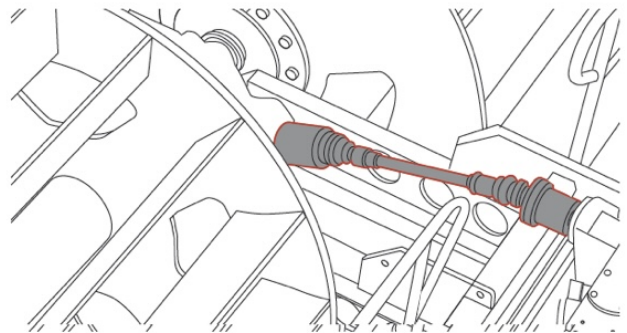
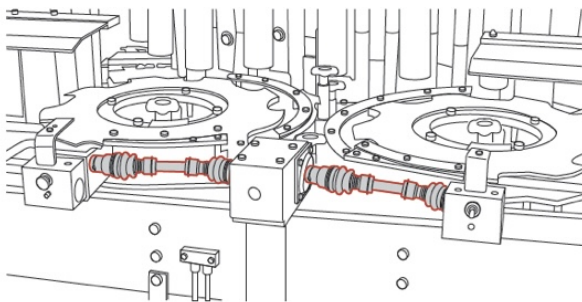
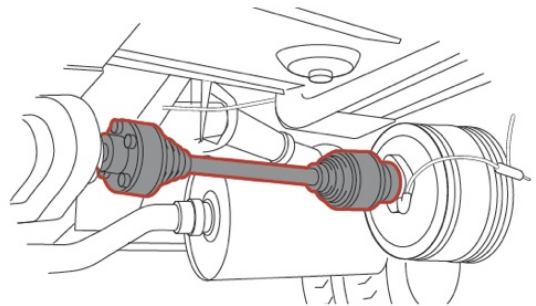
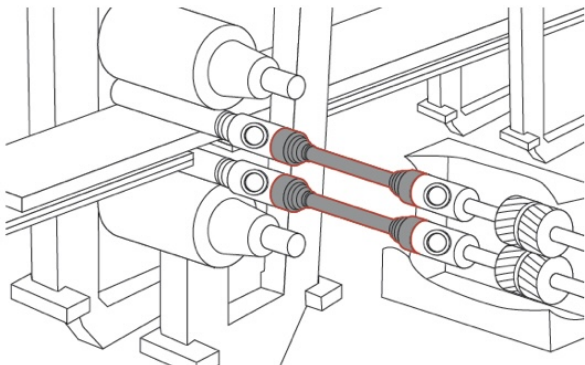
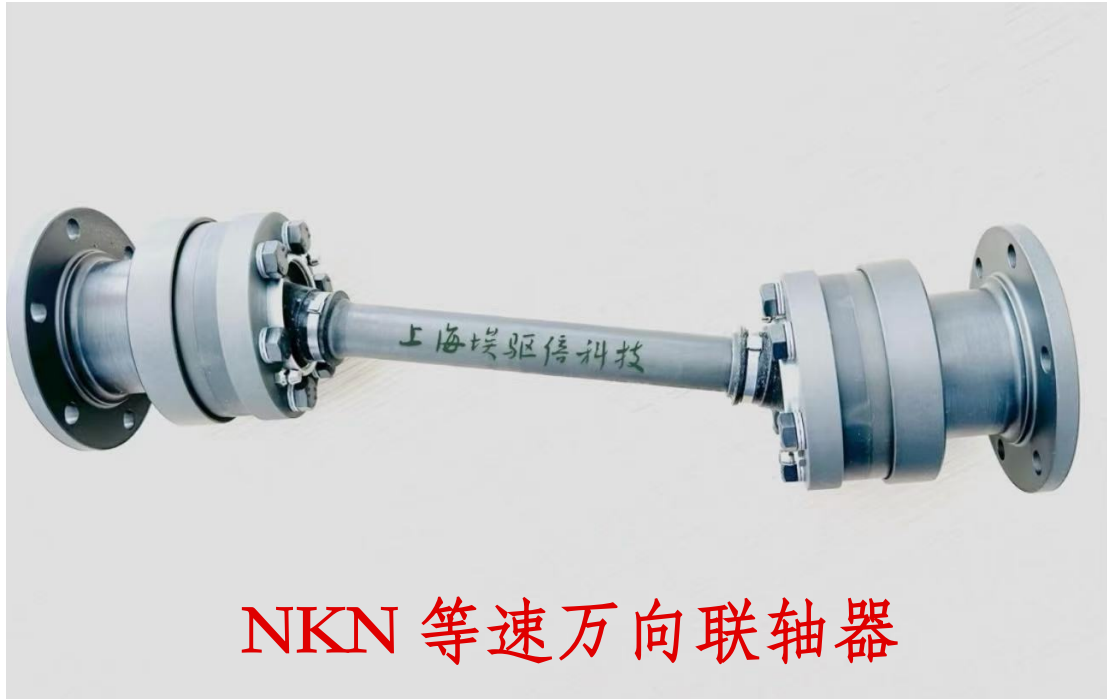


NKN INDUSTRIAL CONSTANT VELOCITY JOINTS



上海埃驱倍科技有限公司
Shanghai ATB Technology Co., Ltd.

电话: 021-34710980
邮箱: info@atbttec.cn

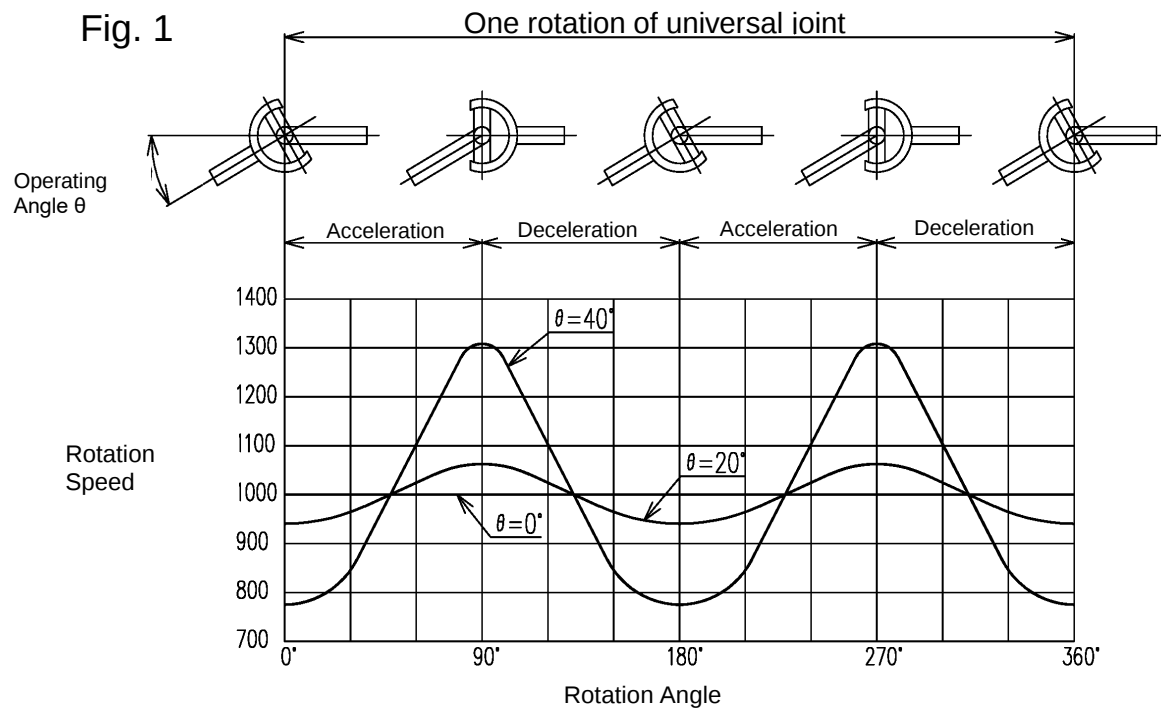
Characteristics of Universal Joints and Constant Velocity Joints

【Characteristics of Universal Joints】

When the Universal joint rotates at the operating angle as shown in Fig. 1, even if the drive shaft has a constant speed, the driven shaft will rotate non-constantly and the angular velocity and torque will fluctuate.

This is due to the structural characteristics of the universal joint.

During one rotation, acceleration and deceleration are repeated twice therefore, vibration and noise may occur depending on the angle and number of rotations.



【Characteristic of Constant Velocity Joint】

On the other hand, the constant velocity joint has the characteristic of transmitting rotation and torque at a constant velocity even if the operating angle of the drive shaft and driven shaft changes, so high efficiency and smooth power transmission is possible.

Features and Theory of Constant Velocity Joint

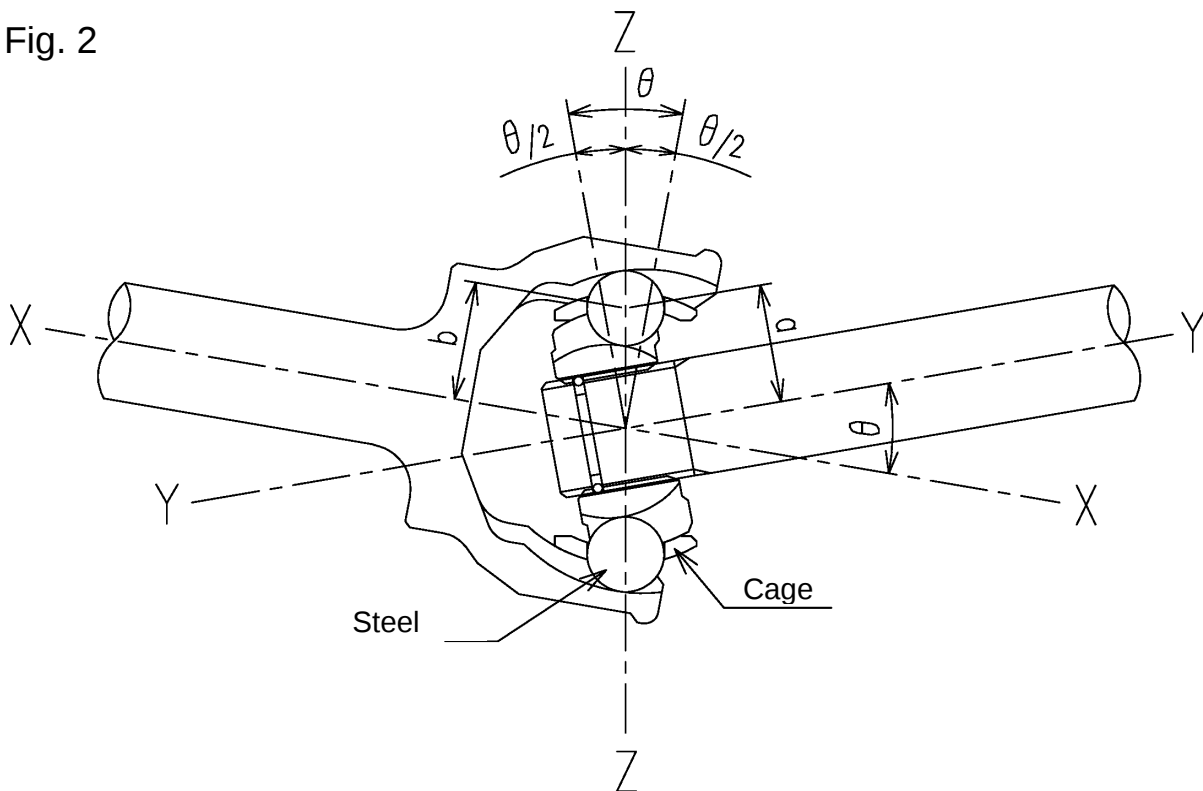
1. Features

- Rotate at the constant velocity with operating angle
- Prevent vibration
- Smooth and quiet rotation
- High transmission efficiency
- Common torque loads

2. Theory

1. Fig.2 shows the model of constant velocity joint.
Constant velocity joint requires that the two intersecting axles rotate at equal angular velocities.
No matter what angle the X and Y axles intersect, if the distance from shaft center to the center of steel ball is " $a = b$ ", the angular velocities will be equal, and the X and Y axles rotate at a constant speed.
2. In order to make " $a = b$ ", it is necessary to keep the center of 6 steel balls on the Z-Z plane, and the Z-Z plane must be a plane that bisects the angle θ at which the X and Y axles intersect.
In a constant velocity joint, the cage (retainer) always holds the center of 6 steel balls on this Z-Z plane, so it has a certain constant velocity.

Fig. 2



Selection of Joint

1. Selection from Strength

1-1 Check the maximum torque (N・m) used.

1-2 Select the load condition from ① and ② in the table below.

1-3 Make sure that the maximum torque to be used is smaller than the value of dynamic allowable torque under the conditions selected in ① and ②.

Unit (N・m)

SERIES	TYPE	SERIAL NUMBER	STATIC ALLOWABLE TORQUE	DYNAMIC ALLOWABLE TORQUE	
				① When torque fluctuates in one direction rotation.	② When start/stop and forward/reverse rotation are frequently repeated.
DOJ	B / F	008	30	14	9
		012	125	60	38
		016	230	110	70
		020	495	235	150
		025	1010	480	305
DOJ BJ	DOJ : B/F BJ : C/R	075	1040	590	400
		095	1820	1130	650
BJ	C	100	2480	1450	900
	C / R	125	4000	2750	1470
	R	150	8100	4710	2890
		175	11500	6720	4020
		200	17000	11200	5880

(Ex.) Operating condition => Maximum torque: 700 Nm Use Term: One direction rotation

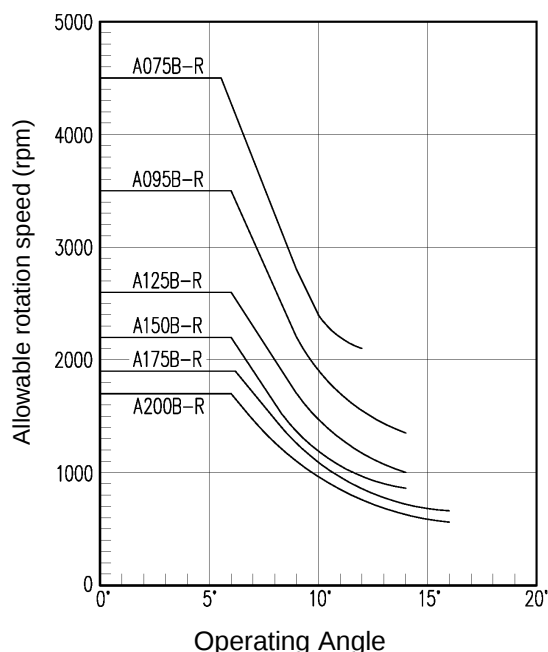
1) Select from the table of dynamic allowable torque ①.

2) The dynamic allowable torque that exceeds the torque of 700 Nm is 1130 Nm
Therefore, the recommended joint will be serial number 095.

2-. Confirmation of Allowable Rotation Speed (BJ Series Disc Type)

- 1) In charts 5 and 6, check that the operating speed is below the allowable rotation speed.
- 2) The lower speed of chart 3 or 4 is the allowable speed.

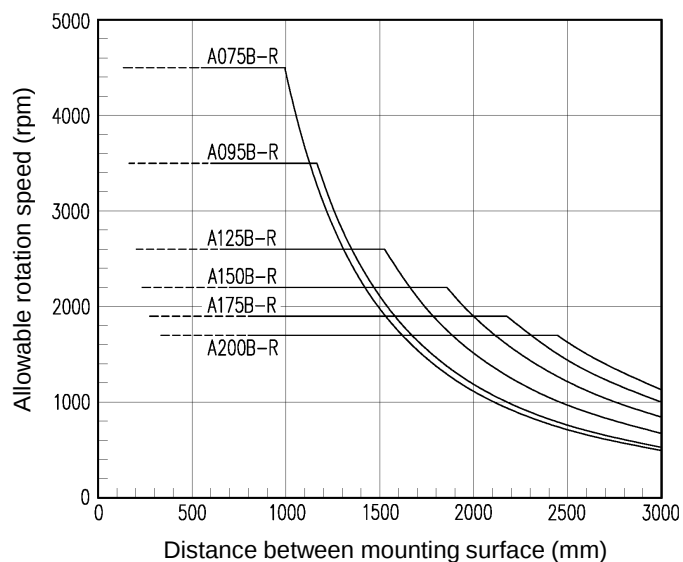
Remark) The allowable rotation speed is a value that considers the durability of the bo



The horizontal part of the chart is the value of boot allowable rotation speed.

Chart 5

【Operation angle and allowable rotation speed】



- * --- is the face-to-face distance on a solid shaft.
- * The above is allowable rotaion speed at operating angle C
- * The horizontal part of the chart is the value of boot allowa

Chart 6

【Distance between mounting surface and Allowable rotation speed】

Remarks)

- In terms of using slide shaft, there is a limit to the allowable rotation speed in the intermediate spline section. Use the reference table on page 12.
- In terms of using slide shaft and pipe shaft, it might be necessary to correct the dynamic balance depending on the rotation speed and length.

<Reference Chart> Allowable rotation speed for slideshaft.

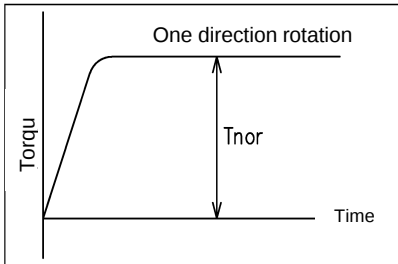
Serial Number	Distance Between Mounting Surface (mm)						
	500	750	1000	1250	1500	1750	2000
A025D	1000	900	750	650	550	450	300
A075B							
A095B							

Remark) For A008D~A020D, set the value 1/2 of chart 2 on page 10.

(rpm)

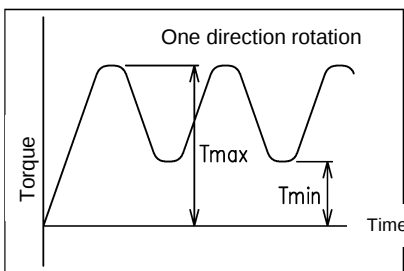
3. Selection from Life Span

3-1 According to the usage conditions, select one of the usage models (A) to (E) and find the common torque T_j (Nm).



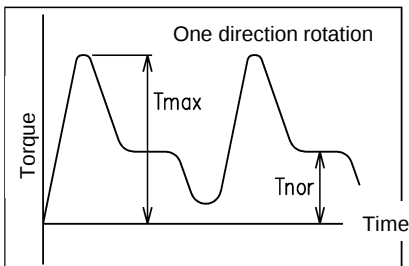
(A) When the torque is constant in one direction rotation.

$$T_j = T_{nor}$$



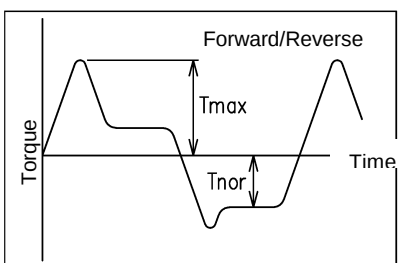
(B) When torque fluctuates uniformly in one direction rotation.

$$T_j = (T_{min} + 2 \times T_{max}) \times 0.3$$



(C) When the torque fluctuates in one direction rotation and T_{max} time ratio is small and frequently occurs.

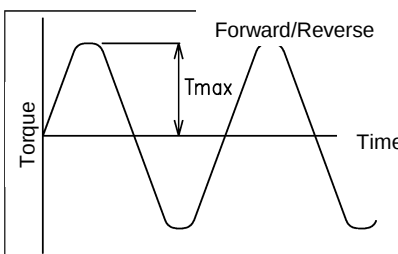
$$T_j = (T_{max} + T_{nor}) \times 0.5$$



(D) When the torque fluctuates in forward/reverse rotation and the T_{max} time ratio is small and frequently occurs.

$$T_j = (T_{max} + T_{nor}) \times 0.5$$

※For forward/reverse rotation, select large values for T_{max} and T_{nor} .



(E) When the torque fluctuates uniformly in forward/reverse rotation.

$$T_j = 2 \times T_{max} \times 0.3$$

3-2 Set the life factors K1, K2, K3.

Table 1. Power source factor **K1**

Type of Power Source			K1
Motor			1
Engine	Gasoline Engine	4 cylinders or more	1.25
		3 cylinders or less	1.5
	Diesel Engine	4 cylinders or more	2
		3 cylinders or less	3

Table 2. Operating time factor **K2**

Operating Hours per Day	2	4	6	8	10	12	14	16	18	20	22	24
K2	0.6	0.8	0.9	1.0	1.1	1.15	1.2	1.25	1.3	1.35	1.4	1.45

Table 3. Angle coefficient **K3**

CVJ Operation Angle	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°
K3	1.00	0.96	0.91	0.87	0.83	0.79	0.74	0.70	0.66	0.61	0.57	0.53

3-3 Calculate the equivalent working transmission torque T_t (N·m) by the following formula.

$$T_t = K1 \times K2 \times T_j / K3$$

- Power source factor = **K1**
- Operating time factor = **K2**
- Angle coefficient = **K3**
- Common torque = **T_j**

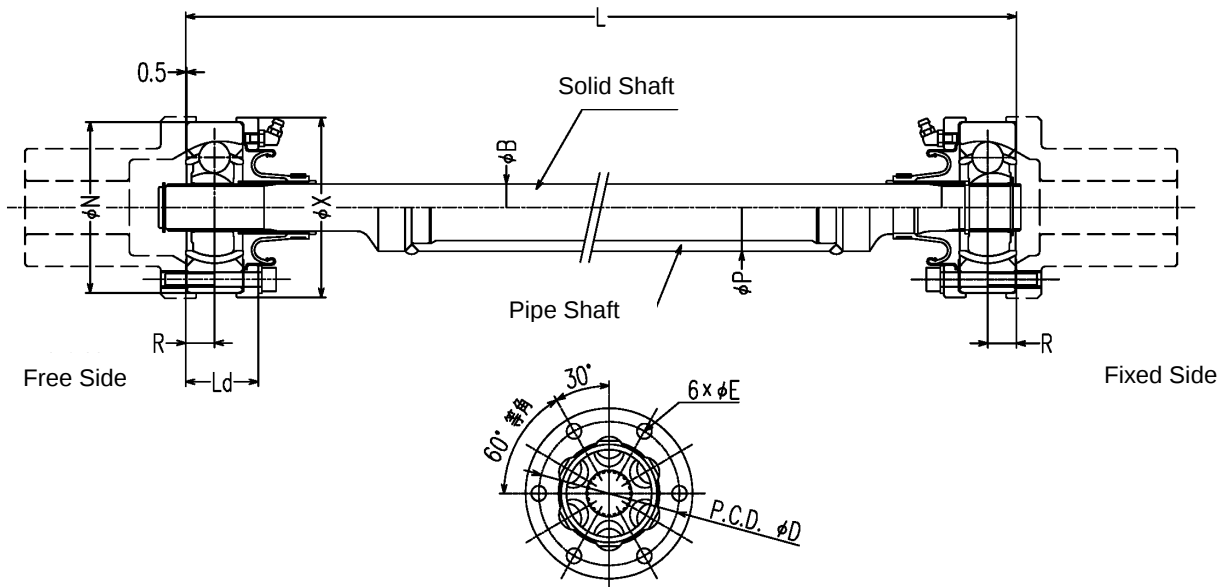
3-4 Select a serial number for which the calculated equivalent working torque (T_t) is below the value in reference Table 4.

Reference Table 4 (N·m)

Serial Number	Series	Use Rotation Speed (rpm)			
		100	500	1000	1500
008	DOJ	6.6	4.9	4.2	3.7
012		21.8	16.2	14	12.3
016		51	38	33	29
020		90	66	57	50
025		175	130	110	100
075		190	140	120	105
095		385	285	245	210
075	BJ	225	165	145	125
095		395	290	255	220
100		520	385	335	290
125		1025	755	660	570
150		1780	1315	1140	990
175		2520	1860	1620	1405
200		4210	3110	2710	2355

※ Please contact our sales staff for final calculations such as checking the life span.

ASSY Disc Type (R) (Solid Shaft) / (Pipe Shaft)

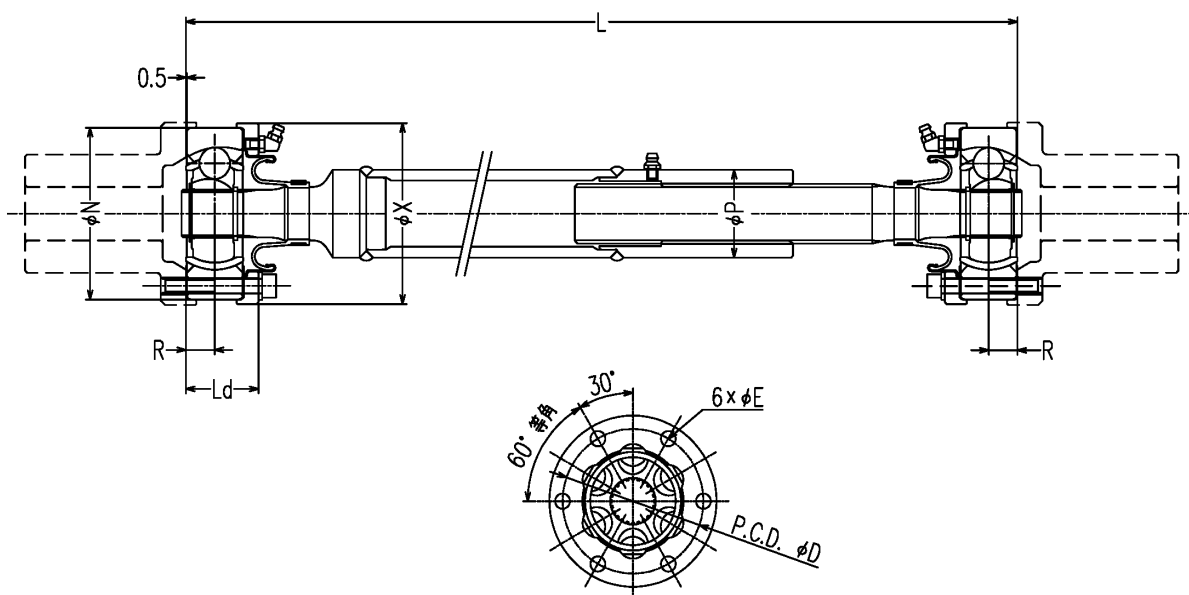


	Position	Serial Number				Position
		075	095	125	150	
Dimension	φN	80	95	125	146	φN
	φD	66	80	106	124	φD
	φE	8.5	8.5	10.5	12.5	φE
	φX	85	100	130	151	φX
	φB	22.1	26.3	36.3	45.6	φB
	φP	45	48.6	60.5	76.3	φP
	R	12.9	16.3	20.8	24.6	R
	Ld	33.9	41.3	50.1	57.7	Ld
	L Min. (B)	135	165	205	235	L Min. (B)
	L Max. (B)	550	600	650	700	L Max. (B)
	L Min (P)	550	600	650	700	L Min (P)
	L Max. (P)	3000	3000	3000	3000	L Max. (P)
	Allowable Expansion	±15		±20		Allowable Expansion
	Allowable Operating Angle	Dynamic	12°	14°		Dynamic
		Static	14°	16°		Static

Remarks)

- The fitting tolerance of the N dimension is H8.
- The dimensions for R and Ld include packing thickness of 0.5 mm.
- L dimension includes the packing thickness of 1.0mm (for 2 sheets) on both ends.
- For the shape of the flange hub (optional) in the dotted line, please refer to page 44.
- Due to the conditions for use, if the expansion exceeds the above, please contact us.

ASSY Disc Type (R) (Slide Shaft)

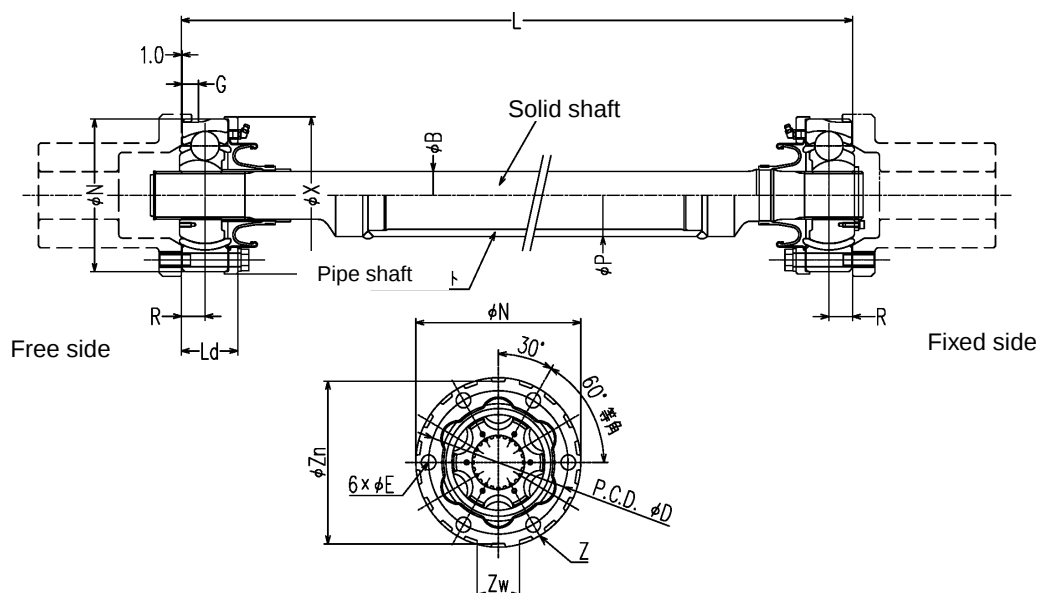


	Position	Serial Number		Position
		075	095	
Dimension	φN	80	95	φN
	φD	66	80	φD
	φE	8.5	8.5	φE
	φX	85	100	φX
	φP	45	48.6	φP
	R	12.9	16.3	R
	Ld	33.9	41.3	Ld
	L Min.	395	435	L Min.
	L Max.	2000	2000	L Max.
	Allowable Expansion	±45	±45	Allowable Expansion
Allowable Operating Angle	Dynamic	12°	14°	Dynamic
	Static	14°	16°	Static

Remarks)

- The allowable expansion measurement is the value at the slideshaft.
- The fitting tolerance of the N dimension is H8.
- The dimensions for R and Ld include packing thickness of 0.5 mm.
- L dimension includes the packing thickness of 1.0mm (for 2 sheets) on both ends.
- Be careful when handling the slide shaft as the shaft might fall out at the middle spline.
- For the shape of the flange hub (optional) in the dotted line, please refer to page 44.

ASSY Disc Type (R) **(Solid Shaft) / (Pipe Shaft)**



	Position	Serial Number		Position
		175	200	
Dimension	ϕN	165.1	190	ϕN
	ϕD	139.7	159	ϕD
	ϕE	15	13.5	ϕE
	ϕX	170	196	ϕX
	ϕB	51.6	59.5	ϕB
	ϕP	89.1	101.6	ϕP
	R	26.4	31	R
	Ld	62.8	73	Ld
	G	18	18	G
	Z	18	18	Z
	Zw	42.4 (2 teeth width)	16.25 (1 tooth width)	Zw
	ϕZn	158.5	180	ϕZn
	L Min. (B)	275	335	L Min. (B)
	L Max. (B)	800	800	L Max. (B)
	L Min (P)	800	800	L Min (P)
	L Max. (P)	3000	3000	L Max. (P)
Allowable Operating Angle	Allowable Expansion	± 25	± 30	Allowable Expansion
	Dynamic	16°		Dynamic
	Static	18°		Static

Remarks)

- The dimensions for R and Ld include packing thickness of 0.5 mm.
- L dimension includes the packing thickness of 2.0 mm (for 2 sheets) on both ends.
- Only for serial number 200, the installation direction of the CVJ body is reversed.
- The flange hub (optional) in the dotted line is a claw type. Please refer to page 45 for the shape.
- Due to the conditions for use, if the expansion exceeds the above, please contact us.

Flange Hub Dimension Table (Option)

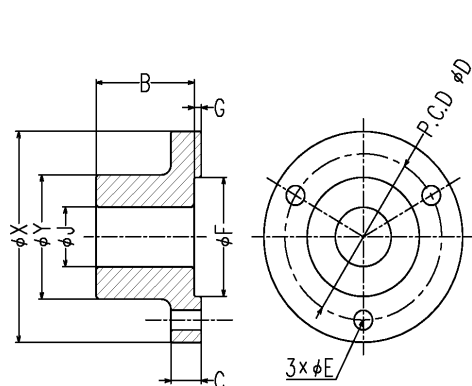


Fig. 1 DOJ Series Flange Type
008D-F ~ 025D-F

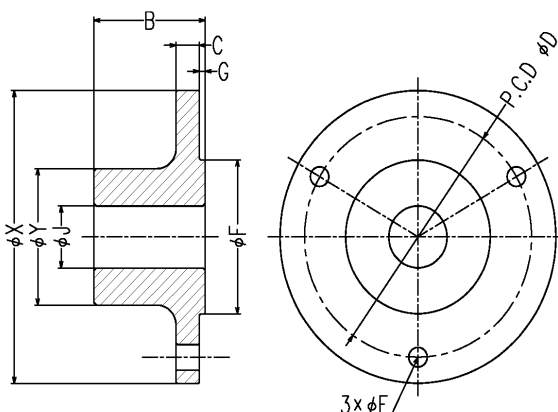


Fig. 2 DOJ Series Flange Type
075D-F ~ 095D-F
BJ Series Cup Type
075B-C ~ 125B-C

DOJ Series Flange Type

Serial Number	Fig. No.	Length			Diameter					Mounting Hole
		B	C	G	φF	φD	φX	φY	φJ ^{※2} (Max.)	
008D-F	1	※1	3	2	16	34	44	25	10	4.3
012D-F			3.5	2.5	24	44	55	34	16	5.3
016D-F			4	2.5	30	56	70	42	22	6.4
020D-F			5	3	38	68	86	52	30	8.4
025D-F			7	3	48	82	102	60	38	10.5
075D-F	2	※1	10	2.5	62	97	118	70	42	10.5
095D-F			12	2.5	70	110	132	80	48	12.5

※1 Please specify the B dimension and shaft length (mm).

※2 Please specify the tolerance of J dimension.

Remarks)

- Fit tolerance for F dimension in Fig. 1 is H9.
- Fit tolerance for F dimension in Fig. 2 is H8.
- The E position is 120° equiangular.

BJ Series Cup Type

Serial Number	Fig. No.	Length			Diameter					Mounting Hole
		B	C	G	φF	φD	φX	φY	φJ ^{※2} (Max.)	
075B-C	2	※1	10	2.5	62	97	118	70	42	10.5
095B-C			12	2.5	70	110	132	80	48	12.5
100B-C			15	2.5	80	125	154	90	54	14.5
125B-C			15	3	102	150	179	110	68	14.5

※1 Please specify the B dimension and shaft length.

※2 Please specify the tolerance of J dimension.

Remarks)

- Fit tolerance for F dimension in Fig.1 is H8.
- The E position is 120° equiangular.
- Please contact us for details as we can also process (keyway etc.) according to your mounting method.

SPECIFICATIONS SETUP CONFIRMATION SHEET

Company Name _____

Person in Charge _____

Model Used					
Place of Installation					
Type of Power Source	Motor	KW			
	Engine	Gasoline	No. of Cylinders	Output	KW (PS)
		Diesel	No. of Cylinders	Output	KW (PS)
Torque	Variable	Min. N·m	Normal N·m	Max. N·m	
	Constant	N·m			
Rotating Speed	Variable	Min. rpm	Normal rpm	Max. rpm	
	Constant	rpm			
Operating Angle	Variable	Min. degree	Normal degree	Max. degree	
	Constant	degree			
Rotating Direction	One direction	Forward/Reverse → Frequent change? Yes · No			
Outside Diameter Limit	Drive side mm	Driven side mm	No limitaiton		
Shock	Yes		No		
Installation Environment	Indoor · Outdoor		Temperature °C		
	Use oil ?:		Others		
Model and No. for Current Use					
Hours of Use	h/day		Others		
Hours of Peak Torque While Torque Is Transmitted					
Others					
installation drawing min () standard () max () min () standard () max ()					



上海埃驱倍科技有限公司
Shanghai ATB Technology Co., Ltd.

电话：021-34710980
邮箱：info@atbtec.cn