

LM Guide®

THK General Catalog

LM Guide

THK General Catalog

A Product Descriptions

LM Guide Classification Table A1-8

Selection Criteria A1-10
Flowchart for Selecting an LM Guide A1-10
Determining the Operating Conditions .. A1-12
- Operating Conditions of the LM Guide A1-12

Selecting a Type A1-28
- Types of LM Guide A1-28

Applied Load A1-42
- Calculating an Applied Load A1-42

Equivalent Load A1-62
- Load Rating of an LM Guide in Each Direction .. A1-62

Static Safety Factor A1-66
Average Load A1-67
Nominal Life A1-69
- Calculating the Nominal Life A1-69
- Calculating the Modified Nominal Life A1-70

Predicting the Rigidity A1-73
- Selecting a Radial Clearance (Preload) ... A1-73
- Service Life with a Preload Considered ... A1-74
- Rigidity A1-74
- Radial Clearance Standard for Each Model .. A1-75

Determining the Accuracy A1-78
- Accuracy Standards A1-78
- Guidelines for Accuracy Grades by Machine Type .. A1-79
- Accuracy Standards for Each Model A1-80

Features and Dimensions of Each Model .. A1-91
Structure and Features of the Caged Ball LM Guide .. A1-92
- Advantages of Caged Ball Technology A1-93

Global Standard Size Caged Ball LM Guide Model SHS .. A1-96
- Structure and Features A1-97
- Types and Features A1-98

Dimensional Drawing, Dimensional Table
Models SHS-C, SHS-CM, SHS-LC, and SHS-LCM A1-100
Models SHS-V, SHS-VM, SHS-LV, and SHS-LVM A1-102
Models SHS-R, SHS-RM, SHS-LR, and SHS-LRM A1-104
- Standard Lengths and Maximum Lengths of LM Rails .. A1-106
- Tapped-Hole Type LM Rail A1-107

Radial Type Caged Ball LM Guide Model SSR ... A1-108
- Structure and Features A1-109
- Types and Features A1-110

Dimensional Drawing, Dimensional Table
Models SSR-XW and SSR-XWM A1-112
Models SSR-XV and SSR-XVM A1-114
Model SSR-XTB A1-116
Model SSR-XSB A1-118
- Standard Lengths and Maximum Lengths of LM Rails .. A1-120
- Tapped-Hole Type LM Rail A1-121

Super-Heavy Load Caged Ball LM Guide Model SVR/SVS for Machine Tools ... A1-122
- Structure and Features A1-123
- Types and Features A1-125

Dimensional Drawing, Dimensional Table
Models SVR-R and SVR-LR A1-128
Models SVS-R and SVS-LR A1-130
Models SVR-C and SVR-LC A1-132
Models SVS-C and SVS-LC A1-134
Models SVR-RH, SVR-LRH, SVS-RH, and SVS-LRH A1-136
Models SVR-CH, SVR-LCH, SVS-CH, and SVS-LCH A1-138
- Standard Lengths and Maximum Lengths of LM Rails .. A1-140

Wide-Rail Caged Ball LM Guide Model SHW ... A1-142
- Structure and Features A1-143
- Types and Features A1-144

Dimensional Drawing, Dimensional Table
Model SHW-CA A1-146
Models SHW-CR and SHW-HR A1-148
- Standard Lengths and Maximum Lengths of LM Rails .. A1-150
- Lubrication Hole A1-151
- Tapped-Hole Type LM Rail A1-151

Miniature Caged Ball LM Guide Model SRS A1-152
- Structure and Features A1-153
- Types and Features A1-154
- Flatness of the LM Rail and the LM Block Mounting Surface .. A1-157

Dimensional Drawing, Dimensional Table
Models SRS-S, SRS-M, and SRS-N A1-158
Models SRS-WS, SRS-WM, and SRS-WN .. A1-162
- Standard Lengths and Maximum Lengths of LM Rails .. A1-166
- Reference bolt tightening torques when mounting an LM block .. A1-167
- Tapped-Hole Type LM Rail A1-167

Caged Ball Cross LM Guide Model SCR .. A1-168
- Structure and Features A1-169
- Types and Features A1-170

Dimensional Drawing, Dimensional Table
Model SCR A1-172
- Standard Lengths and Maximum Lengths of LM Rails .. A1-174
- Tapped-Hole Type LM Rail A1-175

Finite Stroke Caged Ball LM Guide Model EPF ... A1-176
- Structure and Features A1-177
- Types and Features A1-178
- Accuracy of the Mounting Surface A1-179

Dimensional Drawing, Dimensional Table
Model EPF A1-180
- Standard Lengths of LM Rails A1-182

Global Standard LM Guide Model HSR .. A1-184
- Structure and Features A1-185
- Types A1-186

Dimensional Drawing, Dimensional Table
Models HSR-XSCM, HSR-XCM, and HSR-XLCM .. A1-192
Models HSR-C, HSR-CM, HSR-LC, HSR-LCM, HSR-XC, and HSR-XLC A1-194
Models HSR-XSRM, HSR-XRM, and HSR-XLRM .. A1-196
Models HSR-R, HSR-RM, HSR-LR, HSR-LRM, HSR-XR, and HSR-XLR A1-198
Models HSR-YR, HSR-YRM, and HSR-XYR .. A1-200
Models HSR-CA, HSR-CAM, HSR-HA, HSR-HAM, HSR-XCA, and HSR-XHA A1-202
Models HSR-CB, HSR-CBM, HSR-HB, HSR-HBM, HSR-XCB, and HSR-XHB A1-204
Models HSR85A, HSR85LA, HSR85B, and HSR85LB A1-206
Models HSR-HA, HSR-HB, and HSR-HR .. A1-208
- Standard Lengths and Maximum Lengths of LM Rails .. A1-210
- Tapped-Hole Type LM Rail A1-211
- Preventing the LM Block from Falling off of the LM Rail .. A1-212
- Lubrication Hole A1-212

Radial Type LM Guide Model SR A1-216
- Structure and Features A1-217
- Types and Features A1-218
- Characteristics of Model SR A1-220

Dimensional Drawing, Dimensional Table
Models SR-W, SR-WM, SR-V, SR-VM, and SR-T A1-222
Models SR-TB, SR-TBM, SR-SB, and SR-SBM .. A1-224
- Standard Lengths and Maximum Lengths of LM Rails .. A1-226
- Tapped-Hole Type LM Rail A1-227

Super-Heavy Load LM Guide Model NR-X/NRS-X for Machine Tools .. A1-228
- Structure and Features A1-229
- Types and Features A1-230

Dimensional Drawing, Dimensional Table
Models NR-RX, NR-LRX, and NR-SLRX .. A1-234
Models NRS-RX, NRS-LRX, and NRS-SLRX .. A1-236
Models NR-R, NR-LR, NRS-R, and NRS-LR .. A1-238
Models NR-CX, NR-LCX, and NR-SLCX .. A1-240
Models NRS-CX, NRS-LCX, and NRS-SLCX .. A1-242
Models NR-A, NR-LA, NRS-A, and NRS-LA .. A1-244
Models NR-B, NR-LB, NRS-B, and NRS-LB .. A1-246
- Standard Lengths and Maximum Lengths of LM Rails .. A1-248

Wide-Rail LM Guide Model HRW A1-250
- Structure and Features A1-251
- Types and Features A1-252

Dimensional Drawing, Dimensional Table
Models HRW-CA and HRW-CAM A1-254
Models HRW-CR, HRW-CRM, and HRW-LRM .. A1-256
- Standard Lengths and Maximum Lengths of LM Rails .. A1-258
- Preventing the LM Block from Falling off of the LM Rail .. A1-258
- Tapped-Hole Type LM Rail A1-259

Miniature LM Guide Model RSX A1-260
- Structure and Features A1-261
- Types and Features A1-262
- Flatness of the LM Rail and the LM Block Mounting Surface .. A1-265

Dimensional Drawing, Dimensional Table
Models RSX-SM, RSX-M, and RSX-NM .. A1-266
Models RSX-WSM, RSX-WM, and RSX-WNM .. A1-270
- Standard Lengths and Maximum Lengths of LM Rails .. A1-272
- Reference bolt tightening torques when mounting an LM block .. A1-273
- Tapped-Hole Type LM Rail A1-273

Miniature LM Guide Model RSR A1-274
- Structure and Features A1-274
- Types and Features A1-276
- Accuracy of the Mounting Surface A1-277

Dimensional Drawing, Dimensional Table
Models RSR-M, RSR-N, RSR-WM, RSR-WN, and RSR-WVM A1-278

- Standard Lengths and Maximum Lengths of LM Rails .. A1-280
- Preventing the LM Block from Falling off of the LM Rail .. A1-280
- Recommended bolt tightening torques when mounting the LM block and LM rail .. A1-281
- Tapped-Hole Type LM Rail A1-281

Separate Type (4-Way Equal Load) LM Guide Model HR .. A1-282
- Structure and Features A1-283
- Types and Features A1-284
- Example of Clearance Adjustment A1-285
- Comparable Cross-Roller Guide Model Numbers .. A1-286

Dimensional Drawing, Dimensional Table
Models HR, HR-T, HR-M, and HR-TM... A1-288
- Standard Lengths and Maximum Lengths of LM Rails .. A1-292
- Accessories A1-293
- Lubrication Hole A1-294

Separate Type (Radial) LM Guide Model GSR .. A1-296
- Structure and Features A1-297
- Types and Features A1-298
- Example of Clearance Adjustment A1-299

Dimensional Drawing, Dimensional Table
Models GSR-T and GSR-V A1-300
- Standard Lengths and Maximum Lengths of LM Rails .. A1-302
- Tapped-Hole Type LM Rail A1-302

Separate Type (Radial) LM Guide Model GSR-R .. A1-304
- Structure and Features A1-305
- Types and Features A1-306

Dimensional Drawing, Dimensional Table
Model GSR-R A1-308
- Standard Lengths of LM Rails A1-310
- Rack and Pinion A1-311
- Rack and Pinion Dimensional Drawing.... A1-314

Cross LM Guide Model CSR A1-316
- Structure and Features A1-317
- Types and Features A1-318

Dimensional Drawing, Dimensional Table
Model CSR A1-320
- Standard Lengths and Maximum Lengths of LM Rails .. A1-322
- Tapped-Hole Type LM Rail A1-323

Miniature Cross LM Guide Model MX .. A1-324
- Structure and Features A1-325
- Types and Features A1-325

Dimensional Drawing, Dimensional Table
Model MX A1-326
- Standard Lengths and Maximum Lengths of LM Rails .. A1-328

Structural Beam LM Guide Model JR .. A1-330
- Structure and Features A1-331
- Geometric Moment of Inertia of the LM Rail .. A1-331
- Types and Features A1-332

Dimensional Drawing, Dimensional Table
Models JR-A, JR-B, and JR-R..... A1-334
- Standard Lengths and Maximum Lengths of LM Rails .. A1-336
- Model JB Frame for LM Rail Clamps..... A1-337
- Model JT Steel Plate for LM Rail Clamps .. A1-337

Curved LM Guide Model HCR..... A1-338
- Structure and Features A1-339
- Types and Features A1-340

Dimensional Drawing, Dimensional Table
Model HCR A1-342

Straight-and-Curved LM Guide Model HMG .. A1-344
- Structure and Features A1-345
- Types and Features A1-347
- Examples of Table Mechanisms A1-348

Dimensional Drawing, Dimensional Table
Model HMG A1-350
- Jointed LM Rail..... A1-352

Self-Aligning LM Guide Model NSR-TBC .. A1-354
- Structure and Features A1-355
- Types and Features A1-355

Dimensional Drawing, Dimensional Table
Model NSR-TBC..... A1-356
- Standard Lengths and Maximum Lengths of LM Rails .. A1-358

LM Guide Suited for Single-Rail Applications Model HDR... A1-360
- Structure and Features A1-361
- Types and Features A1-362

Dimensional Drawing, Dimensional Table
Models HDR-SC, HDR-C, and HDR-LC... A1-366
Models HDR-SR, HDR-R, and HDR-LR... A1-368
Models HDR-SV, HDR-V, and HDR-LV ... A1-370
Models HDR-US and HDR-UT A1-372
Models HDR-UV and HDR-UW..... A1-374

- Standard Lengths and Maximum Lengths of LM Rails ... A1-376
- Tapped-Hole Type LM Rail ... A1-377
- Plate Cover ... A1-378
- Lubrication Hole ... A1-380

High-Temperature LM Guide Model HSR-M1 .. A1-382
- Structure and Features ... A1-383
- Types and Features ... A1-385
- Service Life ... A1-387

Dimensional Drawing, Dimensional Table
Models HSR-M1C and HSR-M1LC ... A1-388
Models HSR-M1R and HSR-M1LR ... A1-390
Model HSR-M1YR ... A1-392
- Standard Lengths and Maximum Lengths of LM Rails .. A1-394

High-Temperature LM Guide Model SR-M1 .. A1-396
- Structure and Features ... A1-397
- Thermal Characteristics of LM Rail and LM Block Materials .. A1-397
- Types and Features ... A1-398
- Service Life ... A1-399

Dimensional Drawing, Dimensional Table
Models SR-M1W and SR-M1V ... A1-400
Models SR-M1TB and SR-M1SB ... A1-402
- Standard Lengths and Maximum Lengths of LM Rails .. A1-404

High-Temperature LM Guide Model RSX-M1 .. A1-406
- Structure and Features ... A1-407
- Thermal Characteristics of LM Rail and LM Block Materials .. A1-407
- Types and Features ... A1-408
- Service Life ... A1-409

Dimensional Drawing, Dimensional Table
Models RSX-M1 and RSX-M1N ... A1-410
Models RSX-M1W and RSX-M1WN ... A1-412
- Standard Lengths and Maximum Lengths of LM Rails .. A1-414

High-Temperature LM Guide Model RSR-M1 .. A1-416
- Structure and Features ... A1-417
- Thermal Characteristics of LM Rail and LM Block Materials .. A1-417
- Types and Features ... A1-418
- Service Life ... A1-419

Dimensional Drawing, Dimensional Table
Models RSR-M1V and RSR-M1N ... A1-420
- Standard Lengths and Maximum Lengths of LM Rails .. A1-422
- Preventing the LM Block from Falling off of the LM Rail .. A1-422

Corrosion-Resistant LM Guide Model HSR-M2 .. A1-424
- Structure and Features ... A1-425
- Types and Features ... A1-425

Dimensional Drawing, Dimensional Table
Model HSR-M2A ... A1-426
- Standard Lengths and Maximum Lengths of LM Rails .. A1-428

Medium-to-Low Vacuum LM Guide Model HSR-M1VV .. A1-430
- Structure and Features ... A1-431
- Types and Features ... A1-432
- Design Precautions ... A1-432

Dimensional Drawing, Dimensional Table
Model HSR-M1VV ... A1-434
- Standard Lengths and Maximum Lengths of LM Rails .. A1-436

Oil-Free LM Guide Model SR-MS for Special Environments ... A1-438
- Structure and Features ... A1-439
- Calculating Expected Service Life for the Oil-Free LM Guide for Special Environments .. A1-441
- Types and Features ... A1-441

Dimensional Drawing, Dimensional Table
Models SR-MSV and SR-MSW ... A1-442
- Standard Lengths and Maximum Lengths of LM Rails .. A1-444

Structure and Features of the Caged Roller LM Guide .. A1-446
- Advantages of the Caged Roller Technology .. A1-447

Ultra-Rigid Caged Roller LM Guide Model SRG .. A1-450
- Structure and Features ... A1-451
- Types and Features ... A1-452
- Reference Error Tolerance for the Mounting Surface .. A1-455

Dimensional Drawing, Dimensional Table
Models SRG-A, SRG-LA,
SRG-C, and SRG-LC ... A1-456
Models SRG-C, SRG-LC, and SRG-SLC ... A1-458
Model SRG-LC ... A1-462
Models SRG-V, SRG-LV,
SRG-R, and SRG-LR ... A1-464
Models SRG-R, SRG-LR, and SRG-SLR ... A1-466
Models SRG-V, SRG-LV, SRG-SLV,
SRG-R, SRG-LR, and SRG-SLR ... A1-468
- Standard Lengths and Maximum Lengths of LM Rails .. A1-470
- Tapped-Hole Type LM Rail ... A1-471
- Plate Cover ... A1-472
- Lubrication Hole ... A1-474

Ultra-Rigid, Low-Profile Caged Roller LM Guide Model SRN .. A1-476
- Structure and Features A1-477
- Types and Features A1-478
- Reference Error Tolerance for the Mounting Surface .. A1-480

Dimensional Drawing, Dimensional Table
Models SRN-C, SRN-LC, and SRN-SLC .. A1-482
Models SRN-R, SRN-LR, and SRN-SLR .. A1-486
- Standard Lengths and Maximum Lengths of LM Rails .. A1-490
- Plate Cover A1-491
- Lubrication Hole A1-492

Ultra-Rigid, Wide Caged Roller LM Guide Model SRW .. A1-494
- Structure and Features A1-495
- Types and Features A1-496
- Reference Error Tolerance for the Mounting Surface .. A1-497

Dimensional Drawing, Dimensional Table
Model SRW-LR A1-498
- Standard Lengths and Maximum Lengths of LM Rails .. A1-500
- Lubrication Hole A1-501

Super-Rigid Full-Roller LM Guide Model HRX .. A1-502
- Structure and Features A1-503
- Types and Features A1-504
- Reference Error Tolerance for the Mounting Surface .. A1-506

Dimensional Drawing, Dimensional Table
Models HRX-C and HRX-LC A1-508
Models HRX-R and HRX-LR A1-510
- Standard Lengths and Maximum Lengths of LM Rails .. A1-512
- Tapped-Hole Type LM Rail A1-513
- Lubrication hole A1-514

Design Highlights A1-516
Designing the Guide System A1-516
- Examples of Guide System Arrangements .. A1-517
- Methods for Securing an LM Guide Based on Operating Conditions .. A1-521

Designing a Mounting Surface A1-523
- Designing a Mounting Surface A1-523
- Shoulder Height of the Mounting Base and the Corner Radius .. A1-525
- Reference Error Tolerance for the Mounting Surface .. A1-532
- Master LM Guide Indicators and Combined Use .. A1-539

Options A1-541
Table of Supported Options by Models .. A1-542
Seal and Metal Scraper A1-546
Laminated Contact Scraper LaCS A1-548
Side Scraper A1-550
Protector A1-551
Light-Resistance Contact Seal LiCS A1-553
High Chemical Resistance Fluorine Seal FS .. A1-554
Dimensions of Each Model with Options Attached .. A1-555
- The LM Block Length (Dimension L) with LaCS and Seals Attached .. A1-555
- Dimensional Increase with Grease Nipple (When LaCS is Attached) .. A1-564
- LM Block Length (Dimension L) with LiCS Attached .. A1-567
- Dimensional Increase with Grease Nipple (When LiCS is Attached) .. A1-568
- Overall Block Length with Fluorine Seals and Other Accessories Attached .. A1-569
- Maximum Seal Resistance A1-570
- Maximum Resistance for Laminated Contact Scraper LaCS .. A1-573
- Maximum Resistance for Light-Resistance Contact Seal LiCS .. A1-574
- Maximum Seal Resistance of High Chemical Resistance Fluorine Seal FS .. A1-574
- Maximum Resistance for the Side Scraper .. A1-574

QZ Lubricator A1-575
- LM Block Dimension (L Dimension) with QZ Lubricator Attached .. A1-578

List of Parts Symbols A1-584
Dedicated Bellows A1-587
- Bellows A1-588

Dedicated LM Cover A1-602
- LM Cover A1-603

Dedicated Cap for LM Rail Mounting Holes .. A1-604
Plate Cover SV and Steel Tape SP A1-607
Lubrication Adapter A1-610
Removing/Mounting Jig A1-611
End Piece EP A1-612

Model No. A1-614
- Model Number Coding A1-614
- Notes on Ordering A1-618

Handling Precautions A1-620
LM Guide Handling Precautions A1-620
Handling Precautions for LM Guide Models for Special Environments .. A1-622
- LM Guide for Medium-to-Low Vacuums .. A1-622
- Oil-Free LM Guide A1-622

Handling Precautions for Optional Accessories for the LM Guide .. A1-623
- QZ Lubricator for the LM Guide A1-623
- Laminated Contact Scraper LaCS, Side Scraper for the LM Guide .. A1-623
- Light Contact Seal LiCS for the LM Guide .. A1-624
- High Chemical Resistance Fluorine Seal FS for the LM Guide .. A1-624
- GC Cap A1-624

B Support Book (Separate)

Features and Types B1-8
Features of the LM Guide B1-8
- Large Permissible Load and High Rigidity .. B1-9
- High Precision of Motion B1-11
- Averages Accuracy by Absorbing Mounting Surface Error .. B1-14
- Easy Maintenance B1-16
- Substantial Energy Savings B1-17
- Low Total Cost B1-18
- Ideal Structure with Four Raceways, Circular-Arc Grooves, and Two-Point Contact .. B1-19
- Superb Error-Absorbing Capability with DF Design .. B1-23

LM Guide Classification Table B1-24

Selection Criteria B1-26
Flowchart for Selecting an LM Guide B1-26
Determining the Operating Conditions .. B1-28
- Operating Conditions of the LM Guide B1-28

Selecting a Type B1-44
- Types of LM Guide B1-44

Applied Load B1-58
- Calculating an Applied Load B1-58
- Example Calculations B1-61

Equivalent Load B1-68
- Load Ratings of an LM Guide in Each Direction .. B1-68

Static Safety Factor B1-70
Average Load B1-71
- Example of Calculating the Average Load (1) - with Horizontal Mount and Acceleration/Deceleration Considered - .. B1-73
- Example of Calculating the Average Load (2) - When the Rails are Movable B1-74

Nominal Life B1-75
- Calculating the Nominal Life B1-75
- Calculating the Modified Nominal Life B1-76
- Example of Calculating the Nominal Life (1) - with Horizontal Mount and High-Speed Acceleration .. B1-79
- Example of Calculating the Nominal Life (2) - with Vertical Mount B1-84

Predicting the Rigidity B1-87
- Selecting a Radial Clearance (Preload) ... B1-87
- Service Life with a Preload Considered ... B1-88
- Rigidity B1-88

Determining the Accuracy B1-89
- Accuracy Standards B1-89
- Guidelines for Accuracy Grades by Machine Type .. B1-90

Mounting Procedure B1-91
Mounting the LM Guide B1-91
- Master LM Guide Indicators and Combined Use .. B1-91
- Mounting Procedure B1-93
- Methods for Measuring Accuracy after Installation .. B1-103
- Recommended Tightening Torque for LM Rails .. B1-103

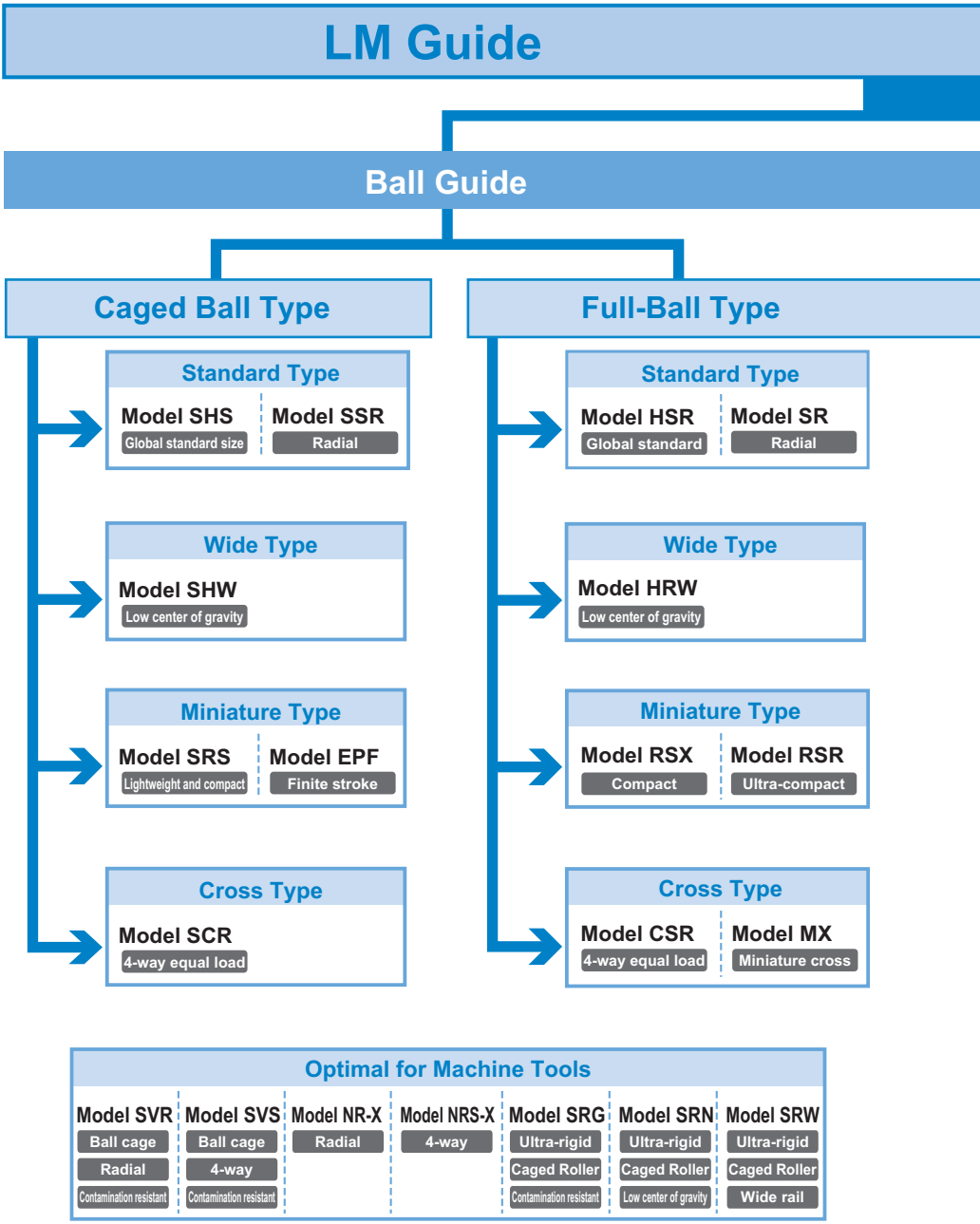
Options B1-105
Seal and Metal Scraper B1-106
Laminated Contact Scraper LaCS B1-108
Side Scraper B1-110
Protector B1-111
Light-Resistance Contact Seal LiCS B1-112
High Chemical Resistance Fluorine Seal FS .. B1-113
Dedicated Bellows B1-114
Dedicated LM Cover B1-114
Dedicated Caps for LM Rail Mounting Holes .. B1-115
Plate Cover SV and Steel Tape SP B1-117
QZ Lubricator B1-120
Lubrication Adapter B1-123
Removing/Mounting Jig B1-124
End Piece EP B1-125

Model No. B1-126
- Model Number Coding B1-126
- Notes on Ordering B1-130

Handling Precautions B1-132
LM Guide Handling Precautions B1-132
Handling Precautions for LM Guide Models for Special Environments .. B1-134
- LM Guide for Medium-to-Low Vacuums ... B1-134
- Oil-Free LM Guide B1-134

Handling Precautions for Optional Accessories for the LM Guide .. B1-135
- QZ Lubricator for the LM Guide B1-135
- Laminated Contact Scraper LaCS, Side Scraper for the LM Guide .. B1-135
- Light Contact Seal LiCS for the LM Guide .. B1-136
- High Chemical Resistance Fluorine Seal FS for the LM Guide .. B1-136
- GC Cap B1-136

LM Guide Classification Table



Roller Guide

Caged Roller Type

Standard Type
- **Model SRG** — Ultra-high rigidity
- **Model SRN** — Ultra-high rigidity; Low center of gravity

Wide Type
- **Model SRW** — Ultra-high rigidity

Full-Roller Type

Standard Type
- **Model HRX** — Super-high rigidity

Curved Type
- **Model HCR** — Curved type
- **Model HMG** — Straight-curved type

Separate Type
- **Model HR** — Heavy load
- **Model GSR** — Interchangeable, self-aligning
- **Model GSR-R** — Interchangeable, self-aligning; With rack

Model JR Type
- **Model JR** — Structural member rail; 4-way equal load

Self-Aligning Type
- **Model NSR-TBC**

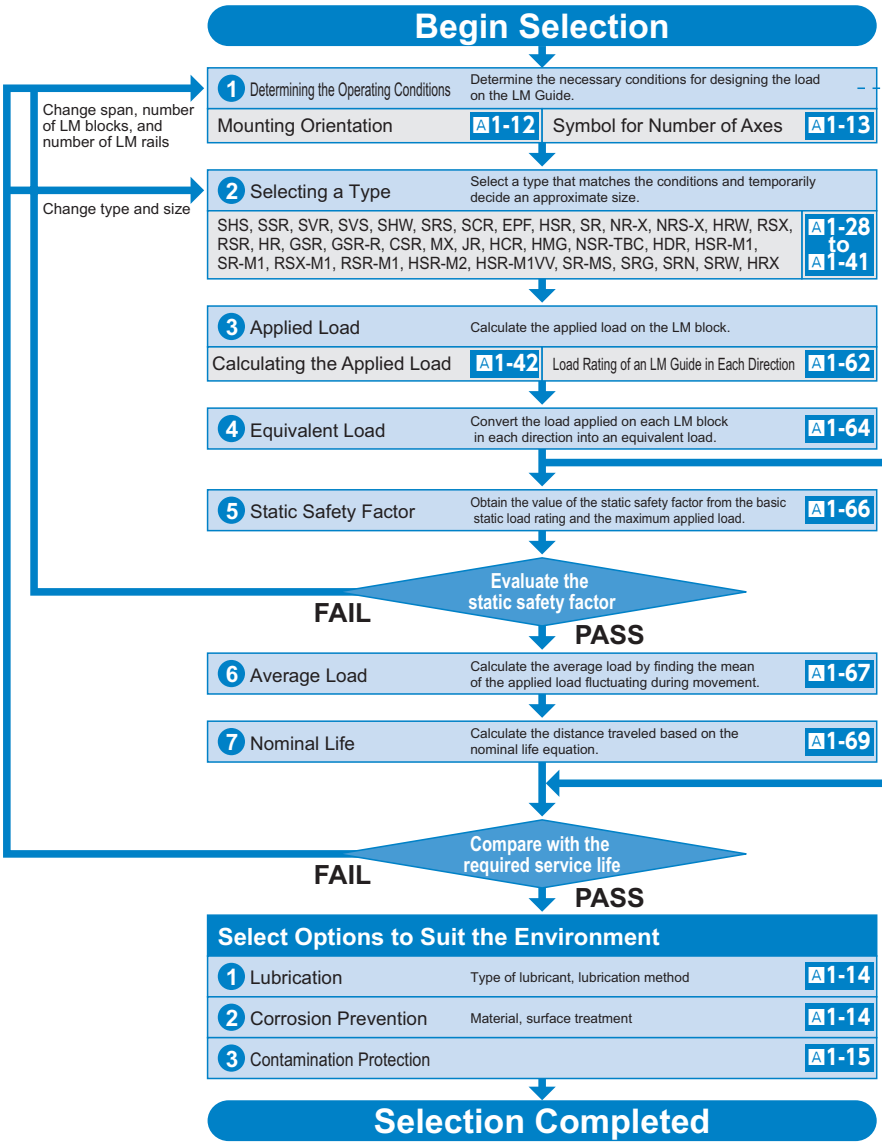
DB Configuration Type
- **Model HDR** — 4-way equal load

Models with Special Environment Specifications
- **Model HSR-M1** — High temperature; 4-way equal load
- **Model SR-M1** — High temperature; Radial
- **Model RSX-M1** — High temperature; Compact
- **Model RSR-M1** — High temperature; Compact
- **Model HSR-M2** — High corrosion resistance; 4-way equal load
- **Model HSR-M1VV** — Medium-to-low vacuum; 4-way equal load
- **Model SR-MS** — Oil-free

Flowchart for Selecting an LM Guide

Steps for Selecting an LM Guide

The following flowchart can be used as reference for selecting an LM Guide.



- Space in which the guide will be used
- Dimensions (span, number of LM blocks, number of LM rails, thrust)
- Mounting orientation (horizontal, vertical, slant mount, wall mount, suspended)
- Magnitude, direction, and position of the working load
- Operating frequency (duty cycle)
- Speed (acceleration)
- Stroke length
- Required service life
- Precision of motion
- Environment
- In a special environment (vacuum, clean room, high temperature, environment exposed to contamination, etc.), it is necessary to take into account material, surface treatment, lubrication, and contamination protection.

Predicting the Rigidity

1. Selecting a Radial Clearance (Preload) A1-73
2. Service Life with a Preload Considered A1-74
3. Rigidity A1-74
4. Radial Clearance Standard for Each Model A1-75
5. Designing the Guide System A1-516

Determining the Accuracy

1. Accuracy Standards A1-78
2. Guidelines for Accuracy Grades by Machine Type A1-79
3. Accuracy Standard for Each Model A1-80~

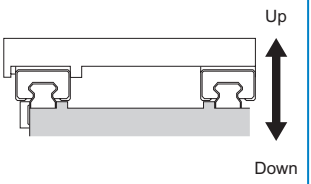
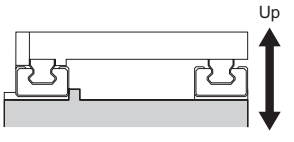
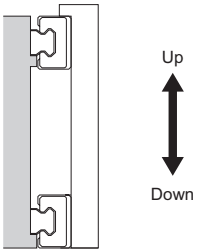
Determining the Operating Conditions

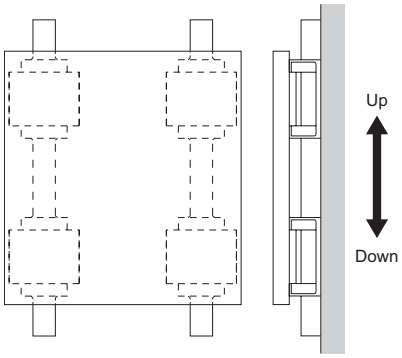
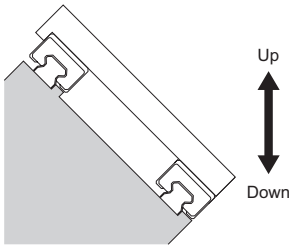
Operating Conditions of the LM Guide

Mounting Orientation

The LM Guide can be mounted in the following five orientations.
The lubricant may not reach the raceway if the LM Guide is not installed in a horizontal orientation. Be sure to let THK know the mounting orientation and the exact position in each LM block where the grease nipple or the piping joint should be attached.
For the lubrication, see A24-2.

Mounting Orientation

Horizontal (symbol: H)	Inverted (symbol: R)	Wall mount (symbol: K)
		

Vertical (symbol: V)	Slant mount (symbol: T)
	

Symbol for Number of Axes

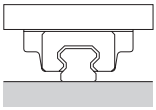
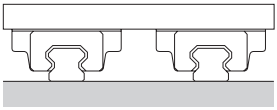
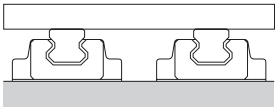
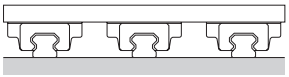
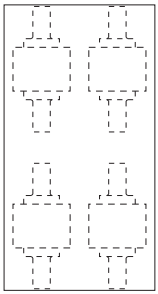
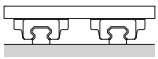
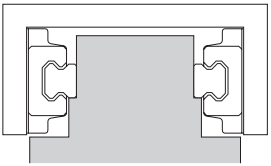
If two or more LM Guide units are used in a parallel combination on the same plane, specify in advance the number of the LM rails (symbol for number of axes) used in combination.
For accuracy standards and radial clearance standards, see **A1-80** and **A1-75**, respectively.

Model number coding

SHS25C2SSC0+1000LP -II

- SHS25C2SSC0+1000LP: Model number (details are given on the corresponding page of the model)
- -II: Symbol for number of axes ("II" indicates 2 axes. No symbol for a single axis)

Symbol for Number of Axes

Symbol for number of axes: none	Symbol for number of axes: II	Symbol for number of axes: II
Required number of axes: 1	Required number of axes: 2	Required number of axes: 2
	 Note: When placing an order, specify the number in multiples of 2 axes.	 Note: When placing an order, specify the number in multiples of 2 axes.
Symbol for number of axes: III	**Symbol for number of axes: IV**	**Other**
Required number of axes: 3	**Required number of axes: 4**	**Required number of axes: 2**
 Note: When placing an order, specify the number in multiples of 3 axes.	  Note: When placing an order, specify the number in multiples of 4 axes.	 Using 2 axes opposed to each other

Service Environment

● Lubrication

When using an LM System, it is necessary to provide effective lubrication. Using the product without lubrication may increase wear on the rolling elements and shorten the service life.
A lubricant has effects such as the following.
(1) Minimizes friction on moving elements to prevent seizure and reduce wear.
(2) Forms an oil film on the raceway to decrease stress acting on the surface and extend rolling fatigue life.
(3) Covers metal surfaces with an oil film to prevent the formation of rust.
To optimize an LM Guide's functionality, it is necessary to provide lubrication according to the operating conditions.
The lubricant may not reach the raceway if the LM Guide is not installed in a horizontal orientation. Be sure to let THK know the mounting orientation and the exact position in each LM block where the grease nipple or the piping joint should be attached. For the mounting orientations of the LM Guide, see A**1-12**. For the lubrication, see A**24-2**.
Even with an LM Guide with seals, the internal lubricant gradually seeps out during operation. Therefore, the system needs to be lubricated at an appropriate interval according to the operating conditions.

● Corrosion Prevention

■Determining a Material

Any LM System requires a material that suits the operating environment. For use in environments where corrosion resistance is required, some LM System models can use martensitic stainless steel. (Martensitic stainless steel can be used for LM Guide models SHS, SSR, SHW, SRS, HSR, SR, HRW, RSX, RSR, and HR.)
The HSR series includes HSR-M2, a highly corrosion-resistant LM Guide using anti-corrosive austenitic stainless steel. For details, see A**1-424**.

■Surface Treatment

The surfaces of the rails and shafts of the LM System can be treated for anti-corrosive or aesthetic purposes.
THK offers THK-AP treatment, which is the optimum surface treatment for the LM System.
There are roughly three types of THK-AP treatment: AP-HC, AP-C, and AP-CF. (See B**0-20**.)

● Contamination Protection

It is necessary to prevent foreign materials from getting inside the product, as it will lead to abnormal wear and a shortened service life. Therefore, when entrance of dust or other foreign material is a possibility, it is necessary to select a sealing device or contamination protection option suited to the operating environment and conditions.

THK offers contamination protection accessories for each model of the LM Guide, such as end seals made of a special synthetic rubber with high wear resistance, and side seals and inner seals that provide further contamination protection.

In addition, for applications in adverse environments, a Laminated Contact Scraper LaCS and dedicated bellows are available for various model numbers.

Also, THK offers dedicated caps designed to prevent cutting chips from entering the LM rail mounting holes.

When it is necessary to provide contamination protection for a ball screw in an environment exposed to cutting chips and moisture, we recommend using a telescopic cover that protects the whole system or a large bellows.

For the options, see **A1-546**.

Special Environments

Clean Room

In a clean environment, the generation of dust from the LM System has to be reduced and anti-rust oil cannot be used. Therefore, it is necessary to increase the corrosion resistance of the LM System. In addition, depending on the required level of cleanliness, a dust collector may be necessary.

Dust Generation from the LM System

■Measures to prevent dust generation resulting from spattering grease

THK AFE-CA, AFF, and L100 Grease
Use grease that produces little dust and is suited to a clean environment.

■Measures to reduce dust generation resulting from metallic abrasion

Caged Ball LM Guide
Dust generation can be reduced by using a Caged Ball LM Guide, which has no friction between balls and generates little metallic abrasion dust.

Corrosion Prevention

■Material-based measures

Stainless steel LM Guide
This LM Guide uses corrosion-resistant martensitic stainless steel.

Corrosion-resistant LM Guide
The LM rail uses austenitic stainless steel, which has a high corrosion-resistant effect.

■Surface treatment measures

THK AP-HC, AP-C, and AP-CF Treatment
The LM System is surface-treated to increase corrosion resistance.

Caged Ball LM Guide

Supported models: SHS SSR SVR/SVS SHW SRS SCR EPF

Caged Roller LM Guide

Supported models: SRG SRN SRW

Stainless Steel LM Guide

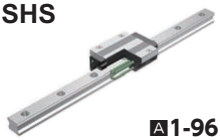
Supported models: SHS SSR SHW SRS HSR SR HRW HR RSX RSR

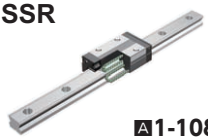
LM Guide Models for Special Environments

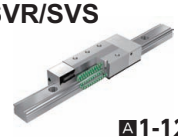
Supported models: Corrosion-Resistant HSR-M2 Oil-Free SR-MS

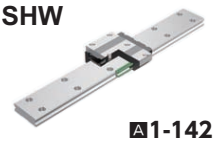
Surface Treatment

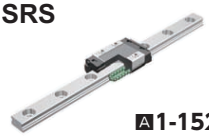
Grease

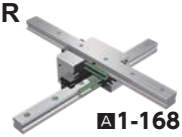
SHS

A1-96

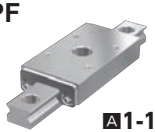
SSR

A1-108

SVR/SVS

A1-122

SHW

A1-142

SRS

A1-152

SCR

A1-168

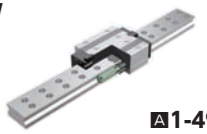
EPF

A1-176

SRG

A1-450

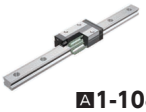
SRN

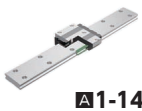
A1-476

SRW

A1-494

SHS

A1-96

SSR

A1-108

SHW

A1-142

SRS

A1-152

HSR

A1-184

SR

A1-216

HRW

A1-250

HR

A1-282

RSX

A1-260

RSR

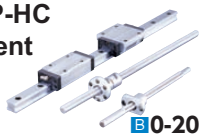
A1-274

HSR-M2

A1-424

SR-MS

A1-438

THK AP-HC Treatment

B0-20

THK AP-C Treatment

B0-20

THK AP-CF Treatment

B0-20

THK AFE-CA Grease

A24-13

THK AFF Grease

A24-15

L100 Grease

A24-25

Vacuum

In a vacuum environment, measures are required to prevent resin from emitting gas and grease from spattering. Anti-rust oil cannot be used, so it is necessary to select a product with high corrosion resistance.

■Measures to prevent resin from emitting gas

Stainless steel LM Guide

The end plate (ball circulation path normally made of resin) of the LM block is made of stainless steel to reduce emission of gas.

■Measures to prevent grease from evaporating

Vacuum grease

If a general-purpose grease is used in a vacuum environment, oil contained in the grease spatters and the grease loses lubricity. Therefore, use a vacuum grease made with low-vapor-pressure fluorine-based oil.

■Corrosion prevention

Stainless steel LM Guide

In a vacuum environment, use a corrosion-resistant stainless steel LM Guide.

High-temperature LM Guide

If high temperatures are predicted due to baking, use a high-temperature LM Guide, which is highly resistant to heat and corrosion.

Corrosion-resistant LM Guide

This LM Guide uses highly corrosion-resistant austenitic stainless steel in the LM rail.

Oil-Free

In environments susceptible to liquid lubricants, a lubrication method other than grease or oil is required.

■Dry Lubricant

S-Coating Dry Film Lubricant

This dry film lubricant is a molybdenum disulfide compound developed for a wide range of conditions, from atmospheric pressure to high-vacuum environments. It provides better load carrying capacity, wear resistance, and seal strength than other forms of dry lubrication.

High-Temperature LM Guide

Supported models: HSR-M1 SR-M1 RSX-M1 RSR-M1

LM Guide Models for Special Environments

Supported models: Medium-to-Low Vacuum HSR-M1VV, Oil-Free SR-MS

Corrosion-Resistant LM Guide

Supported models: HSR-M2

Stainless Steel LM Guide

Supported models: HSR SR HRW HR RSX RSR

Vacuum Grease

Oil-Free LM Guide

Supported models: Oil-Free SR-MS

HSR-M1

A1-382

SR-M1

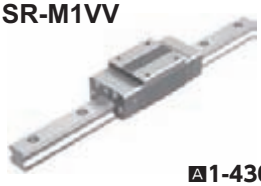
A1-396

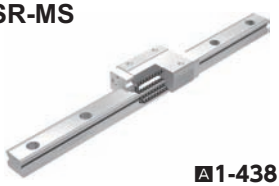
RSX-M1

A1-406

RSR-M1

A1-416

HSR-M1VV

A1-430

SR-MS

A1-438

HSR-M2

A1-424

HSR

A1-184

SR

A1-216

HRW

A1-250

HR

A1-282

RSX

A1-260

RSR

A1-274

SR-MS

A1-438

Corrosion Prevention

As with clean room applications, it is necessary to increase corrosion resistance through material selection and surface treatment.

■Material-based measures

Stainless steel LM Guide

This LM Guide uses corrosion-resistant martensitic stainless steel.

Corrosion-resistant LM Guide

This LM Guide uses highly corrosion-resistant austenitic stainless steel in the LM rail.

■Surface treatment measures

THK AP-CF, AP-C, and AP-HC treatment

The LM system is surface-treated to increase corrosion resistance.

Stainless Steel LM Guide

Supported models: SHS SSR SHW SRS HSR SR HRW HR RSX RSR

Corrosion-Resistant LM Guide

Supported models: HSR-M2

Surface Treatment

SHS

A1-96

SSR

A1-108

SHW

A1-142

SRS

A1-152

HSR

A1-184

SR

A1-216

HRW

A1-250

HR

A1-282

RSX

A1-260

RSR

A1-274

HSR-M2

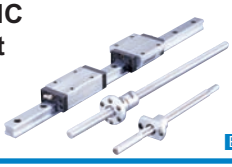
A1-424

THK AP-CF Treatment

B0-20

THK AP-C Treatment

B0-20

THK AP-HC Treatment

B0-20

High Speed

In a high-speed environment, it is necessary to apply an optimal lubrication method that reduces heat generation during high-speed operation and increases grease retention.

■Measures to reduce heat generation

Caged Ball LM Guide

Use of a ball cage eliminates friction between balls to reduce heat generation. In addition, grease retention is increased, contributing to long service life and high-speed operation.

THK AFA Grease, AFJ Grease

It reduces heat generation in high speed operation and has superb lubricity.

■Measures to improve lubrication

QZ Lubricator

Continuous oil lubrication ensures that the lubrication and maintenance interval can be significantly extended. It also applies the right amount of oil to the raceway, making itself an eco-friendly lubrication system that does not contaminate the surrounding area.

Caged Ball LM Guide

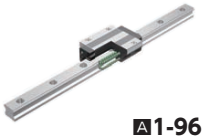
Supported models: SHS SSR SVR/SVS SHW SRS SCR EPF

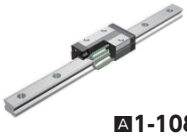
Caged Roller LM Guide

Supported models: SRG SRN SRW

QZ Lubricator

Grease

SHS

A1-96

SSR

A1-108

SVR/SVS

A1-122

SHW

A1-142

SRS

A1-152

SCR

A1-168

EPF

A1-176

SRG

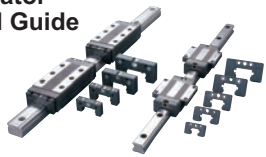
A1-450

SRN

A1-476

SRW

A1-494

QZ Lubricator
for the LM Guide

A1-575

THK AFA Grease

A24-7

THK AFJ Grease

A24-21

High Temperature

In a high-temperature environment, dimensional variations caused by heat are problematic. Use a high-temperature LM Guide, which is heat resistant and has minimal dimensional variation when heated. Also, use a high-temperature grease.

■Heat resistance

High-temperature LM Guide

A special heat treatment to maintain dimensional stability minimizes dimensional variations due to heating and cooling.

■Grease

High-temperature grease

Use a high-temperature grease to maintain consistent rolling resistance in the LM System even at high temperatures.

Low Temperature

In a low-temperature environment, use an LM System with a minimal amount of resin components and a grease that minimizes fluctuations in rolling resistance, even at low temperature.

■Impact of low temperature on resin components

Stainless steel LM Guide

The end plate (ball circulation path normally made of resin) of the LM block is made of stainless steel.

■Corrosion prevention

THK AP-CF, AP-C, and AP-HC Treatment

The LM System is surface-treated to increase corrosion resistance.

■Grease

THK AFC Grease

This grease has little rolling resistance fluctuation even in cold temperatures.

Micro Motion

Micro strokes cause the oil film to break, resulting in poor lubrication and early wear. In such applications, select a grease with high oil film strength that can easily form an oil film.

■Grease

THK AFC Grease

AFC Grease is a urea-based grease that excels in oil film strength and wear resistance.

High-Temperature LM Guide

Supported models: HSR-M1 SR-M1 RSX-M1 RSR-M1 HSR-M1VV

High-Temperature Grease

Stainless Steel LM Guide

Supported models: SHS SSR SHW SRS HSR SR HRW HR RSX RSR

Surface Treatment

Low-Temperature Grease

Grease

HSR-M1

A1-382

SR-M1

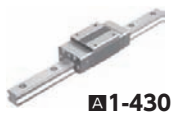
A1-396

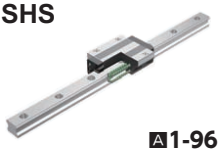
RSX-M1

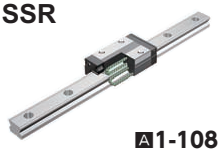
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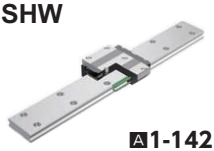
RSR-M1

A1-416

HSR-M1VV

A1-430

SHS

A1-96

SSR

A1-108

SHW

A1-142

SRS

A1-152

HSR

A1-184

SR

A1-216

HRW

A1-250

HR

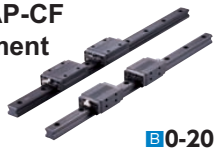
A1-282

RSX

A1-260

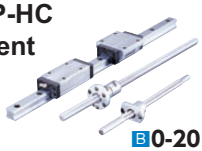
RSR

A1-274

THK AP-CF Treatment

B0-20

THK AP-C Treatment

B0-20

THK AP-HC Treatment

B0-20

THK AFC Grease

A24-11

THK AFC Grease

A24-11

Foreign Matter

If foreign matter enters the LM System, it will cause abnormal wear and shorten the service life. Therefore, it is necessary to prevent such entrance of foreign matter.
Especially in an environment containing small foreign matter or a water-soluble coolant that a telescopic cover or a bellows cannot block, it is necessary to attach a contamination protection accessory capable of efficiently removing foreign matter.

■Metal scraper

It removes relatively large foreign objects such as cutting chips, spatter, sand, or hard foreign materials that adhere to the LM rail.

■Laminated Contact Scraper LaCS

Unlike a metal scraper, it removes foreign matter while making contact with the LM rail. Therefore, it is more effective at preventing contamination by small foreign matter that is difficult to remove with conventional metal scrapers.

■QZ Lubricator

The QZ Lubricator is a lubrication system that feeds the right amount of lubricant to the ball raceway through direct contact with a highly oil-impregnated fiber net.

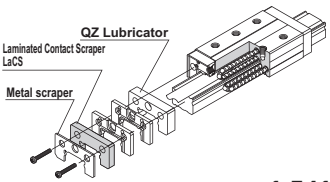
■Dedicated metal caps for LM rail mounting holes - GC caps

GC caps are metal caps that plug LM rail mounting holes (compliant with the RoHS Directives). In harsh environments they prevent the entrance of foreign material and coolant from the top face of the LM rail (mounting holes) and significantly increase contamination protection of the LM Guide if used with a dust seal.

■Protector

The protector minimizes the entrance of foreign material even in harsh environments where foreign material such as fine particles and liquids are present.

LM Guide
+Metal scraper
+Laminated Contact Scraper LaCS
+GC cap etc.

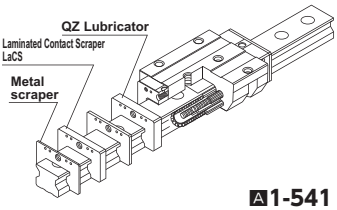


A1-541

Supported models

Caged Ball LM Guide
SHS SSR SVR/SVS SHW SRS
Full-Ball LM Guide
HSR NR-X/NRS-X HDR

Roller Type LM Guide
+Metal scraper
+Laminated Contact Scraper LaCS
+GC cap etc.



A1-541

Supported models

SRG HRX

Caged Ball LM Guide

SHS



A1-96

SSR



A1-108

SHW



A1-142

SRS



A1-152

SVR/SVS



Compatible with protector A1-122

Full-Ball LM Guide

HSR



A1-184

NR-X/NRS-X



A1-228

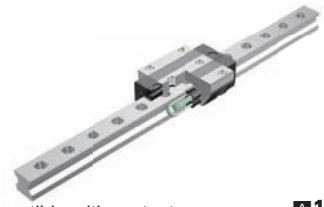
HDR



A1-360

Caged Roller LM Guide

SRG



Compatible with protector A1-450

Full-Roller LM Guide

HRX

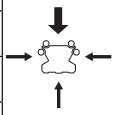
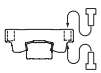
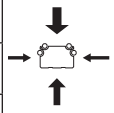
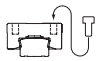
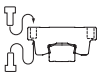
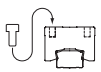


Compatible with protector A1-502

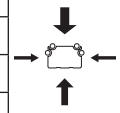
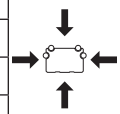
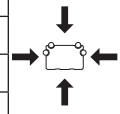
Selecting a Type

Types of LM Guide

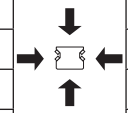
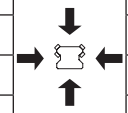
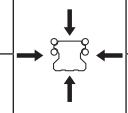
THK offers the LM Guide in a wide array of standard types and dimensions so that you can select the optimal product for any application. The unit structure of the LM Guide allows for high running accuracy with no clearance simply by mounting the product to a flat surface with bolts. We have a proven track record and know-how in extensive applications.

Classification		Type		Dimensional table	Load capacity diagram	Basic load rating (kN)	
						Basic dynamic load rating	Basic static load rating
Radial type	Caged Ball LM Guide models		SSR-XW	▶A1-112		14.7 to 64.6	16.5 to 71.6
			SSR-XV	▶A1-114		9.1 to 48.3	9.7 to 46.7
			SSR-XTB	▶A1-116		14.7 to 64.6	16.5 to 71.6
			SSR-XSB	▶A1-118		9.1 to 48.3	9.7 to 46.7
	Full-Ball LM Guide models		SR-W	▶A1-222		13.8 to 411	20.5 to 537
			SR-M1W	▶A1-400		13.8 to 60.4	20.5 to 81.8
			SR-V	▶A1-222		9.1 to 40.9	11.7 to 46.7
			SR-M1V	▶A1-400		9.1 to 40.9	11.7 to 46.7
			SR-TB	▶A1-224		13.8 to 136	20.5 to 179
			SR-M1TB	▶A1-402		13.8 to 60.4	20.5 to 81.8
			SR-SB	▶A1-224		9.1 to 40.9	11.7 to 46.7
			SR-M1SB	▶A1-402		9.1 to 40.9	11.7 to 46.7
	Oil-Free LM Guide for Special Environments		SR-MSV	▶A1-442		—	—
			SR-MSW	▶A1-442		—	—
	Caged Ball LM Guide models for machine tools High-rigidity models for super-heavy loads		SVR-C	▶A1-132		48 to 260	68 to 328
			SVR-LC	▶A1-132		57 to 340	86 to 481
			SVR-R	▶A1-128		48 to 260	68 to 328
			SVR-LR	▶A1-128		57 to 340	86 to 481
			SVR-CH	▶A1-138		90 to 177	115 to 238
			SVR-LCH	▶A1-138		108 to 214	159 to 312
			SVR-RH	▶A1-136		90 to 177	115 to 238
			SVR-LRH	▶A1-136		108 to 214	159 to 312

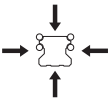
	External dimensions (mm)		Features	Major applications
	Height	Width		
	24 to 48	34 to 70	• Long service life and long-term maintenance-free operation • Low dust generation, low noise, and reduced running sound • Superb high-speed performance • Smooth motion in all mounting orientations • Thin and compact design with large radial load capacity • Superb planar running accuracy • Superb capability to absorb mounting error • Stainless steel type also available as standard	• Surface grinder tables • Tool grinder tables • Electric discharge machines • Printed circuit board drilling machines • Chip mounters • High-speed transfer equipment • Robot travel units • Machining centers • NC lathes • Five axis milling machines • Conveyance systems • Pressing machine mold guides • Inspection equipment • Testing machines • Food-related machines • Medical equipment • 3D measuring instruments • Packaging machines • Injection molding machines • Woodworking machines • Ultra precision tables • Semiconductor/liquid crystal manufacturing equipment
	24 to 48	34 to 70		
	24 to 48	52 to 100		
	24 to 48	52 to 100		
	24 to 135	34 to 250	• Thin and compact design with a large radial load capacity • Superb planar running accuracy • Superb capability to absorb mounting error • Stainless steel type also available as standard • Type M1, achieving max service temperature of 150℃, also available	
	24 to 48	34 to 70		
	24 to 48	34 to 70		
	24 to 48	34 to 70		
	24 to 68	52 to 140		
	24 to 48	52 to 100		
	24 to 48	52 to 100		
	24 to 48	52 to 100		
	24 to 28	34 to 42	• Minimum outgassing (water, organic matter) • Can be used at high temperature (up to 150℃)	• Exposure machine • Organic EL manufacturing machine • Ion injection machine
	24 to 28	34 to 42		
	31 to 75	72 to 170	• Long service life and long-term maintenance-free operation • Low dust generation, low noise, and reduced running sound • Superb high-speed performance • Smooth motion in all mounting orientations • Super-heavy load capacity optimal for machine tools • Thin and compact design with large radial load capacity • High vibration resistance and impact resistance due to improved damping characteristics • Superb planar running accuracy	• Machining centers • NC lathes • Grinding machines • Five axis milling machines • Jig borers • Drilling machines • NC milling machines • Horizontal milling machines • Mold processing machines • Graphite working machines • Electric discharge machines • Wire-cut electric discharge machines
	31 to 75	72 to 170		
	31 to 75	50 to 126		
	31 to 75	50 to 126		
	48 to 70	100 to 140	• Long service life and long-term maintenance-free operation • Low dust generation, low noise, and reduced running sound • Superb high-speed performance • Smooth motion in all mounting orientations • Super-heavy load capacity optimal for machine tools • Large radial load capacity • High vibration resistance and impact resistance due to improved damping characteristics • Superb planar running accuracy • Has dimensions nearly equal to the Full-Ball LM Guide Model HSR, the de facto global standard	
	48 to 70	100 to 140		
	55 to 80	70 to 100		
	55 to 80	70 to 100		

Classification		Type		Dimensional table	Load capacity diagram	Basic load rating (kN)	
						Basic dynamic load rating	Basic static load rating
Radial type	Full-Ball LM Guide models for machine tools High-rigidity models for super-heavy loads		NR-RX	▶A1-234		37.1 to 208.7	68.1 to 351.7
			NR-LRX	▶A1-234		45.4 to 268.9	90.8 to 505.5
			NR-SLRX	▶A1-234		71 to 423.1	172.6 to 967.1
			NR-CX	▶A1-240		37.1 to 208.7	68.1 to 351.7
			NR-LCX	▶A1-240		45.4 to 268.9	90.8 to 505.5
			NR-SLCX	▶A1-240		71 to 423.1	172.6 to 967.1
			NR-R	▶A1-238		271 to 479	610 to 1040
			NR-LR	▶A1-238		355 to 599	800 to 1300
			NR-A	▶A1-244		271 to 479	610 to 1040
			NR-LA	▶A1-244		355 to 599	800 to 1300
			NR-B	▶A1-246		271 to 479	610 to 1040
			NR-LB	▶A1-246		355 to 599	800 to 1300
4-way type	Caged Ball LM Guide Models for machine tools High-rigidity models for super-heavy loads		SVS-R	▶A1-130		37 to 199	52 to 251
			SVS-LR	▶A1-130		44 to 261	66 to 368
			SVS-C	▶A1-134		37 to 199	52 to 251
			SVS-LC	▶A1-134		44 to 261	66 to 368
			SVS-RH	▶A1-136		69 to 136	88 to 182
			SVS-LRH	▶A1-136		83 to 164	122 to 239
			SVS-CH	▶A1-138		69 to 136	88 to 182
			SVS-LCH	▶A1-138		83 to 164	122 to 239
	Full-Ball LM Guide models for machine tools High-rigidity models for super-heavy loads		NRS-RX	▶A1-236		28.4 to 159.8	52.2 to 269.4
			NRS-LRX	▶A1-236		34.7 to 206	69.6 to 387.2
			NRS-SLRX	▶A1-236		54.4 to 324.1	132.2 to 740.8
			NRS-CX	▶A1-242		28.4 to 159.8	52.2 to 269.4
			NRS-LCX	▶A1-242		34.7 to 206	69.6 to 387.2
			NRS-SLCX	▶A1-242		54.4 to 324.1	132.2 to 740.8
4-way equal load type	Full-Ball LM Guide models for machine tools High-rigidity models for super-heavy loads		NRS-A	▶A1-244		212 to 376	431 to 737
			NRS-LA	▶A1-244		278 to 470	566 to 920
			NRS-B	▶A1-246		212 to 376	431 to 737
			NRS-LB	▶A1-246		278 to 470	566 to 920
			NRS-R	▶A1-238		212 to 376	431 to 737
			NRS-LR	▶A1-238		278 to 470	566 to 920

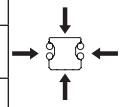
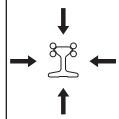
	External dimensions (mm)		Features	Major applications
	Height	Width		
	31 to 75	50 to 126	• Low dust generation, low noise, and acceptable running sound • Superb high-speed performance • Smooth motion in all mounting orientations • Super-heavy load capacity optimal for machine tools • Thin and compact design with large radial load capacity • High vibration resistance and impact resistance due to improved damping characteristics • Superb planar running accuracy	• Machining centers • NC lathes • Grinding machines • Five axis milling machines • Jig borers • Drilling machines • NC milling machines • Horizontal milling machines • Mold processing machines • Graphite working machines • Electric discharge machines • Wire-cut electric discharge machines
	31 to 75	50 to 126		
	31 to 75	50 to 126		
	31 to 75	72 to 170		
	31 to 75	72 to 170		
	31 to 75	72 to 170		
	83 to 105	145 to 200	• Super-heavy load capacity optimal for machine tools • High vibration resistance and impact resistance due to improved damping characteristics • Thin and compact design with large radial load capacity • Superb planar running accuracy	
	83 to 105	145 to 200		
	83 to 105	195 to 260		
	83 to 105	195 to 260		
	83 to 105	195 to 260		
	83 to 105	195 to 260		
	31 to 75	50 to 126	• Long service life and long-term maintenance-free operation • Low dust generation, low noise, and reduced running sound • Superb high-speed performance • Smooth motion in all mounting orientations • Super-heavy load capacity optimal for machine tools • Thin and compact design with 4-way equal load capacity • High vibration resistance and impact resistance due to improved damping characteristics	
	31 to 75	50 to 126		
	31 to 75	72 to 170		
	31 to 75	72 to 170		
	55 to 80	70 to 100	• Long service life and long-term maintenance-free operation • Low dust generation, low noise, and reduced running sound • Superb high-speed performance • Smooth motion in all mounting orientations • Super-heavy load capacity optimal for machine tools • 4-way type • High vibration resistance and impact resistance due to improved damping characteristics • Has dimensions nearly equal to the Full-Ball LM Guide Model HSR, the de facto global standard	
	55 to 80	70 to 100		
	48 to 70	100 to 140		
	48 to 70	100 to 140		
	31 to 75	50 to 126	• Low dust generation, low noise, and reduced running sound • Superb high-speed performance • Smooth motion in all mounting orientations • Super-heavy load capacity optimal for machine tools • Thin and compact design with 4-way equal load capacity • High vibration resistance and impact resistance due to improved damping characteristics	
	31 to 75	50 to 126		
	31 to 75	50 to 126		
	31 to 75	72 to 170		
	31 to 75	72 to 170		
	31 to 75	72 to 170		
	83 to 105	195 to 260	• Super-heavy load capacity optimal for machine tools • High vibration resistance and impact resistance due to improved damping characteristics • Thin and compact design with 4-way equal load capacity	
	83 to 105	195 to 260		
	83 to 105	195 to 260		
	83 to 105	195 to 260		
	83 to 105	145 to 200		
	83 to 105	145 to 200		

Classification		Type		Dimensional table	Load capacity diagram	Basic load rating (kN)	
						Basic dynamic load rating	Basic static load rating
4-way equal load type	Caged Roller LM Guide models Ultra-heavy load, high-rigidity types		SRG-A, C	▶A1-456		11.3 to 219	25.8 to 511
			SRG-LA, LC	▶A1-456		25.9 to 601	63.8 to 1170
			SRG-SLC	▶A1-458		83.4 to 352	199 to 899
			SRG-R, V	▶A1-464		11.3 to 219	25.8 to 511
			SRG-LR, LV	▶A1-464		25.9 to 278	63.8 to 670
			SRG-SLR, SLV	▶A1-466		83.4 to 352	199 to 899
			SRN-C	▶A1-482		55.3 to 219	119 to 511
			SRN-LC	▶A1-482		71.4 to 278	165 to 670
			SRN-SLC	▶A1-482		83.4 to 352	199 to 899
			SRN-R	▶A1-486		55.3 to 219	119 to 511
			SRN-LR	▶A1-486		71.4 to 278	165 to 670
			SRN-SLR	▶A1-486		83.4 to 352	199 to 899
			SRW-LR	▶A1-498		115 to 601	256 to 1170
	Full-Roller LM Guide high-rigidity models for super-heavy loads		HRX-C	▶A1-508		26.3 to 205.5	73.1 to 567
			HRX-LC	▶A1-508		30.8 to 257	89.3 to 756
			HRX-R	▶A1-510		26.3 to 205.5	73.1 to 567
			HRX-LR	▶A1-510		30.8 to 257	89.3 to 756
	Caged Ball LM Guide models Heavy-load, high-rigidity types		SHS-C	▶A1-100		14.2 to 205	24.2 to 320
			SHS-LC	▶A1-100		17.2 to 253	31.9 to 408
			SHS-V	▶A1-102		14.2 to 205	24.2 to 320
			SHS-LV	▶A1-102		17.2 to 253	31.9 to 408
			SHS-R	▶A1-104		14.2 to 128	24.2 to 197
			SHS-LR	▶A1-104		36.8 to 161	64.7 to 259

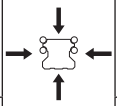
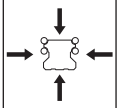
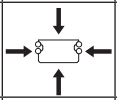
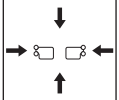
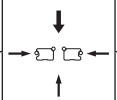
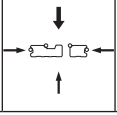
	External dimensions (mm)		Features	Major applications
	Height	Width		
	24 to 90	47 to 170	• Long service life and long-term maintenance-free operation • Low noise and reduced running sound • Superb high-speed performance • Smooth motion due to prevention of rollers from skewing • Ultra-heavy load capacity optimal for machine tools	• Machining centers • NC lathes • Grinding machines • Five axis milling machines • Jig borers • Drilling machines • NC milling machines • Horizontal milling machines • Mold processing machines • Graphite working machines • Electric discharge machines • Wire-cut electric discharge machines
	30 to 120	63 to 250		
	48 to 90	100 to 170		
	24 to 90	34 to 126		
	30 to 90	44 to 126		
	55 to 90	70 to 126		
	44 to 75	100 to 170	• Long service life and long-term maintenance-free operation • Low noise and reduced running sound • Superb high-speed performance • Smooth motion due to prevention of rollers from skewing • Ultra-heavy load capacity optimal for machine tools • Low center of gravity and ultra-high rigidity	
	44 to 75	100 to 170		
	44 to 75	100 to 170		
	44 to 75	70 to 126		
	44 to 75	70 to 126		
	44 to 75	70 to 126		
	70 to 150	135 to 300		
	36 to 90	70 to 170	• Long service life • Superbly high speed • 4-way equal load type • Stable and smooth operation can be achieved by suppressing roller skew • Ultra-heavy load capacity optimal for machine tools	
	36 to 90	70 to 170		
	40 to 100	48 to 126		
	40 to 100	48 to 126		
	24 to 90	47 to 170	• Long service life and long-term maintenance-free operation • Low dust generation, low noise, and reduced running sound • Superb high-speed performance • Smooth motion in all mounting orientations • Heavy load and high rigidity • Has dimensions nearly equal to the Full-Ball LM Guide Model HSR, the de facto global standard • Superb capability to absorb mounting error	• Machining centers • NC lathes • XYZ axes of heavy cutting machine tools • Grinding head feeding axes of grinding machines • Components requiring a heavy moment and high accuracy • NC milling machines • Horizontal milling machines • Gantry five-axis milling machines • Z axes of electric discharge machines • Wire-cut electric discharge machines • Car elevators • Food-related machines • Testing machines • Vehicle doors • Printed circuit board drilling machines • Automatic tool changers • Construction equipment • Shield machines • Semiconductor/liquid crystal manufacturing equipment
	24 to 90	47 to 170		
	24 to 90	34 to 126		
	24 to 90	34 to 126		
	28 to 80	34 to 100		
	28 to 80	34 to 100		

Classification		Type		Dimensional table	Load capacity diagram	Basic load rating (kN)	
						Basic dynamic load rating	Basic static load rating
4-way equal load type	Full-Ball LM Guide models Heavy-load, high-rigidity types		HSR-XSC	▶A1-192		0.85 to 3.95	1.24 to 5.39
			HSR-C/XC	▶A1-194		1.2 to 195	2.02 to 228
			HSR-M1C	▶A1-388		10.9 to 53.9	15.7 to 70.2
			HSR-LC/XLC	▶A1-194		1.5 to 249	2.8 to 323
			HSR-M1LC	▶A1-388		14.2 to 65	22.9 to 91.7
			HSR-A	▶A1-206		304	355
			HSR-LA	▶A1-206		367	464
			HSR-CA/XCA	▶A1-202		19.8 to 304	27.4 to 355
			HSR-HA/XHA	▶A1-202		23.9 to 518	35.8 to 728
			HSR-B	▶A1-206		304	355
			HSR-LB	▶A1-206		367	464
			HSR-CB/XCB	▶A1-204		19.8 to 304	27.4 to 355
			HSR-HB/XHB	▶A1-204		23.9 to 518	35.8 to 728
			HSR-XSR	▶A1-196		0.85 to 3.95	1.24 to 5.39
			HSR-R/XR	▶A1-198		1.2 to 304	2.02 to 355
			HSR-M1R	▶A1-390		10.9 to 53.9	15.7 to 70.2
			HSR-LR/XLR	▶A1-198		1.5 to 367	2.8 to 464
			HSR-M1LR	▶A1-390		14.2 to 65	22.9 to 91.7
			HSR-HR	▶A1-208		441 to 518	540 to 728
	LM Guide for medium-to-low vacuums		HSR-M1VV	▶A1-434		10.9	15.7
	Full-Ball LM Guide models Side-mount types		HSR-YR/XYR	▶A1-200		10.9 to 195	15.7 to 228
			HSR-M1YR	▶A1-392		10.9 to 53.9	15.7 to 70.2

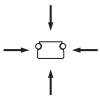
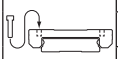
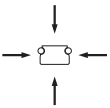
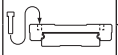
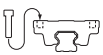
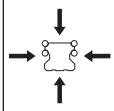
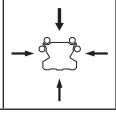
	External dimensions (mm)		Features	Major applications
	Height	Width		
	10 to 19	24 to 40	• Heavy load and high rigidity • De facto global standard • Superb capability to absorb mounting error • Stainless steel type also available as standard • Type M1, achieving max service temperature of 150℃, also available • Type M2, with high corrosion resistance, also available (Basic dynamic load rating: 2.11 to 5.57 kN) (Basic static load rating: 2.04 to 5.15 kN)	• Machining centers • NC lathes • XYZ axes of heavy cutting machine tools • Grinding head feeding axes of grinding machines • Components requiring a heavy moment and high accuracy • NC milling machines • Horizontal milling machines • Gantry five axis milling machines • Z axis of electric discharge machines • Wire-cut electric discharge machines • Car elevators • Food-related machines • Testing machines • Vehicle doors • Printed circuit board drilling machines • Automatic tool changers • Construction equipment • Shield machines • Semiconductor/liquid crystal manufacturing equipment
	10 to 90	24 to 170		
	24 to 48	47 to 100		
	10 to 90	24 to 170		
	24 to 48	47 to 100		
	110	215		
	110	215		
	30 to 110	63 to 215		
	30 to 145	63 to 350		
	110	215		
	110	215		
	30 to 110	63 to 215		
	30 to 145	63 to 350		
	11 to 20	16 to 27		
	11 to 110	16 to 156		
	28 to 55	34 to 70		
	11 to 110	16 to 156		
	28 to 55	34 to 70		
	120 to 145	200 to 266		
	28	34	• Can be used in a range of environments from atmospheric pressure to a vacuum of (10^{-3} Pa) • Allows baking temperatures of up to 200℃. If the baking temperature exceeds 100℃, multiply the basic load rating with the temperature coefficient.	• Medical equipment • Semiconductor/liquid crystal manufacturing equipment
	28 to 90	33.5 to 124.5	• Mounting holes on the side faces of the LM block allow for easy mounting and reduced mounting height when using two units facing each other • Heavy load and high rigidity • Superb capability to absorb mounting error • Stainless steel type also available as standard • Type M1, achieving max service temperature of 150℃, also available	• Cross rails of gantry machine tools • Z axes of woodworking machines • Z axes of measuring instruments • Components opposed to each other
	28 to 55	33.5 to 69.5		

Classification		Type		Dimensional table	Load capacity diagram	Basic load rating (kN)	
						Basic dynamic load rating	Basic static load rating
4-way equal load type	Full-Ball LM Guide models with high rigidity in the rolling direction		HDR-SC	▶A1-366		7.07 to 38.3	8.43 to 43.2
			HDR-C	▶A1-366		10.9 to 195	15.7 to 228
			HDR-LC	▶A1-366		13.7 to 249	21.7 to 323
			HDR-SR	▶A1-368		15.3	19
			HDR-R	▶A1-368		10.9 to 195	15.7 to 228
			HDR-LR	▶A1-368		13.7 to 249	21.7 to 323
			HDR-SV	▶A1-370		7.07 to 38.3	8.43 to 43.2
			HDR-V	▶A1-370		10.9 to 135	15.7 to 170
			HDR-LV	▶A1-370		13.7 to 161	21.7 to 219
			HDR-US	▶A1-372		12.8 to 18.9	14.8 to 21.3
			HDR-UT	▶A1-372		18.7 to 27.6	25.3 to 36.4
			HDR-UV	▶A1-374		12.8 to 18.9	14.8 to 21.3
			HDR-UW	▶A1-374		18.7 to 27.6	25.3 to 36.4
	Full-Ball LM Guide models Special LM rail types		JR-A	▶A1-334		27.6 to 121	36.4 to 146
			JR-B	▶A1-334		27.6 to 121	36.4 to 146
			JR-R	▶A1-334		27.6 to 121	36.4 to 146

	External dimensions (mm)		Features	Major applications
	Height	Width		
	24 to 48	47 to 82	• High rigidity in the rolling direction • Has dimensions nearly equal to the Full-Ball LM Guide Model HSR, the de facto global standard • 4-way equal load type	• Machining centers • NC lathes • XYZ axes of heavy cutting machine tools • Grinding head feeding axes of grinding machines • Single-axis rolling applications with rolling moments that require high rigidity • Woodworking machines • Platform doors • Conveyance systems • Semiconductor/liquid crystal manufacturing equipment • Vehicle doors • Door closing devices
	24 to 90	47 to 170		
	24 to 90	47 to 170		
	30	44		
	28 to 90	34 to 126		
	28 to 90	34 to 126		
	24 to 48	34 to 70		
	24 to 70	34 to 100		
	24 to 70	34 to 100		
	28 to 33	59 to 73	• High rigidity in the rolling direction • Thin and compact design with 4-way equal load capacity	
	28 to 33	59 to 73		
	28 to 33	42 to 48		
	28 to 33	42 to 48		
	61 to 114	70 to 140	• The thin center of the LM rail allows these models to absorb error and provide smooth motion even if two rails used together are not completely parallel. • Since the LM rail has a highly rigid cross-sectional shape, it can be used as a structural component	• Automated warehouses • Garages • Gantry robots • FMS traveling rails • Elevators • Conveyance systems • Welding machines • Lifters • Cranes • Forklifts • Coating machines • Shield machines • Stage settings
	61 to 114	70 to 140		
	65 to 124	48 to 100		

Classification		Type		Dimensional table	Load capacity diagram	Basic load rating (kN)	
						Basic dynamic load rating	Basic static load rating
4-way equal load type	Caged Ball Cross LM Guide		SCR	▶A1-172		36.8 to 253	64.7 to 408
	Full-Ball LM Guide Orthogonal type		CSR	▶A1-320		10.9 to 100	15.7 to 135
	Caged Ball LM Guide models Wide types with low centers of gravity		SHW-CA	▶A1-146		4.31 to 70.2	5.66 to 91.4
			SHW-CR, HR	▶A1-148		4.31 to 70.2	5.66 to 91.4
	Full-Ball LM Guide models Wide types with low centers of gravity		HRW-CA	▶A1-254		5.53 to 80.3	9.1 to 109
			HRW-CR, LRM	▶A1-256		3.29 to 62.4	7.16 to 86.3
	Full-Ball Straight-and-curved Guide		HMG	▶A1-350		2.56 to 66.2	Straight section 4.23 to 66.7 Curved section 0.44 to 36.2
	Caged Ball LM Guide finite stroke		EPF	▶A1-180		0.90 to 3.71	1.60 to 5.88
	Full-Ball LM Guide models Separate types		HR, HR-T	▶A1-288		2.82 to 226	3.48 to 232
Interchangeable designs			GSR-T	▶A1-300		8.42 to 37	9.77 to 39.1
			GSR-V	▶A1-300		6.51 to 15.5	6.77 to 15.2
	Full-Ball LM Guide Integrated-rack LM rail type		GSR-R	▶A1-308		15.5 to 37	15.2 to 39.1

	External dimensions (mm)		Features	Major applications
	Height	Width		
	70 to 180	88 to 226	• An XY orthogonal, single-piece LM block allows for a compact XY structure • The possibility of a saddle-less structure allows for machines with lightweight and compact design • Long service life and long-term maintenance-free operation • Low dust generation, low noise, and reduced running sound • Superb high-speed performance	• Low-center-of-gravity precision XY tables • NC lathes • Optical measuring instruments • Automatic lathes • Inspection equipment • Cartesian coordinate robots • Bonding machines • Wire-cut electric discharge machines • Hollow tables • Printed circuit board assemblers • Machine tool tables • Electric discharge machines • XY axes of horizontal machining centers
	47 to 118	38.8 to 129.8	• An XY orthogonal, single-piece LM block allows for a compact XY structure • The possibility of a saddle-less structure allows for machines with lightweight and compact design	
	12 to 50	40 to 162	• Long service life and long-term maintenance-free operation • Low dust generation, low noise, and reduced running sound • Superb high-speed performance • Smooth motion in all mounting orientations • Wide, space-saving structure with a low center of gravity • Stainless steel type also available as standard	• Z axes of IC printed circuit board drilling machines • Z axes of small electric discharge machines • Loaders • Machining centers • NC lathes • Robots • Wire-cut electric discharge machines • APC • Semiconductor/liquid crystal manufacturing equipment • Measuring instruments • Wafer transfer equipment • Construction equipment • Railroad vehicles
	12 to 50	30 to 130		
	17 to 60	60 to 200	• 4-way equal load capacity, thin, and highly rigid • Wide, space-saving structure with a low center of gravity • Stainless steel type also available as standard	
	12 to 50	30 to 130		
	24 to 90	47 to 170	• Freedom of design • Cost reduction through simplified structure	• Large swivel bases • Pendulum cars for railroads • Pantagraphs • Control units • Optical measuring machines • Tool grinders • X-Ray machines • CT scanners • Medical equipment • Stage settings • Car elevators • Amusement machines • Turntables • Tool changers
	8 to 16	17 to 32	• Caged Ball effect through use of a retainer • Smooth movement with minimal rolling variation • 4-groove construction in a compact body	• Semiconductor manufacturing equipment • Medical equipment • Inspection equipment • Industrial machinery
	8.5 to 60	18 to 125	• Low-profile and highly rigid with a space-saving structure • Interchangeable with cross-roller guide • Adjustable preload • Stainless steel type also available as standard	• XYZ axes of electric discharge machines • Precision tables • XZ axes of NC lathes • Assembly robots • Conveyance systems • Machining centers • Wire-cut electric discharge machines • Tool changers • Woodworking machines
	20 to 38	32 to 68	• LM block and LM rail are both interchangeable • Adjustable preload • Capable of absorbing error in vertical level and horizontal parallelism	• Industrial robots • Various conveyance systems • Automated warehouses • Palette changers • Automatic tool changers • Door closing devices • Guides using molded aluminum bases • Welding machines • Coating machines • Car washing machines
	20 to 30	32 to 50		
	30 to 38	59.91 to 80.18	• Integrated-rack LM rail design eliminates assembly and adjustment work • Integrated-rack LM rail design enables a space-saving structure • Capable of supporting long strokes	

Classification		Type		Dimensional table	Load capacity diagram	Basic load rating (kN)	
						Basic dynamic load rating	Basic static load rating
Miniature types	Caged Ball LM Guide models		SRS-S	▶A1-158		1.09 to 4.5	0.964 to 3.39
			SRS-M			0.439 to 16.5	0.468 to 20.2
			SRS-N			0.515 to 9.71	0.586 to 8.55
			SRS-WS	▶A1-162		1.38 to 6.64	1.35 to 5.94
			SRS-WM			0.584 to 9.12	0.703 to 8.55
			SRS-WN			0.746 to 12.4	0.996 to 12.1
	Full-Ball LM Guide models		RSX-SM	▶A1-266		0.95 to 9.02	1.16 to 10.6
			RSX-M	▶A1-266		1.16 to 13.3	1.54 to 18.6
			RSX-M1	▶A1-410		2.22 to 5.59	3.06 to 6.78
			RSX-NM	▶A1-266		0.45 to 16.5	0.70 to 25.2
			RSX-M1N	▶A1-410		2.94 to 8.27	4.59 to 11.8
			RSX-WSM	▶A1-270		1.06 to 5.59	1.35 to 6.78
			RSX-WM	▶A1-270		1.63 to 7.43	2.51 to 10.1
			RSX-M1W	▶A1-412		2.80 to 7.43	4.28 to 10.1
			RSX-WNM	▶A1-270		0.64 to 9.87	1.17 to 15.2
			RSX-M1WN	▶A1-412		3.48 to 9.87	5.81 to 15.2
			RSR-M	▶A1-278		0.18 to 8.82	0.27 to 12.7
			RSR-M1V	▶A1-420		8.82	12.7
			RSR-N	▶A1-278		0.3 to 14.2	0.44 to 20.6
			RSR-M1N	▶A1-420		14.2	20.6
	Full-Ball LM Guide models Wide types		RSR-WM/WV	▶A1-278		0.25 to 6.66	0.47 to 9.8
			RSR-WN	▶A1-278		0.39 to 9.91	0.75 to 14.9
	Full-Ball LM Guide Orthogonal type		MX	▶A1-326		0.59 to 2.04	1.1 to 3.21
Circular arc type	Full-Ball LM Guide		HCR	▶A1-342		4.7 to 141	8.53 to 215
Self-aligning type	Full-Ball LM Guide		NSR-TBC	▶A1-356		9.41 to 90.8	18.6 to 152

	External dimensions (mm)		Features	Major applications
	Height	Width		
	8 to 16	17 to 32	• Long service life and long-term maintenance-free operation • Low dust generation, low noise, and reduced running sound • Superb high-speed performance • Smooth motion in all mounting orientations • Stainless steel type also available as standard • Lightweight and compact	• IC/LSI manufacturing machines • Hard disc drives • Slide units of OA equipment • Wafer transfer equipment • Printed circuit board assembly tables • Medical equipment • Electronic components of electron microscopes • Optical stages • Steppers • Plotting machines • IC bonding machine feed mechanisms • Inspection equipment
	6 to 25	17 to 48		
	6 to 16	12 to 32		
	9 to 16	25 to 60		
	6.5 to 16	17 to 60		
	8 to 25	17 to 48	• Lightweight and compact • Smooth motion in all mounting orientations • Stainless steel type also available as standard • Type M1, achieving max service temperature of 150°C, also available	• IC/LSI manufacturing machines • Hard disc drives • Slide units of OA equipment • Wafer transfer equipment • Printed circuit board assembly tables • Medical equipment • Electronic components of electron microscopes • Optical stages • Steppers • Plotting machines • IC bonding machine feed mechanisms • Inspection equipment
	8 to 25	17 to 48		
	10 to 16	20 to 32		
	6 to 25	12 to 48		
	10 to 16	20 to 32		
	9 to 16	25 to 60		
	9 to 16	25 to 60		
	12 to 16	30 to 60		
	6.5 to 16	17 to 60		
	12 to 16	30 to 60		
	4 to 25	8 to 46	• Ultra-compact • Stainless steel type also available as standard • Long type with increased load capacity also offered as standard • Type M1, achieving max service temperature of 150°C, also available	
	25	46		
	4 to 25	8 to 46		
	25	46		
	4.5 to 16	12 to 60	• Stainless steel type also available as standard • Long type with increased load capacity also offered as standard	
	4.5 to 16	12 to 60		
	10 to 14.5	15.2 to 30.2	• An XY orthogonal, single-piece LM block allows for a compact XY structure • Stainless steel type also available as standard	• IC/LSI manufacturing machines • Inspection equipment • Slide units of OA equipment • Wafer transfer equipment • IC bonding machine feed mechanisms • Printed circuit board assembly tables • Medical equipment • Electronic components of electron microscopes • Optical stages
	18 to 90	39 to 170	• Circular motion guide in a 4-way equal load design • Highly accurate circular motion without play • Allows efficient design with the LM block placed in the load point • Easily achieves large circular motion	• Large swivel bases • Pendulum cars for railroads • Pantagraphs • Control units • Optical measuring machines • Tool grinders • X-Ray machines • CT scanners • Medical equipment • Stage settings • Car elevators • Amusement machines • Turntables • Tool changers
	40 to 105	70 to 175	• Self-aligns on the mounting surface allowing for use after rough installation • Adjustable preload • Can be mounted on a black steel plate	• XY axes of ordinary industrial machinery • Various conveyance systems • Automated warehouses • Palette changers • Automatic coating machines • Various welding machines

Applied Load

The LM Guide is capable of receiving loads and moments in all directions whether they are generated by the mounting orientation and position, the location of the center of gravity of the moving object, the position of the thrust, the acceleration, or the cutting resistance.

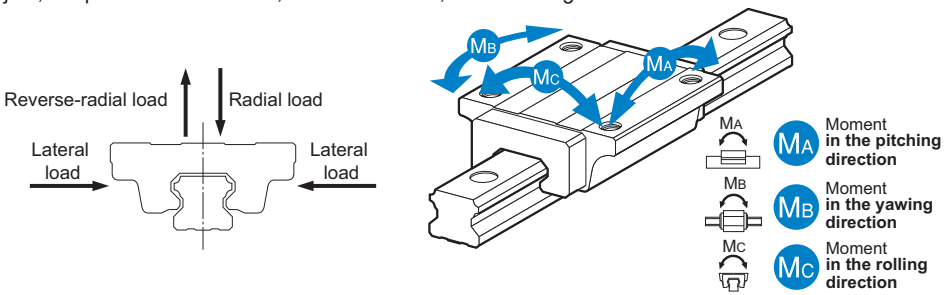


Fig. 1 Directions of the Loads Applied on the LM Guide

Calculating an Applied Load

Single-Axis Use

● **Moment Equivalence**

When the space to install the LM Guide is limited, you may have to use only one LM block, or two LM blocks in close contact with each other. In such a setting, the load distribution is not uniform. As a result, an excessive load is applied in localized areas (i.e., both ends) as shown in Fig. 2. Continued use under such conditions may result in flaking in those areas, consequently shortening the service life. In such a case, calculate the actual load by multiplying the moment value by any one of the equivalent-moment factors specified in Table 1 to Table 6.

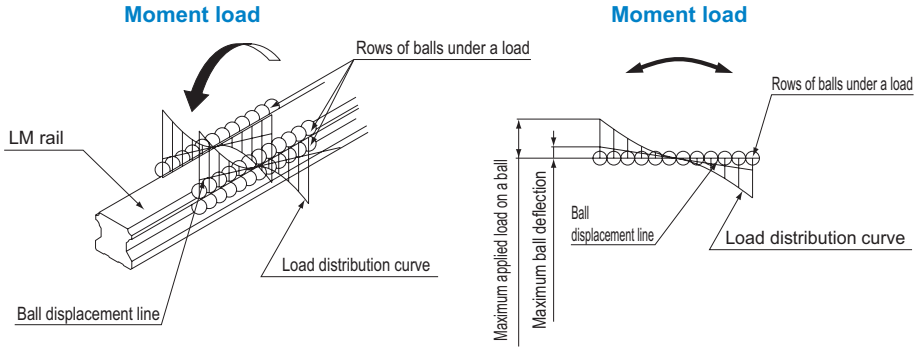


Fig. 2 Ball Load when a Moment is Applied

An equivalent-load equation applicable when a moment acts on an LM Guide is shown below.

$$P = K \cdot M$$

P : Equivalent load per LM Guide (N)
K : Equivalent moment factor
M : Applied moment (N·mm)

● Equivalent Factor

Since the rated load is equivalent to the permissible moment, the equivalent factor to be multiplied when equalizing the M_A, M_B, and M_C moments to the applied load per block is obtained by dividing the rated loads in the corresponding directions.

With models other than 4-way equal load types, however, the load ratings in the 4 directions differ from each other. Therefore, the equivalent factor values for the M_A and M_C moments also differ depending on whether the direction is radial or reverse radial.

■Equivalent Factors for the M_A Moment

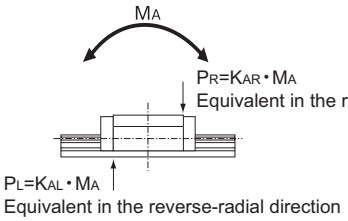


Fig. 3 Equivalent Factors for the M_A Moment

Equivalent factors for the M_A Moment

- Equivalent factor in the radial direction: $K_{AR}=\frac{C_0}{M_A}$
- Equivalent factor in the reverse-radial direction: $K_{AL}=\frac{C_{0L}}{M_A}$

$$\frac{C_0}{K_{AR}\cdot M_A}=\frac{C_{0L}}{K_{AL}\cdot M_A}=1$$

■Equivalent Factors for the M_B Moment

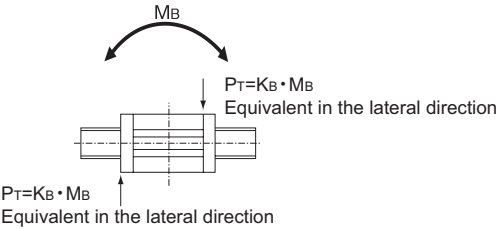


Fig. 4 Equivalent Factors for the M_B Moment

Equivalent factors for the M_B Moment

- Equivalent factor in the lateral directions: $K_B=\frac{C_{0T}}{M_B}$

$$\frac{C_{0T}}{K_B\cdot M_B}=1$$

■Equivalent Factors for the M_C Moment

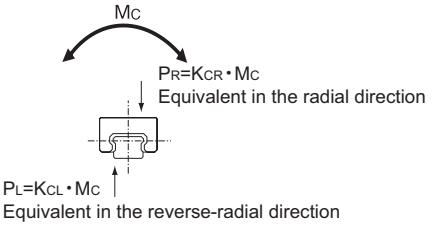


Fig. 5 Equivalent Factors for the M_C Moment

Equivalent factors for the M_C Moment

- Equivalent factor in the radial direction: $K_{CR}=\frac{C_0}{M_C}$
- Equivalent factor in the reverse-radial direction: $K_{CL}=\frac{C_{0L}}{M_C}$

$$\frac{C_0}{K_{CR}\cdot M_C}=\frac{C_{0L}}{K_{CL}\cdot M_C}=1$$

C_0	: Basic static load rating (radial direction)	(N)
C_{0L}	: Basic static load rating (reverse-radial direction)	(N)
C_{0T}	: Basic static load rating (lateral direction)	(N)
P_R	: Calculated load (radial direction)	(N)
P_L	: Calculated load (reverse-radial direction)	(N)
P_T	: Calculated load (lateral direction)	(N)

Table 1: Equivalent Factors (Models SHS, SSR, and SVR)

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
SHS	15	1.38×10^{-1}		2.69×10^{-2}		1.38×10^{-1}	2.69×10^{-2}	1.50×10^{-1}	
	15L	1.07×10^{-1}		2.22×10^{-2}		1.07×10^{-1}	2.22×10^{-2}	1.50×10^{-1}	
	20	1.15×10^{-1}		2.18×10^{-2}		1.15×10^{-1}	2.18×10^{-2}	1.06×10^{-1}	
	20L	8.85×10^{-2}		1.79×10^{-2}		8.85×10^{-2}	1.79×10^{-2}	1.06×10^{-1}	
	25	9.25×10^{-2}		1.90×10^{-2}		9.25×10^{-2}	1.90×10^{-2}	9.29×10^{-2}	
	25L	7.62×10^{-2}		1.62×10^{-2}		7.62×10^{-2}	1.62×10^{-2}	9.29×10^{-2}	
	30	8.47×10^{-2}		1.63×10^{-2}		8.47×10^{-2}	1.63×10^{-2}	7.69×10^{-2}	
	30L	6.52×10^{-2}		1.34×10^{-2}		6.52×10^{-2}	1.34×10^{-2}	7.69×10^{-2}	
	35	6.95×10^{-2}		1.43×10^{-2}		6.95×10^{-2}	1.43×10^{-2}	6.29×10^{-2}	
	35L	5.43×10^{-2}		1.16×10^{-2}		5.43×10^{-2}	1.16×10^{-2}	6.29×10^{-2}	
	45	6.13×10^{-2}		1.24×10^{-2}		6.13×10^{-2}	1.24×10^{-2}	4.69×10^{-2}	
	45L	4.79×10^{-2}		1.02×10^{-2}		4.79×10^{-2}	1.02×10^{-2}	4.69×10^{-2}	
	55	4.97×10^{-2}		1.02×10^{-2}		4.97×10^{-2}	1.02×10^{-2}	4.02×10^{-2}	
	55L	3.88×10^{-2}		8.30×10^{-3}		3.88×10^{-2}	8.30×10^{-3}	4.02×10^{-2}	
	65	3.87×10^{-2}		7.91×10^{-3}		3.87×10^{-2}	7.91×10^{-3}	3.40×10^{-2}	
	65L	3.06×10^{-2}		6.51×10^{-3}		3.06×10^{-2}	6.51×10^{-3}	3.40×10^{-2}	
SSR	15XW(XTB)	2.08×10^{-1}	1.04×10^{-1}	3.75×10^{-2}	1.87×10^{-2}	1.46×10^{-1}	2.59×10^{-2}	1.71×10^{-1}	8.57×10^{-2}
	15XV(XSB)	3.19×10^{-1}	1.60×10^{-1}	5.03×10^{-2}	2.51×10^{-2}	2.20×10^{-1}	3.41×10^{-2}	1.71×10^{-1}	8.57×10^{-2}
	20XW(XTB)	1.69×10^{-1}	8.46×10^{-2}	3.23×10^{-2}	1.62×10^{-2}	1.19×10^{-1}	2.25×10^{-2}	1.29×10^{-1}	6.44×10^{-2}
	20XV(XSB)	2.75×10^{-1}	1.37×10^{-1}	4.28×10^{-2}	2.14×10^{-2}	1.89×10^{-1}	2.89×10^{-2}	1.29×10^{-1}	6.44×10^{-2}
	25XW(XTB)	1.41×10^{-1}	7.05×10^{-2}	2.56×10^{-2}	1.28×10^{-2}	9.86×10^{-2}	1.77×10^{-2}	1.10×10^{-1}	5.51×10^{-2}
	25XV(XSB)	2.15×10^{-1}	1.08×10^{-1}	3.40×10^{-2}	1.70×10^{-2}	1.48×10^{-1}	2.31×10^{-2}	1.10×10^{-1}	5.51×10^{-2}
	30XW(XTB)	1.18×10^{-1}	5.91×10^{-2}	2.19×10^{-2}	1.10×10^{-2}	8.26×10^{-2}	1.52×10^{-2}	9.22×10^{-2}	4.61×10^{-2}
	30XV(XSB)	1.85×10^{-1}	9.24×10^{-2}	4.69×10^{-2}	2.34×10^{-2}	1.27×10^{-1}	3.19×10^{-2}	9.16×10^{-2}	4.58×10^{-2}
	35XW(XTB)	1.01×10^{-1}	5.03×10^{-2}	1.92×10^{-2}	9.60×10^{-3}	7.04×10^{-2}	1.33×10^{-2}	7.64×10^{-2}	3.82×10^{-2}
	35XV(XSB)	1.58×10^{-1}	7.91×10^{-2}	4.04×10^{-2}	2.02×10^{-2}	1.09×10^{-1}	2.75×10^{-2}	7.59×10^{-2}	3.80×10^{-2}
SVR	25	1.13×10^{-1}	7.28×10^{-2}	2.25×10^{-2}	1.45×10^{-2}	7.14×10^{-2}	1.43×10^{-2}	9.59×10^{-2}	6.17×10^{-2}
	25L	9.14×10^{-2}	5.88×10^{-2}	1.85×10^{-2}	1.19×10^{-2}	5.80×10^{-2}	1.17×10^{-2}	9.59×10^{-2}	6.17×10^{-2}
	30	1.01×10^{-1}	6.50×10^{-2}	1.89×10^{-2}	1.21×10^{-2}	6.36×10^{-2}	1.19×10^{-2}	8.45×10^{-2}	5.43×10^{-2}
	30L	7.56×10^{-2}	4.86×10^{-2}	1.57×10^{-2}	1.01×10^{-2}	4.79×10^{-2}	1.00×10^{-2}	8.45×10^{-2}	5.43×10^{-2}
	35	9.19×10^{-2}	5.91×10^{-2}	1.68×10^{-2}	1.08×10^{-2}	5.77×10^{-2}	1.06×10^{-2}	7.08×10^{-2}	4.55×10^{-2}
	35L	6.80×10^{-2}	4.37×10^{-2}	1.39×10^{-2}	8.97×10^{-3}	4.31×10^{-2}	8.86×10^{-3}	7.08×10^{-2}	4.55×10^{-2}
	45	6.73×10^{-2}	4.33×10^{-2}	1.35×10^{-2}	8.71×10^{-3}	4.25×10^{-2}	8.59×10^{-3}	5.32×10^{-2}	3.42×10^{-2}
	45L	5.40×10^{-2}	3.47×10^{-2}	1.10×10^{-2}	7.09×10^{-3}	3.41×10^{-2}	6.97×10^{-3}	5.30×10^{-2}	3.41×10^{-2}
	55	5.89×10^{-2}	3.79×10^{-2}	1.14×10^{-2}	7.35×10^{-3}	3.72×10^{-2}	7.24×10^{-3}	4.63×10^{-2}	2.98×10^{-2}
	55L	4.55×10^{-2}	2.92×10^{-2}	9.45×10^{-3}	6.08×10^{-3}	2.89×10^{-2}	6.02×10^{-3}	4.63×10^{-2}	2.98×10^{-2}
	65	4.85×10^{-2}	3.12×10^{-2}	1.01×10^{-2}	6.48×10^{-3}	3.06×10^{-2}	6.40×10^{-3}	3.91×10^{-2}	2.51×10^{-2}
	65L	3.58×10^{-2}	2.30×10^{-2}	7.73×10^{-3}	4.97×10^{-3}	2.28×10^{-2}	4.93×10^{-3}	3.91×10^{-2}	2.51×10^{-2}

K_{AR1} : Equivalent factor in the M_A radial direction when one LM block is used

K_{AL1} : Equivalent factor in the M_A reverse-radial direction when one LM block is used

K_{AR2} : Equivalent factor in the M_A radial direction when two LM blocks are used in close contact with each other

K_{AL2} : Equivalent factor in the M_A reverse-radial direction when two LM blocks are used in close contact with each other

K_{B1} : Equivalent factor in the M_B when one LM block is used

K_{B2} : Equivalent factor in the M_B when two LM blocks are used in close contact with each other

K_{CR} : Equivalent factor in the M_C radial direction

K_{CL} : Equivalent factor in the M_C reverse-radial direction

Table 2: Equivalent Factors (Models SVS, SHW, and SRS)

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
SVS	25	1.09×10^{-1}	9.14×10^{-2}	2.17×10^{-2}	1.82×10^{-2}	1.00×10^{-1}	2.00×10^{-2}	9.95×10^{-2}	8.35×10^{-2}
	25L	8.82×10^{-2}	7.40×10^{-2}	1.78×10^{-2}	1.50×10^{-2}	8.13×10^{-2}	1.64×10^{-2}	9.95×10^{-2}	8.35×10^{-2}
	30	9.71×10^{-2}	8.15×10^{-2}	1.82×10^{-2}	1.52×10^{-2}	8.95×10^{-2}	1.67×10^{-2}	8.78×10^{-2}	7.37×10^{-2}
	30L	7.29×10^{-2}	6.11×10^{-2}	1.51×10^{-2}	1.27×10^{-2}	6.72×10^{-2}	1.39×10^{-2}	8.78×10^{-2}	7.37×10^{-2}
	35	8.84×10^{-2}	7.42×10^{-2}	1.61×10^{-2}	1.35×10^{-2}	8.14×10^{-2}	1.48×10^{-2}	7.36×10^{-2}	6.17×10^{-2}
	35L	6.56×10^{-2}	5.50×10^{-2}	1.34×10^{-2}	1.13×10^{-2}	6.04×10^{-2}	1.24×10^{-2}	7.36×10^{-2}	6.17×10^{-2}
	45	6.48×10^{-2}	5.44×10^{-2}	1.30×10^{-2}	1.09×10^{-2}	5.98×10^{-2}	1.20×10^{-2}	5.45×10^{-2}	4.57×10^{-2}
	45L	5.22×10^{-2}	4.38×10^{-2}	1.07×10^{-2}	8.94×10^{-3}	4.81×10^{-2}	9.81×10^{-3}	5.44×10^{-2}	4.56×10^{-2}
	55	5.67×10^{-2}	4.76×10^{-2}	1.10×10^{-2}	9.24×10^{-3}	5.23×10^{-2}	1.01×10^{-2}	4.78×10^{-2}	4.01×10^{-2}
	55L	4.39×10^{-2}	3.68×10^{-2}	9.12×10^{-3}	7.65×10^{-3}	4.05×10^{-2}	8.40×10^{-3}	4.78×10^{-2}	4.01×10^{-2}
	65	4.67×10^{-2}	3.92×10^{-2}	9.72×10^{-3}	8.15×10^{-3}	4.30×10^{-2}	8.95×10^{-3}	4.04×10^{-2}	3.39×10^{-2}
	65L	3.46×10^{-2}	2.90×10^{-2}	7.46×10^{-3}	6.26×10^{-3}	3.19×10^{-2}	6.88×10^{-3}	4.04×10^{-2}	3.39×10^{-2}
SHW	12	2.48×10^{-1}		4.69×10^{-2}		2.48×10^{-1}	4.69×10^{-2}	1.40×10^{-1}	
	12HR	1.70×10^{-1}		3.52×10^{-2}		1.70×10^{-1}	3.52×10^{-2}	1.40×10^{-1}	
	14	1.92×10^{-1}		3.80×10^{-2}		1.92×10^{-1}	3.80×10^{-2}	9.93×10^{-2}	
	17	1.72×10^{-1}		3.41×10^{-2}		1.72×10^{-1}	3.41×10^{-2}	6.21×10^{-2}	
	21	1.59×10^{-1}		2.95×10^{-2}		1.59×10^{-1}	2.95×10^{-2}	5.57×10^{-2}	
	27	1.21×10^{-1}		2.39×10^{-2}		1.21×10^{-1}	2.39×10^{-2}	4.99×10^{-2}	
	35	8.15×10^{-2}		1.64×10^{-2}		8.15×10^{-2}	1.64×10^{-2}	3.02×10^{-2}	
	50	6.22×10^{-2}		1.24×10^{-2}		6.22×10^{-2}	1.24×10^{-2}	2.30×10^{-2}	
SRS	5M	6.33×10^{-1}		9.20×10^{-2}		6.45×10^{-1}	9.30×10^{-2}	3.85×10^{-1}	
	5GM	6.71×10^{-1}		9.15×10^{-2}		6.66×10^{-1}	9.08×10^{-2}	3.85×10^{-1}	
	5N	5.23×10^{-1}		7.87×10^{-2}		5.32×10^{-1}	7.99×10^{-2}	3.86×10^{-1}	
	5GN	5.25×10^{-1}		7.97×10^{-2}		5.33×10^{-1}	8.12×10^{-2}	3.84×10^{-1}	
	5WM	4.48×10^{-1}		7.30×10^{-2}		4.56×10^{-1}	7.40×10^{-2}	1.96×10^{-1}	
	5WGM	4.58×10^{-1}		7.39×10^{-2}		4.54×10^{-1}	7.34×10^{-2}	1.96×10^{-1}	
	5WN	3.31×10^{-1}		5.93×10^{-2}		3.36×10^{-1}	6.02×10^{-2}	1.96×10^{-1}	
	5WGN	3.31×10^{-1}		5.97×10^{-2}		3.35×10^{-1}	6.05×10^{-2}	1.96×10^{-1}	
	7S	6.03×10^{-1}		7.65×10^{-2}		6.27×10^{-1}	7.91×10^{-2}	2.58×10^{-1}	
	7GS	5.92×10^{-1}		7.89×10^{-2}		6.14×10^{-1}	8.17×10^{-2}	2.58×10^{-1}	
	7M	4.19×10^{-1}		6.76×10^{-2}		4.18×10^{-1}	6.94×10^{-2}	2.58×10^{-1}	
	7GM	4.27×10^{-1}		6.04×10^{-2}		4.43×10^{-1}	6.23×10^{-2}	2.34×10^{-1}	
	7N	2.97×10^{-1}		5.35×10^{-2}		3.07×10^{-1}	5.50×10^{-2}	2.58×10^{-1}	
	7GN	3.11×10^{-1}		5.35×10^{-2}		3.20×10^{-1}	5.51×10^{-2}	2.58×10^{-1}	
	7WS	4.67×10^{-1}		6.89×10^{-2}		4.84×10^{-1}	7.08×10^{-2}	1.36×10^{-1}	
	7WGS	5.23×10^{-1}		6.75×10^{-2}		5.43×10^{-1}	6.95×10^{-2}	1.36×10^{-1}	
	7WM	3.01×10^{-1}		5.32×10^{-2}		3.00×10^{-1}	5.46×10^{-2}	1.36×10^{-1}	
	7WGM	2.83×10^{-1}		4.87×10^{-2}		2.93×10^{-1}	5.02×10^{-2}	1.24×10^{-1}	
	7WN	2.19×10^{-1}		4.16×10^{-2}		2.24×10^{-1}	4.28×10^{-2}	1.36×10^{-1}	
	7WGN	2.20×10^{-1}		4.17×10^{-2}		2.27×10^{-1}	4.31×10^{-2}	1.36×10^{-1}	

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
SRS	9XS	4.86×10^{-1}		6.89×10^{-2}		5.04×10^{-1}	7.11×10^{-2}	2.17×10^{-1}	
	9XGS	5.37×10^{-1}		6.77×10^{-2}		5.57×10^{-1}	7.00×10^{-2}	2.17×10^{-1}	
	9XM	2.95×10^{-1}		5.27×10^{-2}		3.06×10^{-1}	5.43×10^{-2}	2.17×10^{-1}	
	9XGM	3.10×10^{-1}		5.28×10^{-2}		3.19×10^{-1}	5.44×10^{-2}	2.17×10^{-1}	
	9XN	2.13×10^{-1}		4.12×10^{-2}		2.19×10^{-1}	4.23×10^{-2}	2.17×10^{-1}	
	9XGN	2.18×10^{-1}		4.14×10^{-2}		2.24×10^{-1}	4.27×10^{-2}	2.17×10^{-1}	
	9WS	4.10×10^{-1}		5.73×10^{-2}		4.25×10^{-1}	5.63×10^{-2}	1.06×10^{-1}	
	9WGS	4.16×10^{-1}		5.80×10^{-2}		4.30×10^{-1}	5.98×10^{-2}	1.06×10^{-1}	
	9WM	2.37×10^{-1}		4.25×10^{-2}		2.44×10^{-1}	4.37×10^{-2}	1.06×10^{-1}	
	9WGM	2.41×10^{-1}		4.80×10^{-2}		2.41×10^{-1}	4.13×10^{-2}	1.06×10^{-1}	
	9WN	1.74×10^{-1}		3.35×10^{-2}		1.78×10^{-1}	3.44×10^{-2}	1.06×10^{-1}	
	9WGN	1.75×10^{-1}		3.38×10^{-2}		1.73×10^{-1}	3.32×10^{-2}	1.06×10^{-1}	
	12S	4.55×10^{-1}		5.60×10^{-2}		4.55×10^{-1}	5.60×10^{-2}	1.52×10^{-1}	
	12GS	5.04×10^{-1}		5.51×10^{-2}		5.04×10^{-1}	5.51×10^{-2}	1.52×10^{-1}	
	12M	2.94×10^{-1}		4.50×10^{-2}		2.94×10^{-1}	4.50×10^{-2}	1.53×10^{-1}	
	12GM	2.93×10^{-1}		4.49×10^{-2}		2.93×10^{-1}	4.49×10^{-2}	1.53×10^{-1}	
	12N	1.86×10^{-1}		3.51×10^{-2}		1.86×10^{-1}	3.51×10^{-2}	1.53×10^{-1}	
	12GN	1.96×10^{-1}		3.50×10^{-2}		1.96×10^{-1}	3.50×10^{-2}	1.53×10^{-1}	
	12WS	3.22×10^{-1}		5.00×10^{-2}		3.22×10^{-1}	5.00×10^{-2}	7.97×10^{-2}	
	12WGS	3.32×10^{-1}		5.07×10^{-2}		3.32×10^{-1}	5.07×10^{-2}	7.97×10^{-2}	
	12WM	2.00×10^{-1}		3.69×10^{-2}		2.00×10^{-1}	3.69×10^{-2}	7.97×10^{-2}	
	12WGM	2.07×10^{-1}		3.64×10^{-2}		2.07×10^{-1}	3.64×10^{-2}	7.96×10^{-2}	
	12WN	1.44×10^{-1}		2.83×10^{-2}		1.44×10^{-1}	2.83×10^{-2}	7.97×10^{-2}	
	12WGN	1.46×10^{-1}		2.85×10^{-2}		1.46×10^{-1}	2.85×10^{-2}	7.95×10^{-2}	
	15S	3.56×10^{-1}		4.38×10^{-2}		3.56×10^{-1}	4.38×10^{-2}	1.41×10^{-1}	
	15GS	3.37×10^{-1}		4.57×10^{-2}		3.37×10^{-1}	4.57×10^{-2}	1.41×10^{-1}	
	15M	2.17×10^{-1}		3.69×10^{-2}		2.17×10^{-1}	3.69×10^{-2}	1.41×10^{-1}	
	15GM	2.31×10^{-1}		3.61×10^{-2}		2.31×10^{-1}	3.61×10^{-2}	1.41×10^{-1}	
	15N	1.43×10^{-1}		2.73×10^{-2}		1.43×10^{-1}	2.73×10^{-2}	1.41×10^{-1}	
	15GN	1.45×10^{-1}		2.75×10^{-2}		1.45×10^{-1}	2.75×10^{-2}	1.41×10^{-1}	
	15WS	2.34×10^{-1}		3.76×10^{-2}		2.34×10^{-1}	3.76×10^{-2}	4.83×10^{-2}	
	15WGS	2.34×10^{-1}		3.81×10^{-2}		2.34×10^{-1}	3.81×10^{-2}	4.84×10^{-2}	
	15WM	1.67×10^{-1}		2.94×10^{-2}		1.67×10^{-1}	2.94×10^{-2}	4.83×10^{-2}	
	15WGM	1.63×10^{-1}		2.93×10^{-2}		1.63×10^{-1}	2.93×10^{-2}	4.83×10^{-2}	
	15WN	1.13×10^{-1}		2.27×10^{-2}		1.13×10^{-1}	2.27×10^{-2}	4.83×10^{-2}	
	15WGN	1.15×10^{-1}		2.28×10^{-2}		1.15×10^{-1}	2.28×10^{-2}	4.83×10^{-2}	
	20M	1.80×10^{-1}		3.30×10^{-2}		1.86×10^{-1}	3.41×10^{-2}	9.34×10^{-2}	
	20GM	2.10×10^{-1}		3.88×10^{-2}		2.10×10^{-1}	3.87×10^{-2}	1.03×10^{-1}	
	25M	1.14×10^{-1}		2.17×10^{-2}		1.14×10^{-1}	2.17×10^{-2}	8.13×10^{-2}	
	25GM	1.23×10^{-1}		2.32×10^{-2}		1.23×10^{-1}	2.32×10^{-2}	8.75×10^{-2}	

K_{AR1} : Equivalent factor in the M_A radial direction when one LM block is used
K_{AL1} : Equivalent factor in the M_A reverse-radial direction when one LM block is used
K_{AR2} : Equivalent factor in the M_A radial direction when two LM blocks are used in close contact with each other
K_{AL2} : Equivalent factor in the M_A reverse-radial direction when two LM blocks are used in close contact with each other
K_{B1} : Equivalent factor in the M_B when one LM block is used
K_{B2} : Equivalent factor in the M_B when two LM blocks are used in close contact with each other
K_{CR} : Equivalent factor in the M_C radial direction
K_{CL} : Equivalent factor in the M_C reverse-radial direction

Table 3: Equivalent Factors (Models SCR, EPF, HSR, SR, NR-X, and NR)

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
SCR	15S	1.38×10^{-1}		2.69×10^{-2}		1.38×10^{-1}		—	
	20S	1.15×10^{-1}		2.18×10^{-2}		1.15×10^{-1}		—	
	20	8.85×10^{-2}		1.79×10^{-2}		8.85×10^{-2}		—	
	25	9.25×10^{-2}		1.90×10^{-2}		9.25×10^{-2}	1.90×10^{-2}	—	
	30	8.47×10^{-2}		1.63×10^{-2}		8.47×10^{-2}	1.63×10^{-2}	—	
	35	6.95×10^{-2}		1.43×10^{-2}		6.95×10^{-2}	1.43×10^{-2}	—	
	45	6.13×10^{-2}		1.24×10^{-2}		6.13×10^{-2}	1.24×10^{-2}	—	
	65	3.87×10^{-2}		7.91×10^{-3}		3.87×10^{-2}	7.91×10^{-3}	—	
EPF	7M	3.55×10^{-1}		—		3.55×10^{-1}		2.86×10^{-1}	
	9M	3.10×10^{-1}		—		3.10×10^{-1}		2.22×10^{-1}	
	12M	2.68×10^{-1}		—		2.68×10^{-1}		1.67×10^{-1}	
	15M	2.00×10^{-1}		—		2.00×10^{-1}		1.34×10^{-1}	
HSR	8XS	6.93×10^{-1}		8.37×10^{-2}		6.93×10^{-1}	8.37×10^{-2}	2.91×10^{-1}	
	8X	4.42×10^{-1}		6.80×10^{-2}		4.42×10^{-1}	6.80×10^{-2}	2.91×10^{-1}	
	8XL	3.07×10^{-1}		5.58×10^{-2}		3.07×10^{-1}	5.58×10^{-2}	2.91×10^{-1}	
	10XS	4.70×10^{-1}		6.49×10^{-2}		4.70×10^{-1}	6.49×10^{-2}	2.30×10^{-1}	
	10X	3.11×10^{-1}		5.37×10^{-2}		3.11×10^{-1}	5.37×10^{-2}	2.30×10^{-1}	
	10XL	2.32×10^{-1}		4.26×10^{-2}		2.32×10^{-1}	4.26×10^{-2}	2.30×10^{-1}	
	12XS	3.15×10^{-1}		4.64×10^{-2}		3.15×10^{-1}	4.64×10^{-2}	1.95×10^{-1}	
	12X	2.08×10^{-1}		3.73×10^{-2}		2.08×10^{-1}	3.73×10^{-2}	1.95×10^{-1}	
	12XL	1.56×10^{-1}		2.96×10^{-2}		1.56×10^{-1}	2.96×10^{-2}	1.95×10^{-1}	
	15	1.66×10^{-1}		2.98×10^{-2}		1.66×10^{-1}	2.98×10^{-2}	1.57×10^{-1}	
	15L	1.18×10^{-1}		2.33×10^{-2}		1.18×10^{-1}	2.33×10^{-2}	1.57×10^{-1}	
	20	1.26×10^{-1}		2.28×10^{-2}		1.26×10^{-1}	2.28×10^{-2}	1.17×10^{-1}	
	20L	9.88×10^{-2}		1.92×10^{-2}		9.88×10^{-2}	1.92×10^{-2}	1.17×10^{-1}	
	25	1.12×10^{-1}		2.02×10^{-2}		1.12×10^{-1}	2.02×10^{-2}	9.96×10^{-2}	
	25L	8.23×10^{-2}		1.70×10^{-2}		8.23×10^{-2}	1.70×10^{-2}	9.96×10^{-2}	
	30	8.97×10^{-2}		1.73×10^{-2}		8.97×10^{-2}	1.73×10^{-2}	8.24×10^{-2}	
	30L	7.05×10^{-2}		1.44×10^{-2}		7.05×10^{-2}	1.44×10^{-2}	8.24×10^{-2}	
	35	7.85×10^{-2}		1.56×10^{-2}		7.85×10^{-2}	1.56×10^{-2}	6.69×10^{-2}	
	35L	6.17×10^{-2}		1.29×10^{-2}		6.17×10^{-2}	1.29×10^{-2}	6.69×10^{-2}	
	45	6.73×10^{-2}		1.21×10^{-2}		6.73×10^{-2}	1.21×10^{-2}	5.20×10^{-2}	
	45L	5.22×10^{-2}		1.01×10^{-2}		5.22×10^{-2}	1.01×10^{-2}	5.20×10^{-2}	
	55	5.61×10^{-2}		1.03×10^{-2}		5.61×10^{-2}	1.03×10^{-2}	4.26×10^{-2}	
	55L	4.35×10^{-2}		8.56×10^{-3}		4.35×10^{-2}	8.56×10^{-3}	4.26×10^{-2}	
	65	4.49×10^{-2}		9.13×10^{-3}		4.49×10^{-2}	9.13×10^{-3}	3.68×10^{-2}	
	65L	3.29×10^{-2}		7.08×10^{-3}		3.29×10^{-2}	7.08×10^{-3}	3.68×10^{-2}	
	85	3.49×10^{-2}		6.94×10^{-3}		3.49×10^{-2}	6.94×10^{-3}	2.78×10^{-2}	
	85L	2.74×10^{-2}		5.72×10^{-3}		2.74×10^{-2}	5.72×10^{-3}	2.78×10^{-2}	
	100	2.61×10^{-2}		5.16×10^{-3}		2.61×10^{-2}	5.16×10^{-3}	2.24×10^{-2}	
	120	2.37×10^{-2}		4.72×10^{-3}		2.37×10^{-2}	4.72×10^{-3}	1.96×10^{-2}	
	150	2.17×10^{-2}		4.35×10^{-3}		2.17×10^{-2}	4.35×10^{-3}	1.61×10^{-2}	
	15M2A	1.65×10^{-1}		2.89×10^{-2}		1.65×10^{-1}	2.89×10^{-2}	1.86×10^{-1}	
	20M2A	1.23×10^{-1}		2.23×10^{-2}		1.23×10^{-1}	2.23×10^{-2}	1.34×10^{-1}	
	25M2A	1.10×10^{-1}		1.98×10^{-2}		1.10×10^{-1}	1.98×10^{-2}	1.14×10^{-1}	

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
SR	15W(TB)	2.08×10^{-1}	1.04×10^{-1}	3.72×10^{-2}	1.86×10^{-2}	1.46×10^{-1}	2.57×10^{-2}	1.69×10^{-1}	8.43×10^{-2}
	15V(SB)	3.40×10^{-1}	1.70×10^{-1}	5.00×10^{-2}	2.50×10^{-2}	2.34×10^{-1}	3.37×10^{-2}	1.69×10^{-1}	8.43×10^{-2}
	20W(TB)	1.71×10^{-1}	8.56×10^{-2}	3.23×10^{-2}	1.61×10^{-2}	1.20×10^{-1}	2.24×10^{-2}	1.28×10^{-1}	6.40×10^{-2}
	20V(SB)	2.69×10^{-1}	1.34×10^{-1}	4.34×10^{-2}	2.17×10^{-2}	1.86×10^{-1}	2.95×10^{-2}	1.28×10^{-1}	6.39×10^{-2}
	25W(TB)	1.37×10^{-1}	6.85×10^{-2}	2.57×10^{-2}	1.29×10^{-2}	9.61×10^{-2}	1.78×10^{-2}	1.09×10^{-1}	5.47×10^{-2}
	25V(SB)	2.15×10^{-1}	1.08×10^{-1}	3.47×10^{-2}	1.73×10^{-2}	1.49×10^{-1}	2.36×10^{-2}	1.10×10^{-1}	5.48×10^{-2}
	30W(TB)	1.14×10^{-1}	5.71×10^{-2}	2.21×10^{-2}	1.10×10^{-2}	8.01×10^{-2}	1.54×10^{-2}	9.16×10^{-2}	4.58×10^{-2}
	30V(SB)	1.98×10^{-1}	9.92×10^{-2}	2.98×10^{-2}	1.49×10^{-2}	1.37×10^{-1}	2.01×10^{-2}	9.16×10^{-2}	4.58×10^{-2}
	35W(TB)	1.04×10^{-1}	5.21×10^{-2}	1.91×10^{-2}	9.57×10^{-3}	7.30×10^{-2}	1.32×10^{-2}	7.59×10^{-2}	3.80×10^{-2}
	35V(SB)	1.70×10^{-1}	8.50×10^{-2}	2.61×10^{-2}	1.31×10^{-2}	1.17×10^{-1}	1.77×10^{-2}	7.59×10^{-2}	3.80×10^{-2}
	45W(TB)	9.11×10^{-2}	4.56×10^{-2}	1.69×10^{-2}	8.44×10^{-3}	6.38×10^{-2}	1.17×10^{-2}	5.67×10^{-2}	2.83×10^{-2}
	55W(TB)	6.85×10^{-2}	3.42×10^{-2}	1.37×10^{-2}	6.86×10^{-3}	4.80×10^{-2}	9.57×10^{-3}	5.38×10^{-2}	2.69×10^{-2}
	15MSV	4.00×10^{-1}	2.48×10^{-1}	5.89×10^{-2}	3.65×10^{-2}	3.51×10^{-1}	4.98×10^{-2}	2.76×10^{-1}	1.71×10^{-1}
	15MSW	2.43×10^{-1}	1.50×10^{-1}	4.38×10^{-2}	2.72×10^{-2}	2.17×10^{-1}	3.84×10^{-2}	2.74×10^{-1}	1.70×10^{-1}
	20MSV	3.19×10^{-1}	1.97×10^{-1}	5.09×10^{-2}	3.16×10^{-2}	2.77×10^{-1}	4.36×10^{-2}	2.10×10^{-1}	1.30×10^{-1}
	20MSW	1.99×10^{-1}	1.24×10^{-1}	3.77×10^{-2}	2.34×10^{-2}	1.78×10^{-1}	3.33×10^{-2}	2.09×10^{-1}	1.30×10^{-1}
NR-X	25	1.19×10^{-1}	7.64×10^{-2}	2.24×10^{-2}	1.43×10^{-2}	7.47×10^{-2}	1.41×10^{-2}	9.69×10^{-2}	6.20×10^{-2}
	25L	9.18×10^{-2}	5.87×10^{-2}	1.85×10^{-2}	1.18×10^{-2}	5.78×10^{-2}	1.17×10^{-2}	9.69×10^{-2}	6.21×10^{-2}
	25SL	5.13×10^{-2}	3.28×10^{-2}	1.13×10^{-2}	7.24×10^{-3}	3.25×10^{-2}	7.17×10^{-3}	9.69×10^{-2}	6.21×10^{-2}
	30	9.95×10^{-2}	6.37×10^{-2}	1.90×10^{-2}	1.21×10^{-2}	6.23×10^{-2}	1.19×10^{-2}	8.55×10^{-2}	5.47×10^{-2}
	30L	7.65×10^{-2}	4.89×10^{-2}	1.57×10^{-2}	1.00×10^{-2}	4.82×10^{-2}	9.91×10^{-3}	8.55×10^{-2}	5.47×10^{-2}
	30SL	4.27×10^{-2}	2.73×10^{-2}	9.41×10^{-3}	6.02×10^{-3}	2.71×10^{-2}	5.96×10^{-3}	8.55×10^{-2}	5.47×10^{-2}
	35	9.08×10^{-2}	5.81×10^{-2}	1.69×10^{-2}	1.08×10^{-2}	5.67×10^{-2}	1.06×10^{-2}	7.17×10^{-2}	4.59×10^{-2}
	35L	6.88×10^{-2}	4.40×10^{-2}	1.40×10^{-2}	8.96×10^{-3}	4.32×10^{-2}	8.81×10^{-3}	7.17×10^{-2}	4.59×10^{-2}
	35SL	3.66×10^{-2}	2.34×10^{-2}	8.06×10^{-3}	5.16×10^{-3}	2.32×10^{-2}	5.11×10^{-3}	7.17×10^{-2}	4.59×10^{-2}
	45	7.02×10^{-2}	4.50×10^{-2}	1.35×10^{-2}	8.64×10^{-3}	4.37×10^{-2}	8.39×10^{-3}	5.31×10^{-2}	3.40×10^{-2}
	45L	5.25×10^{-2}	3.36×10^{-2}	1.11×10^{-2}	7.11×10^{-3}	3.31×10^{-2}	7.05×10^{-3}	5.31×10^{-2}	3.40×10^{-2}
	45SL	3.20×10^{-2}	2.05×10^{-2}	7.10×10^{-3}	4.54×10^{-3}	2.03×10^{-2}	4.50×10^{-3}	5.31×10^{-2}	3.40×10^{-2}
	55	5.92×10^{-2}	3.79×10^{-2}	1.15×10^{-2}	7.36×10^{-3}	3.72×10^{-2}	7.21×10^{-3}	4.66×10^{-2}	2.98×10^{-2}
	55L	4.66×10^{-2}	2.98×10^{-2}	9.43×10^{-3}	6.02×10^{-3}	2.92×10^{-2}	5.93×10^{-3}	4.66×10^{-2}	2.98×10^{-2}
	55SL	2.13×10^{-2}	1.36×10^{-2}	4.84×10^{-3}	3.10×10^{-3}	1.35×10^{-2}	3.08×10^{-3}	4.66×10^{-2}	2.98×10^{-2}
	65	5.12×10^{-2}	3.28×10^{-2}	1.00×10^{-2}	6.40×10^{-3}	3.21×10^{-2}	6.31×10^{-3}	3.93×10^{-2}	2.52×10^{-2}
	65L	3.66×10^{-2}	2.34×10^{-2}	7.73×10^{-3}	4.93×10^{-3}	2.31×10^{-2}	4.89×10^{-3}	3.93×10^{-2}	2.52×10^{-2}
	65SL	2.02×10^{-2}	1.29×10^{-2}	4.58×10^{-3}	2.93×10^{-3}	1.28×10^{-2}	2.91×10^{-3}	3.93×10^{-2}	2.52×10^{-2}
NR	75	4.21×10^{-2}	2.99×10^{-2}	8.31×10^{-3}	5.90×10^{-3}	3.08×10^{-2}	6.13×10^{-3}	3.16×10^{-2}	2.24×10^{-2}
	75L	3.14×10^{-2}	2.23×10^{-2}	6.74×10^{-3}	4.78×10^{-3}	2.33×10^{-2}	5.04×10^{-3}	3.16×10^{-2}	2.24×10^{-2}
	85	3.70×10^{-2}	2.62×10^{-2}	7.31×10^{-3}	5.19×10^{-3}	2.71×10^{-2}	5.40×10^{-3}	2.80×10^{-2}	1.99×10^{-2}
	85L	2.80×10^{-2}	1.99×10^{-2}	6.07×10^{-3}	4.31×10^{-3}	2.08×10^{-2}	4.55×10^{-3}	2.80×10^{-2}	1.99×10^{-2}
	100	3.05×10^{-2}	2.17×10^{-2}	6.20×10^{-3}	4.41×10^{-3}	2.26×10^{-2}	4.63×10^{-3}	2.38×10^{-2}	1.69×10^{-2}
	100L	2.74×10^{-2}	1.95×10^{-2}	5.46×10^{-3}	3.87×10^{-3}	2.00×10^{-2}	4.00×10^{-3}	2.38×10^{-2}	1.69×10^{-2}

K_{AR1} : Equivalent factor in the M_A radial direction when one LM block is used

K_{AL1} : Equivalent factor in the M_A reverse-radial direction when one LM block is used

K_{AR2} : Equivalent factor in the M_A radial direction when two LM blocks are used in close contact with each other

K_{AL2} : Equivalent factor in the M_A reverse-radial direction when two LM blocks are used in close contact with each other

K_{B1} : Equivalent factor in the M_B when one LM block is used

K_{B2} : Equivalent factor in the M_B when two LM blocks are used in close contact with each other

K_{CR} : Equivalent factor in the M_C radial direction

K_{CL} : Equivalent factor in the M_C reverse-radial direction

Table 4: Equivalent Factors (Models NRS-X, NRS, HRW, and RSX)

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
NRS-X	25	1.15×10^{-3}	9.66×10^{-2}	2.16×10^{-2}	1.81×10^{-2}	1.06×10^{-1}	1.98×10^{-2}	9.51×10^{-2}	7.99×10^{-2}
	25L	8.85×10^{-2}	7.44×10^{-2}	1.79×10^{-2}	1.50×10^{-2}	8.14×10^{-2}	1.64×10^{-2}	9.51×10^{-2}	7.99×10^{-2}
	25SL	4.97×10^{-2}	4.17×10^{-2}	1.10×10^{-2}	9.20×10^{-3}	4.57×10^{-2}	1.01×10^{-2}	9.51×10^{-2}	7.99×10^{-2}
	30	9.58×10^{-2}	8.05×10^{-2}	1.83×10^{-2}	1.53×10^{-2}	8.81×10^{-2}	1.68×10^{-2}	8.40×10^{-2}	7.05×10^{-2}
	30L	7.38×10^{-2}	6.20×10^{-2}	1.51×10^{-2}	1.27×10^{-2}	6.79×10^{-2}	1.39×10^{-2}	8.40×10^{-2}	7.05×10^{-2}
	30SL	4.14×10^{-2}	3.48×10^{-2}	9.12×10^{-3}	7.66×10^{-3}	3.81×10^{-2}	8.38×10^{-3}	8.40×10^{-2}	7.05×10^{-2}
	35	8.73×10^{-2}	7.33×10^{-2}	1.62×10^{-2}	1.36×10^{-2}	8.03×10^{-2}	1.49×10^{-2}	7.04×10^{-2}	5.91×10^{-2}
	35L	6.63×10^{-2}	5.57×10^{-2}	1.35×10^{-2}	1.13×10^{-2}	6.10×10^{-2}	1.24×10^{-2}	7.04×10^{-2}	5.91×10^{-2}
	35SL	3.55×10^{-2}	2.98×10^{-2}	7.81×10^{-3}	6.56×10^{-3}	3.26×10^{-2}	7.18×10^{-3}	7.04×10^{-2}	5.91×10^{-2}
	45	6.78×10^{-2}	5.69×10^{-2}	1.30×10^{-2}	1.09×10^{-2}	6.23×10^{-2}	1.19×10^{-2}	5.22×10^{-2}	4.39×10^{-2}
	45L	5.07×10^{-2}	4.26×10^{-2}	1.07×10^{-2}	8.99×10^{-3}	4.66×10^{-2}	9.86×10^{-3}	5.22×10^{-2}	4.39×10^{-2}
	45SL	3.10×10^{-2}	2.61×10^{-2}	6.87×10^{-3}	5.77×10^{-3}	2.86×10^{-2}	6.32×10^{-3}	5.22×10^{-2}	4.39×10^{-2}
	55	5.71×10^{-2}	4.79×10^{-2}	1.10×10^{-2}	9.24×10^{-3}	5.25×10^{-2}	1.01×10^{-2}	4.58×10^{-2}	3.84×10^{-2}
	55L	4.50×10^{-2}	3.78×10^{-2}	9.14×10^{-3}	7.65×10^{-3}	4.14×10^{-2}	8.39×10^{-3}	4.58×10^{-2}	3.84×10^{-2}
	55SL	2.07×10^{-2}	1.74×10^{-2}	4.69×10^{-3}	3.94×10^{-3}	1.90×10^{-2}	4.31×10^{-3}	4.58×10^{-2}	3.84×10^{-2}
	65	4.93×10^{-2}	4.14×10^{-2}	9.70×10^{-3}	8.15×10^{-3}	4.53×10^{-2}	8.88×10^{-3}	3.86×10^{-2}	3.25×10^{-2}
	65L	3.54×10^{-2}	2.97×10^{-2}	7.47×10^{-3}	6.30×10^{-3}	3.25×10^{-2}	6.86×10^{-3}	3.86×10^{-2}	3.25×10^{-2}
	65SL	1.95×10^{-2}	1.64×10^{-2}	4.44×10^{-3}	3.73×10^{-3}	1.80×10^{-2}	4.08×10^{-3}	3.86×10^{-2}	3.25×10^{-2}
NRS	75	4.05×10^{-2}		8.01×10^{-3}		4.05×10^{-2}	8.01×10^{-3}	3.20×10^{-2}	
	75L	3.03×10^{-2}		6.50×10^{-3}		3.03×10^{-2}	6.50×10^{-3}	3.20×10^{-2}	
	85	3.56×10^{-2}		7.05×10^{-3}		3.56×10^{-2}	7.05×10^{-3}	2.83×10^{-2}	
	85L	2.70×10^{-2}		5.87×10^{-3}		2.70×10^{-2}	5.87×10^{-3}	2.83×10^{-2}	
	100	2.93×10^{-2}		5.97×10^{-3}		2.93×10^{-2}	5.97×10^{-3}	2.41×10^{-2}	
	100L	2.65×10^{-2}		5.27×10^{-3}		2.65×10^{-2}	5.27×10^{-3}	2.41×10^{-2}	
HRW	12	2.72×10^{-1}	1.93×10^{-1}	5.16×10^{-2}	3.65×10^{-2}	5.47×10^{-1}	1.04×10^{-1}	1.40×10^{-1}	9.92×10^{-2}
	14	2.28×10^{-1}	1.61×10^{-1}	4.16×10^{-2}	2.94×10^{-2}	4.54×10^{-1}	8.28×10^{-2}	1.01×10^{-1}	7.18×10^{-2}
	17	1.96×10^{-1}		3.34×10^{-2}		1.96×10^{-1}	3.34×10^{-2}	6.30×10^{-2}	
	21	1.65×10^{-1}		2.90×10^{-2}		1.65×10^{-1}	2.90×10^{-2}	5.89×10^{-2}	
	27	1.30×10^{-1}		2.34×10^{-2}		1.30×10^{-1}	2.34×10^{-2}	5.11×10^{-2}	
	35	8.69×10^{-2}		1.60×10^{-2}		8.69×10^{-2}	1.60×10^{-2}	3.06×10^{-2}	
	50	6.52×10^{-2}		1.22×10^{-2}		6.52×10^{-2}	1.22×10^{-2}	2.35×10^{-2}	
	60	5.80×10^{-2}		1.08×10^{-2}		5.80×10^{-2}	1.08×10^{-2}	1.77×10^{-2}	
RSX	5M	6.68×10^{-1}		9.11×10^{-2}		6.80×10^{-1}	9.24×10^{-2}	3.86×10^{-1}	
	5NM	5.25×10^{-1}		8.01×10^{-2}		5.36×10^{-1}	8.12×10^{-2}	3.86×10^{-1}	
	5WM	4.58×10^{-1}		7.39×10^{-2}		4.65×10^{-1}	7.51×10^{-2}	1.96×10^{-1}	
	5WNM	3.31×10^{-1}		5.98×10^{-2}		3.36×10^{-1}	6.06×10^{-2}	1.96×10^{-1}	

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
RSX	7SM	5.90×10^{-1}		7.87×10^{-2}		6.12×10^{-1}	8.15×10^{-2}	2.59×10^{-1}	
	7M	4.72×10^{-1}		6.68×10^{-2}		4.87×10^{-1}	6.88×10^{-2}	2.59×10^{-1}	
	7NM	3.10×10^{-1}		5.18×10^{-2}		3.20×10^{-1}	5.33×10^{-2}	2.59×10^{-1}	
	7WSM	5.23×10^{-1}		6.75×10^{-2}		5.43×10^{-1}	6.95×10^{-2}	1.36×10^{-1}	
	7WM	3.10×10^{-1}		5.34×10^{-2}		3.20×10^{-1}	5.50×10^{-2}	1.36×10^{-1}	
	7WNM	2.21×10^{-1}		4.18×10^{-2}		2.27×10^{-1}	4.32×10^{-2}	1.36×10^{-1}	
	9SM	5.37×10^{-1}		6.77×10^{-2}		5.57×10^{-1}	7.00×10^{-2}	2.17×10^{-1}	
	9M	3.10×10^{-1}		5.28×10^{-2}		3.19×10^{-1}	5.44×10^{-2}	2.17×10^{-1}	
	9NM	2.17×10^{-1}		4.13×10^{-2}		2.24×10^{-1}	4.27×10^{-2}	2.17×10^{-1}	
	9WSM	4.16×10^{-1}		5.80×10^{-2}		4.30×10^{-1}	5.98×10^{-2}	1.06×10^{-1}	
	9WM	2.31×10^{-1}		4.31×10^{-2}		2.38×10^{-1}	4.43×10^{-2}	1.06×10^{-1}	
	9WNM	1.75×10^{-1}		3.38×10^{-2}		1.81×10^{-1}	3.48×10^{-2}	1.06×10^{-1}	
	12SM	5.04×10^{-1}		5.52×10^{-2}		5.04×10^{-1}	5.52×10^{-2}	1.52×10^{-1}	
	12M	2.96×10^{-1}		4.55×10^{-2}		2.96×10^{-1}	4.55×10^{-2}	1.52×10^{-1}	
	12NM	1.96×10^{-1}		3.50×10^{-2}		1.96×10^{-1}	3.50×10^{-2}	1.52×10^{-1}	
	12WSM	3.32×10^{-1}		5.07×10^{-2}		3.32×10^{-1}	5.07×10^{-2}	7.95×10^{-2}	
	12WM	2.10×10^{-1}		3.69×10^{-2}		2.10×10^{-1}	3.69×10^{-2}	7.95×10^{-2}	
	12WNM	1.46×10^{-1}		2.85×10^{-2}		1.46×10^{-1}	2.85×10^{-2}	7.95×10^{-2}	
	15SM	3.36×10^{-1}		4.58×10^{-2}		3.36×10^{-1}	4.58×10^{-2}	1.41×10^{-1}	
	15M	2.34×10^{-1}		3.65×10^{-2}		2.34×10^{-1}	3.65×10^{-2}	1.41×10^{-1}	
	15NM	1.45×10^{-1}		2.75×10^{-2}		1.45×10^{-1}	2.75×10^{-2}	1.41×10^{-1}	
	15WSM	2.34×10^{-1}		3.81×10^{-2}		2.34×10^{-1}	3.81×10^{-2}	4.82×10^{-2}	
	15WM	1.66×10^{-1}		2.97×10^{-2}		1.66×10^{-1}	2.97×10^{-2}	4.82×10^{-2}	
	15WNM	1.15×10^{-1}		2.28×10^{-2}		1.15×10^{-1}	2.28×10^{-2}	4.82×10^{-2}	
	20SM	2.62×10^{-1}		4.12×10^{-2}		2.18×10^{-1}	3.42×10^{-2}	9.34×10^{-2}	
	20M	1.80×10^{-1}		3.31×10^{-2}		1.50×10^{-1}	2.74×10^{-2}	9.34×10^{-2}	
	20NM	1.29×10^{-1}		2.50×10^{-2}		1.07×10^{-1}	2.07×10^{-2}	9.34×10^{-2}	
	25SM	1.87×10^{-1}		2.88×10^{-2}		1.87×10^{-1}	2.88×10^{-2}	8.14×10^{-2}	
	25M	1.16×10^{-1}		2.17×10^{-2}		1.16×10^{-1}	2.17×10^{-2}	8.14×10^{-2}	
	25NM	8.77×10^{-2}		1.74×10^{-2}		8.77×10^{-2}	1.74×10^{-2}	8.14×10^{-2}	
	9M1	3.10×10^{-1}		5.28×10^{-2}		3.19×10^{-1}	5.44×10^{-2}	2.17×10^{-1}	
	9M1N	2.17×10^{-1}		4.13×10^{-2}		2.24×10^{-1}	4.27×10^{-2}	2.17×10^{-1}	
	9M1W	2.31×10^{-1}		4.31×10^{-2}		2.38×10^{-1}	4.43×10^{-2}	1.06×10^{-1}	
	9M1WN	1.75×10^{-1}		3.38×10^{-2}		1.81×10^{-1}	3.48×10^{-2}	1.06×10^{-1}	
	12M1	2.96×10^{-1}		4.55×10^{-2}		2.96×10^{-1}	4.55×10^{-2}	1.52×10^{-1}	
	12M1N	1.96×10^{-1}		3.50×10^{-2}		1.96×10^{-1}	3.50×10^{-2}	1.52×10^{-1}	
	12M1W	2.10×10^{-1}		3.69×10^{-2}		2.10×10^{-1}	3.69×10^{-2}	7.95×10^{-2}	
	12M1WN	1.46×10^{-1}		2.85×10^{-2}		1.46×10^{-1}	2.85×10^{-2}	7.95×10^{-2}	
	15M1	2.34×10^{-1}		3.65×10^{-2}		2.34×10^{-1}	3.65×10^{-2}	1.41×10^{-1}	
	15M1N	1.45×10^{-1}		2.75×10^{-2}		1.45×10^{-1}	2.75×10^{-2}	1.41×10^{-1}	
	15M1W	1.66×10^{-1}		2.97×10^{-2}		1.66×10^{-1}	2.97×10^{-2}	4.82×10^{-2}	
	15M1WN	1.15×10^{-1}		2.28×10^{-2}		1.15×10^{-1}	2.28×10^{-2}	4.82×10^{-2}	

K_{AR1} : Equivalent factor in the M_A radial direction when one LM block is used

K_{AL1} : Equivalent factor in the M_A reverse-radial direction when one LM block is used

K_{AR2} : Equivalent factor in the M_A radial direction when two LM blocks are used in close contact with each other

K_{AL2} : Equivalent factor in the M_A reverse-radial direction when two LM blocks are used in close contact with each other

K_{B1} : Equivalent factor in the M_B when one LM block is used

K_{B2} : Equivalent factor in the M_B when two LM blocks are used in close contact with each other

K_{CR} : Equivalent factor in the M_C radial direction

K_{CL} : Equivalent factor in the M_C reverse-radial direction

Table 5: Equivalent Factors (Models RSR, HR, GSR, CSR, MX, JR, NSR, and HDR)

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
RSR	2N	6.81×10^{-1}		1.28×10^{-1}		6.81×10^{-1}	1.28×10^{-1}	8.69×10^{-1}	
	2WN	5.10×10^{-1}		9.32×10^{-2}		5.10×10^{-1}	9.32×10^{-2}	4.54×10^{-1}	
	3M	9.20×10^{-1}		1.27×10^{-1}		9.20×10^{-1}	1.27×10^{-1}	6.06×10^{-1}	
	3N	6.06×10^{-1}		1.01×10^{-1}		6.06×10^{-1}	1.01×10^{-1}	6.06×10^{-1}	
	3W	7.03×10^{-1}		1.06×10^{-1}		7.03×10^{-1}	1.06×10^{-1}	3.17×10^{-1}	
	3WN	4.76×10^{-1}		8.27×10^{-2}		4.76×10^{-1}	8.27×10^{-2}	3.17×10^{-1}	
	14WV	2.10×10^{-1}	1.47×10^{-1}	3.89×10^{-2}	2.73×10^{-2}	1.69×10^{-1}	3.10×10^{-2}	8.22×10^{-2}	5.75×10^{-2}
	20M1V	1.68×10^{-1}	1.18×10^{-1}	2.92×10^{-2}	2.04×10^{-2}	1.35×10^{-1}	2.32×10^{-2}	1.30×10^{-1}	9.13×10^{-2}
	20M1N	1.20×10^{-1}	8.39×10^{-2}	2.30×10^{-2}	1.61×10^{-2}	9.68×10^{-2}	1.84×10^{-2}	1.30×10^{-1}	9.13×10^{-2}
HR	918	2.65×10^{-1}		3.58×10^{-2}		2.65×10^{-1}	3.58×10^{-2}	—	—
	1123	2.08×10^{-1}		3.17×10^{-2}		2.08×10^{-1}	3.17×10^{-2}	—	—
	1530	1.56×10^{-1}		2.39×10^{-2}		1.56×10^{-1}	2.39×10^{-2}	—	—
	2042	1.11×10^{-1}		1.80×10^{-2}		1.11×10^{-1}	1.80×10^{-2}	—	—
	2042T	8.64×10^{-2}		1.53×10^{-2}		8.64×10^{-2}	1.53×10^{-2}	—	—
	2555	7.79×10^{-2}		1.38×10^{-2}		7.79×10^{-2}	1.38×10^{-2}	—	—
	2555T	6.13×10^{-2}		1.17×10^{-2}		6.13×10^{-2}	1.17×10^{-2}	—	—
	3065	6.92×10^{-2}		1.15×10^{-2}		6.92×10^{-2}	1.15×10^{-2}	—	—
	3065T	5.45×10^{-2}		9.92×10^{-3}		5.45×10^{-2}	9.92×10^{-3}	—	—
	3575	6.23×10^{-2}		1.08×10^{-2}		6.23×10^{-2}	1.08×10^{-2}	—	—
	3575T	4.90×10^{-2}		9.42×10^{-3}		4.90×10^{-2}	9.42×10^{-3}	—	—
	4085	5.19×10^{-2}		9.53×10^{-3}		5.19×10^{-2}	9.53×10^{-3}	—	—
	4085T	4.09×10^{-2}		7.97×10^{-3}		4.09×10^{-2}	7.97×10^{-3}	—	—
	50105	4.15×10^{-2}		7.40×10^{-3}		4.15×10^{-2}	7.40×10^{-3}	—	—
	50105T	3.27×10^{-2}		6.26×10^{-3}		3.27×10^{-2}	6.26×10^{-3}	—	—
	60125	2.88×10^{-2}		5.18×10^{-3}		2.88×10^{-2}	5.18×10^{-3}	—	—
GSR	15T	1.61×10^{-1}	1.44×10^{-1}	2.88×10^{-2}	2.59×10^{-2}	1.68×10^{-1}	3.01×10^{-2}	—	—
	15V	2.21×10^{-1}	1.99×10^{-1}	3.54×10^{-2}	3.18×10^{-2}	2.30×10^{-1}	3.68×10^{-2}	—	—
	20T	1.28×10^{-1}	1.16×10^{-1}	2.34×10^{-2}	2.10×10^{-2}	1.34×10^{-1}	2.44×10^{-2}	—	—
	20V	1.77×10^{-1}	1.59×10^{-1}	2.87×10^{-2}	2.58×10^{-2}	1.84×10^{-1}	2.99×10^{-2}	—	—
	25T	1.07×10^{-1}	9.63×10^{-2}	1.97×10^{-2}	1.77×10^{-2}	1.12×10^{-1}	2.06×10^{-2}	—	—
	25V	1.47×10^{-1}	1.33×10^{-1}	2.42×10^{-2}	2.18×10^{-2}	1.53×10^{-1}	2.52×10^{-2}	—	—
	30T	9.17×10^{-2}	8.26×10^{-2}	1.68×10^{-2}	1.51×10^{-2}	9.59×10^{-2}	1.76×10^{-2}	—	—
	35T	8.03×10^{-2}	7.22×10^{-2}	1.48×10^{-2}	1.33×10^{-2}	8.39×10^{-2}	1.55×10^{-2}	—	—
CSR	15	1.66×10^{-1}		—		1.66×10^{-1}	—	—	
	20S	1.26×10^{-1}		—		1.26×10^{-1}	—	—	
	20	9.88×10^{-2}		—		9.88×10^{-2}	—	—	
	25S	1.12×10^{-1}		—		1.12×10^{-1}	—	—	
	25	8.23×10^{-2}		—		8.23×10^{-2}	—	—	
	30S	8.97×10^{-2}		—		8.97×10^{-2}	—	—	
	30	7.05×10^{-2}		—		7.05×10^{-2}	—	—	
	35	6.17×10^{-2}		—		6.17×10^{-2}	—	—	
	45	5.22×10^{-2}		—		5.22×10^{-2}	—	—	

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
MX	5	4.27×10^{-1}		7.01×10^{-2}		4.27×10^{-1}	7.01×10^{-2}	—	
	7W	2.18×10^{-1}		4.13×10^{-2}		2.18×10^{-1}	4.13×10^{-2}	—	
JR	25	1.12×10^{-1}		2.02×10^{-2}		1.12×10^{-1}	2.02×10^{-2}	9.96×10^{-2}	
	35	7.85×10^{-2}		1.56×10^{-2}		7.85×10^{-2}	1.56×10^{-2}	6.69×10^{-2}	
	45	6.73×10^{-2}		1.21×10^{-2}		6.73×10^{-2}	1.21×10^{-2}	5.20×10^{-2}	
	55	5.61×10^{-2}		1.03×10^{-2}		5.61×10^{-2}	1.03×10^{-2}	4.26×10^{-2}	
NSR	20TBC	2.29×10^{-1}		2.68×10^{-2}		2.29×10^{-1}	2.68×10^{-2}	—	—
	25TBC	2.01×10^{-1}		2.27×10^{-2}		2.01×10^{-1}	2.27×10^{-2}	—	—
	30TBC	1.85×10^{-1}		1.93×10^{-2}		1.85×10^{-1}	1.93×10^{-2}	—	—
	40TBC	1.39×10^{-1}		1.60×10^{-2}		1.39×10^{-1}	1.60×10^{-2}	—	—
	50TBC	1.24×10^{-1}		1.42×10^{-2}		1.24×10^{-1}	1.42×10^{-2}	—	—
	70TBC	9.99×10^{-2}		1.15×10^{-2}		9.99×10^{-2}	1.15×10^{-2}	—	—
HDR	15S	2.71×10^{-1}		3.43×10^{-2}		2.71×10^{-1}	3.43×10^{-2}	1.01×10^{-1}	
	15	1.60×10^{-1}		2.61×10^{-2}		1.60×10^{-1}	2.61×10^{-2}	1.01×10^{-1}	
	15L	1.19×10^{-1}		2.20×10^{-2}		1.19×10^{-1}	2.20×10^{-2}	1.01×10^{-1}	
	20S	1.66×10^{-1}		2.76×10^{-2}		1.66×10^{-1}	2.76×10^{-2}	7.87×10^{-2}	
	20	1.21×10^{-1}		2.16×10^{-2}		1.21×10^{-1}	2.16×10^{-2}	7.87×10^{-2}	
	20L	9.47×10^{-2}		1.82×10^{-2}		9.47×10^{-2}	1.82×10^{-2}	7.87×10^{-2}	
	20UV/US	2.05×10^{-1}		3.09×10^{-2}		2.05×10^{-1}	3.09×10^{-2}	7.87×10^{-2}	
	20UW/UT	1.30×10^{-1}		2.35×10^{-2}		1.30×10^{-1}	2.35×10^{-2}	7.87×10^{-2}	
	25S	1.53×10^{-1}		2.51×10^{-2}		1.53×10^{-1}	2.51×10^{-2}	6.88×10^{-2}	
	25	1.01×10^{-1}		1.85×10^{-2}		1.01×10^{-1}	1.85×10^{-2}	6.88×10^{-2}	
	25L	8.34×10^{-2}		1.57×10^{-2}		8.34×10^{-2}	1.57×10^{-2}	6.88×10^{-2}	
	25UV/US	1.71×10^{-1}		2.67×10^{-2}		1.71×10^{-1}	2.67×10^{-2}	6.88×10^{-2}	
	25UW/UT	1.08×10^{-1}		2.00×10^{-2}		1.08×10^{-1}	2.00×10^{-2}	6.88×10^{-2}	
	30S	1.31×10^{-1}		2.10×10^{-2}		1.31×10^{-1}	2.10×10^{-2}	5.62×10^{-2}	
	30	8.63×10^{-2}		1.59×10^{-2}		8.63×10^{-2}	1.59×10^{-2}	5.62×10^{-2}	
	30L	6.77×10^{-2}		1.33×10^{-2}		6.77×10^{-2}	1.33×10^{-2}	5.62×10^{-2}	
	35S	1.15×10^{-1}		1.84×10^{-2}		1.15×10^{-1}	1.84×10^{-2}	4.55×10^{-2}	
	35	7.55×10^{-2}		1.39×10^{-2}		7.55×10^{-2}	1.39×10^{-2}	4.55×10^{-2}	
	35L	6.26×10^{-2}		1.18×10^{-2}		6.26×10^{-2}	1.18×10^{-2}	4.55×10^{-2}	
	45	6.04×10^{-2}		1.12×10^{-2}		6.04×10^{-2}	1.12×10^{-2}	3.65×10^{-2}	
	45L	4.74×10^{-2}		9.30×10^{-3}		4.74×10^{-2}	9.30×10^{-3}	3.65×10^{-2}	
	55	4.71×10^{-2}		9.20×10^{-3}		4.71×10^{-2}	9.20×10^{-3}	3.08×10^{-2}	
	55L	3.75×10^{-2}		7.70×10^{-3}		3.75×10^{-2}	7.70×10^{-3}	3.08×10^{-2}	
	65	4.32×10^{-2}		8.10×10^{-3}		4.32×10^{-2}	8.10×10^{-3}	2.59×10^{-2}	
	65L	3.16×10^{-2}		6.40×10^{-3}		3.16×10^{-2}	6.40×10^{-3}	2.59×10^{-2}	

K_{AR1} : Equivalent factor in the M_A radial direction when one LM block is used
K_{AL1} : Equivalent factor in the M_A reverse-radial direction when one LM block is used
K_{AR2} : Equivalent factor in the M_A radial direction when two LM blocks are used in close contact with each other
K_{AL2} : Equivalent factor in the M_A reverse-radial direction when two LM blocks are used in close contact with each other
K_{B1} : Equivalent factor in the M_B when one LM block is used
K_{B2} : Equivalent factor in the M_B when two LM blocks are used in close contact with each other
K_{CR} : Equivalent factor in the M_C radial direction
K_{CL} : Equivalent factor in the M_C reverse-radial direction

Table 6: Equivalent Factors (Models SRG, SRN, SRW, and HRX)

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
SRG	15X	1.23×10^{-1}		2.07×10^{-2}		1.23×10^{-1}	2.07×10^{-2}	1.04×10^{-1}	
	15XG	1.25×10^{-1}		2.08×10^{-2}		1.25×10^{-1}	2.08×10^{-2}	1.04×10^{-1}	
	20X	9.60×10^{-2}		1.71×10^{-2}		9.60×10^{-2}	1.71×10^{-2}	8.00×10^{-2}	
	20XG	9.67×10^{-2}		1.68×10^{-2}		9.67×10^{-2}	1.68×10^{-2}	8.00×10^{-2}	
	20XL	7.21×10^{-2}		1.42×10^{-2}		7.21×10^{-2}	1.42×10^{-2}	8.00×10^{-2}	
	20XGL	7.38×10^{-2}		1.39×10^{-2}		7.38×10^{-2}	1.39×10^{-2}	8.00×10^{-2}	
	25X	8.96×10^{-2}		1.55×10^{-2}		8.96×10^{-2}	1.55×10^{-2}	7.23×10^{-2}	
	25XG	8.52×10^{-2}		1.51×10^{-2}		8.52×10^{-2}	1.51×10^{-2}	7.23×10^{-2}	
	25XL	6.99×10^{-2}		1.31×10^{-2}		6.99×10^{-2}	1.31×10^{-2}	7.23×10^{-2}	
	25XGL	6.69×10^{-2}		1.27×10^{-2}		6.69×10^{-2}	1.27×10^{-2}	7.23×10^{-2}	
	30X	8.06×10^{-2}		1.33×10^{-2}		8.06×10^{-2}	1.33×10^{-2}	5.61×10^{-2}	
	30XG	7.90×10^{-2}		1.34×10^{-2}		7.90×10^{-2}	1.34×10^{-2}	5.96×10^{-2}	
	30XL	6.12×10^{-2}		1.11×10^{-2}		6.12×10^{-2}	1.11×10^{-2}	5.61×10^{-2}	
	30XGL	6.15×10^{-2}		1.11×10^{-2}		6.15×10^{-2}	1.11×10^{-2}	5.96×10^{-2}	
	35	7.14×10^{-2}		1.18×10^{-2}		7.14×10^{-2}	1.18×10^{-2}	4.98×10^{-2}	
	35G	7.37×10^{-2}		1.17×10^{-2}		7.37×10^{-2}	1.17×10^{-2}	4.86×10^{-2}	
	35L	5.26×10^{-2}		9.67×10^{-3}		5.26×10^{-2}	9.67×10^{-3}	4.98×10^{-2}	
	35GL	5.37×10^{-2}		9.67×10^{-3}		5.37×10^{-2}	9.67×10^{-3}	4.86×10^{-2}	
	35SL	4.40×10^{-2}		8.34×10^{-3}		4.40×10^{-2}	8.34×10^{-3}	4.98×10^{-2}	
	35GSL	4.43×10^{-2}		8.35×10^{-3}		4.43×10^{-2}	8.35×10^{-3}	4.86×10^{-2}	
	45	5.49×10^{-2}		9.58×10^{-3}		5.49×10^{-2}	9.58×10^{-3}	3.85×10^{-2}	
	45G	5.53×10^{-2}		9.60×10^{-3}		5.53×10^{-2}	9.60×10^{-3}	3.68×10^{-2}	
	45L	4.18×10^{-2}		7.93×10^{-3}		4.18×10^{-2}	7.93×10^{-3}	3.85×10^{-2}	
	45GL	4.19×10^{-2}		7.94×10^{-3}		4.19×10^{-2}	7.94×10^{-3}	3.68×10^{-2}	
	45SL	3.28×10^{-2}		6.56×10^{-3}		3.28×10^{-2}	6.56×10^{-3}	3.85×10^{-2}	
	45GSL	3.30×10^{-2}		6.57×10^{-3}		3.30×10^{-2}	6.57×10^{-3}	3.68×10^{-2}	
	55	4.56×10^{-2}		8.04×10^{-3}		4.56×10^{-2}	8.04×10^{-3}	3.25×10^{-2}	
	55G	4.61×10^{-2}		8.05×10^{-3}		4.61×10^{-2}	8.05×10^{-3}	3.14×10^{-2}	
	55L	3.37×10^{-2}		6.42×10^{-3}		3.37×10^{-2}	6.42×10^{-3}	3.25×10^{-2}	
	55GL	3.40×10^{-2}		6.42×10^{-3}		3.40×10^{-2}	6.42×10^{-3}	3.14×10^{-2}	
	55SL	2.56×10^{-2}		5.22×10^{-3}		2.56×10^{-2}	5.22×10^{-3}	3.25×10^{-2}	
	55GSL	2.59×10^{-2}		5.22×10^{-3}		2.59×10^{-2}	5.22×10^{-3}	3.14×10^{-2}	
	65	3.54×10^{-2}		6.06×10^{-3}		3.54×10^{-2}	6.06×10^{-3}	2.70×10^{-2}	
	65G	3.44×10^{-2}		6.10×10^{-3}		3.44×10^{-2}	6.10×10^{-3}	2.63×10^{-2}	
	65L	2.63×10^{-2}		4.97×10^{-3}		2.63×10^{-2}	4.97×10^{-3}	2.70×10^{-2}	
	65GL	2.65×10^{-2}		4.98×10^{-3}		2.65×10^{-2}	4.98×10^{-3}	2.63×10^{-2}	
	65SL	1.97×10^{-2}		4.01×10^{-3}		1.97×10^{-2}	4.01×10^{-3}	2.70×10^{-2}	
	65GSL	1.99×10^{-2}		4.10×10^{-3}		1.99×10^{-2}	4.10×10^{-3}	2.63×10^{-2}	
	85LC	2.19×10^{-2}		4.15×10^{-3}		2.19×10^{-2}	4.15×10^{-3}	1.91×10^{-2}	
	100LC	1.95×10^{-2}		3.67×10^{-3}		1.95×10^{-2}	3.67×10^{-3}	1.62×10^{-2}	
SRN	35	7.14×10^{-2}		1.18×10^{-2}		7.14×10^{-2}	1.18×10^{-2}	4.98×10^{-2}	
	35G	7.37×10^{-2}		1.17×10^{-2}		7.37×10^{-2}	1.17×10^{-2}	4.86×10^{-2}	

Model No.		Equivalent factor							
		K_{AR1}	K_{AL1}	K_{AR2}	K_{AL2}	K_{B1}	K_{B2}	K_{CR}	K_{CL}
SRN	35L	5.26×10^{-2}		9.67×10^{-3}		5.26×10^{-2}	9.67×10^{-3}	4.98×10^{-2}	
	35GL	5.37×10^{-2}		9.67×10^{-3}		5.37×10^{-2}	9.67×10^{-3}	4.86×10^{-2}	
	35SL	4.40×10^{-2}		8.34×10^{-3}		4.40×10^{-2}	8.34×10^{-3}	4.98×10^{-2}	
	35GSL	4.43×10^{-2}		8.35×10^{-3}		4.43×10^{-2}	8.35×10^{-3}	4.86×10^{-2}	
	45	5.49×10^{-2}		9.58×10^{-3}		5.49×10^{-2}	9.58×10^{-3}	3.85×10^{-2}	
	45G	5.53×10^{-2}		9.60×10^{-3}		5.53×10^{-2}	9.60×10^{-3}	3.68×10^{-2}	
	45L	4.18×10^{-2}		7.93×10^{-3}		4.18×10^{-2}	7.93×10^{-3}	3.85×10^{-2}	
	45GL	4.19×10^{-2}		7.94×10^{-3}		4.19×10^{-2}	7.94×10^{-3}	3.68×10^{-2}	
	45SL	3.28×10^{-2}		6.56×10^{-3}		3.28×10^{-2}	6.56×10^{-3}	3.85×10^{-2}	
	45GSL	3.30×10^{-2}		6.57×10^{-3}		3.30×10^{-2}	6.57×10^{-3}	3.68×10^{-2}	
	55	4.56×10^{-2}		8.04×10^{-3}		4.56×10^{-2}	8.04×10^{-3}	3.25×10^{-2}	
	55G	4.61×10^{-2}		8.05×10^{-3}		4.61×10^{-2}	8.05×10^{-3}	3.14×10^{-2}	
	55L	3.37×10^{-2}		6.42×10^{-3}		3.37×10^{-2}	6.42×10^{-3}	3.25×10^{-2}	
	55GL	3.40×10^{-2}		6.42×10^{-3}		3.40×10^{-2}	6.42×10^{-3}	3.14×10^{-2}	
	55SL	2.56×10^{-2}		5.22×10^{-3}		2.56×10^{-2}	5.22×10^{-3}	3.25×10^{-2}	
	55GSL	2.59×10^{-2}		5.22×10^{-3}		2.59×10^{-2}	5.22×10^{-3}	3.14×10^{-2}	
	65	3.54×10^{-2}		6.06×10^{-3}		3.54×10^{-2}	6.06×10^{-3}	2.70×10^{-2}	
	65G	3.44×10^{-2}		6.10×10^{-3}		3.44×10^{-2}	6.10×10^{-3}	2.63×10^{-2}	
	65L	2.63×10^{-2}		4.97×10^{-3}		2.63×10^{-2}	4.97×10^{-3}	2.70×10^{-2}	
	65GL	2.65×10^{-2}		4.98×10^{-3}		2.65×10^{-2}	4.98×10^{-3}	2.63×10^{-2}	
	65SL	1.97×10^{-2}		4.01×10^{-3}		1.97×10^{-2}	4.01×10^{-3}	2.70×10^{-2}	
	65GSL	1.99×10^{-2}		4.10×10^{-3}		1.99×10^{-2}	4.10×10^{-3}	2.63×10^{-2}	
SRW	70	4.18×10^{-2}		7.93×10^{-3}		4.18×10^{-2}	7.93×10^{-3}	2.52×10^{-2}	
	85	3.37×10^{-2}		6.42×10^{-3}		3.37×10^{-2}	6.42×10^{-3}	2.09×10^{-2}	
	100	2.63×10^{-2}		4.97×10^{-3}		2.63×10^{-2}	4.97×10^{-3}	1.77×10^{-2}	
	130	2.19×10^{-2}		4.15×10^{-3}		2.19×10^{-2}	4.15×10^{-3}	1.33×10^{-2}	
	150	1.95×10^{-2}		3.67×10^{-3}		1.95×10^{-2}	3.67×10^{-3}	1.15×10^{-2}	
HRX	25	7.91×10^{-2}		1.51×10^{-2}		7.91×10^{-2}	1.51×10^{-2}	1.29×10^{-1}	1.29×10^{-1}
	25L	6.52×10^{-2}		1.30×10^{-2}		6.52×10^{-2}	1.30×10^{-2}	1.29×10^{-1}	1.29×10^{-1}
	30	7.07×10^{-2}		1.36×10^{-2}		7.07×10^{-2}	1.36×10^{-2}	1.02×10^{-1}	1.02×10^{-1}
	30L	5.54×10^{-2}		1.12×10^{-2}		5.54×10^{-2}	1.12×10^{-2}	1.02×10^{-1}	1.02×10^{-1}
	35	6.45×10^{-2}		1.29×10^{-2}		6.45×10^{-2}	1.29×10^{-2}	8.29×10^{-2}	8.29×10^{-2}
	35L	5.00×10^{-2}		1.05×10^{-2}		5.00×10^{-2}	1.05×10^{-2}	8.29×10^{-2}	8.29×10^{-2}
	45	5.16×10^{-2}		1.05×10^{-2}		5.16×10^{-2}	1.05×10^{-2}	6.52×10^{-2}	6.52×10^{-2}
	45L	4.00×10^{-2}		8.50×10^{-3}		4.00×10^{-2}	8.50×10^{-3}	6.52×10^{-2}	6.52×10^{-2}
	55	4.17×10^{-2}		8.74×10^{-3}		4.17×10^{-2}	8.74×10^{-3}	5.39×10^{-2}	5.39×10^{-2}
	55L	3.14×10^{-2}		6.85×10^{-3}		3.14×10^{-2}	6.85×10^{-3}	5.39×10^{-2}	5.39×10^{-2}
	65	3.08×10^{-2}		6.56×10^{-3}		3.08×10^{-2}	6.56×10^{-3}	4.62×10^{-2}	4.62×10^{-2}
	65L	2.36×10^{-2}		5.15×10^{-3}		2.36×10^{-2}	5.15×10^{-3}	4.62×10^{-2}	4.62×10^{-2}

K_{AR1} : Equivalent factor in the M_A radial direction when one LM block is used

K_{AL1} : Equivalent factor in the M_A reverse-radial direction when one LM block is used

K_{AR2} : Equivalent factor in the M_A radial direction when two LM blocks are used in close contact with each other

K_{AL2} : Equivalent factor in the M_A reverse-radial direction when two LM blocks are used in close contact with each other

K_{B1} : Equivalent factor in the M_B when one LM block is used

K_{B2} : Equivalent factor in the M_B when two LM blocks are used in close contact with each other

K_{CR} : Equivalent factor in the M_C radial direction

K_{CL} : Equivalent factor in the M_C reverse-radial direction

Double-Axis Use

● Determining the Operating Conditions

Set the conditions needed to calculate the applied load and service life in hours for the LM System.

(1) Mass: m (kg)
(2) Direction of the working load
(3) Position of the working point (e.g., center of gravity): ℓ_2, ℓ_3, h_1 (mm)
(4) Thrust position: ℓ_4, h_2 (mm)
(5) LM system arrangement: ℓ_0, ℓ_1 (mm)
(No. of units and axes)
(6) Velocity diagram
Speed: V (mm/s)
Time constant: t_n (s)
Acceleration: α_n (mm/s^2)

$$(\alpha_n = \frac{V}{t_n})$$

(7) Duty cycle
Number of reciprocations per minute: N_1 (min^{-1})
(8) Stroke length: ℓ_s (mm)
(9) Average speed: V_m (m/s)
(10) Required service life in hours: L_h (h)

Gravitational acceleration g = 9.8 (m/s^2)

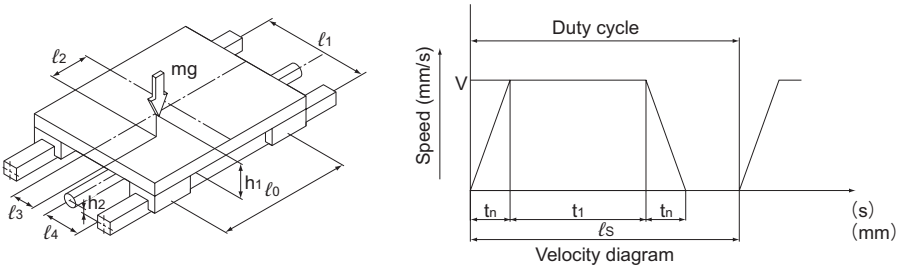


Fig. 6: Operating Conditions

● Applied Load Equation

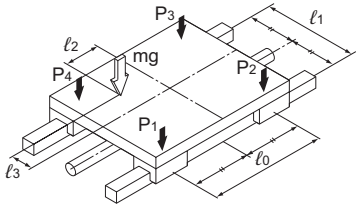
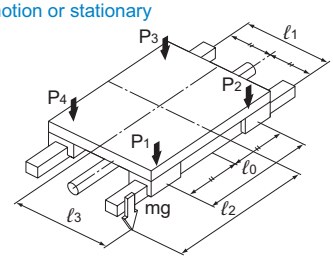
The load applied to the LM Guide varies with external forces such as the location of the center of gravity of the load, the position of the thrust, inertia generated by acceleration and deceleration during starts and stops, and cutting resistance.
In selecting an LM Guide, it is necessary to obtain the value of the applied load while taking into account these conditions.

Calculate the load applied to the LM Guide in each of the examples 1 to 10 shown below.

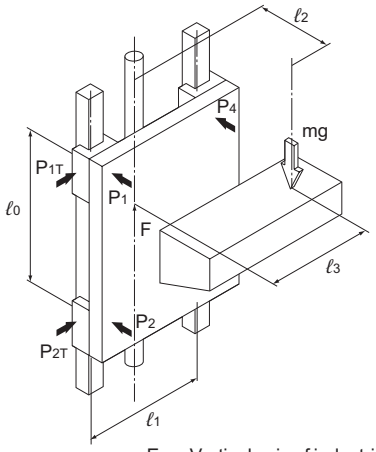
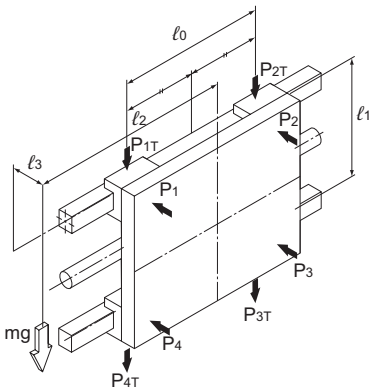
m	:	Mass	(kg)
ℓ_n	:	Distance	(mm)
F_n	:	External force	(N)
P_n	:	Applied load (radial/reverse-radial direction)	(N)
P_{nT}	:	Applied load (lateral directions)	(N)
g	:	Gravitational acceleration ($g = 9.8\ m/s^2$)	(m/s^2)
V	:	Speed	(m/s)
t_n	:	Time constant	(s)
α_n	:	Acceleration	(m/s^2)

$$(\alpha_n = \frac{V}{t_n})$$

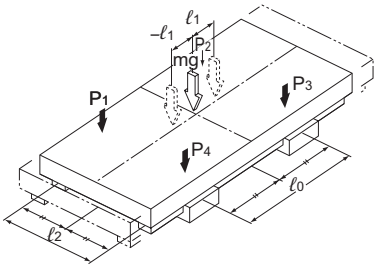
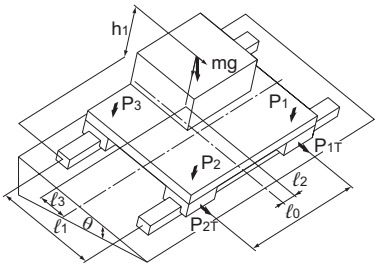
Example

	Operating conditions	Applied load equation
1	Horizontal mount (with the block moving) Uniform motion or stationary 	$P_1 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_2 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_3 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_4 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$
2	Horizontal mount, overhung (with the block moving) Uniform motion or stationary 	$P_1 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_2 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_3 = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_4 = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$

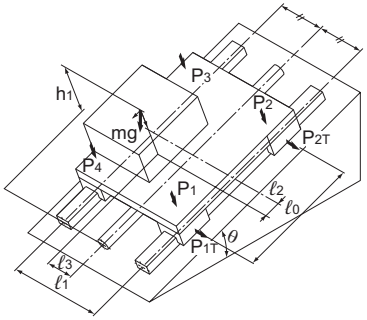
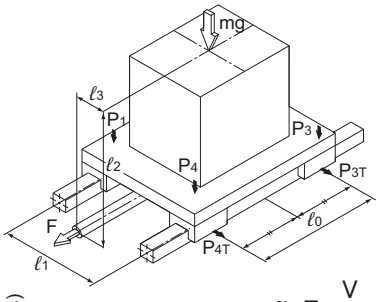
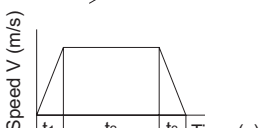
Note: Load is positive in the direction of the arrow.

	Operating conditions	Applied load equation
3	**Vertical mount** **Uniform motion or stationary**  E.g.: Vertical axis of industrial robot, automatic coating machine, lifter	$P_1 = P_4 = -\frac{mg \cdot \ell_2}{2 \cdot \ell_0}$ $P_2 = P_3 = \frac{mg \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T} = P_{4T} = \frac{mg \cdot \ell_3}{2 \cdot \ell_0}$ $P_{2T} = P_{3T} = -\frac{mg \cdot \ell_3}{2 \cdot \ell_0}$
4	**Wall mount** **Uniform motion or stationary**  E.g.: Travel axis of cross-rail loader	$P_1 = P_2 = -\frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_3 = P_4 = \frac{mg \cdot \ell_3}{2 \cdot \ell_1}$ $P_{1T} = P_{4T} = \frac{mg}{4} + \frac{mg \cdot \ell_2}{2 \cdot \ell_0}$ $P_{2T} = P_{3T} = \frac{mg}{4} - \frac{mg \cdot \ell_2}{2 \cdot \ell_0}$

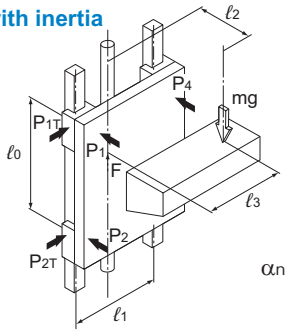
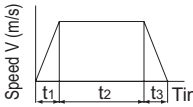
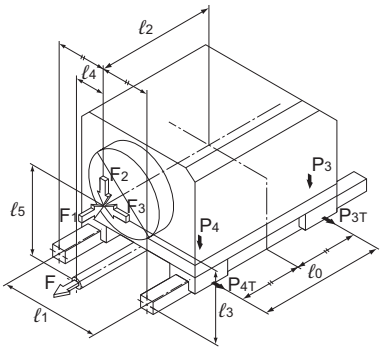
Note: Load is positive in the direction of the arrow.

	Operating conditions	Applied load equation
5	**With the LM rails moving** **Horizontal mount**  E.g.: XY table sliding fork	P_1 to P_4 (max) $= \frac{mg}{4} + \frac{mg \cdot \ell_1}{2 \cdot \ell_0}$ P_1 to P_4 (min) $= \frac{mg}{4} - \frac{mg \cdot \ell_1}{2 \cdot \ell_0}$
6	**Lateral tilt mount**  E.g.: NC lathe carriage	$P_1 = + \frac{mg \cdot \cos\theta}{4} + \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_1}$ $P_{1T} = \frac{mg \cdot \sin\theta}{4} + \frac{mg \cdot \sin\theta \cdot \ell_2}{2 \cdot \ell_0}$ $P_2 = + \frac{mg \cdot \cos\theta}{4} - \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_1}$ $P_{2T} = \frac{mg \cdot \sin\theta}{4} - \frac{mg \cdot \sin\theta \cdot \ell_2}{2 \cdot \ell_0}$ $P_3 = + \frac{mg \cdot \cos\theta}{4} - \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_1}$ $P_{3T} = \frac{mg \cdot \sin\theta}{4} - \frac{mg \cdot \sin\theta \cdot \ell_2}{2 \cdot \ell_0}$ $P_4 = + \frac{mg \cdot \cos\theta}{4} + \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_1}$ $P_{4T} = \frac{mg \cdot \sin\theta}{4} + \frac{mg \cdot \sin\theta \cdot \ell_2}{2 \cdot \ell_0}$

Note: Load is positive in the direction of the arrow.

	Operating conditions	Applied load equation
7	**Longitudinal tilt mount**  E.g.: NC lathe tool rest	$P_1 = + \frac{mg \cdot \cos\theta}{4} + \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_0}$ $P_{1T} = + \frac{mg \cdot \sin\theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_2 = + \frac{mg \cdot \cos\theta}{4} - \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} - \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_0}$ $P_{2T} = - \frac{mg \cdot \sin\theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_3 = + \frac{mg \cdot \cos\theta}{4} - \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} - \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_0}$ $P_{3T} = - \frac{mg \cdot \sin\theta \cdot \ell_3}{2 \cdot \ell_0}$ $P_4 = + \frac{mg \cdot \cos\theta}{4} + \frac{mg \cdot \cos\theta \cdot \ell_2}{2 \cdot \ell_0} + \frac{mg \cdot \cos\theta \cdot \ell_3}{2 \cdot \ell_1} + \frac{mg \cdot \sin\theta \cdot h_1}{2 \cdot \ell_0}$ $P_{4T} = + \frac{mg \cdot \sin\theta \cdot \ell_3}{2 \cdot \ell_0}$
8	**Horizontal mount with inertia**  $\alpha_n = \frac{V}{t_n}$  Velocity diagram E.g.: Conveyance truck	During acceleration $P_1 = P_4 = \frac{mg}{4} - \frac{m \cdot \alpha_1 \cdot \ell_2}{2 \cdot \ell_0}$ $P_2 = P_3 = \frac{mg}{4} + \frac{m \cdot \alpha_1 \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T} = P_{4T} = \frac{m \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0}$ $P_{2T} = P_{3T} = - \frac{m \cdot \alpha_1 \cdot \ell_3}{2 \cdot \ell_0}$ During uniform motion P_1 to $P_4 = \frac{mg}{4}$ During deceleration $P_1 = P_4 = \frac{mg}{4} + \frac{m \cdot \alpha_3 \cdot \ell_2}{2 \cdot \ell_0}$ $P_2 = P_3 = \frac{mg}{4} - \frac{m \cdot \alpha_3 \cdot \ell_2}{2 \cdot \ell_0}$ $P_{1T} = P_{4T} = - \frac{m \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0}$ $P_{2T} = P_{3T} = \frac{m \cdot \alpha_3 \cdot \ell_3}{2 \cdot \ell_0}$

Note: Load is positive in the direction of the arrow.

	Operating conditions	Applied load equation
9	**Vertical mount with inertia**  $\alpha_n = \frac{V}{t_n}$  Velocity diagram E.g.: Conveyance lift	During acceleration $P_1 = P_4 = -\frac{m(g+\alpha_1)\ell_2}{2\cdot\ell_0}$ $P_2 = P_3 = \frac{m(g+\alpha_1)\ell_2}{2\cdot\ell_0}$ $P_{1T} = P_{4T} = \frac{m(g+\alpha_1)\ell_3}{2\cdot\ell_0}$ $P_{2T} = P_{3T} = -\frac{m(g+\alpha_1)\ell_3}{2\cdot\ell_0}$ During uniform motion $P_1 = P_4 = -\frac{mg\cdot\ell_2}{2\cdot\ell_0}$ $P_2 = P_3 = \frac{mg\cdot\ell_2}{2\cdot\ell_0}$ $P_{1T} = P_{4T} = \frac{mg\cdot\ell_3}{2\cdot\ell_0}$ $P_{2T} = P_{3T} = -\frac{mg\cdot\ell_3}{2\cdot\ell_0}$ During deceleration $P_1 = P_4 = -\frac{m(g-\alpha_3)\ell_2}{2\cdot\ell_0}$ $P_2 = P_3 = \frac{m(g-\alpha_3)\ell_2}{2\cdot\ell_0}$ $P_{1T} = P_{4T} = \frac{m(g-\alpha_3)\ell_3}{2\cdot\ell_0}$ $P_{2T} = P_{3T} = -\frac{m(g-\alpha_3)\ell_3}{2\cdot\ell_0}$
10	**Horizontal mount with external force**  E.g.: Drill unit, milling machine, lathe, machining center, and other cutting machines	Under force F_1 $P_1 = P_4 = -\frac{F_1\cdot\ell_5}{2\cdot\ell_0}$ $P_2 = P_3 = \frac{F_1\cdot\ell_5}{2\cdot\ell_0}$ $P_{1T} = P_{4T} = \frac{F_1\cdot\ell_4}{2\cdot\ell_0}$ $P_{2T} = P_{3T} = -\frac{F_1\cdot\ell_4}{2\cdot\ell_0}$ Under force F_2 $P_1 = P_4 = \frac{F_2}{4} + \frac{F_2\cdot\ell_2}{2\cdot\ell_0}$ $P_2 = P_3 = \frac{F_2}{4} - \frac{F_2\cdot\ell_2}{2\cdot\ell_0}$ Under force F_3 $P_1 = P_2 = \frac{F_3\cdot\ell_3}{2\cdot\ell_1}$ $P_3 = P_4 = -\frac{F_3\cdot\ell_3}{2\cdot\ell_1}$ $P_{1T} = P_{4T} = -\frac{F_3}{4} - \frac{F_3\cdot\ell_2}{2\cdot\ell_0}$ $P_{2T} = P_{3T} = -\frac{F_3}{4} + \frac{F_3\cdot\ell_2}{2\cdot\ell_0}$

Note: Load is positive in the direction of the arrow.

Equivalent Load

Load Rating 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 load rating 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 load rating 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 dimensional table. The values in the reverse-radial and lateral directions are obtained from Table 7 on A1-63.

Load Ratings in Each Direction

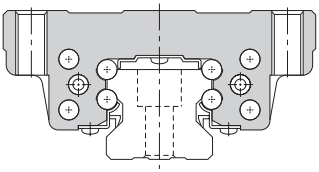
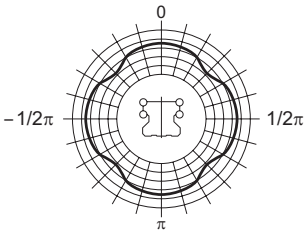
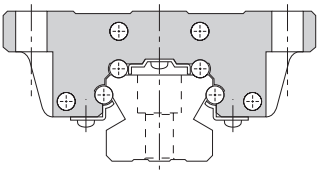
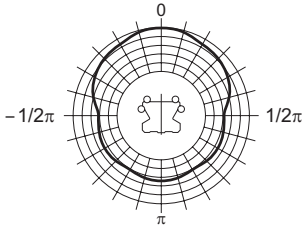
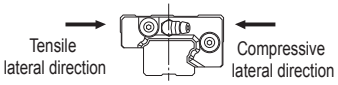
Type	Load distribution curve
4-way equal load type 	
Radial type 	

Table 7: Load Rating in Each Direction

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
	RSX	12,15,25	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
	HDR		C	C_0	C	C_0
	HSR-M1		C	C_0	C	C_0
	RSX-M1	12,15	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
	HRX		C	C_0	C	C_0
Radial	SSR		0.50C	$0.50C_0$	0.53C	$0.43C_0$
	SVR		0.64C	$0.64C_0$	0.47C	$0.38C_0$
	SR	15,20,25,30,35,45,55,70	0.62C	$0.50C_0$	0.56C	$0.43C_0$
	SR	85,100,120,150	0.78C	$0.71C_0$	0.48C	$0.35C_0$
	NR-X		0.64C	$0.64C_0$	0.47C	$0.38C_0$
	NR	75,85,100	0.78C	$0.71C_0$	0.48C	$0.45C_0$
	HRW	12,14	0.78C	$0.71C_0$	0.48C	$0.35C_0$
	NSR		0.62C	$0.50C_0$	0.56C	$0.43C_0$
	SR-M1		0.62C	$0.50C_0$	0.56C	$0.43C_0$
	SR-MS		—	$0.50F_0$	—	$0.43F_0$
Other	SVS		0.84C	$0.84C_0$	0.92C	$0.85C_0$
	NRS-X		0.84C	$0.84C_0$	0.92C	$0.85C_0$
	SRS	5,7,9,20	C	C_0	1.19C	$1.19C_0$
	RSX	5,7,9,20	C	C_0	1.19C	$1.19C_0$
	RSR	14	0.78C	$0.70C_0$	0.78C	$0.71C_0$
	HR		C	C_0	C	C_0
	GSR		0.93C	$0.90C_0$	(T) $0.84C^1$ (C) $0.93C^2$	(T) $0.78C_0{}^1$ (C) $0.90C_0{}^2$
	GSR-R		0.93C	$0.90C_0$	(T) $0.84C^1$ (C) $0.93C^2$	(T) $0.78C_0{}^1$ (C) $0.90C_0{}^2$
	RSX-M1	9	C	C_0	1.19C	$1.19C_0$
	RSR-M1	20	0.78C	$0.70C_0$	0.78C	$0.71C_0$

[1] (T) Indicates the tensile lateral direction
[2] (C) Indicates the compressive lateral direction

Notes: C and C_0 in the table each represent the basic load rating indicated in the specification table of the respective model. 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 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 ·Radial direction ·Reverse-radial direction	(N)
P_L	:	Reverse-radial load	(N)
P_T	:	Lateral load	(N)
X,Y	:	Equivalent factor	(see Table 8)

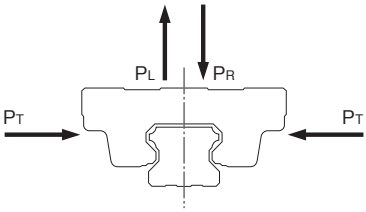


Fig. 7: Equivalent Load of the LM Guide

Table 8: Equivalent Factor in Each Direction

Classification	Model No.		If radial and lateral loads are applied simultaneously  Equivalent in radial direction 		If reverse-radial and lateral loads are applied simultaneously  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
	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
	RSX	12,15,25	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
	HDR		1.000	1.000	1.000	1.000
	HSR-M1		1.000	1.000	1.000	1.000
	RSX-M1	12,15	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
	HRX		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	5,7,9,20	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	1.280
	GSR-R		1.000	1.280	1.000	1.280
	RSX-M1	9	1.000	0.839	1.000	0.839
	RSR-M1	20	1.000	0.830	1.000	0.990

Note: If the radial type LM Guide receives radial and lateral loads simultaneously, study the static safety 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.

Static Safety Factor

During actual operation, damage may be caused by an unexpectedly large load acting on the LM Guide that is caused by particularly sudden starting and stopping, vibrations due to a cutting load, or a large moment created by an overhang. Therefore, a static safety factor (f_S) must be considered. The static safety factor (f_S) is obtained from the formulas in Table 9 based on the relationship between the applied load and the basic static load rating. Estimates for the static safety factor based on operating conditions are shown in Table 10. In addition, the static safety factor (f_S) must also be considered for each direction (radial, reverse-radial, and horizontal) individually.

Table 9: Static Safety Factor Formulas per Load Direction

When the radial load is large	$\frac{f_H \cdot f_T \cdot f_C \cdot C_0}{P_R} \geqq f_S$
When the reverse-radial load is large	$\frac{f_H \cdot f_T \cdot f_C \cdot C_{0L}}{P_L} \geqq f_S$
When the lateral loads are large	$\frac{f_H \cdot f_T \cdot f_C \cdot C_{0T}}{P_T} \geqq f_S$

Table 10: Guideline for the Static Safety Factor (f_S)

Load conditions[2]	Lower Limit of (f_S)
Without vibrations or impacts	2
With vibrations or impacts	5

f_S : Static safety factor
C_0[1] : Basic static load rating (radial direction) (N)
C_{0L}[1] : Basic static load rating (reverse-radial direction) (N)
C_{0T}[1] : Basic static load rating (lateral direction) (N)
P_R : Calculated load (radial direction) (N)
P_L : Calculated load (reverse-radial direction) (N)
P_T : Calculated load (lateral direction) (N)
f_H : Hardness factor (see Fig. 8 on A**1-71**)
f_T : Temperature factor (see Fig. 9 on A**1-71**)
f_C : Contact factor (see Table 11 on A**1-71**)

[1] The basic static load rating is a static load with a constant direction and size where the sum of the permanent deformation of the rolling element and that of the raceway on the contact area under the maximum stress is 0.0001 times the rolling element diameter.
[2] Vibrations and impacts are typically caused by factors such as acceleration and deceleration, sudden starting and stopping, vibrations and impacts from an external machine, and changes in processing power over time.

Average Load

In cases where the load applied to each LM block fluctuates under different conditions, such as an industrial robot advancing while holding a workpiece with its arm then retreating with its arm empty, or a machine tool handling various workpieces, it is necessary to calculate the service life of the LM block while taking into account such fluctuating loading conditions.
The average load (P_m) is the load under which the service life of the LM Guide is equivalent to that under varying loads applied to the LM blocks.

$$P_m = \sqrt[i]{\frac{1}{L} \cdot \sum_{n=1}^{n} (P_n^{\,i} \cdot L_n)}$$

P_m	: Average Load[1]	(N)
P_n	: Varying load	(N)
L	: Total travel distance	(mm)
L_n	: Distance traveled under load P_n	(mm)
i	: Constant determined by rolling element	

Note: This equation applies when the rolling elements are balls.

(1) With stepwise load fluctuation

LM Guide Using Balls (i=3)

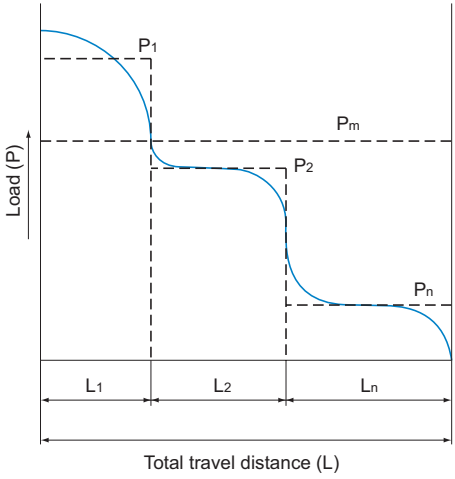
$$P_m = \sqrt[3]{\frac{1}{L} (P_1^{\,3} \cdot L_1 + P_2^{\,3} \cdot L_2 \cdots\cdots + P_n^{\,3} \cdot L_n)} \quad \cdots\cdots\cdots\cdots (1)$$

P_m	: Average load	(N)
P_n	: Varying load	(N)
L	: Total travel distance	(mm)
L_n	: Distance traveled under P_n	(mm)

LM Guide Using Rollers ($i = \frac{10}{3}$)

$$P_m = \sqrt[\frac{10}{3}]{\frac{1}{L} (P_1^{\frac{10}{3}} \cdot L_1 + P_2^{\frac{10}{3}} \cdot L_2 \cdots\cdots + P_n^{\frac{10}{3}} \cdot L_n)} \quad \cdots\cdots\cdots\cdots (2)$$

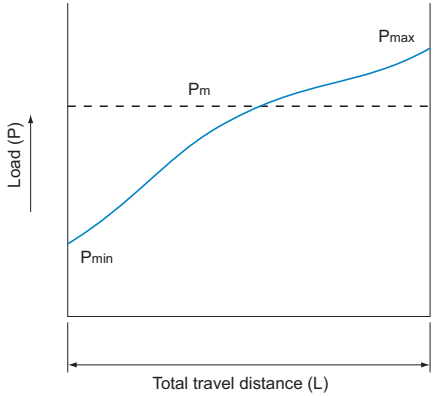
P_m	: Average Load	(N)
P_n	: Varying load	(N)
L	: Total travel distance	(mm)
L_n	: Distance traveled under P_n	(mm)



(2) With monotone load fluctuation

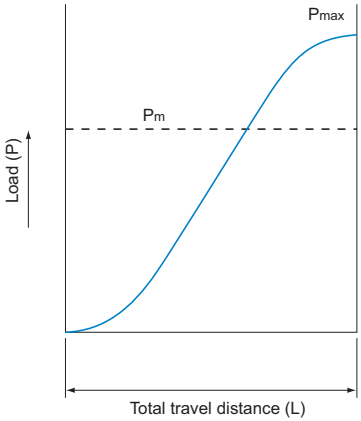
$$P_m \fallingdotseq \frac{1}{3}(P_{min} + 2 \cdot P_{max}) \quad \cdots\cdots (3)$$

P_{min} : Minimum load (N)
P_{max} : Maximum load (N)

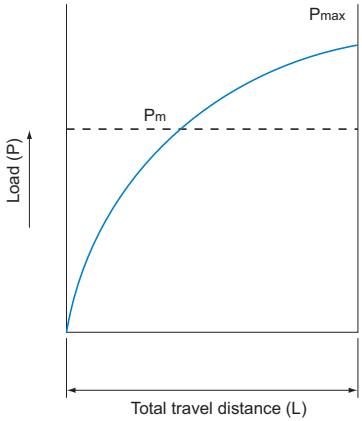


(3) With sinusoidal load fluctuation

(a) $P_m \fallingdotseq 0.65P_{max}$ ····· (4)



(b) $P_m \fallingdotseq 0.75P_{max}$ ····· (5)



Nominal Life

An LM Guide in motion under an external load receives repeated stress on its raceways and rolling elements. When the stress reaches the limit, the surface of the raceways and rolling elements flake in places due to rolling fatigue. This phenomenon is called flaking. The service life of an LM Guide is the total travel distance until the first flaking occurs on any of the raceways or the rolling elements as a result of rolling fatigue of the material.
The nominal life defined below is typically used as a guideline for obtaining the service life of the LM Guide.
The nominal life means the total travel distance that 90% of a group of units of the same LM Guide model can achieve without flaking after individually running under the same conditions.

Calculating the Nominal Life

The nominal life (L_{10}) of an LM Guide is obtained from the following formulas using the basic dynamic load rating (C), which is based on a reference distance of 50 km for an LM Guide with balls and 100 km for an LM Guide with rollers, and the calculated load acting on the LM Guide (P_C).

●LM Guide with balls (using a basic dynamic load rating based on a nominal life of 50 km)

$$L_{10} = \left(\frac{C}{P_C}\right)^3 \times 50 \quad \cdots\cdots\cdots\cdots (1)$$

L_{10} : Nominal life (km)
C : Basic dynamic load rating (N)
P_C : Calculated load (N)

●LM Guide with rollers (using a basic dynamic load rating based on a nominal life of 100 km)

$$L_{10} = \left(\frac{C}{P_C}\right)^{\frac{10}{3}} \times 100 \quad \cdots\cdots\cdots\cdots (2)$$

Note: These nominal life formulas may not apply if the length of the stroke is less than or equal to twice the length of the LM block.

When comparing the nominal life (L_{10}), you must take into account whether the basic dynamic load rating was defined based on 50 km or 100 km. Convert the basic dynamic load rating based on ISO 14728-1 as necessary.

ISO-regulated basic dynamic load rating conversion formulas:

• LM Guide with balls

$$C_{100} = \frac{C_{50}}{1.26}$$

C_{50} : Basic dynamic load rating based on a nominal life of 50 km
C_{100} : Basic dynamic load rating based on a nominal life of 100 km

• LM Guide with rollers

$$C_{100} = \frac{C_{50}}{1.23}$$

Calculating the Modified Nominal Life

During use, an LM Guide may be subjected to vibrations and shocks as well as fluctuating loads, which are difficult to detect. In addition, the surface hardness of the raceways, the operating temperature, and having LM blocks arranged directly behind one another will have a decisive impact on the service life. Taking these factors into account, the modified nominal life (L_{10m}) can be calculated according to the following formulas (3) and (4).

●Modified factor α

$$\alpha = \frac{f_H \cdot f_T \cdot f_C}{f_W}$$

α : Modified factor
f_H : Hardness factor (see Fig. 8 on A**1-71**)
f_T : Temperature factor (see Fig. 9 on A**1-71**)
f_C : Contact factor (see Table 11 on A**1-71**)
f_W : Load factor (see Table 12 on A**1-72**)

●Modified nominal life L_{10m}

• LM Guide with balls

$$L_{10m} = \left(\alpha \times \frac{C}{P_C}\right)^3 \times 50 \quad \cdots\cdots\cdots\cdots (3)$$

• LM Guide with rollers

$$L_{10m} = \left(\alpha \times \frac{C}{P_C}\right)^{\frac{10}{3}} \times 100 \quad \cdots\cdots\cdots\cdots (4)$$

L_{10m} : Modified nominal life (km)
C : Basic dynamic load rating (N)
P_C : Calculated load (N)

Once the nominal life (L_{10}) has been obtained, the service life time can be obtained using the following equation if the stroke length and the number of reciprocations are constant.

$$L_h = \frac{L_{10} \times 10^6}{2 \times \ell_s \times n_1 \times 60}$$

L_h : Service life time (h)
ℓ_s : Stroke length (mm)
n_1 : Number of reciprocations per minute (min^{-1})

f_H: Hardness Factor

To ensure that the LM Guide achieves optimum load capacity, the raceway hardness must be between 58 and 64 HRC.

If the hardness is lower than this range, the basic dynamic load rating and the basic static load rating decrease. Therefore, it is necessary to multiply each rating by the respective hardness factor (f_H).

Since the LM Guide has sufficient hardness, the f_H value for the LM Guide is normally 1.0 unless otherwise specified.

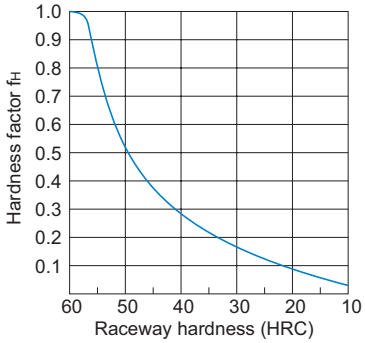


Fig. 8: Hardness Factor (f_H)

f_T: Temperature Factor

If the temperature of the operating environment surrounding the LM Guide exceeds 100℃, take into account the adverse effect of the high temperature and multiply the basic load ratings by the temperature factor indicated in Fig. 9.

In addition, the selected LM Guide must also be of a high-temperature type.

Note: An LM Guide not designed to withstand high temperatures should be used at 80°C or less. Please contact THK if application requirements exceed 80°C.

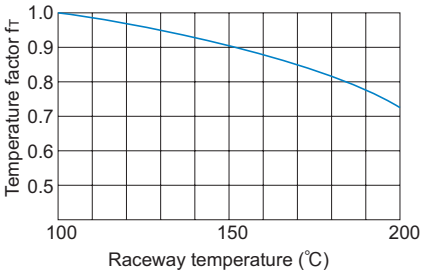


Fig. 9: Temperature Factor (f_T)

f_C: Contact Factor

When multiple LM blocks are used in close contact with each other, it is difficult to achieve uniform load distribution due to moment loads and mounting-surface accuracy. When using multiple blocks in close contact with each other, multiply the basic load rating (C or C_0) by the corresponding contact factor indicated in Table 11.

Note: If uneven load distribution is expected in a large machine, take into account the respective contact factor indicated in Table 11.

Table 11: Contact Factor (f_C)

Number of blocks used in close contact	Contact factor f_C
2	0.81
3	0.72
4	0.66
5	0.61
6 or more	0.6
Normal use	1

f_w: Load Factor

In general, reciprocating machines tend to involve vibrations or impacts during operation. It is extremely difficult to accurately determine vibrations generated during high-speed operation and impacts that occur during frequent starts and stops. Therefore, where the effects of speed and vibration are estimated to be significant, divide the basic dynamic load rating (C) by a load factor selected from Table 12, which contains empirically obtained data.

Table 12: Load Factor (f_w)

Vibrations/ impacts	Speed (V)	f_w
Faint	Very low V≦0.25 m/s	1 to 1.2
Weak	Low 0.25 m/s<V≦1 m/s	1.2 to 1.5
Medium	Medium 1 m/s<V≦2 m/s	1.5 to 2
Strong	High V>2 m/s	2 to 3.5

Predicting the Rigidity

Selecting a Radial Clearance (Preload)

Since the radial clearance of an LM Guide greatly affects the running accuracy, load carrying capacity, and rigidity of the LM Guide, it is important to select an appropriate clearance according to the application. In general, the service life and accuracy are favorably affected by selecting a negative clearance (i.e., applying a preload[1]) while taking into account possible vibrations and impacts generated from reciprocating motion.
For specific radial clearances, contact THK. We will help you select the optimal clearance according to the conditions.
The clearances of all LM Guide models (except models HR, GSR, and GSR-R, which are separate types) are adjusted as specified before shipment, and therefore they do not need further preload adjustment.

Note: Preload is an internal load applied in advance to the rolling elements (balls, rollers, etc.) of an LM block in order to increase its rigidity.

Table 13: Types of Radial Clearance

	Normal clearance	Clearance C1 (light preload)	Clearance C0 (medium preload)
Condition	● The loading direction is fixed, impact and vibrations are minimal and 2 rails are installed in parallel. ● Very high precision is not required, and the sliding resistance must be as low as possible.	● An overhang load or moment load is applied. ● The LM Guide is used in a single-rail configuration. ● Light load and high accuracy are required.	● High rigidity is required and vibrations and impact are applied. ● Heavy-cutting machine tools
Examples of applications	• Beam-welding machines • Book-binding machines • Automatic packaging machines • XY axes of general industrial machinery • Automatic sash-manufacturing machines • Welding machines • Flame cutting machines • Tool changers • Various kinds of material feeders	• Grinding machine table feed axes • Automatic coating machines • Industrial robots • Various kinds of high-speed material feeders • NC drilling machines • Vertical axes of general industrial machinery • Printed circuit board drilling machines • Electric discharge machines • Measuring instruments • Precision XY tables	• Machining centers • NC lathes • Grinding stone feed axes of grinding machines • Milling machines • Vertical/horizontal boring machines • Tool rest guides • Vertical axes of machine tools

Service Life with a Preload Considered

When using an LM Guide under a medium preload (clearance C0), it is necessary to calculate the service life while taking into account the magnitude of the preload.
To identify the appropriate preload for any selected LM Guide model, contact THK.

Rigidity

When a load is applied to an LM Guide, the bearings and LM block will undergo elastic deformation within the allowable load range. The ratio of displacement to applied load is referred to as “rigidity.” The radial internal clearance (preload) for the LM Guide can be specified in order to reduce displacement.
By using balls larger than the width of the raceway, they will naturally deform elastically as they roll, allowing the load to be maintained for longer while limiting displacement in the LM Guide.
The effect of the preload can be up to 2.8 times greater than the size of the preload itself. If that level is exceeded, the preload is released and the effect of the preload is lost.
When a preloaded LM Guide takes an external load, the displacement will be linear. The level of displacement will be approximately half that of an LM Guide with no preload.
The preload, in addition to reducing displacement, helps prevent premature failure due to vibration and impact/shock.

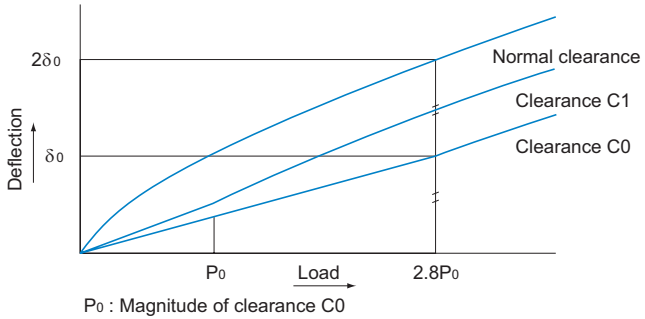
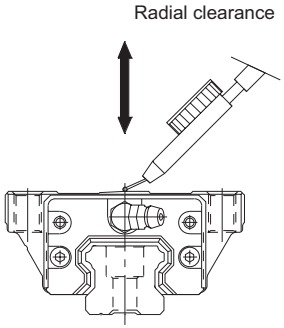


Fig. 10: Rigidity Data

$$K=\frac{P}{\delta}$$

K	: Rigidity value	(N/μm)
δ	: Deflection	(μm)
P	: Calculated load	(N)

Radial Clearance Standard for Each Model



Radial Clearances for Models SHS and SCR

Unit: μm

Indication symbol	Normal	Light preload	Medium preload
Model No.	No symbol	C1	C0
15	–5 to 0	–12 to –5	—
20	–6 to 0	–12 to –6	–18 to –12
25	–8 to 0	–14 to –8	–20 to –14
30	–9 to 0	–17 to –9	–27 to –17
35	–11 to 0	–19 to –11	–29 to –19
45	–12 to 0	–22 to –12	–32 to –22
55	–15 to 0	–28 to –16	–38 to –28
65	–18 to 0	–34 to –22	–45 to –34

Radial Clearances for Models SVR/SVS, NR-X/NRS-X, and NR/NRS

Unit: μm

Indication symbol	Normal	Light preload	Medium preload
Model No.	No symbol	C1	C0
25	–3 to +2	–6 to –3	–9 to –6
30	–4 to +2	–8 to –4	–12 to –8
35	–4 to +2	–8 to –4	–12 to –8
45	–5 to +3	–10 to –5	–15 to –10
55	–6 to +3	–11 to –6	–16 to –11
65	–8 to +3	–14 to –8	–20 to –14
75	–10 to +4	–17 to –10	–24 to –17
85	–13 to +4	–20 to –13	–27 to –20
100	–14 to +4	–24 to –14	–34 to –24

Radial Clearances for Model SSR

Unit: μm

Indication symbol	Normal	Light preload
Model No.	No symbol	C1
15	–4 to +2	–10 to –4
20	–5 to +2	–12 to –5
25	–6 to +3	–15 to –6
30	–7 to +4	–18 to –7
35	–8 to +4	–20 to –8

Radial Clearances for Models SRS, RSX, and RSX-M1

Unit: μm

Indication symbol	Normal	Light preload
Model No.	No symbol	C1
5	0 to +1.5	–1 to 0
7	–2 to +2	–3 to 0
9	–2 to +2	–4 to 0
12	–3 to +3	–6 to 0
15	–5 to +5	–10 to 0
20	–5 to +5	–10 to 0
25	–7 to +7	–14 to 0

Note: Model RSX includes types 5, 7, 9, 12, and 15.
The Model RSX-M1 is available in models 9, 12, and 15.

Radial Clearances for Model SHW

Unit: μm

Indication symbol	Normal	Light preload	Medium preload
Model No.	No symbol	C1	C0
12	–1.5 to 0	–4 to –1	—
14	–2 to 0	–5 to –1	—
17	–3 to 0	–7 to –3	—
21	–4 to +2	–8 to –4	—
27	–5 to +2	–11 to –5	—
35	–8 to +4	–18 to –8	–28 to –18
50	–10 to +5	–24 to –10	–38 to –24

Radial Clearances for Model EPF

Unit: μm

Indication symbol	Normal
Model No.	No symbol
7M	0 or less
9M	
12M	
15M	

Radial Clearances for Models HSR, CSR, HSR-M1, and HSR-M1VV

Unit: μm

Indication symbol	Normal	Light preload	Medium preload
Model No.	No symbol	C1	C0
8	–1 to +1	–4 to –1	—
10	–2 to +2	–5 to –1	—
12	–3 to +3	–6 to –2	—
15	–4 to +2	–12 to –4	—
20	–5 to +2	–14 to –5	–23 to –14
25	–6 to +3	–16 to –6	–26 to –16
30	–7 to +4	–19 to –7	–31 to –19
35	–8 to +4	–22 to –8	–35 to –22
45	–10 to +5	–25 to –10	–40 to –25
55	–12 to +5	–29 to –12	–46 to –29
65	–14 to +7	–32 to –14	–50 to –32
85	–16 to +8	–36 to –16	–56 to –36
100	–19 to +9	–42 to –19	–65 to –42
120	–21 to +10	–47 to –21	–73 to –47
150	–23 to +11	–51 to –23	–79 to –51

Radial Clearances for Models SR and SR-M1

Unit: μm

Indication symbol	Normal	Light preload	Medium preload
Model No.	No symbol	C1	C0
15	–4 to +2	–10 to –4	—
20	–5 to +2	–12 to –5	–17 to –12
25	–6 to +3	–15 to –6	–21 to –15
30	–7 to +4	–18 to –7	–26 to –18
35	–8 to +4	–20 to –8	–31 to –20
45	–10 to +5	–24 to –10	–36 to –24
55	–12 to +5	–28 to –12	–45 to –28
70	–14 to +7	–32 to –14	–50 to –32
85	–20 to +9	–46 to –20	–70 to –46
100	–22 to +10	–52 to –22	–78 to –52
120	–25 to +12	–57 to –25	–87 to –57
150	–29 to +14	–69 to –29	–104 to –69

Radial Clearances for Model SR-MS

Unit: μm

Indication symbol	Clearance CS
Model No.	
15	–2 to +1
20	–2 to +1

Radial Clearances for Models RSR, RSR-W, and RSR-M1

Unit: μm

Indication symbol	Normal	Light preload
Model No.	No symbol	C1
2	0 to +4	—
3	0 to +1	–0.5 to 0
14	–5 to +5	–10 to 0
20	–7 to +7	–14 to 0

Radial Clearances for Model HRW

Unit: μm

Indication symbol	Normal	Light preload	Medium preload
Model No.	No symbol	C1	C0
12	–1.5 to +1.5	–4 to –1	—
14	–2 to +2	–5 to –1	—
17	–3 to +2	–7 to –3	—
21	–4 to +2	–8 to –4	—
27	–5 to +2	–11 to –5	—
35	–8 to +4	–18 to –8	–28 to –18
50	–10 to +5	–24 to –10	–38 to –24
60	–12 to +5	–27 to –12	–42 to –27

Radial Clearance for Model MX

Unit: μm

Indication symbol	Normal	Light preload
Model No.	No symbol	C1
5	0 to +1.5	–1 to 0
7	–2 to +2	–3 to 0

Radial Clearances for Model HDR

Unit: μm

Model No.	Normal	Light preload	Medium preload
	No symbol	C1	C0
15	–6 to 0	–10 to –6	—
20	–8 to 0	–14 to –8	–18 to –14
20U	–9 to 0	–14 to –9	–18 to –14
25	–9 to 0	–16 to –11	–21 to –16
25U	–10 to 0	–17 to –13	–22 to –17
30	–11 to 0	–18 to –13	–22 to –18
35	–13 to 0	–20 to –15	–25 to –20
45	–18 to 0	–29 to –22	–37 to –29
55	–20 to 0	–34 to –27	–42 to –34
65	–23 to 0	–39 to –28	–49 to –39

Radial Clearances for Model JR

Unit: μm

Indication symbol	Normal
Model No.	No symbol
25	0 to +30
35	0 to +30
45	0 to +50
55	0 to +50

Radial Clearances for Model NSR-TBC

Unit: μm

Indication symbol	Normal	Light preload	Medium preload
Model No.	No symbol	C1	C0
20	–5 to +5	–15 to –5	–25 to –15
25	–5 to +5	–15 to –5	–25 to –15
30	–5 to +5	–15 to –5	–25 to –15
40	–8 to +8	–22 to –8	–36 to –22
50	–8 to +8	–22 to –8	–36 to –22
70	–10 to +10	–26 to –10	–42 to –26

Radial Clearances for Models HCR and HMG

Unit: μm

Indication symbol	Normal	Light preload
Model No.	No symbol	C1
12	–3 to +3	–6 to –2
15	–4 to +2	–12 to –4
25	–6 to +3	–16 to –6
35	–8 to +4	–22 to –8
45	–10 to +5	–25 to –10
65	–14 to +7	–32 to –14

Radial Clearances for Model HSR-M2

Unit: μm

Indication symbol	Normal	Light preload
Model No.	No symbol	C1
15	–4 to +2	–12 to –4
20	–5 to +2	–14 to –5
25	–6 to +3	–16 to –6

Radial Clearances for Models SRG and SRN

Unit: μm

Indication symbol	Normal	Light preload	Medium preload	Heavy preload	Super heavy preload
Model No.	No symbol	C1	C0	CN1	CN2
15	–0.5 to 0	–1 to –0.5	–2 to –1	—	—
20	–0.8 to 0	–2 to –0.8	–3 to –2	—	—
25	–2 to –1	–3 to –2	–4 to –3	—	—
30	–2 to –1	–3 to –2	–4 to –3	—	—
35	–2 to –1	–3 to –2	–5 to –3	–6 to –5	–7 to –6
45	–2 to –1	–3 to –2	–5 to –3	–6 to –5	–8 to –6
55	–2 to –1	–4 to –2	–6 to –4	–7 to –6	–9 to –7
65	–3 to –1	–5 to –3	–8 to –5	–9 to –8	–11 to –9
85	–3 to –1	–7 to –3	–12 to –7	—	—
100	–3 to –1	–8 to –3	–13 to –8	—	—

Note: Heavy preload and super heavy preload are available only for Model SRG-C/LC/SLC and Model SRN-C/LC/SLC.
Contact THK if you desire a heavy preload or super heavy preload.

Radial Clearances for Model SRW

Unit: μm

Indication symbol	Normal	Light preload	Medium preload
Model No.	No symbol	C1	C0
70	–2 to –1	–3 to –2	–5 to –3
85	–2 to –1	–4 to –2	–6 to –4
100	–3 to –1	–5 to –3	–8 to –5
130	–3 to –1	–7 to –3	–12 to –7
150	–3 to –1	–8 to –3	–13 to –8

Radial Clearances for Model HRX

Unit: μm

Indication symbol	Medium preload
Model No.	C0
25	–2 to –1
30	–2 to –1
35	–2 to –1
45	–3 to –2
55	–3 to –2
65	–4 to –2

Determining the Accuracy

Accuracy Standards

Accuracy of the LM Guide is specified in terms of running parallelism, dimensional tolerance for height and width, and height and width difference between a pair when two or more LM blocks are used on one rail or when two or more rails are mounted on the same plane.
For details, see “Accuracy Standards for Each Model” on A1-80 to A1-90.

Running Parallelism

Running parallelism refers to the tolerance for parallelism between the LM block and the LM rail datum surface when the LM block travels the whole length of the LM rail with the LM rail bolted to a reference surface.

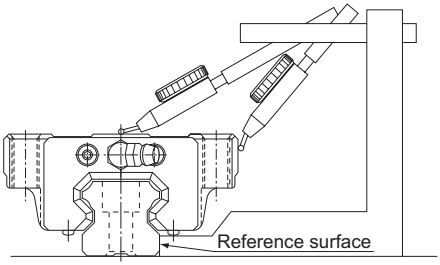


Fig. 11: Running Parallelism

Difference in Height M

The difference in height M indicates the difference between the minimum and maximum values of the height (M) of each of the LM blocks used together on the same plane.

Difference in Width W_2

The difference in width W_2 indicates the difference between the minimum and maximum values of the width (W_2) between an LM rail and each of the LM blocks mounted together on the LM rail.

Notes: When two or more rails are used on the same plane in parallel, this applies only to the difference in width (W_2) and dimensional tolerance of the master rail. Please specify if you wish for it to apply to the difference in width and dimensional tolerance of the subsidiary rail as well. Master LM rails will have a serial number ending with “KB” printed on them. However, this is not the case for Normal grade products.

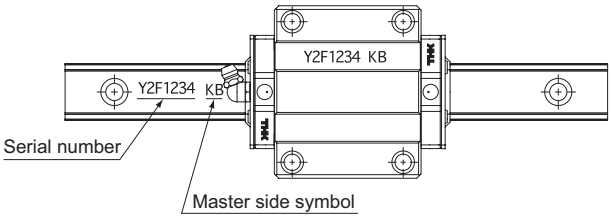


Fig. 12: Master LM Rail (E.g. Model HSR-C)

Accuracy measurements each represent the average value of the central point or the central area of the LM block.
If it is mounted on a less rigid base such as an aluminum base, the curve of the rail will affect the accuracy of the machine. Therefore, it is necessary to define straightness of the rail in advance.

Guidelines for Accuracy Grades by Machine Type

Table 14 shows guidelines for selecting an accuracy grade of the LM Guide according to the machine type.

Table 14: Guidelines for Accuracy Grades by Machine Type

Type of machine		Accuracy grades				
		Normal	H	P	SP	UP
Machine tools	Machining center			●	●	
	Lathe			●	●	
	Milling machine			●	●	
	Boring machine			●	●	
	Jig borer				●	●
	Grinding machine				●	●
	Electric discharge machine			●	●	●
	Punching press		●	●		
	Laser beam machine		●	●	●	
	Woodworking machine	●	●	●		
	NC drilling machine		●	●		
	Tapping center		●	●		
	Palette changer	●				
	ATC	●				
	Wire cutting machine			●	●	
	Dressing machine				●	●
Industrial robots	Cartesian coordinate	●	●	●		
	Cylindrical coordinate	●	●			
Semiconductor manufacturing equipment	Wire bonding machine			●	●	
	Prober				●	●
	Electronic component inserter		●	●		
	Printed circuit board drilling machine		●	●	●	
Other equipment	Injection molding machine	●	●			
	3D measuring instrument				●	●
	Office equipment	●	●			
	Conveyance system	●	●			
	XY table		●	●	●	
	Coating machine	●	●			
	Welding machine	●	●			
	Medical equipment	●	●			
	Digitizer		●	●	●	
	Inspection equipment			●	●	●

Normal : Normal grade
H : High Accuracy grade
P : Precision grade
SP : Super Precision grade
UP : Ultra Precision grade

Accuracy Standards for Each Model

- Accuracies of models SHS, SSR, SVR/SVS, SHW, HSR, SR, NR-X/NRS-X, NR/NRS, HRW, NSR-TBC, HDR, HSR-M1, HSR-M1VV, SR-M1, HSR-M2, SRG, SRN, and HRX are categorized into Normal grade (no symbol), High Accuracy grade (H), Precision grade (P), Super Precision grade (SP) and Ultra Precision grade (UP) by model number, as indicated in Table 16 on A1-81.

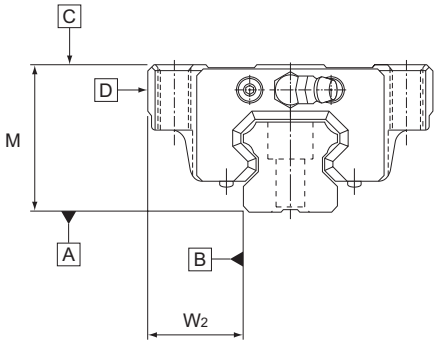


Fig.13

Table 15: LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values				
Above	Up to	Normal grade	High Accuracy grade	Precision grade	Super Precision grade	Ultra Precision grade
—	50	5	3	2	1.5	1
50	80	5	3	2	1.5	1
80	125	5	3	2	1.5	1
125	200	5	3.5	2	1.5	1
200	250	6	4	2.5	1.5	1
250	315	7	4.5	3	1.5	1
315	400	8	5	3.5	2	1.5
400	500	9	6	4.5	2.5	1.5
500	630	11	7	5	3	2
630	800	12	8.5	6	3.5	2
800	1000	13	9	6.5	4	2.5
1000	1250	15	11	7.5	4.5	3
1250	1600	16	12	8	5	4
1600	2000	18	13	8.5	5.5	4.5
2000	2500	20	14	9.5	6	5
2500	3090	21	16	11	6.5	5.5

Table 16: Accuracy Standards for Models SHS, SSR, SVR/SVS, SHW, HSR, SR, NR-X/NRS-X, NR/NRS, HRW, NSR-TBC, HDR, HSR-M1, HSR-M1VV, SR-M1, HSR-M2, SRG, SRN, and HRX.

Unit: mm

Model No.	Accuracy standards	Normal grade	High Accuracy grade	Precision grade	Super Precision grade	Ultra Precision grade
	Item	No symbol	H	P	SP	UP
8 10 12 14	Dimensional tolerance in height M	±0.07	±0.03	±0.015	±0.007	—
	Difference in height M	0.015	0.007	0.005	0.003	—
	Dimensional tolerance in width W_2	±0.04	±0.02	±0.01	±0.007	—
	Difference in width W_2	0.02	0.01	0.006	0.004	—
	Running parallelism of surface C against surface A	As shown in Table 15 A1-80				
	Running parallelism of surface D against surface B	As shown in Table 15 A1-80				
15 17 20 21	Dimensional tolerance in height M	±0.07	±0.03	0 –0.03	0 –0.015	0 –0.008
	Difference in height M	0.02	0.01	0.006	0.004	0.003
	Dimensional tolerance in width W_2	±0.06	±0.03	0 –0.02	0 –0.015	0 –0.008
	Difference in width W_2	0.02	0.01	0.006	0.004	0.003
	Running parallelism of surface C against surface A	As shown in Table 15 A1-80				
	Running parallelism of surface D against surface B	As shown in Table 15 A1-80				
25 27 30 35	Dimensional tolerance in height M	±0.08	±0.04	0 –0.04	0 –0.02	0 –0.01
	Difference in height M	0.02	0.015	0.007	0.005	0.003
	Dimensional tolerance in width W_2	±0.07	±0.03	0 –0.03	0 –0.015	0 –0.01
	Difference in width W_2	0.025	0.015	0.007	0.005	0.003
	Running parallelism of surface C against surface A	As shown in Table 15 A1-80				
	Running parallelism of surface D against surface B	As shown in Table 15 A1-80				
40 45 50 55 60	Dimensional tolerance in height M	±0.08	±0.04	0 –0.05	0 –0.03	0 –0.015
	Difference in height M	0.025	0.015	0.007	0.005	0.003
	Dimensional tolerance in width W_2	±0.07	±0.04	0 –0.04	0 –0.025	0 –0.015
	Difference in width W_2	0.03	0.015	0.007	0.005	0.003
	Running parallelism of surface C against surface A	As shown in Table 15 A1-80				
	Running parallelism of surface D against surface B	As shown in Table 15 A1-80				
65 70 75 85 100 120 150	Dimensional tolerance in height M	±0.08	±0.04	0 –0.05	0 –0.04	0 –0.03
	Difference in height M	0.03	0.02	0.01	0.007	0.005
	Dimensional tolerance in width W_2	±0.08	±0.04	0 –0.05	0 –0.04	0 –0.03
	Difference in width W_2	0.03	0.02	0.01	0.007	0.005
	Running parallelism of surface C against surface A	As shown in Table 15 A1-80				
	Running parallelism of surface D against surface B	As shown in Table 15 A1-80				

Notes: Models SRG15 to 65 are available in high accuracy grade and above. Other models are only available in precision grade or above. (Normal grade is not available.)
Model SRN is available in high accuracy grade or above. (Normal grade is not available.)
The Model HRX is only available in High Accuracy grade and Precision grade.

● Accuracies of model HMG are defined by model number as indicated in Table 17.

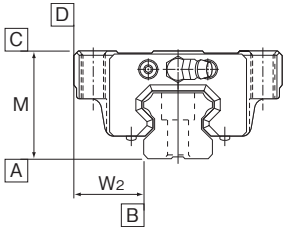


Fig. 14

Table 17: Accuracy Standards for Model HMG

Unit: mm

Model No.	Accuracy standards Item	Normal grade No symbol
15	Dimensional tolerance in height M	±0.1
	Difference in height M	0.02
	Dimensional tolerance in width W_2	±0.1
	Difference in width W_2	0.02
	Running parallelism of surface C against surface A	As shown in Table 18
	Running parallelism of surface D against surface B	As shown in Table 18
25 35	Dimensional tolerance in height M	±0.1
	Difference in height M	0.02
	Dimensional tolerance in width W_2	±0.1
	Difference in width W_2	0.03
	Running parallelism of surface C against surface A	As shown in Table 18
	Running parallelism of surface D against surface B	As shown in Table 18
45 65	Dimensional tolerance in height M	±0.1
	Difference in height M	0.03
	Dimensional tolerance in width W_2	±0.1
	Difference in width W_2	0.03
	Running parallelism of surface C against surface A	As shown in Table 18
	Running parallelism of surface D against surface B	As shown in Table 18

Table 18: LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values
Above	Up to	Normal grade
—	125	30
125	200	37
200	250	40
250	315	44
315	400	49
400	500	53
500	630	58
630	800	64
800	1000	70
1000	1250	77
1250	1600	84
1600	2000	92

- Accuracies of model HCR are categorized into Normal and High Accuracy grades by model number as indicated in Table 19.

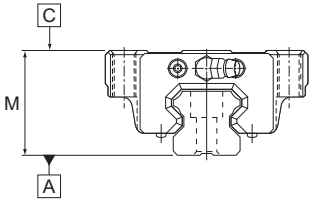


Fig. 15

Table 19: Accuracy Standards for Model HCR

Unit: mm

Model No.	Accuracy standards	Normal grade	High Accuracy grade
	Item	No symbol	H
12 15 25 35	Dimensional tolerance in height M	±0.2	±0.2
	Difference in height M	0.05	0.03
	Running parallelism of surface C against surface A	As shown in Table 20	
45 65	Dimensional tolerance in height M	±0.2	±0.2
	Difference in height M	0.06	0.04
	Running parallelism of surface C against surface A	As shown in Table 20	

Table 20: LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values	
Above	Up to	Normal grade	High Accuracy grade
—	125	30	15
125	200	37	18
200	250	40	20
250	315	44	22
315	400	49	24
400	500	53	26
500	630	58	29
630	800	64	32
800	1000	70	35
1000	1250	77	38
1250	1600	84	42
1600	2000	92	46

- Accuracies of model JR are defined by model number as indicated in Table 21.

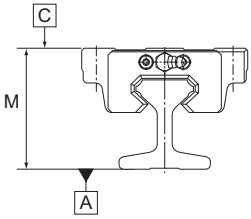


Fig.16

Table 21: Accuracy Standard for Model JR

Unit: mm

Model No.	Accuracy standards	Normal grade
	Item	No symbol
25 35	Difference in height M	0.05
	Running parallelism of surface C against surface A	As shown in Table 22
45 55	Difference in height M	0.06
	Running parallelism of surface C against surface A	As shown in Table 22

Table 22: LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values
Above	Up to	Normal grade
—	50	5
50	80	5
80	125	5
125	200	6
200	250	8
250	315	9
315	400	11
400	500	13
500	630	15
630	800	17
800	1000	19
1000	1250	21
1250	1600	23
1600	2000	26
2000	2500	28
2500	3150	30
3150	4000	33

- Accuracies of models SCR and CSR are categorized into Precision, Super Precision, and Ultra Precision grades by model number as indicated in Table 23.

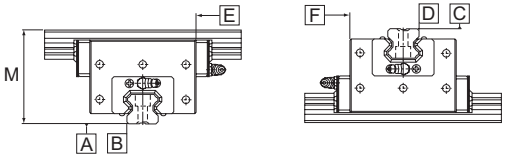


Fig. 17

Table 23: Accuracy Standards for Models SCR and CSR

Unit: mm

Model No.	Accuracy standards	Precision grade	Super Precision grade	Ultra Precision grade
	Item	P	SP	UP
15 20	Difference in height M	0.01	0.007	0.005
	Perpendicularity of surface D against surface B	0.005	0.004	0.003
	Running parallelism of surface E against surface B	As shown in Table 24		
	Running parallelism of surface F against surface D	As shown in Table 24		
25	Difference in height M	0.01	0.007	0.005
	Perpendicularity of surface D against surface B	0.008	0.006	0.004
	Running parallelism of surface E against surface B	As shown in Table 24		
	Running parallelism of surface F against surface D	As shown in Table 24		
30 35	Difference in height M	0.01	0.007	0.005
	Perpendicularity of surface D against surface B	0.01	0.007	0.005
	Running parallelism of surface E against surface B	As shown in Table 24		
	Running parallelism of surface F against surface D	As shown in Table 24		
45	Difference in height M	0.012	0.008	0.006
	Perpendicularity of surface D against surface B	0.012	0.008	0.006
	Running parallelism of surface E against surface B	As shown in Table 24		
	Running parallelism of surface F against surface D	As shown in Table 24		
65	Difference in height M	0.018	0.012	0.009
	Perpendicularity of surface D against surface B	0.018	0.012	0.009
	Running parallelism of surface E against surface B	As shown in Table 24		
	Running parallelism of surface F against surface D	As shown in Table 24		

Table 24: LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values		
Above	Up to	Precision grade	Super Precision grade	Ultra Precision grade
—	50	2	1.5	1
50	80	2	1.5	1
80	125	2	1.5	1
125	200	2	1.5	1
200	250	2.5	1.5	1
250	315	3	1.5	1
315	400	3.5	2	1.5
400	500	4.5	2.5	1.5
500	630	5	3	2
630	800	6	3.5	2
800	1000	6.5	4	2.5
1000	1250	7.5	4.5	3
1250	1600	8	5	4
1600	2000	8.5	5.5	4.5
2000	2500	9.5	6	5
2500	3090	11	6.5	5.5

- Accuracies of Model HR are categorized into Normal, High Accuracy, Precision, Super Precision and Ultra Precision grades by model number as indicated in Table 25.

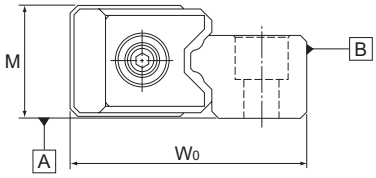


Fig. 18

Table 25: Accuracy Standards for Model HR

Unit: mm

Accuracy standards	Normal grade	High Accuracy grade	Precision grade	Super Precision grade	Ultra Precision grade
Item	No symbol	H	P	SP	UP
Dimensional tolerance in height M	±0.1	±0.05	±0.025	±0.015	±0.01
Difference in height M [1]	0.03	0.02	0.01	0.005	0.003
Dimensional tolerance for total width W_0 [3]	±0.1		±0.05		
Difference in total width W_0 [2, 3]	0.03	0.015	0.01	0.005	0.003
Parallelism of the raceway against surfaces A and B	As shown in Table 26				

[1] Difference in height M applies to a set of LM Guide units used on the same plane.
[2] Difference in total width W_0 applies to LM blocks used in combination on one LM rail.
[3] In a set of LM Guide units, dimensional tolerance and difference in total width W_0 for Precision and higher grades apply only to the master rail. The Master LM Guide will have a serial number ending with “KB” printed on it.

Table 26: LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values				
Above	Up to	Normal grade	High Accuracy grade	Precision grade	Super Precision grade	Ultra Precision grade
—	50	5	3	2	1.5	1
50	80	5	3	2	1.5	1
80	125	5	3	2	1.5	1
125	200	5	3.5	2	1.5	1
200	250	6	4	2.5	1.5	1
250	315	7	4.5	3	1.5	1
315	400	8	5	3.5	2	1.5
400	500	9	6	4.5	2.5	1.5
500	630	11	7	5	3	2
630	800	12	8.5	6	3.5	2
800	1000	13	9	6.5	4	2.5
1000	1250	15	11	7.5	4.5	3
1250	1600	16	12	8	5	4
1600	2000	18	13	8.5	5.5	4.5
2000	2500	20	14	9.5	6	5
2500	3000	21	16	11	6.5	5.5

- Accuracies of Model GSR are categorized into Normal, High Accuracy, and Precision grades as indicated in Table 27.

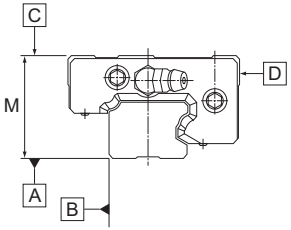


Fig.19

Table 27: Accuracy Standards for Model GSR

Unit: mm

Model No.	Accuracy standards	Normal grade	High-Accuracy grade	Precision grade
	Item	No symbol	H	P
15 20	Dimensional tolerance in height M	±0.02		
	Running parallelism of surface C against surface A	As shown in Table 28		
	Running parallelism of surface D against surface B	As shown in Table 28		
25 30 35	Dimensional tolerance in height M	±0.03		
	Running parallelism of surface C against surface A	As shown in Table 28		
	Running parallelism of surface D against surface B	As shown in Table 28		

Table 28: LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values		
Above	Up to	Normal grade	High Accuracy grade	Precision grade
—	50	5	3	2
50	80	5	3	2
80	125	5	3	2
125	200	5	3.5	2
200	250	6	4	2.5
250	315	7	4.5	3
315	400	8	5	3.5
400	500	9	6	4.5
500	630	11	7	5
630	800	12	8.5	6
800	1000	13	9	6.5
1000	1250	15	11	7.5
1250	1600	16	12	8
1600	2000	18	13	8.5
2000	2500	20	14	9.5
2500	3000	21	16	11

- Accuracies of Model GSR-R are categorized into Normal and High Accuracy grades by model number as indicated in Table 29.

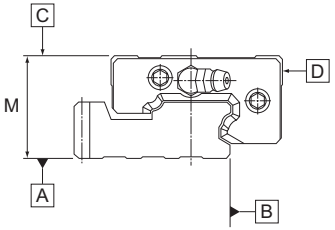


Fig. 20

Table 29: Accuracy Standards for GSR-R

Unit: mm

Model No.	Accuracy standards	Normal grade	High Accuracy grade
	Item	No symbol	H
25 30 35	Dimensional tolerance in height M	±0.03	
	Running parallelism of surface C against surface A	As shown in Table 30	
	Running parallelism of surface D against surface B	As shown in Table 30	

Table 30: LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values	
Above	Up to	Normal grade	High Accuracy grade
—	50	5	3
50	80	5	3
80	125	5	3
125	200	5	3.5
200	250	6	4
250	315	7	4.5
315	400	8	5
400	500	9	6
500	630	11	7
630	800	12	8.5
800	1000	13	9
1000	1250	15	11
1250	1600	16	12
1600	2000	18	13

- Accuracies of Models SRS, RSX, RSR, RSX-M1, and RSR-M1 are categorized into Normal, High Accuracy, and Precision grades by model number as indicated in Table 31.

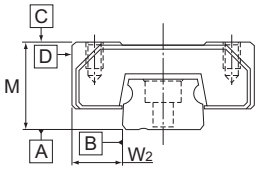


Fig. 21

Table 31: Accuracy Standards for Models SRS, RSX, RSR, RSX-M1, and RSR-M1

Unit: mm

Model No.	Accuracy standards	Normal grade	High Accuracy grade	Precision grade
	Item	No symbol	H	P
35	Dimensional tolerance in height M	±0.03	—	±0.015
	Difference in height M	0.015	—	0.005
	Dimensional tolerance in width W_2	±0.03	—	±0.015
	Difference in width W_2	0.015	—	0.005
	Running parallelism of surface C against surface A	As shown in Table 32		
	Running parallelism of surface D against surface B	As shown in Table 32		
7 9 12 14 15 20 25	Dimensional tolerance in height M	±0.04	±0.02	±0.01
	Difference in height M	0.03	0.015	0.007
	Dimensional tolerance in width W_2	±0.04	±0.025	±0.015
	Difference in width W_2	0.03	0.02	0.01
	Running parallelism of surface C against surface A	As shown in Table 33		
	Running parallelism of surface D against surface B	As shown in Table 33		

Table 32: LM Rail Length and Running Parallelism for Models SRS5, RSX5, and RSR3 by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values	
Above	Up to	Normal grade	Precision grade
—	25	2.5	1.5
25	50	3.5	2
50	100	5.5	3
100	150	7	4
150	200	8.4	5

Table 33: LM Rail Length and Running Parallelism for Models SRS7 to SRS25, RSX7 to RSX15, and RSR9 to RSR15 by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values		
Above	Up to	Normal grade	High Accuracy grade	Precision grade
—	40	8	4	1
40	70	10	4	1
70	100	11	4	2
100	130	12	5	2
130	160	13	6	2
160	190	14	7	2
190	220	15	7	3
220	250	16	8	3
250	280	17	8	3
280	310	17	9	3
310	340	18	9	3
340	370	18	10	3
370	400	19	10	3
400	430	20	11	4
430	460	20	12	4
460	520	21	12	4
520	550	22	12	4
550	640	22	13	4
640	670	23	13	4
670	700	23	13	5
700	820	23	14	5
820	850	24	14	5
850	970	24	15	5
970	1030	25	16	5
1030	1150	25	16	6
1150	1330	26	17	6
1330	1420	27	18	6
1420	1510	27	18	7
1510	1830	28	19	7
1830	2000	28	19	8

Table 34: LM Rail Length and Running Parallelism for Model RSR2 by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values	
Above	Up to	Normal grade	Precision grade
—	25	2	1
25	50	2	1
50	75	2.5	1
75	100	3.5	1
100	125	4	1.5
125	150	5	1.5
150	175	5.5	2
175	200	6	2

- Accuracies of Model MX are categorized into Normal and Precision grades by model number as indicated in Table 35.

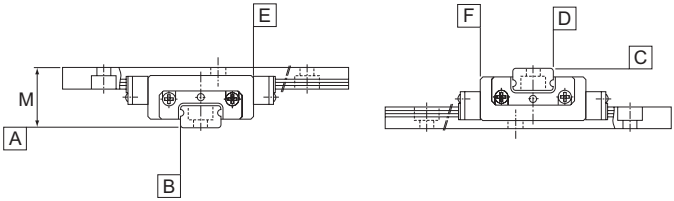


Fig. 22

Table 35: Accuracy Standards for Model MX

Unit: mm

Model No.	Accuracy standards	Normal grade	Precision grade
	Item	No symbol	P
5	Difference in height M	0.015	0.005
	Perpendicularity of surface D against surface B	0.003	0.002
	Running parallelism of surface E against surface B	As shown in Table 36	
	Running parallelism of surface F against surface D	As shown in Table 36	
7	Difference in height M	0.03	0.007
	Perpendicularity of surface D against surface B	0.01	0.005
	Running parallelism of surface E against surface B	As shown in Table 37	
	Running parallelism of surface F against surface D	As shown in Table 37	

Table 36: LM Rail Length and Running Parallelism for Model MX5 by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values	
Above	Up to	Normal grade	Precision grade
—	25	2.5	1.5
25	50	3.5	2
50	100	5.5	3
100	150	7	4
150	200	8.4	5

Table 37: LM Rail Length and Running Parallelism for Model MX7 by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values	
Above	Up to	Normal grade	Precision grade
—	40	8	1
40	70	10	1
70	100	11	2
100	130	12	2
130	160	13	2
160	190	14	2
190	220	15	3
220	250	16	3
250	280	17	3
280	310	17	3
310	340	18	3
340	370	18	3
370	400	19	3

- Accuracies of Model SRW are categorized into Precision, Super Precision, and Ultra Precision grades by model number as indicated in Table 38.

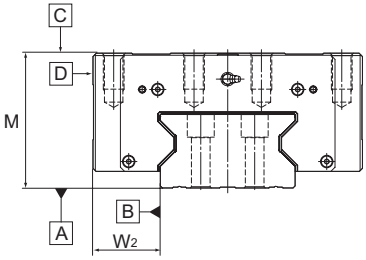


Fig. 23

Table 38: Accuracy Standards for Model SRW

Unit: mm

Model No.	Accuracy standards	Precision grade	Super Precision grade	Ultra Precision grade
	Item	P	SP	UP
70 85	Dimensional tolerance in height M	0 –0.05	0 –0.03	0 –0.015
	Difference in height M	0.007	0.005	0.003
	Dimensional tolerance in width W_2	0 –0.04	0 –0.025	0 –0.015
	Difference in width W_2	0.007	0.005	0.003
	Running parallelism of surface C against surface A	As shown in Table 39		
	Running parallelism of surface D against surface B	As shown in Table 39		
100	Dimensional tolerance in height M	0 –0.05	0 –0.04	0 –0.03
	Difference in height M	0.01	0.007	0.005
	Dimensional tolerance in width W_2	0 –0.05	0 –0.04	0 –0.03
	Difference in width W_2	0.01	0.007	0.005
	Running parallelism of surface C against surface A	As shown in Table 39		
	Running parallelism of surface D against surface B	As shown in Table 39		
130 150	Dimensional tolerance in height M	0 –0.05	0 –0.04	0 –0.03
	Difference in height M	0.01	0.007	0.005
	Dimensional tolerance in width W_2	0 –0.05	0 –0.04	0 –0.03
	Difference in width W_2	0.01	0.007	0.005
	Running parallelism of surface C against surface A	As shown in Table 39		
	Running parallelism of surface D against surface B	As shown in Table 39		

Table 39: LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values		
Above	Up to	Precision grade	Super Precision grade	Ultra Precision grade
—	50	2	1.5	1
50	80	2	1.5	1
80	125	2	1.5	1
125	200	2	1.5	1
200	250	2.5	1.5	1
250	315	3	1.5	1
315	400	3.5	2	1.5
400	500	4.5	2.5	1.5
500	630	5	3	2
630	800	6	3.5	2
800	1000	6.5	4	2.5
1000	1250	7.5	4.5	3
1250	1600	8	5	4
1600	2000	8.5	5.5	4.5
2000	2500	9.5	6	5
2500	3090	11	6.5	5.5

- Accuracies of Model EPF are categorized into Normal, High Accuracy, and Precision grades by model number as indicated in Table 40.

Table 40: Accuracy Standards for Model EPF

Unit: mm

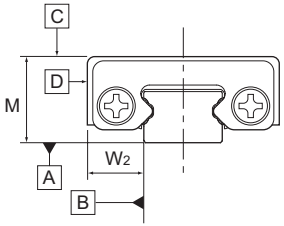


Fig. 24

Model No.	Accuracy Standards	Normal grade	High Accuracy grade	Precision grade
	Item	No Symbol	H	P
7M 9M 12M 15M	Dimensional tolerance in height M	±0.04	±0.02	±0.01
	Difference in height M	0.03	0.015	0.007
	Dimensional tolerance in width W_2	±0.04	±0.025	±0.015
	Running parallelism of surface C against surface A[1]	0.008	0.004	0.001
	Running parallelism of surface D against surface B[1]	0.008	0.004	0.001

Note: If the stroke is more than 40 mm, contact THK.

- Accuracies of Model SR-MS are categorized into Precision, Super Precision, and Ultra Precision grades by model number as indicated in Table 41.

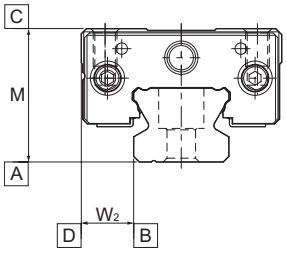


Fig. 25

Table 41: Accuracy Standards for Model SR-MS

Unit: mm

Model No.	Accuracy standards	Precision grade	Super Precision grade	Ultra Precision grade
	Item	P	SP	UP
15 20	Dimensional tolerance in height M	0 –0.03	0 –0.015	0 –0.008
	Difference in height M	0.006	0.004	0.003
	Dimensional tolerance in width W_2	0 –0.02	0 –0.015	0 –0.008
	Difference in width W_2	0.006	0.004	0.003
	Running parallelism of surface C against surface A	As shown in Table 42		
	Running parallelism of surface D against surface B	As shown in Table 42		

Table 42: LM Rail Length and Running Parallelism by Accuracy Standard

Unit: μm

LM rail length (mm)		Running parallelism values		
Above	Up to	Precision grade	Super Precision grade	Ultra Precision grade
		P	SP	UP
—	50	2	1.5	1
50	80	2	1.5	1
80	125	2	1.5	1
125	200	2	1.5	1
200	250	2.5	1.5	1
250	315	3	1.5	1
315	400	3.5	2	1.5

LM Guide

Features and Dimensions of Each Model

Structure and Features of the Caged Ball LM Guide

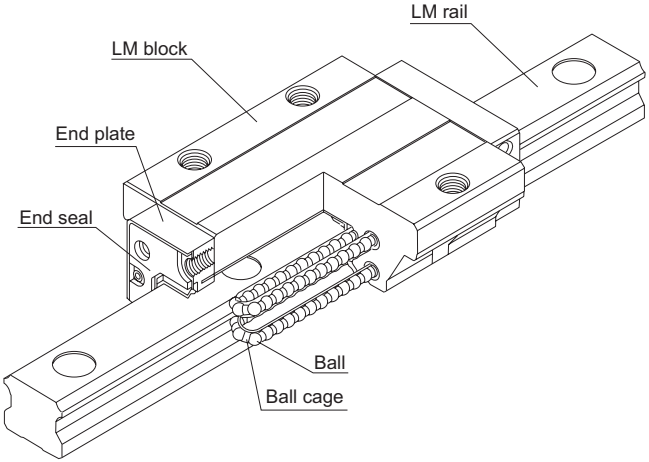


Fig. 1: Structural Drawing of the Caged Ball LM Guide Model SHS

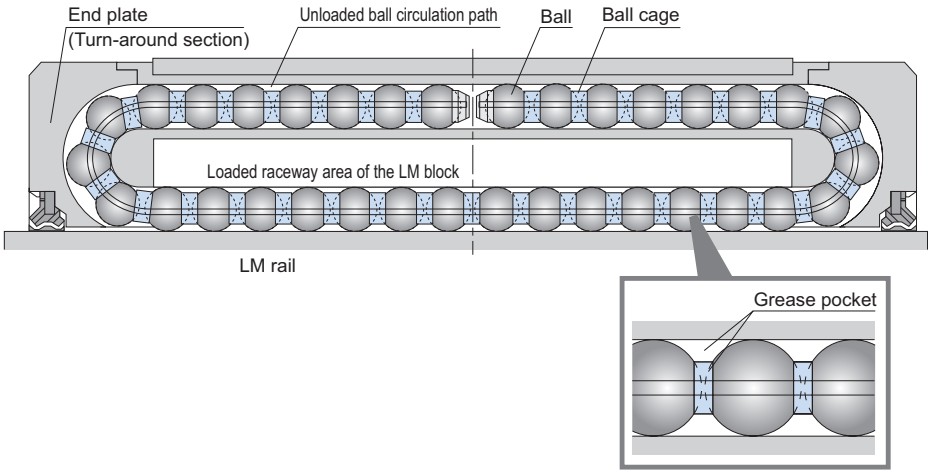


Fig. 2: Circulation Structure inside the LM Block of the Caged Ball LM Guide

With the Caged Ball LM Guide, the use of a ball cage allows lines of evenly spaced balls to circulate and eliminates friction between the balls.
In addition, grease held in a space between the ball circulation path and the ball cage (grease pocket) is applied on the contact surface between each ball and the ball cage as the ball rotates, forming an oil film on the ball surface. As a result, the oil film is not easily broken.

Advantages of Caged Ball Technology

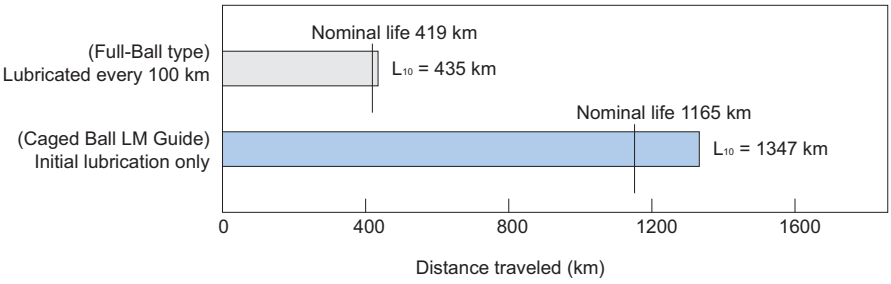
(1) The absence of friction between balls, together with increased grease retention, achieves long service life and long-term maintenance-free (lubrication-free) operation.
(2) The absence of ball-to-ball collision achieves low noise and reduced running sound.
(3) The absence of friction between balls enables low heat generation and high speed operation.
(4) The circulation of rows of evenly arranged balls ensures smooth movement.
(5) The absence of friction between balls allows high grease retention and low dust generation.

Long Service Life and Long-Term Maintenance-Free Operation

● Data on Long Service Life and Long-Term Maintenance-Free Operation

Use of a ball cage eliminates friction between balls and increases grease retention to achieve long service life and long-term maintenance-free operation.

Operating Conditions
Speed : 60 m/min
Stroke : 350 mm
Acceleration: 9.8 m/s^2
Orientation : horizontal
Load : Caged Ball LM Guide : 11.1 kN
Full-Ball type : 9.8 kN

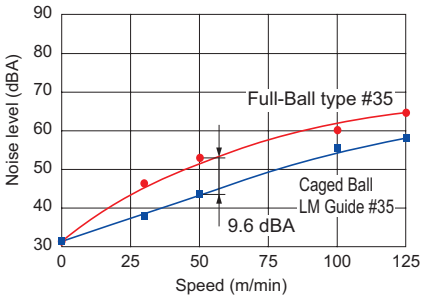


Caged Ball LM Guide and Full-Ball Type Durability Testing Data

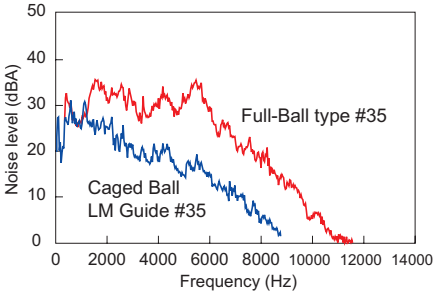
Low Noise and Reduced Running Sound

● Noise Level Data

Since the ball circulation path inside the LM block is made of resin, metallic noise between balls and the LM block is eliminated. In addition, use of a ball cage eliminates metallic noise of ball-to-ball collision, allowing a low noise level to be maintained even at high speed.



Comparison of Noise Levels between Caged Ball LM Guide #35 and Full-Ball Type #35



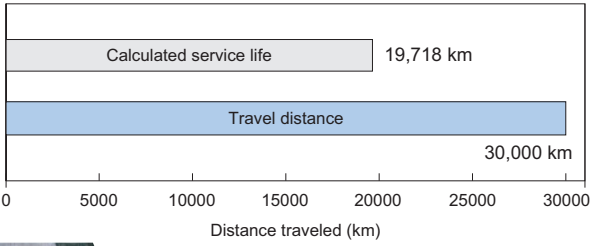
Comparison of Noise Levels between Caged Ball LM Guide #35 and Full-Ball Type #35 (at speed of 50 m/min)

High Speed

● High-Speed Durability Test Data

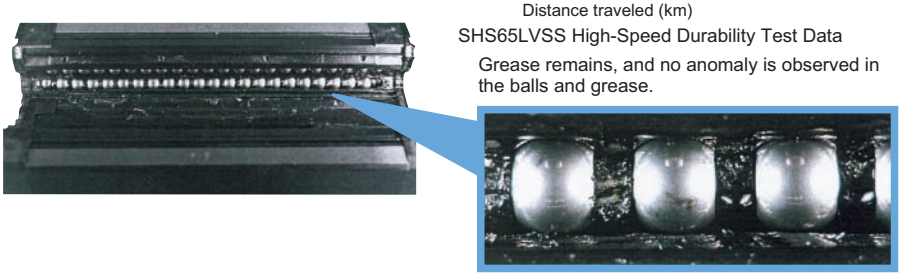
Since use of a ball cage eliminates friction between balls, it enables low heat generation and high-speed operation.

Operating Conditions
Model No. : Caged Ball LM Guide Model SHS65LVSS
Speed : 200 m/min
Stroke : 2500 mm
Lubrication : initial lubrication only
Applied load: 34.5 kN
Acceleration: 1.5 G



SHS65LVSS High-Speed Durability Test Data

Grease remains, and no anomaly is observed in the balls and grease.

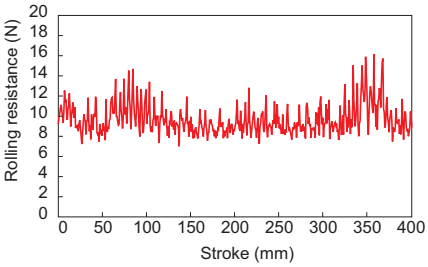


Detail view of the ball cage

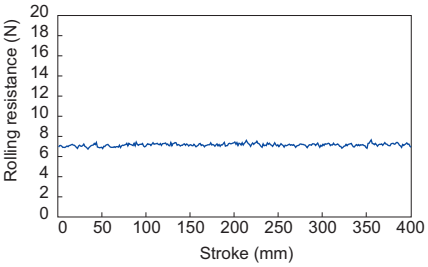
Smooth Motion

● Rolling Resistance Data

Use of a ball cage allows the balls to be uniformly aligned and prevents a line of balls from meandering as they enter the LM block. This enables smooth and stable motion, minimizes fluctuations in rolling resistance, and ensures high accuracy in any mounting orientation.



Rolling Resistance Fluctuation Data with Full-Ball Type #25
(Vertical-use feeding speed: 1 mm/s)

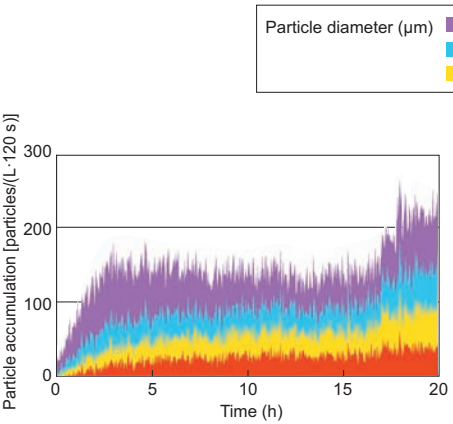


Rolling Resistance Fluctuation Data with Caged Ball LM Guide #25
(Vertical-use feeding speed: 1 mm/s)

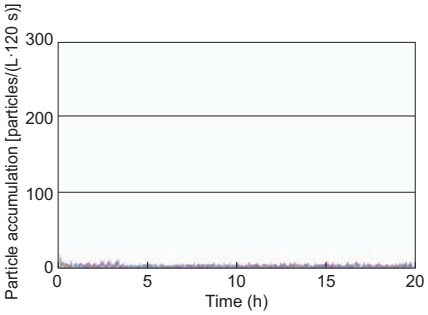
Low Dust Generation

● Low Dust Generation Data

In addition to eliminating friction between balls, using resin for the through holes also eliminates metallic contact. Furthermore, the Caged Ball LM Guide has a high level of grease retention and minimizes spattering of grease, thus achieving superbly low dust generation.



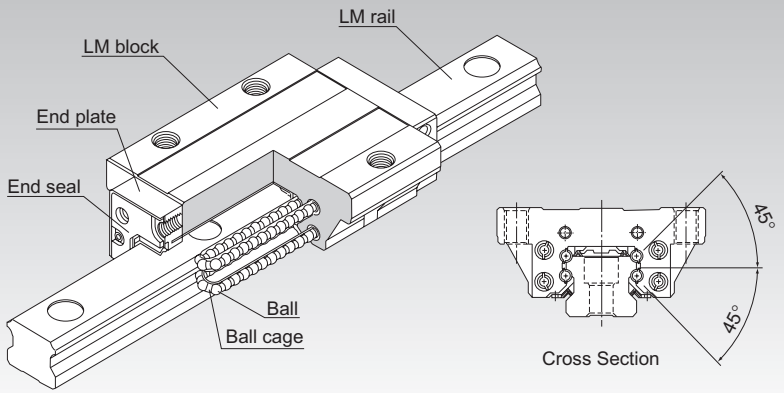
Full-Ball Type Dust Generation Data



Caged Ball LM Guide Model SSR20
Dust Generation Data

SHS

Global Standard Size Caged Ball LM Guide Model SHS



Note: For the ball cage, see A1-92.

Selection Criteria A1-10
Design Highlights A1-516
Options A1-541
Model No. A1-614
Handling Precautions A1-620
Accessories for Lubrication A24-1
Mounting Procedure B1-91

Equivalent Moment Factor A1-45
Rated Loads in All Directions A1-63
Equivalent Factor in Each Direction A1-65
Radial Clearance A1-75
Accuracy Standards A1-81
Shoulder Height of the Mounting Base and the Corner Radius A1-526
Reference Error Tolerance for the Mounting Surface A1-532
Dimensions of Each Model with Options Attached A1-555

Structure and Features

Balls roll in four rows of raceways precision-ground on the LM rail and LM block and are circulated by ball cages and end plates incorporated in the LM block.
Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in four directions (radial, reverse-radial, and lateral directions), enabling the LM Guide to be used in all orientations. In addition, the LM block can receive a well-balanced preload, increasing the rigidity in the four directions while maintaining a constant, low friction coefficient.

4-Way Equal Load

Each row of balls is placed at a contact angle of 45° so that the load ratings applied to the LM block are uniform in the four directions (radial, reverse-radial, and lateral directions), enabling the LM Guide to be used in all orientations and in extensive applications.

Self-Adjustment Capability

The self-adjustment capability of the front-to-front configuration of THK's unique circular-arc grooves (DF set) enables mounting error to be absorbed even under a preload, thus achieving highly accurate and smooth linear motion.

Global Standard Size

SHS is designed to have dimensions nearly equal to the Full-Ball LM Guide Model HSR, the de facto global standard with which THK pioneered the LM System.

Stainless Steel Type also Available

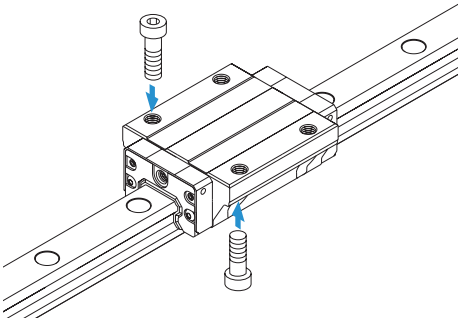
A special type whose LM block, LM rail, and balls are made of stainless steel is also available.
Applicable only to sizes 15 through 25.

Types and Features

Model SHS-C

Dimensional Table⇒A1-100

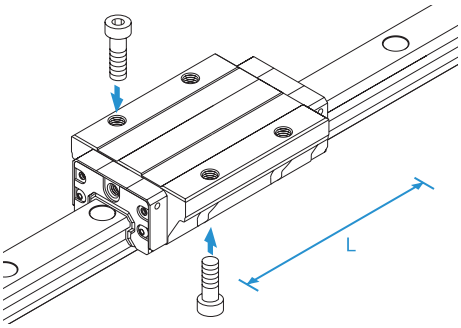
The flange of the LM block has tapped holes.
It can be mounted from the top or the bottom.
It is used in places where the table cannot have through holes for mounting bolts.



Model SHS-LC

Dimensional Table⇒A1-100

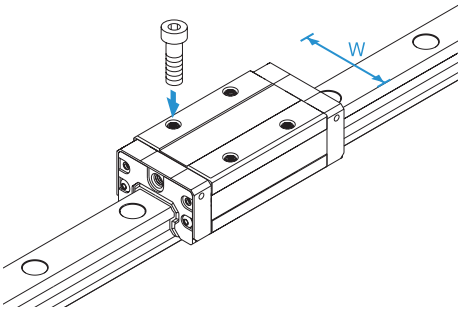
The LM block has the same cross-sectional shape as the Model SHS-C, but it has a longer overall LM block length (L) and a greater load rating.



Model SHS-V

Dimensional Table⇒A1-102

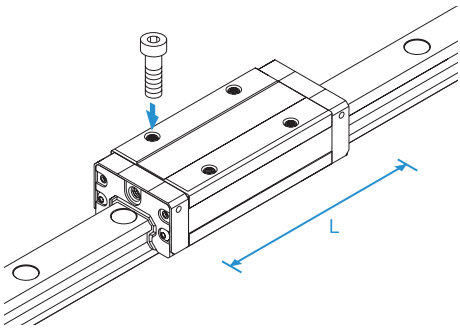
With this type, the LM block has a smaller width (W) and tapped holes.
It is used in places where the space for table width is limited.



Model SHS-LV

Dimensional Table⇒A1-102

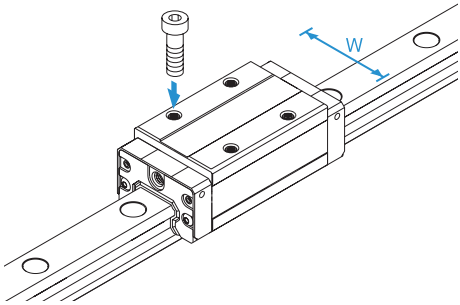
The LM block has the same cross-sectional shape as model SHS-V, but has a longer overall LM block length (L) and a greater load rating.



Model SHS-R

Dimensional Table⇒A1-104

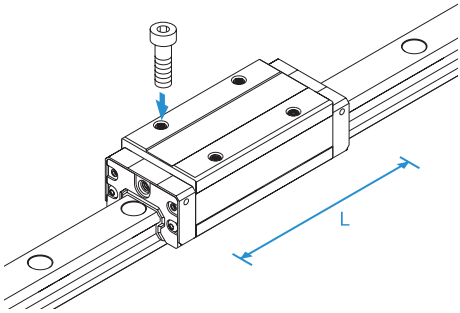
With this type, the LM block has a smaller width (W) and tapped holes. It is used in places where the space for the table width is limited.
It has the same height dimension as the Full-Ball LM Guide Model HSR-R.



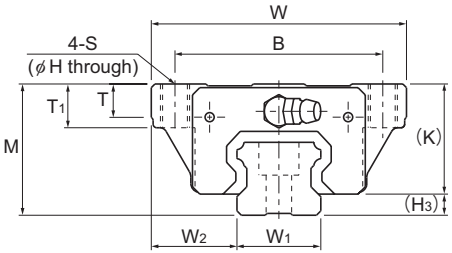
Model SHS-LR

Dimensional Table⇒A1-104

The LM block has the same cross-sectional shape as model SHS-R, but has a longer overall LM block length (L) and a greater load rating.



Models SHS-C, SHS-CM, SHS-LC, and SHS-LCM



Model No.	Outer dimensions			LM block dimensions											Pilot hole for side nipple		
	Height M	Width W	Length[1] L	B	C	S	H	L_1	T	T_1	K	N	E	Grease nipple	e_0	f_0	D_0[2]
SHS 15C SHS 15CM	24	47	64.4	38	30	M5	4.4	48	5.9	8	21	5.5	5.5	PB1021B	4	4	3
SHS 15LC SHS 15LCM	24	47	79.4	38	30	M5	4.4	63	5.9	8	21	5.5	5.5	PB1021B	4	4	3
SHS 20C SHS 20CM	30	63	79	53	40	M6	5.4	59	7.2	10	25.4	6.5	12	B-M6F	4.3	5.3	3
SHS 20LC SHS 20LCM	30	63	98	53	40	M6	5.4	78	7.2	10	25.4	6.5	12	B-M6F	4.3	5.3	3
SHS 25C SHS 25CM	36	70	92	57	45	M8	6.8	71	9.1	12	30.2	7.5	12	B-M6F	4.5	5.5	3
SHS 25LC SHS 25LCM	36	70	109	57	45	M8	6.8	88	9.1	12	30.2	7.5	12	B-M6F	4.5	5.5	3
SHS 30C SHS 30LC	42	90	106 131	72	52	M10	8.5	80 105	11.5	15	35	8	12	B-M6F	5.8	6	5.2
SHS 35C SHS 35LC	48	100	122 152	82	62	M10	8.5	93 123	11.5	15	40.5	8	12	B-M6F	6.5	5.5	5.2
SHS 45C SHS 45LC	60	120	140 174	100	80	M12	10.5	106 140	14.1	18	51.1	10.5	16	B-PT1/8	8	8	5.2
SHS 55C SHS 55LC	70	140	171 213	116	95	M14	12.5	131 173	16	21	57.3	11	16	B-PT1/8	10	8	5.2
SHS 65C SHS 65LC	90	170	221 272	142	110	M16	14.5	175 226	18.8	24	71	19	16	B-PT1/8	10	12	5.2

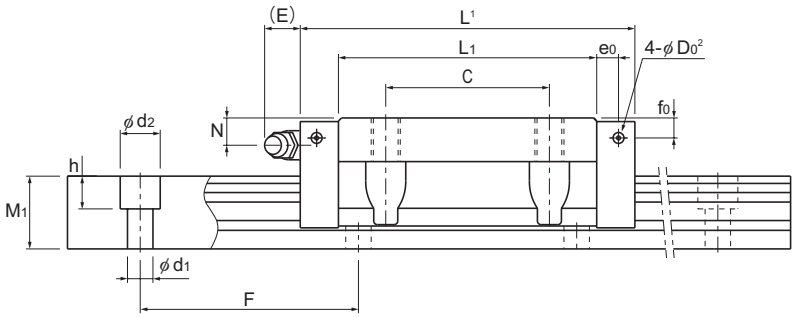
Model number coding

SHS25 LC 2 QZ KKHH C0 M +1240L P Z T M -II

- SHS25: Model number
- LC: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- KKHH: Contamination protection accessory symbol
- C0: Radial clearance symbol
  - Normal (No symbol)
  - Light preload (C1)
  - Medium preload (C0)
- M: Stainless steel LM block
- +1240L: LM rail length (in mm)
- P: Accuracy symbol
  - Normal grade (No Symbol)
  - High Accuracy grade (H)
  - Precision grade (P)
  - Super Precision grade (SP)
  - Ultra Precision grade (UP)
- Z: With steel tape
- T: Stainless steel LM rail
- M: Symbol for LM rail jointed use
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Unit: mm

		LM rail dimensions						Basic load rating		Static permissible moment kN·m [4]					Mass	
		Width		Height	Pitch		Length [3]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	H_3	W_1 0 -0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	3	15	16	13	60	4.5×7.5×5.3	3000 (1240)	14.2	24.2	0.175	0.898	0.175	0.898	0.16	0.23	1.3
	3	15	16	13	60	4.5×7.5×5.3	3000 (1240)	17.2	31.9	0.296	1.43	0.296	1.43	0.212	0.29	1.3
	4.6	20	21.5	16.5	60	6×9.5×8.5	3000 (1480)	22.3	38.4	0.334	1.75	0.334	1.75	0.361	0.46	2.3
	4.6	20	21.5	16.5	60	6×9.5×8.5	3000 (1480)	28.1	50.3	0.568	2.8	0.568	2.8	0.473	0.61	2.3
	5.8	23	23.5	20	60	7×11×9	3000 (2020)	31.7	52.4	0.566	2.75	0.566	2.75	0.563	0.72	3.2
	5.8	23	23.5	20	60	7×11×9	3000 (2020)	36.8	64.7	0.848	3.98	0.848	3.98	0.696	0.89	3.2
	7	28	31	23	80	9×14×12	3000	44.8 54.2	66.6 88.8	0.786 1.36	4.08 6.6	0.786 1.36	4.08 6.6	0.865 1.15	1.34 1.66	4.5
	7.5	34	33	26	80	9×14×12	3000	62.3 72.9	96.6 127	1.38 2.34	6.76 10.9	1.38 2.34	6.76 10.9	1.53 2.01	1.9 2.54	6.2
	8.9	45	37.5	32	105	14×20×17	3090	82.8 100	126 166	2.05 3.46	10.1 16.3	2.05 3.46	10.1 16.3	2.68 3.53	3.24 4.19	10.4
	12.7	53	43.5	38	120	16×23×20	3060	128 161	197 259	3.96 6.68	19.3 31.1	3.96 6.68	19.3 31.1	4.9 6.44	5.35 6.97	14.5
	19	63	53.5	53	150	18×26×22	3000	205 253	320 408	8.26 13.3	40.4 62.6	8.26 13.3	40.4 62.6	9.4 11.9	10.7 13.7	23.7

[1] Length L is for when the contamination protection accessory symbol is UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

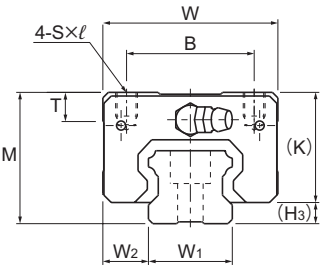
[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] Length Max represents the standard maximum length of an LM rail (see **A1-106**).

[4] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Options⇒A1-541

Models SHS-V, SHS-VM, SHS-LV, and SHS-LVM



Model No.	Outer dimensions			LM block dimensions									Pilot hole for side nipple		
	Height M	Width W	Length[1] L	B	C	S×ℓ	L_1	T	K	N	E	Grease nipple	e_0	f_0	D_0[2]
SHS 15V SHS 15VM	24	34	64.4	26	26	M4×4	48	5.9	21	5.5	5.5	PB1021B	4	4	3
SHS 15LV SHS 15LVM	24	34	79.4	26	34	M4×4	63	5.9	21	5.5	5.5	PB1021B	4	4	3
SHS 20V SHS 20VM	30	44	79	32	36	M5×5	59	8	25.4	6.5	12	B-M6F	4.3	5.3	3
SHS 20LV SHS 20LVM	30	44	98	32	50	M5×5	78	8	25.4	6.5	12	B-M6F	4.3	5.3	3
SHS 25V SHS 25VM	36	48	92	35	35	M6×6.5	71	8	30.2	7.5	12	B-M6F	4.5	5.5	3
SHS 25LV SHS 25LVM	36	48	109	35	50	M6×6.5	88	8	30.2	7.5	12	B-M6F	4.5	5.5	3
SHS 30V SHS 30LV	42	60	106 131	40	40 60	M8×8	80 105	8	35	8	12	B-M6F	5.8	6	5.2
SHS 35V SHS 35LV	48	70	122 152	50	50 72	M8×10	93 123	14.7	40.5	8	12	B-M6F	6.5	5.5	5.2
SHS 45V SHS 45LV	60	86	140 174	60	60 80	M10×15	106 140	14.9	51.1	10.5	16	B-PT1/8	8	8	5.2
SHS 55V SHS 55LV	70	100	171 213	75	75 95	M12×15	131 173	19.4	57.3	11	16	B-PT1/8	10	8	5.2
SHS 65V SHS 65LV	90	126	221 272	76	70 120	M16×20	175 226	19.5	71	19	16	B-PT1/8	10	12	5.2

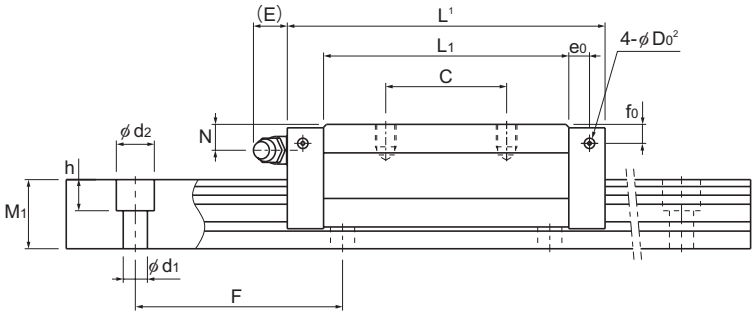
Model number coding

SHS25 V 2 QZ KKHH C1 M +1240L P Z T M -II

- SHS25: Model number
- V: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- KKHH: Contamination protection accessory symbol
- C1: Radial clearance symbol — Normal (No symbol), Light preload (C1), Medium preload (C0)
- M: Stainless steel LM block
- +1240L: LM rail length (in mm)
- P: Accuracy symbol — Normal grade (No Symbol), High Accuracy grade (H), Precision grade (P), Super Precision grade (SP), Ultra Precision grade (UP)
- Z: With steel tape
- T: Stainless steel LM rail
- M: Symbol for LM rail jointed use
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Unit: mm

		LM rail dimensions						Basic load rating		Static permissible moment kN·m [4]					Mass	
		Width		Height	Pitch		Length [3]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	H_3	W_1 0 -0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	3	15	9.5	13	60	4.5×7.5×5.3	3000 (1240)	14.2	24.2	0.175	0.898	0.175	0.898	0.16	0.19	1.3
	3	15	9.5	13	60	4.5×7.5×5.3	3000 (1240)	17.2	31.9	0.296	1.43	0.296	1.43	0.212	0.22	1.3
	4.6	20	12	16.5	60	6×9.5×8.5	3000 (1480)	22.3	38.4	0.334	1.75	0.334	1.75	0.361	0.35	2.3
	4.6	20	12	16.5	60	6×9.5×8.5	3000 (1480)	28.1	50.3	0.568	2.8	0.568	2.8	0.473	0.46	2.3
	5.8	23	12.5	20	60	7×11×9	3000 (2020)	31.7	52.4	0.566	2.75	0.566	2.75	0.563	0.54	3.2
	5.8	23	12.5	20	60	7×11×9	3000 (2020)	36.8	64.7	0.848	3.98	0.848	3.98	0.696	0.67	3.2
	7	28	16	23	80	9×14×12	3000	44.8 54.2	66.6 88.8	0.786 1.36	4.08 6.6	0.786 1.36	4.08 6.6	0.865 1.15	0.94 1.16	4.5
	7.5	34	18	26	80	9×14×12	3000	62.3 72.9	96.6 127	1.38 2.34	6.76 10.9	1.38 2.34	6.76 10.9	1.53 2.01	1.4 1.84	6.2
	8.9	45	20.5	32	105	14×20×17	3090	82.8 100	126 166	2.05 3.46	10.1 16.3	2.05 3.46	10.1 16.3	2.68 3.53	2.54 3.19	10.4
	12.7	53	23.5	38	120	16×23×20	3060	128 161	197 259	3.96 6.68	19.3 31.1	3.96 6.68	19.3 31.1	4.9 6.44	4.05 5.23	14.5
	19	63	31.5	53	150	18×26×22	3000	205 253	320 408	8.26 13.3	40.4 62.6	8.26 13.3	40.4 62.6	9.4 11.9	8.41 10.7	23.7

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

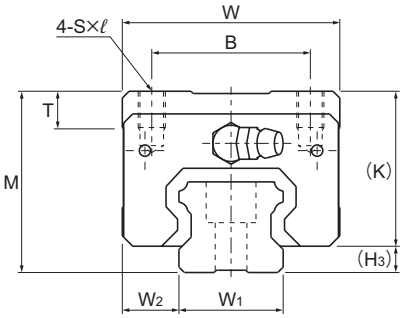
[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-106**.)

[4] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Options⇒A1-541

Models SHS-R, SHS-RM, SHS-LR, and SHS-LRM



Model No.	Outer dimensions			LM block dimensions									Pilot hole for side nipple		
	Height M	Width W	Length[1] L	B	C	S×ℓ	L_1	T	K	N	E	Grease nipple	e_0	f_0	D_0[2]
SHS 15R SHS 15RM	28	34	64.4	26	26	M4×5	48	5.9	25	9.5	5.5	PB1021B	4	8	3
SHS 25R SHS 25RM	40	48	92	35	35	M6×8	71	8	34.2	11.5	12	B-M6F	6	9.5	3
SHS 25LR SHS 25LRM	40	48	109	35	50	M6×8	88	8	34.2	11.5	12	B-M6F	6	9.5	3
SHS 30R SHS 30LR	45	60	106 131	40	40 60	M8×10	80 105	8	38	11	12	B-M6F	5.8	9	5.2
SHS 35R SHS 35LR	55	70	122 152	50	50 72	M8×12	93 123	14.7	47.5	15	12	B-M6F	6.5	12.5	5.2
SHS 45R SHS 45LR	70	86	140 174	60	60 80	M10×17	106 140	14.9	61.1	20.5	16	B-PT1/8	8	18	5.2
SHS 55R SHS 55LR	80	100	171 213	75	75 95	M12×18	131 173	19.4	67.3	21	16	B-PT1/8	10	18	5.2

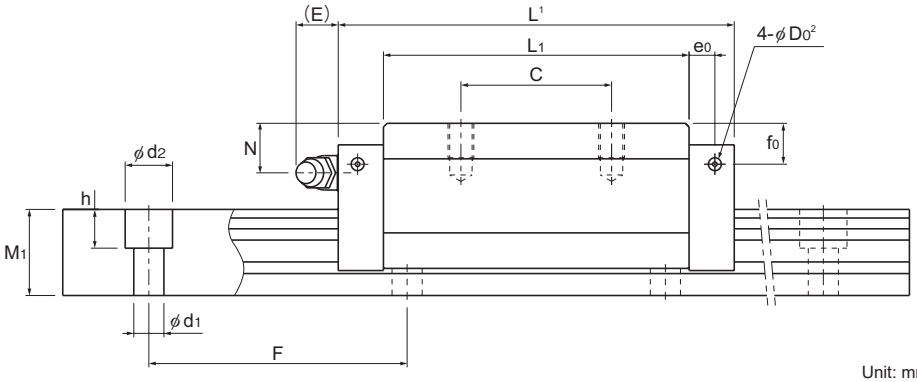
Model number coding

SHS25 LR 2 QZ KKHH C0 M +1240L P T M -II

- SHS25: Model number
- LR: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- KKHH: Contamination protection accessory symbol
- C0: Radial clearance symbol — Normal (No symbol), Light preload (C1), Medium preload (C0)
- M: Stainless steel LM block
- +1240L: LM rail length (in mm)
- P: Accuracy symbol — Normal grade (No Symbol), High Accuracy grade (H), Precision grade (P), Super Precision grade (SP), Ultra Precision grade (UP)
- T: Stainless steel LM rail; Symbol for LM rail jointed use
- M: Symbol for No. of rails used on the same plane
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Unit: mm

		LM rail dimensions						Basic load rating		Static permissible moment kN·m 4					Mass	
		Width		Height	Pitch		Length 3	C	C_0	M_A		M_B		M_C	LM block	LM rail
	H_3	W_1 0 -0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	3	15	9.5	13	60	4.5×7.5×5.3	3000 (1240)	14.2	24.2	0.175	0.898	0.175	0.898	0.16	0.22	1.3
	5.8	23	12.5	20	60	7×11×9	3000 (2020)	31.7	52.4	0.566	2.75	0.566	2.75	0.563	0.66	3.2
	5.8	23	12.5	20	60	7×11×9	3000 (2020)	36.8	64.7	0.848	3.98	0.848	3.98	0.696	0.8	3.2
	7	28	16	23	80	9×14×12	3000	44.8 54.2	66.6 88.8	0.786 1.36	4.08 6.6	0.786 1.36	4.08 6.6	0.865 1.15	1.04 1.36	4.5
	7.5	34	18	26	80	9×14×12	3000	62.3 72.9	96.6 127	1.38 2.34	6.76 10.9	1.38 2.34	6.76 10.9	1.53 2.01	1.8 2.34	6.2
	8.9	45	20.5	32	105	14×20×17	3090	82.8 100	126 166	2.05 3.46	10.1 16.3	2.05 3.46	10.1 16.3	2.68 3.53	3.24 4.19	10.4
	12.7	53	23.5	38	120	16×23×20	3060	128 161	197 259	3.96 6.68	19.3 31.1	3.96 6.68	19.3 31.1	4.9 6.44	5.05 6.57	14.5

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See A**1-555** or A**1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See A**1-106**.)

[4] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Options⇒A1-541

Standard Lengths and Maximum Lengths of LM Rails

Table 1 shows the standard and maximum lengths of the SHS model rail. If a rail length longer than the listed max length is required, rails may be jointed to meet the overall length. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G and g dimensions from the table. As the G and g dimensions increase, this portion becomes less stable, and the accuracy performance is severely impacted.

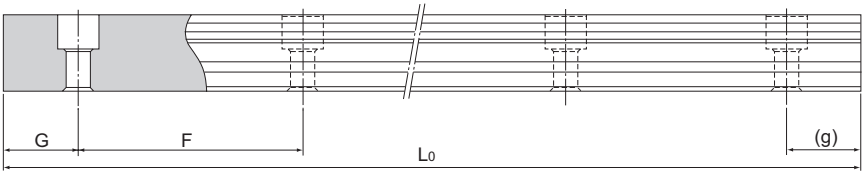


Table 1: Standard Lengths and Maximum Lengths of LM Rails for Model SHS

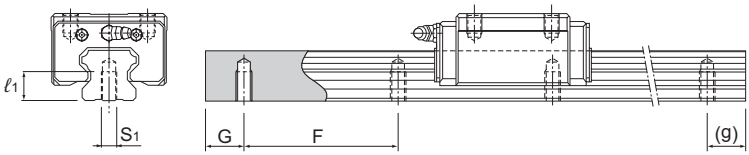
Unit: mm

Model No.	SHS 15	SHS 20	SHS 25	SHS 30	SHS 35	SHS 45	SHS 55	SHS 65
LM rail standard lengths (L_0)	160 220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1360 1480 1600	220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1360 1480 1600 1720 1840 1960 2080 2200	220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1300 1360 1420 1480 1540 1600 1720 1840 1960 2080 2200 2320 2440	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1560 1640 1720 1800 1880 1960 2040 2200 2360 2520 2680 2840 3000	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1560 1640 1720 1800 1880 1960 2040 2200 2360 2520 2680 2840 3000	570 675 780 885 990 1095 1200 1305 1410 1515 1620 1725 1830 1935 2040 2145 2250 2355 2460 2565 2670 2775 2880 2985 3090	780 900 1020 1140 1260 1380 1500 1620 1740 1860 1980 2100 2220 2340 2460 2580 2700 2820 2940 3060	1270 1570 2020 2620
Standard pitch F	60	60	60	80	80	105	120	150
G, g	20	20	20	20	20	22.5	30	35
Max length	3000 (1240)	3000 (1480)	3000 (2020)	3000	3000	3090	3060	3000

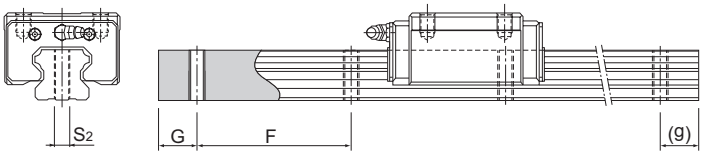
Notes: The maximum length varies with accuracy grades. Contact THK for details.
If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.
The figures in the parentheses indicate the maximum lengths of stainless steel models.

Tapped-Hole Type LM Rail

Model SHS rails also include a type where the LM rail is tapped from the bottom. This type is useful when mounting from the bottom of the base and when increased contamination protection is desired.



K Type



W Type

(1) A tapped-hole LM rail type is available only for Precision grade or lower grades.
(2) For standard pitches of the taps and the G and g dimensions, see Table 1 on A1-106.

Table 2: Dimensions of the LM Rail Tap

Unit: mm

Model No.	K Type		W Type
	S_1	Effective tap depth ℓ_1	S_2
SHS 15	M5	8	M5 through
SHS 20	M6	10	M6 through
SHS 25	M6	12	—
SHS 30	M8	15	—
SHS 35	M8	17	—
SHS 45	M12	20	—
SHS 55	M14	24	—
SHS 65	M20	30	—

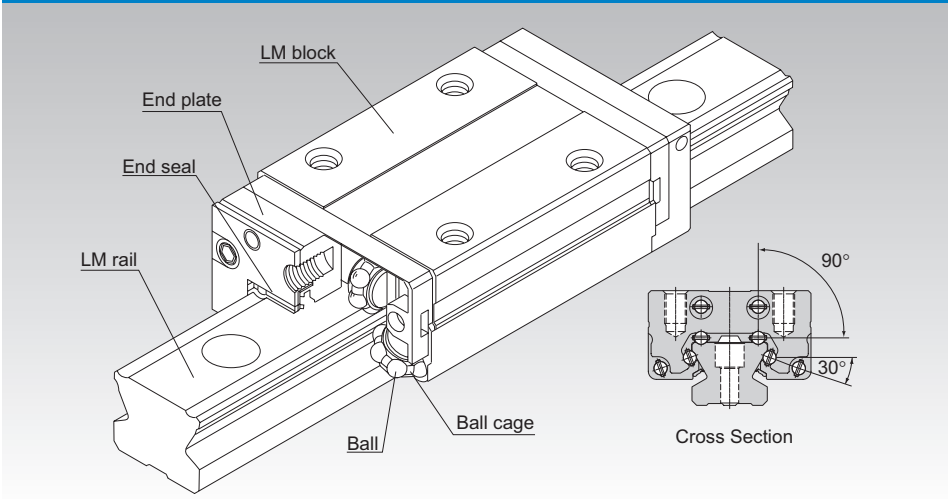
Model number coding

SHS35LC2UU+1000LH K

Symbol for
tapped-hole LM rail (K/W)

SSR

Radial Type Caged Ball LM Guide Model SSR



Note: For the ball cage, see **A1-92**.

Selection Criteria A1-10
Design Highlights A1-516
Options A1-541
Model No. A1-614
Handling Precautions A1-620
Accessories for Lubrication A24-1
Mounting Procedure B1-91

Equivalent Moment Factor A1-45
Rated Loads in All Directions A1-63
Equivalent Factor in Each Direction A1-65
Radial Clearance A1-75
Accuracy Standards A1-81
Shoulder Height of the Mounting Base and the Corner Radius A1-529
Reference Error Tolerance for the Mounting Surface A1-532
Dimensions of Each Model with Options Attached A1-555

Structure and Features

Balls roll in four rows of raceways precision-ground on the LM rail and LM block and are circulated by ball cages and end plates incorporated in the LM block.
Use of the ball cage eliminates friction between balls and increases grease retention, thereby achieving low noise, high speeds, and long-term maintenance-free operations.

Compact, Radial Type

Since it is a compactly designed model with a low cross-sectional height and a ball contact structure that is suited to large loads in the radial direction, this model is optimal for horizontal guide units.

Superb Planar Running Accuracy

Use of a ball contact structure that is suited to large loads in the radial direction minimizes radial displacement under radial loads and allows stable, highly accurate motion.

Self-Adjustment Capability

The self-adjustment capability of the front-to-front configuration of THK's unique circular-arc grooves (DF set) enables mounting error to be absorbed even under a preload, thus achieving highly accurate, smooth linear motion.

Stainless Steel Type Also Available

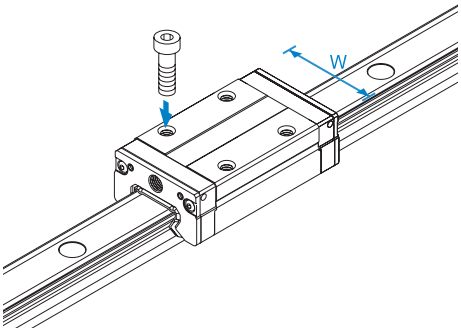
A special type whose LM block, LM rail, and balls are made of stainless steel is also available.

Types and Features

Model SSR-XW

Dimensional Table⇒A1-112

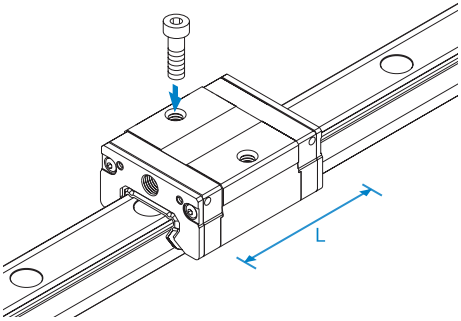
With this type, the LM block has a smaller width (W) and tapped holes. It is used in places where the space for the table width is limited.



Model SSR-XV

Dimensional Table⇒A1-114

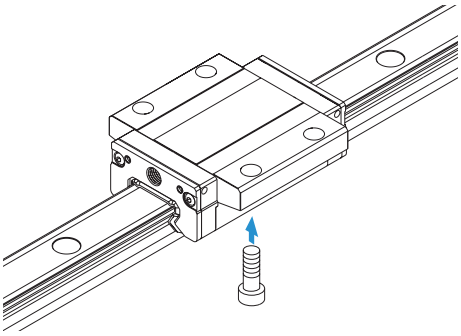
This type has the same cross-sectional shape as SSR-XW but has a shorter overall LM block length (L).



Model SSR-XTB

Dimensional Table⇒A1-116

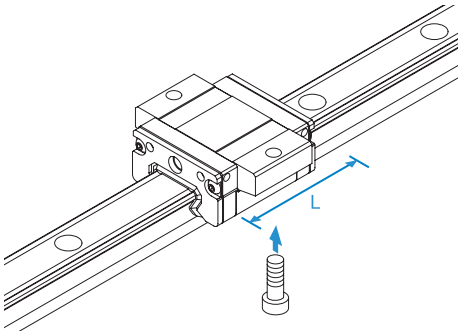
The flange of the LM block has through holes. It is used in places where the table cannot have through holes for mounting bolts.



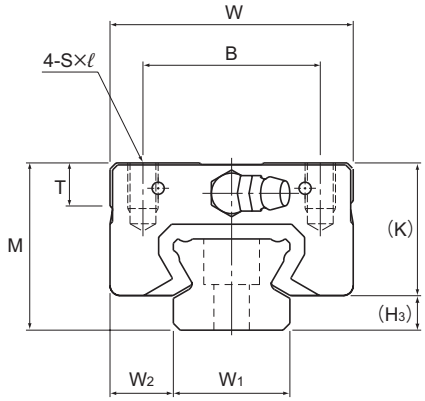
Model SSR-XSB

Dimensional Table⇒A1-118

This type has the same cross-sectional shape as SSR-XTB but has a shorter overall LM block length (L).



Models SSR-XW and SSR-XWM



Model No.	Outer dimensions			LM block dimensions								Pilot hole for side nipple			
	Height	Width	Length[1]								Grease nipple				
	M	W	L	B	C	S×ℓ	L_1	T	K	N	E		e_0	f_0	D_0[2]	H_3
SSR 15XW SSR 15XWM	24	34	56.9	26	26	M4×7	39.9	6.5	19.5	4.5	5.5	PB1021B	4.5	2.7	3	4.5
SSR 20XW SSR 20XWM	28	42	66.5	32	32	M5×8	46.6	8.2	22	5.5	12	B-M6F	5.2	2.9	3	6
SSR 25XW SSR 25XWM	33	48	83	35	35	M6×9	59.8	8.4	26.2	6	12	B-M6F	6.8	3.3	3	6.8
SSR 30XW SSR 30XWM	42	60	97	40	40	M8×12	70.7	11.3	32.5	8	12	B-M6F	7.6	4.5	4	9.5
SSR 35XW	48	70	110.9	50	50	M8×12	80.5	13	36.5	8.5	12	B-M6F	8.8	4.7	4	11.5

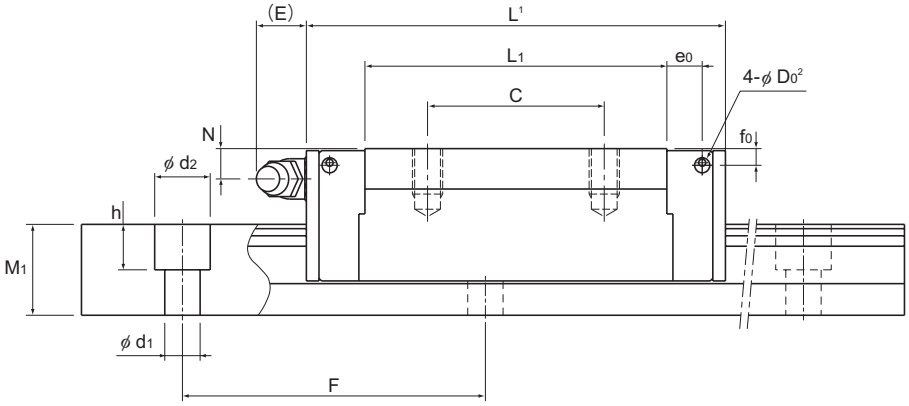
Model number coding

SSR25X W 2 QZ UU C1 M +1240L Y P T M -II

- SSR25X: Model number
- W: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ lubricator
- UU: Contamination protection accessory symbol
- C1: Radial clearance symbol — Normal (No symbol), Light preload (C1)
- M: Stainless steel LM block
- +1240L: LM rail length (in mm)
- Y: Applied to only 15 and 25
- P: Accuracy symbol — Normal grade (No Symbol), High Accuracy grade (H)/Precision grade (P), Super Precision grade (SP)/Ultra Precision grade (UP)
- T: Symbol for LM rail jointed use
- M: Stainless steel LM rail
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Unit: mm

	LM rail dimensions						Basic load rating[4]		Static permissible moment kN·m [5]					Mass	
	Width		Height	Pitch		Length[3]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 ±0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	15	9.5	12.5	60	4.5×7.5×5.3	3000 (1240)	14.7	16.5	0.0792	0.44	0.0486	0.274	0.0962	0.15	1.2
	20	11	15.5	60	6×9.5×8.5	3000 (1480)	19.6	23.4	0.138	0.723	0.0847	0.448	0.18	0.25	2.1
	23	12.5	18	60	7×11×9	3000 (2020)	31.5	36.4	0.258	1.42	0.158	0.884	0.33	0.4	2.7
	28	16	23	80	7×11×9	3000 (2520)	46.5	52.7	0.446	2.4	0.274	1.49	0.571	0.8	4.3
	34	18	27.5	80	9×14×12	3000	64.6	71.6	0.711	3.72	0.437	2.31	0.936	1.1	6.4

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-120**.)

[4] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[5] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

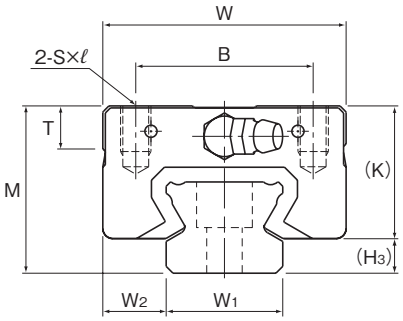
Notes: The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.
The stainless steel provides excellent corrosion and environmental resistance.
For models SSR15 and 25, two types of rails with different mounting hole dimensions are available. (See Table 1.)
When replacing this model with model SR, pay attention to the mounting hole dimension of the LM rail. Contact THK for details.

Table 1: Rail Mounting Hole Dimensions

Model No.	Standard rail	Semi-standard rail
SSR 15	For M4 (symbol Y)	For M3 (no symbol)
SSR 25	For M6 (symbol Y)	For M5 (no symbol)

Options⇒A1-541

Models SSR-XV and SSR-XVM



Model No.	Outer dimensions			LM block dimensions								Pilot hole for side nipple			
	Height	Width	Length[1]								Grease nipple				
	M	W	L	B	S×ℓ	L_1	T	K	N	E		e_0	f_0	D_0[2]	H_3
SSR 15XV SSR 15XVM	24	34	40.3	26	M4×7	23.3	6.5	19.5	4.5	5.5	PB1021B	4.5	2.7	3	4.5
SSR 20XV SSR 20XVM	28	42	47.7	32	M5×8	27.8	8.2	22	5.5	12	B-M6F	5.2	2.9	3	6
SSR 25XV SSR 25XVM	33	48	60	35	M6×9	36.8	8.4	26.2	6	12	B-M6F	6.8	3.3	3	6.8
SSR 30XV SSR 30XVM	42	60	66.7	40	M8×12	40.4	11.5	32.5	8	12	B-M6F	7.6	4.5	4	9.5
SSR 35XV	48	70	77.5	50	M8×12	47.1	16.2	36.5	8.5	12	B-M6F	8.8	4.7	4	11.5

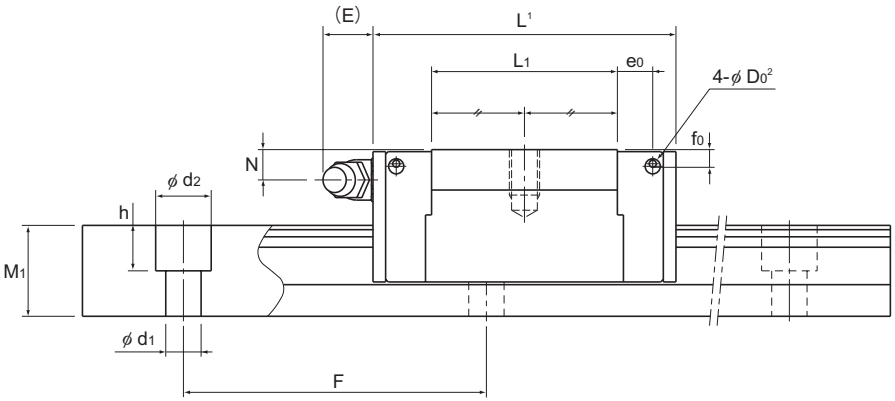
Model number coding

SSR25X V 2 QZ UU C1 M +1240L Y P T M -III

- SSR25X: Model number
- V: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ lubricator
- UU: Contamination protection accessory symbol
- C1: Radial clearance symbol — Normal (No symbol), Light preload (C1)
- M: Stainless steel LM block
- +1240L: LM rail length (in mm)
- Y: Applied to only 15 and 25
- P: Accuracy symbol — Normal grade (No Symbol), High Accuracy grade (H)/Precision grade (P), Super Precision grade (SP)/Ultra Precision grade (UP)
- T: Symbol for LM rail jointed use
- M: Stainless steel LM rail
- -III: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 3 rails are used in parallel is 3 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ. See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

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Unit: mm

	LM rail dimensions						Basic load rating[4]		Static permissible moment kN·m [5]					Mass	
	Width		Height	Pitch		Length[3]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 ±0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	15	9.5	12.5	60	4.5×7.5×5.3	3000 (1240)	9.1	9.7	0.0303	0.119	0.0189	0.122	0.0562	0.08	1.2
	20	11	15.5	60	6×9.5×8.5	3000 (1480)	13.4	14.4	0.0523	0.336	0.0326	0.213	0.111	0.14	2.1
	23	12.5	18	60	7×11×9	3000 (2020)	21.7	22.5	0.104	0.661	0.0652	0.419	0.204	0.23	2.7
	28	16	23	80	7×11×9	3000 (2520)	34.8	34.4	0.186	1.12	0.116	0.711	0.376	0.43	4.3
	34	18	27.5	80	9×14×12	3000	48.3	46.7	0.295	1.77	0.184	1.12	0.615	0.6	6.4

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-120**.)

[4] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[5] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

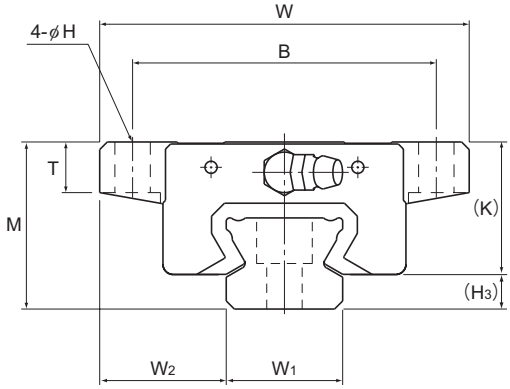
Notes: The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.
The stainless steel provides excellent corrosion and environmental resistance.
For models SSR15 and 25, two types of rails with different mounting hole dimensions are available. (See Table 1.)
When replacing this model with model SR, pay attention to the mounting hole dimension of the LM rail. Contact THK for details.

Table 1: Rail Mounting Hole Dimensions

Model No.	Standard rail	Semi-standard rail
SSR 15	For M4 (symbol Y)	For M3 (no symbol)
SSR 25	For M6 (symbol Y)	For M5 (no symbol)

Options⇒A1-541

Model SSR-XTB



Model No.	Outer dimensions			LM block dimensions									Pilot hole for side nipple			
	Height	Width	Length[1]									Grease nipple				
	M	W	L	B	C	H	L_1	T	K	N	E		e_0	f_0	D_0[2]	H_3
SSR 15XTB	24	52	56.9	41	26	4.5	39.9	7	19.5	4.5	5.5	PB1021B	4.5	2.7	3	4.5
SSR 20XTB	28	59	66.5	49	32	5.5	46.6	9	22	5.5	12	B-M6F	5.2	2.9	3	6
SSR 25XTB	33	73	83	60	35	7	59.8	10	26.2	6	12	B-M6F	6.8	3.3	3	6.8
SSR 30XTB	42	90	97	72	40	9	70.7	10	32.5	8	12	B-M6F	7.6	4.5	4	9.5
SSR 35XTB	48	100	110.9	82	50	9	80.5	13	36.5	8.5	12	B-M6F	8.8	4.7	4	11.5

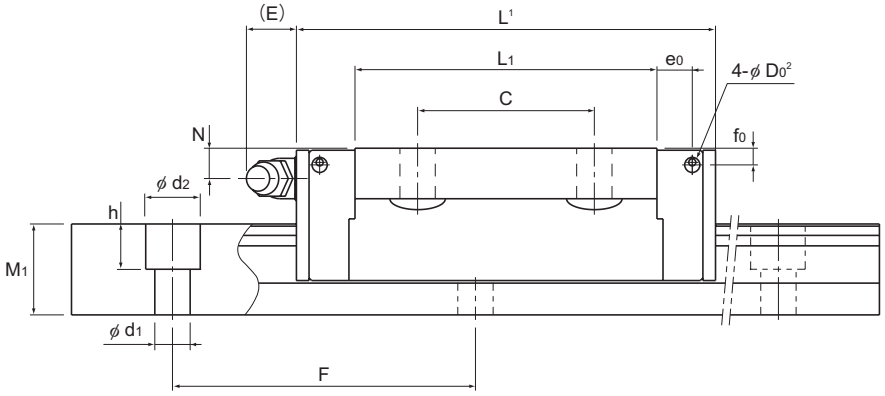
Model number coding

SSR15X TB 2 QZ UU C1 +820L Y P T -II

- SSR15X: Model number
- TB: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ lubricator
- UU: Contamination protection accessory symbol
- C1: Radial clearance symbol
  - Normal (No symbol)
  - Light preload (C1)
  - Medium preload (C0)
- +820L: LM rail length (in mm)
- Y: Applied to only 15 and 25 sizes
- P: Symbol for LM rail jointed use
- T: Accuracy symbol
  - Normal grade (No Symbol)
  - High Accuracy grade (H)
  - Precision grade (P)
  - Super Precision grade (SP)
  - Ultra Precision grade (UP)
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

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Unit: mm

	LM rail dimensions						Basic load rating[4]		Static permissible moment kN·m [5]					Mass	
	Width		Height	Pitch		Length[3]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 ±0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	15	18.5	12.5	60	4.5×7.5×5.3	3000 (1240)	14.7	16.5	0.0792	0.44	0.0486	0.274	0.0962	0.19	1.2
	20	19.5	15.5	60	6×9.5×8.5	3000 (1480)	19.6	23.4	0.138	0.723	0.0847	0.448	0.18	0.31	2.1
	23	25	18	60	7×11×9	3000 (2020)	31.5	36.4	0.258	1.42	0.158	0.884	0.33	0.53	2.7
	28	31	23	80	7×11×9	3000 (2520)	46.5	52.7	0.446	2.4	0.274	1.49	0.571	0.87	4.3
	34	33	27.5	80	9×14×12	3000	64.6	71.6	0.711	3.72	0.437	2.31	0.936	1.33	6.4

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-120**.)

[4] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[5] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

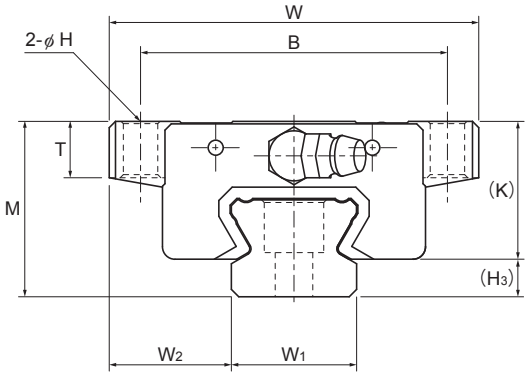
Notes: For models SSR15 and 25, two types of rails with different mounting hole dimensions are available. (See Table 1.)
When replacing this model with model SR, pay attention to the mounting hole dimension of the LM rail. Contact THK for details.

Table 1: Rail Mounting Hole Dimensions

Model No.	Standard rail	Semi-standard rail
SSR 15	For M4 (symbol Y)	For M3 (no symbol)
SSR 25	For M6 (symbol Y)	For M5 (no symbol)

Options⇒A1-541

Model SSR-XSB



Model No.	Outer dimensions			LM block dimensions								Pilot hole for side nipple			
	Height	Width	Length[1]								Grease nipple				
	M	W	L	B	H	L_1	T	K	N	E		e_0	f_0	D_0[2]	H_3
SSR 15XSB	24	52	40.3	41	4.5	23.3	7	19.5	4.5	5.5	PB1021B	4.5	2.7	3	4.5
SSR 20XSB	28	59	47.7	49	5.5	27.8	9	22	5.5	12	B-M6F	5.2	2.8	3	6
SSR 25XSB	33	73	60	60	7	36.8	10	26.2	6	12	B-M6F	7	3.3	3	6.8
SSR 30XSB	42	90	66.7	72	9	40.4	10	32.5	8	12	B-M6F	7.6	4.5	4	9.5
SSR 35XSB	48	100	77.5	82	9	47.1	13	36.5	8.5	12	B-M6F	8.8	4.7	4	11.5

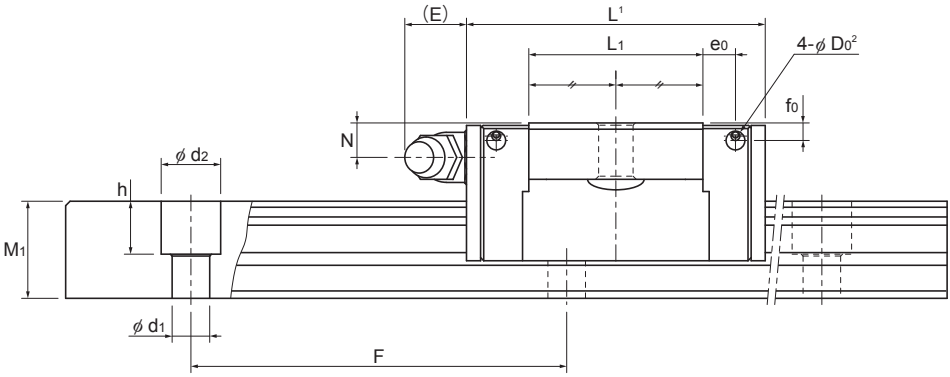
Model number coding

SSR15X SB 2 QZ UU C1 +820L Y P T -II

- SSR15X: Model number
- SB: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ lubricator
- UU: Contamination protection accessory symbol
- C1: Radial clearance symbol
  - Normal (No symbol)
  - Light preload (C1)
  - Medium preload (C0)
- +820L: LM rail length (in mm)
- Y: Applied to only 15 and 25 sizes
- P: Accuracy symbol
  - Normal grade (No Symbol)
  - High Accuracy grade (H)
  - Precision grade (P)
  - Super Precision grade (SP)
  - Ultra Precision grade (UP)
- T: Symbol for LM rail jointed use
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

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Unit: mm

	LM rail dimensions						Basic load rating[4]		Static permissible moment kN·m [5]					Mass	
	Width		Height	Pitch		Length[3]	C	C0	MA		MB		MC	LM block	LM rail
	W1 ±0.05	W2	M1	F	d1×d2×h	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	15	18.5	12.5	60	4.5×7.5×5.3	3000 (1240)	9.1	9.7	0.0303	0.1192	0.0189	0.122	0.0562	0.11	1.2
	20	19.5	15.5	60	6×9.5×8.5	3000 (1480)	13.4	14.4	0.0523	0.336	0.0326	0.213	0.111	0.18	2.1
	23	25	18	60	7×11×9	3000 (2020)	21.7	22.5	0.104	0.661	0.0652	0.419	0.204	0.31	2.7
	28	31	23	80	7×11×9	3000 (2520)	34.8	34.4	0.186	1.12	0.116	0.711	0.376	0.52	4.3
	34	33	27.5	80	9×14×12	3000	48.3	46.7	0.295	1.77	0.184	1.12	0.615	0.77	6.4

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-120**.)

[4] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[5] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Notes: For models SSR15 and 25, two types of rails with different mounting hole dimensions are available. (See Table 1.)
When replacing this model with model SR, pay attention to the mounting hole dimension of the LM rail. Contact THK for details.

Table 1: Rail Mounting Hole Dimensions

Model No.	Standard rail	Semi-standard rail
SSR 15	For M4 (symbol Y)	For M3 (no symbol)
SSR 25	For M6 (symbol Y)	For M5 (no symbol)

Options⇒A1-541

Standard Lengths and Maximum Lengths of LM Rails

Table 1 shows the standard lengths and the maximum lengths of model SSR variations. If the maximum length of the desired LM rail exceeds these values, joint rails will be used. Contact THK for details.
For special rail lengths, it is recommended to use a value corresponding to the G and g dimensions from the table. As the G and g dimensions increase, this portion becomes less stable, and the accuracy performance is severely impacted.

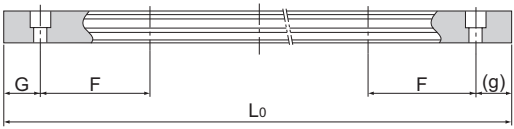


Table 1: Standard Lengths and Maximum Lengths of LM Rails

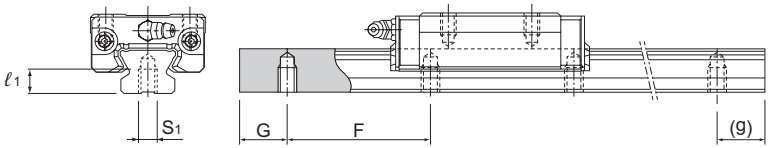
Unit: mm

Model No.	SSR 15X	SSR 20X	SSR 25X	SSR 30X	SSR 35X
LM rail standard lengths (L_0)	160 220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1300 1360 1420 1480 1540	220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1300 1360 1420 1480 1540 1600 1660 1720 1780 1840 1900 1960 2020 2080 2140	220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1240 1300 1360 1420 1480 1540 1600 1660 1720 1780 1840 1900 1960 2020 2080 2140 2200 2260 2320 2380 2440	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1640 1720 1800 1880 1960 2040 2120 2200 2280 2360 2440 2520 2600 2680 2760 2840 2920	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1640 1720 1800 1880 1960 2040 2120 2200 2280 2360 2440 2520 2600 2680 2760 2840 2920
Standard pitch F	60	60	60	80	80
G, g	20	20	20	20	20
Max length	3000 (1240)	3000 (1480)	3000 (2020)	3000 (2520)	3000

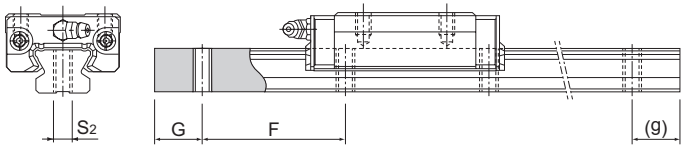
Notes: The maximum length varies with accuracy grades. Contact THK for details.
If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.
The figures in the parentheses indicate the maximum lengths of stainless steel made models.

Tapped-Hole Type LM Rail

LM rails with tapped holes machined on the bottom surface are available for the Model SSR. This type is useful when mounting from the bottom of the base and when increased contamination protection is desired.



K Type



W Type

(1) A tapped-hole LM rail type is available only for Precision grade or lower grades.
(2) For standard pitches of the taps and the G and g dimensions, see Table 1 on **A1-120**.

Table 2: Dimensions of the LM Rail Tap

Unit: mm

Model No.	K Type		W Type
	S_1	Effective tap depth ℓ_1	S_2
SSR 15X	M5	7	M5 through
SSR 20X	M6	9	M6 through
SSR 25X	M6	10	—
SSR 30X	M8	14	—
SSR 35X	M8	16	—

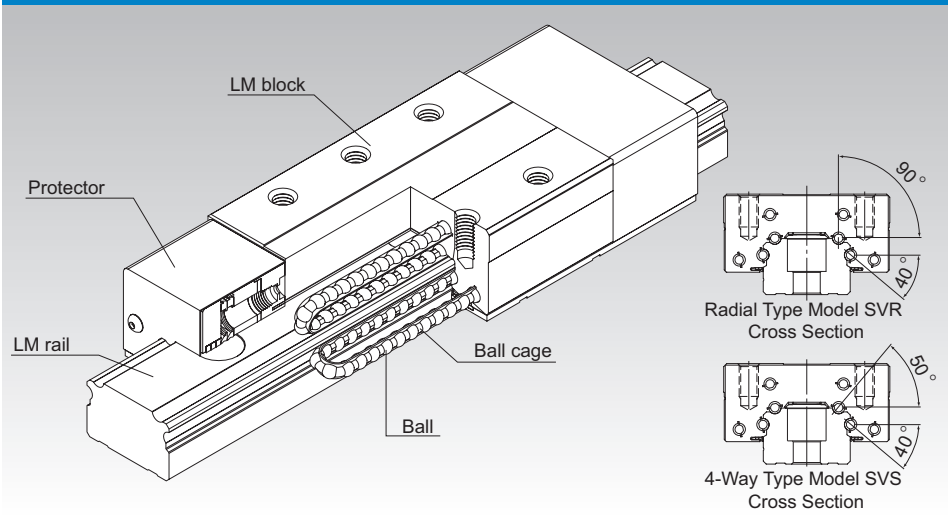
Model number coding

SSR20XW2UU+1200LH K

Symbol for
tapped-hole LM rail (K/W)

SVR/SVS

Super-Heavy Load Caged Ball LM Guide Model SVR/SVS for Machine Tools



Note: For the ball cage, see A1-92.

Selection Criteria A1-10
Design Highlights A1-516
Options A1-541
Model No. A1-614
Handling Precautions A1-620
Accessories for Lubrication A24-1
Mounting Procedure B1-91

Equivalent Moment Factor A1-45
Rated Loads in All Directions A1-63
Equivalent Factor in Each Direction A1-65
Radial Clearance A1-75
Accuracy Standards A1-81
Shoulder Height of the Mounting Base and the Corner Radius A1-526
Reference Error Tolerance for the Mounting Surface A1-532
Dimensions of Each Model with Options Attached A1-555

Structure and Features

Balls roll in four rows of raceways precision-ground on the LM rail and LM block and are circulated by ball cages and end plates incorporated in the LM block.
Models SVR and SVS have especially high rigidity and load carrying capacity among the Caged Ball LM Guide series. In addition, these models achieve stable LM Guide performance and high reliability by strengthening contamination protection functionality with a broad range of options that take into account the service environments of machine tools, etc.

Note: Models SVR and SVS have extremely high rigidity, which makes it easier for misalignment in the mounting surface or mounting error to negatively impact the product's service life and hinder its performance. If affected by these factors, their service life may be shortened or their motion may be disrupted. When considering using these models, contact THK.

Super-Heavy Load and Increased Damping

The raceways of models SVR and SVS adopt a deep circular-arc groove with a curvature approximate to the ball diameter. Since the ball contact area increases as the applied load increases, a large load carrying capacity is achieved and damping is also improved.

Increased Contamination Protection Performance

The protector's improved ability to remove foreign material strengthens its contamination protection performance. In addition, use of a side scraper reduces the entrance of foreign material into the LM block, thus maintaining the LM Guide performance for a long period even in adverse environments.

High Rigidity

Models SVR and SVS achieve the highest rigidity among the Caged Ball LM Guide series.
Both the radial type SVR and the 4-way type SVS are available in the same sizes. Depending on the intended use, you can select either type.

Wide Array of Options

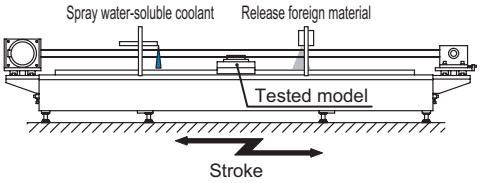
Various options are available, including an end seal, inner seal, side seal, Laminated Contact Scraper LaCS, protector, side scraper, and GC cap, to cope with diversified service environments.

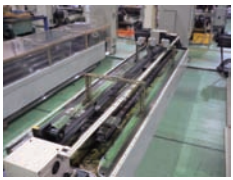
Contamination Protection Performance Evaluation for Models SVR and SVS

Models SVR and SVS maintain their performance under severe conditions with fine particles or liquid contamination.

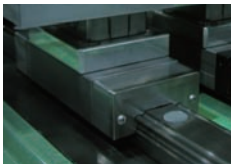
Test conditions

Item		Description
Tested model		SVS45LR1TTHHYYC1+2880LP×2set
Maximum speed		200 m/min
Stroke		2500 mm
Grease used		THK AFB-LF Grease
Environmental conditions	Foreign material	Type: Metal powder (atomized powder) (particle diameter: 125 μm or less)
		Amount: 0.4 g/20 min
	Coolant	Water-soluble coolant
		Amount: 0.2 cc/10 s



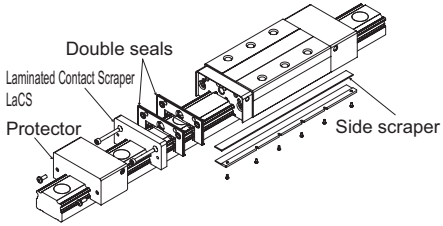


Test equipment



Tested model (before use)

Models SVR and SVS with accessories (TTHHYY option)



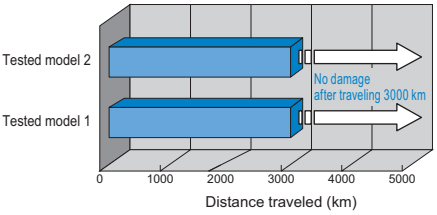
TTHHYY Option:

- Double seals
- Laminated Contact Scraper LaCS
- Protector
- Side scraper

Test result



After traveling 3000 km



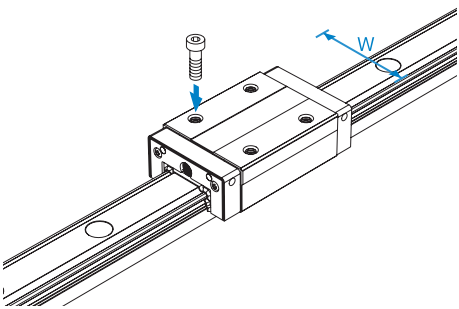
Models SVR and SVS maintain their performance even after traveling 3000 km under severe conditions with exposure to coolant and contamination.

Types and Features

Models SVR-R/SVS-R

Dimensional Table⇒A1-128/A1-130

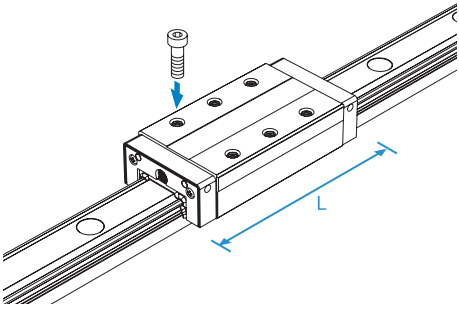
With this type, the LM block has a smaller width (W) and tapped holes.
It is used in places where the space for table width is limited.



Models SVR-LR/SVS-LR

Dimensional Table⇒A1-128/A1-130

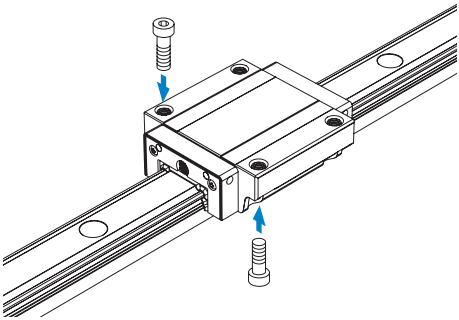
The LM block has the same cross-sectional shape as models SVR and SVS-R, but has a longer overall LM block length (L) and a greater load rating.



Models SVR-C/SVS-C

Dimensional Table⇒A1-132/A1-134

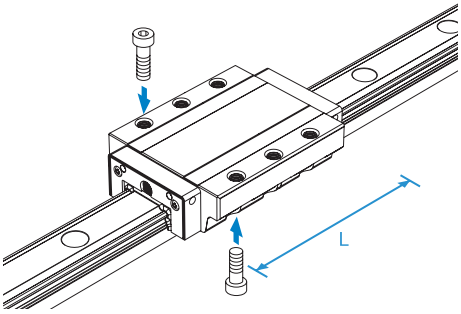
The flange of the LM block has tapped holes.
It can be mounted from the top or the bottom.
It can also be used in places where the table cannot have through holes for mounting bolts.



Models SVR-LC/SVS-LC

Dimensional Table⇒A1-132/A1-134

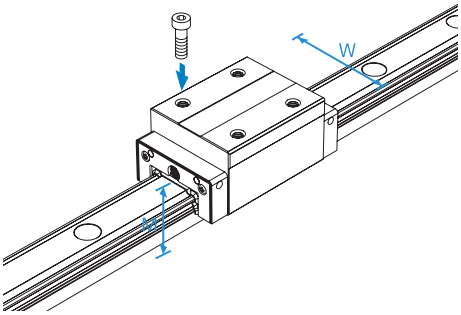
The LM block has the same cross-sectional shape as models SVR and SVS-C, but has a longer overall LM block length (L) and a greater load rating.



Models SVR-RH/SVS-RH

Dimensional Table⇒A1-136

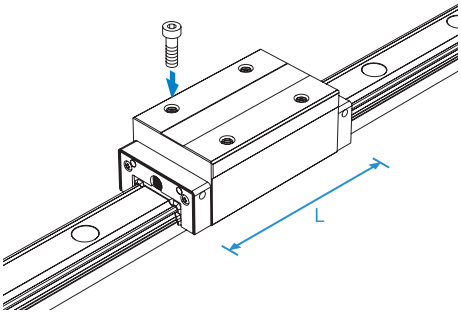
The dimensions are almost the same as those of LM Guide models SHS and HSR, and the LM block has tapped holes. They are used in places where the space for table width is limited.



Models SVR-LRH/SVS-LRH

Dimensional Table⇒A1-136

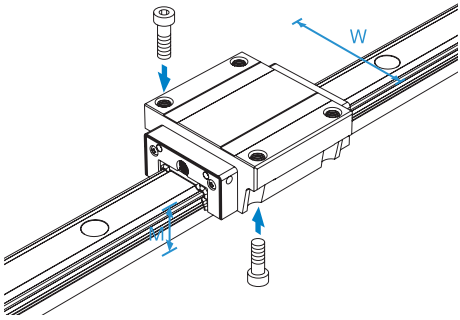
The LM block has the same cross-sectional shape as models SVR and SVS-RH, but has a longer overall LM block length (L) and a greater load rating.



Models SVR-CH/SVS-CH

Dimensional Table⇒A1-138

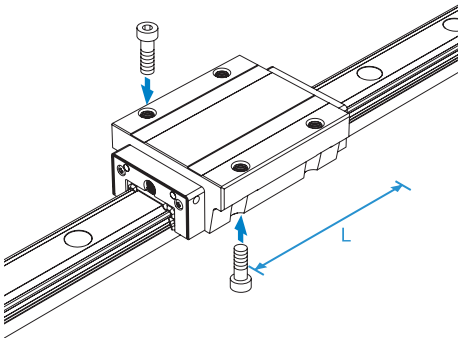
The dimensions are similar to those of LM Guide models SHS and HSR, and the flange of the LM block has tapped holes. It can be mounted from the top or the bottom. It is used in places where the table cannot have through holes for mounting bolts.



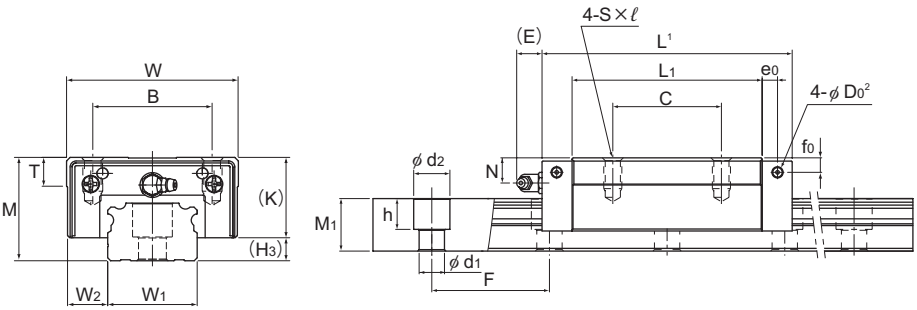
Models SVR-LCH/SVS-LCH

Dimensional Table⇒A1-138

The LM block has the same cross-sectional shape as models SVR and SVS-CH, but has a longer overall LM block length (L) and a greater load rating.



Models SVR-R and SVR-LR



Model SVR-R

Model No.	Outer dimensions			LM block dimensions									Pilot hole for side nipple			
	Height M	Width W	Length[1] L	B	C	S×ℓ	L1	T	K	N	E	Grease nipple	e0	f0	D0²	H3
SVR 25R SVR 25LR	31	50	82.8 102	32	35 50	M6×8	61.4 80.6	9.7	25.5	7.8	12	B-M6F	4.5	5.1	3.9	5.5
SVR 30R SVR 30LR	38	60	98 120.5	40	40 60	M8×10	72.1 94.6	9.7	31	10.3	12	B-M6F	6.5	7	3.9	7
SVR 35R SVR 35LR	44	70	109.5 135	50	50 72	M8×12	79 104.5	11.7	35	12.1	12	B-M6F	6	8	5.2	9
SVR 45R SVR 45LR	52	86	138.2 171	60	60 80	M10×17	105 137.8	14.7	40.4	13.9	16	B-PT1/8	8.5	8	5.2	11.6
SVR 55R SVR 55LR	63	100	163.3 200.5	65	75 95	M12×18	123.6 160.8	17.7	49	16.6	16	B-PT1/8	10	10	5.2	14
SVR 65R SVR 65LR	75	126	186 246	76	70 110	M16×20	143.6 203.6	21.6	60	19	16	B-PT1/8	8.7	15	8.2	15

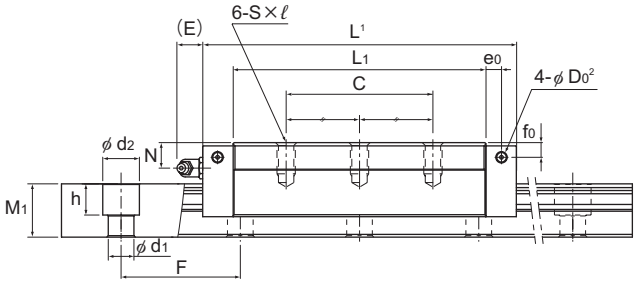
Model number coding

SVR45 LR 2 QZ TTHH C0 +1200L P T -II

- SVR45: Model No.
- LR: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- TTHH: Contamination protection accessory symbol
- C0: Radial clearance symbol — Normal (No symbol), Light preload (C1), Medium preload (C0)
- +1200L: LM rail length (in mm)
- P: Symbol for LM rail jointed use
- T: Accuracy symbol — Normal grade (No Symbol)/High Accuracy grade (H), Precision grade (P)/Super Precision grade (SP), Ultra Precision grade (UP)
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Model SVR-LR

Unit: mm

	LM rail dimensions						Basic load rating[4]		Static permissible moment kN·m [5]					Mass	
	Width		Height	Pitch		Length[3]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 0 -0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	25	12.5	17	40	6×9.5×8.5	3000	48.2 57	68.1 86.3	0.602 0.944	3.02 4.67	0.365 0.57	1.83 2.81	0.71 0.9	0.4 0.5	2.9
	28	16	21	80	7×11×9	3000	67.9 84	91.6 124	0.907 1.64	4.85 7.92	0.552 0.991	2.94 4.76	1.08 1.47	0.7 0.9	4.2
	34	18	24.5	80	9×14×12	3000	89.6 112	116 160	1.26 2.35	6.91 11.5	0.769 1.42	4.2 6.91	1.64 2.26	1 1.3	6
	45	20.5	29	105	14×20×17	3090	138 161	186 233	2.76 4.52	13.7 22.1	1.67 2.74	8.3 13.4	3.5 4.6	1.8 2.3	9.5
	53	23.5	36.5	120	16×23×20	3060	177 214	235 309	3.99 6.8	20.6 32.7	2.42 4.1	12.4 19.7	5.07 6.67	3.3 4.3	14
	63	31.5	43	150	18×26×22	3000	271 339	352 484	7.26 13.5	34.9 62.6	4.4 8.14	21.1 37.6	9 12.4	6 8.5	19.6

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-140**.)

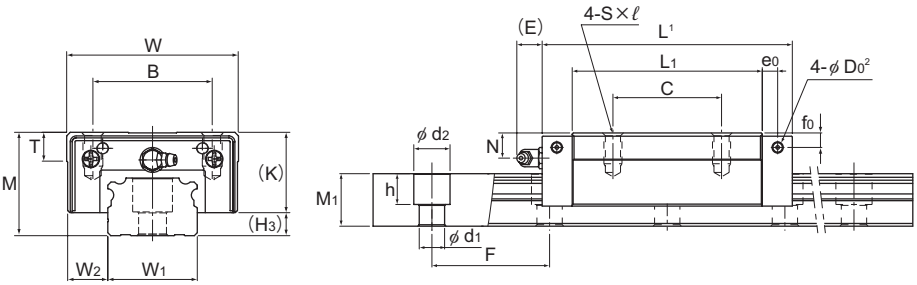
[4] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[5] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Note: For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.
(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Options⇒A1-541

Models SVS-R and SVS-LR



Model SVS-R

Model No.	Outer dimensions			LM block dimensions								Grease nipple	Pilot hole for side nipple			
	Height M	Width W	Length[1] L	B	C	S×ℓ	L_1	T	K	N	E		e_0	f_0	D_0^2	H_3
SVS 25R SVS 25LR	31	50	82.8 102	32	35 50	M6×8	61.4 80.6	9.7	25.5	7.8	12	B-M6F	4.5	5.1	3.9	5.5
SVS 30R SVS 30LR	38	60	98 120.5	40	40 60	M8×10	72.1 94.6	9.7	31	10.3	12	B-M6F	6.5	7	3.9	7
SVS 35R SVS 35LR	44	70	109.5 135	50	50 72	M8×12	79 104.5	11.7	35	12.1	12	B-M6F	6	8	5.2	9
SVS 45R SVS 45LR	52	86	138.2 171	60	60 80	M10×17	105 137.8	14.7	40.4	13.9	16	B-PT1/8	8.5	8	5.2	11.6
SVS 55R SVS 55LR	63	100	163.3 200.5	65	75 95	M12×18	123.6 160.8	17.7	49	16.6	16	B-PT1/8	10	10	5.2	14
SVS 65R SVS 65LR	75	126	186 246	76	70 110	M16×20	143.6 203.6	21.6	60	19	16	B-PT1/8	8.7	15	8.2	15

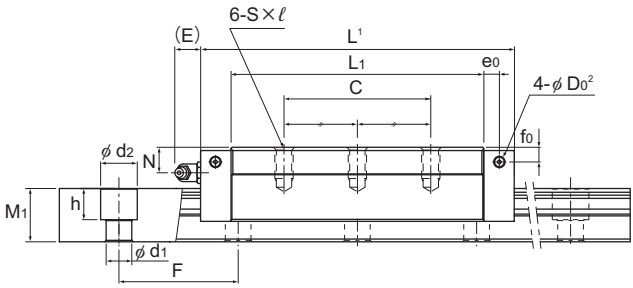
Model number coding

SVS45 LR 2 QZ TTHH C0 +1200L P T -II

- SVS45: Model No.
- LR: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- TTHH: Contamination protection accessory symbol
- C0: Radial clearance symbol — Normal (No symbol), Light preload (C1), Medium preload (C0)
- +1200L: LM rail length (in mm)
- P: Symbol for LM rail jointed use — Accuracy symbol: Normal grade (No Symbol)/High Accuracy grade (H), Precision grade (P)/Super Precision grade (SP), Ultra Precision grade (UP)
- T: Symbol for No. of rails used on the same plane
- -II

Notes: This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Model SVS-LR

Unit: mm

	LM rail dimensions						Basic load rating[4]		Static permissible moment kN·m [5]						Mass	
	Width		Height	Pitch		Length[3]	C	C_0	M_A		M_B		M_C		LM block	LM rail
	W_1 0 -0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block		kg	kg/m
	25	12.5	17	40	6×9.5×8.5	3000	37 43.7	52.2 66.1	0.479 0.75	2.41 3.71	0.443 0.693	2.23 3.43	0.525 0.665		0.4 0.5	2.9
	28	16	21	80	7×11×9	3000	52 64.4	70.1 95.2	0.722 1.31	3.86 6.3	0.667 1.21	3.58 5.83	0.798 1.08		0.7 0.9	4.2
	34	18	24.5	80	9×14×12	3000	68.6 86.1	88.6 123	1 1.88	5.49 9.15	0.927 1.73	5.09 8.46	1.2 1.67		1 1.3	6
	45	20.5	29	105	14×20×17	3090	105 123	142 178	2.19 3.58	10.9 17.5	2.02 3.31	10.1 16.2	2.6 3.44		1.8 2.3	9.5
	53	23.5	36.5	120	16×23×20	3060	136 164	180 237	3.17 5.4	16.4 26	2.93 4.99	15.1 24	3.76 4.96		3.3 4.3	14
	63	31.5	43	150	18×26×22	3000	208 260	269 370	5.76 10.7	27.7 49.6	5.33 9.88	25.6 45.8	6.66 9.16		6 8.5	19.6

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-140**.)

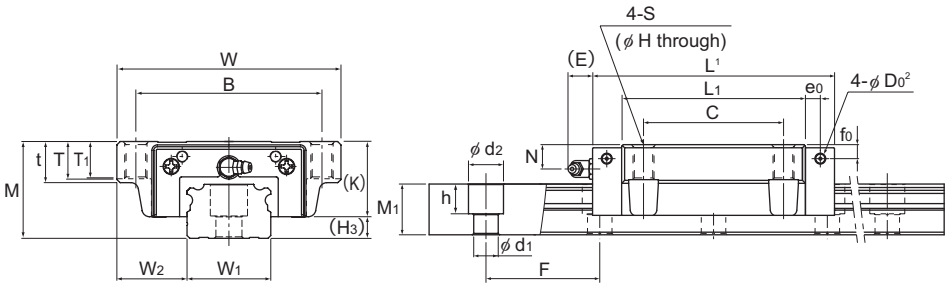
[4] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[5] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Note: For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.
(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Options⇒A1-541

Models SVR-C and SVR-LC



Model SVR-C

Model No.	Outer dimensions			LM block dimensions												Pilot hole for side nipple			
	Height	Width	Length¹												Grease nipple				
	M	W	L	B	C	S	H	L_1	t	T	T_1	K	N	E		e_0	f_0	D_0^2	H_3
SVR 25C SVR 25LC	31	72	82.8 102	59	45	M8	6.8	61.4 80.6	16	14.8	12	25.5	7.8	12	B-M6F	4.5	5.1	3.9	5.5
SVR 30C SVR 30LC	38	90	98 120.5	72	52	M10	8.5	72.1 94.6	18.1	16.9	14	31	10.3	12	B-M6F	6.5	7	3.9	7
SVR 35C SVR 35LC	44	100	109.5 135	82	62	M10	8.5	79 104.5	20.1	18.9	16	35	12.1	12	B-M6F	6	8	5.2	9
SVR 45C SVR 45LC	52	120	138.2 171	100	80	M12	10.5	105 137.8	22.1	20.6	20	40.4	13.9	16	B-PT1/8	8.5	8	5.2	11.6
SVR 55C SVR 55LC	63	140	163.3 200.5	116	95	M14	12.5	123.6 160.8	24	22.5	22	49	16.6	16	B-PT1/8	10	10	5.2	14
SVR 65C SVR 65LC	75	170	186 246	142	110	M16	14.5	143.6 203.6	28	26	25	60	19	16	B-PT1/8	8.7	15	8.2	15

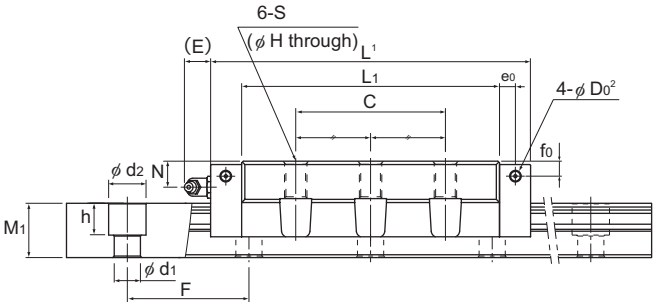
Model number coding

SVR45 LC 2 QZ TTHH C0 +1200L P T -II

- SVR45: Model No.
- LC: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- TTHH: Contamination protection accessory symbol
- C0: Radial clearance symbol (Normal (No symbol), Light preload (C1), Medium preload (C0))
- +1200L: LM rail length (in mm)
- P: Accuracy symbol (Normal grade (No Symbol)/High Accuracy grade (H), Precision grade (P)/Super Precision grade (SP), Ultra Precision grade (UP))
- T: Symbol for LM rail jointed use
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Model SVR-LC

Unit: mm

	LM rail dimensions						Basic load rating[4]		Static permissible moment kN·m [5]					Mass	
	Width		Height	Pitch		Length[3]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 0 -0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	25	23.5	17	40	6×9.5×8.5	3000	48.2 57	68.1 86.3	0.602 0.944	3.02 4.67	0.365 0.57	1.83 2.81	0.71 0.9	0.6 0.8	2.9
	28	31	21	80	7×11×9	3000	67.9 84	91.6 124	0.907 1.64	4.85 7.92	0.552 0.991	2.94 4.76	1.08 1.47	1.1 1.5	4.2
	34	33	24.5	80	9×14×12	3000	89.6 112	116 160	1.26 2.35	6.91 11.5	0.769 1.42	4.2 6.91	1.64 2.26	1.6 2	6
	45	37.5	29	105	14×20×17	3090	138 161	186 233	2.76 4.52	13.7 22.1	1.67 2.74	8.3 13.4	3.5 4.6	2.7 3.6	9.5
	53	43.5	36.5	120	16×23×20	3060	177 214	235 309	3.99 6.8	20.6 32.7	2.42 4.1	12.4 19.7	5.07 6.67	4.5 5.9	14
	63	53.5	43	150	18×26×22	3000	271 339	352 484	7.26 13.5	34.9 62.6	4.4 8.14	21.1 37.6	9 12.4	7.8 11	19.6

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-140**.)

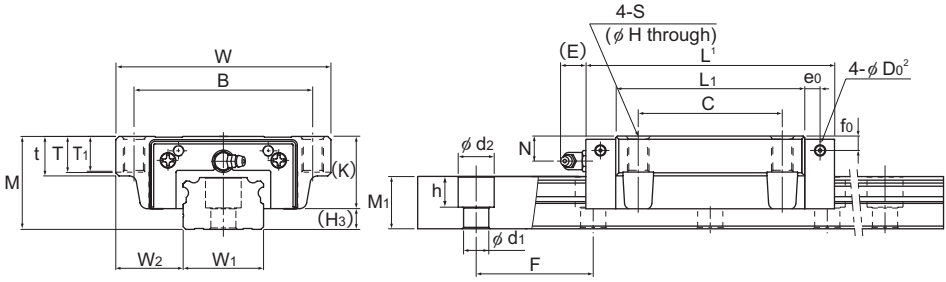
[4] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[5] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Note: For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.
(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Options⇒A1-541

Models SVS-C and SVS-LC



Model SVS-C

Model No.	Outer dimensions			LM block dimensions												Pilot hole for side nipple			
	Height	Width	Length[1]												Grease nipple				
	M	W	L	B	C	S	H	L_1	t	T	T_1	K	N	E		e_0	f_0	D_0^2	H_3
SVS 25C SVS 25LC	31	72	82.8 102	59	45	M8	6.8	61.4 80.6	16	14.8	12	25.5	7.8	12	B-M6F	4.5	5.1	3.9	5.5
SVS 30C SVS 30LC	38	90	98 120.5	72	52	M10	8.5	72.1 94.6	18.1	16.9	14	31	10.3	12	B-M6F	6.5	7	3.9	7
SVS 35C SVS 35LC	44	100	109.5 135	82	62	M10	8.5	79 104.5	20.1	18.9	16	35	12.1	12	B-M6F	6	8	5.2	9
SVS 45C SVS 45LC	52	120	138.2 171	100	80	M12	10.5	105 137.8	22.1	20.6	20	40.4	13.9	16	B-PT1/8	8.5	8	5.2	11.6
SVS 55C SVS 55LC	63	140	163.3 200.5	116	95	M14	12.5	123.6 160.8	24	22.5	22	49	16.6	16	B-PT1/8	10	10	5.2	14
SVS 65C SVS 65LC	75	170	186 246	142	110	M16	14.5	143.6 203.6	28	26	25	60	19	16	B-PT1/8	8.7	15	8.2	15

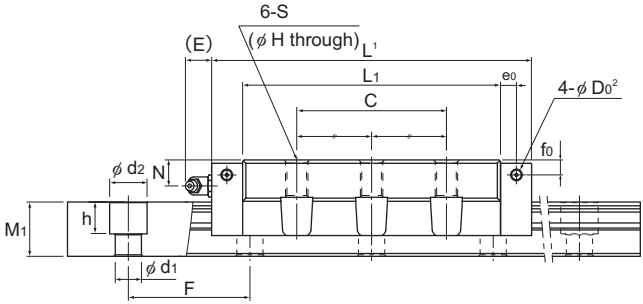
Model number coding

SVS45 LC 2 QZ TTHH C0 +1200L P T -II

- SVS45: Model No.
- LC: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- TTHH: Contamination protection accessory symbol
- C0: Radial clearance symbol (Normal (No symbol), Light preload (C1), Medium preload (C0))
- +1200L: LM rail length (in mm)
- P: Accuracy symbol (Normal grade (No Symbol)/High Accuracy grade (H), Precision grade (P)/Super Precision grade (SP), Ultra Precision grade (UP))
- T: Symbol for LM rail jointed use
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Model SVS-LC

Unit: mm

LM rail dimensions						Basic load rating[4]		Static permissible moment kN·m [5]					Mass	
Width		Height	Pitch		Length[3]	C	C_0	M_A		M_B		M_C	LM block	LM rail
W_1 0 -0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
25	23.5	17	40	6×9.5×8.5	3000	37 43.7	52.2 66.1	0.479 0.75	2.41 3.71	0.443 0.693	2.23 3.43	0.525 0.665	0.6 0.8	2.9
28	31	21	80	7×11×9	3000	52 64.4	70.1 95.2	0.722 1.31	3.86 6.3	0.667 1.21	3.58 5.83	0.798 1.08	1.1 1.5	4.2
34	33	24.5	80	9×14×12	3000	68.6 86.1	88.6 123	1 1.88	5.49 9.15	0.927 1.73	5.09 8.46	1.2 1.67	1.6 2	6
45	37.5	29	105	14×20×17	3090	105 123	142 178	2.19 3.58	10.9 17.5	2.02 3.31	10.1 16.2	2.6 3.44	2.7 3.6	9.5
53	43.5	36.5	120	16×23×20	3060	136 164	180 237	3.17 5.4	16.4 26	2.93 4.99	15.1 24	3.76 4.96	4.5 5.9	14
63	53.5	43	150	18×26×22	3000	208 260	269 370	5.76 10.7	27.7 49.6	5.33 9.88	25.6 45.8	6.66 9.16	7.8 11	19.6

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-140**.)

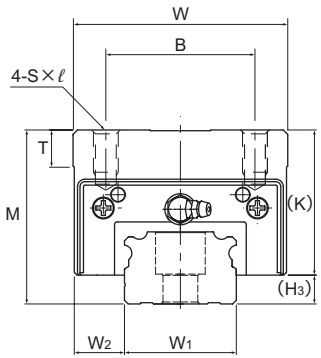
[4] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[5] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Note: For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.
(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Options⇒A1-541

Models SVR-RH, SVR-LRH, SVS-RH, and SVS-LRH



Model No.	Outer dimensions			LM block dimensions									Pilot hole for side nipple			
	Height M	Width W	Length[1] L	B	C	S×ℓ	L_1	T	K	N	E	Grease nipple	e_0	f_0	D_0[2]	H_3
SVR 35RH SVS 35RH	55	70	109.5	50	50	M8×12	79	11.7	46	23.1	12	B-M6F	6	19	5.2	9
SVR 35LRH SVS 35LRH	55	70	135	50	72	M8×12	104.5	11.7	46	23.1	12	B-M6F	6	19	5.2	9
SVR 45RH SVS 45RH	70	86	138.2	60	60	M10×17	105	14.7	58.4	31.9	16	B-PT1/8	8.5	26	5.2	11.6
SVR 45LRH SVS 45LRH	70	86	171	60	80	M10×17	137.8	14.7	58.4	31.9	16	B-PT1/8	8.5	26	5.2	11.6
SVR 55RH SVS 55RH	80	100	163.3	75	75	M12×18	123.6	17.7	66	33.6	16	B-PT1/8	10	27	5.2	14
SVR 55LRH SVS 55LRH	80	100	200.5	75	95	M12×18	160.8	17.7	66	33.6	16	B-PT1/8	10	27	5.2	14

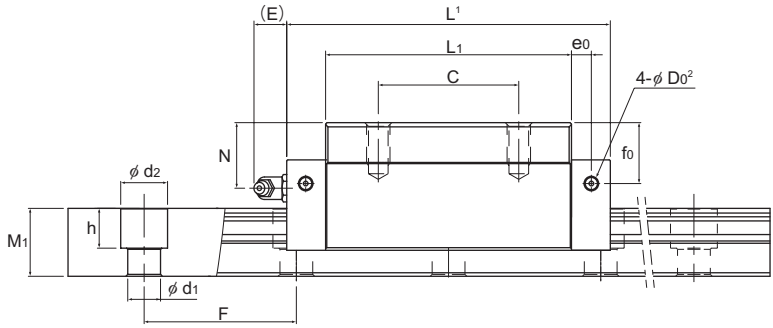
Model number coding

SVR35 RH 2 QZ TTHH C0 +920L H T -II

- SVR35: Model No.
- RH: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- TTHH: Contamination protection accessory symbol
- C0: LM rail length (in mm)
  - Radial clearance symbol
  - Normal (No symbol)
  - Light preload (C1)
  - Medium preload (C0)
- +920L: LM rail length (in mm)
- H: Accuracy symbol
  - Normal grade (No Symbol)/High Accuracy grade (H)
  - Precision grade (P)/Super Precision grade (SP)
  - Ultra Precision grade (UP)
- T: Symbol for LM rail jointed use
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See A1-584 for contamination protection accessories. See A1-75 for radial clearance symbol. See A1-81 for accuracy symbol. See A1-13 for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Unit: mm

	LM rail dimensions						Basic load rating[4]		Static permissible moment kN·m [5]						Mass	
	Width		Height	Pitch		Length[3]	C	C_0	M_A		M_B		M_C		LM block	LM rail
	W_1 0 -0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block		kg	kg/m
	34	18	24.5	80	9×14×12	3000	89.6 68.6	116 88.6	1.26 1	6.91 5.49	0.769 0.927	4.2 5.09	1.64 1.2		1.5	6
	34	18	24.5	80	9×14×12	3000	112 86.1	160 123	2.35 1.88	11.5 9.15	1.42 1.73	6.91 8.46	2.26 1.67		2	6
	45	20.5	29	105	14×20×17	3090	138 105	186 142	2.76 2.19	13.7 10.9	1.67 2.02	8.3 10.1	3.5 2.6		3.1	9.5
	45	20.5	29	105	14×20×17	3090	161 123	233 178	4.52 3.58	22.1 17.5	2.74 3.31	13.4 16.2	4.6 3.44		4.1	9.5
	53	23.5	36.5	120	16×23×20	3060	177 136	235 180	3.99 3.17	20.6 16.4	2.42 2.93	12.4 15.1	5.07 3.76		4.7	14
	53	23.5	36.5	120	16×23×20	3060	214 164	309 237	6.8 5.4	32.7 26	4.1 4.99	19.7 24	6.67 4.96		6.2	14

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See A**1-555** or A**1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See A**1-140**.)

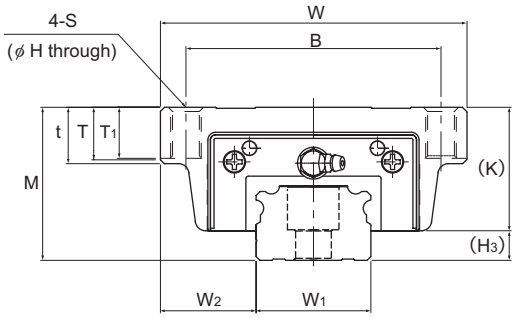
[4] The basic load rating is for a load in the radial direction.
Use Table 7 on A**1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[5] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Note: For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.
(Mounting orientation: see A**1-12**, Lubricant: see A**24-2**)

Options⇒A1-541

Models SVR-CH, SVR-LCH, SVS-CH, and SVS-LCH



Model No.	Outer dimensions			LM block dimensions												Pilot hole for side nipple			
	Height	Width	Length[1]												Grease nipple				
	M	W	L	B	C	S	H	L_1	t	T	T_1	K	N	E		e_0	f_0	D_0[2]	H_3
SVR 35CH SVS 35CH	48	100	109.5	82	62	M10	8.5	79	20	19	16	39	16.1	12	B-M6F	6	12	5.2	9
SVR 35LCH SVS 35LCH	48	100	135	82	62	M10	8.5	104.5	20	19	16	39	16.1	12	B-M6F	6	12	5.2	9
SVR 45CH SVS 45CH	60	120	138.2	100	80	M12	10.5	105	22	20.5	20	48.4	21.9	16	B-PT1/8	8.5	16	5.2	11.6
SVR 45LCH SVS 45LCH	60	120	171	100	80	M12	10.5	137.8	22	20.5	20	48.4	21.9	16	B-PT1/8	8.5	16	5.2	11.6
SVR 55CH SVS 55CH	70	140	163.3	116	95	M14	12.5	123.6	24	22.5	22	56	23.6	16	B-PT1/8	10	17	5.2	14
SVR 55LCH SVS 55LCH	70	140	200.5	116	95	M14	12.5	160.8	24	22.5	22	56	23.6	16	B-PT1/8	10	17	5.2	14

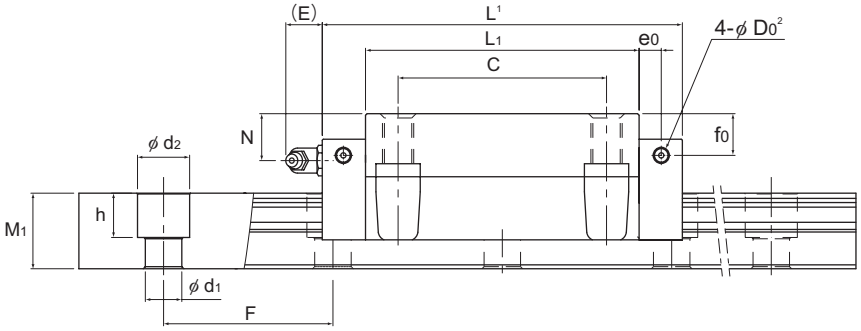
Model number coding

SVR45 LCH 2 QZ TTHH C0 +1200L P T -II

- SVR45: Model No.
- LCH: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- TTHH: Contamination protection accessory symbol
- C0: LM rail length (in mm); Radial clearance symbol: Normal (No symbol), Light preload (C1), Medium preload (C0)
- +1200L: LM rail length (in mm)
- P: Accuracy symbol: Normal grade (No Symbol)/High Accuracy grade (H), Precision grade (P)/Super Precision grade (SP), Ultra Precision grade (UP)
- T: Symbol for LM rail jointed use
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that an LM block and an LM rail constitute one set (i.e., the required number of sets when 2 rails are used in parallel is 2).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ. See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Unit: mm

	LM rail dimensions						Basic load rating[4]		Static permissible moment kN·m [5]					Mass	
	Width		Height	Pitch		Length[3]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 0 -0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	34	33	24.5	80	9×14×12	3000	89.6 68.6	116 88.6	1.26 1	6.91 5.49	0.769 0.927	4.2 5.09	1.64 1.2	1.7	6
	34	33	24.5	80	9×14×12	3000	112 86.1	160 123	2.35 1.88	11.5 9.15	1.42 1.73	6.91 8.46	2.26 1.67	2.2	6
	45	37.5	29	105	14×20×17	3090	138 105	186 142	2.76 2.19	13.7 10.9	1.67 2.02	8.3 10.1	3.5 2.6	3.3	9.5
	45	37.5	29	105	14×20×17	3090	161 123	233 178	4.52 3.58	22.1 17.5	2.74 3.31	13.4 16.2	4.6 3.44	4.3	9.5
	53	43.5	36.5	120	16×23×20	3060	177 136	235 180	3.99 3.17	20.6 16.4	2.42 2.93	12.4 15.1	5.07 3.76	5.1	14
	53	43.5	36.5	120	16×23×20	3060	214 164	309 237	6.8 5.4	32.7 26	4.1 4.99	19.7 24	6.67 4.96	6.6	14

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-140**.)

[4] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[5] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Note: For oil lubrication, be certain to let THK know the mounting orientation and where the LM block piping joint should be attached.
(Mounting orientation: see **A1-12**, Lubricant: see **A24-2**)

Standard Lengths and Maximum Lengths of LM Rails

Table 1 shows the standard lengths and the maximum lengths of model SVR/SVS variations. If the maximum length of the desired LM rail exceeds these values, jointed rails will be used. Contact THK for details.
For special rail lengths, it is recommended to use a value corresponding to the G and g dimensions from the table. As the G and g dimensions increase, this portion becomes less stable, and the accuracy performance is severely impacted.

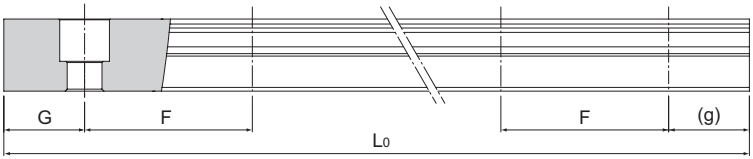


Table 1: Standard Lengths and Maximum Lengths of LM Rails for Models SVR/SVS

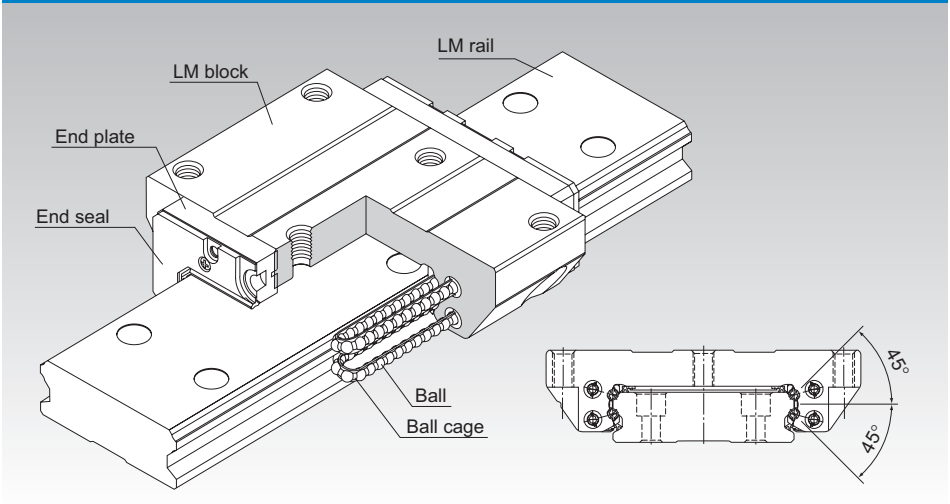
Unit: mm

Model No.	SVR/SVS 25	SVR/SVS 30	SVR/SVS 35	SVR/SVS 45	SVR/SVS 55	SVR/SVS 65
LM rail standard lengths (L_o)	230 270 350 390 470 510 590 630 710 750 830 950 990 1070 1110 1190 1230 1310 1350 1430 1470 1550 1590 1710 1830 1950 2070 2190 2310 2430 2470	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1560 1640 1720 1800 1880 1960 2040 2200 2360 2520 2680 2840 3000	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1560 1640 1720 1800 1880 1960 2040 2200 2360 2520 2680 2840 3000	570 675 780 885 990 1095 1200 1305 1410 1515 1620 1725 1830 1935 2040 2145 2250 2355 2460 2565 2670 2775 2880 2985 3090	780 900 1020 1140 1260 1380 1500 1620 1740 1860 1980 2100 2220 2340 2460 2580 2700 2820 2940 3060	1270 1570 2020 2620
Standard pitch F	40	80	80	105	120	150
G, g	15	20	20	22.5	30	35
Max length	3000	3000	3000	3090	3060	3000

Notes: The maximum length varies with accuracy grades. Contact THK for details.
If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.

SHW

Wide-Rail Caged Ball LM Guide Model SHW



Note: For the ball cage, see A1-92.

Selection Criteria A1-10
Design Highlights A1-516
Options A1-541
Model No. A1-614
Handling Precautions A1-620
Accessories for Lubrication A24-1
Mounting Procedure B1-91

Equivalent Moment Factor A1-45
Rated Loads in All Directions A1-63
Equivalent Factor in Each Direction A1-65
Radial Clearance A1-75
Accuracy Standards A1-81
Shoulder Height of the Mounting Base and the Corner Radius A1-529
Reference Error Tolerance for the Mounting Surface A1-533
Dimensions of Each Model with Options Attached A1-555

Structure and Features

Balls roll in four rows of raceways precision-ground on the LM rail and LM block and are circulated by ball cages and end plates incorporated in the LM block.
This is a wide and highly rigid LM Guide that uses ball cages to achieve low noise, long-term maintenance free operation, and high speed.

Wide with a Low Center of Gravity

The Model SHW, which has a wide LM rail and a low center of gravity, is optimal for locations requiring compactness and a large M_C moment rigidity.

4-Way Equal Load

Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse-radial, and lateral directions), enabling the LM Guide to be used in all orientations and in extensive applications.

Self-Adjustment Capability

The self-adjustment capability of the front-to-front configuration of THK's unique circular-arc grooves (DF set) enables mounting error to be absorbed even under a preload, thus achieving highly accurate, smooth linear motion.

Low Dust Generation

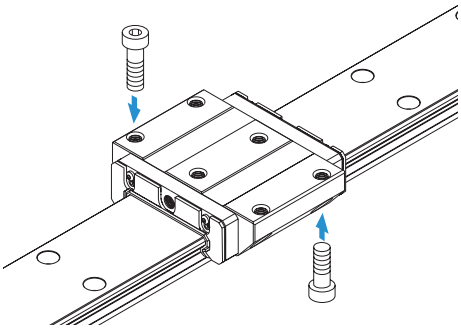
Use of ball cages eliminates friction between balls and retains lubricant, thus achieving low dust generation.

Types and Features

Model SHW-CA

Dimensional Table⇒A1-146

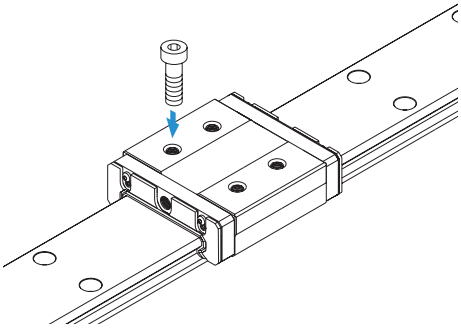
The flange of the LM block has tapped holes.
It can be mounted from the top or the bottom.



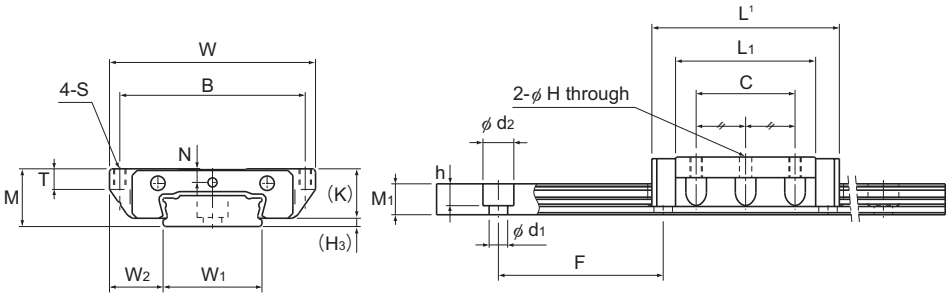
Models SHW-CR/HR

Dimensional Table⇒A1-148

The LM block has tapped holes.



Model SHW-CA



Models SHW12 and SHW14CAM

Model No.	Outer dimensions			LM block dimensions								
	Height	Width	Length[1]									
	M	W	L	B	C	S	H	L_1	T	K	N	H_3
SHW 12CAM	12	40	37	35	18	M3	2.5	27	4	10	2.8	2
SHW 14CAM	14	50	45.5	45	24	M3	2.5	34	5	12	3.3	2
SHW 17CAM	17	60	51	53	26	M4	3.3	38	6	14.5	4	2.5
SHW 21CA	21	68	59	60	29	M5	4.4	43.6	8	17.7	5	3.3
SHW 27CA	27	80	72.8	70	40	M6	5.3	56.6	10	23.5	6	3.5
SHW 35CA	35	120	107	107	60	M8	6.8	83	14	31	7.6	4
SHW 50CA	50	162	141	144	80	M10	8.6	107	18	46	14	4

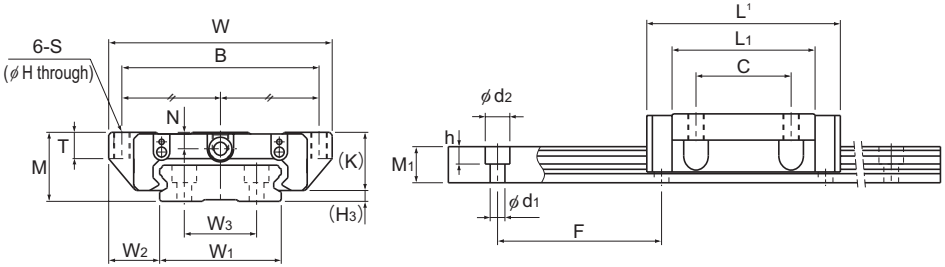
Model number coding

SHW17 CA 2 QZ UU C1 M +550L P M -II

- SHW17: Model number
- CA: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- UU: Contamination protection accessory symbol
- C1: Radial clearance symbol — Normal (No symbol), Light preload (C1), Medium preload (C0)
- M: Stainless steel LM block
- +550L: LM rail length (in mm)
- P: Accuracy symbol — Normal grade (No Symbol)/High Accuracy grade (H), Precision grade (P)/Super Precision grade (SP), Ultra Precision grade (UP)
- M: Stainless steel LM rail
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See A1-584 for contamination protection accessories. See A1-75 for radial clearance symbol. See A1-81 for accuracy symbol. See A1-13 for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Models SHW17CAM and SHW21 to 50CA

Unit: mm

	LM rail dimensions							Basic load rating		Static permissible moment kN·m [3]					Mass	
	Width			Height	Pitch		Length [2]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 0 -0.05	W_2	W_3	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	18	11	—	6.6	40	4.5×7.5×5.3	1230	4.31	5.66	0.0228	0.12	0.0228	0.12	0.0405	0.05	0.8
	24	13	—	7.5	40	4.5×7.5×5.3	1430	7.05	8.98	0.0466	0.236	0.0466	0.236	0.0904	0.1	1.23
	33	13.5	18	8.6	40	4.5×7.5×5.3	1800	7.65	10.18	0.0591	0.298	0.0591	0.298	0.164	0.15	1.9
	37	15.5	22	11	50	4.5×7.5×5.3	3000	8.24	12.8	0.0806	0.434	0.0806	0.434	0.229	0.24	2.9
	42	19	24	15	60	4.5×7.5×5.3	3000	16	22.7	0.187	0.949	0.187	0.949	0.455	0.47	4.5
	69	25.5	40	19	80	7×11×9	3000	35.5	49.2	0.603	3	0.603	3	1.63	1.4	9.6
	90	36	60	24	80	9×14×12	3000	70.2	91.4	1.46	7.37	1.46	7.37	3.97	3.7	15

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS. If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

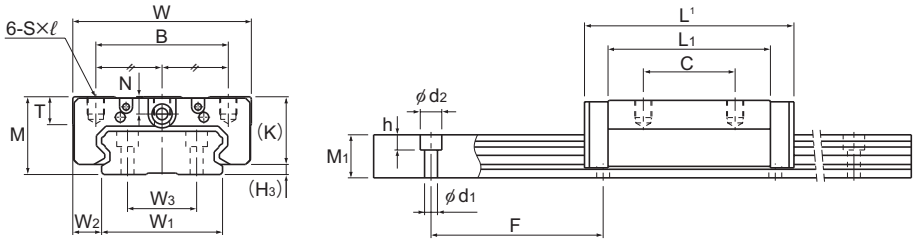
[2] The maximum length indicates the standard maximum length of an LM rail. (See **A1-150**.)

[3] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Notes: The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel. The stainless steel provides excellent corrosion and environmental resistance.

Options⇒A1-541

Models SHW-CR and SHW-HR



Models SHW27 to 50CR

Model No.	Outer dimensions			LM block dimensions							
	Height M	Width W	Length[1] L	B	C	S×ℓ	L_1	T	K	N	H_3
SHW 12CRM	12	30	37	21	12	M3×3.5	27	4	10	2.8	2
SHW 12HRM	12	30	50.4	21	24	M3×3.5	40.4	4	10	2.8	2
SHW 14CRM	14	40	45.5	28	15	M3×4	34	5	12	3.3	2
SHW 17CRM	17	50	51	29	15	M4×5	38	6	14.5	4	2.5
SHW 21CR	21	54	59	31	19	M5×6	43.6	8	17.7	5	3.3
SHW 27CR	27	62	72.8	46	32	M6×6	56.6	10	23.5	6	3.5
SHW 35CR	35	100	107	76	50	M8×8	83	14	31	7.6	4
SHW 50CR	50	130	141	100	65	M10×15	107	18	46	14	4

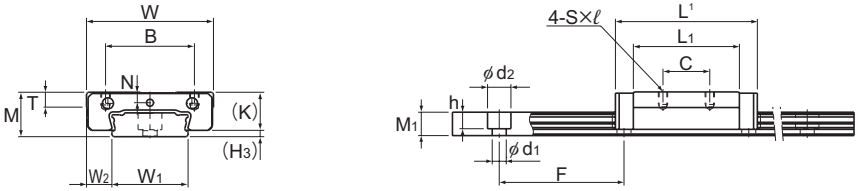
Model number coding

SHW17 CR 2 QZ KKHH C1 M +550L P M -II

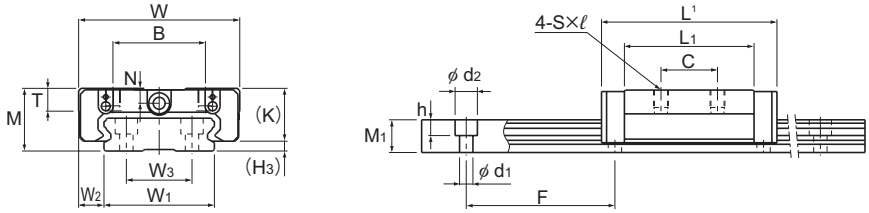
- SHW17: Model number
- CR: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- KKHH: Contamination protection accessory symbol
- C1: Radial clearance symbol — Normal (No symbol), Light preload (C1), Medium preload (C0)
- M: Stainless steel LM block
- +550L: LM rail length (in mm)
- P: Accuracy symbol — Normal grade (No Symbol), High Accuracy grade (H)/Precision grade (P), Super Precision grade (SP)/Ultra Precision grade (UP)
- M: LM rail is made of stainless steel
- -II: Symbol for No. of rails used on the same plane

Notes: Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ. See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Models SHW12CRM, SHW12HRM, and SHW14CRM



Models SHW17CRM and SHW21CR

Unit: mm

	LM rail dimensions							Basic load rating		Static permissible moment kN·m [3]					Mass	
	Width			Height	Pitch		Length [2]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 0 -0.05	W_2	W_3	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	18	6	—	6.6	40	4.5×7.5×5.3	1230	4.31	5.66	0.0228	0.12	0.0228	0.12	0.0405	0.04	0.8
	18	6	—	6.6	40	4.5×7.5×5.3	1230	5.56	8.68	0.0511	0.246	0.0511	0.246	0.0621	0.06	0.8
	24	8	—	7.5	40	4.5×7.5×5.3	1430	7.05	8.98	0.0466	0.236	0.0466	0.236	0.0904	0.08	1.23
	33	8.5	18	8.6	40	4.5×7.5×5.3	1800	7.65	10.18	0.0591	0.298	0.0591	0.298	0.164	0.13	1.9
	37	8.5	22	11	50	4.5×7.5×5.3	3000	8.24	12.8	0.0806	0.434	0.0806	0.434	0.229	0.19	2.9
	42	10	24	15	60	4.5×7.5×5.3	3000	16	22.7	0.187	0.949	0.187	0.949	0.455	0.36	4.5
	69	15.5	40	19	80	7×11×9	3000	35.5	49.2	0.603	3	0.603	3	1.63	1.2	9.6
	90	20	60	24	80	9×14×12	3000	70.2	91.4	1.46	7.37	1.46	7.37	3.97	3	15

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] The maximum length indicates the standard maximum length of an LM rail. (See **A1-150**.)

[3] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Notes: The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.
The stainless steel provides excellent corrosion and environmental resistance.

Options⇒A1-541

Standard Lengths and Maximum Lengths of LM Rails

Table 1 shows the standard lengths and the maximum lengths of model SHW variations. If the maximum length of the desired LM rail exceeds these values, jointed rails will be used. Contact THK for details.
For special rail lengths, it is recommended to use a value corresponding to the G and g dimensions from the table. As the G and g dimensions increase, this portion becomes less stable, and the accuracy performance is severely impacted.

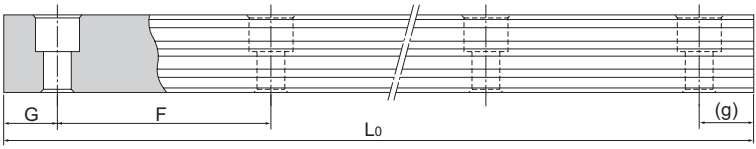


Table 1: Standard Lengths and Maximum Lengths of LM Rails for Model SHW

Unit: mm

Model No.	SHW 12	SHW 14	SHW 17	SHW 21	SHW 27	SHW 35	SHW 50
LM rail standard lengths (L_0)	70 110 150 190 230 270 310 390 470	70 110 150 190 230 270 310 390 470 550 670	110 190 310 470 550	130 230 380 480 580 780	160 280 340 460 640 820	280 440 760 1000 1240 1560	280 440 760 1000 1240 1640 2040
Standard pitch F	40	40	40	50	60	80	80
G, g	15	15	15	15	20	20	20
Max length	1230	1430	1800	3000	3000	3000	3000

Notes: The maximum length varies with accuracy grades. Contact THK for details.
If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.
Models SHW12, 14 and 17 are made of stainless steel.

Lubrication Hole

Grease Nipple and Lubrication Hole for Model SHW

Model SHW does not have a grease nipple as standard. Installation of a grease nipple and the drilling of a lubrication hole is performed at THK. When ordering SHW, indicate that the desired model requires a grease nipple or lubrication hole. (For lubrication hole dimensions and supported grease nipple types and dimensions, see Table 2). When using SHW under harsh conditions, use QZ Lubricator (optional) or Laminated Contact Scraper LaCS (optional).

Notes: Grease nipple is not available for models SHW12 and SHW14. They can have a lubrication hole.
Using a lubrication hole other than for greasing may cause damage.
For QZ Lubricator, see **A1-575**. For Laminated Contact Scraper LaCS, see **A1-548**.
When desiring a grease nipple for a model attached with QZ Lubricator, contact THK.

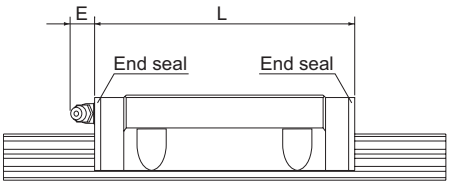


Fig. 1: Dimensions of the Grease Nipple for Model SHW

Note: For the L dimension, see the corresponding specification table.

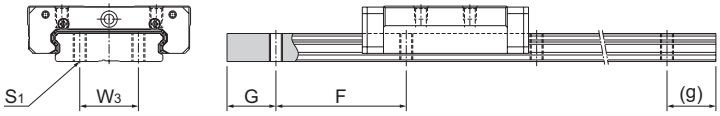
Table 2: Table of Grease Nipple and Lubrication Hole Dimensions

Unit: mm

Model No.		E	Grease nipple or lubrication hole
SHW	12	—	2.2 drilled hole
	14	—	2.2 drilled hole
	17	5	PB107
	21	5.5	PB1021B
	27	12	B-M6F
	35	12	B-M6F
	50	16	B-PT1/8

Tapped-Hole Type LM Rail

Model SHW rails also include a type where the LM rail is tapped. This type is useful when mounting from the bottom of the base.



(1) A tapped-hole LM rail type is available only for Precision grade or lower grades.
(2) For standard pitches of the taps and the G and g dimensions, see Table 1 on **A1-150**.

Table 3: Dimensions of the LM Rail Tap

Unit: mm

Model No.	W_3	S_1
SHW 12	—	M4 through
SHW 14	—	M4 through
SHW 17	18	M4 through
SHW 21	22	M4 through

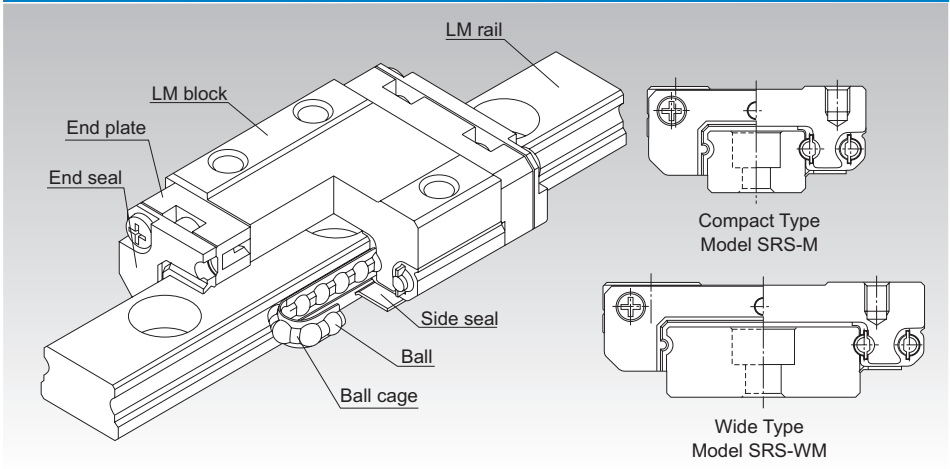
Model number coding

SHW17CA2UU+550LH W

Symbol for tapped-hole LM rail

SRS

Miniature Caged Ball LM Guide Model SRS



Note: For the ball cage, see A1-92.

Selection Criteria A1-10
Design Highlights A1-516
Options A1-541
Model No. A1-614
Handling Precautions A1-620
Accessories for Lubrication A24-1
Mounting Procedure B1-91

Equivalent Moment Factor A1-45
Rated Loads in All Directions A1-63
Equivalent Factor in Each Direction A1-65
Radial Clearance A1-75
Accuracy Standards A1-87
Shoulder Height of the Mounting Base and the Corner Radius A1-531
Reference Error Tolerance for the Mounting Surface A1-533
Flatness of the Mounting Surface A1-534
Dimensions of Each Model with Options Attached A1-555

Structure and Features

Caged Ball LM Guide Model SRS has two raceways incorporated into its compact structure, enabling the model to receive loads in all directions, and to be used as a single axis in locations where a moment is applied. In addition, use of ball cages eliminates friction between balls, thus achieving high speed, low noise, reduced running sound, long service life, and long-term maintenance-free operation.

Low Dust Generation

Use of ball cages eliminates friction between balls and retains lubricant, thus achieving low dust generation. In addition, the LM block and LM rail use stainless steel, which is highly resistant to corrosion.

Compact

Because the LM rail has a low cross-sectional height and a compact structure with a single row of balls on either side, it can be installed in smaller areas.

Lightweight

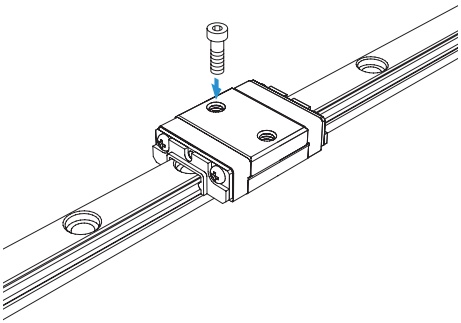
Since parts of the LM block (e.g., around the ball release hole) are made of resin and formed through injection molding, SRS is a lightweight, low-inertia type of LM Guide.

Types and Features

Model SRS5M

Dimensional Table⇒A1-158

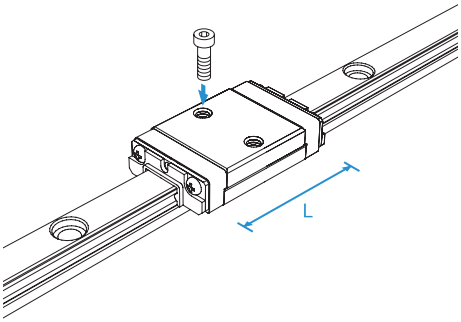
SRS5 is the smallest Caged Ball LM guide.



Model SRS5N

Dimensional Table⇒A1-158

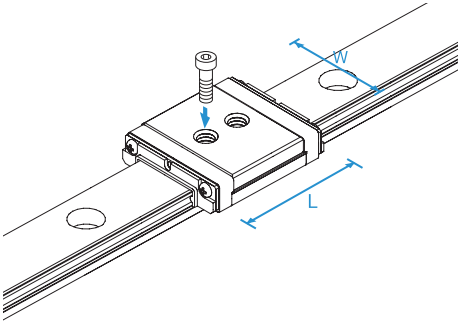
The overall LM block length (L) is greater than for model SRS5M; load rating and permissible moment are higher as well.



Model SRS5WM

Dimensional Table⇒A1-162

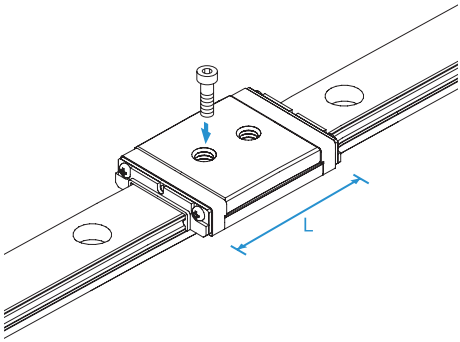
This model has a larger overall LM block length (L), width (W), load rating and permissible moment than model SRS5M.



Model SRS5WN

Dimensional Table⇒A1-162

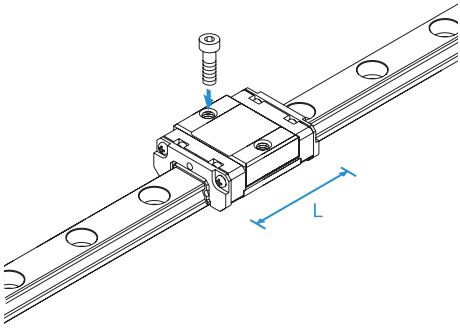
The overall LM block length (L) is greater than for model SRS5WM; load rating and permissible moment are higher as well.



Model SRS-S

Dimensional Table⇒A1-158

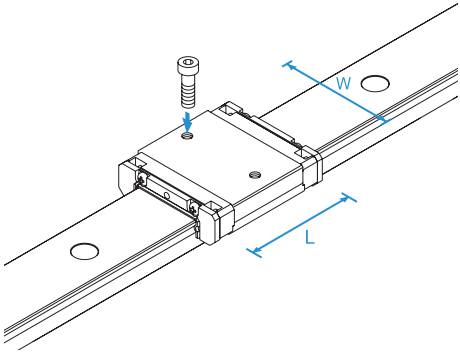
The overall LM block length (L) is less than that of model SRS-M.



Model SRS-WS

Dimensional Table⇒A1-162

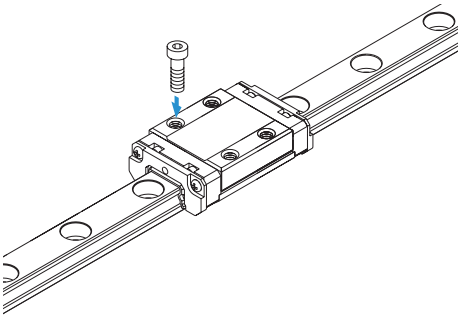
This model has a longer overall LM block length (L), a greater width, and a larger load rating and permissible moment than SRS-S.



Model SRS-M

Dimensional Table⇒A1-158

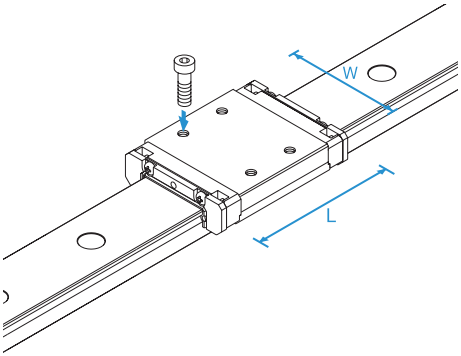
This model is the standard type of SRS.



Model SRS-WM

Dimensional Table⇒A1-162

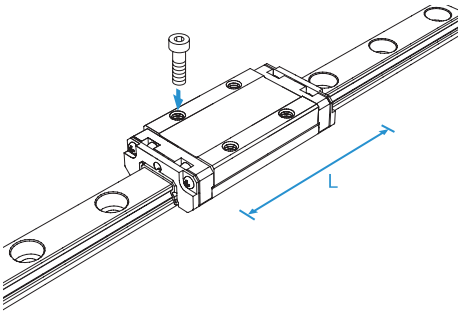
This model has a longer overall LM block length (L), a greater width, and a larger load rating and permissible moment than SRS-M.



Model SRS-N

Dimensional Table⇒A1-158

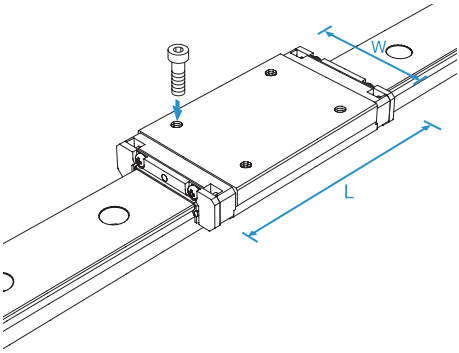
Compared with Model SRS-M, it has a longer total LM block length (L) and a higher load rating and permissible moment.



Model SRS-WN

Dimensional Table⇒A1-162

Compared with Model SRS-WM, it has a longer total LM block length (L) and a higher load rating and permissible moment.



SRS-G

Dimensional Table⇒A1-158 to A1-164

The SRS-G, a model equipped with uncaged, full-complement bearings, is also available. Due to its cageless design, however, the SRS-G's dynamic load rating is lower than that of standard SRS models. For specific data, please refer to the dimension tables in this catalog.

Flatness of the LM Rail and the LM Block Mounting Surface

Since the Model SRS has Gothic-arch grooves, any precision errors in the mounting surface may negatively affect its operability. Therefore, we recommend using SRS on mounting surfaces made with high precision.

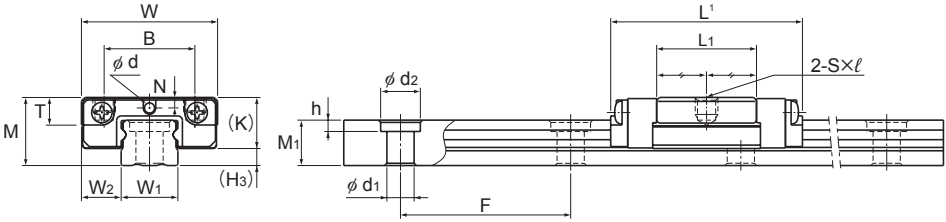
Table 1: Flatness of the LM Rail and the LM Block Mounting Surface

Unit: mm

Model No.	Flatness error
SRS 5	0.015/200
SRS 7	0.025/200
SRS 9	0.035/200
SRS 12	0.050/200
SRS 15	0.060/200
SRS 20	0.070/200
SRS 25	0.070/200

Notes: As many factors can affect the mounting precision, we recommend using values 70% or less than those shown.
The above figures apply to normal clearances. When using two or more rails with C1 clearance, we recommend using values 50% or less than those shown.

Models SRS-S, SRS-M, and SRS-N



Models SRS5M/N

Model No.	Outer dimensions			LM block dimensions								
	Height	Width	Length[1]								Lubrication hole	
	M	W	L	B	C	S×ℓ	L_1	T	K	N	d	H_3
SRS 5M SRS 5GM	6	12	16.9	8	—	M2×1.5	8.8	1.7	4.5	0.93	0.8	1.5
SRS 5N SRS 5GN	6	12	20.1	8	—	M2×1.5	12	1.7	4.5	0.93	0.8	1.5
SRS 7S SRS 7GS	8	17	19	12	—	M2×2.3	9	3.3	6.7	1.6	1.2	1.3
SRS 7M SRS 7GM	8	17	23.4	12	8	M2×2.3	13.4	3.3	6.7	1.6	1.2	1.3
SRS 7N SRS 7GN	8	17	31	12	13	M2×2.3	21	3.3	6.7	1.6	1.2	1.3
SRS 9XS SRS 9XGS	10	20	21.5	15	—	M3×2.8	10.5	4.5	8.5	2.4	1.6	1.5
SRS 9XM SRS 9XGM	10	20	30.8	15	10	M3×2.8	19.8	4.5	8.5	2.4	1.6	1.5
SRS 9XN SRS 9XGN	10	20	40.8	15	16	M3×2.8	29.8	4.5	8.5	2.4	1.6	1.5
SRS 12S SRS 12GS	13	27	25	20	—	M3×3.2	11.2	5.7	11	3	2	2.1
SRS 12M SRS 12GM	13	27	34.4	20	15	M3×3.2	20.6	5.7	11	3	2	2.1
SRS 12N SRS 12GN	13	27	47.1	20	20	M3×3.2	33.3	5.7	11	3	2	2.1

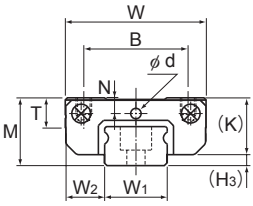
Model number coding

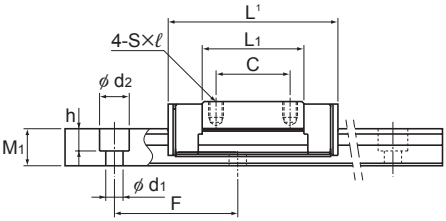
2 SRS12M QZ UU C1 +220L P M -II

- 2: No. of LM blocks used on the same rail
- SRS12M: Model No.
- QZ: With QZ Lubricator
- UU: Contamination protection accessory symbol
- C1: Radial clearance symbol — Normal (No symbol)/Light preload (C1)
- +220L: LM rail length (in mm)
- P: Accuracy symbol — Normal grade (No Symbol)/High Accuracy grade (H) Precision grade (P)
- M: Stainless steel LM rail
- -II: Symbol for No. of rails used on the same plane

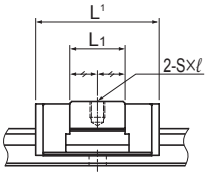
Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
No symbol for single LM block. See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-87** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/





Models SRS7 to 12M/N



Models SRS7 to 12S

Unit: mm

LM rail dimensions							Basic load rating[3]		Static permissible moment N·m [4]						Mass	
	Width		Height	Pitch		Length[2]	C	C_0	M_A		M_B		M_C		LM block	LM rail
	$W_1{}^{0}_{-0.02}$	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block		kg	kg/m
	5	3.5	4	15	2.4×3.5×1	220	0.439 0.366	0.468 0.527	0.74 0.79	5.11 5.76	0.86 0.94	5.99 6.91	1.21 1.37		0.002	0.13
	5	3.5	4	15	2.4×3.5×1	220	0.515 0.448	0.586 0.703	1.12 1.34	7.45 8.82	1.31 1.57	8.73 10.3	1.52 1.83		0.003	0.13
	7	5	4.7	15	2.4×4.2×2.3	480	1.09 0.946	0.964 1.16	1.6 1.96	12.6 14.7	1.83 2.25	14.5 16.9	3.73 4.49		0.005	0.25
	7	5	4.7	15	2.4×4.2×2.3	480	1.51 1.16	1.29 1.54	3.09 3.61	17.2 25.5	3.69 4.14	17.3 29.4	5.02 6.57		0.009	0.25
	7	5	4.7	15	2.4×4.2×2.3	480	2.01 1.63	2.31 2.51	7.77 8.08	43.2 46.9	8.96 9.32	50 54.2	8.96 9.72		0.012	0.25
	9	5.5	5.5	20	3.5×6×3.3	1240	1.78 1.37	1.53 1.53	3.15 2.85	22.2 22.6	3.61 3.27	25.6 26	7.04 7.04		0.009	0.36
	9	5.5	5.5	20	3.5×6×3.3	1240	2.69 2.22	2.75 3.06	9.31 9.87	52.2 57.9	10.7 11.4	60.3 66.9	12.7 14.1		0.016	0.36
	9	5.5	5.5	20	3.5×6×3.3	1240	3.48 2.94	3.98 4.59	18.7 21.1	96.5 111	21.6 24.4	112 128	18.3 21.1		0.024	0.36
	12	7.5	7.5	25	3.5×6×4.5	2000	2.7 2.07	2.1 2.1	4.62 4.17	37.5 38.1	4.62 4.17	37.5 38.1	13.8 13.8		0.017	0.65
	12	7.5	7.5	25	3.5×6×4.5	2000	4 3.36	3.53 3.55	12 12.1	78.5 79	12 12.1	78.5 79	23.1 23.2		0.027	0.65
	12	7.5	7.5	25	3.5×6×4.5	2000	5.82 4.72	5.3 6.83	28.4 34.8	151 195	28.4 34.8	151 195	34.7 44.7		0.049	0.65

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] The maximum length indicates the standard maximum length of an LM rail. (See **A1-166**.)

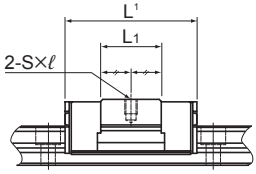
[3] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[4] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

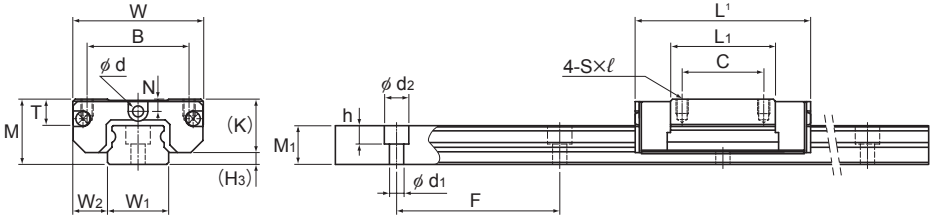
Notes: Since stainless steel is used in the LM block, LM rail, and balls, these models are highly resistant to corrosion and environment.
The SRS-G is equipped with uncaged, full-complement bearings.
Using a lubrication hole other than for greasing may cause damage.
For the SRS5M/N LM Guide, the balls will fall out of the block if it is removed from the rail.
To secure the LM rail of Model SRS5, use M2 cross-recessed head screws for precision equipment (No. 0 pan head screw, class 1).

Options⇒A1-541

Models SRS-S, SRS-M, and SRS-N



Model SRS15S



Models SRS15M/N, 20M, 25M

Model No.	Outer dimensions			LM block dimensions										H_3
	Height M	Width W	Length¹ L	B	C	S×ℓ	L_1	T	K	N	E	Lubrication hole d	Grease nipple	
SRS 15S SRS 15GS	16	32	32	25	—	M3×3.5	14.7	6.5	13.3	3	— 4	3 —	— PB107	2.7
SRS 15M SRS 15GM	16	32	43	25	20	M3×3.5	25.7	6.5	13.3	3	— 4	3 —	— PB107	2.7
SRS 15N SRS 15GN	16	32	60.8	25	25	M3×3.5	43.5	6.5	13.3	3	— 4	3 —	— PB107	2.7
SRS 20M SRS 20GM	20	40	50	30	25	M4×6	34	9	16.6	4	— 3.5	3 —	— PB107	3.4
SRS 25M SRS 25GM	25	48	77	35	35	M6×7	56	11	20	5	— 4	4 —	— PB1021B	5

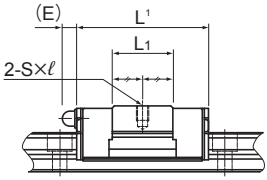
Model number coding

2 SRS20M QZ UU C1 +220L P M -II

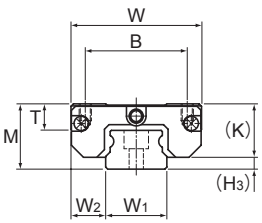
- **2**: No. of LM blocks used on the same rail
- **SRS20M**: Model No.
- **QZ**: With QZ Lubricator
- **UU**: Contamination protection accessory symbol
- **C1**: Radial clearance symbol — Normal (No symbol)/Light preload (C1)
- **+220L**: LM rail length (in mm)
- **P**: Accuracy symbol — Normal grade (No Symbol)/High Accuracy grade (H) Precision grade (P)
- **M**: Stainless steel LM rail
- **-II**: Symbol for No. of rails used on the same plane

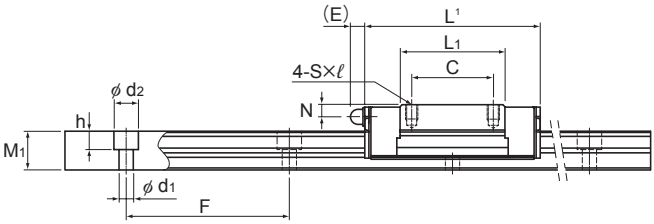
Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
No symbol for single LM block. See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-87** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Model SRS15GS





Models SRS15GM/GN, 20GM, 25GM

Unit: mm

	LM rail dimensions						Basic load rating[3]		Static permissible moment N·m [4]						Mass	
	Width		Height	Pitch		Length[2]	C	C_0	M_A		M_B		M_C		LM block	LM rail
	W_1	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block		kg	kg/m
	15 $^{0}_{-0.02}$	8.5	9.5	40	3.5×6×4.5	2000	4.5 4.01	3.39 4.24	9.54 12.6	77.5 92.7	9.54 12.6	77.5 92.7	24.1 30.1		0.033	0.96
	15 $^{0}_{-0.02}$	8.5	9.5	40	3.5×6×4.5	2000	6.66 5.59	5.7 5.72	26.2 24.8	154 158	26.2 24.8	154 158	40.4 40.6		0.047	0.96
	15 $^{0}_{-0.02}$	8.5	9.5	40	3.5×6×4.5	2000	9.71 8.27	8.55 11.9	59.7 82.3	312 433	59.7 82.3	312 433	60.7 84.5		0.095	0.96
	20 $^{0}_{-0.03}$	10	11	60	6×9.5×8	1800	7.75 5.95	9.77 9.4	54.3 44.7	296 242	62.4 53.3	341 289	104 91.4		0.11	1.68
	23 $^{0}_{-0.03}$	12.5	15	60	7×11×9	1800	16.5 13.3	20.2 22.3	177 181	932 962	177 181	932 962	248 255		0.24	2.6

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] The maximum length indicates the standard maximum length of an LM rail. (See **A1-166**.)

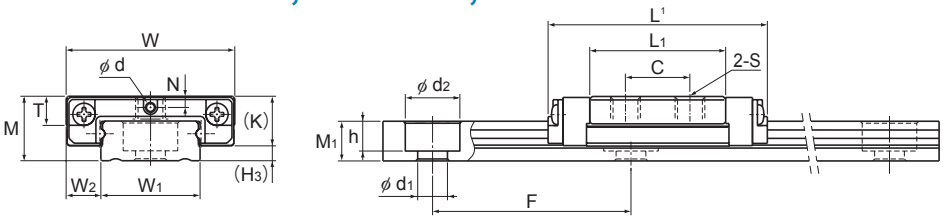
[3] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[4] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Notes: Since stainless steel is used in the LM block, LM rail, and balls, these models are highly resistant to corrosion and environment.
The SRS-G is equipped with uncaged, full-complement bearings.
For the SRS15S/M/N, 20M, and 25M, if a grease nipple is required, please specify upon ordering.
Using a lubrication hole other than for greasing may cause damage.

Options⇒A1-541

Models SRS-WS, SRS-WM, and SRS-WN



Models SRS5WM/WN

Model No.	Outer dimensions			LM block dimensions								
	Height	Width	Length[1]								Lubrication hole	
	M	W	L	B	C	S×ℓ	L_1	T	K	N	d	H_3
SRS 5WM SRS 5WGM	6.5	17	22.1	—	6.5	M3 through	13.7	2.7	5	1.1	0.8	1.5
SRS 5WN SRS 5WGN	6.5	17	28.1	—	11	M3 through	19.7	2.7	5	1.1	0.8	1.5
SRS 7WS SRS 7WGS	9	25	22.5	19	—	M3×2.8	11.9	3.8	7.2	1.8	1.2	1.8
SRS 7WM SRS 7WGM	9	25	31	19	10	M3×2.8	20.4	3.8	7.2	1.8	1.2	1.8
SRS 7WN SRS 7WGN	9	25	40.9	19	17	M3×2.8	30.3	3.8	7.2	1.8	1.2	1.8
SRS 9WS SRS 9WGS	12	30	26.5	21	—	M3×2.8	14.5	4.9	9.1	2.3	1.6	2.9
SRS 9WM SRS 9WGM	12	30	39	21	12	M3×2.8	27	4.9	9.1	2.3	1.6	2.9
SRS 9WN SRS 9WGN	12	30	50.7	23	24	M3×2.8	38.7	4.9	9.1	2.3	1.6	2.9
SRS 12WS SRS 12WGS	14	40	30.5	28	—	M3×3.5	16.9	5.7	11	3	2	3
SRS 12WM SRS 12WGM	14	40	44.5	28	15	M3×3.5	30.9	5.7	11	3	2	3
SRS 12WN SRS 12WGN	14	40	59.5	28	28	M3×3.5	45.9	5.7	11	3	2	3

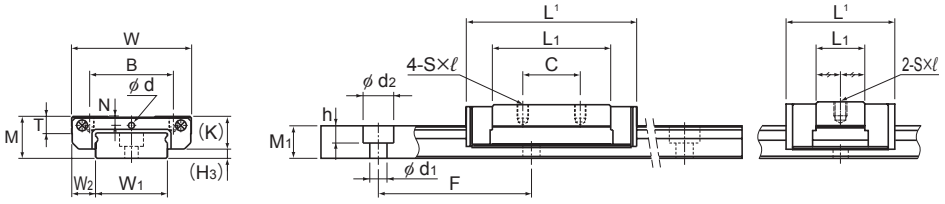
Model number coding

2 SRS12WM QZ UU C1 +470L P M -II

- 2: No. of LM blocks used on the same rail
- SRS12WM: Model No.
- QZ: With QZ Lubricator
- UU: Contamination protection accessory symbol
- C1: Radial clearance symbol — Normal (No symbol)/ Light preload (C1)
- +470L: LM rail length (in mm)
- P: Accuracy symbol — Normal grade (No Symbol)/High Accuracy grade (H) / Precision grade (P)
- M: Stainless steel LM rail
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
No symbol for single LM block. See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-87** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Models SRS7 to 12WM/WN

Models SRS7 to 12WS

Unit: mm

LM rail dimensions							Basic load rating[3]		Static permissible moment N·m [4]						Mass	
	Width		Height	Pitch		Length[2]	C	C_0	M_A		M_B		M_C		LM block	LM rail
	W_1 $^{0}_{-0.02}$	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block		kg	kg/m
	10	3.5	4	20	3×5.5×3	220	0.584 0.498	0.703 0.82	1.57 1.79	9.59 11.1	1.83 2.15	11.24 13.3	3.58 4.18		0.005	0.27
	10	3.5	4	20	3×5.5×3	220	0.746 0.64	0.996 1.17	3.01 3.54	16.8 19.6	3.53 4.15	19.7 23	5.08 5.97		0.007	0.27
	14	5.5	5.2	30	3.5×6×3.2	480	1.38 1.06	1.35 1.35	2.89 2.58	19.6 20	3.32 2.96	22.7 23.1	9.95 9.95		0.011	0.56
	14	5.5	5.2	30	3.5×6×3.2	480	2.01 1.63	1.94 2.51	6.47 8.87	36.4 51.5	7.71 10.2	42.3 59.5	14.33 20.3		0.018	0.56
	14	5.5	5.2	30	3.5×6×3.2	480	2.56 2.12	3.28 3.66	15 16.6	78.9 87.7	17.4 19.2	91.2 101	24.2 27		0.026	0.56
	18	6	7.5	30	3.5×6×4.5	1430	2.03 1.73	1.84 2.14	4.49 5.15	32.1 36.9	5.15 5.92	38.9 42.6	17.4 20.2		0.018	1.01
	18	6	7.5	30	3.5×6×4.5	1430	3.29 2.67	3.34 3.35	14 13.9	78.6 69.7	16.2 16.6	91 96.7	31.5 31.7		0.031	1.01
	18	6	7.5	30	3.5×6×4.5	1430	4.20 3.48	4.37 5.81	25.1 33.2	130 172	29.1 40	151 208	41.3 54.9		0.049	1.01
	24	8	8.5	40	4.5×8×4.5	2000	3.58 3.05	3.15 3.68	9.77 11.1	63 72.6	9.77 11.1	63 72.6	39.5 46.2		0.034	1.52
	24	8	8.5	40	4.5×8×4.5	2000	5.48 4.46	5.3 5.32	26.4 25.7	143 146	26.4 25.7	143 146	66.5 66.8		0.055	1.52
	24	8	8.5	40	4.5×8×4.5	2000	7.13 5.93	7.07 9.46	49.2 64.7	249 332	49.2 64.7	249 332	88.7 119		0.091	1.52

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] The maximum length indicates the standard maximum length of an LM rail. (See **A1-166**.)

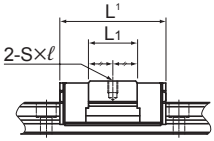
[3] The basic load rating is for a load in the radial direction.
Use Table 7 on **A1-63** to calculate the load rating for loads in the reverse-radial direction or lateral direction.

[4] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

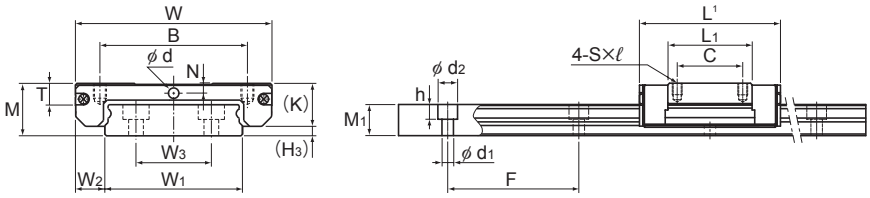
Notes: Since stainless steel is used in the LM block, LM rail, and balls, these models are highly resistant to corrosion and environment.
The SRS-G is equipped with uncaged, full-complement bearings.
Using a lubrication hole other than for greasing may cause damage.
For models SRS5WM/WN, the balls will fall out of the block if it is removed from the rail.

Options⇒A1-541

Models SRS-WS, SRS-WM, and SRS-WN



Model SRS15WS



Model SRS15WM/WN

Model No.	Outer dimensions			LM block dimensions										H_3
	Height M	Width W	Length[1] L	B	C	S×ℓ	L_1	T	K	N	E	Lubrication hole d	Grease nipple	
SRS 15WS SRS 15WGS	16	60	41.5	45	—	M4×4.5	24.9	6.5	13.3	3	— 4	3 —	— PB107	2.7
SRS 15WM SRS 15WGM	16	60	55.5	45	20	M4×4.5	38.9	6.5	13.3	3	— 4	3 —	— PB107	2.7
SRS 15WN SRS 15WGN	16	60	74.5	45	35	M4×4.5	57.9	6.5	13.3	3	— 4	3 —	— PB107	2.7

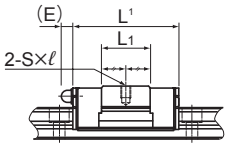
Model number coding

2 SRS15WM QZ UU C1 +550L P M -II

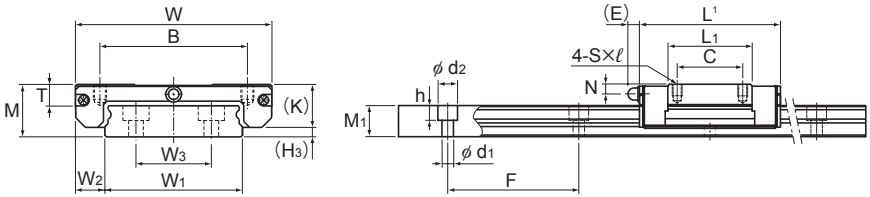
- **2**: No. of LM blocks used on the same rail
- **SRS15WM**: Model No.
- **QZ**: With QZ Lubricator
- **UU**: Contamination protection accessory symbol
- **C1**: Radial clearance symbol — Normal (No symbol)/ Light preload (C1)
- **+550L**: LM rail length (in mm)
- **P**: Accuracy symbol — Normal grade (No Symbol)/High Accuracy grade (H) Precision grade (P)
- **M**: Stainless steel LM rail
- **-II**: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
No symbol for single LM block. See **A1-584** for contamination protection accessories. See **A1-75** for radial clearance symbol. See **A1-87** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

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Model SRS15WGS



Model SRS15WGM/WGN

Unit: mm

	LM rail dimensions							Basic load rating		Static permissible moment N·m [3]					Mass	
	Width			Height	Pitch		Length[2]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 $^{0}_{-0.02}$	W_2	W_3	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	42	9	23	9.5	40	4.5×8×4.5	2000	6.64 5.59	5.94 6.78	25.4 29	158 178	25.4 29	158 178	123 140	0.087	2.87
	42	9	23	9.5	40	4.5×8×4.5	2000	9.12 7.43	8.55 8.59	51.2 52.7	290 293	51.2 52.7	290 293	176 178	0.13	2.87
	42	9	23	9.5	40	4.5×8×4.5	2000	12.4 9.87	12.1 15.3	106 133	532 671	106 133	532 671	250 317	0.201	2.87

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] The maximum length indicates the standard maximum length of an LM rail. (See **A1-166**.)

[3] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Notes: Since stainless steel is used in the LM block, LM rail, and balls, these models are highly resistant to corrosion and environment.
The SRS-G is equipped with uncaged, full-complement bearings.
For the SRS15WS/WM/WN, if a grease nipple is required, please specify upon ordering.
Using a lubrication hole other than for greasing may cause damage.

Options⇒A1-541

Standard Lengths and Maximum Lengths of LM Rails

Table 2 shows the standard lengths and the maximum lengths of model SRS variations. If the maximum length of the desired LM rail exceeds these values, jointed rails will be used. Contact THK for details.
For special rail lengths, it is recommended to use a value corresponding to the G and g dimensions from the table. As the G and g dimensions increase, this portion becomes less stable, and the accuracy performance is severely impacted.

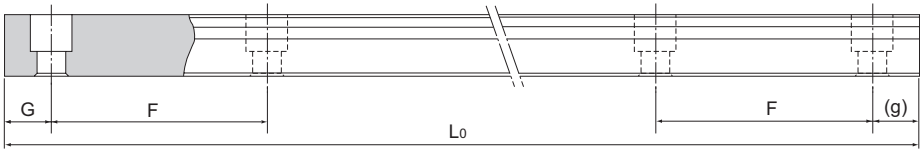


Table 2: Standard Lengths and Maximum Lengths of LM Rails for Model SRS

Unit: mm

Model No.	SRS 5	SRS 5W	SRS 7	SRS 7W	SRS 9	SRS 9W	SRS 12	SRS 12W	SRS 15	SRS 15W	SRS 20	SRS 25
LM rail standard lengths (L_o)	40 55 70 100 130 160	50 70 90 110 130 150 170	40 55 70 85 100 115 130	50 80 110 140 170 200 260 290	55 75 95 115 135 155 175 195 275 375	50 80 110 140 170 200 260 290 320	70 95 120 145 170 195 220 245 270 320 370 470 570	70 110 150 190 230 270 310 390 470 550	70 110 150 190 230 270 310 350 390 430 470 550 670 870	110 150 190 230 270 310 430 550 670 790	220 280 340 460 640 880 1000	220 280 340 460 640 880 1000
Standard pitch F	15	20	15	30	20	30	25	40	40	40	60	60
G, g	5	5	5	10	7.5	10	10	15	15	15	20	20
Max length	220	220	480	480	1240	1430	2000	2000	2000	2000	1800	1800

Notes: The maximum length varies with accuracy grades. Contact THK for details.
If jointed rails are not allowed and a greater length than the maximum values above is required, contact THK.

Reference bolt tightening torques when mounting an LM block

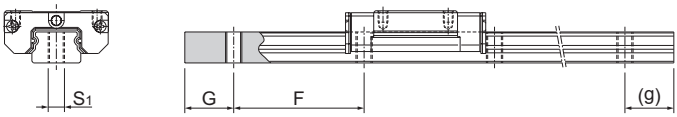
Reference bolt-tightening torques when mounting an LM block for Model SRS are shown in Table 3. Tightening above the tightening torque affects accuracy. Be sure to tighten at or below the defined tightening torque.

Table 3: Reference tightening torque

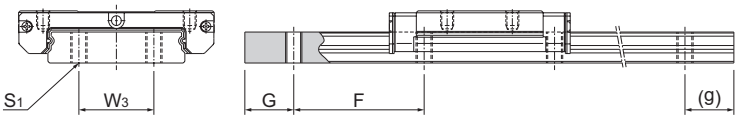
Model No.	Model No. of screw	Screw depth (mm)	Reference tightening torque (N·m)
SRS 5	M2	1.5	0.4
SRS 5W	M3	2.3	0.4
SRS 7	M2	2.3	0.4
SRS 7W	M3	2.8	0.4

Tapped-Hole Type LM Rail

Model SRS rails also include a type where the LM rail is tapped. This type is useful when mounting from the bottom of the base.



Model SRS



Model SRS-W

(1) For standard pitches of the taps and the G and g dimensions, see Table 2 on A1-166.

Table 4: Dimensions of the LM Rail Tap (Model SRS)
Unit: mm

Model No.	S_1
SRS 5	M2.6 through
SRS 7	M3 through
SRS 9	M4 through
SRS 12	M4 through
SRS 15	M5 through
SRS 20	M6 through
SRS 25	M6 through

Table 5: Dimensions of the LM Rail Tap (Model SRS-W)
Unit: mm

Model No.	W_3	S_1
SRS 5W	—	M3 through
SRS 7W	—	M4 through
SRS 9W	—	M4 through
SRS 12W	—	M5 through
SRS 15W	23	M5 through

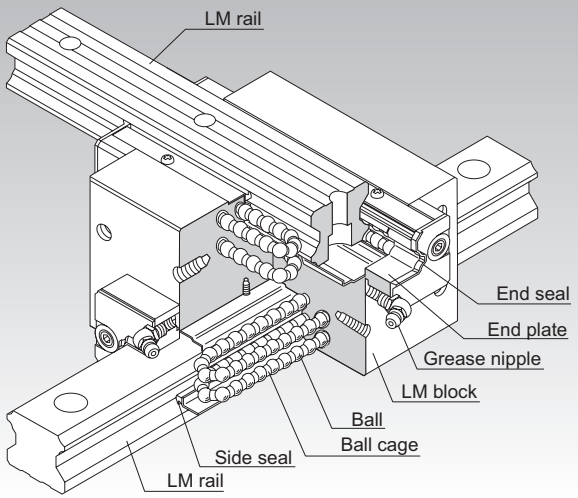
Model number coding

SRS15MC1UU+310LH W

Symbol for
tapped-hole LM rail

SCR

Caged Ball Cross LM Guide Model SCR



Note: For the ball cage, see A1-92.

Selection Criteria A1-10
Design Highlights A1-516
Options A1-541
Model No. A1-614
Handling Precautions A1-620
Accessories for Lubrication A24-1
Mounting Procedure B1-91

Equivalent Moment Factor A1-45
Rated Loads in All Directions A1-63
Equivalent Factor in Each Direction A1-65
Radial Clearance A1-75
Accuracy Standards A1-84
Shoulder Height of the Mounting Base and the Corner Radius A1-526
Reference Error Tolerance for the Mounting Surface A1-532
Dimensions of Each Model with Options Attached A1-555

Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and ball cages and end plates incorporated in the LM block allow the balls to circulate.
This LM Guide has two rails intersecting at right angles integrated back-to-back into a single block with the same internal structure as the proven Caged Ball LM Guide Model SHS. Because an orthogonal LM System can be achieved with the Model SCR alone, conventional saddles are no longer necessary, enabling simplified X-Y motion and compact structure.

4-Way Equal Load

Each row of balls is placed at a contact angle of 45° so that the load ratings applied to the LM block are uniform in the four directions (radial, reverse-radial, and lateral directions), enabling the LM Guide to be used in all orientations and in extensive applications.

High Rigidity

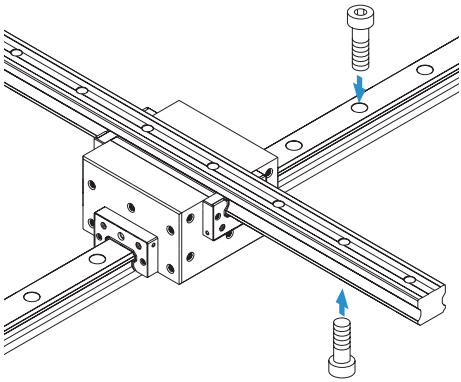
Since the balls are well balanced in four rows, this model is able to withstand moments, and it achieves smooth straight motion even when a preload is applied to increase the rigidity.
The rigidity of the single LM block is higher than that of a combination of two conventional LM blocks secured back-to-back with bolts, making this model optimal for building an X-Y table that requires high rigidity.

Types and Features

Model SCR

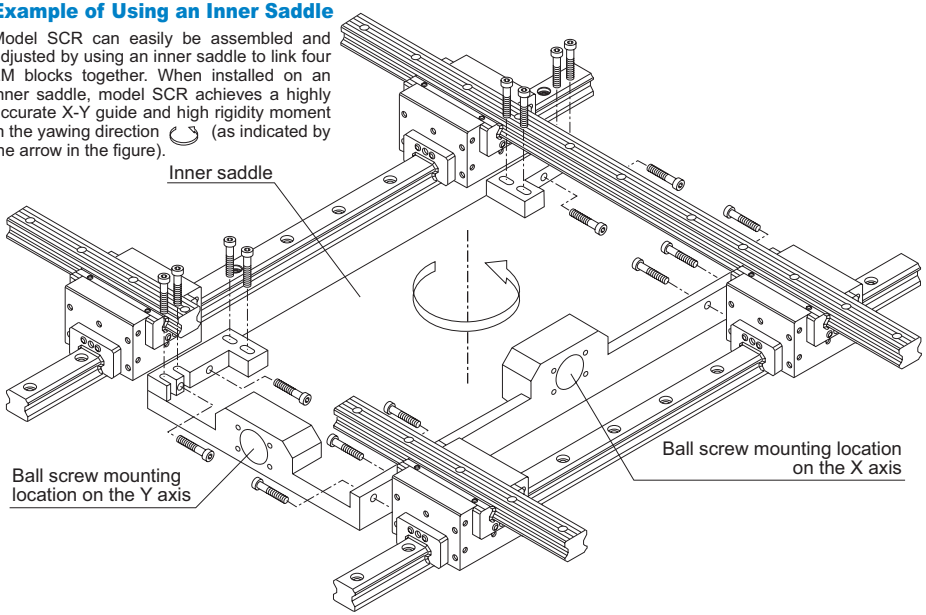
Dimensional Table⇒A1-172

This model is the standard type.

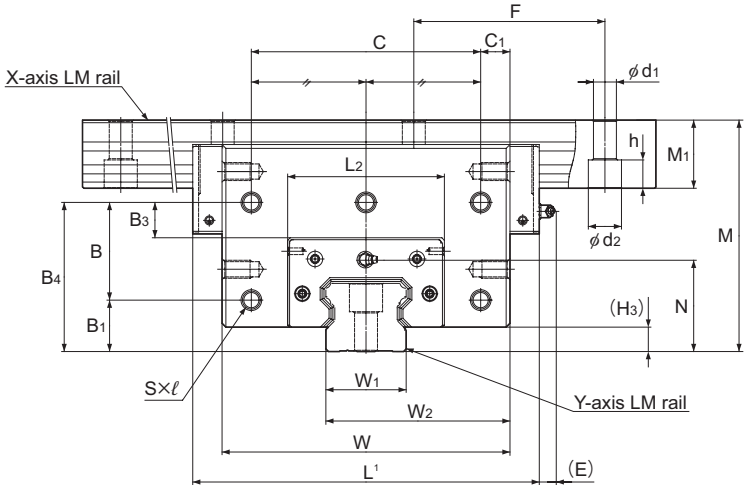


Example of Using an Inner Saddle

Model SCR can easily be assembled and adjusted by using an inner saddle to link four LM blocks together. When installed on an inner saddle, model SCR achieves a highly accurate X-Y guide and high rigidity moment in the yawing direction (as indicated by the arrow in the figure).



Model SCR



Model No.	Outer dimensions			LM block dimensions											
	Height M	Width W	Length[1] L	B_1	B_3	B_4	B	C	C_1	S×ℓ	L_2	H_3	N	E
SCR 15S	47	48	64.4	—	11.3	34.8	—	20	14	2×2-M4×6	33.4	3	18.5	5.5
SCR 20S	57	59	79	—	13	42.5	—	30	14.5	2×2-M5×8	43	4.6	23.5	12
SCR 20	57	78	98	13	7.5	37	24	56	11	2×5-M5×8	43	4.6	23.5	12
SCR 25	70	88	109	18	9	44	26	64	12	2×5-M6×10	47.4	5.8	28.5	12
SCR 30	82	105	131	21	12	53	32	76	14.5	2×5-M6×10	58	7	34	12
SCR 35	95	123	152	24	14	61	37	90	16.5	2×5-M8×14	68	7.5	40	12
SCR 45	118	140	174	30	16.5	75	45	110	15	2×5-M10×15	84.6	8.9	49.5	16
SCR 65	180	226	272	40	27.5	116	76	180	23	2×5-M14×22	123	19	71	16

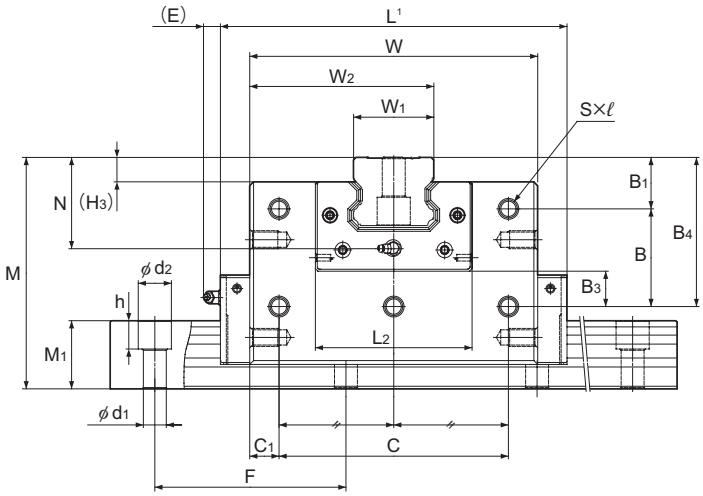
Model number coding

4 SCR25 QZ KKHH C0 +1240/1000L P

- **4**: Total No. of LM blocks
- **SCR25**: Model number
- **QZ**: With QZ Lubricator
- **KKHH**: Contamination protection accessory symbol
- **C0**: Radial clearance symbol — Normal (No symbol)/Light preload (C1) / Medium preload (C0)
- **+1240/1000L**: LM rail length on the X axis (in mm) / LM rail length on the Y axis (in mm)
- **P**: Accuracy symbol — Precision grade (P) / Super Precision grade (SP) / Ultra Precision grade (UP)

Notes: Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ. See contamination protection accessories on **A1-584**. See **A1-75** for radial clearance symbol. See **A1-84** for accuracy symbol.

Download data from the THK Online Services website. https://www.thk.com/

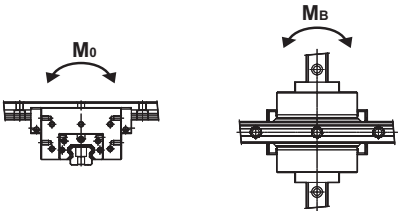


Unit: mm

	Grease nipple	LM rail dimensions					Basic load rating		Static permissible moment[2]		Mass	
		Width W_1 $^{0}_{-0.05}$	W_2	Height M_1	Pitch F	Mounting hole $d_1 \times d_2 \times h$	C kN	C_0 kN	M_O kN·m	M_B kN·m	LM block kg	LM rail kg/m
	PB1021B	15	31.5	13	60	4.5×7.5×5.3	14.2	24.2	0.16	0.175	0.54	1.3
	B-M6F	20	39.5	16.5	60	6×9.5×8.5	22.3	38.4	0.334	0.334	0.88	2.3
	B-M6F	20	49	16.5	60	6×9.5×8.5	28.1	50.3	0.473	0.568	1.7	2.3
	B-M6F	23	55.5	20	60	7×11×9	36.8	64.7	0.696	0.848	3.4	3.2
	B-M6F	28	66.5	23	80	9×14×12	54.2	88.8	1.15	1.36	4.6	4.5
	B-M6F	34	78.5	26	80	9×14×12	72.9	127	2.01	2.34	6.8	6.2
	B-PT1/8	45	92.5	32	105	14×20×17	100	166	3.46	3.46	10.8	10.4
	B-PT1/8	63	144.5	53	150	18×26×22	253	408	11.9	13.3	44.5	23.7

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See A1-555 or A1-578)

[2] Static permissible moment 1 block: the static permissible moment with one LM block



Options⇒A1-541

Standard Lengths and Maximum Lengths of LM Rails

Table 1 shows the standard and maximum lengths of the Model SCR rail. If the maximum length of the desired LM rail exceeds these values, joint rails will be used. Contact THK for details. For special rail lengths, it is recommended to use a value corresponding to the G and g dimensions from the table. As the G and g dimensions increase, this portion becomes less stable, and the accuracy performance is severely impacted.

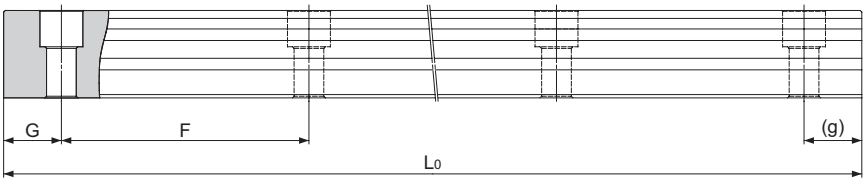


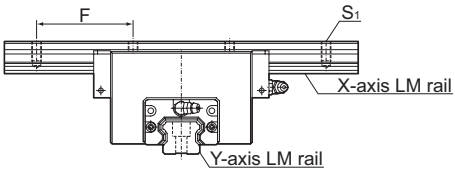
Table 1: Standard Lengths and Maximum Lengths of LM Rails for Model SCR

Unit: mm

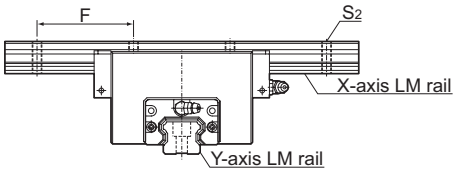
Model No.	SCR 15	SCR 20	SCR 25	SCR 30	SCR 35	SCR 45	SCR 65
LM rail standard lengths (L_0)	160 220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1360 1480 1600	220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1360 1480 1600 1720 1840 1960 2080 2200	220 280 340 400 460 520 580 640 700 760 820 940 1000 1060 1120 1180 1240 1300 1360 1420 1480 1540 1600 1720 1840 1960 2080 2200 2320 2440	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1560 1640 1720 1800 1880 1960 2040 2200 2360 2520 2680 2840 3000	280 360 440 520 600 680 760 840 920 1000 1080 1160 1240 1320 1400 1480 1560 1640 1720 1800 1880 1960 2040 2200 2360 2520 2680 2840 3000	570 675 780 885 990 1095 1200 1305 1410 1515 1620 1725 1830 1935 2040 2145 2250 2355 2460 2565 2670 2775 2880 2985 3090	1270 1570 2020 2620
Standard pitch F	60	60	60	80	80	105	150
G, g	20	20	20	20	20	22.5	35
Max length	3000	3000	3000	3000	3000	3090	3000

Tapped-Hole Type LM Rail

Model SCR rails also include a type where the LM rail is tapped from the bottom. With the X-axis LM rail having tapped holes, this model can be secured with bolts from the top.



K Type



W Type

Table 2: Dimensions of the LM Rail Tap

Unit: mm

Model No.	K Type		W Type
	S_1	Effective tap depth ℓ_1	S_2
SCR 15	M5	8	M5 through
SCR 20	M6	10	M6 through
SCR 25	M6	12	—
SCR 30	M8	15	—
SCR 35	M8	17	—
SCR 45	M12	20	—
SCR 65	M20	30	—

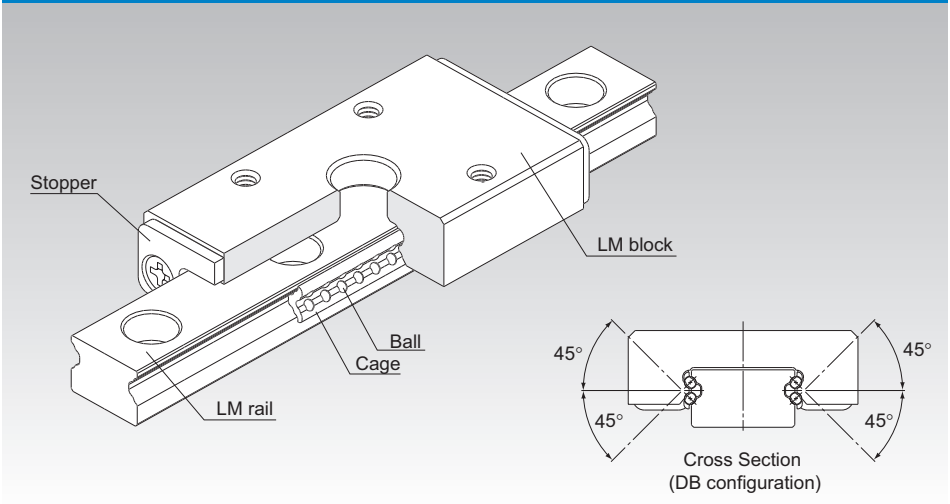
Model number coding

4SCR35KKHHC0+1000LP K /1000LP

Symbol for
tapped-hole LM rail (K/W)

EPF

Finite Stroke Caged Ball LM Guide Model EPF



Note: For the ball cage, see A1-92.

Selection Criteria	**A1-10**
Design Highlights	**A1-516**
Options	**A1-541**
Model No.	**A1-614**
Handling Precautions	**A1-620**
Accessories for Lubrication	**A24-1**
Mounting Procedure	**B1-91**

Equivalent Moment Factor	A1-45
Rated Loads in All Directions	A1-63
Equivalent Factor in Each Direction	A1-65
Radial Clearance	A1-75
Accuracy Standards	A1-90
Shoulder Height of the Mounting Base and the Corner Radius	A1-527
Accuracy of the Mounting Surface	A1-179
Dimensions of Each Model with Options Attached	A1-555

Structure and Features

Balls are held in cages with spherical ball holders and they roll in four rows of circular-arc grooves in raceways precision-ground in LM rails and LM blocks.

Smooth Motion

Because a finite stroke is used, balls do not circulate and movement is smooth even with preload. Also, because variations in rolling resistance are small, this model is ideal for locations where smooth movement is required with a short stroke.

High Rigidity

Because model EPF uses a DB construction featuring four rows of circular-arc grooves, it offers particularly high rigidity with respect to moment in the M_C direction. This makes it ideal for locations where M_C moment is applied with one rail.

Miniature Type

Because the mounting method is compatible with the Miniature LM Guide Model RSR-N, the models are dimensionally interchangeable.

4-Way Equal Load

Each row of balls is configured at a contact angle of 45° so that the load ratings of the LM block are uniform in all directions (radial, reverse-radial, and lateral directions), enabling the LM Guide to be used in all orientations and in extensive applications.

Ball Cage Technology Application 1

Because the cage is formed out of plastic resin, there is no metal contact between the cage and the balls, providing excellent noise characteristics, low dust emissions, and long product life.

Ball Cage Technology Application 2

Forming the cage in a spherical shape out of plastic resin allows lubricant to be held in grease pockets, enabling long periods of maintenance-free operation.

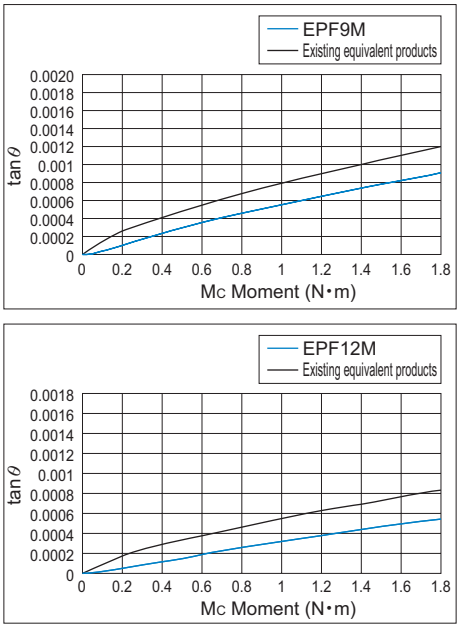


Fig. 1: Comparison of M_C Moment Test Data

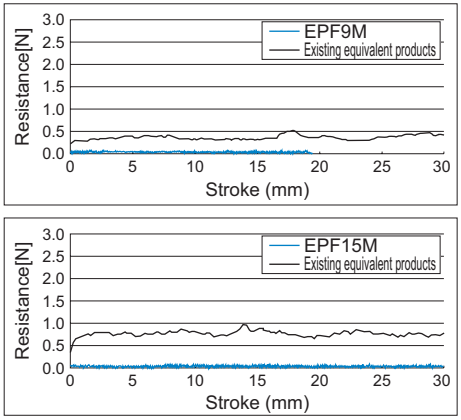
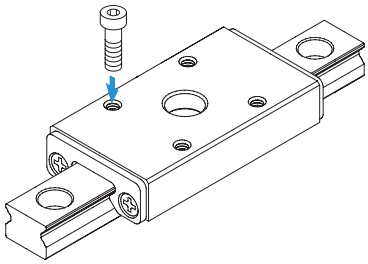


Fig. 2: Comparison of Rolling Resistance Test Data

Types and Features

Model EPF

Dimensional Table⇒A1-180



Accuracy of the Mounting Surface

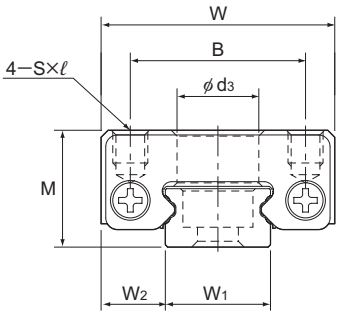
If there is not sufficient precision in the LM rail and LM block mounting surfaces, the product may not function to its full potential. Machine to values no higher than those in Table 1. (Recommended value: 70% of Table 1)

Table 1: Flatness of the LM Rail and the LM Block Mounting Surface
Unit: mm

Model No.	Flatness error
EPF 7M, 9M	0.015/200
EPF 12M	0.025/200
EPF 15M	0.035/200

Note: It is recommended that highly rigid materials such as steel or cast metal be used as the mounting material. If a material with poor rigidity, such as aluminum, is used, unforeseen loads may be applied to the product. In such situations, contact THK.

Model EPF



Model No.	Outer dimensions			LM block dimensions					LM rail dimensions		
	Height	Width	Length								
	M	W	L_B	B	C	d_3	S×ℓ	L_{B1}	W_1	W_2	M_1
EPF 7M	8	17	31.6	12	13	5	M2×2.3	29.6	7	5	5
EPF 9M	10	20	37.8	15	16	7	M3×2.8	35.8	9	5.5	5
EPF 12M	13	27	43.7	20	20	7	M3×3.2	41.7	12	7.5	6.75
EPF 15M	16	32	56.5	25	25	7	M3×3.5	54.5	15	8.5	9

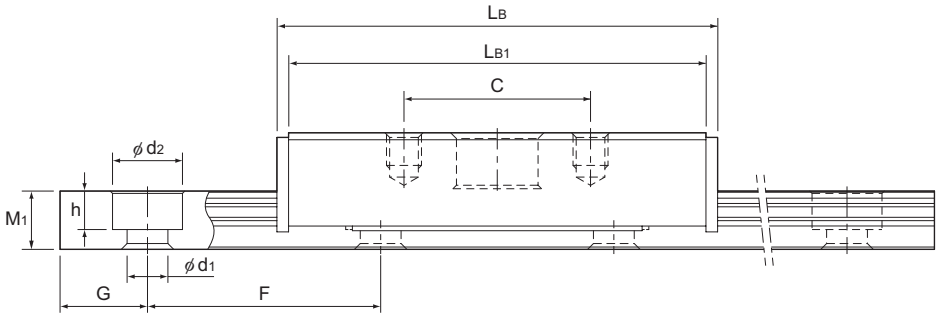
Model number coding

EPF7M 16 +55L P M

- EPF7M: Model No.
- 16: LM rail length (in mm)
- +55L: Guaranteed stroke (in mm)
- P: Accuracy symbol
- M: Rail material: Stainless steel (standard)

Notes: This model number indicates that a single-rail unit constitutes one set.
See **A1-90** for accuracy symbol.

Download data from the THK Online Services website. https://www.thk.com/



Unit: mm

				Guaranteed stroke	Basic load rating		Static permissible moment N·m[1]			Mass	
	G	F	$d_1 \times d_2 \times h$	S_T	C kN	C_0 kN	M_A	M_B	M_C	LM block kg	LM rail kg/m
	5	15	2.4×4.2×2.6	16	0.9	1.6	5.08	5.08	5.26	0.019	0.23
	7.5	20	3.5×6×3.3	21	1	1.87	6.81	6.81	7.89	0.036	0.29
	10	25	3.5×6×3.8	27	2.26	3.71	15.5	15.5	20.8	0.074	0.55
	15	40	3.5×6×4	34	3.71	5.88	33	33	41.3	0.136	0.94

[1] Static permissible moment 1 block: the static permissible moment with one LM block
Note: Since stainless steel is used in the LM block, LM rail, and balls, these models are highly resistant to corrosion and environment.

Table 1: Recommended Tightening Torques of Mounting Bolts

Unit: N·m

Model No.	Nominal bolt	Rated tightening torque		
		Iron	Casting	Aluminum
EPF 7M	M2	0.588	0.392	0.294
EPF 9M	M3	1.96	1.27	0.98
EPF 12M				
EPF 15M				

Table 2: Maximum Slip Resistance

Unit: N

Model No.	Maximum slip resistance
EPF 7M	20
EPF 9M	20
EPF 12M	30
EPF 15M	30

Notes: While the cage used to hold the balls is designed to operate extremely precisely, factors such as impacts, inertial moment, or drive vibration from the machine can cause cage distortion.
If using the EPF LM Guide in the following conditions, contact THK.
- Vertical orientation
- Under a large moment load
- Butting the guide's external stopper with the table
- Applications with rapid acceleration or deceleration

If cage distortion occurs, the cage must be forcibly restored to its original shape.
Table 2 shows the required slip resistance in this event. Set the thrust so that it is no less than the maximum value shown in the table.

Options⇒A1-541

Standard Lengths of LM Rails

Table 3 shows the standard LM rail lengths of model EPF.
For special rail lengths, it is recommended to use a value corresponding to the G and g dimensions from the table. As the G and g dimensions increase, this portion becomes less stable, and the accuracy performance is severely impacted.

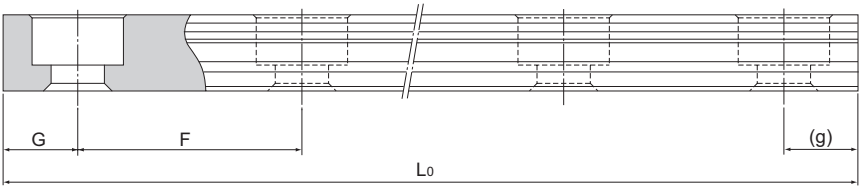


Table 3: Standard Lengths of LM Rails for Model EPF

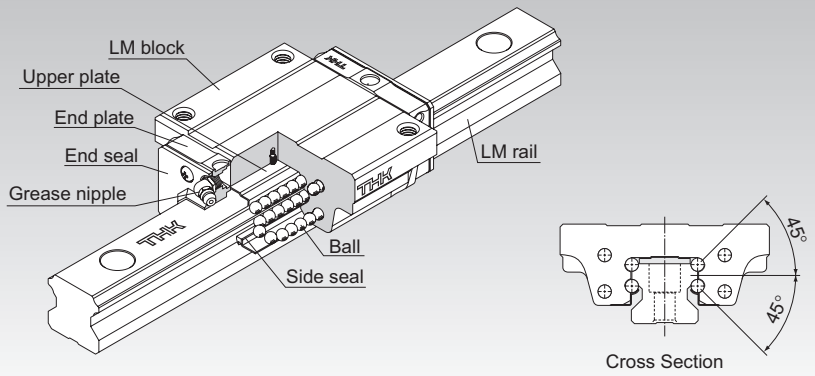
Unit: mm

Model No.	EPF 7M	EPF 9M	EPF 12M	EPF 15M
LM rail standard lengths (L_0)	55	75	95	110
Standard pitch F	15	20	25	40
G, g	5	7.5	10	15

Note: Lengths other than the standard LM rail length (L_0) are also available. Contact THK for details.

HSR

Global Standard LM Guide Model HSR



Selection Criteria A1-10
Design Highlights A1-516
Options A1-541
Model No. A1-614
Handling Precautions A1-620
Accessories for Lubrication A24-1
Mounting Procedure B1-91

Equivalent Moment Factor A1-45
Rated Loads in All Directions A1-63
Equivalent Factor in Each Direction A1-65
Radial Clearance A1-76
Accuracy Standards A1-81
Shoulder Height of the Mounting Base and the Corner Radius A1-527
Reference Error Tolerance for the Mounting Surface A1-532
Dimensions of Each Model with Options Attached A1-555

Structure and Features

Balls roll in four rows of raceways precision-ground on an LM rail and an LM block, and end plates incorporated in the LM block allow the balls to circulate. Since retainer plates hold the balls, they will not fall out even if the LM block is removed from the LM rail (except models HSR 8X, 10X, and 12X). Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations. In addition, the LM block can receive a well-balanced preload, increasing the rigidity in the four directions while maintaining a constant, low friction coefficient. The low height of the LM block makes it highly rigid, achieving stable, high-precision linear motion.

4-Way Equal Load

Each row of balls is placed at a contact angle of 45° so that the rated loads applied to the LM block are uniform in the four directions (radial, reverse-radial, and lateral directions), enabling the LM Guide to be used in all orientations.

High Rigidity

Since the balls are well balanced in four rows, a large preload can be applied and the rigidity in four directions can easily be increased.

Self-Adjustment Capability

The self-adjustment capability through the front-to-front configuration of THK's unique circular-arc grooves (DF set) enables mounting error to be absorbed even under a preload, thus achieving highly accurate and smooth linear motion.

High Durability

Balls do not undergo differential slip, even under a preload or excessive biased load, allowing for smooth motion. Due to the product's high wear resistance, it maintains long-term accuracy.

Stainless Steel Type also Available

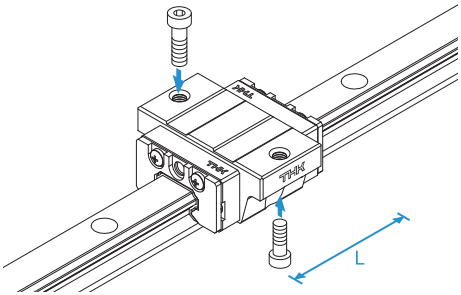
A special type whose LM block, LM rail, and balls are made of stainless steel is also available.

Types

Model HSR-XSC

Dimensional Table⇒A1-192

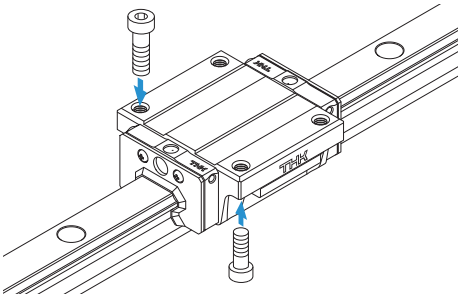
This type has a shorter overall LM block length (L) than the Model HSR-XC.



Models HSR-C/XC

Dimensional Table⇒A1-194

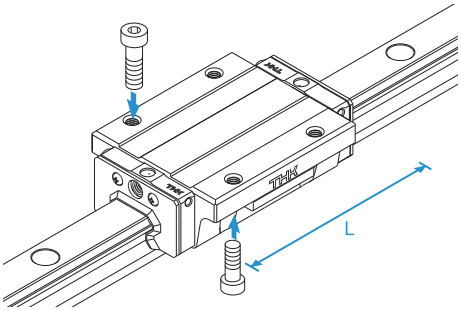
The flange of the LM block has tapped holes. This type can be mounted from the top or the bottom. It is used in places where the table cannot have through holes for mounting bolts.



Models HSR-LC/XLC

Dimensional Table⇒A1-194

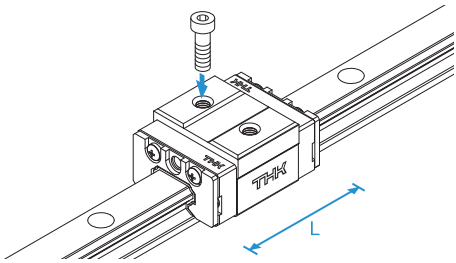
The LM block has the same cross-sectional shape as model HSR-C, but has a longer overall LM block length (L) and a greater load rating.



Model HSR-XSR

Dimensional Table⇒A1-196

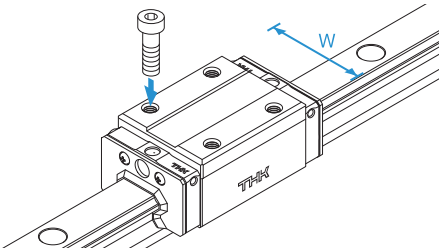
This type has a shorter overall LM block length (L) than the Model HSR-XR.



Models HSR-R/XR

Dimensional Table⇒A1-198

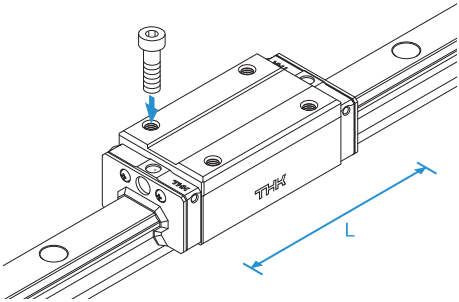
With this type, the LM block has a smaller width (W) and tapped holes. It is used in places where the space for table width is limited.



Models HSR-LR/XLR

Dimensional Table⇒A1-198

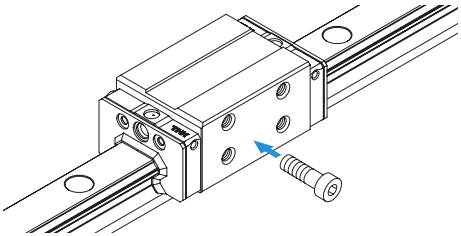
The LM block has the same cross-sectional shape as model HSR-R, but has a longer overall LM block length (L) and a greater load rating.



Models HSR-YR/XYR

Dimensional Table⇒A1-200

If using two conventional LM Guide units facing each other, it takes a long time to machine the table, and is difficult to achieve the desired accuracy and adjust the clearance. With the Model HSR-YR and Model HSR-XYR, the tapped holes on the side of the LM block simplify the structure, which drastically reduces labor time and increases accuracy.



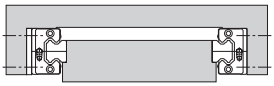


Fig. 1: Conventional Structure

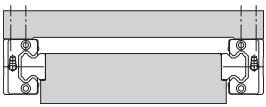
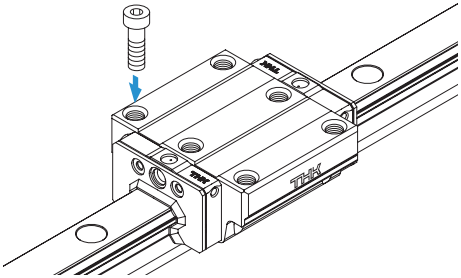


Fig. 2: Mounting Structure for Model HSR-YR

Models HSR-CA/XCA

Dimensional Table⇒A1-202

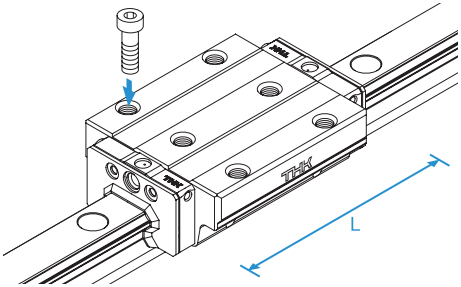
This model has six tapped holes on the LM block.



Models HSR-HA/XHA

Dimensional Table⇒A1-202

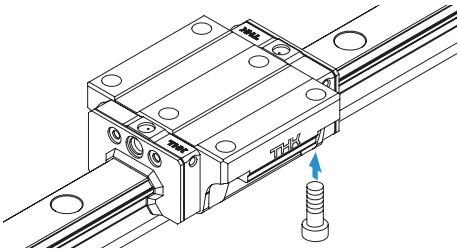
The LM block has the same cross-sectional shape as the Model HSR-CA, but it has a longer overall LM block length (L) and a greater load rating.



Models HSR-CB/XCB

Dimensional Table⇒A1-204

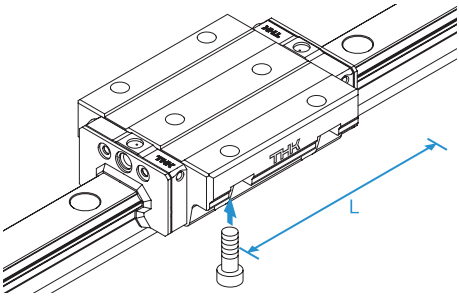
The LM block has six through holes. It is used in places where the table cannot have through holes for mounting bolts.



Models HSR-HB/XHB

Dimensional Table⇒A1-204

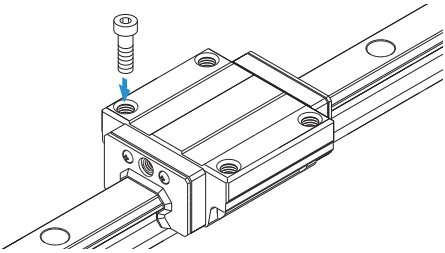
The LM block has the same cross sectional shape as model HSR-CB, but has a longer overall LM block length (L) and a greater load rating.



Model HSR85A

Dimensional Table⇒A1-206

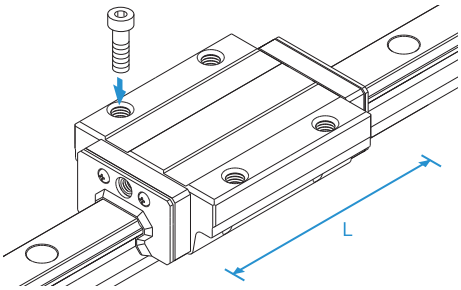
The flange of its LM block has tapped holes.



Model HSR85LA

Dimensional Table⇒A1-206

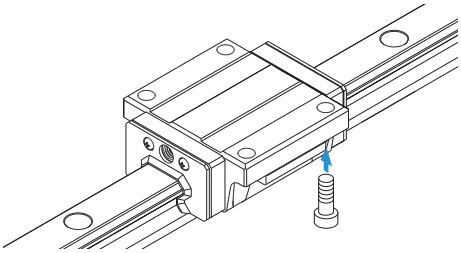
The LM block has the same cross-sectional shape as model HSR85A, but has a longer overall LM block length (L) and a greater load rating.



Model HSR85B

Dimensional Table⇒A1-206

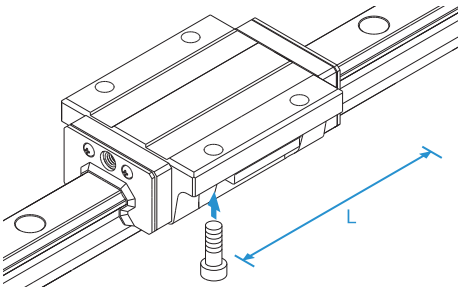
The flange of the LM block has through holes. It is used in places where the table cannot have through holes for mounting bolts.



Model HSR85LB

Dimensional Table⇒A1-206

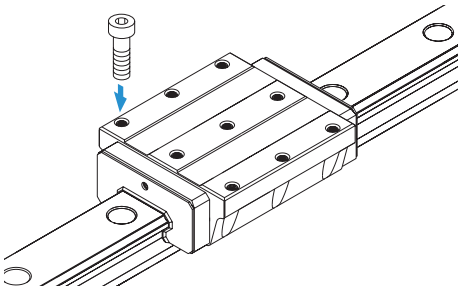
The LM block has the same cross-sectional shape as model HSR85B, but has a longer overall LM block length (L) and a greater load rating.



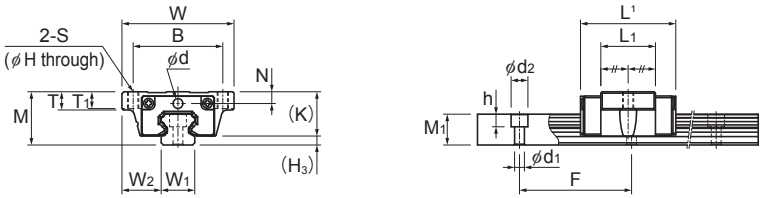
Models HSR 100/120/150 HA/HB/HR

Dimensional Table⇒A1-208

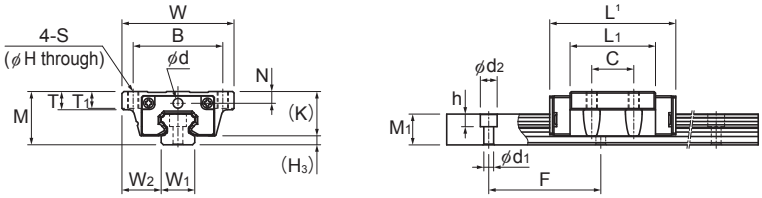
These are large types of model HSR that can be used in large-scale machine tools and building structures.
Models HSR100/120/150HA/HB have nine tapped holes on the LM block. Models HSR100/120/150HR have six tapped holes on the LM block.



Models HSR-XSCM, HSR-XCM, and HSR-XLCM



Models HSR8X SCM and 10X SCM



Models HSR8X CM/LCM and 10X CM/LCM

Model No.	Outer dimensions			LM block dimensions												Grease nipple	H_3
	Height M	Width W	Length[1] L	B	C	Mounting hole S	H	L_1	T	T_1	K	N	E	Lubrication hole d		
HSR 8XSCM HSR 8XCM HSR 8XLCM	10	24	18 24 30.5	19	— 10 10	M2.3	1.5	9 15 21.5	4	3.5	7.9	1.6	—	2.2	—	2.1
HSR 10XSCM HSR 10XCM HSR 10XLCM	12	30	24 31 40	24	— 12 12	M3	2.5	13.1 20.1 29.1	5	4.5	9.8	2.5	—	2.2	—	2.2
HSR 12XSCM HSR 12XCM HSR 12XLCM	19	40	34 45 58	32	— 15 15	M4	3.3	19.5 30.5 43.5	6.5	6	15.9	4.2	4	—	PB107	3.1

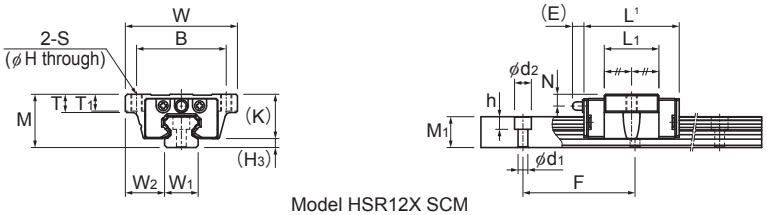
Model number coding

HSR12X C 2 UU C1 M +670L H T M -II

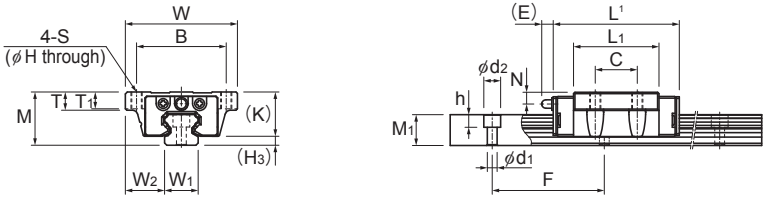
- HSR12X: Model number
- C: Type of LM block
- 2: No. of LM blocks used on the same rail
- UU: Contamination protection accessory symbol
- C1: Radial clearance symbol — Normal (No symbol), Light preload (C1)
- M: Stainless steel LM block
- +670L: LM rail length (in mm)
- H: Accuracy symbol — Normal grade (No Symbol)/High Accuracy grade (H)/Precision grade (P)/Super Precision grade (SP)
- T: Symbol for LM rail jointed use
- M: Stainless steel LM rail
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
See **A1-584** for contamination protection accessories. See **A1-76** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Model HSR12X SCM



Models HSR12X CM/LCM

Unit: mm

	LM rail dimensions						Basic load rating		Static permissible moment kN·m [3]						Mass	
	Width		Height	Pitch		Length [2]	C	C_0	M_A		M_B		M_C		LM block	LM rail
	W_1 ±0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block		kg	kg/m
	8	8	6	20	2.4×4.2×2.3	(1000)	0.85 1.2 1.5	1.24 2.02 2.8	0.00179 0.00457 0.00913	0.0148 0.0297 0.0502	0.00179 0.00457 0.00913	0.0148 0.0297 0.0502	0.0043 0.00698 0.00964		0.007 0.013 0.018	0.3
	10	10	7	25	3.5×6×3.3	(1000)	1.54 2.16 2.72	2.18 3.54 4.9	0.00464 0.0114 0.0211	0.0336 0.0659 0.115	0.00464 0.0114 0.0211	0.0336 0.0659 0.115	0.00949 0.0154 0.0213		0.017 0.026 0.038	0.45
	12	14	11	40	3.5×6×4.5	(1480)	3.95 5.54 6.96	5.39 8.75 12.1	0.0171 0.0421 0.0781	0.116 0.234 0.409	0.0171 0.0421 0.0781	0.116 0.234 0.409	0.0277 0.0449 0.0622		0.059 0.092 0.132	0.83

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

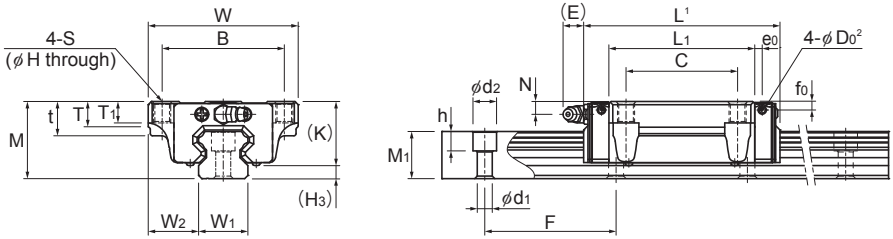
[2] The maximum length indicates the standard maximum length of an LM rail. (See **A1-210**.)

[3] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Notes: The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.
The stainless steel provides excellent corrosion and environmental resistance.

Options⇒A1-541

Models HSR-C, HSR-CM, HSR-LC, HSR-LCM, HSR-XC, and HSR-XLC



Models HSR15 to 35C/LC/CM/LCM

Model No.	Outer dimensions			LM block dimensions											Grease nipple	Pilot hole for side nipple			
	Height	Width	Length[1]			Mounting hole													
	M	W	L	B	C	S	H	L_1	t	T	T_1	K	N	E		e_0	f_0	D_0[2]	H_3
HSR 15C HSR 15CM	24	47	56.6	38	30	M5	4.4	38.8	11	7	7	19.3	4.3	5.5	PB1021B	3.2	3.9	3	4.7
HSR 15LC HSR 15LCM	24	47	74.6	38	30	M5	4.4	56.8	11	7	7	19.3	4.3	5.5	PB1021B	3.2	3.9	3	4.7
HSR 20C HSR 20CM	30	63	74	53	40	M6	5.4	50.8	10	9.5	10	26	5	12	B-M6F	3.1	3.4	3	4
HSR 20LC HSR 20LCM	30	63	90	53	40	M6	5.4	66.8	10	9.5	10	26	5	12	B-M6F	3.1	3.4	3	4
HSR 25C HSR 25CM	36	70	83.1	57	45	M8	6.8	59.5	16	11	10	30.5	6	12	B-M6F	3.5	4	3	5.5
HSR 25LC HSR 25LCM	36	70	102.2	57	45	M8	6.8	78.6	16	11	10	30.5	6	12	B-M6F	3.5	4	3	5.5
HSR 30C HSR 30CM	42	90	98	72	52	M10	8.5	70.4	18	9	10	35	7	12	B-M6F	5.2	6.2	5.2	7
HSR 30LC HSR 30LCM	42	90	120.6	72	52	M10	8.5	93	18	9	10	35	7	12	B-M6F	5.2	6.2	5.2	7
HSR 35C HSR 35CM	48	100	109.4	82	62	M10	8.5	80.4	21	12	13	40.5	8	12	B-M6F	5.5	5.6	5.2	7.5
HSR 35LC HSR 35LCM	48	100	134.8	82	62	M10	8.5	105.8	21	12	13	40.5	8	12	B-M6F	5.5	5.6	5.2	7.5
HSR 45C HSR 45LC	60	120	138.9 170.7	100	80	M12	10.5	98 129.8	25	13	15	50	10	16	B-PT1/8	6.1	6.6	5.2	10
HSR 55C HSR 55LC	70	140	162.9 201	116	95	M14	12.5	118 156.1	29	13.5	17	57	11	16	B-PT1/8	5.6	7.7	5.2	13
HSR 65XC HSR 65XLC	90	170	190.5 250	142	110	M16	14.5	138.5 198	37	21.5	23	76	19	16	B-PT1/8	6.8	14.6	5.2	14

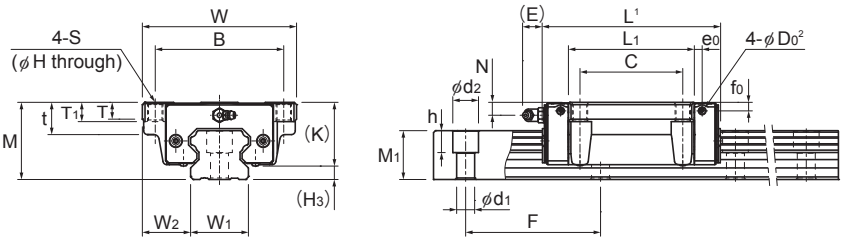
Model number coding

HSR25 C 2 QZ UU C0 M +1240L P T M -II

- HSR25: Model number
- C: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- UU: Contamination protection accessory symbol
- C0: Radial clearance symbol — Normal (No symbol), Light preload (C1), Medium preload (C0)
- M: Stainless steel LM block
- +1240L: LM rail length (in mm)
- P: Accuracy symbol — Normal grade (No Symbol)/High Accuracy grade (H), Precision grade (P)/Super Precision grade (SP), Ultra Precision grade (UP)
- T: Symbol for LM rail jointed use
- M: Stainless steel LM rail
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum). Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ. See **A1-584** for contamination protection accessories. See **A1-76** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

Download data from the THK Online Services website. https://www.thk.com/



Models HSR45 to 65C/LC/XC/XLC

Unit: mm

	LM rail dimensions						Basic load rating		Static permissible moment kN·m [4]					Mass	
	Width		Height	Pitch		Length[3]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 ±0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	15	16	15	60	4.5×7.5×5.3	3000 (1240)	10.9	15.7	0.0945	0.527	0.0945	0.527	0.0998	0.2	1.5
	15	16	15	60	4.5×7.5×5.3	3000 (1240)	14.2	22.9	0.194	0.984	0.194	0.984	0.145	0.29	1.5
	20	21.5	18	60	6×9.5×8.5	3000 (1480)	19.8	27.4	0.218	1.2	0.218	1.2	0.235	0.35	2.3
	20	21.5	18	60	6×9.5×8.5	3000 (1480)	23.9	35.8	0.363	1.87	0.363	1.87	0.307	0.47	2.3
	23	23.5	22	60	7×11×9	3000 (2020)	27.6	36.4	0.324	1.8	0.324	1.8	0.366	0.59	3.3
	23	23.5	22	60	7×11×9	3000 (2020)	35.2	51.6	0.627	3.04	0.627	3.04	0.518	0.75	3.3
	28	31	26	80	9×14×12	3000 (2520)	40.5	53.7	0.599	3.1	0.599	3.1	0.652	1.1	4.8
	28	31	26	80	9×14×12	3000 (2520)	48.9	70.2	0.995	4.89	0.995	4.89	0.852	1.3	4.8
	34	33	29	80	9×14×12	3000 (2520)	53.9	70.2	0.895	4.51	0.895	4.51	1.05	1.6	6.6
	34	33	29	80	9×14×12	3000 (2520)	65	91.7	1.49	7.13	1.49	7.13	1.37	2.0	6.6
	45	37.5	38	105	14×20×17	3090	82.2 100	101 135	1.5 2.59	8.37 13.4	1.5 2.59	8.37 13.4	1.94 2.6	2.8 3.3	11 11
	53	43.5	44	120	16×23×20	3060	121 148	146 194	2.6 4.46	14.1 22.7	2.6 4.46	14.1 22.7	3.43 4.56	4.5 5.7	15.1 15.1
	63	53.5	53	150	18×26×22	3000	195 249	228 323	5.08 9.81	25 45.6	5.08 9.81	25 45.6	6.2 8.79	8.5 10.7	22.5 22.5

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

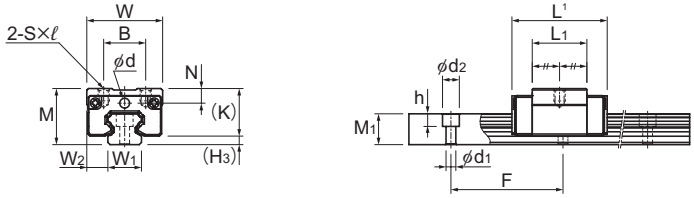
[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-210**.)

[4] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

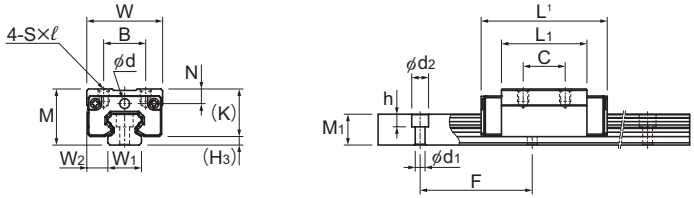
Notes: The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.
The stainless steel provides excellent corrosion and environmental resistance.

Options⇒A1-541

Models HSR-XSRM, HSR-XRM, and HSR-XLRM



Models HSR8X SRM and 10X SRM



Models HSR8X RM/LRM and 10X RM/LRM

Model No.	Outer dimensions			LM block dimensions										H3
	Height M	Width W	Length[1] L	B	C	S×ℓ	L1	T	K	N	E	Lubrication hole d	Grease nipple	
HSR 8XSRM HSR 8XRM HSR 8XLRM	11	16	18 24 30.5	10	— 10 10	M2×2.5	9 15 21.5	—	8.9	2.6	—	2.2	—	2.1
HSR 10XSRM HSR 10XRM HSR 10XLRM	13	20	24 31 40	13	— 12 12	M2.6×2.5	13.1 20.1 29.1	—	10.8	3.5	—	2.2	—	2.2
HSR 12XSRM HSR 12XRM HSR 12XLRM	20	27	34 45 58	15	— 15 15	M4×4.5	19.5 30.5 43.5	6	16.9	5.2	4	—	PB107	3.1

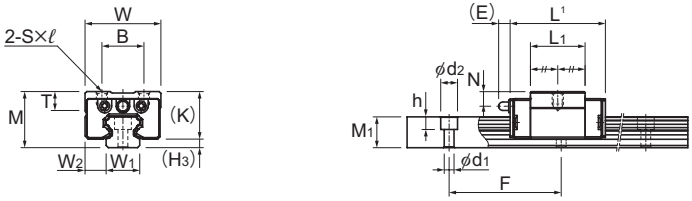
Model number coding

HSR12X R 2 UU C1 M +670L H T M -II

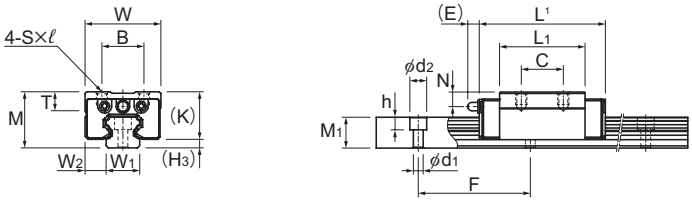
- HSR12X: Model number
- R: Type of LM block
- 2: No. of LM blocks used on the same rail
- UU: Contamination protection accessory symbol
- C1: Radial clearance symbol (Normal (No symbol), Light preload (C1))
- M: Stainless steel LM block
- +670L: LM rail length (in mm)
- H: Accuracy symbol (Normal grade (No Symbol)/High Accuracy grade (H) Precision grade (P)/Super Precision grade (SP))
- T: Symbol for LM rail jointed use
- M: Stainless steel LM rail
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
See **A1-584** for contamination protection accessories. See **A1-76** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

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Model HSR12X SRM



Models HSR12X RM/LRM

Unit: mm

	LM rail dimensions						Basic load rating		Static permissible moment kN·m [3]					Mass	
	Width		Height	Pitch		Length[2]	C	C_0	M_A		M_B		M_C	LM block	LM rail
	W_1 ±0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block	kg	kg/m
	8	4	6	20	2.4×4.2×2.3	(1000)	0.85 1.2 1.5	1.24 2.02 2.8	0.00179 0.00457 0.00913	0.0148 0.0297 0.0502	0.00179 0.00457 0.00913	0.0148 0.0297 0.0502	0.0043 0.00698 0.00964	0.006 0.01 0.015	0.3
	10	5	7	25	3.5×6×3.3	(1000)	1.54 2.16 2.72	2.18 3.54 4.9	0.00464 0.0114 0.0211	0.0336 0.0659 0.115	0.00464 0.0114 0.0211	0.0336 0.0659 0.115	0.00949 0.0154 0.0213	0.014 0.021 0.031	0.45
	12	7.5	11	40	3.5×6×4.5	(1480)	3.95 5.54 6.96	5.39 8.75 12.1	0.0171 0.0421 0.0781	0.116 0.234 0.409	0.0171 0.0421 0.0781	0.116 0.234 0.409	0.0277 0.0449 0.0622	0.045 0.071 0.102	0.83

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

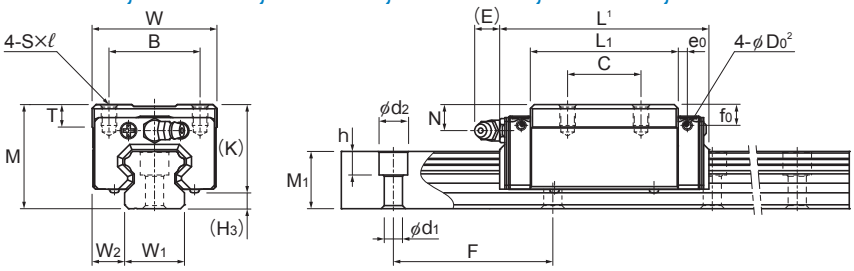
[2] The maximum length indicates the standard maximum length of an LM rail. (See **A1-210**.)

[3] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Notes: The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.
The stainless steel provides excellent corrosion and environmental resistance.

Options⇒A1-541

Models HSR-R, HSR-RM, HSR-LR, HSR-LRM, HSR-XR, and HSR-XLR



Models HSR15 to 35R/LR/RM/LRM

Model No.	Outer dimensions			LM block dimensions									Pilot hole for side nipple			
	Height M	Width W	Length[1] L	B	C	S×ℓ	L_1	T	K	N	E	Grease nipple	e_0	f_0	D_0[2]	H_3
HSR 15R HSR 15RM	28	34	56.6	26	26	M4×5	38.8	6	23.3	8.3	5.5	PB1021B	3.2	7.9	3	4.7
HSR 15LR HSR 15LRM	28	34	74.6	26	34	M4×5	56.8	6	23.3	8.3	5.5	PB1021B	3.2	7.9	3	4.7
HSR 20R HSR 20RM	30	44	74	32	36	M5×6	50.8	8	26	5	12	B-M6F	3.1	3.4	3	4
HSR 20LR HSR 20LRM	30	44	90	32	50	M5×6	66.8	8	26	5	12	B-M6F	3.1	3.4	3	4
HSR 25R HSR 25RM	40	48	83.1	35	35	M6×8	59.5	9	34.5	10	12	B-M6F	3.5	8	3	5.5
HSR 25LR HSR 25LRM	40	48	102.2	35	50	M6×8	78.6	9	34.5	10	12	B-M6F	3.5	8	3	5.5
HSR 30R HSR 30RM	45	60	98	40	40	M8×10	70.4	9	38	10	12	B-M6F	5.2	9.2	5.2	7
HSR 30LR HSR 30LRM	45	60	120.6	40	60	M8×10	93	9	38	10	12	B-M6F	5.2	9.2	5.2	7
HSR 35R HSR 35RM	55	70	109.4	50	50	M8×12	80.4	11.7	47.5	15	12	B-M6F	5.5	12.6	5.2	7.5
HSR 35LR HSR 35LRM	55	70	134.8	50	72	M8×12	105.8	11.7	47.5	15	12	B-M6F	5.5	12.6	5.2	7.5
HSR 45R HSR 45LR	70	86	138.9 170.7	60	60 80	M10×17	98 129.8	15	60	20	16	B-PT1/8	6.1	16.6	5.2	10
HSR 55R HSR 55LR	80	100	162.9 201	75	75 95	M12×18	118 156.1	20.5	67	21	16	B-PT1/8	5.6	17.7	5.2	13
HSR 65XR HSR 65XLR	90	126	190.5 250	76	70 120	M16×20	138.5 198	23	76	19	16	B-PT1/8	6.8	14.6	5.2	14
HSR 85R HSR 85LR	110	156	245.6 303	100	80 140	M18×25	178.6 236	29	94	23	16	B-PT1/8	—	—	—	16

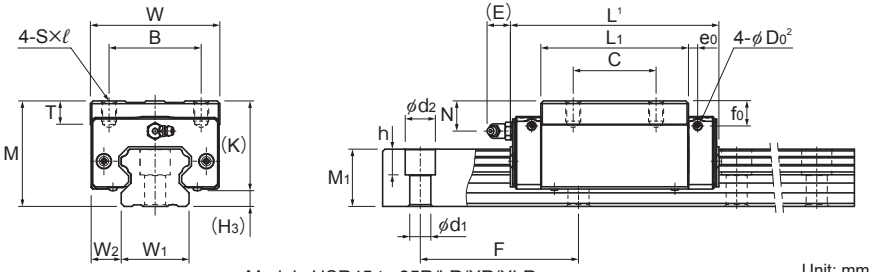
Model number coding

HSR35 R 2 QZ SS C0 M +1400L P T M -II

- HSR35: Model number
- R: Type of LM block
- 2: No. of LM blocks used on the same rail
- QZ: With QZ Lubricator
- SS: Contamination protection accessory symbol
- C0: Radial clearance symbol — Normal (No symbol), Light preload (C1), Medium preload (C0)
- M: Stainless steel LM block
- +1400L: LM rail length (in mm)
- P: Accuracy symbol — Normal grade (No Symbol)/High Accuracy grade (H), Precision grade (P)/Super Precision grade (SP), Ultra Precision grade (UP)
- T: Symbol for LM rail jointed use
- M: Stainless steel LM rail
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum). Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ. See **A1-584** for contamination protection accessories. See **A1-76** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

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Models HSR45 to 85R/LR/XR/XLR

Unit: mm

	LM rail dimensions						Basic load rating		Static permissible moment kN·m [4]						Mass	
	Width		Height	Pitch		Length [3]	C	C_0	M_A		M_B		M_C		LM block	LM rail
	W_1 ±0.05	W_2	M_1	F	$d_1 \times d_2 \times h$	Max	kN	kN	1 block	2 blocks	1 block	2 blocks	1 block		kg	kg/m
	15	9.5	15	60	4.5×7.5×5.3	3000 (1240)	10.9	15.7	0.0945	0.527	0.0945	0.527	0.0998		0.18	1.5
	15	9.5	15	60	4.5×7.5×5.3	3000 (1240)	14.2	22.9	0.194	0.984	0.194	0.984	0.145		0.26	1.5
	20	12	18	60	6×9.5×8.5	3000 (1480)	19.8	27.4	0.218	1.2	0.218	1.2	0.235		0.25	2.3
	20	12	18	60	6×9.5×8.5	3000 (1480)	23.9	35.8	0.363	1.87	0.363	1.87	0.307		0.35	2.3
	23	12.5	22	60	7×11×9	3000 (2020)	27.6	36.4	0.324	1.8	0.324	1.8	0.366		0.54	3.3
	23	12.5	22	60	7×11×9	3000 (2020)	35.2	51.6	0.627	3.04	0.627	3.04	0.518		0.67	3.3
	28	16	26	80	9×14×12	3000 (2520)	40.5	53.7	0.599	3.1	0.599	3.1	0.652		0.9	4.8
	28	16	26	80	9×14×12	3000 (2520)	48.9	70.2	0.995	4.89	0.995	4.89	0.852		1.1	4.8
	34	18	29	80	9×14×12	3000 (2520)	53.9	70.2	0.895	4.51	0.895	4.51	1.05		1.5	6.6
	34	18	29	80	9×14×12	3000 (2520)	65	91.7	1.49	7.13	1.49	7.13	1.37		2	6.6
	45	20.5	38	105	14×20×17	3090	82.2 100	101 135	1.5 2.59	8.37 13.4	1.5 2.59	8.37 13.4	1.94 2.6		2.6 3.1	11
	53	23.5	44	120	16×23×20	3060	121 148	146 194	2.6 4.46	14.1 22.7	2.6 4.46	14.1 22.7	3.43 5.4		4.3 5.4	15.1
	63	31.5	53	150	18×26×22	3000	195 249	228 323	5.08 9.81	25 45.6	5.08 9.81	25 45.6	6.2 8.79		7.3 9.7	22.5 22.5
	85	35.5	65	180	24×35×28	3000	304 367	355 464	10.2 16.9	51.2 81	10.2 16.9	51.2 81	12.8 16.7		13 16	35.2

[1] Length L shown in the table is the length with the contamination protection accessories, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, the total block length will increase. (See **A1-555** or **A1-578**)

[2] D_0 are the pilot holes for when a grease nipple is desired for a product with LaCS or a QZ Lubricator.
Pilot holes are not drilled through for models other than those stated above.
For grease nipple mount machining, contact THK.

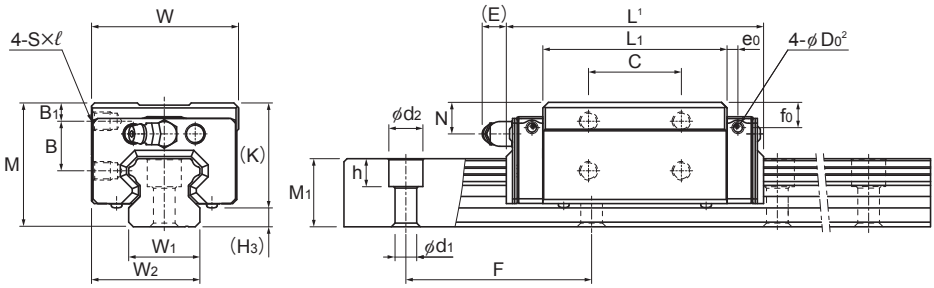
[3] The maximum length indicates the standard maximum length of an LM rail. (See **A1-210**.)

[4] Static permissible moment 1 block: the static permissible moment with one LM block
2 blocks: the static permissible moment with two LM blocks in close contact with each other

Notes: The M in the model number symbol indicates that the LM block, LM rail and balls are made of stainless steel.
The stainless steel provides excellent corrosion and environmental resistance.

Options⇒A1-541

Models HSR-YR, HSR-YRM, and HSR-XYR



Models HSR15 to 35YR/YRM

Model No.	Outer dimensions			LM block dimensions								Grease nipple	Pilot hole for side nipple			
	Height	Width	Length[1]													
	M	W	L	B_1	B	C	S×ℓ	L_1	K	N	E		e_0	f_0	D_0^2	H_3
HSR 15YR HSR 15YRM	28	33.5	56.6	4.3	11.5	18	M4×5	38.8	23.3	8.3	5.5	PB1021B	3.2	7.9	3	4.7
HSR 20YR HSR 20YRM	30	43.5	74	4	11.5	25	M5×6	50.8	26	5	12	B-M6F	3.1	3.4	3	4
HSR 25YR HSR 25YRM	40	47.5	83.1	6	16	30	M6×6	59.5	34.5	10	12	B-M6F	3.5	8	3	5.5
HSR 30YR HSR 30YRM	45	59.5	98	8	16	40	M6×9	70.4	38	10	12	B-M6F	5.2	9.2	5.2	7
HSR 35YR HSR 35YRM	55	69.5	109.4	8	23	43	M8×10	80.4	47.5	15	12	B-M6F	5.5	12.6	5.2	7.5
HSR 45XYR	70	85.5	138.9	10	30	55	M10×12	98	60	20	16	B-PT1/8	6.1	16.6	5.2	10
HSR 45YR	70	85.5	138.9	10	30	55	M10×14	98	60	20	16	B-PT1/8	—	—	—	10
HSR 55XYR	80	99.5	162.9	12	32	70	M12×13	118	67	21	16	B-PT1/8	5.6	17.7	5.2	13
HSR 55YR	80	99.5	162.9	12	32	70	M12×15	118	67	21	16	B-PT1/8	—	—	—	13
HSR 65XYR	90	124.5	190.5	12	35	85	M16×18	138.5	76	19	16	B-PT1/8	6.8	14.6	5.2	14

Model number coding

HSR25 YR 2 UU C0 M +1240L P T M -II

- HSR25: Model number
- YR: Type of LM block
- 2: No. of LM blocks used on the same rail
- UU: Contamination protection accessory symbol
- C0: Radial clearance symbol — Normal (No symbol), Light preload (C1), Medium preload (C0)
- M: Stainless steel LM block
- +1240L: LM rail length (in mm)
- P: Accuracy symbol — Normal grade (No Symbol)/High Accuracy grade (H), Precision grade (P)/Super Precision grade (SP), Ultra Precision grade (UP)
- T: Symbol for LM rail jointed use
- M: Stainless steel LM rail
- -II: Symbol for No. of rails used on the same plane

Notes: This model number indicates that a single-rail unit constitutes one set (i.e., required number of sets when 2 rails are used in parallel is 2 at a minimum).
Grease nipples are not installed when there is a QZ Lubricator. Contact THK if you want to use a grease nipple for a model with a QZ.
See **A1-584** for contamination protection accessories. See **A1-76** for radial clearance symbol. See **A1-81** for accuracy symbol. See **A1-13** for symbol for number of rails used on the same plane.

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