

IKO

Precision Positioning Table

TSMK

CAT-5772



● Structure and Features

④ Precision Positioning Table TSMK incorporates an ④ Linear Way FH series which has a wide track rail as a base axis and can support a large moment load. A rolled ball screw, a motor bracket, an end plate and a table are the minimum necessary parts for the positioning system, and they are assembled compactly on the Linear Way to achieve a simple structure and low cost. Variety of optional items such as a sensor, bellows, an

aluminum base are also available. TSMK series are suitable for the positioning mechanism of assembling machines, metal working machines, inspection instruments, transfer machines, etc.

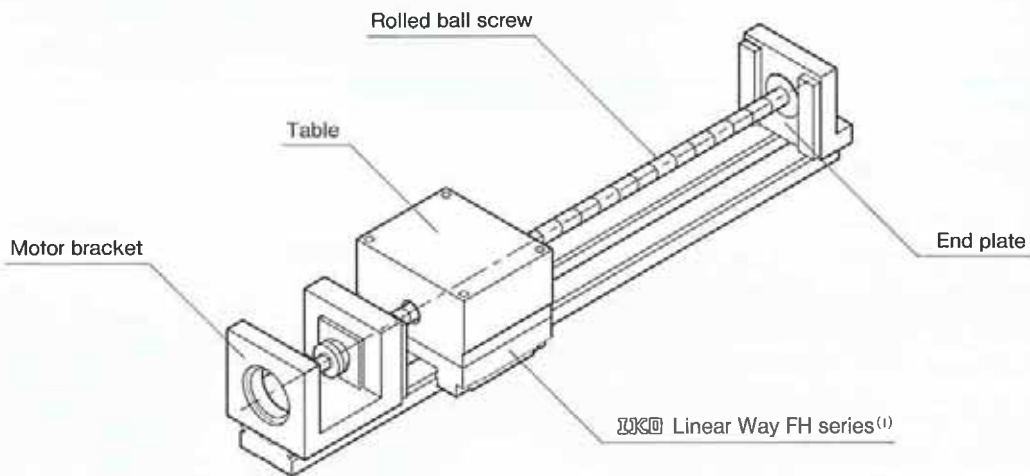


Fig. 1 Basic structure of TSMK

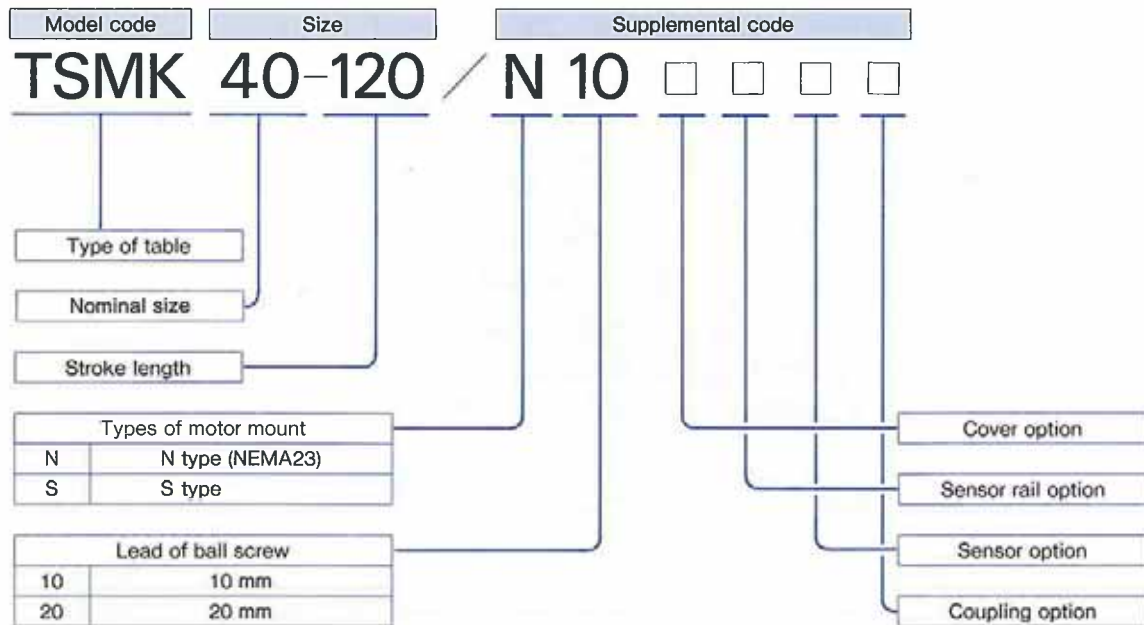
Note⁽¹⁾ : Features, accuracies and mounting bolt tightening torque of ④ Linear Way FH series are shown on page 10.

● Identification Number

Identification number of TSMK consists of a model code, a size and any supplemental codes. An example is shown on the next page.

When several optional items are required, attach supplemental codes to the end of identification number. When optional items are not required, supplemental codes are not necessary. As to the details of each optional item, please refer to page 2.

Example of identification number



Cover option (see page 3 for details)	
0	None
1	With bellows
2	With bellows and motor bracket cover
3	With aluminum base
4	With aluminum base and end cap
5	With aluminum base, end cap and motor cap

Sensor rail option (see page 5 for details)	
0	None
1	Sensor rail (Attach one rail at right side)
2	Sensor rail (Attach one rail at left side)
3	Sensor rail (Attach two rails, one to each side)

Sensor option (see page 6 for details)	
0	None
1	Normally open : One piece
2	Normally closed : One piece
3	Normally closed : Two pieces
4	Normally closed : Three pieces
5	Normally open : One piece, Normally closed : Two pieces (Standard specification)
6	Normally open : Two pieces, Normally closed : Two pieces
7	Normally open : One piece, Normally closed : Three pieces
8	Normally closed : Four pieces

Coupling option (see page 6 for details)	
0	None
1	Motor shaft diameter : ϕ 6.35 mm
2	Motor shaft diameter : ϕ 6 mm

Caution in ordering : If the cover option 3, 4 or 5 is selected, the sensor rail option 0 should be selected
 When the supplemental code N for motor mount option is selected, the supplemental code of coupling option should be 1. (In case of S, supplemental code of coupling option should be 2.)

1 kgf = 9.807N = 2.2046 lbs.
 1 mm = 0.03937 inch

● Specifications of Optional Items

Variety of optional items shown as follows can be specified by attaching the supplemental codes to the end of identification number.

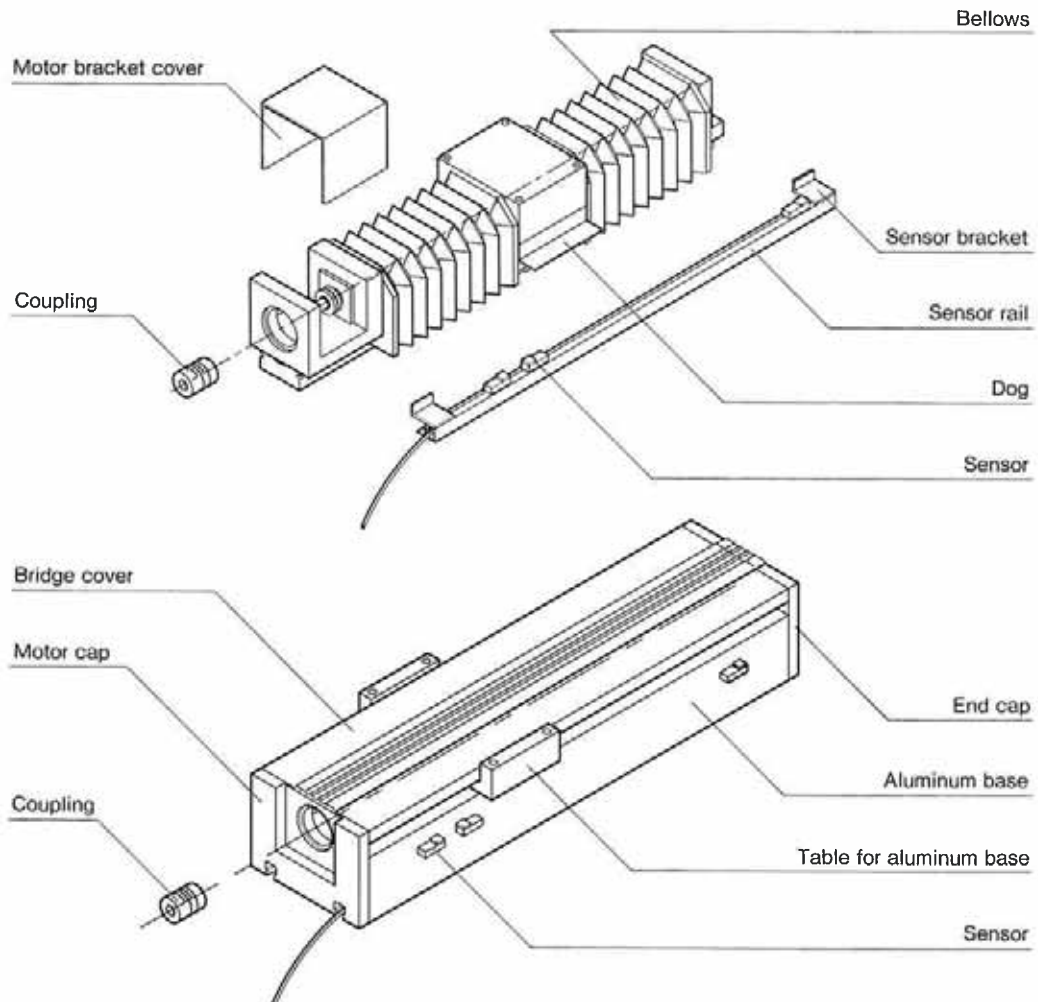


Fig. 2 Optional items of TSMK

Cover option

Tables with bellows or with an aluminum base shown in Table 2 can be specified as options.

Table 1 Stroke lengths of TSMK with bellows

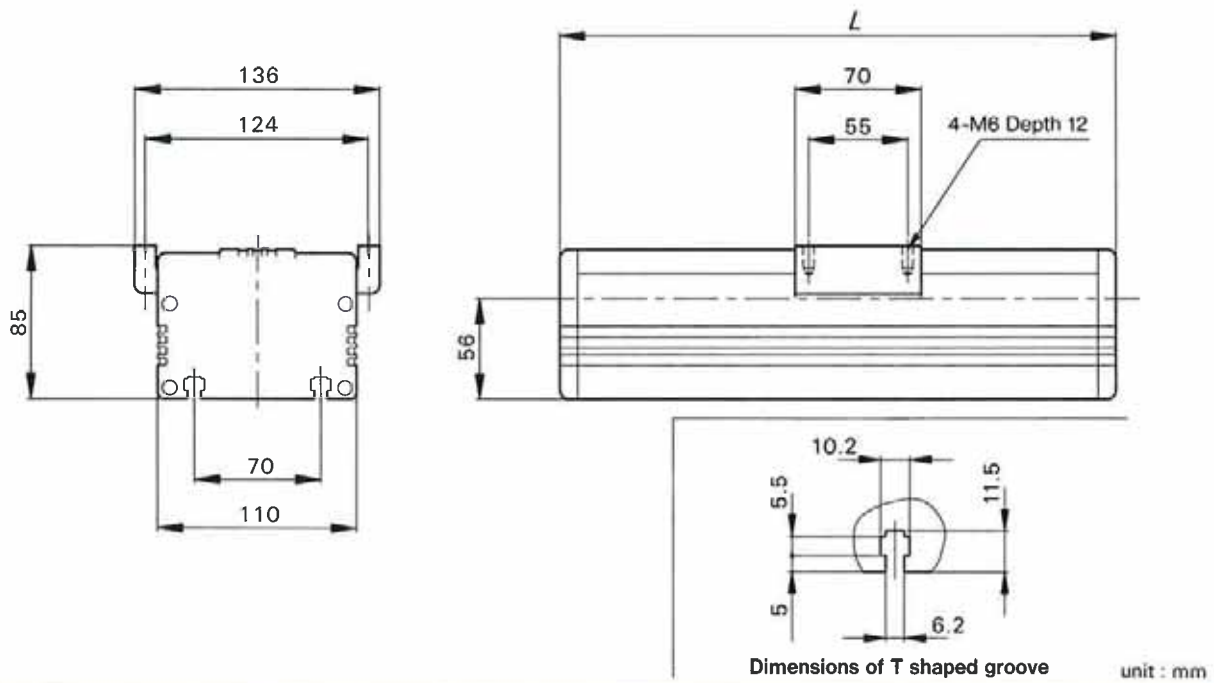
unit : mm

Model number	Standard	With bellows
TSMK40-120	120	80
TSMK40-240	240	170
TSMK40-360	360	260
TSMK40-480	480	350
TSMK40-600	600	440
TSMK40-720	720	530
TSMK40-840	840	620
TSMK40-960	960	710

Table 2 Types of cover option

Cover option		Description
Option No.1	With bellows	Bellows are very useful for protecting the table from dust and other harmful foreign matters. In case of bellows specification, the stroke length of the table will be shorter (refer to Table 1). When mounting the table, remove the fixing bolts of bellows at their ends temporarily and then fix the table by the table mounting bolts.
Option No.2	With bellows and motor bracket cover	In addition to the specification of option No.1, a motor bracket cover is attached. The motor bracket cover is a steel cover provided for safety.
Option No.3	With aluminum base	TSMK is assembled on an aluminum base to increase the rigidity. A bridge cover can prevent dust and other foreign matters from intruding into the inside of the table.
Option No.4	With aluminum base and end cap	In addition to the specification of option No.3, an end cap is attached to the side plate at the opposite side of motor.
Option No.5	With aluminum base, end cap and motor cap	In addition to the specification of option No.4, a motor cap is attached to the side plate at the motor side. The dimensions of this option are shown in Table 3.

Table 3 Dimensions of TSMK with aluminum base (with end cap and motor cap)



Model number	Stroke length (mm)	Overall length L (mm)	Table weight (Ref.) (kgf)
TSMK40-120	120	330	5.7
TSMK40-240	240	450	6.4
TSMK40-360	360	570	7.0
TSMK40-480	480	690	7.6
TSMK40-600	600	810	8.3
TSMK40-720	720	930	8.9
TSMK40-840	840	1050	9.5
TSMK40-960	960	1170	10.2

1 kgf = 9.807N = 2.2046 lbs.
1 mm = 0.03937 inch

Sensor rail option

Sensor rails can be attached to the table as an option. Positions of sensor rails can be specified by adding a supplemental code to the identification number. The right or left side from the view of the opposite motor side or both sides can be chosen. In case of sensor rail option, a dog which is able to detect the position is attached. When the aluminum base option is specified, the sensor rail option is not required because the sensor rail is attached inside the aluminum base. The dimensions of the table with sensor rails are shown in Fig. 3, and the dimensions of sensor rails are shown in Fig. 4.

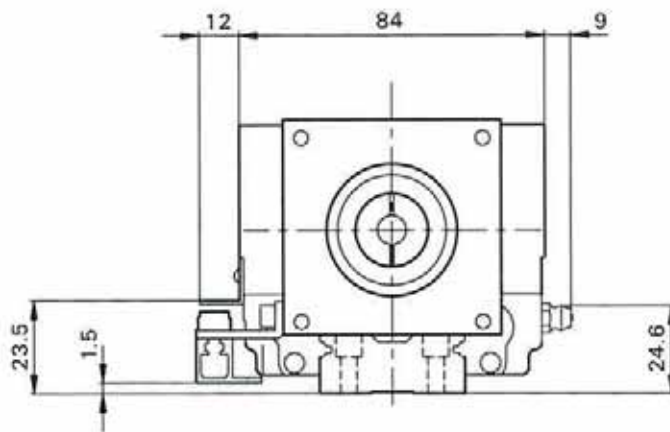


Fig. 3 Dimensions of TSMK with sensor rail

unit : mm

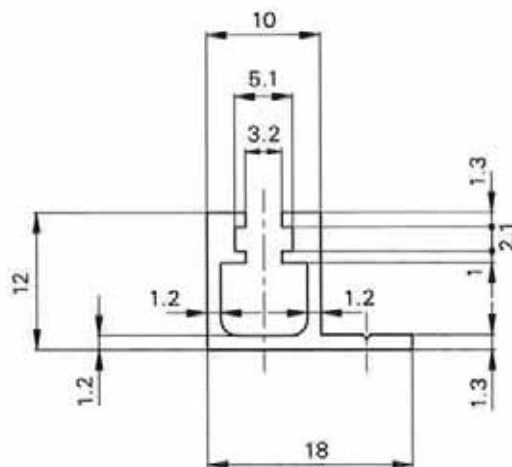


Fig. 4 Dimensions of sensor rail (Sectional view)

unit : mm

Sensor option

The types and numbers of sensors which are attached to the sensor rail can be selected by a supplemental code. The sensor can be fixed at any position on the sensor rail. When the sensor rail option is not specified, only sensors will be delivered. The specifications of the sensors are shown in Table 4.

Table 4 Specifications of sensor

Item \ Type	Normally open	Normally closed
Type	GXL-8F Manufactured by SUNX LTD.	GXL-8FB Manufactured by SUNX LTD.
Classification	Proximity sensor	
Supply voltage	DC12~24V ±10%	
Current consumption	15mA	
Output	Open collector ● Maximum input current : 100mA ● Applied voltage : DC30V or less ● Residual voltage : 1.0V or less at input current 100mA : 0.4V or less at input current 18mA	
Actuation	On : When approaching	Off : When approaching
Indicator	On : When LED (red) is lighted	
Circuit diagram		

Coupling option

A suitable coupling can be selected according to the diameter of the motor shaft and it is specified by a supplemental code.

● Load Rating and Maximum Moment

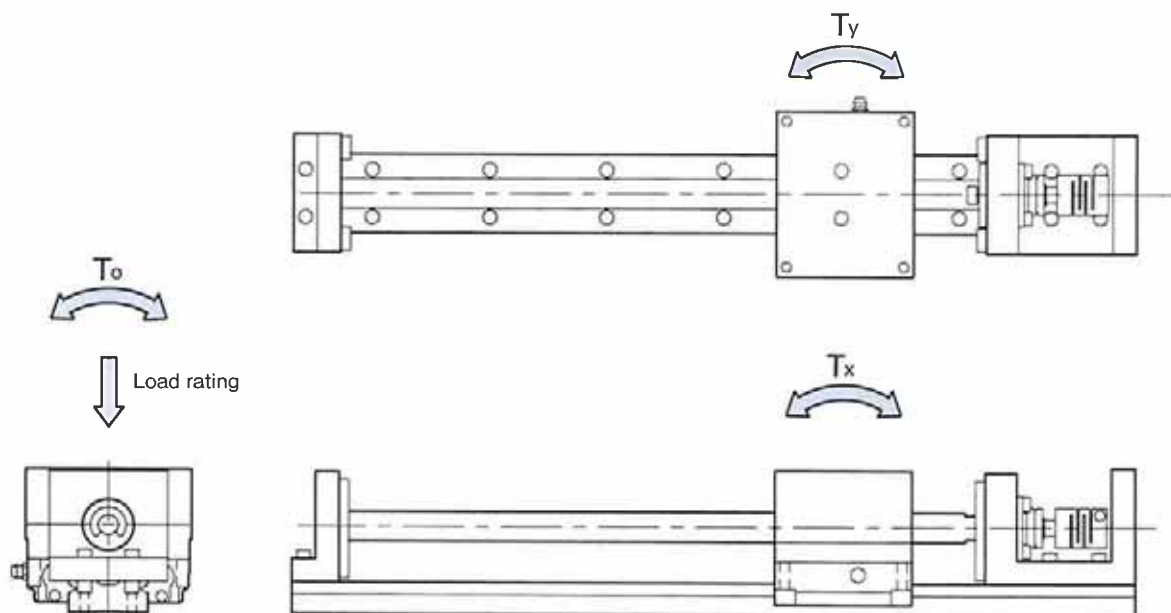
Load rating is the maximum weight that can be supported by TSMK. When TSMK is used under the rated load, accuracies may, in some cases, be outside the range shown in the catalog. The accuracy guaranteed load is one half of the load rating. The maximum moment is the maximum static moment under which the table can be used without any trouble in its function and performance.

① Basic dynamic load rating is that of the Linear Way and is used for calculating the life of Linear Way assembled in TSMK. For example, when TSMK40-840 is used under the following conditions, the life of Linear Way of TSMK will be approx. 5,500,000 hours based on the life calculation of Linear Way LWFH 40.

- ◆ Applied load : 20 kgf
- ◆ Stroke length : 830 mm
- ◆ Number of strokes per minute : 15 cpm

② Basic static load rating is that of the Linear Way FH series, and gives a measure of static load that can be applied on the Linear Way.

Table 5 Load rating and maximum moment



Model number	Load rating (kgf)	Maximum moment (kgf·m)			Basic dynamic load rating C (kgf)	Basic static load rating Co (kgf)
		Tx	Ty	To		
TSMK40-***	20	3.3	1.2	1.1	1100	1750

● Characteristics of TSMK

The characteristics of the standard TSMK are shown in Table 6.

Table 6 Characteristics of TSMK

Model number	Table weight (Ref.) (kgf)	Inertia GD ² of moving parts (kgf·cm ²)	Starting torque (kgf·cm)	Repeatability (mm)	Backlash (max.) (mm)
TSMK40-120	3.9	0.41	0.6	±0.05	0.05
TSMK40-240	4.6	0.60			
TSMK40-360	5.3	0.79			
TSMK40-480	6.0	0.97			
TSMK40-600	6.7	1.16			
TSMK40-720	7.4	1.34			
TSMK40-840	8.1	1.53			
TSMK40-960	8.8	1.72			

Remark : The table weight does not include the weight of optional items. The inertia GD² and starting torque are for cases not including the coupling and the applied load.

● Motor Bracket

YUKI can supply two types of motor brackets shown in Fig. 5 according to motor types. Select a suitable motor bracket and specify by the supplemental code.

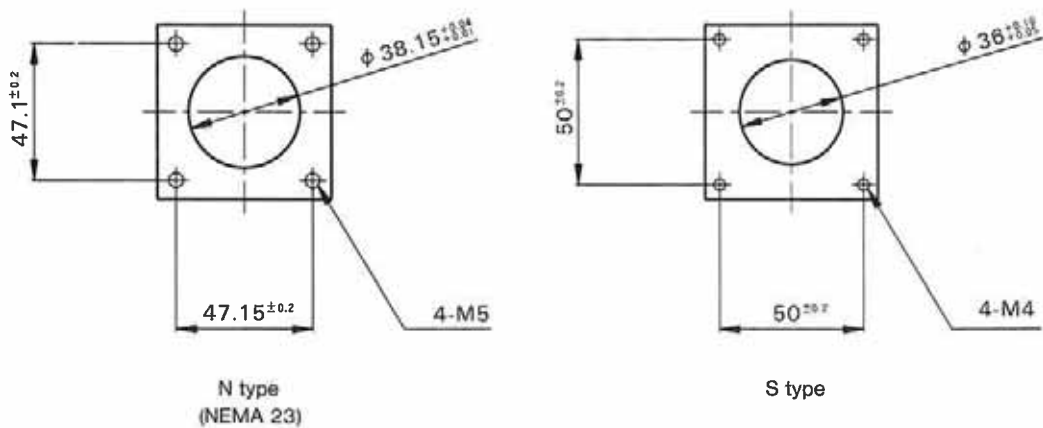
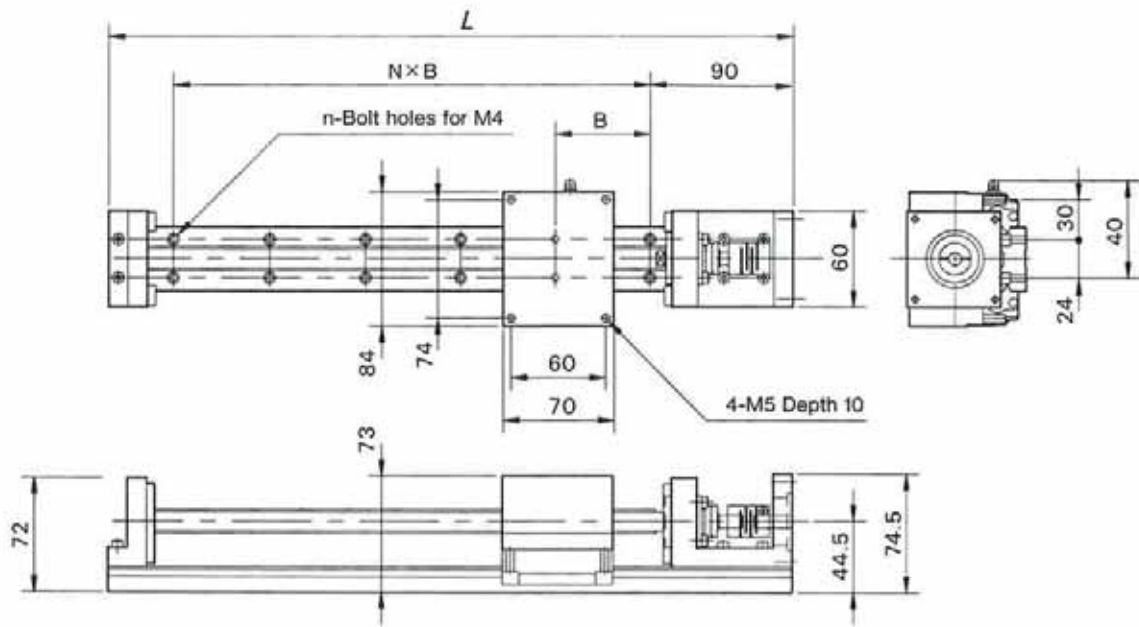


Fig. 5 Dimensions of motor mount

unit : mm

1 kgf = 9.807N = 2.2046 lbs.
1 mm = 0.03937 inch

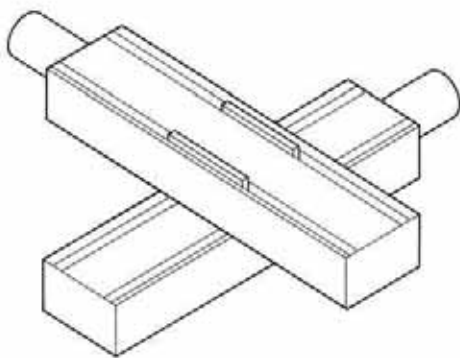
TSMK standard table



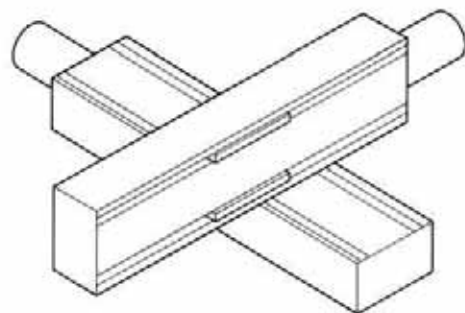
unit : mm

Model number	Stroke length (mm)	Overall length L (mm)	Mounting holes for bed	
			N x B (mm)	n
TSMK40-120	120	310	3 x 60	8
TSMK40-240	240	430	5 x 60	12
TSMK40-360	360	550	7 x 60	16
TSMK40-480	480	670	9 x 60	20
TSMK40-600	600	790	11 x 60	24
TSMK40-720	720	910	13 x 60	28
TSMK40-840	840	1030	15 x 60	32
TSMK40-960	960	1150	17 x 60	36

● X-Y Stage Applications using Aluminum Bases



In this case, the jointing bracket is not needed for assembly. But six nuts and a spacer plate are needed.



In this case, the jointing bracket and six nuts are needed for assembly.

IKO Linear Way FH Series (Wide Rail High Rigidity Type)

LWFH

● Features

1. Excellent strength under moment and/or complex loads

A large moment load can be supported, because the span between the raceways of wide track rail is large. This structure is strong against complex loads occurring in many cases in actual service.

2. Large load capacity in any directions

The simple two-row raceway design is adopted to incorporate large steel balls for high load ratings. This design can withstand loads almost uniformly in all directions.

3. High accuracy with simple structure

The two-row raceway design minimizes the number of potential errors in manufacturing. Therefore, a high dimensional accuracy between two raceway rows is easy to obtain. Grinding by large diameter grinding wheels ensures highest accuracy of raceways.

4. High rigidity

The four point contact design features high rigidity in all directions because each steel ball is held in the position without play.

5. Long life with high reliability

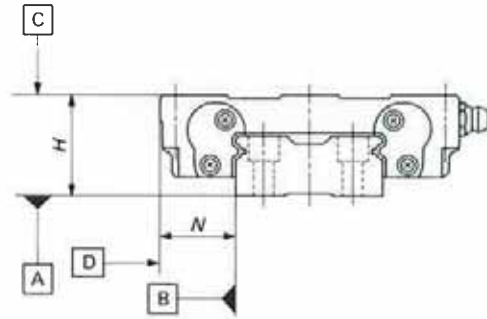
Simplicity of design reduces the potential processing errors in manufacturing, and high accuracy is easily obtained. Therefore, the load is shared uniformly by steel balls, resulting in long life and high reliability. Preload is also uniformly distributed.

6. Smooth operation and low noise

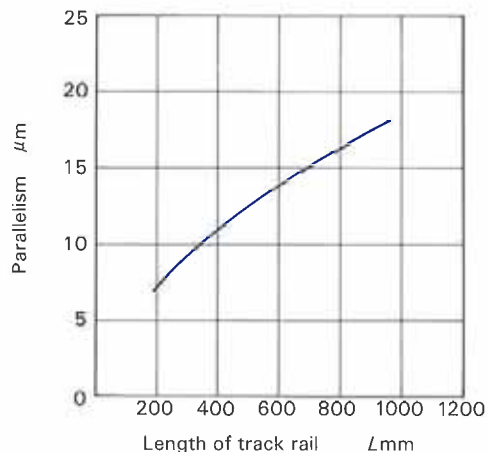
Smooth and quiet operation is achieved because all contours of raceways are precisely and accurately ground, and also, the design of ball circulating routes is based on the analysis of optimal functional characteristics.

● Accuracy

Accuracies for Linear Way FH series are shown below.



Item	Accuracy (mm)
Dim. <i>H</i> tolerance	±0.040
Dim. <i>N</i> tolerance	±0.050
Dim. variation of <i>H</i>	0.015
Dim. variation of <i>N</i>	0.020

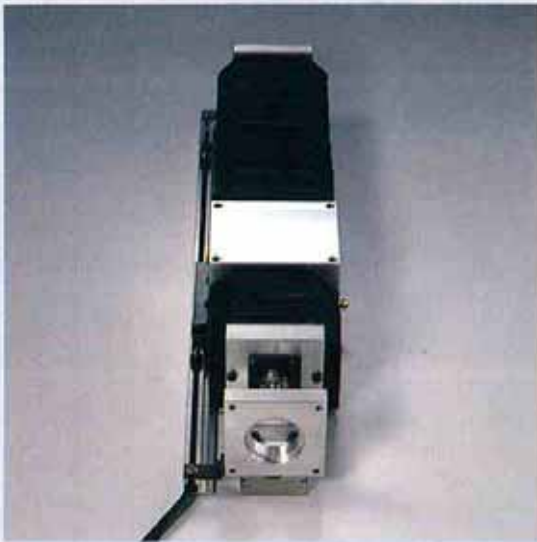


Parallelism operation (C to A, D to B)

● Mounting bolt tightening torque

Bolt size	Tightening torque (kgf·cm)
M 4×0.7	40
M 5×0.8	80
M 6×1.0	130

1 kgf = 9.807N = 2.2046 lbs.
1 mm = 0.03937 inch



Precision Positioning Table
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