TSUBAKI JAW-FLEX COUPLING (L SERIES)

The TSUBAKI Jaw-flex Coupling has an extremely simple design, consisting of just two hubs and an insert. In addition to having excellent torque transmission characteristics and vibration and shock absorption capacity, it is extremely easy to install and remove. There are three types of inserts to choose from, depending upon operating temperature and chemical resistance requirements, and there is a wide lineup of easy-to-use models suitable for use with general-purpose motors of up to 110 kW.

Our L-series Jaw-flex Coupling represents a return to our original coupling design philosophy, and we are confident that you will be more than satisfied with its performance.

Comparison between Jaw-flex Coupling and JIS flexible flanged shaft couplings

Item \ Coupling	L-Series Jaw-flex Coupling	JIS Flexible Flanged Shaft Coupling
Model	L090-H	112
Rated Torque	44.1 N·m	32.3 N·m
Maximum Shaft Bore Dia.	ø 29 mm	ø 28 mm
No. of Parts	3	22
Compactness (Total length) (External diameter)	54.4 mm ø 53.6 mm	83 mm ø 112 mm
Weight	0.54 kg	2.64 kg
Operating Temperature Range	–50 to 120°C	–20 to 90°C
Allowable Offset Misalignment	0.38 mm	0.1 mm
Allowable Angular Misalignment	1/2°	1/6°
Maximum speed	9000 r/min	4000 r/min
Installation and Removal	Move along the shaft to connect or disconnect	Four bolts must be loosened (or tightened)
Cost Ratio	0.8	1.0

(Directly connected to a 3.7 kW motor running at 1800 r/min)

Wide Variation — With a total of 33 sizes (shaft bore diameters from 4 to 69 mm) for torque ranges from 0.4 to 711 N·m, there is now an ever wider variety to choose from.

Ideal for Direct Motor Connection — The designs are suitable for high-speed and low-torque applications, and are suitable for use with most general-purpose motors. Four-pole motors of up to 45 kW and two-pole motors of up to 110 kW can be used.

Selectable Inserts — There are three types of standard inserts, S, M, and H (L035 can use the S type only, and L050 can use the S and H types only). Select the type of insert that best suits your application. The characteristics of each type are listed on page 14.

Light and Compact — Compared to the equivalent JIS (Japan Industrial Standards) flange-type bending shaft couplings for direct connections to motors, Jaw-flex Couplings have approximately 1/2 the diameter and are 1/10 to 1/2 the weight.

Simple Construction — There are only three parts, so failure is rare. Repair is simple.

Excellent Resistance to Chemicals — It is possible to select an insert that is resistant to oil and chemicals.

Wide Operating Temperature Range — The H-type insert can be used at temperatures in the range of -50 to 120°C. Use of rubber-type inserts at such temperature extremes is not possible.

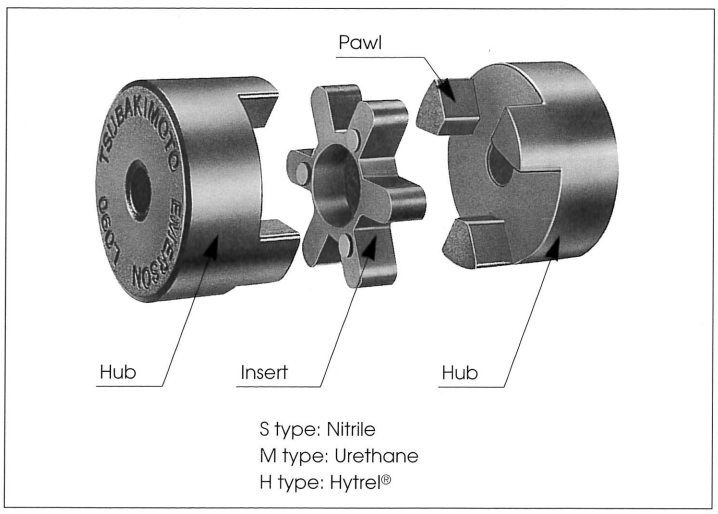
Large Allowable Misalignment — Approximately twice the allowable offset misalignment, and six times the allowable angular misalignment of JIS (Japan Industrial Standards) flange-type bending shaft couplings.

Simple Installation — Connection is through the pawls on the two hubs, and inserting, connecting and disconnecting are possible by simply moving the hubs along the shaft.

Economically Priced — This economical design is the most cost-effective coupling for direct motor connection available.

Wide Stock Range — 78 kinds of finished bore type are available.

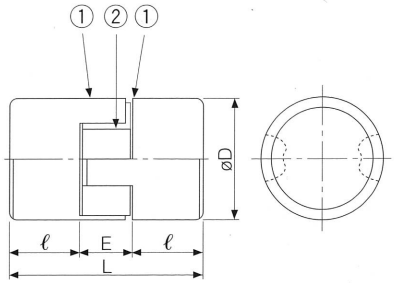
■ CONSTRUCTION



Hytrel® is a registered trademark of the DuPont Corporation.

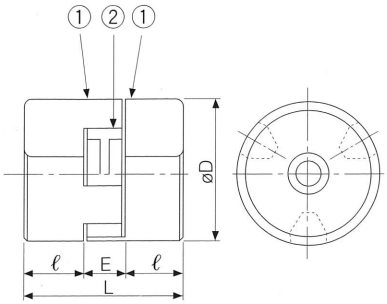
■ TRANSMISSION CAPACITY AND DIMENSIONS

Type 1



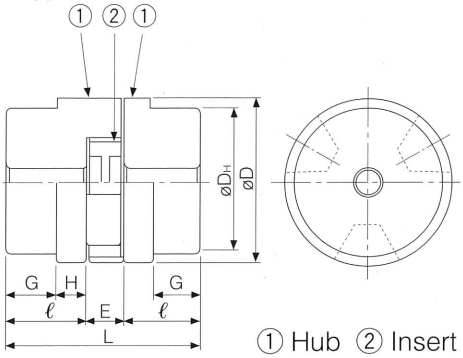
① Hub ② Insert

Type 2



① Hub ② Insert

Type 3



① Hub ② Insert

Dimensions in mm

Model No.	Rated Torque (N·m)	Maximum Speed (r/min)	Type	Pilot Bore Dia.	Max. Bore Dia.	L	ℓ	E	G	H	D	D_H	Weight (kg)	Inertia (10^{-4} kg·m²)
L035-S	0.4	31000	1	–	9.5	20.8	6.7	7.4	–	–	15.9	–	0.015	0.006
L050-S	2.9	18000	1	–	16.0	44.5	15.9	12.7	–	–	27.4	–	0.10	0.12
L050-H	5.9													
L070-S	4.9	14000	1	6.4	20.0	51.2	19.0	13.2	–	–	34.5	–	0.20	0.40
L070-M	7.8				19.0									
L070-H	12.7													
L075-S	11.8	11000	2	8.0	26.0	54.4	20.6	13.2	–	–	44.5	–	0.36	1.14
L075-M	14.7													
L075-H	25.5													
L090-S	16.7	9000	2	11.1	29.0	54.4	20.6	13.2	–	–	53.6	–	0.54	2.45
L090-M	24.5													
L090-H	44.1													
L095-S	23.5	9000	2	11.1	29.0	64.0	25.4	13.2	–	–	53.6	–	0.64	2.95
L095-M	32.3													
L095-H	63.7													
L099-S	35.3	7000	2	12.7	35.0	72.8	27.0	18.8	–	–	64.3	–	1.1	6.95
L099-M	53.9													
L099-H	89.2													
L100-S	49.0	7000	2	15.0	37.0	88.8	34.9	19.0	–	–	64.3	–	1.2	8.35
L100-M	70.6				35.0									
L100-H	128													
L110-S	110	5000	2	18.0	48.0	108.4	42.9	22.6	–	–	84.1	–	2.8	31
L110-M	133				47.0									
L110-H	256													
L150-S	157	5000	2	22.0	49.0	114.6	44.4	25.8	–	–	95.2	–	3.7	53
L150-M	214													
L150-H	363													
L190-S	192	5000	3	19.1	58.0	134.1	54.0	26.1	34.9	19.1	114.3	101.6	5.8	108
L190-M	288													
L190-H	529													
L225-S	264	4200	3	19.1	69.0	153.1	63.5	26.1	34.9	28.6	127.0	107.9	8.0	182
L225-M	395				63.0									
L225-H	711													

1. All sizes are stock items.
2. The maximum speed is determined by the transmission capacity of the coupling (without balance adjustment).
3. The weights and inertia listed in the table are for couplings with bore holes of the maximum allowable diameter.

■ INSERT CHARACTERISTICS

It is possible to select from three types of inserts, S, M, and H, for each Jaw-flex coupling (however, the L035 can use the S type only, and the L050 can use the S and H types only). The characteristics of each type are listed in the table below. Select the type of insert that best suits your application.

S type:

Made of nitrile rubber, the S type insert has excellent flexibility and resistance to shock. It is the most commonly used type.

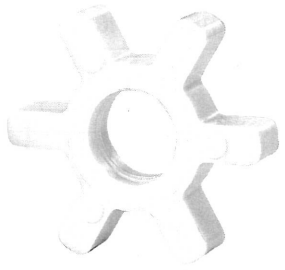
M type:

Made of urethane, the M type insert has approximately 1.5 times the transmission torque capacity of the S type. It also has excellent resistance to chemical attack.

H type:

Made of Hytrel, the H type insert has approximately two to three times the transmission torque capacity of the S type. It also has excellent resistance to oil and chemical attack, and high and low temperatures.

Inserts



H type

S type M type

Insert Characteristics

Characteristics / Type	Insert Material	Color	Torque Factor	Flexibility	Shock Resistance	Oil Resistance	Chemical Resistance	Operating Temperature Range	Allowable Angular Misalignment	Allowable Offset Misalignment
S type	Nitrile	Black	1	◎	◎	○	—	–40 to 100°C	1°	0.38 mm
M type	Urethane	Blue	1.5	◎	○	○	○	–34 to 70°C	1°	0.38 mm
H type	Hytrel®	White	2 – 3	○	○	◎	◎	–50 to 120°C	0.5°	0.38 mm

Note: Hytrel® is registered trademark of DuPont Corporation. ◎ Excellent ○ Good

FINISHED BORE TYPE HUB

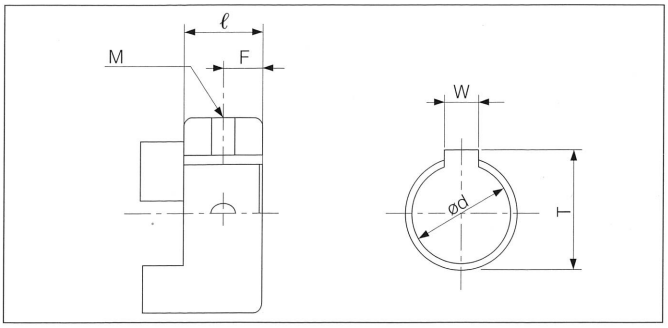
■ DIMENSIONS (Refer to the drawing on the next page)

Dimensions in mm

Bore Size Code	Type (size)							ød		W		T	
	L035	L050	L070	L075	L090	L099	L110	Nominal Bore Diameter	Tolerance	Nominal Width	Tolerance	Nominal Depth	Tolerance
5								5	H7 $^{+0.012}_{0}$	Without Keyway			
6								6	H7 $^{+0.012}_{0}$				
8								8	H7 $^{+0.015}_{0}$				
10								10	J7 $^{+0.015}_{0}$				
11								11	H7 $^{+0.018}_{0}$				
12J								12	H7 $^{+0.018}_{0}$	4	±0.015	13.8	$^{+0.1}_{0}$
12E										4	$^{+0.050}_{+0.020}$	13.5	$^{+0.2}_{0}$
14JN								14	G7 $^{+0.024}_{+0.006}$	5	±0.015	16.3	$^{+0.1}_{0}$
15J								15	H7 $^{+0.018}_{0}$	5	±0.015	17.3	$^{+0.1}_{0}$
15E										5	$^{+0.050}_{+0.020}$	17	$^{+0.2}_{0}$
16J								16	H7 $^{+0.018}_{0}$	5	±0.015	18.3	$^{+0.1}_{0}$
16E										5	$^{+0.050}_{+0.020}$	18	$^{+0.2}_{0}$
18J								18	H7 $^{+0.018}_{0}$	6	±0.015	20.8	$^{+0.1}_{0}$
18E										5	$^{+0.050}_{+0.020}$	20	$^{+0.2}_{0}$
19JN								19	G7 $^{+0.028}_{+0.007}$	6	±0.015	21.8	$^{+0.1}_{0}$
20J								20	H7 $^{+0.021}_{0}$	6	±0.015	22.8	$^{+0.1}_{0}$
20E										5	$^{+0.050}_{+0.020}$	22	$^{+0.2}_{0}$
22J								22	H7 $^{+0.021}_{0}$	6	±0.015	24.8	$^{+0.1}_{0}$
22E										7	$^{+0.061}_{+0.025}$	25	$^{+0.2}_{0}$
24JN								24	G7 $^{+0.028}_{+0.007}$	8	±0.018	27.3	$^{+0.2}_{0}$
25J								25	H7 $^{+0.021}_{0}$	8	±0.018	28.3	$^{+0.2}_{0}$
25E										7	$^{+0.061}_{+0.025}$	28	$^{+0.2}_{0}$
28JN								28	G7 $^{+0.028}_{+0.007}$	8	±0.018	31.3	$^{+0.2}_{0}$
30J								30	H7 $^{+0.021}_{0}$	8	±0.018	33.3	$^{+0.2}_{0}$
30E										7	$^{+0.061}_{+0.025}$	33	$^{+0.2}_{0}$
32J								32	H7 $^{+0.025}_{0}$	10	±0.018	35.3	$^{+0.2}_{0}$
32E										10	$^{+0.061}_{+0.025}$	35.5	$^{+0.2}_{0}$
35J								35	H7 $^{+0.025}_{0}$	10	±0.018	38.3	$^{+0.2}_{0}$
35E										10	$^{+0.061}_{+0.025}$	38.5	$^{+0.2}_{0}$
38JN								38	$^{+0.040}_{+0.015}$	10	±0.018	41.3	$^{+0.2}_{0}$
42JN								42	$^{+0.040}_{+0.015}$	12	±0.021	45.3	$^{+0.2}_{0}$
45J								45	H7 $^{+0.025}_{0}$	14	±0.021	48.8	$^{+0.2}_{0}$
45E										12	$^{+0.075}_{+0.032}$	48.5	$^{+0.2}_{0}$
48JN								48	$^{+0.040}_{+0.015}$	14	±0.021	51.8	$^{+0.2}_{0}$

Notes: 1. The shaded parts are standard stock items, other bore sizes, and type L150, L190, L225 with finished bore are "made to order" items.
2. The alphabet of bore size code represents;
J: Keyway is based on ISO R773 (JIS B1301-1976)
E: Keyway is based on JIS B1301-1959
JN: Bore and Keyway can fit to the IEC standard motor.
3. Bore size code is indicated on the surface of the coupling.

■ OUTLINE DRAWING FOR FINISHED BORE TYPE



Dimensions

Dimensions in mm

Type	R	F	M Set Screw
L035	6.7	3.0	M3 × 4 ℓ
L050	15.9	8.0	M4 × 6 ℓ
L070	19.0	9.5	M5 × 5 ℓ
L075	20.6	10.5	M5 × 5 ℓ
L090	20.6	10.5	M6 × 8 ℓ
L099	27.0	13.5	M6 × 8 ℓ
L110	42.9	20.5	M8 × 12 ℓ

■ DIMENSION TABLE FOR SHAFT DIAMETER AND TOLERANCE OF IEC MOTOR (3phase, 4pole)

Dimensions in mm

Motor Capacity	0.2 kW	0.4 kW	0.75 kW	1.5 kW	2.2 kW	3.7 kW	5.5 kW	7.5 kW	11 kW	15 kW	22 kW
Motor Size	63	71	80	90L	100L	112M	132S	132M	160M	160L	180M
Shaft Diameter & Tolerance	11 0 h6 −0.018	14+0.008 j6 −0.003	19+0.009 j6 −0.004	24+0.009 j6 −0.004	28+0.009 j6 −0.004	28+0.009 j6 −0.004	38+0.018 k6 +0.002	38+0.018 k6 +0.002	42+0.018 k6 +0.002	42+0.018 k6 +0.002	48+0.018 k6 +0.002

PLATED TYPE

Special nickel plating is applied to the sintered hub (L190, L225 is a cast iron hub).
Plated type hubs with Urethane or Hytrel inserts are combined for anti-corrosion.
Because of its anti-corrosion feature, it is suitable for food, sanitary, and textile machines.
All sizes are supplied with a pilot bore.
Transmission capacity and dimensions are the same as the standard pilot bore type.

■ TYPE CODE IDENTIFICATION

Finished bore type

L 070 — S — 11 × 20 E

- E — Keyway standard
  - J: As per ISO·R773(JIS B1301-1976)
  - E: As per JIS·B1301-1959
  - No mark: Without keyway (Bore Dia.: 5-11mm)
- 11 × 20 — Bore size (Pilot Bore: RB)
- S — Insert type
  - S: Nitril
  - M: Urethane
  - H: Hytrel®
- 070 — Size
- L — Series

Pilot bore type coupling

L 090 — M

- M — Insert type
- 090 — Size
- L

Plated type coupling

L 070 F — M

- M — Insert type
- F — Plated type
- 070
- L

■ SELECTION

(1) Select a service factor from Table 2 on page 18, based on the type of drive source and load conditions.
(2) Calculate the corrected torque (T') by multiplying the load torque by this service factor (SF), and select a model whose rated torque is greater than this corrected torque.
(3) Confirm that the required shaft bore hole diameter is smaller than the maximum allowable diameter for the model that you have chosen. If it is larger, select a model that meets this requirement.
(4) If the coupling is to be connected directly to a motor, refer to the selection table below.

Torque Calculation

$$T = \frac{9550 \times kW}{N}$$

$T' = T \times S.F.$

T = Load torque (N·m)
kW = Motor capacity (kW)
T' = Compensated torque
S.F. = Service factor

Table 1. Selection Table (for direct connection to a 50 Hz motor and 60 Hz motor)

50 Hz Motor Rated Output (kW)	Two Pole 3000 r/min					Four Pole 1500 r/min					Six Pole 1000 r/min				
	Motor Shaft Diameter (mm)	Rated Motor Torque (N·m)	Service Factor			Motor Shaft Diameter (mm)	Rated Motor Torque (N·m)	Service Factor			Motor Shaft Diameter (mm)	Rated Motor Torque (N·m)	Service Factor		
			1.0	1.5	2.0			1.0	1.5	2.0			1.0	1.5	2.0
			Coupling Model					Coupling Model					Coupling Model		
0.1						11	0.6	L050-S	L050-S	L050-S					
0.2	11	0.6	L050-S	L050-S	L050-S	11	1.3	L050-S	L050-S	L050-S	14	1.9	L070-S	L070-S	L070-S
0.4	14	1.3	L050-S	L050-S	L050-S	14	2.5	L050-S	L050-H	L050-H	19	3.8	L075-S	L075-S	L075-S
0.75	19	2.4	L070-S	L070-S	L070-S	19	4.8	L070-S	L070-M	L070-H	24	7.2	L090-S	L090-S	L090-S
1.5	24	4.8	L075-S	L075-S	L075-S	24	9.5	L075-S	L075-M	L075-H	28	14.7	L090-S	L090-M	L090-H
2.2	24	7.0	L075-S	L075-S	L075-M	28	14.0	L090-S	L090-M	L090-H	28	20.6	L110-S	L110-S	L110-S
3.7	28	11.8	L090-S	L090-M	L090-M	28	23.5	L090-M	L090-H	L090-H	38	35.3	L110-S	L110-S	L110-S
5.5	38	17.6	L110-S	L110-S	L110-S	38	35.3	L110-S	L110-S	L110-S	38	52.9	L110-S	L110-S	L110-S
7.5	38	23.5	L110-S	L110-S	L110-S	38	48.0	L110-S	L110-S	L110-S	42	71.5	L110-S	L110-S	L110-H
11	42	35.3	L110-S	L110-S	L110-S	42	69.6	L110-S	L110-S	L110-H	42	105	L150-S	L150-M	L150-M
15	42	48.0	L110-S	L110-S	L110-S	42	95.1	L110-S	L110-H	L110-H	48	143	L190-S	L190-M	L190-M
18.5	42	58.8	L110-S	L110-S	L110-M	48	118	L150-S	L150-S	L150-H	55	176	L190-S	L190-M	L190-H
22	48	69.6	L150-S	L150-S	L150-S	48	140	L150-S	L150-M	L150-H	55	210	L225-S	L225-M	L225-H
30	55	95.1	L190-S	L190-S	L190-S	55	191	L190-S	L190-M	L190-H	60	286	L225-M	L225-H	L225-H
37	55	118	L190-S	L190-S	L190-M	60	235	L225-S	L225-M	L225-H					
45	55	143	L190-S	L190-M	L190-M	60	286	L225-H	L225-H	L225-H					
55	55	175	L190-S	L190-M	L190-H										
75	55	239	L190-M	L190-H	L190-H										
90	55	286	L190-M	L190-H	L190-H										
110	55	350	L190-H	L190-H	L225-H										
132	55	420	L190-H	L225-H											

60 Hz Motor Rated Output (kW)	Two Pole 3600 r/min					Four Pole 1800 r/min					Six Pole 1200 r/min				
	Motor Shaft Diameter (mm)	Rated Motor Torque (N·m)	Service Factor			Motor Shaft Diameter (mm)	Rated Motor Torque (N·m)	Service Factor			Motor Shaft Diameter (mm)	Rated Motor Torque (N·m)	Service Factor		
			1.0	1.5	2.0			1.0	1.5	2.0			1.0	1.5	2.0
			Coupling Model					Coupling Model					Coupling Model		
0.1						11	0.5	L050-S	L050-S	L050-S					
0.2	11	0.5	L050-S	L050-S	L050-S	11	1.0	L050-S	L050-S	L050-S	14	1.6	L070-S	L070-S	L070-S
0.4	14	1.0	L050-S	L050-S	L050-S	14	2.0	L050-S	L050-S	L050-H	19	2.9	L075-S	L075-S	L075-S
0.75	19	2.0	L070-S	L070-S	L070-S	19	3.9	L070-S	L070-M	L070-H	24	5.9	L090-S	L090-S	L090-S
1.5	24	3.9	L075-S	L075-S	L075-S	24	7.8	L075-S	L075-S	L075-H	28	11.8	L090-S	L090-M	L090-M
2.2	24	5.9	L075-S	L075-S	L075-S	28	11.8	L090-S	L090-M	L090-M	28	17.6	L110-S	L110-S	L110-S
3.7	28	9.8	L090-S	L090-S	L090-M	28	19.6	L090-M	L090-H	L090-H	38	29.4	L110-S	L110-S	L110-S
5.5	38	14.7	L110-S	L110-S	L110-S	38	29.4	L110-S	L110-S	L110-S	38	44.1	L110-S	L110-S	L110-S
7.5	38	19.6	L110-S	L110-S	L110-S	38	40.2	L110-S	L110-S	L110-S	42	59.8	L110-S	L110-S	L110-M
11	42	29.4	L110-S	L110-S	L110-S	42	58.8	L110-S	L110-S	L110-M	42	87.2	L150-S	L150-S	L150-M
15	42	40.1	L110-S	L110-S	L110-S	42	79.4	L110-S	L110-M	L110-H	48	120	L190-S	L190-S	L190-M
18.5	42	49.0	L110-S	L110-S	L110-S	48	98.0	L150-S	L150-S	L150-M	55	147	L190-S	L190-M	L190-H
22	48	58.8	L150-S	L150-S	L150-S	48	117	L150-S	L150-M	L150-H	55	175	L225-S	L225-S	L225-M
30	55	79.4	L190-S	L190-S	L190-S	55	159	L190-S	L190-M	L190-H	60	239	L225-S	L225-M	L225-H
37	55	98.0	L190-S	L190-S	L190-S	60	196	L225-S	L225-M	L225-M					
45	55	120	L190-S	L190-S	L190-M	60	239	L225-S	L225-M	L225-H					
55	55	146	L190-S	L190-M	L190-H										
75	55	199	L190-M	L190-H	L190-H										
90	55	239	L190-M	L190-H	L190-H										
110	55	292	L190-H	L190-H	L225-H										
132	55	350	L190-H	L190-H	L225-H										

Notes: 1. Confirm the torque characteristics of the motor when making a selection.
2. The finished bore hubs for the shaded sections are in stock.

Table 2. Service Factors

Load classification	Type of Drive Source		
	Electric Motor, Turbine	Gasoline Engine, Diesel Engine (six or more cylinders)	Gasoline Engine, Diesel Engine (less than six cylinders)
Low variation, low shock, low starting torque, and infrequent reversing.	1.0	1.5	2.0
Medium variation, medium shock, medium starting torque, and medium frequency of reversing.	1.5	2.0	2.5
High variation, high shock, high starting torque, and high frequency of reversing.	2.0	2.5	3.0

■ HANDLING

1. Bore hole processing

Clamp the external diameter of the hub in the chuck of a lathe (avoid the model sticker), and perform centering and bore hole drilling as illustrated in Fig. 1 on the below.

The hub material is a steam-processed sintered steel alloy, so we recommend that you use a super-hard drill bit (JIS P-20, K-01). (L190 and L225 are cast iron.)

Locate the keyway away from the pawl positions and avoid the model sticker when drilling the hole for the set-tap bolt.

Recommended tap sizes and positions are shown in Table 3.

2. Installation

(1) Mount the hubs onto each shaft and insert the keys.

(2) Put the insert into one of the hubs.

(3) Move the hubs on the shafts until the ends of the pawls and the insert are even with each other.

(4) Using a straight edge as shown in Fig. 2, measure α and ε at two points approximately 90° apart on the circumference of the hub, and confirm that the measurements are smaller than the values in Table 4. Accuracy of centering greatly effects the service life of an insert.

Table 3. Recommended Set-bolt Positions (F dimension)

Size	L035	L050	L070	L075	L090	L095
F (mm)	3.0	8.0	9.5	10.5	10.5	12.5
Size	L099	L110	L110	L150	L190	L225
F (mm)	13.5	12.5	20.5	17.5	25.5	25.5

Fig.1 Shaft Hole Processing

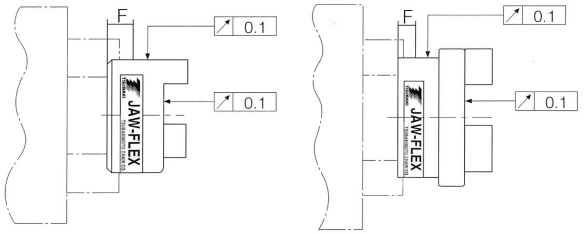


Fig.2 Centering

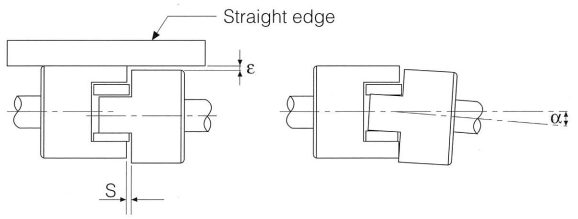


Table 4. Allowable Misalignment

Size		035	050	070	075	090	095	099	100	110	150	190	225
Allowable offset misalignment (ε) mm		0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Allowable angular misalignment (α°)	S, M types	1	1	1	1	1	1	1	1	1	1	1	1
	H type	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Position variance along the shaft (S) mm		±0.3	±0.5	±0.5	±0.5	±0.5	±0.5	±0.5	±0.7	±0.7	±0.7	±1.0	±1.0