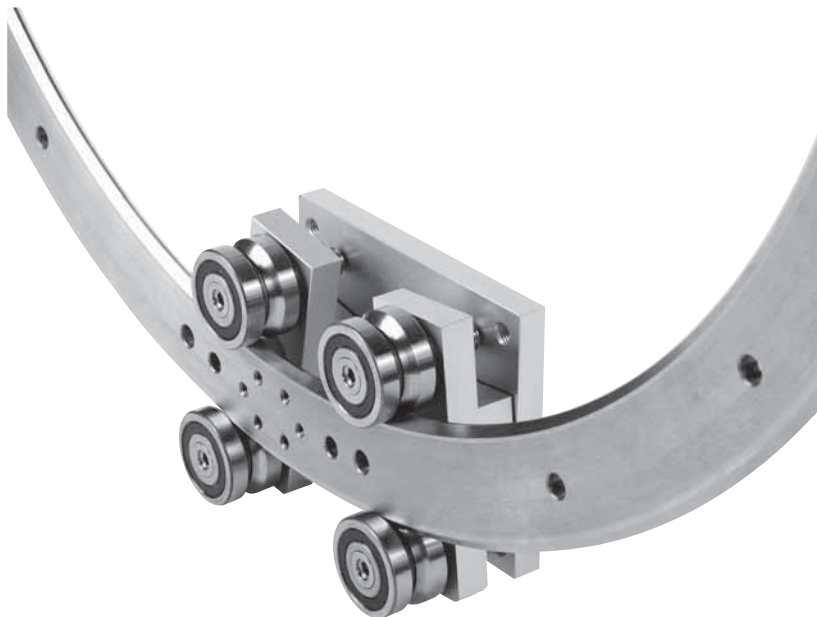


Multi-Motion-Line

FSR System

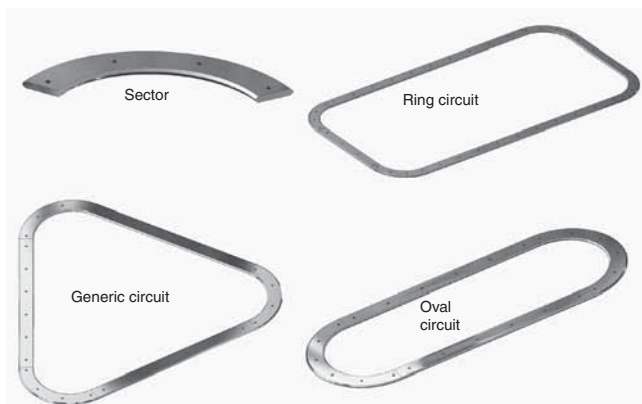


Multi-Motion-Line

Circular systems

Nadella proposes several circular rails based on the FS family of profiles. The rails can be used as an entire circumference, or single sectors, or joined together with straight pieces of rail in order to obtain oval or ring circuits.

Guide



The rails are steel, induction hardened on the raceways, with the same section dimensions as straight FS..M rails. In the circuits the rails are joined together with alignment blocks that allow easy precise mounting.

All the pieces of the circuit are supplied appropriately marked in order to avoid mistakes during joining.

For protection against corrosion Nadella proposes nickel plating (option NW) for both straight and circular pieces.

In addition to the standard dimensions in the table it is possible to realize rings with different sections or radii in order to satisfy specific demands.

Guide rollers

Any guide rollers of the FS family of products can be used in combination with the circular rails.

Carriage

Carriages for circular rails can be realized with guide rollers in fixed position or mounted on steering arms.

Carriages with guide rollers in fixed positions

You can set up the distance between the centres of the guide rollers of a carriage with fixed guide rollers in order to obtain clearance-free running both on the straight and on the circular stretch of a circuit. The resulting carriage, normally a simple table with four holes for the housing of the guide rollers, will be simple and compact; there are, however, some contraindications:

- In the passage from the straight stretch to the circular one (and vice versa), when two guide rollers are engaged on the straight portion and two on the circular one, there will be clearance between the carriage and

the rail. The extent of the clearance depends on the dimensions of the rail, of the roller guides and of the carriage. Because of this clearance it is not possible to have an accurate positioning of the carriage during the passage between straight and circular stretch and therefore, in fast application, there will be vibration, noise and overload of the roller guides.

- This kind of carriages, with fixed guide rollers, can be used only for a single specific radius throughout the circuit. To use a carriage with fixed guide roller positions you can't have circular stretches with different radii.

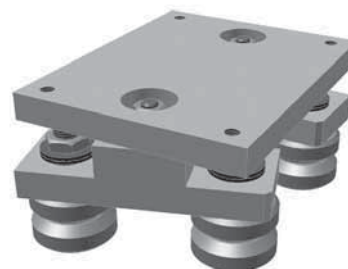
To define the design for holes of the fixed rollers please contact the Nadella Technical Service.



Steering Carriages

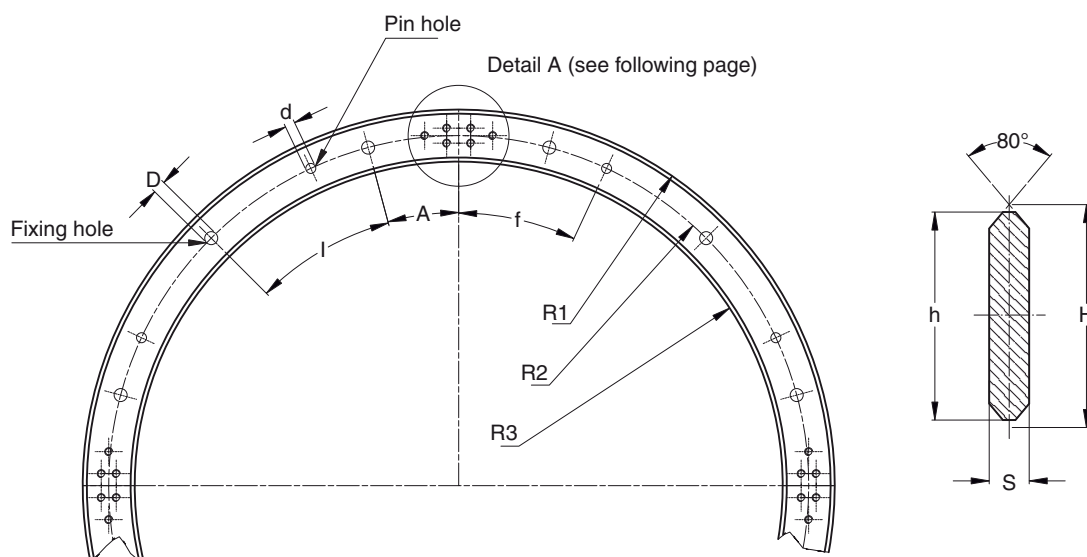
The contraindications for the carriage with guide rollers in fixed positions can be resolved by using the steering carriage. Guide rollers are mounted in pairs on steering arms that are free to rotate in order to always be transversal to the rail in every point of the circuit. The carriage won't have clearance at any point in the circuit improving transition area accuracy and reduce running noise.

The studs of the steering carriage are fitted with needle bearings and seals for lubricant retention and protection. The tightening of the stud is obtained by the full tightening of the nut, and guarantees the best locking.



Multi-Motion-Line

Circular rails FSR..M



Type	A	I	f	d H7	D	R1*	R2*	R3*	n° fixing holes/360°	n° pin holes/360°	h	H	S
FSR22M-075	22.5°	45°	45	5	6.5	88	75	62	8	4	26	27.86	5
FSR22M-125	15°	30°	25°	5	6.5	138	125	112	12	8	26	27.86	5
FSR22M-175	15°	30°	25°	5	6.5	188	175	162	12	8	26	27.86	5
FSR35M-225	11.25°	22.5°	7.5°	8	9	248	225	202	16	8	46	47.86	8
FSR35M-300	11.25°	22.5°	7.5°	8	9	323	300	277	16	8	46	47.86	8
FSR47M-400	9°	18°	18°	10	11.5	438	400	362	20	8	76	78.58	10
FSR47M-500	9°	18°	18°	10	11.5	538	500	462	20	8	76	78.58	10

* R1, R2, R3 are radius

Rails finishing

- steel
- induction hardened on the raceways

Hole layout

- holes according to catalogue (**SB**)
- finishes to drawing (**NZ**)

Optional features

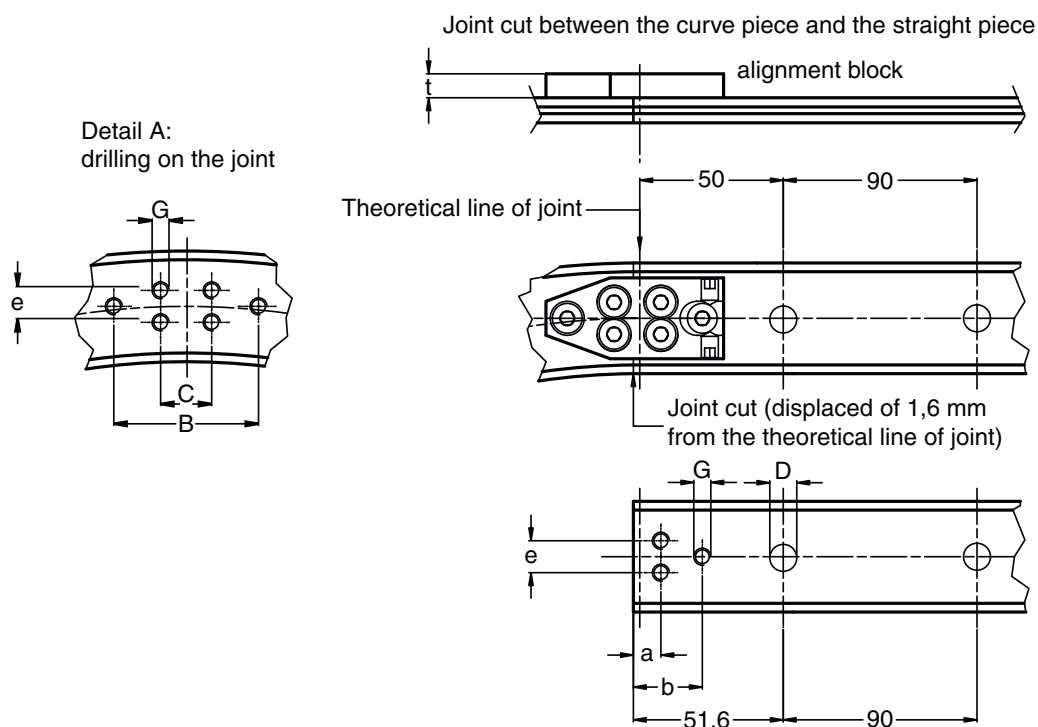
- stainless steel (**NX**)
- nickel plating (**NW**)
- spacers for rails **FS** (page 58)

Example of standard designation: **FSR35M-225-180**

Circular rail sector FSR35M, radius R2 225 mm, sector angle 180°

Multi-Motion-Line

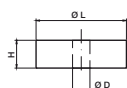
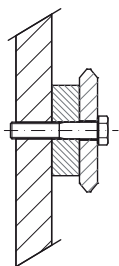
Alignment blocks for FSR



Type	Dimensions (mm)								Suggested combination
	C	B	e	G	D	a	b	t	
FSR22M-075	12	34	7.5	M4	6.5	7.6	18.6	5.8	FR22EU FRN22EI
FSR22M-125	12	34	7.5	M4	6.5	7.6	18.6	5.8	FR22EU FRN22EI
FSR22M-175	12	34	7.5	M4	6.5	7.6	18.6	5.8	FR22EU FRN22EI
FSR35M-225	18	38	20	M6	9	10.6	19.6	6	FR32EU FRN32EI FR40EU FRN40EI
FSR35M-300	18	38	20	M6	9	10.6	19.6	6	FR32EU FRN32EI FR40EU FRN40EI
FSR47M-400	18	58	43	M6	11.5	8.6	18.1	9	FR40EU FRN40EI FR52EU RKY52
FSR47M-500	18	58	43	M6	11.5	8.6	18.1	9	FR40EU FRN40EI FR52EU RKY52

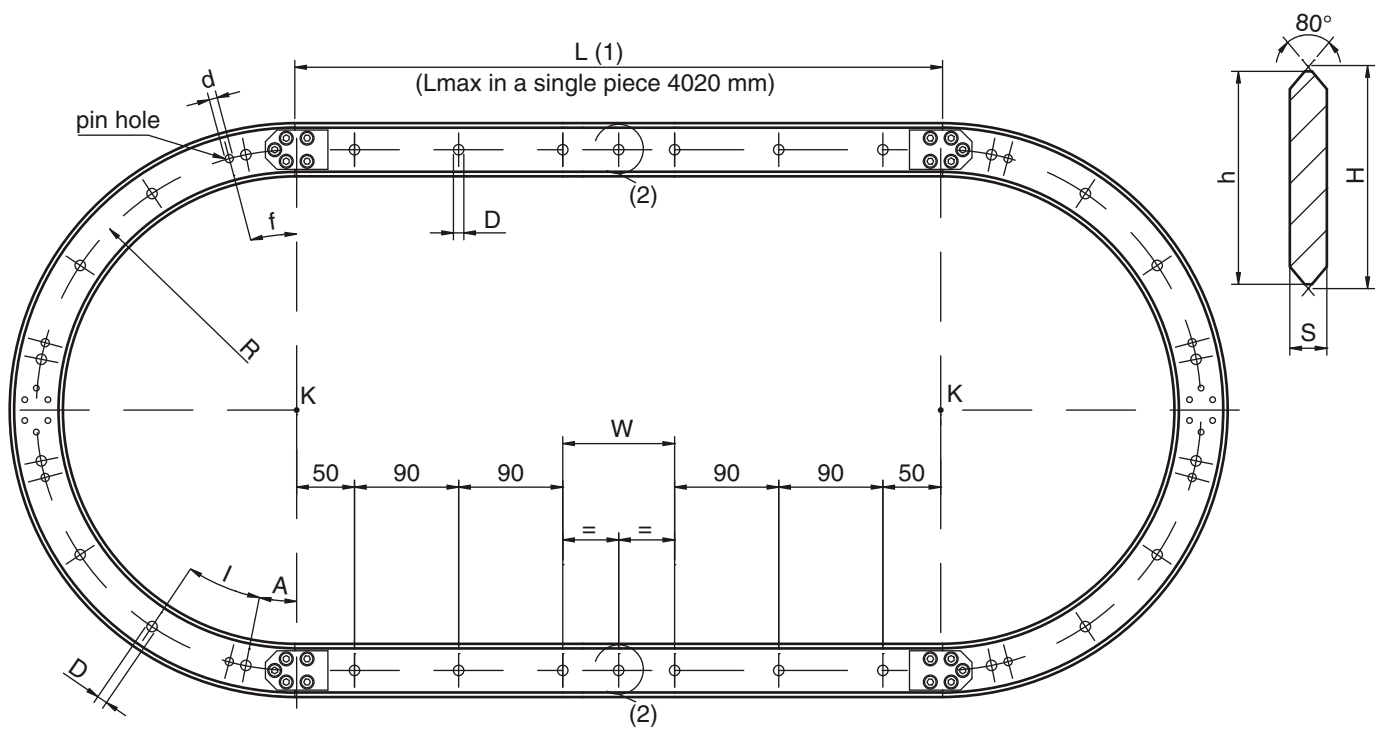
The joint cut is displaced of 1.6 mm from the theoretical line of joint.
The alignment block allows an easy mounting of the joint.

Spacers for FSR



Spacers **DIST FS** can be used to mount the rails FSR (pag. 60)

Oval circuit FSRO



Type	Dimensions (mm)								
	Radius R	D	A	I	d H7	f	S	h	H
FSRO22M-075-...	75	6.5	22.5°	45°	5	45°	5	26	27.86
FSRO22M-125-...	125	6.5	15°	30°	5	25°	5	26	27.86
FSRO22M-175-...	175	6.5	15°	30°	5	25°	5	26	27.86
FSRO35M-225-...	225	9	11.25°	22.5°	8	7.5°	8	46	47.86
FSRO35M-300-...	300	9	11.25°	22.5°	8	7.5°	8	46	47.86
FSRO47M-400-...	400	11.5	9°	18°	10	18°	10	76	78.58
FSRO47M-500-...	500	11.5	9°	18°	10	18°	10	76	78.58

The oval circuit is composed by: two sectors of circular rails (180° with center in K) and two straight pieces of rails. The circuit is supplied complete of alignment blocks (with the proper screws), and all the pieces are marked in order to obtain the correct sequence during the mounting.

(1) The length of the straight pieces is higher than the distance between the centers K (1.6 mm x 2) in order to cover the thickness of rail lost during the cutting of the circular sectors (for more details about joints see page 68).

- Standard hole layout (SB) for the straight rails:**
- first and last hole of 50 mm, starting from the centers K;
 - hole pitch 90 mm;
 - central hole (2) only if the last hole pitch W is higher than 120 mm;
 - W can't be less than 60 mm.

- Rails finishing**
- for the circular rail see page 67
 - for the straight rail see page 49

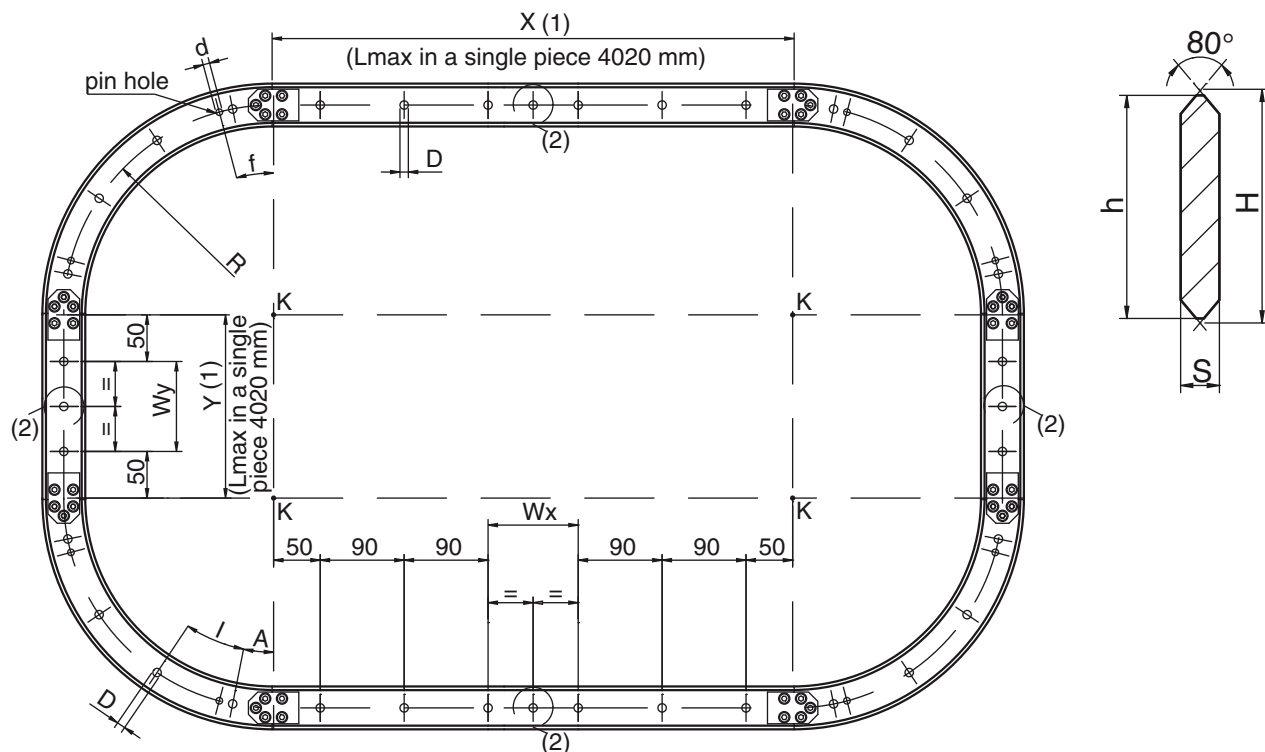
- Hole layout**
- standard holes according to catalogue (SB)
 - finishes to drawing (NZ)

- Optional features**
- stainless steel (NX)
 - nickel plating (NW)

Example of standard designation: **FSRO35M-225-2000 SB**
 Oval circuit, size 35, radius 225 mm, distance between the centers K equal to 2000 mm (1), standard holes.

Multi-Motion-Line

Ring circuit FSRQ



Type	Dimensions (mm)								
	Radius R	D	A	I	d H7	f	S	h	H
FSRQ22M-075-...	75	6.5	22.5°	45°	5	45°	5	26	27.86
FSRQ22M-125-...	125	6.5	15°	30°	5	25°	5	26	27.86
FSRQ22M-175-...	175	6.5	15°	30°	5	25°	5	26	27.86
FSRQ35M-225-...	225	9	11.25°	22.5°	8	7.5°	8	46	47.86
FSRQ35M-300-...	300	9	11.25°	22.5°	8	7.5°	8	46	47.86
FSRQ47M-400-...	400	11.5	9° 55'	18°	10	18°	10	76	78.58
FSRQ47M-500-...	500	11.5	9°	18°	10	18°	10	76	78.58

The ring circuit is composed by: four sectors of circular rails (90° with center in K) and four straight pieces of rails. The circuit is supplied complete of alignment blocks (with the proper screws), and all the pieces are marked in order to obtain the correct sequence during the mounting.

(1) The length of the straight pieces is higher than the distance between the centers K (1,6 mm x 2) in order to cover the thickness of rail lost during the cutting of the circular sectors (for more details about joints see page 68).

Standard hole layout (SB) for the straight rails:

- first and last hole at 50 mm, starting from the centers K;
- hole pitch 90 mm;
- central hole (2) only if the last hole pitch (Wx in horizontal and Wy in vertical) is higher than 120 mm;
- Wx and Wy can't be less than 60 mm.

Rails finishing

- for the circular rail see page 67
- for the straight rail see page 49

Hole layout

- standard holes according to catalogue (SB)
- finishes to drawing (NZ)

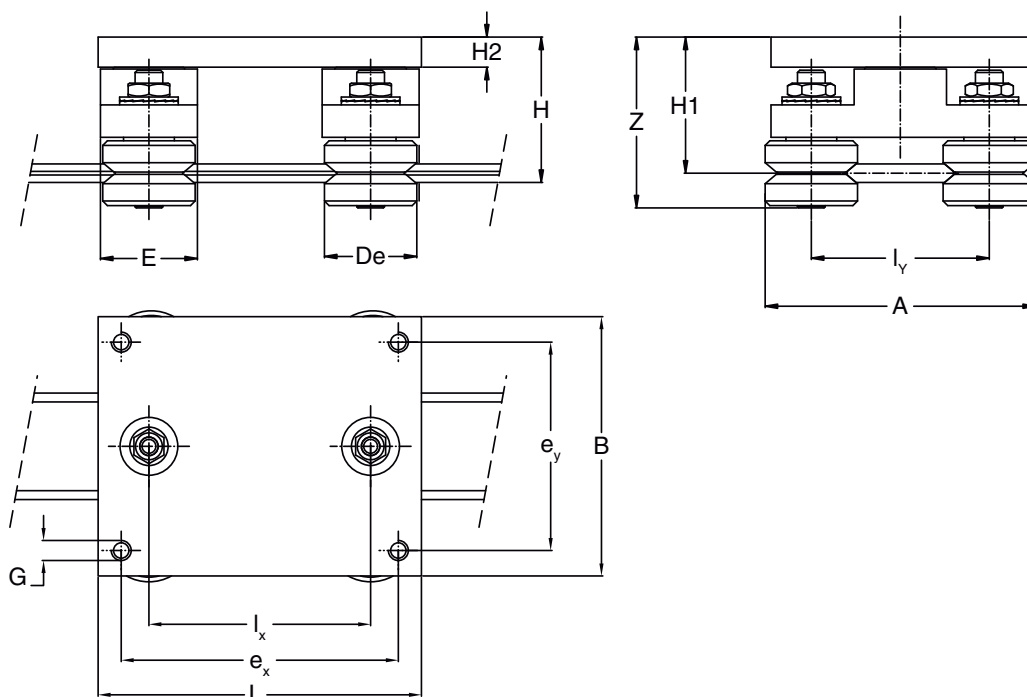
Optional features

- stainless steel (NX)
- nickel plating (NW)

Example of standard designation: **FSRQ35M-225-2000-1000 SB**
Ring circuit, size 35, radius 225 mm, horizontal distance between the centers K equal to 2000 mm (1), vertical distance between the centers K equal to 1000 mm (1), standard holes.

Multi-Motion-Line

Steering carriage T4R...



Type	Dimensions (mm)														Weight (kg)	Suggested combination
	De	L	B	ex	ey	Ix	Iy	H	H1	H2	G	A	E	Z		
T4R22 FR22EU 80 T4R22 FRN22EI 80	22	80	62	68	50	50	43.3	45.5	43	12	M5	65.3	27	51.6 53.6	0.5	FSR 22 M FS 22 M
T4R35 FR32EU 140 T4R35 FRN32EI 140	32	140	112	120	90	96	71.5	59.9	55.9	13	M8	103.5	42	66.2 69.3	1.1	FSR 35 M FS 35 M
T4R35 FR40EU 140 T4R35 FRN40EI 140	40	140	112	120	90	96	77	62.8	58.8	13	M8	117	42	72.8 74.3	1.6	FSR 35 M FS 35 M
T4R47 FR40EU 180 T4R47 FRN40EI 180	40	180	160	150	130	120	107.8	74.3	69.3	19	M10	147.8	56	83.3 84.8	2.4	FSR 47 M FS 47 M
T4R47 FR52EU 180 T4R47 RKY52 180	52	180	160	150	130	120	116.8	78.6	73.6	19	M10	168.8	56	90.3 94.8	3.3	FSR 47 M FS 47 M

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Mounting example

Assembly line
Multi-Motion-Line

