

Calculating the Equivalent Load

Rated Load of an LM Guide in Each Direction

The LM Guide is categorized into roughly two types: the 4-way equal load type, which has the same rated load in the radial, reverse radial and lateral directions, and the radial type, which has a large rated load in the radial direction. With the radial type LM Guide, the rated load in the radial direction is different from that in the reverse radial and lateral directions. The basic load rating in the radial direction is indicated in the specification table. The values in the reverse-radial and lateral directions are obtained from Table7 on **A1-59**.

[Rated Loads in All Directions]

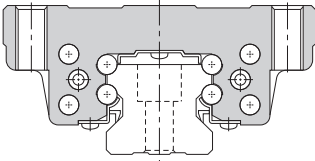
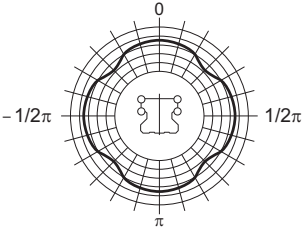
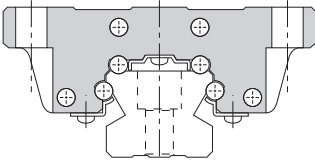
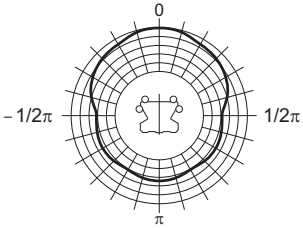


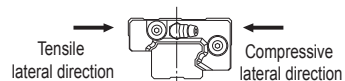
Type	Load Distribution Curve
<p data-bbox="204 520 434 544">4-way Equal Load Type</p> 	
<p data-bbox="262 772 379 796">Radial Type</p> 	

Table7 Rated Loads in All Directions

Classification	Model No.		Reverse radial direction 		Lateral directions 	
	Type	Size	Dynamic load rating C_L	Static load rating C_{0L}	Dynamic load rating C_T	Static load rating C_{0T}
4-way Equal Load	SHS		C	C_0	C	C_0
	SHW		C	C_0	C	C_0
	SRS	12,15,25	C	C_0	C	C_0
	SCR		C	C_0	C	C_0
	EPF		C	C_0	C	C_0
	HSR		C	C_0	C	C_0
	NRS	75,85,100	C	C_0	C	C_0
	HRW	17,21,27,35,50,60	C	C_0	C	C_0
	RSR	2,3	C	C_0	C	C_0
	CSR		C	C_0	C	C_0
	MX		C	C_0	C	C_0
	JR		C	C_0	C	C_0
	HCR		C	C_0	C	C_0
	HMG		C	C_0	C	C_0
	HSR-M1		C	C_0	C	C_0
	RSR-M1	9	C	C_0	C	C_0
	HSR-M2		C	C_0	C	C_0
	HSR-M1VV		C	C_0	C	C_0
SRG		C	C_0	C	C_0	
SRN	35,45,55,65	C	C_0	C	C_0	
SRW		C	C_0	C	C_0	
Radial	SSR		0.50C	0.50 C_0	0.53C	0.43 C_0
	SVR		0.64C	0.64 C_0	0.47C	0.38 C_0
	SR	15,20,25,30,35,45,55,70	0.62C	0.50 C_0	0.56C	0.43 C_0
	SR	85,100,120,150	0.78C	0.71 C_0	0.48C	0.35 C_0
	NR-X		0.64C	0.64 C_0	0.47C	0.38 C_0
	NR	75,85,100	0.78C	0.71 C_0	0.48C	0.45 C_0
	HRW	12,14	0.78C	0.71 C_0	0.48C	0.35 C_0
	NSR		0.62C	0.50 C_0	0.56C	0.43 C_0
	SR-M1		0.62C	0.50 C_0	0.56C	0.43 C_0
SR-MS		—	0.50 F_0	—	0.43 F_0	
Other	SVS		0.84C	0.84 C_0	0.92C	0.85 C_0
	NRS-X		0.84C	0.84 C_0	0.92C	0.85 C_0
	SRS	5,7,9,20	C	C_0	1.19C	1.19 C_0
	RSX	7,9	C	C_0	1.19C	1.19 C_0
	RSX	12,15	C	C_0	C	C_0
	RSR	14	0.78C	0.70 C_0	0.78C	0.71 C_0
	HR		C	C_0	C	C_0
	GSR		0.93C	0.90 C_0	(T) 0.84C* (C) 0.93C*	(T) 0.78 C_0 * (C) 0.90 C_0 *
	GSR-R		0.93C	0.90 C_0	(T) 0.84C* (C) 0.93C*	(T) 0.78 C_0 * (C) 0.90 C_0 *
RSR-M1	12,15,20	0.78C	0.70 C_0	0.78C	0.71 C_0	

*(T): Tensile lateral direction; (C): Compressive lateral direction
 Note) C and C_0 in the table each represent the basic load rating indicated in the specification table of the respective model. F_0 represents the permissible load.
 For types with no size indication in the table, the same factor is applied to all sizes.
 Models HR, GSR and GSR-R cannot be used in single-axis applications.



[Equivalent Load P_E]

The LM Guide can bear loads and moments in all directions, including a radial load (PR), reverse radial load (PL) and lateral loads (PT), simultaneously.

When two or more loads (e.g., radial load and lateral load) are simultaneously applied to the LM Guide, the service life and the static safety factor are calculated using equivalent load values obtained by converting all the loads into radial load or reverse radial load.

[Equivalent Load Equation]

When the LM block of the LM Guide receives loads simultaneously in the radial and lateral directions, or the reverse radial and lateral directions, the equivalent load is obtained from the equation below.

$$P_E = X \cdot P_{R(L)} + Y \cdot P_T$$

P_E	: Equivalent load	(N)
	· Radial direction	
	· Reverse radial direction	
P_L	: Reverse radial load	(N)
P_T	: Lateral load	(N)
X, Y	: Equivalent factor	(see Table8)

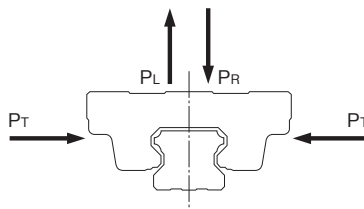




Fig.7 Equivalent of Load of the LM Guide

Table8 Equivalent factor in each direction

Classification	Model No.		If radial and lateral loads are applied simultaneously		If reverse-radial and lateral loads are applied simultaneously	
						
			Equivalent in radial direction		Equivalent in reverse radial direction	
Type	Size	X	Y	X	Y	
4-way Equal Load	SHS		1.000	1.000	1.000	1.000
	SHW		1.000	1.000	1.000	1.000
	SRS	12,15,25	1.000	1.000	1.000	1.000
	RSX	12,15	1.000	1.000	1.000	1.000
	SCR		1.000	1.000	1.000	1.000
	EPF		1.000	1.000	1.000	1.000
	HSR		1.000	1.000	1.000	1.000
	NRS	75,85,100	1.000	1.000	1.000	1.000
	HRW	17,21,27,35,50,60	1.000	1.000	1.000	1.000
	RSR	2,3	1.000	1.000	1.000	1.000
	CSR		1.000	1.000	1.000	1.000
	MX		1.000	1.000	1.000	1.000
	JR		1.000	1.000	1.000	1.000
	HCR		1.000	1.000	1.000	1.000
	HMG		1.000	1.000	1.000	1.000
	HSR-M1		1.000	1.000	1.000	1.000
	RSR-M1	9	1.000	1.000	1.000	1.000
	HSR-M2		1.000	1.000	1.000	1.000
	HSR-M1VV		1.000	1.000	1.000	1.000
	SRG		1.000	1.000	1.000	1.000
SRN		1.000	1.000	1.000	1.000	
SRW		1.000	1.000	1.000	1.000	
Radial	SSR		—	—	1.000	1.155
	SVR		—	—	1.000	1.678
	SR	15,20,25,30,35,45,55,70	—	—	1.000	1.155
	SR	85,100,120,150	—	—	1.000	2.000
	NR-X		—	—	1.000	1.678
	NR	75,85,100	—	—	1.000	2.000
	HRW	12,14	—	—	1.000	2.000
	NSR		—	—	1.000	1.155
	SR-M1		—	—	1.000	1.155
SR-MS		—	—	1.000	1.155	
Other	SVS		1.000	0.935	1.000	1.020
	NRS-X		1.000	0.935	1.000	1.020
	SRS	5,7,9,20	1.000	0.839	1.000	0.839
	RSX	7,9	1.000	0.839	1.000	0.839
	RSR	14	1.000	0.830	1.000	0.990
	HR		1.000	0.500	1.000	0.500
	GSR		1.000	1.280	1.000	1.000
	GSR-R		1.000	1.280	1.000	1.280
RSR-M1	12,15,20	1.000	0.830	1.000	0.990	

Note) If the radial type LM Guide receives radial and lateral loads simultaneously, study the safety static factor and the rated load in the radial-load and lateral-load directions.

For types with no size indication in the table, the same factor is applied to all sizes.

Models HR, GSR and GSR-R cannot be used in single-axis applications.