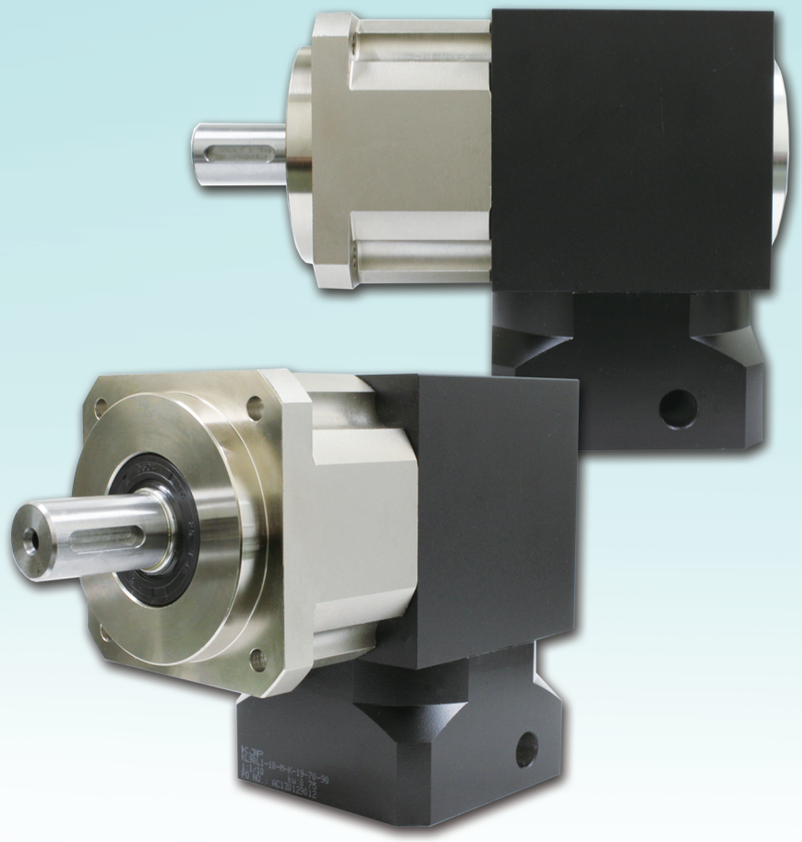
KHL Series

High Precision & Low Backlash Spiral Bevel Planetary Gearboxes.



KHL

High Precision Planetary Gearbox Reducer / Application & Components Features

Application

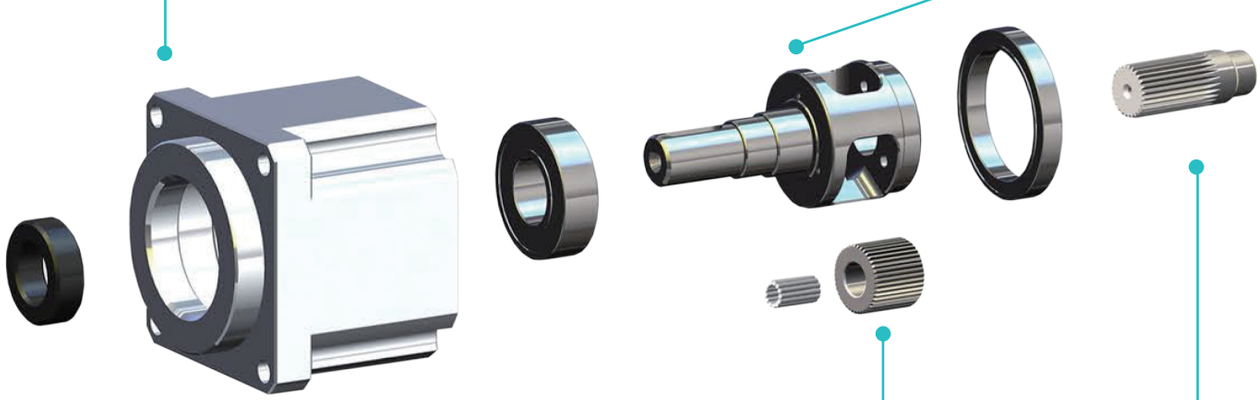
KHL series can be applied to precision positioning or reciprocating motion device and can output stably to automated equipment which is operating in minimum vibratility.
Such as printing industry, pipe bender, spring machine industry, LCD inspection equipment, connected ball screw transmission mechanism... 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.
- ▲ With high corrosion resistance.

Output Shaft

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



Planetary 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.
- ▲ Needle roller without cage internal the gear for higher abrasion resistance and strength.

Sun Gear

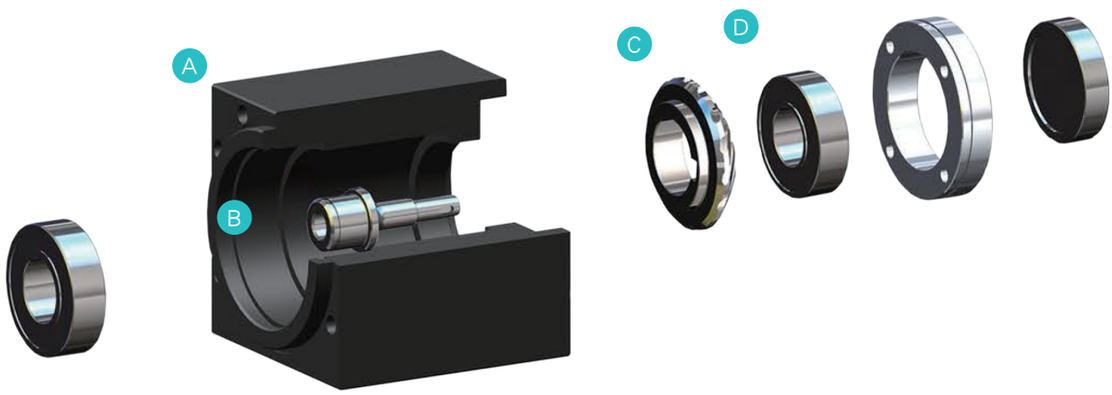
- ▲ Made by Ni-Cr-Mo alloy steel and carburizing process on surface for the high abrasion and impact resistance.
- ▲ Tooth skiving to enhance gear precision and to lower noise.

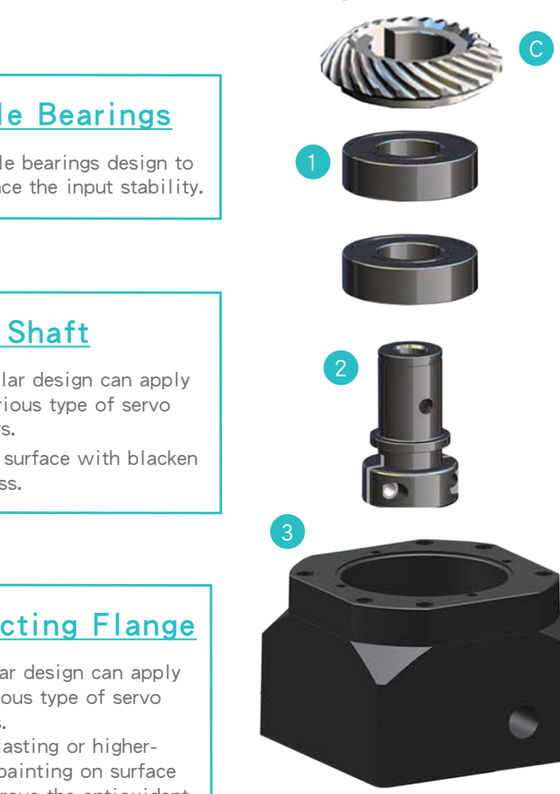
A Steering Gearbox

- Specific process for the gearbox to ensure the alignment of rotating shaft and perpendicularity of input shaft.
- Using Aluminum alloy for the gearbox to slash the weight and sandblasting on surface to improve the antioxidant capacity.

B Rotating Shaft

- Made by Cr-Mo alloy steel.





1 Double Bearings

- Double bearings design to enhance the input stability.

C Helical Bevel Gear

- Made by Ni-Cr-Mo alloy steel with carburizing process on surface to enhance the abrasion and impact resistance.

2 Input Shaft

- Modular design can apply to various type of servo motors.
- Shaft surface with blacken process.

D Ball Bearing

- Using the ball bearing instead of needle bearing on the simple beam for the better loading capacity and the longer life.

3 Connecting Flange

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

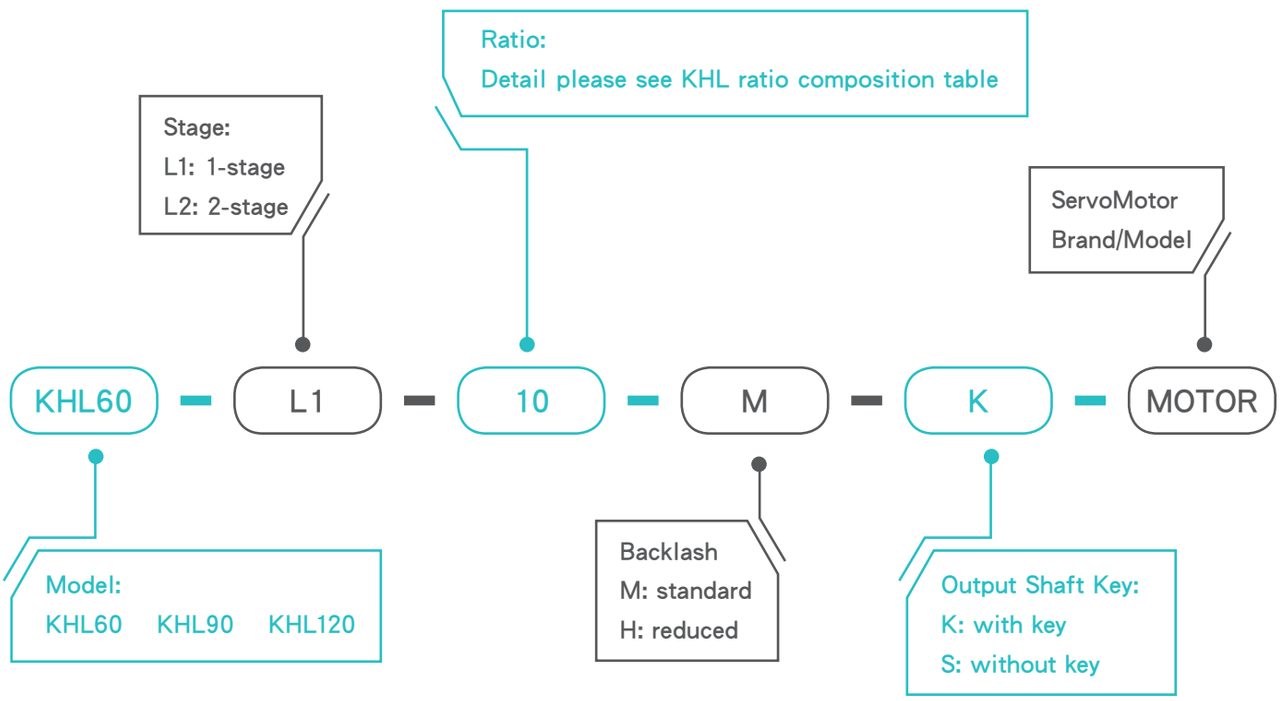
A — D Patented Structure

- The adjustable structure of helical bevel gear can adjust bearing and bevel gear's backlash at the same time.
  Patent no. : M441754

High Precision Planetary Gearbox Reducer

/ Model Code / Ratio Composition
/ Moment of Inertia Table

Reducer Model(KHL)



KHL Ratio Composition Table

	Ratio	
Model	Ratio of 1 Stage (L1)	Ratio of 2 Stages (L2)
KHL60	3，4，5，6，7，8，9，10	14，20，25，30，35，40，45，50，60，70，80，90，100，120，140，180，200
KHL90	3，4，5，6，7，8，9，10	14，20，25，30，35，40，45，50，60，70，80，90，100，120，140，180，200
KHL120	3，4，5，6，7，8，9，10	14，20，25，30，35，40，45，50，60，70，80，90，100，120，140，180，200

KHL Reducer Moment of Inertia Table

Model	Gear Ratio	Moment of inertia J1 kg*cm^2
KHL60	1：1	0.11
	1：2	0.10
KHL90	1：1	1.31
	1：2	1.15
KHL120	1：1	2.91
	1：2	2.48

KHL Series Technical Specifications

Specification	Unit	Stage	Ratio	KHL60	KHL90	KHL120
Reducer Nominal Output Torque T_{2N}	Nm	L1	3	34	116	228
			4	35	120	236
			5	34	117	229
			6	33	113	222
			7	33	110	214
			8	35	100	236
			9	31	107	203
			10	29	94	184
			14	33	110	214
			20	29	94	184
		L2	25	34	117	229
			30	34	113	228
			35	34	117	229
			40	35	120	236
			45	31	107	203
			50	34	117	229
			60	33	113	222
			70	33	110	214
			80	35	100	236
			90	31	107	203
			100	29	94	184
			120	33	113	222
			140	29	94	184
			180	31	107	203
			200	29	94	184
Emergency Stop Torque	Nm	L1 , L2	3~200	3 Times of Nominal Output Torque		
Nominal Input Speed n_{1N}	rpm	L1 , L2	3~200	3 , 000	3 , 000	2 , 500
Max. Input Speed n_{1B}	rpm	L1 , L2	3~200	6 , 000	6 , 000	5 , 000
Reduced Backlash H	arcmin	L1	3~20	≦ 4	≦ 4	≦ 4
		L2	25~200	≦ 7	≦ 7	≦ 7
Standard Backlash M	arcmin	L1	3~20	≦ 6	≦ 6	≦ 6
		L2	25~200	≦ 9	≦ 9	≦ 9
Torsional Rigidity	Nm/arcmin	L1 , L2	3~200	4	11	35
Max. Radial Load F_{rB}	N	L1 , L2	3~200	1 , 328	2 , 340	4 , 000
Max. Axial Load F_{aB}	N	L1 , L2	3~200	664	1 , 170	2 , 000
Warranty	M	L1 , L2	3~200	18 Months (Under Normal Usage)		
Average Operation Time	Hr	L1 , L2	3~100	20 , 000		
Efficiency of Full Loading η	%	L1	3~20	≧ 94%		
		L2	25~200	≧ 91%		
Net Weight	kg	L1	3~20	2.26	6.85	13.5
		L2	25~200	2.56	8.05	15.88
Operating Temp	℃	L1 , L2	3~200	-10℃ ~+90℃		
Lubrication		L1 , L2	3~200	Lithium Complex Synthetic Lubrication		
Mounting Position		L1 , L2	3~200	All Directions		
Degree of Protection		L1 , L2	3~200	IP65		
Running Noise	dBA	L1 , L2	3~200	≦ 68	≦ 70	≦ 70

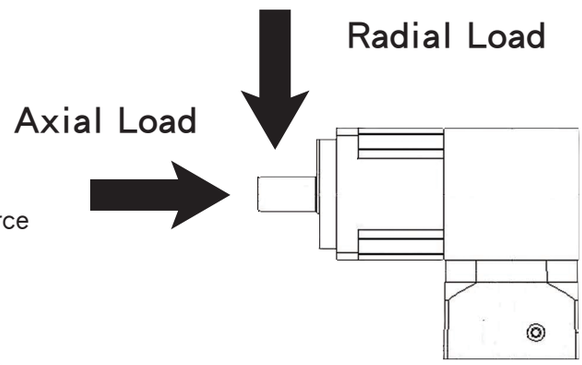
1.Above relative specifications of each model most are measured on 5 : 1 gear ratio
2.Ratios : I = Nin / Nout
3.Backlash : Measured on 2% of nominal output torque
4.Max. Radial and Axial Load : Applied to the output shaft center, and 50% of duty time and at 100 rpm
5.Duty Cycle < 60%, Average Lifetime = 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 Gearbox Reducer

/ Permitted Radial & Axial Load Diagram

Permitted Radial Load :
The force exerts perpendicular to output shaft

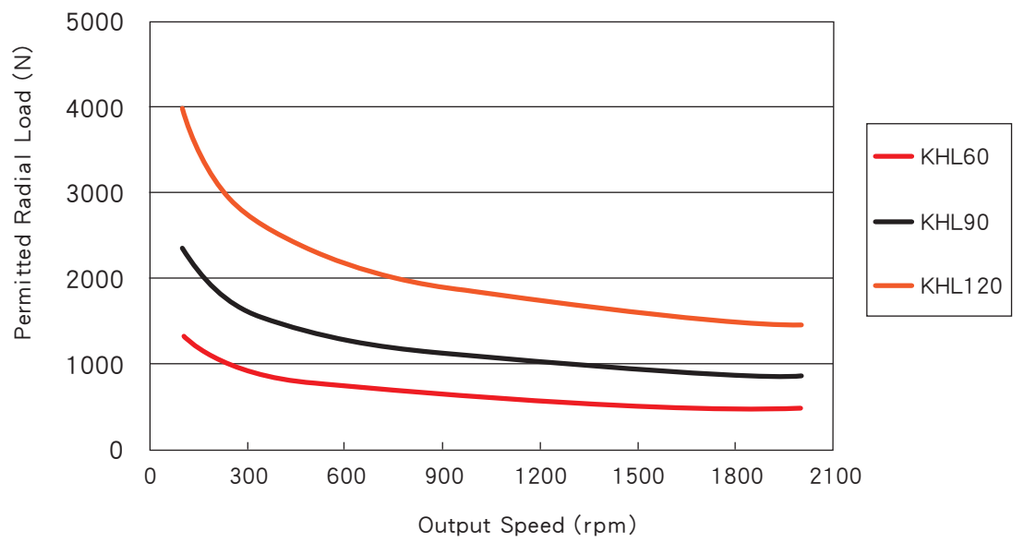
Permitted Axial Load :
The force exerts parallel to output shaft



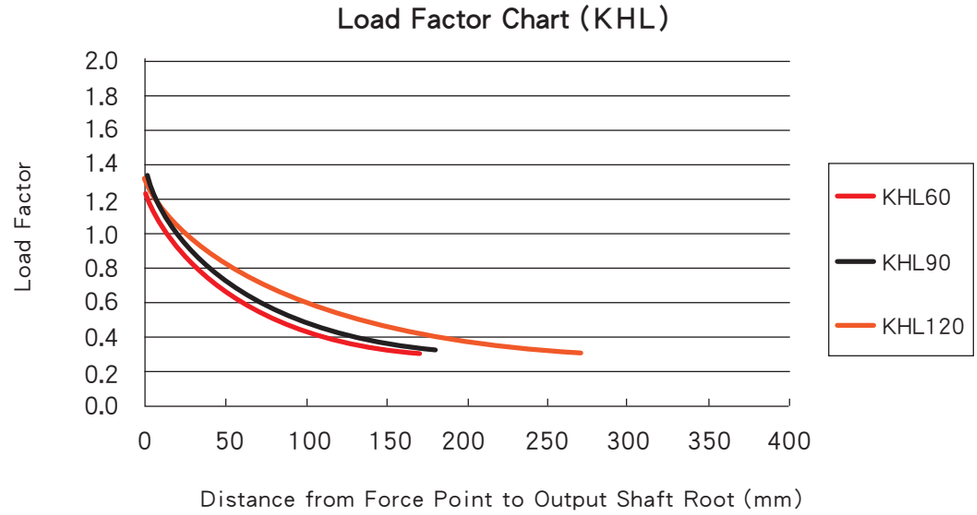
The radial/axial loads are relate to both speed and force point on output shaft.

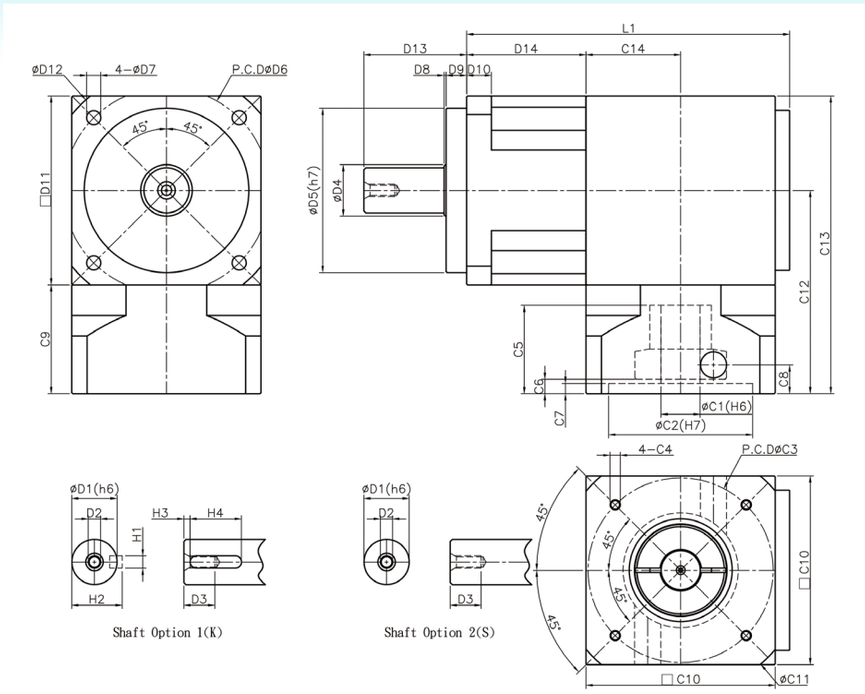
a: if the output shaft run faster, the radial/axial loads become lower.
b: if the force point get farther from the shaft root, the radial/axial loads get lower.

Radial Load Chart (KHL)



Load Factor Chart (KHL)





(Unit : mm)

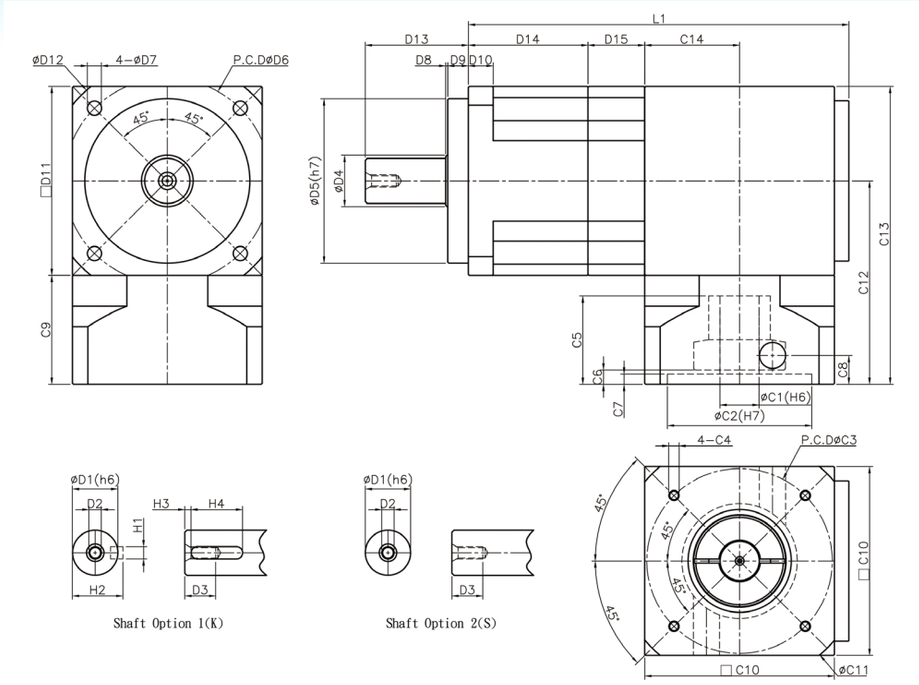
Symbol & Size		KHL60-L1	KHL90-L1	KHL120-L1
C	C1	6~14	14~19	16~24
	C2	50	70	110
	C3	70	90	145
	C4	M5x0.8P	M6x1.0P	M8x1.25P
	C5	35	40	65
	C6	7	7	20
	C7	4	5	7
	C8	13	15	28.5
	C9	39.5	49	78
	C10	60	92	122
	C11	80	120	161.4
	C12	69.5	95	138
	C13	99.5	141	198
	C14	31	46	60
D	D1	16	22	32
	D2	M5x0.8P	M6x1.0P	M8x1.25P
	D3	12	15	20
	D4	18	25	35
	D5	50	80	110
	D6	70	100	130
	D7	5.5	6.8	8.7
	D8	1.5	1	1
	D9	7.5	10	12
	D10	10	12	15
	D11	60	92	120
	D12	80	118	158
	D13	35.5	50	65
	D14	49	58	69
	D15			
H	H1	5	6	10
	H2	18	24.5	35
	H3	3	5	3
	H4	20	25	40
L	L1	114	157	194

C1~C11 are standard metric motor connect flange dimensions, size may change by motor

KHL

High Precision Planetary Gearbox Reducer

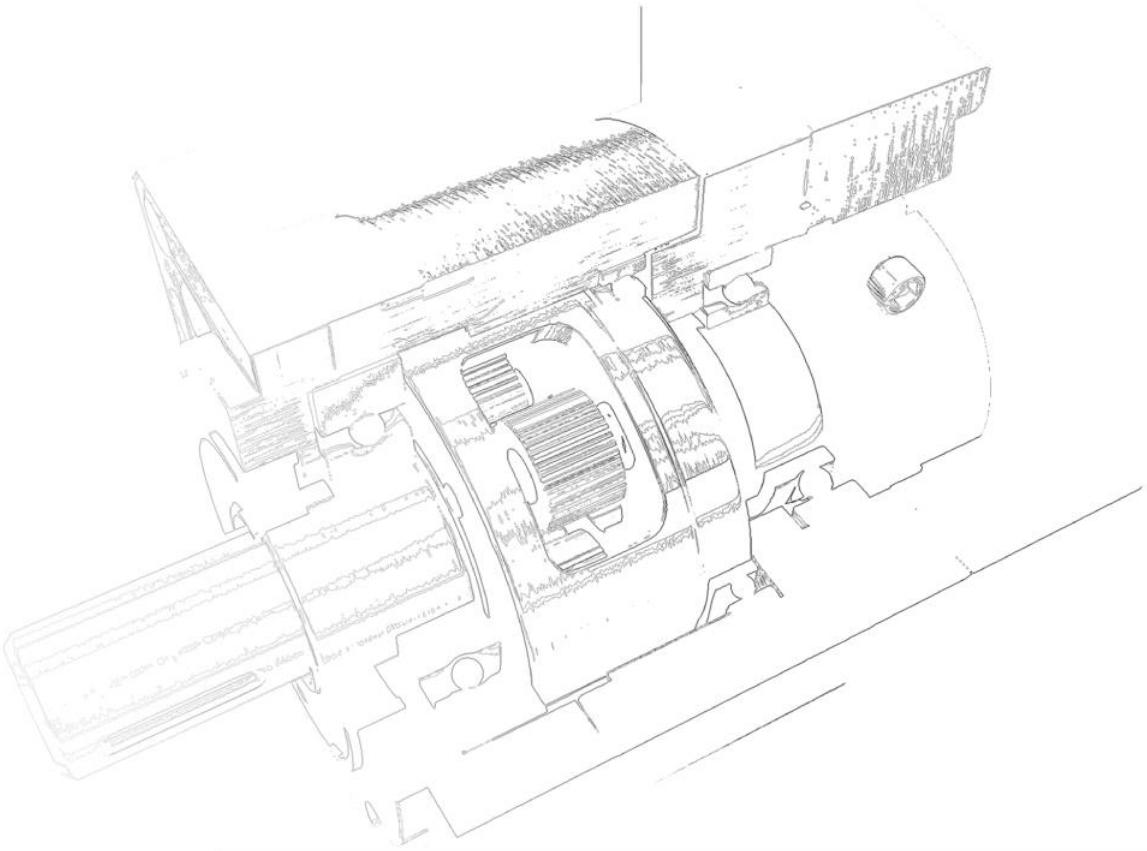
/ Drawing & Dimension



(Unit：mm)

Symbol & Size		KHL60-L2	KHL90-L2	KHL120-L2
C	C1	6~14	14~19	16~24
	C2	50	70	110
	C3	70	90	145
	C4	M5x0.8P	M6x1.0P	M8x1.25P
	C5	35	40	65
	C6	7	7	20
	C7	4	5	7
	C8	13	15	28.5
	C9	39.5	49	78
	C10	60	92	122
	C11	80	120	161.4
	C12	69.5	95	138
	C13	99.5	141	198
	C14	31	46	60
D	D1	16	22	32
	D2	M5x0.8P	M6x1.0P	M8x1.25P
	D3	12	15	20
	D4	18	25	35
	D5	50	80	110
	D6	70	100	130
	D7	5.5	6.8	8.7
	D8	1.5	1	1
	D9	7.5	10	12
	D10	10	12	15
	D11	60	92	120
	D12	80	118	158
	D13	35.5	50	65
	D14	49	58	69
	D15	16	27.5	33.2
H	H1	5	6	10
	H2	18	24.5	35
	H3	3	5	3
	H4	20	25	40
L	L1	130	184.5	227.2

C1~C11 are standard metric motor connect flange dimensions, actual size may change by motor



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