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BEVEL GEARBOXES

P.955 **Bevel Gearboxes**

P.971 **Technical Documentation**

BEVEL GEARBOXES

Technical Documentation

BEVEL GEARBOXES

P.960 **1. Bevel Gearboxes K Type**

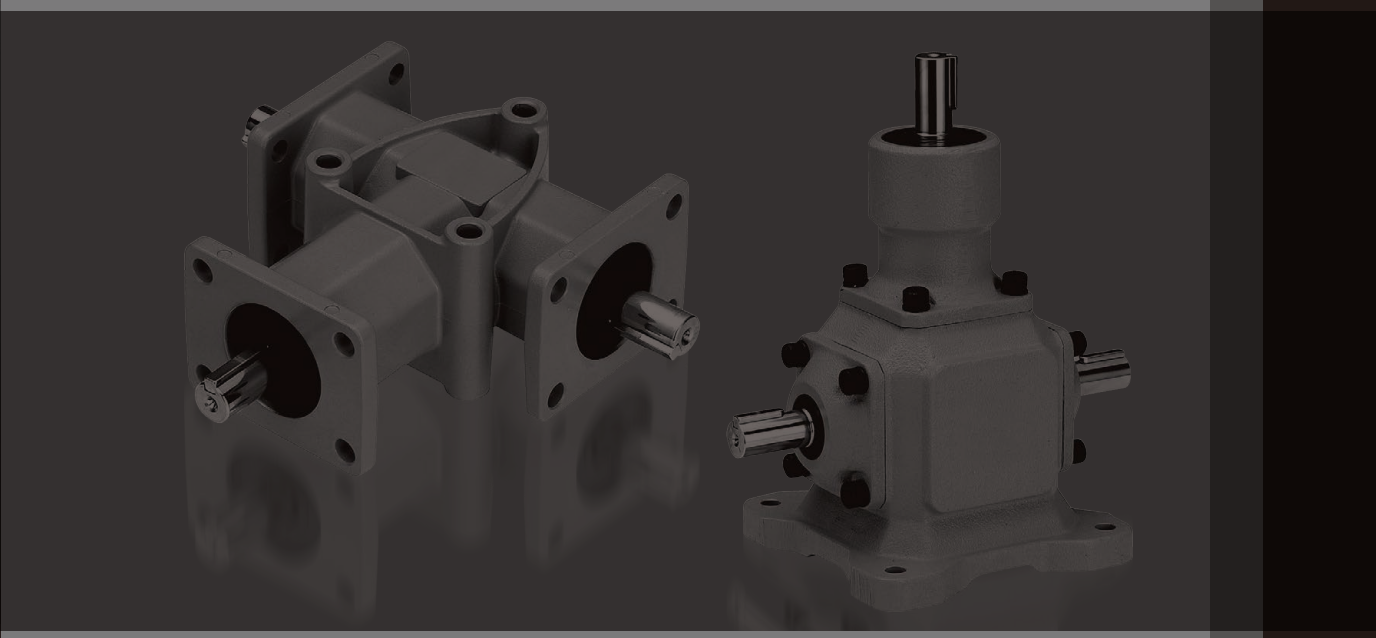
1-1. Performance Tables

1-2. Drawings

P.964 **2. Bevel Gearboxes KN Type**

2-1. Performance Tables

2-2. Drawings



Standard Specification

Part Number		K Type	KN Type
Frame Size		10, 15, 20	19, 25, 32, 40
Reduction Ratio		1:1, 1:2	
Structure	Lubrication Type	Grease Lubrication	Oil Lubrication
	Case Material	Aluminum	Cast Iron
	Internal Gear	Spiral Bevel Gear	
Paint	Paint Color	Gray	
Mounting Direction		No limitation	Horizontal Type, Vertical Type (Note 1)
Ambient Conditions	Ambient Temperature	-10 °C to 40 °C	
	Ambient Humidity	80 % max	
	Altitude	1,000 m max	
	Installation Environment	A place free from corrosive gas, explosive gas, and/or vapor. Well ventilated place with no dust.	
	Installation Place	Indoors	

Note 1: For the shaft arrangements and shaft arrangement codes of horizontal and vertical types, please refer to page 958.

Model and Type Codes

K Type

Type Code	Type		Frame Size and Output Shaft Diameter		Reduction Ratio
K	B	–	10	–	1
K	C	–	15	–	2
①	②		③		④

①Type Code	K	: K Type
②Type	B	: Y-axis one direction
	C	: Y-axis two directions
③Frame Size and Output Shaft Diameter	10	: Ø10
	15	: Ø15
	20	: Ø20
④Reduction Ratio	1	: 1/1
	2	: 1/2 (reduction from X-axis to Y-axis)

KN Type

Type Code	Type		Frame Size and Output Shaft Diameter		Reduction Ratio	Shaft Arrangement Code
KN	B	–	19	–	1	HH1043
KN	C	–	32	–	2	HU2344
①	②		③		④	⑤

①Type Code	KN	: KN Type
②Type	B	: Y-axis one direction
	C	: Y-axis two directions
③Frame Size and Output Shaft Diameter	19	: Ø19
	25	: Ø25
	32	: Ø32
	40	: Ø40
④Reduction Ratio	1	: 1/1
	2	: 1/2 (reduction from X-axis to Y-axis)
⑤Shaft Arrangement Code	Shaft Arrangement Option Code For details, please refer to the list of shaft arrangements on page 958.	

■ Lubrication

The specified amount of lubricant is sealed in each bevel gearbox before shipment from our factory.

Model	Lubricant Type		Approx. Amount of Lubricant	Paint Color	Key Dimensions
K-10 Model	Grease	Class NLGI-0 containing Li-based extreme pressure additive	10 g	Gray	JIS key adopted JIS B 1301-1996 (plain form)
K-15 Model			30 g		
K-20 Model			50 g		
KN-19 Model	Oil	JIS Grade 2 industrial gear oil ISO VG150	0.3 L	Gray	JIS key adopted JIS B 1301-1996 (plain form)
KN-25 Model			0.7 L		
KN-32 Model			1.0 L		
KN-40 Model			1.5 L		

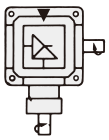
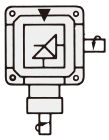
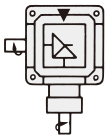
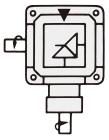
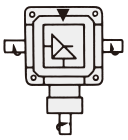
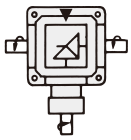
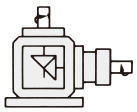
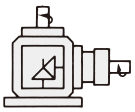
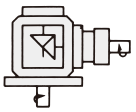
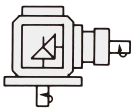
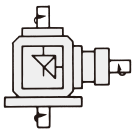
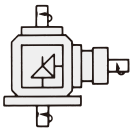
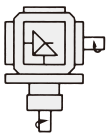
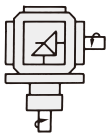
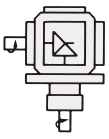
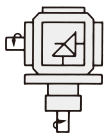
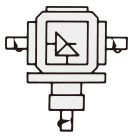
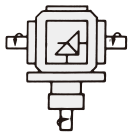
KN Model Shaft Arrangement Code

■ Shaft Arrangements and Shaft Arrangement Codes

The KN Type offers 24 standardized shaft arrangements, allowing flexible mounting according to output shaft direction and rotation.
Be sure to consider not only the type code but also a shaft arrangement.

[Notes]

- Each figure shows a mounting base and horizontal mounting (floor mounting).
- The rotational direction indicated by the arrow shows the rotation relationship between the shafts and does not limit the rotational direction. The shafts can rotate in the CW and CCW directions.
- The ▼ mark indicates the face provided with the oil filler port and the drain plug in horizontal mounting (floor mounting). In a figure without the mark, they are provided on the back face. (Standard specification)
- The bearing lubrication type is different in floor mounting in which the input shaft (X-axis) faces upward, except for “HU Type” shaft arrangements. Please inform us of the mounting method when placing an order.
- For use in mounting patterns other than mounting on a horizontal face, refer to page 977.

	KNB Model				KNC Model	
Horizontal Type (Top View)	 HH1043	 HH1044	 HH1033	 HH1034	 HH1343	 HH1344
Vertical Type (Front View)	 HH1022	 HH1025	 HH1052	 HH1055	 HH1252	 HH1255
	 HU2043	 HU2044	 HU2033	 HU2034	 HU2343	 HU2344
	 HD5043	 HD5044	 HD5033	 HD5034	 HD5343	 HD5344

MEMO

1. Bevel Gearboxes K Type

1-1. Performance Tables

[Notes]

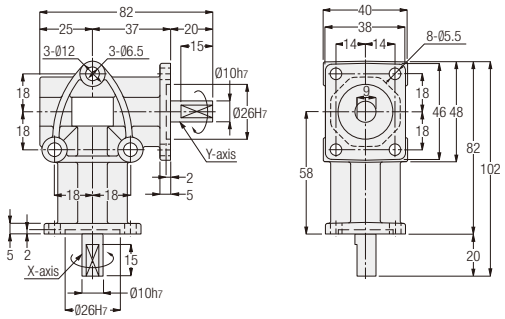
- Be sure to use the bevel gearbox within the specified tolerances. Bevel gear boxes with a reduction ratio of 1:2 will be decelerated to the Y-axis.
- The values shown in this performance table are those when the service factor is 1. To use a bevel gearbox under other conditions, refer to the service factors shown in [Table-1] on page 972.
- The O.H.L. (overhung load) means the allowable load that may be applied to the middle area of the shaft length. To use a bevel gearbox under other conditions, refer to the coefficients K1 and K2 shown in [Table-2 and Table-3] on page 972.
- When a bevel gearbox type with a reduction ratio of 1:2 is used at increased speed (speed-up from the Y-axis to the X-axis), the X-axis torque will become 1/2 of the value (Y-axis torque) shown in the performance table.
- The Y-axis torque of the KC Type is the total value of the right and left shafts.
- The Y-axis O.H.L. of the KC Type is the total value of the right and left shafts.

Reduction Ratio	Part Number	Option Code	X-axis Rotational Speed (r/min)												Allowable Thrust Load (N) {kgf}	
			50	100	200	300	400	600	900	1200	1500	1800	2500	3600	X-axis	Y-axis
1 : 1	KB-101 KC-101	Allowable Transmission Capacity (kW)	0.01	0.02	0.05	0.07	0.09	0.14	0.20	0.26	0.31	0.35	0.38	0.44	59 {6}	69 {7}
		Allowable X/Y-axis Torque (N·m) {kgf·m}	2.35 {0.24}	2.35 {0.24}	2.25 {0.23}	2.25 {0.23}	2.16 {0.22}	2.16 {0.22}	2.06 {0.21}	2.06 {0.21}	1.96 {0.20}	1.86 {0.19}	1.47 {0.15}	1.18 {0.12}		
		Allowable X-axis O.H.L. (N) {kgf}	78 {8}	78 {8}	78 {8}	78 {8}	69 {7}	69 {7}	69 {7}	69 {7}	69 {7}	59 {6}	49 {5}	39 {4}		
		Allowable Y-axis O.H.L. (N) {kgf}	127 {13}	127 {13}	118 {12}	118 {12}	118 {12}	118 {12}	108 {11}	108 {11}	108 {11}	98 {10}	78 {8}	59 {6}		
	KB-151 KC-151	Allowable Transmission Capacity (kW)	0.05	0.09	0.18	0.27	0.35	0.51	0.75	0.96	1.16	1.30	1.44	1.66	98 {10}	118 {12}
		Allowable X/Y-axis Torque (N·m) {kgf·m}	8.82 {0.90}	8.82 {0.90}	8.62 {0.88}	8.53 {0.87}	8.33 {0.85}	8.13 {0.83}	7.94 {0.81}	7.64 {0.78}	7.35 {0.75}	6.86 {0.70}	5.49 {0.56}	4.41 {0.45}		
		Allowable X-axis O.H.L. (N) {kgf}	255 {26}	255 {26}	255 {26}	245 {25}	245 {25}	235 {24}	225 {23}	216 {22}	216 {22}	186 {19}	157 {16}	127 {13}		
		Allowable Y-axis O.H.L. (N) {kgf}	294 {30}	294 {30}	284 {29}	284 {29}	274 {28}	265 {27}	265 {27}	255 {26}	245 {25}	216 {22}	176 {18}	147 {15}		
	KB-201 KC-201	Allowable Transmission Capacity (kW)	0.09	0.18	0.36	0.52	0.68	0.95	1.38	1.78	2.15	2.50	2.55	2.95	196 {20}	274 {28}
		Allowable X/Y-axis Torque (N·m) {kgf·m}	17.6 {1.80}	17.6 {1.80}	17.2 {1.75}	16.7 {1.70}	16.2 {1.65}	15.2 {1.55}	14.7 {1.50}	14.2 {1.45}	13.7 {1.40}	13.2 {1.35}	9.80 {1.00}	7.84 {0.80}		
		Allowable X-axis O.H.L. (N) {kgf}	353 {36}	353 {36}	343 {35}	333 {34}	333 {34}	323 {33}	314 {32}	304 {31}	294 {30}	265 {27}	216 {22}	176 {18}		
		Allowable Y-axis O.H.L. (N) {kgf}	529 {54}	529 {54}	519 {53}	510 {52}	500 {51}	490 {50}	470 {48}	451 {46}	441 {45}	392 {40}	314 {32}	255 {26}		
1 : 2	KB-102 KC-102	Allowable Transmission Capacity (kW)	0.005	0.01	0.02	0.03	0.04	0.06	0.09	0.12	0.14	0.16	0.17	0.20	59 {6}	69 {7}
		Allowable Y-axis Torque (N·m) {kgf·m}	2.06 {0.21}	2.06 {0.21}	2.06 {0.21}	1.96 {0.20}	1.96 {0.20}	1.96 {0.20}	1.86 {0.19}	1.86 {0.19}	1.76 {0.18}	1.67 {0.17}	1.27 {0.13}	1.08 {0.11}		
		Allowable X-axis O.H.L. (N) {kgf}	88 {9}	88 {9}	88 {9}	88 {9}	88 {9}	78 {8}	78 {8}	78 {8}	78 {8}	69 {7}	59 {6}	49 {5}		
		Allowable Y-axis O.H.L. (N) {kgf}	137 {14}	137 {14}	137 {14}	127 {13}	127 {13}	127 {13}	127 {13}	118 {12}	118 {12}	108 {11}	88 {9}	69 {7}		
	KB-152 KC-152	Allowable Transmission Capacity (kW)	0.02	0.04	0.08	0.13	0.17	0.25	0.36	0.46	0.55	0.62	0.69	0.80	98 {10}	118 {12}
		Allowable Y-axis Torque (N·m) {kgf·m}	8.43 {0.86}	8.43 {0.86}	8.23 {0.84}	8.13 {0.83}	8.04 {0.82}	7.84 {0.80}	7.55 {0.77}	7.25 {0.74}	7.06 {0.72}	6.57 {0.67}	5.29 {0.54}	4.21 {0.43}		
		Allowable X-axis O.H.L. (N) {kgf}	255 {26}	255 {26}	255 {26}	245 {25}	245 {25}	235 {24}	225 {23}	216 {22}	216 {22}	186 {19}	157 {16}	127 {13}		
		Allowable Y-axis O.H.L. (N) {kgf}	294 {30}	294 {30}	284 {29}	284 {29}	274 {28}	265 {27}	265 {27}	255 {26}	245 {25}	216 {22}	176 {18}	147 {15}		
	KB-202 KC-202	Allowable Transmission Capacity (kW)	0.05	0.10	0.19	0.28	0.37	0.53	0.77	0.99	1.15	1.31	1.40	1.57	196 {20}	274 {28}
		Allowable Y-axis Torque (N·m) {kgf·m}	19.6 {2.00}	19.6 {2.00}	18.6 {1.90}	18.1 {1.85}	17.6 {1.80}	17.0 {1.73}	16.4 {1.67}	15.7 {1.60}	14.7 {1.50}	13.9 {1.42}	10.8 {1.10}	8.33 {0.85}		
		Allowable X-axis O.H.L. (N) {kgf}	372 {38}	372 {38}	363 {37}	363 {37}	353 {36}	343 {35}	333 {34}	323 {33}	314 {32}	274 {28}	235 {24}	186 {19}		
		Allowable Y-axis O.H.L. (N) {kgf}	588 {60}	588 {60}	578 {59}	568 {58}	559 {57}	539 {55}	529 {54}	510 {52}	490 {50}	441 {45}	363 {37}	294 {30}		

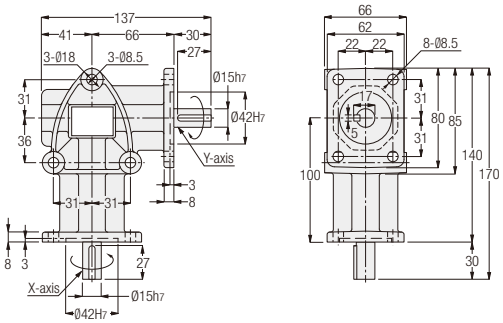
1-2. Drawings

KB Type

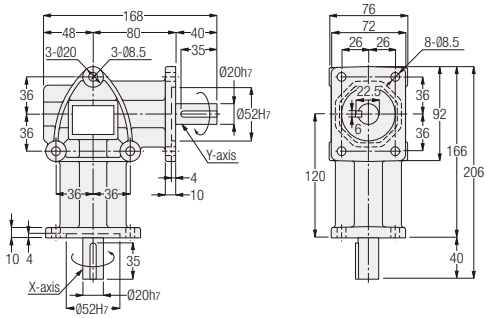
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<Figure 2>



<Figure 3>

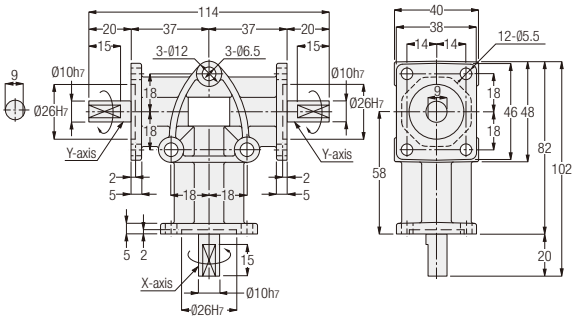


Part Number	Figure Number	Approx. Weight (kg)
KB-101	1	0.4
KB-102	1	0.4
KB-151	2	1.8
KB-152	2	1.8
KB-201	3	3.1
KB-202	3	3.1

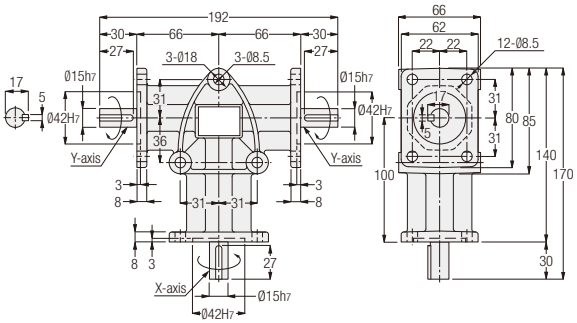
Note 1: The rotational directions indicated by the arrows show the rotation relationship between the shafts and do not limit the rotational directions. The shafts can rotate in the CW and CCW directions.
Note 2: In the standard rotation relationship, the X-axis rotates in the CW direction, whereas the Y-axis rotates in the CCW direction.
Note 3: The phase of the key groove of the X-axis and that of the Y-axis do not always match.

KC Type

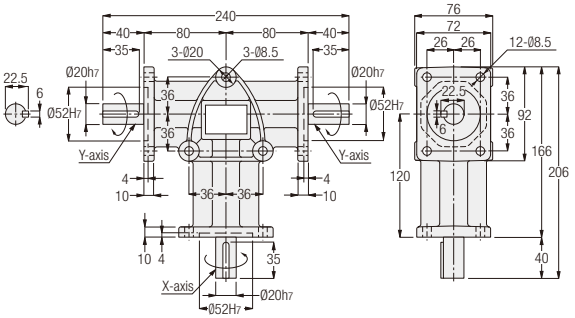
<Figure 1>



<Figure 2>



<Figure 3>



Part Number	Figure Number	Approx. Weight (kg)
KC-101	1	0.5
KC-102	1	0.5
KC-151	2	2.2
KC-152	2	2.2
KC-201	3	3.4
KC-202	3	3.4

Note 1: The rotational directions indicated by the arrows show the rotation relationship between the shafts and do not limit the rotational directions. The shafts can rotate in the CW and CCW directions.
Note 2: In the standard rotation relationship, the X-axis rotates in the CW direction, whereas the Y-axis rotates in the CCW direction.
Note 3: The phase of the key groove of the X-axis and that of the Y-axis do not always match.

MEMO

2. Bevel Gearboxes KN Type

2-1. Performance Tables

[Notes]

- Be sure to use the bevel gearbox within the specified tolerances. Bevel gear boxes with a reduction ratio of 1:2 will be decelerated to the Y-axis.
- The values shown in this performance table are those when the service factor is 1. To use a bevel gearbox under other conditions, refer to the service factors shown in [Table-1] on page 972.
- The O.H.L. (overhung load) means the allowable load that may be applied to the middle area of the shaft length. To use a bevel gearbox under other conditions, refer to the coefficients K1 and K2 shown in [Table-2 and Table-3] on page 972.
- When a bevel gearbox type with a reduction ratio of 1:2 is used at increased speed (speed-up from the Y-axis to the X-axis), the X-axis torque will become 1/2 of the value (Y-axis torque) shown in the performance table.
- The Y-axis torque of the KNC Type is the total value of the right and left shafts.
- The Y-axis O.H.L. of the KNC Type is the total value of the right and left shafts.
- The allowable thrust load will become half of each O.H.L. value.

Reduction Ratio	Part Number	Option Code	X-axis Rotational Speed (r/min)												
			20	50	100	200	300	400	600	900	1200	1500	1800	2500	3600
1 : 1	KNB-191 KNC-191	Allowable Transmission Capacity (kW)	0.08	0.20	0.39	0.77	1.15	1.50	2.05	2.67	3.30	3.95	4.40	4.40	4.40
		Allowable X/Y-axis Torque (N·m) {kgf·m}	37.2 {3.8}	37.2 {3.8}	37.2 {3.8}	36.3 {3.7}	36.3 {3.7}	36.3 {3.6}	32.3 {3.3}	28.4 {2.9}	26.5 {2.7}	24.5 {2.5}	23.5 {2.4}	16.7 {1.7}	10.8 {1.1}
		Allowable X-axis O.H.L. (N) {kgf}	1760 {180}	1760 {180}	1760 {180}	1760 {180}	1670 {170}	1620 {165}	1270 {130}	1080 {110}	882 {90}	833 {85}	784 {80}	686 {70}	637 {65}
		Allowable Y-axis O.H.L. (N) {kgf}	1960 {200}	1960 {200}	1960 {200}	1960 {200}	1960 {200}	1810 {185}	1470 {150}	1180 {120}	1030 {105}	980 {100}	931 {95}	784 {80}	735 {75}
1 : 2	KNB-192 KNC-192	Allowable Transmission Capacity (kW)	0.03	0.07	0.14	0.27	0.40	0.53	0.78	1.15	1.50	1.85	2.17	2.20	2.20
		Allowable X/Y-axis Torque (N·m) {kgf·m}	25.5 {2.6}	25.5 {2.6}	25.5 {2.6}	25.5 {2.6}	25.5 {2.6}	24.5 {2.5}	24.5 {2.5}	24.5 {2.5}	23.5 {2.4}	23.5 {2.4}	22.5 {2.3}	16.7 {1.7}	10.8 {1.1}
		Allowable X-axis O.H.L. (N) {kgf}	1180 {120}	1180 {120}	1180 {120}	1180 {120}	1180 {120}	1130 {115}	1130 {115}	1080 {110}	1080 {110}	882 {90}	833 {85}	784 {80}	735 {75}
		Allowable Y-axis O.H.L. (N) {kgf}	1760 {180}	1760 {180}	1760 {180}	1760 {180}	1760 {180}	1720 {175}	1670 {170}	1470 {150}	1270 {130}	1080 {110}	980 {100}	833 {85}	784 {80}
1 : 1	KNB-251 KNC-251	Allowable Transmission Capacity (kW)	0.25	0.62	1.24	2.47	3.68	4.70	6.40	8.60	10.5	12.3	13.8	—	—
		Allowable X/Y-axis Torque (N·m) {kgf·m}	118 {12.0}	118 {12.0}	118 {12.0}	118 {12.0}	116 {11.8}	112 {11.4}	101 {10.3}	91.1 {9.3}	83.3 {8.5}	78.4 {8.0}	73.5 {7.5}	—	—
		Allowable X-axis O.H.L. (N) {kgf}	3920 {400}	3920 {400}	3920 {400}	3920 {400}	3630 {370}	3330 {340}	2940 {300}	2450 {250}	2160 {220}	1960 {200}	1760 {180}	—	—
		Allowable Y-axis O.H.L. (N) {kgf}	4120 {420}	4120 {420}	4120 {420}	4120 {420}	4020 {410}	3920 {400}	3430 {350}	2940 {300}	2550 {260}	2450 {250}	2250 {230}	—	—
1 : 2	KNB-252 KNC-252	Allowable Transmission Capacity (kW)	0.09	0.23	0.45	0.90	1.34	1.78	2.67	4.00	5.30	6.33	7.50	7.50	—
		Allowable Y-axis Torque (N·m) {kgf·m}	85.3 {8.7}	85.3 {8.7}	85.3 {8.7}	85.3 {8.7}	85.3 {8.7}	84.3 {8.6}	84.3 {8.6}	84.3 {8.6}	84.3 {8.6}	80.4 {8.2}	79.4 {8.1}	56.8 {5.8}	—
		Allowable X-axis O.H.L. (N) {kgf}	3920 {400}	3920 {400}	3920 {400}	3920 {400}	3920 {400}	3720 {380}	3630 {370}	3530 {360}	3230 {330}	2740 {280}	2250 {230}	1670 {170}	—
		Allowable Y-axis O.H.L. (N) {kgf}	4120 {420}	4120 {420}	4120 {420}	4120 {420}	4020 {410}	3920 {400}	3820 {390}	3720 {380}	3430 {350}	3040 {310}	2650 {270}	2350 {240}	—

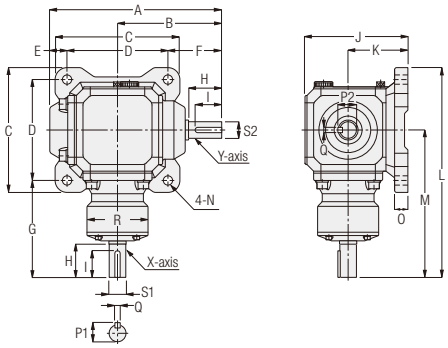
Reduction Ratio	Part Number	Option Code	X-axis Rotational Speed (r/min)										
			20	50	100	200	300	400	600	900	1200	1500	1800
1 : 1	KNB-321 KNC-321	Allowable Transmission Capacity (kW)	0.36	0.88	1.77	3.53	5.26	6.72	9.15	12.3	15.0	17.5	19.7
		Allowable X/Y-axis Torque (N·m) {kgf·m}	167 {17.0}	167 {17.0}	167 {17.0}	167 {17.0}	165 {16.8}	160 {16.3}	144 {14.7}	130 {13.3}	119 {12.1}	112 {11.4}	104 {10.6}
		Allowable X-axis O.H.L. (N) {kgf}	4900 {500}	4900 {500}	4900 {500}	4900 {500}	4610 {470}	4210 {430}	3720 {380}	3140 {320}	2740 {280}	2450 {250}	2160 {220}
		Allowable Y-axis O.H.L. (N) {kgf}	5190 {530}	5190 {530}	5190 {530}	5190 {530}	5100 {520}	4900 {500}	4310 {440}	3720 {380}	3230 {330}	3140 {320}	2840 {290}
1 : 2	KNB-322 KNC-322	Allowable Transmission Capacity (kW)	0.13	0.32	0.64	1.28	1.91	2.54	3.80	5.72	7.57	9.05	10.7
		Allowable X/Y-axis Torque (N·m) {kgf·m}	123 {12.5}	123 {12.5}	123 {12.5}	123 {12.5}	122 {12.4}	122 {12.4}	121 {12.3}	121 {12.3}	120 {12.2}	115 {11.7}	114 {11.6}
		Allowable X-axis O.H.L. (N) {kgf}	4900 {500}	4900 {500}	4900 {500}	4900 {500}	4900 {500}	4700 {480}	4610 {470}	4410 {450}	4120 {420}	3430 {350}	2840 {290}
		Allowable Y-axis O.H.L. (N) {kgf}	5190 {530}	5190 {530}	5190 {530}	5190 {530}	5100 {520}	4900 {500}	4800 {490}	4700 {480}	4310 {440}	3820 {390}	3330 {340}
1 : 1	KNB-401 KNC-401	Allowable Transmission Capacity (kW)	0.62	1.59	3.18	6.32	9.50	12.0	16.1	22.0	26.5	—	—
		Allowable X/Y-axis Torque (N·m) {kgf·m}	294 {30.0}	294 {30.0}	294 {30.0}	294 {30.0}	294 {30.0}	284 {29.0}	255 {26.0}	231 {23.6}	211 {21.5}	—	—
		Allowable X-axis O.H.L. (N) {kgf}	9800 {1000}	9800 {1000}	9800 {1000}	7840 {800}	5880 {600}	4900 {500}	4410 {450}	3720 {380}	3430 {350}	—	—
		Allowable Y-axis O.H.L. (N) {kgf}	11760 {1200}	11760 {1200}	11760 {1200}	9800 {1000}	7350 {750}	6370 {650}	5880 {600}	5100 {520}	4020 {410}	—	—
1 : 2	KNB-402 KNC-402	Allowable Transmission Capacity (kW)	0.20	0.48	0.96	1.93	2.90	3.84	5.72	8.55	11.0	13.8	16.4
		Allowable Y-axis Torque (N·m) {kgf·m}	183 {18.7}	183 {18.7}	183 {18.7}	183 {18.7}	183 {18.7}	182 {18.6}	181 {18.5}	180 {18.4}	174 {17.8}	173 {17.6}	172 {17.5}
		Allowable X-axis O.H.L. (N) {kgf}	9800 {1000}	9800 {1000}	9800 {1000}	9800 {1000}	9800 {1000}	8820 {900}	7840 {800}	6860 {700}	5880 {600}	4900 {500}	3920 {400}
		Allowable Y-axis O.H.L. (N) {kgf}	11760 {1200}	11760 {1200}	11760 {1200}	11760 {1200}	11760 {1200}	9800 {1000}	8820 {900}	8820 {900}	8820 {900}	7840 {800}	6860 {700}

2-2. Drawings

KNB Type

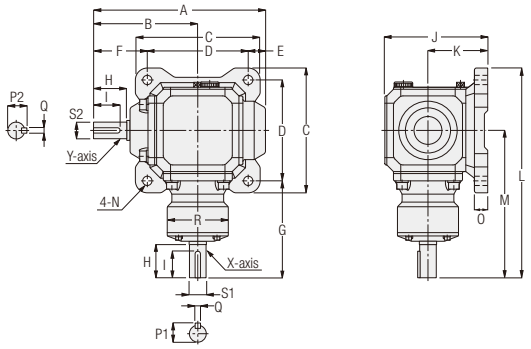
Shaft Arrangement Code: HH1043 HH1044

<Figure 1>



Shaft Arrangement Code: HH1033 HH1034

<Figure 2>

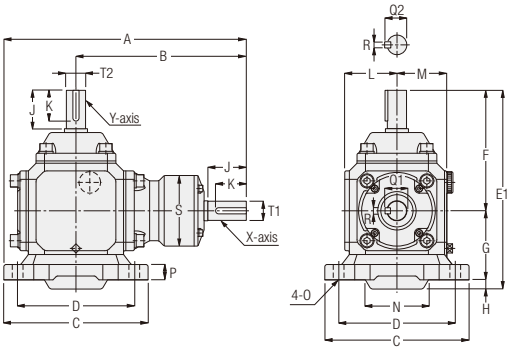


Part Number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P1	P2	Q	R	S1	S2	Approx. Weight (kg)
KNB-191	193	116	154	125	14.5	53.5	117.5	38	27	129	76	257	180	Ø10.5	17	21.5	21.5	6	Ø66	Ø19h6	Ø19h6	10
KNB-192	193	116	154	125	14.5	53.5	117.5	38	27	129	76	257	180	Ø10.5	17	20.5	21.5	6	Ø66	Ø18h6	Ø19h6	10
KNB-251	259	157	188	152	26	81	146	50	40	155	90	316	222	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	17
KNB-252	259	157	188	152	26	81	146	50	40	155	90	316	222	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	17
KNB-321	277	168	196	160	29	88	162	55	50	174	100	340	242	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	22
KNB-322	277	168	196	160	29	88	162	55	50	174	100	340	242	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	22
KNB-401	337	208	234	195	31.5	110.5	210.5	75	60	200	115	425	308	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	33
KNB-402	337	208	234	195	31.5	110.5	210.5	75	60	200	115	425	308	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	33

Note: The size of the oil cap for the oil filler port is PF1/2, and that for the oil drain port is PT1/4. (Standard specification)
Note: The phase of the key groove of the X-axis and that of the Y-axis do not always match.

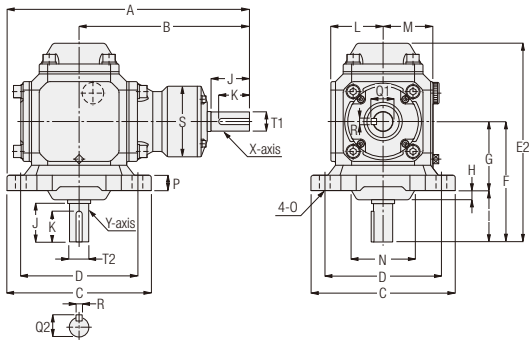
Shaft Arrangement Code: HH1022 HH1025

<Figure 3>



Shaft Arrangement Code: HH1052 HH1055

<Figure 4>

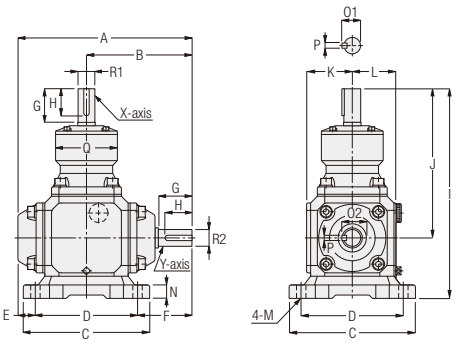


Part Number	A	B	C	D	E1	E2	F	G	H	I	J	K	L	M	N	O	P	Q1	Q2	R	S	T1	T2	Approx. Weight (kg)
KNB-191	257	180	154	125	192	191	116	76	—	40	38	27	56	53	—	Ø10.5	17	21.5	21.5	6	Ø66	Ø19h6	Ø19h6	10
KNB-192	257	180	154	125	192	191	116	76	—	40	38	27	56	53	—	Ø10.5	17	20.5	21.5	6	Ø66	Ø18h6	Ø19h6	10
KNB-251	316	222	188	152	259	259	157	90	12	67	50	40	68	65	Ø82.5	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	17
KNB-252	316	222	188	152	259	259	157	90	12	67	50	40	68	65	Ø82.5	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	17
KNB-321	340	242	196	160	277	277	168	100	9	68	55	50	77	74	Ø88.5	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	22
KNB-322	340	242	196	160	277	277	168	100	9	68	55	50	77	74	Ø88.5	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	22
KNB-401	425	308	234	195	337	337	208	115	14	93	75	60	88	85	Ø114.5	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	33
KNB-402	425	308	234	195	337	337	208	115	14	93	75	60	88	85	Ø114.5	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	33

Note: The size of the oil cap for the oil filler port is PF1/2, and that for the oil drain port is PT1/4. (Standard specification)
Note: The phase of the key groove of the X-axis and that of the Y-axis do not always match.

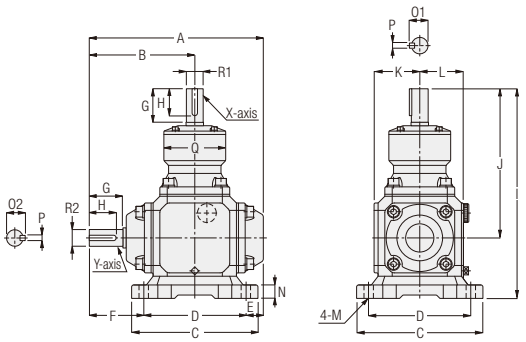
Shaft Arrangement Code: HU2043 HU2044

<Figure 1>



Shaft Arrangement Code: HU2033 HU2034

<Figure 2>

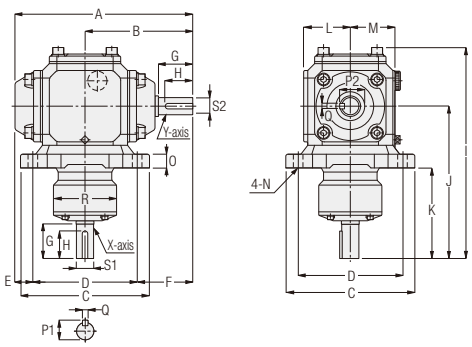


Part Number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O1	O2	P	Q	R1	R2	Approx. Weight (kg)
KNB-191	193	116	154	125	14.5	53.5	38	27	256	180	56	53	Ø10.5	17	21.5	21.5	6	Ø66	Ø19h6	Ø19h6	10
KNB-192	193	116	154	125	14.5	53.5	38	27	256	180	56	53	Ø10.5	17	20.5	21.5	6	Ø66	Ø18h6	Ø19h6	10
KNB-251	259	157	188	152	26	81	50	40	312	222	68	65	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	17
KNB-252	259	157	188	152	26	81	50	40	312	222	68	65	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	17
KNB-321	277	168	196	160	29	88	55	50	342	242	77	74	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	22
KNB-322	277	168	196	160	29	88	55	50	342	242	77	74	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	22
KNB-401	337	208	234	195	31.5	110.5	75	60	423	308	88	85	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	33
KNB-402	337	208	234	195	31.5	110.5	75	60	423	308	88	85	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	33

Note: The size of the oil cap for the oil filler port is PF1/2, and that for the oil drain port is PT1/4. (Standard specification)
Note: The phase of the key groove of the X-axis and that of the Y-axis do not always match.

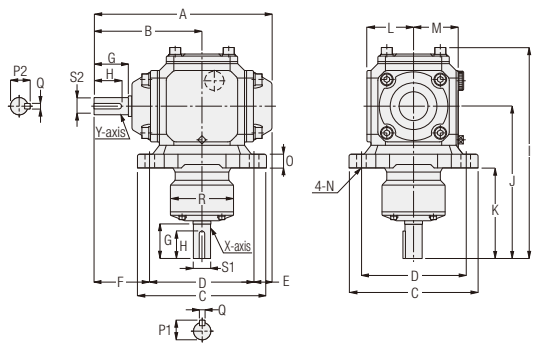
Shaft Arrangement Code: HD5043 HD5044

<Figure 3>



Shaft Arrangement Code: HD5033 HD5034

<Figure 4>



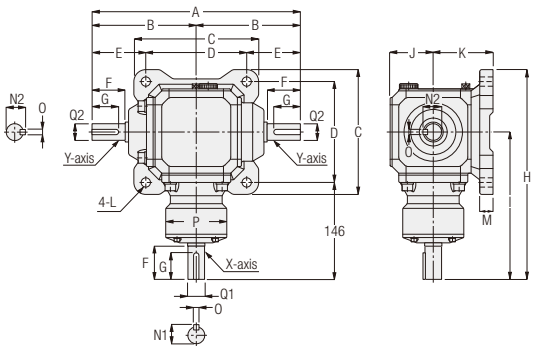
Part Number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P1	P2	Q	R	S1	S2	Approx. Weight (kg)
KNB-191	193	116	154	125	14.5	53.5	38	27	250	180	104	56	53	Ø10.5	17	21.5	21.5	6	Ø66	Ø19h6	Ø19h6	10
KNB-192	193	116	154	125	14.5	53.5	38	27	250	180	104	56	53	Ø10.5	17	20.5	21.5	6	Ø66	Ø18h6	Ø19h6	10
KNB-251	259	157	188	152	26	81	50	40	307.5	222	132	68	65	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	17
KNB-252	259	157	188	152	26	81	50	40	307.5	222	132	68	65	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	17
KNB-321	277	168	196	160	29	88	55	50	334.5	242	142	77	74	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	22
KNB-322	277	168	196	160	29	88	55	50	334.5	242	142	77	74	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	22
KNB-401	337	208	234	195	31.5	110.5	75	60	418	308	193	88	85	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	33
KNB-402	337	208	234	195	31.5	110.5	75	60	418	308	193	88	85	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	33

Note: The size of the oil cap for the oil filler port is PF1/2, and that for the oil drain port is PT1/4. (Standard specification)
Note: The phase of the key groove of the X-axis and that of the Y-axis do not always match.

KNC Type

Shaft Arrangement Code: HH1343 HH1344

<Figure 1>

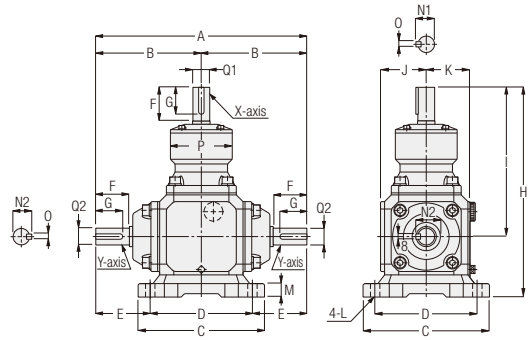


Part Number	A	B	C	D	E	F	G	H	I	J	K	L	M	N1	N2	O	P	Q1	Q2	Approx. Weight (kg)
KNC-191	232	116	154	125	53.5	38	27	257	180	53	76	Ø10.5	17	21.5	21.5	6	Ø66	Ø19h6	Ø19h6	10
KNC-192	232	116	154	125	53.5	38	27	257	180	53	76	Ø10.5	17	20.5	21.5	6	Ø66	Ø18h6	Ø19h6	10
KNC-251	314	157	188	152	81	50	40	316	222	65	90	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	18
KNC-252	314	157	188	152	81	50	40	316	222	65	90	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	18
KNC-321	336	168	196	160	88	55	50	340	242	74	100	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	23
KNC-322	336	168	196	160	88	55	50	340	242	74	100	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	23
KNC-401	416	208	234	195	110.5	75	60	425	308	85	115	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	34
KNC-402	416	208	234	195	110.5	75	60	425	308	85	115	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	34

Note: The size of the oil cap for the oil filler port is PF1/2, and that for the oil drain port is PT1/4. (Standard specification)
Note: The phase of the key groove of the X-axis and that of the Y-axis do not always match.

Shaft Arrangement Code: HU2343 HU2344

<Figure 2>

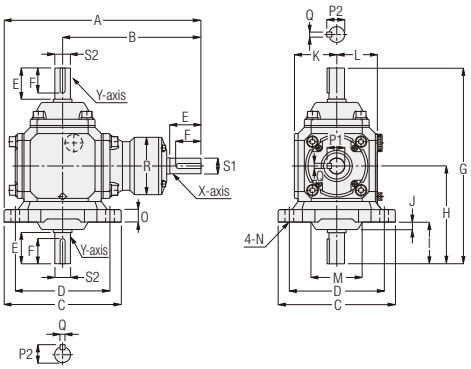


Part Number	A	B	C	D	E	F	G	H	I	J	K	L	M	N1	N2	O	P	Q1	Q2	Approx. Weight (kg)
KNC-191	232	116	154	125	53.5	38	27	256	180	56	53	Ø10.5	17	21.5	21.5	6	Ø66	Ø19h6	Ø19h6	10
KNC-192	232	116	154	125	53.5	38	27	256	180	56	53	Ø10.5	17	20.5	21.5	6	Ø66	Ø18h6	Ø19h6	10
KNC-251	314	157	188	152	81	50	40	312	222	68	65	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	18
KNC-252	314	157	188	152	81	50	40	312	222	68	65	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	18
KNC-321	336	168	196	160	88	55	50	342	242	77	74	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	23
KNC-322	336	168	196	160	88	55	50	342	242	77	74	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	23
KNC-401	416	208	234	195	110.5	75	60	423	308	88	85	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	34
KNC-402	416	208	234	195	110.5	75	60	423	308	88	85	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	34

Note: The size of the oil cap for the oil filler port is PF1/2, and that for the oil drain port is PT1/4. (Standard specification)
Note: The phase of the key groove of the X-axis and that of the Y-axis do not always match.

Shaft Arrangement Code: HH1252 HH1255

<Figure 1>

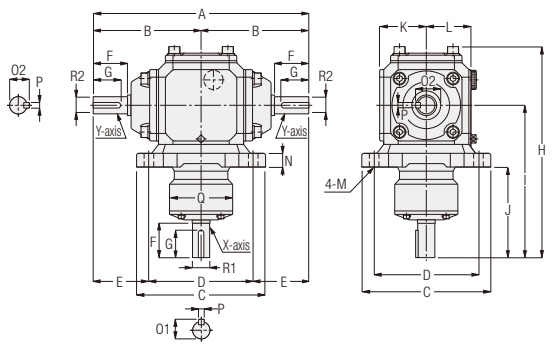


Part Number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P1	P2	Q	R	S1	S2	Approx. Weight (kg)
KNC-191	257	180	154	125	38	27	232	116	40	—	56	53	—	Ø10.5	17	21.5	21.5	6	Ø66	Ø19h6	Ø19h6	10
KNC-192	257	180	154	125	38	27	232	116	40	—	56	53	—	Ø10.5	17	20.5	21.5	6	Ø66	Ø18h6	Ø19h6	10
KNC-251	316	222	188	152	50	40	314	157	67	12	68	65	Ø82.5	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	18
KNC-252	316	222	188	152	50	40	314	157	67	12	68	65	Ø82.5	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	18
KNC-321	340	242	196	160	55	50	336	168	68	9	77	74	Ø88.5	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	23
KNC-322	340	242	196	160	55	50	336	168	68	9	77	74	Ø88.5	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	23
KNC-401	425	308	234	195	75	60	416	208	93	14	88	85	Ø114.5	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	34
KNC-402	425	308	234	195	75	60	416	208	93	14	88	85	Ø114.5	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	34

Note: The size of the oil cap for the oil filler port is PF1/2, and that for the oil drain port is PT1/4. (Standard specification)
Note: The phase of the key groove of the X-axis and that of the Y-axis do not always match.

Shaft Arrangement Code: HD5343 HD5344

<Figure 2>



Part Number	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O1	O2	P	Q	R1	R2	Approx. Weight (kg)
KNC-191	232	116	154	125	53.5	38	27	250	180	104	56	53	Ø10.5	17	21.5	21.5	6	Ø66	Ø19h6	Ø19h6	10
KNC-192	232	116	154	125	53.5	38	27	250	180	104	56	53	Ø10.5	17	20.5	21.5	6	Ø66	Ø18h6	Ø19h6	10
KNC-251	314	157	188	152	81	50	40	307.5	222	132	68	65	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	18
KNC-252	314	157	188	152	81	50	40	307.5	222	132	68	65	Ø14	20	28	28	8	Ø92	Ø25h6	Ø25h6	18
KNC-321	336	168	196	160	88	55	50	334.5	242	142	77	74	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	23
KNC-322	336	168	196	160	88	55	50	334.5	242	142	77	74	Ø14	20	35	35	10	Ø100	Ø32h6	Ø32h6	23
KNC-401	416	208	234	195	110.5	75	60	418	308	193	88	85	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	34
KNC-402	416	208	234	195	110.5	75	60	418	308	193	88	85	Ø14	22	43	43	12	Ø124	Ø40h6	Ø40h6	34

Note: The size of the oil cap for the oil filler port is PF1/2, and that for the oil drain port is PT1/4. (Standard specification)
Note: The phase of the key groove of the X-axis and that of the Y-axis do not always match.

MEMO

Technical Documentation

BEVEL GEARBOXES

P.972 **Precautions for Selection**

P.973 **Selection Process Steps and Examples**

P.975 **Moment of Inertia of Gearbox**

P.976 **Precautions for Use**

P.977 **About the Machining**

Precautions for Selection

Items Required for Selection

Load torque, motor type, input speed, reduction ratio, operation time, connection method, frequency of startup/stop

Selection Process Steps

1. The performance tables in the catalog show bevel gear boxes that use a motor and are designed under the condition of operating for 10 hours/day under a uniform load.

Thus, when you use a bevel gearbox under a condition of longer operation time under a heavier load, correct the load torque based on the service factor shown in [Table-1].

Corrected load torque = Load torque applied to the gearbox × Service factor

Service Factor (Sf) [Table-1]

Load Condition	Service Factor (Sf)		
	Operating for less than 3 hours/day	Operating for 3 to 10 hours/day	Operating for more than 10 hours/day
Uniform load	1 (1)	1 (1.25)	1.25 (1.50)
Light shock load	1 (1.25)	1.25 (1.50)	1.50 (1.75)
Heavy shock load	1.25 (1.50)	1.50 (1.75)	1.75 (2.00)

Note 1: When the number of startups and stops is 10 times or more an hour, use the coefficient in parentheses.
Note 2: Use the coefficient in parentheses also for a motor other than an electric motor (engine etc.)

Be sure to make the corrected load torque at the speed used smaller than the allowable X/Y-axis torque or the allowable Y-axis torque shown in the performance table.

2. Select a shaft arrangement from the shaft arrangement diagrams of each model.

3. Checking the overhung load (O.H.L.)

An overhung load (O.H.L.) is a suspending load imposed on a shaft. When a chain, belt, gear, etc. is used to couple the gearbox shaft with the application, the resulting O.H.L. must be taken into consideration.

$$\text{O.H.L.} = \frac{T_{LE} \times K_1 \times K_2}{R} \text{ (N) \{kgf\}}$$

T_{LE} : Corrected load torque imposed on the gearbox shaft (N·m) {kgf·m}
R : Pitch Circle Radius (m) of sprocket, pulley, gear, etc. attached to the gearbox shaft
K_1 : Refer to the coefficient for the connection method [Table-2].
K_2 : Refer to the coefficient for the load point [Table-3].

* Be sure to make the O.H.L. value calculated from the equation shown above smaller than the allowable X-axis and Y-axis O.H.L. values listed in the performance table.

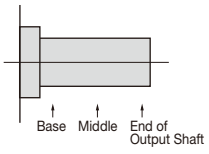
■ Coefficient K_1 [Table-2]

Connection method	K_1
Chain, timing belt	1.00
Gear	1.25
V belt	1.50

■ Coefficient K_2 [Table-3]

Load Point	K_2
Base of the shaft	0.75
Middle of the shaft	1.00
End of Output Shaft	1.50

● Load Point

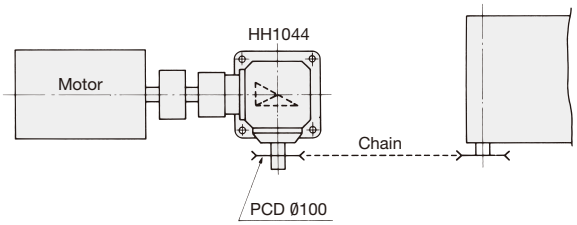


4. Select a model that meets all values specified in 1, 2, and 3 above.

Selection Process Steps and Examples

Selection Examples Selection Example 1

Application ····· Conveyor (uniform load)
Load Torque ····· 78.4 N·m {8 kgf·m}
X-axis Rotational Speed ·· 300 r/min
Reduction Ratio ····· 1 : 2
Shaft Arrangement ····· HH1044
Operation Time ····· 12 hours/day
Connection method ····· X-axis - Coupling
Y-axis - Chain (located on the center of the shaft)
Installation Method ····· Horizontal mounting
Installation Place ····· Indoors



1. Examining the torque

From [Table-1] on page 972, the service factor Sf in a loaded state is 1.25. Thus, the corrected load torque imposed on the Y-axis is:

$T_{LE} = 78.4 \times 1.25 = 98$ N·m {$T_{LE} = 8 \times 1.25 = 10$ kgf·m}

2. Examining the O.H.L.

The load O.H.L. of the Y-axis is:

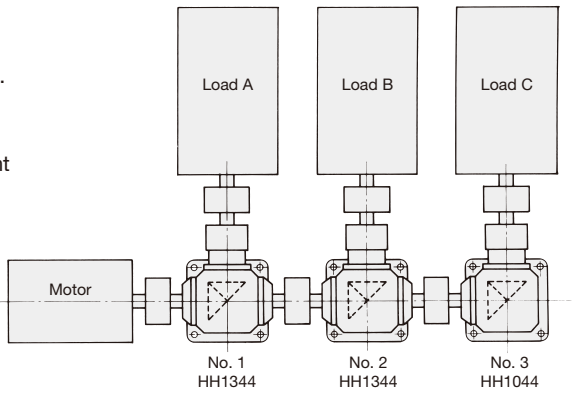
$$\text{O.H.L.} = \frac{T_{LE} \times K_1 \times K_2}{R} = \frac{98 \times 1 \times 1}{\frac{100}{2 \times 1000}} = 1960 \text{ N} \quad \{\text{O.H.L.} = \frac{T_{LE} \times K_1 \times K_2}{R} = \frac{10 \times 1 \times 1}{\frac{100}{2 \times 1000}} = 200 \text{ kgf}\}$$

3. Determining a model

Select a model that meets the conditions, the torque, and the O.H.L. That is KNB-322 HH1044.

Selection Examples Selection Example 2

Application ..... Line shaft drive
Load Torque ..... All of loads A, B, and C are 58.8 N·m {6 kgf·m} (uniform load).
Speed ..... 600 r/min
Reduction Ratio ..... 1 : 1
Shaft Arrangement ..... As shown in the figure on the right
Operation Time ..... 8 hours/day
Connection method ..... All couplings
Installation Method ..... Horizontal mounting
Installation Place ..... Indoors



In the case of a line shaft drive, the load imposed on the Y-axis differs depending on the position of the gearbox. For this reason, it is necessary to select a gearbox for each line shaft drive. From [Table-1] on page 972, the service factor Sf for all gear boxes based on the condition is 1.0.

1. Gearbox No. 1

Thus, since only load A is to be operated, the corrected load torque imposed on the X-axis is:
58.8 × 1.0 = 58.8 N·m {6×1.0 = 6 kgf·m}
Since loads A, B, and C are to be operated, the corrected load torque imposed on the Y-axis is:
(58.8 + 58.8 + 58.8) × 1.0 = 176.4 N·m
{(6 + 6 + 6) × 1.0 = 18 kgf·m}
From the performance table, select KNC-401 HH1344.

2. Gearbox No. 2

Since only load B is to be operated, the corrected load torque imposed on the X-axis is:
58.8 × 1.0 = 58.8 N·m {6×1.0 = 6 kgf·m}
Since loads B and C are to be operated, the corrected load torque imposed on the Y-axis is:
(58.8 + 58.8) × 1.0 = 117.6 N·m
{(6 + 6) × 1.0 = 12 kgf·m}
From the performance table, select KNC-321 HH1344.

3. Gearbox No. 3

Since only load C is to be operated, the corrected load torque imposed on the X-axis is:
58.8 × 1.0 = 58.8 N·m {6×1.0 = 6 kgf·m}
Since only load C is to be operated, the corrected load torque imposed on the Y-axis is:
58.8 × 1.0 = 58.8 N·m {6×1.0 = 6 kgf·m}
From the performance table, select KNB-251 HH1044.

4. Determining models

Gearbox No. 1 KNC-401 HH1344
Gearbox No. 2 KNC-321 HH1344
Gearbox No. 3 KNB-251 HH1044

Moment of Inertia of Gearbox

■ Moment of Inertia of Gearbox {GD²} (X-axis Equivalent)

● K Type

Reduction Ratio	Type Code	Moment of Inertia (×10⁻⁴kg·m²)	{GD² (×10⁻⁴kg·m²)}
1:1	KB-101	0.045	0.18
	KC-101	0.048	0.19
	KB-151	0.53	2.1
	KC-151	0.56	2.2
	KB-201	1.8	7.2
	KC-201	1.9	7.8
1:2	KB-102	0.022	0.086
	KC-102	0.022	0.089
	KB-152	0.37	1.5
	KC-152	0.37	1.5
	KB-202	0.79	3.1
	KC-202	0.82	3.3

● KN Type

Reduction Ratio	Type Code	Moment of Inertia (×10⁻⁴kg·m²)	{GD² (×10⁻⁴kg·m²)}
1:1	KNB-191	4.0	16.0
	KNC-191	4.1	16.2
	KNB-251	24.8	99.3
	KNC-251	25.0	100
	KNB-321	40.0	160
	KNC-321	40.8	163
	KNB-401	89.5	358
	KNC-401	92.0	368
1:2	KNB-192	1.9	7.4
	KNC-192	1.9	7.5
	KNB-252	10.3	41.3
	KNC-252	10.4	41.6
	KNB-322	12.9	51.7
	KNC-322	13.1	52.4
	KNB-402	38.3	153
	KNC-402	38.8	155

Precautions for Use

1. Installation Location

Ambient Temperature	–10 °C to 40 °C
Ambient Humidity	80 % max
Installation Environment	A place free from corrosive gas, explosive gas and/or vapor. Well ventilated place with no dust.
Installation Place	Indoors

2. Installation Surface

- Secure the bevel gearbox with bolts on a vibration-free and flat machine-processed surface.

3. Connection with application

- Some gearbox models have a shaft without a step. Thus, when attaching a coupling, sprocket, pulley, gear, etc. to such a shaft, take care not to allow them to interfere with the oil seal or case surface. In addition, H7 fit is recommended for a hole.
- In direct coupling, accurately align the center of the gearbox shaft from the mating shaft.
- In chain, belt, or gear engagement, keep the gearbox shaft and the mating shaft parallel to each other accurately, and install the device so that the line connecting the centers of both shafts is perpendicular to the shafts.

4. Precautions for Operation

- Be sure to operate the bevel gearbox with the load torque and the O.H.L. kept within the tolerances.
- CW and CCW rotations by plucking adversely affect the gearbox and the application. To prevent this, temporarily stop the gearbox, and then start it in the reverse direction.

About the Machining

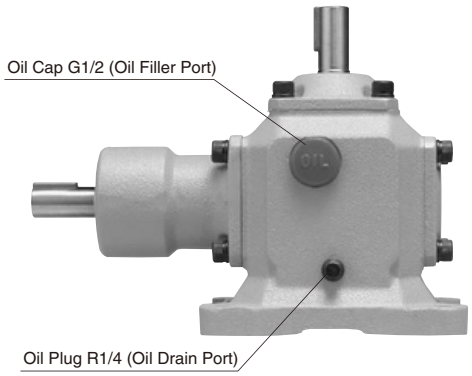
■ When machining for adding an oil plug R1/4 to a standard specification is required

Thedesignsthepositionsof oilfillerportsandoildrain ports assuming horizontal surface mounting (floor mounting) as a standard specification.

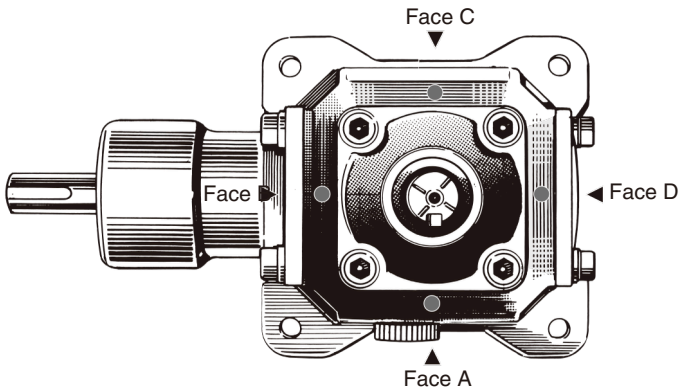
Our bevel gear boxes can be mounted not only on horizontal surfaces but also on ceiling surfaces, wall surfaces, etc. When you intend to use and mount a bevel gearbox on a surface other than a horizontal surface, an oil plug R1/4 can be added to any of faces A, B, C, and D shown in [Figure-1] as a special order. When placing an order for an oil plug R1/4, designate face A, B, C, or D.

* For machine work of adding an oil plug, please contact your nearest Sales Office or the CS Center.

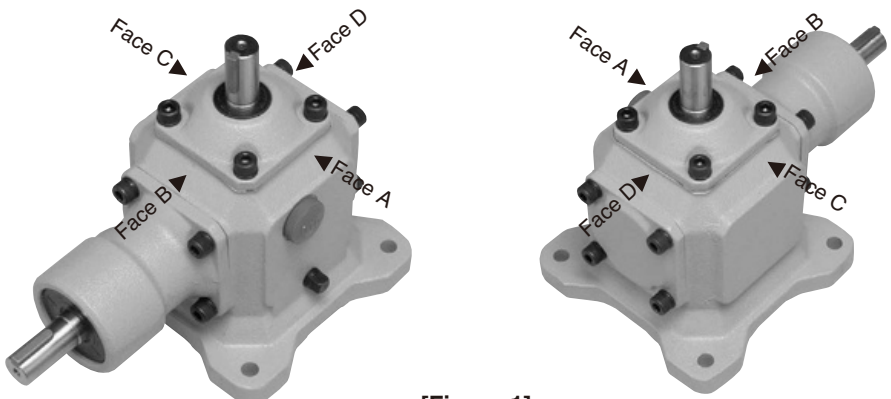
• Standard Specification



• Positions for adding an oil plug R1/4



An oil plug PT1/4 can be added to the positions marked with ●.



[Figure-1]

* The face of the standard specification provided with an oil cap is assumed to be face A, and the faces clockwise from face A are B, C, and D when viewed from the top.

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