

Flat Roller Cage

FT/FTW...A

IICO Flat Roller Cage is a precision linear motion rolling guide consisting of a high accuracy cage and very precise rollers and features very low sectional height. In this series, both single row type and double row type with a 90° angle are available. The cage material is steel or synthetic resin.

Smooth operation

As the cage precisely guides the rollers, the frictional resistance is very low without stick-slip, and stable linear motion is obtained.

Low noise

Cages made of synthetic resin are also available. This type is most suitable for applications where low noise is required.

Large load rating

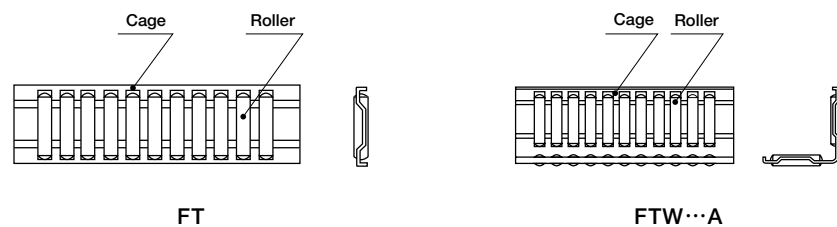
Needle rollers are assembled in a cage with a small pitch distance, so load ratings are large.

Easy handling

The rollers are retained in a cage securely, allowing easy handling and assembly.

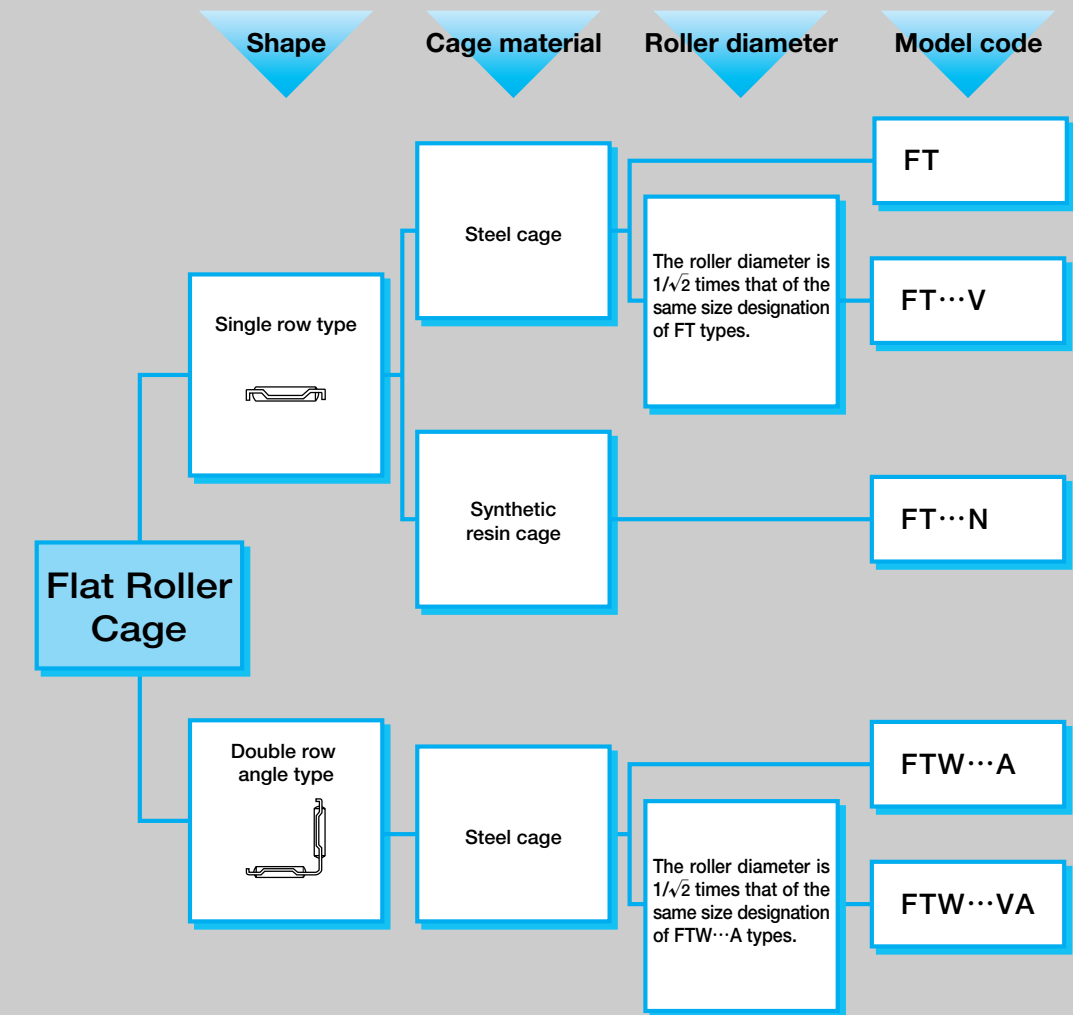
Adaptability to conventional plain guide ways

Single row and double row types are standardized and can be easily used to modify the conventional plain guide ways of machine tools, etc. into rolling guide type without large-scale redesign of the bed.



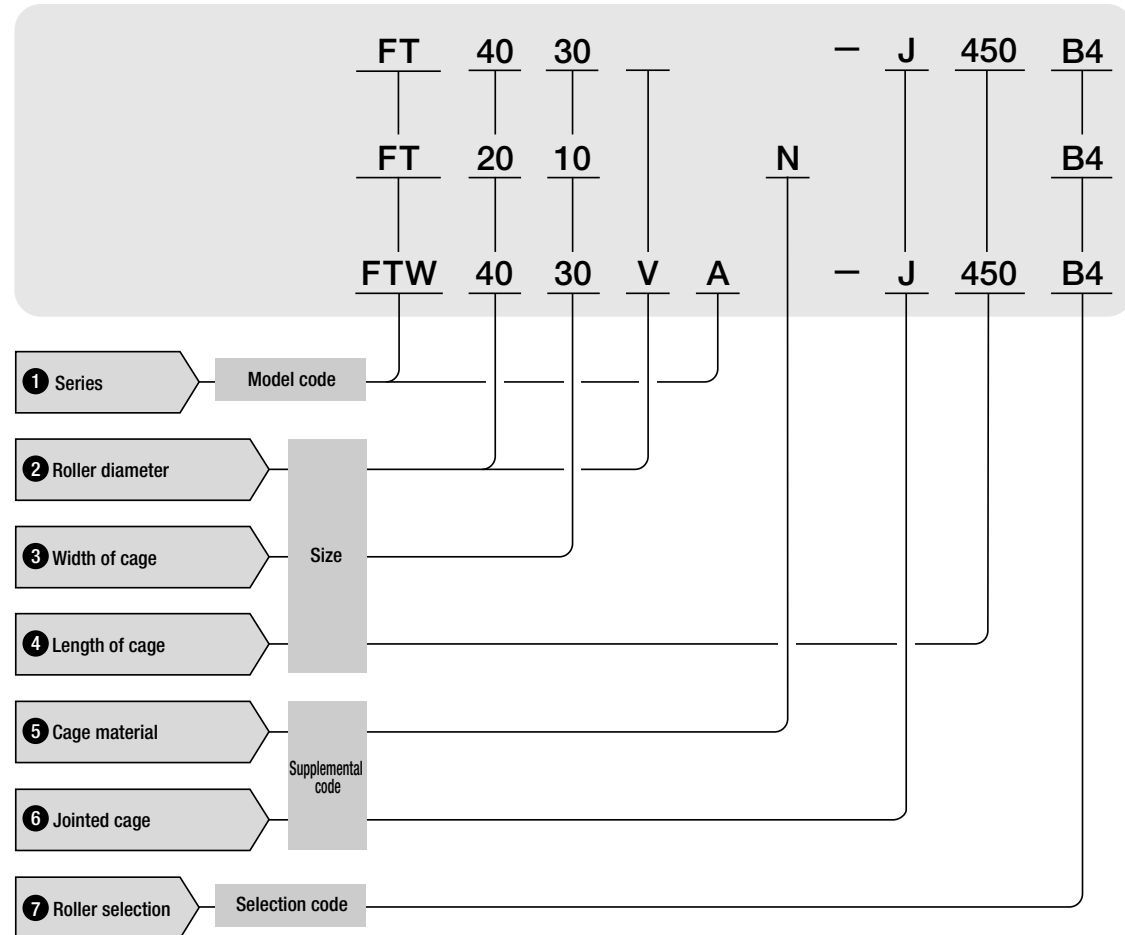
Structure of Flat Roller Cage

Flat Roller Cage series



Identification number and specification

The specification of Flat Roller Cage is indicated by the identification number, consisting of a model code, a size, any supplemental codes and a selection code.



1 Series	Single row : FT Double rows : FTW...A
2 Roller diameter	Indicate a ten-fold numeric value of the roller diameter (mm). When symbol V is attached in the model code, indicate an integer obtained by multiplying the roller diameter(mm) by $10\sqrt{2}$.
3 Width of cage	Indicate the width of cage in mm.

4 Length of cage	Indicate the length of cage in mm.	
5 Cage material	Steel cage : No symbol Synthetic resin cage : N	Specify the material of cage. For applicable models and sizes, see the "model number" column in the table of dimensions on page E-224. The maximum operating temperature for the synthetic resin type is 100°C. Continuous operation is possible at up to 80°C.
6 Jointed cage	Not jointed : No symbol Jointed : J	The overall length of the cage is also indicated. Specify this item when the standard length is exceeded.

Jointed Flat Roller Cages made from steel are available to extend the overall length of a cage. If the jointing specification is required, indicate "J" and the necessary overall length in millimeters in the identification number. Available maximum length of jointed Flat Roller Cage is shown in Table 1. If a longer Flat Roller Cage than the maximum length shown in Table 1 is required, consult **I KO**.

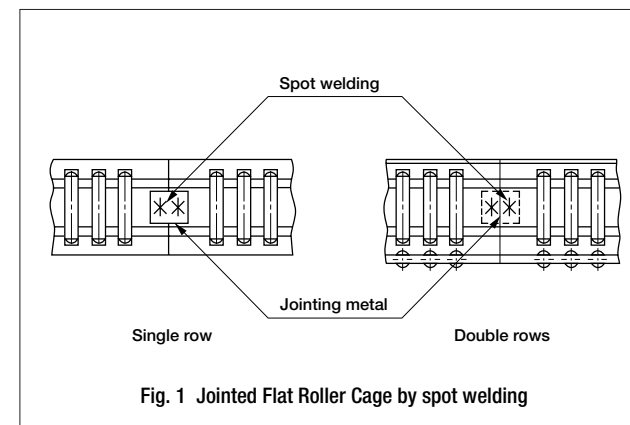


Fig. 1 Jointed Flat Roller Cage by spot welding

Table 1 Maximum length of jointed Flat Roller Cage
unit : mm

Model number	Maximum length of jointed cage
FT 2010	
FT 2515	300
FT 3020	
FT 3525	375
FT 4030	
FT 4035	600
FT 4026 V	
FT 5038	
FT 5043	
FT 5030 V	1 000
FT 10080	
FT 10060 V	
FT 200120	1 500
FT 200100 V	1 000
FTW 4030 VA	600
FTW 5045 A	
FTW 5050 A	1 000
FTW 5035 VA	
FTW 10095 A	
FTW 10070 VA	1 500
FTW 200150 A	
FTW 200120 VA	

7 Roller selection

See Table 2.

Tolerances of the roller diameter of Flat Roller Cage are shown in Table 2. Any standard tolerance class rollers will be supplied unless otherwise specified. For a uniform load distribution, Flat Roller Cages with the same range of roller tolerance (the same selection code) are recommended for assembly. When the particular tolerance ranges are required, add its selection code onto the identification number.

Table 2 Selection classification of rollers unit : μm

Selection classification	Selection code	Tolerance of mean diameter of rollers (1)
Standard	B2	0 ~ -2
	B4	-2 ~ -4
	B6	-4 ~ -6
	B8	-6 ~ -8
Semi-standard	A1	0 ~ -1
	A2	-1 ~ -2
	A3	-2 ~ -3
	A4	-3 ~ -4
	A5	-4 ~ -5
	A6	-5 ~ -6

Note(1) : The out of roundness and cylindricity conform to JIS B 1506 "Rollers for Roller Bearings".

Load Rating

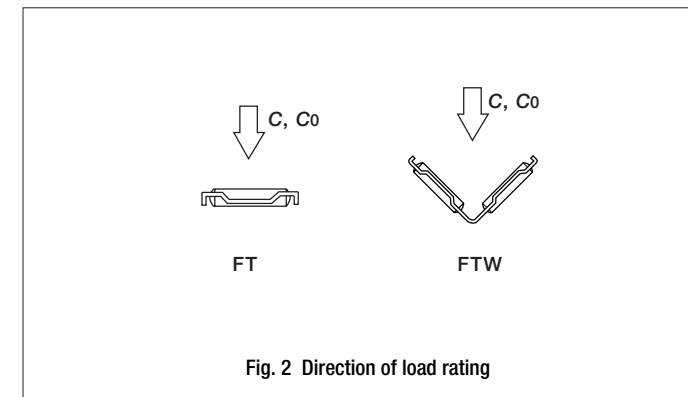
The load ratings of Flat Roller Cage are defined for downward load. Summarized descriptions of load ratings are given below. For details of load rating definitions and load calculations, see "General description".

Basic dynamic load rating C

The basic dynamic load rating is defined as the constant load both in direction and magnitude under which a group of identical Flat Roller Cages are individually operated and 90% of the units in the group can travel 100×10^3 meters free from material damage due to rolling contact fatigue.

Basic static load rating C_0

The basic static load rating is defined as the static load that gives a prescribed constant contact stress at the center of the contact area between the rolling element and raceway receiving the maximum load.



Precautions for Use

1 Mating raceways

Recommended surface hardness and roughness of mating raceways are shown in Table 3, and also recommended minimum effective hardening depth of the raceways is shown in Table 4.

Table 3 Surface hardness and roughness of mating raceways

Item	Recommended value	Remark
Surface hardness	58~64HRC	When the raceway hardness is less than the necessary hardness, multiply load ratings by the hardness factor.
Surface roughness	0.2 μmRa or better (0.8 μmRy or better)	When the required accuracy is not severe, a surface roughness of about 0.8 μmRa (3.2 μmRy) is adequate.

Table 4 Minimum effective hardening depth unit : mm

Roller diameter		Recommended minimum effective hardening depth
over	incl.	
—	3	0.5
3	4	0.8
4	5	1.0
5	8	1.5
8	10	2.0
10	14.142	2.5
14.142	20	3.5

2 For V-Flat configuration where the flat and the 90° angle surfaces are present

Either FT and FTW...VA types or FT...V and FTW...A types are assembled after accurately lapping the raceways of bed and table on each other as shown in Fig. 3. The combinations of Flat Roller Cages are shown in Table 5.

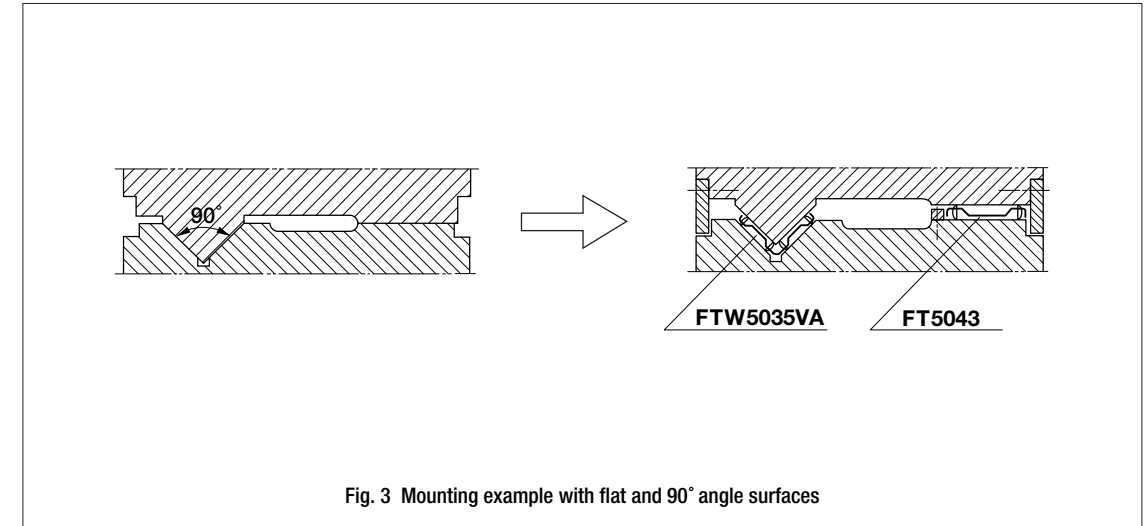


Fig. 3 Mounting example with flat and 90° angle surfaces

Table 5 Combination of Flat Roller Cages unit : mm

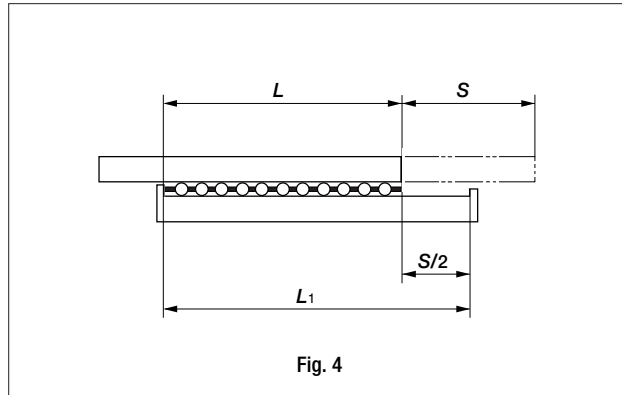
Combination number	For flat surface		For 90° angle surface	
	Model number	Roller diameter D_w	Model number	Roller diameter D_w
1	FT 4030	4	FTW 4030 VA	2.828
2	FT 4035	4	FTW 4030 VA	2.828
3	FT 5038	5	FTW 5035 VA	3.535
4	FT 5043	5	FTW 5035 VA	3.535
5	FT 10060 V	7.071	FTW 5045 A	5
6	FT 10060 V	7.071	FTW 5050 A	5
7	FT 10080	10	FTW 10070 VA	7.071
8	FT 200100 V	14.142	FTW 10095 A	10
9	FT 200120	20	FTW 200120 VA	14.142

③ Stroke length and cage length

When the table or bed is stroked in linear direction, Flat Roller Cage moves 1/2 distance of the stroke length of the table or bed in the same direction as shown in Fig.4. Therefore, the relationship among the raceway length, the stroke length and the cage length is given as in the following formula.

$$L_1 = \frac{S}{2} + L \dots \dots \dots (1)$$

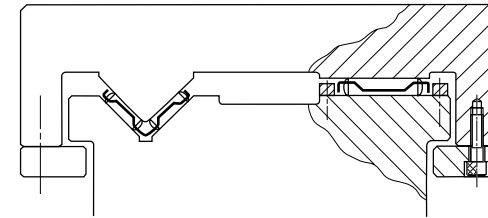
where, L_1 : Raceway length, mm
 S : Stroke length, mm
 L : Cage length, mm



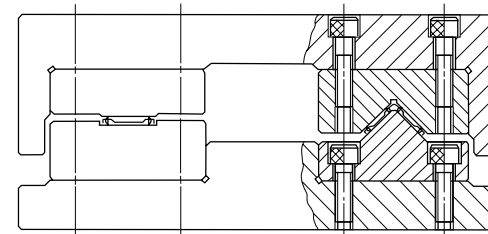
Precautions for Mounting

Flat Roller Cages are generally mounted as shown in Fig. 5. When mounting separate raceways, which are heat-treated and ground, onto the table and bed (See mounting examples 2 and 3 in Fig.5.), be careful not to cause deformation on the raceways by over tightening mounting bolts.

① General mounting



② With separate raceways



③ When overhung load is applied

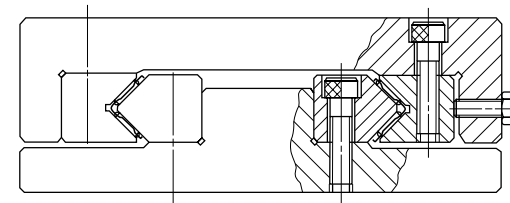
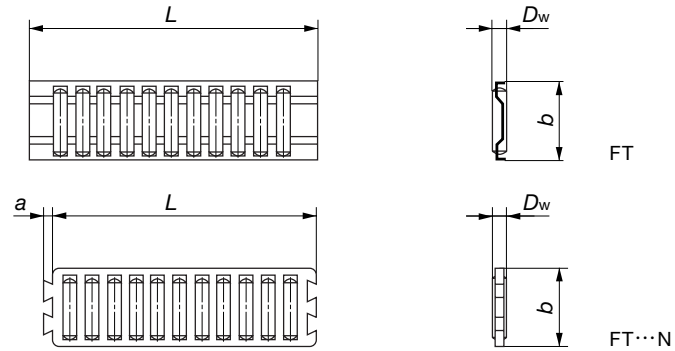


Fig. 5 Mounting examples

IKO Flat Roller Cage

Single row : FT

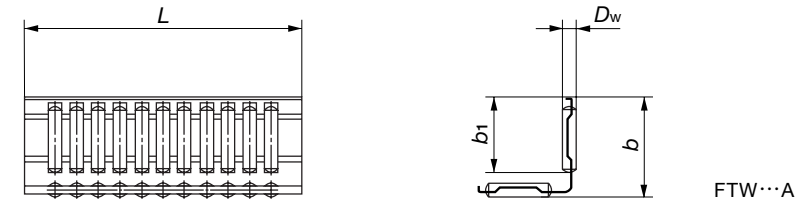


Model number		Mass (Ref.) g	Nominal dimensions mm				Basic dynamic load rating		Basic static load rating Co
Steel cage	Synthetic resin cage		Dw	b	L	a	C	N	
—	FT 2010N	1.63	2	10	32	2	7 650	19 700	
FT 2010 - 32	—	1.91	2	10	32	—	8 560	22 800	
FT 2010 - 100	—	5.8	2	10	100	—	19 500	68 300	
—	FT 2515N	4.3	2.5	15	45	2.5	15 100	40 900	
FT 2515 - 45	—	5.6	2.5	15	45	—	19 200	55 900	
FT 2515 - 100	—	11.6	2.5	15	100	—	32 300	112 000	
—	FT 3020N	9.7	3	20	60	3	27 400	78 300	
FT 3020 - 60	—	12.5	3	20	60	—	32 200	96 100	
—	FT 3525N	18.6	3.5	25	75	3.5	44 300	131 000	
FT 3525 - 75	—	23	3.5	25	75	—	50 300	155 000	
FT 4030 - 150	—	73	4	30	150	—	107 000	380 000	
FT 4035 - 150	—	86	4	35	150	—	120 000	443 000	
FT 4026V - 150	—	45	2.828	26	150	—	81 900	345 000	
FT 5038 - 250	—	195	5	38	250	—	221 000	846 000	
FT 5043 - 250	—	200	5	43	250	—	254 000	1 010 000	
FT 5030V - 250	—	103	3.535	30	250	—	149 000	649 000	
FT 10080 - 500	—	1 610	10	80	500	—	1 130 000	4 340 000	
FT 10060V - 500	—	870	7.071	60	500	—	681 000	2 890 000	
FT 200120 - 500	—	4 940	20	120	500	—	2 540 000	7 620 000	
FT 200100V - 500	—	2 860	14.142	100	500	—	1 700 000	5 780 000	

IKO Flat Roller Cage



Double row : FTW...A



Model number		Mass (Ref.) g	Nominal dimensions mm				Basic dynamic load rating		Basic static load rating Co
Steel cage	Synthetic resin cage		Dw	b	L	b1	C	N	
FTW 4030VA - 150	—	94	2.828	30	150	24.5	107 000	488 000	
FTW 5045A - 250	—	410	5	45	250	35.5	297 000	1 230 000	
FTW 5050A - 250	—	460	5	50	250	40.5	333 000	1 430 000	
FTW 5035VA - 250	—	220	3.535	35	250	29	195 000	917 000	
FTW 10095A - 500	—	3 360	10	95	500	77	1 480 000	6 140 000	
FTW 10070VA - 500	—	1 790	7.071	70	500	56.5	892 000	4 080 000	
FTW 200150A - 500	—	10 200	20	150	500	118	3 330 000	10 800 000	
FTW 200120VA - 500	—	5 940	14.142	120	500	96	2 230 000	8 170 000	

