








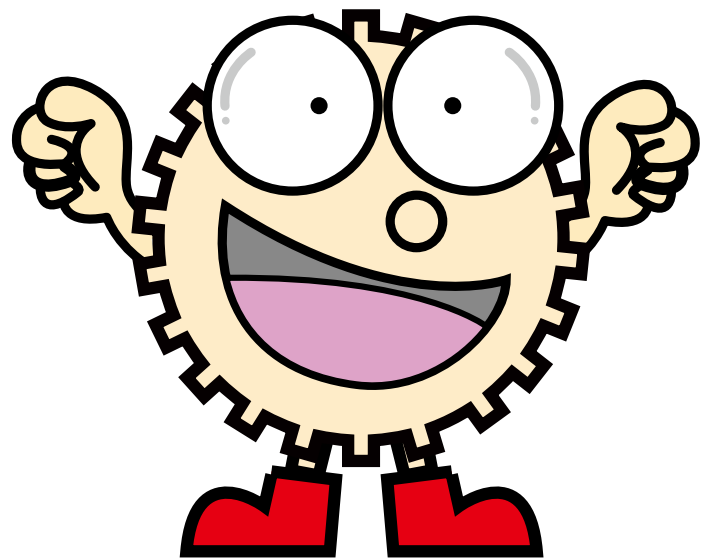


Gear Boxes

- Spur Gears
- Helical Gears
- Internal Gears
- Racks
- CP Racks & Pinions
- Miter Gears
- Bevel Gears
- Screw Gears
- Worm Gear Pair
- Bevel Gearboxes
- Other Products

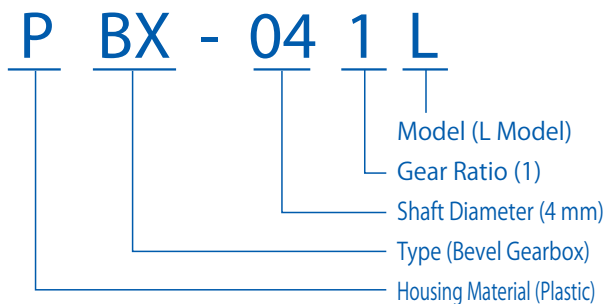
PBX Miniature Bevel Gearboxes	KBX Bevel Gearboxes	CBX Bevel Gearboxes
		
Model L/ T Page 396	Model L/ T Page 400	Model L/ T Page 404
 	 	 



Catalog Number of KHK Stock Gears

The Catalog Number for KHK stock gears is based on the simple formula listed below. Please order KHK gears by specifying the Catalog Numbers.

(Example) Gearboxes













Housing Material

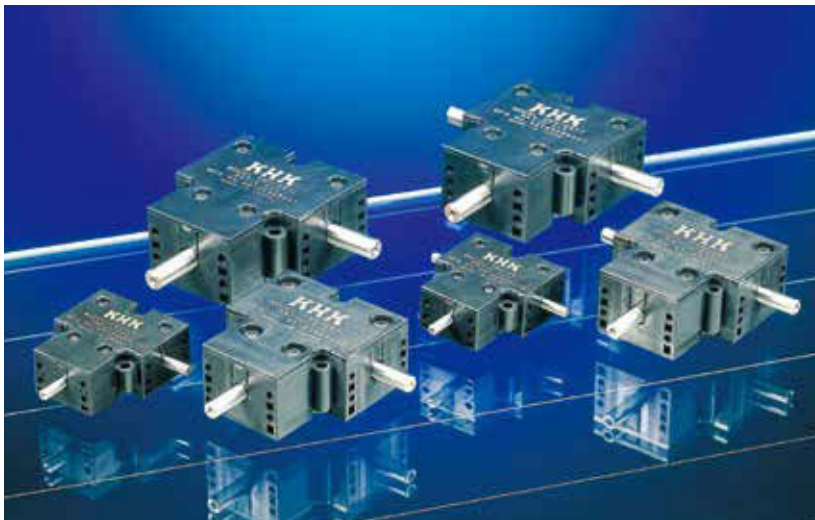
- P Plastic
- K Light Metal Alloy
- C FC250 Cast Iron

Main body

- BX Bevel Gearbox

Feature Icons

 RoHS Compliant Product	 Finished Product	 Ground Gear	 Resin Product	 Injection Molded Product
 Re-machinable Product	 Heat Treated Product	 Stainless Product	 Copper Alloy Product	 Black Oxide coated Product



■ Features

- ① **Light weight and compact**
Simple construction with plastic housing.
Uses a plastic resin which has superior chemical and thermal resistance.
- ② **Freedom of installing orientation**
Unit has through holes and counter-bores allowing mounting on any orientation.
- ③ **Maintenance free**
Grease is applied to gears before shipping.
- ④ **Speed ratio**
1:1

■ Points to observe during use

1. Environmental conditions

- Ambient temperature -10°C to 40°C
- Ambient humidity 80% or less
- Atmosphere Well-ventilated, dust-free air not including corrosive gas and steam.
- Location Indoors

2. Mounting Methods

- Bolt or screw the unit firmly on a flat surface free from variations.
- For screws, we recommend JIS Type 2 grooved screws.
- The dimensions of the mounting screws and the recommended tightening torques are given in the table below.
- No secondary operations such as adding bolt holes can be performed on the casing. There is a danger that the gearbox will break.

- When used in applications where oil contamination is undesirable such as in a food processing machines, please use preventive measures against oil leaks due to malfunction or the units wearing out.

3. Connection with mating machinery

- Before connecting to the mating machinery, please verify the directions of the shaft rotation to avoid breakage of the equipment.
- Please use a flexible coupling to connect the gearbox shaft to a mating shaft.
- Make sure that the shafts of the gearbox and the mating machinery are lined up center to center.
- If the gearbox shaft does not have a step, care should be exercised when attaching a coupling so that it does not interfere with the housing.
- There is no keyway on the gearbox shaft. Use clamping type couplings to avoid slippage.

4. Operating precautions

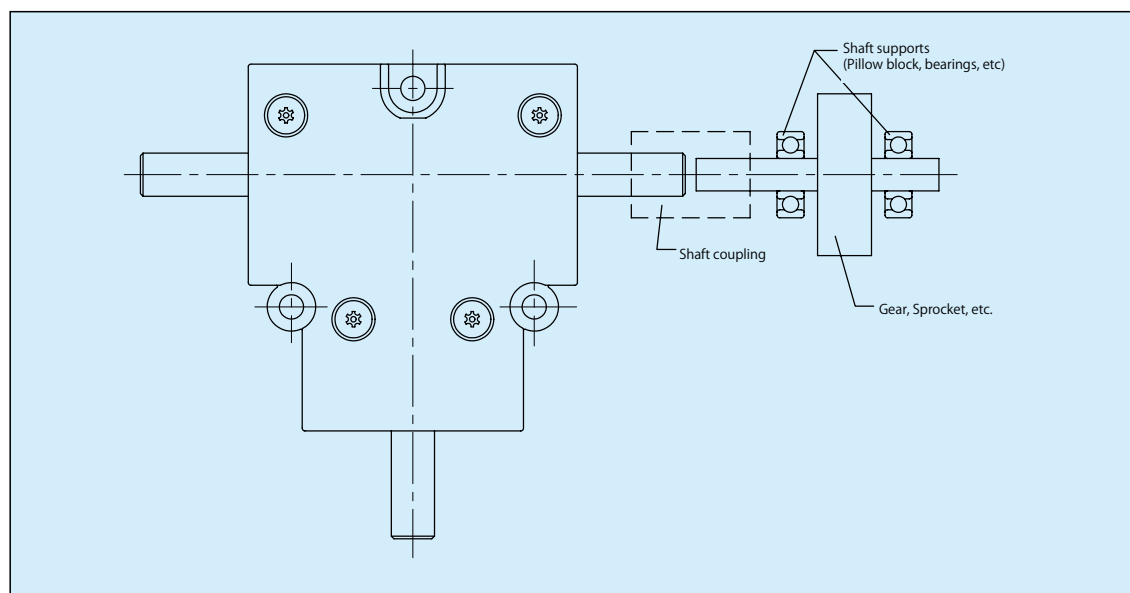
- Do not go near or touch rotating portions of the machine such as the shafts during operation. You may get caught and injure yourself.
- Stop the operation immediately when the noise level or the temperature rises abnormally. Do not restart until all of the causes are analyzed and proper repairs are made.
- Do not disassemble or modify these productions. You may destroy the unit.

■ Recommended tightening torques

Mode	Thru-hole		Tapped screw hole		
	Size	Tightening torque (N · m)	Nominal dia.	Effective length (mm)	Tightening torque (N · m)
PBX-04 Type	M3	0.3 ~ 0.6	3	7 ~ 11	0.4 ~ 0.8
PBX-06 Type	M3	0.4 ~ 0.8	3	9 ~ 13	0.5 ~ 1.0
PBX-08 Type	M4	0.5 ~ 1.0	4	9 ~ 14	0.5 ~ 1.0

Selection Hints

- ① PBX series are economical bevel gearboxes. For applications requiring high precision, strength and/or speed, we recommend the use of KBX type bevel gearboxes.
- ② Please avoid overhang and thrust loads on the shafts. By supporting both ends of the shaft on which a gear or sprocket is mounted by means of pillow blocks or bearings as shown below, you can eliminate overhang loads.
- ③ These units are not suitable when you have sudden reversals of rotation or impact loads. Please consider KBX type bevel gearboxes in such applications.



PBX Specification Chart

Type	Specifications	X-axis revolutions per minute (rpm)						
		50	100	200	250	300	400	500
PBX-041	X&Y-axis torque (N · cm) {kgf · cm}	9.8 {1.0}	9.8 {1.0}	9.6 {0.98}	9.5 {0.97}	9.4 {0.96}	9.3 {0.95}	9.1 {0.93}
	Efficiency (Reference values)	70%						
PBX-061	X&Y-axis torque (N · cm) {kgf · cm}	39.2 {4.0}	39.2 {4.0}	38.5 {3.93}	38.2 {3.90}	37.9 {3.87}	37.2 {3.80}	36.5 {3.72}
	Efficiency (Reference values)	80%						
PBX-081	X&Y-axis torque (N · cm) {kgf · cm}	78.4 {8.0}	78.4 {8.0}	77.0 {7.86}	76.5 {7.80}	75.7 {7.72}	74.4 {7.59}	73.1 {7.46}
	Efficiency (Reference values)	75%						

- [CAUTION]
- ① Be sure not to exceed the allowable values.
 - ② The values in the table are effective when the service factor is 1. When the units are used under other conditions, refer to the Selection Guide.



PBX Miniature Bevel Gearboxes



L Type



Spur Gears

Helical Gears

Internal Gears

Racks

CP Racks & Pinions

Miter Gears

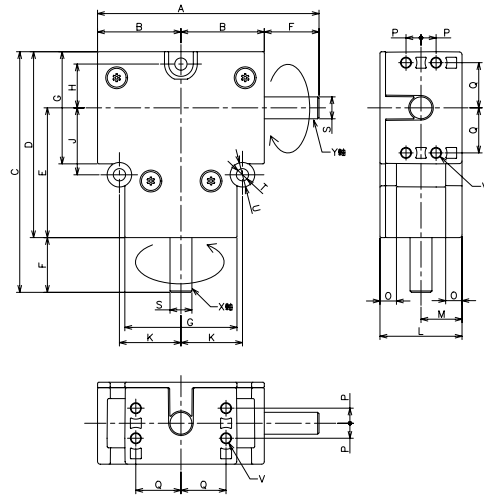
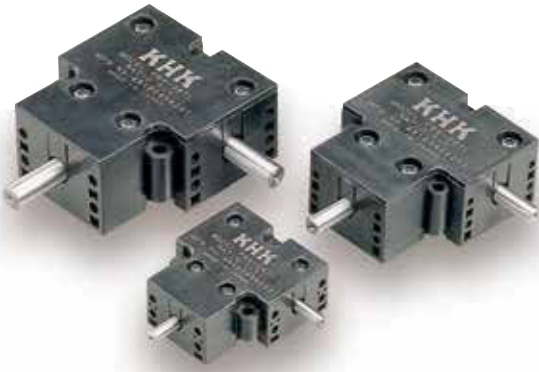
Bevel Gears

Screw Gears

Worm Gear Pair

Bevel Gearboxes

Other Products



Catalog No.	Speed Ratio	A	B	C	D	E	F	G	H	J	K	L	M	O	P	Q	S	T
PBX-041L	1:1	51	20.5	55	45	32	10	26	9.5	16	15	18	9	4.5	3	10	φ4	φ3.5
PBX-061L	1:1	70	27.5	73	58	41	15	34	13.5	20	19	26	13	4.5	4.5	14	φ6	φ3.5
PBX-081L	1:1	81	30.5	88	68	47.5	20	41	16	24.5	22.5	30	15	6	5.5	16.5	φ8	φ4.5



PBX Miniature Bevel Gearboxes



T Type

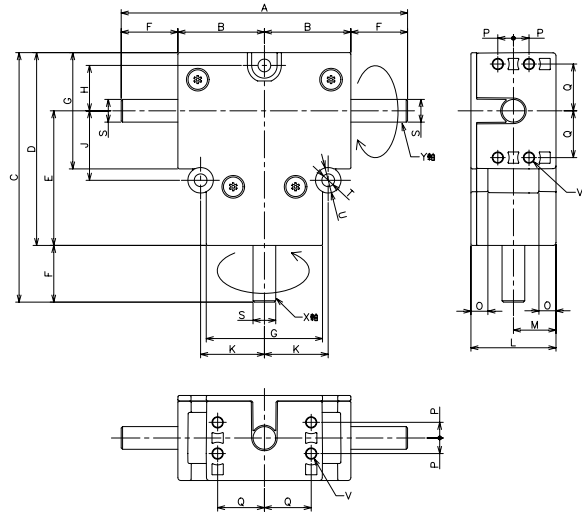
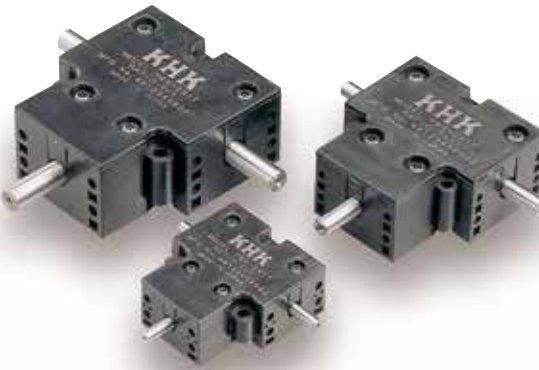


Screw Gears

Worm Gear Pair

Bevel Gearboxes

Other Products



Catalog No.	Speed Ratio	A	B	C	D	E	F	G	H	J	K	L	M	O	P	Q	S	T
PBX-041T	1:1	61	20.5	55	45	32	10	26	9.5	16	15	18	9	4.5	3	10	φ4	φ3.5
PBX-061T	1:1	85	27.5	73	58	41	15	34	13.5	20	19	26	13	4.5	4.5	14	φ6	φ3.5
PBX-081T	1:1	101	30.5	88	68	47.5	20	41	16	24.5	22.5	30	15	6	5.5	16.5	φ8	φ4.5

Bevel Gearboxes

- [Caution]
- ① The arrow marks on the shafts are intended to show the relative direction of rotation. The units can be driven in the opposite direction as well.
 - ② In the standard unit, the X-axis rotates clockwise, and the Y-axis counterclockwise.
 - ③ The tolerance of shaft diameter is JIS h8.
 - ④ The shafts do not have keyways. Please use clamping type couplings to avoid slippage.
 - ⑤ The backlash at the X-axis (input shaft) is about 3 degrees.

U	V		Weight (g)	Catalog No.
	Diameter	Depth		
7	φ 2.5	11	45	PBX-041L
7	φ 2.5	13	120	PBX-061L
9	φ 3.3	14	200	PBX-081L

PBX

Miniature Bevel Gearboxes

- [Caution]
- ① The arrow marks on the shafts are intended to show the relative direction of rotation. The units can be driven in the opposite direction as well.
 - ② In the standard unit, the X-axis rotates clockwise, and the Y-axis counterclockwise.
 - ③ The tolerance of shaft diameter is JIS h8.
 - ④ The shafts do not have keyways. Please use clamping type couplings to avoid slippage.
 - ⑤ The backlash at the X-axis (input shaft) is about 3 degrees.

U	V		Weight (g)	Catalog No.
	Diameter	Depth		
7	φ 2.5	11	45	PBX-041T
7	φ 2.5	13	120	PBX-061T
9	φ 3.3	14	200	PBX-081T

Spur
GearsHelical
GearsInternal
Gears

Racks

CP Racks
& PinionsMiter
GearsBevel
GearsScrew
GearsWorm
Gear PairBevel
GearboxesOther
Products



Spur
Gears

Helical
Gears

Internal
Gears

Racks

CP Racks
& Pinions

Miter
Gears

Bevel
Gears

Screw
Gears

Worm
Gear Pair

Bevel
Gearboxes

Other
Products



■ Features

- ① **Compactness**
Simplicity of design, enclosed in an aluminum die-cast casing.
- ② **Low noise and high efficiency**
The spiral bevel gears are made of case-hardened alloy steel.
- ③ **Freedom of installing orientation**
The unit can be installed easily in any orientation.
- ④ **Maintenance-free**
High-grade grease is sealed in the casting before shipping.
- ⑤ **Selective speed ratio**
Gear ratios of 1/1/ or 1/2 are available to meet most applications.

■ Lubrication

A standard volume of lubricant is sealed at the factory before shipping.

Model	Volume of lubricant	Lubrication	
KBX-10 Type	10g	Grease	The grease contains the Li Extreme Pressure additive NLGI-00
KBX-15 Type	30g		
KBX-20 Type	50g		

■ Points to observe during use

1. Environmental space suitable for installation
 - ① Ambient temperature -10°C to 40°C
 - ② Ambient humidity 80% or less
 - ③ Atmosphere Well-ventilated, dust-free air not including corrosive gas and steam.
 - ④ Location Indoors

2. Mounting methods

- ① Bolt the unit firmly on a machined plain surface free from vibrations.
- ② No secondary operations such as adding bolt holes can be performed on the casing. Also, do not disassemble or modify the units. There is a danger that the gearbox will break.
- ③ When used in applications where oil contamination is undesirable such as in a food processing machines, please use preventive measures against oil leaks due to malfunction or the units wearing out.

3. Connections with mating machinery

- ① Before connecting to the mating machinery, please verify the direction of the shaft rotation to avoid breakage of the equipment.
- ② Take care not to cause interference with an oil seal or case surface when fitting a coupling, sprocket, pulley, gear, etc. to gearbox shafts, especially for models without steps on the shaft. We recommend an H7 tolerance for the bore.
- ③ In the case of direct connection, alignment must be made accurately so that the gearbox shaft and the mating shaft are inline. We recommend flexible couplings.
- ④ When using a chain, belt or gear drive, position the gearbox shaft and the mating shaft accurately parallel with each other so that a line connecting the center of one shaft to the center of the other shaft makes a right angle with the shafts.

4. Operating precautions

- ① Do not get near or touch rotating portions of the machine such as the shafts during operations. You may get caught and injure yourself.
- ② Stop the operation immediately when the noise level or the temperature rises abnormally. Do not restart until all of the causes are analyzed and proper repairs are made.
- ③ Sudden reversal of the direction of rotation could affect the gearbox and mating machinery. Be sure to stop the unit before reversing the rotation.
- ④ Be sure to keep the load torque and overhang load (O.H.L.) within the allowable range during operation.

KBX Performance Chart

Speed Ratio	Type	Specifications	X-axis revolutions per minute (rpm)												Allowable thrust load (N) {kgf}	
			50	100	200	300	400	600	900	1200	1500	1800	2500	3600	X-axis	Y-axis
1 : 1	KBX-101	Allowable Power (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}
		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}		
		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}		
		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}		
		Efficiency (Reference values)	90%													
	KBX-151	Allowable Power (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}
		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}		
		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}		
		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}		
		Efficiency (Reference values)	90%													
	KBX-201	Allowable Power (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}
		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}		
		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}		
		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}		
		Efficiency (Reference values)	90%													
1 : 2	KBX-102	Allowable Power (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}
		X&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}		
		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}		
		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}		
		Efficiency (Reference values)	90% 85%													
	KBX-152	Allowable Power (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}
		X&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}		
		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}		
		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}		
		Efficiency (Reference values)	90% 85%													
	KBX-202	Allowable Power (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}
		X&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}		
		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}		
		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}		
		Efficiency (Reference values)	90% 85%													

- [CAUTION]
- ① Be sure not to exceed the allowable values. Units with (1:2) reduction ratio have the slower speed in the Y-axis.
 - ② The values in the table are in effect when the service factor is 1. When the units are used under other conditions, refer to the Selection Guides.
 - ③ Overhang load (O.H.L.) means the load applied to the middle of the overhang shaft, perpendicular to the axis, When using the units under other conditions, refer to the factors K1 and K2 described in the Selection Guide.
 - ④ When the 1:2 speed ratio unit is used as a speed increaser (from the Y-axis to the X-axis), the X-axis torque becomes one half of the Y-axis torque shown in the table.
 - ⑤ The Y-axis torque of type T is the sum of the values on both right and left axis.
 - ⑥ The Y-axis O.H.L. of type T is the sum of the values on both right and left axis.

Spur Gears
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KBX Bevel Gearboxes



L Type



Spur Gears

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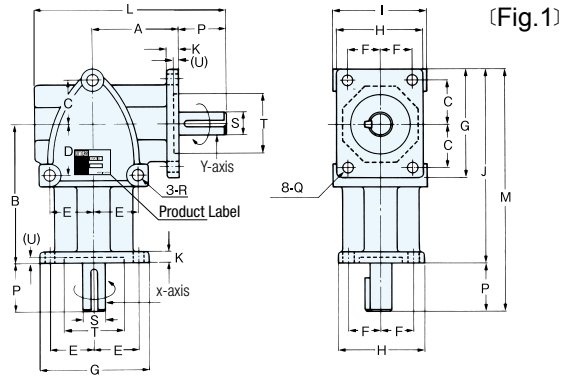
Bevel Gears

Screw Gears

Worm Gear Pair

Bevel Gearboxes

Other Products



Catalog No.	Speed Ratio	A	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S
KBX-101L	1:1	37	58	18	18	18	14	46	38	40	82	5	82	102	20	φ 5.5	φ 6.5	φ 10
KBX-102L	1:2	37	58	18	18	18	14	46	38	40	82	5	82	102	20	φ 5.5	φ 6.5	φ 10
KBX-151L	1:1	66	100	31	36	31	22	80	62	66	140	8	137	170	30	φ 8.5	φ 8.5	φ 15
KBX-152L	1:2	66	100	31	36	31	22	80	62	66	140	8	137	170	30	φ 8.5	φ 8.5	φ 15
KBX-201L	1:1	80	120	36	36	36	26	92	72	76	166	10	168	206	40	φ 8.5	φ 8.5	φ 20
KBX-202L	1:2	80	120	36	36	36	26	92	72	76	166	10	168	206	40	φ 8.5	φ 8.5	φ 20



KBX Bevel Gearboxes



T Type

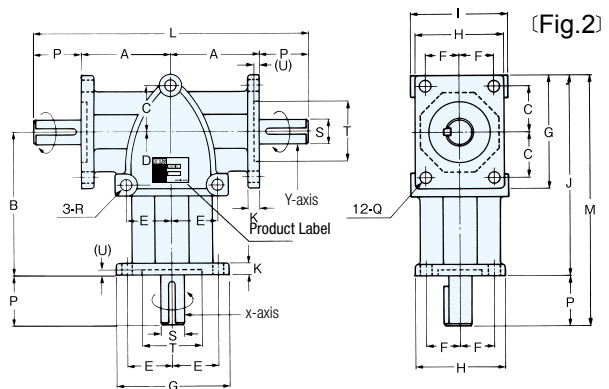


Screw Gears

Worm Gear Pair

Bevel Gearboxes

Other Products

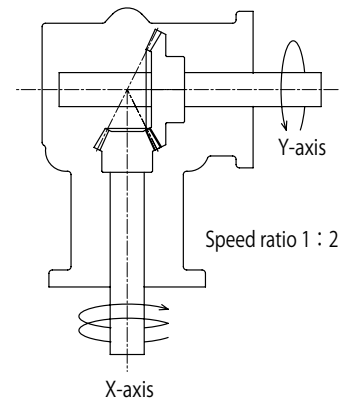
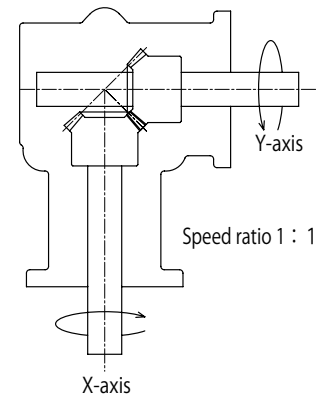


Catalog No.	Speed Ratio	A	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S
KBX-101T	1:1	37	58	18	18	18	14	46	38	40	82	5	114	102	20	φ 5.5	φ 6.5	φ 10
KBX-102T	1:2	37	58	18	18	18	14	46	38	40	82	5	114	102	20	φ 5.5	φ 6.5	φ 10
KBX-151T	1:1	66	100	31	36	31	22	80	62	66	140	8	192	170	30	φ 8.5	φ 8.5	φ 15
KBX-152T	1:2	66	100	31	36	31	22	80	62	66	140	8	192	170	30	φ 8.5	φ 8.5	φ 15
KBX-201T	1:1	80	120	36	36	36	26	92	72	76	166	10	240	206	40	φ 8.5	φ 8.5	φ 20
KBX-202T	1:2	80	120	36	36	36	26	92	72	76	166	10	240	206	40	φ 8.5	φ 8.5	φ 20

Bevel Gearboxes

- [Caution]
- ① The arrow marks on the shafts are intended to show the relative direction of rotation. The units can be driven in the opposite direction as well.
 - ② In the unit, the X-axis rotates clockwise, and the Y-axis counter-clockwise.
 - ③ The key grooves in the X-axis and the Y-axis do not always coincide in phase with each other.
 - ④ The tolerance of shaft diameter is JIS h7
 - ⑤ The pinion gear is mounted on the x-axis (the input side) in 1 : 2 ratio units.
 - ⑥ The key dimensions are per JIS B 1301-1976 (Standard Grade)
 - ⑦ The backlash angles are measured at the X-axis (Input Shaft).

T	(U)	Key	Backlash of shaft rotation	Weight (kg)	Catalog No.
φ 26 _{H7}	(2)	1 x 15 ℓ (flat)	16' ~ 44'	0.40	KBX-101L
			30' ~ 1° 23'		KBX-102L
φ 42 _{H7}	(3)	5 x 5 x 27 ℓ	10' ~ 37'	1.80	KBX-151L
			19' ~ 1° 09'		KBX-152L
φ 52 _{H7}	(4)	6 x 6 x 35 ℓ	8' ~ 33'	3.10	KBX-201L
			15' ~ 60'		KBX-202L



Spur Gears

Helical Gears

Internal Gears

Racks

CP Racks & Pinions

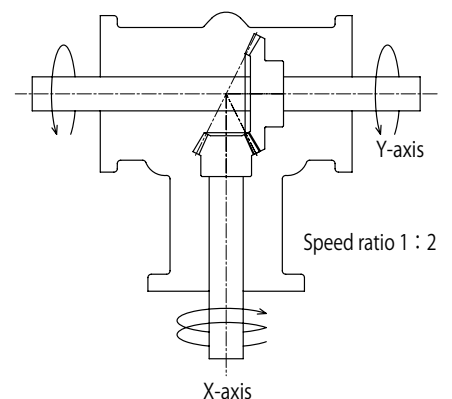
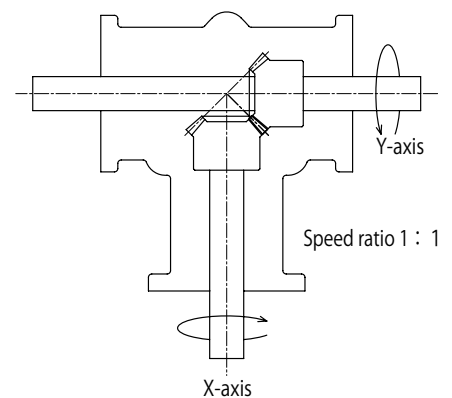
Miter Gears

KBX

Bevel Gearboxes

- [Caution]
- ① The arrow marks on the shafts are intended to show the relative direction of rotation. The units can be driven in the opposite direction as well.
 - ② In the unit, the X-axis rotates clockwise, and the Y-axis counter-clockwise.
 - ③ The key grooves in the X-axis and the Y-axis do not always coincide in phase with each other.
 - ④ The tolerance of shaft diameter is JIS h7.
 - ⑤ The pinion gear is mounted on the x-axis (the input side) in 1 : 2 ratio units.
 - ⑥ The key dimensions are per JIS B 1301-1976 (Standard Grade)
 - ⑦ The backlash angles are measured at the X-axis (Input Shaft).

T	(U)	Key	Backlash of shaft rotation	Weight (kg)	Catalog No.
φ 26 _{H7}	(2)	1 x 15 ℓ (flat)	16' ~ 44'	0.50	KBX-101T
			30' ~ 1° 23'		KBX-102T
φ 42 _{H7}	(3)	5 x 5 x 27 ℓ	10' ~ 37'	2.20	KBX-151T
			19' ~ 1° 09'		KBX-152T
φ 52 _{H7}	(4)	6 x 6 x 35 ℓ	8' ~ 33'	3.40	KBX-201T
			15' ~ 60'		KBX-202T



Bevel Gears

Screw Gears

Worm Gear Pair

Bevel Gearboxes

Other Products



Spur Gears

Helical Gears

Internal Gears

Racks

CP Racks & Pinions

Miter Gears

Bevel Gears

Screw Gears

Worm Gear Pair

Bevel Gearboxes

Other Products



Shaft Orientations and Orientation Codes

There are 24 permutations of shaft orientations and rotations, which are standardized for CBX Bevel Gearboxes. Please pay attention to the shaft orientations in addition to the catalog number when selecting the units.

【CAUTION】

- ① The diagrams below show the mounting surface.
- ② The arrow marks on the shafts are intended to show the relative directions of rotation. The units can be driven in the opposite directions as well.
- ③ "▼" mark indicates the surface on which the oiling and drain plugs are located when mounting horizontally. The ones without the marks have the plugs on the rear surface (Standard specifications).
- ④ When the unit (other than LI-LL Type, TE-TF Type) is used with the input shaft (X-axis) pointing up and is wall mounted, the lubrication method for the bearings must be altered. Please notify us at the time of placing your order.
- ⑤ For use other than mounting on a horizontal surface, please see page 407.

CBX Shaft Orientations Chart

	CBX-L Type Diagram				CBX-T Type Diagram	
Vertical Type (Front View)	Horizontal Type (Top View)					

Features

- ① **Very strong**
The unit has high grade cast iron housing and uses tapered roller bearings.
- ② **Low noise and high efficiency**
The spiral bevel gears are made of case-hardened alloy steel.
- ③ **Freedom of installing orientation**
The unit can be installed easily in any orientation. However, if you cannot use one of the standard orientations, please see page 407.
- ④ **Maintenance-free**
High-grade oil is added to the casing before shipping.
- ⑤ **Selective speed ratio**
Gear ratios of 1/1 or 1/2 are available to meet most applications.

Lubrication

A standard volume of lubricant is sealed at the factory before shipping.

Model	Volume of lubricant	Lubrication	
CBX-19 Type	0.3L	Oil	JIS Gear oil Industrial Type 2
CBX-25 Type	0.7L		
CBX-32 Type	1.0L		
CBX-40 Type	1.5L		

Operating preconditions

See KBX (Page 400)

■ CBX Performance Chart

Speed Ratio	Type	Specifications	X-axis revolutions per minute (rpm)												
			20	50	100	200	300	400	600	900	1200	1500	1800	2500	3600
1 : 1	CBX-191	Allowable Power (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
		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}
		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}
		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}
		Efficiency (Reference values)	95%						90%						
	CBX-251	Allowable Power (kW)	0.25	0.62	1.24	2.47	3.68	4.70	6.40	8.60	10.5	12.3	13.8	—	—
		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}	—	—
		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}	—	—
		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}	—	—
		Efficiency (Reference values)	95%						90%						
	CBX-321	Allowable Power (kW)	0.36	0.88	1.77	3.53	5.26	6.72	9.15	12.3	15.0	17.5	19.7	—	—
		X&Y-axis torque (N · m) {kgf · m}	167 {17.0}	167 {17.0}	167 {17.0}	167 {17.0}	165 {16.3}	160 {14.7}	144 {13.3}	130 {12.3}	119 {12.1}	112 {11.4}	104 {10.6}	—	—
		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}	—	—
		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}	—	—
		Efficiency (Reference values)	95%						90%						
	CBX-401	Allowable Power (kW)	0.62	1.59	3.18	6.32	9.50	12.0	16.1	22.0	26.5	—	—	—	—
		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}	225 {26.0}	231 {23.6}	211 {21.5}	—	—	—	—
		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}	—	—	—	—
		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}	—	—	—	—
		Efficiency (Reference values)	95%						90%						

Speed Ratio	Type	Specifications	X-axis revolutions per minute (rpm)													
			20	50	100	200	300	400	600	900	1200	1500	1800	2500	3600	
1 : 2	CBX-192	Allowable Power (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	
		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}	24.5 {2.5}	23.5 {2.4}	23.5 {2.4}	22.5 {2.3}	16.7 {1.7}	10.8 {1.1}
		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}	
		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}	
		Efficiency (Reference values)	90%						85%							
	CBX-252	Allowable Power (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	—	
		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}	—	
		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}	—	
		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}	—	
		Efficiency (Reference values)	90%						85%							
	CBX-322	Allowable Power (kW)	0.13	0.32	0.64	1.28	1.91	2.54	3.80	5.72	7.57	9.05	10.7	—	—	
		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}	—	—	
		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}	—	—	
		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}	—	—	
		Efficiency (Reference values)	90%						85%							
	CBX-402	Allowable Power (kW)	0.20	0.48	0.96	1.93	2.90	3.84	5.72	8.55	11.0	13.8	16.4	—	—	
		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}	—	—	
		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}	—	—	
		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}	—	—	
		Efficiency (Reference values)	90%						85%							

- [CAUTION] ① Be sure not to exceed the allowable values. Units with (1:2) reduction ratio have the slower speed in the Y-axis.
 ② The values in the table are in effect when the service factor is 1. When the units are used under other conditions, refer to the Service Factor Tables 2 and 3 (Page 408).
 ③ Overhang load (O.H.L.) means the load applied to the middle of the overhang shaft, perpendicular to the axis, When using the units under other conditions, refer to the factors K1 and K2 described in Tables 2 and 3 (Page 408).
 ④ When the 1:2 speed ratio unit is used as a speed increaser (from the Y-axis to the X-axis), the X-axis torque becomes one half of the Y-axis torque shown in the table.
 ⑤ The Y-axis torque of CBX-T Type is the sum of the values on both right and left axis.
 ⑥ The Y-axis O.H.L. of CBX-T Type is the sum of the values on both right and left axis.
 ⑦ The allowable thrust load is half of O.H.L. value in each case.

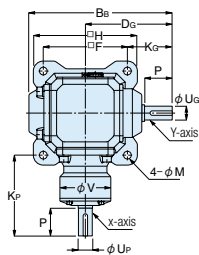
Spur Gears
Helical Gears
Internal Gears
Racks
CP Racks & Pinions
Miter Gears
Bevel Gears
Screw Gears
Worm Gear Pair
Bevel Gearboxes
Other Products



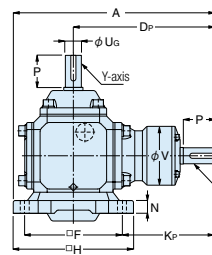
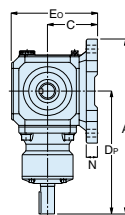
CBX Bevel Gearboxes



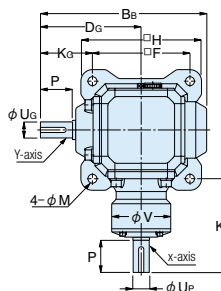
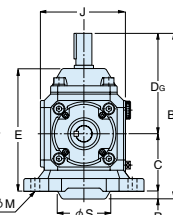
L type



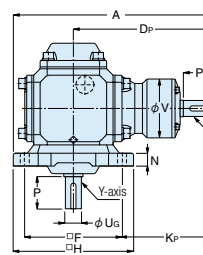
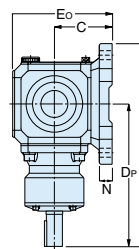
LA, LB



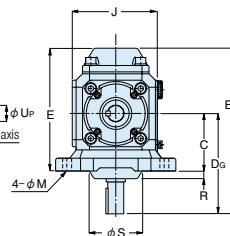
LE, LF



LC, LD



LG, LH



Catalog No.	Speed ratio	A	B _B	C	D _P	D _G	E	E _o	F	H	J	K _P	K _G	φM	N	P	R	φS
CBX-191L <input type="checkbox"/>	1:1	257	193	76	180	116	146	129	125	154	109	117.5	53.5	10.5	17	38	—	—
CBX-192L <input type="checkbox"/>	1:2																	
CBX-251L <input type="checkbox"/>	1:1	316	259	90	222	157	177.5	155	152	188	133	146	81	14	20	50	12	82.5
CBX-252L <input type="checkbox"/>	1:2																	
CBX-321L <input type="checkbox"/>	1:1	340	277	100	242	168	192.5	174	160	196	151	162	88	14	20	55	9	88.5
CBX-322L <input type="checkbox"/>	1:2																	
CBX-401L <input type="checkbox"/>	1:1	425	337	115	308	208	225	200	195	234	173	210.5	110.5	14	22	75	14	114.5
CBX-402L <input type="checkbox"/>	1:2																	

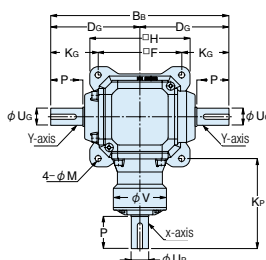
Please place one of the orientation codes (A to P) from Page 404 on the box at the end of the catalog number.



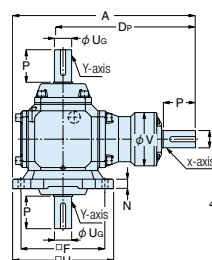
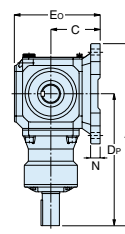
CBX Bevel Gearboxes



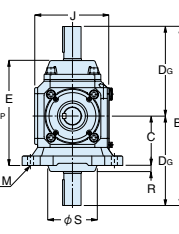
T type



TA, TB



TC, TD

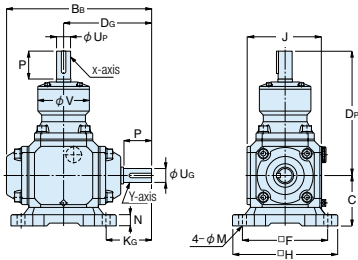


Catalog No.	Speed ratio	A	B _B	C	D _P	D _G	E	E _o	F	H	J	K _P	K _G	φM	N	P	R	φS
CBX-191T <input type="checkbox"/>	1:1	257	232	76	180	116	146	129	125	154	109	117.5	53.5	10.5	17	38	—	—
CBX-192T <input type="checkbox"/>	1:2																	
CBX-251T <input type="checkbox"/>	1:1	316	314	90	222	157	177.5	155	152	188	133	146	81	14	20	50	12	82.5
CBX-252T <input type="checkbox"/>	1:2																	
CBX-321T <input type="checkbox"/>	1:1	340	336	100	242	168	192.5	174	160	196	151	162	88	14	20	55	9	88.5
CBX-322T <input type="checkbox"/>	1:2																	
CBX-401T <input type="checkbox"/>	1:1	425	416	115	308	208	225	200	195	234	173	210.5	110.5	14	22	75	14	114.5
CBX-402T <input type="checkbox"/>	1:2																	

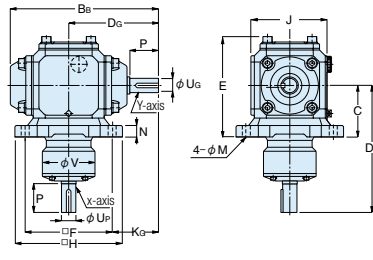
Please place one of the orientation codes (A – P) from Page 404 on the box at the end of the catalog number.

■ Since these products are assembled to each customer's specifications, the delivery lead time is about 10 working days after placing an order. These units are not available from stock.

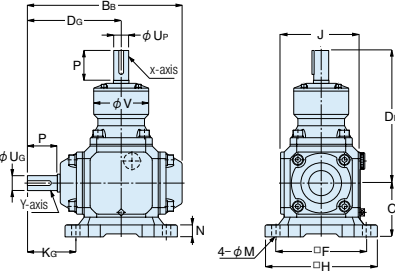
Bevel Gearboxes



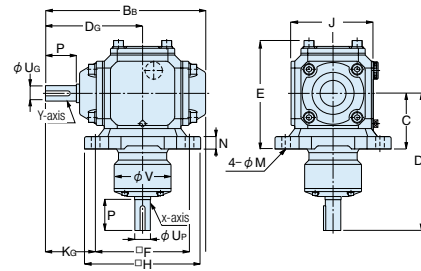
LI, LJ



LM, LN



LK, LL

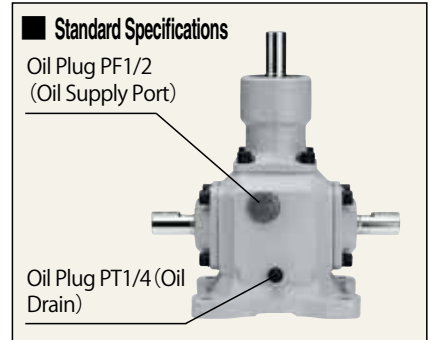


LO, LP

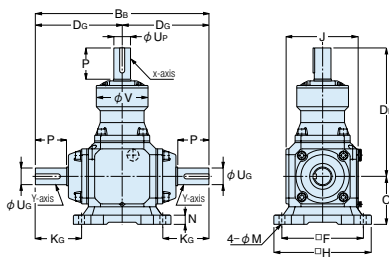
φV	X-axis φUp	Y-axis φUg	Key	Backlash of shaft rotation	Weight (kg)	Catalog No.
66	19	19	6 x 6 x 27 ℓ	11' ~30'	10.0	CBX-191L <input type="checkbox"/>
	18			17' ~47'		CBX-192L <input type="checkbox"/>
92	25	25	8 x 7 x 40 ℓ	9' ~22'	17.0	CBX-251L <input type="checkbox"/>
				15' ~36'		CBX-252L <input type="checkbox"/>
100	32	32	10 x 8 x 50 ℓ	9' ~21'	22.0	CBX-321L <input type="checkbox"/>
				15' ~36'		CBX-322L <input type="checkbox"/>
124	40	40	12 x 8 x 60 ℓ	8' ~20'	33.0	CBX-401L <input type="checkbox"/>
				15' ~37'		CBX-402L <input type="checkbox"/>

[Caution]

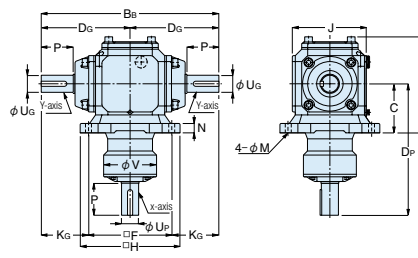
- ① The key grooves in the X-axis and the Y-axis do not always coincide in phase with each other.
- ② The tolerance of shaft diameter is JIS h6.
- ③ The key dimensions are per JIS B 1301-1976 (Standard Grade)
- ④ The backlash angles are measured at the X-axis (Input Shaft).
- ⑤ Sides of the oil plugs are for the supply port → PF 1/2 and for the drain port → PT 1/4 (standard specifications.)
We can accept as a special order units that are mounted on the ceiling or on a wall. Please let us know at the time or ordering.



CBX



TE, TF



TG, TH

φV	X-axis φUp	Y-axis φUg	Key	Backlash of shaft rotation	Weight (kg)	Catalog No.
66	19	19	6 x 6 x 27 ℓ	11' ~30'	10.0	CBX-191T <input type="checkbox"/>
	18			17' ~47'		CBX-192T <input type="checkbox"/>
92	25	25	8 x 7 x 40 ℓ	9' ~22'	18.0	CBX-251T <input type="checkbox"/>
				15' ~36'		CBX-252T <input type="checkbox"/>
100	32	32	10 x 8 x 50 ℓ	9' ~21'	23.0	CBX-321T <input type="checkbox"/>
				15' ~36'		CBX-322T <input type="checkbox"/>
124	40	40	12 x 8 x 60 ℓ	8' ~20'	34.0	CBX-401T <input type="checkbox"/>
				15' ~37'		CBX-402T <input type="checkbox"/>

Additional Oil Plug Locations

The mark "●" indicates the possible positions for additional oil plug.

※ Starting on the surface containing the standard oil plug as A, go clockwise looking from the top as B, C and D surfaces.



Spur Gears
Helical Gears
Internal Gears
Racks
CP Racks & Pinions
Miter Gears
Bevel Gears
Screw Gears
Worm Gear Pair
Bevel Gearboxes
Other Products

Selection Guide

Essential data for selection

Load torque, type of prime mover, input speed, speed ratio, running time, coupling method, and frequency of start and stop.

Selection Procedure

The performance table in the catalog is based on the design conditions that the prime mover is a motor, the load is uniform, and the unit runs 10 hours per day.

- a) When using the units under any other condition, it is necessary to correct the value of load to torque by applying the service factors shown in Table 1.

Corrected Load Torque = Load torque applied to gearbox x Service factor <See Table 1>.

Service factors (Sf) <Table 1>

Loading condition	Service factors (Sf)		
	Less than 3 hrs/day operation	3-10 hrs/day operation	More than 10 hrs/day operation
Uniform load	1 (1)	1 (1.25)	1.25 (1.50)
Light impact load	1 (1.25)	1.25 (1.50)	1.50 (1.75)
Heavy impact load	1.25 (1.50)	1.50 (1.75)	1.75 (2.00)

- (NOTE) 1. Use the factors in parentheses when frequency of starts and stops exceed 10 times per hour.
2. Also, use the factors in parentheses when a prime mover other than a motor is used (for example, an internal combustion engine).

Keep the corrected load torque at the speed at less than the allowed X & Y axis torque (Speed ratio 1:1), or the allowable Y axis torque (Speed ratio 1:2) shown in the performance table.

- b) Select an appropriate shaft layout from the shaft layout drawing for each model.
- c) Check for overhang load space (O.H.L.)
Overhang load is a load applied beyond the bearing support. Examining the overhang load is indispensable whenever chains, belts, or gears are used to couple the unit with the mating machinery.

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

- T_{LE} : Corrected load torque applied to the gearbox shaft (N · m) {kgf · m}
 R : Pitch radius of sprocket, pulley, gear, etc., mounted on the gearbox shaft (m)
 K_1 : Factor depending on the method of coupling <See Table 2>
 K_2 : Factor depending on the position of load <See Table 3>

* The value of O.H.L. from the equation above must be smaller than the value of allowable O.H.L. on the X-and the Y-axis shown on the performance table.

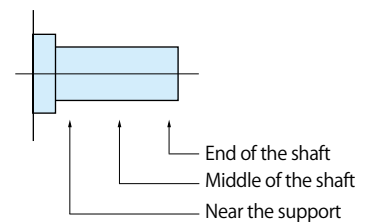
Factor K_1 <Table 2>

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

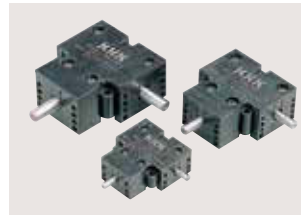
Factor K_2 <Table 3>

Position of load	K_2
Near the support	0.75
Middle of shaft	1.00
End of the shaft	1.50

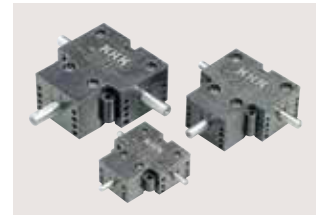
Position of load



- d) Select a model capable to satisfy all of a), b) and c) obtained above.



PBX-L Type



PBX-T Type



KBX-L Type

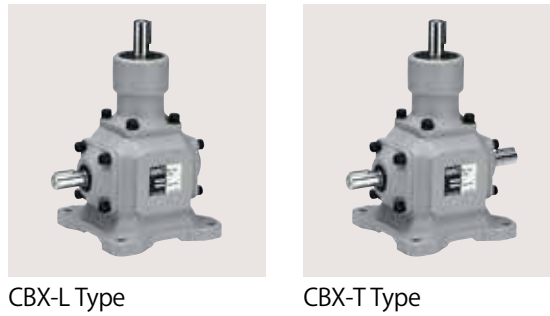


KBX-T Type

■ Selection Examples

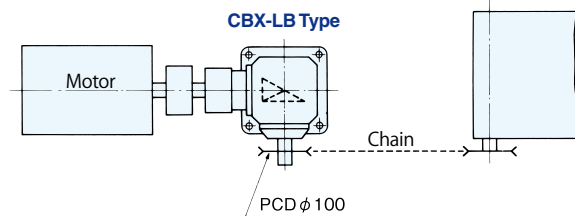
Example 1

- Application / Conveyor (uniform load)
- Load torque / 78.4N · m {8kgf · m}
- X-axis rotational speed / 300rpm
- Speed Ratio / 1 : 2
- Shaft layout / As illustrated at right
- Running time / 12 hours/day
- Coupling method / X-axis – Coupling
Y-axis – Chain (positioned at the middle of the shaft)
- Installation / Horizontal
- Location / Indoors



CBX-L Type

CBX-T Type



① Torque Analysis

Service factor under load is $S_f = 1.25$ (Table 1).
Accordingly, corrected load torque applied to Y-axis.
 $T_{LE} = 78.4 \times 1.25 = 98\text{N} \cdot \text{m}$ { $T_{LE} = 8 \times 1.25 = 10\text{kgf} \cdot \text{m}$ }

② O.H.L. Analysis

O.H.L.on the Y-axis

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

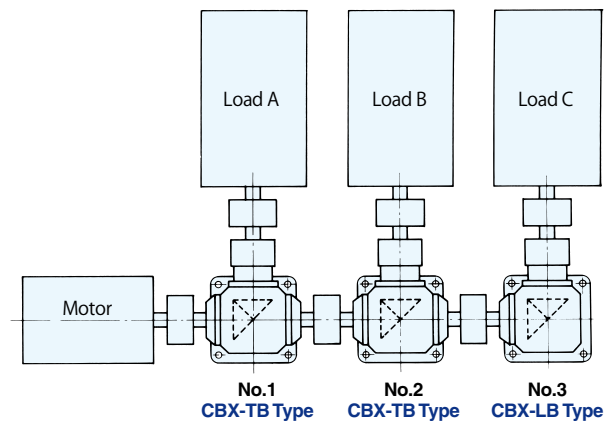
③ Model Selection

A model capable of satisfying all of the design conditions, torque and O.H.L. is **CBX-322LB**.

Example 2

- Application / Line shaft drive
- Load torque / 58.8N · m {6kgf · m} (uniform load) for each A,B and C
- Rotational speed / 600rpm
- Speed Ratio / 1 : 1
- Shaft layout / As illustrated at right
- Running time / 8 hours/day
- Coupling method / All couplings
- Installation / Horizontal
- Location / Indoors

In case of an inline shaft drive, load applied to the Y-axis varies with the location of the gearbox. Therefore, an adequate model must be selected individually for each position. Service factor (Table 1) under the design condition is $S_f=1.0$ for all gearboxes.



① Gearbox No.1

Corrected load torque applied to the X-axis that drives only load A is:
 $58.8 \times 1.0 = 58.8\text{N} \cdot \text{m}$ { $6 \times 1.0 = 6\text{kgf} \cdot \text{m}$ }
Corrected load torque applied to the Y-axis that drives load A, B and C is:
 $(58.8 + 58.8 + 58.8) \times 1.0 = 176.4\text{N} \cdot \text{m}$
{ $((6 + 6 + 6) \times 1.0 = 18\text{kgf} \cdot \text{m})$ }
CBX-401TB is selected from the performance table.

② Gearbox No.2

Corrected load torque applied to the X-axis that drives only load B is:
 $58.8 \times 1.0 = 58.8\text{N} \cdot \text{m}$ { $6 \times 1.0 = 6\text{kgf} \cdot \text{m}$ }
Corrected load torque applied to the Y-axis that drives load B and C is:
 $(58.8 + 58.8) \times 1.0 = 117.6\text{N} \cdot \text{m}$
{ $((6 + 6) \times 1.0 = 12\text{kgf} \cdot \text{m})$ }
CBX-321TB is selected from the performance table.

③ Gearbox No.3

Corrected load torque applied to the X-axis that drives only load C is:
 $58.8 \times 1.0 = 58.8\text{N} \cdot \text{m}$ { $6 \times 1.0 = 6\text{kgf} \cdot \text{m}$ }
Corrected load torque applied to the Y-axis that drives only load C is:
 $58.8 \times 1.0 = 58.8\text{N} \cdot \text{m}$ { $6 \times 1.0 = 6\text{kgf} \cdot \text{m}$ }
CBX-251LB is selected from the performance table.

④ Model selection

No.1 gearbox is **CBX-401TB**
No.2 gearbox is **CBX-321TB**
No.3 gearbox is **CBX-251LB**



■ Moment of Inertia of KBX Bevel Gearbox's

Unit : $\text{kg} \cdot \text{m}^2$

Type	Catalog No.	Pinion Shaft (X-axis)	Gear Shaft (Y-axis)
L	KBX-101L	4.45×10^{-6}	4.45×10^{-6}
	KBX-102L	2.16×10^{-6}	8.65×10^{-6}
	KBX-151L	5.30×10^{-5}	5.30×10^{-5}
	KBX-152L	3.65×10^{-5}	1.47×10^{-4}
	KBX-201L	1.79×10^{-4}	1.79×10^{-4}
	KBX-202L	7.85×10^{-5}	3.15×10^{-4}
T	KBX-101T	4.75×10^{-6}	4.75×10^{-6}
	KBX-102T	2.23×10^{-6}	8.93×10^{-6}
	KBX-151T	5.60×10^{-5}	5.60×10^{-5}
	KBX-152T	3.37×10^{-5}	1.50×10^{-4}
	KBX-201T	1.94×10^{-4}	1.94×10^{-4}
	KBX-202T	8.20×10^{-5}	3.28×10^{-4}

[CAUTION] The moments of inertia shown in this table are reference values.
Please use data only for reference.

■ Moment of Inertia of CBX Bevel Gearbox's

Unit : $\text{kg} \cdot \text{m}^2$

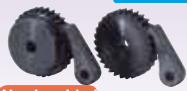







Type	Catalog No.	Pinion Shaft (X-axis)	Gear Shaft (Y-axis)
L	CBX-191L	4.00×10^{-4}	4.00×10^{-4}
	CBX-192L	1.86×10^{-4}	7.43×10^{-4}
	CBX-251L	2.48×10^{-3}	2.48×10^{-3}
	CBX-252L	1.03×10^{-3}	4.13×10^{-3}
	CBX-321L	4.00×10^{-3}	4.00×10^{-3}
	CBX-322L	1.29×10^{-3}	5.18×10^{-3}
	CBX-401L	8.95×10^{-3}	8.95×10^{-3}
	CBX-402L	3.83×10^{-3}	1.53×10^{-2}
T	CBX-191T	4.05×10^{-4}	4.05×10^{-4}
	CBX-192T	1.87×10^{-4}	7.48×10^{-4}
	CBX-251T	2.50×10^{-3}	2.50×10^{-3}
	CBX-252T	1.04×10^{-3}	4.15×10^{-3}
	CBX-321T	4.08×10^{-3}	4.08×10^{-3}
	CBX-322T	1.31×10^{-3}	5.25×10^{-3}
	CBX-401T	9.20×10^{-3}	9.20×10^{-3}
	CBX-402T	3.88×10^{-3}	1.55×10^{-2}

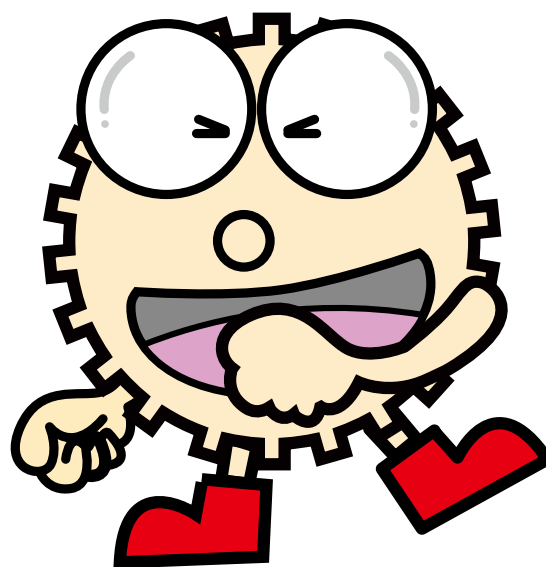
[CAUTION] The moments of inertia shown in this table are reference values.
Please use data only for reference.

Spur Gears
Helical Gears
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Racks
CP Racks & Pinions
Miter Gears
Bevel Gears
Screw Gears
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Bevel Gearboxes
Other Products



Other Products

SRT · SRTB · SRT-C Pawls & Ratchets  <i>Newly added</i> P2.09 ~ 12.57 Page 414 	GC · GC-I Gear Couplings  m2, 2.5 Page 418 	SV · SVI Involute Spline Shafts, Spline Bushings  m1.667 Page 422 	GCU Gear Assembly Kit  Page 426 
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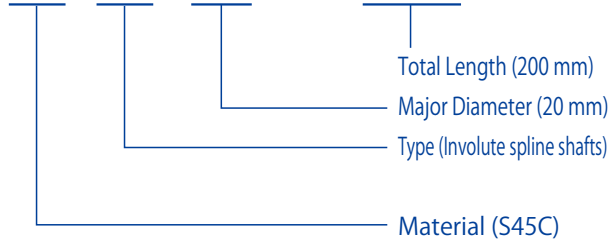


Catalog Number of KHK Stock Gears

The Catalog Number for KHK stock gears is based on the simple formula listed below. Please order KHK gears by specifying the Catalog Numbers.

(Example) Other Products

S V 20 - 200



Material
S S45C

Type
RT Pawls and Ratchets
GC Gear Coupling
V Involute Spline

Feature Icons



RoHS Compliant Product



Finished Product



Ground Gear



Resin Product



Injection Molded Product



Re-machinable Product



Heat Treated Product



Stainless Product



Copper Alloy Product



Black Oxide coated Product

Spur Gears

Helical Gears

Internal Gears

Racks

CP Racks & Pinions

Miter Gears

Bevel Gears

Screw Gears

Worm Gear Pair

Bevel Gearboxes

Other Products



Spur
Gears

Helical
Gears

Internal
Gears

Racks

CP Racks
& Pinions

Miter
Gears

Bevel
Gears

Screw
Gears

Worm
Gear Pair

Bevel
Gearboxes

Other
Products



■ Features

Characteristics of Pawls and Ratchets

- A simple structure used to restrict the rotational direction in one-way.
- The tips of pawls and the teeth of ratchets are induction hardened and therefore have superior durability.

■ Points to observe during use

- No secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm), due to gear teeth induction hardened.
- The pawls are designed to prevent reverse rotation. They are not suitable for use as driving ratchets or driving rotation.
- SRT2/3-C is manufactured using a lost wax casting method.
- Regarding SRTB ratchets with hubs, please note the direction of teeth, viewing from the hub side. KHK can produce ratchets which have the teeth pointed in the opposite direction as a custom order item.

■ Bending strength of Ratchets

The allowable transmission forces F_b (N) of ratchets is the value calculated by the following formula.

$$F_b = \sigma_b \cdot \frac{b \cdot e^2}{6} \cdot \frac{1}{h} \cdot \frac{1}{S_F}$$

Also, the SRT Ratchet's allowable torque T (N · m) for bending strength is calculated by the following formula.

$$T = F_b \cdot r_f$$

Where

σ_b = Bending stress (Assumed 225.55MPa)

b = Face width E (mm)

e = Root length (mm)

$$e = \text{Depth of teeth } (h) \times \tan \left(60 - \frac{360}{\text{No. of teeth } (z)} \right)$$

h = Depth of teeth (H) (mm)

S_F = Safety factor (Assumed 2)

r_f = Tooth root radius (m)

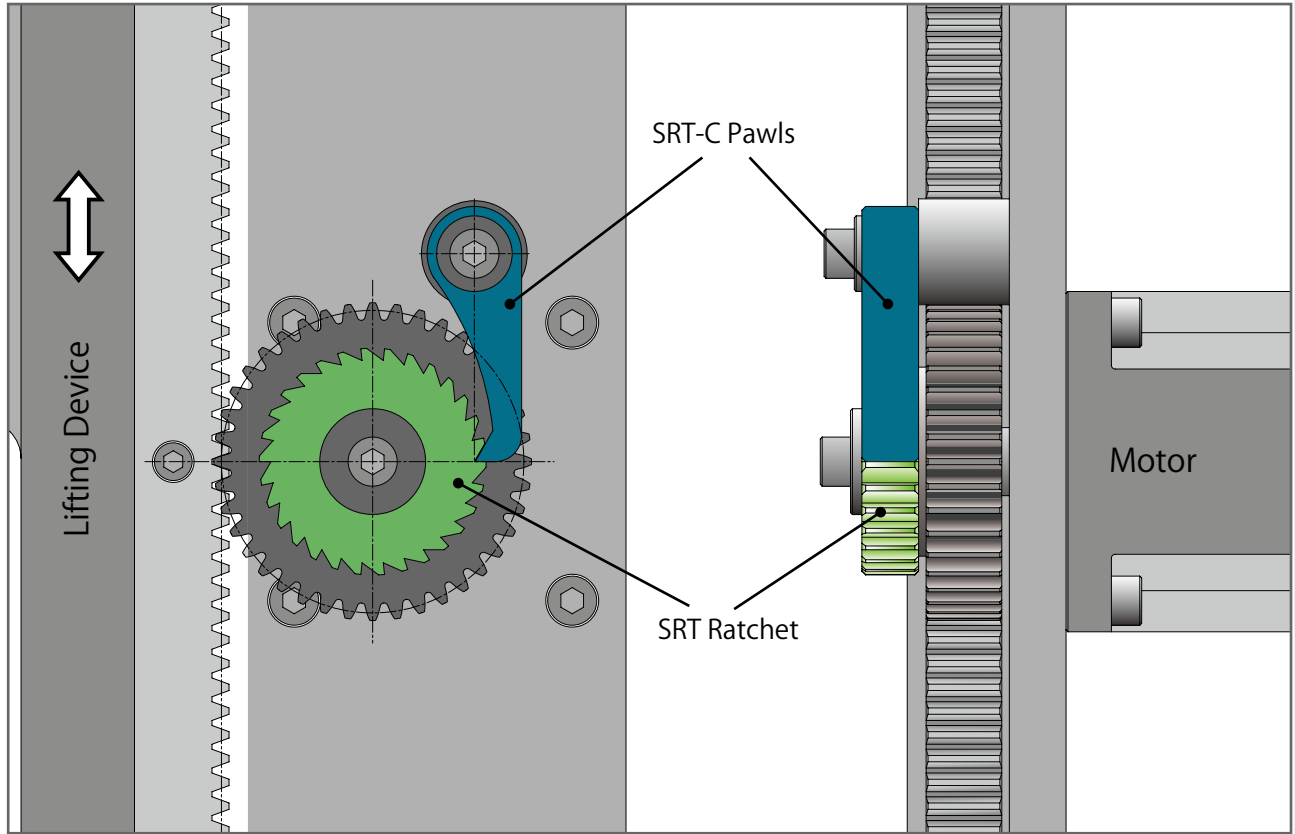
$$\rightarrow r_f = \frac{\text{Outside dia. } D - (2 \cdot h)}{2000}$$



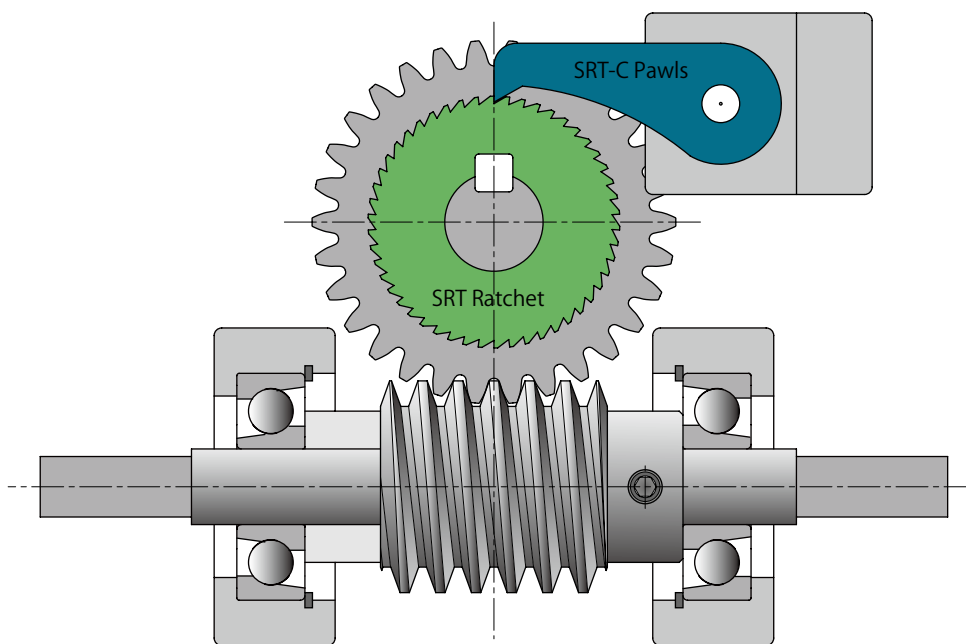
Assembly example: KHK Stock Gears Sample Units

Application

* The illustration is a design example, not a design for machinery or a device in actual use.



Example: SRT Ratchets used as a free-fall prevention mechanism of a lift device*

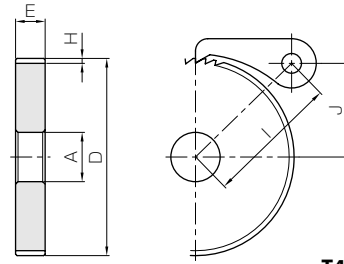


Example: ratchets used for complete reverse prevention of worm gears *

- Spur Gears
- Helical Gears
- Internal Gears
- Racks
- CP Racks & Pinions
- Miter Gears
- Bevel Gears
- Screw Gears
- Worm Gear Pair
- Bevel Gearboxes
- Other Products



Specifications	
Angle of teeth	60°
Material	S45C
Heat treatment	Induction hardened teeth
Tooth hardness	50 ~ 60HRC



T4

Spur Gears

Helical Gears

Internal Gears

Racks

CP Racks & Pinions

Miter Gears

Bevel Gears

Screw Gears

Worm Gear Pair

Bevel Gearboxes

Other Products

Catalog No.	Pitch	No. of teeth	Shape	Bore		Outside dia. D	Face width E	Hub width F	Total length G	Depth of teeth H	Center distance I	Mounting distance J	Allowable torque (N · m)		Weight (kg)
				A	B								Bending strength	Bending strength	
SRT2/3-50	2.09	50	T4	10	—	33.3	6	—	6	1	33.84	15.67	3.07	0.31	0.035
SRT2/3-60		60		40		4.10							0.42	0.053	
SRT2/3-80		80		53.3		6.00							0.61	0.096	
SRT2/3-90		90		60		7.11							0.73	0.12	
SRT2/3-100		100		66.6		8.24							0.84	0.15	
SRT1-50	3.14	50	T4	12	—	50	12	—	12	1.6	45.48	23.4	14.7	1.50	0.16
SRT1-60		60		60		19.5							1.99	0.24	
SRT1-80		80		80		29.4							3.00	0.44	
SRT1-90		90		90		34.5							3.52	0.56	
SRT1-100		100		100		39.4							4.02	0.70	
SRT2-30	6.28	30	T4	15	—	60	15	—	15	3.1	61.23	26.9	29.0	2.96	0.28
SRT2-40		40		80		49.2							5.02	0.53	
SRT2-50		50		100		70.8							7.22	0.85	
SRT2-60		60		120		94.3							9.61	1.24	
SRT3-30		9.42		30		T4							15	—	90
SRT3-40	40		120	158	16.1		1.58								
SRT3-50	50		150	229	23.3		2.54								
SRT4-30	12.57	30	T4	20	—	120	25	—	25	7.4	95.74	52.6	226	23.0	1.89
SRT4-40		40		160		385							39.3	3.53	
SRT4-50		50		200		559							57.0	5.66	

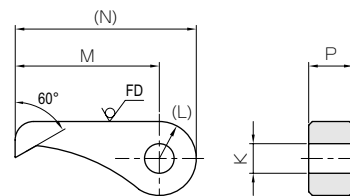
(Caution on Product Characteristics) ① Regarding SRTB ratchets with hubs, please note the direction of teeth, viewed from the hub side. KHK can produce ratchets that have teeth pointed in the opposite direction as a custom order item.
 ② Due to heat treating, some deformation of the bore may occur. It may be necessary to ream the bore to bring to the stated dimensions.

(Caution on Secondary Operations) ① Due to gear teeth induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).

SRT-C Pawls



Specifications	
Angle of teeth	60°
Material	S45C
Heat treatment	Induction hardened teeth
Tooth hardness	50 ~ 60HRC

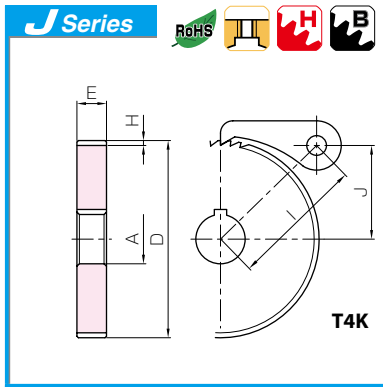


* FD has die-forged finish.

T5

Catalog No.	Shape	K	(L)	M	(N)	P	Weight (kg)
SRT2/3-C	T5	5	(8)	30	(38)	6	0.020
SRT1-C		8	(10)	39	(49)	12	0.057
SRT2-C		10	(12.5)	55	(67.5)	15	0.13
SRT3-C		12	(15)	65	(80)	20	0.23
SRT4-C		13	(18)	80	(98)	25	0.38

(Caution on Product Characteristics) ① The pawls are designed to prevent reverse rotation. They are not suitable for use as driving ratchets or driving rotation.
 ② SRT2/3-C is manufactured using a lost wax casting method.



Ratchets
Newly added



Spur Gears

Helical Gears

Internal Gears

Racks

CP Racks & Pinions

Miter Gears

Bevel Gears

Screw Gears

Worm Gear Pair

Bevel Gearboxes

Other Products

To order J Series products, please specify; Catalog No. + J + BORE

Bore	* The product shapes of J Series items are identified by background color.																		
Keyway Js9	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50	
Screw size	4 x 1.8				5 x 2.3				6 x 2.8				8 x 3.3			10 x 3.3		12 x 3.3	14 x 3.8
Catalog No.	-																		
SRT2/3-50 J BORE																			
SRT2/3-60 J BORE																			
SRT2/3-80 J BORE																			
SRT2/3-90 J BORE																			
SRT2/3-100 J BORE																			
SRT1-50 J BORE																			
SRT1-60 J BORE																			
SRT1-80 J BORE																			
SRT1-90 J BORE																			
SRT1-100 J BORE																			
SRT2-30 J BORE																			
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SRT3-50 J BORE																			
SRT4-30 J BORE																			
SRT4-40 J BORE																			
SRT4-50 J BORE																			

[Caution on J series]

- ① As available-on-request products, requires a lead-time for shipping within 2 working-days (excludes the day ordered), after placing an order. Please allow additional shipping time to get to your local distributor.
- ② Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
- ③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
- ④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
- ⑤ Areas of products which have been re-worked will not be black oxide coated.
- ⑥ For products having a tapped hole, a set screw is included.

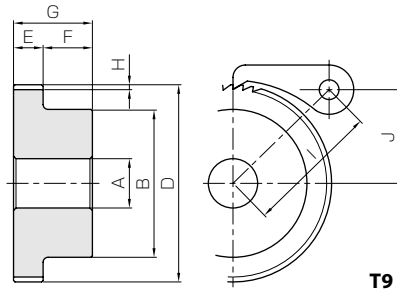
SRT-C
Pawls

SRTB Ratchets

Pitch 2.09 ~ 12.57



Specifications	
Angle of teeth	60°
Material	S45C
Heat treatment	Induction hardened teeth
Tooth hardness	50 ~ 60HRC
Screw offset (K)	Half of (F)



- Spur Gears
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- Internal Gears
- Racks
- CP Racks & Pinions
- Miter Gears
- Bevel Gears
- Screw Gears
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- Bevel Gearboxes
- Other Products

Catalog No.	Pitch	No. of teeth	Shape	Bore		Outside dia.	Face width	Hub width	Total length	Depth of teeth	Center distance	Mounting distance	Allowable torque (N · m)		Weight (kg)
				A	B								Bending strength	Bending strength	
SRTB2/3-50	2.09	50	T9	10	25	33.3	6	10	16	1	33.84	15.67	3.07	0.31	0.067
SRTB2/3-60		60		10	30	40							4.10	0.42	0.10
SRTB2/3-80		80		12	35	53.3							6.00	0.61	0.16
SRTB2/3-90		90		12	40	60							7.11	0.73	0.21
SRTB2/3-100		100		12	40	66.6							8.24	0.84	0.24
SRTB1-50	3.14	50	T9	12	35	50	12	12	24	1.6	45.48	23.4	14.7	1.50	0.24
SRTB1-60		60		15	40	60							19.5	1.99	0.34
SRTB1-80		80		15	50	80							29.4	3.00	0.61
SRTB1-90		90		15	50	90							34.5	3.52	0.73
SRTB1-100		100		15	50	100							39.4	4.02	0.87
SRTB2-30	6.28	30	T9	15	50	60	15	14	29	3.1	61.23	26.9	29.0	2.96	0.47
SRTB2-40		40		15	60	80							49.2	5.02	0.82
SRTB2-50		50		15	60	100							70.8	7.22	1.14
SRTB2-60		60		15	65	120							94.3	9.61	1.59
SRTB3-30		9.42		30	T9	15							75	90	20
SRTB3-40	40		20	80		120	158	16.1	2.17						
SRTB3-50	50		20	85		150	229	23.3	3.22						
SRTB4-30	12.57	30	T9	20	90	120	25	18	43	7.4	95.74	52.6	226	23.0	2.75
SRTB4-40		40		20	90	160							385	39.3	4.38
SRTB4-50		50		20	100	200							559	57.0	6.72

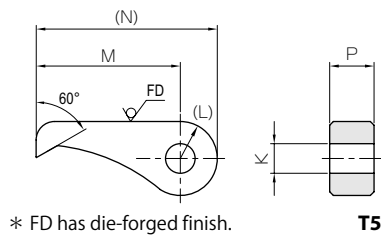
- (Caution on Product Characteristics)
- ① Regarding SRTB ratchets with hubs, please note the direction of teeth, viewed from the hub side. KHK can produce ratchets that have teeth pointed in the opposite direction as a custom order item.
 - ② Due to heat treating, some deformation of the bore may occur. It may be necessary to ream the bore to bring to the stated dimensions.
- (Caution on Secondary Operations)
- ① Due to gear teeth induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).

SRT-C Pawls

Pitch 2.09 ~ 12.57

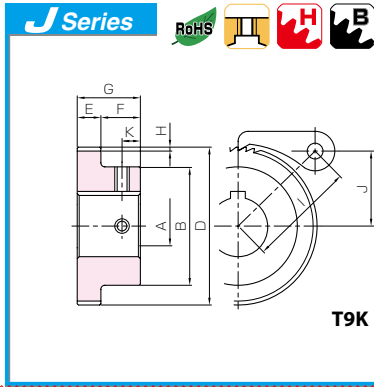


Specifications	
Angle of teeth	60°
Material	S45C
Heat treatment	Induction hardened teeth
Tooth hardness	50 ~ 60HRC



Catalog No.	Shape	K	(L)	M	(N)	P	Weight (kg)
SRT2/3-C	T5	5	(8)	30	(38)	6	0.020
SRT1-C		8	(10)	39	(49)	12	0.057
SRT2-C		10	(12.5)	55	(67.5)	15	0.13
SRT3-C		12	(15)	65	(80)	20	0.23
SRT4-C		13	(18)	80	(98)	25	0.38

- (Caution on Product Characteristics)
- ① The pawls are designed to prevent reverse rotation. They are not suitable for use as driving ratchets or driving rotation.
 - ② SRT2/3-C is manufactured using a lost wax casting method.



Ratchets
Newly added



To order J Series products, please specify; **Catalog No. + J + BORE**

Bore	* The product shapes of J Series items are identified by background color.																	
Keyway Js9	10	12	14	15	16	17	18	19	20	22	25	28	30	32	35	40	45	50
Screw size	4 x 1.8		5 x 2.3				6 x 2.8				8 x 3.3			10 x 3.3		12 x 3.3	14 x 3.8	
Catalog No.	-																	
SRTB2/3-50 J BORE																		
SRTB2/3-60 J BORE																		
SRTB2/3-80 J BORE																		
SRTB2/3-90 J BORE																		
SRTB2/3-100 J BORE																		
SRTB1-50 J BORE																		
SRTB1-60 J BORE																		
SRTB1-80 J BORE																		
SRTB1-90 J BORE																		
SRTB1-100 J BORE																		
SRTB2-30 J BORE																		
SRTB2-40 J BORE																		
SRTB2-50 J BORE																		
SRTB2-60 J BORE																		
SRTB3-30 J BORE																		
SRTB3-40 J BORE																		
SRTB3-50 J BORE																		
SRTB4-30 J BORE																		
SRTB4-40 J BORE																		
SRTB4-50 J BORE																		

[Caution on J series]

- ① As available-on-request products, requires a lead-time for shipping within 2 working-days (excludes the day ordered), after placing an order. Please allow additional shipping time to get to your local distributor.
- ② Number of products we can process for one order is 1 to 20 units. For quantities of 21 or more pieces, we need to quote price and lead time.
- ③ Keyways are made according to JIS B1301 standards, Js9 tolerance.
- ④ Certain products which would otherwise have a very long tapped hole are conterbored to reduce the length of the tap.
- ⑤ Areas of products which have been re-worked will not be black oxide coated.
- ⑥ For products having a tapped hole, a set screw is included.

SRT-C

Pawls

- Spur Gears
- Helical Gears
- Internal Gears
- Racks
- CP Racks & Pinions
- Miter Gears
- Bevel Gears
- Screw Gears
- Worm Gear Pair
- Bevel Gearboxes
- Other Products

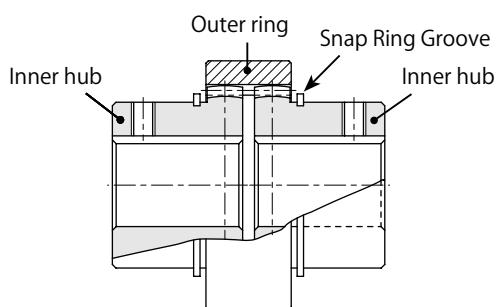


■ Features

Characteristics of Gear Couplings

- There are many ways to couple shafts to transmit power. We have developed these standardized gear couplings of our own design. They are easier to connect or disconnect than chain couplings.
- The gear teeth of the inner hubs are crowned to allow for up to 5° of shaft angle offset.
- Due to induction hardened gear teeth, these couplings have excellent durability. All surfaces are plated (Trivalent-chromate).
- The units are machined complete with keyways, set screw holes and finished bores and are ready for immediate installation. We also offer minimum bore models for users who want to perform their own secondary operations.

■ Points to observe during use



- If you require one set of GC2-30, you will need one GC2-1 (outer ring) and two GC2-30 (inner hubs). These components may also be purchased separately. Therefore, please specify set or each when ordering.
- Inner hubs come with snap rings, S type products have prepared minimum bores and finished products come with set screws.
- Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).

■ Strength of Gear Couplings

Tolerance torques of the gear couplings are determined in accordance with the shear strength of the keys. Allowable shear force of keys F (N) are calculated from the following formula.

$$F = b \cdot L \cdot \sigma \cdot \frac{1}{S}$$

Additionally, allowable torques (T) of the inner hubs of the gear coupling, versus shear force of keys, can be calculated from the formula below.

$$T = \frac{F \cdot d}{2000}$$

b : Key Width (mm) → Keyway width of inner hubs of the GC Gear Coupling

L : Key Length (mm) → Set at -2 mm from the total length of the inner hub of the GC Gear Coupling

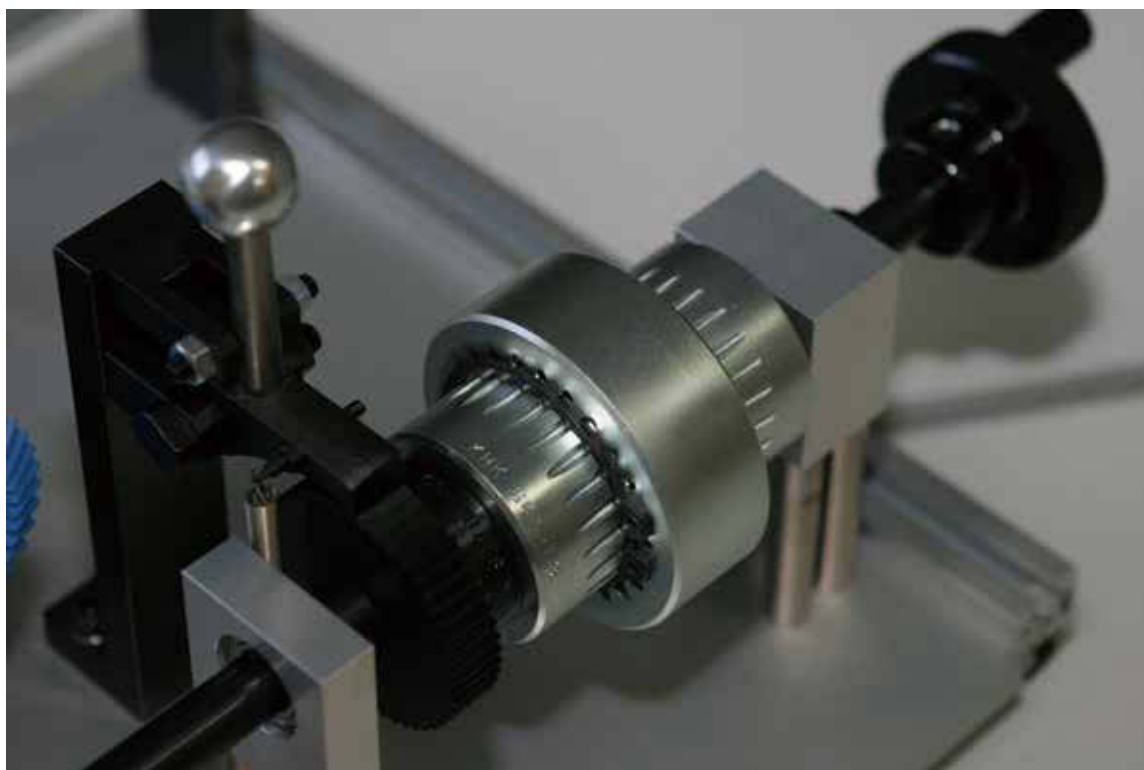
σ : Allowable Shear Force of keys → Set at 49MPa (5kgf/mm²)

S : Safety Factor → Optionally set

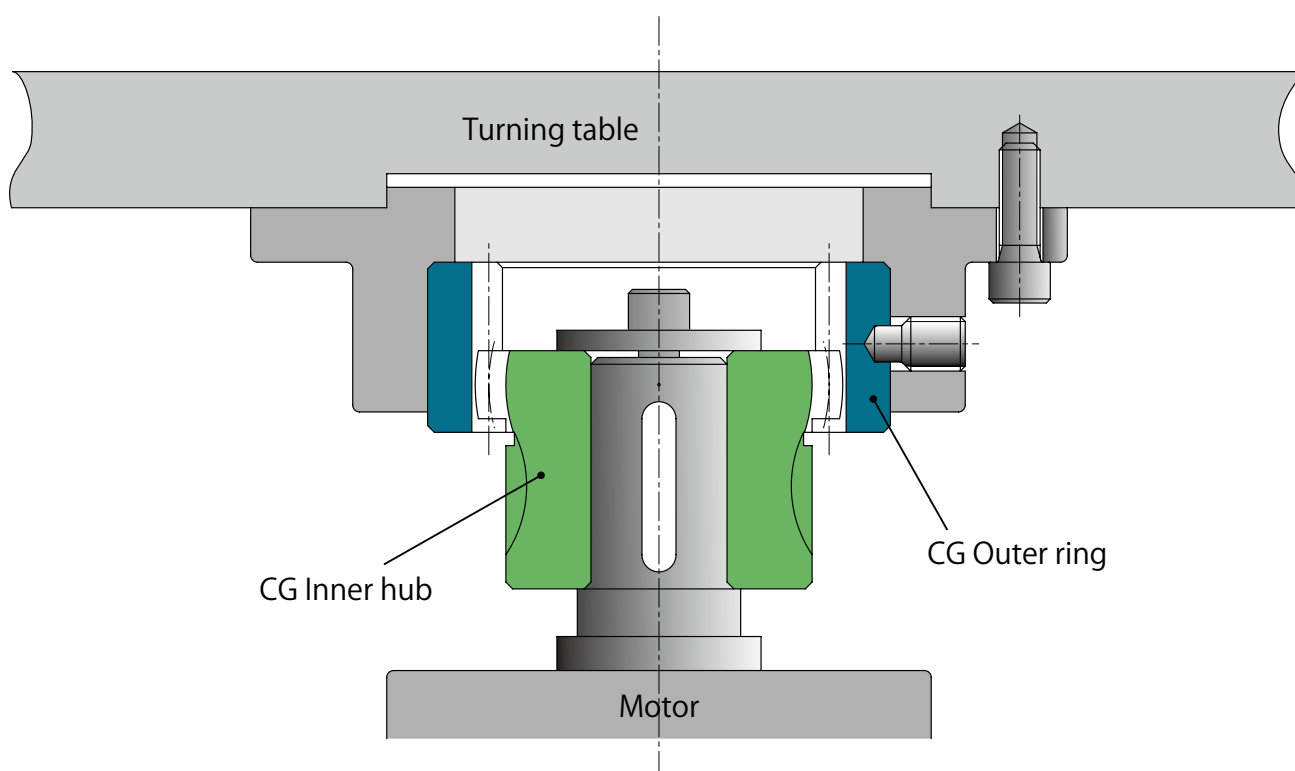
d : Bore size (mm) → Bore size A of the inner hub of the GC Gear Coupling

Caution: Safety Factor (S) must be set at a value between 1 to 3, depending on the load types or the coupling displacement.

Application



Assembly Example: KHK Stock Gears Sample Unit
Module 2 to 2.5



Specific usage for turning the work having no shafts or bores.

Spur
GearsHelical
GearsInternal
Gears

Racks

CP Racks
& PinionsMiter
GearsBevel
GearsScrew
GearsWorm
Gear PairBevel
GearboxesOther
Products



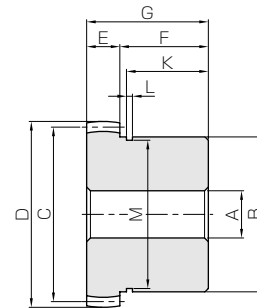
GC Gear Couplings (Inner hub)



Module 2 ~ 2.5



Specifications	
Gear teeth	Standard full depth (Inner hubs are Crowning)
Pressure angle	20°
Material	S45C
Heat treatment	Tooth surface induction hardened
Tooth hardness	50 ~ 60HRC



T2

Catalog No.	Module	No. of teeth	Shape	Bore	Hub dia.	Pitch dia.	Outside dia.	Face width	Hub width	Total length	Set Screw	
				A	B _{H7}	C	D	E	F	G	Size	L
GC1-12S	m2	25	T2	12	45	50	54	10	25	35	—	—
GC1-20			TK	20							M5	10
GC1-22			TK	22							M6	10
GC1-25			TK	25							M6	10
GC2-20S	m2	40	T2	20	70	80	84	15	40	55	—	—
GC2-30			TK	30							M6	13
GC2-32			TK	32							M10	13
GC2-35			TK	35							M10	13
GC2-40			TK	40							M10	13
GC3-20S	m2.5	42	T2	20	90	105	110	20	45	65	—	—
GC3-45			TK	45							M10	20
GC3-50			TK	50							M10	20

[Caution on Product Characteristics]

- ① S-type products are of minimum bore depth. Keyways are made according to JIS B1301 standards, Js 9 tolerance.
- ② For products with a snap ring and a tapped hole, a set screw is included as an accessory.
- ③ The allowable torques in the table are obtained from the shear strength of keyways. The shear strength of keyway is assumed to be 49MPa (5kgf/mm²).
- ④ Since trivalent-chromate treatment is applied, changes may occur in the dimensions of the bore, keyway etc., decreasing by a few μm.

[Caution on Secondary Operations]

- ① Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).



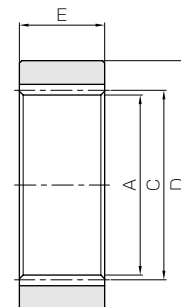
GC-I Gear Couplings (Outer ring)



Module 2 ~ 2.5



Specifications	
Gear teeth	Standard full depth
Pressure angle	20°
Material	S45C
Heat treatment	Tooth surface induction hardened
Tooth hardness	50 ~ 60HRC



T1

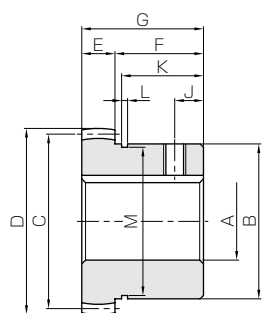
Catalog No.	Module	No. of teeth	Shape	Internal dia.	Pitch dia.	Outside dia.	Face width	Backlash (mm)	Weight (kg)
				A	C	D	E		
GC1-I	m2	25	T1	46	50	68	25	0.40~0.60	0.33
GC2-I	m2	40		76	80	105	36		1.03
GC3-I	m2.5	42		100	105	145	48		2.96

[Caution on Secondary Operations]

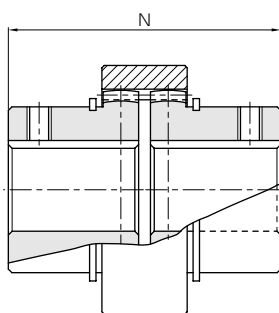
- ① Due to the gear teeth being induction hardened, no secondary operations can be performed on tooth areas including the bottom land (approx. 2 to 3 mm).

* For products not categorized in our 'KHK Stock Gear series', custom gear production services is available. For details see page 8.

Gear Couplings (Inner hub)



TK



C-Shaped Snap Ring Groove			Total Width of Gear Coupling N	Keyway Width×Depth	Allowable torque (N · m)		Backlash (mm)	Weight (kg)	Catalog No.
K	L	M			Shear strength of keyways				
23	1.95	42.5	73	—	—	—	0.40~0.60	0.43 0.37 0.35 0.32	GC1-12S GC1-20 GC1-22 GC1-25
				5 x 2.3	68.7	7.00			
				7 x 3 7 x 3	98.1 137	10.0 14.0			
37	2.7	67	115	—	—	—	0.40~0.60	1.66 1.48 1.42 1.36 1.23	GC2-20S GC2-30 GC2-32 GC2-35 GC2-40
				7 x 3	245	25.0			
				10 x 3.3	294	30.0			
				10 x 3.3 10 x 3.3	392 490	40.0 50.0			
42	3.2	86.5	135	—	—	—	0.40~0.60	3.43 2.74 2.56	GC3-20S GC3-45 GC3-50
				12 x 3.3 12 x 3.3	785 883	80.0 90.0			

GC-I

Gear Couplings (Outer ring)

Spur
GearsHelical
GearsInternal
Gears

Racks

CP Racks
& PinionsMiter
GearsBevel
GearsScrew
GearsWorm
Gear PairBevel
GearboxesOther
Products



■ Features

Characteristics of Gear Couplings

- SV and SVI series are made according to the automotive involute spline standard, JIS D 2001: 1959 (FLAT ROOT SIDE FIT, Backlash 0.06 to 0.15)
- Involute spline shafts and bushings are thermal refined to have good abrasion-resistance.
- Spline bushings may be made in CAC (bronze) type material as a special custom order item.

■ Points to observe during use

- Be sure not to bend shafts or break teeth when performing secondary operations on SV Involute Spline shafts.
- When using SVI Spline Bushings with sliding movement, lubrication is necessary on the sliding surface. To prevent scuffing, it is recommended to apply lubricating grease. If used in applications where oil contamination is not desirable, solid lubrication is recommended.

■ The surface strength of Spline

The design concept of the spline surface strength is the same as that of a key. Here is the formula for the allowable transmission force (N) of spline.

$$F = \eta \cdot z \cdot h_w \cdot l \cdot \sigma$$

And the formula of allowable torque T (N · m) of spline with respect to the surface strength.

$$T = \frac{F \cdot d_w}{2000}$$

In designing a spline shafts, besides considering the surface strength, we should take into account the torsional and bending stresses of the spline.

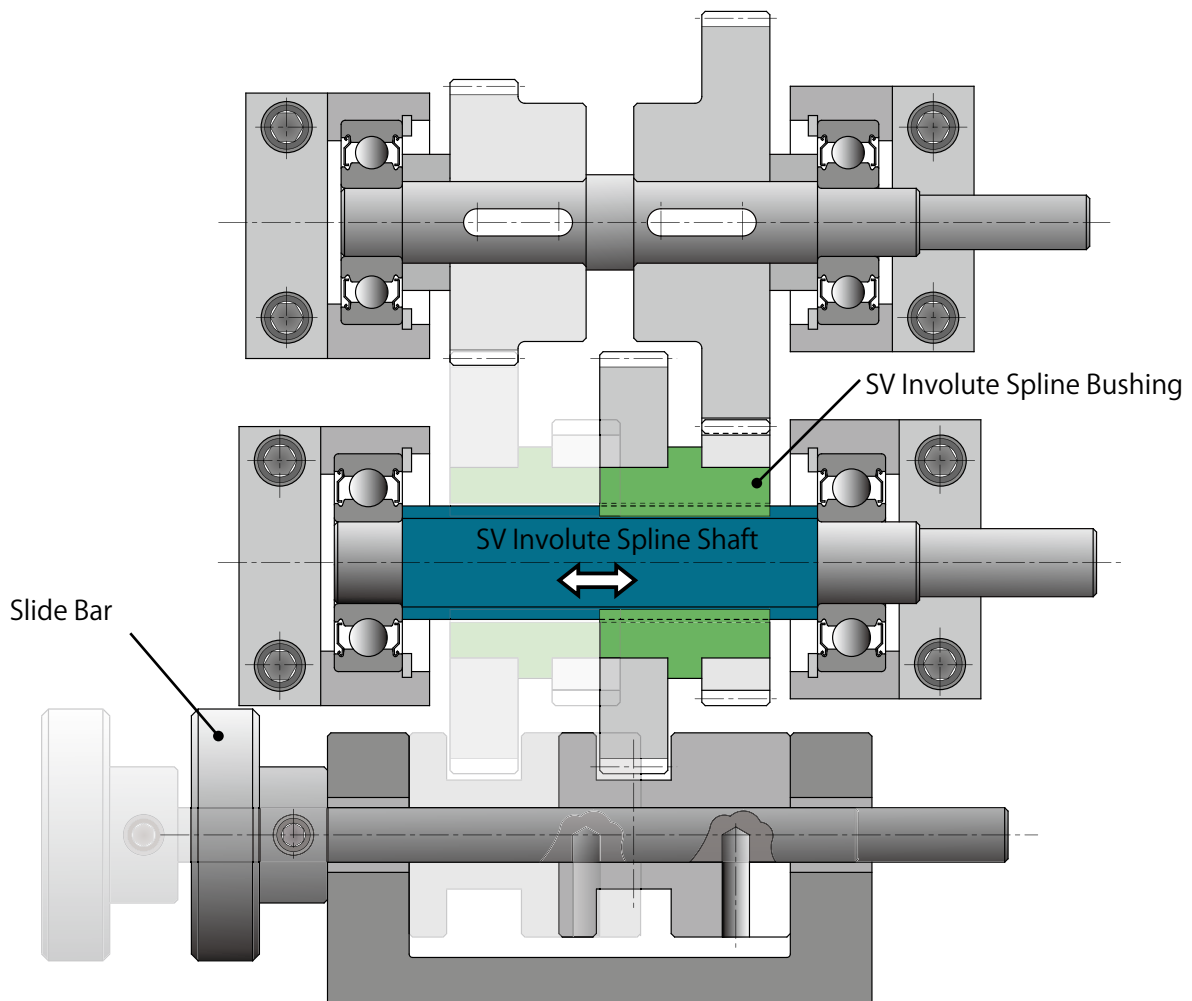
Here

- η : Contact ratio of surface → 0.75 (assumed)
- z : Number of teeth → number of teeth (z) of spline from the table
- h_w : Contact depth of tooth → 1.485
- l : Contact length of spline → Total length (A) of involute spline bushing
- σ : Allowable surface stress of spline → 19.61MPa (2kgf/mm²) (assumed)
- d_w : Contact diameter (mm) → Tip diameter of spline shaft D - h_w

Application



Assembly Example: KHK Stock Gears Sample Unit



SV Involute Spline Shafts are used in shift transmission mechanisms

Spur
GearsHelical
GearsInternal
Gears

Racks

CP Racks
& PinionsMiter
GearsBevel
GearsScrew
GearsWorm
Gear PairBevel
GearboxesOther
Products



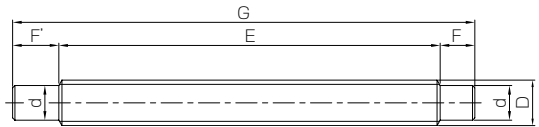
SV Involute Spline Shafts



Module 1.667



Specifications	
Gear teeth	Stub teeth
Pressure angle	20°
Material	S45C
Heat treatment	Thermal refined
Tooth hardness	200 ~ 270HB



TA

Catalog No.	Module	No. of teeth	Shape	Outside dia.	Shaft dia.	Face width	Shaft length (R)	Shaft length (L)	Total length	Backlash (mm)	Weight (kg)
				D	$d \begin{smallmatrix} +0.22 \\ +0.15 \end{smallmatrix}$	E	F	F'	G		
SV17-170	m1.667	8	TA	16.67	13	135	20	15	170	0.06~0.15	0.26
SV20-200		10	TA	19.67	15	165	20	15	200	0.06~0.15	0.43
SV25-250		13	TB	24.67	20	220	—	30	250	0.06~0.15	0.88
SV30-300		16	TB	29.67	25	270	—	30	300	0.06~0.15	1.55

[Caution on Secondary Operations] ① Be sure not to bend shafts or break teeth when performing secondary operations on SV Involute Spline shafts.

* For products not categorized in our KHK Stock Gear series', custom gear production services with **short lead times** is available. For details see page 8.



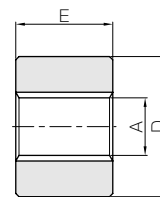
SVI Involute Spline Bushings



Module 1.667



Specifications	
Gear teeth	Stub teeth
Pressure angle	20°
Material	S45C
Heat treatment	Thermal refined
Tooth hardness	200 ~ 270HB



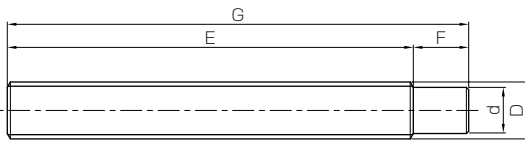
T1

Catalog No.	Module	No. of teeth	Shape	Internal dia.	Outside dia.	Face width	Allowable torque (N · m)	Allowable torque (kgf · m)	Backlash (mm)	Weight (kg)
				A	D	E	Surface durability	Surface durability		
SVI17-40	m1.667	8	T1	13.7	40	25	33.2	3.38	0.06~0.15	0.21
SVI20-45		10		16.7	45	30	59.6	6.08	0.06~0.15	0.31
SVI25-55		13		21.7	55	38	125	12.8	0.06~0.15	0.57
SVI30-65		16		26.7	65	45	222	22.6	0.06~0.15	0.93

[Caution on Product Characteristics] ① The allowable torques are calculated based on "The surface strength of Spline".

② It is essential to apply lubricant on contact surface of the spline shaft and the hub. To prevent scuffing, it is recommended to apply lubricating grease. If used in applications where oil contamination is not desirable, solid lubrication is recommended.

* For products not categorized in our KHK Stock Gear series', custom gear production services with **short lead times** is available. For details see page 8.

Involute Spline Shafts**TB**Spur
GearsHelical
GearsInternal
Gears

Racks

CP Racks
& PinionsMiter
Gears

SVI

Involute Spline BushingsBevel
GearsScrew
GearsWorm
Gear PairBevel
GearboxesOther
Products



Spur Gears



GCU-S Spur Gear Kit

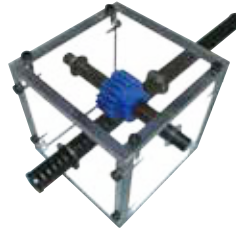
Helical Gears



GCU-H Helical Gear Kit



GCU-M Miter Gear Kit



GCU-R Rack Kit



GCU-N Screw Gear Kit



GCU-W Worm Gear Pair Kit

Internal Gears

Racks

Catalog No.	Installment	Gear Type	Gears	Speed Ratio	Weight (Approx. kg)
GCU-S	Apparel Axes Gears (Two stages)	Spur Gears	SS1.5-16 x2, PS1.5-22 x2	1.89	1
GCU-H	Apparel Axes Gears	Helical Gears (Screw Gears)	SN2.5-10L, PN2.5-10R	1	1
GCU-R	Apparel Axes Gears	Racks & Pinion	SRO1.5-500, PS1.5-20	—	1
GCU-M	Intersecting Axes Gears	Miter Gears	SM2-25, PM2-25	1	1
GCU-N	Nonparallel and Nonintersecting Axes Gears	Screw Gears	SN2.5-10R, PN2.5-10R	1	1
GCU-W	Nonparallel and Nonintersecting Axes Gears	Worms	SW2-R1, PG2-20R1	20	1
GCU-H45	Hand Wheel	—	—	—	0.068

(Caution on Product Characteristics)

① These kits are not for actual use to transmit power and please use only as representations of gear systems.

CP Racks & Pinions

Miter Gears

Bevel Gears

Screw Gears

Worm Gear Pair

Bevel Gearboxes

Other Products

GCU-S Spur Gear Kit



The Gear Kit contains two-stage spur gears and allows speed increases / reductions, and includes the most commonly used combinations of gears.

GCU-H Helical Gear Kit



Helical gears have more strength than spur gears of the same dimensions and have the advantage of being less noisy

GCU-M Miter Gear Kit



Use of bevel gears allows the changing of the shaft angle by 90 degrees. Applications include the changing of the direction of power.

GCU-R Rack Kit



Use of racks enables the conversion of rotation motion to linear motion. Applications include devices that provide lift.

GCU-N Screw Gear Kit



Screw Gears are helical gears used in nonparallel and nonintersecting situations. Applications include devices like conveyers with light loads.

GCU-W Worm Gear Pair Kit

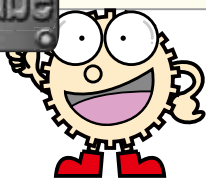
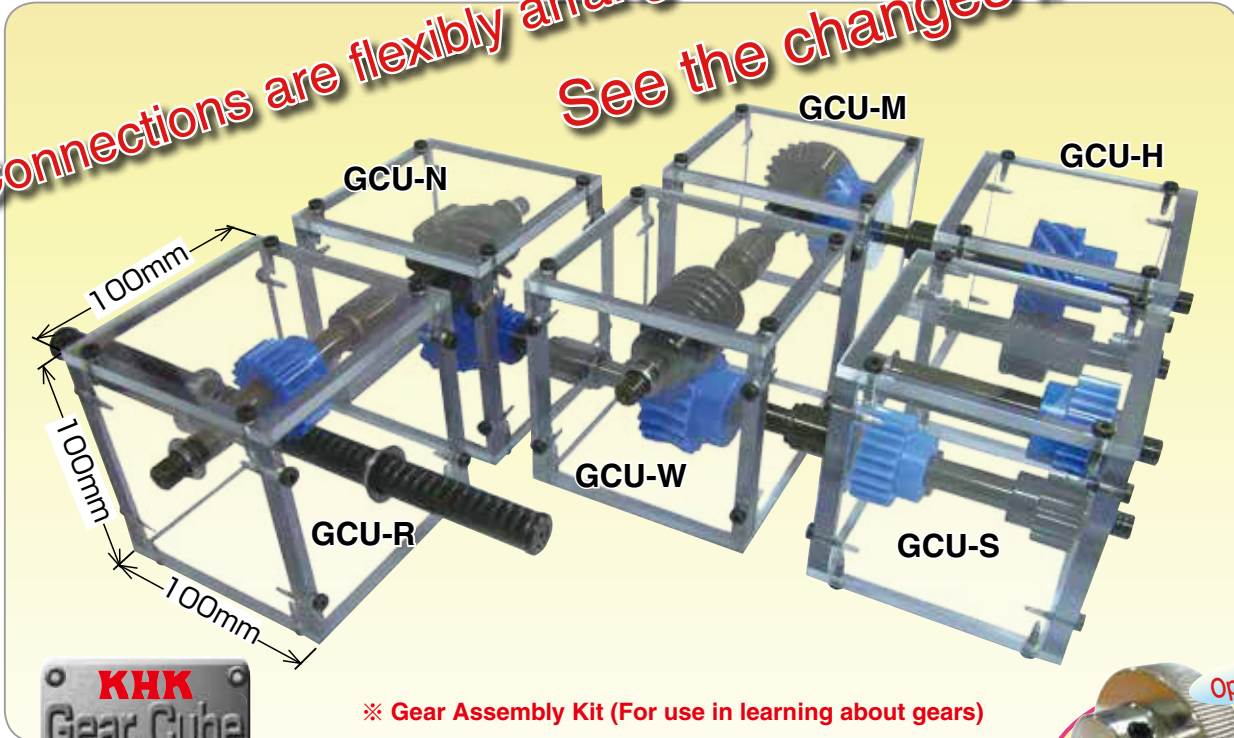


Worm Gear Pairs can be used to make large reductions in speed in a single phase. The Worm gear cannot be driven by the worm wheel due to inherent self-locking.



KAWAGUCHI i-mono Certified as Kawaguchi i-mono Brand Products

*Connections are flexibly arranged!
See the changes in rotation!*



- Spur Gears
- Helical Gears
- Internal Gears
- Racks
- CP Racks & Pinions
- Miter Gears
- Bevel Gears
- Screw Gears
- Worm Gear Pair
- Bevel Gearboxes
- Other Products

Assembly Instructions

For details see our website

The picture is GCU-R.



Remove film coverings from all the frames.



Attach bushings to the frames.



Install the Spur Gear to the shaft.



Set up the shaft in the frame.



set contents

Picture is GCU-R



Place the attractive special sticker on the gear assembly kit.



Screwed

For details visit our website

Autorisierter Händler | Distributeur autorisé | Distributore autorizzato | Authorized distributor



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