FI	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	10 mm 20 mm	C: Normal P: Precision		A: Standard	FI: Internal	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



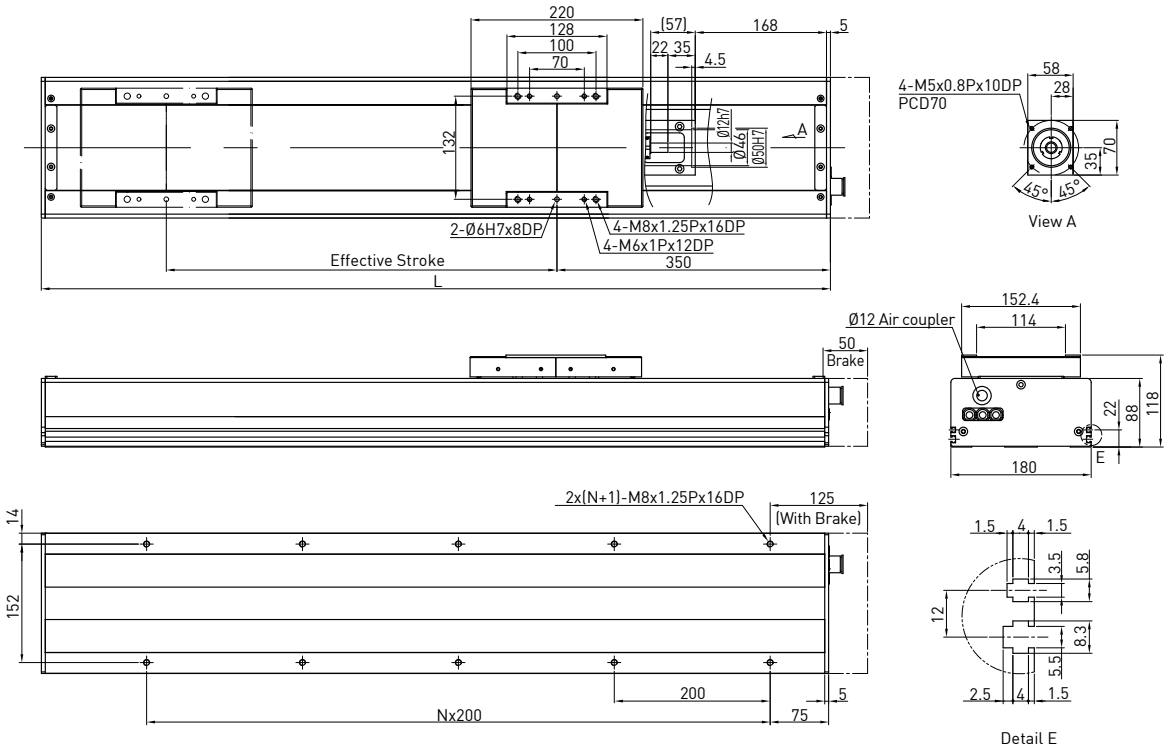
Effective stroke (mm)	L	A	M	N	Weight (kg)
150	669	200	2	8	13.96
200	719	50	3	10	14.84
250	769	100	3	10	15.72
300	819	150	3	10	16.6
350	869	200	3	10	17.48
400	919	50	4	12	18.36
450	969	100	4	12	19.24
500	1019	150	4	12	20.12
550	1069	200	4	12	21
600	1119	50	5	14	21.88
650	1169	100	5	14	22.76
700	1219	150	5	14	23.64
750	1269	200	5	14	24.52
800	1319	50	6	16	25.4
850	1369	100	6	16	26.28
900	1419	150	6	16	27.16
950	1469	200	6	16	28.04
1000	1519	50	7	18	28.92
1050	1569	100	7	18	29.8
1100	1619	150	7	18	30.68
1150	1669	200	7	18	31.56
1200	1719	50	8	20	32.44
1250	1769	100	8	20	33.32

AC motor output			W	200	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	280	140
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	87	45
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	870	450
		Mxd	N-m	60	66
		Myd	N-m	80	86
		Mzd	N-m	20	26
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz are working loads				

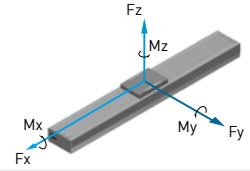
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS180 -FI

KS180	-20	P	-1200	A	FI	S2	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	10mm 20mm	P: Precision C: Normal		A: Standard	FI: Internal	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



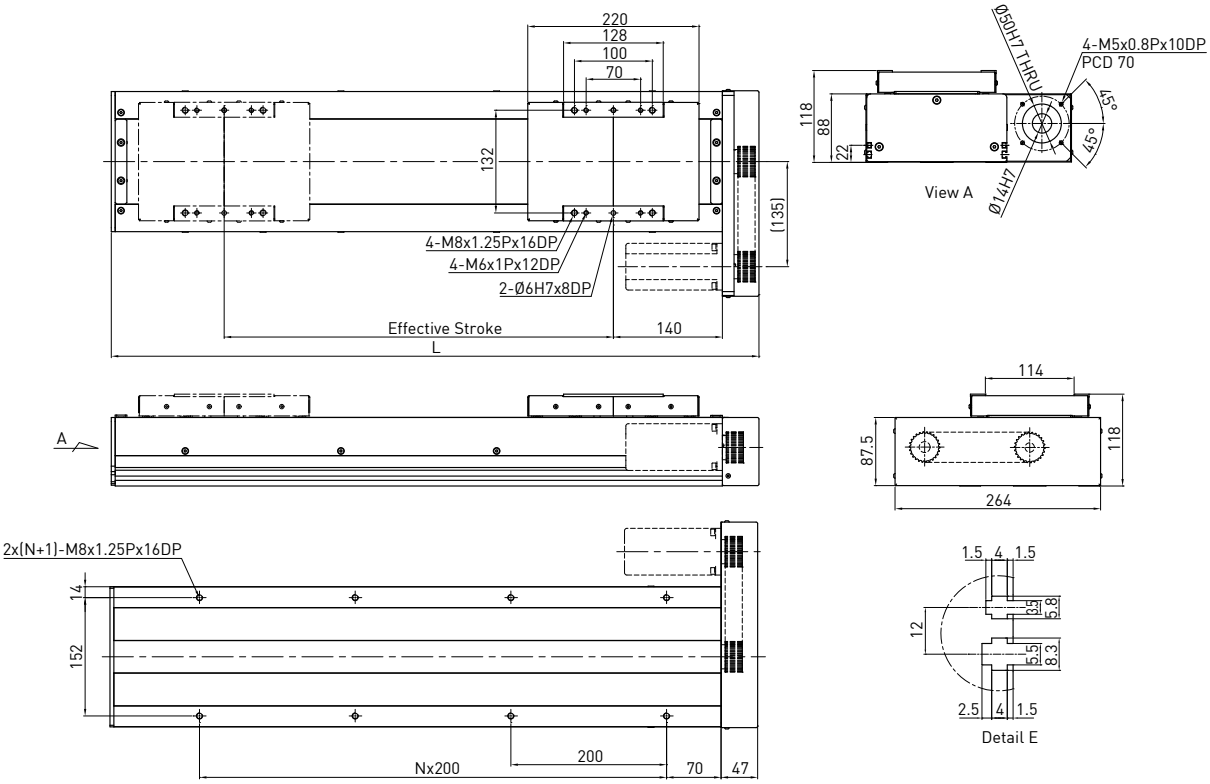
Effective stroke (mm)	L	N	Weight (kg)
200	710	3	16.5
300	810	3	18.1
400	910	4	19.7
500	1010	4	21.3
600	1110	5	22.9
700	1210	5	24.4
800	1310	6	26
900	1410	6	27.6
1000	1510	7	29.2
1100	1610	7	30.8
1200	1710	8	32.3

AC motor output			W	400	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	560	280
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	95	46
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	950	460
		Mxd	N-m	70	80
		Myd	N-m	80	90
		Mzd	N-m	22	23
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

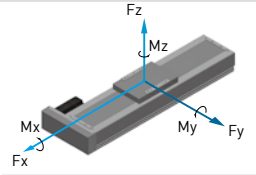
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS180-FL

KS180	-20	P	-1200	A	FL	S2	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	10mm 20mm	P: Precision C: Normal		A: Standard	FL: Left	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



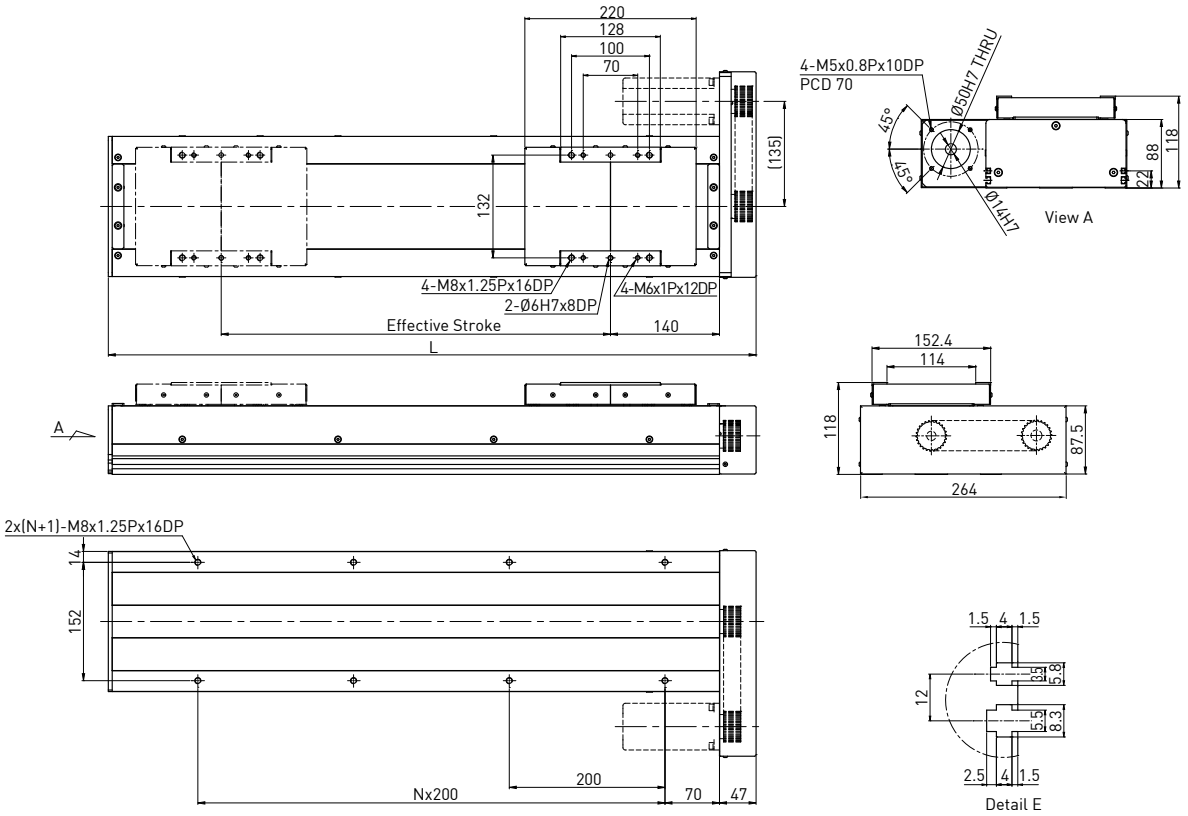
Effective stroke (mm)	L	N	Weight (kg)
200	532	1	11.3
300	632	2	12.3
400	732	2	13.3
500	832	3	14.3
600	932	3	15.3
700	1032	4	16.3
800	1132	4	17.3
900	1232	5	18.3
1000	1332	5	19.3
1100	1432	6	20.3
1200	1532	6	21.3

AC motor output			W	400	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	560	280
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	95	46
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	950	460
		Mxd	N-m	70	80
		Myd	N-m	80	90
		Mzd	N-m	22	23
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

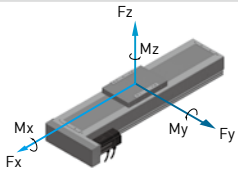
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS180-FR

KS180	-20	P	-1200	A	FR	S2	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	10mm 20mm	P: Precision C: Normal		A: Standard	FR: Right	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



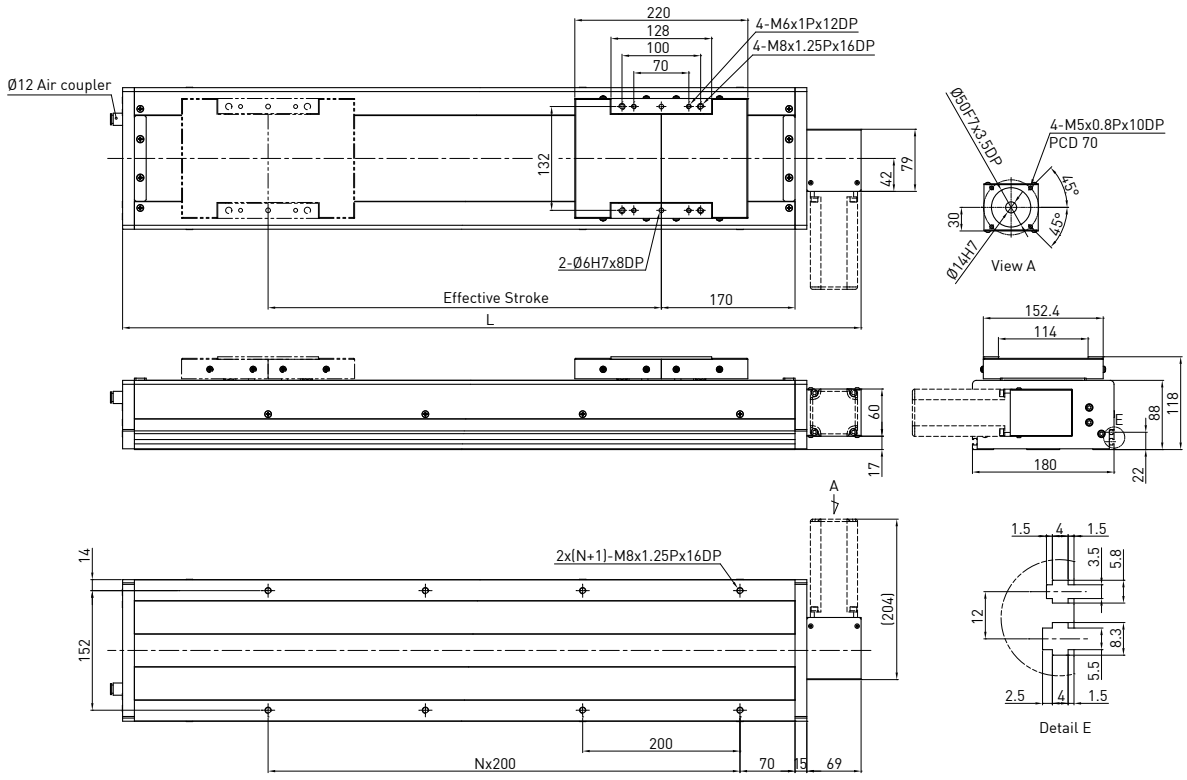
Effective stroke (mm)	L	N	Weight (kg)
200	532	1	11.3
300	632	2	12.3
400	732	2	13.3
500	832	3	14.3
600	932	3	15.3
700	1032	4	16.3
800	1132	4	17.3
900	1232	5	18.3
1000	1332	5	19.3
1100	1432	6	20.3
1200	1532	6	21.3

AC motor output			W	400	
Drive				Ballscrew C7(normal)	
Lead			mm	10	20
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	500	1000
Rated thrust			N	560	280
Repeatability			mm	±0.02	
Effective stroke			mm	150~1250	
Max load (H)			kg	95	46
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	950	460
		Mxd	N-m	70	80
		Myd	N-m	80	90
		Mzd	N-m	22	23
Permitted load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads				

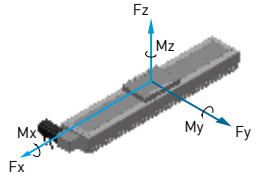
* Vibration might occur when the effective stroke is longer than 700mm.
The maximum speed should be decreased by 15% for every 100mm of increased stroke.
** The load condition is based on 10,000km operation.
*** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KS180B-FL

KS180	B	-120	C	-3000	A	FL	S2	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
			C: Normal		A: Standard	FL: Left	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



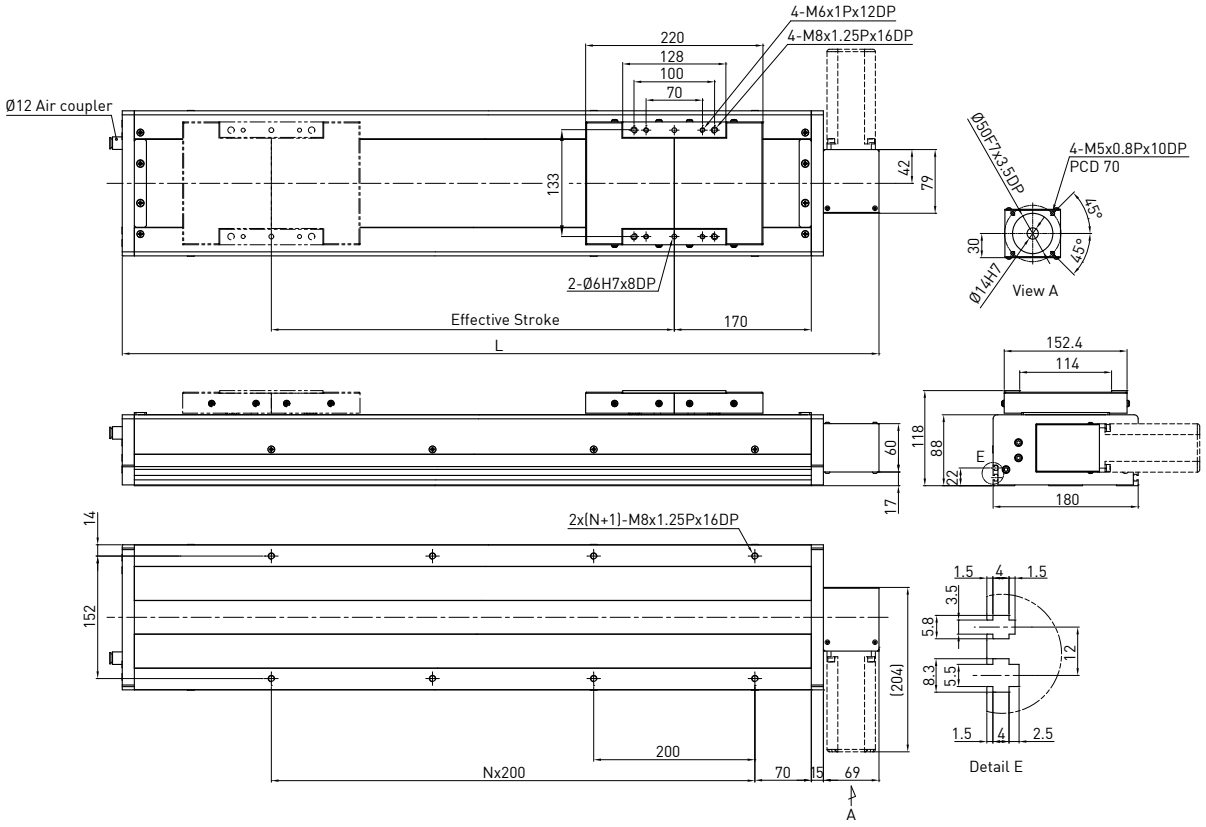
Effective stroke (mm)	L	N	Weight (kg)
200	639	2	14.2
400	839	3	17.0
600	1039	4	19.8
800	1239	5	22.6
1000	1439	6	25.4
1200	1639	7	28.2
1400	1839	8	31.0
1600	2039	9	33.8
1800	2239	10	36.6
2000	2439	11	39.4
2200	2639	12	42.2
2400	2839	13	45.0
2600	3039	14	47.8
2800	3239	15	50.6
3000	3439	16	53.4

AC motor output			W	400
Drive				Timing Belt
Pulley Perimeter			mm	120
Pulley RPM			RPM	900
Max linear speed			mm/sec	1800
Rated thrust			N	133
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	30
Rated dynamic load*		Fyd	N	50
		Fzd	N	300
		Mxd	N-m	82
		Myd	N-m	92
		Mzd	N-m	23
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

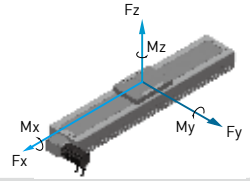
*The load condition is based on 10,000km operation.
**For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KS180B-FR

KS180	B	-120	C	-3000	A	FR	S2	M
Model	Timing Belt	Pulley Perimeter	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
			C: Normal		A: Standard	FR: Right	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	N	Weight (kg)
200	639	2	14.2
400	839	3	17.0
600	1039	4	19.8
800	1239	5	22.6
1000	1439	6	25.4
1200	1639	7	28.2
1400	1839	8	31.0
1600	2039	9	33.8
1800	2239	10	36.6
2000	2439	11	39.4
2200	2639	12	42.2
2400	2839	13	45.0
2600	3039	14	47.8
2800	3239	15	50.6
3000	3439	16	53.4

AC motor output			W	400
Drive				Timing Belt
Pulley Perimeter			mm	120
Pulley RPM			RPM	900
Max linear speed			mm/sec	1800
Rated thrust			N	133
Repeatability			mm	±0.1
Effective stroke			mm	200~3000
Max load (H)			kg	30
Rated dynamic load*		Fyd	N	50
		Fzd	N	300
		Mxd	N-m	82
		Myd	N-m	92
		Mzd	N-m	23
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

*The load condition is based on 10,000km operation.
**For horizontal application only. If used in special condition, please contact HIWIN.

Industrial Robot

KU Series

5.1 Features

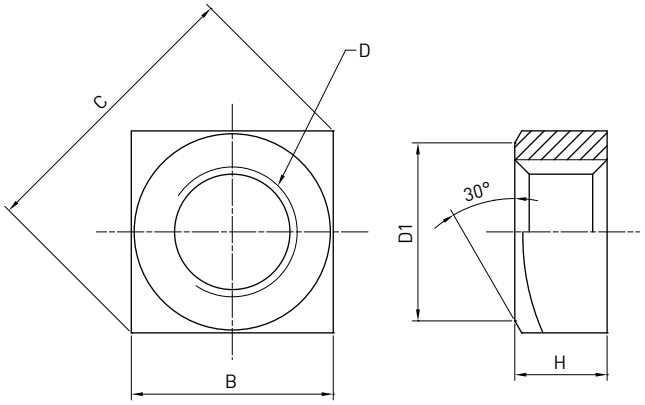
- Lightweight & Cost reduction
- High performance of dust proof
- High accuracy, High efficiency, High reliability
- Customer cost down
- Easy system installation and maintenance(Square nut use)

5.2 Applications

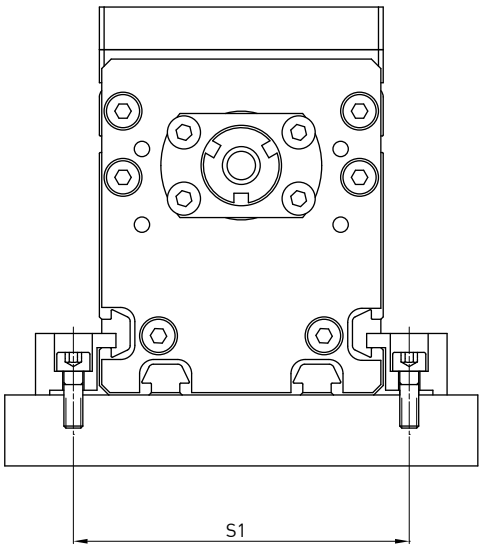
- Precision Industry & Semiconductor
- Inspection & Testing & Assembly equipment
- Optical & Medical high positional equipment

5.3 KU Fitting

Square nut



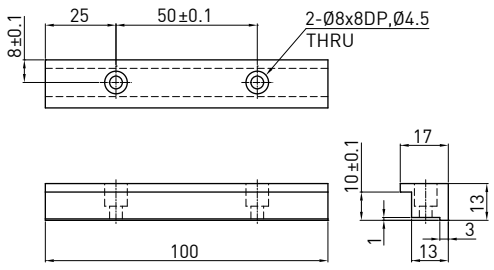
	B	C	D	D1	H
KU60	7	9.9	M4x0.7	6.8	3.2
KU80	8	11.3	M5x0.8	7.8	4



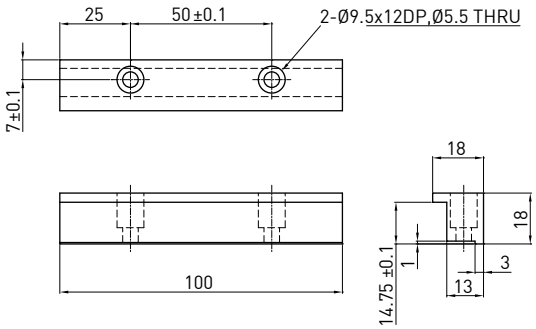
KA Model	S1	Screw
KU80	93	M5
KU60	71	M4

Fixed plate

- KU060



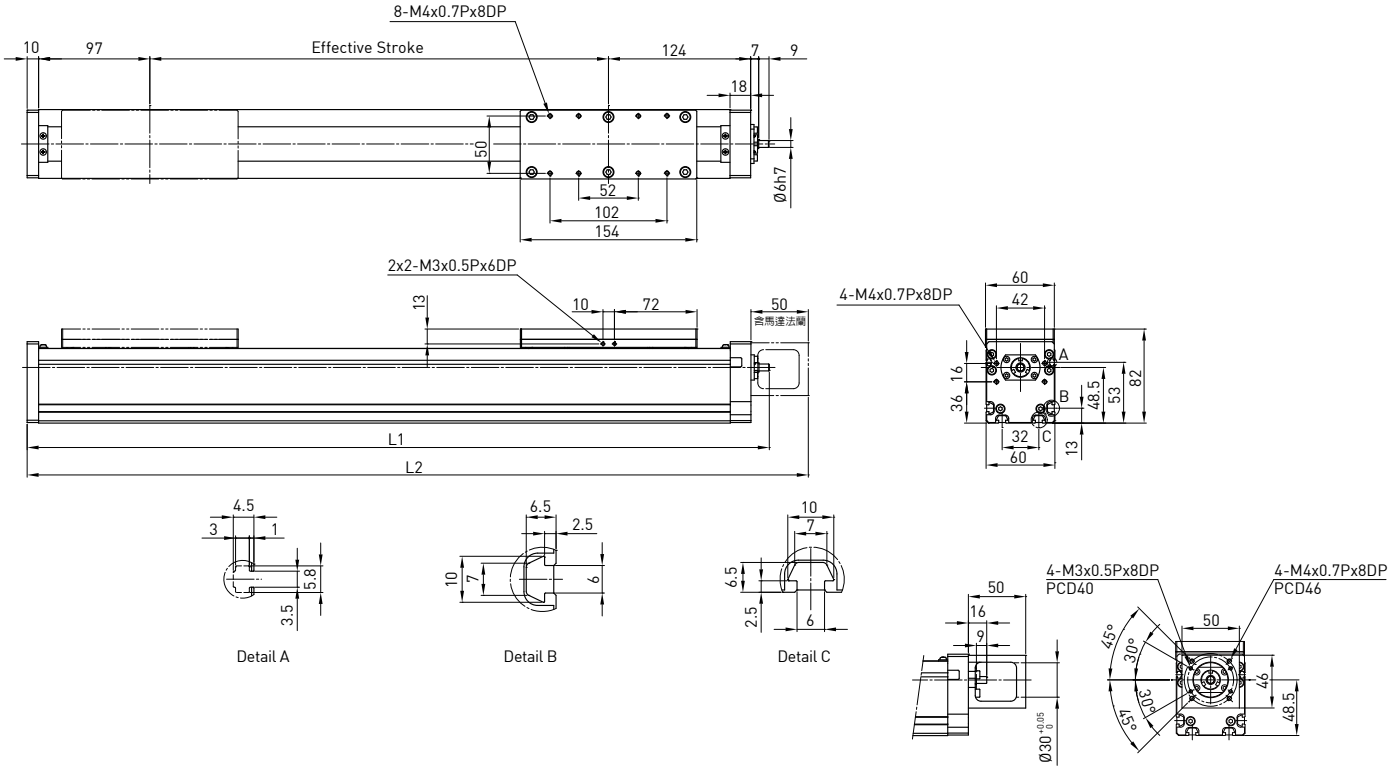
- KU080



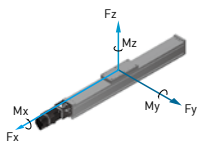
5.4 KU Series

Model Number for KU60

KU060	-10	P	-600	A	F0	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	5 mm 10 mm	C: Normal P: Precision		A: Standard	F0: 100W F: Without Flange	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective Stroke (mm)	L1	L2	Weight (kg)
50	297	331	1
100	347	381	1.5
150	397	431	2
200	447	481	2.5
250	497	531	3
300	547	581	3.5
350	597	631	4
400	647	681	4.5
450	697	731	5
500	747	781	5.5
550	797	831	6
600	847	881	6.5

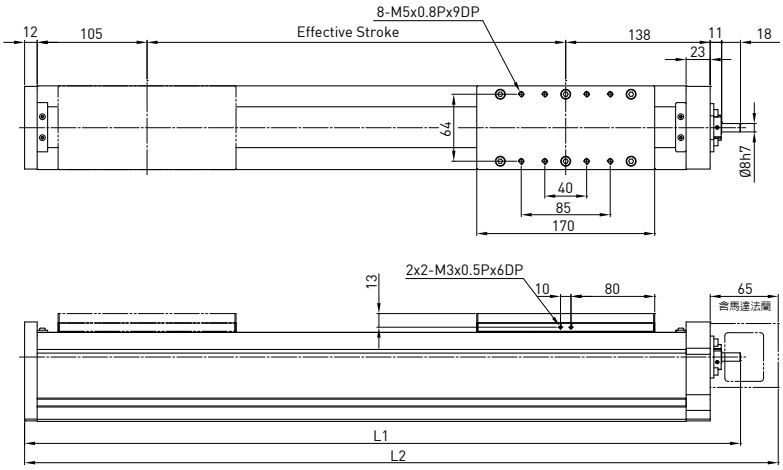
AC motor output			W	100	
Drive				Ballscrew C7(normal)	
Lead			mm	5	10
Rated RPM			RPM	3000	3000
Max linear speed*			mm/sec	250	500
Rated thrust			N	280	140
Repeatability			mm	±0.02	
Effective stroke			mm	50~600	
Max load (H)			kg	47	32
Rated dynamic load**		Fyd	N	50	50
		Fzd	N	470	320
		Mxd	N-m	7	7
		Myd	N-m	27	33
		Mzd	N-m	2	2
Permitted Load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy、Fz、Mx、My、Mz are working loads				

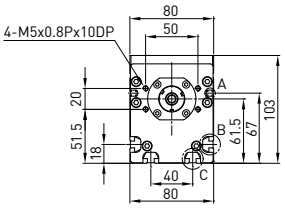
Motor Adaptor Flange F0

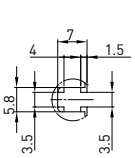
* Vibration might occur when the effective stroke is longer than 500mm.
The maximum speed should be decreased by 15% for every 50mm of increased stroke.
**The load condition is based on 10,000km operation
***For horizontal application only. If used in special condition, please contact HIWIN.

Model Number for KU80

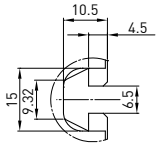
KU080	-10	P	-1100	A	F0	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	5 mm 10 mm 20 mm	C: Normal P: Precision		A: Standard	F0: 200W F: Without Flange	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



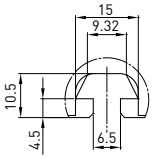




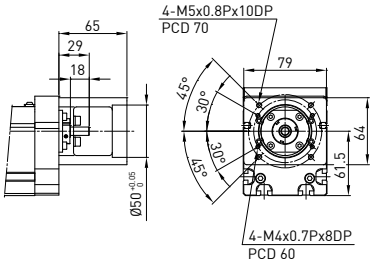
Detail A



Detail B

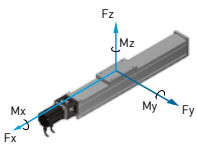


Detail C



Motor Adaptor Flange F0

Effective Stroke (mm)	L1	L2	Weight (kg)
100	384	420	7.04
150	434	470	7.48
200	484	520	7.92
250	534	570	8.36
300	584	620	8.8
350	634	670	9.24
400	684	720	9.68
450	734	770	10.12
500	784	820	10.56
550	834	870	11.0
600	884	920	11.44
650	934	970	11.88
700	984	1020	12.32
750	1034	1070	12.76
800	1084	1120	13.2
850	1134	1170	13.64
900	1184	1220	14.08
950	1234	1270	14.52
1000	1284	1320	14.96
1050	1334	1370	15.4
1100	1384	1420	15.84

AC motor output			W	200		
Drive				Ballscrew C7(normal)		
Lead			mm	5	10	20
Rated RPM			RPM	3000	3000	3000
Max linear speed*			mm/sec	250	500	1000
Rated thrust			N	560	280	140
Repeatability			mm	±0.02		
Effective stroke			mm	100~1100		
Max load (H)			kg	95	64	32
Rated dynamic load**		Fyd	N	50	50	50
		Fzd	N	950	640	320
		Mxd	N-m	6	7	8
		Myd	N-m	20	30	41
		Mzd	N-m	0.5	1	1
Permitted Load condition***	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy、Fz、Mx、My、Mz are working loads					

* Vibration might occur when the effective stroke is longer than 550mm.
The maximum speed should be decreased by 15% for every 50mm of increased stroke.
**The load condition is based on 10,000km operation
***For horizontal application only. If used in special condition, please contact HIWIN.

Industrial Robot

KE Series

6.1 Features

- Compact and lightweight
- Easy system installation and maintenance.
- MG is made of stainless steel for anti-corrosion purpose.
- Closed design.
- High accuracy, High efficiency, High reliability

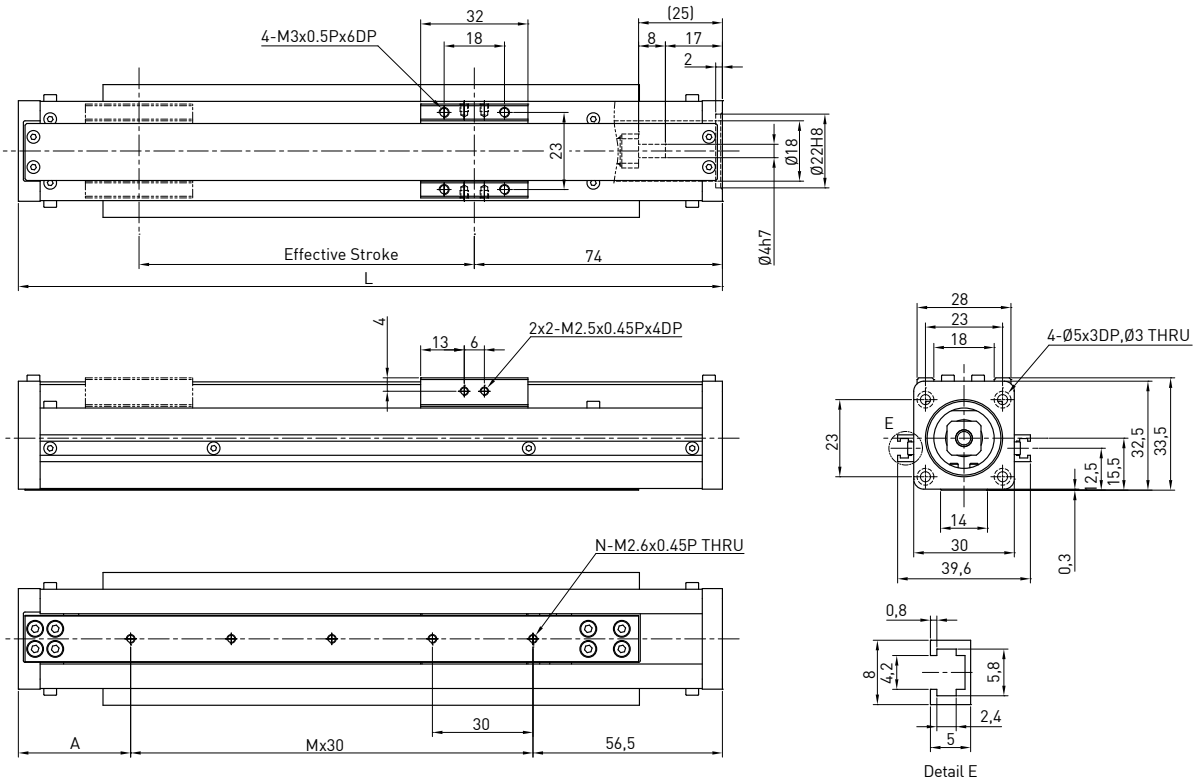
6.2 Applications

- Precision Industry & Semiconductor
- Inspection & Testing & Assembly equipment
- Optical & Medical high positional equipment

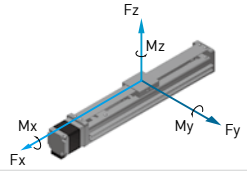
6.3 KE Series

Model Number for KE30

KE030	-1.25	C	-300	A	F0	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	1.25 mm	C: Normal P: Precision		A: Standard	F0 : Direct	S1:OMRON SX671 S2:OMRON SX674 S3:SUNX GX-F12A S4:SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



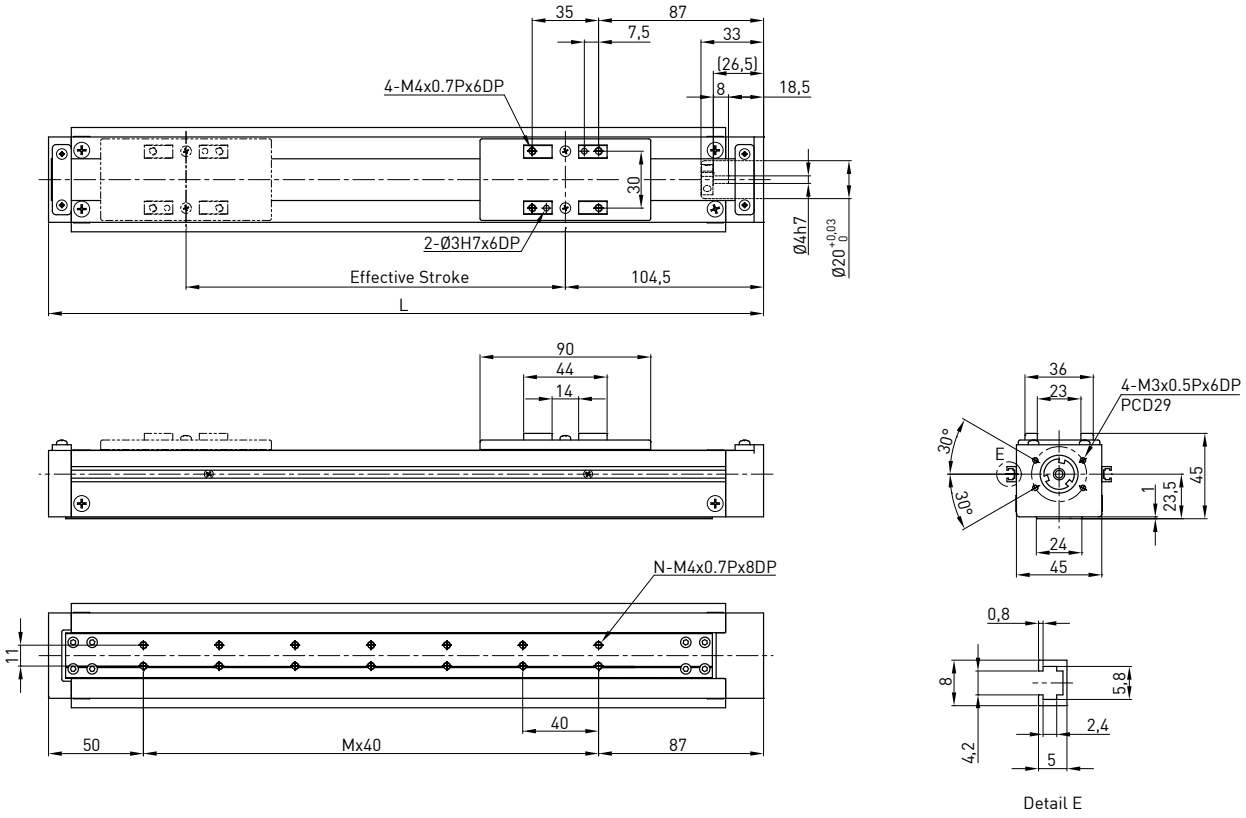
Effective stroke (mm)	L	A	M	N	Weight (kg)
50	160	43.5	2	3	0.2
100	210	33.5	4	5	0.5
150	260	23.5	6	7	0.8
200	310	43.5	7	8	1.1
250	360	33.5	9	10	1.4
300	410	53.5	10	11	1.9

AC motor output			W	28 stepping motor
Rated RPM			RPM	-
Lead			mm	1.25
Max linear speed			mm/sec	62.5
Rated thrust			N	175
Repeatability			mm	±0.02
Effective stroke			mm	50-300
Max load (H)			kg	4
Rated dynamic load*		Fyd	N	4
		Fzd	N	40
		Mxd	N-m	0.1
		Myd	N-m	0.1
		Mzd	N-m	0.1
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz Mz are working loads			

* The load condition is based on 10,000km operation.
** If used on the vertical axis or in a special condition, please contact HIWIN.

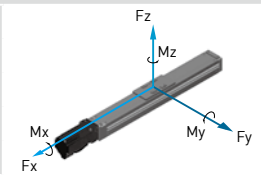
Model Number for KE40

KE040	-10	C	-300	A	F0	S1	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	2 mm 5 mm	C: Normal P: Precision		A: Standard	F0 : Direct	S1:OMRON SX671 S2:OMRON SX674 S3:SUNX GX-F12A S4:SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



Detail E

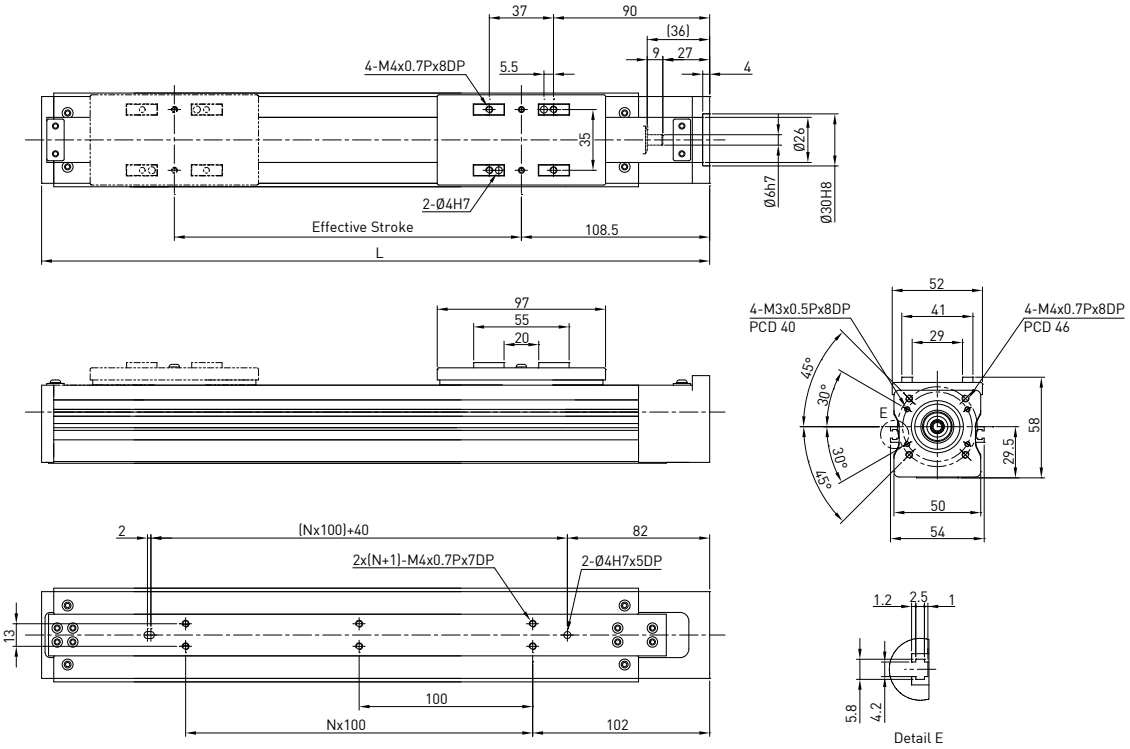
Effective stroke (mm)	L	A	M	N	Weight (kg)
50	227	60	2	6	1
100	277	70	3	8	1.3
150	327	40	5	12	1.6
200	377	50	6	14	1.9
250	427	60	7	16	2.2
300	477	70	8	18	2.5

AC motor output			W	50	
Rated RPM			RPM	3000	3000
Lead			mm	2	5
Max linear speed			mm/sec	100	250
Rated thrust			N	280	140
Repeatability			mm	±0.02	
Effective stroke			mm	50~300	
Max load (H)			kg	8	6
Rated dynamic load*		Fyd	N	6	6
		Fzd	N	80	60
		Mxd	N-m	1	1.1
		Myd	N-m	0.5	0.6
		Mzd	N-m	0.5	0.5
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\le 1$ Fy, Fz, Mx, My, Mz Mz are working loads				

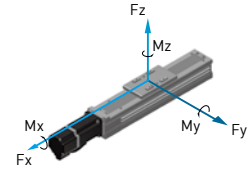
* The load condition is based on 10,000km operation.
** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KE50 (Single Slider)

KE050	-04	C	-400	A	F0	S2	M
Model	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
	4 mm	C: Normal		A: Standard	F0:Direct	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	N	Weight (kg)
100	285	1	1.4
200	385	2	1.7
300	485	3	2
400	585	4	2.3

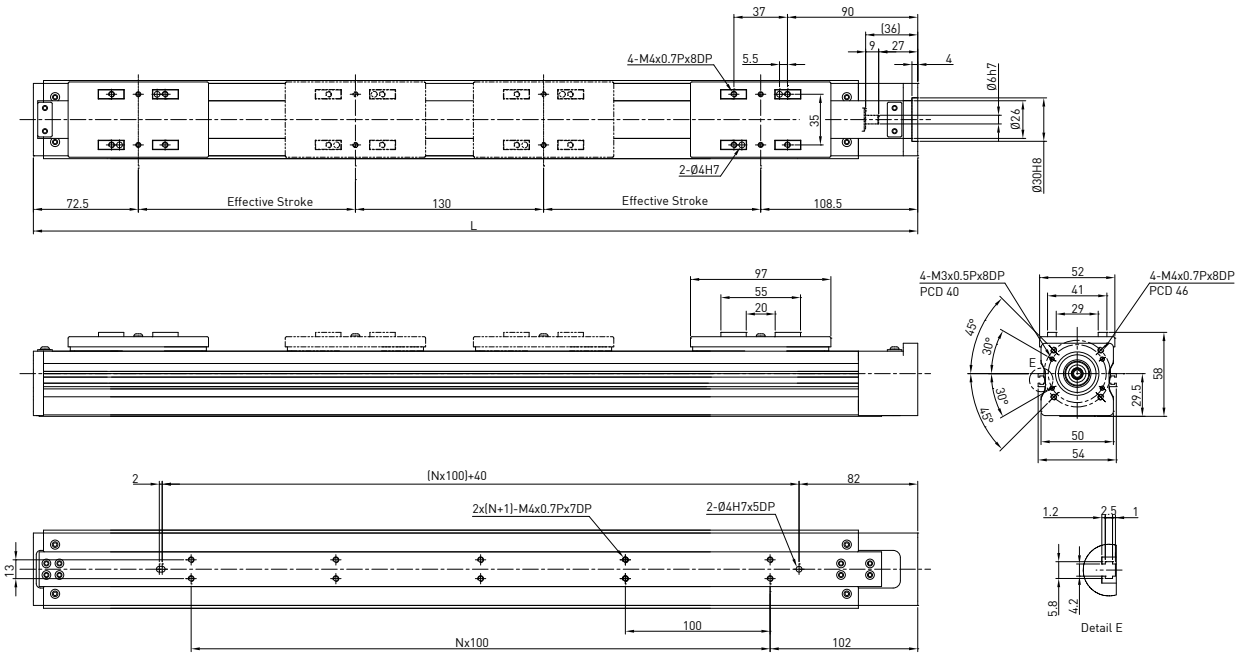
AC motor output			W	100
Rated RPM			RPM	3000
Lead			mm	4
Max linear speed			mm/sec	200
Rated thrust			N	175
Repeatability			mm	±0.02
Effective stroke			mm	100~400
Max load (H)			kg	10
Rated dynamic load*		Fyd	N	6
		Fzd	N	100
		Mxd	N-m	1.7
		Myd	N-m	0.8
		Mzd	N-m	0.8
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

* The load condition is based on 10,000km operation.

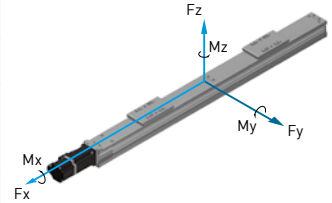
** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KE50 (Double Slider)

KE050	D	-04	C	-250	A	F0	S2	M
Model	Double Slider	Lead	Precision Grade	Effective Stroke	Slider Type	Motor Flange	Limit Switch	Motor
		4mm	C: Normal		A: Standard	F0 :Direct	S2: OMRON SX674 None: Without Sensor	M: Supplied With Motor None: Without Motor



Effective stroke (mm)	L	N	Weight (kg)
100	511	3	2.3
150	611	4	2.5
200	711	5	2.8
250	811	6	3.0

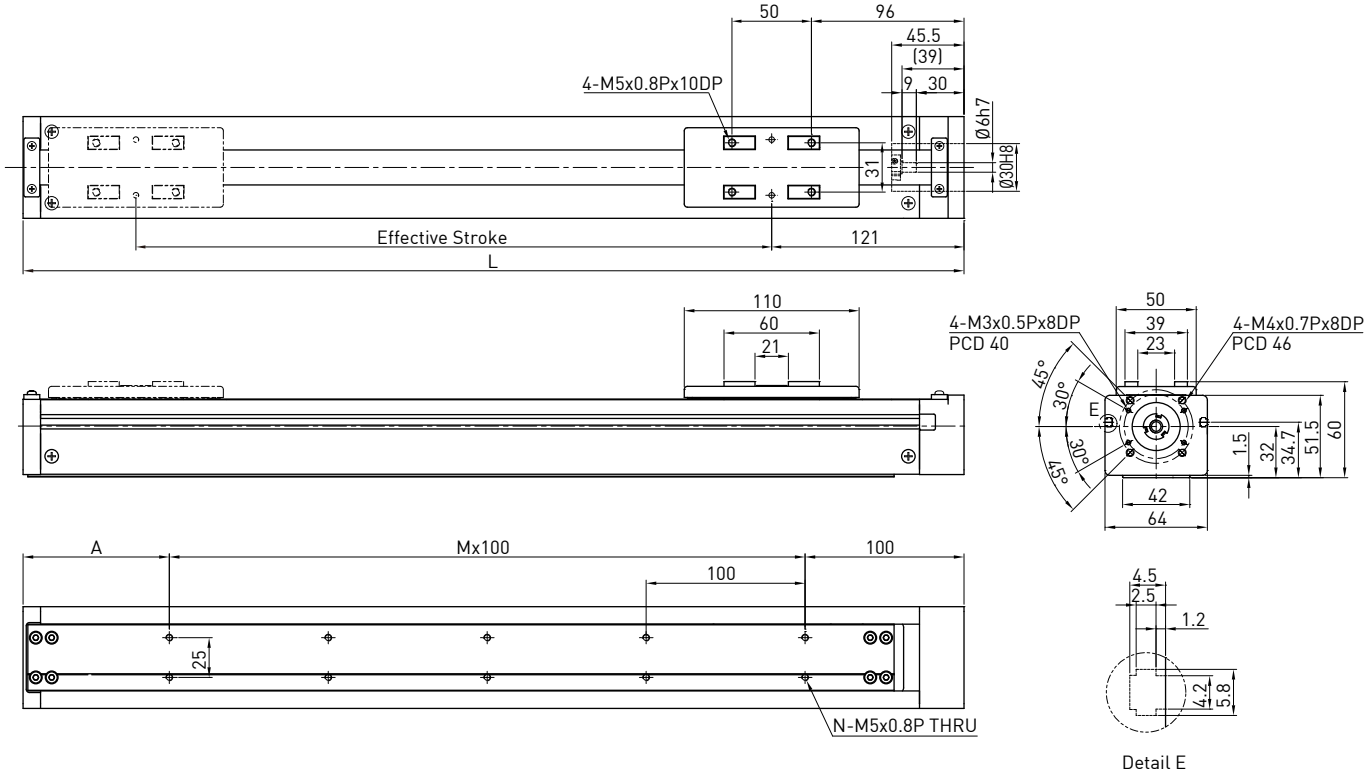
AC motor output			W	100
Rated RPM			RPM	3000
Lead			mm	4
Max linear speed			mm/sec	200
Rated thrust			N	175
Repeatability			mm	±0.02
Effective stroke			mm	100~400
Max load (H)			kg	10
Rated dynamic load*		Fyd	N	6
		Fzd	N	100
		Mxd	N-m	1.7
		Myd	N-m	0.8
		Mzd	N-m	0.8
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz are working loads			

* The load condition is based on 10,000km operation.

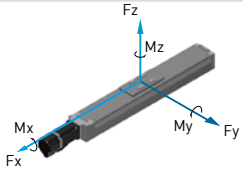
** If used on the vertical axis or in a special condition, please contact HIWIN.

Model Number for KE65

KE065	-10	C	-600	A	F0	S1	M
Model	Lead	Accuracy Grade	Effective Stroke	Slider Type	Flange F0	Limit Switch	Motor
	5 mm 10 mm	C: Normal P: Precision		A: Standard	F0: 100W	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor



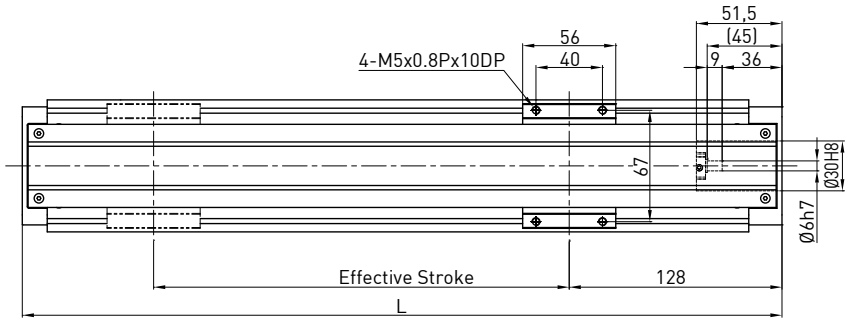
Effective stroke (mm)	L	A	M	N	Weight (kg)
50	242	42	1	4	2.5
100	292	92	1	4	2.8
150	342	42	2	6	3.1
200	392	92	2	6	3.4
250	442	42	3	8	3.7
300	492	92	3	8	4
350	542	42	4	10	4.3
400	592	92	4	10	4.6
450	642	42	5	12	4.9
500	692	92	5	12	5.2
550	742	42	6	14	5.5
600	792	92	6	14	5.8

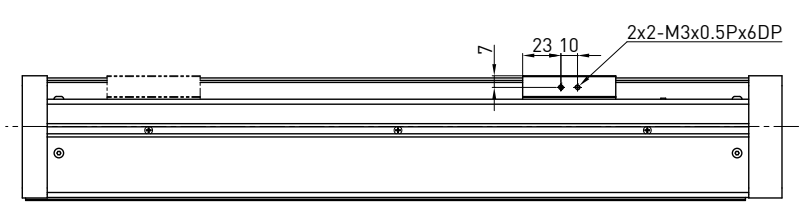
AC motor output			W	100	
Rated RPM			RPM	3000	3000
Lead			mm	5	10
Max linear speed			mm/sec	250	500
Rated thrust			N	280	140
Repeatability			mm	±0.02	
Effective stroke			mm	50~600	
Max load (H)			kg	15	13
Rated dynamic load*		Fyd	N	6	6
		Fzd	N	150	130
		Mxd	N-m	4.4	4.5
		Myd	N-m	2.3	2.4
		Mzd	N-m	2.3	2.4
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz Mz are working loads				

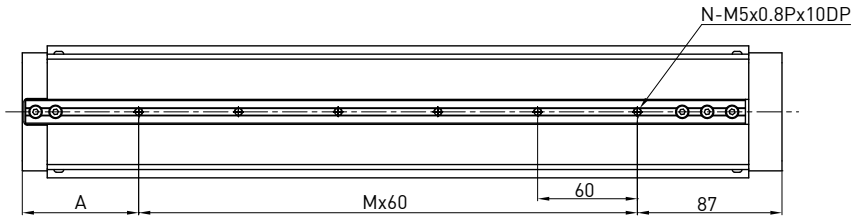
*The load condition is based on 10,000km operation
**If used on vertical axis or special condition , please contact HIWIN.

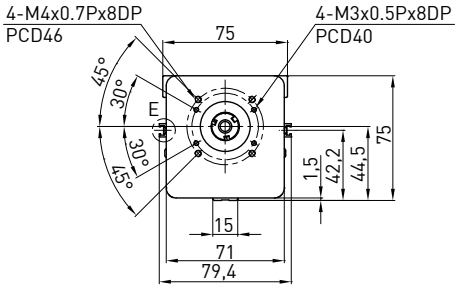
Model Number for KE70

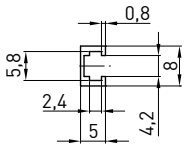
KE070	-10	C	-600	A	F0	S1	M
Model	Lead	Accuracy Grade	Effective Stroke	Slider Type	Flange F0	Limit Switch	Motor
	5 mm 10 mm	C: Normal P: Precision		A: Standard	F0: Direct	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor





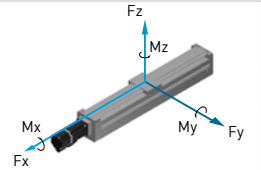






Detail E

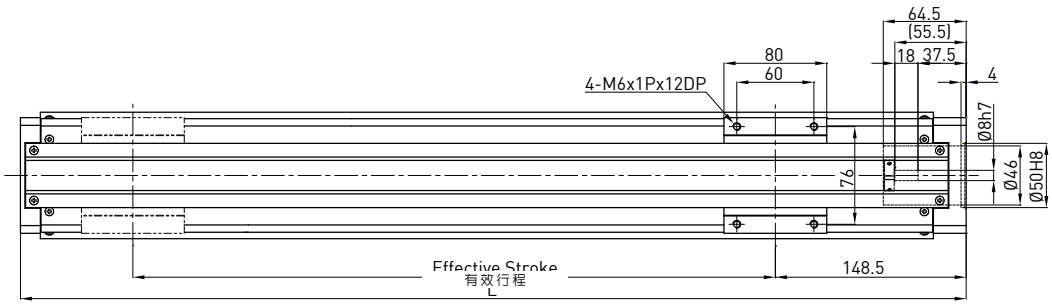
Effective stroke (mm)	L	A	M	N	Weight (kg)
50	257	50	2	3	2.8
100	307	40	3	4	3.1
150	357	90	3	4	3.4
200	407	80	4	5	3.7
250	457	70	5	6	4
300	507	60	6	7	4.3
350	557	50	7	8	4.6
400	607	40	8	9	4.9
450	657	90	8	9	5.2
500	707	80	9	10	5.5
550	757	70	10	11	5.8
600	807	60	11	12	6.1

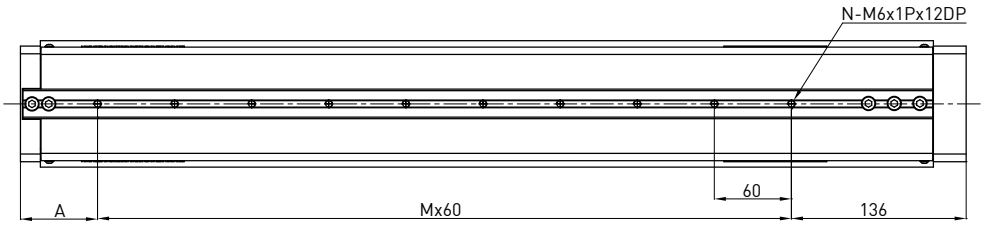
AC motor output			W	100	
Rated RPM			RPM	3000	3000
Lead			mm	5	10
Max linear speed			mm/sec	250	500
Rated thrust			N	280	140
Repeatability			mm	±0.02	
Effective stroke			mm	50~600	
Max load (H)			kg	20	18
Rated dynamic load*		Fyd	N	6	6
		Fzd	N	200	180
		Mxd	N-m	4.5	4.5
		Myd	N-m	1.8	1.8
		Mzd	N-m	1.6	1.6
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz Mz are working loads				

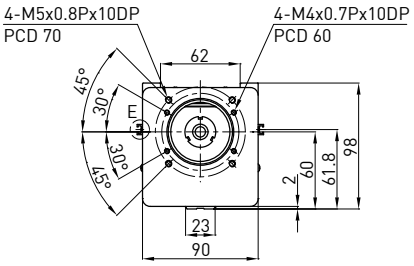
*The load condition is based on 10,000km operation
**If used on vertical axis or special condition , please contact HIWIN.

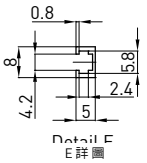
Model Number for KE90

KE090	-10	C	-600	A	F0	S1	M
Model	Lead	Accuracy Grade	Effective Stroke	Slider Type	Flange F0	Limit Switch	Motor
	5 mm 10 mm	C: Normal P: Precision		A: Standard	F0: Direct	S1: OMRON SX671 S2: OMRON SX674 S3: SUNX GX-F12A S4: SUNX GX-F12A-P None: Without Sensor	M: Supplied With Motor None: Without Motor

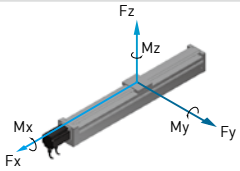








Effective stroke (mm)	L	A	M	N	Weight (kg)
50	286	90	1	2	6.7
100	336	80	2	3	7
150	386	70	3	4	7.3
200	436	60	4	5	7.6
250	486	50	5	6	7.9
300	536	40	6	7	8.2
350	586	90	6	7	8.5
400	636	80	7	8	8.8
450	686	70	8	9	9.1
500	736	60	9	10	9.4
550	786	50	10	11	9.7
600	836	40	11	12	10

AC motor output			W	100	
Rated RPM			RPM	3000	3000
Lead			mm	5	10
Max linear speed			mm/sec	250	500
Rated thrust			N	280	140
Repeatability			mm	±0.02	
Effective stroke			mm	50~600	
Max load (H)			kg	25	23
Rated dynamic load*		Fyd	N	6	6
		Fzd	N	250	230
		Mxd	N-m	13	12
		Myd	N-m	7.1	7
		Mzd	N-m	7.1	6.9
Permitted load condition**	$\frac{Fy}{Fyd}+\frac{Fz}{Fzd}+\frac{Mx}{Mxd}+\frac{My}{Myd}+\frac{Mz}{Mzd}\leq 1$ Fy, Fz, Mx, My, Mz Mz are working loads				

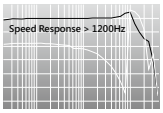
*The load condition is based on 10,000km operation
**If used on vertical axis or special condition , please contact HIWIN.

Industrial Robot

Motor & Drive

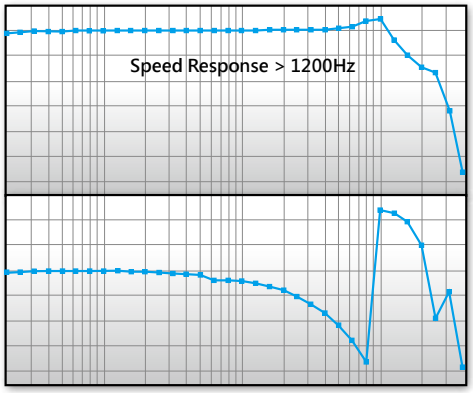
7.1 Feature

Excellent Performance



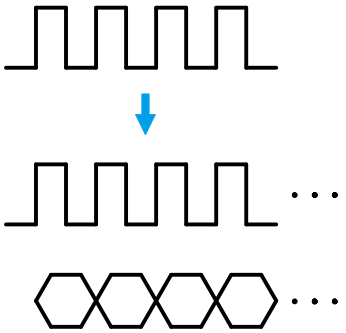
Excellently high speed response

With help of semiconductor high-end motion control algorithm and advanced common gain concept, the high speed response is achieved, therefore satisfying all of the motion control needs.



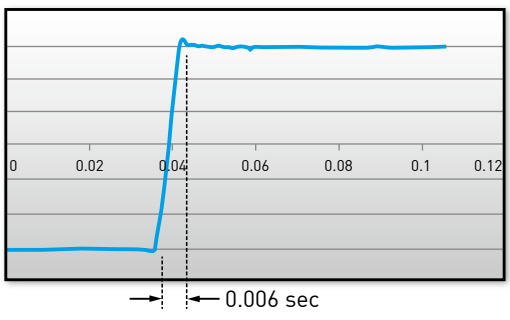
17bit High resolution encoder

Thanks to the advanced serial encoder technology, a resolution of 131072 count/rev is reached. It guarantees the performance of most demanded motions.



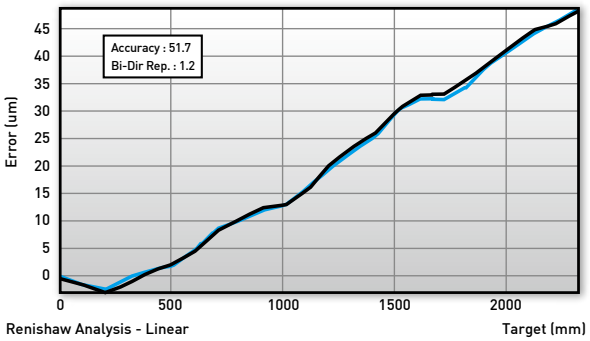
High acceleration responses

Using advanced WizAlg controller design tools, plus space vector current control technology, servo performance has been achieved to the highest level. To change motor speed from -3000 to +3000 rpm, it takes as low as 0.006 second.

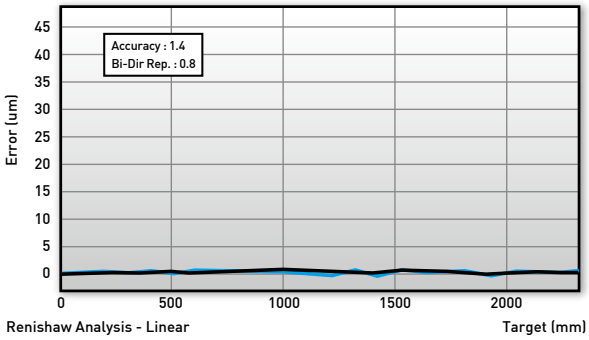


Built-in accuracy improvement features

D2 drive includes features to improve total positioning accuracy of the mechanical system. The table size can be up to 16000 points. It is implemented in all control modes to optimize system behavior.



Without compensation

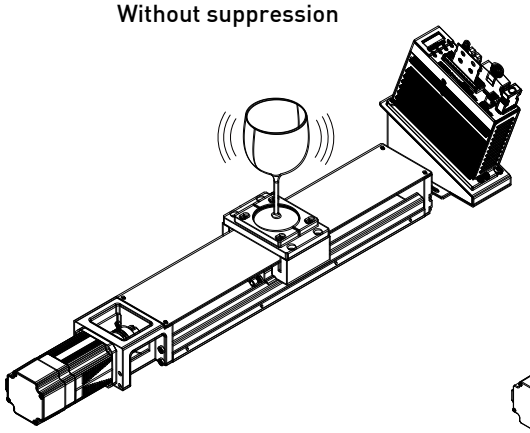


With compensation

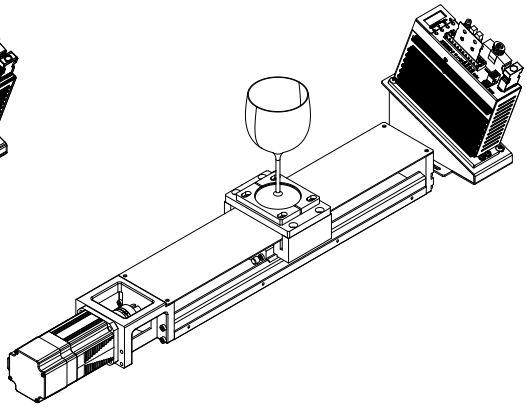
Vibration Suppression Feature

D2 drive can remove the vibration frequency that occurs during movement. It reduces vibrations caused by system's structure and improve the machine's production efficiency.

Without suppression



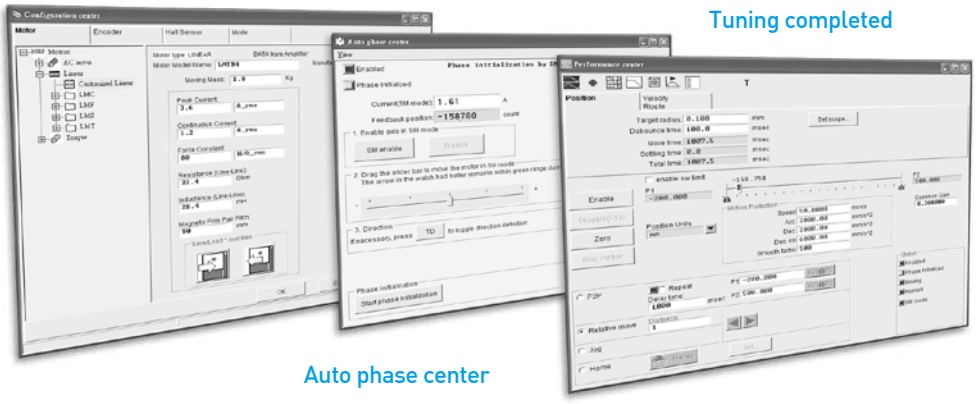
With suppression



Simple Operation

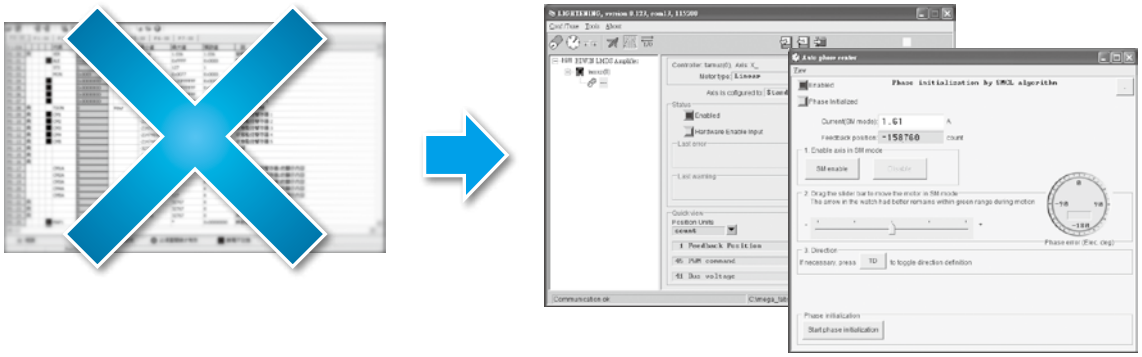
Simple setup

Three Steps



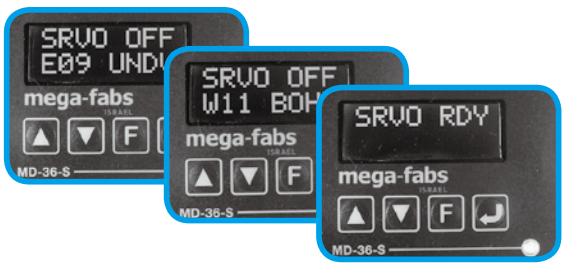
Easy operation

Parameters are categorized according to features, only necessary ones are shown at the right time. No confusing parameter list.



LCD display

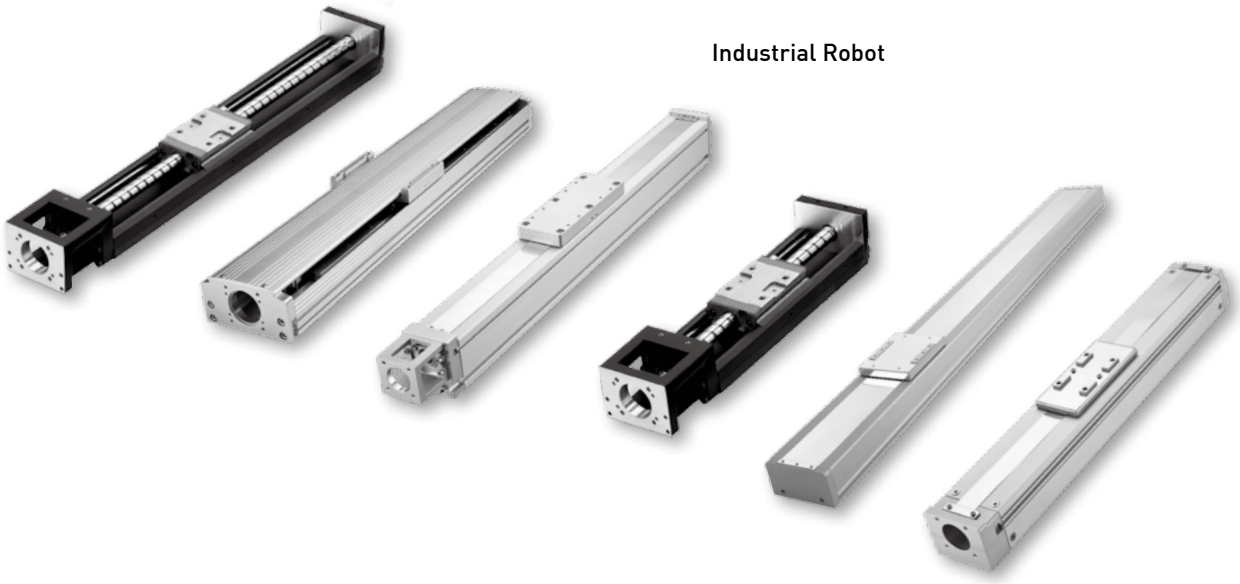
Without PC and user's interface, it is possible to complete basic settings. The LCD display shows the necessary error or warning information and statuses. With push buttons on the panel, it is possible to set gains and test run.



Easy Integration

The total solution

HIWIN provides positioning modules, motors, and the best servo drive solution from mega-fabs. According to customer's requirements we can integrate all that are required for user's easiness of application.



Industrial Robot

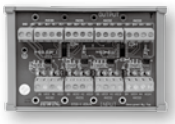
Mega-Fabs Drive

AC servo Motor

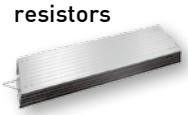
Line Filter

Ferrite core

STDO terminal



Regenerative resistors

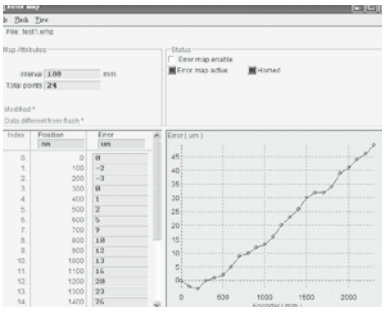


Complete Tool Sets

Real time scope, frequency analysis tool, gain scheduling tools, I/O settings, electronic gear tools, encoder output scale etc makes the complete tools for motion control in diverse fields.

Accuracy enhancement

To improve on the positioning accuracy of motion systems, the D2 amplifier is featured with an error compensation function. By taking the measurements from a laser interferometer, the positioning error table can be built inside the D2, so that high positioning accuracy is achieved.

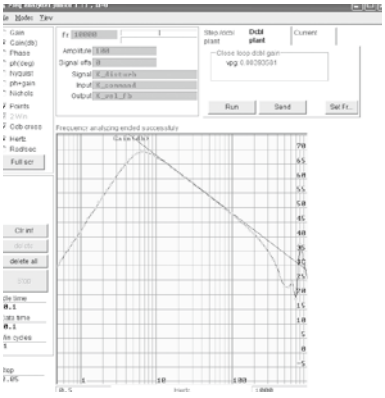


Advanced gain scheduling feature

After setting gains through optimization tools, there is only one value to adjust: the common gain. During motion, the D2 drive provides a gain scheduling function. You can adjust the gain according to different phases of motion, such as moving phase, settling phase, and in-position phase.

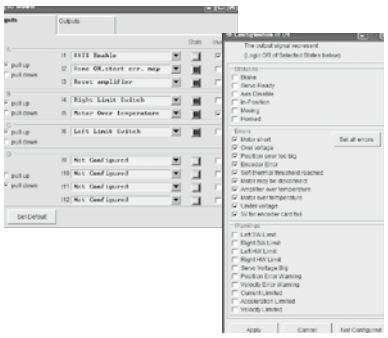
Optimization tools

The D2 provides a powerful and easy to use tool for optimization. You can use the frequency analysis tools to display the real response in the form of a graph. You can easily set the best gain value for the system based on the real response, even first time users can easily get started.



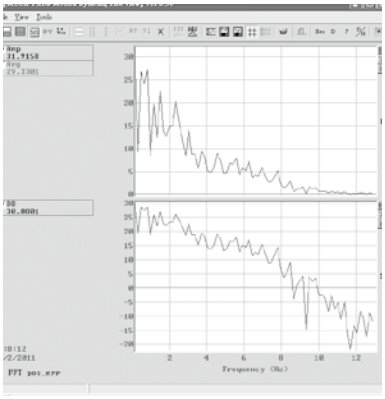
Variety of I / O functions

In response to a number of different functions, you are free to configure the I / O pin functionality and adapt different hardware interface needs. This satisfies diverse requirements for different motion controllers with regards to their pin assignments and hardware interfaces.



Analysis Tools

To solve a resonance problem, the D2 drive offers a filter design tool for improving the control performance, a Fast Fourier Transform (FFT) and other mathematical operation tools.. You can use the functions to calculate the resonant frequency of the system easily, and to make the filter design more accurate.

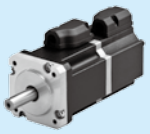
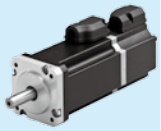
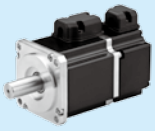
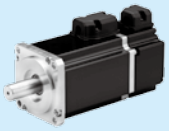


7.2 Application international safety standards

CE

		Drive	Motor
EC Directives	EMC Directives	EN55011 EN61000-6-2 EN61000-6-4 EN61000-3-2 EN61000-3-3	EN55011 EN61000-6-2 EN61000-6-4
	Low-Voltage Directives	EN61800-5-1	EN60034-1 EN60034-5

7.3 Motor line-up / Application

Motor			Voltage	Rated Output (W)	Rated Rotational Speed(Max Speed)(rpm)	Rotary Encoder		Enclosure Rating	Application
						13-bit	17-bit		
Low Inertia	FRLS		220V	50W	3000 4500	◎	◎	IP54/IP65	◆Semiconductor equipment ◆Packing machines ◆SMT machines ◆Food machines ◆LCD equipment
			220V	100W	3000 4500	◎	◎		
			220V	200W	3000 4500	◎	◎		
			220V	400W	3000 4500	◎	◎		
Middle Inertia	FRMS		220V	750W	3000 4500	◎	◎	IP54/IP65	◆Semiconductor equipment ◆Packing machines ◆SMT machines ◆Food machines ◆LCD equipment
	FRMM		220V	1000W	2000 3000	◎	◎	IP54/IP65	◆Machine tools ◆Conveyors ◆Textile machines ◆Robots

7.4 Model designation

Drive-Series of D2

D2	04	2	3	S	B	0
1st+2nd	3rd+4th	5th	6th	7th	8th	9th

1st+2nd	
D2	HIWIN Drive-Series of D2

3rd+4th	Rated Output
01	50W / 100W
04	200W / 400W
10	750W / 1000W

5th	Phase
2	Single Phase / 3Phase

6th	Voltage Range
3	110V / 220V

9th	Encoder Type
0	13-bit Incremental
4	17-bit Incremental

8th	Frame
A	Frame A
B	Frame B
C	Frame C

7th	Interface
P	Pulse
S	Full Function

Servo motor

FR	LS	40	2	0	4	06	A
1st+2nd	3rd+4th	5th+6th	7th	8th	9th	10th+11th	12th

1st+2nd	
FR	HIWIN AC Servo Motor Series

3rd+4th	Motor type
LS	Low Inertia Small Capacity
MS	Middle Inertia Small Capacity
MM	Middle Inertia Middle Capacity

5th+6th	Output Power
05	50W
10	100W
20	200W
40	400W
75	750W
1K	1000W

7th	Drive Input Voltage
2	220V

12th	Shaft		Oil Seal	
	Round	Key, Center tap	With	Without
A	◎			◎
B	◎		◎	
C		◎		◎
D		◎	◎	

10th+11th	Frame Size
A4	42mm
06	60mm
08	80mm
13	130mm

9th	Encoder Type
5	13-bit Incremental
3	17-bit Incremental

8th	Brake Option
0	Without Brake
B	With Brake

Motor cable & Brake cable

HVP	S	04	A	A	05M	A
1st+2nd+3rd	4th	5th+6th	7th	8th	9th+10th+11th	12th

1st+2nd+3rd
HIWIN Power Extension Cable

4th	Capacity Type
Code	Specification
S	Small Capacity (0.05KW~0.75KW)
M	Middle Capacity (1KW)

5th+6th	Number of pin
Code	Specification
04	Power
06	Brake & Power

7th	Motor Side Connector
Code	Specification
A	AMP Connector
B	Straight Connector
C	L-Shaped Connector

12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

8th	Driver Side Connector
Code	Specification
A	Rod terminal

Encoder cable

HVE	17A	A	B	05M	A
1st+2nd+3rd	4th+5th+6th	7th	8th	9th+10th+11th	12th

1st+2nd+3rd
HIWIN Encoder Extension Cable

4th+5th+6th	Encoder Type
Code	Specification
13I	13-bit Incremental
17I	17-bit Incremental

7th	Encoder Side Connector
Code	Specification
A	AMP Connector
B	Straight Connector
C	L-Shaped Connector

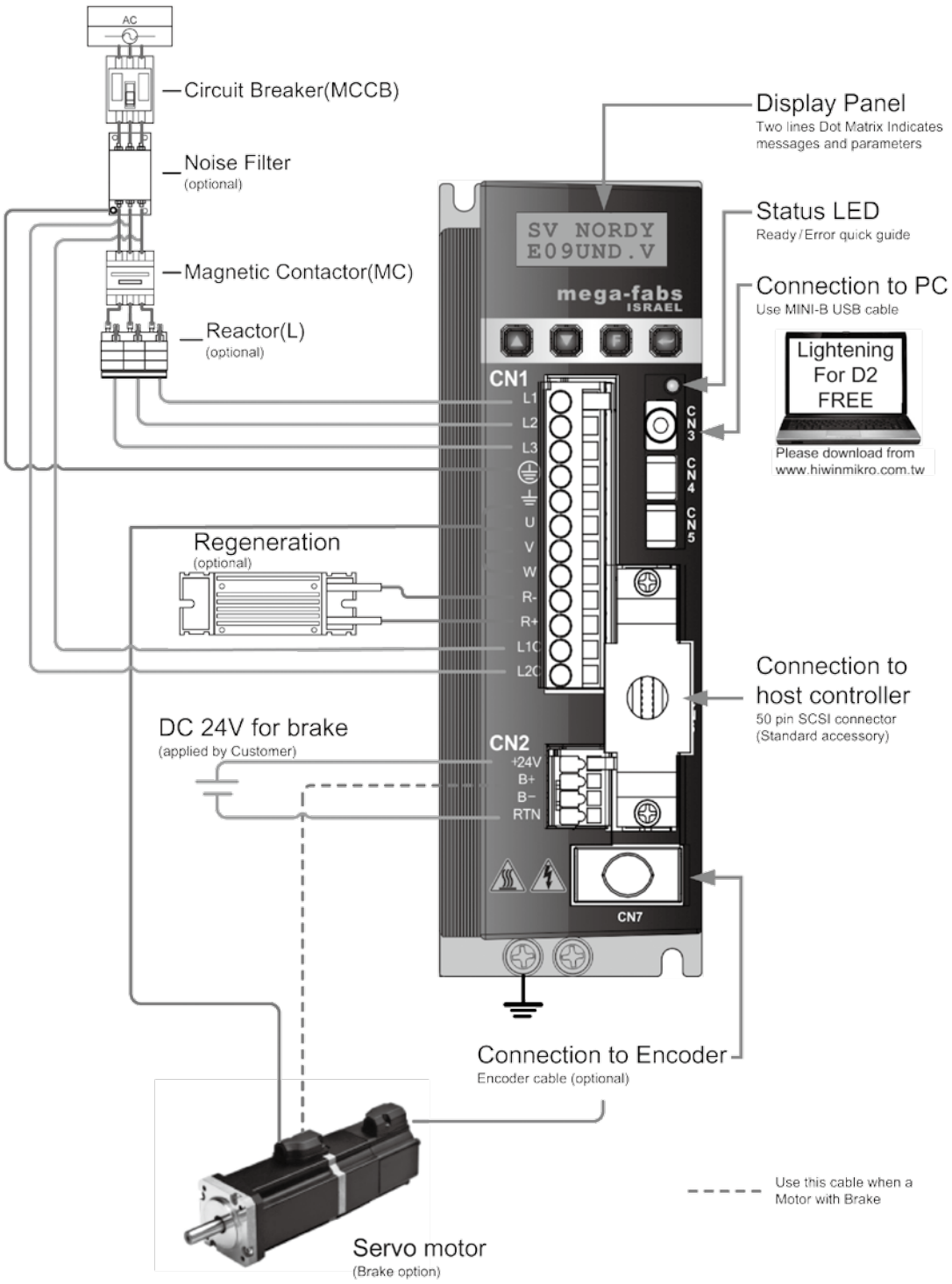
12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

8th	Driver Side Connector
Code	Specification
B	SCR Connector

7.5 Overing wiring

Connector type (110/220V: A to C- Frame)



7.6 Table of Part Numbers and Options

AC50W~AC750W-13bit Incremental

Motor					Drive			Power capacity (Rated load)
Motor Series		Power supply	Output (W)	Part No. (Note 1)	Part No. (Full function type)	Part No. (Pulse type Only)	Frame	
Low Inertia	FRLS	single phase/ 3phase 220V	50	FRLS05205A4△	D2-0123-S-A0	D2-0123-P-A0	Frame A	Approx. 0.4kVA
				FRLS052B5A4△				
			100	FRLS10205A4△				
				FRLS102B5A4△				
			200	FRLS2020506△	D2-0423-S-B0	D2-0423-P-B0	Frame B	Approx. 0.9kVA
				FRLS202B506△				
			400	FRLS4020506△				
				FRLS402B506△				
Middle inertia	FRMS		750	FRMS7520508△	D2-1023-S-C0	D2-1023-P-C0	Frame C	Approx. 1.8kVA
				FRMS752B508△				

(Note 1) △ : Shaft End & Oil Seal Specification (Please refer to p.9)
(Note 3) : EMC pack model (please refer to p.30)

(Note 2) : Selection of cable for FRMS motor

◆Motor Cable(without brake)

HVPS04AA□□□◇

Cable Length — Cable Bendable Type

9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

	Optional parts						
	Motor cable(Note 2)		Encoder cable	D2 drive accessories			
	without brake	with brake	13bit incremental (Note 2)	Control Signal Cable	1 phase EMC Pack (Note 3)	3 phase EMC Pack (Note 3)	External Regenerative Resistor
	HVPS04AA□□□◇	HVPS06AA□□□◇	HVE13IAB□□□◇	LMACK02D	D2-EMC1	D2-EMC2	050100700001
					D2-EMC3		

◆Motor Cable(with brake)

HVPS06AA□□□ ◇

Cable Length — Cable Bendable Type

9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

◆Encoder Cable(13bit-Incremental)

HVE13IAB□□□ ◇

Cable Length — Cable Bendable Type

9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

AC1KW-13bit Incremental

Motor					Drive			Power capacity (Rated load)	
Motor Series		Power supply	Output (W)	Part No. (Note 1)	Part No. (Full function type)	Part No. (Pulse type Only)	Frame		
Middle inertia	FRMM	single phase/ 3phase 220V	1000	FRMM1K20513△	D2-1023-S-C0	D2-1023-P-C0	Frame C	Approx. 1.8kVA	
				FRMM1K2B513△					

(Note 1) △ : Shaft End & Oil Seal Specification (Please refer to p.9)
(Note 3) : EMC pack model (please refer to p.30)

(Note 2) : Motor Cable (without brake & without brake)

HVPM04☆A□□□◇

Motor Side Connector

7th	Motor Side Connector(Note 2)
Code	Specification
B	Straight Type
C	L-Shaped Type

Cable Bendable Type

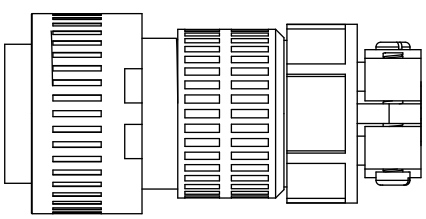
12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

Cable Length

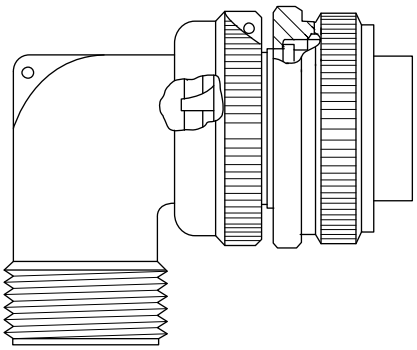
9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

◆Motor Side Connector

● Straight Type



● L-Shaped Type



	Optional parts						
	Motor cable(Note 2)		Encoder cable	D2 drive accessories			External Regenerative Resistor
	without brake	with brake	13bit incremental (Note 2)	Control Signal Cable	1 phase EMC Pack (Note 3)	3 phase EMC Pack (Note 3)	
	HVPM04☆A□□□◇	HVPM06☆A□□□◇	HVE13I○B□□□◇	LMACK02D	D2-EMC3	D2-EMC2	050100700001

◆Encoder Cable(13bit-Incremental)

HVE13I○B□□□◇

Hirose Connectors

7th	Encoder Side Connector(Note 3)
Code	Specification
B	Straight Type
C	L-Shaped Type

Cable Bendable Type

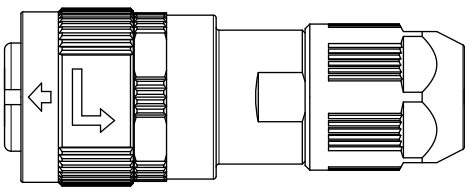
12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

Cable Length

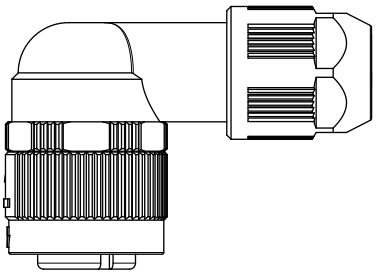
9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

◆Encoder Side Connector

● Straight Type



● L-Shaped Type



AC50W~AC750W-17bit Incremental

Motor					Drive			Power capacity (Rated load)
Motor Series		Power supply	Output (W)	Part No. (Note 1)	Part No. (Full function type)	Part No. (Pulse type Only)	Frame	
Low Inertia	FRLS	single phase/ 3phase 220V	50	FRLS05203A4△	D2-0123-S-A4	D2-0123-P-A4	Frame A	Approx. 0.4kVA
				FRLS052B3A4△				
			100	FRLS10203A4△				
				FRLS102B3A4△				
			200	FRLS2020306△	D2-0423-S-B4	D2-0423-P-B4	Frame B	Approx. 0.9kVA
				FRLS202B306△				
			400	FRLS4020306△				
				FRLS402B306△				
Middle inertia	FRMS		750	FRMS7520308△	D2-1023-S-C4	D2-1023-P-C4	Frame C	Approx. 1.8kVA
				FRMS752B308△				

(Note 1) △ : Shaft End & Oil Seal Specification (Please refer to p.9)
(Note 3) : EMC pack model (please refer to p.30)

(Note 2) : Selection of cable for FRMS motor

◆Motor Cable(without brake)

HVPS04AA□□□ ◇

Cable Length — Cable Bendable Type

9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

	Optional parts						
	Motor cable(Note 2)		Encoder cable	D2 drive accessories			External Regenerative Resistor
	without brake	with brake	17bit incremental (Note 2)	Control Signal Cable	1 phase EMC Pack (Note 3)	3 phase EMC Pack (Note 3)	
	HVPS04AA□□□◇	HVPS06AA□□□◇	HVE17IAB□□□◇	LMACK02D	D2-EMC1	D2-EMC2	050100700001
					D2-EMC3		

◆Motor Cable(with brake)

HVPS06AA□□□◇

Cable Length — Cable Bendable Type

9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

◆Encoder Cable(17bit-Incremental)

HVE17IAB□□□◇

Cable Length — Cable Bendable Type

9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

AC1KW-17bit Incremental

Motor					Drive			Power capacity (Rated load)	
Motor Series		Power supply	Output (W)	Part No. (Note 1)	Part No. (Full function type)	Part No. (Pulse type Only)	Frame		
Middle inertia	FRMM	single phase/ 3phase 220V	1000	FRMM1K20313△	D2-1023-S-C4	D2-1023-P-C4	Frame C	Approx. 1.8kVA	
				FRMM1K2B313△					

(Note 1) △ : Shaft End & Oil Seal Specification (Please refer to p.9)
(Note 3) : EMC pack model (please refer to p.30)

(Note 2) : Motor Cable (without brake & without brake)

HVPM04☆A□□□◇

Motor Side Connector

7th	Motor Side Connector(Note 2)
Code	Specification
B	Straight Type
C	L-Shaped Type

Cable Bendable Type

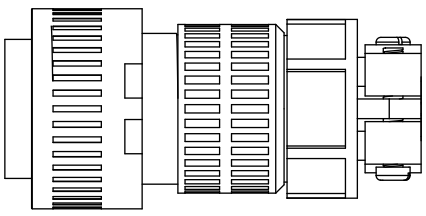
12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

Cable Length

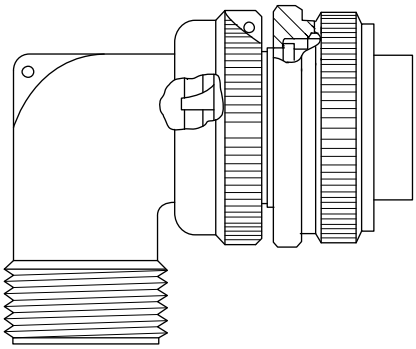
9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

◆Motor Side Connector

● Straight Type



● L-Shaped Type



	Optional parts						
	Motor cable(Note 2)		Encoder cable	D2 drive accessories			External Regenerative Resistor
	without brake	with brake	17bit incremental (Note 2)	Control Signal Cable	1 phase EMC Pack (Note 3)	3 phase EMC Pack (Note 3)	
	HVPM04☆A□□□◇	HVPM06☆A□□□◇	HVE17I○B□□□◇	LMACK02D	D2-EMC3	D2-EMC2	050100700001

◆Encoder Cable(17bit-Incremental)

HVE17I○B□□□ ◇

Hirose Connectors

7th	Encoder Side Connector(Note 3)
Code	Specification
B	Straight Type
C	L-Shaped Type

Cable Bendable Type

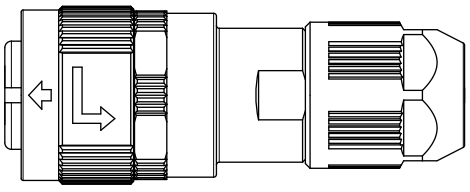
12th	Cable Type
Code	Specification
A	Standard
B	Highly Bendable Type

Cable Length

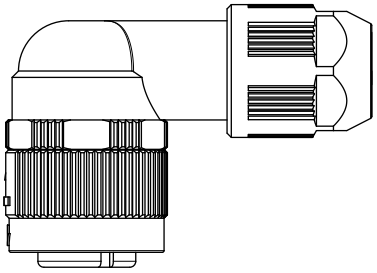
9th+10th+11th	Length of Cable
Code	Specification
03M	3M
05M	5M
07M	7M
10M	10M

◆Encoder Side Connector

● Straight Type



● L-Shaped Type



7.7 Servo Drive

7.7.1 Basic Specifications of Servo Drive for full function

Input power	220V	Main circuit	A to C-frame	Single/3-phase, 200 to 240V 50/60Hz
		Control circuit	A to C-frame	Single phase, 200 to 240V 50/60Hz
Environment		Temperature		Operation Temperature: 0℃~40℃ (if over 55℃, forced ventilation is needed) Storage Temperature: -20℃~65℃
		Humidity		0 to 90%RH
		Altitude		Under 1000 Meters
		Vibration		1G (10 to 500Hz)
Control method				IGBT PWM space vector control
Encoder feedback				13-bit (10000 cnt/rev) incremental encoder, 9-wire serial 17-bit (131072 cnt/rev) incremental encoder, 5-wire serial
Parallel I/O connector	Control signal		Input	General purpose 9 inputs
			Output	General purpose 4 outputs
	Analog signal		Input	1 input (12bit A/D)
			Output	2 outputs (Analog monitor: 2 outputs)
	Pulse signal		Input	2 inputs (Low speed channel, High speed channel)
			Output	4 outputs (Line driver: 3output, open collector: 1 output)
Brake connector	Control signal		output	Used for direct brake connection. (no need of extra relay for brake) Also programmable for general purpose output
Communication function			USB	Connection with PC, 115200bps
Front panel				Dot matrix 8*2 characters LCD with 4 buttons LED(green, red)
Regeneration				A, B-frame: No built-in regenerative resistor (external) C-frame: Built-in regenerative resistor (external resistor is also available)
Dynamic brake				External only (Option)
Control mode				Switching among the following modes is possible (1)Position control (2)Velocity control (3)Torque control (4)Position/Velocity control (5)Position/Torque control (6)Velocity/Torque control

Functions

Position control	Control input		(1)Inhibit pulse command, (2)Clear position error, (3)Axis Enable, (4)Switch between 1st and 2nd CG, (5)Electronic Gear Select, (6)Left Limit Switch, (7)Switch between 1st and 2nd mode, (8)Clear Error, (9)Right Limit Switch etc.
	Control output		(1)Servo Ready, (2)Errors, (3)In-Position, (4)Zero Speed Detected etc.
	Pulse input	Max. command pulse frequency	Dedicated interface for Photo-coupler(single end input): 500kpps Dedicated interface for line driver(differential input): 4Mpps(16M cnt/s with AqB)
		Input pulse signal format	(1) Pulse and Direction, (2) Pulse Up/Pulse Down(3) Quadrature(AqB)
		Electronic gear (Division/ Multiplication of command pulse)	Gear ratio: pulses/counts pulses: 1~2147483647, counts: 1~2147483647
		Smoothing filter	Smooth factor : 1~500 (0: no smoothing filter)
	Vibration suppression filter(VSF)		VSF can remove the vibration frequency that occurs during movement. It can reduce the vibration caused by the system' s structure and improve the machine' s productivity.
Velocity control	Control input		(1)Zero Speed Clamp, (2)Axis Enable, (3)Switch between 1st and 2nd CG, (4)Left Limit Switch, (5)Switch between 1st and 2nd mode, (6)Clear Error, (7)Right Limit Switch etc.
	Control output		(1)Servo Ready, (2)Errors, (3)In-Velocity, (4)Zero Speed Detected etc.
	PWM input	Velocity command input	Speed command input can be provided by means of duty cycle of PWM input. Parameter are used for scale setting and command polarity.
	Analog Input	Velocity command input	Speed command input can be provided by means of analog voltage. Parameter are used for scale setting and command polarity.
	Zero speed clamp		Zero speed clamp input is possible.
Torque control	Control input		(1)Zero Speed Clamp, (2)Axis Enable, (3)Switch between 1st and 2nd CG, (4)Left Limit Switch, (5)Switch between 1st and 2nd mode, (6)Clear Error, (7)Right Limit Switch etc.
	Control output		(1)Servo Ready, (2)Errors, (3)In-Velocity, (4)Zero Speed Detected etc.
	PWM input	Torque command input	Torque command input can be provided by means of duty cycle of PWM input. Parameter are used for scale setting and command polarity.
	Analog Input	Torque command input	Torque command input can be provided by means of analog voltage. Parameter are used for scale setting and command polarity.
	Speed limit function		Speed limit value with parameter is possible
Common	Auto tune		The AutoTune procedure runs automatically after started and identify the load inertia, so that no user setting is required. All necessary gains are set with one click from the LCD panel.
	Emulated encoder feedback output		Set up of any value is possible (frequency up to 18M cnt/s)
	Protective function		(1)Motor short detected, (2)Over voltage detected, (3)Position error too big, (4)Encoder error, (5)Soft-thermal threshold reached, (6)Motor maybe disconnected, (7)Amplifier over temperature, (8)Under voltage detected, (9)5V for encoder Card fail, (10)Phase initialization error, (11)Serial encoder communication error
	Error log		Errors and warnings are saved in non-volatile memory
	Error Mapping		Method: Established compensation table to compensate encoder error by linear interpolation
			Samples: Maximum 16,000 point
			Storage: Flash ROM, Disc file
			Unit: um, count
			Activation: Activated internally by home complete, or activated externally by input signal
	Others		Friction compensation, Backlash compensation

7.7.2 Basic Specifications of Servo Drive for pulse type

Input power	220V	Main circuit	A to C-frame	Single phase, 200 to 240V 50/60Hz
		Control circuit	A to C-frame	Single phase, 200 to 240V 50/60Hz
Environment		Temperature		Operation Temperature: 0℃~40℃ (if over 55℃, forced ventilation is needed) Storage Temperature: -20℃~65℃
		Humidity		0 to 90%RH
		Altitude		Under 1000 Meters
		Vibration		1G (10 to 500Hz)
Control method				IGBT PWM space vector control
Encoder feedback				13-bit (10000 cnt/rev) incremental encoder, 9-wire serial 17-bit (131072 cnt/rev) incremental encoder, 5-wire serial
Parallel I/O connector	Control signal		Input	General purpose 9 inputs
			Output	General purpose 4 outputs
	Pulse signal		Input	2 inputs (Low speed channel, High speed channel)
			Output	4 outputs (Line driver: 3output, open collector: 1 output)
Brake connector	Control signal		output	Used for direct brake connection. (no need of extra relay for brake) Also programmable for general purpose output
Communication function			USB	Connection with PC, 115200bps
Front panel				Dot matrix 8*2 characters LCD with 4 buttons LED(green, red)
Regeneration				A, B-frame: No built-in regenerative resistor (external) C-frame: Built-in regenerative resistor (external resistor is also available)
Dynamic brake				External only (Option)
Control mode				Position control only

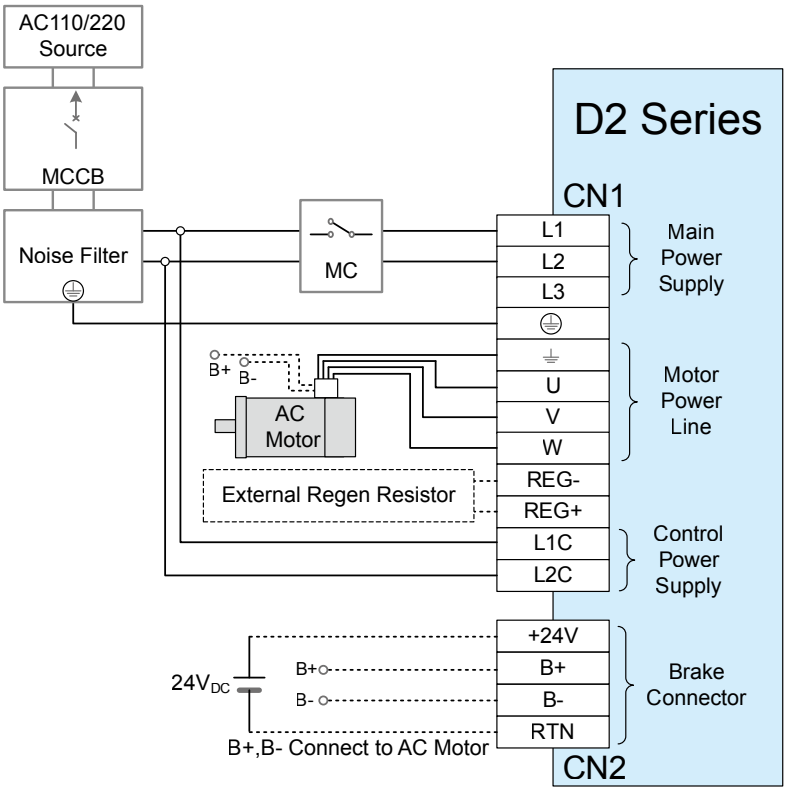
Functions

Position control	Control input		(1)Inhibit pulse command, (2)Clear position error, (3)Axis Enable, (4)Switch between 1st and 2nd CG, (5)Electronic Gear Select, (6)Left Limit Switch, (7)Switch between 1st and 2nd mode, (8)Clear Error, (9)Right Limit Switch etc.
	Control output		(1)Servo Ready, (2)Errors, (3)In-Position, (4)Zero Speed Detected etc.
	Pulse input	Max. command pulse frequency	Dedicated interface for Photo-coupler(single end input): 500kpps Dedicated interface for line driver(differential input): 4Mpps(16M cnt/s with AqB)
		Input pulse signal format	(1) Pulse and Direction, (2) Pulse Up/Pulse Down, (3) Quadrature(AqB)
		Electronic gear (Division/ Multiplication of command pulse)	Gear ratio: pulses/counts pulses: 1~2147483647, counts: 1~2147483647
		Smoothing filter	Smooth factor : 1~500 (0: no smoothing filter)
	Vibration suppression filter(VSF)		VSF can remove the vibration frequency that occurs during movement. It can reduce the vibration caused by the system' s structure and improve the machine' s productivity.
Common	Auto tune		The AutoTune procedure runs automatically after started and identify the load inertia, so that no user setting is required. All necessary gains are set with one click from the LCD panel.
	Emulated encoder feedback output		Set up of any value is possible (frequency up to 18M cnt/s)
	Protective function		(1)Motor short detected, (2)Over voltage detected, (3)Position error too big, (4)Encoder error, (5)Soft-thermal threshold reached, (6)Motor maybe disconnected, (7)Amplifier over temperature, (8)Under voltage detected, (9)5V for encoder Card fail, (10)Phase initialization error, (11)Serial encoder communication error
	Error log		Errors and warnings are saved in non-volatile memory
	Error Mapping		Method: Established compensation table to compensate encoder error by linear interpolation
			Samples: Maximum 16,000 point
			Storage: Flash ROM, Disc file
			Unit: um, count
			Activation: Activated internally by home complete, or activated externally by input signal
	Others		Friction compensation, Backlash compensation

Wiring diagram

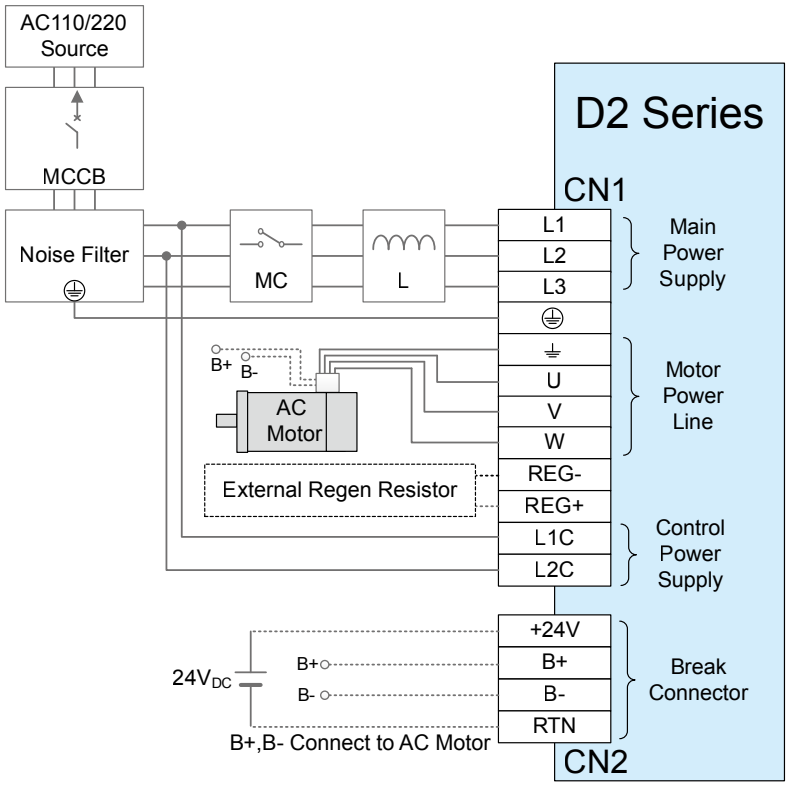
Wiring to Connector CN1 and CN2

A. Single-phase(Brake without relay, using HIWIN motor)



--------- : Optional connected(Brake, Regen)

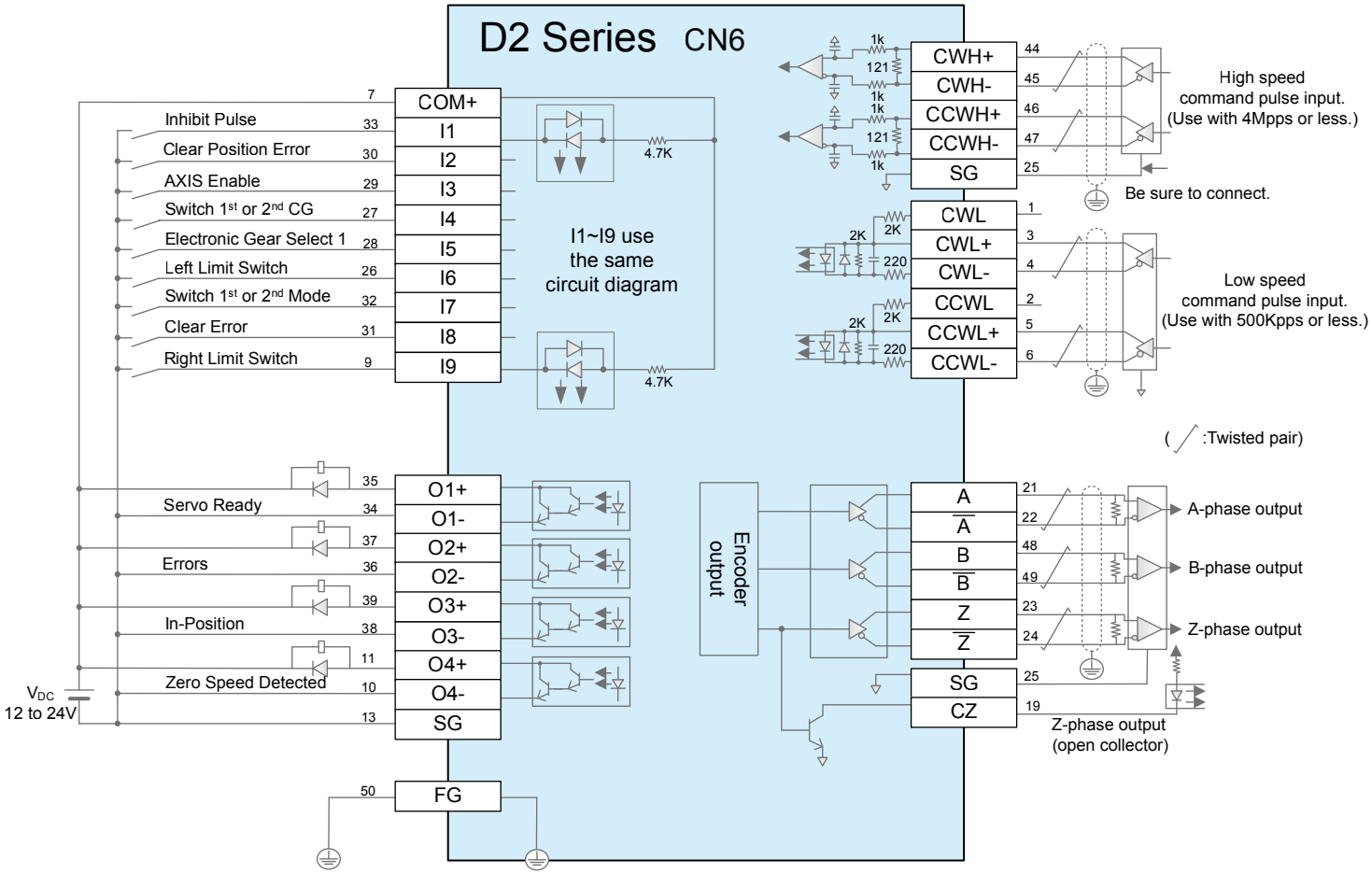
B. Three-phase(Brake without relay, using HIWIN motor)



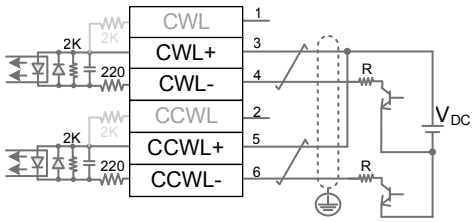
--------- : Optional connected(Brake, Regen)

7.7.3 Control circuit

A. Wiring Example of Position Control Mode



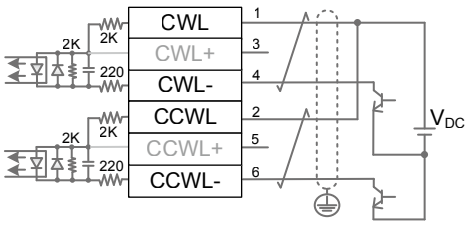
Low speed command pulse input.(Use with 500Kpps or less.)



V_{DC}	Specifications of R
12V	1k ohm 1/2 W
24V	2k ohm 1/2 W

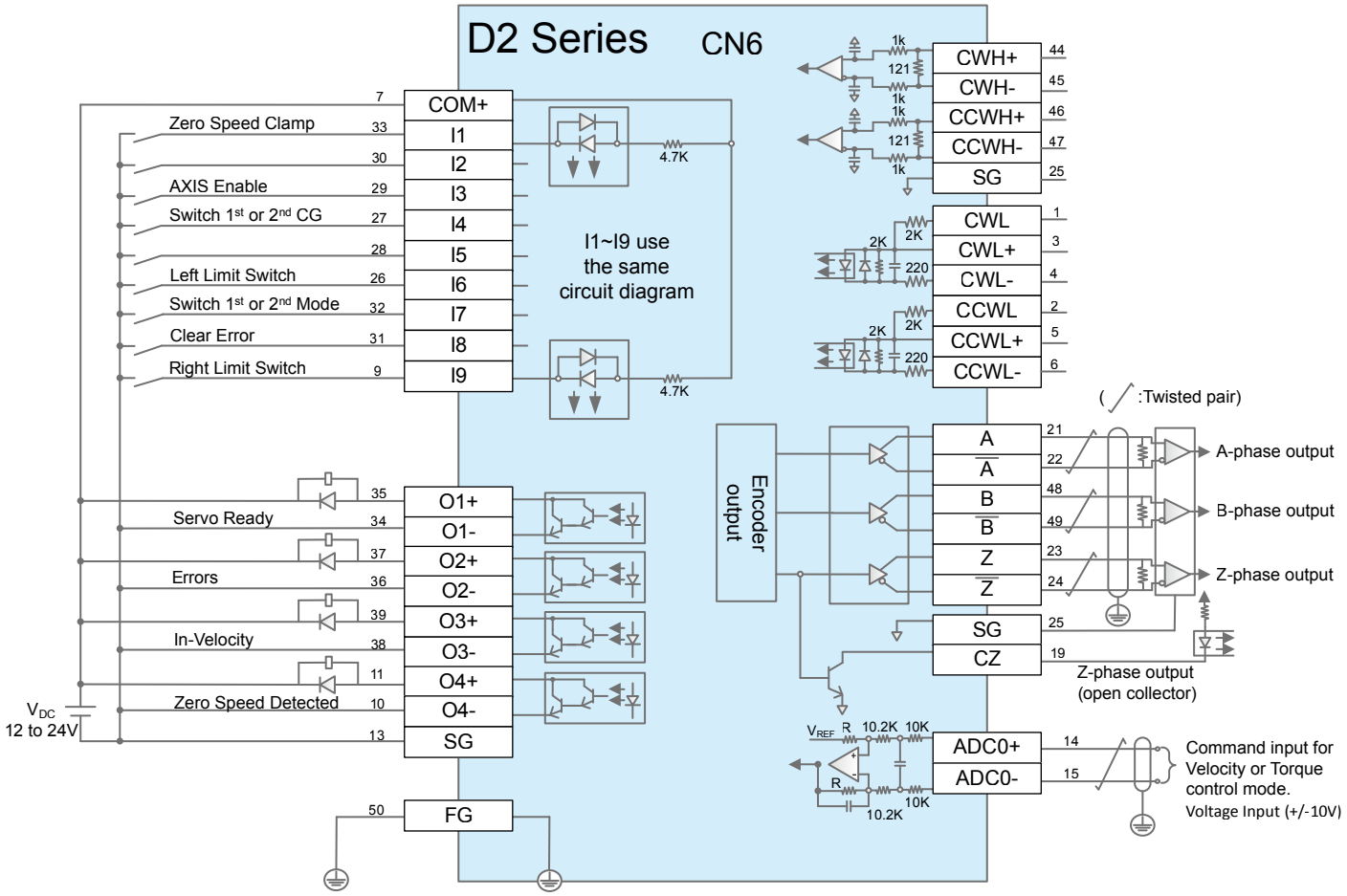
$$\frac{V_{DC} - 1.5}{R + 220} \approx 10mA$$

(1) When you use the external resistor with 12V and 24V power supply



(2) When you do not use the external resistor with 24V power supply

B. Wiring Example of Velocity/Torque Control Mode



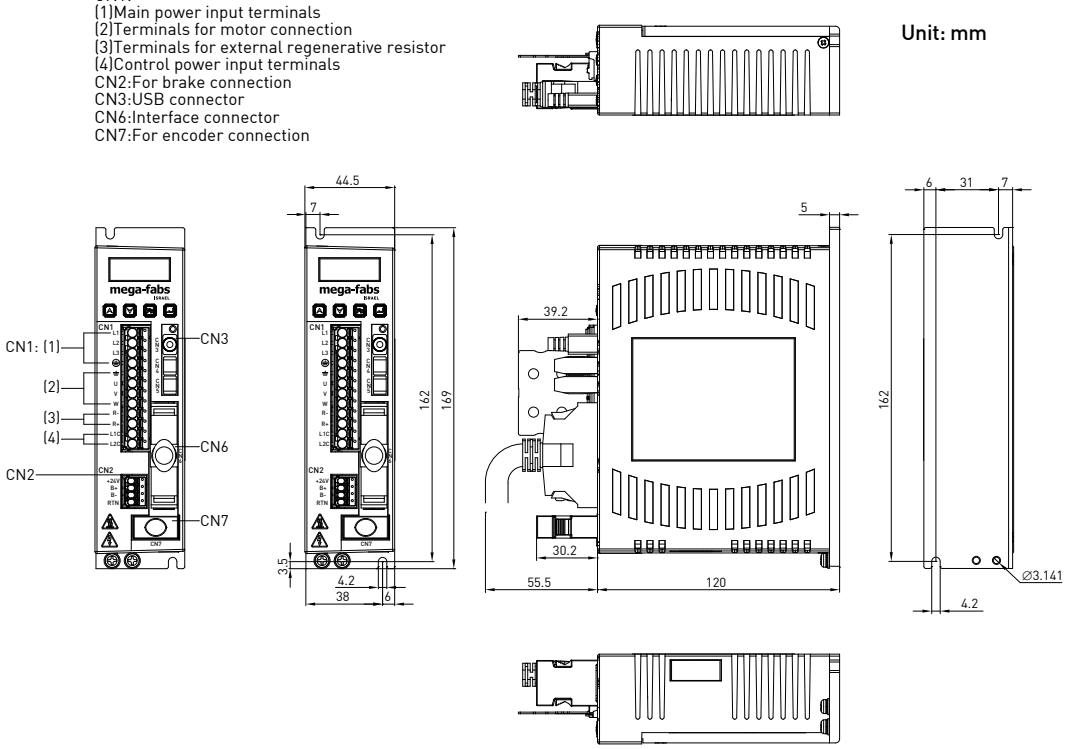
Velocity and Torque control Mode use the ADC0+(14) and ADC0-(15).
(Velocity and Torque control Mode must be enable from software(lightening)

7.7.4 Dimensions of drive

Frame A

CN1:
(1)Main power input terminals
(2)Terminals for motor connection
(3)Terminals for external regenerative resistor
(4)Control power input terminals
CN2:For brake connection
CN3:USB connector
CN6:Interface connector
CN7:For encoder connection

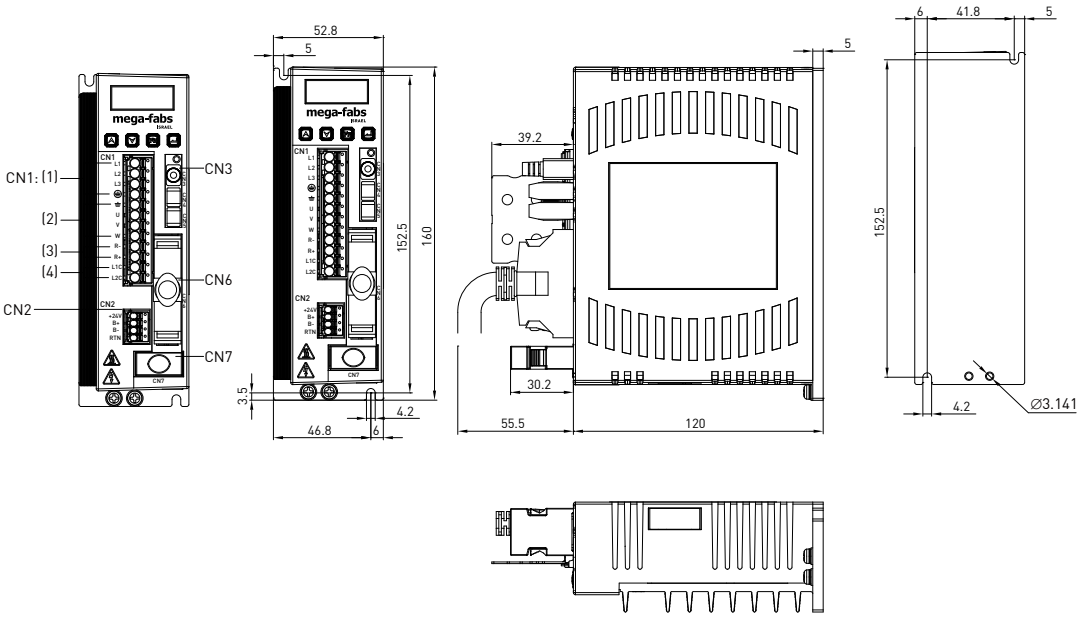
Unit: mm



Frame B

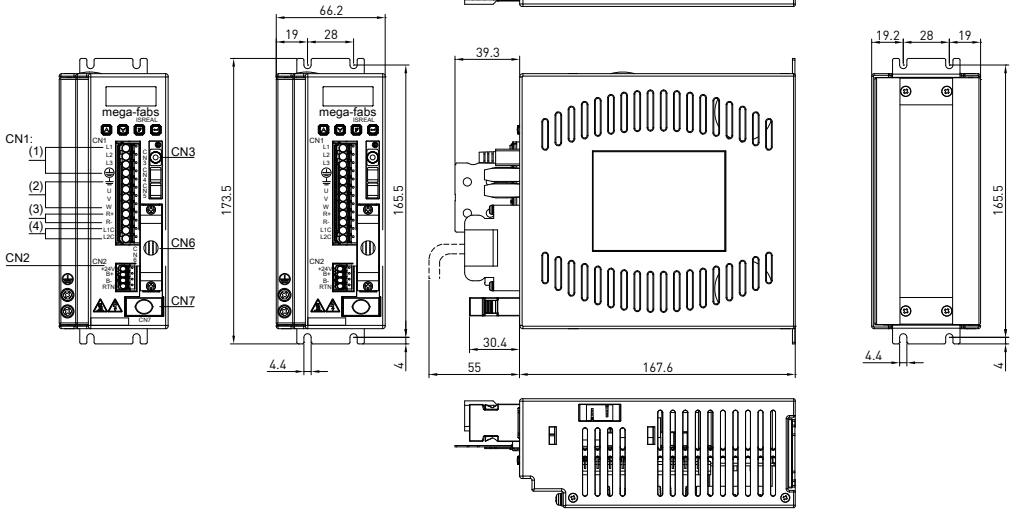
CN1:
(1)Main power input terminals
(2)Terminals for motor connection
(3)Terminals for external regenerative resistor
(4)Control power input terminals
CN2:For brake connection
CN3:USB connector
CN6:Interface connector
CN7:For encoder connection

Unit: mm



Frame C

CN1:
(1)Main power input terminals
(2)Terminals for motor connection
(3)Terminals for external regenerative resistor
(4)Control power input terminals
CN2:For brake connection
CN3:USB connector
CN6:Interface connector
CN7:For encoder connection



7.7.5 Composition of Peripheral Equipments

Connector Kit

Part Name	Model	Description	Quantity
D2 drive connectors	D2-CK3	CN1: AC power, motor power, Regen resistor and control power connector: 12 pins, pitch 5mm. Wago 721-112/026-000	1
		CN2: Brake connector: 4pins, pitch 3.5mm. Wago734-104	1
		CN6: Control signal connector: 50 pins welded type. 3M 10150-3000PE+10350-52A0-008	1
		CN1 connector fixture: Wago 231-131	1
		CN2 connector fixture: Wago 734-230	1

EMC Accessory Pack

Part Name	Model	Description	Quantity
D2 EMC accessory pack for single phase	D2-EMC1	Single phase filter FN2090-6-06 for 50W to 400W (Rated current:6A, leakage current: 0.67mA)	1
		EMI core KCF-130-B	2
	D2-EMC3	Single phase filter FN2090-10-06 for 750W and 1KW (Rated current:10A, leakage current: 0.67mA)	1
		EMI core KCF-130-B	2
D2 EMC accessory pack for three phase	D2-EMC2	Three phase filter FN3025HL-20-71 (Rated current:20A, leakage current:0.4mA)	1
		EMI core KCF-130-B	2

EMI core for all cables.(power cable, motor cable, encoder cable and control signal cable)

Regenerative Resistor

Part Name	Model	Description
Regenerative resistor	050100700001	68Ω. Rated power 100W and peak 500W

Motor line-up/ Environment

Motor			Voltage	Rated Output (W)	Rated Rotational Speed(Max Speed)(rpm)	Rotary Encoder		Enclosure Rating	Environment
						13-bit	17-bit		
Low Inertia	FRLS		220V	50W	3000 4500	◎	◎	IP54/IP65	**Ambient Temperature:** 0˚C~40˚C **Storage Temperature:** -15˚C~70˚C **Ambient Humidity:** 80% RH down **Storage Humidity:** 80% RH down **Storage Environment:** Indoor & keep off Causticity gas, Inflammable gas, oil and dust **Elevation:** 1000m down **Vibration Resistance:** 49m/s^2 down
			220V	100W	3000 4500	◎	◎		
			220V	200W	3000 4500	◎	◎		
			220V	400W	3000 4500	◎	◎		
Middle Inertia	FRMS		220V	750W	3000 4500	◎	◎		
	FRMM		220V	1000W	2000 3000	◎	◎	IP54/IP65	

7.8 Servo Motor

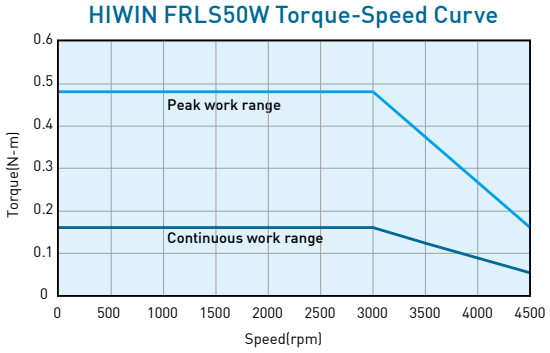
7.8.1 Model of AC Servo motor

AC 50W (Low inertia, Small capacity)

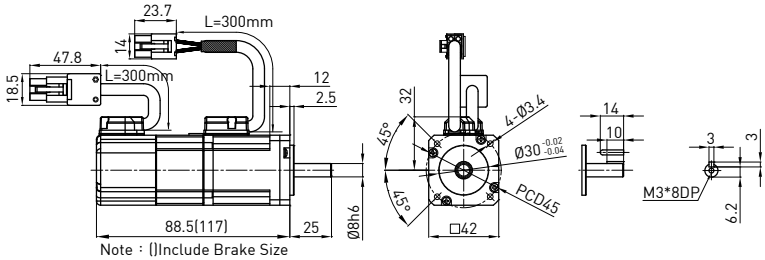
● Specification

Parameter	Symbol	Unit	FRLS052□□A4□
Driver Input Voltage	V	V	AC220
Rated Power	W	W	50
Rated Torque	Tc	N.m	0.16
Rated Current	Ic	A(rms)	0.9
Peak Max. Torque	Tp	N.m	0.48
Peak Max. Current	Ip	A(rms)	2.7
Rated Speed	ωc	rpm	3000
No Load Max. Speed	ωp	rpm	4500
Torque Constant	Kt	N.m / Arms	0.178
Back EMF Constant	Ke	Vrms / krpm	10.74
Resistance (line to line)	R	Ω	4.7
Inductance (line to line)	L	mH	4.7
Inertia of Rotating Parts (with brake)	J	kg-m²(×10⁻⁴)	0.02(0.022)
Weight(with brake)	M	kg	0.45(0.58)
Brake Keep Torque	Tb	N.m	0.32
Brake Voltage	V	V	DC24±10%
Motor Insulation Grade	Class A		
Motor protect	Total enclosed, self-cooled, IP54/IP65 (Except for shaft and connector)		

● Torque-Speed Curve



● Dimensions



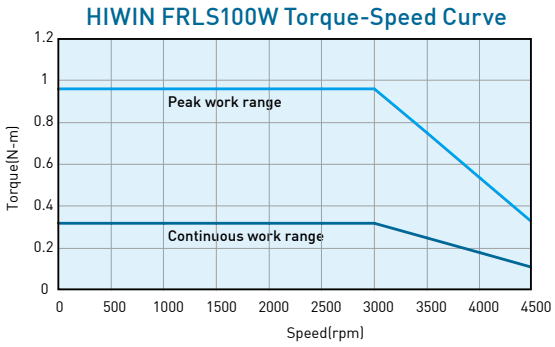
Note：()Include Brake Size

AC 100W (Low inertia, Small capacity)

Specification

Parameter	Symbol	Unit	FRLS102□□A4□
Driver Input Voltage	V	V	AC220
Rated Power	W	W	100
Rated Torque	Tc	N.m	0.32
Rated Current	Ic	A(rms)	0.9
Peak Max. Torque	Tp	N.m	0.96
Peak Max. Current	Ip	A(rms)	2.7
Rated Speed	ωc	rpm	3000
No Load Max. Speed	ωp	rpm	4500
Torque Constant	Kt	N.m / Arms	0.356
Back EMF Constant	Ke	Vrms / krpm	21.98
Resistance (line to line)	R	Ω	8
Inductance (line to line)	L	mH	8.45
Inertia of Rotating Parts (with brake)	J	kg-m²(×10⁻⁴)	0.036(0.038)
Weight(with brake)	M	kg	0.63(0.76)
Brake Keep Torque	Tb	N.m	0.32
Brake Voltage	V	V	DC24±10%
Motor Insulation Grade	Class A		
Motor protect	Total enclosed, self-cooled, IP54/IP65 (Except for shaft and connector)		

Torque-Speed Curve



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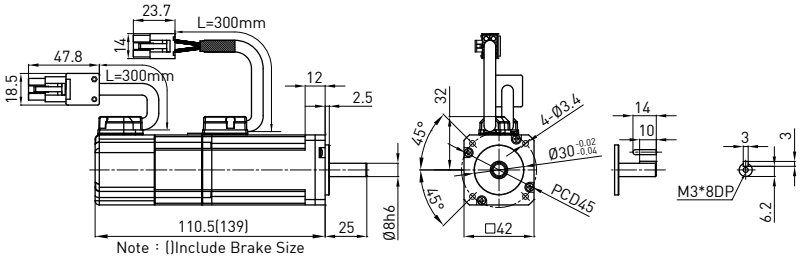
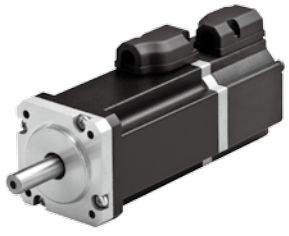


Note：()Include Brake Size

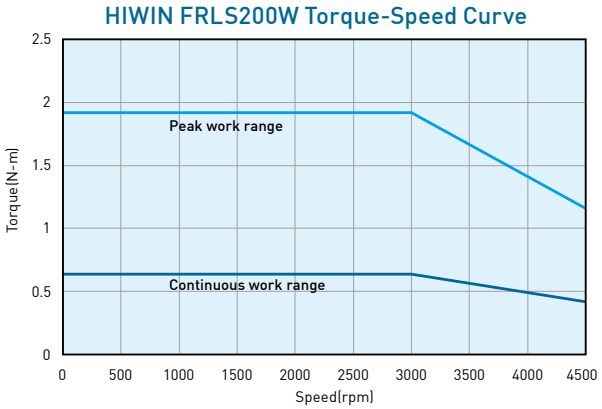


AC 200W (Low inertia, Small capacity)

Specification

Parameter	Symbol	Unit	FRLS202□□06□
Driver Input Voltage	V	V	AC220
Rated Power	W	W	200
Rated Torque	Tc	N.m	0.64
Rated Current	Ic	A(rms)	1.7
Peak Max. Torque	Tp	N.m	1.92
Peak Max. Current	Ip	A(rms)	5.1
Rated Speed	ωc	rpm	3000
No Load Max. Speed	ωp	rpm	4500
Torque Constant	Kt	N.m / Arms	0.43
Back EMF Constant	Ke	Vrms / krpm	26
Resistance (line to line)	R	Ω	4.3
Inductance (line to line)	L	mH	13
Inertia of Rotating Parts (with brake)	J	kg-m²(×10⁻⁴)	0.17(0.21)
Weight(with brake)	M	kg	0.95(1.5)
Brake Keep Torque	Tb	N.m	1.3
Brake Voltage	V	V	DC24±10%
Motor Insulation Grade	Class A		
Motor protect	Total enclosed, self-cooled, IP54/IP65 (Except for shaft and connector)		

Torque-Speed Curve



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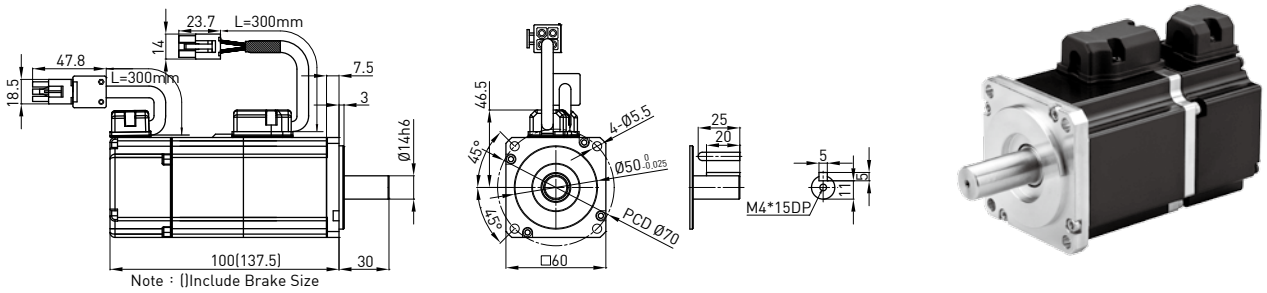
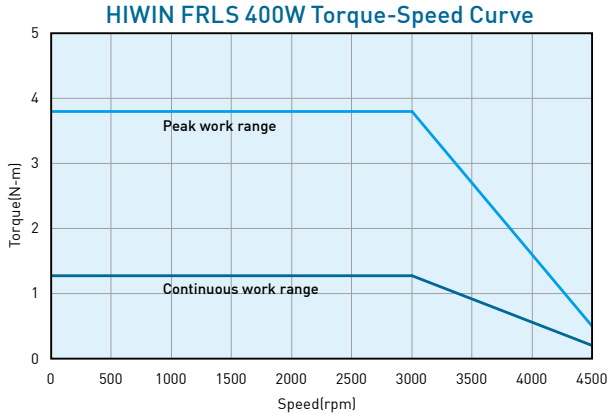


AC 400W (Low inertia, Small capacity)

Specification

Parameter	Symbol	Unit	FRLS402□□06□
Driver Input Voltage	V	V	AC220
Rated Power	W	W	400
Rated Torque	Tc	N.m	1.27
Rated Current	Ic	A(rms)	2.5
Peak Max. Torque	Tp	N.m	3.81
Peak Max. Current	Ip	A(rms)	7.5
Rated Speed	ωc	rpm	3000
No Load Max. Speed	ωp	rpm	4500
Torque Constant	Kt	N.m / Arms	0.53
Back EMF Constant	Ke	Vrms / krpm	31.9
Resistance (line to line)	R	Ω	3.5
Inductance (line to line)	L	mH	13
Inertia of Rotating Parts (with brake)	J	kg-m²(×10⁻⁴)	0.27(0.31)
Weight(with brake)	M	kg	1.31(1.86)
Brake Keep Torque	Tb	N.m	1.3
Brake Voltage	V	V	DC24±10%
Motor Insulation Grade	Class A		
Motor protect	Total enclosed, self-cooled, IP54/IP65 (Except for shaft and connector)		

Torque-Speed Curve



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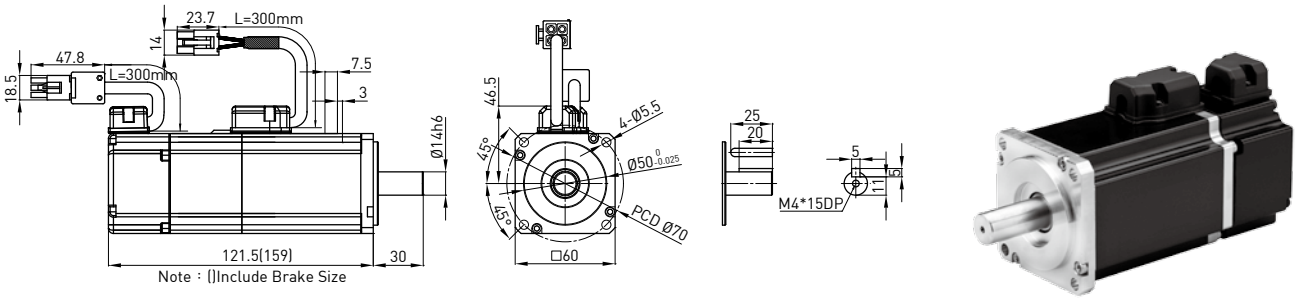
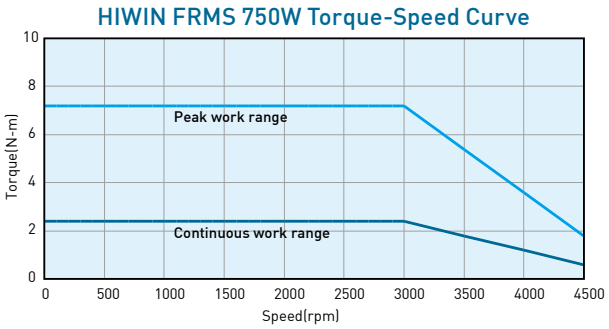


AC 750W (Middle inertia, Small capacity)

Specification

	Symbol	Unit	FRMS752□□08□
Driver Input Voltage	V	V	AC220
Rated Power	W	W	750
Rated Torque	Tc	N.m	2.4
Rated Current	Ic	A(rms)	5.1
Peak Max. Torque	Tp	N.m	7.2
Peak Max. Current	Ip	A(rms)	15.3
Rated Speed	ωc	rpm	3000
No Load Max. Speed	ωp	rpm	4500
Torque Constant	Kt	N.m / Arms	0.47
Back EMF Constant	Ke	Vrms / krpm	28.4
Resistance (line to line)	R	Ω	0.813
Inductance (line to line)	L	mH	3.4
Inertia of Rotating Parts (with brake)	J	kg-m²(×10⁻⁴)	1.4(1.46)
Weight(with brake)	M	kg	2.66(3.32)
Brake Keep Torque	Tb	N.m	2.4
Brake Voltage	V	V	DC24±10%
Motor Insulation Grade	Class A		
Motor protect	Total enclosed, self-cooled, IP54/IP65 (Except for shaft and connector)		

Torque-Speed Curve



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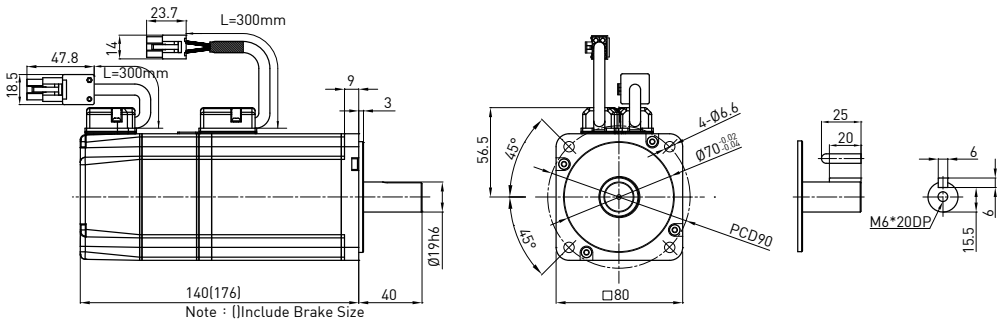
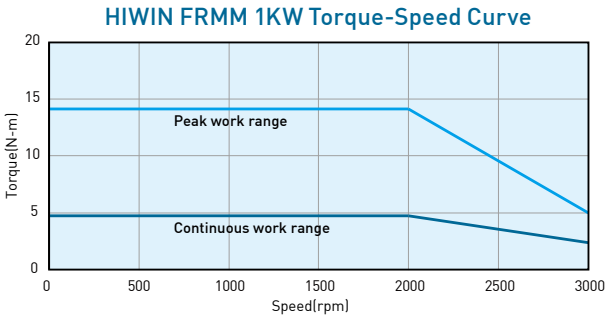


AC 1KW (Middle inertia, Middle capacity)

Specification

	Symbol	Unit	FRMM1K2□□13□
Driver Input Voltage	V	V	AC220
Rated Power	W	W	1000
Rated Torque	Tc	N.m	4.77
Rated Current	Ic	A(rms)	5.1
Peak Max. Torque	Tp	N.m	14.3
Peak Max. Current	Ip	A(rms)	15.3
Rated Speed	ωc	rpm	2000
No Load Max. Speed	ωp	rpm	3000
Torque Constant	Kt	N.m / Arms	0.94
Back EMF Constant	Ke	Vrms / krpm	54.7
Resistance (line to line)	R	Ω	0.81
Inductance (line to line)	L	mH	8
Inertia of Rotating Parts (with brake)	J	kg-m²(×10⁻⁴)	7.6(8.7)
Weight(with brake)	M	kg	5.4(6.2)
Brake Keep Torque	Tb	N.m	10
Brake Voltage	V	V	DC24±10%
Motor Insulation Grade	Class A		
Motor protect	Total enclosed, self-cooled, IP54/IP65 (Except for shaft and connector)		

Torque-Speed Curve



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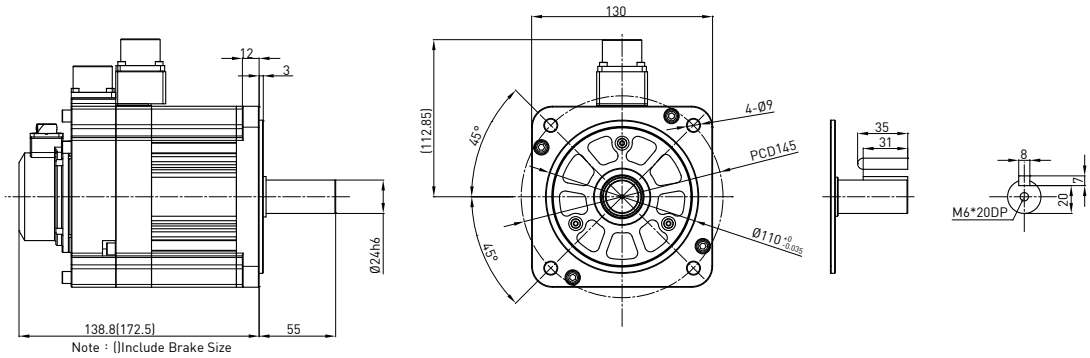


7.8.2 Encoder Type

13-bit Incremental

Encoder Specification
- 10000 pulse/rev
- Work temperature for -20℃~+85℃.
- 200KHz frequency response.
- Work voltage DC+5V±5%.
- RoHs.

17-bit Incremental

Encoder Specification
- 131072 pulse/rev
- Work temperature for -10℃~ +85℃.
- 13MHz frequency response.
- Work voltage DC+5V±5%.
- RoHs.

7.8.3 Motor Power Connector & Encoder Connector

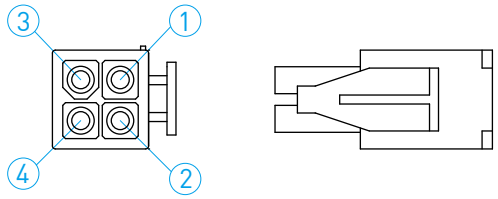
7.8.3.1 Motor Power Connector

- **Small Capacity Series(AC50W~AC750W)**

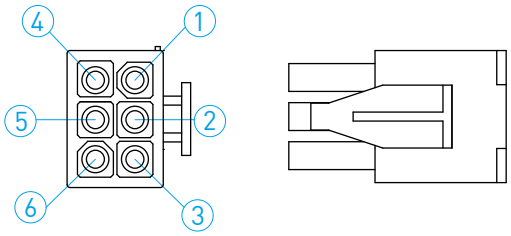
Signal	Color	AMP-172167-1 (without brake)	AMP-172168-1 (with brake)
U	Red	3	3
V	White	2	2
W	Black	1	1
GND	Green	4	4
B+	Black	--	5
B-	White	--	6

Connect Pins Position Definition(without brake & with brake)

AMP-172167-1(without brake)



AMP-172168-1(with brake)

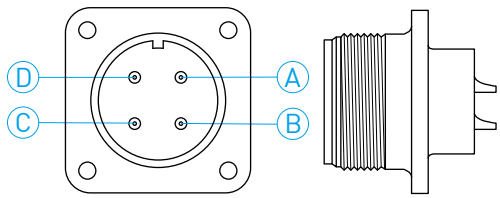


- **Middle Capacity Series(AC1KW)**

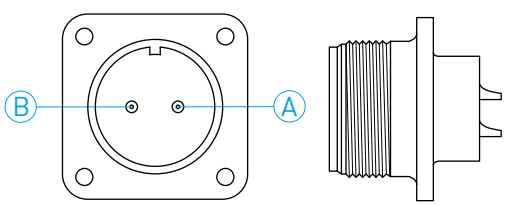
Signal	Color	MS3102A18-10P	MS3102A14-9P
U	Red	A	--
V	White	B	--
W	Black	C	--
GND	Green	D	--
B+	Black	--	A
B-	Black	--	B

Connect Pins Position Definition(without brake & with brake)

MS3102A18-10P



MS3102A14-9P



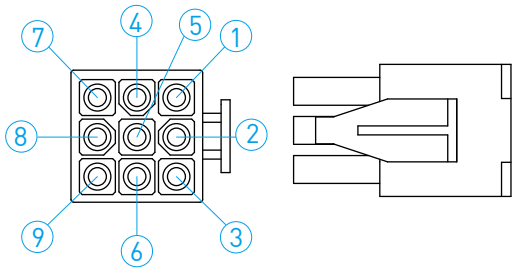
Note: By brake Type, two connectors must be used simultaneously

7.8.3.2 Encoder Connector

13-bit Incremental : AC50W~AC750W

Function	Signal		AMP-172169-1
Power	5V±5%		1
	0V		2
Incremental Signal	A	+	3
	A	-	4
	B	+	5
	B	-	6
Reference signal	Z	+	7
	Z	-	8
Shielding	Shielding		9

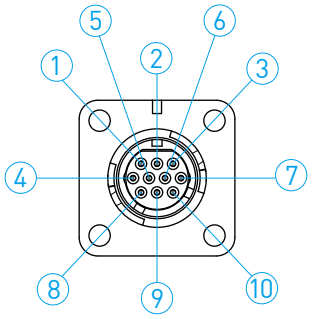
AMP-172169-1



13-bit Incremental : AC1KW

Function	Signal		HR34B-12WRA-10P
Power	5V±5%		1
	0V		2
Incremental Signal	A	+	3
	A	-	4
	B	+	5
	B	-	6
Reference signal	Z	+	7
	Z	-	8
Shielding	Shielding		9

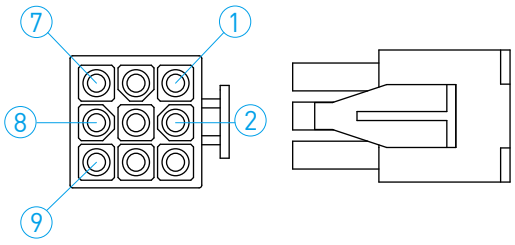
HR34B-12WRA-10P



17-bit Incremental encoder : AC50W~AC750W

Function	Signal		AMP-1-172169-9
Power	5V±5%		1
	0V		2
Serial Data Signal	SD	+	7
	$\overline{SD}$	-	8
Shielding	Shielding		9

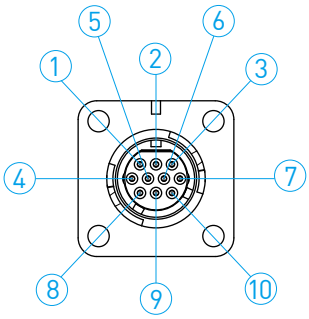
AMP-1-172169-9



17-bit Incremental encoder : AC50W~AC750W

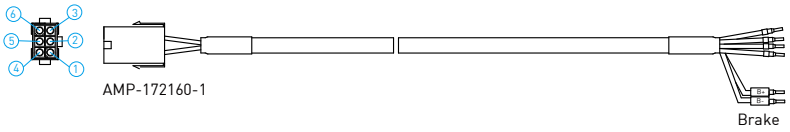
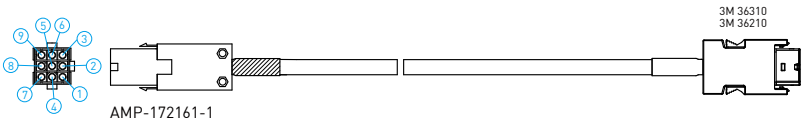
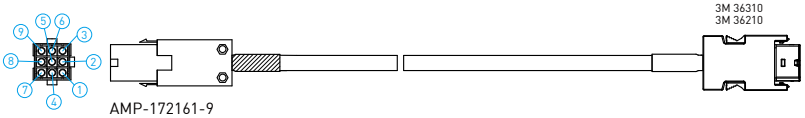
Function	Signal		HR34B-12WRA-10P
Power	5V±5%		1
	0V		2
Serial Data Signal	SD	+	7
	$\overline{SD}$	-	8
Shielding	Shielding		9

HR34B-12WRA-10P

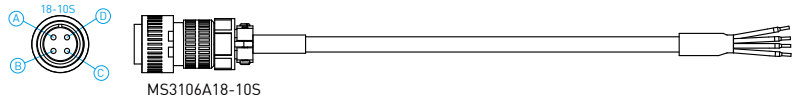
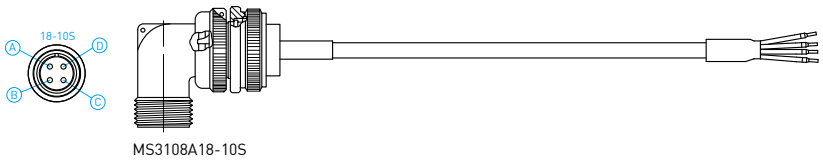
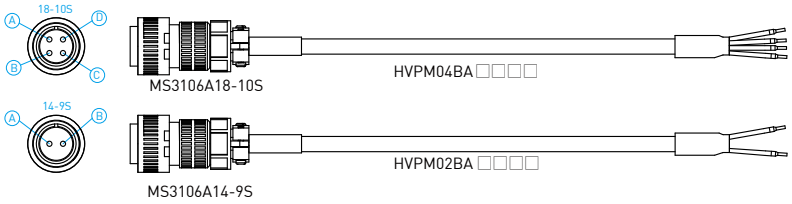
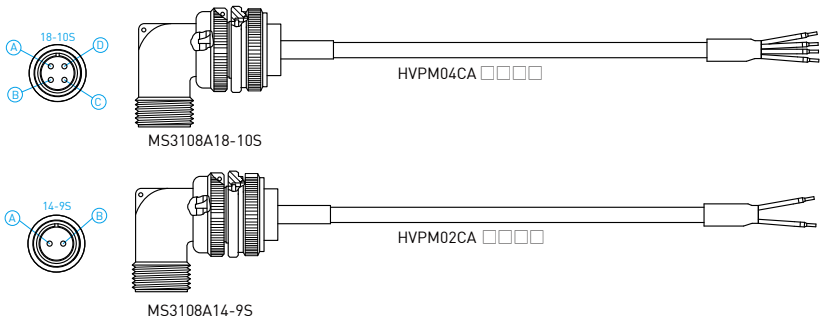
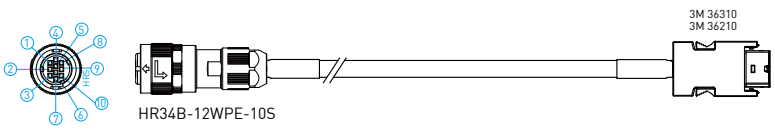
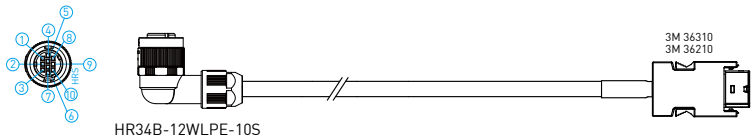
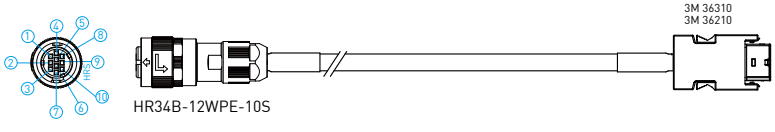
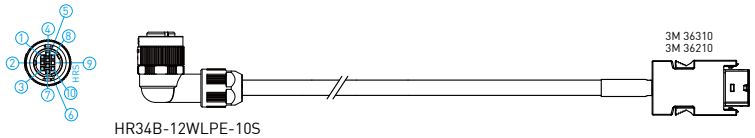


7.8.4 AC Servo Motor Accessories

Small Capacity

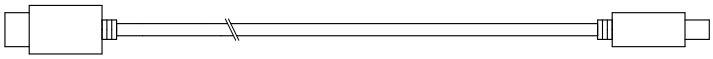
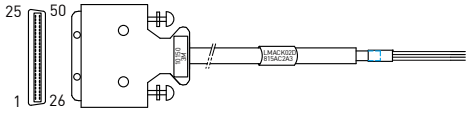
Name	Type	Connect	Description
AC Servo Motor Power Cable	HVPS04AA□□□A HVPS04AA□□□B (highly bendable)	CN1	
AC Servo Motor Power Cable (Brake)	HVPS06AA□□□A HVPS06AA□□□B (highly bendable)		
AC Servo Motor Encoder Cable (13bit-Incremental)	HVE13IAA□□□A HVE13IAA□□□B (highly bendable)	CN7	
AC Servo Motor Encoder Cable (17bit-Incremental)	HVE17IAA□□□A HVE17IAA□□□B (highly bendable)		

Middle Capacity

Name	Type	Connect	Description
AC Servo Motor Power Cable	HVPM04BA□□□A HVPM04BA□□□B (Highly Bendable)	CN1	
	HVPM04CA□□□A HVPM04CA□□□B (Highly Bendable)		
AC Servo Motor Power Cable (with brake)	HVPM06BA□□□A HVPM06BA□□□B (Highly Bendable)	CN1	
	HVPM06CA□□□A HVPM06CA□□□B (Highly Bendable)		
AC Servo Motor Encoder Cable (13bit-Incremental)	HVE13IBA□□□A HVE13IBA□□□B (Highly Bendable)	CN7	
	HVE13ICA□□□A HVE13ICA□□□B (Highly Bendable)		
AC Servo Motor Encoder Cable (17bit-Incremental)	HVE17IBA□□□A HVE17IBA□□□B (Highly Bendable)		
	HVE17ICA□□□A HVE17ICA□□□B (Highly Bendable)		

Note: For middle capacity motors with brake, please remember to use power cable and brake cable simultaneously.

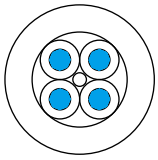
Drive Cable

Name	Type	Connect	Description
Mini USB Cable	051700800366	CN3	
Interface Cable	HE00815AC200	CN6	

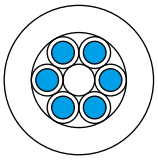
7.8.5 Power External Cables & Encoder External Cables

7.8.5.1 Power Cables

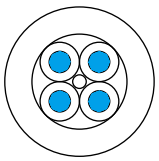
Cable Specification : For Small Capacity type(without brake)

Items	HVPS04AA□□□A	HVPS04AA□□□B
Specification	UL2517(Rated Tem. :105℃) AWG18×4C	UL2517(Rated Tem. :105℃ AWG18×4C
Finished Dimensions	8.0 dia. mm	
Internal Configuration		
Standard Length	Cable Length:3m, 5m, 7m, 10m	

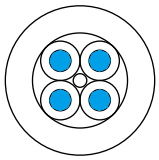
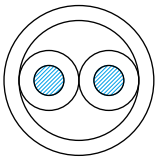
Cable Specification : For Small Capacity type(with brake)

Items	HVPS06AA□□□A	HVPS06AA□□□B
Specification	UL2517(Rated Tem. :105℃) AWG18×6C	UL2517(Rated Tem. :105℃ AWG18×6C
Finished Dimensions	10.0 dia. mm	
Internal Configuration		
Standard Length	Cable Length:3m, 5m, 7m, 10m	

Cable Specification : For Middle Capacity type(without brake)

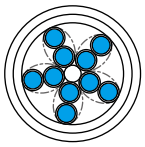
Items	HVPS04BA□□□A	HVPS04BA□□□B
Specification	UL2586(Rated Tem. :105℃) AWG14×4C	UL2586(Rated Tem. :105℃ AWG14×4C
Finished Dimensions	10.5 dia. mm	
Internal Configuration		
Standard Length	Cable Length:3m, 5m, 7m, 10m	

Cable Specification: For Middle Capacity(with brake)

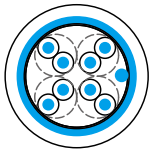
Items	HVPM04□A□□□A HVPM04□A□□□B	HVPS02□A□□□A HVPS02□A□□□A
Specification	UL2586(Rated Tem. :105℃) AWG14×4C	UL2517(Rated Tem. :105℃) AWG18×2C
Finished Dimensions	10.5 dia. mm	7.0 dia. mm
Internal Configuration		
Standard Length	Cable Length:3m, 5m, 7m, 10m	

7.8.5.2 Encoder Cables

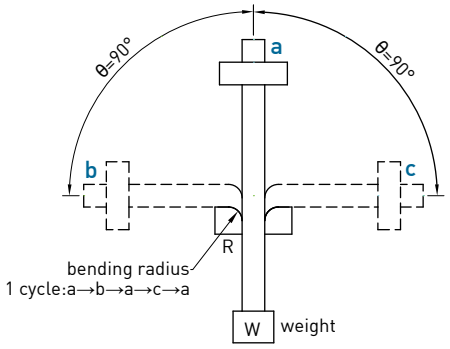
Cable Specification : For Small Capacity type

Items	HVE□□□AB□□□A	HVE□□□AB□□□B
Specification	UL2464(Rated Tem. :80℃) AWG24×5P	UL2464(Rated Tem. :80℃ AWG24×5P
Finished Dimensions	8.0 dia. mm	
Internal Configuration		
Standard Length	Cable Length:3m, 5m, 7m, 10m	

Cable Specification: For Middle Capacity type

Items	HVE□□□BB□□□A	HVE□□□BB□□□B
Specification	UL2464(Rated Tem. :80℃) AWG24×4P	UL2464(Rated Tem. :80℃ AWG24×4P
Finished Dimensions	7.0 dia. mm	
Internal Configuration		
Standard Length	Cable Length:3m, 5m, 7m, 10m	

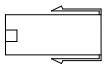
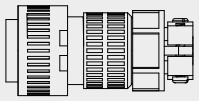
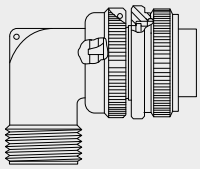
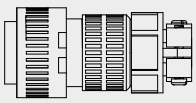
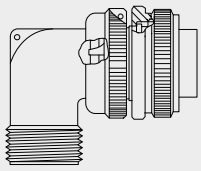
7.8.5.3 Highly Bendable Test

Testing Conditions	Bending Angle(θ)	Left-Right 90 degree
	Bending Radius(R)	Diameter of 12.5 times
	Bending velocity	30 times(one minute)
	Weight(W)	100 g
Bending Life	Number of bending(with weight)	3,000,000 cycles
	Number of bending(with no weight)	5,000,000 cycles
Highly Bendable Test		

Note: Bending life with the recommended bending radius R under the following testing conditions and the flexible test.

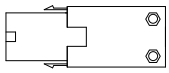
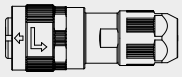
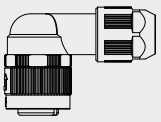
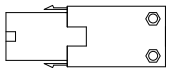
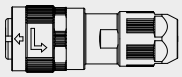
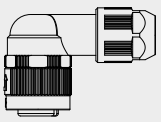
7.8.5.4 Table of selecting extension cables

● Power Extension Cable

Name	Servomotor Rate Output	Shape	Length	Order No.	
				Standard Type	Highly Bendable Type*
Power Extension Cable (without Brake)	50W~750W		3m	HVPS04AA03MA	HVPS04AA03MB
			5m	HVPS04AA05MA	HVPS04AA05MB
			7m	HVPS04AA07MA	HVPS04AA07MB
			10m	HVPS04AA10MA	HVPS04AA10MB
	1KW		3m	HVPM04BA03MA	HVPM04CA03MB
			5m	HVPM04BA05MA	HVPM04CA05MB
			7m	HVPM04BA07MA	HVPM04CA07MB
			10m	HVPM04BA10MA	HVPM04CA10MB
			3m	HVPM04CA03MA	HVPM04CA03MB
			5m	HVPM04CA05MA	HVPM04CA05MB
			7m	HVPM04CA07MA	HVPM04CA07MB
			10m	HVPM04CA10MA	HVPM04CA10MB
Power Extension Cable (with Brake)	50W~750W		3m	HVPS06AA03MA	HVPS06AA03MB
			5m	HVPS06AA05MA	HVPS06AA05MB
			7m	HVPS06AA07MA	HVPS06AA07MB
			10m	HVPS06AA10MA	HVPS06AA10MB
	1KW		3m	HVPM02BA03MA	HVPM06BA03MB
			5m	HVPM02BA05MA	HVPM06BA05MB
			7m	HVPM02BA07MA	HVPM06BA07MB
			10m	HVPM02BA10MA	HVPM06BA10MB
			3m	HVPM02CA03MA	HVPM06CA03MB
			5m	HVPM02CA05MA	HVPM06CA05MB
			7m	HVPM02CA07MA	HVPM06CA07MB
			10m	HVPM02CA10MA	HVPM06CA10MB

*1: Use Highly Bendable cables for movable sections such as robot arms.

● Encoder Extension Cable

Name	Servomotor Rated Output	Shape	Length	Order No.	
				Standard Type	Highly Bendable Type*
13-bit Encoder Extension Cable	50W~750W		3m	HVE13IAB03MA	HVE13IAB03MB
			5m	HVE13IAB05MA	HVE13IAB05MB
			7m	HVE13IAB07MA	HVE13IAB07MB
			10m	HVE13IAB10MA	HVE13IAB10MB
	1KW		3m	HVE13IBB03MA	HVE13IBB03MB
			5m	HVE13IBB05MA	HVE13IBB05MB
			7m	HVE13IBB07MA	HVE13IBB07MB
			10m	HVE13IBB10MA	HVE13IBB10MB
			3m	HVE13ICB03MA	HVE13ICB03MB
			5m	HVE13ICB05MA	HVE13ICB05MB
			7m	HVE13ICB07MA	HVE13ICB07MB
			10m	HVE13ICB10MA	HVE13ICB10MB
17-bit Encoder Extension Cable	50W~750W		3m	HVE17IAB03MA	HVE17IAB03MB
			5m	HVE17IAB05MA	HVE17IAB05MB
			7m	HVE17IAB07MA	HVE17IAB07MB
			10m	HVE17IAB10MA	HVE17IAB10MB
	1KW		3m	HVE17IBB03MA	HVE17IBB03MB
			5m	HVE17IBB05MA	HVE17IBB05MB
			7m	HVE17IBB07MA	HVE17IBB07MB
			10m	HVE17IBB10MA	HVE17IBB10MB
			3m	HVE17ICB03MA	HVE17ICB03MB
			5m	HVE17ICB05MA	HVE17ICB05MB
			7m	HVE17ICB07MA	HVE17ICB07MB
			10m	HVE17ICB10MA	HVE17ICB10MB

*1: Use Highly Bendable cables for movable sections such as robot arms.

7.8.6 Safety Precautions

Thank you for purchasing HIWIN's AC servo motor. Installation and operation of the motor must be in accordance with the HIWIN manual. Before using the servo motor, please read these safety instructions and precautions carefully.

★ Unpacking instructions

1. Before using the servo motor, please read these safety instructions and precautions carefully. HIWIN is not responsible for any damage, accident, or injury caused by incorrect handling.
2. Examine the appearance of the motor for any unusual marks or damage from shipment.
3. Inspect the wires for damage.
4. Do not disassemble the motor. Since the product design has been based on structure calculations, computer simulations, and prototype testing, do not disassemble the product without the permission of HIWIN engineers.
5. Supervise children when handling this product.
6. People with psychosomatic illness or insufficient experience should not handle this product, unless under the direct supervision of managers or product narrators.

If any items are damaged or incorrect, please contact your distributor or HIWIN sales representative.

★ Safety instructions

1. The product can only be repaired by HIWIN engineers. Please send the product back to us if there is any unusual phenomenon.
2. Do not hold the motor by its wire harness or shaft.
3. Do not hit the motor or shaft. Shock can damage the encoder inside the motor.
4. Do not apply loads to the motor shaft that are in excess of the specified value.
5. Protect the motor and encoder from high electrical noise, vibration, and unusual temperatures.
6. Do not change the motor parts or disassemble the screws. HIWIN will not be responsible for any damages, injuries, or accidents that may occur.

★ Wiring instructions

1. Ensure the specified power input value before using the product, and verify that the proper power supply is being used.
2. Before operation, please ensure that the motor, brake, and encoder are connected correctly. Incorrect wiring may cause abnormal motor operation or even cause permanent damage to the motor.
3. To avoid voltage coupling and electrical noise on the encoder, ensure adequate separation of the motor power wires and the encoder wires.
4. Ensure that the motor ground wire is connected to the ground terminal on the servo drive.
5. Do not perform a dielectric voltage-withstand test on any encoder terminal. The test may cause damage to the encoder.

★ Operation instructions

1. Higher than maximum specified current may cause demagnetization of magnetic components inside the motor.
2. The AC servo motor is designed to operate through a dedicated servo drive. Do not connect to a commercial power source (100/200V AC, 50/60 HZ). The motor will not operate correctly and may cause permanent damage.
3. The motor must be operated within its specified range.
4. Attention should be given to ensure adequate cooling and ventilation of the motor during operation.
5. For long term use, the motor shaft should be resupplied with proper and sufficient oil during the period of operation.
6. If any abnormal odor, noise, smoke, temperature rise or vibration is detected, stop the motor immediately. Remove power from the servo drive and isolated the motor.

★ Motor International Standard

CE Certification

LVD：EN60034-1
EN60034-5

EMC：EN55011
EN61000-6-2
EN61000-6-4

★ Maintenance and Storage instructions

1. Do not store the product in an inflammable environment or that with chemical agents.
2. Store the product in a place without humidity, dust, harmful gases, or liquids.
3. The motor shaft opening is neither waterproof nor oil-proof. Do not install the motor in an environment where there is harmful gas, liquid, excessive moisture, or water vapor.
4. Do not store the servo motor where it will be subjected to vibration or shock in excess of the specified limit.
5. The storage and transportation temperature of this product: -10℃~+50℃
6. Clean：Wipe with Alcohol (70%)
7. Before shipping, the motor shaft is coated with antirust oil to protect the motor shaft against rust formation. However, the material of the motor shaft is not entirely rust-proof. When the motor storage time has exceeded six months, please inspect and examine the motor shaft and resupply with proper and sufficient antirust oil at least once every three months thereafter.
8. Product abandoned：Follow the local laws and regulations for recycling.

A one year guarantee is provided from the date of delivery. For product damage caused by improper operation (Please refer to the notes and instructions in this operation manual). HIWIN will not be held responsible for replacing or maintaining the product as a result of any natural disasters that may occur during this period.

Warning：For the proper use of the HIWIN AC servo motor read these safety precautions carefully before installation, operation, and maintenance.

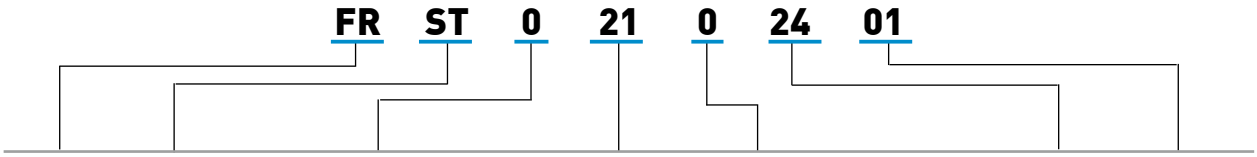
Warning：Do not touch when motor operating to avoid being scalded.

Caution：Please read these safety precautions before using the product.
Caution：Do not alter the instrument without the permission of the manufacturer.
Caution：Remove the broken power line buckle carefully.
Caution：The product cannot be used in an inflammable environment.
Caution：Remove the power before cleaning.
Caution：Overload cause motor temperature rising.
Caution：There may be potential difficulties in ensuring electromagnetic compatibility in other enviroments.
Caution：Do not knock shaft and encoder ends.

7.9 Stepping System

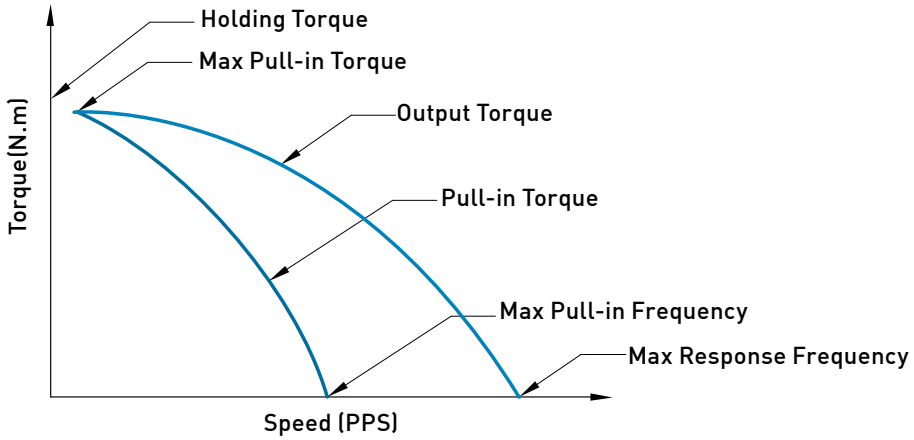
Two Phase Stepping Motor

Stepping Motor Ordering Information



Product	Model	Phase/Shaft	Type	Step Angle	Voltage	Serial number
Brushless Motor	ST：Stepping Motor	0：2S (2 phase/single axis) 1：2D (2 phase/double axis)	1X：ST40 2X：ST55	0：F (stepping angle 1.8 meh.)	24V	01~99

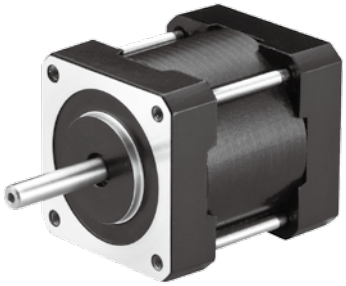
Characteristic Curves of Stepping Motor

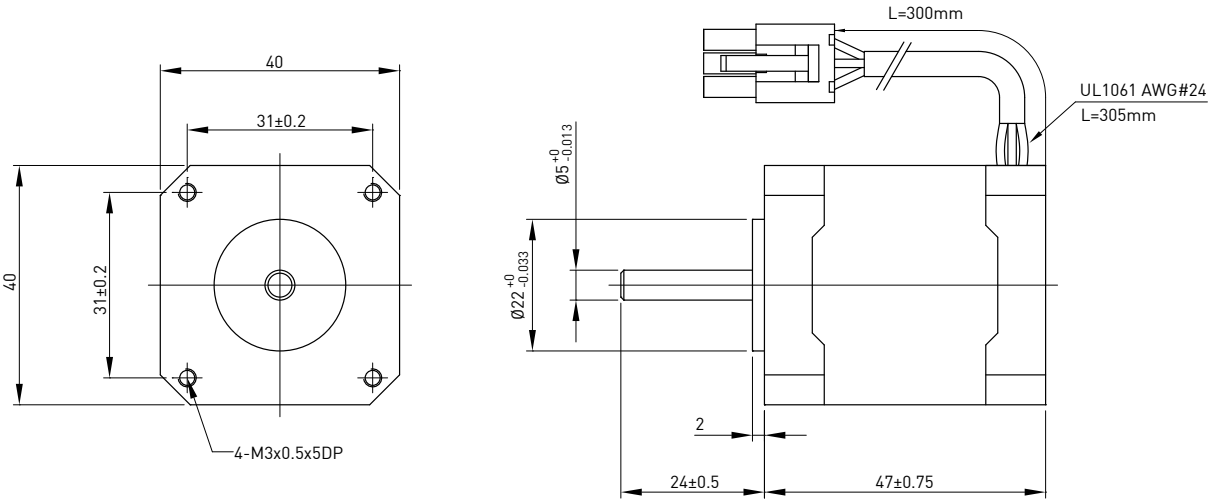


- **Pull-in Torque**
  It is the Max. torque that stepping motor and input signal are starting, stop synchronously. The range under of pull-in torque that motor can starting, stop synchronously and forward/reverse. The range is Starting rang oneself.
- **Max Pull-in Torque**
  It is the starting pulse frequency lower than 10 pps, the Max torque of stepping motor can input signal for starting, stop synchronously.
- **Max Pull-in Frequency**
  It is the Max input pulse rate of motor at no load that motor can stop, start in instant.
- **Max Pull-in Torque**
  It is the motor and input signal for work synchronously, but can't start ,stop in instant for Max torque. The torque larger than output torque that motor be not work. The output torque below and start torque above of region in the meantime, the motor can't start or stop in instant that region is call slew region. It must be relay start region oneself at start and stop in slew region, otherwise has out of set.
- **Max Response Frequency**
  The output torque is equal zero for Max input frequency in motor at no load that calls it. In instant the Motor can't start or stop at the moment.
- **Holding Torque**
  It is exerting max torque for extra add load to change rotor position in rotor keep motionless that motor stator winding is enable.

7.9.1 Model of Stepping Motor

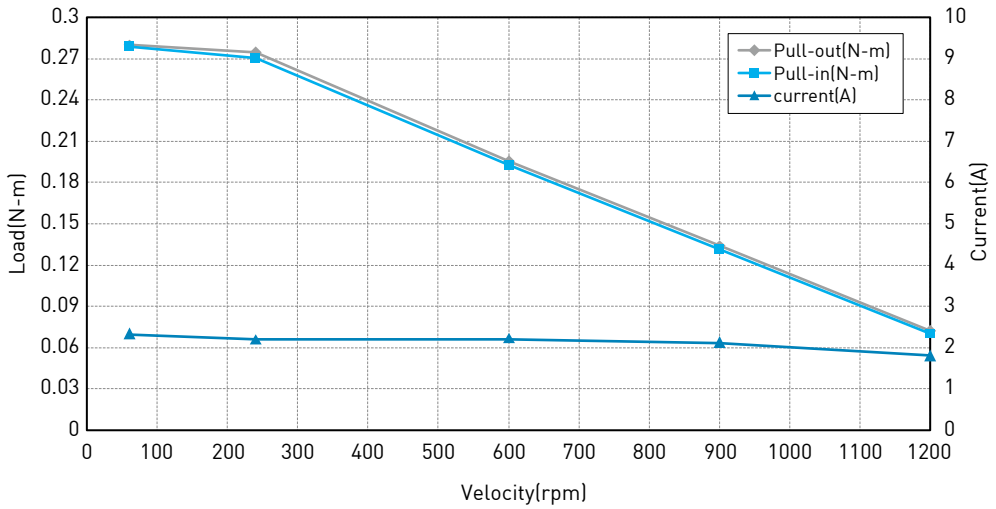
40mm Step Angle 1.8° ST40 Series



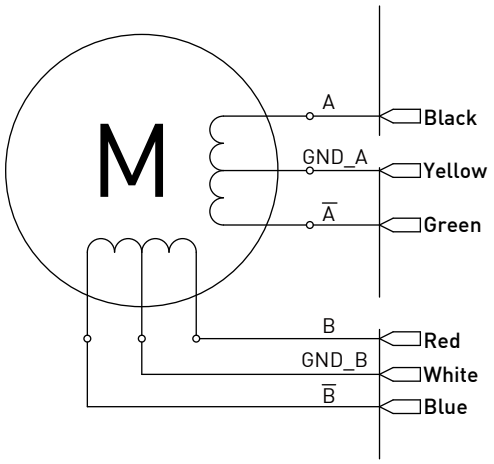


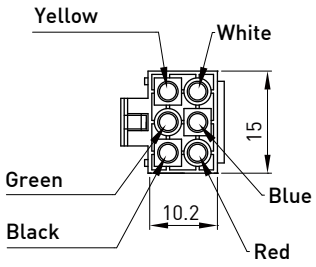
Model	Winding Type	Holding Torque	Current	Resistance	Inductance	Rotor Inertia	Leads	Motor Length	Input Voltage
Single axis		N.m	A/phase	Ω/phase	mH/phase	g-cm2		(L)mm	Vdc
FRST01102401	Single Pole	0.27	0.95	3.3	3.5	19	6	47	4

Torque- Speed Curve



Wiring Diagram





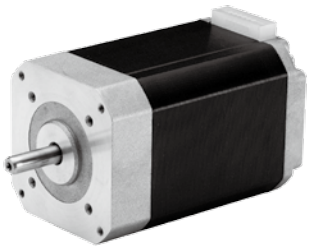
(6 Pin male connector)

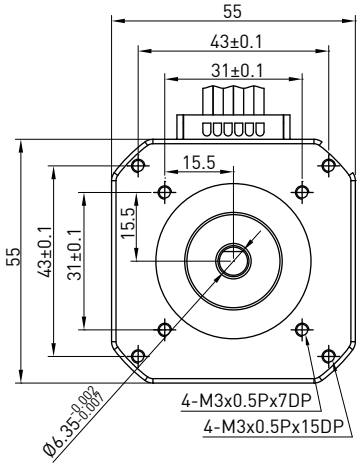
Notice:

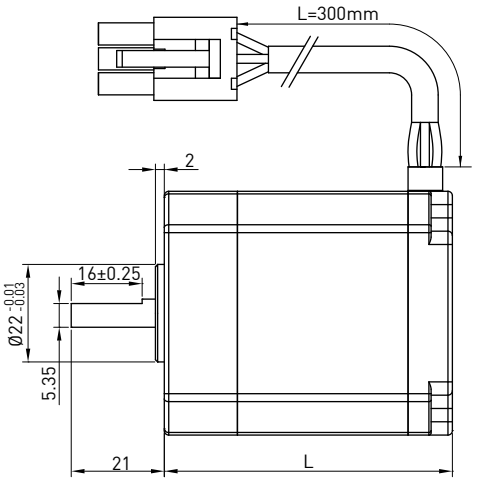
★ Please use the wire which is larger than 0.5㎜^{2} and as short as possible for power and motor connection.

★ Support 2 phase stepping motor (6 lead wire).

55mm Step Angle 1.8° ST55 Series



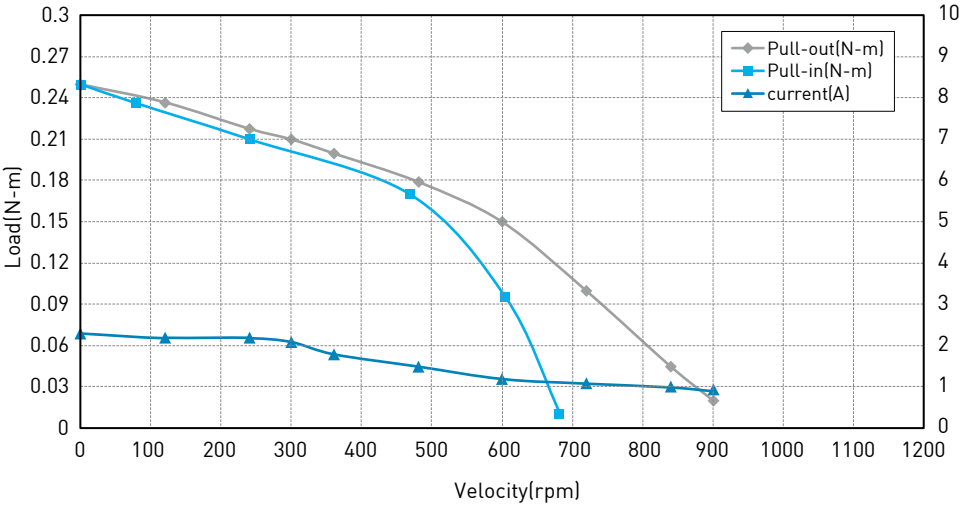




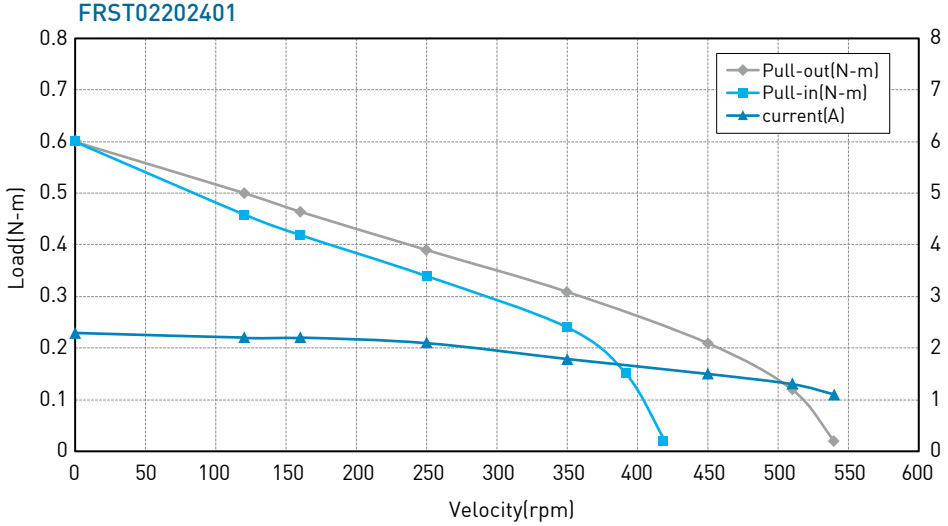
Model		Winding Type	Holding torque	Current	Resistance	Inductance	Rotor Inertia	Leads	Motor Length	Input Voltage
Single axis	Double axis		N.m	A/phase	Ω/phase	mH/phase	g-m2		(L)mm	Vdc
FRST02102401	FRST12102401	Single Pole	0.25	1.3	2.8	3.3	90	6	50.5	3
FRST02202401	FRST12202401	Single Pole	0.6	1.3	4.0	7.0	171	6	65	4
FRST02302401	FRST12302401	Single Pole	1.05	1.2	5.6	13.0	290	6	87	5.3

Torque- Speed Curve

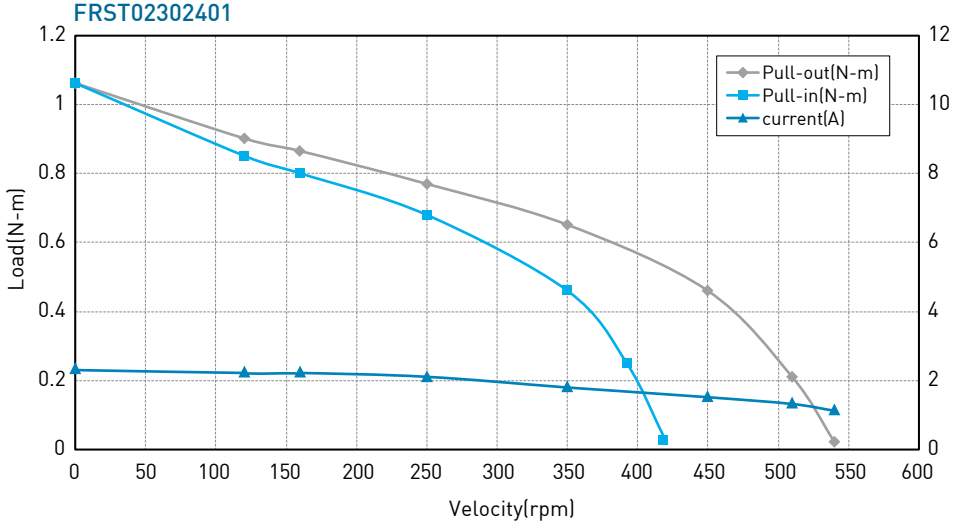
FRST02102401



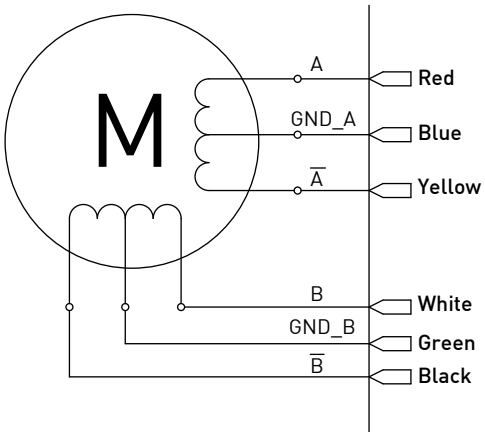
FRST02202401

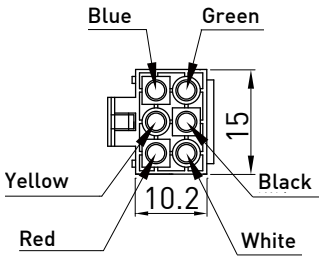


FRST02302401



Wiring Diagram





(6 Pin male connector)

Notice:

★ Please use the wire which is larger than 0.5㎜^{2} and as short as possible for power and motor connection.

★ Support 2 phase stepping motor (6 lead wire).

7.9.2 Model of Stepping Driver (STD-24A)

Specification

- 2 phase stepping motor (6 lead wire)
- Signal Pole current driver
- Micro-stepping driver function
- Constant output current 0.2A~2A
- Max Frequency response 150000Hz
- Support Pulse/Direction Pulse (1P)
- Support CW/CCW Pulse (2P)
- Support Quadrature Pulse (A/B)
- Additional Positive/Negative pole limit control
- Motor exciting release
- RoHS certificate
- CE safe characteristic

Connect and Setting

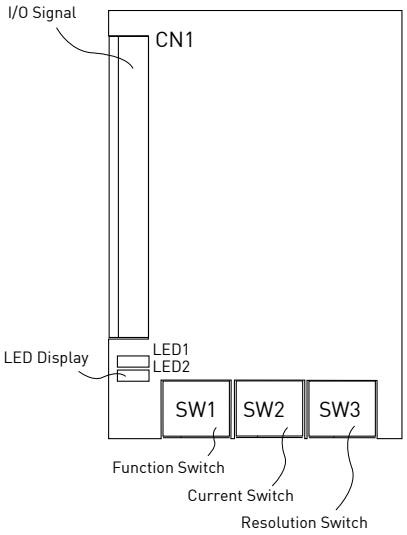
1. LED State

- LED display

Display	Color	function
LED1	Red	Power light
LED2	Green	State light

- State light Information

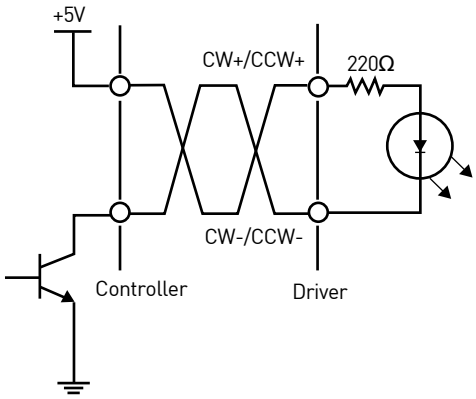
Drive State	LED State
Forward	low speed flash (0.5s/per)
Reverse	high speed flash (0.2s/per)
Limit Input	low speed flash (1s/per)
Exciting release	dark
Stand by	light

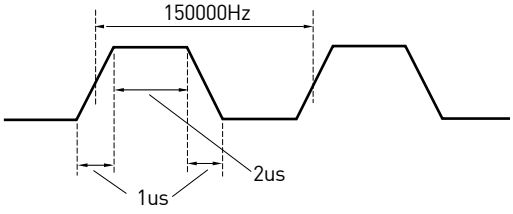


2. Input / Output

Interface	Pin	Input / Output	Mark
(CN1)	1	Power Input	DC24V
	2		Power Input
	3	Motor connect	COM A
	4	Motor connect	COM B
	5	Motor connect	A +
	6	Motor connect	A -
	7	Motor connect	B +
	8	Motor connect	B -
	9	Pulse single Input	CW -
	10	Pulse single Input	CW +
	11	Pulse single Input	CCW -
	12	Pulse single Input	CCW +
	13	Control single	MF
	14	Control single	LSF
	15	Control single	LSR
	16	No use	NC

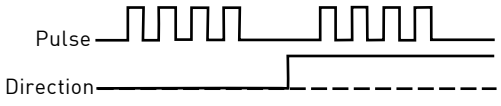
● Input Pulse Single Wiring Diagram



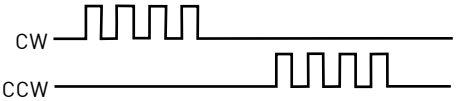


Notice:
※ Please use the wire which is larger than 0.5㎟ and as short as possible for power and motor connection.
※ Pulse width please corresponds to the sketch.
※ These signal types are accepted by driver：

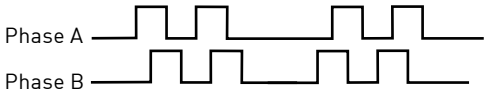
A. Pulse/Direction (1P)



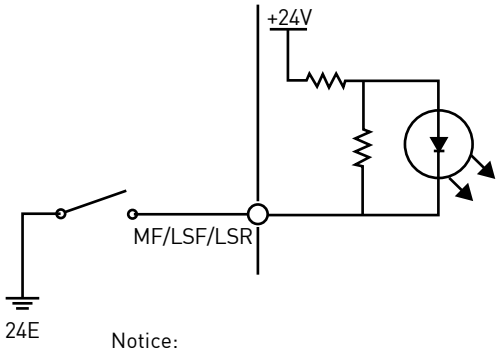
B. CW/CCW (2P)



C. Quadrature (A/B)

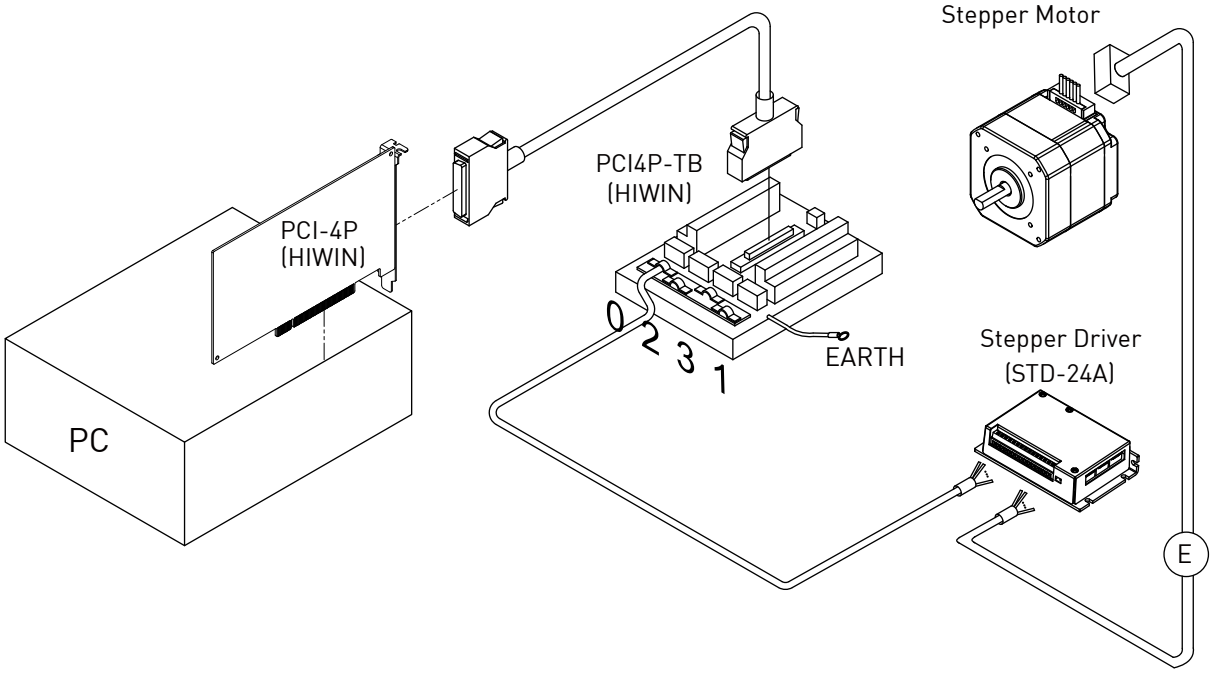


● Limit Input、Motor Disable Wiring Diagram

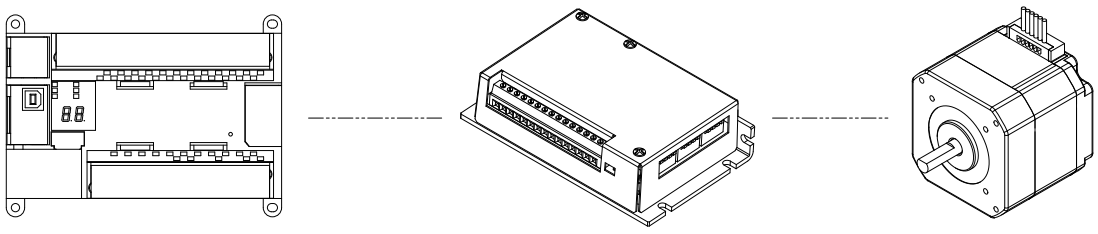


Notice:
※ The function was triggered by closing the switch (ON).
※ The forward limit signal is ON，motor will not rotate even receiving forward pulse command. Furthermore, The reverse limit signal is ON，motor will not rotate even receiving reverse pulse command.
※ Motor release signal is ON, exciting release.

HIWIN PCI-4P Wiring Example

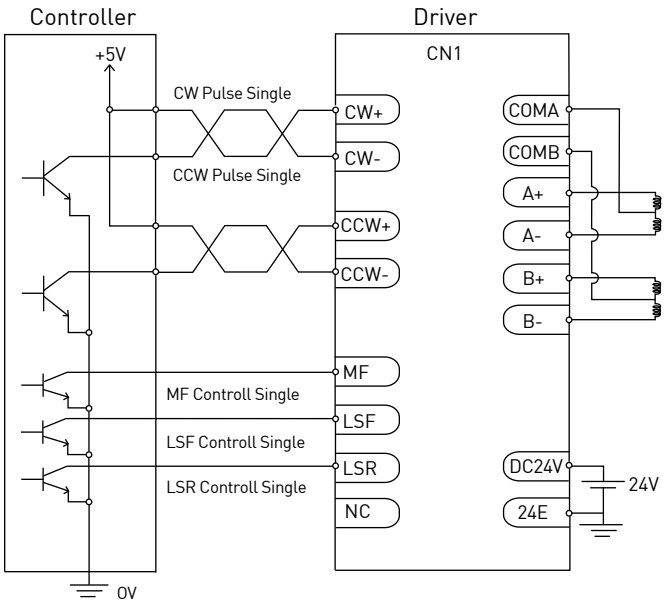


PLC Wiring Example



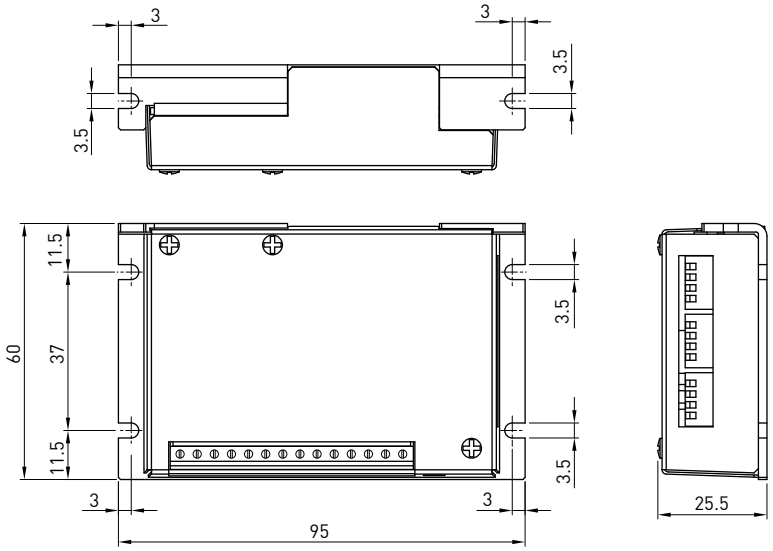
PLC Motion Controller　　Stepper Motor Driver (STD-24A)　　Stepper Motor

Connect Diagram

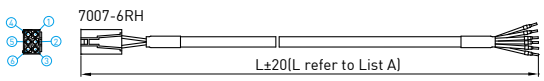


Notice:
※ Please input DC+5V pulse.
※ Please use twisted line or shading line as signal line which is as short as possible.

Size Diagram



Stepping Motor Accessories

Name	Type	Connect	Description	Signal	Color	7007-6RH	cord-end sleeve terminal
Ⓔ Stepping Motor External Cable	HV00FRSTP□□A	MOTOR OUTPUTS		COM A	Blue	1	COM A
				A-	Yellow	2	A-
				A+	Red	3	A+
				COM B	Green	4	COM B
				B-	Black	5	B-
				B+	White	6	B+

List A

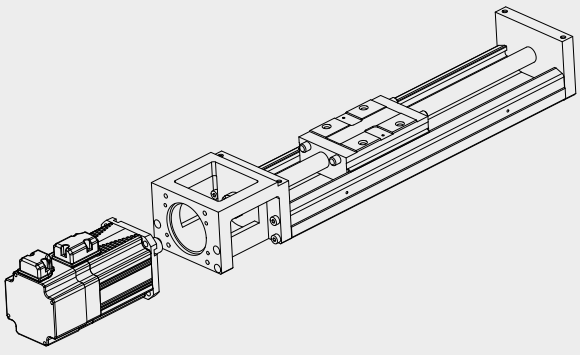
□□	30	50	70	A0
L (m)	3	5	7	10

7.10 HIWIN Robot and Motor adaptor Flange

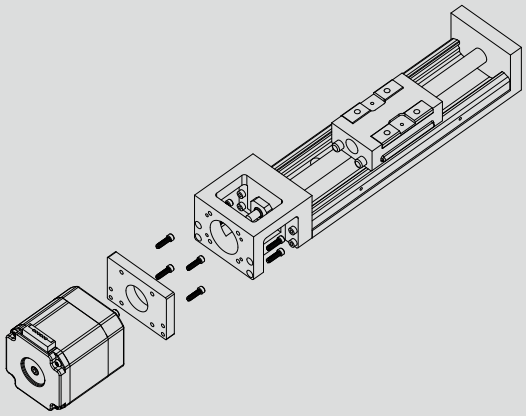
Motor Flange List

	Motor Type								
Model	AC 50W	AC 100W	AC 200W	AC 400W	AC 750W	ST40-11	ST55-21	ST55-22	ST55-23
KK40	F2	F2	-	-	-	F3	F3	F3	F3
KK50	F2	F2	-	-	-	F3	F3	F3	F3
KK60	F2	F2	-	-	-	F5	F5	F5	F5
KK86	-	-	F0	F0		-	-	-	-
KK100	-	-	F0	F0	F1	-	-	-	-
KK130	-	-	F1	F1	F0	-	-	-	-
SK60	F2	F2	F0	F0		F5	F5	F5	F5
SK86	F3	F3	F0	F0		-	-	-	-
KA100	F1	F1	-	-	-	-	-	-	-
KA136	F3	F3	F0	F0	-	-	-	-	-
KA170	-	-	F0	F0	F1	-	-	-	-
KA200	-	-	F1	F1	F0				
KS100	-	-	-	-	-	-	-	-	-
KS140	-	-	F0	F0	-	-	-	-	-
KS180	-	-	-	-	-	-	-	-	-
KU60	KA100-F1	KA100-F1	-	-	-	KK60-F5	KK60-F5	KK60-F5	KK60-F5
KU80	KK86-F3	KK86-F3	F0	F0		-	-	-	-
KE50	KA100-F1	KA100-F1	-	-	-	KK60-F5	KK60-F5	KK60-F5	KK60-F5
KE65	KA100-F1	KA100-F1	-	-	-	KK60-F5	KK60-F5	KK60-F5	KK60-F5

Robot connect Servo Motor



Robot connect Stepping Motor



7.11 Selecting servo motor capacity guide

Guide for motor selection

1. Definition of mechanism to be driven by the motor.

Define detail dimension of individual mechanical components (ex: ball screw length, lead and pulley diameter)
Typical servo mechanisms are listed as follow:
[Ball screw mechanism]
[Belt mechanism]
[Rack and pinion mechanism]
[Reduction gear mechanism]

2. Definition of operating pattern (motion velocity profile).

The operating pattern can be defined by the following parameters: acceleration/deceleration time, constant-velocity time, stop time, cycle time, travel distance.

3. Calculation of load inertia and motor inertia ratio.

Calculate load inertia for each mechanical component. (Refer to “General inertia calculation method” described later.)
Then, divide the calculated load inertia by the inertia of the selected motor the check the inertia ratio. Note that the ratio should less than 15, if the selected motor is less than 750W. If the power of selected motor is higher than 1000W, the ratio should less than 10.

4. Calculation of motor velocity.

Calculate that motor velocity from the moving distance, acceleration/deceleration time and constant-velocity time.

5. Calculation of torque.

Calculate the required motor torque from the load inertia, acceleration/deceleration time and constant-velocity time.

6. Calculation of motor

Select a motor that meets the above 3 to 5 requirements.

7.11.1 Description of the items related to motor selection

1. Torque

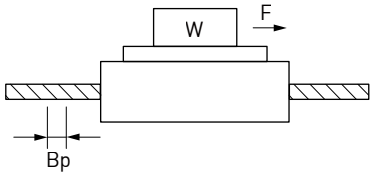
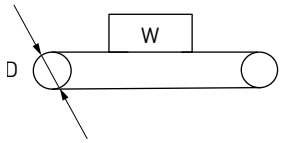
(1) Peak torque

Peak torque indicates the maximum torque that the motor requires during operation (mainly in acceleration and deceleration steps). The reference value is 80% or less of the maximum motor torque. If the torque is a negative value, a regenerative discharge resistor may be required.

(2) Traveling torque, stop holding torque

Traveling torque indicates the torque that the motor requires for a long time. Stop holding torque indicates that the amount of torque required for a motor to remain in a fixed position.

Traveling torque calculation formula for each mechanism.

Ball screw mechanism 	**Traveling torque** $T_f = \frac{B_P}{2\pi B_{eff}} \mu g W + F$
Belt mechanism 	**Traveling torque** $T_f = \frac{D}{2\pi B_{eff}} \mu g W + F$

List of symbol：
W：Workpiece weight [kg]
B_P：Lead [m]
D：Pulley diameter [m]
F：External force [N]
B_{eff}： Mechanical efficiency
μ：Coefficient of friction
g: Acceleration of gravity 9.8[m/s^2]

(3) Effective torque

Effective torque indicates a root-mean- square value of the total required for running and stopping the motor per unit time. The reference value is approximate 80% or less of the rated motor torque.

$$T_{rms} = \sqrt{\frac{T_a^2 \times t_a + T_f^2 \times t_b + T_d^2 \times t_d}{t_c}}$$

T_a: Acceleration torque [N-m]
T_f: Traveling torque [N-m]
T_d: Deceleration torque [N-m]
t_c: Cycle time [s] (Run time + Stop time)
t_a: Acceleration time [s]
t_b: constant-velocity time [s]
t_d: Deceleration time [s]

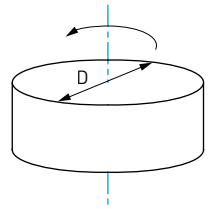
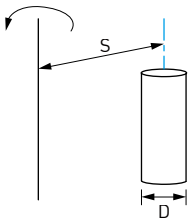
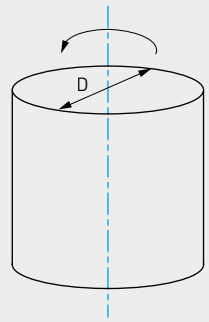
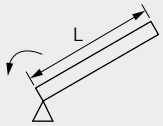
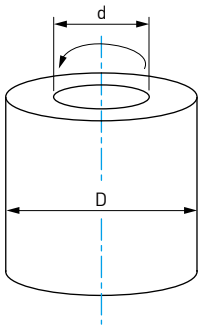
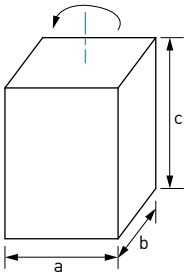
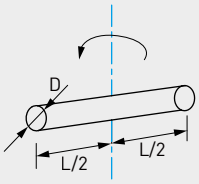
2. Motor velocity

Maximum velocity of motor in operation: The reference value is the rated velocity or lower value. When the motor operates at the maximum velocity, you must pay attention to the motor torque and temperature rise.

3. Load inertia and motor inertia ratio

Inertia is like the force to retain the current moving condition. Inertia ration is calculated by dividing load inertia by rotor inertia. Generally, for motor with 750W or lower capacity, the inertia ratio should be “15” or less. For motor with 1000W or higher capacity, the inertia ratio should be “10” or less. If the system need quicker response, a lower inertia ratio is required.

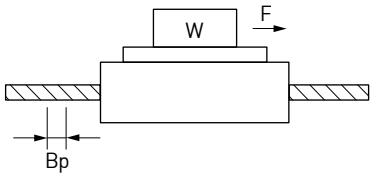
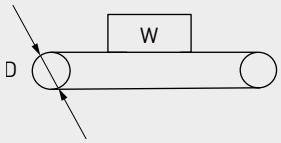
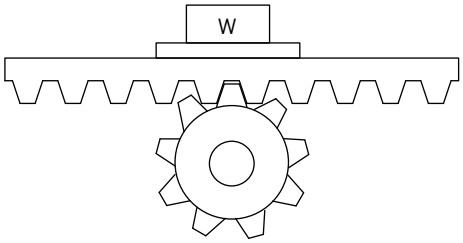
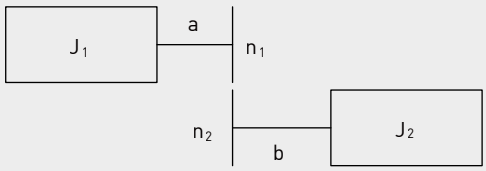
7.11.2 General inertia calculation for various rigid object of uniform composition

Shape	J calculation formula	Shape	J calculation formula
Disk 	$J=\frac{1}{8}MD^2$	Separated rod 	$J=\frac{1}{8}MD^2+MS^2$
Solid cylinder 	$J=\frac{1}{8}MD^2$	Straight rod 	$J=\frac{1}{3}ML^2$
Hollow cylinder 	$J=\frac{1}{8}M(D^2+d^2)$	Prism 	$J=\frac{1}{12}M(a^2+b^2)$
Uniform rod 	$J=\frac{1}{48}M(3D^2+4L^2)$		

List of symbol :
J : Inertia [kg-m^2]
M : Mass [kg]
D : Outer diameter [m]
d : Inner diameter [m]
L : Length [m]
a, b, c : Side length [m]
S : Distance [m]

If mass (M [kg]) is unknown, calculate it with the following formula :
Mass M[kg] = Density ρ [kg/m^3] Volume V[m^3]
Density of each material
Iron ρ = 7.9 x 10^3 [kg/m^3]
Brass ρ = 8.5 x 10^3 [kg/m^3]
Aluminum ρ = 2.8 x 10^3 [kg/m^3]

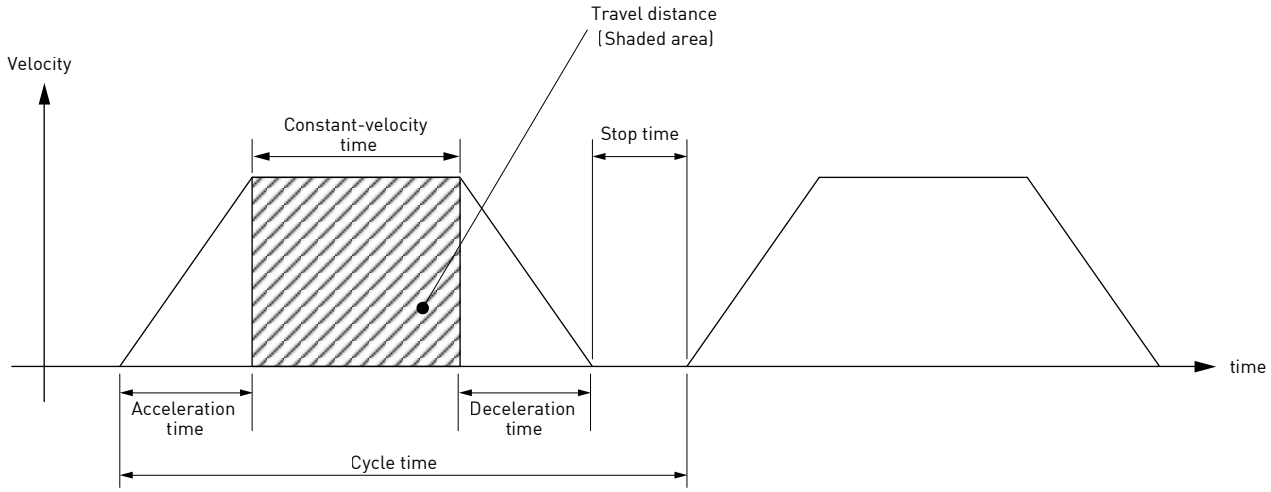
7.11.3 Equivalent inertia calculation for mechanism

Mechanism	J calculation formula
Ball screw 	$J = J_B + \frac{MB_P^2}{4\pi^2}$
Belt(Conveyor) 	$J = \frac{1}{4} W_b D^2$ *Excluding drum J
Rack and pinion 	$J = J_p + (M_r + W_r)\frac{D^2}{4}$
Reduction gear 	$J = J_1 + (\frac{n_2}{n_1})^2 J_2$ Inertia on shaft "a"

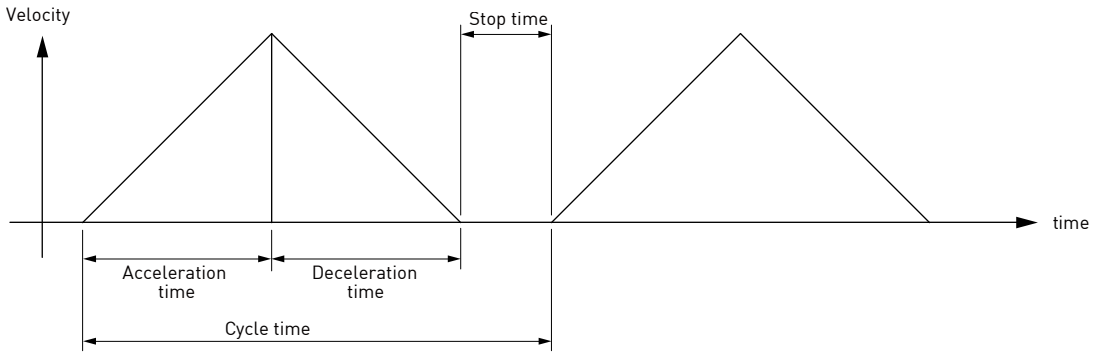
List of symbol:
J : Inertia [kg-m^2]
J_B : J of ball screw
J_P : J of pinion
M : Mass [kg]
M_r : Mass of rack [kg]
W_b : Workpiece weight on belt [kg]
W_r : Workpiece weight on rack [kg]
P : Lead
D : Drum diameter [m]
n_1 : A rotational speed of a shaft [r/min]
n_2 : A rotational speed of b shaft [r/min]

7.11.4 Operating pattern (motion velocity profile)

Trapezoidal profile



Triangle profile

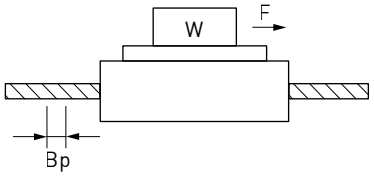


List of symbol:
Acceleration time ta
Constant-velocity time tb
Deceleration time td
Cycle time tc
Travel distance

Example of motor selection

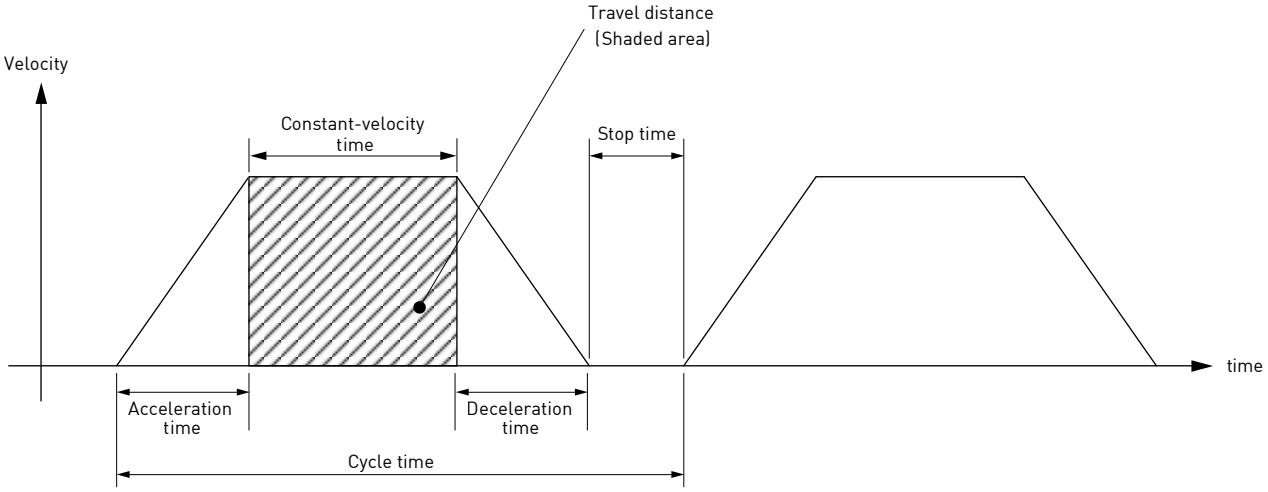
To drive ball screw mechanism

1. Example of motor selection for driving ball screw mechanism



Workpiece weight W = 10 [kg]
Ball screw length B_L = 0.5 [m]
Ball screw diameter B_D = 0.02 [m]
Ball screw lead B_P = 0.02 [m]
Ball screw efficiency B_{eff} = 0.9
Travel distance 0.3 [m]
Coupling inertia $J_C = 10 \times 10^{-6}$ [kg-m^2]

2. Running pattern(velocity profile)



Acceleration time t_a = 0.1 [s]
Constant-velocity time t_b = 0.8 [s]
Deceleration time t_d = 0.1 [s]
Cycle time t_c = 2 [s]
Travel distance 0.3[m]

3. Ball screw weight

$$B_W = \rho \times \pi \times \frac{B_D^2}{2} \times B_L$$

$$= 7.9 \times 10^3 \times \pi \times \frac{0.02^2}{2} \times 0.5$$

$$= 1.24\,[\mathrm{kg}]$$

4. Load inertia

$$J_L = J_C + J_B = J_C + \frac{1}{8} B_W \times B_D^2 + \frac{W \times B_P^2}{4\pi^2}$$

$$= 0.00001 + \frac{1.24 \times 0.02^2}{8} + \frac{10 \times 0.02^2}{4\pi^2}$$

$$= 1.73 \times 10^{-4} \ [kg - m^2]$$

5. Provisional motor selection

Choose Hiwin 200W Servo motor : $J_M = 0.14 \times 10^{-4} \ [kg - m^2]$

6. Calculation of inertia ratio

$$\frac{J_L}{J_M} = \frac{1.73 \times 10^{-4}}{0.14 \times 10^{-4}} = 12.3$$

The inertia ratio is less than 30.

7. Calculation of maximum velocity (Vmax)

$$\frac{1}{2} \times t_a \times V_{max} + t_b \times V_{max} + \frac{1}{2} \times t_d \times V_{max} = \text{Travel distance}$$

$$\frac{1}{2} \times 0.1 \times V_{max} + 0.8 \times V_{max} + \frac{1}{2} \times 0.1 \times V_{max} = 0.3$$

$$V_{max} = 0.334 \ [m/s]$$

8. Calculation of motor velocity (N [r/min])

Ball screw lead BP = 0.02 [m]

$$N = \frac{V_{max}}{B_P} = \frac{0.334}{0.02} = 16.7 \left[{}^{rad}/_{s} \right] = 1002[\text{rpm}]$$

1002[rpm] is less than 3000[rpm] (rated velocity of Hiwin 200W Servo motor)

9. Calculation of torque

Traveling torque

$$T_f = \frac{B_P}{2\pi B_{eff}}(\mu gW + F) = \frac{0.02}{2\pi 0.9}(0.1 \times 9.8 \times 10 + 0) = 0.035\ [N-m]$$

Acceleration torque

$$T_a = \frac{(J_L + J_M)}{t_a} + \text{Traveling torque}$$

$$= \frac{(1.73 \times 10^{-4} + 0.14 \times 10^{-4}) \times 2\pi \times 1.67}{0.1} + 0.035$$

$$= 0.231\ [N-m]$$

Deceleration torque

$$T_d = \frac{(J_L + J_M)}{t_d} - \text{Traveling torque}$$

$$= \frac{(1.73 \times 10^{-4} + 0.14 \times 10^{-4}) \times 2\pi \times 1.67}{0.1} - 0.035$$

$$= 0.161\ [N-m]$$

10. Verification of maximum torque

Ta = 0.231 [N-m] is less than 1.91 [N-m] (Maximum torque of Hiwin 200W Servo motor)

11. Verification of effective torque

$$T_{rms} = \sqrt{\frac{T_a^2 \times t_a + T_f^2 \times t_b + T_d^2 \times t_d}{t_c}}$$

$$= \sqrt{\frac{0.231^2 \times 0.1 + 0.035^2 \times 0.8 + 0.161^2 \times 0.1}{2}}$$

$$= 0.067\ [N-m]$$

0.067 [N-m] is less than 0.64 [N-m] (rated torque of Hiwin 200W Servo motor)

12. Evaluation

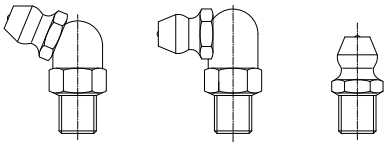
Judging from the inertia ratio calculated above, selection of 200 W motor is preferable, although the torque margin is significantly large.

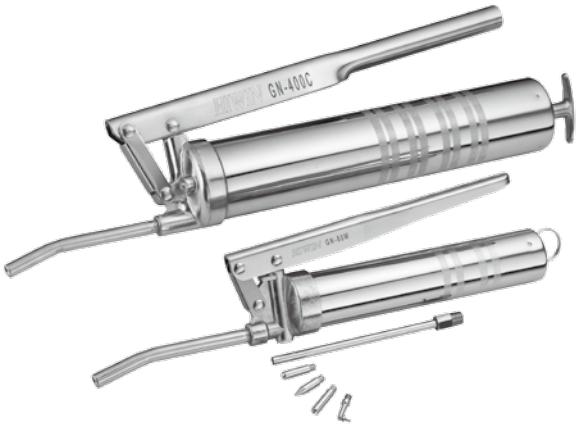
Industrial Robot
Lubricating Device

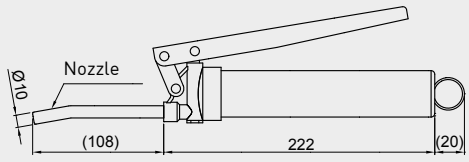
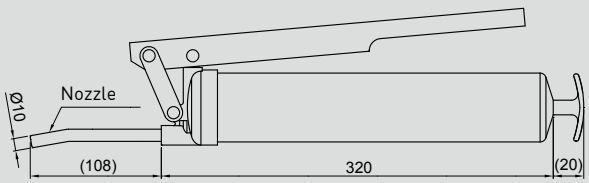
8.1 Grease Gun Unit

HIWIN offers different capacities and packages for grease gun reload, depending on various requirements. The grease gun could not only be equipped with normal grease nozzle, but also be replaced with other nozzles for other kinds of grease nipples.

Grease Nipple: M6、PT1/8

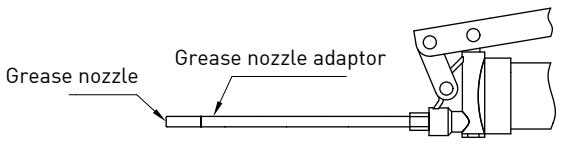




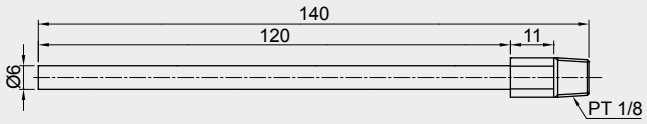
Model no.	GN-80M	GN-400C
Dimen-sion		
Spec.	1. Working pressure: 15 MPa 2. Output: 0.5~0.6 c.c./Stroke 3. Weight: 520 g(grease excluded) 4. Grease reload: 70 g flexible tube or 120 ml bulk loading	1. Working pressure: 15 MPa 2. Output: 0.8~0.9 c.c./Stroke 3. Weight: 1150 g (grease excluded) 4. Grease reload: 14 o.z. cartridge pipe or 400 ml bulk loading

8.2 Grease Nozzle Kit (Model no. GNZ-05-BOX)

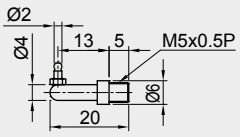
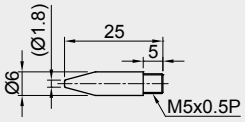
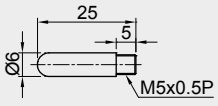
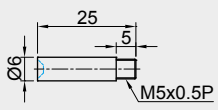
HIWIN grease nozzle kit with various nozzles offers grease reload for different kinds of grease nipples.



8.2.1 Grease Nozzle Adaptor

Model no.	Dimension
GT-PT1/8-M5	

8.2.2 Grease Nozzle

Model no.	Dimension	Lubricating Type
GNZ-L-M5		Minimized grease hole
GNZ-P-M5		Minimized grease hole
GNZ-R-M5		Dent Nipple (DIN3405) 
GNZ-C-M5		Nipple (M3, M4 Thread) 

8.3 Grease

HIWIN offers various lubricants for environment such as general type, heavy load, low particle emitting, high speed, etc. According to the ways of grease reload, choices for different capacities and packages of grease are available.

8.3.1 Packing

70g Flexible tube	400g Pipe	1kg Can
		

HIWIN G01 Grease of Heavy-loading

Features

1. Excellent wear and pressure resistance under heavy load condition
2. Low friction in low temperature
3. Water resistant
4. Available for central lubrication system

Basic Properties:

Color		Light yellow
Base Oil		Mineral oil
Consistency Enhancer		Polyurea
Additive		Solid lubricant
Service Temp. (℃)		-15~115
NLGI-grade (0.1mm)		310-340
Viscosity (cst)	40℃	500
	100℃	30
Drop Point (℃)		＞170

HIWIN G02 Grease of Low Particle-emitting

Features:

1. Low particle emitting rate and suitable for clean room environment
2. Wear resistant
3. For long term usage and wide temperature range
4. Consisting of synthetic hydrocarbon oil and special calcium soap, also resistant to oxidation and corrosion

Basic Properties:

Color		Beige
Base Oil		Synthetic hydrocarbon oil
Consistency Enhancer		Special calcium soap
Service Temp. (℃)		-30~140
NLGI-grade (0.1mm)		265-295
Viscosity (cst)	40℃	100
	100℃	15
Drop Point (℃)		＞180

HIWIN G03 Grease of Low Particle-emitting (High Speed)

Features:

1. Low particle emitting rate and suitable for clean room environment
2. Wear resistant
3. For long term usage and wear resistance under high speed condition

Basic Properties:

Color		Beige
Base Oil		Synthetic hydrocarbon oil
Consistency Enhancer		Special calcium soap
Service Temp. (˚C)		-45~125
NLGI-grade (0.1mm)		265-295
Viscosity (cst)	40˚C	30
	100˚C	5.9
Drop Point (˚C)		＞210

HIWIN G04 Grease of High Speed

Features:

1. Wear resistant under high speed condition
2. Low friction under high speed condition
3. Water resistant

Basic Properties:

Color		Beige
Base Oil		Ester / PAO
Consistency Enhancer		Lithium soap
Service Temp. (˚C)		-35~120
NLGI-grade (0.1mm)		260-280
Viscosity (cst)	40˚C	25
	100˚C	6
Drop Point (˚C)		＞225

HIWIN G05 Grease of General Type

Features:

1. Wear resistant
2. Low friction
3. Long-life
4. Low oxidation tendency
5. Water resistant
6. Corrosion resistant

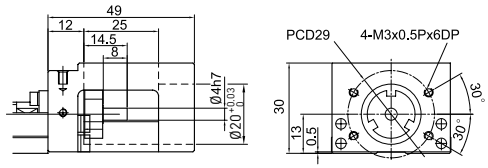
Basic Properties:

Color		Brown
Base Oil		Mineral oil
Consistency Enhancer		Lithium soap
Service Temp. (˚C)		-15~120
NLGI-grade (0.1mm)		2
Viscosity (cst)	40˚C	200
Drop Point (˚C)		190

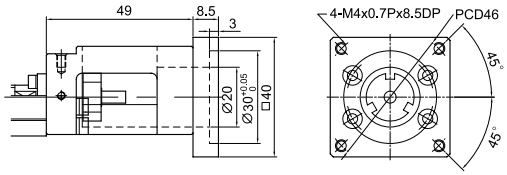
Appendix 1: Motor Adaptor Flange

KK40

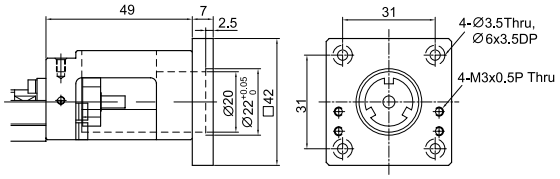
Motor housing F0



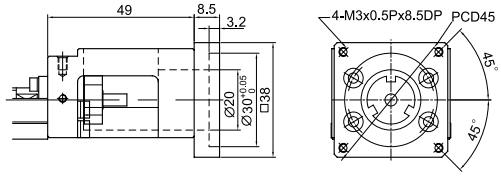
Motor adaptor Flange F1



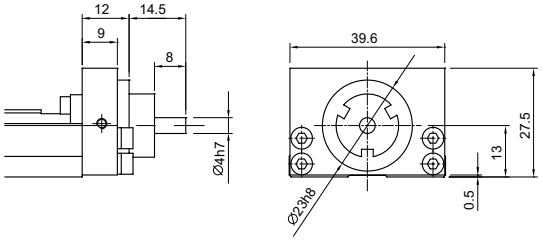
Motor adaptor Flange F3



Motor adaptor Flange F2

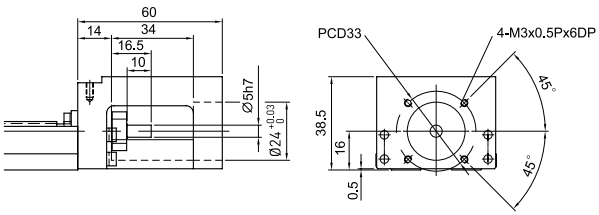


Mount Housing H0

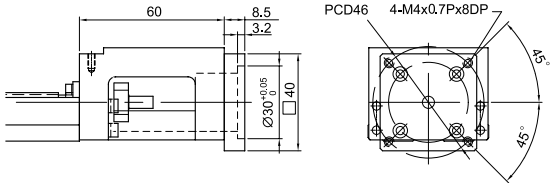


KK50

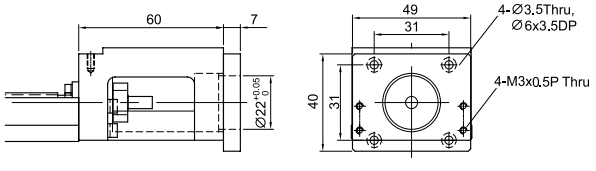
Motor housing F0



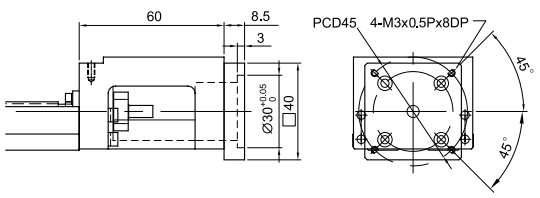
Motor adaptor Flange F1



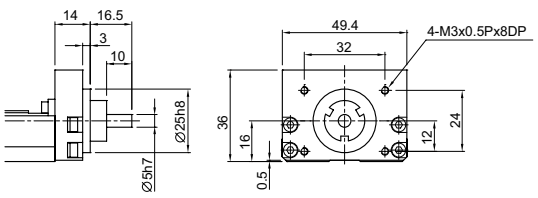
Motor adaptor Flange F1



Motor adaptor Flange F2

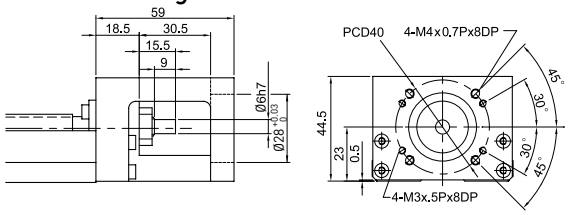


Mount Housing H0

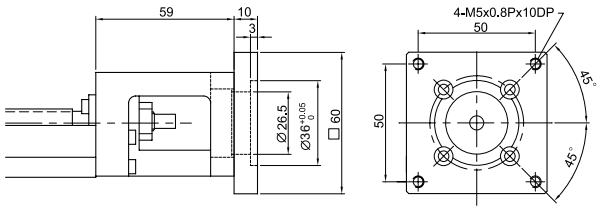


KK60

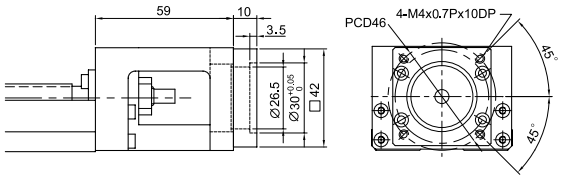
Motor housing F0



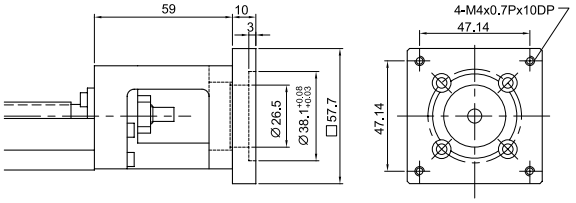
Motor adaptor Flange F3



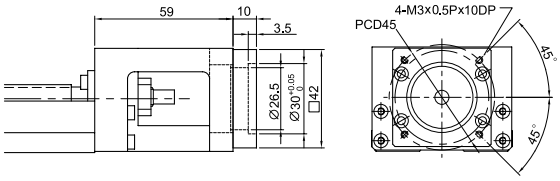
Motor adaptor Flange F1



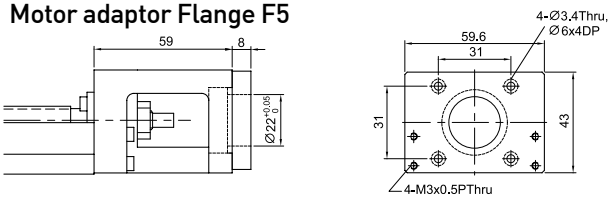
Motor adaptor Flange F4



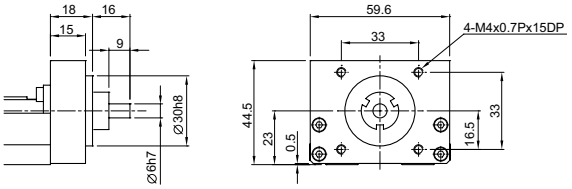
Motor adaptor Flange F2



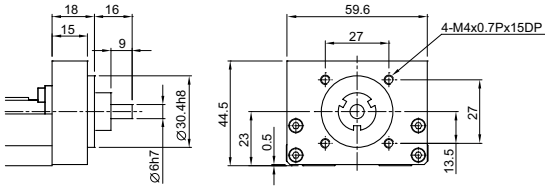
Motor adaptor Flange F5



Mount Housing H0

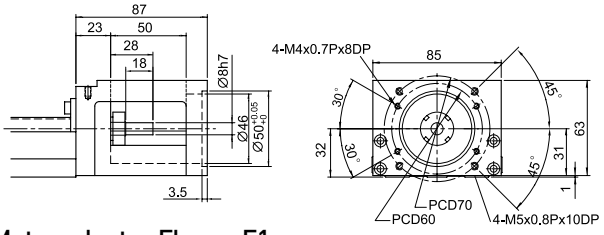


Mount Housing H1

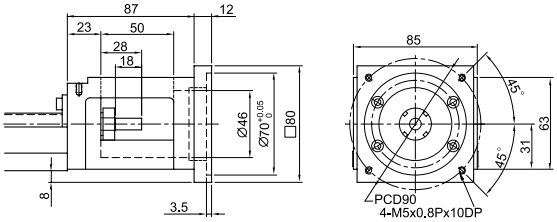


KK86

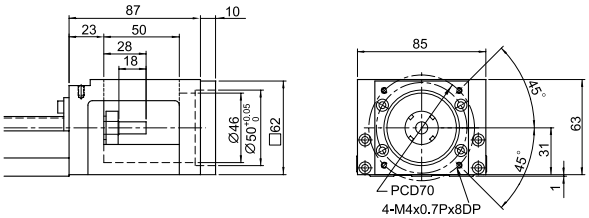
Motor housing F0



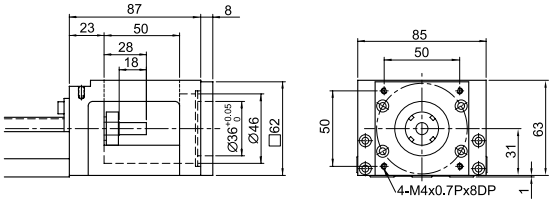
Motor adaptor Flange F4



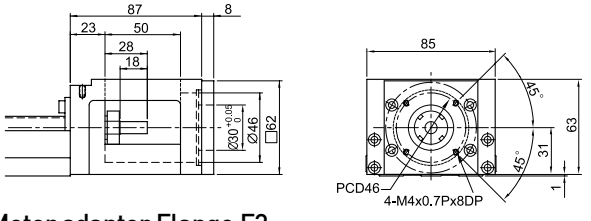
Motor adaptor Flange F1



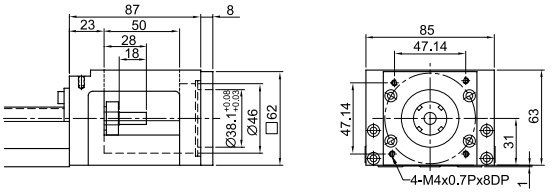
Motor adaptor Flange F5



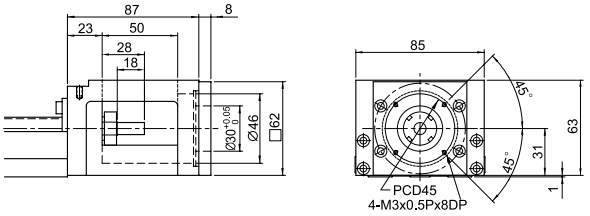
Motor adaptor Flange F2



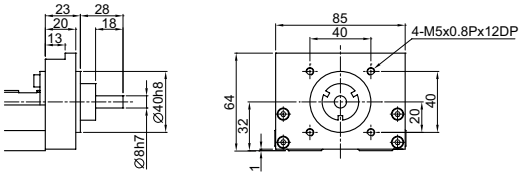
Motor adaptor Flange F6



Motor adaptor Flange F3

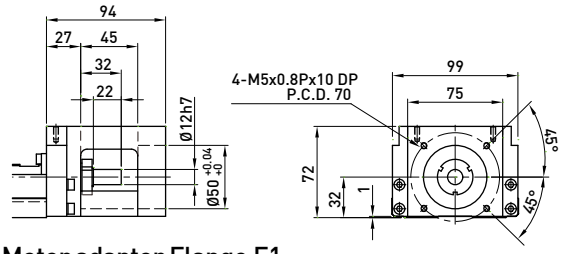


Mount Housing H0

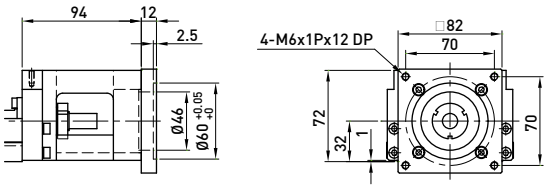


KK100

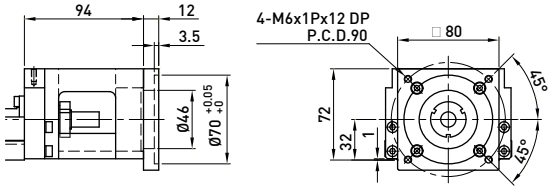
Motor housing F0



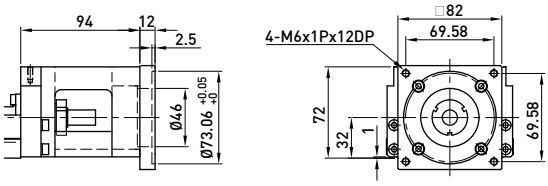
Motor adaptor Flange F3



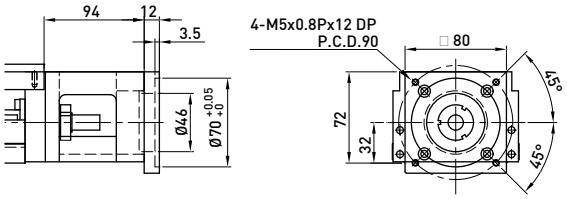
Motor adaptor Flange F1



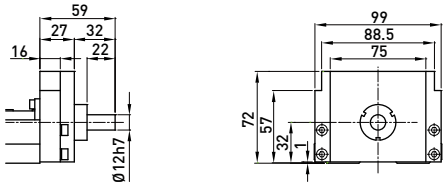
Motor adaptor Flange F4



Motor adaptor Flange F2

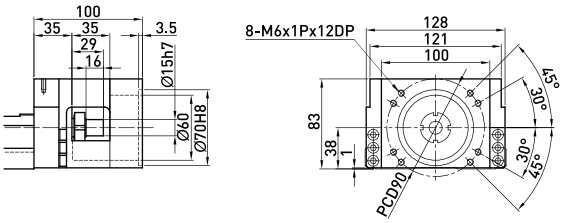


Mount Housing H0

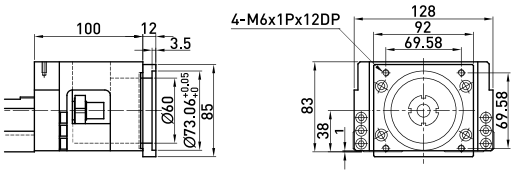


KK130

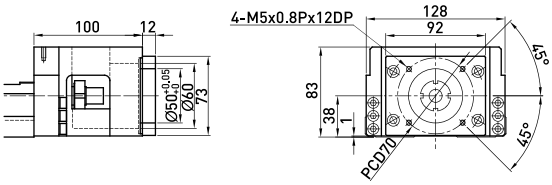
Motor housing F0



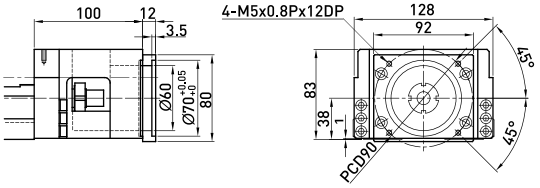
Motor adaptor Flange F3



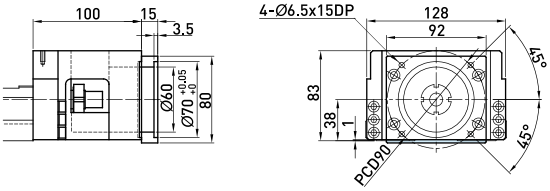
Motor adaptor Flange F1



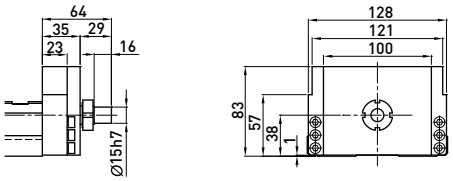
Motor adaptor Flange F4



Motor adaptor Flange F2

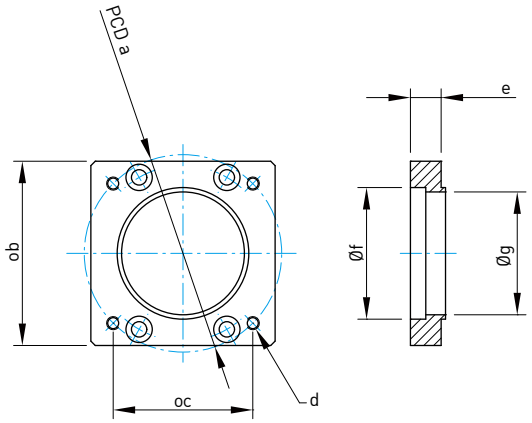


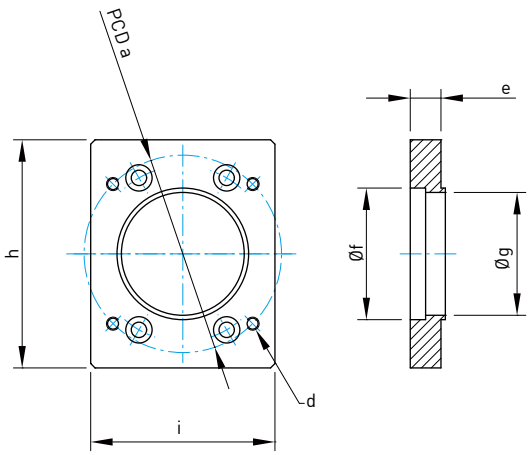
Mount Housing H0



Appendix 2: Motor Adaptor Flange List

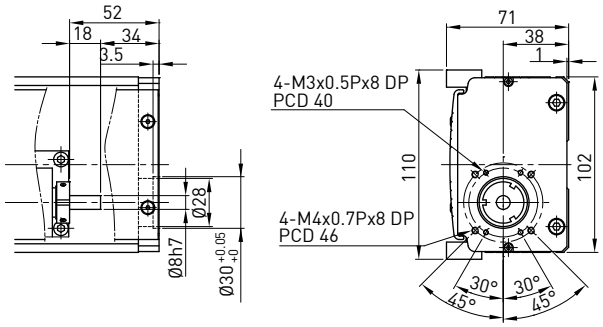
Model no.	Flange Selection	Flange dimension								
		a	b	c	d	e	f	g	h	i
KA100	F1	45	42	-	M3	7	30H8	28	-	-
KA136	F1	70	62	-	M4	10	50H8	46	-	-
	F2	46	62	-	M4	8	30H8	-	-	-
	F3	45	62	-	M3	8	30H8	-	-	-
	F4	90	80	-	M5	12	70H8	46	-	-
	F5	-	62	50	M4	8	36H8	46	-	-
	F6	-	62	47.14	M4	8	38.1H8	46	-	-
KA170	F1	90	80	-	M6	12	70H8	46	-	-
	F2	90	80	-	M5	12	70H8	46	-	-
	F3	-	82	70	M6	12	60H8	46	-	-
	F4	-	82	69.58	M6	12	73.06H8	46	-	-
KA200	F1	70	-	-	M5	12	70H8	60	73	92
	F2	90	-	-	M5	12	70H8	60	80	92



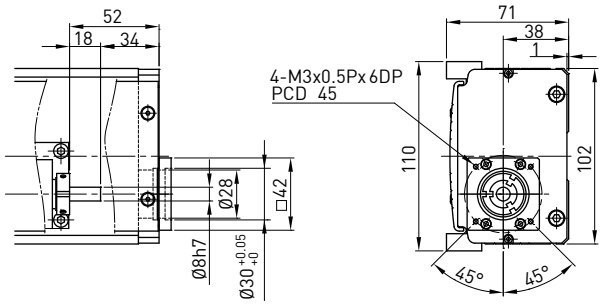


KA100

Motor Adaptor Flange F0

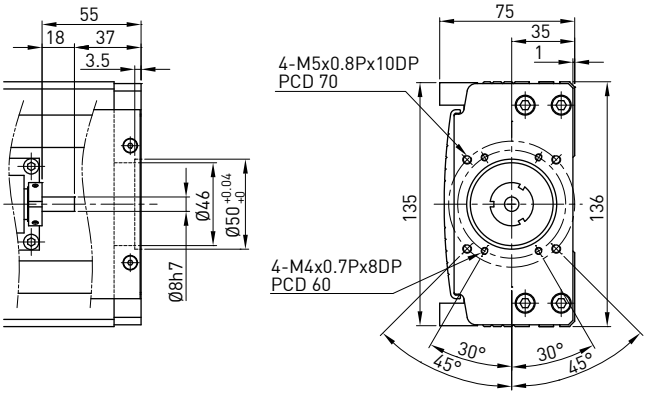


Motor Adaptor Flange F1

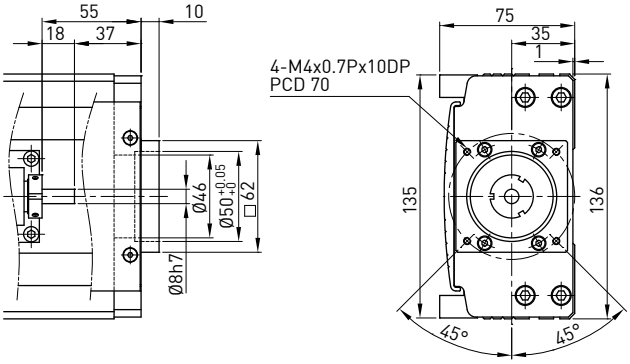


KA136

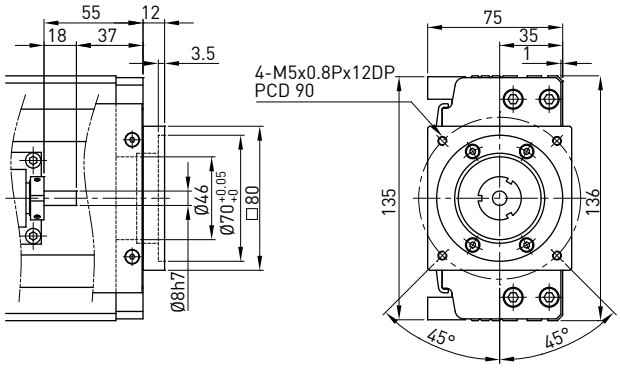
Motor Adaptor Flange F0



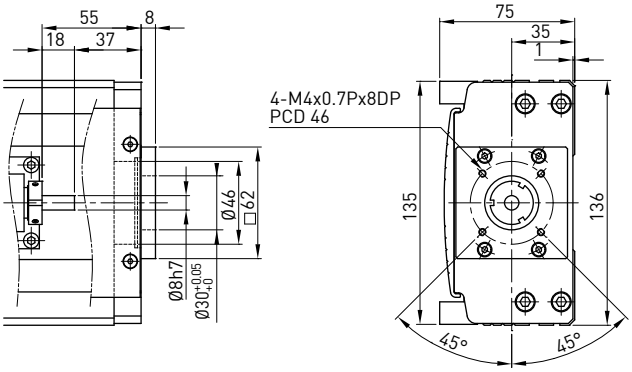
Motor Adaptor Flange F1



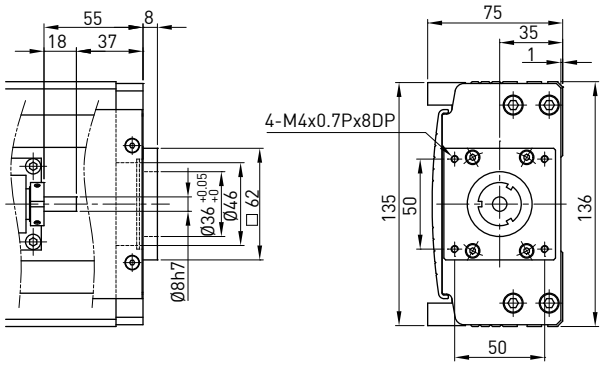
Motor Adaptor Flange F4



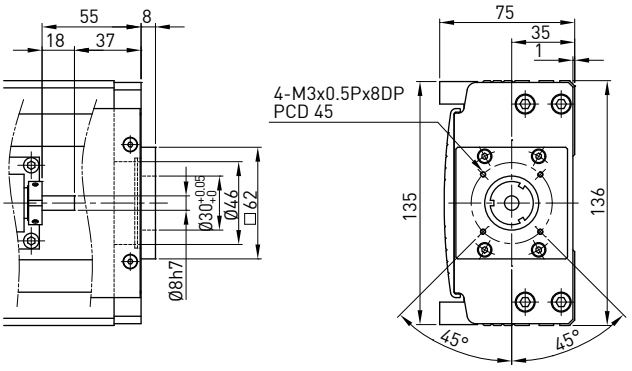
Motor Adaptor Flange F2



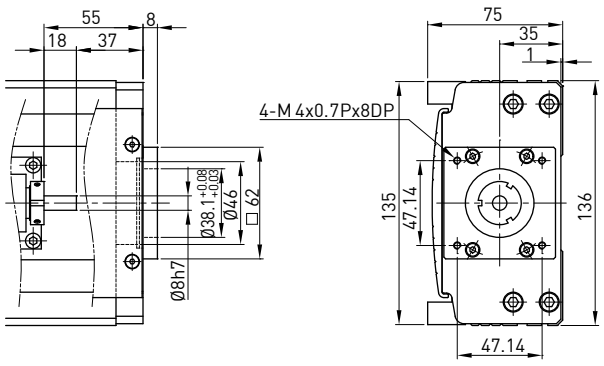
Motor Adaptor Flange F5



Motor Adaptor Flange F3

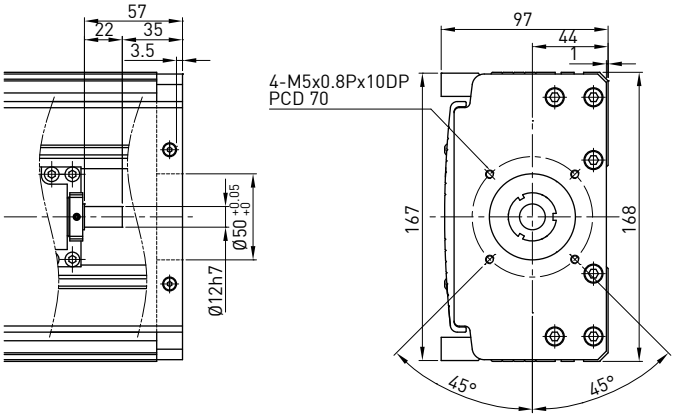


Motor Adaptor Flange F6

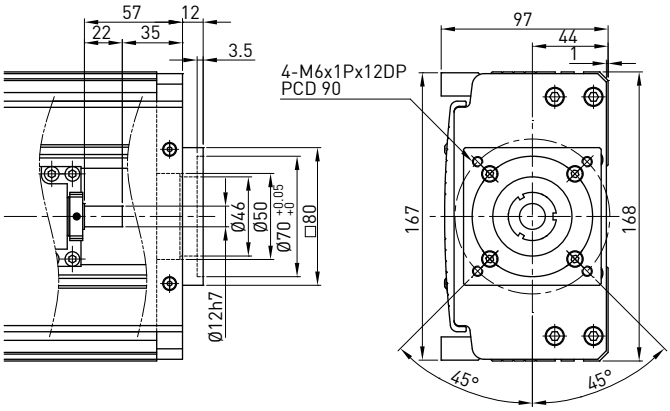


KA170

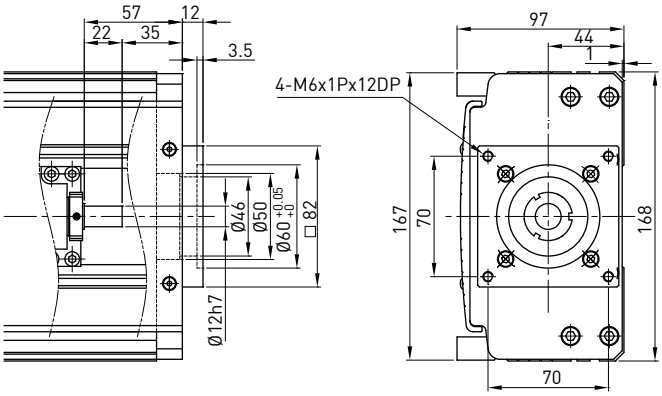
Motor Adaptor Flange F0



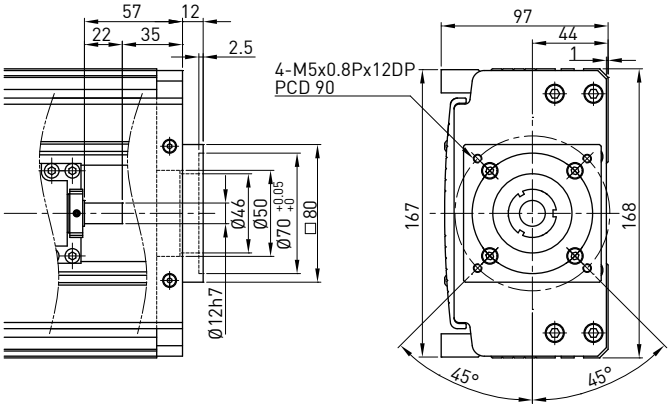
Motor Adaptor Flange F1



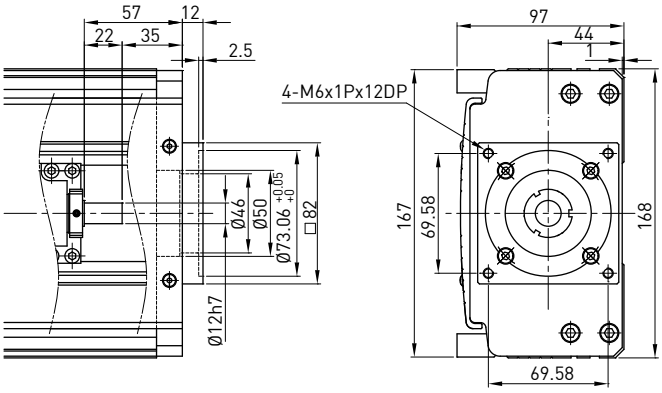
Motor Adaptor Flange F3



Motor Adaptor Flange F2

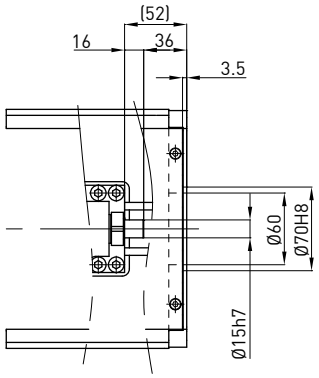


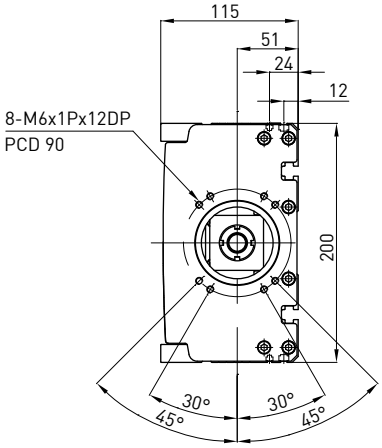
Motor Adaptor Flange F4



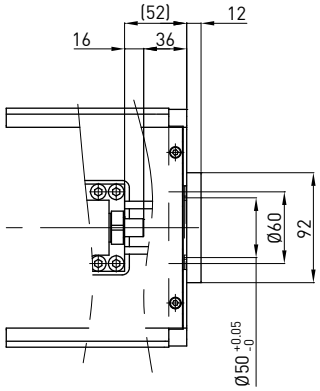
KA200

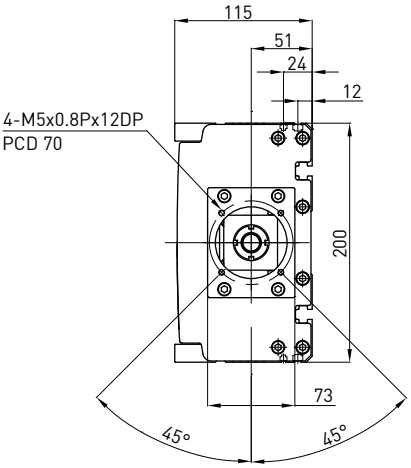
Motor Adaptor Flange F0



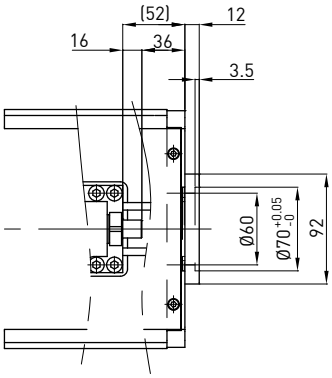


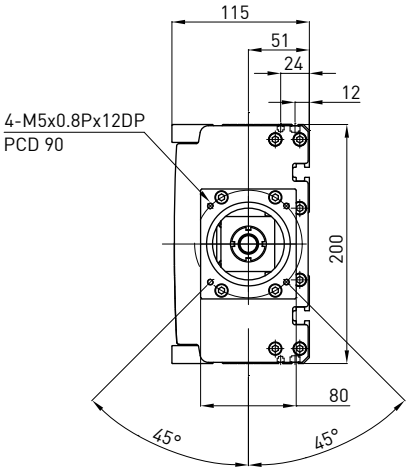
Motor Adaptor Flange F1





Motor Adaptor Flange F2





Appendix: Motor Selection

HIWIN Mikrosystem Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection											+Brake Weight (kg)	Driver	Weight (kg)	Voltage
			KA100	KA136	KA170	KA200	KS100	KS140	KS180	KU060	KU080	KE050	KE065				
100W	FRAC101022	0.6	F1	F3	-	-	KA100-F1	-	-	KA100-F1	KK86-F3	KA100-F1	KA100-F1		MD-36-S	1.25	220V
200W	FRAC102022	1	-	F0	F0	F1	-	F0	F0	-	F0	-	-	-	MD-36-S	1.25	220V
400W	FRAC104022	1.45	-	F0	F0	F1	-	F0	F0	-	F0	-	-	-	MD-36-S	1.25	220V
750W	FRAC107522	2.66	-	-	F1	F0	-	-	-	-	-	-	-	-	MD-36-S	1.25	220V

Mitsubishi Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection											+Brake Weight (kg)	Driver	Weight (kg)	Voltage
			KA100	KA136	KA170	KA200	KS100	KS140	KS180	KU060	KU080	KE050	KE065				
30W	HC-PQ033	0.32	F0	F2	-	-	F0	-	-	F0	KK86-F2	F0	F0			0.6	220V
50W	HF-KP053	0.35	F0	F2	-	-	F0	-	-	F0	KK86-F2	F0	F0	0.75	MR-J3S-10A	0.8	220V
100W	HF-KP13	0.56	F0	F2	-	-	F0	-	-	F0	KK86-F2	F0	F0	0.89	MR-J3S-10A	0.8	220V
200W	HF-KP23	0.94	-	F0	F0	F1	-	F0	F0	-	F0	-	-	1.6	MR-J3S-20A	0.8	220V
400W	HF-KP43	1.5	-	F0	F0	F1	-	F0	F0	-	F0	-	-	2.1	MR-J3S-40A	1	220V
750W	HF-KP73	2.9	-	-	F1	F0	-	-	-	-		-	-	4	MR-J3S-70A	1.4	220V

Panasonic Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection											+Brake Weight (kg)	Driver	Weight (kg)	Voltage
			KA100	KA136	KA170	KA200	KS100	KS140	KS180	KU060	KU080	KE050	KE065				
50W	MSMD5AZP1	0.32	F1	F3	-	-	KA100-F1	-	-	KA100-F1	KK86-F3	F1	KA100-F1	0.53	MADDT1105	0.8	110V
50W	MSMD5AZP1	0.32	F1	F3	-	-	KA100-F1	-	-	KA100-F1	KK86-F3	F1	KA100-F1	0.53	MADDT1205	0.8	220V
100W	MSMD011P1	0.47	F1	F3	-	-	KA100-F1	-	-	KA100-F1	KK86-F3	F1	KA100-F1	0.68	MADDT1107	0.8	110V
100W	MSMD012P1	0.47	F1	F3	-	-	KA100-F1	-	-	KA100-F1	KK86-F3	F1	KA100-F1	0.68	MADDT1205	0.8	220V
200W	MSMD021P1	0.82	-	F1	-	-	-	-	-	-	KK86-F1	-	-	1.3	MADDT2110	1.1	110V
200W	MSMD022P1	0.82	-	F1	-	-	-	-	-	-	KK86-F1	-	-	1.3	MADDT1207	0.8	220V
400W	MSMD041P1	1.2	-	F1	-	-	-	-	-	-	KK86-F1	-	-	1.7	MADDT3120	1.5	110V
400W	MSMD042P1	1.2	-	F1	-	-	-	-	-	-	KK86-F1	-	-	1.7	MADDT2210	1.1	220V
750W	MSMD082S1	2.3	-	F4	F2	F2	-	-	-	-	KK86-F4	-	-	3.1	MADDT3520	1.5	220V

Yasukawa Servo Motor

Motor Output	Motor	Weight (kg)	Flange Selection											Brake (-1+C)	Driver	Weight (kg)	Remarks
			KA100	KA136	KA170	KA200	KS100	KS140	KS180	KU060	KU080	KE050	KE065				
50W	SGMAV-A5ADA61	0.3	F0	F2	-	-	F0	-	-	F0	KK86-F2	F0	F0		SGDV-R70A01A	0.9	with key
50W	SGMAV-A5ADA2C	0.3	F0	F2	-	-	F0	-	-	F0	KK86-F2	F0	F0				no key
50W	SGMAV-A5ADA21	0.3	F0	F2	-	-	F0	-	-	F0	KK86-F2	F0	F0	0.75			Mid inertia
100W	SGMAV-A5ADA64	0.4	F0	F2	-	-	F0	-	-	F0	KK86-F2	F0	F0	0.89	SGDV-R90A01A	0.9	
200W	SGMAV-A5ADA65	0.9	-	F0	F0	F1	-	F0	F0	-	F0	-	-	1.6	SGDV-1R6A01A	0.9	
400W	SGMAV-A5ADA66	1.2	-	F0	F0	F1	-	F0	F0	-	F0	-	-	2.1	SGDV-2R8A01A	1	
750W	SGMAV-A5ADA67	2.6	-	-	F1	F0	-	-	-	-	-	-	-	4	SGDV-5R5A01A	1.5	

HIWIN Mikosystem Step Motor

Series	Model	Flange Selection											Weight (kg)	Built in Motor	Weight (kg)	Remarks
		KA100	KA136	KA170	KA200	KS100	KS140	KS180	KU060	KU080	KE050	KE065				
ST40	FRST011024	-	-	-	-	-	-	-	-	-	-	-	0.3	STD-24A	0.09	single axis
ST55	FRST021024		-	-	-		-	-		-			0.55			
	FRST022024	-	-	-	-	-	-	-	-	-	-	-	0.8	STD-24A	0.09	single axis
	FRST023024		-	-	-		-	-		-			1.18			
	FRST121024		-	-	-		-	-		-			0.58			
	FRST122024	-	-	-	-	-	-	-	-	-	-	-	0.83	STD-24A	0.09	axis of symmetry
	FRST123024		-	-	-		-	-		-			0.21			

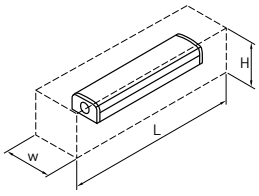
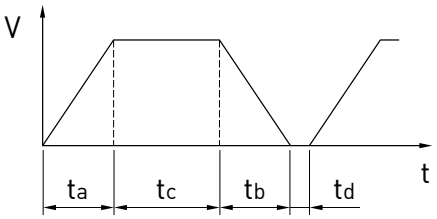
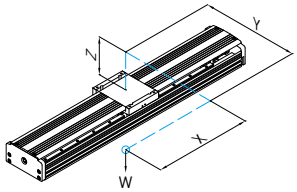
Oriental Step Motor

Series	Model	Flange Selection											Built in Motor	Weight (kg)	Built in Motor	Weight (kg)
		KA100	KA136	KA170	KA200	KS100	KS140	KS180	KU060	KU080	KE050	KE065				
CSK 2 phase	CSK243-AP	-	-	-	-	-	-	-	-	-	-	-	PK243-01A	0.21	CSD2109-P	0.12
	CSK244-AP	-	-	-	-	-	-	-	-	-	-	-	PK244-01A	0.27	CSD2112-P	0.12
	CSK245-AP	-	-	-	-	-	-	-	-	-	-	-	PK245-01A	0.35	CSD2112-P	0.12
	CSK264-AP	-	F6	-	-	-	KK86-F6	-	-	KK86-F6	-	-	PK264-02A	0.45	CSD2120-P	0.12
	CSK266-AP	-	F6	-	-	-	KK86-F6	-	-	KK86-F6	-	-	PK266-02A	0.7	CSD2120-P	0.12
	CSK268-AP	-	F6	-	-	-	KK86-F6	-	-	KK86-F6	-	-	PK268-02A	1	CSD2120-P	0.12
	CSK296-AP	-	-	-	-	-	-	-	-	-	-	-	PK296-03A	1.7	CSD2145P	0.2
	CSK299-AP	-	-	-	-	-	-	-	-	-	-	-	PK299-03A	2.8	CSD2145P	0.2
	CSK2913-AP	-	-	-	-	-	-	-	-	-	-	-	PK2913-02A	3.8	CSD2140P	0.2
CFKII 5 phase micro stepping	CFK543AP2	-	-	-	-	-	-	-	-	-	-	-	PK543NAW	0.21	DFC5107P	0.2
	CFK544AP2	-	-	-	-	-	-	-	-	-	-	-	PK544NAW	0.27	DFC5107P	0.2
	CFK545AP2	-	-	-	-	-	-	-	-	-	-	-	PK545NAW	0.35	DFC5107P	0.2
	CFK564AP2	-	F5	-	-	-	KK86-F5	-	-	KK86-F5	-	-	PK564NAW	0.6	DFC5114P	0.2
	CFK566AP2	-	F5	-	-	-	KK86-F5	-	-	KK86-F5	-	-	PK566NAW	0.8	DFC5114P	0.2
	CFK569AP2	-	F5	-	-	-	KK86-F5	-	-	KK86-F5	-	-	PK569NAW	1.3	DFC5114P	0.2
	CFK566HAP2	-	F5	-	-	-	KK86-F5	-	-	KK86-F5	-	-	PK566HNAW	0.8	DFC5128P	0.22
	CKF569HAP2	-	F5	-	-	-	KK86-F5	-	-	KK86-F5	-	-	PK569HNAW	1.3	DFC5128P	0.22
	CFK596HAP2	-	-	F3	-	-	-	-	-	-	-	-	PK596HNAW	1.7	DFC5128P	0.22
	CFK599HAP2	-	-	F3	-	-	-	-	-	-	-	-	PK599HNAW	2.8	DFC5128P	0.22
	CFK5913HAP2	-	-	F3	-	-	-	-	-	-	-	-	PK5913HNAW	3.8	DFC5128P	0.22
UMK 2 phase	UMK243A	-	-	-	-	-	-	-	-	-	-	-	PK243-01	0.21	UDK2109	0.47
	UMK244A	-	-	-	-	-	-	-	-	-	-	-	PK244-01	0.27	UDK2112	0.47
	UMK245A	-	-	-	-	-	-	-	-	-	-	-	PK245-01	0.35	UDK2112	0.47
	UMK264A	-	F6	-	-	-	KK86-F6	-	-	KK86-F6	-	-	PK264-02	0.45	UDK2120	0.47
	UMK266A	-	F6	-	-	-	KK86-F6	-	-	KK86-F6	-	-	PK266-02	0.7	UDK2120	0.47
	UMK268A	-	F6	-	-	-	KK86-F6	-	-	KK86-F6	-	-	PK268-02	1	UDK2120	0.47
RK 5 phase	RK543AA	-	-	-	-	-	-	-	-	-	-	-	PK543W	0.25	RKD507-A	0.4
	RK544AA	-	-	-	-	-	-	-	-	-	-	-	PK544W	0.3	RKD507-A	0.4
	RK545AA	-	-	-	-	-	-	-	-	-	-	-	PK545W	0.4	RKD507-A	0.4
	RK566AA	-	F5	-	-	-	KK86-F5	-	-	KK86-F5	-	-	PK566W	0.8	RKD514L-A	0.85
	RK569AA	-	F5	-	-	-	KK86-F5	-	-	KK86-F5	-	-	PK569W	1.3	RKD514L-A	0.85
	RK596AA	-	-	F3	-	-	-	-	-	-	-	-	PK596W	1.7	RKD514H-A	0.85
	RK599AA	-	-	F3	-	-	-	-	-	-	-	-	PK599W	2.8	RKD514H-A	0.85
	RK5913AA	-	-	F3	-	-	-	-	-	-	-	-	PK5913W	3.8	RKD514H-A	0.85

HIWIN Industrial Robot Inquiry K Series

Date: / /

Company		Dept.	
Name		Title	
Tel		E-Mail	
Fax		Address	

1. Tentative K model	
2. Effective stroke(mm)	
3. Positioning accuracy (mm)	
4.Accuracy of repetition (mm)	
5.Installation Method	☐ horizontal ☐ vertical ☐ upside down ☐ incline ☐ side installation ☐ XY axis ☐ XZ axis ☐ XYZ axis ☐ Gate ☐ others (Please make drawings)
6.Special environment	☐ high temperature ____˚C ☐ low temperature ____˚C ☐ vibration ☐ oil ☐ water ☐ clean room ☐ erosive chemical ☐ humid ☐ dust ☐ others_____
7.Space limit(mm)	L _____ xW _____ xH _____ . 
8.Screw lead(mm)	_____mm
9.Max speed / acceleration	
10.Motor operation	 Max speedy V= ____mm/s ta= _____sec tb= _____sec tc= _____sec td= _____sec
11.Load(kg)	_____kg(_____N)
12.Load direction	☐offset X _____ xY _____ xZ _____ . ☐Pitching X= _____mm ☐Yawing Y= _____mm ☐Rolling Z= _____mm 
13.Expected service life	
14.Accessories	☐ motor ☐ drive ☐ coupling ☐ limit switch ☐ decelerator ☐ XY connector ☐ cable protection chain ☐ others_____
15.Other comments	
16.Purpose	☐ transport ☐ automatic dispenser ☐ loader/unloader ☐ testing Equipment ☐ transmit ☐ others_____

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Motion Control and System Technology

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