

For New Technology Network



# CONSTANT VELOCITY JOINTS

for industrial machines

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# Constant Velocity Joints

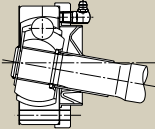
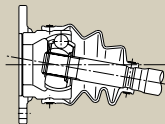
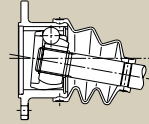
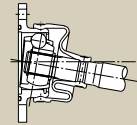
for Industrial Applications

|                                       |                          |      |
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## Types and Features

- Rotational speed can be transmitted at constant velocity
- Greater torque capacity
- Long service life and high reliability
- High transmission efficiency
- Low secondary moment
- Smooth and quiet rotation
- Easy handling, with long lubrication life requiring infrequent re-rubrication

Table 1. Types and features of NTN constant velocity joint

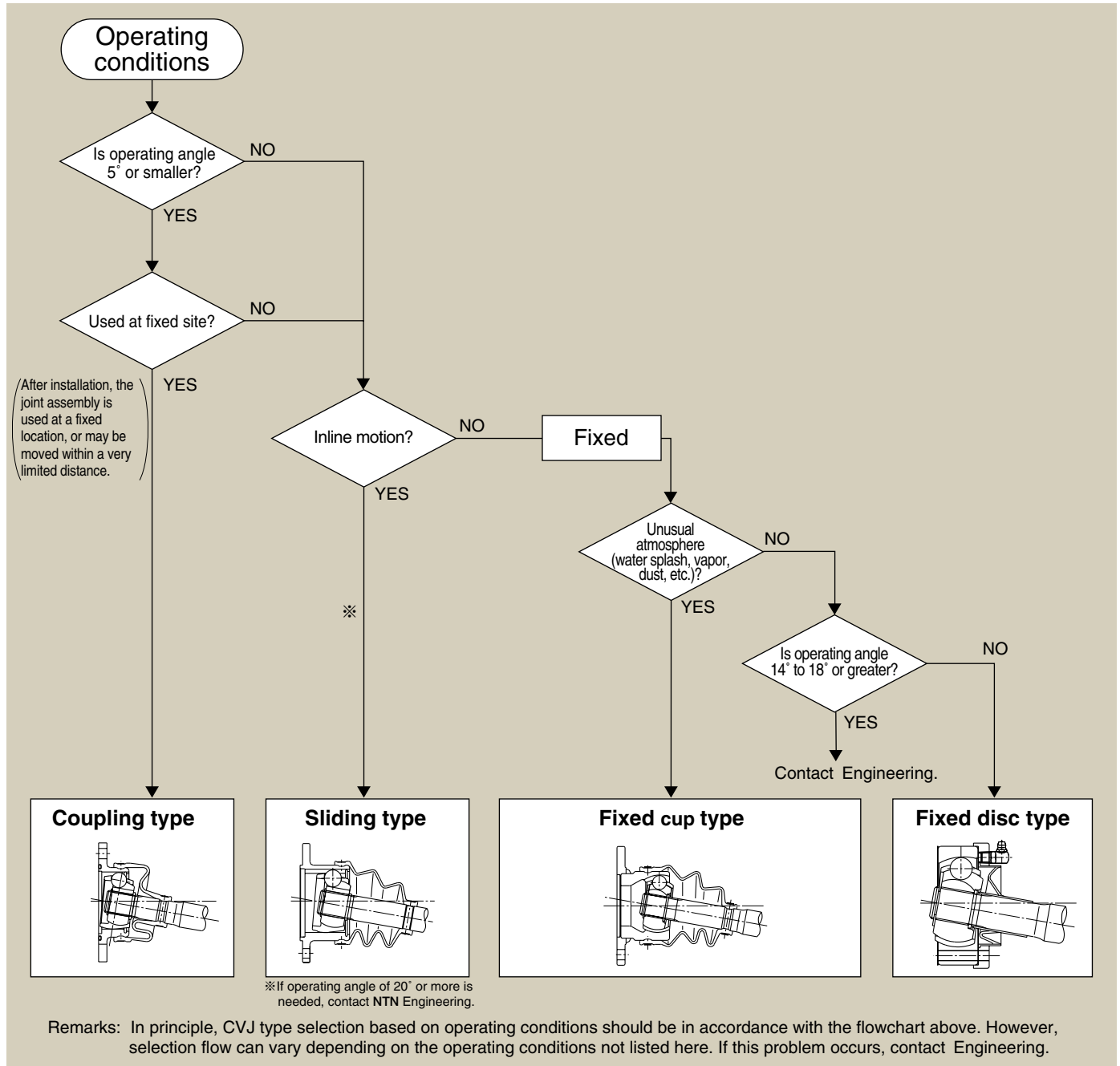
| Variety       | Type                                    | CVJ number                                                                          | Max. allowable operating angle <sup>①</sup> | Features   |                                                                                |
|---------------|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------|------------|--------------------------------------------------------------------------------|
| Fixed type    | Disc type                               |    | BJ75D–BJ300D                                | 14° to 18° | Capable of high speed operation. No need for intermediate slide spline shaft.  |
|               | Cup type                                |    | BJ75C–BJ225C                                | 25°        | Greater operating angle. Excellent sealing.                                    |
| Sliding type  | Flange type                             |  | DOJ 68F–DOJ200F                             | 20°        | Expansion within joint is possible. Low sliding friction (expansion friction). |
|               |                                         |                                                                                     | DOJ225F–DOJ625F                             | 8° to 10°  |                                                                                |
| Coupling type | Short shaft series<br>Long shaft series |  | BC68–BC200 <sup>②</sup>                     | 5°         | No alignment is needed. Easy installation.                                     |

① The maximum allowable operating angle is limited by a boot, as well as the RPM and operating conditions of the CVJ assembly.

② Upon request from the user, larger sizes can be designed and manufactured. Contact Engineering.

Remarks: The NTN constant velocity joint range includes, in addition to those listed here, the bell type CVJs used for drive shafts of automobiles (passenger cars, trucks), construction vehicles and special vehicles, and the proprietary TRI-BALL joint that features unique structure and functions.

## Type Selection Flowchart

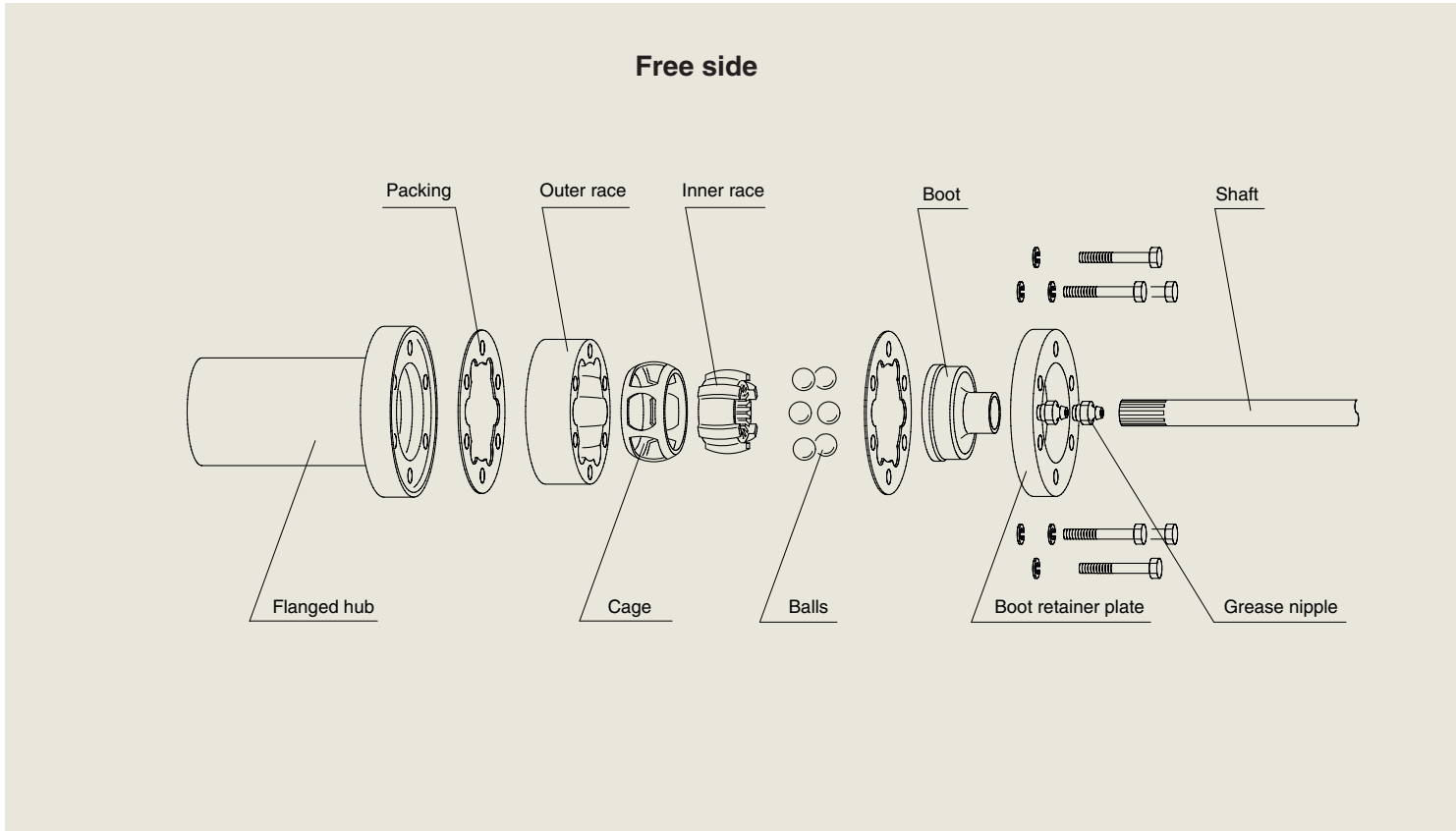


### Applications

| Coupling type                                                                                                                                                                                                           | Sliding type                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Fixed cup/drum type                                                                                                                                                                                                                                                                                                                                                                           | Fixed disc type                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| To compensate for shaft offset with general industrial plant machinery.<br>Connecting shafts of motors on reducer, neck pinion, pump, blower, compressor, hearth roller, conveyor, refiner, crane, hydraulic unit, etc. | Drive shafts of work rolls, pinch rolls, tension reels in rolling mill (steel making machinery).<br>Drive shafts of calender rolls (paper making machinery) and of other general industrial machines (in areas where expansion is needed during driving).<br>Drive shafts of automobiles (passenger cars, trucks) and special vehicles.<br>Hydraulic pump drive shafts of steel making machinery and chemical machinery.<br>Hydraulic pump drive shafts of construction machinery. | Hydraulic pump drive shafts of truck mixers.<br>Drive shafts of hygiene, food processing and packaging machines.<br>Other general industrial plant machinery (where larger operating angle is needed).<br>Tiller drive shafts of agricultural tractors.<br>Drive shafts of machine tools and printing presses.<br>Other general industrial machines (where larger operating angle is needed). | Drive shafts of steel making machinery, paper making machinery, printing machinery, unloading/transportation machinery, textile machinery, chemical machinery, machine tools and other general industrial machines. |

## Structure

### Fixed Disc Type



## Features

### Greater allowable operating angle

Though varying depending on the CVJ size and intended RPM, the maximum allowable operating angle of this type of joint is 18° with boot.

### No slide splines are needed for the intermediate shaft

The intermediate shaft does not need slide splines since the axial expansion and installation mounting distance adjustment are achieved by the sliding splines of the inner race and shaft at the free side.

### Shorter shaft length

The intermediate shaft can be designed to be much shorter since it does not need slide splines.

### Capable of high-speed rotation

The solid shafts for high-speed joints have been precision-machined and the steel pipe shafts have been dynamically balance.

### Higher level of safety

A cylindrical outside surface means that while handling, the fingers of worker are not pinched with the yoke.

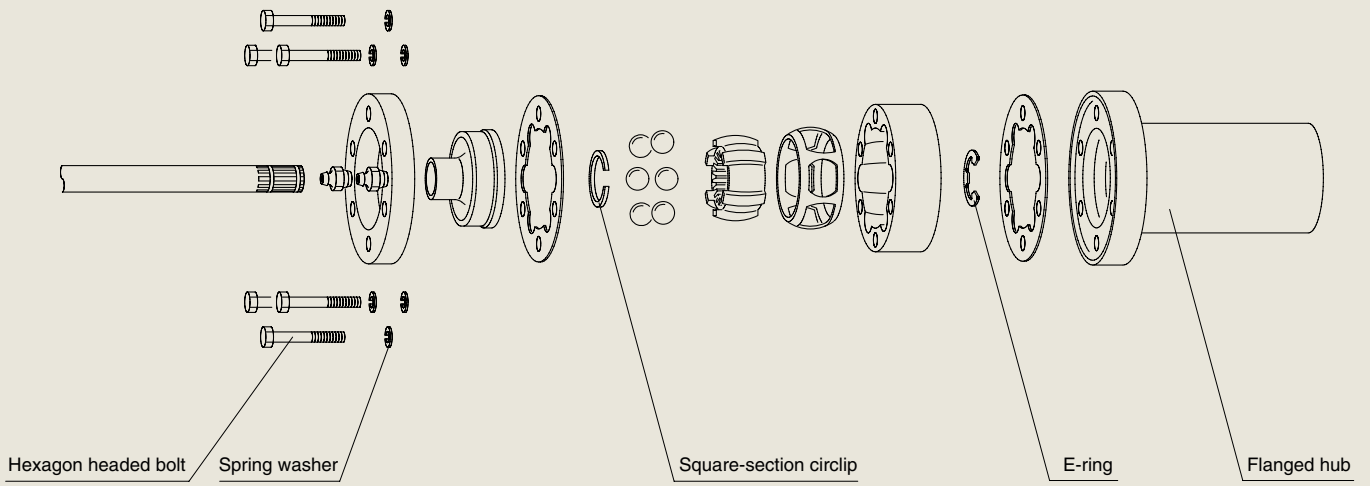
## Remarks:

1. If the maximum allowable operating angle is exceeded, use a cup type joint.
2. If this type of application is unavoidable, use a sliding type joint, or combine a fixed disc type joint with a slide type joint. For types and their combination, contact Engineering.
3. **The disc type joint** is not fully sealed. We recommend that a cup or coupling type joint be used in locations subject to water splash.
4. Certain applications may need much larger axial expansion. To cope with such a need, we can supply a joint with intermediate slide splines. Contact Engineering.

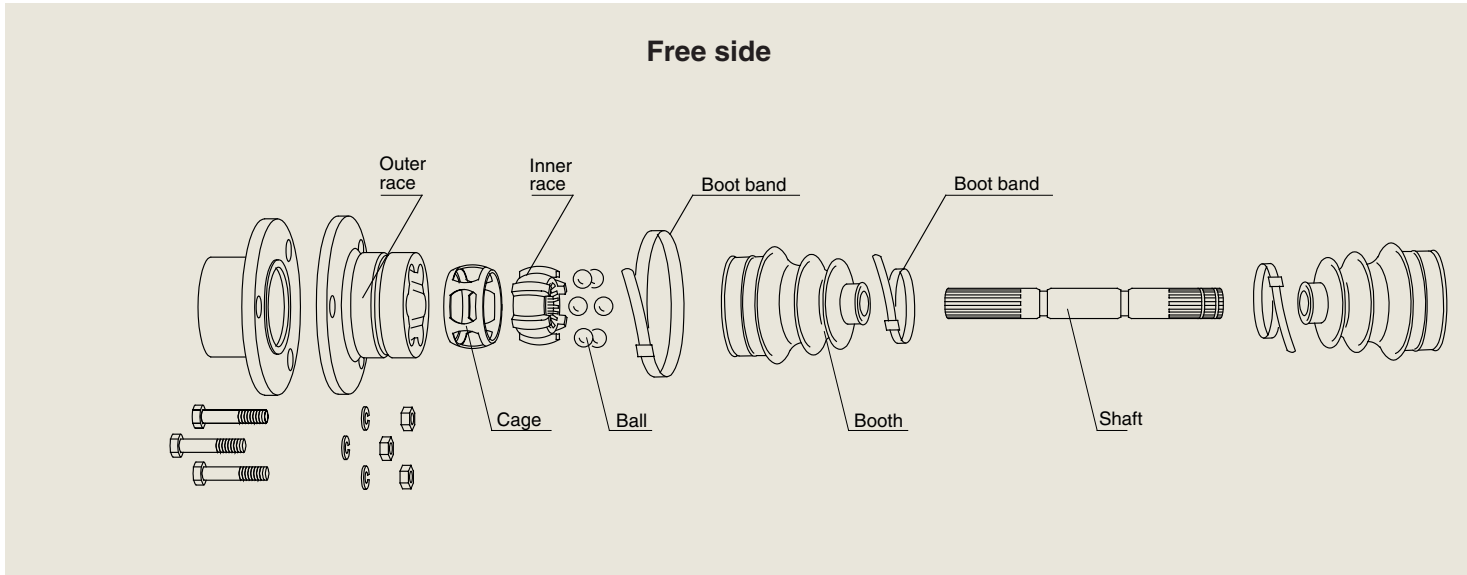
## CAUTION

1. The free side CVJ can come off the splined shaft. Be very careful when handling it.

Fixed side



## Fixed Cup Type



## Features

### Greater allowable operating angle

The maximum allowable operating angle with the CVJ proper is 42°.

Though varying depending on the intended RPM, the maximum allowable operating angle of the joint equipped with a boot is 25° at dynamic state, and 38° at static state.

### Superb sealing, and lubrication-free

Being sealed with bellows type boots, the CVJs can be used in environments where they may be frequently subjected to water splash, humidity and dust.

### Greater expansion

The CVJs with intermediate slide spline shaft offer greater axial expansion.

### Easy installation and removal

The CVJ proper is secured to the flange hub with through bolts. Thus, the joint can be readily installed or removed.

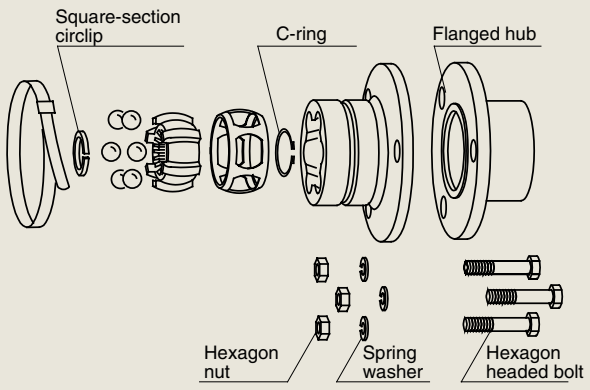
## Remarks:

1. This type is not suitable for use under a situation where an expansion motion occurs while the joint is revolving. If this type of application is unavoidable, use a sliding type joint, or combine a fixed cup type joint with a sliding type joint. For types and their combination, contact Engineering.
2. Consider use of a coupling type joint when the joint assembly is employed for high speed application with a smaller operating angle.

### CAUTION

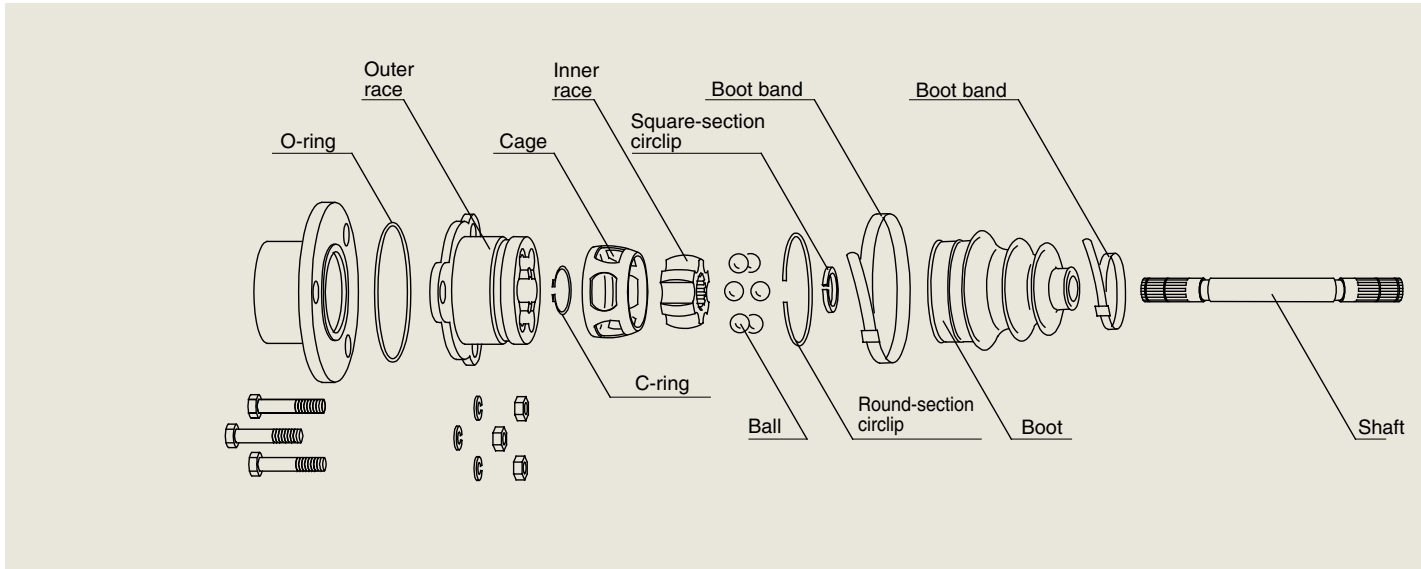
1. The intermediate splined shaft of CLT and CLFT series can come out of position. Be very careful when handling it.

Fixed side





## Sliding Type



### Features

#### Expansion is possible within CVJ

The ball tracks on the outer race are parallel with the axis. Therefore, relative axial expansion between the inner ring and outer ring is possible while transmitting power and providing an operating angle.

#### Low sliding friction ensures smooth expansion

Expansion within the CVJ is achieved by a rolling motion of the balls, which contributes to very small sliding friction (expansion-induced friction). As a result, the joint assembly can smoothly plunge even when torque is applied.

The sliding friction of this arrangement is greatly reduced as compared with generic slide spline shaft. (See Fig. 1.)

#### Axial vibration can be absorbed

Because of the smaller sliding friction, axial vibration can be easily absorbed as compared with the slide spline arrangement.

#### No slide splines are needed for the intermediate shaft

The intermediate shaft does not need slide splines since the axial expansion and installation mounting distance adjustment are achieved by the structure inside the CVJs.

#### Easy installation

Both axial expansion and operating angle definition (20° for smaller size, 8° to 10° for larger size) can be achieved simultaneously. Therefore, this type of joint can accommodate a larger length variation, allowing easy installation.

#### Freedom for wide variety of design

The CVJ assembly can be designed to best suit the user's requirements in terms of torque capacity, expansion and installation system.

### Remarks:

1. For the best operation of a sliding type joint, the operating angle-expansion correlation, operating method and installation/removal method should be considered. For details, contact Engineering.
2. If much larger axial expansion is needed, contact Engineering.
3. Some large size CVJs are capable of allowable maximum operating angle of 15°.
4. If the user wants to use the sliding type joint assembly in a vertical position, contact Engineering.

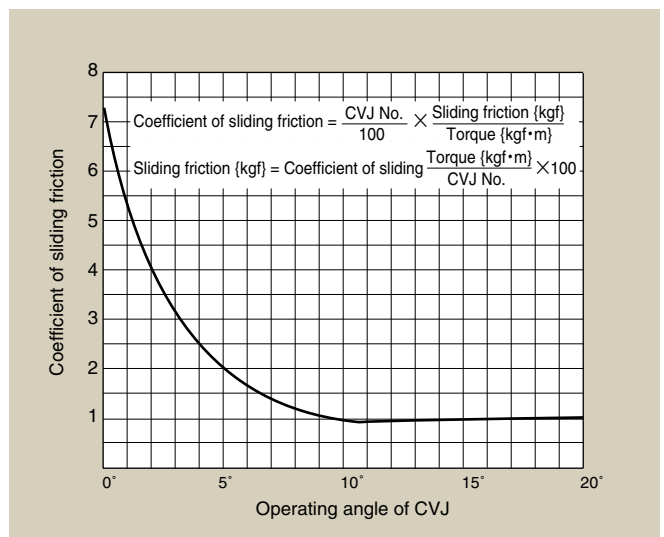
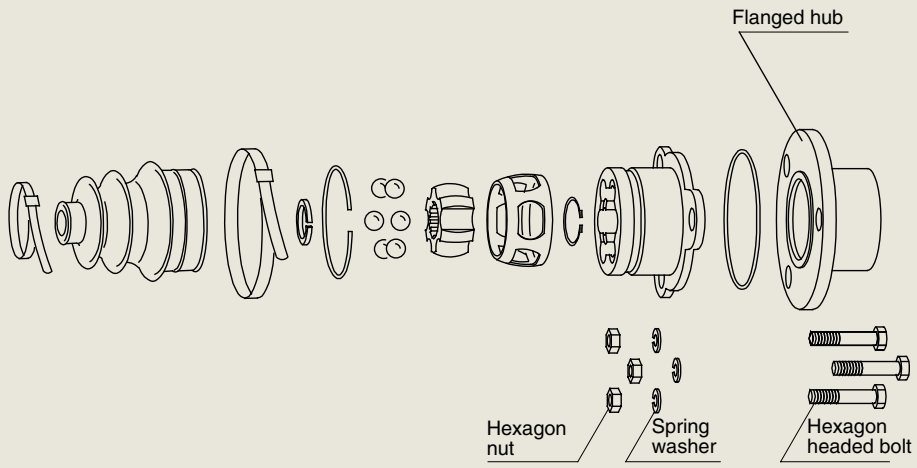
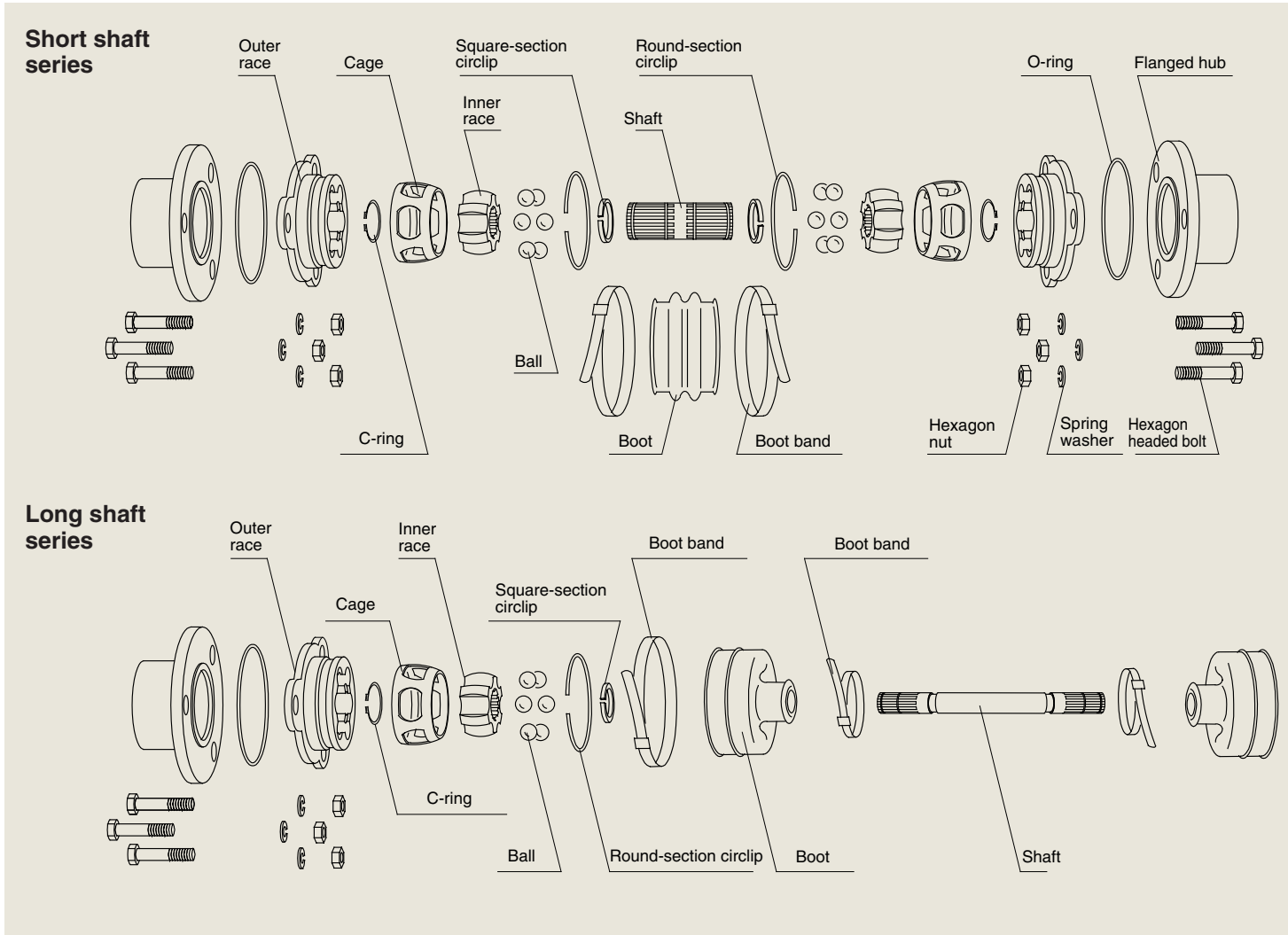


Fig. 1 Sliding friction



## Coupling Type



## Features

### No alignment work is necessary.

The offset across both shafts when the coupling is installed is 3.5 to 11.5 mm in the case of short shaft series joints (see Fig. 1). The long shaft series joints offer much larger offset (see Fig. 3).

The maximum crossed angle between two shafts is 5°. Furthermore, this type of joint allows inline expansion. As a result, time-consuming alignment work is eliminated.

### Low sliding friction ensures smooth expansion.

The ball tracks on the outer race are parallel with the axis. Therefore, axial expansion within the CVJs is possible.

Expansion within the joints is achieved by rolling motion of the balls, which contributes to very small sliding friction (expansion-induced friction). As a result, axial vibration can be readily absorbed as compared with generic slide spline arrangement.

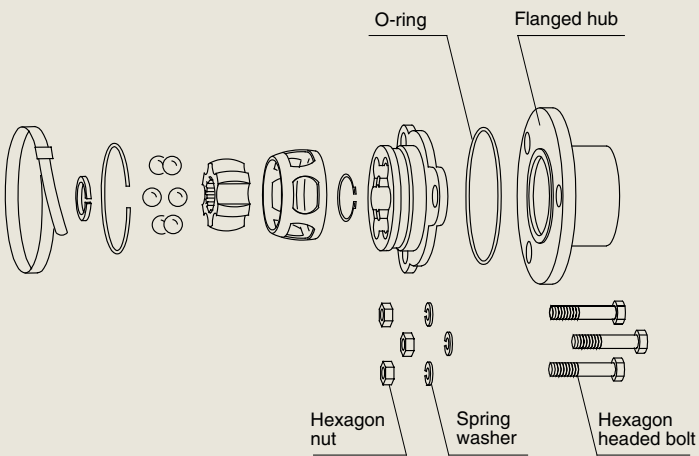
### Light-weight and compact arrangement that contributes to smaller moment of inertia.

The couplings are relatively small. Also, when a long intermediate shaft is needed, the middle portion of the shaft is composed of steel pipe. This light-weight configuration contributes to smaller moment of inertia, resulting in lower starting/braking torque.

### Easy installation

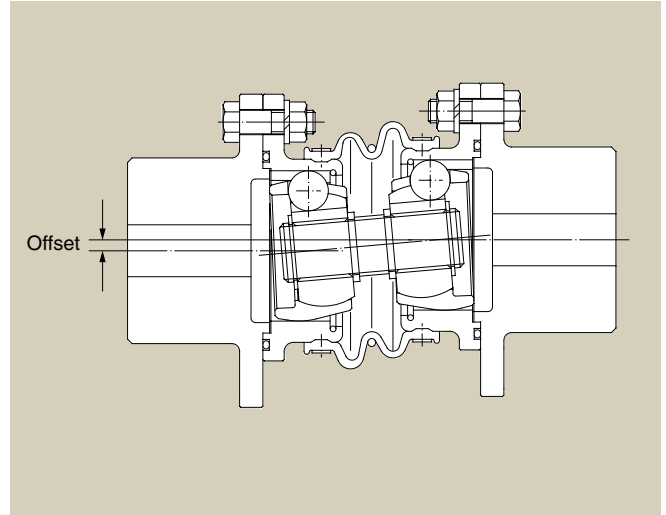
Both flanged hubs are installed to the mating shafts. Then, the couplings are fastened to flanged hubs with bolts.

Since the couplings can be separated from the flanged hubs, the couplings can be fastened after installing a machine in position. Furthermore, installation work is very easy thanks to a larger allowable offset and crossed angle of the couplings.

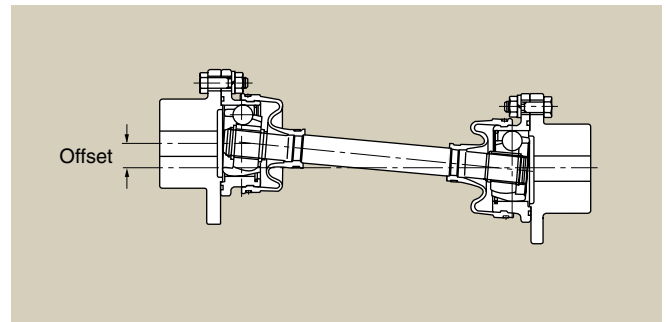


**Remarks:**

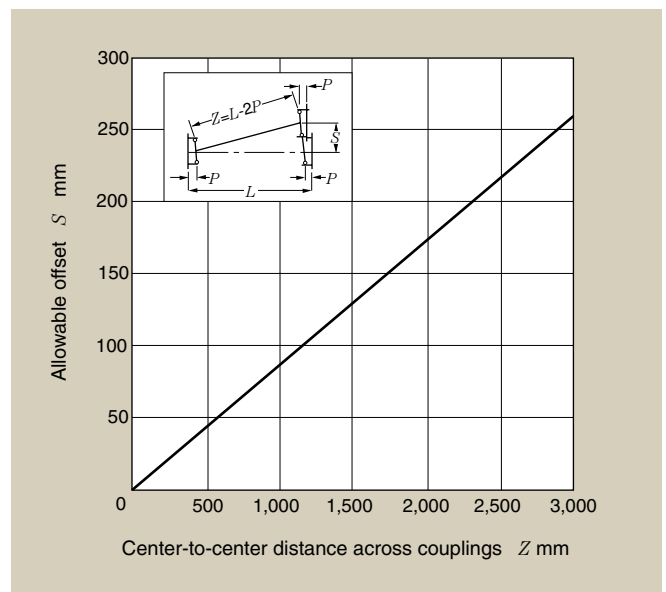
1. If larger axial expansion is needed, consider sliding type joints.
2. If the user wants to use the sliding type joint assembly in a vertical position, contact Engineering.



**Fig. 1 Short shaft series**



**Fig. 2 Long shaft series**



**Fig. 3**

## Joint Selection

### 1. Selection Based on Service Life

1.1 By referring to the load models in Fig. 1, determine normal working torque  $T_a$  {kgf·m} or power  $Q_a$  {kW}.

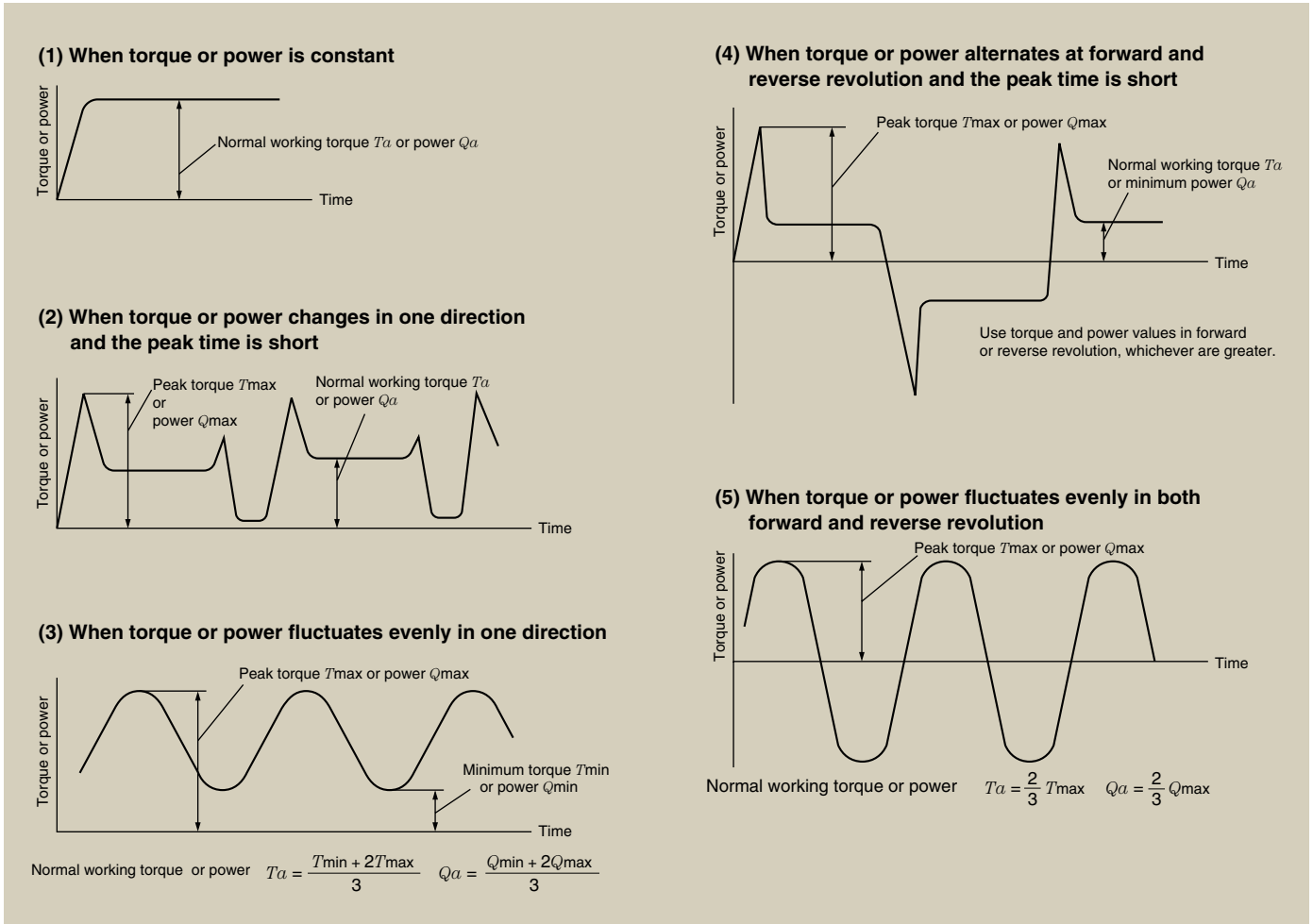


Fig. 1 Load models

1.2 Using the expression below, determine equivalent working torque  $T_a$  {kgf·m} or equivalent working transmission power  $Q_a$  {kW}.

$$T_e = \frac{K_1 \cdot K_2}{K_3} \cdot T_a \quad \text{or} \quad Q_e = \frac{K_1 \cdot K_2}{K_3} \cdot Q_a$$

where

$K_1$ : Machine factor (Table 1)

$K_2$ : Operating time factor (Fig. 2, Fig. 4, Fig. 6)

$K_3$ : Operating angle factor (Fig. 3, Fig. 5, Fig. 7)

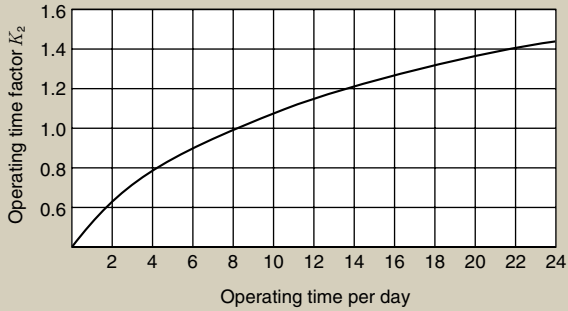
Table 1 Machine factor  $K_1$

| Machine used       |                                                                                                                       | $K_1$              |      |
|--------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------|------|
| Motor              | Electric motor, turbine                                                                                               | 1                  |      |
|                    | Gasoline engine                                                                                                       | 4-cylinder or over | 1.25 |
|                    |                                                                                                                       | 3-cylinder or less | 1.5  |
|                    | Diesel engine                                                                                                         | 4-cylinder or over | 2    |
| 3-cylinder or less |                                                                                                                       | 3                  |      |
| Driven machine     | Machine developing strong vibration or impact (crusher, screening machine, etc.)                                      | 3                  |      |
|                    | Machine running continuously at a constant speed and developing minor vibration (storage/drainage pump, blower, etc.) | 1.5                |      |

① Use the factor with the motor or driven machine, whichever is greater.

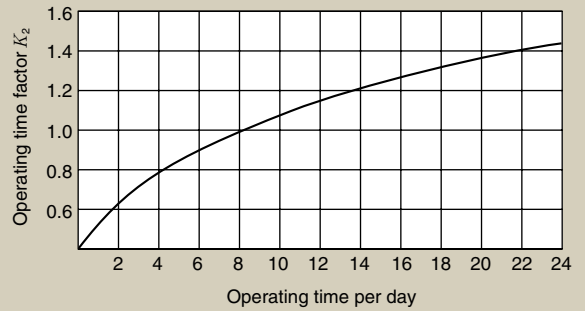
② The joints may be broken by the twisting resonance, when they are directly coupled to reciprocating engines or plunger pumps. Use these configurations after checking the resonance RPM of the twisting vibration for the driving mechanism.

**Fixed Disc/Cup Type**

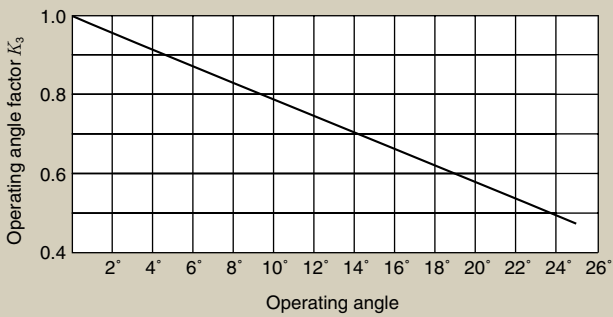


**Fig. 2 Operating time factor  $K_2$**

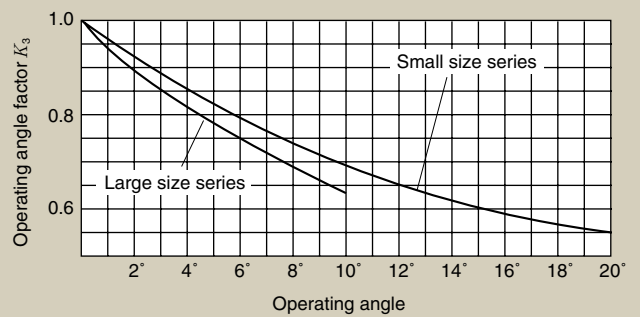
**Sliding Type**



**Fig. 4 Operating time factor  $K_2$**

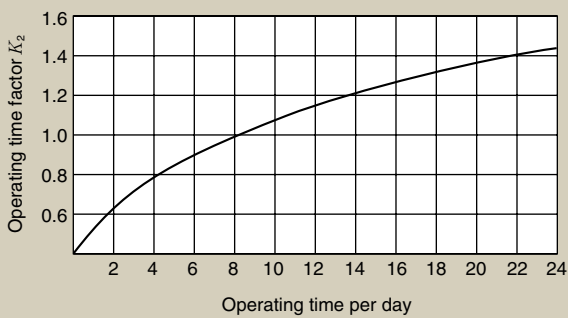


**Fig. 3 Operating angle factor  $K_3$**

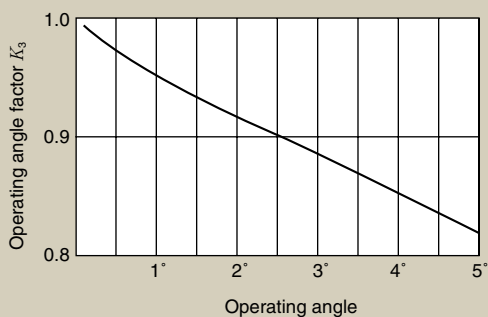


**Fig. 5 Operating angle factor  $K_3$**

**Coupling Type**



**Fig. 6 Operating time factor  $K_2$**

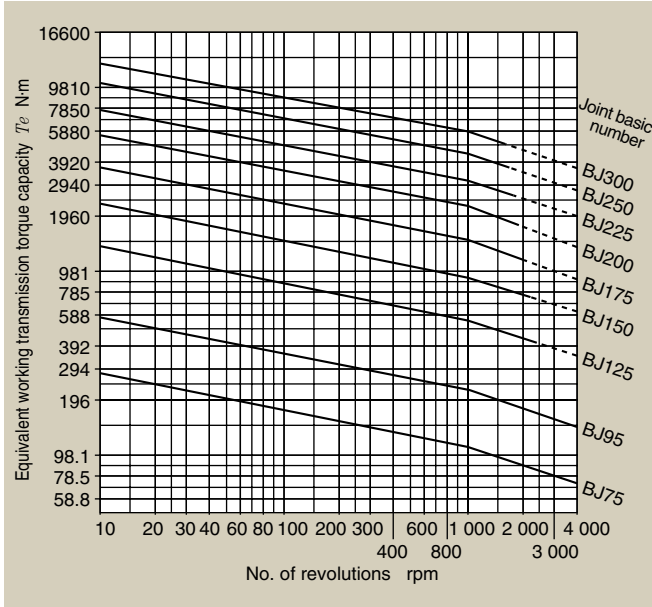


**Fig. 7 Operating angle factor  $K_3$**

# Outline

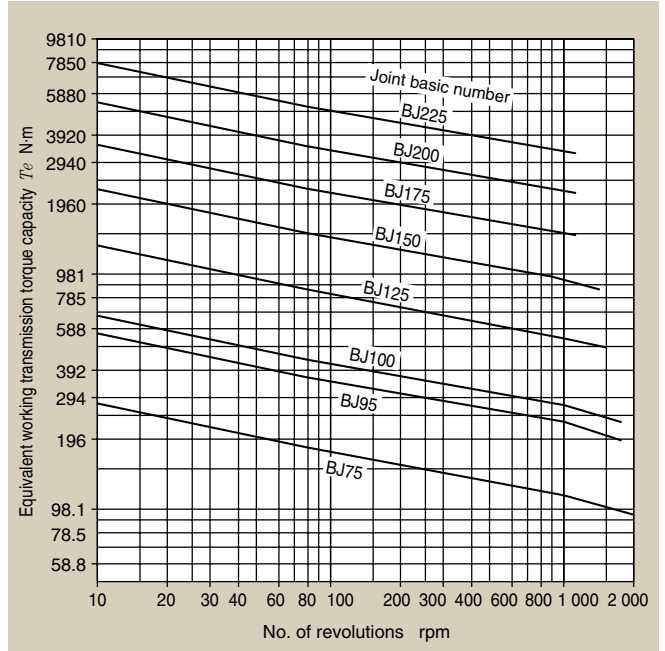
- 1.3 By referring to the equivalent working transmission torque or power graph in **Fig. 8**, find a CVJ basic number whose capacity at the operating RPM is greater than the equivalent working torque  $T_e$  or equivalent working transmission power  $Q_e$  determined in 1.2.

## Fixed Disc Type

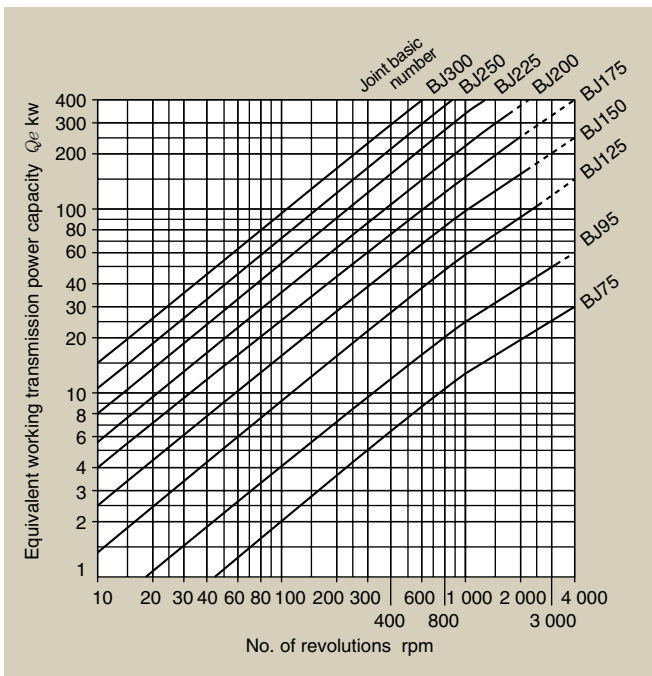


(A) Equivalent working transmission torque capacity

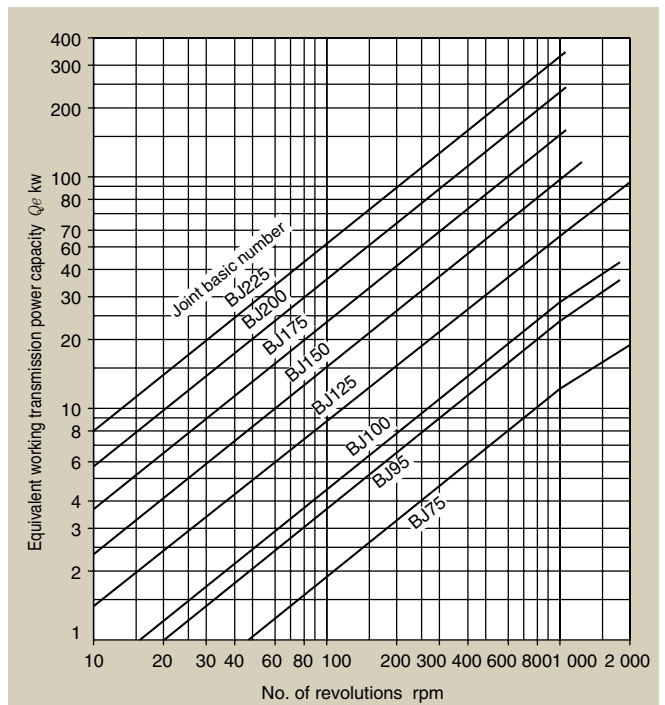
## Fixed Cup Type



(A) Equivalent working transmission torque capacity



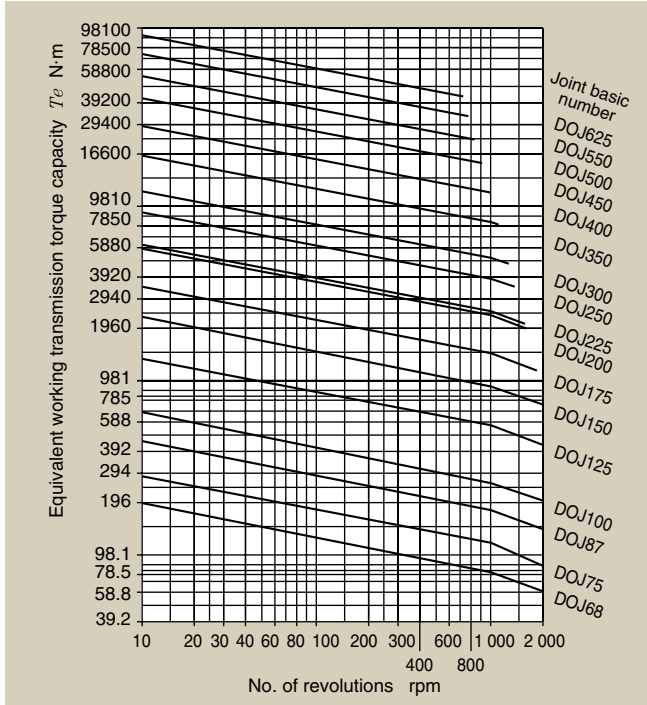
(B) Equivalent working transmission power capacity



(B) Equivalent working transmission power capacity

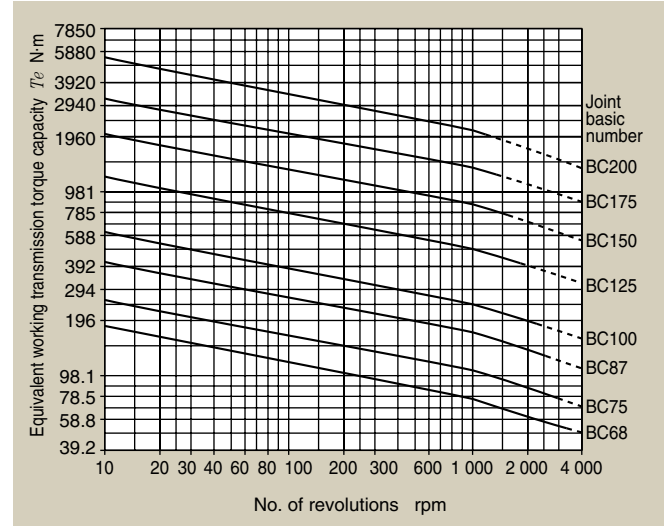
Fig. 8-1 Equivalent working transmission torque and equivalent working transmission power capacity

**Sliding Type**

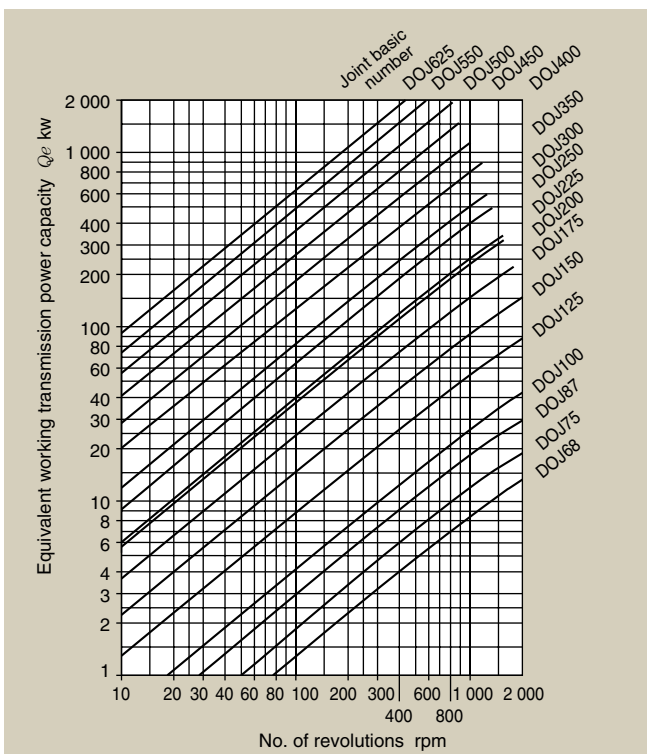


**(A) Equivalent working transmission torque capacity**

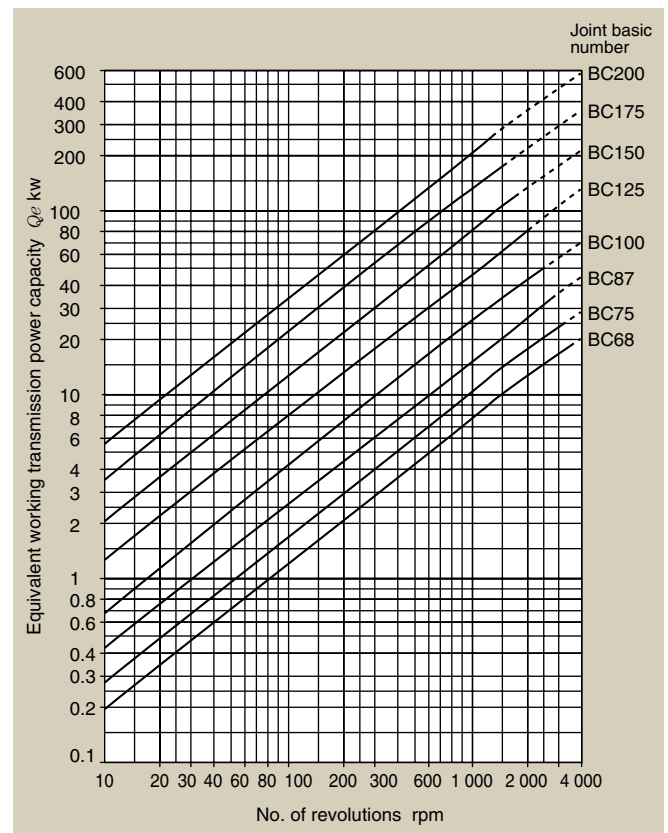
**Coupling Type**



**(A) Equivalent working transmission torque capacity**



**(B) Equivalent working transmission power capacity**



**(B) Equivalent working transmission power capacity**

- Remarks 1) The values of the equivalent working transmission torque and power in **Fig.8 (A) and (B)** are based on the life of 7,200 hours (three years, 25 working days per month).  
 2) When intending to use the CVJ within an envelope defined with a dotted line, contact Engineering.

**Fig. 8-2 Equivalent working transmission torque and equivalent working transmission power capacity**



## 2. Selection Based on Strength

2.1 Determine working peak torque  $T_{max}$  {kgf·m}.

2.2 Check that the maximum dynamic allowable torque  $TD_1$  or  $TD_2$  (see **Table 2**) is greater than the working peak torque.

**Table 2 Allowable maximum torque of CVJ**

| Joint basic | Type            | Dynamic allowable torque                                  |                                                                           |
|-------------|-----------------|-----------------------------------------------------------|---------------------------------------------------------------------------|
|             |                 | When torque fluctuates during revolution in one direction | When start / stop and forward / reverserevolution are repeated frequently |
|             |                 | $TD_1$<br>kgf·m                                           | $TD_2$<br>kgf·m                                                           |
| BC68        | Coupling Type   | 412 {42}                                                  | 275 {28}                                                                  |
| DOJ68       | Sliding Type    |                                                           |                                                                           |
| BJ75        | Fixed Disc Type | 588 {60}                                                  | 392 {40}                                                                  |
|             | Fixed Cup Type  |                                                           |                                                                           |
| DOJ75       | Sliding Type    |                                                           |                                                                           |
| BC75        | Coupling Type   | 932 {95}                                                  | 637 {65}                                                                  |
| DOJ87       | Sliding Type    |                                                           |                                                                           |
| BC87        | Coupling Type   |                                                           |                                                                           |
| BJ95        | Fixed Disc Type | 1130 {115}                                                | 883 {90}                                                                  |
|             | Fixed Cup Type  |                                                           |                                                                           |
| BJ100       | Fixed Cup Type  | 1420 {145}                                                | 883 {90}                                                                  |
| DOJ100      | Sliding Type    |                                                           |                                                                           |
| BC100       | Coupling Type   |                                                           |                                                                           |
| BJ125       | Fixed Disc Type | 2750 {280}                                                | 1470 {150}                                                                |
|             | Fixed Cup Type  |                                                           |                                                                           |
| DOJ125      | Sliding Type    |                                                           |                                                                           |
| BC125       | Coupling Type   | 4710 {480}                                                | 2890 {295}                                                                |
| BJ150       | Fixed Cup Type  |                                                           |                                                                           |
| DOJ150      | Sliding Type    |                                                           |                                                                           |
| BC150       | Coupling Type   | 4810 {490}                                                | 4020 {410}                                                                |
| BJ175       | Fixed Disc Type | 6720 {685}                                                |                                                                           |
|             | Fixed Cup Type  |                                                           |                                                                           |
| DOJ175      | Sliding Type    | 7360 {750}                                                | 5880 {600}                                                                |
| BC175       | Coupling Type   | 11200 {1140}                                              |                                                                           |
| BJ200       | Fixed Cup Type  |                                                           |                                                                           |
| DOJ200      | Sliding Type    | 11500 {1170}                                              | 7550 {770}                                                                |
| BC200       | Coupling Type   |                                                           |                                                                           |
| BJ225       | Fixed Disc Type | 14700 {1500}                                              | 7160 {730}                                                                |
|             | Fixed Cup Type  |                                                           |                                                                           |
| DOJ225      | Sliding Type    | —                                                         | 10700 {1090}                                                              |
| BJ250       | Fixed Disc Type | 20700 {2110}                                              |                                                                           |
| DOJ250      | Sliding Type    | —                                                         | 11200 {1140}                                                              |
| BJ300       | Fixed Disc Type | 29100 {2970}                                              | 15800 {1610}                                                              |
| DOJ300      | Sliding Type    | —                                                         | 14500 {1480}                                                              |
| DOJ350      |                 |                                                           | 22900 {2340}                                                              |
| DOJ400      |                 |                                                           | 34100 {3480}                                                              |
| DOJ450      |                 |                                                           | 48500 {4950}                                                              |
| DOJ500      |                 |                                                           | 66800 {6810}                                                              |
| DOJ550      |                 |                                                           | 89100 {9090}                                                              |
| DOJ625      |                 |                                                           | 116000 {11800}                                                            |

### 3. Selection Based on Number of Revolutions

#### Fixed Disc Type

1. Considering durability of the boots, check that the RPM in Fig. 9 is within the joint angle limitation.

2. Depending on the shaft length, the working RPM of a joint will be limited. Check the allowable RPM of the intended shaft against the data in Fig. 10.

3. For the allowable RPM of the intended shaft in low speed and high speed applications, refer to Fig. 11.

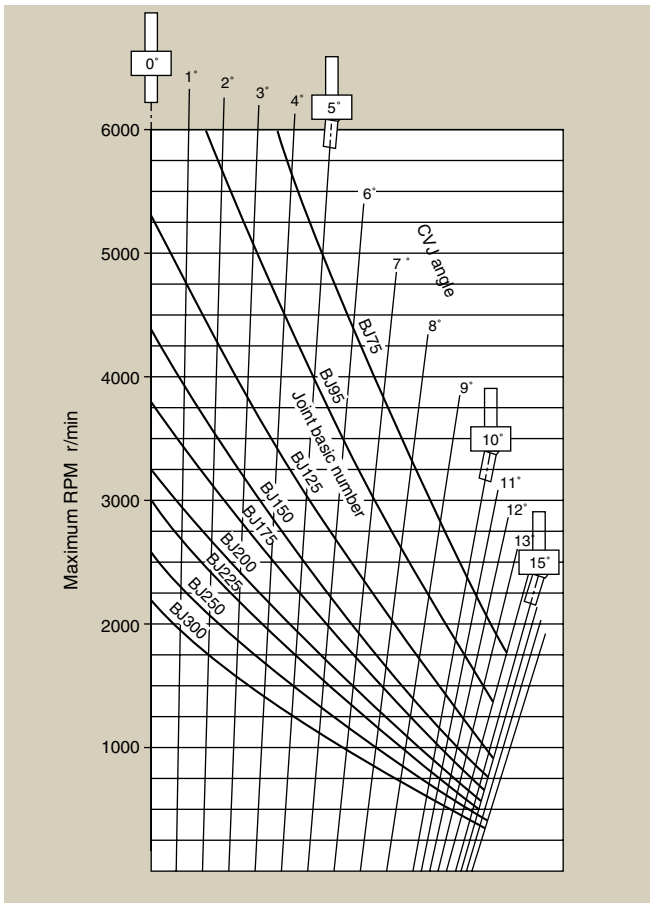


Fig. 9 CVJ angle versus allowable RPM

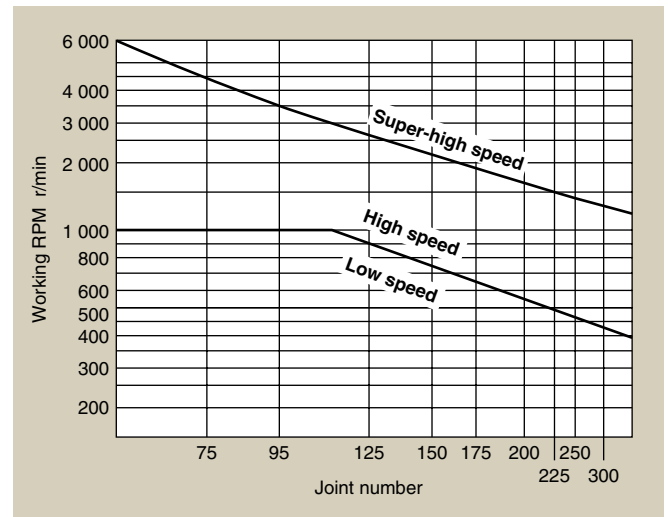


Fig. 11 Joint number versus RPM

NOTE: When selecting an optimal constant velocity joint, the location of operation and operating conditions must be considered in addition to the above-mentioned selection criteria. Contact Engineering. Select a joint that satisfies all of criteria 1 through 3 above.

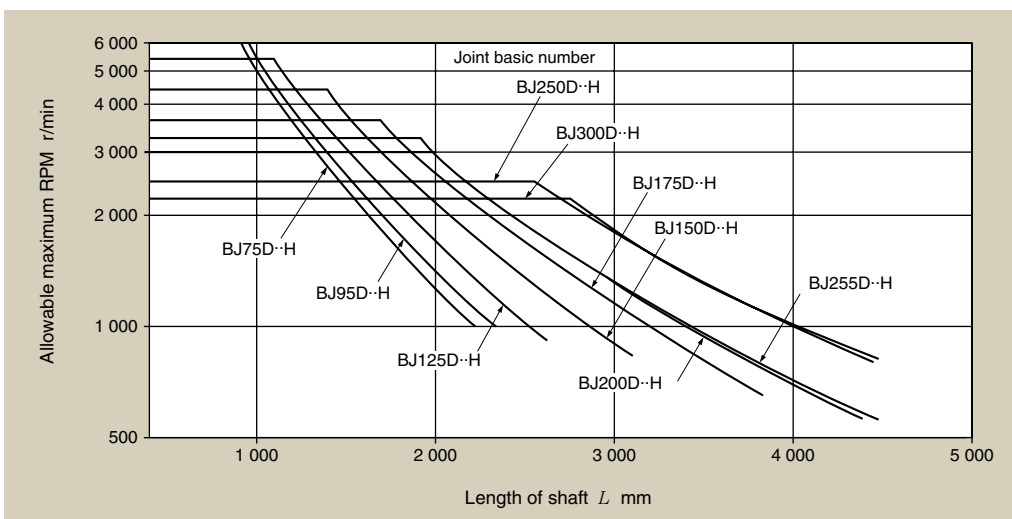
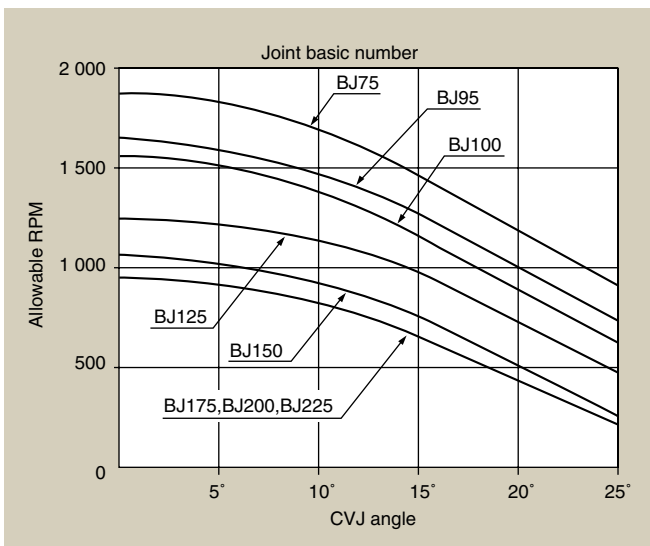


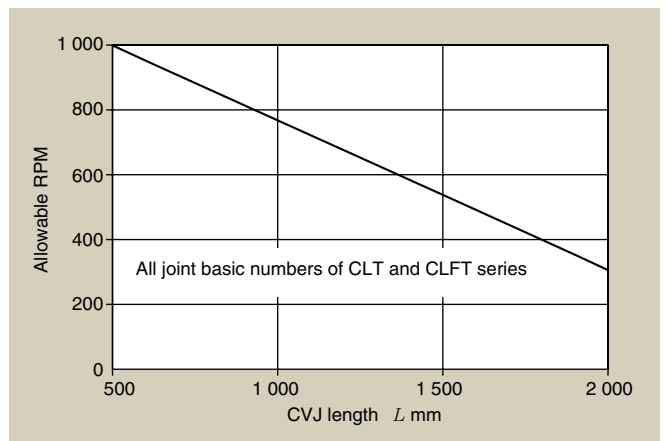
Fig. 10 Allowable RPM of shaft

## Fixed Cup Type

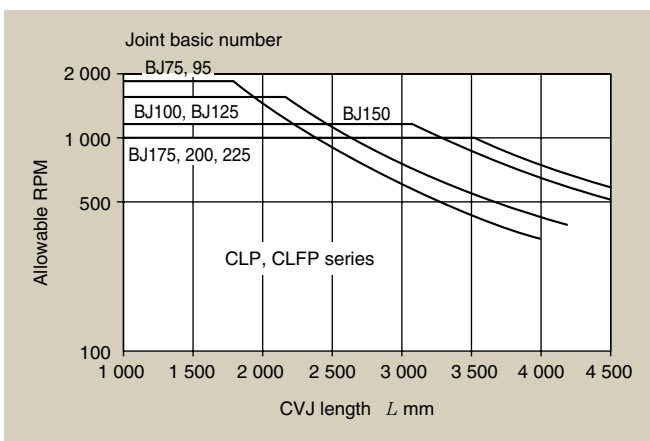
1. When considering the durability of the boots, check that the RPM in **Fig. 12** is within the joint angle limitation.
2. Depending on the shaft length, the working number of revolutions of joint will be limited. Check the allowable RPM of the intended shaft against the data in **Fig. 13**.
3. For the allowable RPM for the CLT and CLFT series, refer to the allowable RPM data in **Fig. 14**.



**Fig. 12** Joint angle versus allowable RPM



**Fig. 14** Allowable RPM of shaft



**Fig.13** Allowance RPM of shaft

NOTE: When selecting an optimal constant velocity joint, the location of operation and operating conditions must be considered in addition to the above-mentioned selection criteria. Contact Engineering.

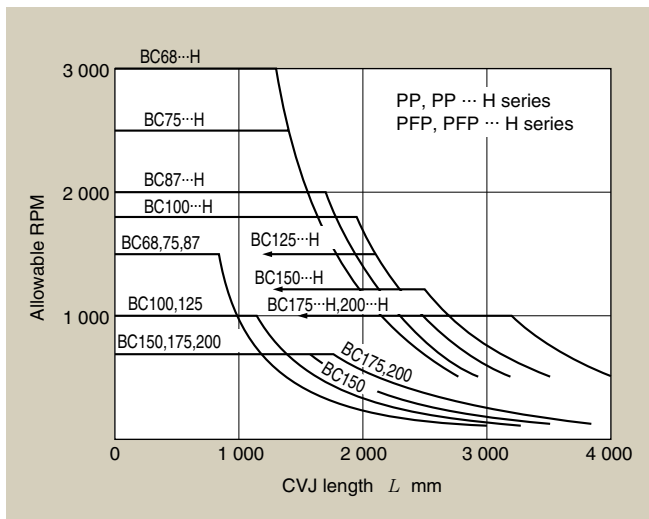
## Coupling Type Joint

- When considering boot durability of the boots, check that the RPM is within the joint angle limitation in **Table 3**.

**Table 3 Allowable RPM of CVJ** rpm

| Joint basic number | Series       |           |                   |
|--------------------|--------------|-----------|-------------------|
|                    | P201<br>P601 | PB<br>PFB | PB...H<br>PFB...H |
| <b>BC 68</b>       | 3 000        | 1 500     | 3 000             |
| <b>BC 75</b>       | 2 500        | 1 500     | 2 500             |
| <b>BC 87</b>       | 2 000        | 1 500     | 2 000             |
| <b>BC 100</b>      | 1 800        | 1 000     | 1 800             |
| <b>BC 125</b>      | 1 500        | 1 000     | 1 500             |
| <b>BC 150</b>      | 1 200        | 700       | 1 200             |
| <b>BC 175</b>      | 1 000        | 700       | 1 000             |
| <b>BC 200</b>      | 1 000        | 700       | 1 000             |

- With the long shaft series joints, depending on the shaft length, the working RPM of joint will be limited. Check the allowable RPM of the intended shaft against the data in **Fig. 15**.



**Fig. 15 Allowable RPM of CVJ**

## 4. Large Size Series DOJ225–DOJ625

### Correlation between CVJ angle and allowable expansion

When an angle occurs on a CVJ, the balls will move and the allowable expansion will decrease. The value of  $2a$  in Fig. 16 is the total expansion decrease of a pair of joints. To determine the expansion for intended application, subtract  $2a$  (see Fig. 16) from the allowable expansion at  $0^\circ$

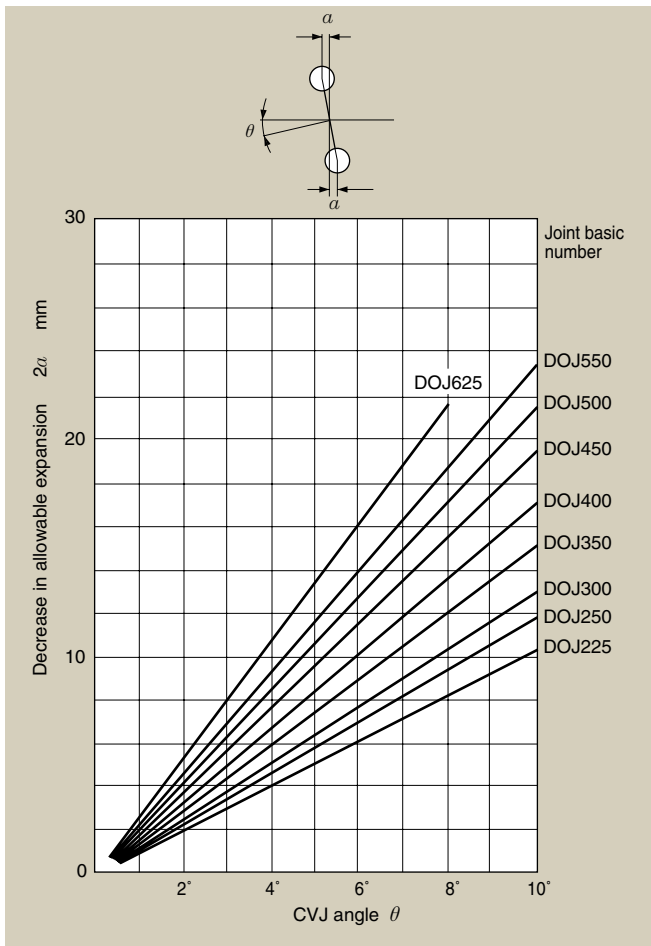


Fig. 16 Allowable expansion

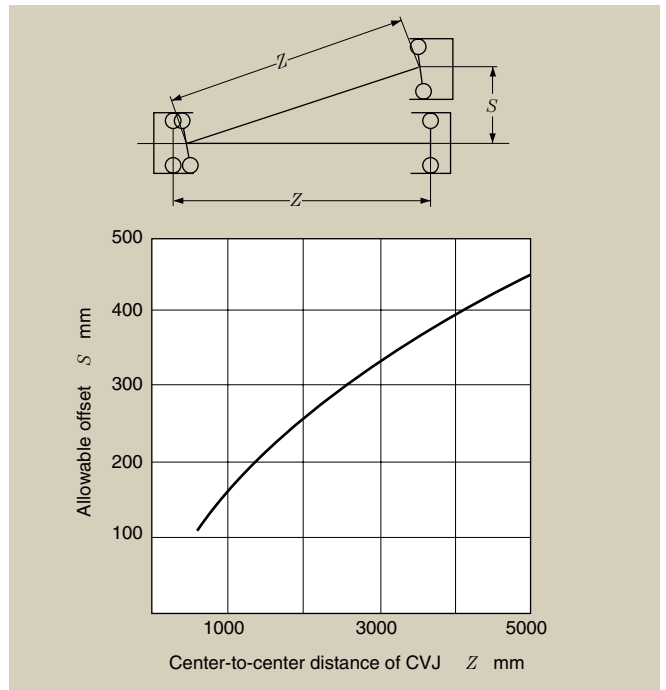


Fig. 17 Allowable offset

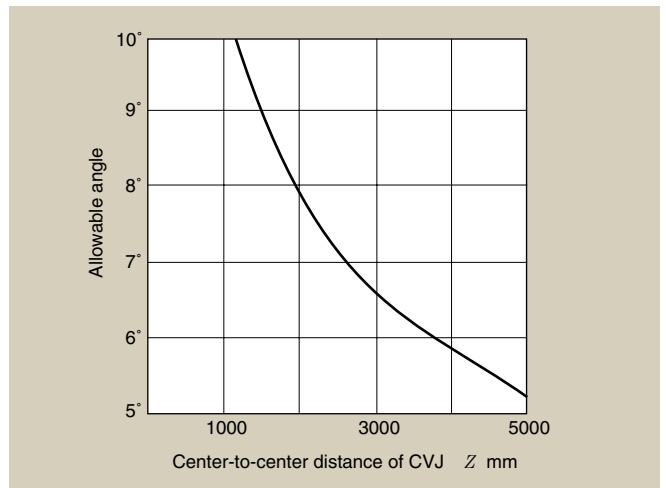


Fig. 18 Allowable angle

Remarks: The correlation between the center-to-center distance of CVJ and allowable offset is given in Fig. 17, and that between the center-to-center distance of CVJ and allowable angle is illustrated in Fig. 18.

## 5. Examples for Selecting a Constant Velocity Joint (Fixed Disc Type)

### Example 1

Select the CVJ for a steel plate feeding pinch rollers that are used under the following conditions.

Motor output: 37 kw/1,750 RPM  
 Reduction ratio: 1/3  
 Normal operating output is 60% motor output.  
 The peak torque when a steel plate is pinched should be taken at 150% motor output.  
 Roller speed: 585 r/min  
 CVJ angle during machine operation is fixed at 5°.  
 This machine runs continuously 20 hours a day.

### Selection

These operating conditions correspond with the load model (2) in **Fig. 1** in page 12.

$$\text{Peak torque } T_{\max} = \frac{974 \times 37}{585} \times 1.5$$

$$\text{where: } 974 \text{ is conversion from KW to kgf}\cdot\text{m} \\ = 92.4 \text{ kgf}\cdot\text{m}$$

$$\text{Working torque } T_a = \frac{974 \times 37}{585} \times 0.6 \\ = 37 \text{ kgf}\cdot\text{m}$$

$$\text{From Table 1 in page 12 } K_1 = 1$$

$$\text{From Fig. 2 in page 13 } K_2 = 1.35$$

$$\text{From Fig. 3 in page 13 } K_3 = 0.90$$

Equivalent working torque

$$T_e = \frac{K_1 \times K_2}{K_3} \cdot T_a = \frac{1 \times 1.35}{0.90} \times 37 \\ = 55.5 \text{ kgf}\cdot\text{m}$$

From the equivalent working torque graphs in **Fig. 8** in page 14, the joint basic number of the CVJ that satisfies 544 N·m relative to 585 RPM is **BJ125** (equivalent working torque 598 N·m). The dynamic allowable torque of this joint when torque fluctuates during revolution in one direction is 280 kgf·m, which satisfies the peak torque 92.4 kgf·m calculated above. Therefore, the CVJ **BJ125** is suited for the operating conditions above.

### Example 2

Select the CVJ for driving a hydraulic pump under the following conditions.

Rated torque of drive shaft: 5kgf·m  
 Speed: 1,800 RPM  
 Joint angle: 4°  
 This pump runs continuously 24 hours a day.

### Selection

In this application, the torque remains constant. Therefore, the rated torque only should be considered.

$$\text{Operating time factor } K_2 = 1.44$$

$$\text{Operating angle factor } K_3 = 0.92$$

$$\text{Equivalent working torque } T_e = \frac{K_2}{K_3} \cdot T_a = \frac{1.44}{0.92} \times 5 \\ = 7.8 \text{ kgf}\cdot\text{m}$$

In equivalent working transmission torque graph in **Fig. 8**, the CVJ basic number that satisfies 7.8 kgf·m against 1,800 RPM is **BJ75** (equivalent working torque 9.6 kgf·m against 1,800 RPM).



# Fixed Disc Type

## Varieties of Fixed Disc Type Joints

| Type                                 | Series symbol                      | Structural drawing                                                                | Remarks                                                                                                                                                                                                                         | Page of dimensions table |
|--------------------------------------|------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Shaft assemblies                     | No semi-finished flange            |                                                                                   | A product consisting of two CVJs connected with a solid or hollow shaft. One joint is used for the fixed side shaft, the other for the free side shaft. Expansion during operation is provided by the splines on the free side. | P24, 25                  |
|                                      |                                    |                                                                                   |                                                                                                                                                                                                                                 |                          |
|                                      | Complete with semi-finished flange |                                                                                   | A product identical to DB or DP series product except having semi-finished flanges.                                                                                                                                             | P26, 27                  |
|                                      |                                    |                                                                                   |                                                                                                                                                                                                                                 |                          |
|                                      | Complete with semi-finished hub    |                                                                                   | A product identical to DB or DP series product except having semi-finished hubs.                                                                                                                                                | P26, 27                  |
|                                      |                                    |                                                                                   |                                                                                                                                                                                                                                 |                          |
| CVJ with shaft head                  |                                    | An assembly consisting of a joint, boot, and shaft head for welding a steel pipe. | P25                                                                                                                                                                                                                             |                          |
|                                      |                                    |                                                                                   |                                                                                                                                                                                                                                 | DK<br>(for fixed side)   |
| Accessories                          | Semi-finished flange               |                                                                                   | Components for mounting the CVJ to a mating shaft.                                                                                                                                                                              | P44, 45                  |
|                                      |                                    |                                                                                   |                                                                                                                                                                                                                                 |                          |
|                                      | Boot                               |                                                                                   | Components for containing grease within the CVJ.                                                                                                                                                                                | P46                      |
|                                      |                                    |                                                                                   |                                                                                                                                                                                                                                 |                          |
| Hexagon headed bolt<br>Spring washer |                                    | Components for fastening the CVJ to the mounting flanged hub.                     | P47                                                                                                                                                                                                                             |                          |
|                                      |                                    |                                                                                   |                                                                                                                                                                                                                                 | 204<br>(for fixed side)  |
|                                      | 205<br>(for free side)             |                                                                                   |                                                                                                                                                                                                                                 |                          |

### CVJ number

Ex. 1  
A CVJ with basic number BJ75;  
DB series, and  $L=500$

**BJ75 DB 500**

Ex. 2  
A CVJ with basic number BJ125;  
DFP series, high speed, and  $L=1,000$

**BJ125 DFP 1000 H**

Ex. 3  
A CVJ with basic number BJ200;  
DP series, high speed, and  $L=1,000$ ;  
complete with hexagon headed bolts  
and spring washers

**BJ200 DP 1000 H Z**



# Fixed Disc Type (No semi-finished flange)

## DB (DB...H) and DP (DP...H) series (BJ75 – 300)

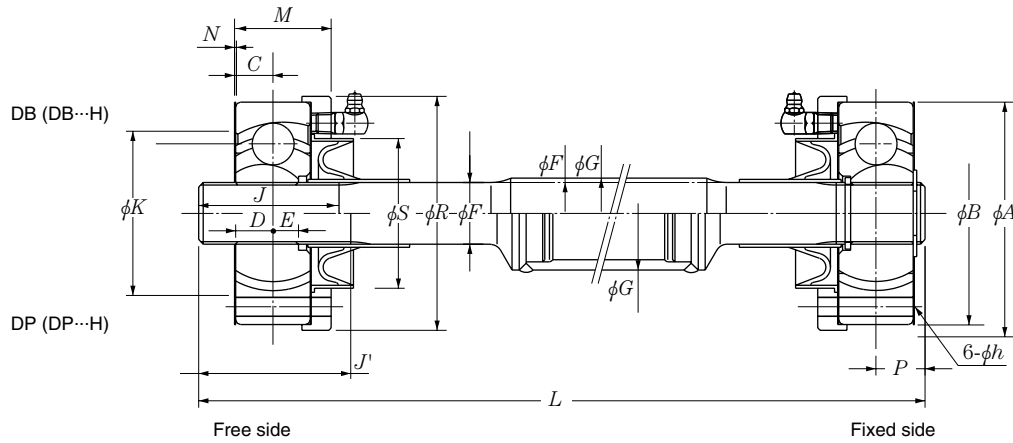


Fig. 1 BJ75 – 150

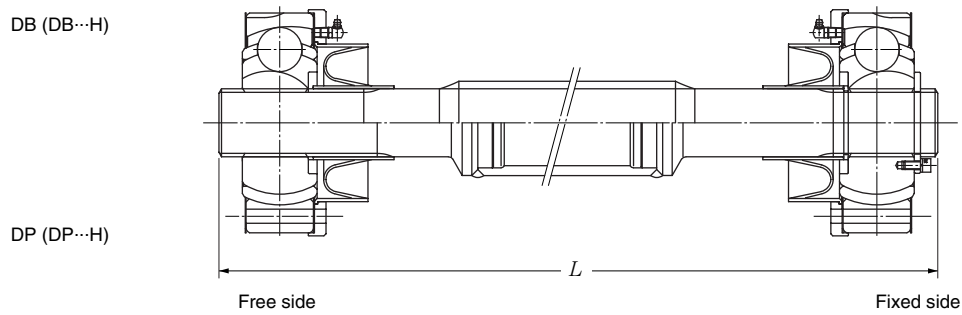


Fig. 2 BJ175 – 300

| Joint basic number | Outer race                             |                        |                       | Inner race |      |      | Shaft              |                |                    |                         |     | Circumference | Seal             |                          | Joint length $L$ <sup>①</sup> |      |                                |                   |                   |        |
|--------------------|----------------------------------------|------------------------|-----------------------|------------|------|------|--------------------|----------------|--------------------|-------------------------|-----|---------------|------------------|--------------------------|-------------------------------|------|--------------------------------|-------------------|-------------------|--------|
|                    | Outside dia.<br>$\phi A$               | Bolt hole              |                       | Width      |      |      | DB...H<br>$\phi F$ | DB<br>$\phi G$ | DP, DP...H<br>48.6 | Spline effective length |     | P             | Total width<br>N | Outside dia.<br>$\phi R$ | Width<br>$\phi S$             | N    | DB                             | DB...H            | DP                | DP...H |
|                    |                                        | Pitch dia.<br>$\phi B$ | Hole dia.<br>$\phi h$ | C          | D    | E    |                    |                |                    | J                       | J'  |               |                  |                          |                               |      | Upper line...Min. <sup>②</sup> | Lower line...Max. | Min. <sup>②</sup> |        |
| BJ75               | 80 <sup>0</sup> / <sub>-0.046</sub>    | 66                     | 8.5                   | 12.2       | 11.0 | 7.9  | 22.33              | 25             | 48.6               | 50                      | 60  | 16            | 33.9             | 85                       | 51                            | 0.5  | 250-                           | 150-              | 510               |        |
| BJ95               | 95 <sup>0</sup> / <sub>-0.054</sub>    | 80                     |                       | 15.9       | 14.0 | 10.6 | 26.36              | 30             |                    | 60                      | 70  | 21            | 41.3             | 100                      | 64                            |      | 280-                           | 190-              |                   |        |
| BJ125              | 125 <sup>0</sup> / <sub>-0.063</sub>   | 106                    | 10.5                  | 20.3       | 20.3 | 12.1 | 36.33              | 40             | 60.5               | 75                      | 80  | 29            | 50.1             | 130                      | 82                            | 0.5  | 320-                           | 250-              | 610               |        |
| BJ150              | 146 <sup>0</sup> / <sub>-0.063</sub>   | 124                    | 12.5                  | 24.1       | 21.5 | 17.0 | 45.6               | 50             | 76.3               | 90                      | 90  | 28            | 57.7             | 151                      | 102                           |      | 340-                           | 250-              |                   |        |
| BJ175              | 165.1 <sup>0</sup> / <sub>-0.100</sub> | 139.7                  | 15                    | 25.4       | 28.5 | 18.5 | 51.6               | 55             | 89.1               | 100                     | 120 | 38            | 62.4             | 170                      | 112                           | 0.8  | 380-                           | 300-              | 810               |        |
| BJ200              | 190 <sup>0</sup> / <sub>-0.115</sub>   | 159                    | 13.5                  | 30.0       | 22.5 | 31.5 | 59.5               | 65             | 101.6              | 120                     | 130 | 40            | 72.6             | 196                      | 130                           |      | 400-                           | 340-              |                   |        |
| BJ225              | 212 <sup>0</sup> / <sub>-0.115</sub>   | 180                    |                       | 32.5       | 27.6 | 36.0 | 65.4               | 70             |                    |                         |     |               |                  |                          |                               | 130  | 145                            | 53                | 87.6              | 218    |
| BJ250              | 230 <sup>0</sup> / <sub>-0.115</sub>   | 197                    | 17.5                  | 37.5       | 37.5 | 26.5 | 74.25              | 80             | 139.8              | 150                     | 165 | 65            | 97.6             | 273                      | 186                           |      |                                |                   |                   |        |
| BJ300              | 266.7 <sup>0</sup> / <sub>-0.130</sub> | 225.4                  |                       | 42.0       | 43.0 | 30.0 | 83.4               | 90             |                    |                         |     |               |                  |                          |                               | 500- | 450-                           |                   |                   |        |
|                    |                                        |                        |                       |            |      |      |                    |                |                    |                         |     |               |                  |                          |                               |      | 800                            |                   | 810               |        |

① Various joint lengths are available in increments of 5 mm within a range from a minimum to a maximum in the table.

② A joint length smaller than the minimum value is available. Contact Engineering.

The maximum joint length is limited by the operating conditions, manufacturing and shipping. If a particularly long joint length is needed, contact Engineering.  
Remarks: The orientation of the inside construction of joint BJ200 and BJ225 differs from that in the illustrations.

**Joint Assemblies with Shaft Head DS and DK Series**

Fastening method: Tap bolt system DS...Free side DK...Fixed side

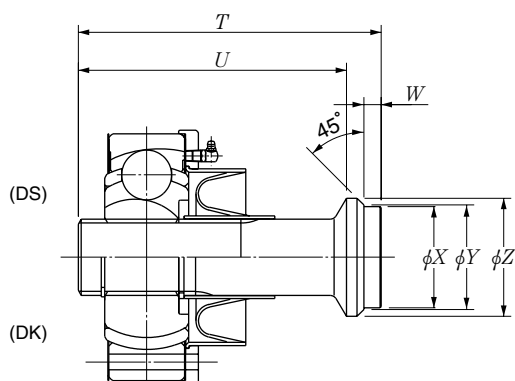


Fig. 3 BJ75 – 150

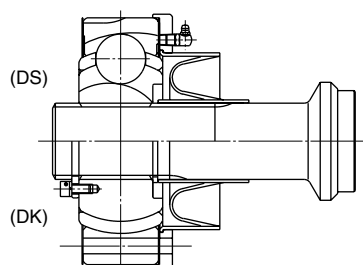


Fig. 4 BJ175 – 300

The **DS** and **DK** joint assemblies are components of **DP series**. Usually, one **DS** joint assembly and one **DK** joint assembly are welded to a segment of steel pipe before operation of the unit. The CVJ proper, shaft, boot and accessories are delivered unassembled.

Assembly sequence

1. Weld the steel pipe to the shaft heads. (See page 51.)
2. Lubricate the joint assemblies with the authorized constant velocity joint grease provided.
3. Install the accessories using special tools. (See pages 59 and 60.)

Material of shaft head: **SCM440**

Recommended steel pipe material: **STKM13 or STPG 370 or equivalent**

Dimensional unit mm

| Shaft head                          |      |        | Reference dimension | Allowable operating angle |         | GD <sup>2</sup> × 10 <sup>-3</sup> kg · m <sup>2</sup> (left column), Mass kg (right column) |      |      |      |     |        |      |              |                      |              |                      |               |                      |      |      |      |      |
|-------------------------------------|------|--------|---------------------|---------------------------|---------|----------------------------------------------------------------------------------------------|------|------|------|-----|--------|------|--------------|----------------------|--------------|----------------------|---------------|----------------------|------|------|------|------|
| Outside dia.                        |      | Length |                     | Under-cut dia.            | Dynamic | Static                                                                                       | DB   |      |      |     | DB...H |      |              |                      | DP, DP...H   |                      |               |                      |      |      |      |      |
| φX                                  | φY   |        | DS                  |                           |         |                                                                                              | DK   | W    | DS   | DK  | U      | φK   | When L=500mm | Per additional 100mm | When L=500mm | Per additional 100mm | When L=1000mm | Per additional 100mm |      |      |      |      |
| 41.6 <sup>+0.062</sup> <sub>0</sub> | 42.6 | 48.6   | 135                 | 102                       | 8       | 119                                                                                          | 86   | 50   | 14°  | 16° | 8.67   | 3.77 | 0.12         | 0.39                 | 8.55         | 3.54                 | 0.08          | 0.31                 | 15.8 | 6.87 | 0.96 | 0.49 |
|                                     |      |        | 145                 | 108                       |         | 131                                                                                          | 94   | 63   |      |     | 21.0   | 5.85 | 0.25         | 0.56                 | 20.7         | 5.48                 | 0.15          | 0.43                 | 27.6 | 8.39 |      |      |
| 51.7 <sup>+0.074</sup> <sub>0</sub> | 53   | 60.5   | 190                 | 140                       | 10      | 170                                                                                          | 120  | 80   | 16°  | 18° | 76.3   | 11.7 | 0.79         | 0.99                 | 75.7         | 11.3                 | 0.54          | 0.81                 | 91.0 | 15.6 | 2.1  | 0.75 |
| 66 <sup>+0.074</sup> <sub>0</sub>   | 67   | 76.3   |                     | 150                       | 163     | 123                                                                                          | 96   | 160  |      |     | 17.5   | 1.93 | 1.54         | 159                  | 16.9         | 1.33                 | 1.28          | 197                  | 23.3 | 5.2  | 1.04 |      |
| 79.5 <sup>+0.074</sup> <sub>0</sub> | 81.5 | 89.1   | 250                 | 175                       | 15      | 205                                                                                          | 145  | 110  | 16°  | 18° | 273    | 24.2 | 2.80         | 1.86                 | 271          | 23.8                 | 2.18          | 1.64                 | 330  | 32.3 | 8.5  | 1.34 |
| 87 <sup>+0.087</sup> <sub>0</sub>   | 90   | 101.6  |                     |                           |         | 222                                                                                          | 162  | 130  |      |     | 551    | 35.2 | 5.50         | 2.60                 | 548          | 34.6                 | 3.87          | 2.18                 | 660  | 48.4 | 17.8 | 2.26 |
|                                     |      |        | 230                 | 172                       | 150     | 904                                                                                          | 45.9 | 7.40 | 3.02 | 900 | 45.4   | 5.63 | 2.64         | 1010                 | 59.6         |                      |               |                      |      |      |      |      |
| 123 <sup>+0.100</sup> <sub>0</sub>  | 125  | 139.8  | 320                 | 230                       | 20      | 284                                                                                          | 194  | 160  | 18°  | 20° | 1400   | 59.4 | 12.6         | 3.94                 | 1390         | 58.8                 | 9.37          | 3.40                 | 1700 | 82.5 | 54   | 3.20 |
|                                     |      |        | 370                 | 260                       |         | 332                                                                                          | 222  | 180  |      |     | 2860   | 87.3 | 20.2         | 4.99                 | 2850         | 86.9                 | 14.9          | 4.29                 | 3200 | 111  |      |      |

# Disc Type (Complete with semi-finished flange)

## DFB (DFB...H) and DFP (DFP...H) series (BJ75 – 150)

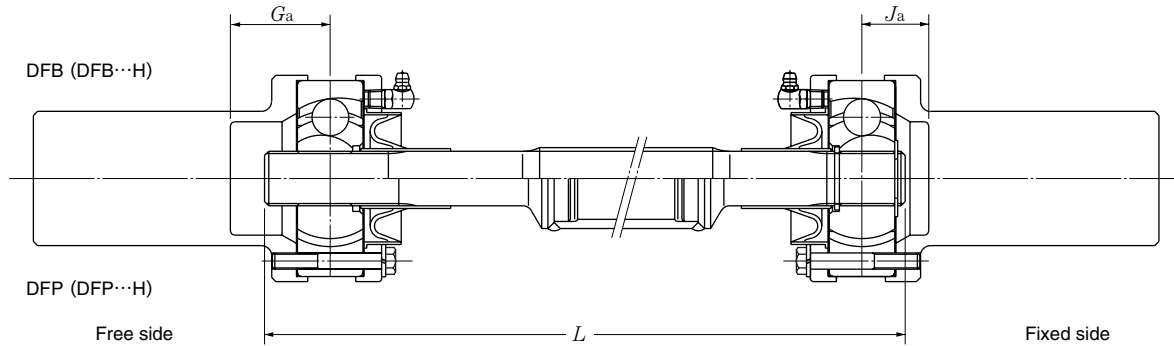


Fig. 1

## DHB (DHB...H) and DHP (DHP...H) series (BJ75 – 150)

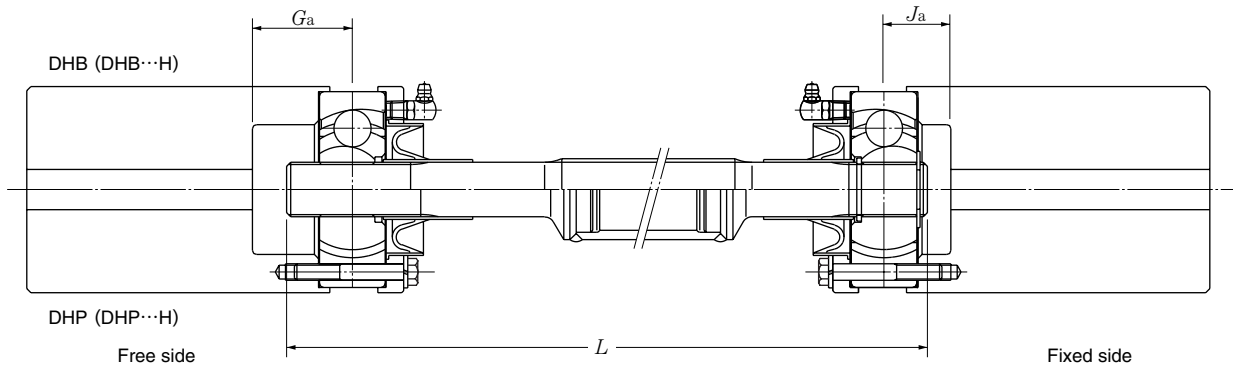


Fig. 2

Dimensional unit mm

| Joint basic number | Figure | CVJ center |       | $GD^2 \times 10^{-3} \text{ kg} \cdot \text{m}^2$ (left column), Mass kg (right column) |      |                      |      |                                                |      |                      |      |                                                          |      |                      |      |
|--------------------|--------|------------|-------|-----------------------------------------------------------------------------------------|------|----------------------|------|------------------------------------------------|------|----------------------|------|----------------------------------------------------------|------|----------------------|------|
|                    |        | $G_a$      | $J_a$ | Upper line... DFB<br>Lower line... DHB                                                  |      |                      |      | Upper line... DFB...H<br>Lower line... DHB...H |      |                      |      | Upper line... DFP, DFP...H<br>Lower line... DHP, DHP...H |      |                      |      |
|                    |        |            |       | When $L=500\text{mm}$                                                                   |      | Per additional 100mm |      | When $L=500\text{mm}$                          |      | Per additional 100mm |      | When $L=1000\text{mm}$                                   |      | Per additional 100mm |      |
|                    |        |            |       |                                                                                         |      |                      |      |                                                |      |                      |      |                                                          |      |                      |      |
| BJ75               | 1      | 36.7       | 24.7  | 16.4                                                                                    | 7.15 | 0.12                 | 0.39 | 16.3                                           | 6.92 | 0.08                 | 0.31 | 23.6                                                     | 10.3 | 0.96                 | 0.49 |
|                    | 2      |            |       | 45.3                                                                                    | 13.6 |                      |      | 45.2                                           | 13.3 |                      |      | 52.4                                                     | 16.7 |                      |      |
| BJ95               | 1      | 48.4       | 32.4  | 40                                                                                      | 12.5 | 0.25                 | 0.56 | 39.8                                           | 12.1 | 0.15                 | 0.43 | 46.6                                                     | 15.0 | 0.96                 | 0.49 |
|                    | 2      |            |       | 106                                                                                     | 22.2 |                      |      | 106                                            | 21.8 |                      |      | 113                                                      | 24.7 |                      |      |
| BJ125              | 1      | 60.8       | 40.8  | 152                                                                                     | 26.1 | 0.79                 | 0.99 | 151                                            | 25.7 | 0.54                 | 0.81 | 166                                                      | 30.0 | 2.1                  | 0.75 |
|                    | 2      |            |       | 362                                                                                     | 40.7 |                      |      | 362                                            | 40.3 |                      |      | 375                                                      | 44.6 |                      |      |
| BJ150              | 1      | 72.6       | 48.6  | 323                                                                                     | 40.2 | 1.93                 | 1.54 | 322                                            | 39.6 | 1.33                 | 1.28 | 360                                                      | 46.0 | 5.2                  | 1.04 |
|                    | 2      |            |       | 749                                                                                     | 60.7 |                      |      | 748                                            | 60.1 |                      |      | 782                                                      | 66.5 |                      |      |

DFB (DFB···H) and DFP (DFP···H) series (BJ175 – 300)

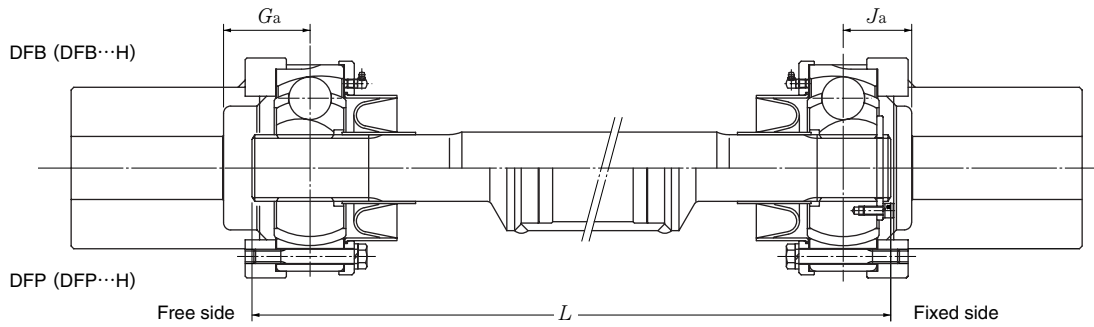


Fig. 3

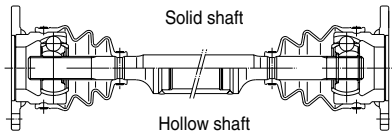
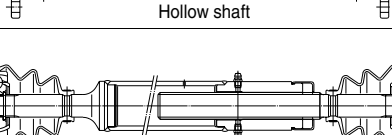
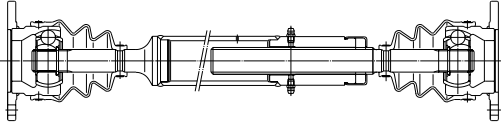
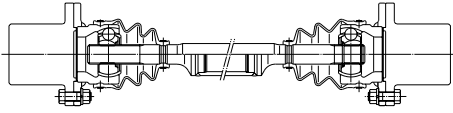
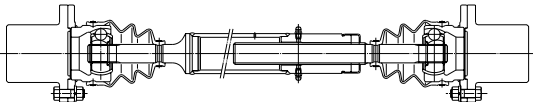
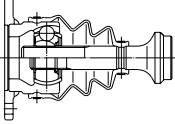
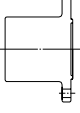
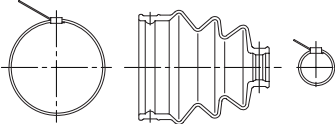

Dimensional unit mm

| Joint basic number | CVJ center |       | $GD^2 \times 10^{-3} \text{ kg} \cdot \text{m}^2$ (left column), Mass kg (right column) |      |                      |      |                       |      |                      |      |                        |      |                      |      |
|--------------------|------------|-------|-----------------------------------------------------------------------------------------|------|----------------------|------|-----------------------|------|----------------------|------|------------------------|------|----------------------|------|
|                    | $G_a$      | $J_a$ | DFB                                                                                     |      |                      |      | DFB···H               |      |                      |      | DFP, DFP···H           |      |                      |      |
|                    |            |       | When $L=500\text{mm}$                                                                   |      | Per additional 100mm |      | When $L=500\text{mm}$ |      | Per additional 100mm |      | When $L=1000\text{mm}$ |      | Per additional 100mm |      |
| <b>BJ175</b>       | 80.2       | 60.2  | 596                                                                                     | 53.9 | 2.80                 | 1.86 | 594                   | 53.5 | 2.18                 | 1.64 | 653                    | 62.0 | 8.5                  | 1.34 |
| <b>BJ200</b>       | 85.8       | 65.8  | 1180                                                                                    | 77.1 | 5.50                 | 2.60 | 1180                  | 76.5 | 3.87                 | 2.18 | 1290                   | 90.3 | 17.8                 | 2.26 |
| <b>BJ225</b>       | 88.3       | 68.3  | 1960                                                                                    | 105  | 7.40                 | 3.02 | 1960                  | 104  | 5.63                 | 2.64 | 2070                   | 118  |                      |      |
| <b>BJ250</b>       | 96.3       | 76.3  | 3250                                                                                    | 140  | 12.6                 | 3.94 | 3240                  | 139  | 9.37                 | 3.40 | 3550                   | 163  | 54.0                 | 3.20 |
| <b>BJ300</b>       | 112.8      | 87.8  | 6200                                                                                    | 200  | 20.2                 | 4.99 | 6190                  | 199  | 14.9                 | 4.29 | 6540                   | 223  |                      |      |



# Fixed Cup Type

## Varieties of Fixed Disc Type Joints

| Type             | Series symbol                                       | Structural drawing     | Remarks                                                                                              | Page of dimensions table                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                    |                                                                                                       |
|------------------|-----------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Shaft assemblies | No semi-finished flange                             | CLB                    |  <p>Solid shaft</p> | <p>A product consisting of two CVJs connected with a solid or hollow shaft. One joint is used for the fixed side shaft, the other for the free side shaft. Expansion during operation is provided by the splines on the free side.</p> <p>A product consisting of two CVJs proper connected with an intermediate slide splined shaft. Both CVJs proper are fixed. Expansion during operation is provided by the intermediate slide spline shaft.</p> | P30, 31                                                                                                                                                                            |                                                                                                       |
|                  |                                                     | CLP                    |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                    |  <p>Hollow shaft</p> |
|                  |                                                     | CLT                    |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                    |                                                                                                       |
|                  | Complete with semi-finished flange                  | CLFB                   |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>A product identical to CLB or CLP series product except having semi-finished flanges.</p> <p>A product identical to CLP series product except having semi-finished flanges.</p> | P32                                                                                                   |
|                  |                                                     | CLFP                   |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                    |                                                                                                       |
|                  |                                                     | CLFT                   |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                    |                                                                                                       |
| Joint assemblies | CVJ with shaft head                                 | CLS<br>(for free side) |                    | <p>An assembly consisting of a CVJ, boot, and shaft head for welding a steel pipe.</p>                                                                                                                                                                                                                                                                                                                                                               | P31                                                                                                                                                                                |                                                                                                       |
|                  |                                                     | CLK<br>(for fixed)     |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                    |                                                                                                       |
| Accessories      | Semi-finished flange                                | 400<br>800             |                   | <p>A component for mounting the CVJ to a mating shaft.</p>                                                                                                                                                                                                                                                                                                                                                                                           | P44, 45                                                                                                                                                                            |                                                                                                       |
|                  | Boot<br>Boot band                                   | —                      |                   | <p>Components for containing grease within the CVJ.</p>                                                                                                                                                                                                                                                                                                                                                                                              | P46                                                                                                                                                                                |                                                                                                       |
|                  | Hexagon headed bolt<br>Spring washer<br>Hexagon nut | —                      |                   | <p>Components for fastening the CVJ to the mounting flanged hub.</p>                                                                                                                                                                                                                                                                                                                                                                                 | P47                                                                                                                                                                                |                                                                                                       |

### CVJ number

Ex. 1  
A CVJ with basic number BJ75;  
CLB series, and  $L=500$

**BJ75 CLB 500**

Joint length  
Series symbol  
Joint basic number

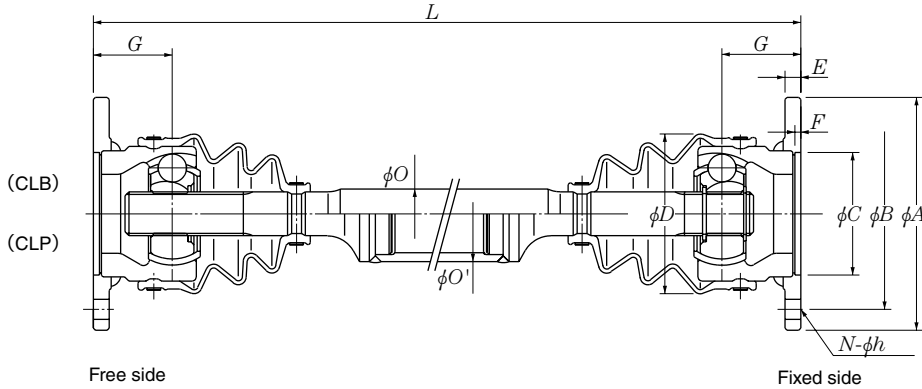
Ex. 2  
A joint with basic number BJ125;  
CLFT series, and  $L=1,000$

**BJ125 CLFT 500**

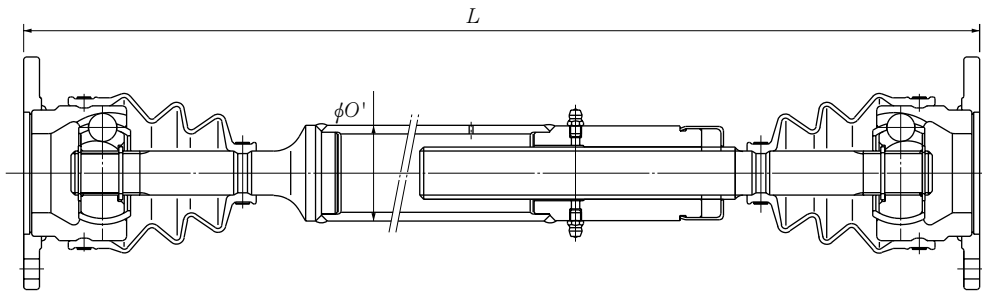
Joint length  
Series symbol  
Joint basic number

# Cup Type (No semi-finished flange)

## CLB and CLP series (BJ75 – 225)



## CLT series (BJ75 – 225)



| Dimensional data<br>Joint basic number | Outer race               |                                     |                         |                         |                  |     | Boot<br>Outside dia.<br>$\phi D$<br>(approx.) | Shaft                     |                          | CVJ center<br>$G$ | Joint length $L$ <sup>①</sup> |                    |          |          |
|----------------------------------------|--------------------------|-------------------------------------|-------------------------|-------------------------|------------------|-----|-----------------------------------------------|---------------------------|--------------------------|-------------------|-------------------------------|--------------------|----------|----------|
|                                        | Outside dia.<br>$\phi A$ | Bolt hole<br>Pitch dia.<br>$\phi B$ | Hole dia.<br>$N-\phi h$ | Socket dia.<br>$\phi C$ | Width<br>$E$ $F$ |     |                                               | CLB<br>$\phi O$<br>(Max.) | CLP,<br>CLT<br>$\phi O'$ |                   | CLB                           | CLP<br>Min. – Max. | CLT      |          |
| <b>BJ75</b>                            | 118                      | 97                                  | 3-10.2                  | 62                      | $+0.074$<br>$0$  | 8   | 3                                             | 81                        | 25                       | 48.6              | 40                            | 240–540            | 550–4000 | 460–2000 |
| <b>BJ95</b>                            | 136                      | 110                                 | 3-12.2                  | 70                      | $+0.074$<br>$0$  | 10  |                                               | 108                       | 30                       |                   | 46                            | 290–540            | 550–4000 | 520–2000 |
| <b>BJ100</b>                           | 154                      | 125                                 | 3-14.3                  | 80                      | $+0.074$<br>$0$  |     | 3.5                                           | 112                       | 32                       | 60.5              | 47                            | 305–540            | 550–4200 | 580–2000 |
| <b>BJ125</b>                           | 179                      | 150                                 |                         | 102                     | $+0.087$<br>$0$  | 148 |                                               | 40                        | 55                       |                   | 380–650                       | 660–4200           | 610–2000 |          |
| <b>BJ150</b>                           | 192                      | 165                                 | 6-14.3                  | 110                     | $+0.087$<br>$0$  | 12  | 165                                           | 50                        | 89.1                     | 76                | 480–780                       | 790–4500           | 830–2000 |          |
| <b>BJ175</b>                           | 215                      | 185                                 | 6-17                    | 125                     | $+0.100$<br>$0$  | 15  | 5                                             | 172                       | 55                       | 101.6             | 83                            | 470–880            | 890–4500 | 910–2000 |
| <b>BJ200</b>                           | 250                      | 215                                 | 6-19                    | 140                     | $+0.100$<br>$0$  | 16  |                                               | 199                       | 65                       |                   | 95                            | 540–900            | 910–4500 | 950–2000 |
| <b>BJ225</b>                           | 265                      | 228                                 | 6-21                    | 155                     | $+0.100$<br>$0$  | 18  |                                               | 222                       | 70                       |                   | 139.8                         | 105                |          | 580–900  |

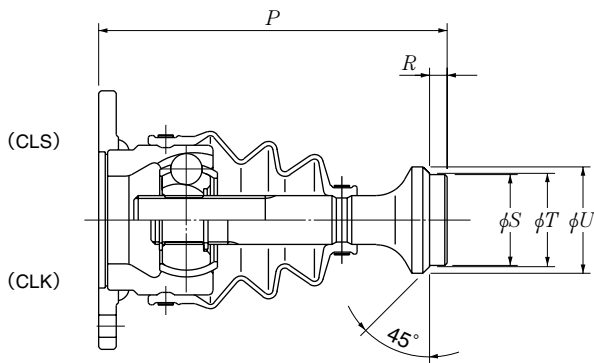
① Various joint lengths  $L$  are available in increments of 5 mm within a range from a minimum to a maximum.

② The allowable expansion data is based on the center-to-center distance  $d$  relative to the operating angle indicated.

Remarks: The form of boot can differ from that in the illustration depending on the joint basic number.

**Joint with Shaft Head CLS and CLK Series (BJ75 – 225)**

Fastening method: Through bolt system CLS...Free side CLK...Fixed side



The **CLS** and **CLK** joint assemblies are components of the **CLP** series. Usually one **CLS** and one **CLK** joint assembly is welded to a segment of steel pipe before operation of the shaft assembly. The CVJ assemblies, shaft heads, grease and boots are delivered unassembled.

Assembly sequence

1. Weld the steel pipe to the shaft heads. (See page 51.)
2. Lubricate the joints with the provided grease for NTN constant velocity joints.
3. Install the accessories. (See pages 59 and 60.)

**Material of shaft head: SCM440**

**Recommended steel pipe material: STKM13 or STPG 370 or equivalent**

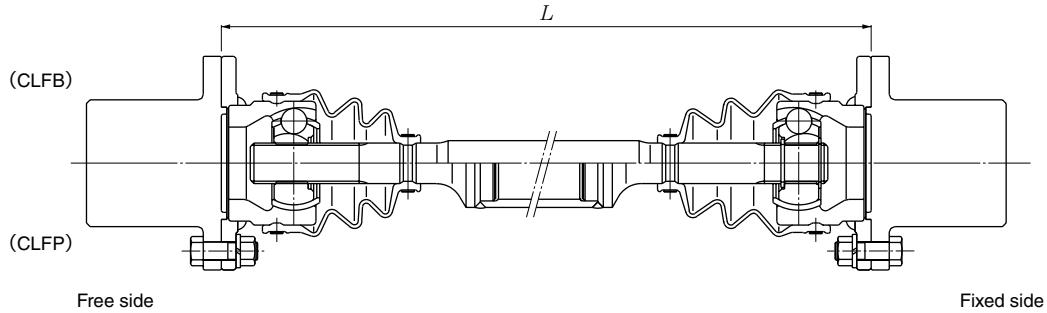
Dimensional unit mm

| Shaft head                          |          |          |                                    |     | Allowable expansion <sup>②</sup> |             |                              | Allowable operating angle |         | GD <sup>2</sup> × 10 <sup>-3</sup> kg · m <sup>2</sup> (left column), Mass kg (right column) |              |                      |               |                      |               |                      |      |      |      |      |      |      |
|-------------------------------------|----------|----------|------------------------------------|-----|----------------------------------|-------------|------------------------------|---------------------------|---------|----------------------------------------------------------------------------------------------|--------------|----------------------|---------------|----------------------|---------------|----------------------|------|------|------|------|------|------|
| Outside dia. (approx.)              |          |          | Length                             |     | R                                | CLB, CLP    |                              | CLT                       | Dynamic | Static                                                                                       | CLB          |                      | CLP           |                      | CLT           |                      |      |      |      |      |      |      |
| $\phi S$                            | $\phi T$ | $\phi U$ | CLS                                | CLK |                                  | 15° or less | 15° or more, and 25° or less |                           |         |                                                                                              | When L=500mm | Per additional 100mm | When L=1000mm | Per additional 100mm | When L=1000mm | Per additional 100mm |      |      |      |      |      |      |
| 41.6 <sup>+0.062</sup> <sub>0</sub> | 42.6     | 48.6     | 151                                | 159 | 8                                | ±10         | +10<br>-5                    | +80<br>-6                 |         |                                                                                              | 14.8         | 4.17                 | 0.12          | 0.39                 | 21.9          | 7.52                 | 0.96 | 0.49 | 22.3 | 8.35 | 0.96 | 0.49 |
|                                     |          |          | 165                                | 170 |                                  |             |                              |                           |         |                                                                                              | 32.6         | 6.42                 | 0.25          | 0.56                 | 39.4          | 9.44                 |      |      | 40.5 | 10.6 |      |      |
| 51.7 <sup>+0.074</sup> <sub>0</sub> | 53       | 60.5     | 210                                | 215 | 10                               | ±10         |                              | +90<br>-8                 | 25°     | 38°                                                                                          | 51.5         | 8.12                 | 0.32          | 0.63                 | 65.2          | 13.2                 | 2.1  | 0.75 | 67.1 | 14.5 | 2.1  | 0.75 |
|                                     |          |          | 214                                | 216 |                                  |             |                              |                           |         |                                                                                              | 109          | 12.5                 | 0.79          | 0.99                 | 122           | 17.2                 |      |      | 124  | 18.6 |      |      |
| 79.5 <sup>+0.074</sup> <sub>0</sub> | 81.5     | 89.1     | 299                                | 306 | 25                               | ±15         |                              | +120<br>-15               |         |                                                                                              | 263          | 21.3                 | 1.93          | 1.54                 | 314           | 31.1                 | 8.5  | 1.34 | 329  | 36.7 | 8.5  | 1.34 |
|                                     |          |          | 305                                | 315 |                                  |             |                              |                           |         |                                                                                              | 469          | 29.2                 | 2.80          | 1.86                 | 567           | 44.1                 |      |      | 590  | 52.8 |      |      |
| 87 <sup>+0.087</sup> <sub>0</sub>   | 90       | 101.6    | 337                                | 343 |                                  |             |                              | +150<br>-15               |         |                                                                                              | 964          | 45.4                 | 5.50          | 2.60                 | 1053          | 60.1                 |      |      | 1081 | 69.0 |      |      |
|                                     |          |          | 123 <sup>+0.100</sup> <sub>0</sub> | 125 |                                  |             |                              |                           |         |                                                                                              | 138.9        | 364                  | 371           | 30                   | 1450          | 58.3                 |      |      | 7.40 | 3.02 |      |      |

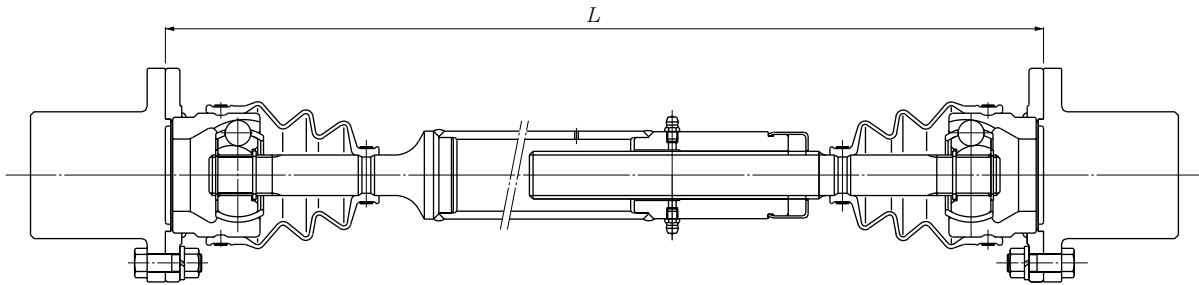


# Cup Type (Complete with semi-finished flange)

## CLFB and CLFPseries (BJ75 – 225)



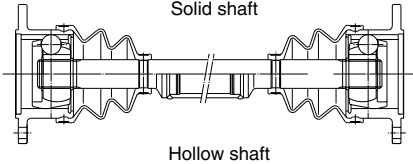
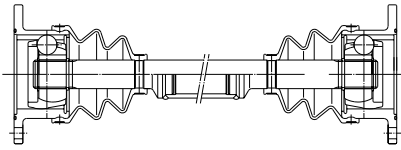
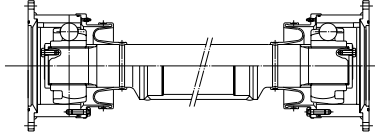
## CLFTseries (BJ75 – 225)



| Dimensional data<br>Joint basic number | $GD^2 \times 10^{-3} \text{ kg} \cdot \text{m}^2$ (left column), Mass kg (right column) |      |                      |      |                        |      |                      |      |                        |      |                      |      |
|----------------------------------------|-----------------------------------------------------------------------------------------|------|----------------------|------|------------------------|------|----------------------|------|------------------------|------|----------------------|------|
|                                        | CLFB                                                                                    |      |                      |      | CLFP                   |      |                      |      | CLFP                   |      |                      |      |
|                                        | When $L=500\text{mm}$                                                                   |      | Per additional 100mm |      | When $L=1000\text{mm}$ |      | Per additional 100mm |      | When $L=1000\text{mm}$ |      | Per additional 100mm |      |
| <b>BJ75</b>                            | 38.0                                                                                    | 10.0 | 0.08                 | 0.39 | 45.1                   | 13.2 | 0.96                 | 0.49 | 45.5                   | 14.2 | 0.96                 | 0.49 |
| <b>BJ95</b>                            | 79.0                                                                                    | 14.9 | 0.15                 | 0.56 | 85.8                   | 17.6 |                      |      | 86.9                   | 19.3 |                      |      |
| <b>BJ100</b>                           | 143                                                                                     | 20.9 | 0.24                 | 0.63 | 157                    | 25.6 | 2.1                  | 0.75 | 159                    | 27.1 | 2.1                  | 0.75 |
| <b>BJ125</b>                           | 303                                                                                     | 33.5 | 0.54                 | 0.99 | 316                    | 37.8 |                      |      | 318                    | 39.4 |                      |      |
| <b>BJ150</b>                           | 552                                                                                     | 46.2 | 1.93                 | 1.54 | 603                    | 56.2 | 8.5                  | 1.34 | 618                    | 61.2 | 8.5                  | 1.34 |
| <b>BJ175</b>                           | 1011                                                                                    | 66.0 | 2.80                 | 1.86 | 1110                   | 80.0 | 17.8                 | 2.26 | 1133                   | 88.9 | 17.8                 | 2.26 |
| <b>BJ200</b>                           | 2004                                                                                    | 98.1 | 5.50                 | 2.60 | 2093                   | 112  |                      |      | 2121                   | 121  |                      |      |
| <b>BJ225</b>                           | 3026                                                                                    | 128  | 7.40                 | 3.02 | 3254                   | 151  | 54.0                 | 3.20 | 3414                   | 171  | 54.0                 | 3.20 |

# Sliding Type

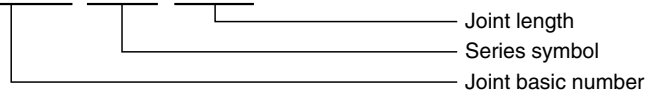
## Varieties of Sliding Type Joint

| Type             | Series symbol | Structural drawing                                                                              | Remarks                                                                                                                                                                     | Page of dimensions table                                                                                                                     |
|------------------|---------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Shaft assemblies | Small         | DOJ68-100<br>  | Two compact flange type CVJs proper are connected with a solid or hollow shaft. Expansion during operation is achieved within the CVJs proper. This series is non-standard. | P34, 35                                                                                                                                      |
|                  |               | DOJ125-200<br> |                                                                                                                                                                             |                                                                                                                                              |
|                  | Large         | FSB<br>FSP                                                                                      | DOJ225-625<br>                                                                             | Two large flange type CVJs proper are connected with a solid or hollow shaft. Expansion during operation is achieved within the CVJs proper. |

### CVJ number

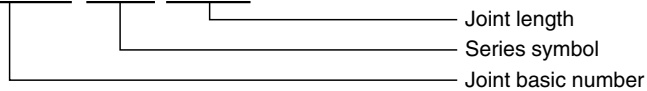
Ex. 1 A CVJ with basic number DOJ225;  
FSB series, and  $L=1,000$

**DOJ225 FSB 1000**



Ex. 2 A joint with basic number DOJ225;  
FSP series, and  $L=2,000$

**DOJ225 FSP 2000**

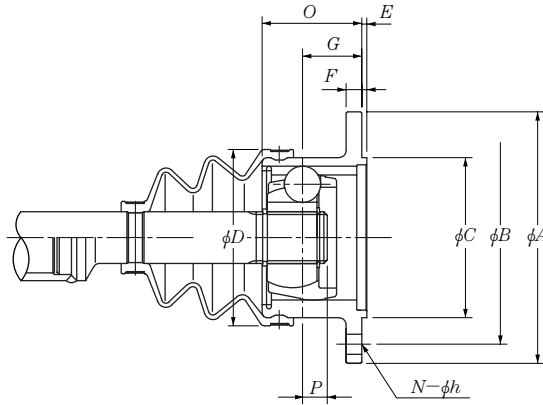


# Sliding Type

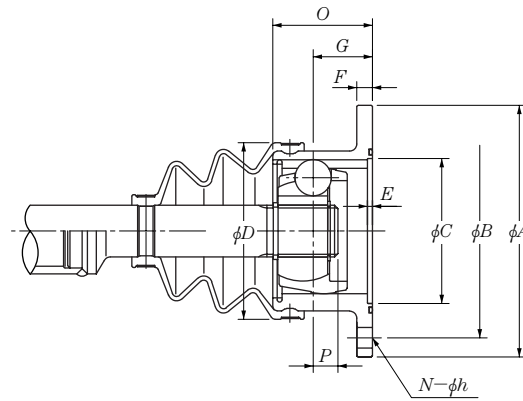
## F Series (reference)

The allowable operating range of a sliding type joint is governed by interrelation among the RPM, operating angle and expansion. When considering use of this type, contact Engineering.

### DOJ68 – 100



### DOJ125 – 200



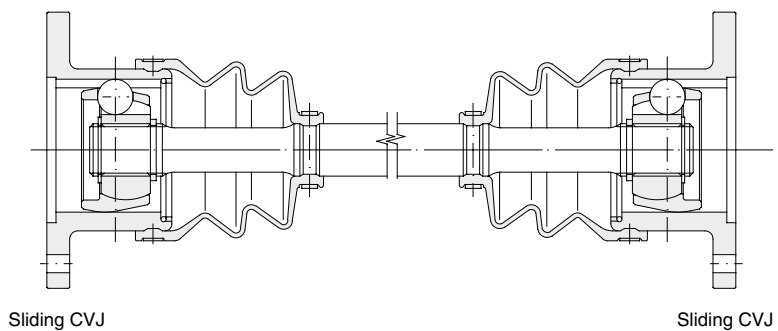
Dimensional unit mm

| Dimensional data<br>Joint basic number | Outer race               |                                     |                         | Socket<br>$\phi C$ | Width<br>$E$ | $F$ | $O$ ① | Boot<br>Outside dia.<br>(approx.)<br>$\phi D$ | Shaft<br>Length<br>$P$ | Joint length<br>$G$ ② | Allowable expansion ③ |        | Allowable operating angle |
|----------------------------------------|--------------------------|-------------------------------------|-------------------------|--------------------|--------------|-----|-------|-----------------------------------------------|------------------------|-----------------------|-----------------------|--------|---------------------------|
|                                        | Outside dia.<br>$\phi A$ | Bolt hole<br>Pitch dia.<br>$\phi B$ | Hole dia.<br>$N-\phi h$ |                    |              |     |       |                                               |                        |                       | At 0°                 | At 20° |                           |
| DOJ68                                  | 95                       | 76                                  | 3-10.5                  | 60<br>0<br>-0.074  | 1.5          | 6   | 44    | 70                                            | 9.5                    | 19                    | ±10                   | ±6     | 20°                       |
| DOJ75                                  | 106                      | 87                                  | 3-10.2                  | 70<br>0<br>-0.074  | 3            | 8   | 50    | 78                                            | 11                     | 28.5                  | ±13                   | ±8     |                           |
| DOJ87                                  | 125                      | 105                                 |                         | 78<br>0<br>-0.074  |              |     | 60    | 89                                            | 13                     | 34                    |                       |        |                           |
| DOJ100                                 | 146                      | 122                                 | 3-14.2                  | 91<br>0<br>-0.087  | 3.5          | 11  | 65    | 100                                           | 15                     | 40                    | ±12                   | ±5     |                           |
| DOJ125                                 | 177                      | 150                                 | 3-14.3                  | 102<br>+0.087<br>0 |              |     | 70    | 124                                           | 17.5                   | 42                    |                       |        |                           |
| DOJ150                                 | 215                      | 185                                 | 3-16.4                  | 124<br>+0.100<br>0 | 4            | 13  | 85    | 154                                           | 21                     | 51                    | ±15                   | ±6     |                           |
| DOJ175                                 | 236                      | 203                                 | 4-18.4                  | 140<br>+0.100<br>0 | 5            | 15  | 90    | 175                                           | 25                     | 60                    | ±18                   | ±7     |                           |
| DOJ200                                 | 270                      | 233                                 | 4-20.4                  | 165<br>+0.100<br>0 | 6            |     | 100   | 200                                           | 28                     | 62                    | ±16                   | ±5     |                           |

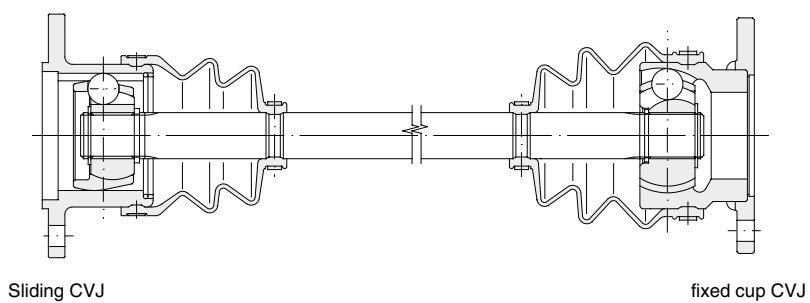
①, ② and ③ are reference values.

The sliding CVJ can be used in two forms: a combination of two sliding CVJs connected with an intermediate shaft, and a configuration comprised of one sliding CVJ and a fixed CVJ to the other end.

[Ex. 1] Example combination of [sliding CVJ] + [sliding CVJ]



[Ex. 2] The example shows a combination of [sliding CVJ] + [fixed cup CVJ]





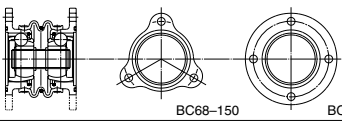
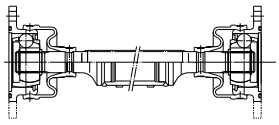
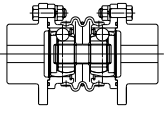
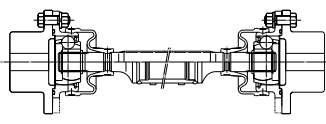
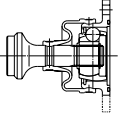
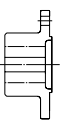
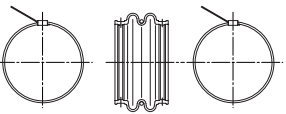
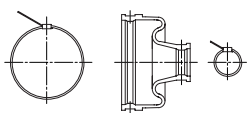
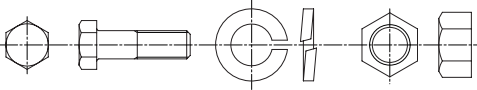
Dimensional unit mm

| Under-cut on flange<br><i>M</i> | Allowable expansion<br>At 0° | Allowable number of revolutions<br>rpm | Allowable operating angle | GD <sup>2</sup> × 10 <sup>-3</sup> kg · m <sup>2</sup> (left column), Mass kg (right column) |      |                      |       |               |      |                      |       |
|---------------------------------|------------------------------|----------------------------------------|---------------------------|----------------------------------------------------------------------------------------------|------|----------------------|-------|---------------|------|----------------------|-------|
|                                 |                              |                                        |                           | FSB series                                                                                   |      |                      |       | FSP series    |      |                      |       |
|                                 |                              |                                        |                           | When L=1000mm                                                                                |      | Per additional 100mm |       | When L=2000mm |      | Per additional 100mm |       |
| 22                              | ±35                          | 2200                                   | 10°                       | 0.907                                                                                        | 62.4 | 0.0087               | 3.28  | 1.11          | 83.7 | 0.0163               | 2.26  |
| 28                              |                              | 2000                                   |                           | 1.58                                                                                         | 83.2 | 0.0139               | 4.14  | 1.99          | 123  | 0.0275               | 3.20  |
|                                 | ±38                          | 1800                                   |                           | 2.43                                                                                         | 110  | 0.0284               | 5.92  | 3.07          | 148  | 0.0499               |       |
| 34                              | ±40                          | 1600                                   |                           | 4.58                                                                                         | 147  | 0.0419               | 7.19  | 5.67          | 199  | 0.0848               | 3.83  |
|                                 |                              | 1300                                   |                           | 8.41                                                                                         | 205  | 0.0776               | 9.78  | 10.6          | 273  | 0.169                | 5.29  |
| 36                              | ±44                          | 1200                                   |                           | 14.6                                                                                         | 272  | 0.112                | 11.7  | 18.4          | 385  | 0.287                | 7.45  |
| 46                              | ±46                          | 1100                                   |                           | 23.6                                                                                         | 350  | 0.178                | 14.8  | 30.8          | 543  | 0.494                | 11.1  |
| 48                              | ±50                          | 1000                                   |                           | 36.3                                                                                         | 450  | 0.257                | 17.8  | 44.3          | 645  | 0.629                |       |
| 52                              |                              | 800                                    |                           | 8°                                                                                           | 63.9 | 606                  | 0.493 | 24.66         | 75.4 | 869                  | 0.872 |



# Coupling Type

## Varieties of Coupling Type Joint

| Type                                                            |                                                                                          | Series symbol                                                                             | Structural drawing                                                                                                  | Remarks                                                                                                                                                                              | Page of dimensions table |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Shaft assemblies                                                | No semi-finished flange                                                                  | Short shaft                                                                               | P201<br>                           | A compact CVJ assembly consisting of two sliding flanged type CVJs connected with a solid shaft. Expansion during operation occurs within the joints.                                | P40, 41                  |
|                                                                 |                                                                                          | Long shaft                                                                                | PB<br>PB··H<br>PP<br>PP··H<br>     | Two sliding flange type CVJs proper are connected with a solid shaft or hollow shaft to constitute a compact product. Expansion during operation is achieved within the CVJs proper. |                          |
|                                                                 | Complete with semi-finished flange                                                       | Short shaft                                                                               | P601<br>                           | A product identical to P201 series product except having semi-finished hubs.                                                                                                         | P42, 43                  |
|                                                                 |                                                                                          | Long shaft                                                                                | PFB<br>PFB··H<br>PFP<br>PFP··H<br> | A product identical to PB or PP series product except having semi-finished flanges.                                                                                                  |                          |
| Joint assemblies                                                | CVJ with shaft head                                                                      | PK<br>   | An assembly consisting of a CVJ, boot, and shaft head for welding a steel pipe.                                     | P41                                                                                                                                                                                  |                          |
| Accessories                                                     | Semi-finished flange                                                                     | 150<br> | Components for mounting the CVJ to a mating shaft.                                                                  | P44, 45                                                                                                                                                                              |                          |
|                                                                 | Boot<br>Boot band                                                                        | —                                                                                         | for long shaft<br>               | Components for containing grease within the CVJ.                                                                                                                                     | P46                      |
|                                                                 |                                                                                          | —                                                                                         | for short shaft<br>              |                                                                                                                                                                                      |                          |
| Small hexagon nut<br>Spring washer<br>Small hexagon headed bolt | —<br> | Components for fastening the CVJ to the mounting flanged hub.                             | P47                                                                                                                 |                                                                                                                                                                                      |                          |

### CVJ number

Ex. 1  
A CVJ with basic number BC68;  
P201 series

**BC68AC P201**

Series symbol  
Joint basic number

Ex. 2  
A CVJ with basic number BC68;  
P201 series, complete with accessories  
(bolts, nuts and washers)

**BC68AC P2100**

Series symbol  
Joint basic number

Ex. 3  
A CVJ with basic number BC68;  
PFP series, high speed, and  $L=1,000$

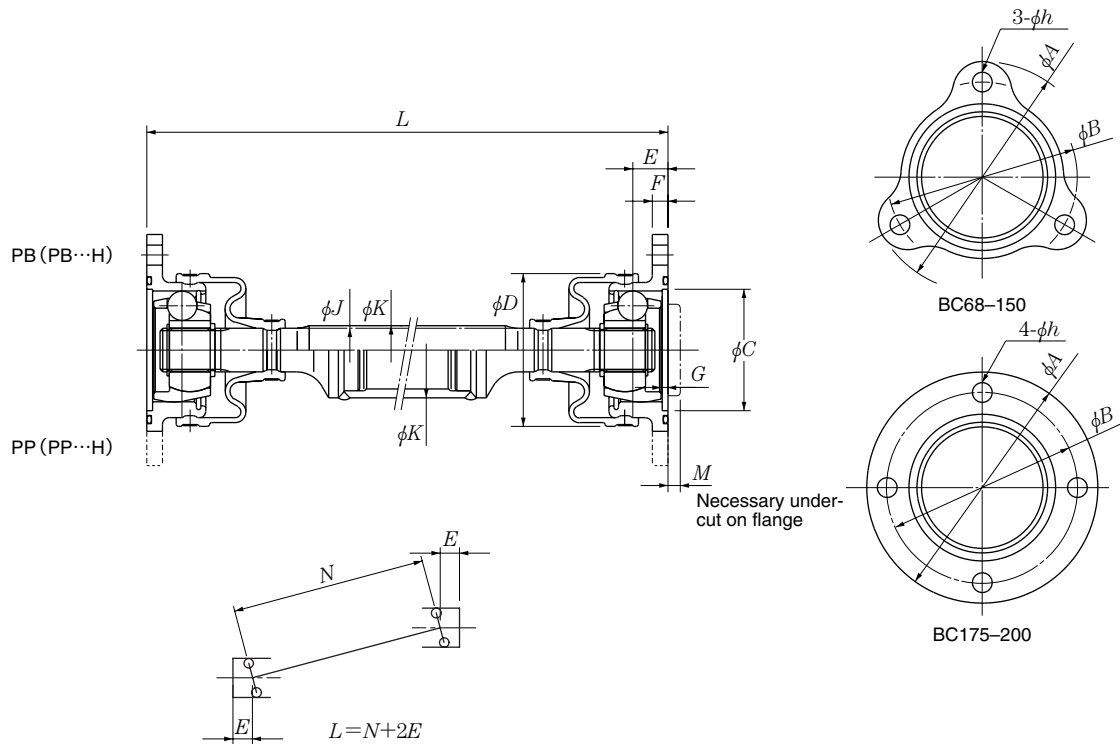
**BC68 PFP 1000 H**

High speed  
Joint length  
Series symbol  
Joint basic number



# Coupling Type (No semi-finished flange)

## PB (PB...H) and PP (PP...H) series (BC68 – 200)



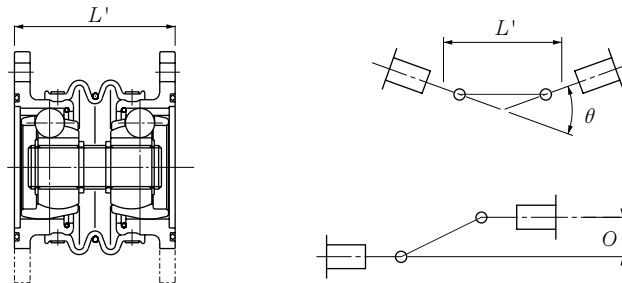
| Joint basic number | Outer race               |                                  |                       | Socket dia.<br>$\phi C$ | Width |     | Boot<br>Outside dia.<br>$\phi D$ (approx.) | Shaft              |                |              | CVJ center<br>$E$ | Joint length <sup>①</sup>                    |                                   |      |                                             | Necessary under-cut<br>$M$ | Allowable offset<br>$O$ |
|--------------------|--------------------------|----------------------------------|-----------------------|-------------------------|-------|-----|--------------------------------------------|--------------------|----------------|--------------|-------------------|----------------------------------------------|-----------------------------------|------|---------------------------------------------|----------------------------|-------------------------|
|                    | Outside dia.<br>$\phi A$ | Bolt hole Pitch dia.<br>$\phi B$ | Hole dia.<br>$\phi h$ |                         | $F$   | $G$ |                                            | PB...H<br>$\phi J$ | PB<br>$\phi K$ | PP<br>PP...H |                   | PB<br>Upper line...Min.<br>Lower line...Max. | PB...H<br>PP, PP...H<br>Min.-Max. | $L'$ | Allowable range of $L(L')$ , when installed |                            |                         |
| <b>BC68</b>        | 105                      | 86                               | 8.2                   | 55 $^{+0.074}_0$        | 7     | 2.5 | 72                                         | 22                 |                |              | 16                | 185-610                                      | 130-2800                          | 72   | $^{+4}_0$                                   | 3                          | 3.5                     |
| <b>BC75</b>        | 118                      | 97                               | 10.2                  | 62 $^{+0.074}_0$        | 8     |     | 78                                         | 22.3               | 25             |              | 18                | 205-660                                      | 145-2800                          | 82   |                                             |                            | 4                       |
| <b>BC87</b>        | 134                      | 110                              | 12.2                  | 70 $^{+0.074}_0$        | 10    | 3   | 90                                         | 26.3               | 30             |              | 20                | 215-715                                      | 155-3000                          | 94   |                                             | 4.5                        | 5                       |
| <b>BC100</b>       | 152                      | 125                              | 14.3                  | 80 $^{+0.074}_0$        | 11    | 3.5 | 100                                        | 29.5               | 32             | 60.5         | 23                | 250-770                                      | 195-3200                          | 108  | $^{+8}_0$                                   |                            |                         |
| <b>BC125</b>       | 177                      | 150                              |                       | 102 $^{+0.087}_0$       |       |     | 124                                        | 36.3               | 40             | 28           | 305-815           | 235-3200                                     | 130                               |      | 7                                           | 7                          |                         |
| <b>BC150</b>       | 215                      | 185                              | 16.4                  | 124 $^{+0.100}_0$       | 13    | 4   | 154                                        | 45.6               | 50             | 76.3         | 35                | 335-825                                      | 275-3500                          | 156  |                                             | 6.5                        | 8                       |
| <b>BC175</b>       | 236                      | 203                              | 18.4                  | 140 $^{+0.100}_0$       | 15    | 5   | 175                                        | 51.6               | 55             | 89.1         | 38                | 380-825                                      | 315-4000                          | 180  | $^{+10}_0$                                  | 8                          | 9                       |
| <b>BC200</b>       | 270                      | 233                              | 20.4                  | 165 $^{+0.100}_0$       |       | 6   | 200                                        | 59.5               | 65             | 101.6        | 45                | 430-835                                      | 360-4000                          | 216  |                                             | 7                          | 11.5                    |

① Various joint lengths are available in increments of 5 mm within a range from a minimum to a maximum in the table.

Remarks: A joint provided with standard bolts, nuts and spring washers is identified with Z at the end of its part designation.

(Ex.) BC68PB315Z

**P201 series (BC68AC – 200AC)**



**Joint Assemblies with Shaft Head PK Series PK series (BC68 – 200)**

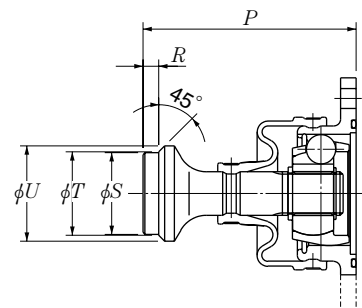
The **PK** joints are components of **DP** series joint assemblies. One **PK** joint assembly are welded to a segment of steel pipe before operation of the unit. Two disc type CVJ assemblies, shaft heads, boots, grease, and associated accessories are delivered unassembled.

Assembly sequence

1. Weld the steel pipe to the shaft heads. (See **page 51**.)
2. Lubricate the joint assemblies with the authorized constant velocity joint grease provided.
3. Install the accessories. (See **pages 59 and 60**.)

**Material of shaft head: SCM440**

**Recommended steel pipe material: STKM13 or STPG 370 or equivalent**

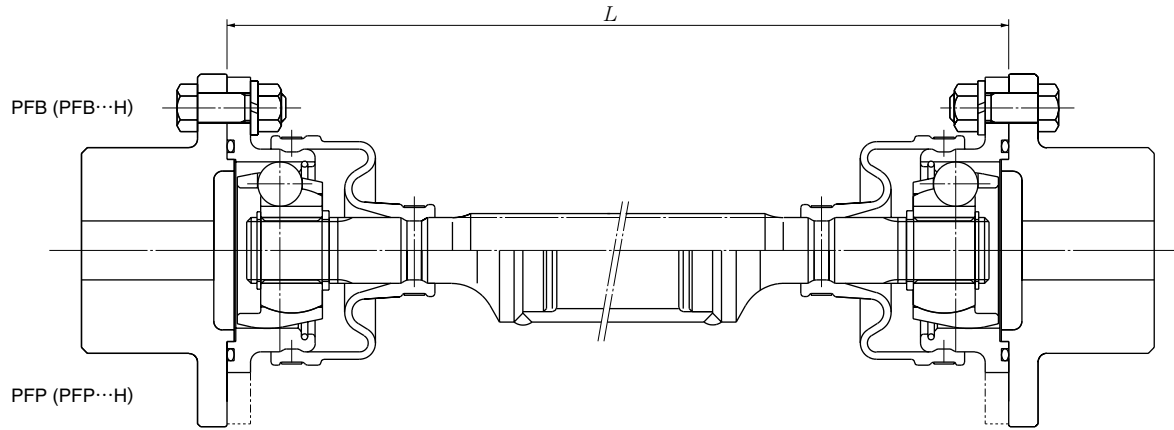


Dimensional unit mm

| Shaft head   |                                |      |                           |       |                                               | GD <sup>2</sup> × 10 <sup>-3</sup> kg · m <sup>2</sup> (left column), Mass kg (right column) |              |                      |              |                      |              |                      |              |                      |            |      |      |      |      |      |      |
|--------------|--------------------------------|------|---------------------------|-------|-----------------------------------------------|----------------------------------------------------------------------------------------------|--------------|----------------------|--------------|----------------------|--------------|----------------------|--------------|----------------------|------------|------|------|------|------|------|------|
| Outside dia. |                                |      | Standard dimension Length |       | Tolerance of P, when installed to the machine | Allowable operating angle θ                                                                  | PB           |                      |              |                      | PB···H       |                      |              |                      | PP, PP···H |      | P201 |      |      |      |      |
| φS           | φT                             | φU   | P                         | R     |                                               |                                                                                              | When L=500mm | Per additional 100mm | When L=500mm | Per additional 100mm | When L=500mm | Per additional 100mm | When L=500mm | Per additional 100mm |            |      |      |      |      |      |      |
| 41.6         | <sup>+0.062</sup> <sub>0</sub> | 42.6 | 48.6                      | 92.5  | 8                                             | +2<br>0                                                                                      | 5°           | 4.48                 | 2.79         | 0.12                 | 0.39         | 4.29                 | 2.44         | 0.07                 | 0.30       | 7.38 | 3.55 | 3.85 | 1.4  |      |      |
|              |                                |      |                           | 6.28  |                                               |                                                                                              |              | 3.39                 | 6.14         |                      |              | 3.11                 | 0.08         | 0.31                 | 9.03       | 4.19 | 0.96 |      |      | 0.49 |      |
|              |                                |      |                           | 115   |                                               |                                                                                              |              | 13.3                 | 4.92         | 0.25                 | 0.56         | 12.9                 | 4.49         | 0.15                 | 0.43       | 15.6 | 5.13 |      |      |      |      |
| 51.7         | <sup>+0.074</sup> <sub>0</sub> | 53   | 60.5                      | 128   | 10                                            | +4<br>0                                                                                      | 5°           | 23.2                 | 6.15         | 0.32                 | 0.63         | 22.9                 | 5.87         | 0.22                 | 0.54       | 29.1 | 7.18 | 21.8 | 4.4  |      |      |
|              |                                |      |                           | 150.5 |                                               |                                                                                              |              | 57.4                 | 10.4         | 0.79                 | 0.99         | 56.7                 | 9.58         | 0.54                 | 0.81       | 62.0 | 10.7 |      |      | 2.1  | 0.75 |
| 66           | <sup>+0.074</sup> <sub>0</sub> | 67   | 76.3                      | 179   | 15                                            | +5<br>0                                                                                      | 5°           | 148                  | 17.5         | 1.93                 | 1.54         | 147                  | 16.9         | 1.33                 | 1.28       | 161  | 18.6 | 5.2  | 1.04 | 140  | 13.4 |
| 79.5         | <sup>+0.074</sup> <sub>0</sub> | 81.5 | 89.1                      | 208   |                                               |                                                                                              |              | 371                  | 28.0         | 2.80                 | 1.87         | 370                  | 27.5         | 2.18                 | 1.64       | 387  | 30.6 | 8.5  | 1.34 | 361  | 24.5 |
| 87           | <sup>+0.087</sup> <sub>0</sub> | 90   | 101.6                     | 227   |                                               |                                                                                              |              | 585                  | 43.9         | 5.50                 | 2.60         | 582                  | 43.2         | 3.87                 | 2.18       | 613  | 47.6 | 17.8 | 2.26 | 571  | 36.2 |

# Coupling Type (Complete with semi-finished flange)

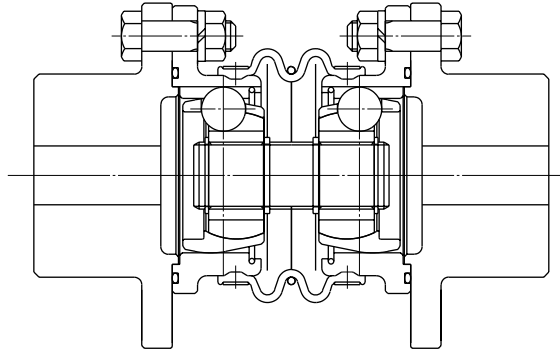
## PFB (PFB...H) and PFP (PFP...H) series (BC68 – 200)



Dimensional unit mm

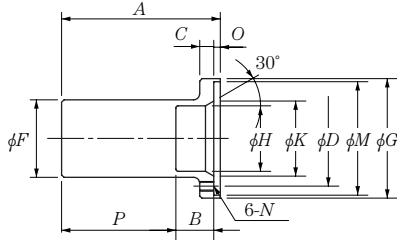
| Dimensional data<br>Joint basic number | GD <sup>2</sup> × 10 <sup>-3</sup> kg · m <sup>2</sup> (left column), Mass kg (right column) |      |                      |      |              |      |                      |      |              |      |                      |      |
|----------------------------------------|----------------------------------------------------------------------------------------------|------|----------------------|------|--------------|------|----------------------|------|--------------|------|----------------------|------|
|                                        | PFB                                                                                          |      |                      |      | PFB...H      |      |                      |      | PFP, PFP...H |      |                      |      |
|                                        | When L=500mm                                                                                 |      | Per additional 100mm |      | When L=500mm |      | Per additional 100mm |      | When L=500mm |      | Per additional 100mm |      |
| <b>BC68</b>                            | 14.2                                                                                         | 5.25 | 0.12                 | 0.39 | 14.0         | 4.90 | 0.07                 | 0.30 | 17.0         | 6.01 | 0.96                 | 0.49 |
| <b>BC75</b>                            | 26.7                                                                                         | 7.47 |                      |      | 26.6         | 7.19 | 0.08                 | 0.31 | 29.5         | 8.27 |                      |      |
| <b>BC87</b>                            | 52.9                                                                                         | 11.1 |                      |      | 52.5         | 10.4 | 0.15                 | 0.43 | 55.2         | 11.1 |                      |      |
| <b>BC100</b>                           | 102                                                                                          | 14.8 | 0.32                 | 0.63 | 102          | 14.5 | 0.22                 | 0.54 | 108          | 15.8 | 2.1                  | 0.75 |
| <b>BC125</b>                           | 227                                                                                          | 24.2 | 0.79                 | 0.99 | 226          | 23.4 | 0.54                 | 0.81 | 232          | 24.5 |                      |      |
| <b>BC150</b>                           | 563                                                                                          | 41.8 | 1.93                 | 1.54 | 562          | 41.2 | 1.33                 | 1.28 | 576          | 42.9 |                      |      |
| <b>BC175</b>                           | 1128                                                                                         | 64.4 | 2.80                 | 1.87 | 1127         | 63.9 | 2.18                 | 1.64 | 1130         | 67.0 | 8.5                  | 1.34 |
| <b>BC200</b>                           | 2041                                                                                         | 101  | 5.50                 | 2.60 | 2038         | 100  | 3.87                 | 2.18 | 2068         | 105  | 17.8                 | 2.26 |

## P601 series (BC68AC–200AC)

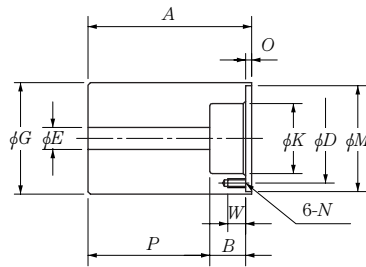


| Dimensional data<br>Joint basic number | P601                                              |         |
|----------------------------------------|---------------------------------------------------|---------|
|                                        | $GD^2 \times 10^{-3} \text{ kg} \cdot \text{m}^2$ | Mass kg |
| <b>BC68</b>                            | 14.1                                              | 3.9     |
| <b>BC75</b>                            | 26.0                                              | 5.9     |
| <b>BC87</b>                            | 51.5                                              | 8.5     |
| <b>BC100</b>                           | 99.7                                              | 13.1    |
| <b>BC125</b>                           | 223                                               | 21.2    |
| <b>BC150</b>                           | 553                                               | 37.8    |
| <b>BC175</b>                           | 1118                                              | 62.8    |
| <b>BC200</b>                           | 2025                                              | 95      |

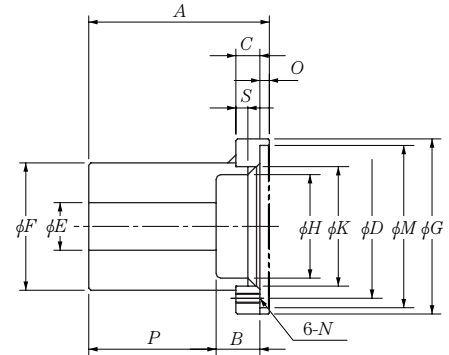
# Accessories



**Fig. 1**  
Disc (BJ75-150)  
201, 202 series



**Fig. 2**  
Disc (BJ75-150)  
204, 205 series

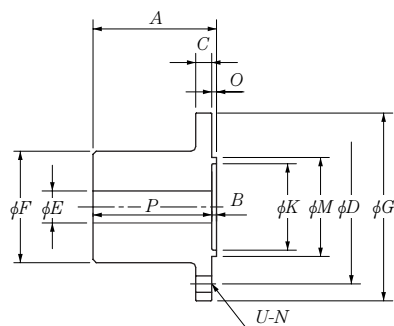


**Fig. 3**  
Disc (BJ75-300)  
201, 202 series

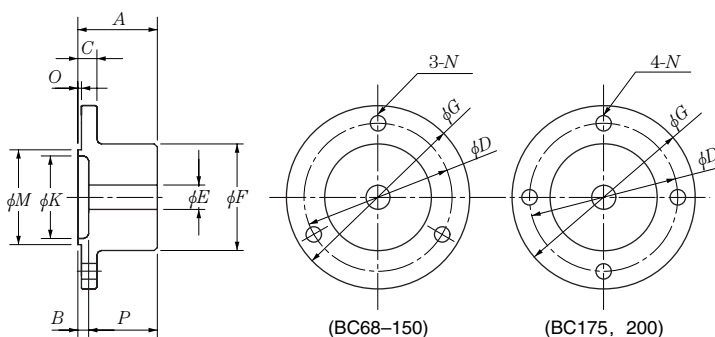
| Applicable joint | Type          | Figure   | Parts number | Width        |     |    |      | Outside dia. |     | Socket                             |                                    |    |     |
|------------------|---------------|----------|--------------|--------------|-----|----|------|--------------|-----|------------------------------------|------------------------------------|----|-----|
|                  |               |          |              | A            | B   | C  | P    | φF           | φG  | φM                                 | O                                  |    |     |
| BC68             | Coupling type | 5        | 50-150#BC68  | 40           | 5   | 9  | 35   | 60           | 107 | 55 <sup>0</sup> <sub>-0.046</sub>  | 2                                  |    |     |
| BJ75             | Disc type     | 1        | Fixed side   | 50-201#BJ75  | 91  | 12 | 12   | 74           | 55  | 85                                 | 80 <sup>+0.046</sup> <sub>0</sub>  | 5  |     |
|                  |               |          | Free side    | 50-202#BJ75  |     |    |      |              |     |                                    |                                    |    | 24  |
|                  |               | 2        | Fixed side   | 50-204#BJ75  | 121 | 12 | —    | 104          | —   | —                                  | —                                  | —  | —   |
|                  |               |          | Free side    | 50-205#BJ75  |     |    |      |              |     |                                    |                                    |    |     |
|                  | Cup type      | 4        | 50-400#BJ75  | 77           | 2.5 | 10 | 74.5 | 70           | 118 | 62 <sup>0</sup> <sub>-0.046</sub>  | 2.5                                |    |     |
| BC75             | Coupling type | 5        | 50-150#BC75  | 52           | 7   | 12 | 45   | 70           | 120 | 70 <sup>0</sup> <sub>-0.046</sub>  | 2.5                                |    |     |
| BC87             |               |          | 50-150#BC87  | 57           |     |    | 50   | 80           | 136 |                                    |                                    |    |     |
| BJ95             | Disc type     | 1        | Fixed side   | 50-201#BJ95  | 133 | 16 | 112  | 65           | 100 | 95 <sup>+0.054</sup> <sub>0</sub>  | 5                                  |    |     |
|                  |               |          | Free side    | 50-202#BJ95  |     |    |      |              |     |                                    |                                    | 32 | 96  |
|                  |               | 2        | Fixed side   | 50-204#BJ95  | 147 | 16 | —    | 126          | —   | —                                  | —                                  | —  |     |
|                  |               |          | Free side    | 50-205#BJ95  |     |    |      |              |     |                                    |                                    |    | 32  |
| BJ100            | Cup type      | 4        | 50-400#BJ100 | 97           | 2.5 | 15 | 94.5 | 90           | 136 | 70 <sup>0</sup> <sub>-0.046</sub>  | 2.5                                |    |     |
| BC100            | Coupling type | 5        | 50-150#BC100 | 67           | 7   | 15 | 60   | 90           | 154 | 80 <sup>0</sup> <sub>-0.046</sub>  | 2.5                                |    |     |
| BJ125            | Disc type     | 1        | Fixed side   | 50-201#BJ125 | 155 | 20 | 130  | 90           | 130 | 125 <sup>+0.063</sup> <sub>0</sub> | 5                                  |    |     |
|                  |               |          | Free side    | 50-202#BJ125 |     |    |      |              |     |                                    |                                    | 40 | 110 |
|                  |               | 2        | Fixed side   | 50-204#BJ125 | 175 | 20 | —    | 150          | —   | —                                  | —                                  | —  |     |
|                  |               |          | Free side    | 50-205#BJ125 |     |    |      |              |     |                                    |                                    |    | 40  |
|                  | Cup type      | 4        | 50-400#BJ125 | 115          | 3   | 15 | 112  | 110          | 179 | 102 <sup>0</sup> <sub>-0.054</sub> | 3                                  |    |     |
| BC125            | Coupling type | 5        | 50-150#BC125 | 80           | 10  | 15 | 70   | 110          | 179 | 102 <sup>0</sup> <sub>-0.054</sub> | 3                                  |    |     |
| BJ150            | Disc type     | 1        | Fixed side   | 50-201#BJ150 | 178 | 24 | 18   | 148          | 105 | 152                                | 146 <sup>+0.063</sup> <sub>0</sub> | 6  |     |
|                  |               |          | Free side    | 50-202#BJ150 |     |    |      |              |     |                                    |                                    |    | 48  |
|                  |               | 2        | Fixed side   | 50-204#BJ150 | 194 | 24 | —    | 164          | —   | —                                  | —                                  | —  | —   |
|                  |               |          | Free side    | 50-205#BJ150 |     |    |      |              |     |                                    |                                    |    |     |
|                  | Cup type      | 4        | 50-800#BJ150 | 123          | 3   | 12 | 120  | 125          | 192 | 110 <sup>0</sup> <sub>-0.054</sub> | 3                                  |    |     |
| BC150            | Coupling type | 5        | 50-150#BC150 | 90           | 10  | 17 | 80   | 140          | 217 | 124 <sup>0</sup> <sub>-0.063</sub> | 3.5                                |    |     |
| BJ175            | Disc type     | 3        | Fixed side   | 50-201#BJ175 | 192 | 34 | 26   | 150          | 120 | 175                                | 159                                | 8  |     |
|                  |               |          | Free side    | 50-202#BJ175 |     |    |      |              |     |                                    |                                    |    | 54  |
|                  |               | Cup type | 4            | 50-800#BJ175 | 139 | 4  | 15   | 135          | 140 | 215                                | 125 <sup>0</sup> <sub>-0.063</sub> | 4  |     |
| BC175            | Coupling type | 5        | 50-150#BC175 | 112          | 12  | 19 | 100  | 160          | 238 | 140 <sup>0</sup> <sub>-0.063</sub> | 4                                  |    |     |
| BJ200            | Disc type     | 3        | Fixed side   | 50-201#BJ200 | 215 | 35 | 28   | 170          | 140 | 200                                | 181                                | 10 |     |
|                  |               |          | Free side    | 50-202#BJ200 |     |    |      |              |     |                                    |                                    |    | 55  |
|                  | Cup type      | 4        | 50-800#BJ200 | 154          | 4   | 16 | 150  | 160          | 250 | 140 <sup>0</sup> <sub>-0.063</sub> | 4                                  |    |     |
| BC200            | Coupling type | 5        | 50-150#BC200 | 132          | 12  | 19 | 120  | 185          | 272 | 165 <sup>0</sup> <sub>-0.063</sub> | 5                                  |    |     |
| BJ225            | Disc type     | 3        | Fixed side   | 50-201#BJ225 | 227 | 35 | 30   | 180          | 160 | 220                                | 204                                | 12 |     |
|                  |               |          | Free side    | 50-202#BJ225 |     |    |      |              |     |                                    |                                    |    | 55  |
|                  | Cup type      | 4        | 50-800#BJ225 | 169          | 4   | 18 | 165  | 175          | 265 | 155 <sup>0</sup> <sub>-0.063</sub> | 4                                  |    |     |
| BJ250            | Disc type     | 3        | Fixed side   | 50-201#BJ250 | 240 | 38 | 34   | 190          | 180 | 245                                | 222                                | 12 |     |
|                  |               |          | Free side    | 50-202#BJ250 |     |    |      |              |     |                                    |                                    |    | 58  |
| BJ300            | Disc type     | 3        | Fixed side   | 50-201#BJ300 | 262 | 45 | 38   | 205          | 205 | 275                                | 256                                | 12 |     |
|                  |               |          | Free side    | 50-202#BJ300 |     |    |      |              |     |                                    |                                    |    | 70  |

① Prepared hole diameter.

Remarks: 1. Upon request from the user, will machine the inside diameter and width according to the shaft to be installed. Contact Engineering.



**Fig. 4**  
Cup (BJ75-225)  
400, 800 series

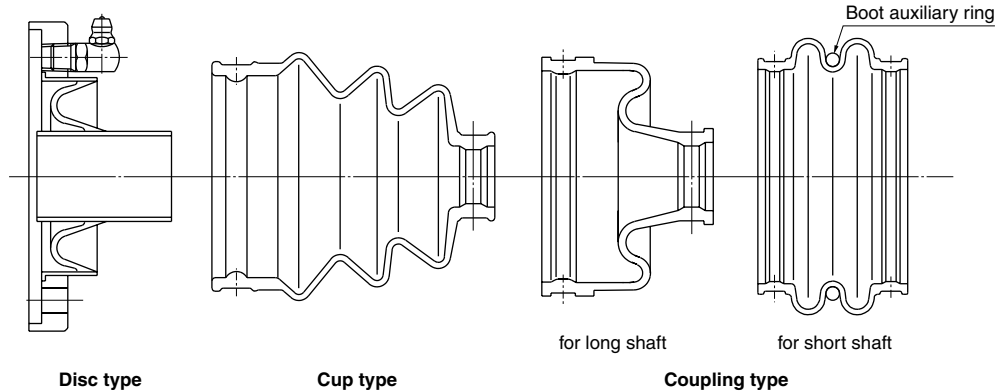


**Fig. 5**  
Coupling (BC68-200)  
150 series

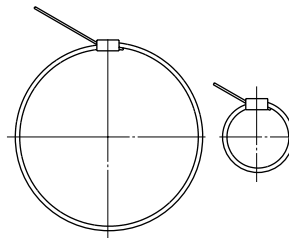
| Inside dia. |          |          |         | Bolt hole |             |             |      | Dimensional unit mm                          |            |      |
|-------------|----------|----------|---------|-----------|-------------|-------------|------|----------------------------------------------|------------|------|
| $\phi E$    | $\phi H$ | $\phi K$ | S       | $\phi D$  | U           | N           | W    | $GD^2 \times 10^{-3}$<br>kg · m <sup>2</sup> | Mass<br>kg |      |
| 0           | —        | 48       | —       | 86±0.15   | —           | $\phi 8.2$  | —    | 4.68                                         | 1.2        |      |
| —           | 45       | 50       |         | 66±0.15   |             | M8          |      | 16                                           | 3.96       | 1.76 |
| 0           | —        | 54       |         | 97±0.15   | 3           | $\phi 10.2$ | 3.80 |                                              | 1.62       |      |
|             |          |          |         |           |             |             | 18.4 |                                              | 4.97       |      |
| 0           | —        | 62       |         | 110±0.15  | —           | $\phi 12.2$ | 18.2 |                                              | 4.78       |      |
| —           | 55       | 63       |         | 80±0.2    |             |             | M8   | 16                                           | 10.6       | 2.80 |
| 0           | —        | 62       |         | 110±0.15  | 3           | $\phi 12.2$ | 9.04 |                                              | 2.0        |      |
|             |          |          |         |           |             |             | 9.73 |                                              | 3.43       |      |
| —           | 75       | 80       |         | 106±0.2   | —           | M10         | 9.28 |                                              | 3.14       |      |
| 0           | —        | 72       |         | 125±0.15  |             |             | 3    | $\phi 14.3$                                  | 43.0       | 8.35 |
| 30          | —        | 70       |         | 125±0.15  | —           | M10         |      |                                              | 42.2       | 7.96 |
| —           | 85       | 96       |         | 124±0.2   |             |             | 24   | M12                                          | 20.8       | 4.02 |
| 48          | —        | 90       |         | 150±0.2   | 3           | $\phi 14.3$ |      |                                              | 41.3       | 6.13 |
|             |          |          |         |           |             |             |      |                                              | 34.8       | 4.2  |
| 0           | —        | 95       |         | 165±0.2   | 6           | $\phi 14.3$ |      |                                              | 38.5       | 7.53 |
| —           | 75       | 80       |         | 106±0.2   |             |             | —    | M10                                          | 36.6       | 6.85 |
| 58          | —        | 96       |         | 124±0.2   | —           | M12         |      |                                              | 144        | 14.7 |
|             |          |          |         |           |             |             | 140  | 14.3                                         |            |      |
| 40          | —        | 110      |         | 139.7±0.2 | —           | M14         | 90.4 | 10.2                                         |            |      |
|             |          |          |         |           |             |             | 78.3 | 6.8                                          |            |      |
| 40          | —        | 125      |         | 203±0.2   | —           | $\phi 18.4$ | 83.4 | 11.9                                         |            |      |
|             |          |          |         |           |             |             | 193  | 12                                           |            |      |
| 50          | —        | 130      |         | 159±0.2   | 6           | $\phi 19$   | 164  | 15.3                                         |            |      |
|             |          |          |         |           |             |             | 236  | 17.4                                         |            |      |
| 50          | —        | 145      | 233±0.2 | —         | $\phi 20.4$ | 159         | 14.4 |                                              |            |      |
|             |          |          |         |           |             | 348         | 18   |                                              |            |      |
| 60          | 110      | 130      | 13      | —         | M12         | 319         | 21.5 |                                              |            |      |
|             |          |          |         |           |             | 311         | 20.4 |                                              |            |      |
| 60          | —        | 150      | 15      | —         | M12         | 452         | 24.9 |                                              |            |      |
|             |          |          |         |           |             | 675         | 28   |                                              |            |      |
| 50          | —        | 135      | —       | 6         | $\phi 21$   | 542         | 30.0 |                                              |            |      |
|             |          |          |         |           |             | 514         | 28.3 |                                              |            |      |
| 70          | 138      | 160      | 16      | —         | M16         | 683         | 32.9 |                                              |            |      |
|             |          |          |         |           |             | 933         | 40.9 |                                              |            |      |
| 80          | 155      | 180      | 18      | —         | M16         | 912         | 39.1 |                                              |            |      |
|             |          |          |         |           |             | 1690        | 57.1 |                                              |            |      |
|             |          |          |         |           |             |             |      | 1645                                         | 54.4       |      |

# Accessories

## Boot



## Boot Band



For cup, coupling

| Applicable joint | Type          | Parts number |                     |                     |                   |                   |                     |             |              |
|------------------|---------------|--------------|---------------------|---------------------|-------------------|-------------------|---------------------|-------------|--------------|
|                  |               | Boot         | Boot retainer plate | Boot retainer plate | Boot band (large) | Boot band (small) | Boot auxiliary ring | Set ①       |              |
| BC68             | Coupling type | Short shaft  | 17-11#BC68          | —                   | —                 | 20-1#BJ75         | —                   | 98-4#BJ68   | 99-120#BJ68  |
|                  |               | Long shaft   | 17-31#BJ68          | —                   | —                 | 20-1#BJ75         | 20-2#BJ75           | —           | 99-17#BJ68   |
| BJ75             | Disc type     | Short shaft  | 18-1#BJ75           | 19-1#BJ75           | 24-3#BJ75         | —                 | —                   | —           | 99-301#BJ75  |
|                  |               | Long shaft   | 17-30#BJ75          | —                   | —                 | 20-1#BJ75         | 20-2#BJ75           | —           | 99-102#BJ75  |
| BC75             | Coupling type | Short shaft  | 17-10#BC75          | —                   | —                 | 20-1#BJ75         | 20-2#BJ75           | 98-5#BJ75   | 99-120#BJ75  |
|                  |               | Long shaft   | 17-30#BJ75          | —                   | —                 | 20-1#BJ75         | 20-2#BJ75           | —           | 99-37#BJ75   |
| BC87             | Coupling type | Short shaft  | 17-10#BC87          | —                   | —                 | 20-1#BJ100        | —                   | 98-7#BJ87   | 99-120#BJ87  |
|                  |               | Long shaft   | 17-39#BJ87          | —                   | —                 | 20-1#BJ100        | 20-2#BJ100          | —           | 99-27#BJ87   |
| BJ95             | Disc type     | Short shaft  | 18-1#BJ95           | 19-1#BJ95           | 24-3#BJ75         | —                 | —                   | —           | 99-301#BJ95  |
|                  |               | Long shaft   | 17-16#BJ95          | —                   | —                 | 20-1#BJ100        | 20-2#BJ100          | —           | 99-15#BJ95   |
| BJ100            | Cup type      | Short shaft  | 17-4#BJ100          | —                   | —                 | 20-1#BJ100        | 20-2#BJ100          | —           | 99-16#BJ100  |
|                  |               | Long shaft   | 17-21#BJ100         | —                   | —                 | 20-1#BJ100        | 20-2#BJ100          | 98-7#BJ100  | 99-120#BJ100 |
| BC100            | Coupling type | Short shaft  | 17-10#BC100         | —                   | —                 | 20-1#BJ100        | —                   | —           | 99-17#BJ100  |
|                  |               | Long shaft   | 17-21#BJ100         | —                   | —                 | 20-1#BJ100        | 20-2#BJ100          | —           | 99-301#BJ100 |
| BJ125            | Disc type     | Short shaft  | 18-1#BJ125          | 19-1#BJ125          | 24-3#BJ75         | —                 | —                   | —           | 99-16#BJ125  |
|                  |               | Long shaft   | 17-15#BJ125         | —                   | —                 | 20-1#BJ150        | 20-2#BJ150          | —           | 99-16#BJ125  |
| BC125            | Coupling type | Short shaft  | 17-10#BC125         | —                   | —                 | 20-1#BJ150        | 20-2#BJ150          | 98-16#BJ125 | 99-30#BJ125  |
|                  |               | Long shaft   | 17-19#BJ125         | —                   | —                 | 20-1#BJ150        | 20-2#BJ150          | —           | 99-17#BJ125  |
| BJ150            | Disc type     | Short shaft  | 18-1#BJ150          | 19-1#BJ150          | 24-3#BJ75         | —                 | —                   | —           | 99-301#BJ150 |
|                  |               | Long shaft   | 17-4#BJ150          | —                   | —                 | 20-1#BJ150        | 20-2#BJ150          | —           | 99-16#BJ150  |
| BC150            | Coupling type | Short shaft  | 17-10#BC150         | —                   | —                 | 20-1#BJ150        | 20-2#BJ150          | 98-8#BJ150  | 99-30#BJ150  |
|                  |               | Long shaft   | 17-6#BJ150          | —                   | —                 | 20-1#BJ150        | 20-2#BJ150          | —           | 99-17#BJ150  |
| BJ175            | Disc type     | Short shaft  | 18-1#BJ175          | 19-1#BJ175          | 24-3#BJ75         | —                 | —                   | —           | 99-301#BJ175 |
|                  |               | Long shaft   | 17-7#BJ175          | —                   | —                 | 20-2#BJ550        | 20-2#BJ225          | —           | 99-28#BJ175  |
| BC175            | Coupling type | Short shaft  | 17-10#BC175         | —                   | —                 | 20-3#BJ250        | —                   | 98-21#BJ175 | 99-30#BJ175  |
|                  |               | Long shaft   | 17-5#BJ175          | —                   | —                 | 20-3#BJ250        | 20-2#BJ350          | —           | 99-27#BJ175  |
| BJ200            | Disc type     | Short shaft  | 18-1#BJ200          | 19-1#BJ200          | 24-3#BJ75         | —                 | —                   | —           | 99-30#BJ200  |
|                  |               | Long shaft   | 17-3#BJ200          | —                   | —                 | 20-1#BJ225        | 20-2#BJ225          | —           | 99-3#BJ200   |
| BC200            | Coupling type | Short shaft  | 17-10#BC200         | —                   | —                 | 20-1#BJ400        | —                   | 98-16#BJ200 | 99-30#BJ200  |
|                  |               | Long shaft   | 17-1#BJ200          | —                   | —                 | 20-1#BJ400        | 20-2#BJ350          | —           | 99-17#BJ200  |
| BJ225            | Disc type     | Short shaft  | 18-1#BJ225          | 19-1#BJ225          | 24-3#BJ75         | —                 | —                   | —           | 99-301#BJ225 |
|                  |               | Long shaft   | 17-1#BJ225          | —                   | —                 | 20-1#BJ225        | 20-2#BJ225          | —           | 99-16#BJ225  |
| BJ250            | Disc type     | Short shaft  | 18-1#BJ250          | 19-1#BJ250          | 24-3#BJ75         | —                 | —                   | —           | 99-301#BJ250 |
|                  |               | Long shaft   | 18-1#BJ300          | 19-1#BJ300          | 24-3#BJ75         | —                 | —                   | —           | 99-301#BJ300 |

① The set for disc comprises an assembly that consists of one boot, one boot fixing plate, and two grease nipples.

The set for cup comprises one boot, one boot band (large) and one boot band (small).

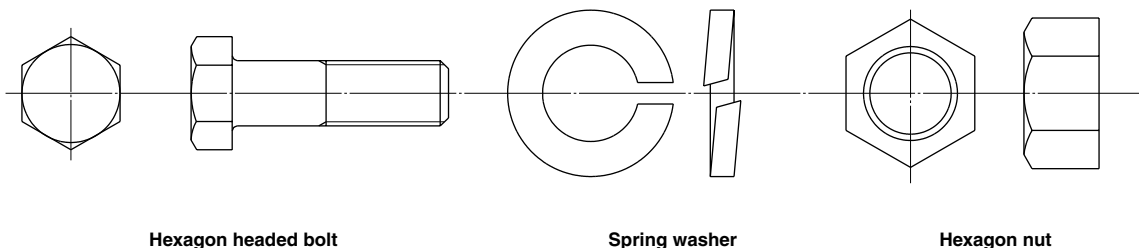
The short shaft set for coupling comprises one boot, one auxiliary ring and two boot bands.

The long shaft set comprises one boot, one boot band (large) and one boot band (small).

Remarks: Depending on an applicable joint number, the form of boot can differ from an illustrated one.

When fastening a boot band, use a special fastening tool. For the form and part description of the tool, see page 60.

## Hexagon Headed Bolt/Spring Washer/Hexagon Nut



Hexagon headed bolt

Spring washer

Hexagon nut

| Applicable joint | Type          | Parts number              |                     |                    |               |             |             |             |
|------------------|---------------|---------------------------|---------------------|--------------------|---------------|-------------|-------------|-------------|
|                  |               | Small hexagon headed bolt | Hexagon headed bolt | Spring washer (#2) | Spring washer | Hexagon nut | Set ①       |             |
| BC68             | Coupling type | 51-5#BJ68                 | —                   | 57-10#BJ75         | 52-5#BJ75     | —           | 99-22#BJ68  |             |
|                  | Disc type     | 51-20#BJ75                |                     |                    | —             |             | 99-31#BJ75  |             |
| BJ75             | Cup type      | 51-23#BJ75                |                     | 57-10#BJ125        | 52-5#BJ125    |             | 99-32#BJ75  |             |
|                  |               |                           |                     | 57-10#BJ150        | 52-5#BJ150    |             | 99-22#BJ87  |             |
| BC75             | Coupling type | 51-6#BJ87                 |                     | 57-10#BJ75         | —             |             | 99-21#BJ95  |             |
| BC87             | Coupling type | 51-20#BJ95                |                     | 57-10#BJ150        | 52-5#BJ150    |             | 99-22#BJ87  |             |
| BJ95             | Disc type     | 51-6#BJ87                 |                     | 57-10#BJ150        | 52-5#BJ150    |             | 99-22#BJ87  |             |
| BJ100            | Cup type      | 51-6#BJ100                |                     | 57-10#BJ175        | 52-5#BJ175    |             | 99-22#BJ100 |             |
| BC100            | Coupling type | 51-20#BJ125               |                     | 57-10#BJ125        | —             |             | 99-21#BJ125 |             |
| BJ125            | Disc type     | 51-6#BJ100                |                     | 57-10#BJ175        | 52-5#BJ175    |             | 99-22#BJ100 |             |
|                  | Cup type      | 51-20#BJ150               |                     | 57-10#BJ150        | —             |             | 99-21#BJ150 |             |
| BC125            | Coupling type | 51-6#BJ100                |                     | 57-10#BJ175        | 52-5#BJ175    |             | 99-32#BJ150 |             |
|                  | Disc type     | 51-20#BJ150               |                     | 57-10#BJ150        | —             |             | 99-22#BJ150 |             |
| BJ150            | Cup type      | 51-6#BJ100                |                     | 57-10#BJ175        | 52-5#BJ175    |             | 99-21#BJ150 |             |
|                  | Coupling type | 51-9#BJ150                |                     | 57-10#BJ250        | 52-5#BJ250    |             | 99-32#BJ150 |             |
| BJ175            | Disc type     | —                         |                     | 51-20#BJ175        | 57-10#BJ175   |             | —           | 99-22#BJ175 |
|                  | Cup type      | —                         |                     | 51-30#BJ175        | 57-10#BJ250   |             | 52-15#BJ250 | 99-21#BJ175 |
| BC175            | Coupling type | 51-15#BJ175               |                     | —                  | 57-10#BJ350   |             | 52-5#BJ350  | 99-32#BJ175 |
|                  | Disc type     | —                         |                     | 51-20#BJ200        | 57-10#BJ150   |             | —           | 99-22#BJ175 |
| BJ200            | Cup type      | —                         |                     | 51-13#BJ300        | 57-10#BJ350   |             | —           | 99-21#BJ200 |
|                  | Coupling type | 51-8#BJ200                | —                   | 57-10#BJ400        | 52-5#BJ400    | 99-32#BJ200 |             |             |
| BC200            | Coupling type | —                         | 51-20#BJ225         | 57-10#BJ150        | —             | 99-22#BJ200 |             |             |
|                  | Disc type     | —                         | 51-27#BJ225         | 57-10#BJ400        | —             | 99-21#BJ225 |             |             |
| BJ225            | Cup type      | —                         | 51-20#BJ250         | 57-10#BJ250        | 52-15#BJ400   | 99-32#BJ225 |             |             |
|                  | Disc type     | —                         | 51-20#BJ300         | 57-10#BJ250        | —             | 99-21#BJ250 |             |             |
| BJ250            | Disc type     | —                         | 51-20#BJ300         | 57-10#BJ250        | —             | 99-21#BJ250 |             |             |
| BJ300            |               | —                         | —                   | —                  | —             | 99-21#BJ300 |             |             |

① The set for disc comprises six hexagonal head bolts and six spring washers.

The sets for cup comprise:

Applicable joint BJ75-BJ125: six hexagonal head bolts, six spring washers, and six hexagonal nuts

Applicable joint BJ150-BJ225: 12 hexagonal head bolts, 12 spring washers, and 12 hexagonal nuts

The sets for coupling comprise:

Applicable joint BC68-BC150: six small hexagonal head bolts, six spring washers, and six small hexagonal nuts

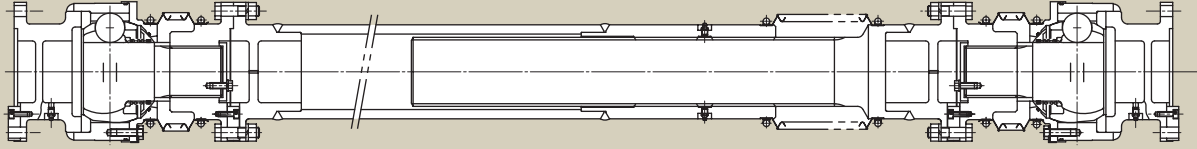
Applicable joint BC175-BC200: eight small hexagonal head bolts, eight spring washers, and eight small hexagonal nuts



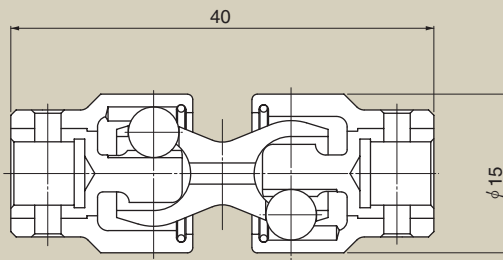
# Diagrams of Applications

The examples below illustrate special applications not covered as standard series in our catalogs.

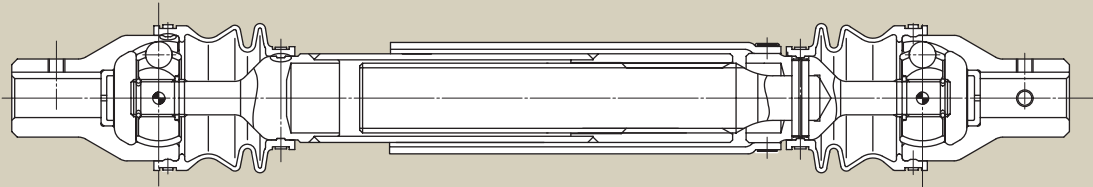
We offer an ideal constant velocity joint that is optimized for your intended machine and/or operating conditions. When wanting a constant velocity joint for a very unique application, contact Engineering.



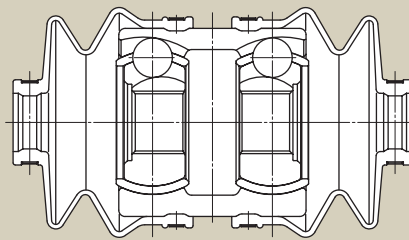
Continuous casting equipment (very demanding atmosphere) (HTJ220)



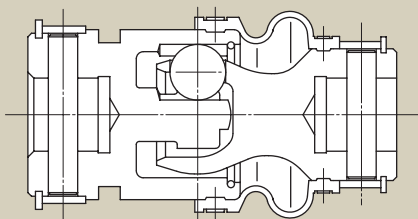
For radio-controlled boat (TBJ8)



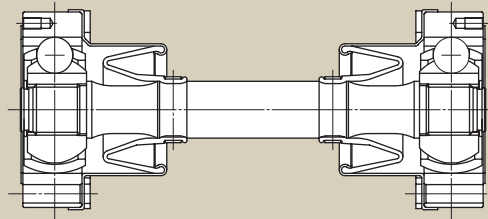
For printing machinery (BJ50)



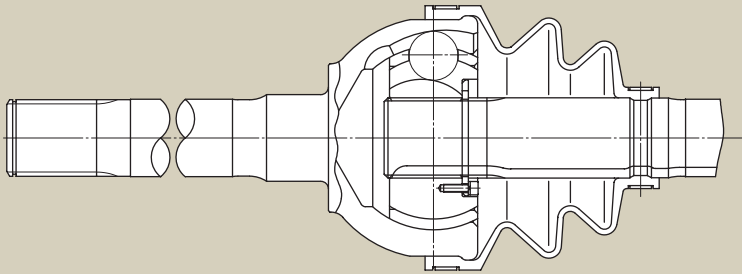
For axle on sprinkling vehicle (BJ75 double-drum)



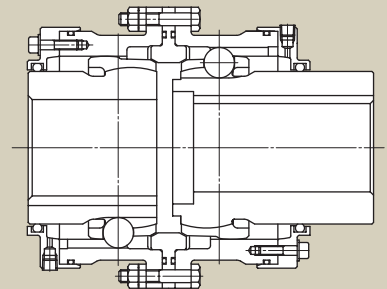
For axle on golf-cart (TBJ20)



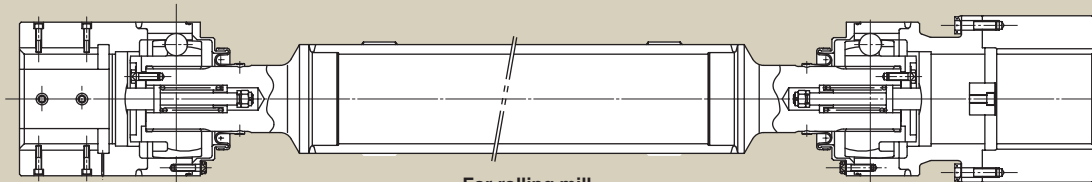
For custom-made special vehicles (LJ109)



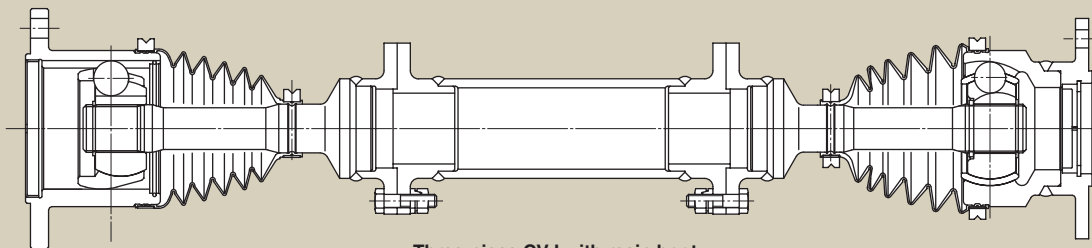
For vehicle (drive axle)  
(BJ175)



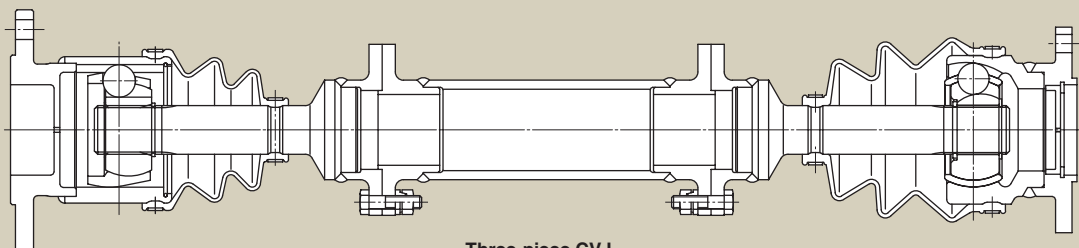
12-ball coupling  
(BC150)



For rolling mill  
(DOJ725)



Three-piece CVJ with resin boot  
(DOJ100+BJ100)



Three-piece CVJ  
(DOJ100+BJ100)

## Usage and Handling

### 1. Installation Procedure

#### (1) Checking the installation dimensions

Check that the mounting span on the machine coincides with the length of the constant velocity joint (see **Fig. 1**).

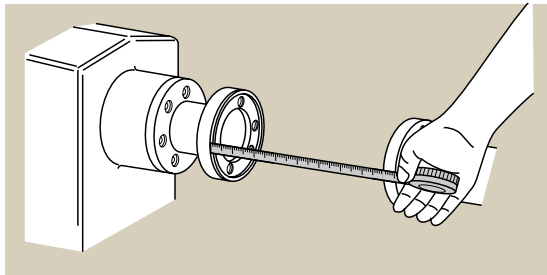


Fig. 1

#### (2) Filling the grease

Fill the grease included with the constant velocity joint to 1/2 to 1/3 as much as the undercut space capacity of the mounting flange hub (see **Fig. 2**).

#### CAUTION

- The grease can cause eye inflammation to human eyes. When handling it, wear protective goggles.
- ※ If it has contaminated the eyes, rinse with clean water, and immediately seek medical attention.
- The grease can cause skin inflammation. When handling it, wear protective gloves.
- ※ If it has touched skin, wash it off thoroughly with water and soap.

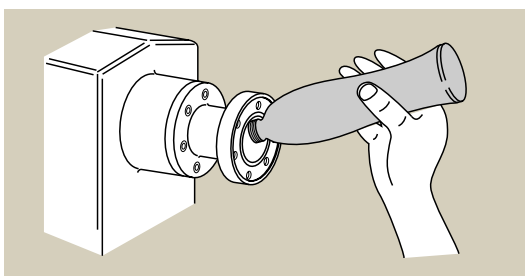


Fig. 2

#### (3) Installing the joint

Install the joint to the flange with the included bolts (see **Fig. 3**). Tighten the bolts with a torque equivalent to JIS bolt strength category 8.8. The recommended bolt tightening torques are listed in **Table 1**.

Retighten the bolts immediately after, and one month after commissioning the operation with the joint.

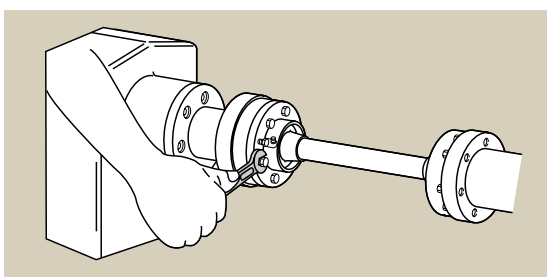


Fig. 3

#### (4) Cautions for installation work

- Avoid hitting the CVJ with a foreign object or exerting an impact force onto the CVJ.
- Limit the angle to the operating angle range at static state in order to avoid damage on the boot.
- Be careful not to damage or deform the boot and boot band.
- The free-side CVJ proper can be readily come off the shaft. Be careful not to allow it to be released from the shaft.
- Be sure to enclose the CVJ with a safety cover. If splash of oil, even in a smallest amount, to the surrounding is unacceptable, be sure to incorporate a cover that contains oil splash.
- In the case of a fixed disc type, the joint assembly can be easily mounted if the free side is mounted first. If the mounting span is short and mounting of the joint assembly is difficult, shift the machine as necessary. Install the packing to a correct position, being careful not to damage or deform it. While tightening the bolts, be careful not to deform the metal ring on boot.
- For a coupling type, fit the O-ring to a correct position, being careful not to damage it (see **Fig. 4**).

#### DANGER

- Do not approach the running joint.

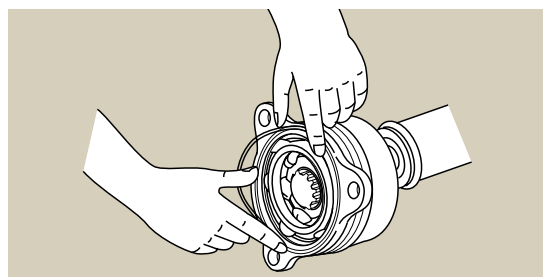


Fig. 4

Table 1

| Nominal bolt size | Tightening torque <sup>①</sup> kgf · m |          |
|-------------------|----------------------------------------|----------|
| M 8               | 19.6                                   | to 24.5  |
| M10               | 39.2                                   | to 49.0  |
| M12               | 73.5                                   | to 83.4  |
| M14               | 118                                    | to 127   |
| M16               | 181                                    | to 201   |
| M18               | 235                                    | to 275   |
| M20               | 353                                    | to 392   |
| M22               | 490                                    | to 539   |
| M24               | 588                                    | to 686   |
| M27               | 883                                    | to 981   |
| M30               | 1 270                                  | to 1 370 |

① Data is for bolt strength classification JIS 8.8.

## 2. Precautions for Operation

### (1) Operating environment

The seal member of constant velocity joint is composed of chloroprene rubber. Though varying depending on the operating conditions, the recommended atmospheric temperature range, as a guideline, should be  $-10\text{--}60^{\circ}\text{C}$ . When intending a temperature range different from this, contact Engineering.

Also, when intending to use the CVJ in an environment where oil, organic solvent, chemical or gas is present, contact Engineering.

### (2) Grease leakage

When grease has leaked from the mounting section of the CVJ or the tightening section of the boot band, replenish grease and exercise an appropriate measure, such as retightening of the bolts, and replacement of the boot band, packing and O-ring.

When replacing the boot band, be sure to use a fresh one.

### (3) Replenishing or replacing grease

When replenishing grease to the CVJ, avoid overfilling to prevent the boot from being deformed.

To replace grease, remove the old grease and fill fresh grease. After degreasing & cleaning of the joint, be sure to apply grease to the sliding surface within the joint and the splining.

Use the grease dedicated to NTN constant velocity joints. This grease is lead-free eco-friendly grease.

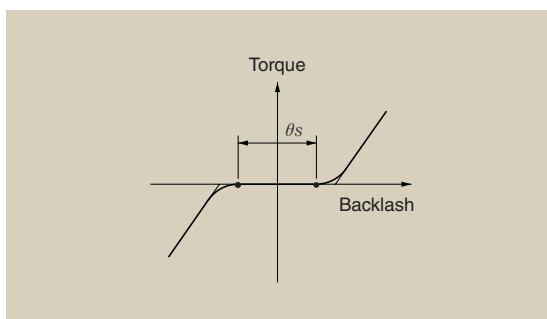
### (4) Backlash

The backlash ( $\theta_s$ ) on NTN constant velocity joints is as defined below:

Joint with standard joined shaft ( $\theta_s$ ):  $40' - 1^{\circ}20'$

Standard intermediate spline joined shaft ( $\theta_s$ ):  $50' - 1^{\circ}40'$

When wanting a joint of a smaller backlash, contact Engineering.



### (5) Vibration

Be sure to provide a difference of 30% or more relative to a characteristic vibration value of torsional vibration or flexural vibration (whirling speed).

Whirling speed  $N$

$$N = 0.12 \times 10^9 \frac{\sqrt{d_0^3 + d_1^3}}{l^2} \text{ rpm}$$

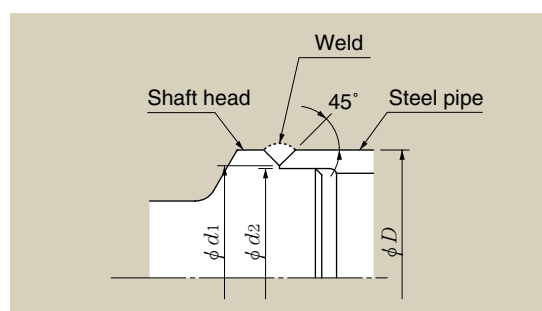
$l$  : center-to-center distance on the CVJ mm

$d_0, d_1$  : outside diameter, inside diameter, of shaft (steel pipe) mm

## 3. Welding Procedure

### (1) Welding shaft head to steel pipe

1. Weld the steel pipe with the butting form shown below.



Recommended weld dimensions with steel pipe

| $\phi D$     | $\phi d_1$  | $\phi d_2$                                                   |
|--------------|-------------|--------------------------------------------------------------|
| $\phi 48.6$  | $\phi 42.6$ | $\phi 41.6 \begin{smallmatrix} 0 \\ -0.05 \end{smallmatrix}$ |
| $\phi 60.5$  | $\phi 53$   | $\phi 51.7 \begin{smallmatrix} 0 \\ -0.05 \end{smallmatrix}$ |
| $\phi 76.3$  | $\phi 67$   | $\phi 66 \begin{smallmatrix} 0 \\ -0.05 \end{smallmatrix}$   |
| $\phi 89.1$  | $\phi 81.5$ | $\phi 79.5 \begin{smallmatrix} 0 \\ -0.05 \end{smallmatrix}$ |
| $\phi 101.6$ | $\phi 90$   | $\phi 87 \begin{smallmatrix} 0 \\ -0.054 \end{smallmatrix}$  |
| $\phi 139.8$ | $\phi 125$  | $\phi 123 \begin{smallmatrix} 0 \\ -0.063 \end{smallmatrix}$ |

2. During welding work, perform preheating and postheating.  
3. After welding work, check the bend of shaft.

TIR should be 0.5mm or less with both centers supported

- If the intended application requires only RPM, the joint assembly can be used without problem by correcting the bend on shaft. If high speed application is intended, the shaft must be corrected for optimal dynamic balance.

Balance quality: JIS G 16 (guideline)

### (2) Welding material

Low hydrogen type electrode 55 kg class for high strength steel (JIS Z 3212, D 5316)

#### CAUTION

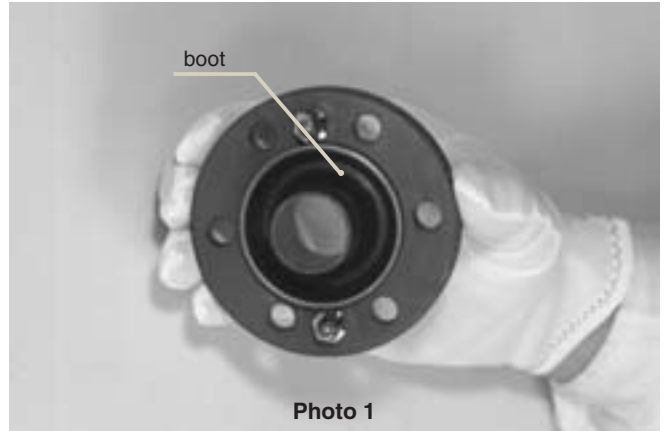
Use care when welding. Take steps to insure good welding techniques.

## 4. Assembly

### (1) Fixed Disc Type

#### Fixed side CVJ

Step 1 Press-fit the boot into the boot retainer plate.  
(Photo 1)



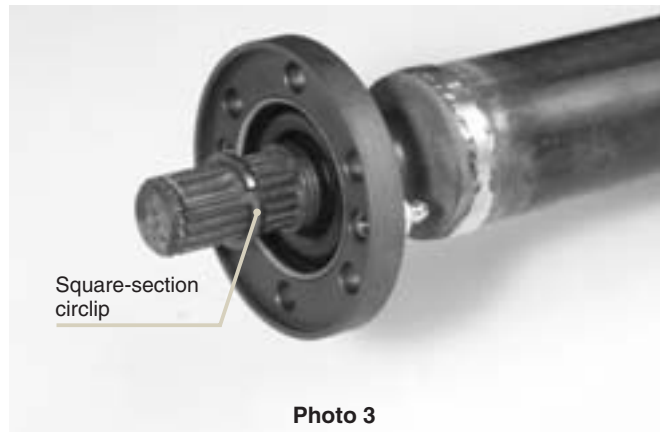
Step 2 Inject provided authorized grease into the boot.  
(Photo 2)



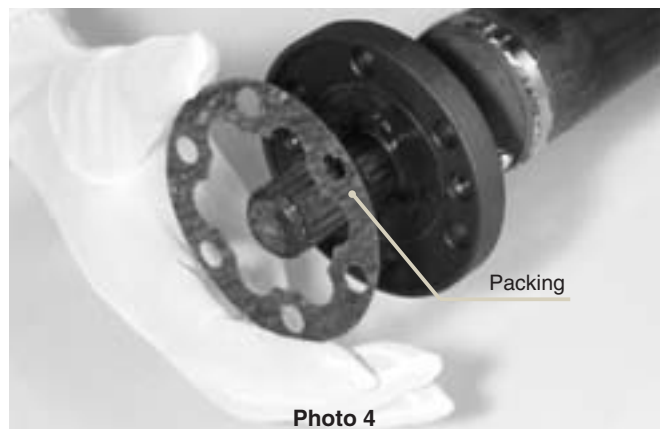
Step 3 Install the boot to the shaft, and fit the square-section circlip into the groove on the shaft ❶.  
(Photo 3)

❶ For installation procedure with the square-section circlip, see Sec. 4.5 on page 59.

Remarks: Joint BJ175–300 lack the square-section circlip.



Step 4 Seat the packing inside the boot. (Photo 4)



Step 5 Inject provided authorized grease into the joint proper. (**Photo 5**)

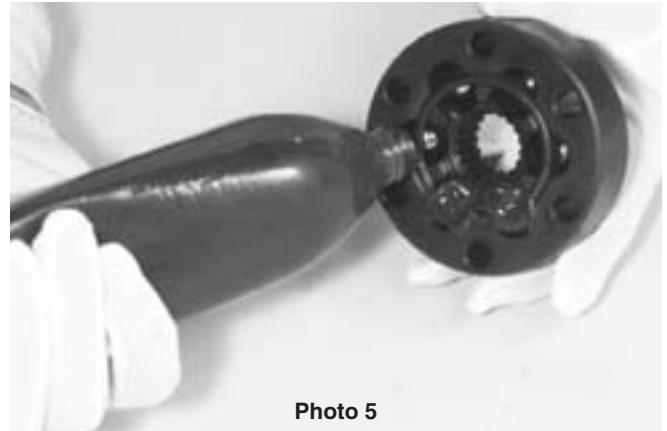


Photo 5

Step 6 Apply provided authorized grease to the splines on the shaft. (**Photo 6**)



Photo 6

Step 7 Procedure for **BJ75-150**  
Force the CVJ proper all the way in until it touches the circlip (see **Photo 6**), and lock it with an E-ring or C-ring. (**Photos 7 and 8**)

**CAUTION**

Handle the E-ring or C-ring with care. The spring force in the ring can cause it to fly off if it slips during installation.

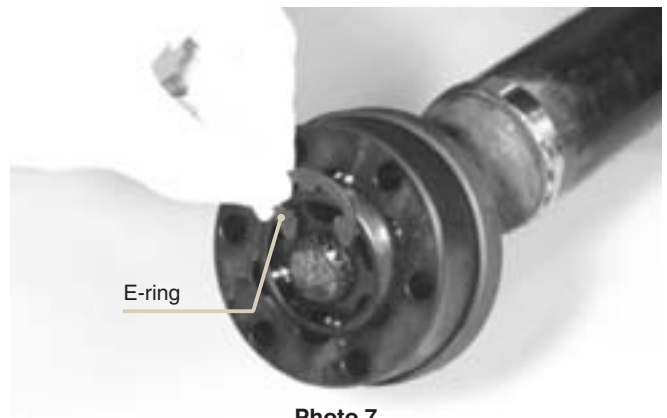


Photo 7

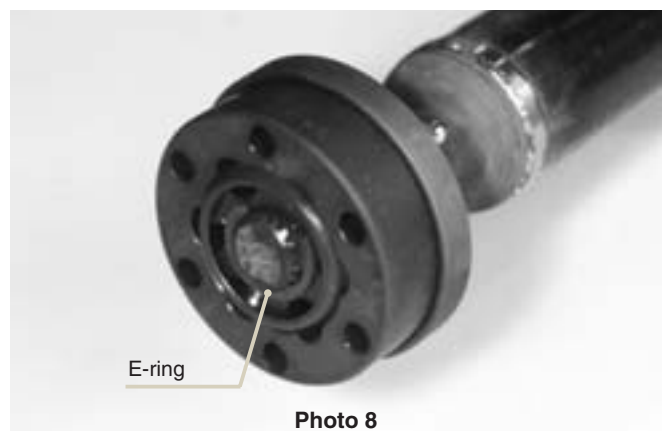


Photo 8

# Usage and Handling

## Step 7 Procedure for BJ175-300

- (1) Orient the groove on the outer face of the outer race to the outward direction. Mount the joint assembly on the shaft until the end face of the inner race reaches the groove for retainer plate on the shaft. **(Photo 9)**

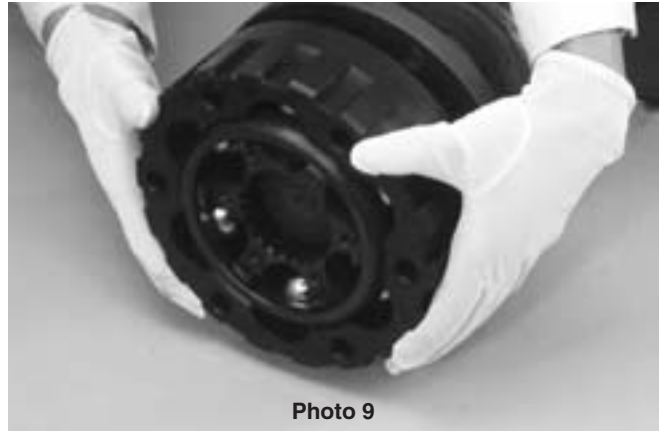


Photo 9

- (2) Install the splined retainer plate so that its splines mesh with the splines on the shaft. **(Photo 10)**

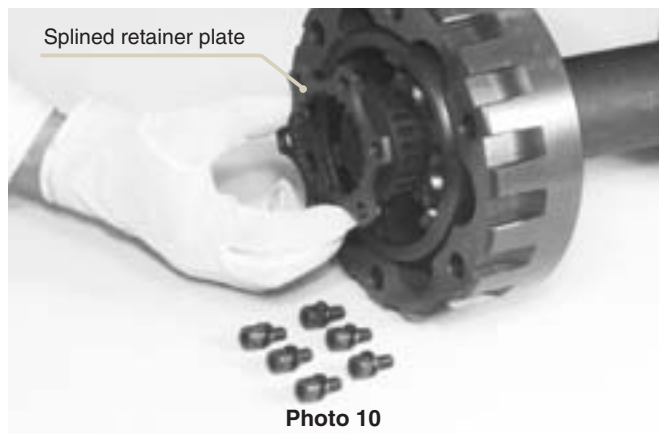


Photo 10

- (3) Align the tapped holes to those on the inner race (also, align the teeth of splines on the shaft with tooth spaces on the retainer plate), then lock the retainer plate with the hexagon headed bolts. **(Photo 11)**

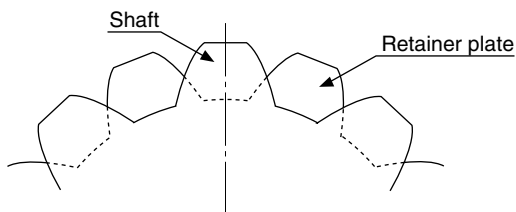


Photo 11

- Step 8 Inject provided authorized grease into the mounting portion on the CVJ assembly. **(Photo 12)**

### Free side CVJ

For assembling the free side CVJ, observe the assembly procedure for the fixed side CVJ except for step 3 (installation of the square-section circlip) and step 7 (installation of the E-ring or locking of the retainer plate).



Photo 12

**(2) Fixed Cup/Drum****Fixed side CVJ**

Step 1 Place the boot bands (both large diameter and small diameter) over the shaft. **(Photo 13)**



Photo 13

Step 2 Fit the boot over the shaft. Fit the square-section circlip into the groove on the shaft **①**. **(Photo 14)**

**①** For installation procedure with the square-section circlip, see **Sec. 4.5 on page 59**.



Photo 14

Step 3 Inject NTN provided authorized grease into the CVJ assembly. **(Photo 15)**



Photo 15

Step 4 Fill provided authorized grease into the boot (about 1/3 to 1/2 as much as the space). **(Photo 16)**  
Apply NTN grease for constant velocity joints to the splines on the shaft.



Photo 16



## Usage and Handling

Step 5 Mount the CVJ assembly onto the shaft until the inner race is against the square section circlip (see **Photo 17**), and lock it with a C-ring. (**Photo 18**)

### CAUTION

Carefully handle a C-ring. The ring can fly owing to its spring force.

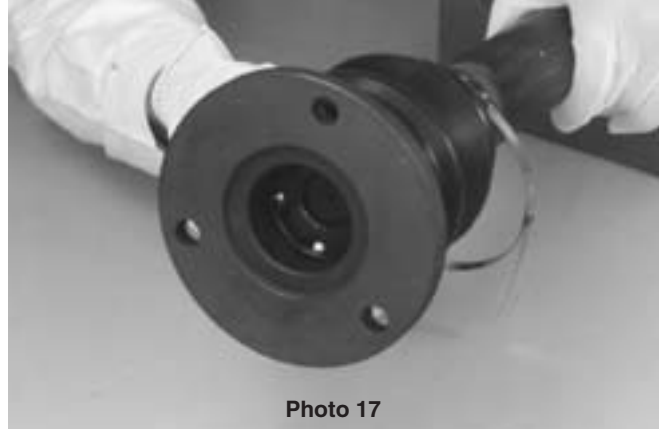


Photo 17

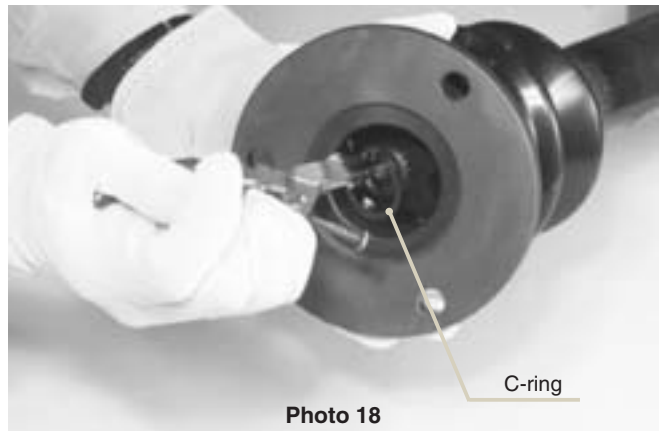


Photo 18

C-ring

Step 6 Inject provided authorized grease into the mounting portion on the CVJ assembly. (**Photo 19**)

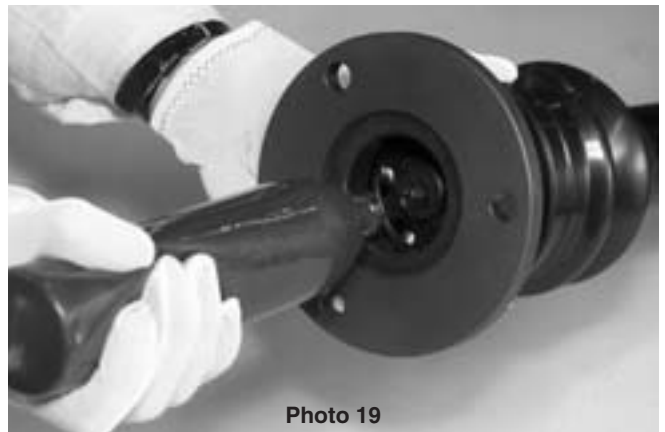


Photo 19

Step 7 Fit the boot into the boot retaining grooves on the shaft and outer race. Fit the boot bands over the boot and fasten them<sup>①</sup>. (**Photo 20**)

① For fastening the boot bands, see Sec. 4.6 and 4.7 on page 60.

### Free side CVJ

For assembling the free side CVJ, observe the assembly procedure for the fixed side CVJ except for step 2 (installation of the square-section circlip) and step 5 (installation of the C-ring).



Photo 20

**(3) Coupling**

Step 1 Place the boot bands (both large diameter and small diameter) over the shaft, and shift them to the steel pipe side. Then, fit the boot over the shaft. (**Photo 21**)



Photo 21

Step 2 Fit the square-section circlip into the groove on the shaft. (**Photo 22**)

① For installation procedure with the square-section circlip, see Sec. 4.5 on page 59.



Photo 22

Step 3 Inject provided authorized grease into the CVJ assembly. (**Photo 23**)



Photo 23

Step 4 Fill provided authorized grease into the boot (about 1/3 to 1/2 as much as the space). (**Photo 24**) Apply NTN grease for constant velocity joints to the splines on the shaft.



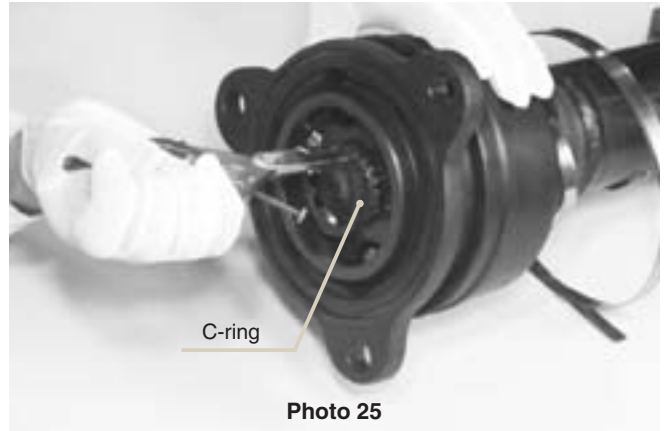
Photo 24

# Usage and Handling

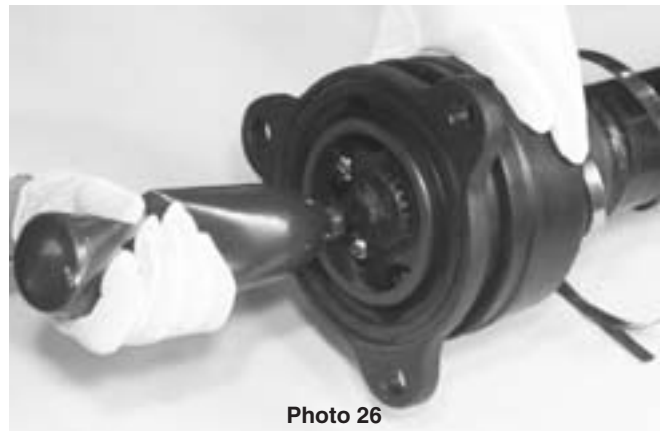
Step 5 Mount the CVJ assembly onto the shaft until the inner race is against the square section circlip, and lock it with a C-ring. **(Photo 25)**

### CAUTION

Handle the C-ring with care. The spring force in the ring can cause it to fly off if it slips during installation.



Step 6 Inject provided authorized grease into the mounting portion on the CVJ assembly. **(Photo 26)**



Step 7 Fit the boot into the boot retaining grooves on the shaft and outer race. Fit the boot bands over the boot and fasten them ❶. **(Photo 27)**

❶ For fastening the boot bands, see Sec. 4.6 and 4.7 on page 60.



#### (4) CVJ Assembly (D0 series, C0 series, M0 series)

The inside of CVJ assembly is coated with Molycoat. Before using the joint, fill with provided authorized grease so that it is uniformly spread within the inside of CVJ assembly. **(Photo 28)**

### CAUTION

Use care when disassembling the joint assembly as there may be sharp edges, particularly on the cage ball sockets.



**(5) Special tools for Square-section Circlip and Installation Procedure**

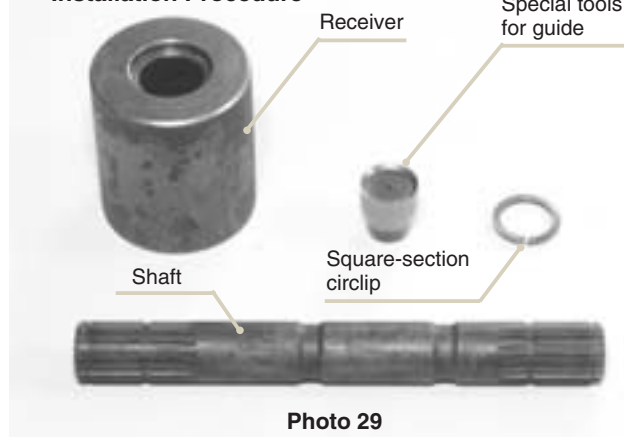


Photo 29

Remarks : The sizes of the receiver and special tools for guide must comply with the associated joint numbers (see Fig. 1 and Fig. 2).

**Tool A for Square-section circlip (major dimensions)**

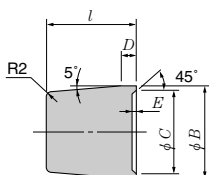


Table 1 mm

| Applicable joint | $l$ | $\phi B$ | $\phi C$ | $D$ | $E$ |
|------------------|-----|----------|----------|-----|-----|
| BJ 75            | 22  | 22.5     | 20.5     | 4   | 2   |
| BJ 95            | 25  | 27       | 25       | 5   | 2   |
| BJ 100           | 25  | 30       | 28       | 5   | 2   |
| BJ 125           | 40  | 37       | 35       | 5   | 2.5 |
| BJ 150           | 35  | 46       | 44       | 5   | 2.5 |

**Tool B for Square-section circlip (major dimensions)**

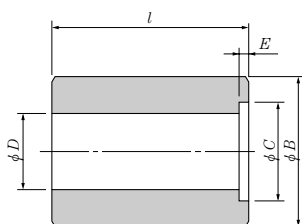


Table 2 mm

| Applicable joint | $l$ | $\phi B$ | $\phi C$ | $\phi D$ | $E$ |
|------------------|-----|----------|----------|----------|-----|
| BJ 75            | 70  | 60       | 30       | 23.5     | 4   |
| BJ 95            | 80  | 65       | 35       | 27.5     | 4   |
| BJ 100           | 80  | 65       | 40       | 30.5     | 4   |
| BJ 125           | 100 | 65       | 47       | 37.5     | 4   |
| BJ 150           | 100 | 70       | 55       | 47.5     | 4   |

**WARNING**

- Be sure to wear a set of protective goggles while fitting a square-section circlip.

**Procedure**

Step 1 Place a square-section circlip onto the receiver. (Photo 30)



Photo 30

Step 2 Insert the guide a special tools into the circlip. (Photo 31)



Photo 31

Step 3 Place the shaft into the guide a special tools and using a vinyl or wood mallet, drive the shaft into the circlip (Photo 32) until it is seated in the groove (Photo 33).



Photo 32

# Usage and Handling



Photo 33

## (6) Boot Band Fastening Jig

Photo 34 illustrates the boot band fastening jig.



Photo 34 (Part number: 98-1 #BJ150)

## (7) Precautions for fastening boot bands

- 1) Securely fasten the boot band to avoid leakage of grease.
- 2) Carefully fasten the boot band so as not to damage or deform it.
- 3) Carefully fold the boot band fastening portion so that the lip of band does not protrude.
- 4) Handle the boot band carefully as there may be sharp edges that could cause injury.
- 5) Deforming the boot band or tightening a boot band obliquely can damage the boot. Avoid such a practice.

### CAUTION

- Wear protective gloves to avoid injury of a finger with an edge on boot band.

## 5. Storage

When storing constant velocity joints, observe the following instructions.

- 1) Store in a clean, dry location.
- 2) To prevent the boots from being deformed, avoid storing the assemblies in an unstable state (**Fig. 1**). Store them in a stable, horizontal position (**Fig. 2**).
- 3) Protect the boots, etc., with a cover.
- 4) Do not stack cardboard boxes containing constant velocity assemblies. The additional weight may deform the boxes and damage to the contents may occur.
- 5) When using a constant velocity joint that has been stored for a prolonged period, elaborately inspect the state of boot and grease.

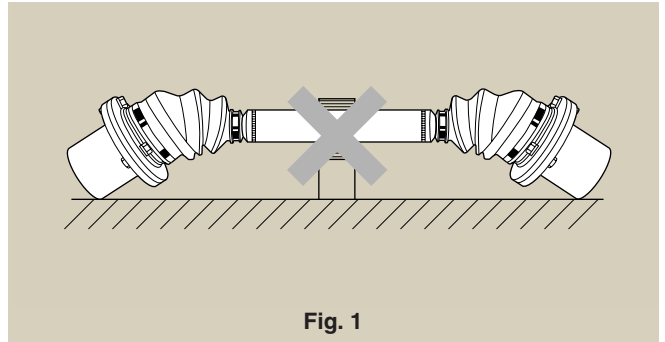


Fig. 1

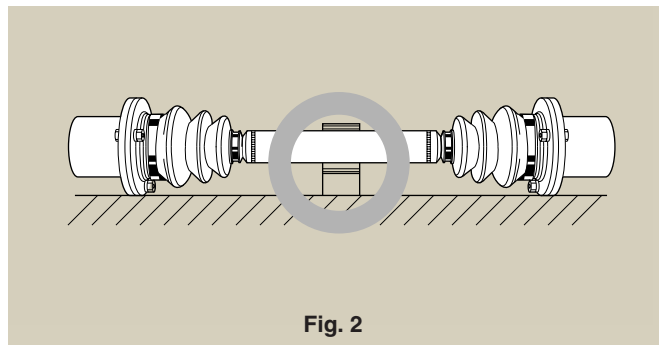


Fig. 2

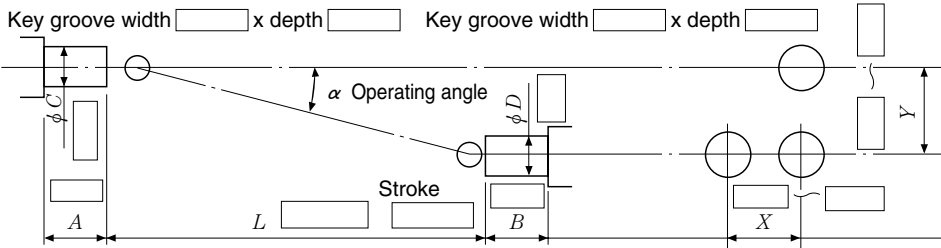
### About Service Conditions Confirmation Sheet

To confirm the service conditions of your joint assembly, use the "Service Conditions Confirmation Sheet" on page 61.

Select an optimal NTN constant velocity joint product from a range of NTN constant velocity joint series after thoroughly considering a user's intended operating conditions and intended applications.

# Service Conditions Confirmation Sheet

## NTN CONSTANT VELOCITY JOINT SERVICE CONDITIONS CONFIRMATION SHEET

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                      |          |                                                                                                         |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------------------------|------|
| Company Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                      |          |                                                                                                         | Date |
| Machine                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                      |          | Area                                                                                                    |      |
| <b>Service conditions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                      |          |                                                                                                         |      |
| 1. Kind of prime motor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Motor                                                                                                | AC, DC   | Output; <input type="text"/> kW / <input type="text"/> HP / <input type="text"/> r/min                  |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Engine                                                                                               | Gasoline | No. of cylinders; <input type="text"/> Max. output <input type="text"/> PS / <input type="text"/> r/min |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                      | Diesel   | Max. torque <input type="text"/> kgf·m / <input type="text"/> r/min                                     |      |
| 2. Number of joints to be driven per unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <input type="text"/>                                                                                 |          |                                                                                                         |      |
| 3. Joint rotation speed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Constant <input type="text"/> r/min Variable <input type="text"/> to <input type="text"/> r/min      |          |                                                                                                         |      |
| 4. Rotating direction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | One direction Forward/reverse                                                                        |          |                                                                                                         |      |
| 5. Transmission torque                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Constant <input type="text"/> kgf·m                                                                  |          |                                                                                                         |      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Variable Max. <input type="text"/> to Normal <input type="text"/> to Min. <input type="text"/> kgf·m |          |                                                                                                         |      |
| 6. Shock                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | None Approx. <input type="text"/> % against the rated torque of driving source                       |          |                                                                                                         |      |
| 7. Service hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 24 hrs/day constantly <input type="text"/> hrs/day Others <input type="text"/>                       |          |                                                                                                         |      |
| <b>8. Joint installation drawing</b><br>Driving end ( <input type="text"/> ) Follower end ( <input type="text"/> )<br>Key groove width <input type="text"/> x depth <input type="text"/> Key groove width <input type="text"/> x depth <input type="text"/><br><br>[Remarks]<br>When the above drawing is not applicable, make a special study.<br>When the installation/operation position (L and X, Y) changes, confirm the changed position (amount) and the loading condition at that position. |                                                                                                      |          |                                                                                                         |      |
| 9. Installation direction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Horizontal Vertical                                                                                  |          |                                                                                                         |      |
| 10. Expansion and angle variation while torque is transmitted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | No Yes                                                                                               |          |                                                                                                         |      |
| 11. Outside diameter limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | No Yes up to <input type="text"/> mm                                                                 |          |                                                                                                         |      |
| 12. Place and atmosphere                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Indoor Outdoor Temp <input type="text"/> °C Others <input type="text"/>                              |          |                                                                                                         |      |
| 13. Kind and joint No. of the joints currently used                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | None Kind and joint No. <input type="text"/>                                                         |          |                                                                                                         |      |
| 14. Special notes:<br>-----<br>-----<br>-----<br>-----<br>-----                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                      |          |                                                                                                         |      |

Remarks: 1. Upon receiving your service conditions, we will recommend the best suited joint number.  
 2. Upon receiving the user's instructions about the dimensions of mounting flange hub (inside dia. key groove dimensions, etc.), we will machine the hub.