

1.1. Structure and Features of LM Guide Actuator Model KR

Because of its integral-structure nut block consisting of a highly rigid LM rail with a U-shaped cross section, LM Guide units on both side faces and a Ball Screw unit in the center, model KR achieves a highly rigid and highly accurate actuator in a minimal space.

Each train of balls is arranged at a contact angle of 45° so that the rated load on the nut block is uniform in the four directions (radial, reverse-radial and lateral directions). As a result, model KR can be used in any mounting orientation.

● Four-way Equal Load

The trains of loaded balls are arranged in a double-row angular contact structure where two trains are placed on each of the right and left sides. The equal load ratings are provided in the vertical and horizontal directions. Thus, this model can be mounted in any orientation and is optimal for locations with indeterminate loads such as the arms of a Cartesian coordinate robot.

● High rigidity

Unlike the conventional LM Guide, model KR uses an outer-rail structure to achieve higher rigidity against an overhung load.

The LM rail is a wide U-shaped cross section to reduce the weight and minimize deflection, enabling the LM Guide system to be used in both a cantilever and fixed-fixed structures.

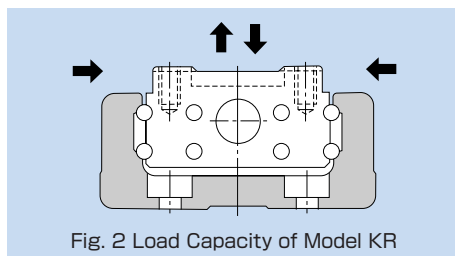


Fig. 2 Load Capacity of Model KR

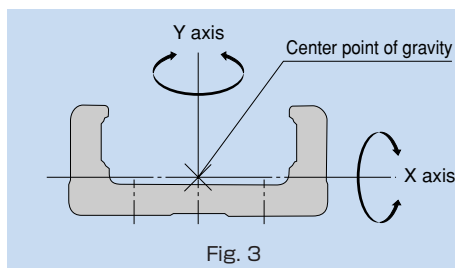


Fig. 3

Table 1 Cross-sectional Characteristics of the LM Rail
Unit: mm⁴

Model No.	I_x	I_y	Mass (kg/100 mm)
KR 15	9.08×10^2	1.42×10^4	0.104
KR 20	6.1×10^3	6.2×10^4	0.26
KR 26	1.7×10^4	1.5×10^5	0.39
KR 30H	2.7×10^4	2.8×10^5	0.5
KR 33	6.2×10^4	3.8×10^5	0.66
KR 45H	8.4×10^4	8.9×10^5	0.9
KR 46	2.4×10^5	1.5×10^6	1.26
KR 55	2.2×10^5	2.3×10^6	1.5
KR 65	4.6×10^5	5.9×10^6	2.31

I_x =geometrical moment of inertia around X axis

I_y =geometrical moment of inertia around Y axis

●High Accuracy

The raceway of the four rows of balls is shaped into a circular-arc groove. This enables the guide system to smoothly travel and maintain high rigidity even under a preload. Fluctuation in frictional resistance caused by load fluctuation is minimized to allow the system to respond to sub-micron feed.

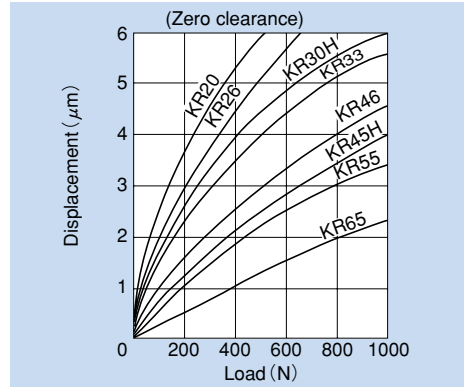


Fig. 4 Displacement of Model KR-A under a Radial Load

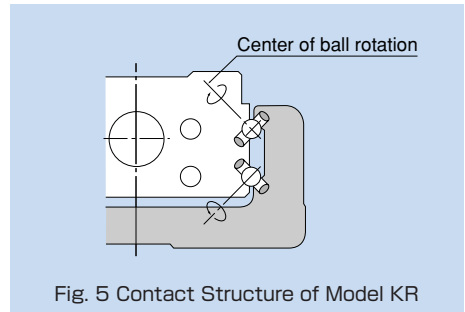


Fig. 5 Contact Structure of Model KR

●Space Saving

Use of a nut block integrating LM Guide units on both ends and a Ball Screw unit in the center makes model KR a highly rigid and highly accurate actuator in a minimal space.

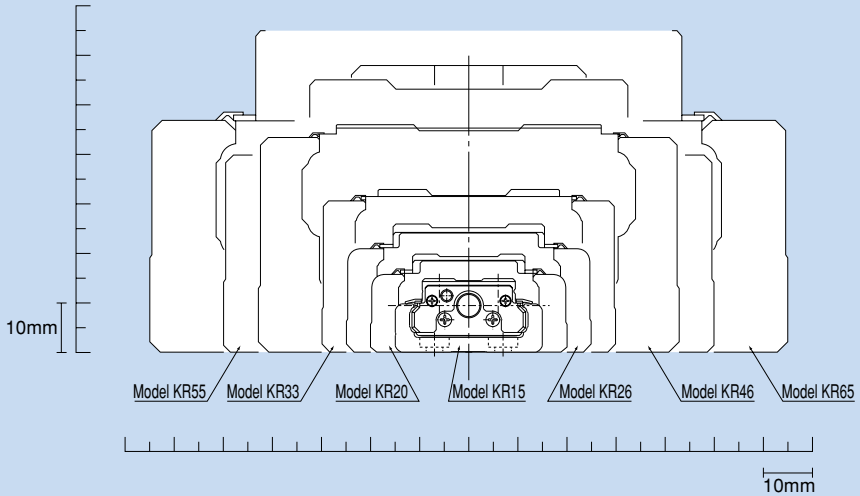


Fig. 6 Cross Sectional Drawing

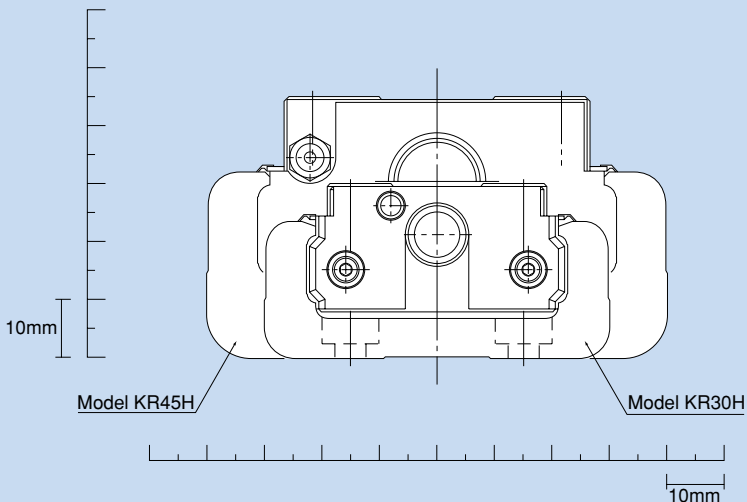


Fig. 7 Cross Sectional Drawing