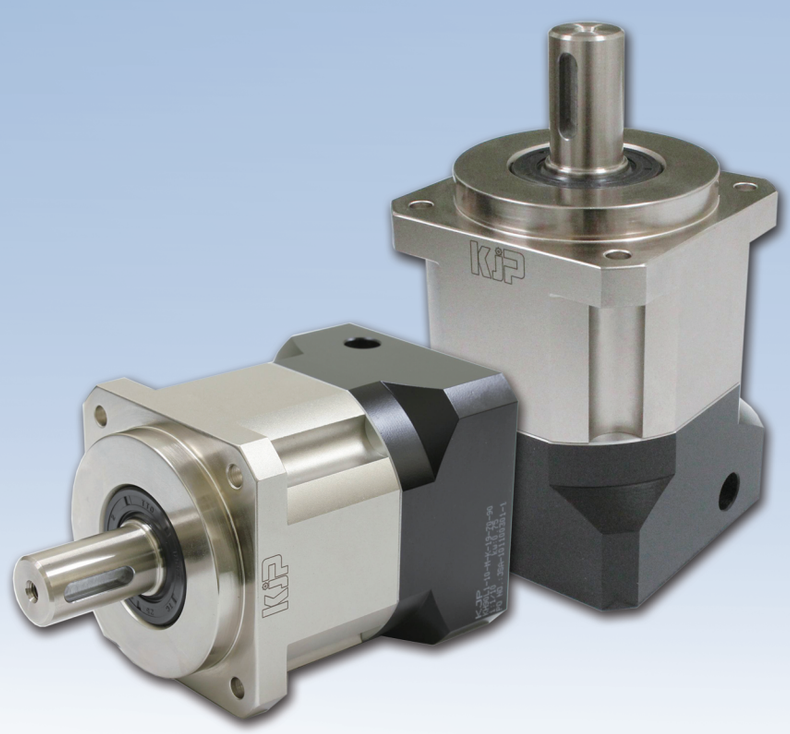
KH Series

High Precision & Low Backlash Planetary Gearboxes.



KH

High Precision Planetary Gear Reducers

/ Application & Components Features

Application

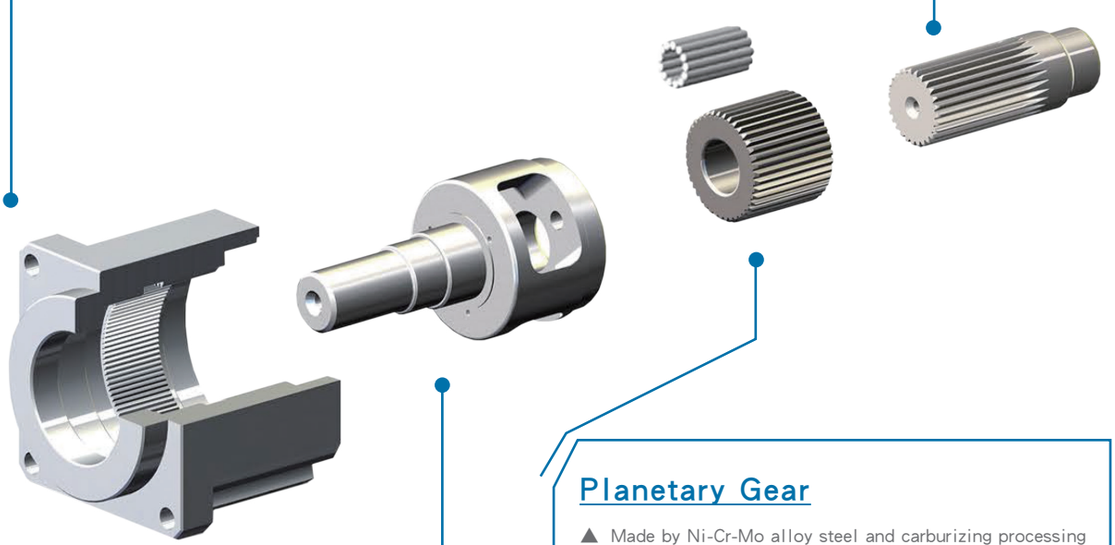
KH series can be applied to precision positioning or reciprocating motion device and can output stably to automated equipment which is operating in minimum vibratility. Such as printing industry, pipe bender, spring machine industry, LCD inspection equipment, connected ball screw transmission mechanism... and so on.

Gearbox

- ▲ With Cr-Mo alloy steel and integrated design for internal gear to make sure the high precision and large output torque.
- ▲ Gearbox surface with electroless plating for corrosion resistance.

Sun Gear

- ▲ Made by Ni-Cr-Mo alloy steel and carburizing process on surface for the high abrasion and impact resistance.
- ▲ Tooth skiving to enhance gear precision and to lower noise.



Planetary Gear

- ▲ Made by Ni-Cr-Mo alloy steel and carburizing processing on surface for the high abrasion and impact resistance.
- ▲ Tooth skiving to enhance gear precision and to lower noise.
- ▲ Needle roller without cage internal the gear for higher abrasion resistance and strength.

Output Shaft

- ▲ Integrated design and structure rigidity to ensure large torque output.
- ▲ Surface by electroless plating to higher anti-rust.

Input Shaft

- ▲ Modular design can apply to various type of servomotors.
- ▲ Shaft surface with blacken process.

Connecting Flange

- ▲ Modular design can apply to various type of servomotors.
- ▲ Sandblasting or higher-grade painting on surface to improve the antioxidant capacity.

KH

High Precision Planetary Gear Reducers

/ Selection Reference Table

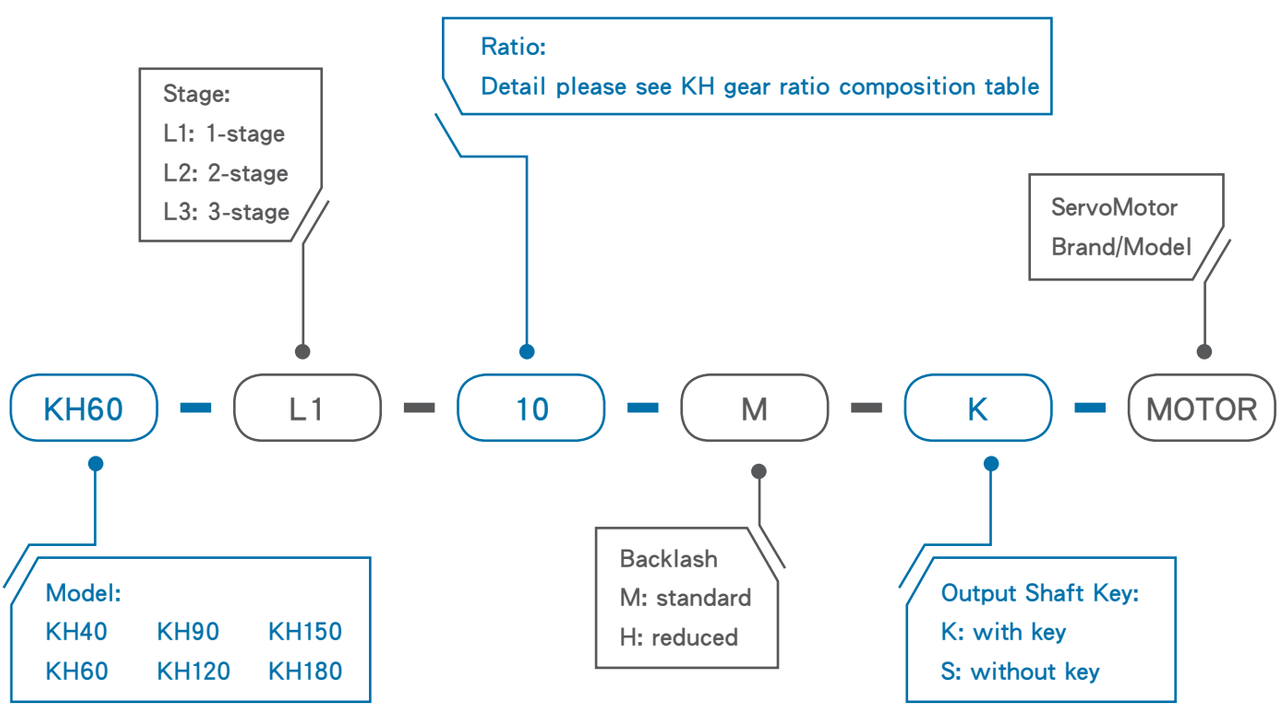
KH Selection Reference Table

Motor Output Power	Model	Ratio																			
		1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	1/15	1/20	1/25	1/30	1/35	1/40	1/50	1/60	1/70	1/80	1/90	1/100
50W	KH40	●	●	●	●	●	●		●	●	●	●	●	●	●	●					
100W	KH40	●	●	●	●	●	●		●												
	KH60	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●		●	●
200W	KH60	●	●	●	●	●		●	●	●	●	●	●	●	●	●					
	KH90	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
400W	KH60	●	●	●	●	●		●	●	●	●	●	●	●							
	KH90	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
500W	KH90	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	KH120	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●		●	●
750W	KH90	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	KH120	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●				
1KW	KH120	●	●	●	●	●		●	●	●	●	●	●	●	●	●					
	KH150	●	●	●	●	●			●	●	●	●	●	●	●	●	●	●			●
1.5KW	KH120	●	●	●	●	●		●	●	●	●	●	●	●							
	KH150	●	●	●		●			●	●	●	●	●	●	●	●					
	KH180	●	●	●		●			●	●	●	●	●	●	●	●		●			●
2.0KW	KH150	●	●	●		●			●	●	●	●	●	●	●	●					
	KH180	●	●	●	●	●			●	●	●	●	●	●	●	●		●			●
3.5KW	KH150	●	●	●		●			●	●	●	●	●								
	KH180	●	●	●	●	●			●	●	●	●	●	●	●	●					
5.0KW	KH150	●	●	●		●			●	●	●										
	KH180	●	●	●	●	●			●	●	●	●	●	●	●						
7.0KW	KH150	●	●	●					●												
	KH180	●	●	●		●			●	●	●										
11.0KW	KH180	●	●	●		●			●												

Note :

1. According to motor output power, selecting the suitable reducer models with '●' mark.
2. When applied to bigger torque or torsional rigidity mechanism, larger size of reducer must be used.
3. Please contact our engineers for ratios not being listed in above table.

Reducer Model(KH)



KH

High Precision Planetary Gear Reducers

/ Ratio Composition Table
/ Reducer Monment of Inertia Table

KH Ratio Composition Table

	Ratios Table for Every Stage		
Model	Ratio of 1 Stage (L1)	Ratio of 2 Stages (L2)	Ratio of 3 Stages (L3)
KH40	3，4，5，6，7，8，10	15，20，25，30，35，40，50	
KH60	3，4，5，6，7，9，10	12，15，16，20，21，25，28，30，35，40，45，50， 60，70，90，100	120，150，200，250，300，350，400，450， 500，600，700，900，1000
KH90	3，4，5，6，7，8，9，10	12，15，16，20，21，25，28，30，35，40，45，50， 60，70，80，90，100	120，150，200，250，300，350，400，450， 500，600，700，800，900，1000
KH120	3，4，5，6，7，8，9，10	12，15，16，20，21，25，28，30，35，40，45，50， 60，70，80，90，100	120，150，200，250，300，350，400，450， 500，600，700，800，900，1000
KH150	3，4，5，7，10	12，15，16，20，21，25，28，30，35，40，50，70，100	120，150，200，250，300，350，400， 500，600，700，1000
KH180	3，4，5，6，7，10	12，15，16，20，21，25，28，30，35，40，50，60，70， 100	120，150，200，250，300，350，400， 500，600，700，1000

Ratio of One Stage (L1) = as listed in table (Ratio of stage 1)

Ratio of Two Stages (L2)= Ratio of Stage 1 x Ratio of Stage 2

Ratio of Three Stages (L3)= Ratio of Stage 1 x Ratio of Stage 2 x Ratio of Stage 3

Ex: (L1) 5:1= Gear Ratio is 5

Ex: (L2) 50:1= L1 Ratio 5 x L2 Gear Ratio 10= Ratio 50

Ex: (L3) 500:1= L1 Ratio 5 x L2 Gear Ratio 10 x L3 Gear Ratio 10 = Ratio 500

KH Reducer Moment of Inertia Table

	Stage	Ratio	KH40	KH60	KH90	KH120	KH150	KH180
Moment of Inertia J_1kg*cm^2	L1	3	0.02	0.12	1.05	2.38	10.76	26.48
		4	0.01	0.09	0.94	1.99	8.89	21.51
		5	0.01	0.08	0.91	1.91	8.55	20.60
		6	0.01	0.08	0.90	1.87	—	20.42
		7	0.01	0.08	0.89	1.86	8.42	20.26
		8	0.01	—	0.89	1.86	—	—
		9	—	0.08	0.89	1.84	—	—
		10	0.01	0.08	0.89	1.84	8.38	20.15
	L2	15	0.01	0.08	0.89	1.87	8.51	20.50
		20	0.01	0.08	0.89	1.87	8.51	20.50
		25	0.01	0.08	0.89	1.87	8.51	20.50
		30	0.01	0.08	0.89	1.85	8.51	20.50
		35	0.01	0.08	0.88	1.84	8.40	20.50
		40	0.01	0.08	0.88	1.83	8.37	20.13
		45	—	0.08	0.88	1.83	—	—
		50	0.01	0.08	0.88	1.83	8.37	20.13
		60	—	0.08	0.88	1.83	—	20.13
		70	—	0.08	0.88	1.83	8.37	20.13
		80	—	—	0.88	1.83	—	—
		90	—	0.08	0.88	1.83	—	—
		100	—	0.08	0.88	1.83	8.37	20.13

KH Series Technical Specifications

Specification	Unit	Stage	Ratio	KH40	KH60	KH90	KH120	KH150	KH180
Reducer Nominal Output Torque T_{2N}	Nm	L1	3	16	50	125	248	500	1，000
			4	17	43	136	286	580	1，090
			5	17	52	152	320	660	1，215
			6	16	52	145	308	—	1，060
			7	15	46	136	306	540	1，135
			8	13	—	118	240	—	—
			9	—	35	94	225	—	—
			10	13	35	94	225	460	935
		L2	15	13	50	128	210	500	1，000
			20	14	46	142	285	530	1，090
			25	13	58	158	320	660	1，215
			30	14	52	146	308	610	1，200
			35	13	48	136	306	540	1，135
			40	11	43	118	252	530	1，090
			45	—	36	98	225	—	—
			50	12	56	156	320	660	1，215
			60	—	53	148	308	—	1，060
			70	—	46	135	306	540	1，135
			80	—	—	116	—	—	—
			90	—	35	94	225	—	—
			100	—	35	94	225	460	935
Emergency Stop Torque	Nm	L1，L2	3~100	3 Times of Nominal Output Torque					
Nominal Input Speed n_{1N}	rpm	L1，L2	3~100	3，000	3，000	3，000	2，500	2，500	2，500
Max. Input Speed n_{1B}	rpm	L1，L2	3~100	6，000	6，000	6，000	5，000	5，000	5，000
Reduced Backlash H	arcmin	L1	3~10	≦5	≦3	≦3	≦3	≦3	≦3
		L2	15~100	≦8	≦5	≦5	≦5	≦5	≦5
Standard Backlash M	arcmin	L1	3~10	≦8	≦5	≦5	≦5	≦5	≦5
		L2	15~100	≦10	≦8	≦8	≦8	≦8	≦8
Torsional Rigidity	Nm/arcmin	L1，L2	3~100	2.6	7	15	28	51	142
Max. Radial Load F_{rB}	N	L1，L2	3~100	750	1，530	3，000	6，200	9，000	14，200
Max. Axial Load F_{aB}	N	L1，L2	3~100	375	765	1，500	3，100	4，500	7，100
Warranty	M	L1，L2	3~100	18 Months (Under Normal Usage)					
Average Operation Time	hr	L1，L2	3~100	20，000					
Efficiency of Full Loading η	%	L1	3~10	≧98%					
		L2	15~100	≧95%					
Net Weight	kg	L1	3~10	0.53	1.55	4.37	9.56	17.7	28.75
		L2	15~100	0.7	2	5.52	11.21	22.3	37.8
Operating Temp	℃	L1，L2	3~100	- 10℃ ～ + 90℃					
Lubrication		L1，L2	3~100	Lithium Complex Synthetic Lubrication					
Mounting Position		L1，L2	3~100	All Directions					
Degree of Protection		L1，L2	3~100	IP65					
Running Noise	dBA	L1，L2	3~100	≦65	≦65	≦65	≦68	≦68	≦70

1.Above relative specifications of each model most are measured on 5 : 1 gear ratio
2.Ratios : I = Nin / Nout
3.Backlash : Measured on 2% of nominal output torque
4.Max. Radial and Axial Load : Applied to the output shaft center, and 50% of duty time and at 100 rpm
5.Duty Cycle < 60%, Average Lifetime = List Value; Duty Cycle ≧ 60%, Average Lifetime < 50% List value
6.Noise Level : Numeric measured on idle running in 1m distance, and at nominal input speed

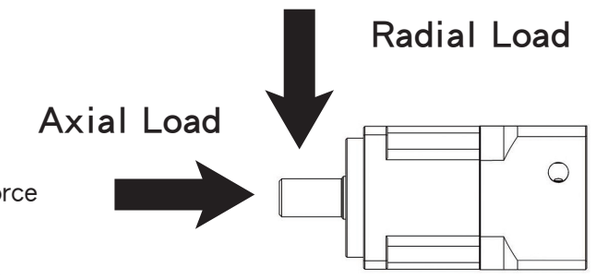
High Precision Planetary Gear Reducers

Permitted Radial Load :

The force exerts perpendicular to output shaft

Permitted Axial Load :

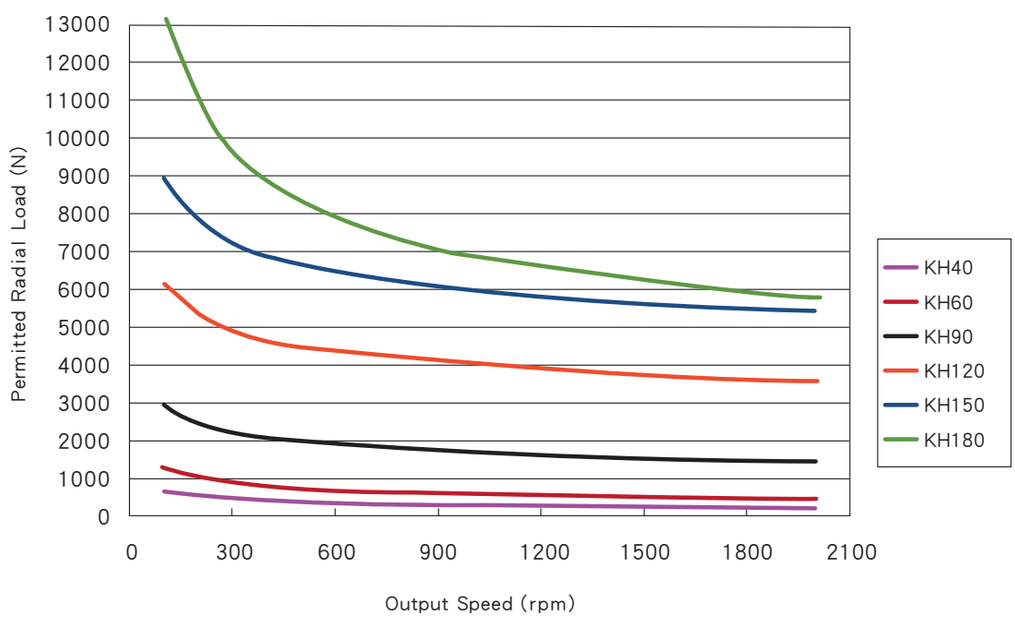
The force exerts parallel to output shaft



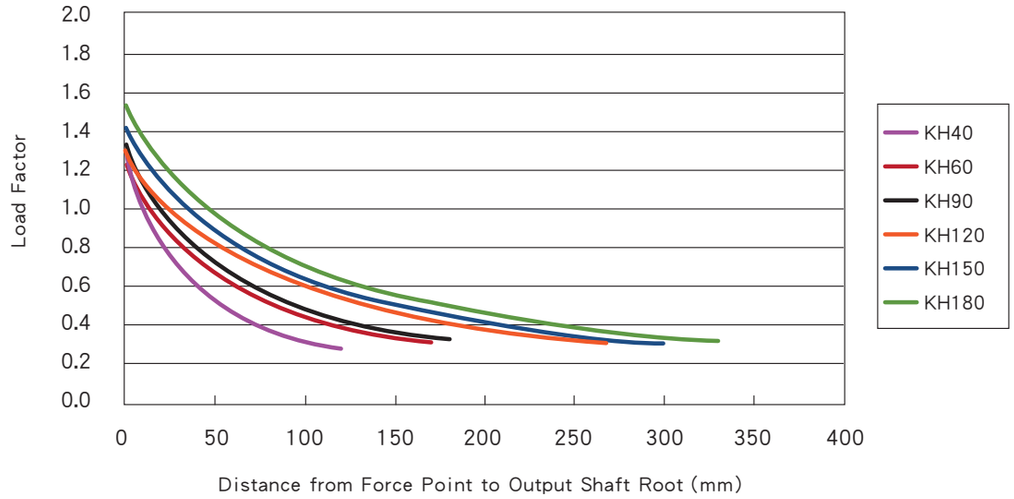
The radial/axial loads are relate to both speed and force point on output shaft.

a: if the output shaft run faster, the radial/axial loads become lower.
b: if the force point get farther from the shaft root, the radial/axial loads get lower.

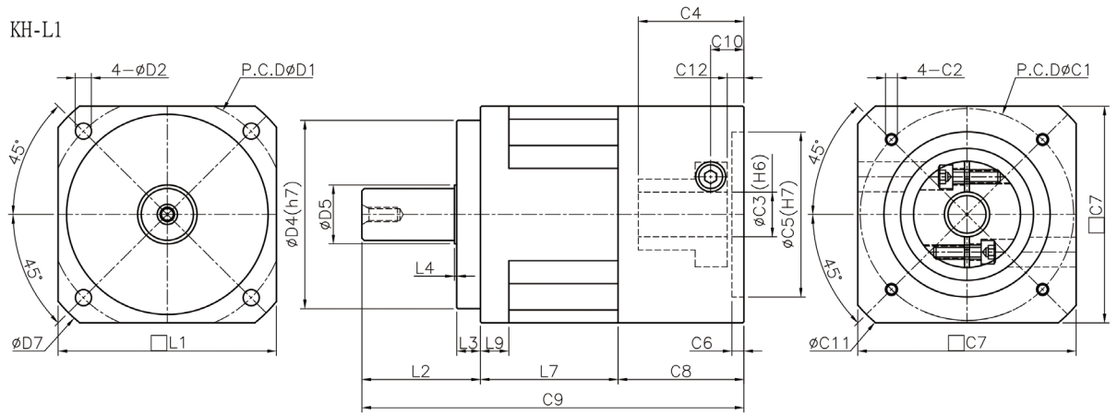
Radial Load Chart (KH)

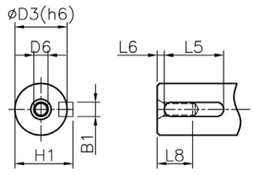


Load Factor Chart (KH)

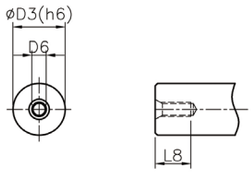


KH-L1





Shaft Option 1(K)



Shaft Option 2(S)

Symbol & Size		KH40-L1	KH60-L1	KH90-L1	KH120-L1	KH150-L1	KH180-L1
D	D1	50	70	100	130	165	215
	D2	3.5	5.5	6.8	8.7	11	13
	D3	13	16	22	32	38 (40)	50 (55)
	D4	35	50	80	110	130	160
	D5	15	18	25	35	40 (45)	60
	D6	M4×0.7P	M5×0.8P	M6×1.0P	M8×1.25P	M12×1.75P	M12×1.75P
	D7	55	80	118	158	190	245
L	L1	42	60	92	120	142	182
	L2	25.5	35.5	50	65	86	105
	L3	5.5	7.5	10	12	15	20
	L4	0.5	1.5	1	1	3	2
	L5	15	20	25	40	45	70
	L6	2	3	5	3	5	6
	L7	33.5	49	58	69	79	85.5
	L8	8	12	15	20	32	42
	L9	7	10	12	15	12	15
C	C1	46	70	90	145	200	200
	C2	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M12X1.75P
	C3	5~8	6~14	14~19	16~24	19~42	19~42
	C4	28	33	39	65	88	85
	C5	30	50	70	110	114.3	114.3
	C6	4	4	5	7	6	10
	C7	42	60	92	122	176	182
	C8	34	39.5	49	78	97.5	100
	C9	93	124	157	212	262.5	290.5
	C10	12.5	13	15	28.5	38.5	33.5
	C11	56	80	120	161.4	230	230
	C12	7.5	7	7	20	26.5	17
B	B1	$4^{-0.01}_{-0.03}$	$5^{-0.01}_{-0.03}$	$6^{-0.01}_{-0.03}$	$10^{-0.02}_{-0.05}$	$10^{-0.02}_{-0.05}$ (12)	$14^{-0.02}_{-0.06}$ (16)
H	H1	14.5	18	24.5	35	41 (43)	53.5 (59)

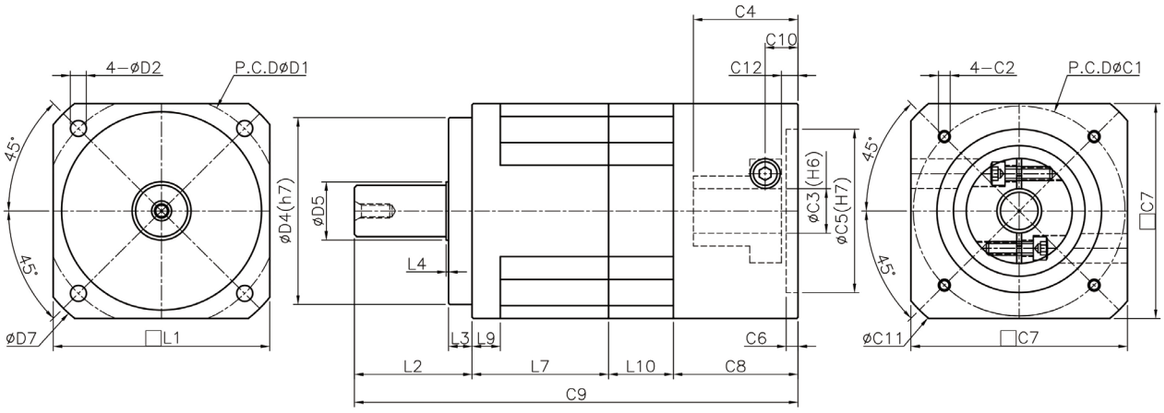
C1~C12 are standard metric motor connect flange dimensions, size may change by motor

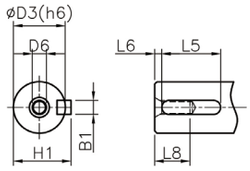
( ) Optional size for output shaft

KH

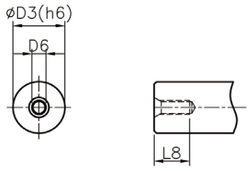
High Precision Planetary Gear Reducers

/ Drawing & Dimension





Shaft Option 1(K)

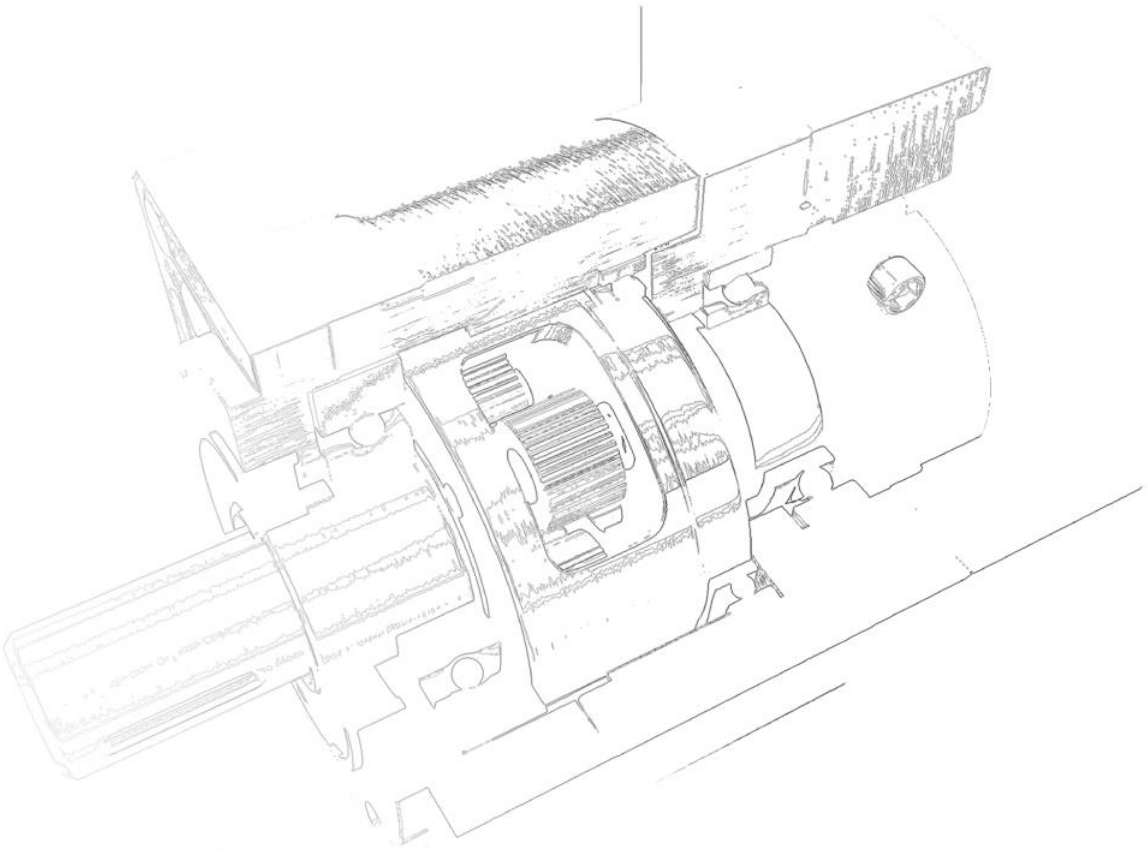


Shaft Option 2(S)

(Unit：mm)

Symbol & Size		KH40-L2	KH60-L2	KH90-L2	KH120-L2	KH150-L2	KH180-L2
D	D1	50	70	100	130	165	215
	D2	3.5	5.5	6.8	8.7	11	13
	D3	13	16	22	32	38 (40)	50 (55)
	D4	35	50	80	110	130	160
	D5	15	18	25	35	40 (45)	60
	D6	M4×0.7P	M5×0.8P	M6×1.0P	M8×1.25P	M12×1.75P	M12×1.75P
	D7	55	80	118	158	190	245
L	L1	42	60	92	120	142	182
	L2	25.5	35.5	50	65	86	105
	L3	5.5	7.5	10	12	15	20
	L4	0.5	1.5	1	1	3	2
	L5	15	20	25	40	45	70
	L6	2	3	5	3	5	6
	L7	33.5	49	58	69	79	85.5
	L8	8	12	15	20	32	42
	L9	7	10	12	15	12	15
	L10	19	16	27.5	33.2	46	51.5
C	C1	46	70	90	145	200	200
	C2	M4x0.7P	M5x0.8P	M6x1.0P	M8x1.25P	M12x1.75P	M12X1.75P
	C3	5~8	6~14	14~19	16~24	19~42	19~42
	C4	28	33	39	65	88	85
	C5	30	50	70	110	114.3	114.3
	C6	4	4	5	7	6	10
	C7	42	60	92	122	176	182
	C8	34	39.5	49	78	97.5	100
	C9	112	140	184.5	245.2	308.5	342
	C10	12.5	13	15	28.5	38.5	33.5
	C11	56	80	120	161.4	230	230
	C12	7.5	7	7	20	26.5	17
B	B1	4	$5^{-0.01}_{-0.03}$	$6^{-0.01}_{-0.03}$	$10^{-0.02}_{-0.05}$	$10^{-0.02}_{-0.05}$ (12)	$14^{-0.02}_{-0.06}$ (16)
H	H1	14.5	18	24.5	35	41 (43)	53.5 (59)

C1~C12 are standard metric motor connect flange dimensions, actual size may change by motor
( ) Optional size for output shaft



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http://www.kojin-precision.com

KOJIN PRECISION

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