Bottom Roller Bearings for Textile Machinery

These are needle roller bearings that support the bottom rollers (fluted rollers) on fine spinning machines, roving frames or drawing frames. **Type FRIS** is applied to a fine spinning machine and a roving frame, and **Type FR** applied to a drawing frame.

Types and construction

Bottom roller bearing **FRIS** is used to support the bottom rollers of a fine spinning machine and a roving frame. The outer ring outer profile of this bearing type is spherical, which can allow, to some extent, mounting error in the bottom rollers. On the other hand, the inner ring is provided with a rib at its both ends and a clearance between the outer ring and each inner ring rib is minimized. Furthermore, the rib outer surface is knurled to prevent invasion of cotton pieces into the bearing.

These bottom roller bearings are classified into internationally interchangeable **A-series** bearings with bearing fixing saddle (to fix a bearing to a support stand) and **B-series** bearings adaptable to the dimensions of JIS Fluted Rollers.

A-series bearings are further classified into one bearing type (suffix **SA**) wherein inner ring and outer ring are separable from one another according to saddle type and another bearing type (suffix **SB**) wherein inner ring and outer ring are non-separable. Of course, these bearings can also be supplied without saddle.
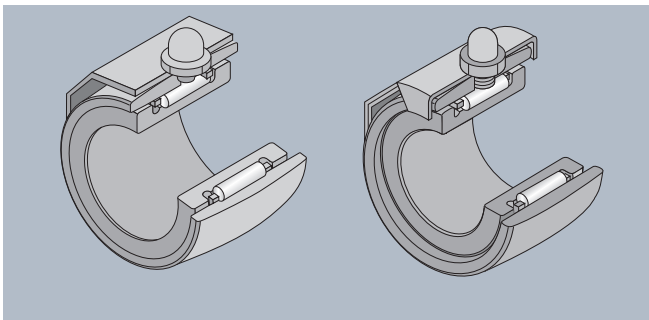

Fig. 1 Type FRIS··SA   **Fig. 2 Type FRIS··SB**

On the other hand, **B-series** bearings are further classified into bearing type with grease nipple (suffix **N**), bearing type with knock pin on its outer ring (suffix **P**) and bearing type with knock hole on its outer ring (suffix **W**) (latter two types-classified by the fixing method applied).
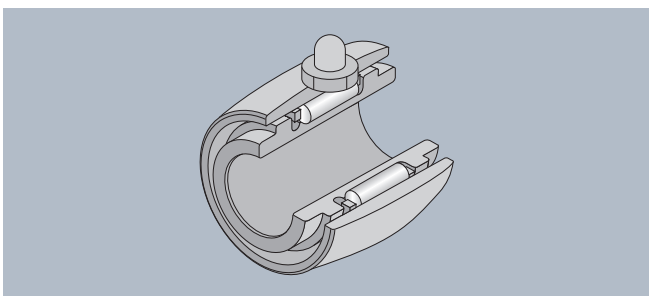

Fig.3 Type FRIS

These bearings can be supplied with saddle thereon on request, similarly to **A-series**.

Type **FR** is used to support the rollers of a drawing frame. This bearing type is composed of two drawn cup type needle roller bearings which are configured in a housing. These have no inner ring and use a shaft as the direct raceway surface. Synthetic rubber seal is fitted in the both ends of the housing. This bearing type is fixed to a support stand with knock pins press-fitted in the housing. The knock pin is provided with an grease hole to enable grease replenishing.
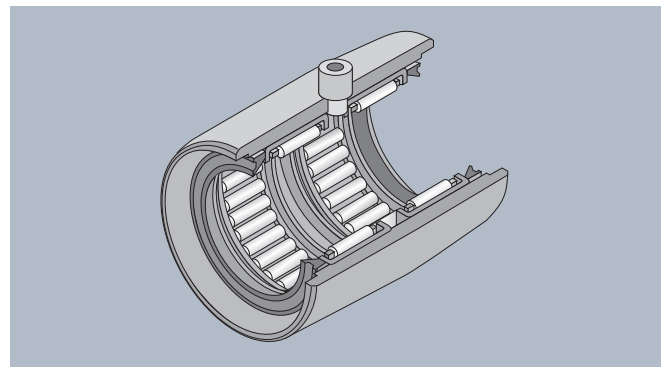

Fig. 4 Type FR

Composition of bearing number

The bearing number comprises type code, dimension code [diameter (d or F_w)] and a suffix.

FRIS 19 SB

— Suffix
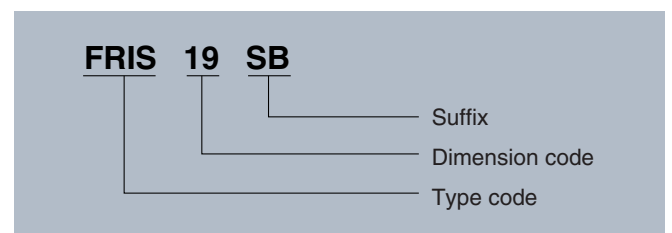— Dimension code
— Type code

Fig.5

Bearing fits

Table 1 shows bearing fits on/in shaft and housing.

Table 1 Bearing fits

Bearing type	Shaft		Housing (stand)
	Screwed joint	Spline joint	
FRIS	g5 (g6)	j5 (j6)	H10
FR	h5 (h6)		H10

Precautions for mounting

(1) For the shaft shoulder dimensions of the Type FRIS, refer to the dimensions d_1 and G in the relevant dimension table. To be able to prevent entanglement with fly and avoid adverse effect onto spinning quality, it is necessary to promptly remove entangling fly without stopping the machine. In this context, the conditions that must be satisfied to allow the bearing to fully develop its functions and maintain spinning quality by provide sufficiently deep and wide shaft shoulder.

(2) To axially position the bottom roller connected to the machine, use a thrust bearing on the gear end side so that axial movement of the bottom roller is positively prevented.

(3) When rinsing the bottom roller with cleaning liquid such as light oil, be careful not to allow the cleaning liquid to enter the bearing.

(4) When installing the bearing to a stand, position the outer ring to the middle of the inner ring width.

(5) Carefully install the bottom roller so that its runout is not greater than 0.05 mm.

Type FRIS Series A
(For fine spinning machine/
roving frame)

Type FRIS

Type FRIS‥SA
(Separable)

Type FRIS‥SB
(Non-separable)

d 16.5～25mm

Boundary dimensions								Basic load ratings			
								dynamic	static	dynamic	static
			mm					N		kgf	
d $^{0}_{-0.010}$	D	B $^{0}_{-0.050}$	C $^{0}_{-0.120}$	E	$r_{s\,min}$ 1)	L	K	C_r	C_{or}	C_r	C_{or}
16.5	28 $^{0}_{-0.020}$	19	22	23.5	0.3	22.2	7.7	10 200	14 600	1 040	1 480
19	32 $^{0}_{-0.025}$	20	23	27	0.3	22.2	7.7	11 800	18 500	1 200	1 880
	36	22	25	29	0.3	22.2	9.8	12 700	17 600	1 300	1 800
22	42 $^{0}_{-0.025}$	25	29	35	0.3	26.4	10.2	19 500	25 300	1 980	2 580
25	45 $^{0}_{-0.025}$	25	29	37	0.3	26.4	10.2	21 300	29 100	2 170	2 970

Note 1) Allowable minimum chamfer dimension r.
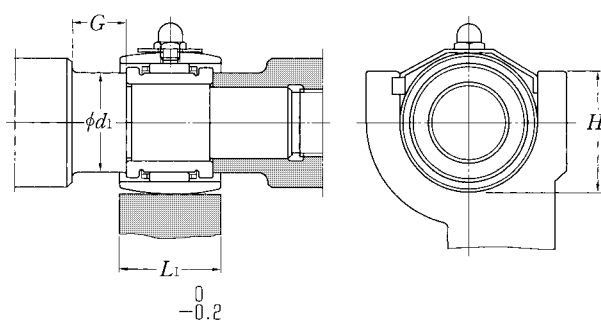
Bearing numbers			Abutment dimensions				Mass
bearing	bearing with saddle		mm				kg
	Type SA	Type SB	L_1	d_1	G	H	bearing with saddle (approx.)
FRIS16.5	FRIS16.5SA	FRIS16.5SB	22	21	13	24～26	0.059
FRIS19	FRIS19SA	FRIS19SB	22	24	15	27～29	0.081
FRIS19-5	FRIS19-5SA	FRIS19-5SB	22	26	15	30～32	0.120
FRIS22-2	FRIS22-2SA	—	26	30	15	35～37	0.208
FRIS25	FRIS25SA	—	26	33	15	37～39	0.226

Type FRIS Series B
(For fine spinning machine/
roving frame)
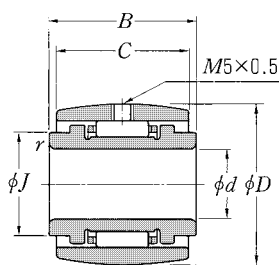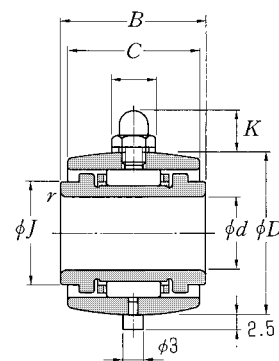
Type FRIS

Type FRIS··NP
(With grease nipple/knock pin) [2]

d　15～25mm

Boundary dimensions								Basic load ratings				Bearing numbers		Mass
			mm					dynamic	static	dynamic	static			(approx.)
								N		kgf				kg
d $^0_{-0.010}$	D		B $^0_{-0.050}$	C $^0_{-0.120}$	J	$r_{\text{s min}}$ [1]	K	C_r	C_{or}	C_r	C_{or}	Type FRIS	Type FRIS··NP	Type FRIS··NP
15	28	$^0_{-0.020}$	24	22	22	0.3	7.7	10 200	14 600	1 040	1 480	FRIS15	—	0.070
15.875	30	$^0_{-0.020}$	25.4	22	22	0.3	7.1	10 200	14 600	1 040	1 480	FRIS15.87	FRIS15.87NP	0.082
16	28	$^0_{-0.020}$	26	22	22	0.3	7.7	10 200	14 600	1 040	1 480	FRIS16	FRIS16NP	0.083
	30		26	22	22	0.3	7.1	10 200	14 600	1 040	1 480	FRIS16-2	FRIS16-2NP	0.098
18	31.750	$^0_{-0.025}$	24	23	24	0.3	7.7	11 800	18 500	1 200	1 880	FRIS18	FRIS18NP	0.083
	32		26	23	24	0.3	7.7	11 800	18 500	1 200	1 880	FRIS18-2	FRIS18-2NP	0.088
19.050	31.750	$^0_{-0.025}$	23.81	23	24	0.3	7.7	11 800	18 500	1 200	1 880	FRIS19.05	—	0.078
	34		25.4	23	26	0.3	7.7	12 700	17 600	1 300	1 800	FRIS19.05-1	FRIS19.05-1NP	0.098
20	34	$^0_{-0.025}$	24	23	26	0.3	7.7	12 700	17 600	1 300	1 800	FRIS20-2	FRIS20-2NP	0.089
	34		26	23	26	0.3	7.7	12 700	17 600	1 300	1 800	—	FRIS20-4NP	0.097
	36		26	23	26	0.3	7.1	12 700	17 600	1 300	1 800	—	FRIS20-7NP	0.125
22	40	$^0_{-0.025}$	26	24	30	0.6	7.1	16 200	22 300	1 650	2 280	FRIS22-1	FRIS22-1NP	0.154
22.225	40	$^0_{-0.025}$	25.4	24	30	0.6	7.1	16 200	22 300	1 650	2 280	FRIS22.22	FRIS22.22NP	0.145
25	42	$^0_{-0.025}$	26	24	32	0.6	7.1	16 000	22 500	1 640	2 290	FRIS25-1	FRIS25-1NP	0.154
	44		26	24	34	0.6	7.1	17 200	25 100	1 750	2 560	FRIS25-2	FRIS25-2NP	0.174

Note 1) Allowable minimum chamfer dimension r.
　　2) Example of bearing with grease nipple: Ex. FRIS 18N
　　　 Bearing with knock pin only: Ex. FRIS 15.87P

Type FR
(Drawing frame)

Type FR

F_W 17.462〜22mm

Boundary dimensions								Basic load ratings				Bearing numbers	Mass
				mm				dynamic	static	dynamic	static		kg
									N		kgf		
F_W	D	C	E	G	H	K	D_1	C_r	C_{or}	C_r	C_{or}		(approx.)
	0 −0.050	0 −0.20											
17.462 +0.053 +0.010	26.5	46	24	31	5	5	26	10 200	16 600	1 040	1 690	**FR17.46P**	0.066
	26.5	47.6	24.6	42.86	4.76	4.76	26	14 400	25 900	1 470	2 640	**FR17.46-1P**	0.075
	26.5	52.38	24.6	42.86	4.76	4.76	26	14 400	25 900	1 470	2 640	**FR17.46-2P**	0.082
	26.988	41.28	24	31	5	5	26.5	10 200	16 600	1 040	1 690	**FR17.46-3P**	0.068
19.050 +0.053 +0.020	31.750	52.38	28	42.86	4.76	4.76	31.2	16 700	25 800	1 700	2 630	**FR19.05P**	0.134
22 +0.053 +0.020	34	46	28	43	4.76	4.76	33.5	23 400	44 000	2 380	4 500	**FR22P**	0.150

Tensioner Pulleys for Textile Machinery

These pulleys are used to guide and tension the tapes and belts driving the spindles of a fine spinning machine, a roving frame, a false twister, etc.

A pulley drawn precisely from steel plate by precision deep drawing is press-fitted in the outer ring of shaft bearing in in place of inner ring.

Types and construction

Single-row or double-row ball bearing is built in this pulley, which is internally prefilled with lithium soap base grease. Grease is replenished through a grease hole which is internally provided in the stud. Two different mounting methods are available as follows for these pulleys; one method is to bolt a pulley to the roller carrier of machine with holder bolt using a special-purposed holder (Type code: **JF‥S**) and another method is to bolt directly a pulley to machine frame using the bolting hole drilled in the stud and a corresponding hexagon head bolt. A knock pin press-fitted in the stud end face is to lock the bolt after tightened.

When a pulley is directly bolted to machine frame, provide the hexagon head bolt center with a grease through-hole for grease replenishing and screw a grease nipple in its end face.

In mounting a double-row ball bearing type tension pulley, insert the stud directly into machine frame and tighten it with nut, without using the special-purposed holder. Replenish grease using the box nut.

Composition of pulley number

The pulley number of a given **NTN** tension pulley consists of a type code (**JPU‥S**), dimension code [pulley outside diameter (D)] and a suffix. A pulley having a special holder is marked with the holder number of that holder added to the suffix.
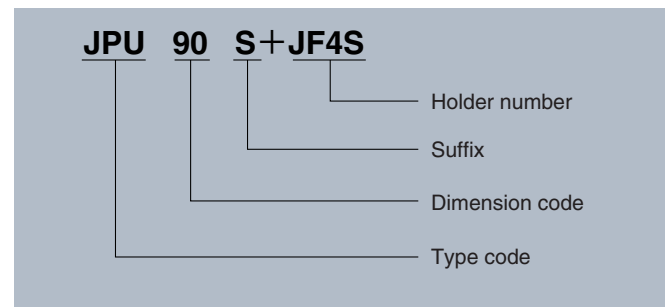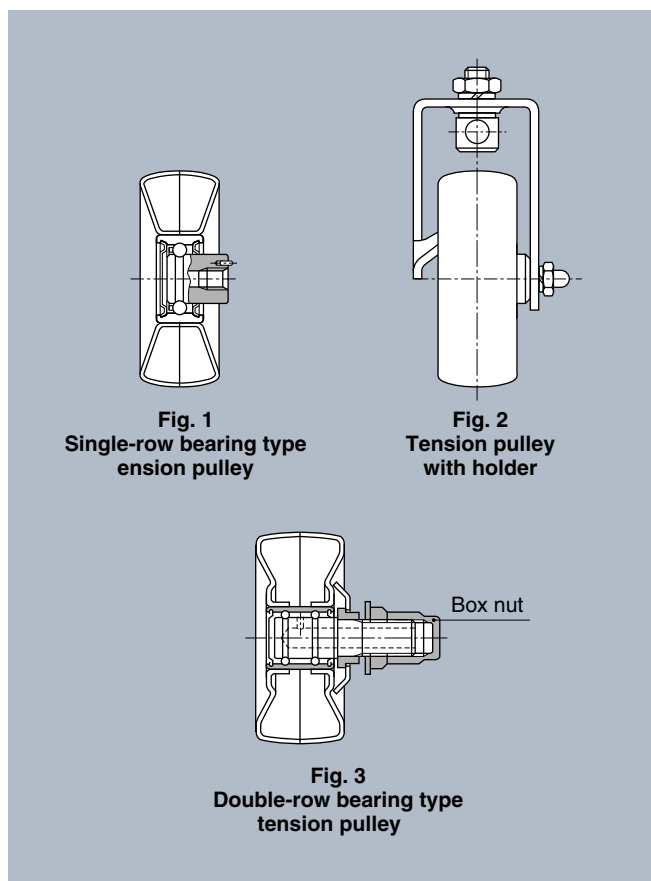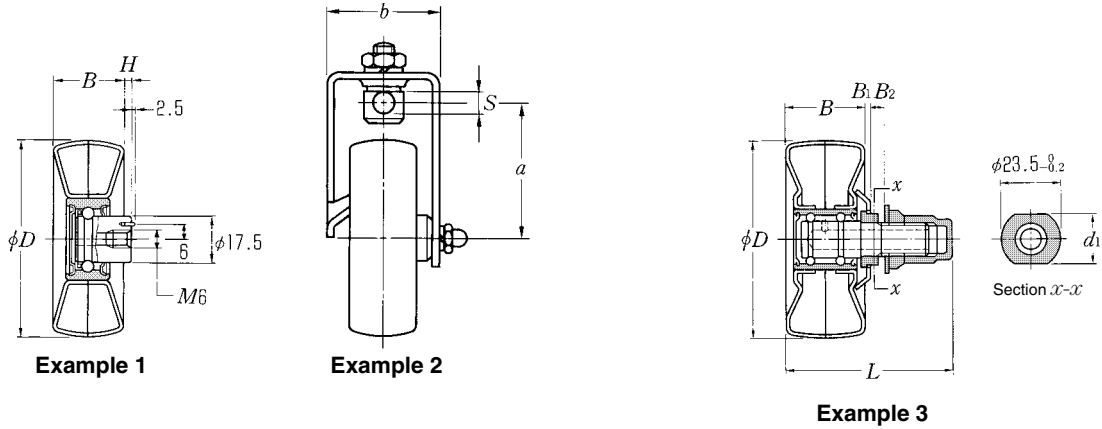
JPU   90   S＋JF4S

Holder number

Suffix

Dimension code

Type code

Fig. 4

Fig. 1
Single-row bearing type ension pulley

Fig. 2
Tension pulley with holder

Box nut

Fig. 3
Double-row bearing type tension pulley

Example 1

Example 2

Example 3

D 60～100mm

Boundary dimensions										Bearing numbers	Sample number	Mass
				mm								kg
D	B	B_1	H	d_1 0 -0.3	a	b	S	L	B_2			(approx.)
60	25	—	3.5	—	—	—	—	—	—	JPU60S	1	0.140
70	25	—	3.5	—	—	—	—	—	—	JPU70S	1	0.160
	25	—	3.5	—	48	39	10.2	—	—	JPU70S＋JF1S	2	0.235
	30	2	—	21	—	—	—	67 ～71	5～9	JPU70-2S	3	0.245
	32	—	—	—	—	—	—	—	—	JPU70-1S	1	0.175
	32	—	—	—	48	46	10.2	—	—	JPU70-1S＋JF2S	2	0.250
90	25	—	3.5	—	—	—	—	—	—	JPU90S	1	0.215
	25	—	3.5	—	58	39	10.2	—	—	JPU90S＋JF3S	2	0.300
	32	—	—	—	—	—	—	—	—	JPU90-1S	1	0.230
	32	—	—	—	58	46	10.2	—	—	JPU90-1S＋JF4S	2	0.320
	32	3.5	—	21	—	—	—	70.5～74.5	5～9	JPU90-9S	3	0.325
	45	3.5	—	21	—	—	—	83.5～87.5	5～9	JPU90-10S	3	0.380
100	32	3.5	—	21	—	—	—	70.5～74.5	5～9	JPU100-14S	3	0.290
	40	3.5	—	21	—	—	—	78.5～82.5	5～9	JPU100-12S	3	0.390