

Aratron

Set your thoughts in motions

KK Linear axis

Compact Single Axis Robot Units



Single Axis Robot

Total Solution



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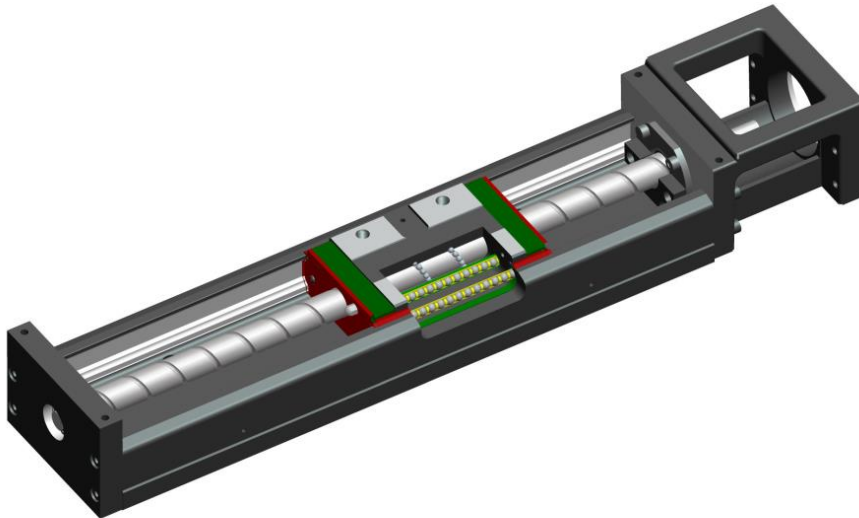




Single Axis Robot

KK Series

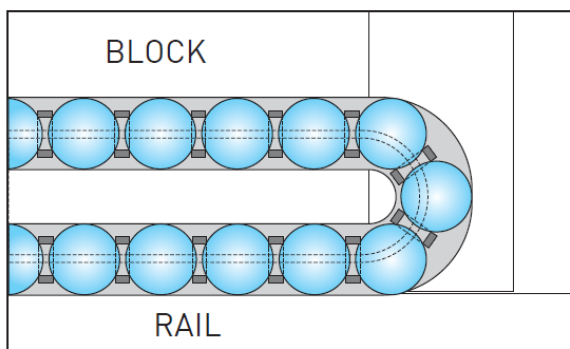
HIWIN KK linear units are very compact made of robust steel profiles. The U-profile acts as a broad rail guide with ground ball tracks on the inside. The carriage has externally recirculating steelballs and a built-in integrated ballscrew nut. HIWIN KK units can either be delivered as system with stepper or servo motors or as a single components without motors but with flanges adapting to any motor manufacturer and motor types. KK linear units are available in different tolerance classes C class with repeatability of $\pm 0.01\text{mm}$ and P class with repeatability within $\pm 0.003\text{mm}$.



SK Series available only for size 60 and 86

SynchMotion™ Technology:

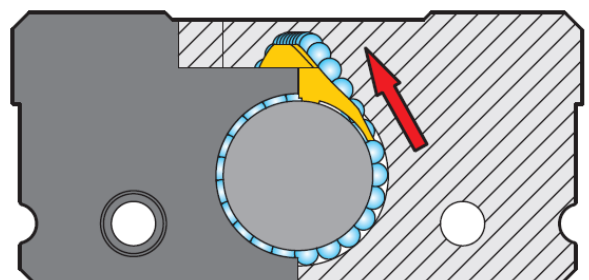
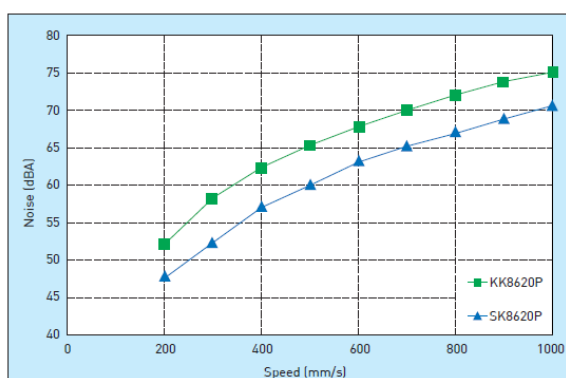
With SynchMotion™ Technology, rolling elements are interposed between the partitions of SynchMotion™ to provide improved circulation. Due to the elimination of contact between the rolling elements, collision noise and sound levels are drastically reduced.



◆ 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, reduce the noise while balls are entering the circulation system. In so doing, it acts high speed and low noise performance.

Noise Test



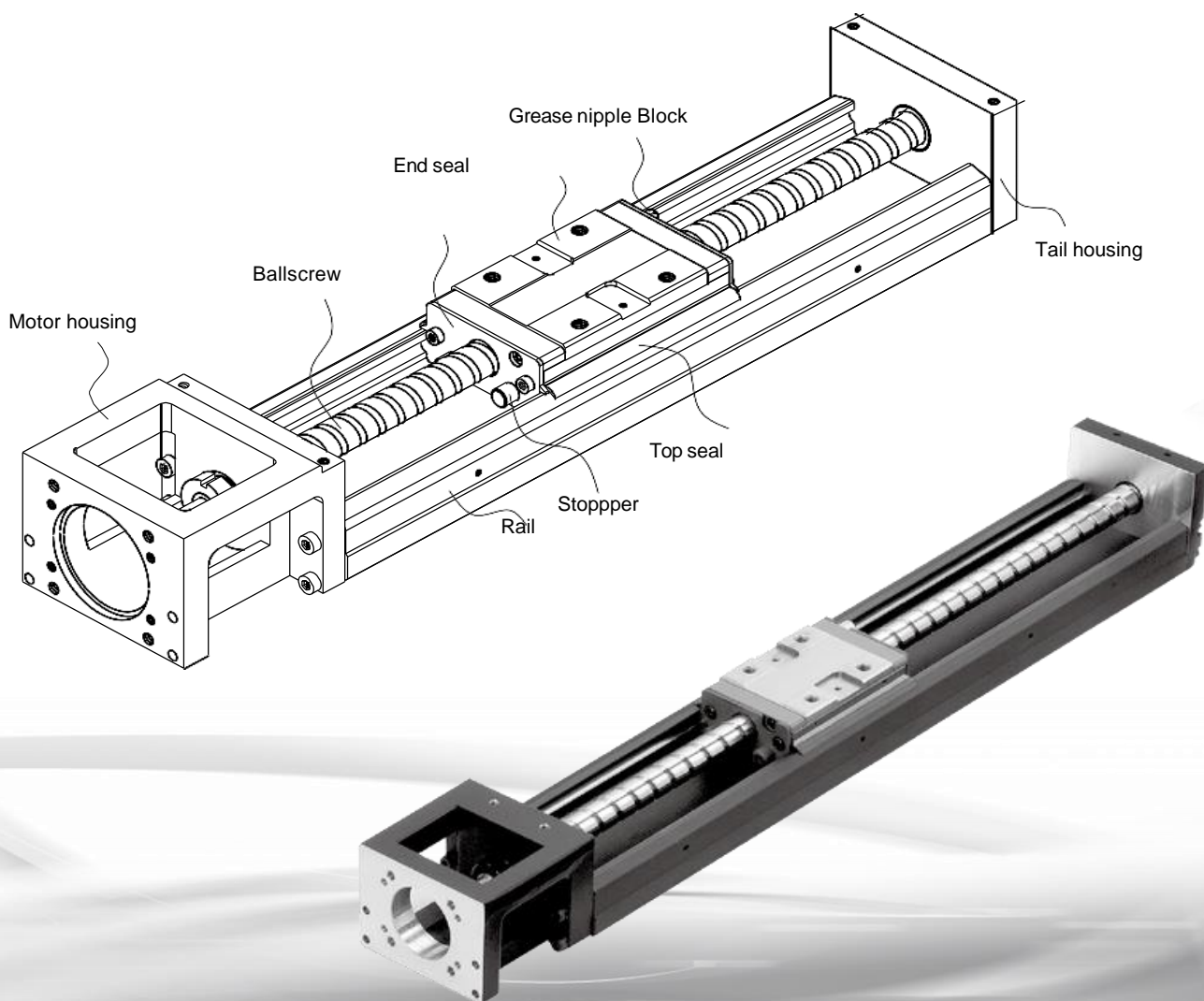
Single Axis Robot

KK Series

The HIWIN KK Single Axis Robot is driven by a ballscrew while a guideway slides on an optimized U-rail to achieve higher accuracy and greater stiffness.

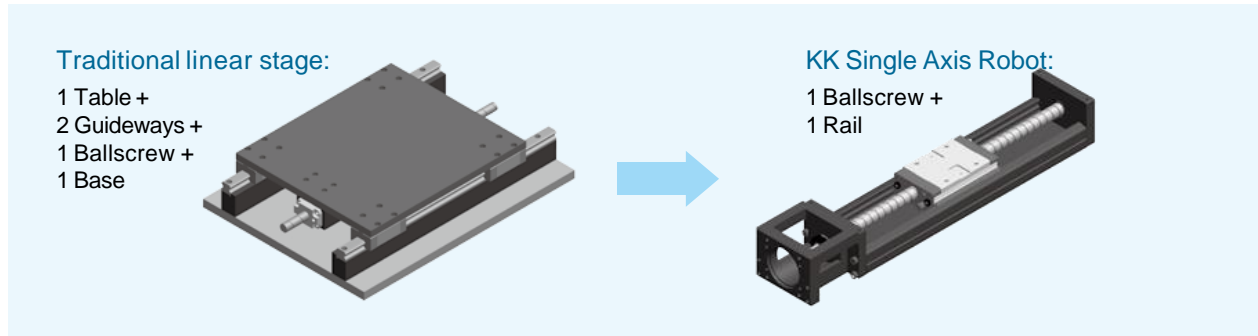
1.1 Features

- An integrated system
- Easy installation and maintenance
- Compact and lightweight
- High accuracy
- High stiffness
- Complete line of accessories



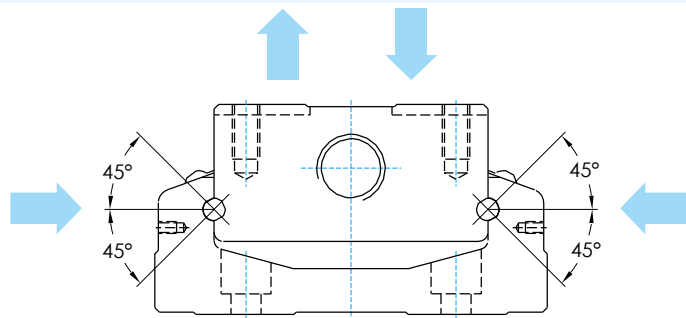
1.1.1 Modulization

The KK Single Axis Robot integrating a ballscrew and guideway forms a modularized product. The modularized design can help customers save time, cost and system inspection. Therefore, installation efficiency and a space-saving design are also promoted.



1.1.2 Equivalent Load

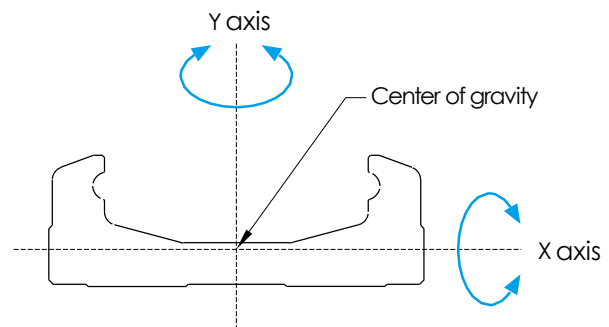
The gothic arch contact design sustains load from all directions and offers high rigidity and accuracy.



1.1.3 High Stiffness

Using finite element analysis on the U-shaped cross section allows the volume and rigidity to be made balanced, therefore, a high rigidity rail, compact design and a light weight design are also accomplished simultaneously.

Moment of inertia		Unit:mm ⁴
Model no.	I_x	I_y
KK30	7.554×10^2	12.726×10^{43}
KK40	3.533×10^3	5.317×10^4
KK50	9.6×10^3	1.34×10^5
KK60	2.056×10^4	2.802×10^5
KK80	6.711×10^4	8.444×10^5
KK86	7.445×10^4	1.134×10^6
KK100	1.296×10^5	2.035×10^6
KK130	2.546×10^5	5.073×10^6



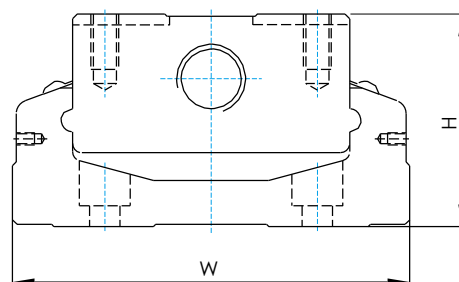
I_x : Moment of inertia computed about X axis

I_y : Moment of inertia computed about Y axis

1.1.4 Various Specification

KK Single Axis Robots of various specifications are developed, providing customers with different choices relating to space and loading conditions.

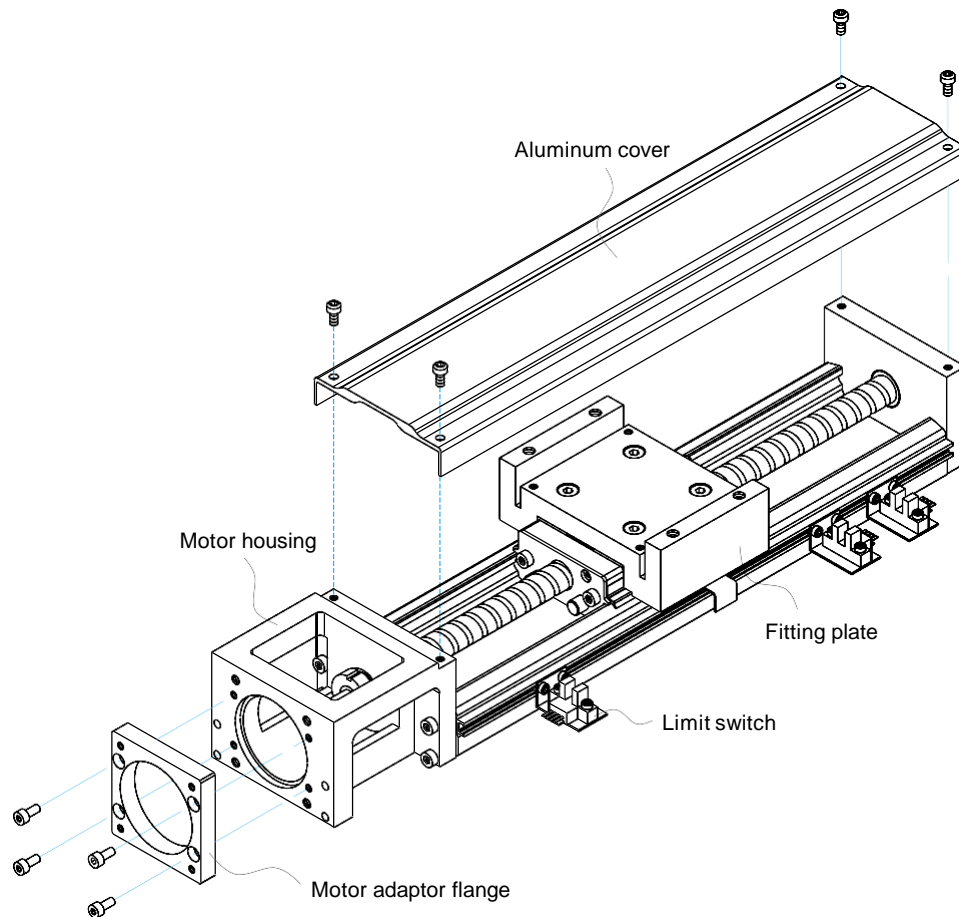
Model no.	W	H
KK30	30	15
KK40	40	20
KK50	50	26
KK60	60	33
KK80	80	45
KK86	86	46
KK100	100	55
KK130	130	65



1.2 Accessories

Accessories of KK Single Axis Robot are also supported for specific demands, such as an aluminum cover, bellows, motor adaptor flange and limit switches.

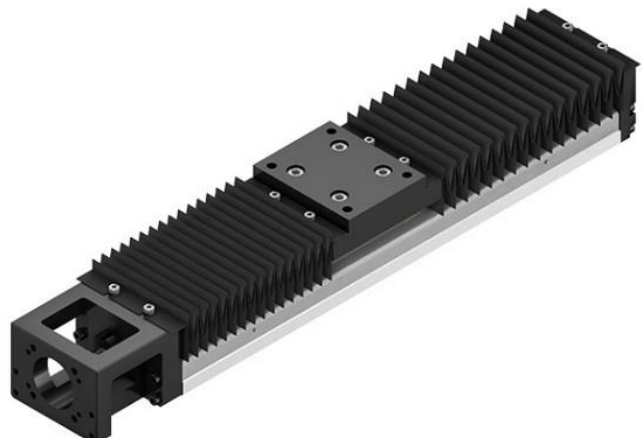
- Aluminum cover and bellow: contamination protection
- Motor adaptor flange: connection for different types of motors
- Limit switches: starting point, positioning and other safety matters



Aluminum cover



Bellows cover



HIWIN

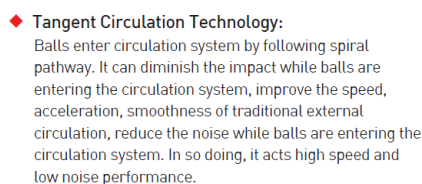
KK60D changes from 6 to 8mm and KK86D changes from 8 to 10mm. Add the lettercode **D** in ordercode after dimension to get the new standard from 2018. Note If replacing old KK units couplings may have to be changed

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

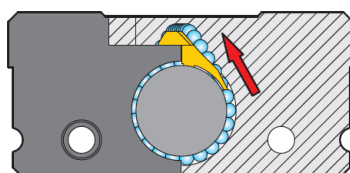
Please note! Many different special ballscrew lead's are possible

only available for size 60 and 86

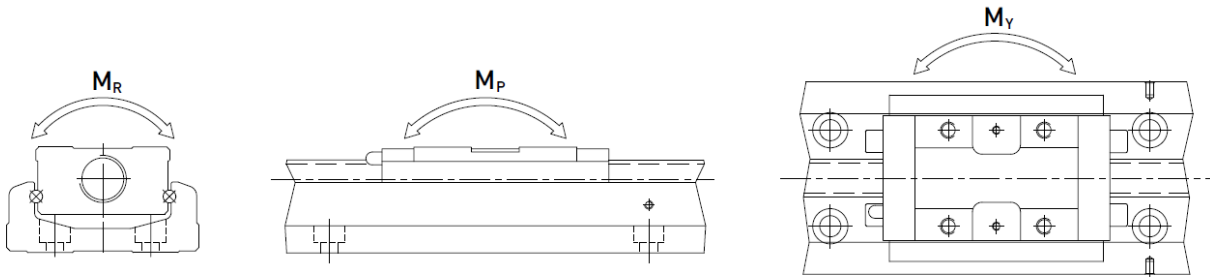
With SynchMotion™ Technology, rolling elements are interposed between the partitions of SynchMotion™ to provide improved circulation. Due to the elimination of contact between the rolling elements, collision noise and sound levels are drastically reduced.



Speed (mm/s)	KHG420P Noise (dBA)	SNG420P Noise (dBA)
200	52	48
300	58	52
400	63	57
500	66	61
600	69	64
700	72	67
800	74	69
900	76	71
1000	77	72



1.4 Specifications



Model No.		Ball screw				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
KK3001	Precision	6	1	647	1088	2210	-	3510	-	14	73	-	-	14	73	-	-	41	82	-	-
	Normal			618	1079																
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																
KK8010	Precision	15	10	7144	12642	31458	21051	50764	29475	622	3050	228	1309	622	3050	228	1309	1433	2866	800	1600
	Normal			6429	11387																
KK8020	Precision	15	20	4645	7655	31458	21051	50764	29475	622	3050	228	1309	622	3050	228	1309	1433	2866	800	1600
	Normal			4175	6889																
KK8610	Precision	15	10	7144	12642	31458	21051	50764	29475	622	3050	228	1309	622	3050	228	1309	1507	3014	847	1694
	Normal			6429	11387																
KK8620	Precision	15	20	4645	7655	31458	21051	50764	29475	622	3050	228	1309	622	3050	228	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																

Other special ballscrew lead's are possible. See model number page 8

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
KK30	75	±0.003	±0.004	0.02	0.04	0.01	0.02	1.2	0.8
	100								
	125								
	150								
	175								
	200								
KK40	100	±0.003	±0.01	0.02	-	0.01	-	1.2	0.8
	150								
	200								
KK50	150	±0.003	±0.01	0.02	-	0.01	-	4	2
	200								
	250								
	300								
KK60	150	±0.003	±0.01	0.02	-	0.01	-	15	7
	200								
	300								
	400								
	500	±0.003	±0.01	0.025	-	0.015	-	15	7
	600								
KK80	340	±0.003	±0.01	0.025	-	0.015	-	15	10
	440								
	540								
	640								
	740	±0.003	±0.01	0.03	-	0.02	-	17	10
	940	±0.003	±0.01	0.04	-	0.03	-	25	10
KK86	340	±0.003	±0.01	0.025	-	0.015	-	15	10
	440								
	540								
	640								
	740	±0.003	±0.01	0.03	-	0.02	-	17	10
	940	±0.003	±0.01	0.04	-	0.03	-	25	10
KK100	980	±0.005	±0.01	0.035	-	0.025	-	17	12
	1080								
	1180	±0.005	±0.01	0.04	-	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	-

1.6 Maximum Speed Limit for standard ballscrews

Higher speeds are possible with special ballscrew lead

Model	Ballscrew Lead (mm)	Rail Length (mm)	Speed (mm/sec)	
			Precision	Normal
KK30	01	75	160	160
		100	160	160
		125	160	160
		150	160	160
		175	160	160
		200	160	160
KK40	01 06	100	190 Ask Aratron	190 Ask Aratron
		150	190 -	190 -
		200	190 -	190 -
KK50	02 06	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 20	150	1100 1900	790 1370
		200	1100 1900	790 1370
		300	1100 1900	790 1370
		400	1100 1900	790 1370
		500	1100 1900	790 1370
		600	670 1300	670 1300
KK80	10 05	340	740 370	520 260
		440	740 370	520 260
		540	740 370	520 260
		640	740 370	520 260
		740	740 370	520 260
		940	610 305	430 220
	20 30	340	1480 2100	1050 1500
		440	1480 2100	1050 1500
		540	1480 2100	1050 1500
		640	1480 2100	1050 1500
		740	1480 2100	1050 1500
		940	1220 1800	870 1300
KK86	10 05	340	740 370	520 260
		440	740 370	520 260
		540	740 370	520 260
		640	740 370	520 260
		740	740 370	520 260
		940	610 305	430 220
	20 30	340	1480 2100	1050 1500
		440	1480 2100	1050 1500
		540	1480 2100	1050 1500
		640	1480 2100	1050 1500
		740	1480 2100	1050 1500
		940	1220 1800	870 1250
KK100	20 40	980	1120 2100	800 1600
		1080	980 1700	800 1600
		1180	750 1400	750 1400
		1280	630 1100	630 1100
		1380	530 1000	530 1000
KK130	25 10	980	1120 450	800 320
		1180	1120 450	800 320
		1380	830 340	800 320
		1680	550 220	550 220

7. Life Calculations

1. Service Life

Under repeated stress between the raceway and the rolling elements, pitting and flaking will occur as it reaches fatigue failure. The service life of the KK Single Axis Robot is defined as the distanced traveled before any failure of the raceway or rolling elements appear.

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.

3. Nominal Life Calculation

The calculating formulas are divided into two parts, guideway and ballscrew. The smaller value of the two would be the recommended nominal life of the KK unit.

Nominal life formulas for both the guideway and ballscrew depend on several parameters and are shown below.

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	$V < 15\text{m/min}$	1.0 ~ 1.5
Low Vibration	$15\text{m/min} < V < 60\text{m/min}$	1.5 ~ 2.0
High Vibration	$V > 60\text{m/min}$	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)

Insufficient lubrication of the guideway would lead to a reduction of the service life.

The lubricant provides the following functions:

- Reducing rolling friction and avoiding abrasion
- Providing a lubricating film and extending the service life
- Anti-rusting

1.8.1 Lubricating Grease

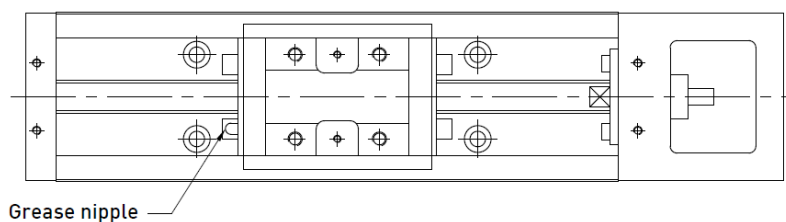
Re-lubricating the KK Single Axis Robot every 100km is recommended. Generally, grease is applied for speeds under 60 m/min. For operating speeds over 60 m/min, a grease with a higher viscosity should be used.

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

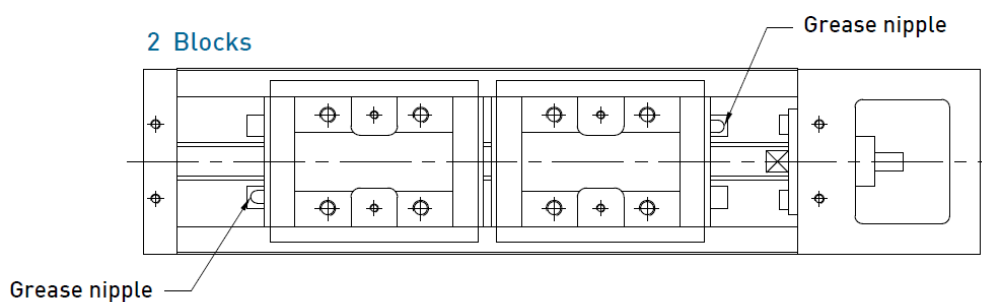
T : Lubricating frequency (hrs)
 V_e : Speed (m/min)

1.8.2 Grease Nipple

1 Block

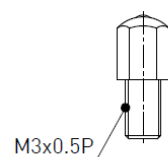


2 Blocks



Types of grease nipple

KK40



NO. 34310010

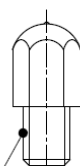
KK50

KK60

KK80

KK86

M4x0.7P

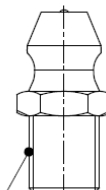


NO. 34310002

KK100

KK130

M6x0.75P

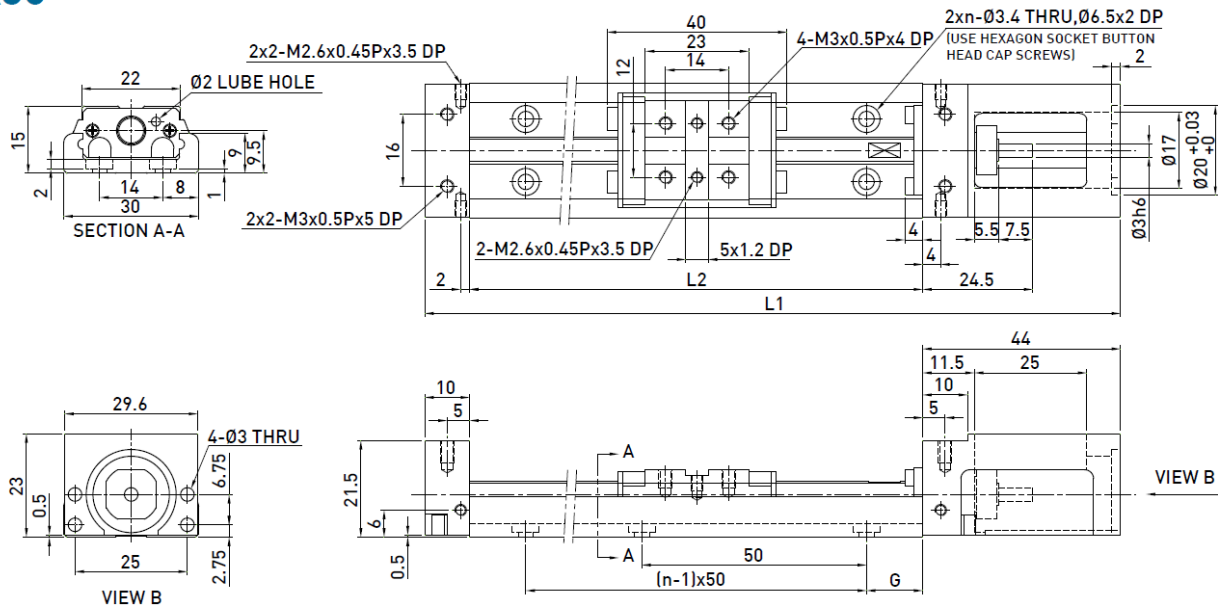


NO. 34310008

1.9 Dimensions

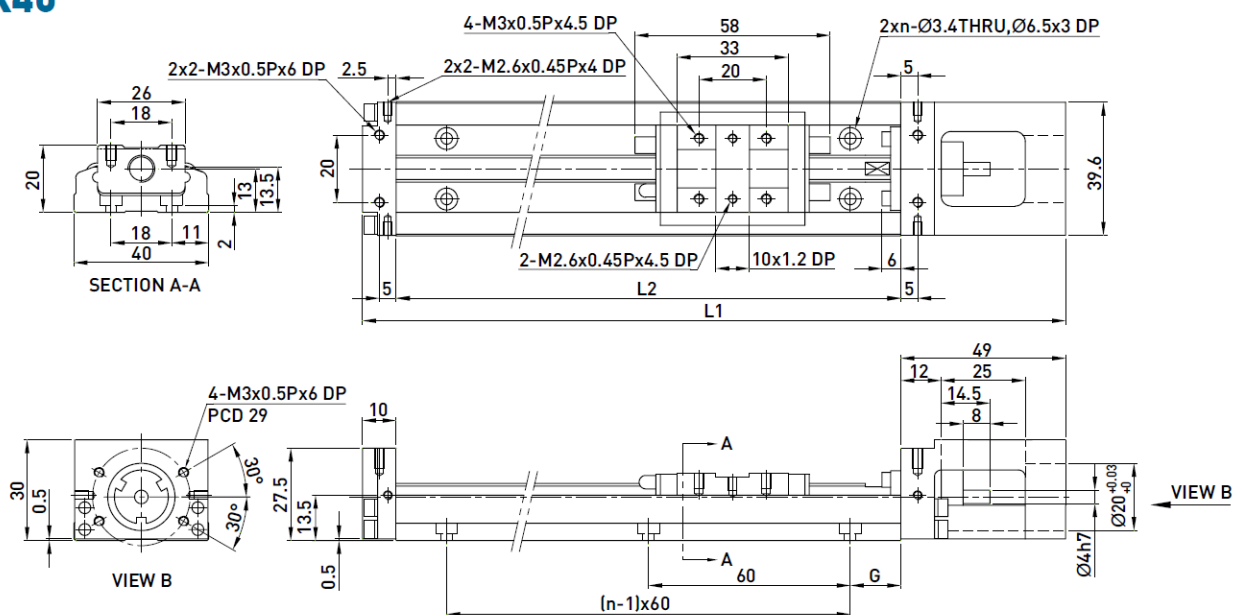
1.9.1 Without cover

KK30



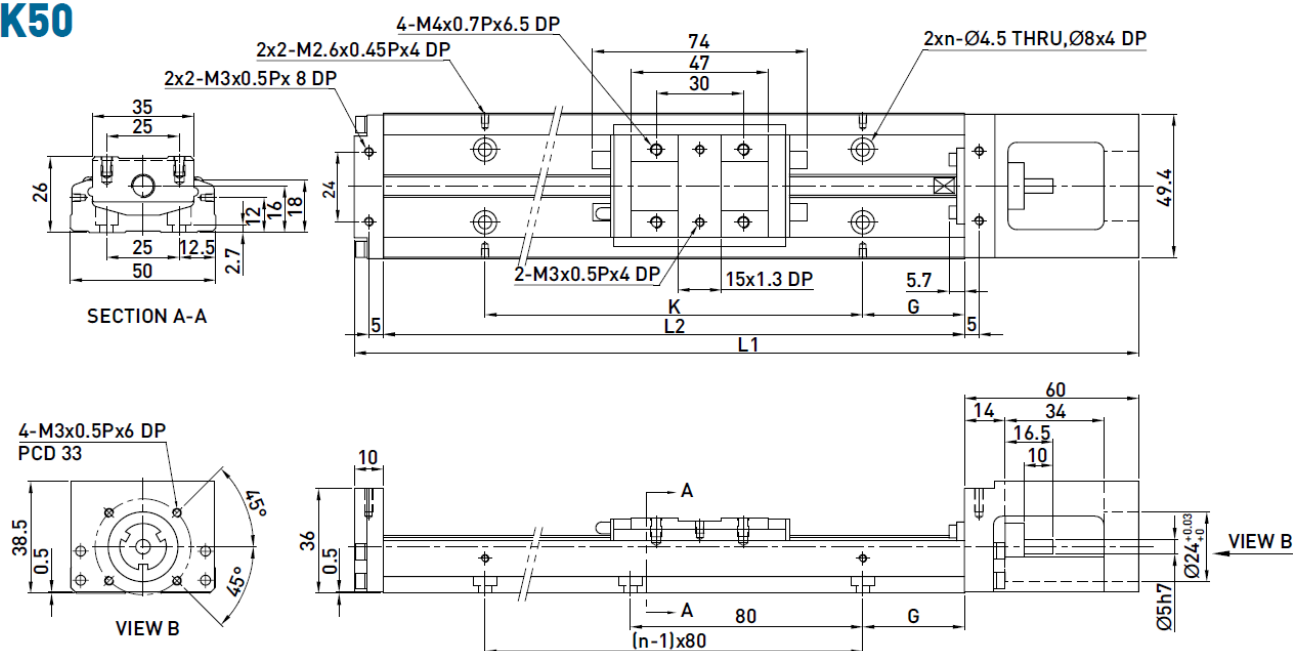
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	n	Mass (kg)	
		A1 Block	A2 Block			A1 Block	A2 Block
75	129	31	-	12.5	2	0.2	-
100	154	56	-	25	2	0.23	-
125	179	81	45	12.5	3	0.26	0.3
150	204	106	70	25	3	0.29	0.33
175	229	131	95	12.5	4	0.32	0.36
200	254	156	120	25	4	0.35	0.39

KK40



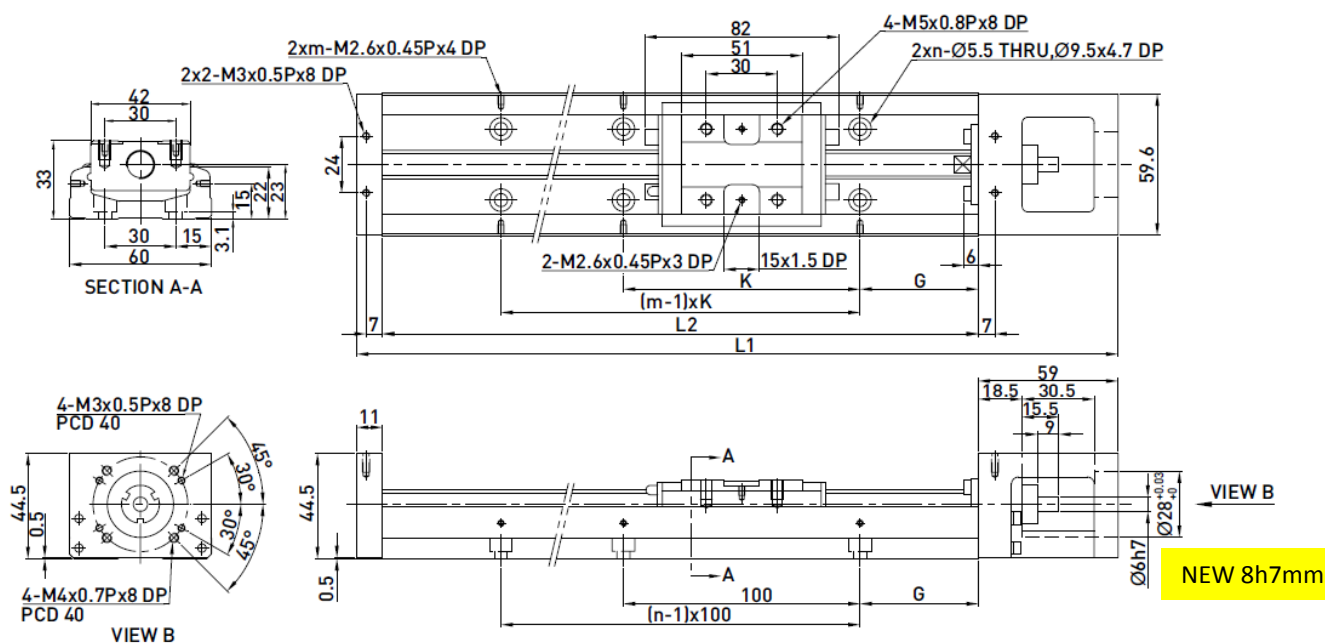
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	n	Mass (kg)	
		A1 Block	A2 Block			A1 Block	A2 Block
100	159	36	-	20	2	0.48	-
150	209	86	34	15	3	0.6	0.67
200	259	136	84	40	3	0.72	0.79

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

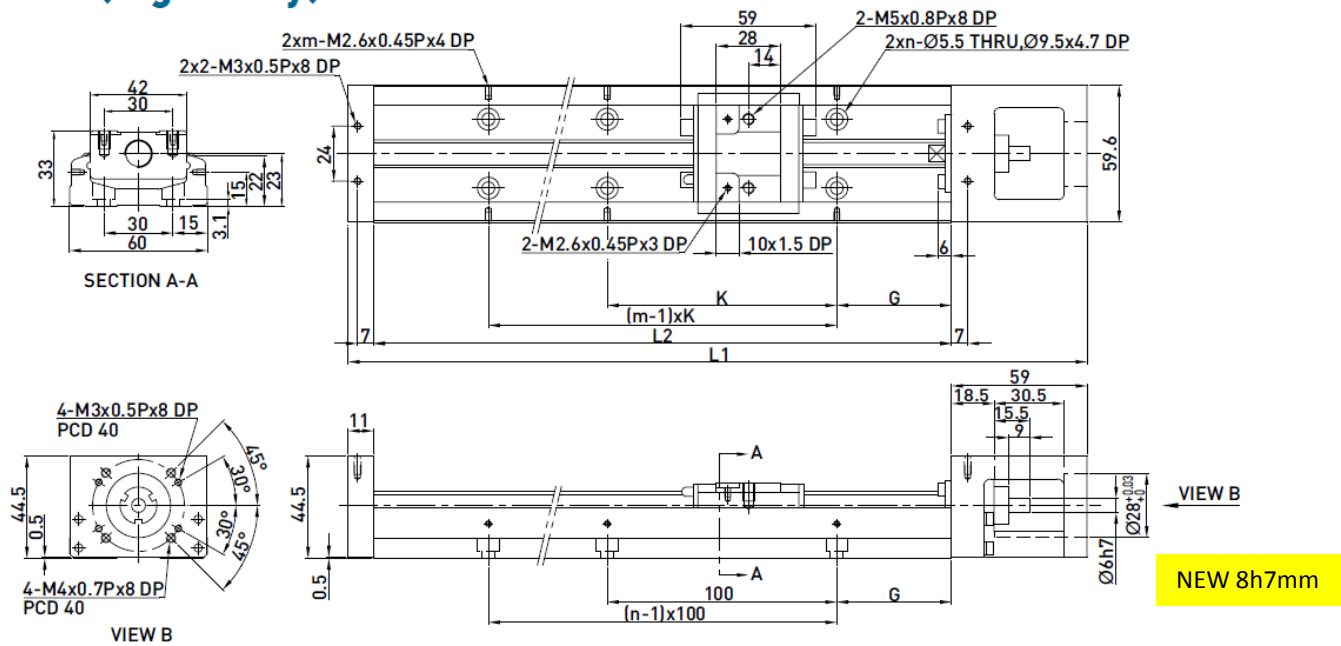
KK60 (Standard)



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

Note: New spindle end standard diameter changes from 6mm to 8mm in 2018 model code KK60D

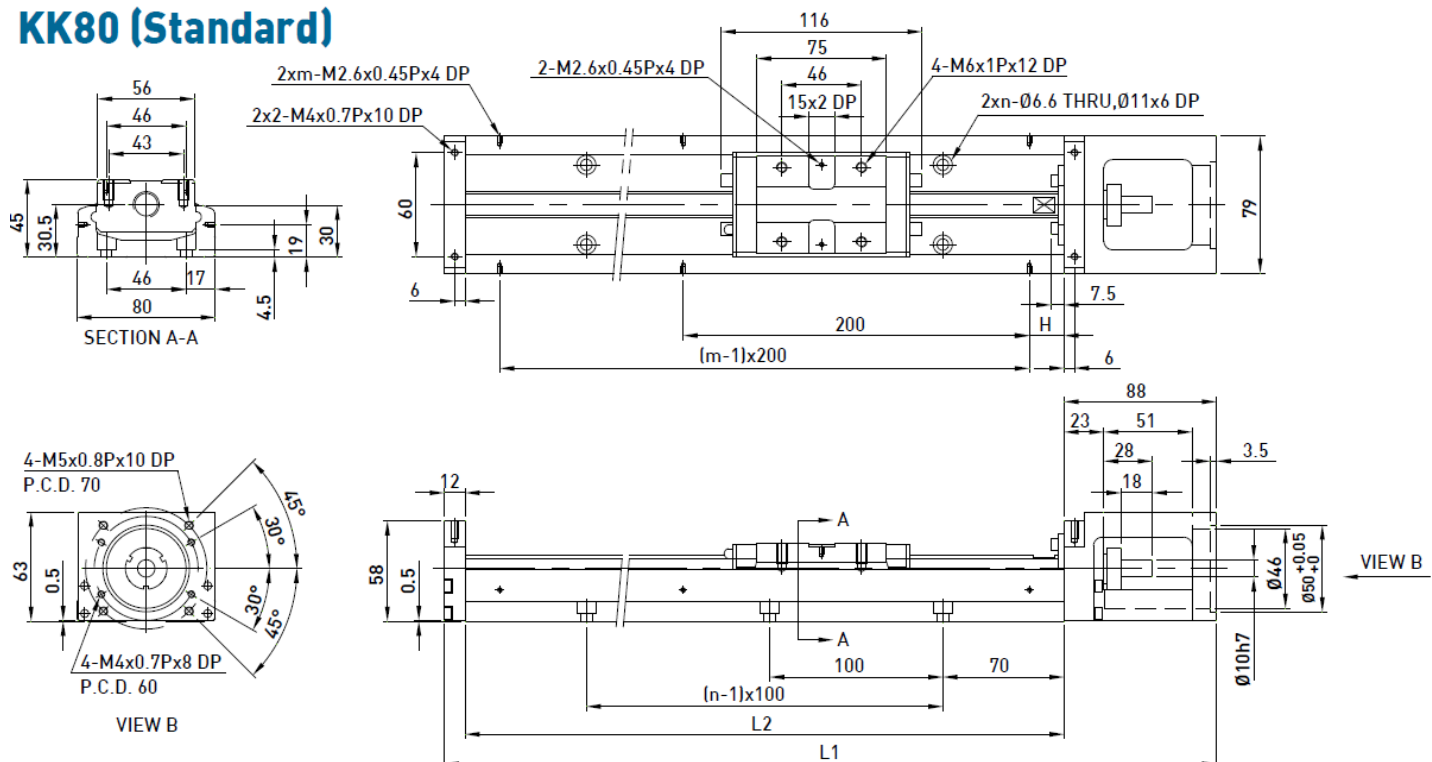
KK60 (Light Duty)



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

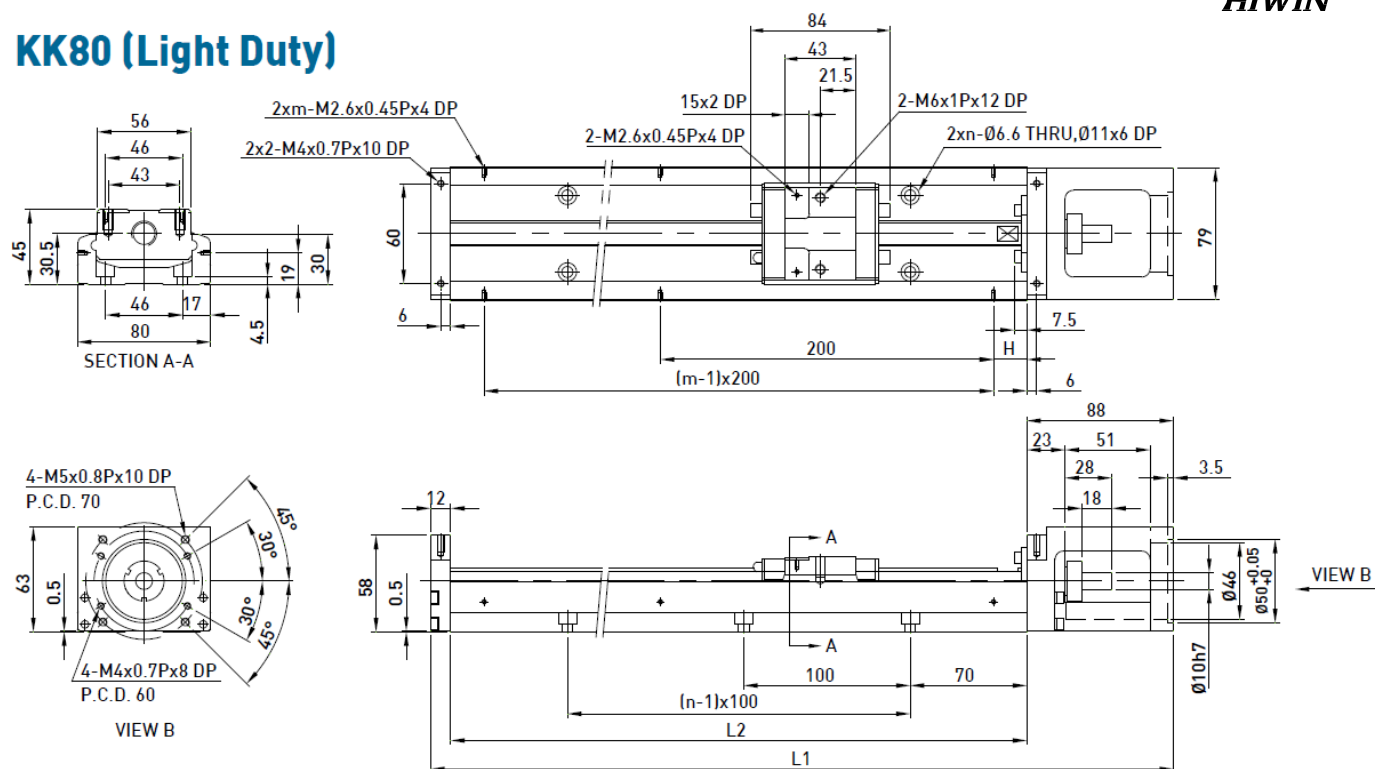
Note: New spindle end standard diameter changes from 6mm to 8mm in 2018 model code KK60D

KK80 (Standard)



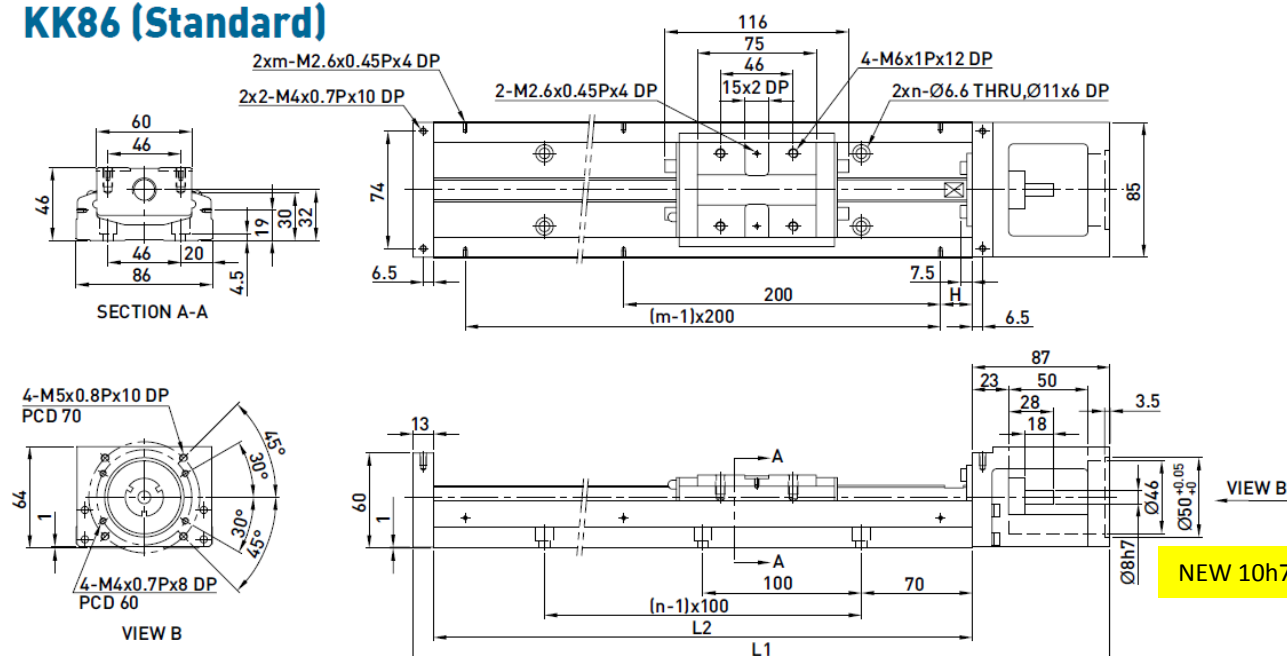
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block				A1 Block	A2 Block
340	440	216.5	108.5	70	3	2	5.3	6
440	540	316.5	208.5	20	4	3	6.5	7.2
540	640	416.5	308.5	70	5	3	7.6	8.3
640	740	516.5	408.5	20	6	4	8.8	9.5
740	840	616.5	508.5	70	7	4	10	10.7
940	1040	816.5	708.5	70	9	5	12.4	13.1

KK80 (Light Duty)



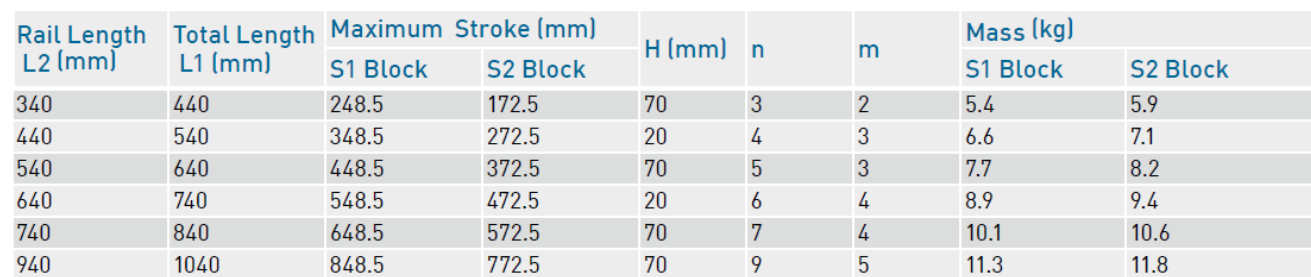
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		H (mm)	n	m	Mass (kg)	
		S1 Block	S2 Block				S1 Block	S2 Block
340	440	248.5	172.5	70	3	2	5	5.4
440	540	348.5	272.5	20	4	3	6.2	6.6
540	640	448.5	372.5	70	5	3	7.3	7.7
640	740	548.5	472.5	20	6	4	8.5	8.9
740	840	648.5	572.5	70	7	4	9.7	10.1
940	1040	848.5	772.5	70	9	5	12.1	12.5

KK86 (Standard)

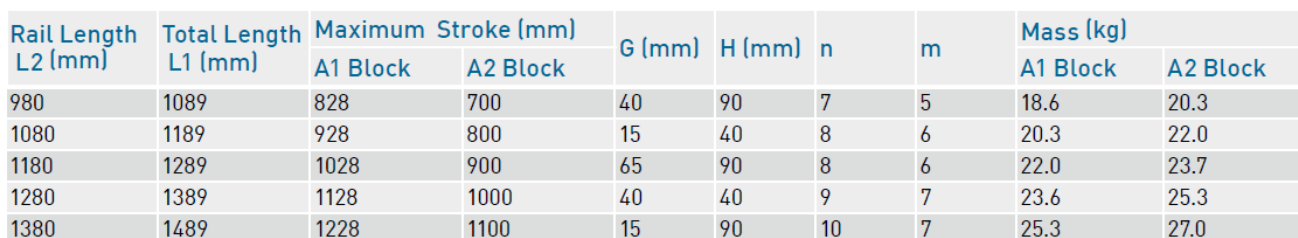


Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block				A1 Block	A2 Block
340	440	216.5	108.5	70	3	2	5.7	6.5
440	540	316.5	208.5	20	4	3	6.9	7.7
540	640	416.5	308.5	70	5	3	8.0	8.8
640	740	516.5	408.5	20	6	4	9.2	10.0
740	840	616.5	508.5	70	7	4	10.4	11.2
940	1040	816.5	708.5	70	9	5	11.6	12.4

Note: New spindle end standard diameter changes from 8mm to 10mm in 2018 model code KK86D

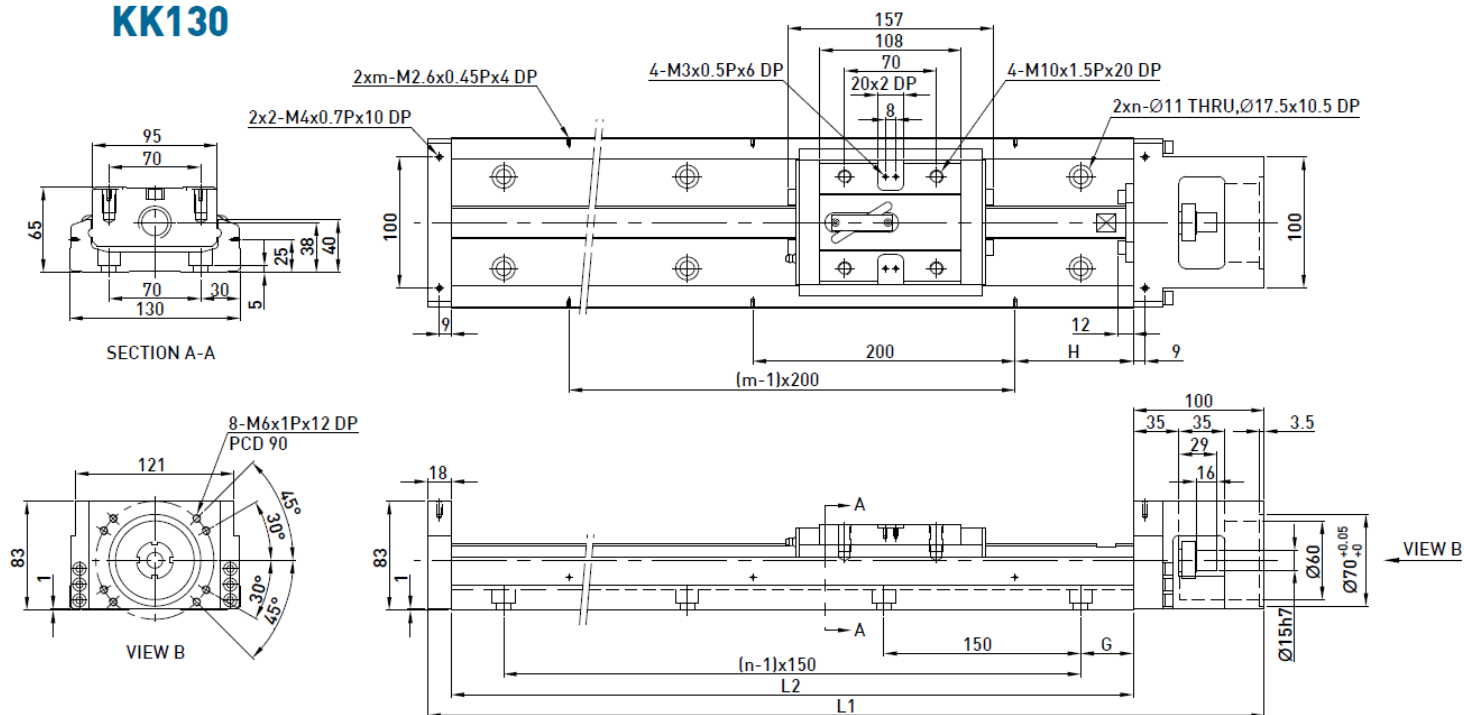


KK100



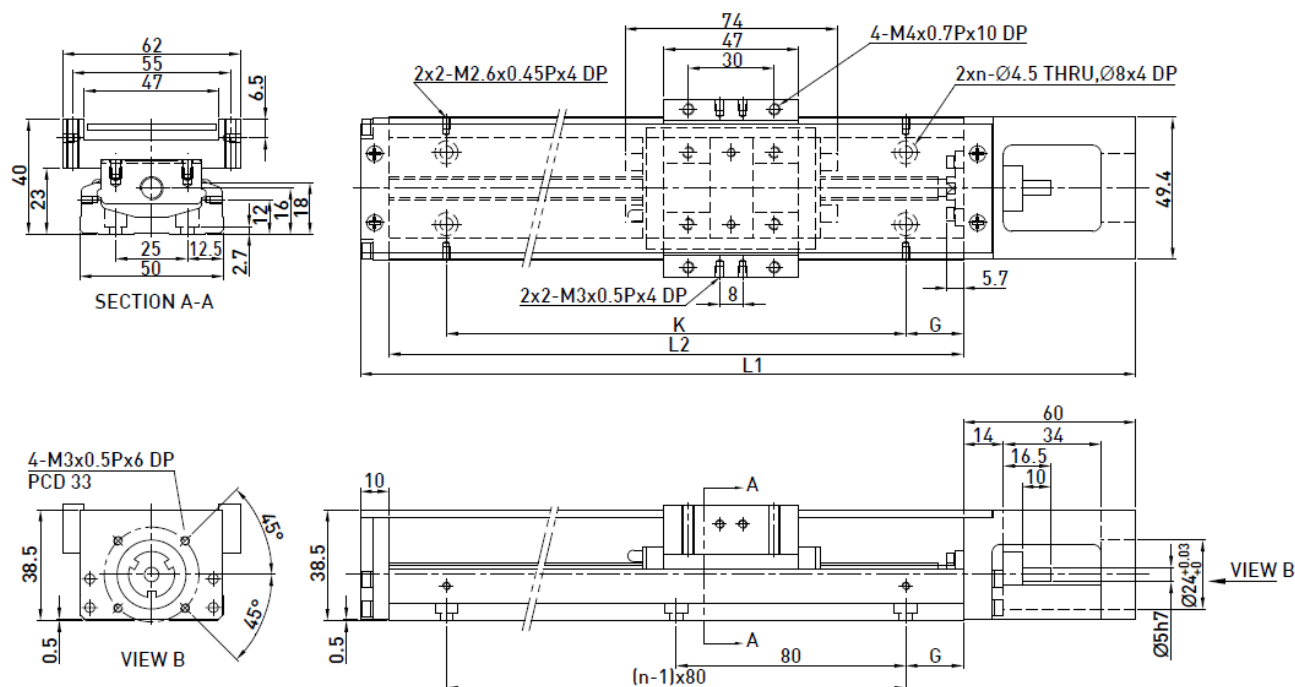
19

KK130



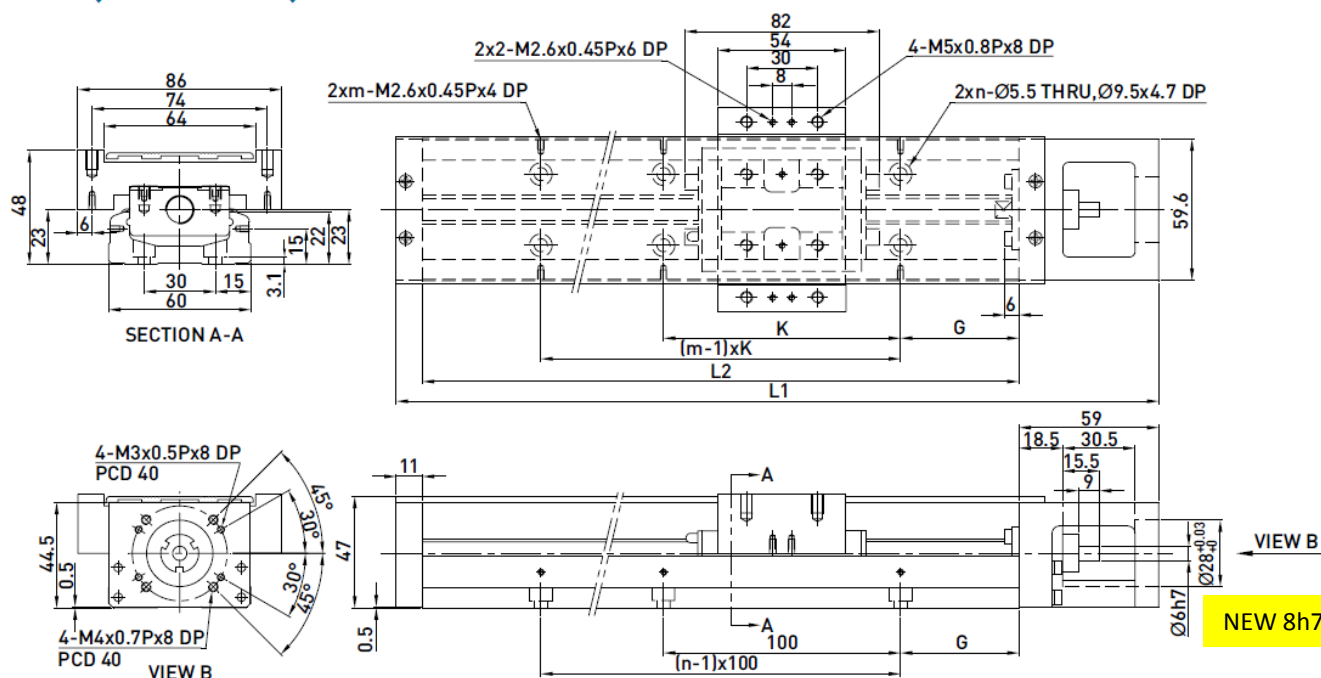
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		G (mm)	H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block					A1 Block	A2 Block
980	1098	811	659	40	90	7	5	29.4	32.3
1180	1298	1011	859	65	90	8	6	34.3	37.2
1380	1498	1211	1059	90	90	9	7	39.2	42.1
1680	1798	1511	1359	90	40	11	9	46.5	49.4

Shorter customized length are available on request



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

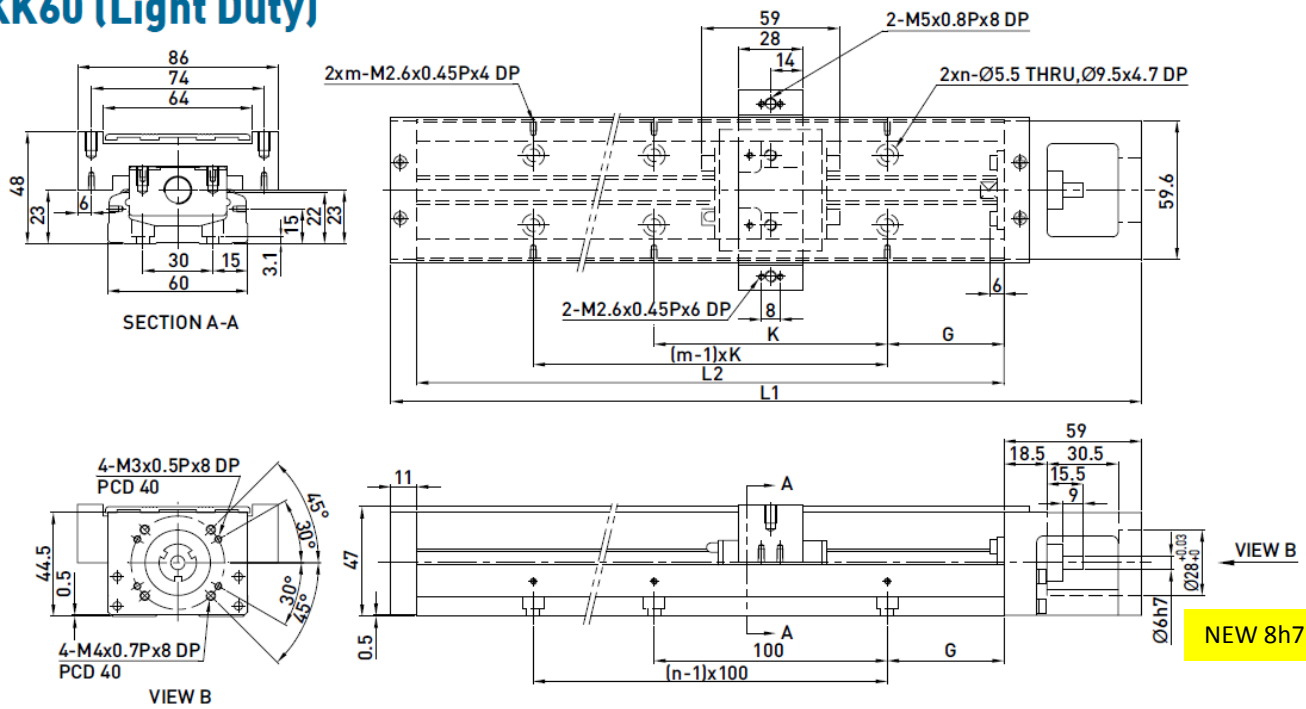
KK60 (Standard)



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

Note: New spindle end standard diameter changes from 6mm to 8mm in 2018 model code KK60D

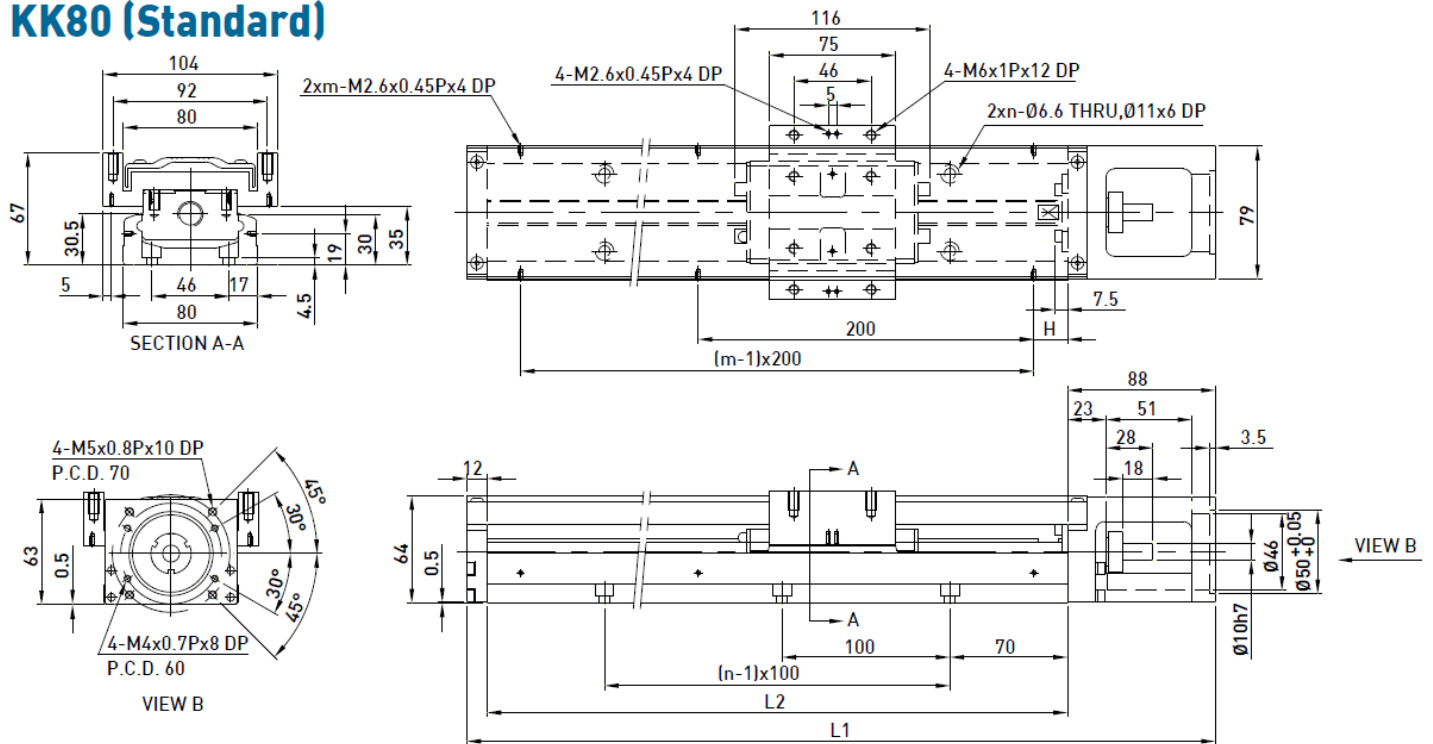
KK60 (Light Duty)



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

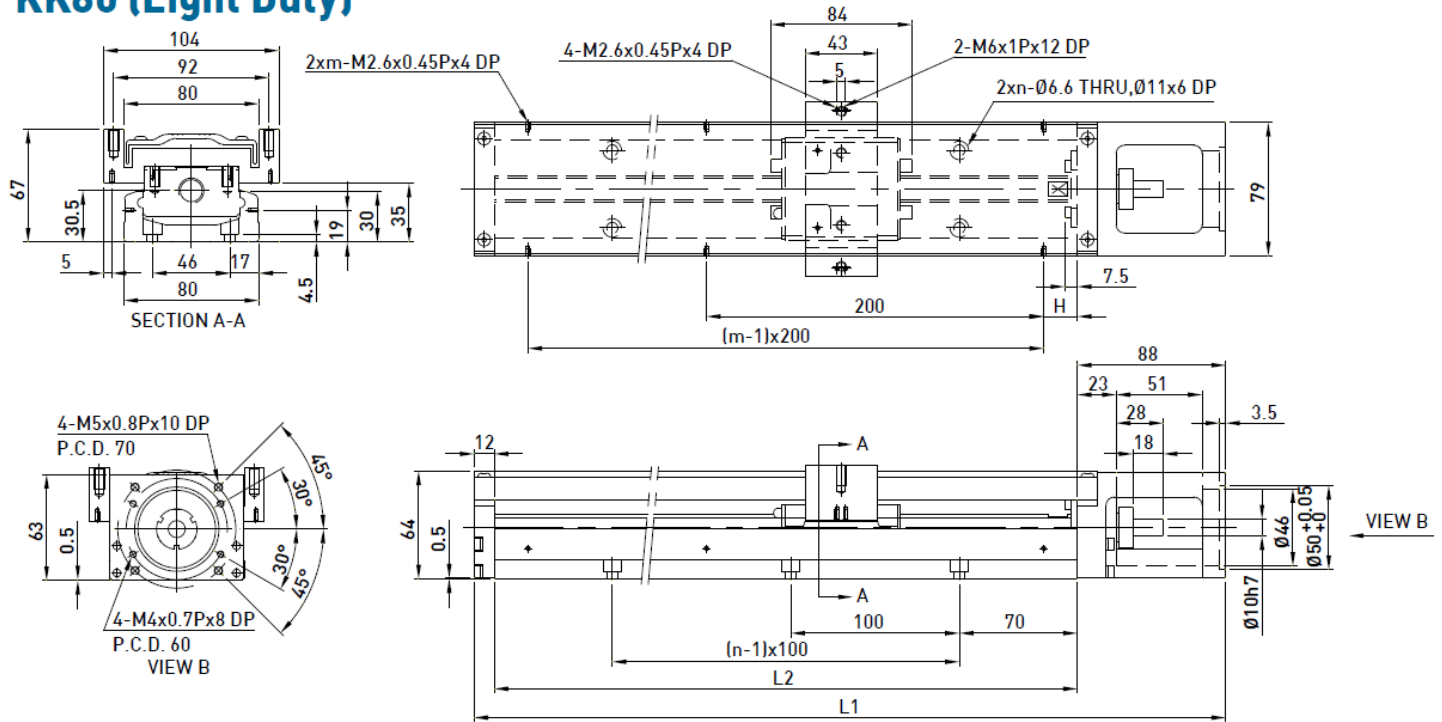
Note: New spindle end standard diameter changes from 6mm to 8mm in 2018 model code KK60D

KK80 (Standard)



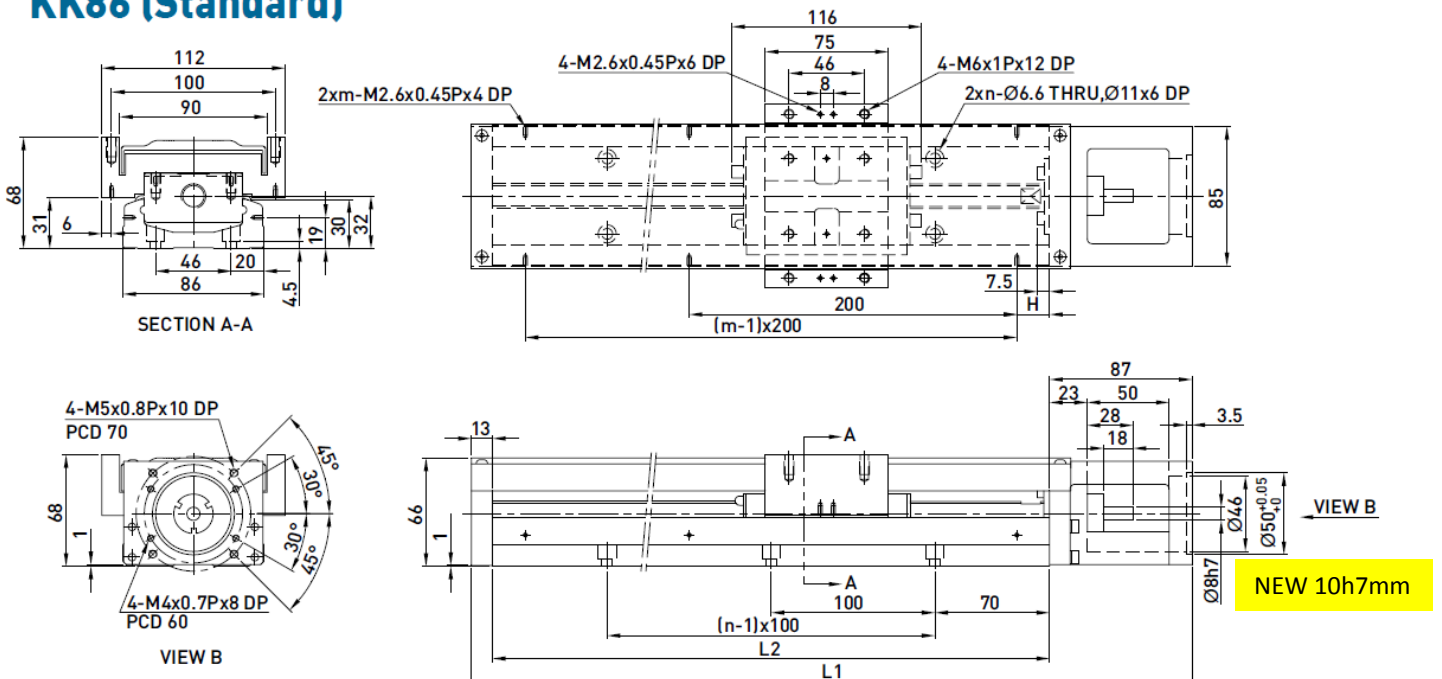
Rail Length L2 (mm)	Total Length L1 (mm)	Maximum Stroke (mm)		H (mm)	n	m	Mass (kg)	
		A1 Block	A2 Block				A1 Block	A2 Block
340	440	216.5	108.5	70	3	2	6	7.1
440	540	316.5	208.5	20	4	3	7.2	8.3
540	640	416.5	308.5	70	5	3	8.4	9.5
640	740	516.5	408.5	20	6	4	9.7	10.8
740	840	616.5	508.5	70	7	4	10.9	12
940	1040	816.5	708.5	70	9	5	13.5	14.6

KK80 (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	248.5	172.5	70	3	2	5.5	6.1
440	540	348.5	272.5	20	4	3	6.8	7.4
540	640	448.5	372.5	70	5	3	7.9	8.5
640	740	548.5	472.5	20	6	4	9.2	9.8
740	840	648.5	572.5	70	7	4	10.5	11.1
940	1040	848.5	772.5	70	9	5	13	13.6

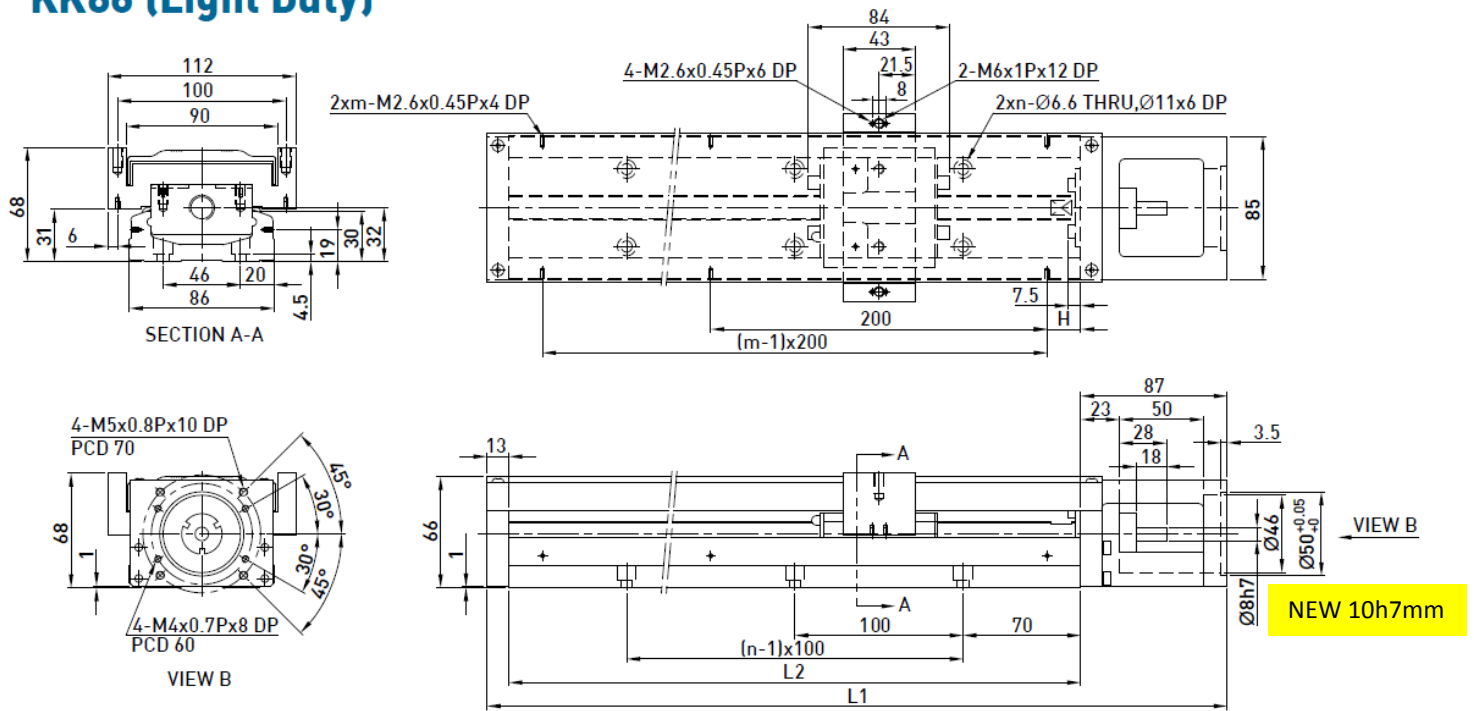
KK86 (Standard)



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	216.5	108.5	70	3	2	6.5	7.3
440	540	316.5	208.5	20	4	3	7.8	8.6
540	640	416.5	308.5	70	5	3	9.0	9.8
640	740	516.5	408.5	20	6	4	10.3	11.3
740	840	616.5	508.5	70	7	4	11.6	12.4
940	1040	816.5	708.5	70	9	5	13.0	13.8

Note: New spindle end standard diameter changes from 8mm to 10mm in 2018 model code KK86D

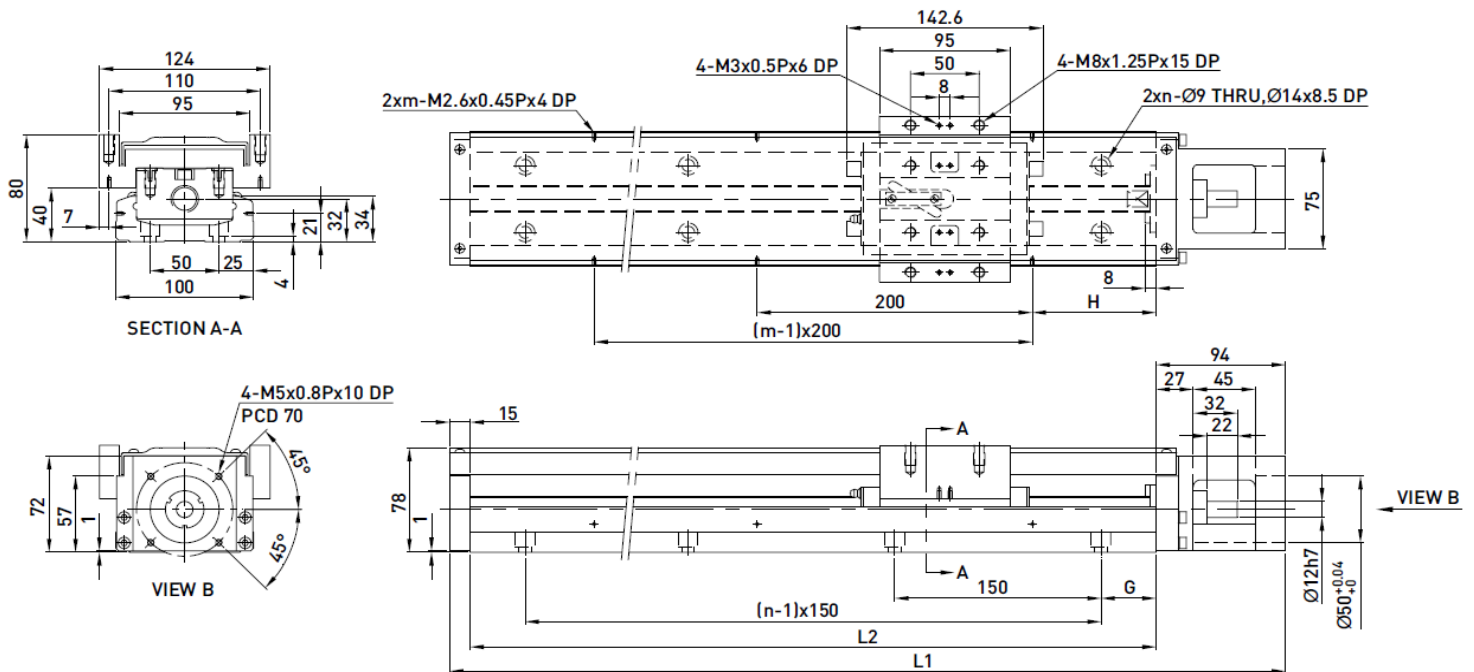
KK86 (Light Duty)



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	248.5	172.5	70	3	2	6.3	7.1
440	540	348.5	272.5	20	4	3	7.6	8.4
540	640	448.5	372.5	70	5	3	8.8	9.6
640	740	548.5	472.5	20	6	4	10.1	11.1
740	840	648.5	572.5	70	7	4	11.4	12.2
940	1040	848.5	772.5	70	9	5	12.8	13.6

Note: New spindle end standard diameter changes from 8mm to 10mm in 2018 model code KK86D

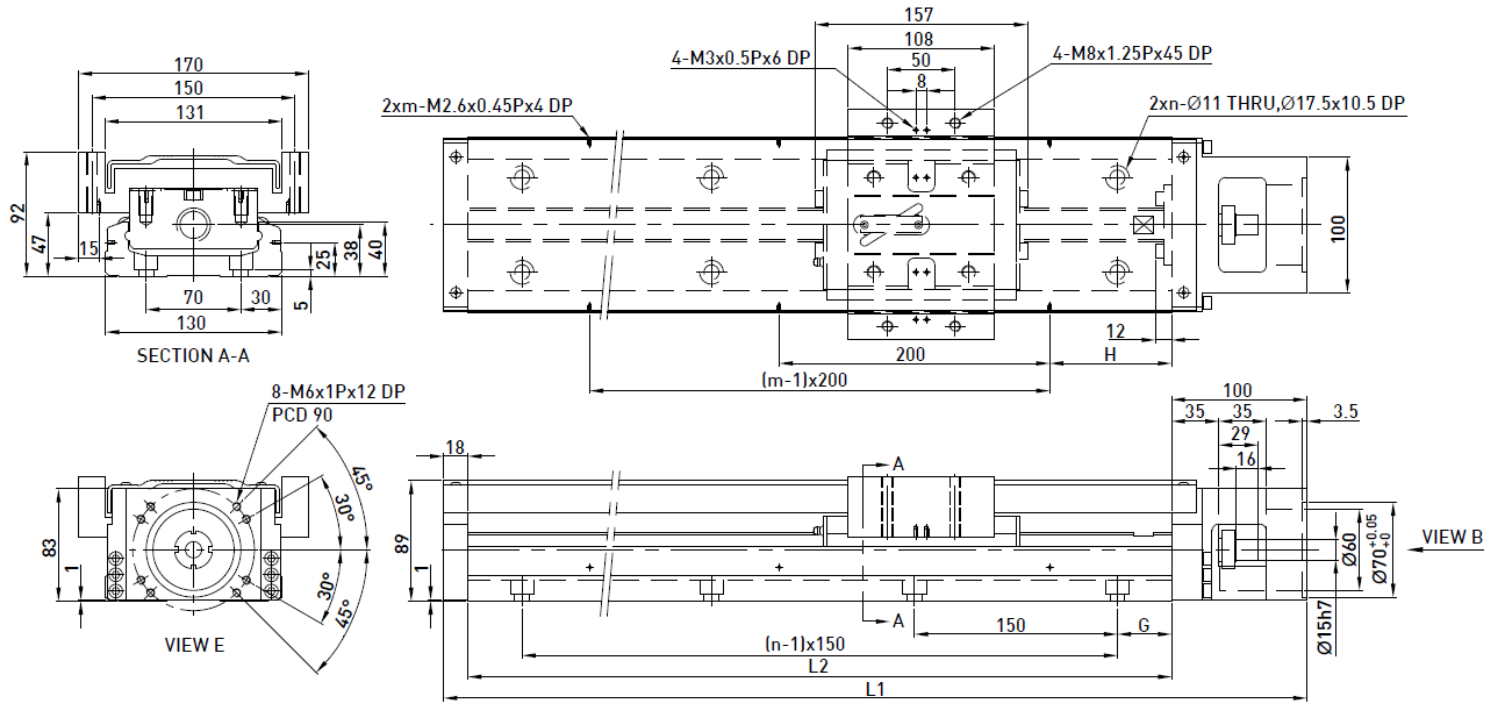
KK100



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

Shorter customized length are available on request

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

Shorter customized length are available on request

1.10 Motor Housing and Motor Adaptor Flange

1.10.1 Motor Selection

HIWIN Mikrosystem Servo Motor

For other motor brands and motor types than HIWIN please consult Aratron to help you select the right motorflange and coupling combination

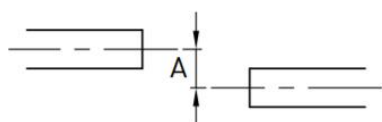
Motor Output	Motor	Weight (kg)	Flange Selection								+Brake Weight (kg)	Driver	Weight (kg)	Remarks
			KK30	KK40	KK50	KK60	KK80	KK86	KK100	KK130				
50W	FRLS052□□A4□	0.45	-	F2	F2	F2	F3	F3	-	-	0.58	D2	1.25	220V
100W	FRLS102□□A4□	0.6	-	F2	F2	F2	F3	F3	-	-	0.76			220V
200W	FRLS202□□06□	1	-	-	-	-	F0	F0	F0	F1	1.5			220V
400W	FRLS402□□06□	1.45	-	-	-	-	F0	F0	F0	F1	1.86			220V
750W	FRMS752□□08□	2.66	-	-	-	-	-	-	F1	F2	3.32			220V



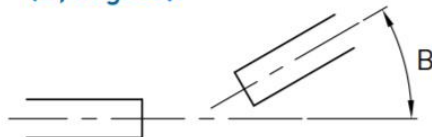
Installation guide for motor flange, motor and coupling

- Three types of displacement may exist while installing the ballscrew with motor axis, which are shown as below.

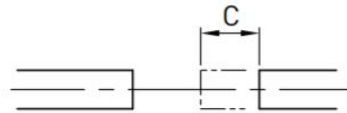
1. Radial displacement (A):



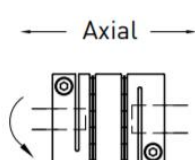
2. Angular displacement (B, degree):



3. Axial displacement (C):

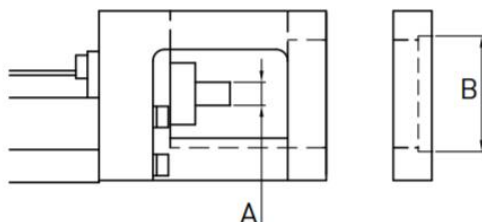


- Confirmation of axial alignment:



When the ballscrew shaft and motor are connected by a coupling, turn the coupling to confirm if it is capable of rotating without restrictions. This will ensure the concentricity of both axes. The illustration is shown as left.

- The use of a motor mounting jig might be necessary to make sure the ballscrew spindle end (A) and the positioning hole of the motor flange (B) are concentric. The illustration is shown below.



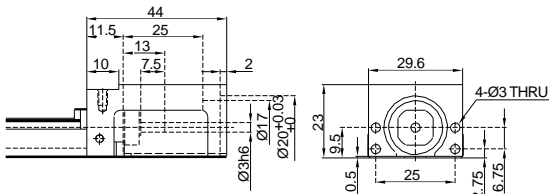
- Precaution:

- During motor flange mounting, the displacement between ballscrew spindle end and the positioning hole of the motor flange should be controlled and also within the allowable displacement range of the chosen coupling.
- The ballscrew spindle end could break if the displacement is beyond the allowable range limit or the coupling is mounted incorrectly.
- Make sure the allowable displacement of the coupling is sufficient for your application, HIWIN recommends a Disk Type coupling. Please contact HIWIN with any questions regarding coupling installation or selection.

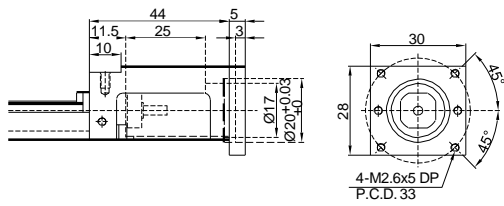
1.10.2 Motor Housing and Motor Adaptor Flange

KK30

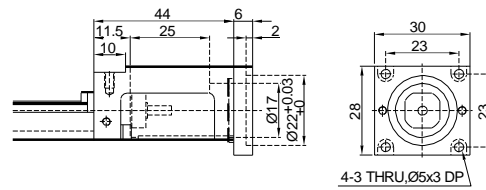
Motor Housing F0



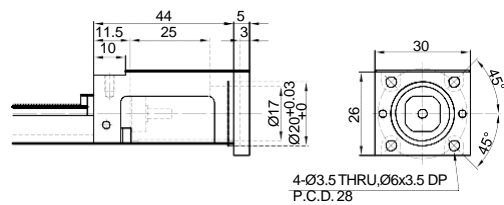
Motor Adaptor Flange F1



Motor Adaptor Flange F3

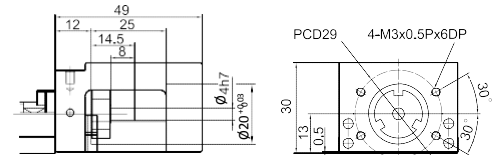


Motor Adaptor Flange F2

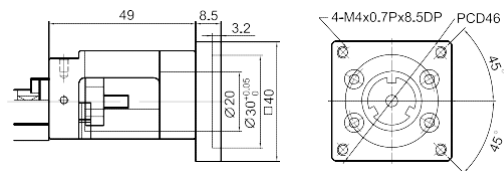


KK40

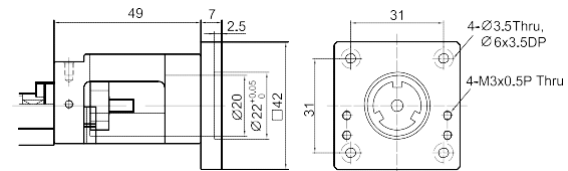
Motor Housing F0



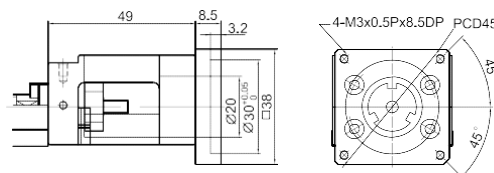
Motor Adaptor Flange F1



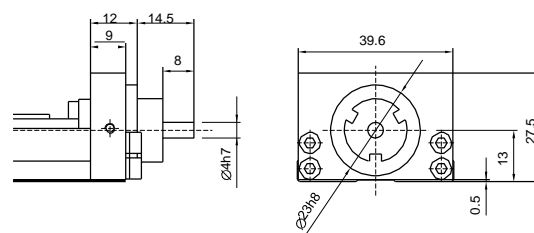
Motor Adaptor Flange F3



Motor Adaptor Flange F2



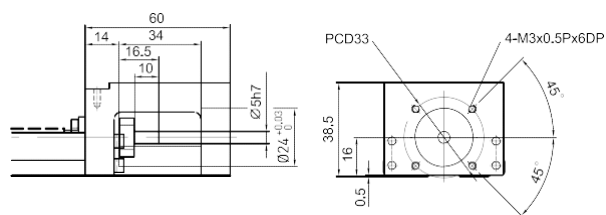
Mount Housing H0



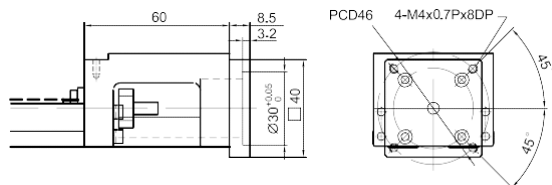
For customized motorflanges and couplings please consult Aratron

KK50

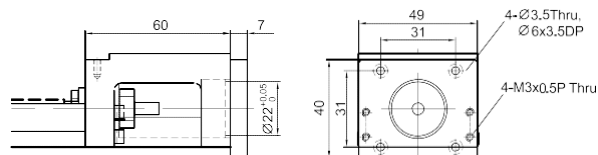
Motor Housing F0



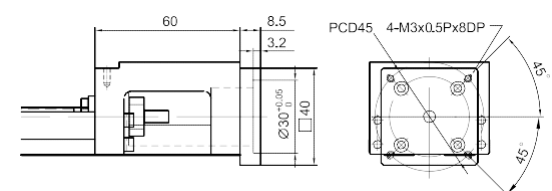
Motor Adaptor Flange F1



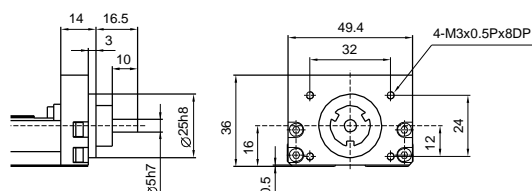
Motor Adaptor Flange F3



Motor Adaptor Flange F2

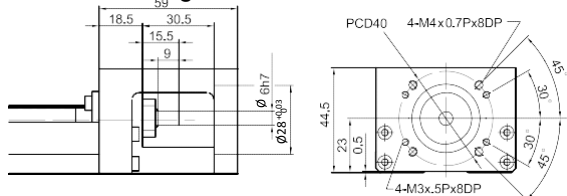


Mount Housing H0

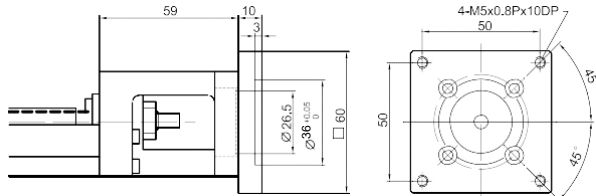


KK60

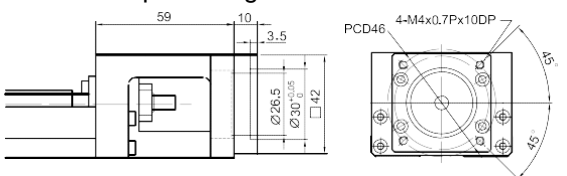
Motor Housing F0



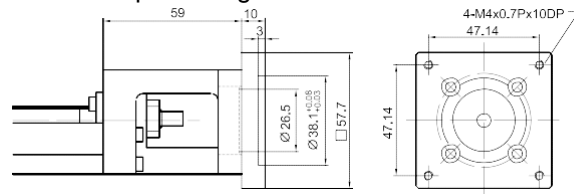
Motor Adaptor Flange F3



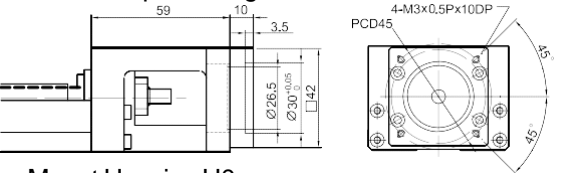
Motor Adaptor Flange F1



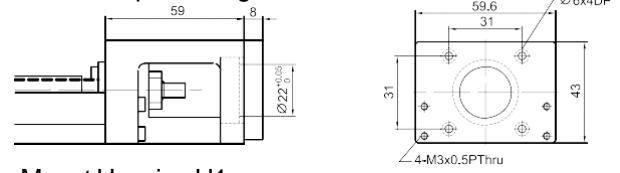
Motor Adaptor Flange F4



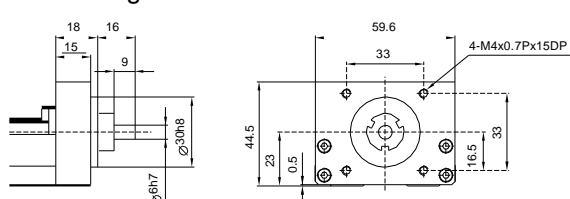
Motor Adaptor Flange F2



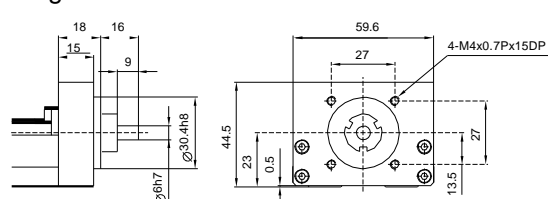
Motor Adaptor Flange F5



Mount Housing H0



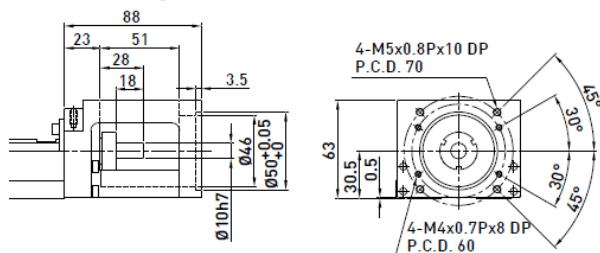
Mount Housing H1



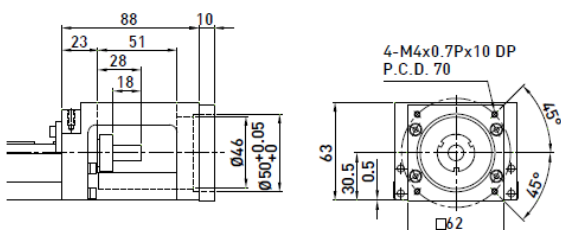
For customized motorflanges and couplings please consult Aratron

KK80

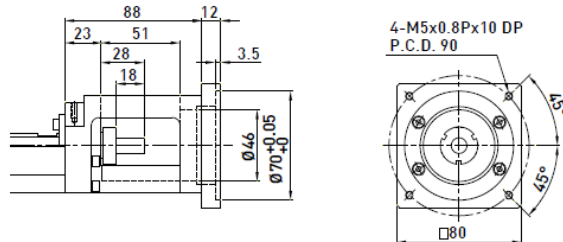
Motor Housing F0



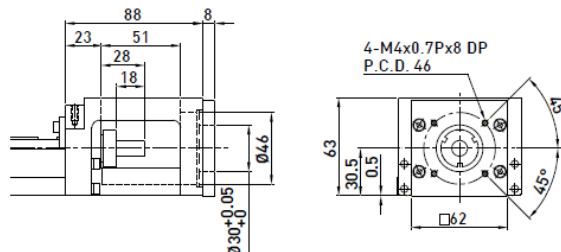
Motor Adaptor Flange F1



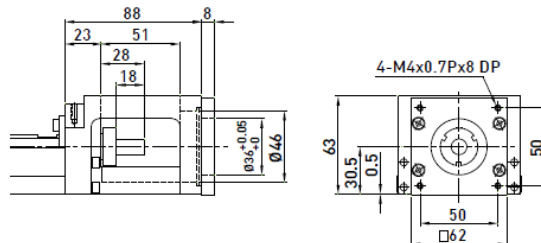
Motor Adaptor Flange F4



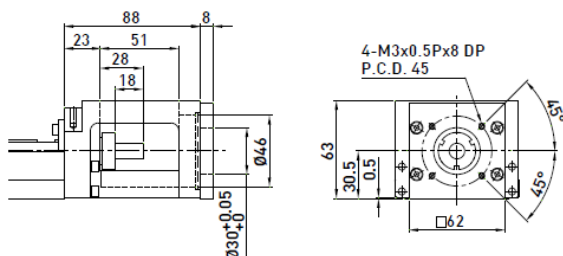
Motor Adaptor Flange F2



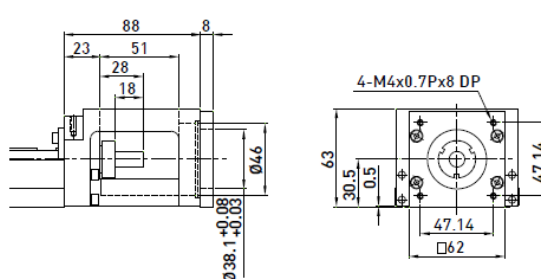
Motor Adaptor Flange F5



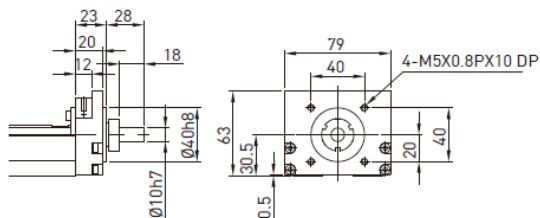
Motor Adaptor Flange F3



Motor Adaptor Flange F6



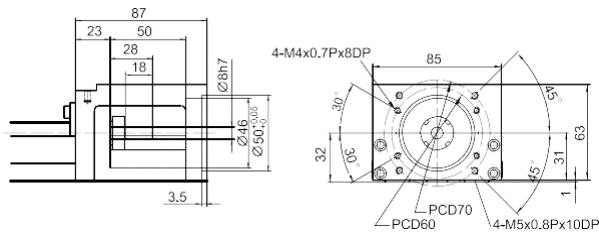
Mount Housing H0



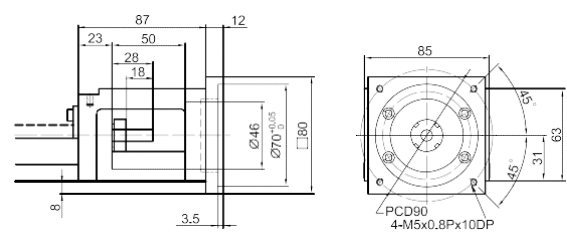
For customized motorflanges and couplings please consult Aratron

KK86

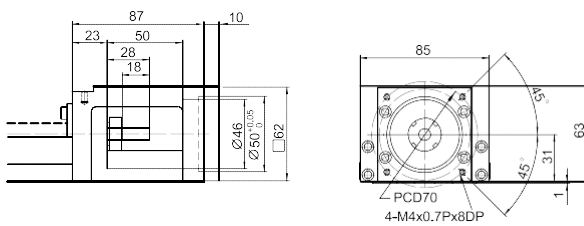
Motor Housing F0



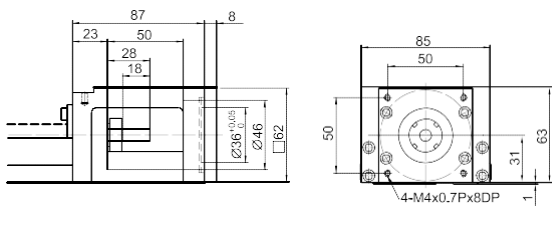
Motor Adaptor Flange F4



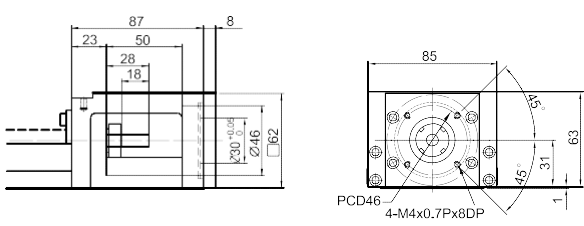
Motor Adaptor Flange F1



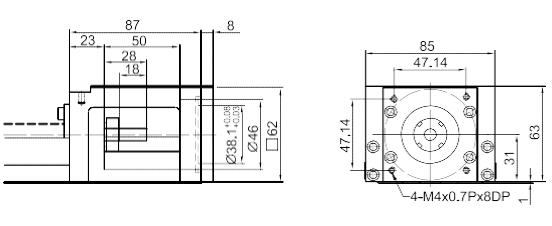
Motor Adaptor Flange F5



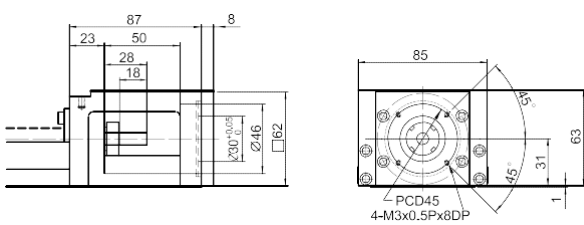
Motor Adaptor Flange F2



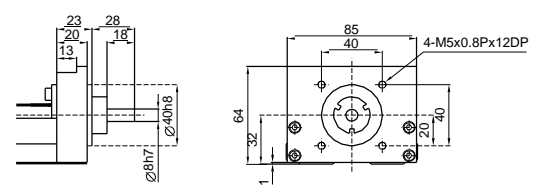
Motor Adaptor Flange F6



Motor Adaptor Flange F3

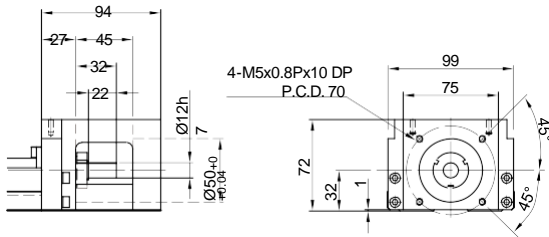


Mount Housing H0

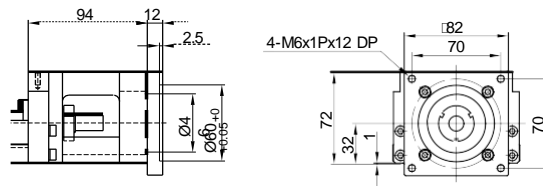


KK100

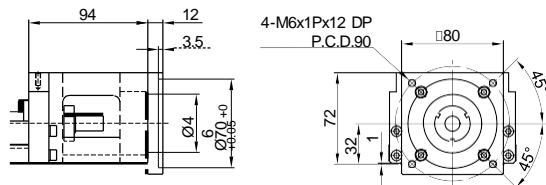
Motor Housing F0



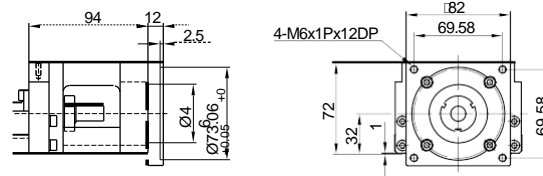
Motor Adaptor Flange F3



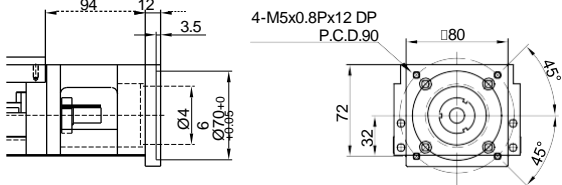
Motor Adaptor Flange F1



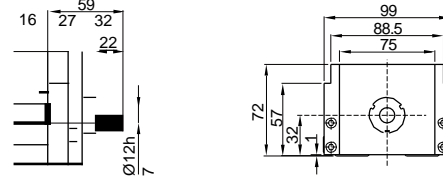
Motor Adaptor Flange F4



Motor Adaptor Flange F2

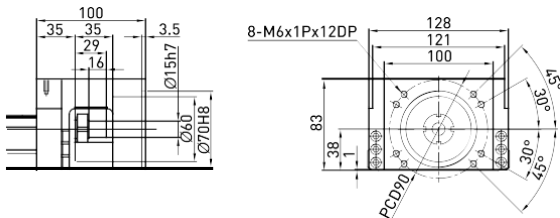


Mount Housing H0

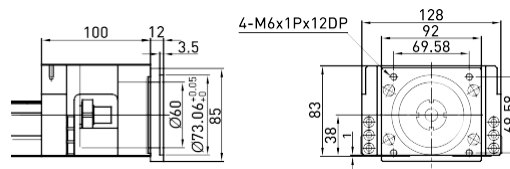


KK130

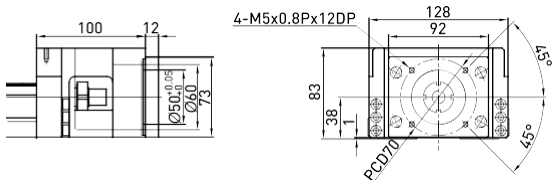
Motor Housing F0



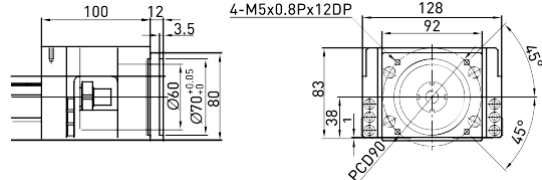
Motor Adaptor Flange F3



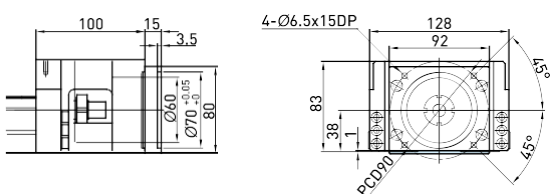
Motor Adaptor Flange F1



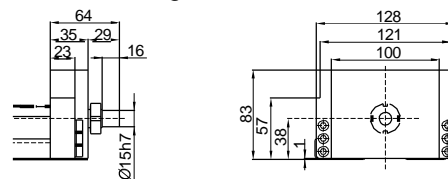
Motor Adaptor Flange F4



Motor Adaptor Flange F2

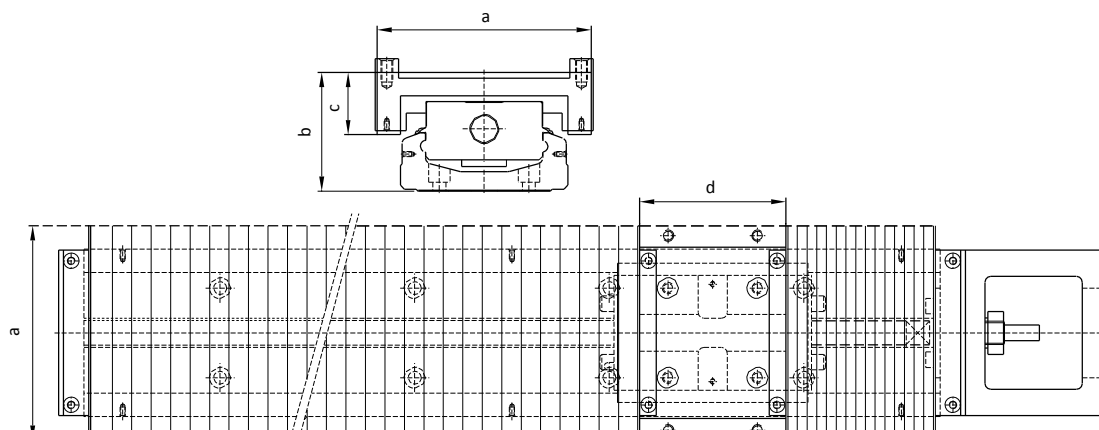


Mount Housing H0



For customized motorflanges and couplings please consult Aratron

1.11 Optional Accessories

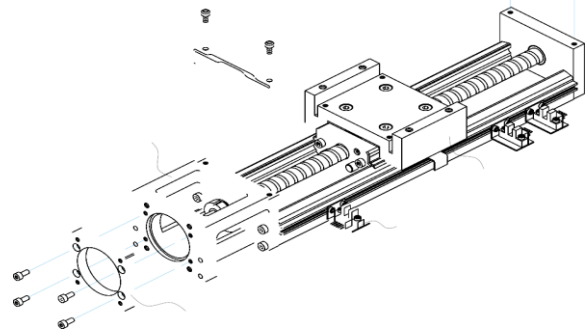
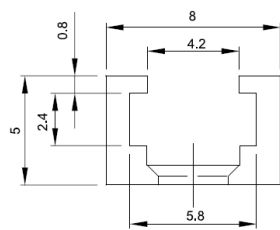


Unit : mm

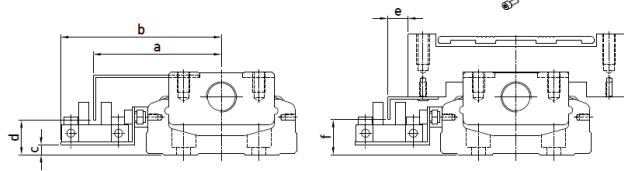
Nominal Width	Rail Length	Stroke	Min.	Max.	a	b	c	d
KK40	100	35	16	51	60	29.5	19	33
	150	63	27	90				
	200	93	37	130				
KK50	150	60	21.5	81.5	62	37	19	47
	200	95	29	124				
	250	130	36.5	166.5				
	300	160	46.5	206.5				
KK60	150	56	16	80	84	45.5	24	54
	200	106	20	126				
	300	166	40	206				
	400	234	56	290				
	500	306	70	376				
	600	366	90	456				
KK80	340	181	42	223	106	62.5	34.5	75
	440	257	54	311				
	540	333	66	399				
	640	409	78	487				
	740	485	90	575				
	940	649	108	757				
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

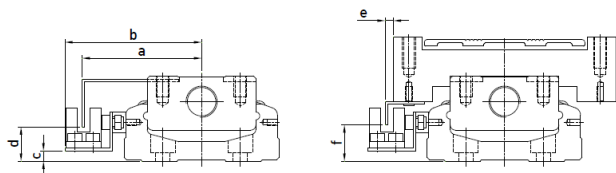


Switch



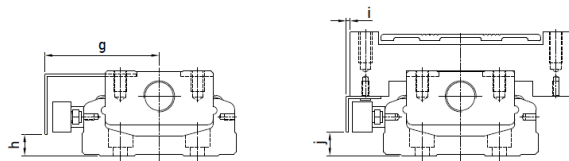
Nominal Width	a	b	c	d	e	f
KK40	41.5	54.1	0.5	10.8	15.3	12
KK50	45.5	59	1	10	15	11
KK60	51	63.8	4	14.5	8	13
KK80	61	74	8	19	9	19
KK86	63.5	76.7	8	18	8	18
KK100	71	84	10	20	9	20
KK130	85.5	98.5	14	24	0.5	23

Switch 1 : OMRON EE-SX-671



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
KK80	56	63	8	18	4	18
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-SX-674



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
KK80	54	12	2	13
KK86	57	13	1	13
KK100	64.5	15	2.5	15
KK130	79	19	-6	19

Switch 3 : PANASONIC GX-F12A

Switch 4 : PANASONIC GX-F12A-P



Nominal Width	g	h	i	j
KK30	28	1.8	5.8	1.8

Switch 5 : YAMATAKE APM-D3B1-03

9.4 Cross table adapter

- Adapter for connecting two or more KK axes crosswise into one X-Y system
- Adapter for KK axes available with and without aluminium cover
- Cam switch for limit switch can be adapted
- Black anodised surface
- Delivered in a set including mounting material



9.4.1 Cross table adapter for KK linear axes without aluminium cover

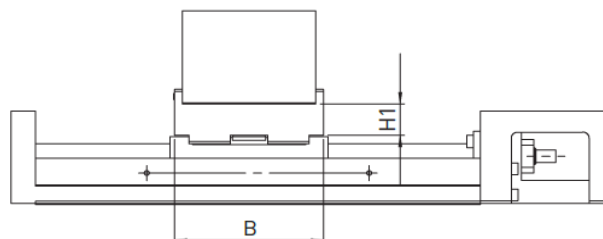
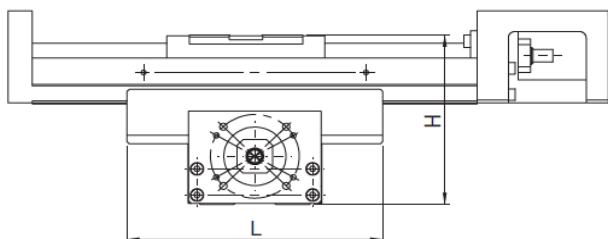


Table 9.5 Dimensions of cross table adapter without cover

Article number	Lower axis	Upper axis	H	H1	L	B
10-000604	KK40	KK40	47	7	70	47
10-000606	KK50	KK40	56	10	70	47
10-000608	KK50	KK50	62	10	90	57
10-000610	KK60	KK50	74	15	90	57
10-000612	KK60	KK60	81	15	115	67
10-000614	KK86	KK60	95	16	110	67
10-000616	KK86	KK86	108	16	120	97

Unit: mm

9.4.2 Cross table adapter for KK linear axes with aluminium cover

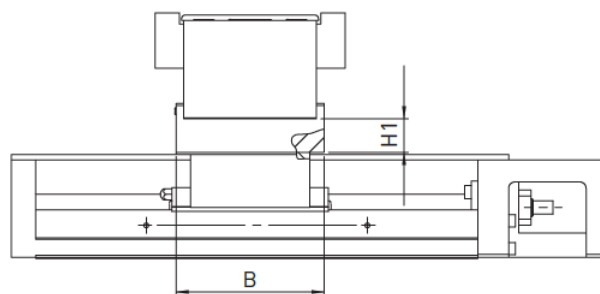
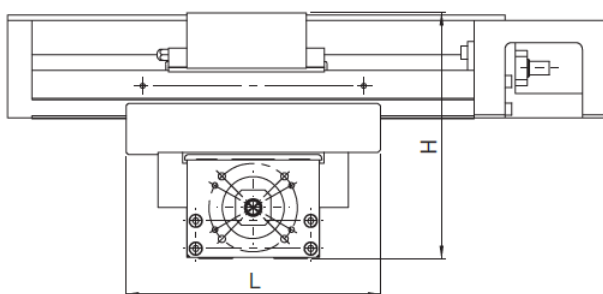
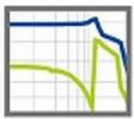


Table 9.6 Dimensions of cross table adapter with cover

Article number	Lower axis	Upper axis	H	H1	L	B
10-000605	KK40	KK40	74	10	70	47
10-000607	KK50	KK40	82	10	70	47
10-000609	KK50	KK50	90	10	90	57
10-000611	KK60	KK50	103	15	57	57
10-000613	KK60	KK60	111	15	115	67
10-000615	KK86	KK60	132	16	144	67
10-000617	KK86	KK86	152	16	144	97

Unit: mm



Example of some useful functions

High speed response	High acceleration response	Vibration Suppression Feature	Built-in accuracy Improvement features	Electronic gear ratio and Encoder Emulator	High speed Communication Interface	Simple set up
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HIWIN D2 Servo Drivers

Intelligent, flexible and programmable Driver. Free software "lightening" that simplifies parameter setting for homing, parameter settings and programming processes. D2 is suitable for positioning, speed and torque control but can also work standalone as a simple programmable PLC.

Options: Modbus (RTU and ASCII) for the serial communication. EtherCAT interface (CoE) for advanced CNC control, or (mega-ulink) that provides good interface with the API-compatible with other software and programming languages. Drivers can work Stand Alone" as a simple PLC, or as a slave to an external PLC or PC control system.



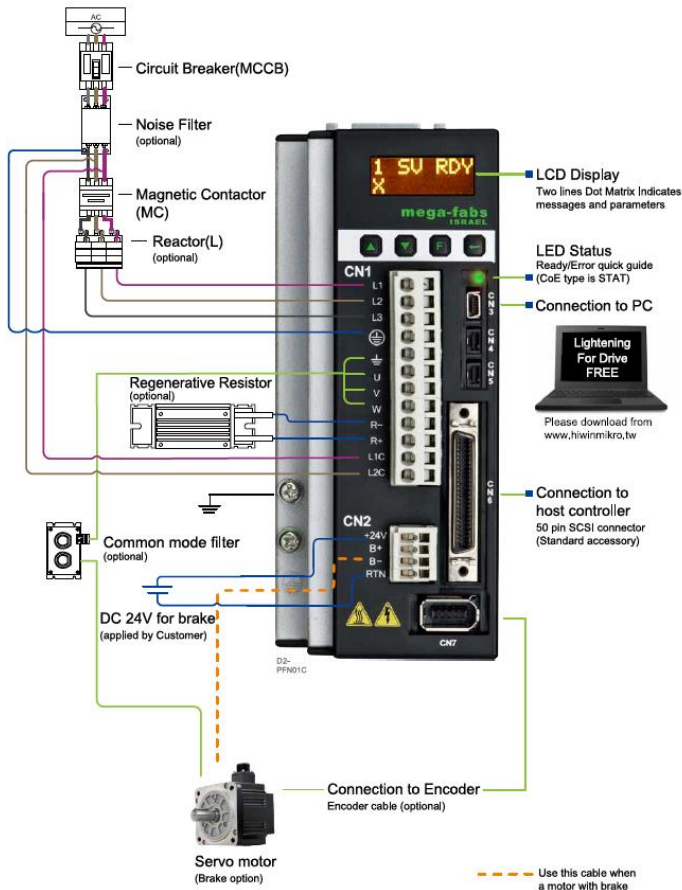
abilymotor

Motor med inbyggd servodriver
200W och 400W



D2 Servodriver Codes & Interfaces

HIWIN



Code	1	2	2a	3	4	5	6	7	8	9	10	11	12
Example	D	2	T	-	0	4	2	3	-	S	-	B	0

Product
HIWIN servo drive D2 = D2

Type
17bit encoder only = T
13bit encoder only = Blank

Rated output
100W = 01
400W = 04
1000W = 10
2000W = 20

Voltage range
1/3 phase 110/220VAC = 23
3 phase 220VAC = 32

Interface
Standard = S
EtherCAT(CoE) = E
EtherCAT(mega-ulink) = F
Standard with extension I/O modules = K
Modbus = T

Frame size
A frame(suggestion: 100W rated output) = A
B frame(suggestion: 400W rated output) = B
C frame(suggestion: 1000W rated output) = C
D frame(suggestion: 2000W rated output) = D

Encoder type
13bit less-wire incremental encoder = 0
17bit serial incremental encoder(HIWIN17) = 4
Dual Loop (Full closed loop) and 17bit serial absolute encoder = 5

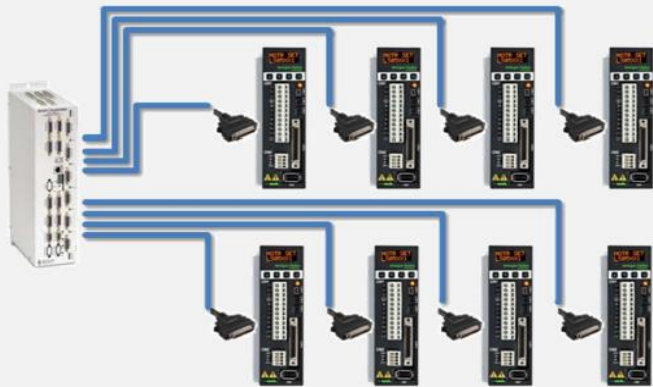
Interface	Standard	EtherCAT(CoE)	EtherCAT(mega-ulink)	Standard with extension I/O modules	Modbus
D2I(frame A-C)	0	0	0	X	0
D2T(frame A-C)	0	0	0	0	Δ
D2T(frame D)	Δ	0	0	Δ	Δ

0: Available X:Unavailable Δ:Please contact with Sales Representative.

Note Single and three phase AC voltage drive only support rated output which is lower or equal to 1000W.

Traditional command interfaces

- Pulse command
- Voltage command



EtherCAT interfaces

- Less wire/Cost down
- Reduce disturbance
- Access drive parameters directly

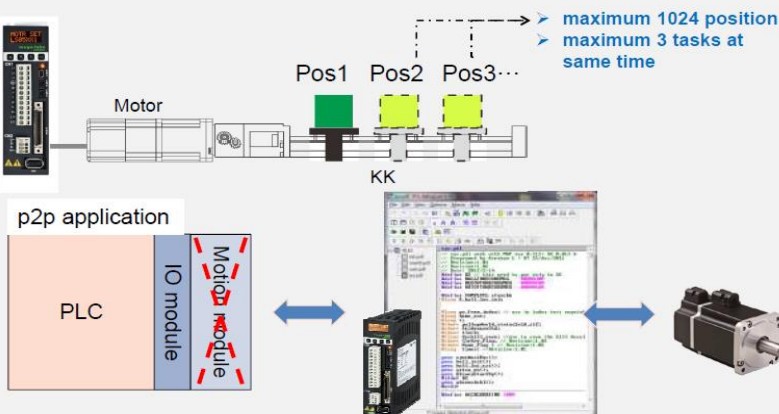


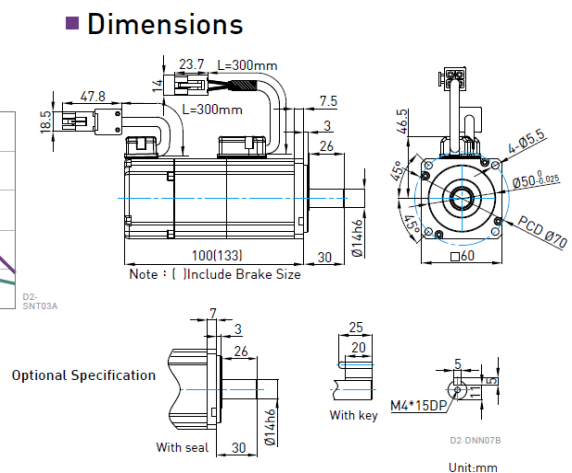
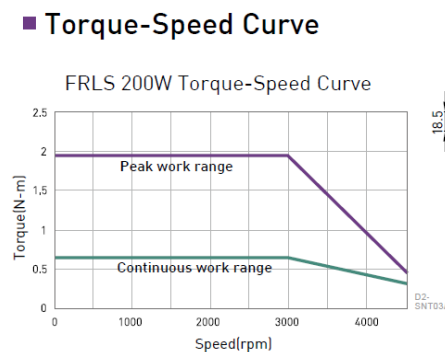
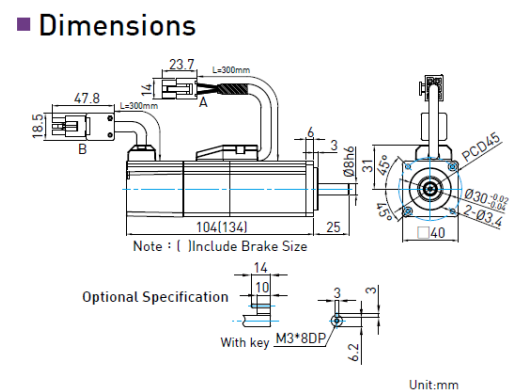
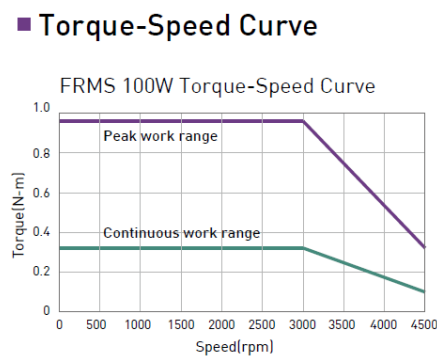
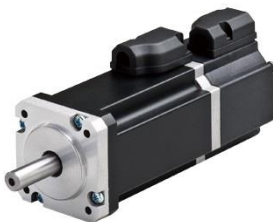
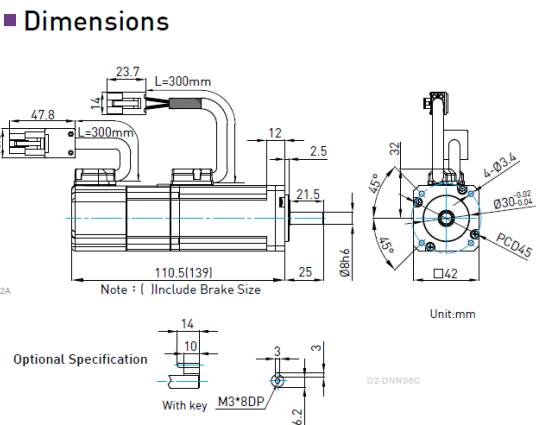
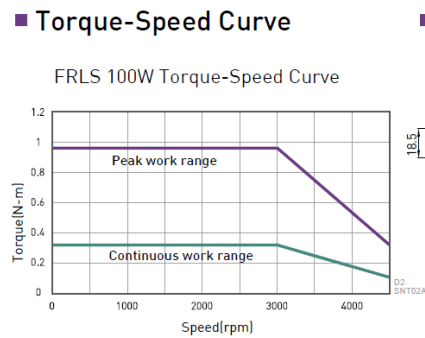
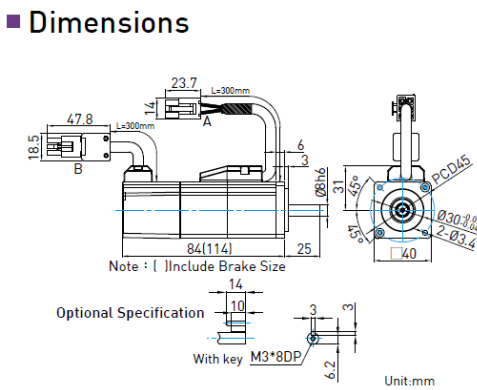
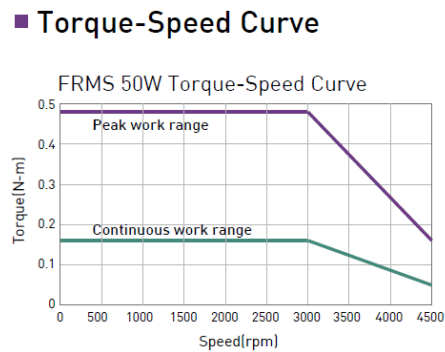
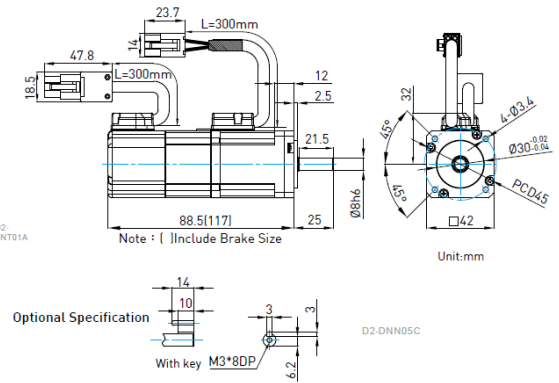
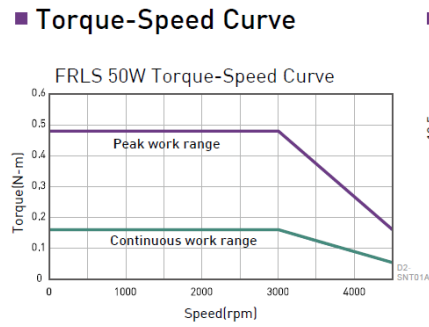
mega-ulink interfaces

- Cost efficiency solution
- No motion control card
- Point-to-point application

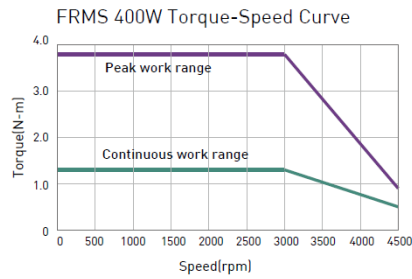


Process description language (PDL)

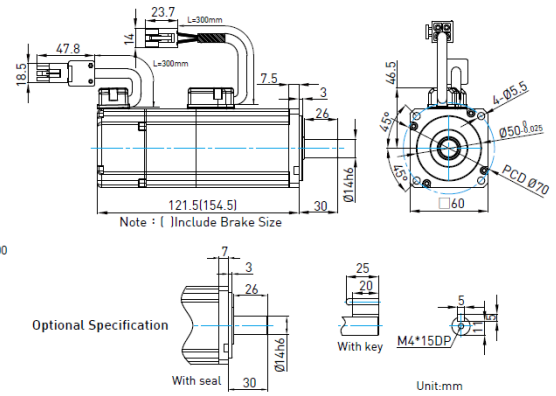


HIWIN

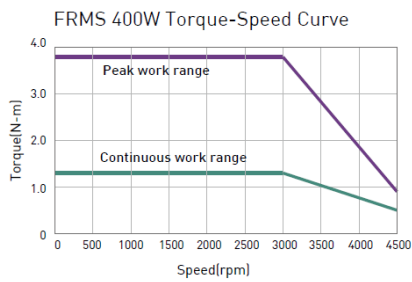
Torque-Speed Curve



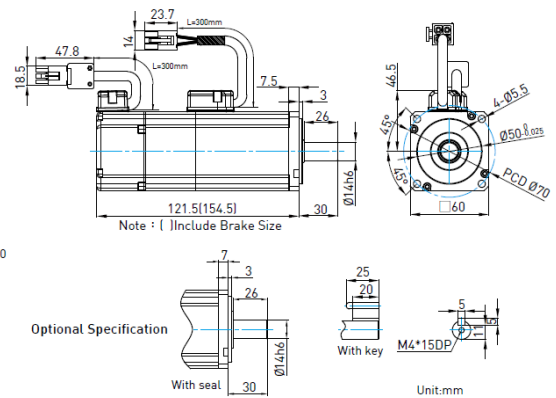
Dimensions



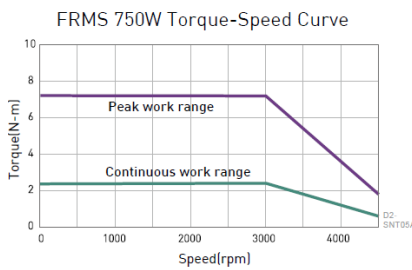
Torque-Speed Curve



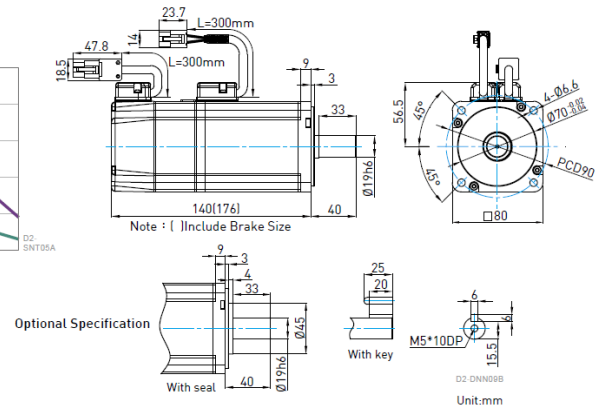
Dimensions



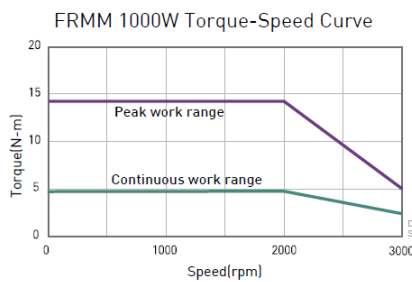
Torque-Speed Curve



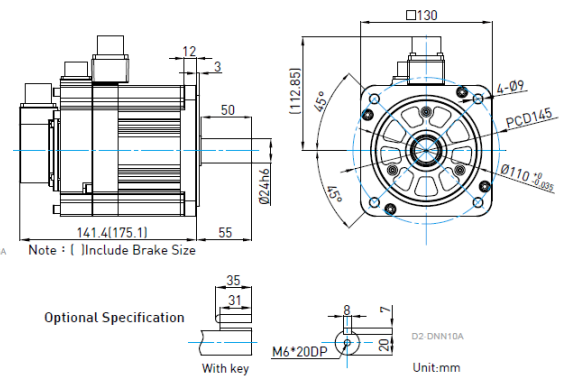
Dimensions



Torque-Speed Curve



Dimensions



Ezi-SERVO[®] II

Closed Loop Stepping System

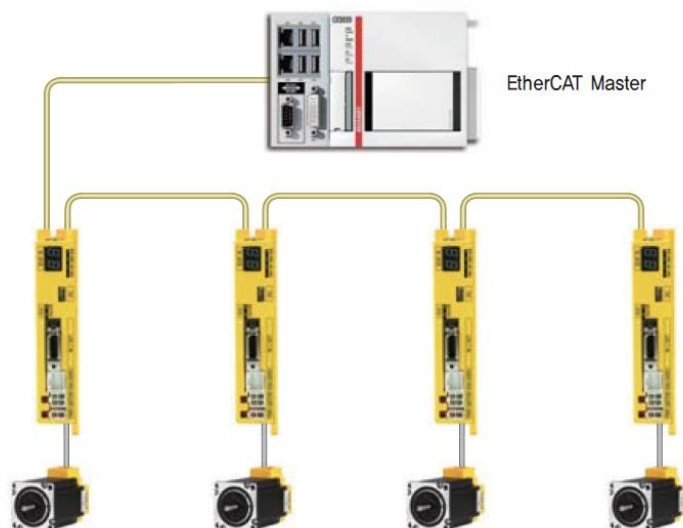
- CiA 402 Drive Profile Support
- Closed Loop Stepping System
- No Gain Tuning / No Hunting
- Torque Improvement by Boost Current Control

EtherCAT[®] 
Conformance tested



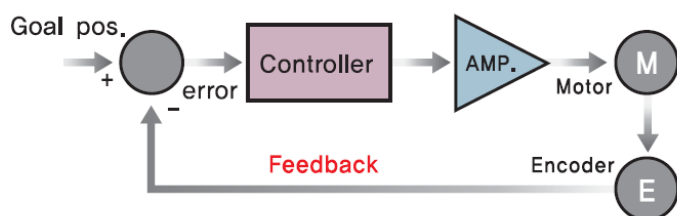
1 EtherCAT Based Motion Control

Ezi-SERVO II EtherCAT is stepping motor control system using EtherCAT, high speed ethernet (100Mbps full-duplex) based fieldbus. Ezi-SERVO II EtherCAT is EtherCAT slave module which support CAN application layer over EtherCAT (CoE). CiA402 Drive profile implemented, Supported modes are CSP Profile, Position Profile, Homing Profile.



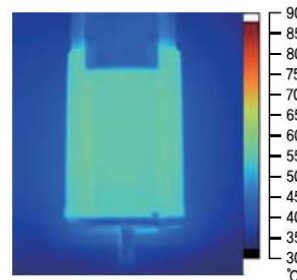
2 Closed Loop Stepping System

Ezi-SERVO II is an innovative closed loop stepping motor and controller that utilizes a high-resolution motor mounted encoder to constantly monitor the motor shaft position. The encoder feedback feature allows the Ezi-SERVO II to update the current motor shaft position information every 25 micro seconds. This allows the Ezi-SERVO II drive to compensate for the loss of position, ensuring accurate positioning. For example, due to a sudden load change, a conventional stepper motor and drive could lose a step creating a positioning error and a great deal of cost to the end user!

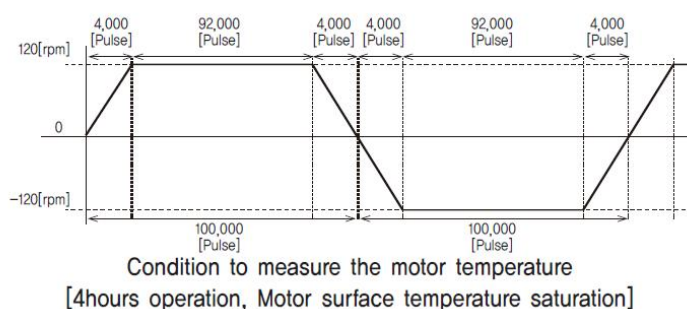


3 Current control according to load

Ezi-SERVO II automatically control the motor current according to loads. Thus, febricity of motor and drive are minimized so can save the energy as well.



Motor temperature [measured by thermograph]

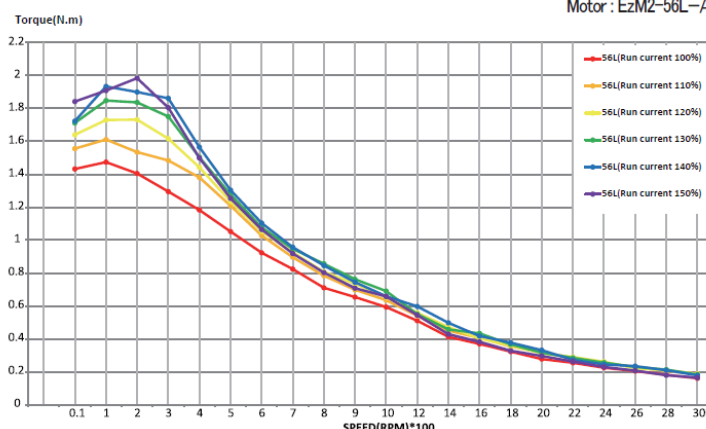


4 Boost Current / Run Current

Accel / Decel characteristics can be improved by set the Boost Current Parameters.

Torque can be improved when driving by set the Run Current Parameters.

[Example of the Torque Graph according to Run Current setting]
Motor : EzM2-56L-A



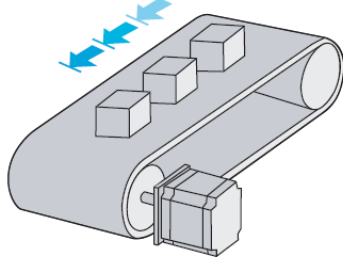
Measured Condition Motor Voltage : Drive = Ezi-SERVO II EtherCAT
Motor Current = 40VDC
Input Voltage = 24VDC

5

No Gain Tuning

Conventional servo systems, to ensure machine performance, smoothness, positional error and low servo noise, require the adjustment of its servo's gains as an initial crucial step. Even systems that employ auto-tuning require manual tweaking after the system is installed, especially if more than one axis are interdependent. Ezi-SERVO II employs the best characteristics of stepper and closed loop motion controls and algorithms to eliminate the need of tedious gain tuning required for conventional closed loop servo systems. This means that Ezi-SERVO II is optimized for the application and ready to work right out of the box! The Ezi-SERVO II system employs the unique characteristics of the closed loop stepping motor control, eliminating these cumbersome steps and giving the engineer a high performance servo system without wasting setup time. Ezi-SERVO II is especially well suited for low stiffness loads (for example, a belt and pulley system) that some-time require conventional servo systems to inertia match with the added expense and bulk of a gearbox.

Ezi-SERVO II also performs exceptionally, even under heavy loads and high speeds!

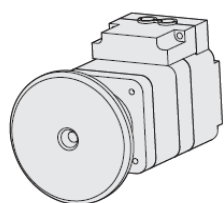


6

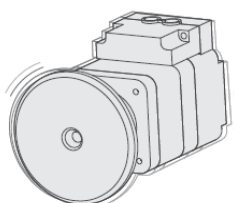
No Hunting

Traditional servo motor drives overshoot their position and try to correct by overshooting the opposite direction, especially in high gain applications. This is called null hunt and is especially prevalent in systems that the break away or static friction is significantly higher than the running friction. The cure is lowering the gain, which affects accuracy or using Ezi-SERVO II Motion Control System! Ezi-SERVO II utilizes the unique characteristics of stepping motors and locks itself into the desired target position, eliminating Null Hunt. This feature is especially useful in applications such as nanotech manufacturing, semiconductor fabrication, vision systems and ink jet printing in which system oscillation and vibration could be a problem.

Complete stop

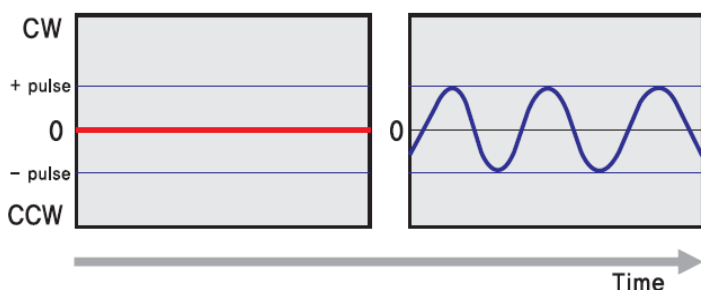


Hunting



Ezi-SERVO II

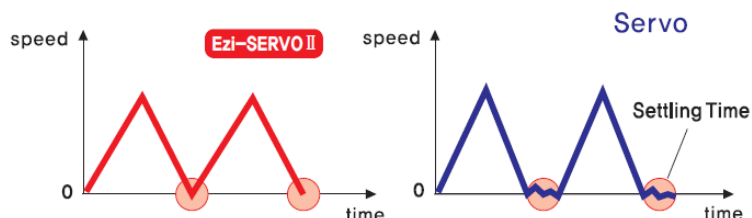
Servo motor



7

Fast Response

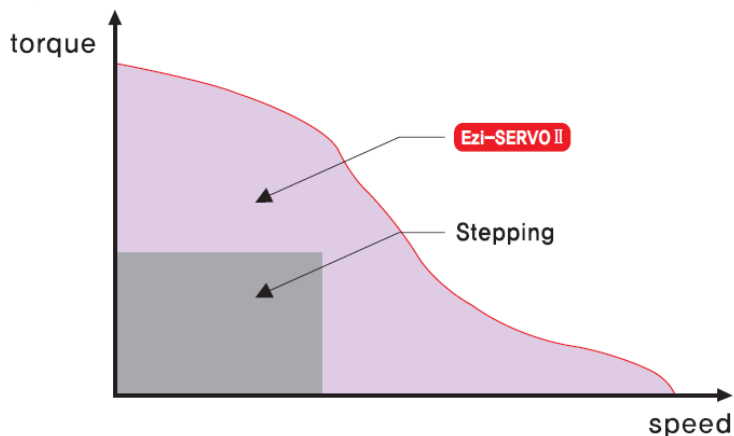
Similar to conventional stepping motors, Ezi-SERVO II instantly synchronizes with command pulses providing fast positional response. Ezi-SERVO II is the optimum choice when zero-speed stability and rapid motions within a short distance are required. Traditional servo motor systems have a natural delay between the commanding input signals and the resultant motion because of the constant monitoring of the current position, necessitating in a waiting time until it settles, called settling time.



8

High Torque

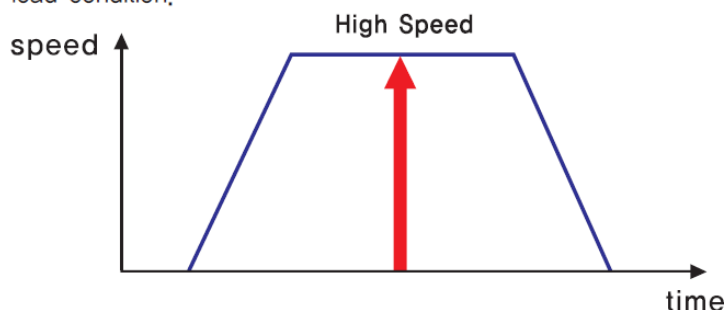
Compared with common step motors and drives, Ezi-SERVO II motion control systems can maintain a high torque state over relatively long period of time. This means that Ezi-SERVO II continuously operates without loss of position under 100% of the load. Unlike conventional Microstep drives, Ezi-SERVO II exploits continuous high-torque operation during high-speed motion due to its innovative optimum current phase control.



9

High Speed

The Ezi-SERVO II functions well at high speed without the loss of Synchronism or positioning error. Ezi-SERVO II's ability of continuous monitoring of current position enables the stepping motor to generate high-torque, even under a 100% load condition.

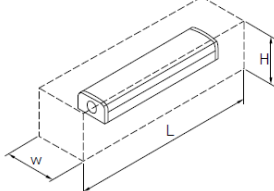


HIWIN Single Axis Robot Inquiry Form

Date: / /

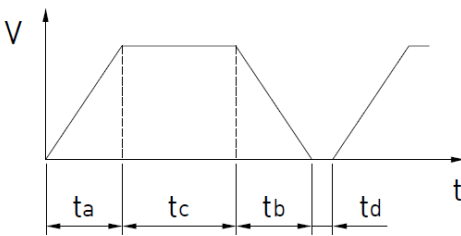
Company		Dept.	
Name		Title	
Tel		E-Mail	
Fax		Address	

1. Tentative "K" model	
2. Effective stroke(mm)	
3. Positioning accuracy (mm)	
4.Repeatability (mm)	
5.Installation Method	<input type="checkbox"/> horizontal <input type="checkbox"/> vertical <input type="checkbox"/> upside down <input type="checkbox"/> incline <input type="checkbox"/> side installation <input type="checkbox"/> XY axis <input type="checkbox"/> XZ axis <input type="checkbox"/> XYZ axis <input type="checkbox"/> Gate <input type="checkbox"/> others (Please provide a drawing)
6.Special environment	<input type="checkbox"/> high temperature ____°C <input type="checkbox"/> low temperature ____°C <input type="checkbox"/> vibration <input type="checkbox"/> oil <input type="checkbox"/> water <input type="checkbox"/> clean room <input type="checkbox"/> corrosive chemical <input type="checkbox"/> humid <input type="checkbox"/> dust <input type="checkbox"/> others_____

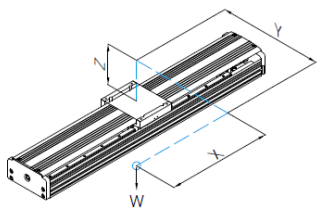
7.Space limit(mm)	L ____ xW ____ xH ____ . 
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8.Screw lead(mm)	_____ mm
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9.Max speed / acceleration	
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10.Motor operation	 <div style="float: right;"> Max speed V= ____mm/s ta= ____sec tb= ____sec tc= ____sec td= ____sec </div>
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11.Load(kg)	_____ kg(_____ N)
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12.Load direction	<input type="checkbox"/> offset <input type="checkbox"/> Pitching <input type="checkbox"/> Yawing <input type="checkbox"/> Rolling X ____ xY ____ xZ ____ . X= ____mm Y= ____mm Z= ____mm 
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13.Expected service life	
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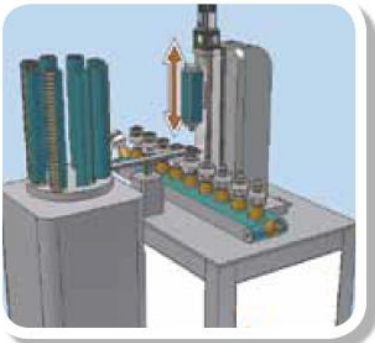
14.Accessories	<input type="checkbox"/> motor <input type="checkbox"/> driver <input type="checkbox"/> coupling <input type="checkbox"/> limit switch <input type="checkbox"/> decelerator <input type="checkbox"/> XY connector <input type="checkbox"/> cable protection chain <input type="checkbox"/> others_____
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15.Other comments	
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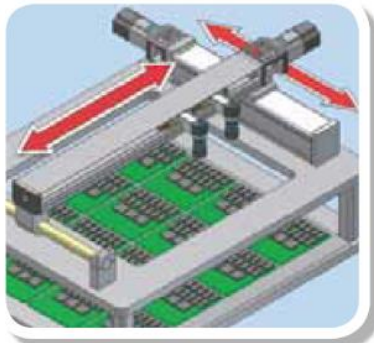
16.Purpose	<input type="checkbox"/> transport <input type="checkbox"/> automatic dispenser <input type="checkbox"/> loader/unloader <input type="checkbox"/> testing equipment <input type="checkbox"/> transmit <input type="checkbox"/> others_____
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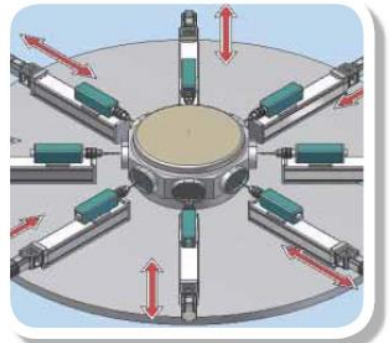
Applications



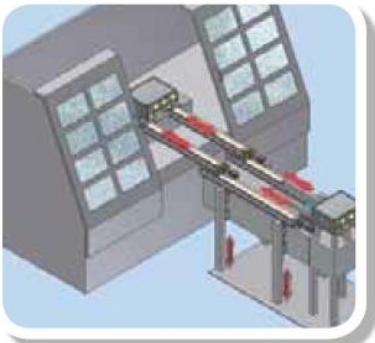
Auto bonding machine



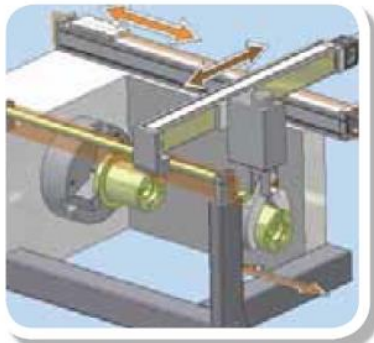
Auto optical inspection



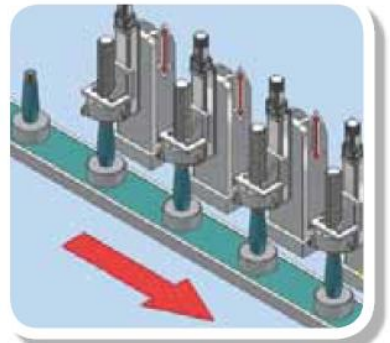
Drilling machine



Automated material handling



Automated loading and unloading



Bottle capping machine

Technical Support

Please ask Aratron about KK systems and special customized combinations
We can support our customers with technical calculations and CAD drawings