YOSO
LINEAR MOTION

LINEAR GUIDE

CONTENT — *YOSO MOTION*

linear guide rail

■ Introduction to Linear Guides

1-1-1 High Accuracy

LinearGuide has littlefriction,onlya small driving force is needed tomovethe load.Low frictionhelps thetemperature rising effect tostay low.Thus,the friction is decreased and theaccuracy canbe maintained fora long period thantradition slidesystem.

1-1-2 High Rigidity

The designofLinearGuide features anequal load rating inall directions that provide sufficientngidity load in all directions,self-aligning capability to absorbinstallation-error.Moreove,asuffidentpreload canbe achievedto increase rigidity and makesit suitable for any kindof installation.

1-1-3 Easy for Maintenance

Compared with high-skll required scrapping process of traditional slide system,the Linear Guidecan offer high precision even if the mountingsurface is machined by milling or grinding.Moreover,the interchangeability of Linear Guide gives a conveniencefor installation and future maintenance.

1-1-4 HighSpeed

LinearGuide block,rail and ball apply by contact pointof rolling system.Due to the characteristicoflowfriction,the required driving force is much lower than that in other systems,thusthe powerconsumption is low.Moreover the temperature rising effect is lower even under high speedoperation.

1-1-5 Super mute

The linear slider moves rapidly,the friction coefficient is verysmall and the noise is very low.It is widelyusedinsemi conductor and medical industries.

1-2 Recognizing of Master Rail

Linear rails to be applied on the same plane are all marked with the same serial number,and "M"is marked at the end of serial numberfor indicating the master rail,shown as the figure below.Thereference side of carriage is the surface where is ground to a specified accuracy.For normal grade

(N),it has no mark "M"on rail which means any one of rails with same serial numbercould be themaster rail.

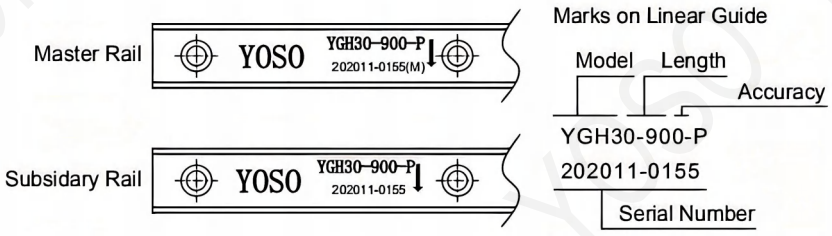


Fig 1.02 Recognizing of MasterRail

Combined Use of Rail andCarriage

For combined use,the rail and carriage must have the same serial number.When reinstalling thecarriage back to the rail,make sure they have the same serial number and the reference side ofcarriage should be in accordance with that of rail.

■ Installation of Linear Guide

1-3 For Butt-joint Rail

Accuracy may deviate at joints when carriages pass the joint simultaneously.Therefore,the jointsshould be interlaced for avoiding such accuracy problem.

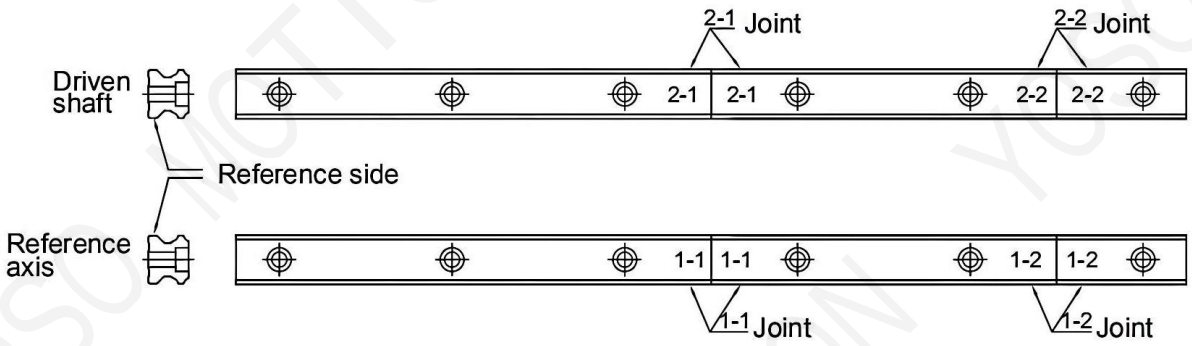


Fig 1.03 Butt-joint

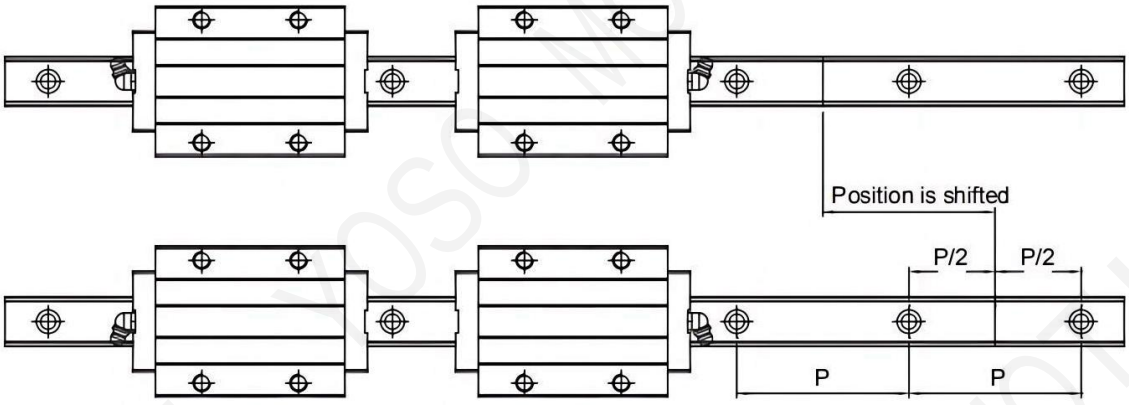


Fig 1.04

YG Series Heavy Load Ball Type

■ YG Series- Heavy Load Ball Type Linear Guideway

YG series linear guideways are designed with load capacity and rigidity higher than other similar products withcir-cular-arc groove and structure optimization. It features equal load ratings in the radial, reverse radial and lateraldirec-tions, and self-aligning to absorb installation-error. Thus, YOSO YG series linear guideways can achieve a longlife with high speed, high accuracy and smooth linear motion.

2-1-1 Featuresof YG Series

(1) Self-aligningcapability

By design,the circular-arc groove has contact points at 45 degrees.YGseriescan absorb most installation errors due to surface irregularities and provide smooth linear motion through the elastic deformation of rolling elements and the shift of contact points.Self-aligning capability,high accuracy and smooth operation can be obtained withaneasy installation.

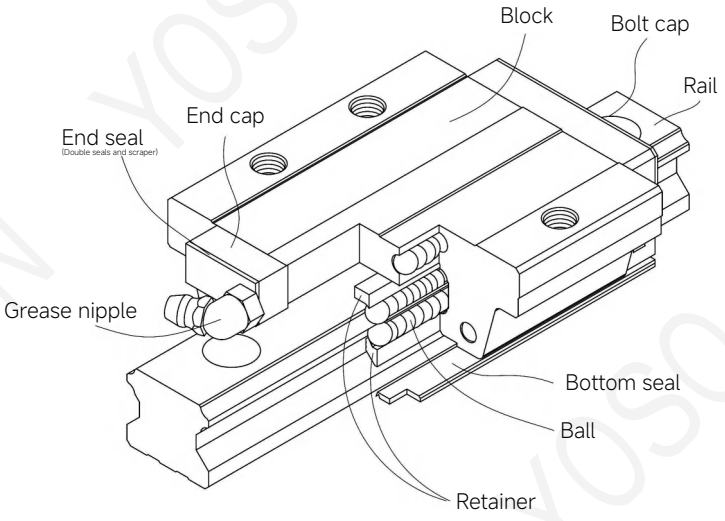
(2) Interchangeability

Because of precision dimensional control,the dimensional tolerance of YG series can be kept in a reasonable range. which means thatany blocks and any rails in a specific series can beused together while maintaining dimension-al tolerance.And aretainer is added to preventthe balls from falling out whenthe blocks are removed from the rail.

(3) High rigidity inall four directions

Because of precision dimensional control,the dimensional tolerance of YG series can be kept in a reasonable range. which means thatany blocks and any rails in a specific series can beused together while maintaining dimension-al tolerance.And aretainer is added to preventthe balls from falling out whenthe blocks are removed from the rail.

2-1-2 Construction of YG Series



- Rolling circulation system: Block, Rail, End Cap and Retainer
- Lubrication system: Grease Nipple and Piping Joint
- Dust protection system: End seal, Bottom Seal, Bolt Cap, Double Seals and Scraper

2-1-3 Model Number of YG Series

YG series quideways can be classified into non-interchangeable and interchangeable types. The sizes are identicalThe only diference between the two types is that the interchangeable type of blocks and rails can be freely exchanged,and their accuracy can reach up to P class. The model number of YG series contains the size, type, accuracy classpreload class, etc.

Y G H 20 L C/R - 2- - 1200 - N - Z0 -II - U + N3 N3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

① Nominal Model	② Block Type	③ Height of Assembly Type	④ Dimension
Y	G:Standard	R:Low-Assembly	15,20,25,30,35,45,55,65
	S:Low-Assembly	L:Middle-Assembly	
		H:High-Assembly	

⑤ Length of Block	⑥ Flange Type	⑦ Number of Block Per Rail	⑧ Accessory Code
N:Normal	C:WithFlange	EX:2	□:Standard (Please refer to page A26)
L:Long	R:Quartet		

⑨ Length of Rai	⑩ Accuracy Grade	⑪ Preload	⑫ Two Sets per Axis	⑬ Rail Special Machining
Unit:mm	N:Norma	ZF:Slight Clearance	II	U:Tapped-Hole Rail
	H:High	Z0:No Preload		E:Rail with Special Machining
	P:Precision	Z1:Light Preload		
	SP:Super-Precision	Z2:Medium Preload		
	UP:Ultra-Precision	Z3:Heavy Preload		

⑭ Block Surface Treatment	⑮ Rail Surface Treatment
S:Standard	S:Standard
B1:Black Oxidation	B1:Black Oxidation
N1:Hard Chrome Plating	N1:Hard Chrome Plating
P:Phosphating	P:Phosphating
N3:Nickel Plating	N3:Nickel Plating
N4:Raydent	N4:Raydent
N5:Chrome Plating	N5:Chrome Plating

No symbol required when plating is not needed

YG Series Heavy Load Ball Type

■ Nominal Model Code for Interchangeable YG Type

Interchangeable Type of Block:

Y G H 20 L C- -N - Z0 + B1

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

①

Nominal Model
Y

②

Block Type
G:Standard
S:Low-Assembly

③

Height of Assembly Type
R:Low-Assembly
L:Middle-Assembly
H:High-Assembly

④

Dimension
15,20,25,30,35,45,55,65

⑤

Length of Block
N:Normal
L:Long

⑥

Flange Type
C:WithFlange
R:Without Flange

⑦

Accessory Code
□:Standard

⑧

Accuracy Grade
N:Norma

⑨

Preload
ZF:Slight Clearance

⑩

Block Surface Treatment
S:Standard
B1:Black Oxidation
N1:Hard Chrome Plating
P:Phosphating
N3:Nickel Plating
N4:Raydent
N5:Chrome Plating

YG H 20 - 4000-N -U+B1

① ② ③ ④ ⑤ ⑥ ⑦

①

Nominal Model
YG

②

Block Type
H:Standard
E:Special

③

Dimension
15,20,25,30,35,45,55,65

④

Length of Rail
Unit:mm
L:Long

⑤

Accuracy Grade
N:Norma

⑥

Rail Special Machining
U:Tapped-Hole Rail
E:Rail with Special Machining

⑦

Block Surface Treatment
S:Standard
B1:Black Oxidation
N1:Hard Chrome Plating
P:Phosphating
N3:Nickel Plating
N4:Raydent
N5:Chrome Plating

YG Series Heavy Load Ball Type

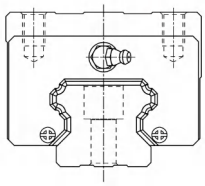
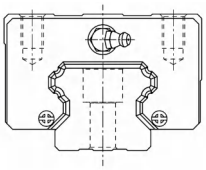
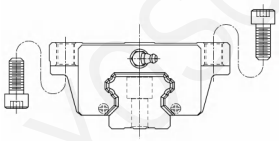
■ YG Series- Heavy Load Ball Type Linear Guideway

2-1-4 Type

(1) Blocktypes

There're two types of blocks:flange and square.The flange type is suitable for heavy moment load application because of the lower assembly height and wider mounting surface

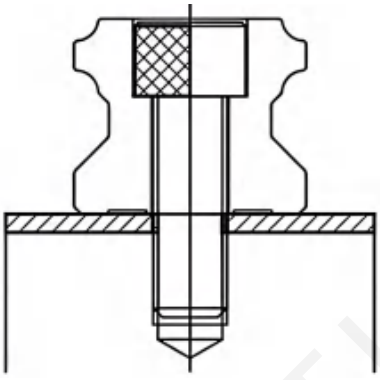
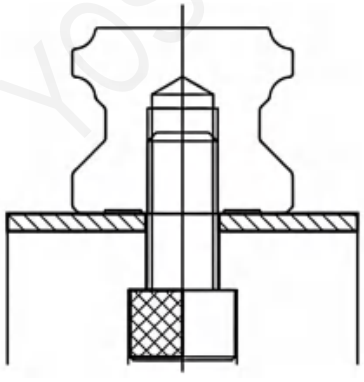
Table 2-1-1 Block Types

Type	Model	Shape	Height	Rail Length	Main Application
Standard	YGH-R YGH-LR	 Mountingfrom Above	28 90	100 6000	●MachineCenters. ●NC Lathes. ●Grinding Machines ●Precision Machining Machines ●Heavy Cutting Machines ●Automation Devices ●Transportation Equipment ●Measuring Equipment ●Devices Requiring HighPosi-tional Accuracy
	YGL-R TGL-SR	 Mountingfrom Above	24 70	100 6000	
Flange	YGH-C YGH-LC	 Mounting froma bove and below	24 90	100 6000	

(2) Rail types

Besides the standard top mounting type, the bottom mounting type is also available.

Table 2-1-2 RailTypes

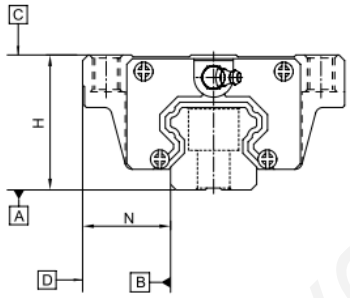
 Mounting from Above	 Munting from Below

YG Series Heavy Load Ball Type

■ YG Series- Heavy Load Ball Type Linear Guideway

2-1-5 Accuracy Classes

The accuracy of YG series can be classified intonormal lC], high lH), precision lP), super precision SP),ultra precision {UP], five classes. Please choose theclass by referring the accuracy of applied equipment.



(1) Accuracy of non-interchangeable guideways

Table 2-1-3 Accuracy Standards

Item	YG-15,20				
Accuracy Classes	Normal [C]	High (H)	Precision [P]	Super Precision [SP]	Ultra Precision [UP]
Dimensional tolerance of height H	±0.1	±0.03	0 -0.03	0 -0.015	0 -0.008
Dimensional tolerance of width N	±0.1	±0.03	0 -0.03	0 -0.015	0 -0.008
Variation of height H	0.02	0.01	0.006	0.004	0.003
Variation of width N	0.02	0.01	0.006	0.004	0.003
Running parallelism of block surface C to surface A	See Table 2-1-11				
Running parallelism of block surface D to surface B	See Table 2-1-11				

Table 2-1-4 Accuracy Standards

Item	YG-25,30,35				
Accuracy Classes	Normal [C]	High (H)	Precision [P]	Super Precision [SP]	Ultra Precision [UP]
Dimensional tolerance of height H	±0.1	±0.04	0 -0.04	0 -0.02	0 -0.01
Dimensional tolerance of width N	±0.1	±0.04	0 -0.04	0 -0.02	0 -0.01
Variation of height H	0.02	0.015	0.007	0.005	0.003
Variation of width N	0.03	0.015	0.007	0.005	0.003
Running parallelism of block surface C to surface A	See Table 2-1-11				
Running parallelism of block surface D to surface B	See Table 2-1-11				

YG Series Heavy Load Ball Type

Table 2-1-5 Accuracy Standards

Item	YG-45,55				
Accuracy Classes	Normal [C]	High (H)	Precision [P]	Super Precision [SP]	Ultra Precision [UP]
Dimensional tolerance of height H	±0.1	±0.05	0 -0.05	0 -0.03	0 -0.02
Dimensional tolerance of width N	±0.1	±0.05	0 -0.05	0 -0.03	0 -0.02
Variation of height H	0.03	0.015	0.007	0.005	0.003
Variation of width N	0.03	0.02	0.01	0.007	0.005
Running parallelism of block surface C to surface A	See Table 2-1-11				
Running parallelism of block surface D to surface B	See Table 2-1-11				

Table 2-1-6 Accuracy Standards

Item	YG-65				
Accuracy Classes	Normal [C]	High (H)	Precision [P]	Super Precision [SP]	Ultra Precision [UP]
Dimensional tolerance of height H	±0.1	±0.07	0 -0.07	0 -0.05	0 -0.03
Dimensional tolerance of width N	±0.1	±0.07	0 -0.07	0 -0.05	0 -0.03
Variation of height H	0.03	0.02	0.01	0.007	0.005
Variation of width N	0.03	0.025	0.015	0.01	0.007
Running parallelism of block surface C to surface A	See Table 2-1-11				
Running parallelism of block surface D to surface B	See Table 2-1-11				

(2) Accuracy of interchangeable guideways

Table 2-1-7 Accuracy Standards

Item	YG-15,20		
Accuracy Classes	Normal [C]	High (H)	Precision [P]
Dimensional tolerance of height H	±0.1	±0.03	±0.015
Dimensional tolerance of width N	±0.1	±0.03	±0.015
Variation of height H	0.02	0.01	0.006
Variation of width N	0.02	0.01	0.006
Running parallelism of block surface C to surface A	See Table 2-1-11		
Running parallelism of block surface D to surface B	See Table 2-1-11		

YG Series Heavy Load Ball Type

Table 2-1-8 Accuracy Standards

Item	YG-25,30,35		
Accuracy Classes	Normal [C]	High (H)	Precision [P]
Dimensional tolerance of height H	±0.1	±0.04	±0.02
Dimensional tolerance of width N	±0.1	±0.04	±0.02
Variation of height H	0.02	0.015	0.007
Variation of width N	0.03	0.015	0.007
Running parallelism of block surface C to surface A	See Table 2-1-11		
Running parallelism of block surface D to surface B	See Table 2-1-11		

Table 2-1-9 Accuracy Standards

Item	YG-45,55		
Accuracy Classes	Normal [C]	High (H)	Precision [P]
Dimensional tolerance of height H	±0.1	±0.05	±0.025
Dimensional tolerance of width N	±0.1	±0.05	±0.025
Variation of height H	0.02	0.015	0.007
Variation of width N	0.03	0.02	0.007
Running parallelism of block surface C to surface A	See Table 2-1-11		
Running parallelism of block surface D to surface B	See Table 2-1-11		

Table 2-1-10 Accuracy Standards

Item	YG-65		
Accuracy Classes	Normal [C]	High (H)	Precision [P]
Dimensional tolerance of height H	±0.1	±0.07	±0.035
Dimensional tolerance of width N	±0.1	±0.07	±0.035
Variation of height H	0.03	0.02	0.01
Variation of width N	0.03	0.025	0.015
Running parallelism of block surface C to surface A	See Table 2-1-11		
Running parallelism of block surface D to surface B	See Table 2-1-11		

YG Series Heavy Load Ball Type

(2) Accuracy of interchangeable guideways

Table 2-1-11 Accuracy Standards

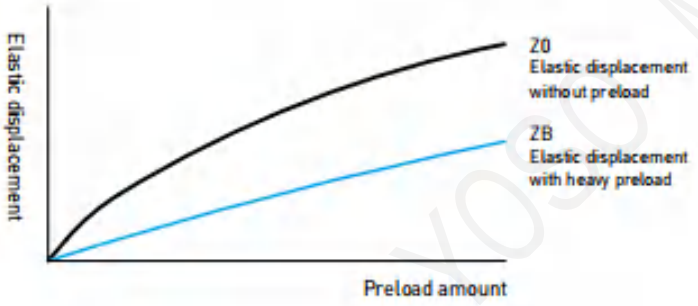
Rail Length (mm)	Accuracy(μm)				
	C	H	P	SP	UP
~100	12	7	3	2	2
100~200	14	9	4	2	2
200~300	15	10	5	3	2
300~500	17	12	6	3	2
500~700	20	13	7	4	2
700~900	22	15	8	5	3
900~1100	24	16	9	6	3
1100~1500	26	18	11	7	4
1500~1900	28	20	13	8	4
1900~2500	31	22	15	10	5
2500~3100	33	25	18	11	6
3100~3600	36	27	20	14	7
3600~4000	37	28	21	15	7

YG Series Heavy Load Ball Type

2-1-6 Preload

(1) Definition

Each guide rail can be preloaded and oversized balls are used. Generally, linear guides leave a negative gap between the groove and the ball to increase rigidity and maintain high precision. The figure shows that when the load is multiplied by the preload, the rigidity is doubled and the deflection is reduced by half. It is recommended that the preload of models below YG20 should not be greater than ZA to avoid excessive preload affecting the life of the guide rail.



(2) Preload classes

YOSO offers three classes of standardpreload for various applications and conditions.

Table 2-1-13 Preload classes

Class	Code	Preload	Condition	Condition
Light Preload	Z0	0~0.02C	Certain load direction,low impact, low precision required	Transportation devices,auto-packing machines,X-Y axis for general industrial machines,welding machines, welders
Medium Preload	ZA	0.05C~0.07C	High precision required	Machining centers,Z axis for general industrial, machines,EDM,NC lathes,Precision X-Y tables, measuring equipment
Heavy Preload	ZB	0.10C~0.12C	High rigidity required,with vibration andimpact	Machining centers,grinding machines,NC lathes, horizontal and vertical milling machines,Z axis of machine tools,Heavy cutting machines

Class	Interchangeable Guideway	Non-Interchangeable Guideway
Preload classes	Z0,ZA	Z0,ZA,ZB

Note:The"C"in the preload column denotes basic dynamic loadrating.

(3) Stiffness performance

Stiffness depends on preload.The following table shows stiffnessvalue of each size.

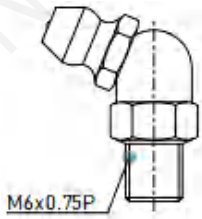
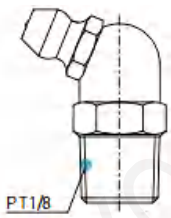
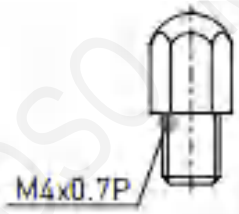
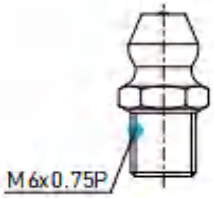
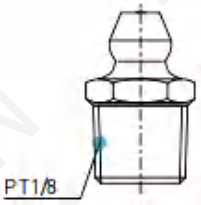
Table2-1-13 Radial stiffness for YG Series

Load type	Series/Size	Stiffness (N/μm)		
		Z0	ZA	ZB
Heavy load	HG 15C	196	365	483
	HG 20C	232	460	678
	HG 25C	292	539	705
	HG 30C	354	618	823
	HG 35C	395	642	865
	HG 45C	505	738	980
	HG 55C	609	828	1092
	HG 65C	716	918	1201
Super heavy load	HG 20H	300	611	824
	HG 25H	378	715	935
	HG 30H	453	820	1093
	HG 35H	509	855	1150
	HG 45H	649	970	1298
	HG 55H	789	1085	1445
	HG 65H	946	1221	1599

YG Series Heavy Load Ball Type

2-1-7 Lubrication

(1) Grease

● Grease nipple	 YG20 YG25 YG30 YG35 No.34320001	 YG45 YG55 YG65 No.34320003
 YG15 No.34310002	 YG20 YG25 YG30 YG35 No.34310003(OPTION)	 YG45 YG55 YG65 No.3431000B(OPTION)

● Mounting location

The standard location for the grease fittings is at either end of the cylinder body, but the fittings can be mounted on either side of the cylinder body. For side mounting, please contact YOSO to pre-drill holes in the desired location.

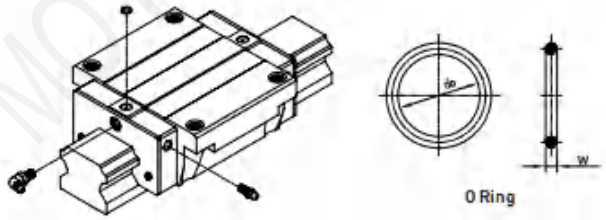
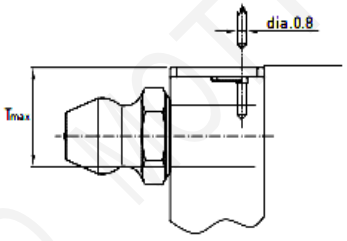


Table 2-1-14 0-Ring size and max, permissible depth for piercing

Size	0-Ring		Lube hole at top:max. permissible depth for piercing
	do (mm)	W(mm)	T_{max} (mm)
YG15	2.5±0.15	1.5±0.15	3.75
YG20	4.5±0.15	1.5±0.15	5.7
YG25	4.5±0.15	1.5±0.15	5.8
YG30	4.5±0.15	1.5±0.15	6.3
YG35	4.5±0.15	1.5±0.15	8.8
YG45	4.5±0.15	1.5±0.15	8.2
YG55	4.5±0.15	1.5±0.15	11.8
YG65	4.5±0.15	1.5±0.15	10.8



● The lubricant amount for a block filled with grease

Table 2-1-15 Thelubricant Amount for a Block Filled with Grease

Size	Heavy load [cm^3]	Super heavy load [cm^3]	Size	Heavy load [cm^3]	Super heavy load [cm^3]
YG15	1	-	YG35	10	12
YG20	2	3	YG45	17	21
YG25	5	6	YG55	26	33
YG30	7	8	YG65	50	61

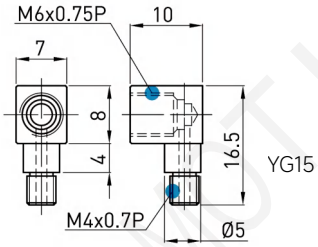
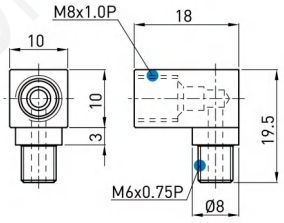
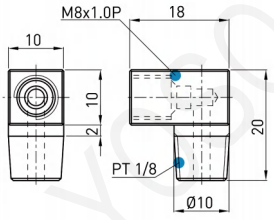
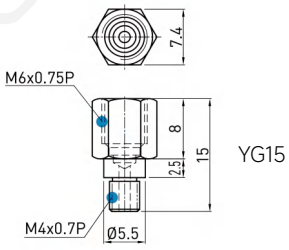
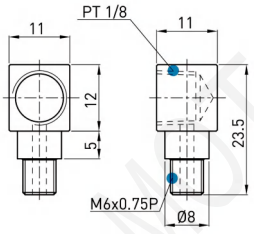
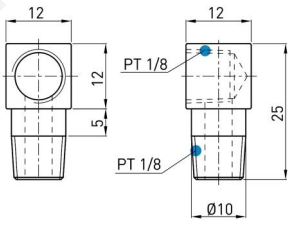
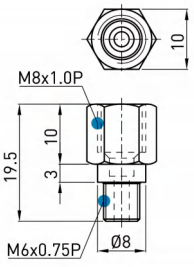
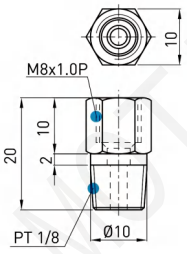
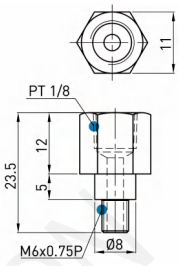
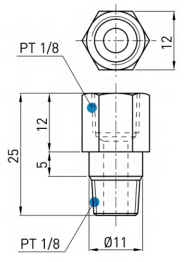
● Frequency of replenishment

Check the grease every 100 km, or every 3-6 months.

YG Series Heavy Load Ball Type

(2) Oil

The recommende d viscosity of oil is about 30~150cSt. If customers need to use oil-type lubrication, please inform us.

LF-64  YG15 No.97000EA1	LF-76  YG20 YG25 YG30 YG35 No.970002A1	LF-78  YG45 YG55 YG65 No.970006A1
SF-64  YG15 No.97001TA1	LF-86  YG20 YG25 YG30 YG35 No.970004A1	LF-88  YG45 YG55 YG65 No.970008A1
	SF-76  YG20 YG25 YG30 YG35 No.970001A1	SF-78  YG45 YG55 YG65 No.970005A1
	SF-86  YG20 YG25 YG30 YG35 No.970003A1	SF-88  YG45 YG55 YG65 No.970007A1

YG Series Heavy Load Ball Type

● Oil refilling rate

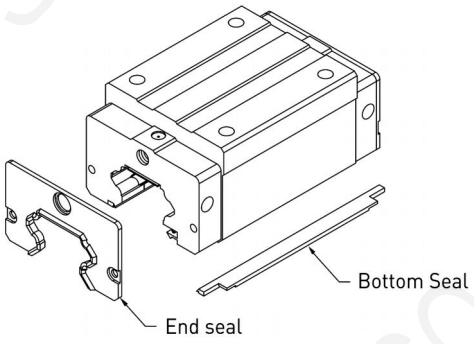
Table 2-1-16

Size	Refilling rate (cm3/hr)	Size	Refilling rate (cm3/hr)
YG15	0.2	YG35	0.3
YG20	0.2	YG45	0.4
YG25	0.3	YG55	0.5
YG30	0.3	YG65	0.6

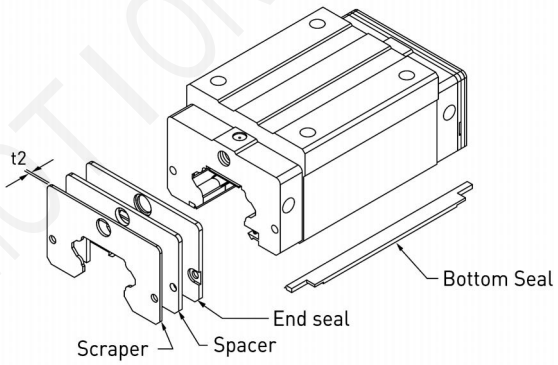
2-1-8 Dust Proof Accessories

(1) Codes of standard dust proof accessories

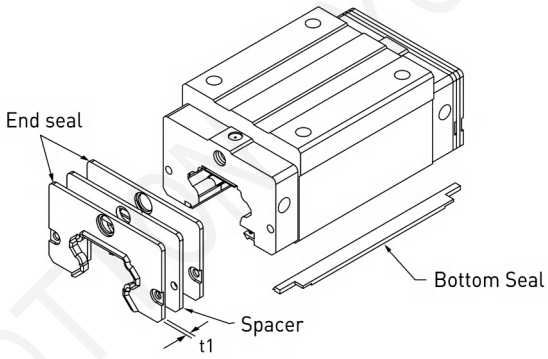
If the following accessores are needed, please add the code followed by the model number.



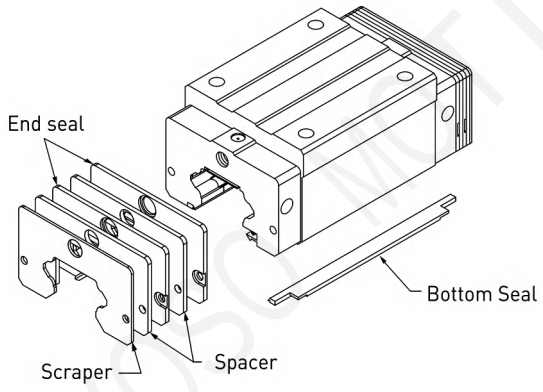
No symbol: Standard Protection (End seal + Bottom Seal)



ZZ(End seal+ Bottom Seal+ Scraper)



DD (Double seals+ Bottom Seal)



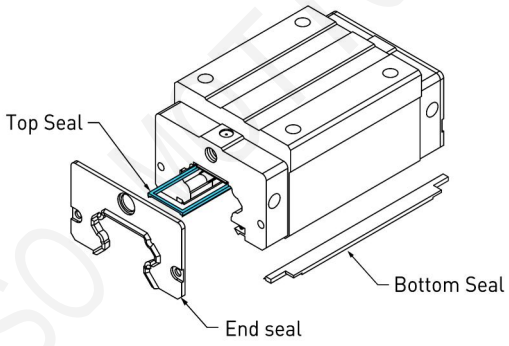
KK (Double seals+ Bottom Seal+Scraper)

Note: YG20/25/65 are without spacer.

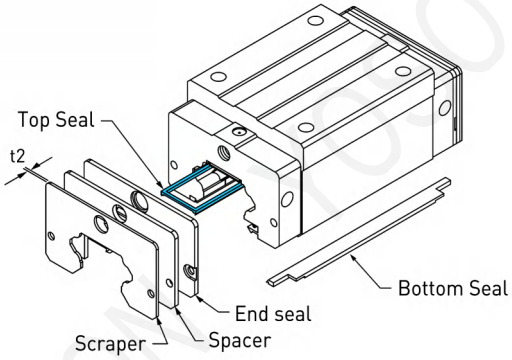
YG Series Heavy Load Ball Type

(2) Codes ofhigh-dust proof accessories

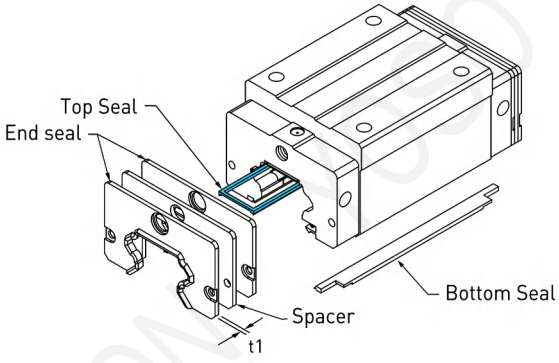
YOSO has developed a variety of dust protection accessories for different applications and working environments to avoid dust or debris. If you need the following accessories, please add the code after the model number.



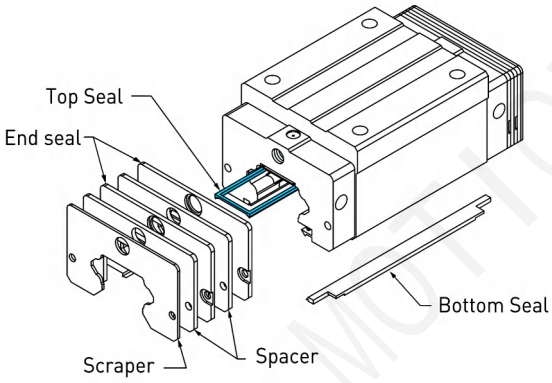
SH {End Seal (High-Dust Proof)+
Bottom Seal (High Dust Proof) + Top Seal}



ZH {End Seal(High-Dust Proof)+
Bottom Seal (High Dust Proof)+ Top Seal+ Spacer}



DH {Double End Seal(High Dust Proof)
+Bottom Seal (High Dust Proof) + Top Seal}

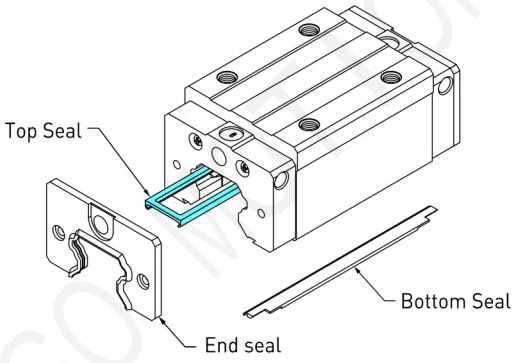


KH {Double End Seal (High Dust Proof)
+ Bottom Seal(High Dust Proof) +Top Seal+Scraper}

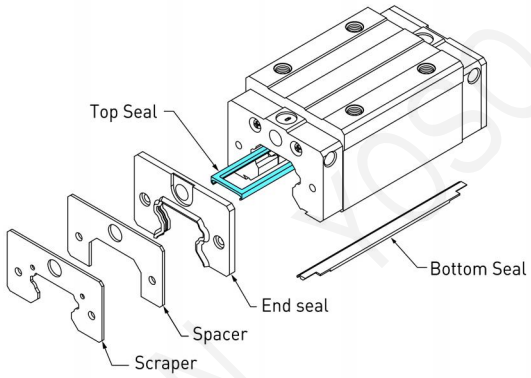
Note:
1. The available size for high dust proof accessories are HG20lC/H), 251C/H), 301C/H), 351C/H) and 45C
2. The value of fricton force will increase 0.6-1.2 kgf.
3.YG20/25 are without spacer.
4. If higher dust proof accessories is needed , please contact YOSO.

(3) Codes of ultra-high dust proof accessories

YOSO has developed high dust-resistant accessories for use in environments filled with dust and particles, such as wood-working machinery and glass/stone processing equipment. These accessories have high dust resistance. If you need an accessory, please add the code after the model number.



SW (End SeallUltra-high dustproof)
+Bottom Seal(Ultra-high dustproof) +Top Seal)



ZW (End SealUltra-high dustproof)
+Bottom Seal(Ultra-high dustproof) +Top Seal+Scraper)

Note:
1.The available size for high dust proof accessories are YG15C,HG20(C/H),YG25(C/H),YG30(C/H),YG35(C/H),YG45(C/H)
2.The value of fricton force will increase 1.5~4.0kgf.
3.MGN5 is only supplied with End Seal[Ultra-high dustproof]

(4) Fuction of dust proofaccessories

- End seal and bottomseal

  To prevent life reduction caused by ironchips or dust entering the block.

- Double seals

  Enhances thewiping effect,foreign matter can be completely wiped off.

Table 2-1-17 Dimensions of end seal

Size	Thickness (t1) (mm)	Size	Thickness (t1) (mm)
YG15 ES	3	YG35 ES	3.2
YG20 ES	3.5	YG45 ES	4.5
YG25 ES	3.5	YG55 ES	4.5
YG30 ES	3.2	YG65 ES	6

- Scraper

  The scraper removes high-temperature iron chips and larger foreign objects.

Table 2-1-18 Dimensions of scraper

Size	Thickness (t2) (mm)	Size	Thickness (t2) (mm)
YG15 SC	1.5	YG35 SC	1.5
YG20 SC	1.5	YG45 SC	1.5
YG25 SC	1.5	YG55 SC	1.5
YG30 SC	1.5	YG65 SC	1.5

- Top Seal

  Top seal can efficiently avoid dust from the surface of rail or tapping hole getting inside the block.

YG Series Heavy Load Ball Type

● Bolt caps for rail mounting holes

Caps are used to cover the mounting holes to prevent chips or other foreign objects from collecting in the holes.The caps will be enclosed in each rail package.

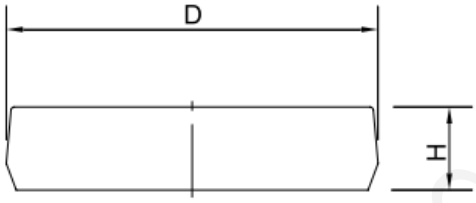


Table 2-1-19 Dimensions of Bolt Caps for Rail Mounting Holes

Rail size	Bolt size	Diameter(D) (mm)	Thickness(H) (mm)	Rail size	Bolt size	Diameter(D) (mm)	Thickness(H) (mm)
YGR15	M4	7.65	1.1	YGR35	M8	14.20	3.5
YGR20	M5	9.65	2.5	YGR45	M12	20.25	4.5
YGR25	M6	11.15	2.5	YGR55	M14	23.25	5.0
YGR30	M8	14.20	3.5	YGR65	M16	26.35	5.0

(5) Dimensions ofblockequipped with the parts

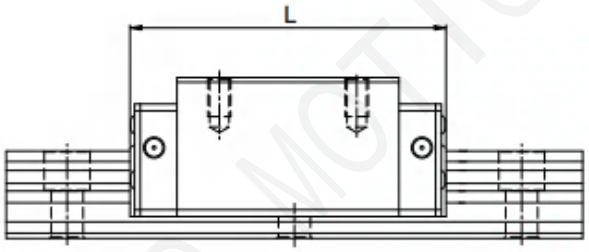


Table 2-1-20 Overall block length

Size	Overall block length(L)					
	SS/SH	ZZ/ZH	DD/DH	KK/KH	SW	ZW
YG15C	61.4[61.8]	69.0(69.0)	68.0(68.4)	75.6(75.6)	63.2(63.2)	71.0(71.0)
*YG20C	77.5(79.3)	82.5(84.5)	82.5(84.3)	87.5(89.5)	78.5(78.5)	86.3(87.7)
*YG20H	92.2 (94.0)	97.2(99.2)	97.5(99.0)	102.2(104.2)	93.2(93.2)	101.0(102.4)
*YG25C	84.0(85.0)	89.0(91.0)	89.0(90.0)	94.0(96.0)	85.0(85.0)	92.8(94.8)
*YG25H	104.6(105.6)	109.6(111.6)	109.6(110.6)	114.6(116.6)	105.6(105.6)	113.4(115.4)
*YG30C	97.4(99.4)	105.4(107.4)	104.8(106.8)	112.8(114.8)	99.0(100.4)	107.2(109.2)
*YG30H	120.4(122.4)	128.4(130.4)	127.8(129.8)	135.8(137.8)	122.0(123.4)	130.2(132.2)
*YG35C	112.4(114.4)	120.4(122.4)	119.8(121.8)	127.8(129.8)	115.2(116.0)	123.4(125.4)
*YG35H	138.2(140.2)	146.2(148.2)	145.6(147.6)	153.6(155.6)	141.0(141.8)	149.2(151.2)
*YG45C	139.4(139.4)	150.0(150.0)	149.4(149.4)	160.0(160.0)	140.0(140.0)	148.8(150.2)
YG45H	171.2(171.2)	181.8(181.8)	181.2(181.2)	191.8(191.8)	171.8(171.8)	180.6(182.0)
YG55C	166.7(166.7)	177.1(177.1)	177.1(177.1)	187.5(187.5)	-	-
YG55H	204.8(204.8)	215.2(215.2)	215.2(215.2)	225.6(225.6)	-	-
YG65C	200.2(200.2)	208.2(208.2)	209.2(209.2)	217.2(217.2)	-	-
YG65H	259.6(259.6)	267.6(267.6)	268.6(268.6)	276.6(276.6)	-	-

Note:
1.For the marking of"*",it means this specification is available for SH/ZH/DH/KH dust proof accessories.
2.The marking of "T "denotes the maximum block length with screws,lips of end seals,etc

2-1-9 Friction

The maximum value of resistance per end seal are as shown in the table.

Table 2-1-21 Seal Resistance

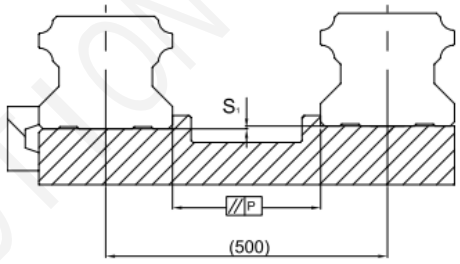
Bolt size	Resistance N (kgf)	Bolt size	Resistance N (kgf)
YG15	2.35(0.24)	YG35	4.91(0.5)
YG20	2.75(0.28)	YG45	3.83(0.39)
YG25	3.14(0.32)	YG55	4.61 (0.47)
YG30	3.53(0.36)	YG65	5.79(0.59)

Note:
1. 1kgf=9.81N
2. Please inform HIWIN if low friction request is required.

2-1-10 The Accuracy Tolerance of Mounting Surface

(1) The accuracy tolerance ofrail-mounting surface

Because of the circular-arc contact design, the HG linear guidewaycan compensate for some surface-error on installation and stillmaintain smooth linear motion.As long as the accuracy requirements for the mounting surfaceare followed, high accuracy and rigidity of linear motion of theguideway can be obtained without any difficulty. For fast installationand smooth movement ability of the deviation in mounting surfaceaccuracy.



(2) The parallelism tolerance of reference surface (P)

Table 2-1-22 Max. Parallelism Tolerance (P)

Size	Preload classes		
	Z0	ZA	ZB
YG15	25	18	13
YG20	25	20	18
YG25	30	22	20
YG30	40	30	27
YG35	50	35	30
YG45	60	40	35
YG55	70	50	45
YG65	80	60	55

(3) The accuracy tolerance ofreference surface height

Table 2-1-23 Max.Tolerance ofReference Surface Height (s_1)

Size	Preload classes		
	Z0	ZA	ZB
YG15	130	85	35
YG20	130	85	50
YG25	130	85	70
YG30	170	110	90
YG35	210	150	120
YG45	250	170	140
YG55	300	210	170
YG65	350	250	200

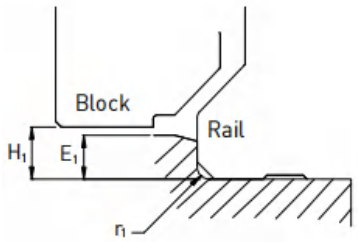
Note :Permissible value is proportional to the axial distance

YG Series Heavy Load Ball Type

2-1-11 Cautions for Installation

(1) Shoulder heights and fillets

Improper shoulder height and radii on the mounting surface can cause accuracy deviations and interference with the rail or slide. Installation inaccuracies can be eliminated by following the recommended shoulder height and radii.



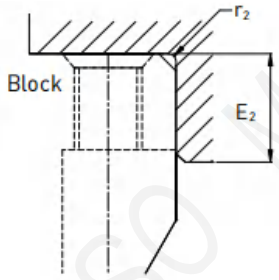


Table 2-1-24 Shoulder Heights and Fillets

Size	Max.radius of fillets	Max.radius of fillets	Shoulder height beside the rail	Shoulder height beside the rail	Clearance under block
	r_1 (mm)	r_2 (mm)	E_1 (mm)	E_2 (mm)	H_1 (mm)
YG15	0.5	0.5	3	4	4.3
YG20	0.5	0.5	3.5	5	4.6
YG25	1.0	1	5	5	5.5
YG30	1.0	1	5	5	6
YG35	1.0	1	6	6	7.5
YG45	1.0	1	8	8	9.5
YG55	1.5	1.5	10	10	13
YG65	1.5	1.5	10	10	15

(2)Tightening Torque of Bolts for Installation

Improper tightening of boltswill seriously influence the accuracy of Linear Guideway installation.The following tightening torques for diferent sizes of bolts are recommended.

Table 2-1-25 Mounting Torque

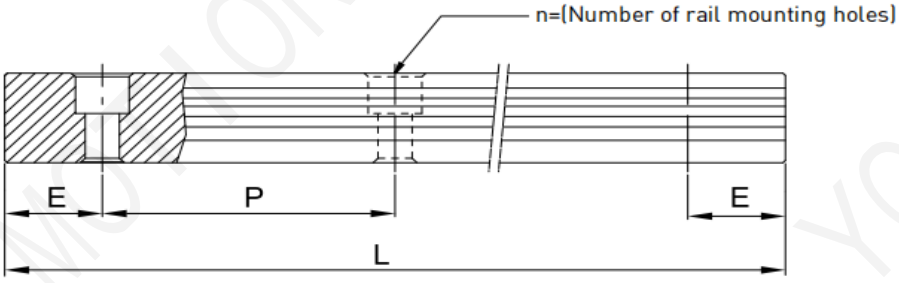
Size	Bolt size	Torque N-cm (kgf-cm)		
		Iron	Casting	Aluminum
YG15	M4×0.7P×16L	392(40)	274(28)	206(21)
YG20	M5×0.8P×16L	883(90)	588(60)	441(45)
YG25	M6×1P×20L	1373(140)	921(94)	686(70)
YG30	M8×1.25P×25L	3041(310)	2010(205)	1470(150)
YG35	M8×1.25P×25L	3041(310)	2010(205)	1470(150)
YG45	M12×1.75P×35L	11772(1200)	7840(800)	5880(600)
YG55	M14×2P×45L	15696(1600)	10500(1100)	7840(800)
YG65	M16×2P×50L	19620(2000)	13100(1350)	9800(1000)

Note:1 kgf=9.81 N

YG Series Heavy Load Ball Type

2-1-12 Standard and Maximum Lengths of Rail

YOSO offers standard rail lenaths for customer needs, For non-standard E-values, the recommended dimensionshould no greater than 1/2 of the pitch [P) dimension. This will prevent an unstable rail end.



$$L=(n-1)xP+2xE \quad \text{.....Eq.2.1}$$

L:Total length of rail (mm)
n:Number ofmounting holes
P:Distance between any two holes [mm]
E:Distance from the center of the last hole to the edge (mm)

Table 2-1-26 Rail StandardLengthand Max.Length

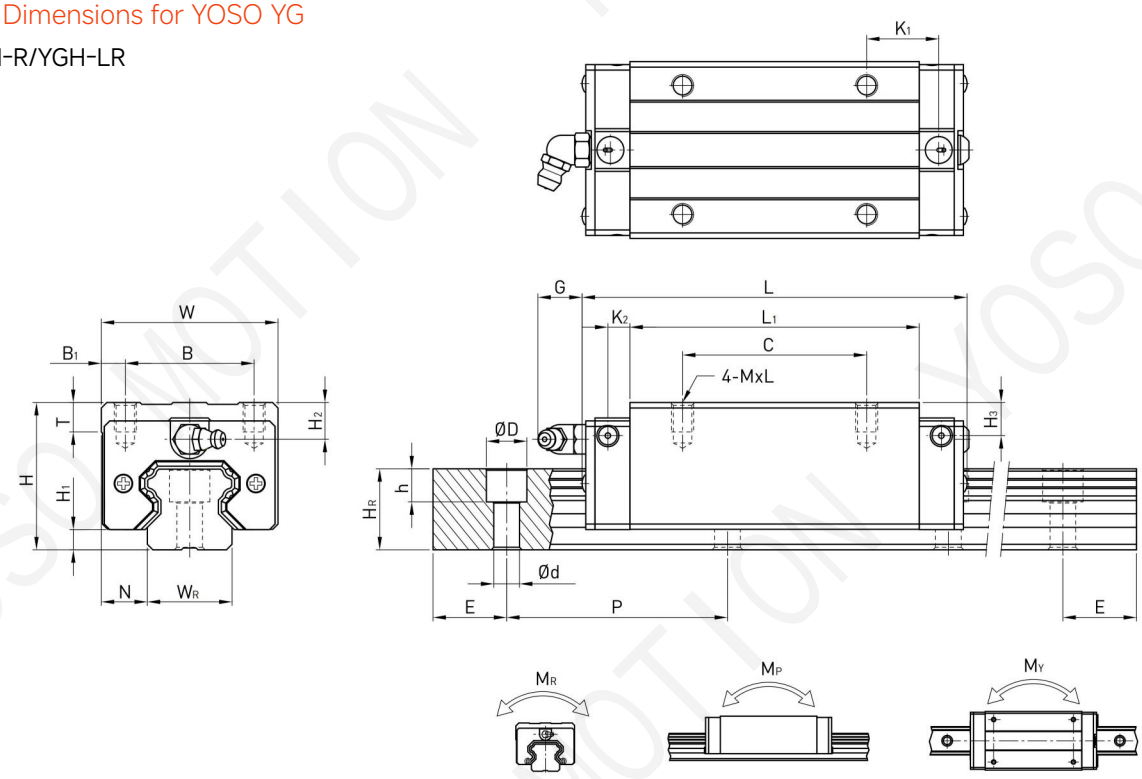
Item	YG15	YG20	YG25	YG30	YG35	YG45	YG55	YG65
Standard Length L(n)	160(3)	220(4)	220(4)	280(4)	280(4)	570(6)	780(7)	1,270(9)
	220(4)	280(5)	280(5)	440(6)	440(6)	885(9)	1,020(9)	1,570(11)
	280(5)	340(6)	340(6)	600(8)	600(8)	1,200(12)	1,260(11)	2,020(14)
	340(6)	460(8)	460(8)	760(10)	760(10)	1,620(16)	1,500(13)	2,620(18)
	460(8)	640(11)	640(11)	1,000(13)	1,000(13)	2,040(20)	1,980(17)	
	640(11)	820(14)	820(14)	1,640(21)	1,640(21)	2,460(24)	2,580(22)	
	820(14)	1,000(17)	1,000(17)	2,040(26)	2,040(26)	2,985(29)	2,940(25)	
		1,240(21)	1,240(21)	2,520(32)	2,520(32)			
			1,600(27)	3,000(38)	3,000(38)			
Pitch(P)	60	60	60	80	80	105	120	150
Distance to End (E,)	20	20	20	20	20	22.5	30	35
Max.Standard Length	4,000(67)	4,000(67)	4,000(67)	3,960(50)	3,960(50)	3,930(38)	3,900(33)	3,970(27)
Max.Length	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000

Note :
1. Tolerance of E value for standard rail is 0.5~-0.5 mm. Tolerance of E value for jointed railis 0~-0.3 mm.
2. M aximum standard length means the max. rail length with standard E value on both sides.
3. If different E value is needed, please contact YOSO.
4.YGR15/YGR20/YGR25 of stainless steelis supplied with the maximum length of 2000mm.

YG Series Heavy Load Ball Type

2-1-13 Dimensions for YOSO YG

(1) YGH-R/YGH-LR

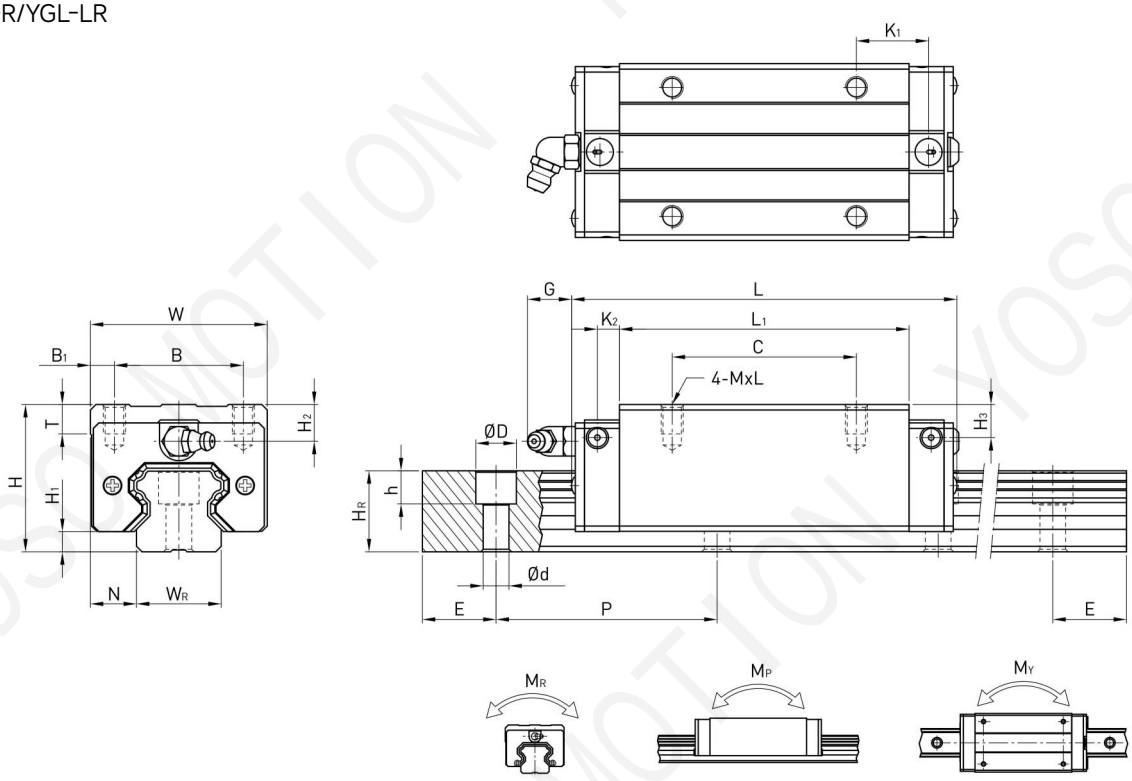


Model No.	Dimensions ofAssembly (mm)			Dimensions of Block (mm)													Dimensions of Rail(mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	H1	N	W	B	B1	C	L1	L	K1	K2	G	MxI	T	H2	H3	W	HR	D	h	d	P	E				MR	Mp	My	Block	Rail
																								(mm)	C(kN)	C0(kN)	kN-m	kN-m	kN-m	kg	kg/m
YGH15R	28	4.3	9.5	34	26	4	26	39.4	61.4	10	4.85	5.3	M4x5	6	7.95	7.7	15	15	7.5	5.3	4.5	60	20	M4x16	14.7	23.47	0.12	0.10	0.10	0.18	1.45
YGH20R	30	4.6	12	44	32	6	36	50.5	77.5	12.25	6	12	M5x6	8	6	6	20	17.5	9.5	8.5	6	60	20	M5x16	27.1	36.68	0.27	0.20	0.20	0.30	2.21
YGH20LR							50	65.2	92.2	12.6															32.7	47.96	0.35	0.35	0.35	0.39	
YGH25R	40	5.5	12.5	48	35	6.5	35	58	84	15.7	6	12	M6x8	8	10	9	23	22	11	9	7	60	20	M6x20	34.9	52.82	0.42	0.33	0.33	0.51	3.21
YGH25LR							50	78.6	104.6	18.5															42.2	69.07	0.56	0.57	0.57	0.69	
YGH30R	45	6	16	60	40	10	40	70	97.4	20.25	6	12	M8x10	8.5	9.5	13.8	28	26	14	12	7	80	20	M8x25	48.5	71.87	0.66	0.53	0.53	0.88	4.47
YGH30LR							60	93	120.4	21.75															58.6	93.99	0.88	0.92	0.92	1.16	
YGH35R	55	7.5	18	70	50	10	50	80	112.4	20.6	7	12	M8x12	10.2	16	19.6	34	29	14	12	9	80	20	M8x25	64.6	93.88	1.16	0.81	0.81	1.45	6.30
YGH35LR							72	105.8	138.2	22.5															77.9	122.77	1.54	1.40	1.40	1.92	
YGH45R	70	9.5	20.5	86	60	13	60	97	139.4	23	10	12.9	M10x17	16	18.5	30.5	45	38	20	17	14	105	22.5	M12x35	103.8	146.71	1.98	1.55	1.55	2.73	10.41
YGH45LR							80	128.8	171.2	28.9															125.3	191.85	2.63	2.68	2.68	3.61	
YGH55R	80	13	23.5	100	75	12.5	75	117.7	166.7	27.35	11	12.9	M12x18	17.5	22	29	53	44	23	20	16	120	30	M14x45	153.2	211.23	3.69	2.64	2.64	4.17	15.08
YGH55LR							95	155.8	204.8	36.4															184.9	276.23	4.88	4.57	4.57	5.49	
YGH65R	90	15	31.5	126		25	70	144.2	200.2	43.1	14	12.9	M16x20	25	15	15	63	53	26	22	18	150	35	M16x50	213.2	287.48	6.65	4.27	4.27	7.00	21.18
YGH65LR							120	203.6	259.6	47.8															277.8	420.17	9.38	7.38	7.38	9.82	

Note : 1 kgf= 9.81 N

YG Series Heavy Load Ball Type

(2) YGL-R/YGL-LR

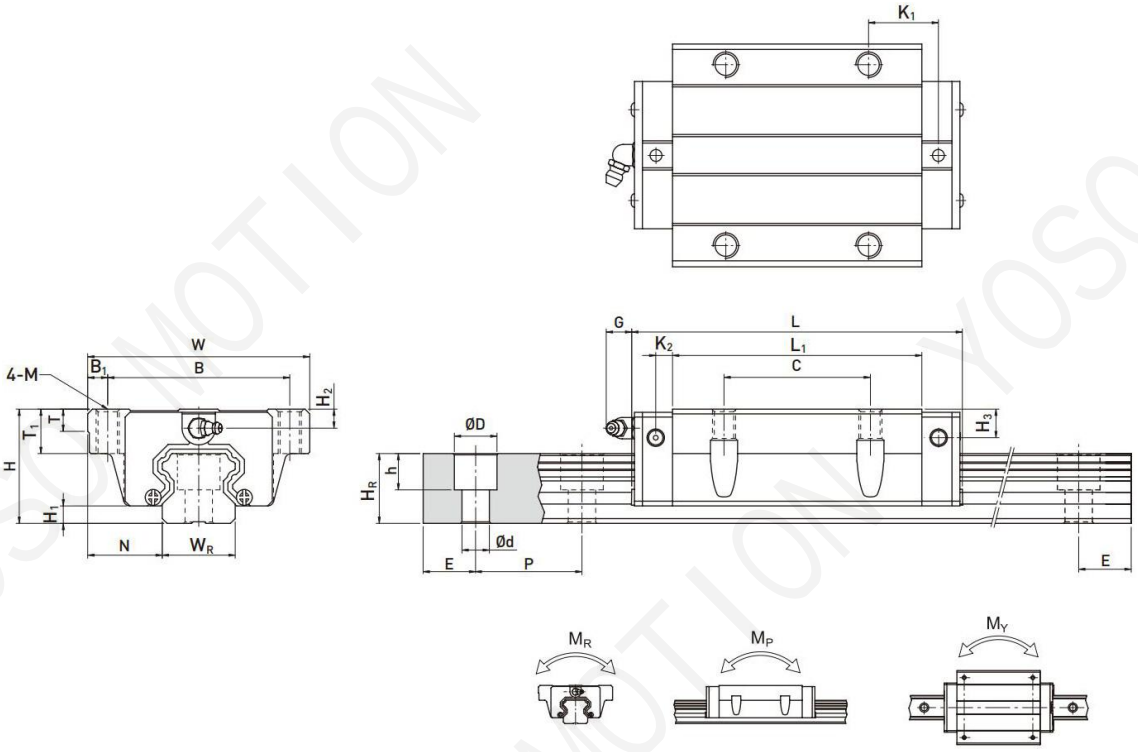


Model No.	Dimensions ofAssembly (mm)			Dimensions of Block (mm)													Dimensions of Rail(mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	H1	N	W	B	B1	C	L1	L	K1	K2	G	MxI	T	H2	H3	W	HR	D	h	d	P	E	(mm)	C(kN)	C0(kN)	MR kN-m	Mp kN-m	My kN-m	Block kg	Rail kg/m
YGL15R	28	4.3	9.5	34	26	4	26	39.4	61.4	10	4.85	5.3	M4x4	6	3.95	3.7	15	15	7.5	5.3	4.5	60	20	M4x16	14.7	23.47	0.12	0.10	0.10	0.14	1.45
YGL25R	36	5.5	12.5	48	6	6.5	35	58	84	15.7	6	12	M6x6	8	6	5	23	22	11	9	7	60	20	M6x20	34.9	52.82	0.42	0.33	0.33	0.42	3.21
YGL25LR							50	78.6	104.6	18.5															42.2	69.07	0.56	0.57	0.57	0.57	
YGL30R	42	6	16	60	40	10	40	70	97.4	20.25	6	12	M8x10	8.5	6.5	10.8	28	26	14	12	9	80	20	M8x25	48.5	71.87	0.66	0.53	0.53	0.78	4.47
YGL30LR							60	93	120.4	21.75															58.6	93.99	0.88	0.92	0.92	1.03	
YGL35R	48	7.5	18	70	50	10	60	80	112.4	20.6	7	12	M8x12	10.2	9	12.6	34	29	14	12	9	80	20	M8x25	64.6	93.88	1.16	0.81	0.81	1.14	6.30
YGL35LR							72	105.8	138.2	22.5															77.9	122.77	1.54	1.40	1.40	1.52	
YGL45R	60	9.5	20.5	86	60	13	60	97	139.4	23	10	12.9	M10x17	16	8.5	20.5	45	38	20	17	14	105	22.5	M12x35	103.8	146.71	1.98	1.55	1.55	2.08	10.41
YGL45LR							80	128.8	171.2	28.9															125.3	191.85	2.63	2.68	2.68	2.75	
YGL55R	70	3	23.5	100	75	12.5	75	117.7	166.7	27.35	11	12.9	M12x18	17.5	12	19	53	44	23	20	16	120	20	M14x45	153.2	211.23	3.69	2.64	2.64	3.25	15.08
YGL55LR							95	155.8	204.8	36.4															184.9	276.23	4.88	4.57	4.57	4.27	

Note : 1 kgf= 9.81 N

YG Series Heavy Load Ball Type

(3) YGH-C/YGH-LC

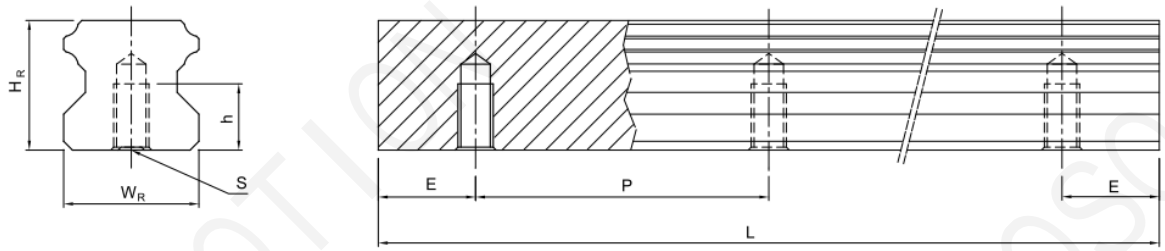


Model No.	Dimensions ofAssembly (mm)			Dimensions of Block (mm)														Dimensions of Rail(mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	H1	N	W	B	B1	C	L1	L	K1	K2	G	M	T	T1	H2	H3	WR	HR	D	h	d	P	E	(mm)	C(kN)	C0(kN)	MR kN-m	Mp kN-m	My kN-m	Block kg	Rail kg/m
YGH15C	24	4.3	16	47	38	4.5	30	39.4	61.4	8	4.85	5.3	M5	6	8.9	3.95	3.7	15	15	7.5	5.3	4.5	60	20	M4x16	14.7	23.47	0.12	0.10	0.10	0.17	1.45
YGH20C	30	4.6	21.5	63	53	5	40	50.5	77.5	10.25	6	12	M6	8	10	6	6	20	17.5	9.5	8.5	6	60	20	M5x16	27.1	36.68	0.27	0.20	0.20	0.40	2.21
YGH20LC								65.2	92.2	17.6																32.7	47.96	0.35	0.35	0.35	0.52	
YGH25C	36	5.5	23.5	70	57	6.5	45	58	84	10.7	6	12	M8	8	14	6	5	23	22	11	9	7	60	20	M6x20	34.9	52.82	0.42	0.33	0.33	0.59	3.21
YGH25LC								78.6	104.6	21																42.2	69.07	0.56	0.57	0.57	0.80	
YGH30C	42	6	31	90	72	9	52	70	97.4	14.25	6	12	M10	8.5	16	6.5	10.8	28	26	14	12	9	80	20	M8x25	48.5	71.87	0.66	0.53	0.53	1.09	4.47
YGH30LC								93	120.4	25.75																58.6	93.99	0.88	0.92	0.92	1.44	
YGH35C	48	7.5	33	100	82	9	62	80	112.4	14.6	7	12	M10	10.1	18	9	12.6	34	29	14	12	9	80	20	M8x25	64.6	93.88	1.16	0.81	0.81	1.56	6.30
YGH35LC								105.8	138.2	27.5																77.9	122.77	1.54	1.40	1.40	2.06	
YGH45C	60	9.5	37.5	120	100	10	80	97	139.4	13	10	12.9	M12	15.1	22	8.5	20.5	45	38	20	17	14	105	22.5	M12x35	103.8	146.71	1.98	1.55	1.55	2.79	10.41
YGH45LC								128.8	171.2	28.9																125.3	191.85	2.63	2.68	2.68	3.69	
YGH55C	70	13	43.5	140	116	12	95	117.7	166.7	17.35	11	12.9	M14	17.5	26.5	12	19	53	44	23	20	16	120	30	M14x45	153.2	211.23	3.69	2.64	2.64	4.52	15.08
YGH55LC								155.8	204.8	36.4																184.9	276.23	4.88	4.57	4.57	5.96	
YGH65C	90	15	53.5	170	142	14	110	144.2	200.2	23.1	14	12.9	M16	25	37.5	15	15	63	53	26	22	18	150	35	M16x50	213.2	287.48	6.65	4.27	4.27	9.17	21.18
YGH65LC								203.6	259.6	52.8																277.8	420.17	9.38	7.38	7.38	12.89	

Note : 1 kgf= 9.81 N

YG Series Heavy Load Ball Type

(4) Dimesions for YGR-T(Rail Mounting from Bottom)



Model No.	Dimensions of Rail (mm)						Weight
	WR	HR	S	h	P	E	(kg/m)
YGR15T	15	15	M5x0.8P	8	60	20	1.48
YGR20T	20	17.5	M6x1P	10	60	20	2.29
YGR25T	23	22	M6x1P	12	60	20	3.35
YGR30T	28	26	M8x1.25P	15	80	20	4.67
YGR35T	34	29	M8x1.25P	17	80	20	6.51
YGR45T	45	38	M12x1.75P	24	105	22.5	10.87
YGR55T	53	44	M14x2P	24	120	30	15.67
YGR65T	63	53	M20x2.5P	30	150	35	21.73

YSR SeriesLow Profile Ball Type

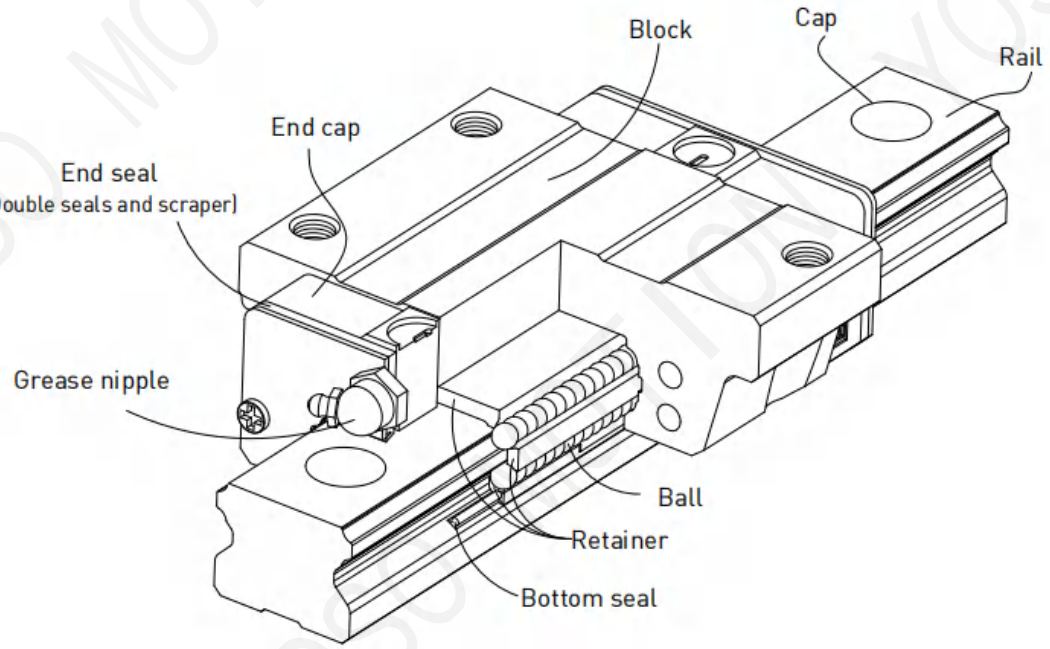
■ YSR Series - Low Profle Ball Type Linear Guideway

2-2-1 Features of the YSR Series Linear Guideway

The desian of the YSR seres offers a low profile, high load caacity, and high rigidity, it also features an equal loadrating in all four directions and self-aligning capability to absorb installation-error, allowing for higher accuraciesAdditionally, the lower assembly height and the shorter length make the YSR series more suitable for high-speed.automation machines and applica-tions where space is limited.

The retainer is desianed to hold the balls in the block even when it is removed from the rail

2-2-2 Construction of YSR Series



- Rolling circulation system: Block, rail, end cap and retainer
- Lubrication system: Grease nipple and piping Joint
- Dust protection system: End seal, bottom seal, cap and scraper

2-2-3 Model Number of YSR Series

YSR series linear guideways are classified into non-interchangeable and interchangeable types. The sizes of these twotypes are the same as one another. The main difference is that the interchangeable type of blocks and rails can befreely exchanged and they can maintain P-class accuracy. Because of strict dimensional control, the interchangeabletype linear quideways are a wise choice for customers when ralls do not need to be matched for an axis. The modenumber of the YSR series identifies the size, type, accuracy class, preload class, etc.

YSR SeriesLow Profile Ball Type

2-2-3 Model Number of YSR Series

YSR series linear guideways are classified into non-interchangeable and interchangeable types. The sizes of these twotypes are the same as one another. The main difference is that the interchangeable type of blocks and rails can befreely exchanged and they can maintain P-class accuracy. Because of strict dimensional control, the interchangeabletype linear quideways are a wise choice for customers when ralls do not need to be matched for an axis. The modenumber of the YSR series identifies the size, type, accuracy class, preload class, etc.

(1) Non-interchangeable type

Y S R 20 L C/R - 2- - 1200 - N - Z0 -II - U + N3 N3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

① Nominal Model	② Block Type	③ Height of Assembly Type	④ Dimension
Y	G:Standard	R:Low-Assembly	15,20,25,30,35
	S:Low-Assembly	L:Middle-Assembly	
		H:High-Assembly	

⑤ Length of Block	⑥ Flange Type	⑦ Number of Block Per Rail	⑧ Accessory Code
N:Normal	C:WithFlange	EX:2	□:Standard (Please refer to page A26)
L:Long	R:Quartet		

⑨ Length of Rai	⑩ Accuracy Grade	⑪ Preload	⑫ Two Sets per Axis	⑬ Rail Special Machining
Unit:mm	N:Norma	ZF:Slight Clearance	II	U:Tapped-Hole Rail
	H:High	Z0:No Preload		E:Rail with Special Machining
	P:Precision	Z1:Light Preload		
	SP:Super-Precision	Z2:Medium Preload		
	UP:Ultra-Precision	Z3:Heavy Preload		

⑭ Block Surface Treatment	⑮ Rail Surface Treatment
S:Standard	S:Standard
B1:Black Oxidation	B1:Black Oxidation
N1:Hard Chrome Plating	N1:Hard Chrome Plating
P:Phosphating	P:Phosphating
N3:Nickel Plating	N3:Nickel Plating
N4:Raydent	N4:Raydent
N5:Chrome Plating	N5:Chrome Plating

No symbol required when plating is not needed

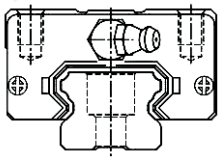
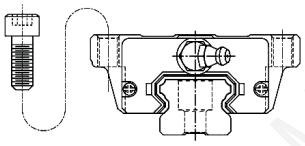
YSR SeriesLow Profile Ball Type

2-2-4 Types

(1) Block types

YOSO offers two types of linear guideways, flange and square types.

Table 2-1-26 Rail StandardLengthand Max.Length

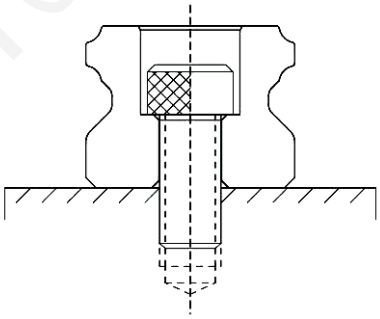
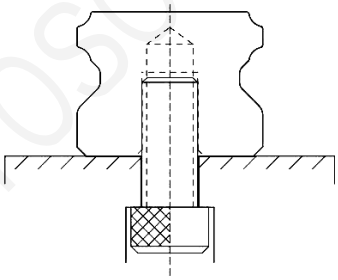
Type	Model	Shape	Height	Rail Length	Main Application
Standard	YSR-R YSR-LR	 Mountingfrom Above	24 48	100 4000	●MachineCenters. ●NC Lathes. ●Grinding Machines ●Precision Machining Machines ●Heavy Cutting Machines ●Automation Devices ●Transportation Equipment ●Measuring Equipment ●Devices Requiring HighPosi-tional Accuracy
Flange	YSR-C YSR-LC	 Mountingfrom Above	24 48	100 4000	

*Please refer to the chapter 2-2-13 for the dimensional detail.

(2) Rail types

Besides the standard top mounting type, HIWIN also offers bottom mounting type rails.

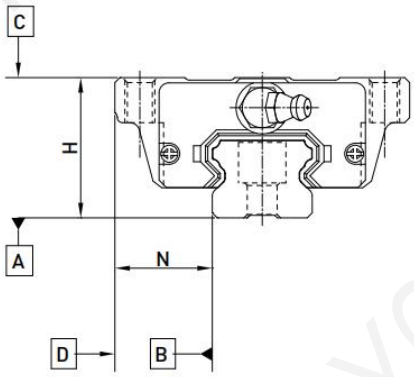
Table 2-1-2 Rail Types

Mounting from Top	Mounting from Bottom
	

YSR SeriesLow Profile Ball Type

2-2-5 Accuracy

The accuracy of the YSR series can be classified into5 classes: normallC), highlH), precisionlP), super-precisionlSP),and ultra precisionlUP). Choosethe class by referencing the accuracy of selectedequipment.



(1) Accuracy ofnon-interchangeable guideways

Table 2-2-3 Accuracy Standards

Item	YSR-15,20				
Accuracy Classes	Normal	High	Precision	Super Precision	Ultra Precision
	(C)	(H)	(P)	(SP)	(UP)
Dimensional tolerance of height H	±0.1	±0.03	0 -0.03	0 -0.015	0 -0.008
Dimensional tolerance of width N	±0.1	±0.03	0 -0.03	0 -0.015	0 -0.008
Variation of height H	0.02	0.01	0.006	0.004	0.003
Variation of width N	0.02	0.01	0.006	0.004	0.003
Running parallelism of block surface C to surface A	See Table 2-2-7				
Running parallelism of block surface D to surface B	See Table 2-2-7				

Table 2-2-4 Accuracy Standards

Item	YSR-25,30,35				
Accuracy Classes	Normal	High	Precision	Super Precision	Ultra Precision
	(C)	(H)	(P)	(SP)	(UP)
Dimensional tolerance of height H	±0.1	±0.04	0 -0.04	0 -0.02	0 -0.01
Dimensional tolerance of width N	±0.1	±0.04	0 -0.04	0 -0.02	0 -0.01
Variation of height H	0.02	0.015	0.007	0.005	0.003
Variation of width N	0.02	0.015	0.007	0.005	0.003
Running parallelism of block surface C to surface A	See Table 2-2-7				
Running parallelism of block surface D to surface B	See Table 2-2-7				

YSR SeriesLow Profile Ball Type

(2) Accuracy ofinterchangeable guideways

Table 2-2-5 Accuracy Standards

Item	YSR-15,20		
Accuracy Classes	Normal	High	Precision
	(C)	(H)	(P)
Dimensional tolerance of height H	±0.1	±0.03	±0.015
Dimensional tolerance of width N	±0.1	±0.03	±0.015
Variation of height H	0.02	0.01	0.006
Variation of width N	0.02	0.01	0.006
Running parallelism of block surface C to surface A	See Table 2-2-7		
Running parallelism of block surface D to surface B	See Table 2-2-7		

Table 2-2-6 Accuracy Standards

Item	YSR-15,20		
Accuracy Classes	Normal	High	Precision
	(C)	(H)	(P)
Dimensional tolerance of height H	±0.1	±0.04	±0.02
Dimensional tolerance of width N	±0.1	±0.04	±0.02
Variation of height H	0.02	0.015	0.007
Variation of width N	0.03	0.015	0.007
Running parallelism of block surface C to surface A	See Table 2-2-7		
Running parallelism of block surface D to surface B	See Table 2-2-7		

(2) Accuracy of running parallelism

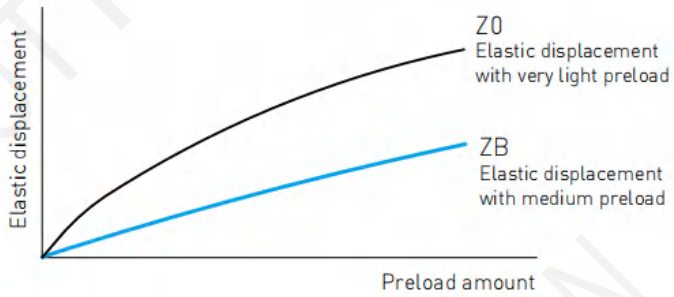
Table 2-2-7 Accuracy of Running Parallelism

Rail Length (mm)	Accuracy (μm)				
	C	h	p	SP	UP
100	12	7	3	2	2
100~200	14	9	4	2	2
200~300	15	10	5	3	2
300~500	17	12	6	3	2
500~700	20	13	7	4	2
700~900	22	15	8	5	3
900~1,100	24	16	9	6	3
1,100~1,500	26	18	11	7	4
1,500~1,900	28	20	13	8	4
1,900~2,500	31	22	15	10	5
2,500~3,100	33	25	18	11	6
3,100~3,600	36	27	20	14	7
3,600~4,000	37	28	21	15	7

2-2-6 Preload

(1) Definition

A preload can be applied to each guideway. Generally, a linear motion guideway has a negative clearance betweenthe groove and balls in order to improve stifness and maintain high precision. The figure shows that adding a preloadcan improve stiffness of the linear quideway. A preload no greater than ZA would be recommended for model sizessmaller than YSR20. This will avoid an over-loaded condition that would affect quideway life.



(2) Preload classes

YOSO offers three standard preloads for various applications and conditions.

Table 2-2-8 Preload Classes

Class	Code	Preload	Condition
Very Light Preload	Z0	0~0.02C	Certain load direction,low impact,low precision required
Light Preload	ZA	0.03C~0.05C	low load and high precision required
Medium Preload	ZB	0.06C~0.08C	High rigidity required,with vibration and impact

Class	Interchangeable Guideway	Non-Interchangeable Guideway
Preload classes	Z0,ZA	Z0,ZA,ZB

Note: The C in the preload column denotes basic dynamic load rating.

(3) Stiffness performance

Stiffness depends on preload. The following table shows stiffness value of each size

Table 2-2-9 Radial stifness for YSR series

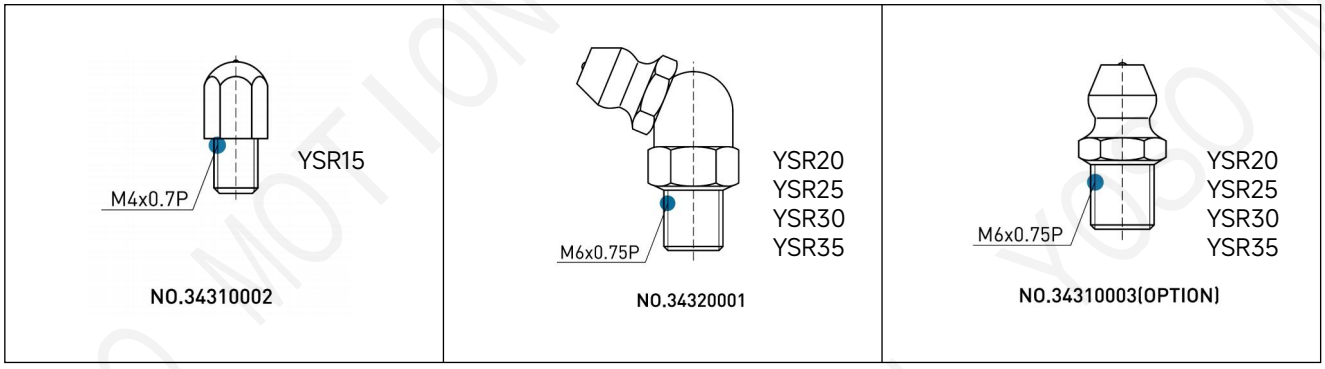
Load type	Series/Size	Stiffness (N/μm)		
		Z0	ZA	ZB
Medium load	YSR 15S	87	186	246
	YSR 20S	114	267	369
	YSR 25S	138	307	415
	YSR 30S	166	335	447
	YSR 35S	189	369	492
Heavy load	YSR 15C	141	323	429
	YSR 20C	181	444	615
	YSR 25C	219	510	668
	YSR 30C	265	555	745
	YSR 35C	307	615	816

YSR SeriesLow Profile Ball Type

2-2-7 Lubrication

(1) Grease

● Grease nipple



● Mounting location

The standard location of the arease fitting is at both ends of the block, the nipple may be mounted in the side or topof the block. For lateral installation, we recommend that the nipple be mounted to the non-reference side, otherwiseplease contact us. When lubricating from above, in the recess for the 0-ring, a smaller, preformed recess can befound. Preheat the 0.8 mm diameter metal tip. Carefuly open the small recess with the metal tip and pierce throughit. insert a round sealing ring into the recess. lThe round sealing ring is not supplied with the blockl Do not open thesmall recess with a drill bit this may introduce the danger of contamination. It is possible to carry out the lubricationby using the oil-piping joint.

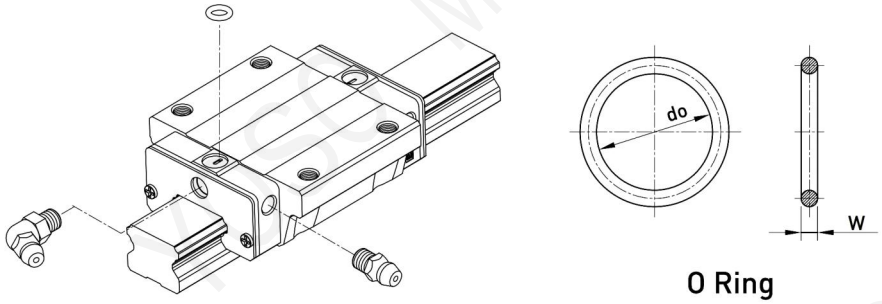
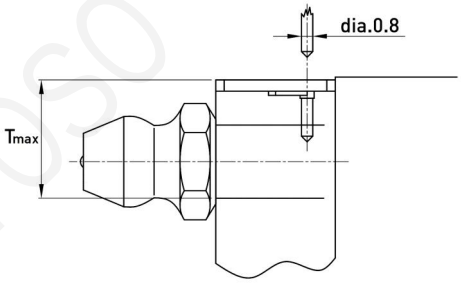


Table 2-2-10 O-Ring size and max. permissible depth for piercing

Size	O-Ring		Lube hole at top:max. permissible depthfor piercing
	do(mm)	W(mm)	T_{max}(mm)
YSR15	2.5±0.15	1.5±0.15	6.9
YSR20	4.5±0.15	1.5±0.15	8.4
YSR25	4.5±0.15	1.5±0.15	10.4
YSR30	4.5±0.15	1.5±0.15	10.4
YSR35	4.5±0.15	1.5±0.15	10.8



YSR SeriesLow Profile Ball Type

● The oil amount for a block filled with grease

Table 2-2-11 The oil amount for a block flled with grease

Size	Medium Load	Heavy Load
	(cm^3)	(cm^3)
YSR15	0.8	1.4
YSR20	1.5	2.4
YSR25	2.8	4.6
YSR30	3.7	6.3
YSR35	5.6	6.6

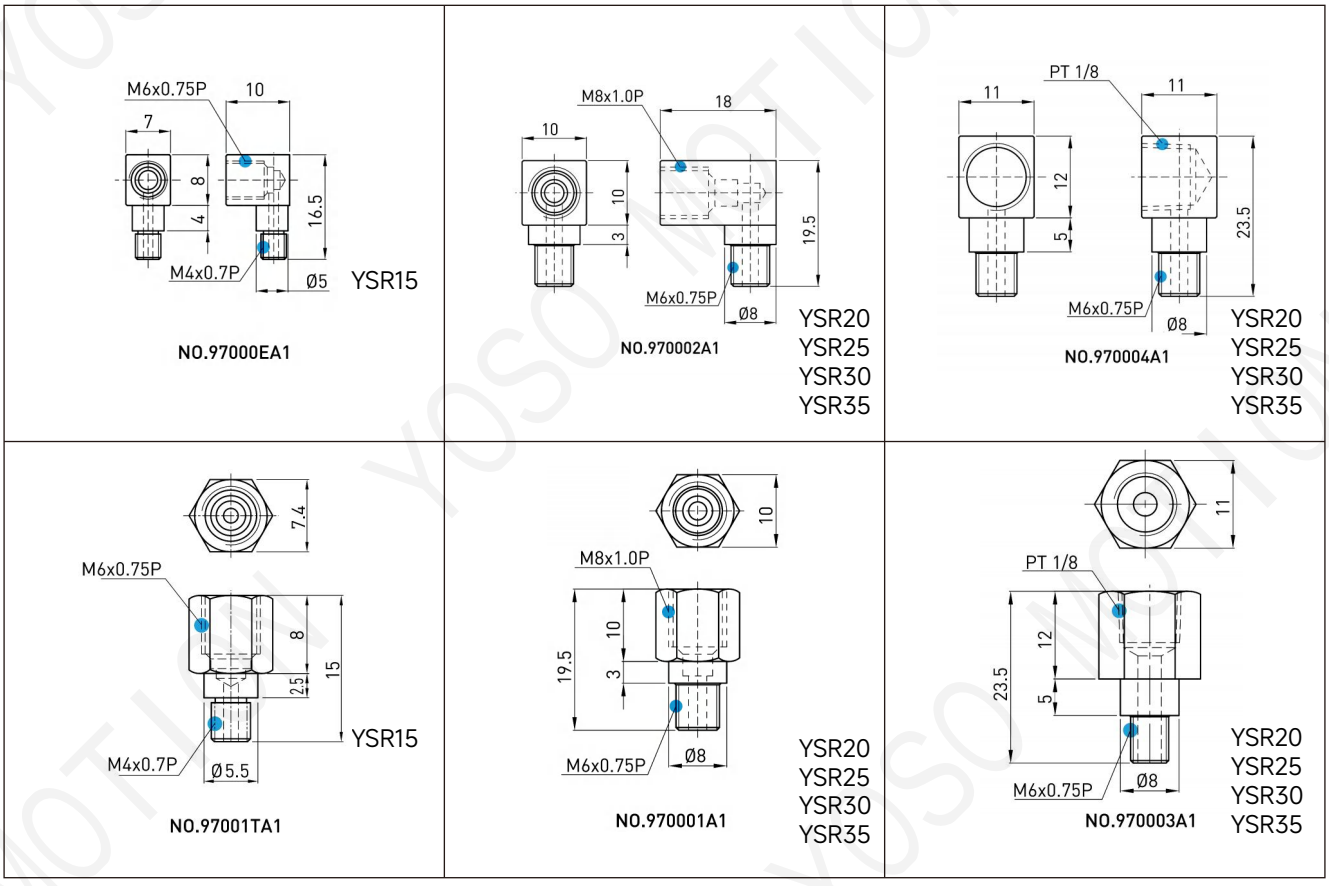
● Frequency ofreplenishment

Check the grease every 100 km, or every 3-6 months.

(2) Oil

The recommended viscosity of oil is about 32~150cSt. If you need to use oil-type lubrication, please inform us.

● Types of oil piping joint



● Types of oil piping joint

Table 2-2-11 The oil amount for a block flled with grease

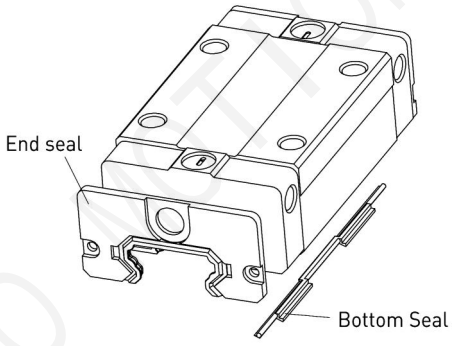
Size	feed rate (cm3/hr)	Size	feed rate (cm3/hr)
YSR15	0.1	YSR30	0.2
YSR20	0.133	YSR35	0.233
YSR25	0.167		

YSR SeriesLow Profile Ball Type

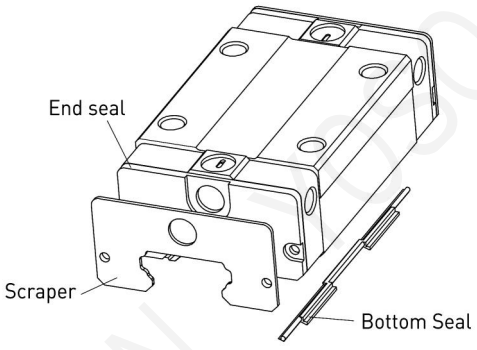
2-2-8 Dust Protection Equipment

(1) Codes of equipment

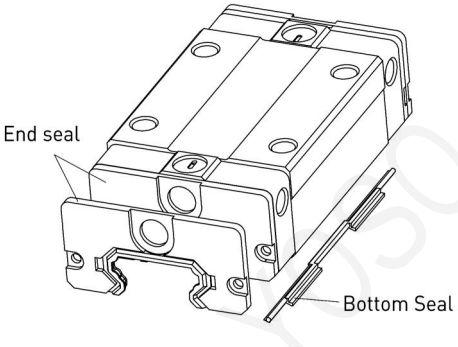
If the following equipment is needed, please indicate the code followed by the model number.



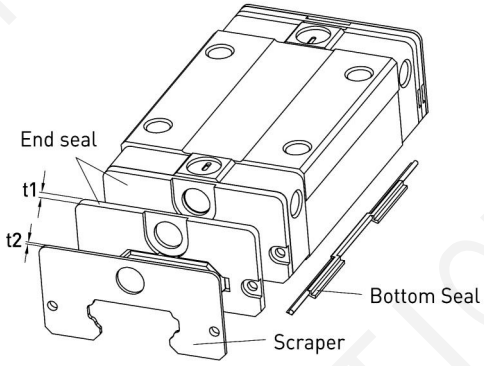
No symbol: Standard Protection
(End seal + Bottom seal)



ZZ(End seal + Bottom seal + Scraper)



DD (Double seals + Bottom Seal)



KK (Double seals + Bottom Seal + Scraper)

(2) End seal and bottom seal

Protects against contaminants entering the block. Reduces potential for groove damage resulting in a reduction of liferatings.

(3) Double seals

Removing foreign matters from the rail to prevent contaminants from entering the block

Table 2-2-13 Dimensions of end seal

Size	Thickness (t1) (mm)	Size	Thickness (t1) (mm)
YSR15ES	2	YSR30ES	2
YSR20ES	2	YSR35ES	2
YSR25ES	2		

(4) Scraper

Clears larger contaminants, such as weld spatter and metal cutlings, from the rail. Metal scraper protects end sealsfrom excessive damage,

Table 2-2-14 Dimensions ofScraper

Size	Thickness (t2) (mm)	Size	Thickness (t2) (mm)
YSR15SC	0.8	YSR30SC	1
YSR20SC	0.8	YSR35SC	1.5
YSR25SC	1		

(5) Bolt caps for rail mounting holes

Rail mounting hole caps prevent foreign matterfrom accumulating in the mounting holes. Caps areincluded with the rail package.

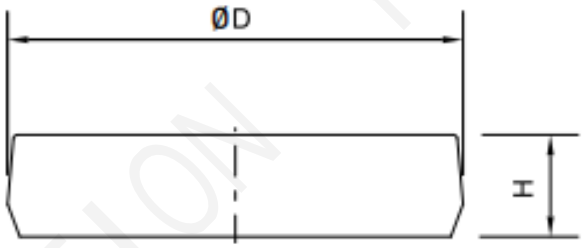


Table 2-2-15 Dimensions of Bolt Caps for Rail Mounting Holes

Rail size	Bolt size	Diameter(D) (mm)	Thickness(H) (mm)
YSR15R	M3	6.15	1.2
YSR20R	M5	9.65	2.5
YSR25R	M6	11.15	2.5
YSR30R	M6	11.15	2.5
YSR35R	M8	14.20	3.5
YSR15U	M4	7.65	1.1
YSR30U	M8	14.20	3.5

(6) Dimensions of block equipped with the dustproofparts

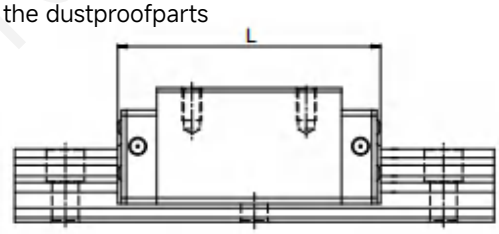


Table 2-2-16 Overall block length

Rail size	Overall block length(L)			
	SS	ZZ	DD	KK
YSR15S	40.1(42.5)	41.7(46.1)	44.1(46.5)	45.7(50.1)
YSR15C	56.8(59.2)	58.4(62.8)	60.8(63.2)	62.4(66.8)
YSR20S	50.0(54.0)	51.6(57.6)	54.0(58.0)	55.6(61.6)
YSR20C	69.1(73.1)	70.7(76.7)	73.1(77.1)	74.7(80.7)
YSR25S	59.1(63.1)	61.1(67.1)	63.1(67.1)	65.1(71.1)
YSR25C	82.6(86.6)	84.6(90.6)	86.6(90.6)	88.6(94.6)
YSR30S	69.5(73.5)	71.5(77.5)	73.5(77.5)	75.5(81.5)
YSR30C	98.1(102.1)	100.1(106.1)	102.1(106.1)	104.1(110.1)
YSR35S	75.0(79.0)	78.0(84.0)	79.0(83.0)	82.0(88.0)
YSR35C	108.0(112.0)	111.0(117.0)	112.0(116.0)	115.0(121.0)

Note : The mar king of "()" denotes the maximum block length with screws, lips of end seals, etc.

YSR SeriesLow Profile Ball Type

2-2-9 Friction

The maximum value of resistance per end seal are as shown in the table.

Table 2-2-17 Seal Resistance

Size	Resistance N(kgf)
YSR15	1.47(0.15)
YSR20	1.96(0.2)
YSR25	1.96(0.2)
YSR30	2.45(0.25)
YSR35	1.96(0.2)

Note: 1. 1kgf=9.81N
2. Please inform HiWiN if low friction request is required.

2-2-10 Mounting Surface Accuracy Tolerance

Because of the circular-arc contact design, the YSR linear guideway can withstand surface-error installation anddeliver smooth linear motion. When the mounting surface meets the accuracy requirements of the installation, thehigh accuracy and rigidity of the quideway will be obtained without any dificulty. For faster installation and smoothermovement, YOSO offers a preload with normal clearance because of its ability to absorb higher deviations inmountna surace inaccura cies.

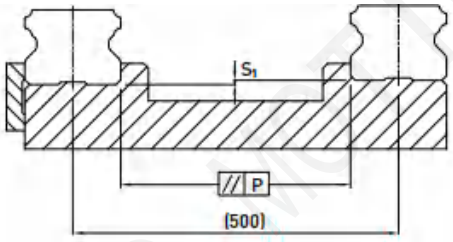


Table 2-2-18 Max, Parallelism Tolerance (P)

Size	Preload classes		
	Z0	ZA	ZB
YSR15	25	18	-
YSR20	25	20	18
YSR25	30	22	20
YSR30	40	30	27
YSR35	50	35	30

Table 2-2-19 Max.Tolerance of Reference Surface Height (S,)

Size	Preload classes		
	Z0	ZA	ZB
YSR15	130	85	-
YSR20	130	85	50
YSR25	130	85	70
YSR30	170	110	90
YSR35	210	150	120

Note :Permissible value is proportional to the axial distance

YSR SeriesLow Profile Ball Type

2-2-11 Cautions for Installation

(1) Shoulder heights and chamfers

Improper shoulder heights and fillets of mounting surfaces will cause a deviation in accuracy and the interferencewith the rail or block. As long as the recommended shoulder heights and fillets are followed, installation inaccuraciesshould be eliminated.

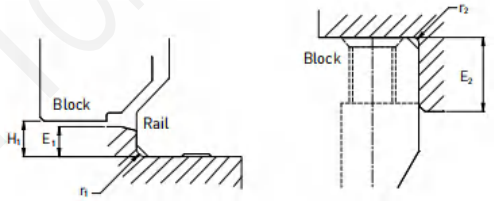


Table 2-2-20 Shoulder Heights and chamfers

Size	Max.radius of fillets	Max.radius of fillets	Shoulder height beside the rail	Shoulder height beside the block	Clearance under block
	r_1 (mm)	r_2 (mm)	E_1 (mm)	E_2 (mm)	H_1 (mm)
YSR15	0.5	0.5	2.7	5.0	4.5
YSR20	0.5	0.5	5.0	7.0	6.0
YSR25	1.0	1.0	5.0	7.5	7.0
YSR30	1.0	1.0	7.0	7.0	10.0
YSR35	1.0	1.0	7.5	9.5	11.0

(2) Tightening Torque of Bolts for installation

Improperly tightened mounting bolts will seriously affect the accuracy of linear quide installations. The followingtightening torques for different sizes of bolts are recommended.

Table 2-2-20 Shoulder Heights and chamfers

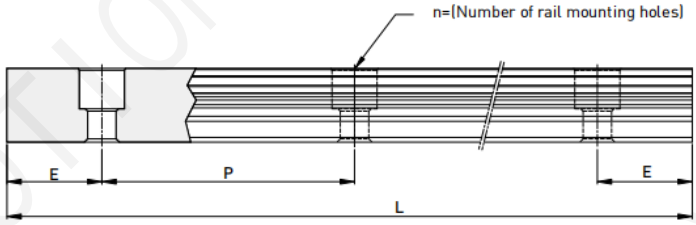
Size	Bolt size	Torque N-cm(kgf-cm)		
		Iron	Casting	Aluminum
YSR15	M3×0.5P×16L	186(19)	127(13)	98(10)
YSR20	M5×0.8P×16L	883(90)	588(60)	441(45)
YSR25	M6×1P×20L	1373(140)	921(94)	686(70)
YSR30	M6×1P×25L	1373(140)	921(94)	686(70)
YSR35	M8×1.25P×25L	3041(310)	2010(205)	1470(150)

Note: 1 kgf= 9.81 N

YSR SeriesLow Profile Ball Type

2-2-12 Standard and Maximum Lengths of Rail

YOSO offers a number of standard rail lengths. Standard rail lengths feature end mounting hole placements set topredeter-mined values lE). For non-standard ral lengths, be sure to specily the E-value to be no greater than 1/2 thepitch lP) dimension. An E-value greater than this will result in unstable rail ends.



$$L=(n-1)\times P+2\times E \quad \text{Eq.2.2}$$

L : Total length of rail (mm)
n : Number of mounting holes
P : Distance between any two holes (mm)
E : Distance from the center of the last hole to the edge (mm)

Table 2-2-18 Max, Parallelism Tolerance (P)

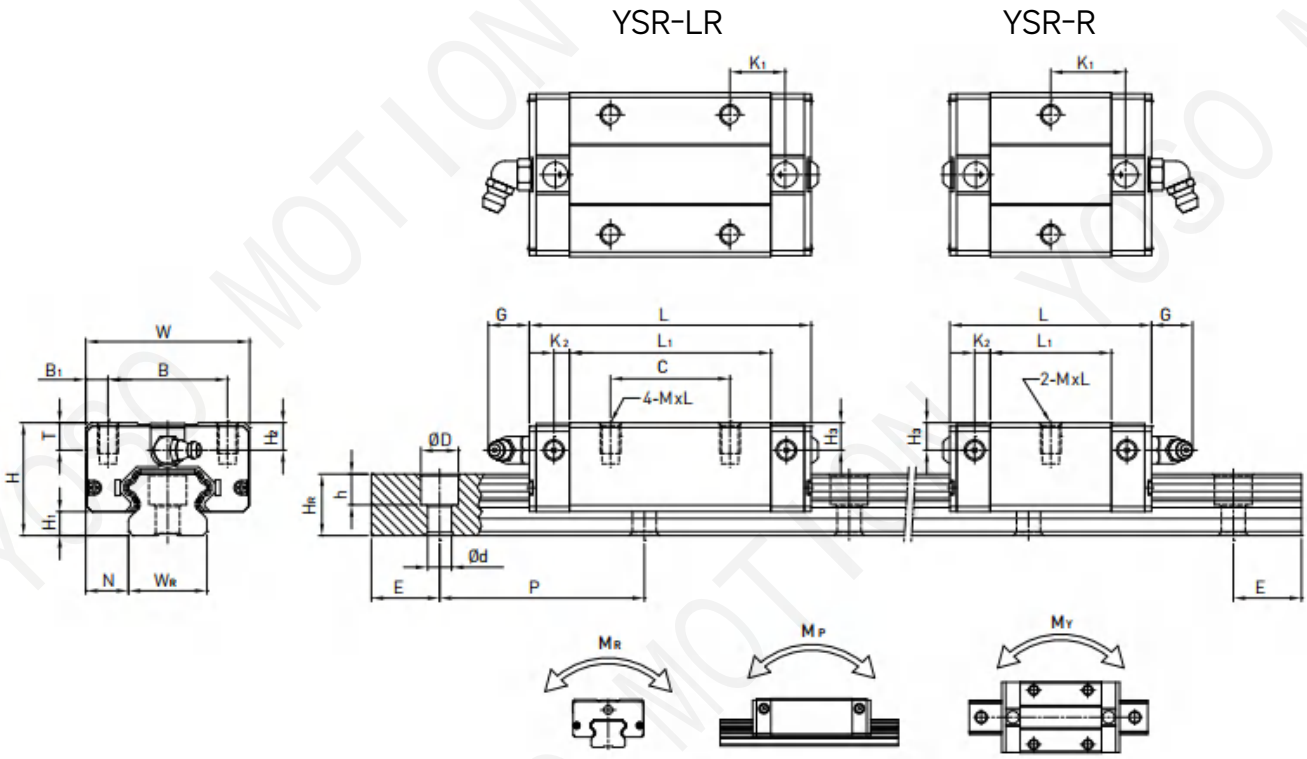
Item	YSR15	YSR20	YSR25	YSR30	YSR35
Standard Length L(n)	160(3)	220(4)	220(4)	280(4)	280(4)
	220(4)	280(5)	280(5)	440(6)	440(6)
	280(5)	340(6)	340(6)	600 (8)	600(8)
	340(6)	460(8)	460(8)	760(10)	760(10)
	460(8)	640(11)	640(11)	1,000(13)	1,000(13)
	640(11)	820(14)	820(14)	1,640(21)	1,640(21)
	820(14)	1,000(17)	1,000(17)	2,040(26)	2,040(26)
		1,240(21)	1,240(21)	2,520 (32)	2,520(32)
		1,600(27)	1,600(27)	3,000(38)	3,000(38)
Pitch(P)	60	60	60	80	80
Distance to End(Es)	20	20	20	20	20
Max.Standard Length	4,000(67)	4,000(67)	4,000(67)	3,960(50)	3,960(50)
Max.Length	4,000	4,000	4,000	4,000	4,000

Note :1. Tolerance of E value for stan dard rail is 0.5.-0.5 mm. Tolerance of E value for jointed rail is 0.-0.3 mm.
2. M aximu m stan dard length means the max. rail length with standard E value on both sides.
3. If different Evalue is needed,please contact HIWIN.
4. EGR15 of stainless steel is supplied with the maximum length of 2000mm.

YSR SeriesLow Profile Ball Type

2-2-13 Dimensions for YOSO YSR Series

(1) YSR-R/YSR-LR

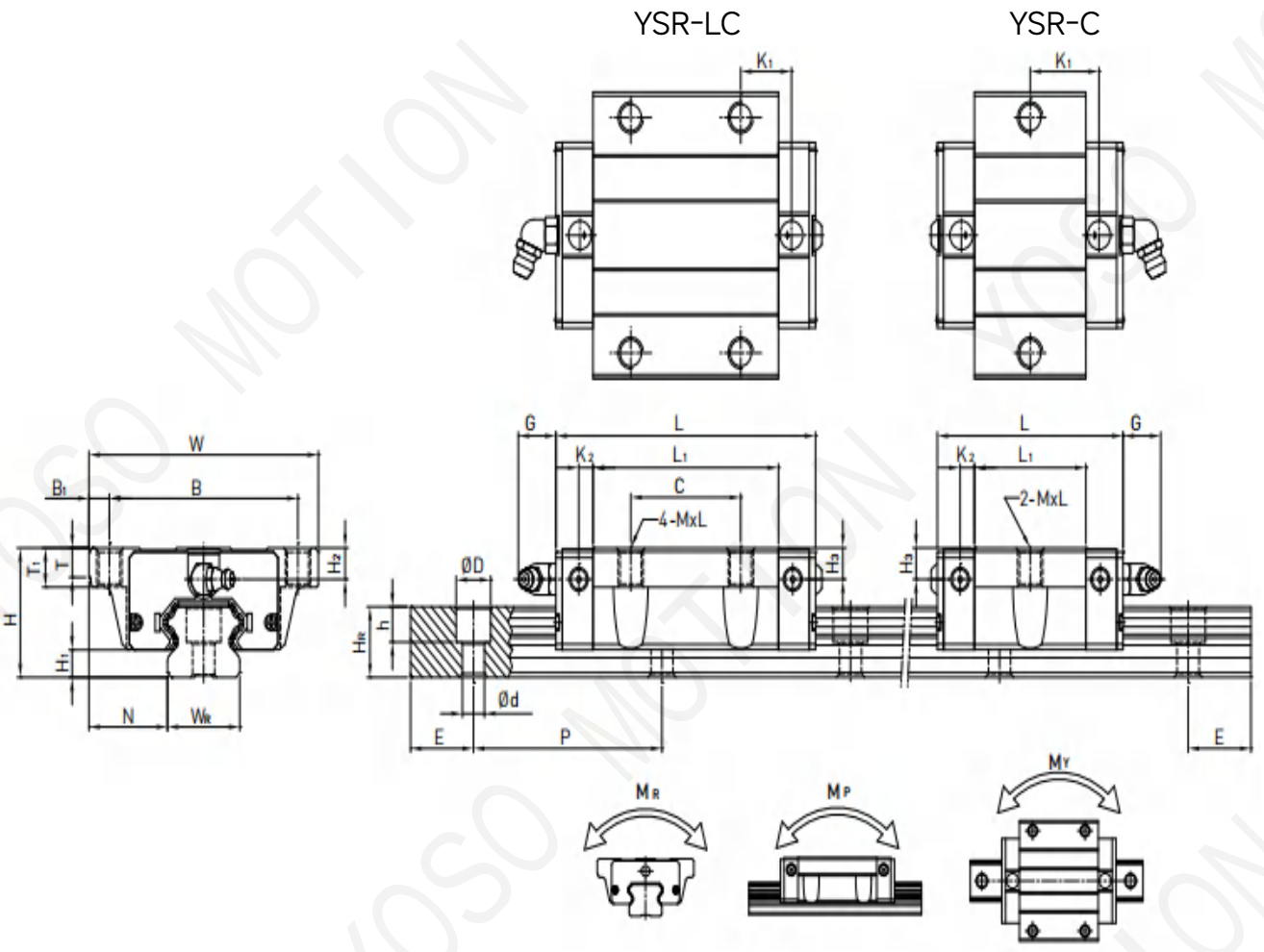


Model No.	Dimensions of Assembly (mm)			Dimensions of Block(mm)													Dimensions of Rail (mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	H1	N	W	B	B1	C	L1	L	K1	K2	G	Mxl	T	H2	H3	WR	HR	D	h	d	P	E	(mm)	C(kN)	C0(kN)	MR kN-m	MP kN-m	MY kN-m	Block kg	Rail kg/m
YSR15R	24	4.5	9.5	34	26	4	-	23.1	40.1	14.8	3.5	5.7	M4x6	6	5.5	6	15	12.5	6	4.5	3.5	60	20	M3x16	5.35	9.40	0.08	0.04	0.04	0.09	1.25
YSR15LR							26	39.8	56.8	10.15															7.83	16.19	0.13	0.10	0.10	0.15	
YSR20R	28	6	11	42	32	5	-	29	50	18.75	4.15	12	M5x7	7.5	6	6	20	15.5	9.5	8.5	6	60	20	M5x16	7.23	12.74	0.13	0.06	0.06	0.15	2.08
YSR20LR							32	48.1	69.1	12.3															10.31	21.13	0.22	0.16	0.16	0.24	
YSR25R	33	7	12.5	48	35	6.5	-	35.5	59.1	21.9	4.55	12	M6x9	8	8	8	23	18	11	9	7	60	20	M6x20	11.40	19.50	0.23	0.12	0.12	0.25	2.67
YSR25LR							35	59	82.6	16.15															16.27	32.40	0.38	0.32	0.32	0.41	
YSR30R	42	10	16	60	40	10	-	41.5	69.5	26.75	6	12	M8x12	9	8	9	28	23	11	9	7	80	20	M6x25	16.42	28.10	0.40	0.21	0.21	0.45	4.35
YSR30LR							40	70.1	98.1	21.05															23.70	47.46	0.68	0.55	0.55	0.76	
YSR35R	48	11	18	70	50	20	-	45	75	28.5	7	12	M8x12	10	8.5	8.5	34	27.5	14	12	9	80	20	M8x25	22.66	37.38	0.56	0.31	0.31	0.74	6.14
YSR35LR							50	78	108	20															33.35	64.84	0.98	0.69	0.69	1.10	

Note :1 kgf= 9.81 N

YSR SeriesLow Profile Ball Type

(2) YSR-C/YSR-LC



Model No.	Dimensions of Assembly (mm)			Dimensions of Block(mm)														Dimensions of Rail (mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	H1	N	W	B	B1	C	L1	L	K1	K2	G	M	T	T1	H2	H3	WR	HR	D	h	d	P	E	(mm)	C(kN)	C0(kN)	MR kN-m	MP kN-m	MY kN-m	Block kg	Rail kg/m
YSR15C	24	4.5	18.5	52	41	5.5	-	23.1	40.1	14.8	3.5	5.7	M5	5	7	5.5	6	15	12.5	6	4.5	3.5	60	20	M3x16	5.35	9.40	0.08	0.04	0.04	0.12	1.25
YSR15LC							26	39.8	56.8	10.15																7.83	16.19	0.13	0.10	0.10	0.21	
YSR20C	28	6	19.5	59	49	5	-	29	50	18.75	4.15	12	M6	7	9	6	6	20	15.5	9.5	8.5	6	60	20	M5x16	7.23	12.74	0.13	0.06	0.06	0.19	2.08
YSR20LC							32	48.1	69.1	12.3																10.31	21.13	0.22	0.16	0.16	0.32	
YSR25C	33	7	25	73	60	6.5	-	35.5	59.1	21.9	4.55	12	M8	7.5	10	8	8	23	18	11	9	7	60	20	M6x20	11.40	19.50	0.23	0.12	0.12	0.35	2.67
YSR25LC							35	59	82.6	16.15																16.27	32.40	0.38	0.32	0.32	0.59	
YSR30C	42	10	31	90	72	9	-	41.5	69.5	26.75	6	12	M10	7	10	8	9	28	23	11	9	7	80	20	M6x25	16.42	28.10	0.40	0.21	0.21	0.62	4.35
YSR30LC							40	70.1	98.1	21.05																23.70	47.46	0.68	0.55	0.55	1.04	
YSR35C	48	11	33	100	82	9	-	45	75	28.5	7	12	M10	10	13	8.5	8.5	34	27.5	14	12	9	80	20	M8x25	22.66	37.38	0.56	0.31	0.31	0.84	6.14
YSR35LC							50	78	108	20																33.35	64.84	0.98	0.69	0.69	1.45	

Note :1 kgf= 9.81 N

YSS SeriesMiniature Type

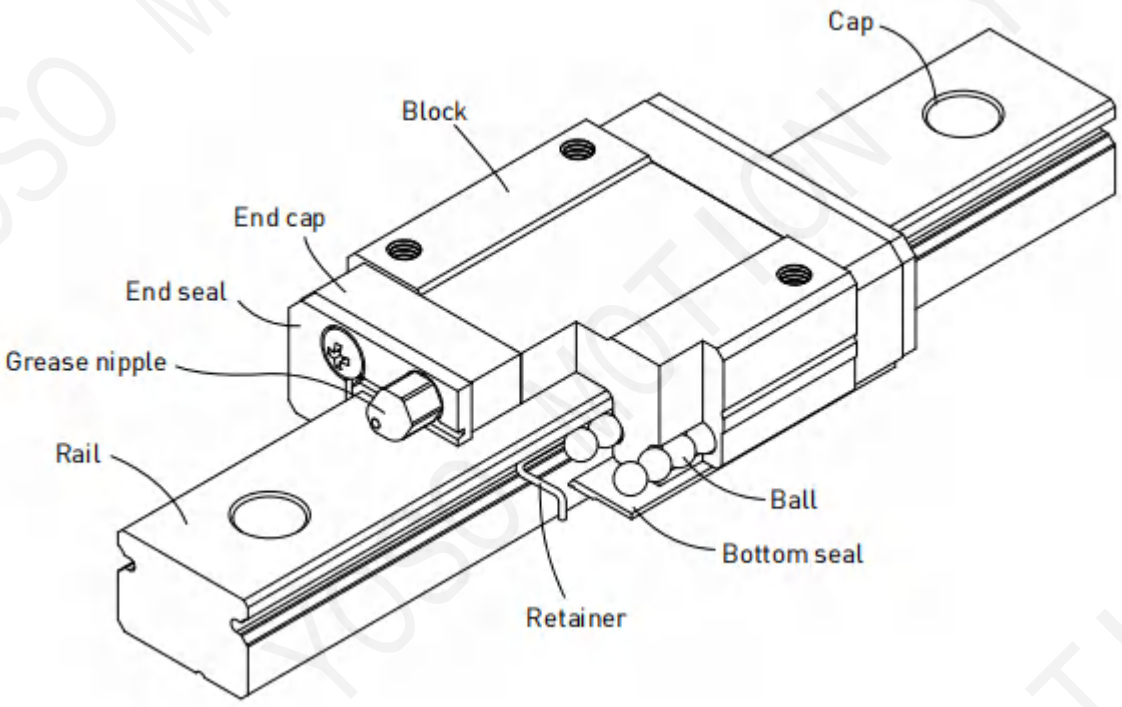
■ YSS Series-Miniature Linear Guideway

2-3-1 Features of YSS Series

Design features of narrow type miniature quideways- YSS:

1. Tiny and light weight, suitable for miniature equipment.
2. Gothic arch contact design can sustain loads from all directions and offer high rigidity and high accuracy.
3. Specification with ball retainers would avoid ball falling when the blocks are removed from rails.
4. Interchangeable types are available in certain sizes and precision grades.

2-3-2 Construction of MGN Series



- Rolling circulation system: Block, rail, ball, end cap and retainer (except size 2, 3)
- Lubrication system: Grease nipple is available for YSS15, lubricated by grease gun. YSS7.9. 12 are lubricated bythe hole at the side of the end cap.
- Dust protection system: End seal, bottom seal, cap and scraper

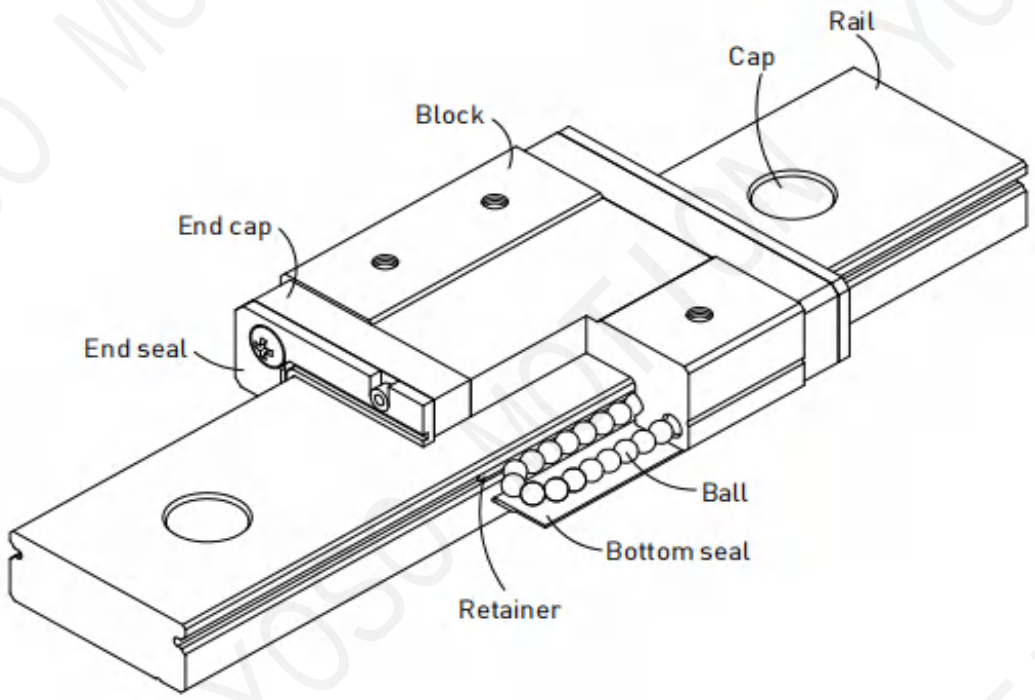
YSS SeriesMiniature Type

2-3-3 Features of YSS Series

Design features of wide type miniature guideways- YSS:

1. The enlarged width design increases the capacity of moment loading.
2. Gothic arch contact design has high rigidity characteristic in all directions.
3. Specification with ball retainers would avoid ball falling when the blocks are removed from rails
4. Interchangeable types are available in certain sizes and precision grades.

2-3-4 Construction of YSS Series



- Rolling circulation system: Block, rail, ball, end cap and retainer (except size 2)
- Lubrication system: Grease nipple is available for YSS14, 15, lubricated by grease gun.
- YSS3, 7. 9, 12 are lubricated by the hole at the side of the end cap.
- Dust protection system: End seal (except size 2), bottom seal loptional size 9,12,14,15, cap (size12,14,15)

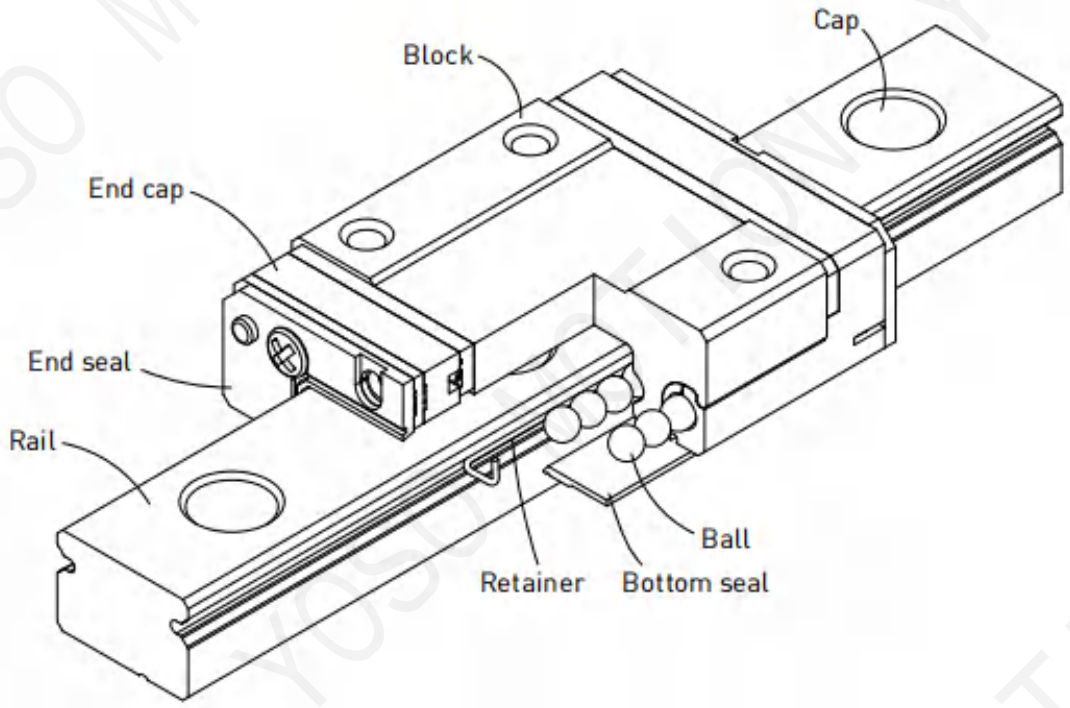
YSS SeriesMiniature Type

2-3-5 Features of MGN-0 Series

Design features ofnarrow type miniature quideways-YSS-0:

1. Reduce 20% weight of block by using resin in the recirculation unit. The copmact size and light weight is suitable for miniturized machinery.
2. Gothic arch contact design can sustain loads from all directions and offer high rigidity and high accuracy.
3.Interchangeable types are available in certain precision grades.
4. The design of resin recirculation unit which is able to eliminate the collision with the metal block.
5. Integrated design for recirculation system.

2-3-6 Construction of YSS-0 Series



- Rolling circulation system: Block, rail, ball, end cap and retainer
- Lubrication system: Grease nipple is available for YSS15-0, lubricated by grease gun.
- YSS5-0,YSS7-0,YSS9-0,YSS12-0 are lubricated by the hole at the side of the end capDust
- protection system: End seal, bottom seal loptiona(size 9, 12,15), cap (size12.15)

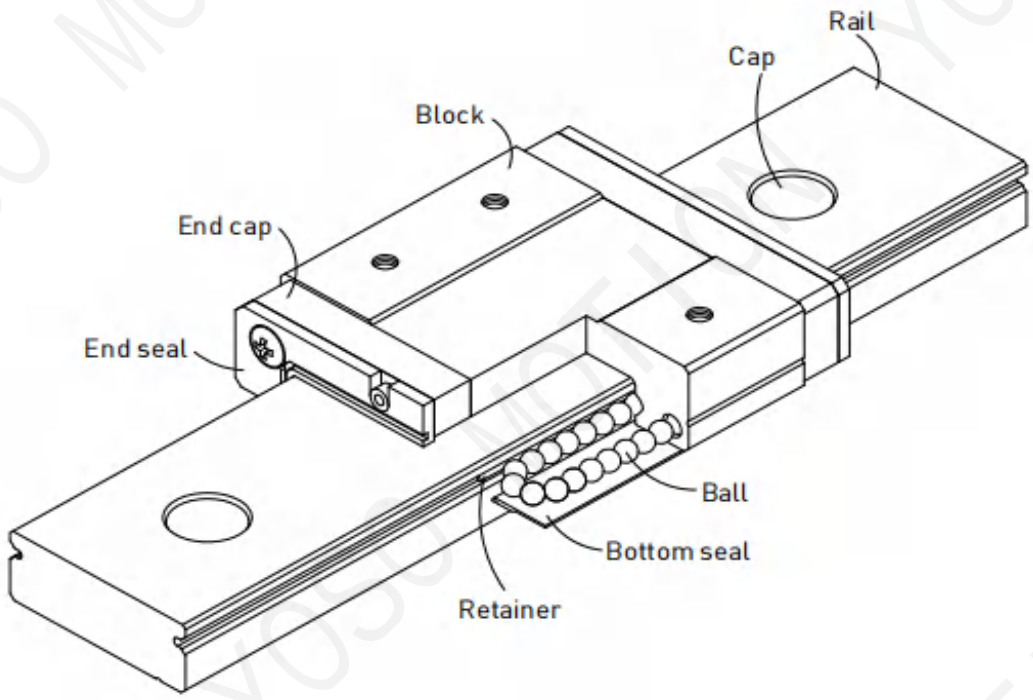
YSS SeriesMiniature Type

2-3-7 Features of YSS-0 Series

Design features of wide type miniature quideways-MGW-0:

1. The enlarged width design increases the capacity of moment loading.
2. Gothic arch contact design has high rigidity characteristic in all directions.
3. Steel balls are held by a miniature retainer to keep balls from faling out, even when the blocks are removed fromthe rail.
4. Integrated design for recirculation system, which reduce 20% weight of block by using resin in the recirculation unit .

2-3-8 Construction of YSS-0 Series



- Rolling circulation system: Block, rail, ball, end cap and retainer
- Lubrication system: Grease nipple is available for YSS15-0, lubricated by grease gun.YSS5-0, YSS7-0, YSS9-0, YSS12-0 are lubricated by the hole at the side of the end cap.
- Dust protection system: End seal, bottom seal loptiona(size 9, 12, 15), cap (size12, 15)

2-3-9 Application

YSS series can be used in various applications, such as semiconductor equipment, PCB AC equipment,medical, robotics, measuring equipment, automation equipment, and other miniature sliding machinery.

YSS SeriesMiniature Type

2-3-10 Model Number of YSS Series

YSS Series linear guideway can be classified into non-interchangeable and interchangeable types, which are thesame size.The interchangeable type is more convenient due to replaceable ralls; however, the precision is less thannon-interchangeable type. With strict dimension and quality control, the interchangeable type linear guideways area suitable choice for customers when rails don't need to be paired. The model number contains information for thesize,type,accuracy, preload, and so on.

(1) Non-interchangeable type

Perform joint treatment when required lengths exceed 1300. Please contact TB! MOTON for detaled information.

YS S 05 M N A - 2- - 1000 - N A - Z0 - II - E

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭

① Nominal Model	② Block Type	③ Dimension	④ Width of Rail
YS	S : Mini	03,05,07,09,12,15	M :Standard
	E : Special		W: Wide

⑤ Length of Block	⑥ Material of Block	⑦ Quantity of Block
S:Standard	S : Stainless steel	(Mark 1 when there is only 1 runner block)
N:Long	A : Alloy steel	

⑧ Accessory Code	⑨ Length of Rai	⑩ Accuracy Grade	⑪ Material of Rail
□:Standard (Please refer to page A26)	Unit:mm	N:Norma	S : Stainless steel
		H:High	A : High Carbon steel
		P:Precision	

⑫ Preload	⑬ Two Sets per Axis	⑭ Rail Special Machining
ZF: Slight Clearance	(No need to be marked when there isonly one rail)II	K : Tapped-Hole Rail
Z0: No Preload		E : Rail withSpecial Machining
Z1 : Light Preload		

No symbol required when plating is not needed

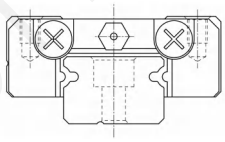
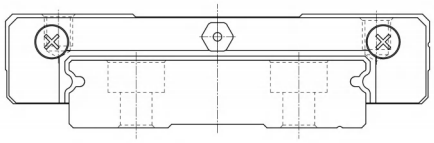
YSS SeriesMiniature Type

2-3-11 Types

(1) Block types

YOSO offers two types of linear guideways, flange and square types.

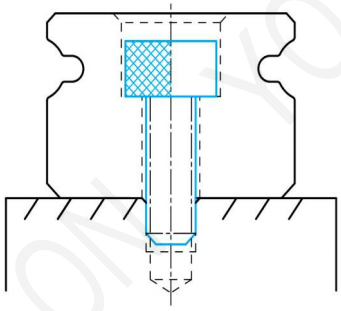
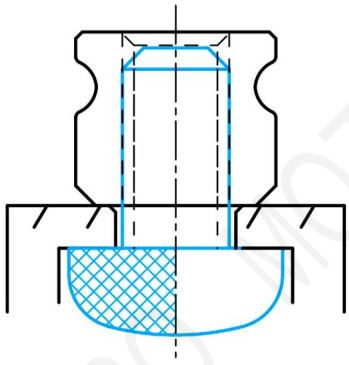
Table 2-3-1 BlockTypes

Type	Model	Shape	Height (mm)	Rail Length (mm)	Main Applications
Square	YSS-MS YSS-MN		3.2 16	30 2000	●Printer ●Robotics ●Precision measure equipment ●Se micon ductor equipme nt
Flange	YSS-WS YSS-WN		4 16	40 2000	

(2) Rail types

YOSO offers standard top mounting and bottom mounting type.

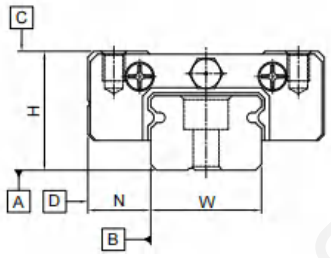
Table 2-3-2 Rail Types

Mounting from Top	Mounting from bottom (MGN2, MGN3)
	

YSS SeriesMiniature Type

2-3-12 Accuracy Classes

The accuracy of YSS series can be classified into threeclasses: normal (C), high (H), precision (P). Choices for differentaccuracy classes are available according to various requirements.



(1) Accuracy of non-interchangeable guideways

Table 2-3-3 Accuracy Standard of Non-interchangeable Type

Accuracy Classes	Normal (C)	High (H)	Precision (P)
Dimensional tolerance of height H	±0.04	±0.02	±0.01
Dimensional tolerance of widthN	±0.04	±0.025	±0.015
Pair Variation of height H	0.03	0.015	0.007
Pair Variation of width N(Master Rail)	0.03	0.02	0.01
Running parallelism of block surfaceC to surface A	See Table 2-4-5		
Running parallelism of block surfaceD to surface B	See Table 2-4-5		

(2) Accuracy of interchangeable guideways

Table 2-3-4 Accuracy Standard ofinterchangeable Type

Accuracy Classes		Normal (C)	High (H)	Precision (P)
Dimensionaltolerance of height H		±0.04	±0.02	±0.01
Dimensional tolerance of width N		±0.04	±0.025	±0.015
0neSet	Pair Variation of height H	0.03	0.015	0.007
	Pair Variation of width N	0.03	0.02	0.01
Pair Variation of width N(Master Rail)		0.07	0.04	0.02
Running parallelism of block surface Cto surface A		See Table 2-4-5		
Running parallelism of block surface D to surface B		See Table 2-4-5		

(2) Accuracy of interchangeable guideways

The running parallelism C to A and D to B are related to the rail length.

Table 2-3-4 Accuracy Standard ofinterchangeable Type

Rail Length	Accuracy(μm)			Rail Length	Accuracy(μm)		
(mm)	(C)	(H)	(P)	(mm)	(C)	(H)	(P)
~50	12	6	2	1,000~1,200	25	18	11
50~80	13	7	3	1,200~1,300	25	18	11
80~125	14	8	3.5	1,300~1,400	26	19	12
125~200	15	9	4	1,400~1,500	27	19	12
200~250	16	10	5	1,500~1,600	28	20	13
250~315	17	11	5	1,600~1,700	29	20	14
315~400	18	11	6	1,700~1,800	30	21	14
400~500	19	12	6	1,800~1,900	30	21	15
500~630	20	13	7	1,900~2,000	31	22	15
630~800	22	14	8	2,000~	31	22	16
800~1,000	23	16	9				

2-3-13 Preload

YSS series provides three different preload levels for various applications.

Table 2-3-1 BlockTypes

Class	Code	Preload	Accuracy
Light Clearance	ZF	Clearance 4~10μm	C
Very Light Preload	Z0	Clearance 0~3μm	C~P
Light Preload	Z1	0.02C	C~P

Note:"C" in column preload means basic dynamic load rating.

● Stiffness performance

Stiffness depends on preload. The following table shows stiffness value of each size.

Table 2-3-7 Radial stiffness for YSS Series

Load type	Series/Size	Stiffness (N/μm)		Series/Size	Stiffness(N/μm)	
		Z0	Z1		Z0	Z1
Standard	YSS5MS-0	20	61	YSS5WS-0	32	85
	YSS7MS	26	73	YSS7WS	44	112
	YSS9MS	38	102	YSS9WS	62	140
	YSS12MS	44	105	YSS12WS	72	148
	YSS15MS	58	126	YSS15WS	85	154
Long	YSS5MN-0	26	79	YSS5WN-0	-	-
	YSS7MN	42	122	YSS7WN	64	168
	YSS9MN	56	153	YSS9WN	81	190
	YSS12MN	70	175	YSS12WN	102	217
	YSS15MN	89	202	YSS15WN	122	235

2-4-14 Dust Proof Accessories

End seals on both sides of the block can prevent dust from entering the block and maintain the accuracy and servicelife of a linear quideway. End seals for YSS3MS are optional, customers can order it by adding the mark "+SS" followedby the model number. For other size of YSS series, end seals are standard accessories. Bottom seals are fixed underthe skirt portion of the block to prevent dust from entering. Customers can order bottom seals by adding the mark"+U" followed by the model number. Sizes 9, 12, 14 and 15 provide bottom seals as an option, but size 2, 3, 5, 7 do notoffer the option due to the space limit of H,. Note that "H," would reduced if bottom seals are atached, be aware ofpossible interference between block and mounting surface.

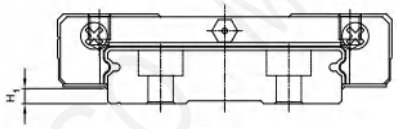


Table 2-3-8

Size	Bottom seal	H₁mm	Size	Bottom seal	H₁mm
YSS2	-	-	YSS2	-	-
YSS3	-	-	YSS3	-	-
YSS7	-	-	YSS7	-	-
YSS9	●	1	YSS9	●	1.9
YSS12	●	2	YSS12	●	2.4
-	-	-	YSS14	●	2.4
YSS15	●	3	YSS15	●	2.4
YSS5-0	-	-	YSS5-0	-	-
YSS7-0	-	-	YSS7-0	-	-
YSS9-0	●	1.2	YSS9-0	●	1.95
YSS12-0	●	2	YSS12-0	●	2.45
YSS15-0	●	3	YSS15-0	●	2.45

● Bolt caps for rail mounting holes

Rail mounting hole caps prevent foreign matter fromaccumulating in the mounting holes. Caps are included with therail package.

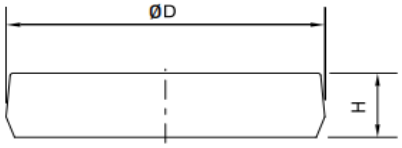


Table 2-3-9 Dimensionsof Bolt caps for Rail Mounting Holes

Rail size	Bolt size	Diameter(D) (mm)	Thickness(H) (mm)
YSS12	M3	6.15	1.2
YSS15	M3	6.15	1.2
YSS12	M4	8.15	2.2
YSS14	M4	8.15	2.2
YSS15	M4	8.15	2.2

2-3-15 Mounting Surface Accuracy Tolerance

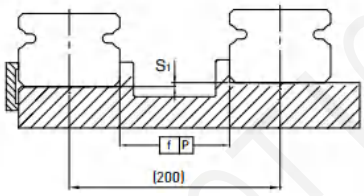


Table 2-3-10 Max,Parallelism Tolerance (P)

Size	Preload classes			Size	Preload classes		
	ZF	Z0	Z1		ZF	Z0	Z1
YSS2	2	2	2	YSS9	4	4	3
YSS3	2	2	2	YSS12	9	9	5
YSS5	2	2	2	YSS14	10	10	6
YSS7	3	3	3	YSS15	10	10	6

Table 2-3-11 Max.Tolerance of Reference Surface Height(S_1)

Size	Preload classes			Size	Preload classes		
	ZF	Z0	Z1		ZF	Z0	Z1
YSS2	15	15	2	YSS9	35	35	6
YSS3	15	15	2	YSS12	50	50	12
YSS5	20	20	2	YSS14	60	60	20
YSS7	25	25	3	YSS15	60	60	20

Table 2-3-12 Permissible Errorof Mounting Surface

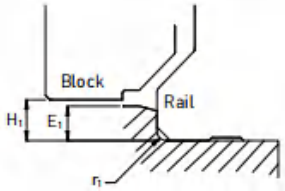
Size	Flatness of the Mounting Surface	Size	Flatness of the Mounting Surface
YSS2	0.012/200	YSS9	0.035/200
YSS3	0.012/200	YSS12	0.050/200
YSS5	0.015/200	YSS14	0.060/200
YSS7	0.025/200	YSS15	0.060/200

Note: The values above are suitable for preload of ZF/Z0. For preload of 21 or usingtwolor morel rails on the same plane, 5096 or lessof the values above are recommended.

2-3-16 Cautions for Installation

(1) Shoulder heights and fillets

Improper shoulder heights and fillets of mountingsurfaces will cause a deviation in accuracy and theinterference with the rail or block. As long as therecommended shoulder heights and fillets are followed,installationinaccuracies should be eliminated.



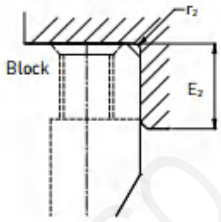


Table 2-3-13 Shoulder Heightsand Fillets

Size	Max.radius of fillets r1 (mm)	Max.radius of fillets r2 (mm)	Shoulder height beside the rail E1 (mml)	Shoulder height beside the rail E2 (mml)	Clearance under block H1 (mm)
YSS2	0.1	0.2	0.5	1.5	0.7
YSS3	0.1	0.2	0.6	1.5	1
YSS5	0.1	0.2	1.2	2	1.5
YSS7	0.2	0.2	1.2	3	1.5
YSS9	0.2	0.3	1.7	3	2
YSS12	0.3	0.4	1.7	4	3
YSS15	0.5	0.5	2.5	5	4
YSS2	0.1	0.2	0.6	1.5	1
YSS3	0.1	0.2	0.6	2	1
YSS5	0.1	0.2	1.2	2	1.5
YSS7	0.2	0.2	1.7	3	1.9
YSS9	0.3	0.3	2.5	3	2.9
YSS12	0.4	0.4	3	4	3.4
YSS14	0.4	0.4	3	5	3.5
YSS15	0.4	0.8	3	5	3.4

(2) Tightening torque of bolts for installation

Improper tightening of rail mounting bolts wil seriously affect the accuracy of the linear guideway. The following tabllists the recommended tightening torque for the specific bolt sizes.

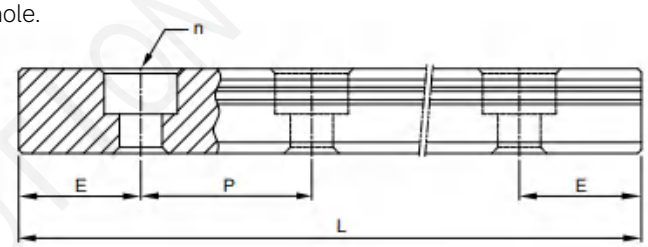
Table 2-3-14 TighteningTorque

Size	Bolt size	Torque,N-cm (kgf-cm)		
		Iron	Casting	Aluminum
YSS5	M2×0.4P×6L	57(5.9)	39.2(4)	29.4(3)
YSS7	M2×0.4P×6L	57(5.9)	39.2(4)	29.4(3)
YSS9	M3×0.5P×8L	186(19)	127(13)	98(10)
YSS12	M3×0.5P×8L	186(19)	127(13)	98(10)
YSS15	M3×0.5P×10L	186(19)	127(13)	98(10)
YSS2	M1.6×0.35P×4.4L	27.6(2.8)	19(1.94)	14.2(1.45)
YSS3	M2×0.4P×6L	57(5.9)	39.2(4)	29.4(3)
YSS5	M2.5×0.45P×7L	118(12)	78.4(8)	58.8(6)
YSS7	M3×0.5P×6L	186(19)	127(13)	98(10)
YSS9	M3×0.5P×8L	186(19)	127(13)	98(10)
YSS12	M4×0.7P×8L	392(40)	274(28)	206(21)
YSS14	M4×0.7P×10L	392(40)	274(28)	206(21)
YSS15	M4×0.7P×10L	392(40)	274(28)	206(21)

Note :1 kgf=9.81N

2-3-17 Standard and Maximum Lengths of Rail

YOSO ofers standard lengths of ral for fast shipping. For non-standard rail lengths, it's recommended that the Evalue is no greater than 1/2 of the pitchlP) to prevent instability at the end of the rail, and the E value should be noless than E-min to avoid a broken mounting hole.



$$L=(n-1)\times P+2\times E \quad \text{Eq.2.4}$$

L : Total length of rail (mm)
n : Number of mounting holes
P : Distance between any two holes (mm)
E : Distance from the center of the last hole to the edge (mm)

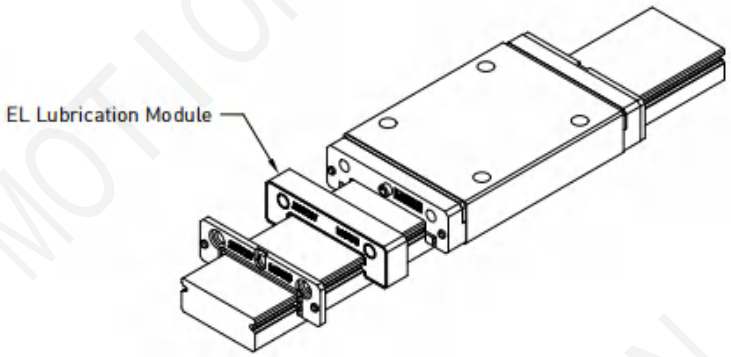
Table 2-3-15

Item	YSSM2	YSSM3	YSSM5	YSSM7	YSSM9	YSSM12	YSSM15	YSSW2	YSSW3	YSSW5	YSSW7	YSSW9	YSSW12	YSSW14	YSSW15
Standard Length L(n)	32(4)	30(3)	40(3)	40(3)	55(3)	70(3)	70(2)	40(4)	40(3)	50(3)	50(2)	80(3)	110(3)	110(3)	110(3)
	40(5)	40(4)	55(4)	55(4)	75(4)	95(4)	110(3)	60(6)	55(4)	70(4)	80(3)	110(4)	150(4)	150(4)	150(4)
	56(7)	50(5)	70(5)	70(5)	95(5)	120(5)	150(4)	70(7)	70(5)	90(5)	100(4)	140(5)	190(5)	190(5)	190(5)
	80(10)	60(6)	100(7)	85(6)	115(6)	145(6)	190(5)	80(8)	100(7)	100(6)	140(5)	170(6)	230(6)	230(6)	230(6)
	104(13)	80(8)	130(9)	100(7)	135(7)	170(7)	230(6)	100(10)	130(9)	130(7)	170(6)	200(7)	270(7)	270(7)	270(7)
		100(10)	160(10)	130(9)	155(8)	195(8)	270(7)		160(11)	150(8)	200(7)	230(8)	310(8)	310(8)	310(8)
					175(9)	220(9)	310(8)			170(9)	260(9)	260(9)	350(9)	350(9)	350(9)
					195(10)	245(10)	350(9)				290(10)	290(10)	390(10)	390(10)	390(10)
					275(14)	270(11)	390(10)					350(14)	430(11)	430(11)	430(11)
					375(19)	320(13)	430(11)					500(19)	510(13)	510(13)	510(13)
						370(15)	470(12)					710(24)	590(15)	590(15)	590(15)
						470(19)	550(14)					860(29)	750(19)	750(19)	750(19)
						570(23)	670(17)						910(23)	910(23)	910(23)
						695(28)	870(22)						1070(27)	1070(27)	1070(27)
Pitch(P)	8	10	15	15	20	25	40	10	15	20	30	30	40	40	40
Distance to End(E)	4	5	5	5	7.5	10	15	5	5	5	10	10	15	15	15
Max. Standard Length	248(31)	250(25)	250(17)	595(40)	1195(60)	1995(80)	1990(50)	250(25)	250(17)	250(13)	590(20)	1970(66)	1990(50)	1790(45)	1990(50)
Max. Length	250[6]	250[6]	250[6]	600	1200[7]	2000	2000	250[6]	250[6]	250[6]	600[8]	2000	2000	1800[5]	2000

Note:1.Tolerance of E value for standard railis 0.5--0.5 mm.Tolerance of E value for jointed rail is 0--0.3 mm.
2.Maximum standard length indicates the max.rail length with standard Evalue on both sides.
3.Fixing screws for YSSM5s mountingholes are appended.
4.If smallerE walue is needed,please contact YOSO.
5.YSSW14is onlysuppliedwith carbon steel.
6.YSSM2,YSSM2,YSSM3,YSSW3,YSSM5,YSSW5 are only supplied with stainless steel.
7.YSSM9 of stainless steel is supplied with the maximumlength of 1200mm;MGNR9 of carbon steelis suppliedwith the maximumlength of 1000mm.
8.YSSW7 of stainless steelis supplied with the maximum length of 600mm;YSSW7 of carbon steel is suppliedwith the maximumlength of 2000mm.

2-3-18 EL Auxiliary Lubrication Module

The EL Auxiliary Lubrication Module is an environment friendly lubrication system that can extend the maintenancelife of YOSO and quideways up to 10,000 km. The module is installed on either end of a quideway block and providesextended lubrication through a no-drip encapsulated material for a cleaner environmental solution.



(1) Feature

1. Extend maintenance period up to10,000km
2. Contained lubrication fluid prevents spills
3. Direct lubrication in ball rolling raceway,
4. Compatible with most YOSO guideways.
5. Conform to cleanroom class 1000 regulation.

Notes :

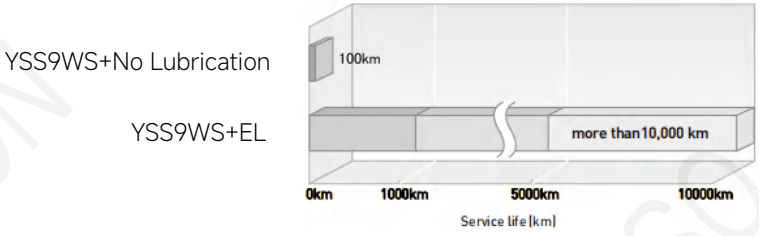
1. Service life will vary from application ervironment, lubrication conditions, and assembly accuracy.
2. Not for use in high heat conditions greater than 50'C ,and if lower than 25"C please contact YOSO.
3. Standard parts must be pregreased with YOSO G05. If there is no pregreasing, the maintenance mileage will beshortened.

(2)Applications

Broadly applicable in automation, conveying equipment, industrial machine, Semi-conductor, and inspectionmachine.

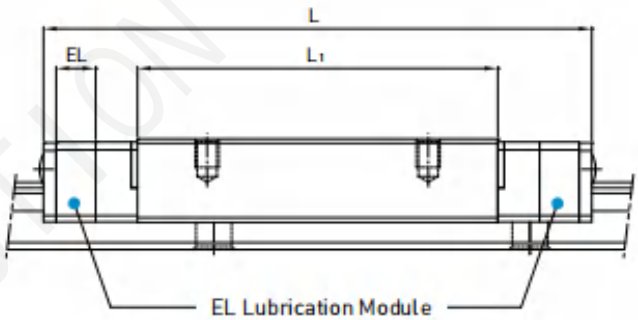
(3) Lubrication Capability

- High speed life testing with light load



Test Specification	YSS9WS1R1000Z0CM+EL
Velocity	5m/s
Acceleration	50 m/s^2
Applied Load	0.2 kgf
Stroke	850 mm
Lubrication	Lithium Soap Grease+EL
Distance travel	10,000 km

(4) Dimension Table for ELType

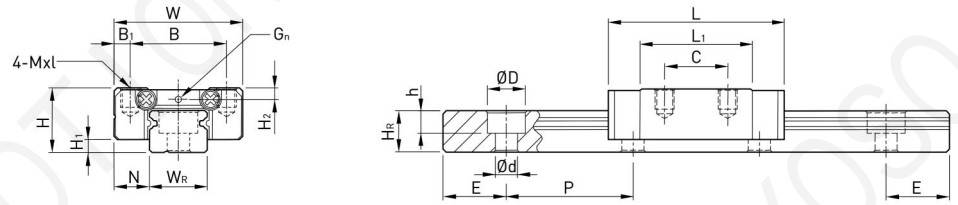


Model No.	Lubrication device (R1)	Block length (L1)	Total length (L)
YSS7MS	3.5	13.5	29.5
YSS7MN		21.8	37.8
YSS9MS	5	18.9	38.9
YSS9MN		29.9	49.9
YSS12MS	5	21.7	44.7
YSS12MN		32.4	55.4
YSS9WS	5	27.5	49.3
YSS9WN		38.5	60.7
YSS12MS	5	31.3	56.1
YSS12WN		45.6	70.4

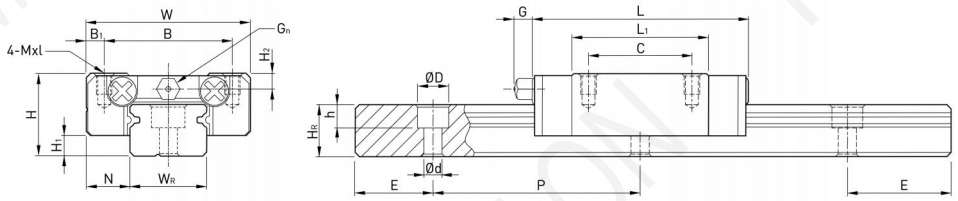
YSS SeriesMiniature Type

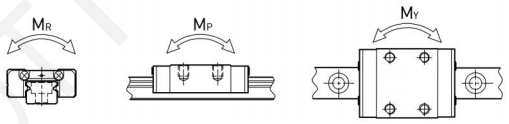
2-3-19 YSS-MS/YSS-MN Series Specifications

YSS3M、YSS5M、YSS7M、YSS9M、YSS12M



YSS15M





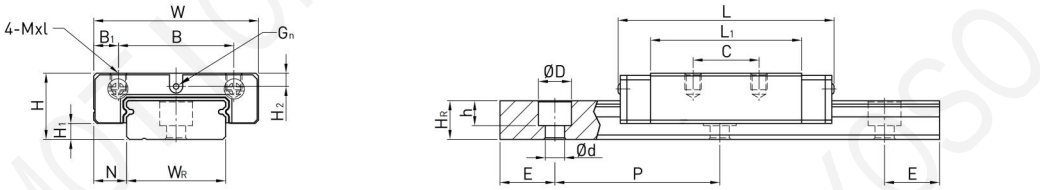
Model	Component size			Slider size(MM)									Slide rail size(MM)							Slide rail fixing bolt dimensions	Basic dynamic load rating	Basic static load rating	Allowable static moment			weight	
	H	H1	N	W	B	B1	C	L1	L	G	G	Mx1	H2	W	H	D	h	d	P	E	(mm)	C(kN)	Co (kN)	M N-m	M N-m	My N-m	slider kg	guide kg/m
YSS 3MS	4	1	2.5	8	-	-	3.5	6.7	12	-	-	M1.6x1.3	-	3	2.6	-	-	1.6	10	5	M1.6×1	0.19	0.32	0.6	0.4	0.4	-	-
YSS 3MN							5.5	10.7	16			M2x1.3										0.3	0.58	0.9	1.1	1.1	-	
YSS 5MS	6	1	3.5	12	8	2	-	9.7	16	-	-	M2x2	-	5	3.7	3.6	0.8	2.4	15	7.5	M2×6	0.34	0.56	1.7	1	1	-	-
YSS 5MN							-	12.7	19													0.48	0.92	2.4	2.1	2.1	-	
YSS 7MS	8	1.5	5	17	12	2.5	8	13.5	22.5	-	φ1.2	M2x2.5	1.5	7	4.8	4.2	2.3	2.4	15	5	M2×6	0.98	1.24	4.70	2.84	2.84	0.010	0.22
YSS 7MN							13	21.8	30.8													1.37	1.96	7.64	4.80	4.80	0.015	
YSS 9MS	10	2	5.5	20	15	2.5	10	18.9	29.8	-	φ1.2	M3x3	1.8	9	6.5	6	3.5	3.5	20	7.5	M3×8	1.86	2.55	11.76	7.35	7.35	0.016	0.38
YSS 9MN							16	29.9	39.9													2.55	4.02	19.60	18.62	18.62	0.026	
YSS 12MS	13	3	7.5	27	20	3.5	15	21.7	34.7	-	φ1.4	M3x3.5	2.5	12	8	6	4.5	3.5	25	10	M3×8	2.84	3.92	25.47	13.81	13.81	0.034	0.65
YSS 12MN							20	32.4	45.4													3.72	5.88	39.22	36.26	36.26	0.054	
YSS 15MS	16	4	8.5	32	25	3.5	20	26.7	42.1	4.5	M3	M3x4	3	15	10	6	4.5	3.5	40	15	M3×10	4.61	5.59	45.08	21.56	21.56	0.059	1.06
YSS 15MN							25	43.3	58.8													6.37	9.11	73.50	57.82	57.82	0.092	

Note：1kgf=9.81N

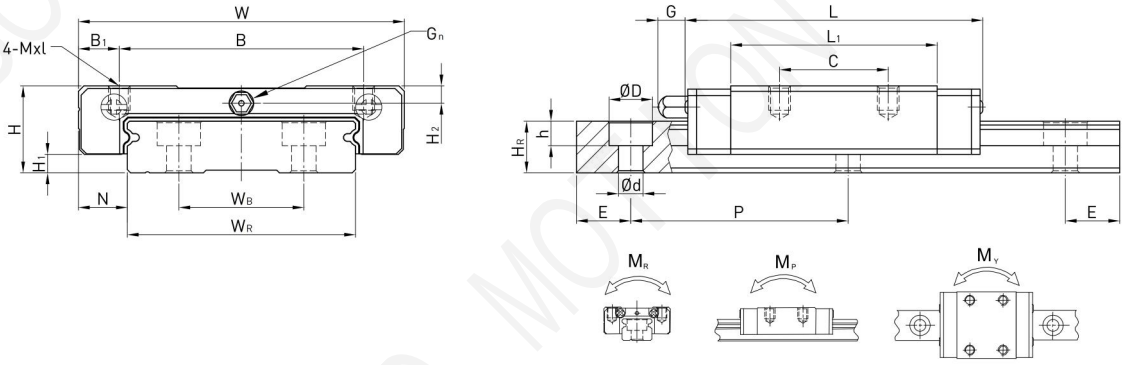
YSS SeriesMiniature Type

2-3-20 YSS-WS/YSS-WN Series Specifications

YSS3W、YSS5W、YSS7W、YSS9W、YSS12W



YSS15W

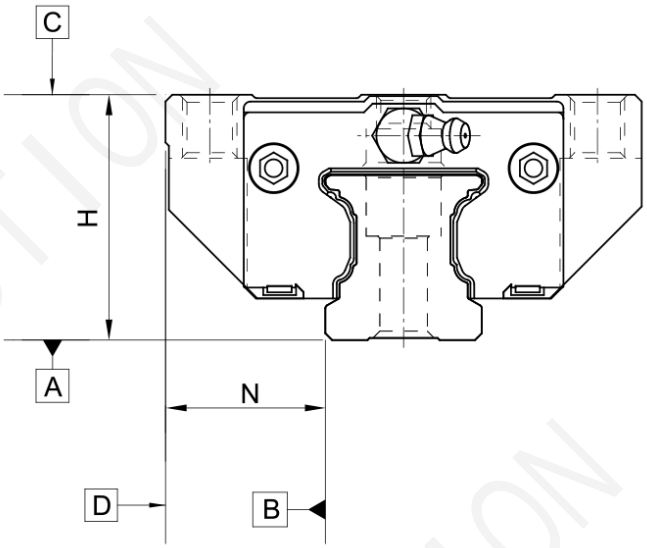


Model	Component size			Slider size(MM)										Slide rail size(MM)								Slide rail fixing bolt dimensions	Basic dynamic load rating	Basic static load rating	Allowable static moment			weight	
	H	H1	N	W	B	B1	C	L1	L	G	G	Mx1	H2	WR	W	HR	D	h	d	P	E	(mm)	C(kN)	Co (kN)	M N-m	M N-m	My N-m	slider kg	guide kg/m
YSS 3WS	4.5	1	3	12	-	-	4.5	10	15.2	-	-	M2×1.4	-	6	-	2.6	4	1.5	2.4	15	-	M2×1	0.29	0.54	1.6	0.9	0.9	-	-
YSS 3WN							8	15.1	20.1														0.38	0.91	2.6	1.9	1.9	-	
YSS 5WS	6.5	1.5	3.5	17	13	2	-	13.6	20.6	-	-	M2.5×2	-	10	-	4	4.8	1.6	2.9	20	7.5	M2.5×6	0.48	0.92	4.7	2.2	2.2	-	-
YSS 5WN							-	17.6	24.6														0.63	1.34	7.0	4.2	4.2	-	
YSS 7WS	9	1.9	5.5	25	19	3	10	21	31.2	-	φ1.2	M3×3	1.85	14	-	5.2	6	3.2	3.5	30	10	M3×6	1.37	2.06	15.7	7.14	7.14	0.020	0.51
YSS 7WN							19	30.8	41														1.77	3.14	23.45	15.53	15.53	0.029	
YSS 9WS	12	2.9	6	30	21	4.5	12	27.5	39.3	-	φ1.4	M3×3	2.4	18	-	7	6	4.5	3.5	30	10	M3×8	2.75	4.12	40.12	18.96	18.96	0.040	0.91
YSS 9WN					23	3.5	24	38.5	50.7														3.43	5.89	54.54	34	34.00	0.057	
YSS 12WS	14	3.4	8	40	28	6	15	31.3	46.1	-	φ1.4	M3×3.6	2.8	24	-	8.5	8	4.5	4.5	40	15	M4×8	3.92	5.59	70.34	27.8	27.80	0.071	1.49
YSS 12WN							28	45.6	60.4														5.10	8.24	102.70	57.37	57.37	0.103	
YSS 15WS	16	3.4	9	60	45	7.5	20	38	54.8	5.2	M3	M4×4.2	3.2	42	23	9.5	8	4.5	4.5	40	15	M4×10	6.77	9.22	199.34	56.66	56.66	0.143	2.86
YSS 15WN							35	57	73.8														8.93	13.38	299.01	120.60	122.60	0.215	

Note：1kgf=9.81N

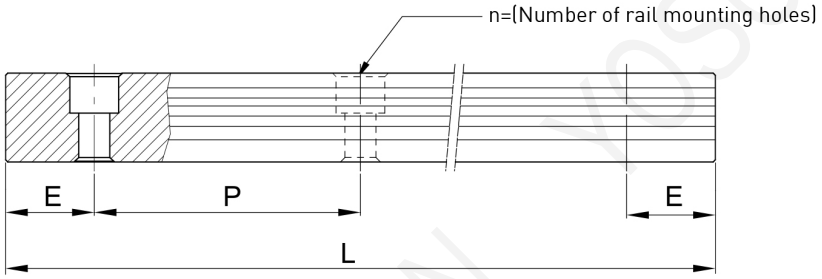
PGH Steel Strip Linear Guide

2-4-1 The Structure of PGH-series



- Rolling circulation system: Block, rail, ball, end cap and retainer
- Lubrication system:Grease Nipple and Piping Joint
- Dust protection system:End seal,Bottom Seal,Bolt Cap,Metal scraper

YOSO offers standard rail lengths for customer needs. For non-standard E-values, the recommended dimension should not be greater than 1/2 of the pitch (P) dimension. This will prevent an unstable rail end.



$$L = (n-1) \times P + 2 \times E \quad \text{Eq.2.1}$$

L : Total length of rail (mm)
P : Distance between any two holes (mm)
n : Number of mounting holes
E : Distance from the center of the last hole to the edge (mm)

PGH Steel Strip Linear Guide

2-4-2 Nominal Model Code of PGH Type

PGH Seriescan be classifiedintointerchangeable andnon-interchangeabletypes.The sizesare identical;theonlydifference between the twotypesis thatthe accuracyof non-interchangeable types could reachuptoUPgradesince YOS0 MOTlON makes the linearguide set under strict in- ternational regulation.interchangeableblocks and railscanbe freely exchanged,however.the ac- curacycould be up to H grade only due to technicaissue.lt ismuchmore convenient forcustom-ers who donot need linear guides with highaccuracy tohave interchange blocks and rails.

Non-inerchangeableType code:

PGH 25 L C/R - 2- - 1200 - N - Z0 -II - U + N3 N3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

① Nominal Model	② Dimension
PGH	15,20,25,30,35,45

③ Length of Block	④ Flange Type	⑤ Number of Block Per Rail	⑥ Accessory Code
N:Normal	C:WithFlange	EX:2	□:Standard (Please refer to page A26)
L:Long	R:Quartet		

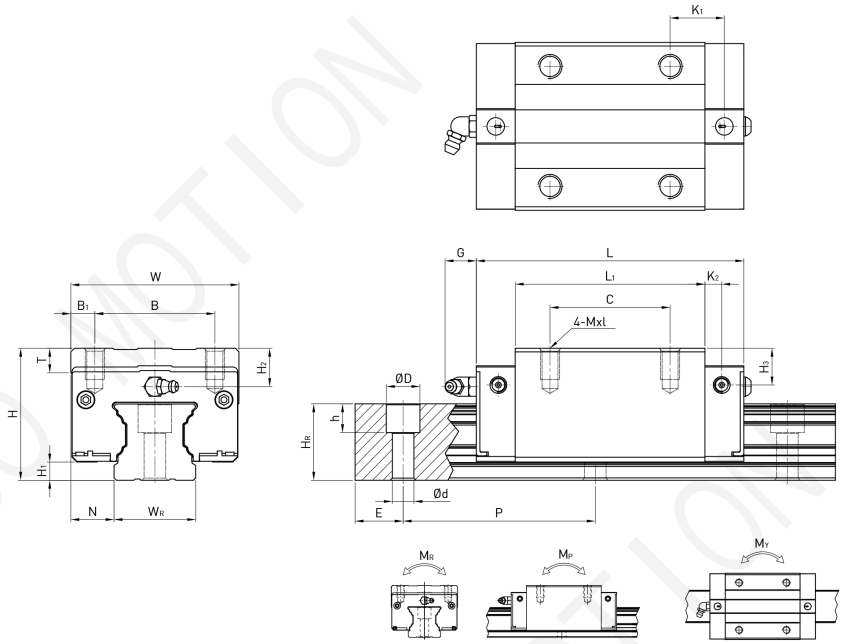
⑦ Length of Rai	⑧ Accuracy Grade	⑨ Preload	⑩ Two Sets per Axis	⑪ Rail Special Machining
Unit:mm	N:Norma	ZF:Slight Clearance	II	U:Tapped-Hole Rail
	H:High	Z0:No Preload		E:Rail with Special Machining
	P:Precision	Z1:Light Preload		
	SP:Super-Precision	Z2:Medium Preload		
	UP:Ultra-Precision	Z3:Heavy Preload		

⑫ Block Surface Treatment	⑬ Rail Surface Treatment
S:Standard	S:Standard
B1:Black Oxidation	B1:Black Oxidation
N1:Hard Chrome Plating	N1:Hard Chrome Plating
P:Phosphating	P:Phosphating
N3:Nickel Plating	N3:Nickel Plating
N4:Raydent	N4:Raydent
N5:Chrome Plating	N5:Chrome Plating

No symbol required when plating is not needed

PGH Steel Strip Linear Guide

2-4-3 PGH-R/PGH-LR Series Specifications

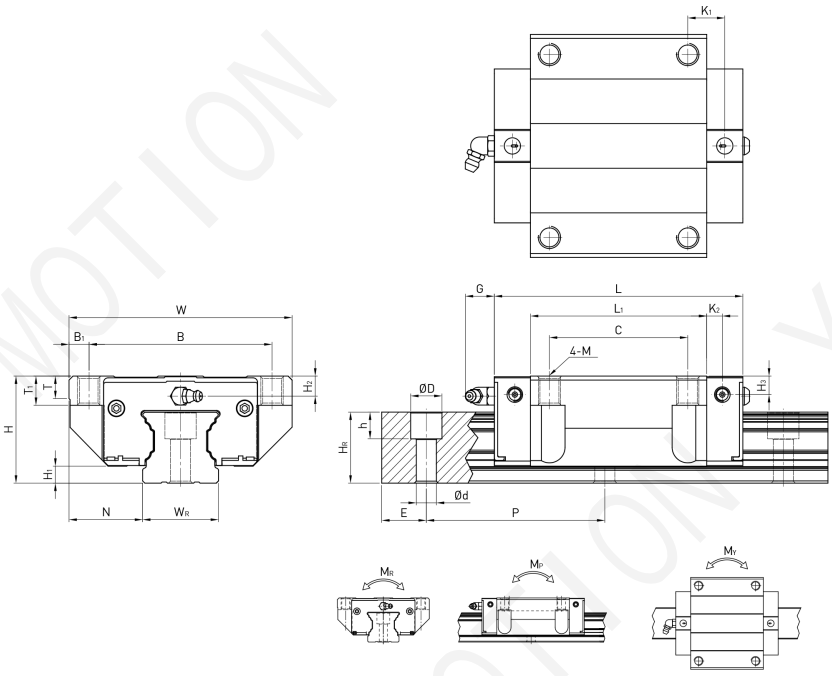


Model No.	Dimensions of Assembly (mm)			Dimensions of Block(mm)													Dimensions of Rail(mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	H1	N	W	B	B1	C	L1	L	K1	K2	G	MxI	T	H2	H3	WR	HR	D	h	d	P	E	(mm)	C(kN)	Co(kN)	MR kN-m	MP kN-m	MY kN-m	Block kg	Rail kg/m
PGH15R	28	4.1	9.5	34	26	4	26	39.6	58.2	10.8	4.25	6	M4x6	6	7.8	7.8	15	16.2	7.5	5.9	4.5	60	20	M4x17	14.7	19.52	0.19	0.14	0.14	0.15	1.58
PGH20R	30	4.65	12	44	32	6	36	52.5	74.9	12.45	5.5	6	M5x6	8	3.7	4	20	20.55	9.5	8.5	6	60	20	M5x19	23.7	30.51	0.37	0.28	0.28	0.25	2.48
PGH20LR							50	68.5	90.9	13.45															28.6	39.9	0.48	0.48	0.48	0.33	
PGH25R	40	6.1	12.5	48	35	6.5	35	61	84	17.4	5	13	M6x8	8	10	9.1	23	24.25	11	9	7	60	20	M6x22	34.96	43.94	0.6	0.49	0.49	0.46	3.38
PGH25LR							50	78.4	101.4	18.6															40.5	54.08	0.74	0.73	0.73	0.59	
PGH30R	45	7	16	60	40	10	40	69	97.4	19.75	8.7	13	M8x10	9.5	9.7	9.7	28	28.35	14	12	9	80	20	M8x25	46	55.19	0.95	0.7	0.7	0.71	5.1
PGH30LR							60	91.5	119.9	21															58.59	78.18	1.35	1.23	1.23	0.94	
PGH35R	55	7.6	18	70	50	10	50	79	111.4	22.6	7	13	M8x13	10.2	16	15.3	34	31.85	14	12	9	80	20	M8x28	61.17	79.3	1.73	1.09	1.09	1.24	7.14
PGH35LR							72	103.4	135.8	23.8															77.9	112.34	2.46	2.02	2.02	1.62	
PGH45R	70	9.7	20.5	86	60	13	60	97.2	137.6	23	8.7	13	M10x17	16	18.5	18.5	45	39.85	20	17	14	105	22.5	M12x37	98.43	112.66	3.56	2.35	2.35	2.38	11.51
PGH45LR							80	133.6	174	31.2															125.58	159.6	5.05	4.45	4.45	3.01	

Note : 1 kgf = 9.81 N

PGH Steel Strip Linear Guide

2-4-4 PGH-C/PGH-LC Series Specifications



Model No.	Dimensions of Assembly (mm)			Dimensions of Block(mm)														Dimensions of Rail(mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	H1	N	W	B	B1	C	L1	L	K1	K2	G	M	T	T1	H2	H3	WR	HR	D	h	d	P	E	(mm)	C(kN)	Co(kN)	MR kN-m	MP kN-m	MY kN-m	Block kg	Rail kg/m
PGH15C	24	4.1	16	47	38	4.5	30	39.6	58.2	8.8	4.25	6	M5	6	6.5	3.8	3.8	15	16.2	7.5	5.9	4.5	60	20	M4x17	14.7	19.52	0.19	0.14	0.14	0.14	1.58
PGH20C	30	4.65	21.5	63	53	5	40	52.5	74.9	10.45	5.5	6	M6	6.5	7.7	3.7	4	20	20.55	9.5	8.5	6	60	20	M5x19	23.7	30.51	0.37	0.28	0.28	0.36	2.48
PGH20LC								68.5	90.9	18.45																28.6	39.9	0.48	0.48	0.48	0.47	
PGH25C	36	6.1	23.5	70	57	6.5	45	61	84	12.4	5	13	M8	7	9.3	6	5.1	23	24.25	11	9	7	60	20	M6x22	34.96	43.94	0.6	0.49	0.49	0.53	3.38
PGH25LC								78.4	101.4	21.1																40.5	54.08	0.74	0.73	0.73	0.68	
PGH30C	42	7	31	90	72	9	52	69	97.4	13.75	8.7	13	M10	10.5	12	6.7	6.7	28	28.35	14	12	9	80	20	M8x25	46	55.19	0.95	0.7	0.7	0.9	5.1
PGH30LC								91.5	119.9	25																58.59	78.18	1.35	1.23	1.23	1.19	
PGH35C	48	7.6	33	100	82	9	62	79	111.4	16.6	7	13	M10	10.1	13.1	9	8.3	34	31.85	14	12	9	80	20	M8x28	61.17	79.3	1.73	1.09	1.09	1.37	7.14
PGH35LC								103.4	135.8	28.8																77.9	112.34	2.46	2.02	2.02	1.79	
PGH45C	60	9.7	37.5	120	100	10	80	97.2	137.6	13	8.7	13	M12	13.5	15	8.5	8.5	45	39.85	20	17	14	105	22.5	M12x37	98.43	112.66	3.56	2.35	2.35	2.45	11.51
PGH45LC								133.6	174	31.2																125.58	159.6	5.05	4.45	4.45	3	

Note : 1 kgf = 9.81 N

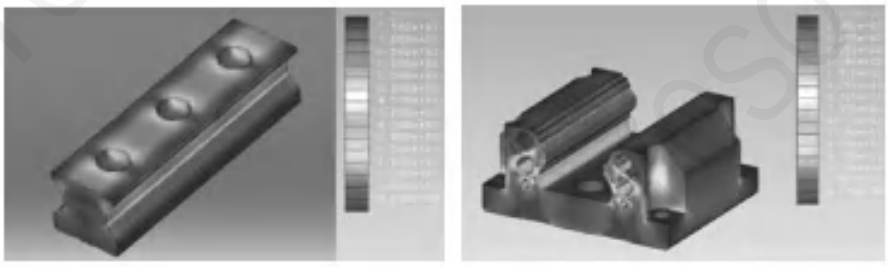
YGG Series -High Rigidity RollerType Linear Guideway

2-5-1 Advantages and features

The new YGG series from YOSO features a roller as the roling element instead of steel balls. The roller series offerssuper high rigidity and very high load capacities. The YGG series is designed with a 45-dearee anole of contact. Elasticdeformation of the line ar contact surface, during load, is greatly reduced thereby offering greater rigidity and higherload capacities in all 4 load directions.The YGG series linear guideway offers high performance for high-precisionmanufacturing and achieving longer service life.

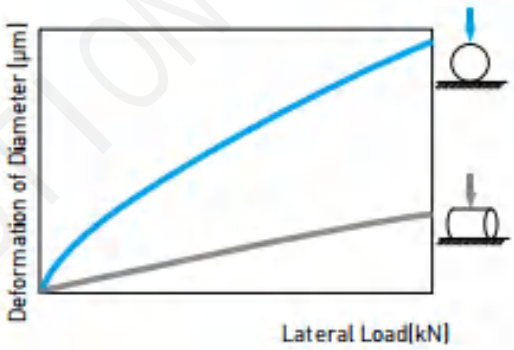
(1) 0ptimal design

FEM analysis was performed to determinethe optimal structure of the block and therail. The unique design of the circulation pathallows the YGG series linear guideway to offersmoother linear motion.



(2) Super high rigidity

The YGG seriesis a type of linear guideway that uses rollers asthe rolling elements. Rollers have a greater contact area thanballs so that the roller guideway features higher load capacityand greater rigidity. The figure shows the rigidity of a rollerand a ball with equal volume.

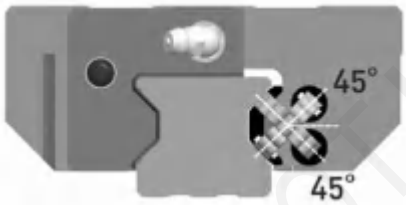


(3) Super high load capacity

With the four rows of rollers arranged at a contact angle of45-degrees, the YGG series linear guideway has equal loadratings in the radial, reverse radial and lateral direcions. TheYGG series has a higher load capacity in a smaller size thancomventional, ball-type linear guideways.

(4) Operating life increased

Compare with the ball element, the contact pressure ofrolling element is distributed on the line region. Therefore,stress concentration was reduced siginificantly and the YGGseries offers longer running life. The nominal life of YGG seriescan be calculated by using Eq.



The acting load will affect the nominal life of a linear quideway. Based on the selected basic dynamic rated load andthe actual load. The nominal life of ball type and roller type linear guideway can be calculated by Eg.2.5 respectively.

$$L = \left(\frac{C}{P}\right)^{\frac{10}{3}} \cdot 100km = \left(\frac{C}{P}\right)^{\frac{10}{3}} \cdot 62mile \quad \text{Eq. 2.5}$$

If the environmental factors are taken into consideration, the nominal life is influenced greatly by the motioncon ditions, the hardness of the raceway, and the temperature of the linear quideway. The relationship between the sefactors is expressed in Eg.2.6.

$$L = \left(\frac{f_h \cdot f_t \cdot C}{f_w \cdot P}\right)^{\frac{10}{3}} \cdot 100km = \left(\frac{f_h \cdot f_t \cdot C}{f_w \cdot P}\right)^{\frac{10}{3}} \cdot 62mile \quad \text{Eq. 2.6}$$

L : Nominal life
C : Basic dynamic load rating
P : Actual load

f_h : Hardness factor
f_t : Temperature factor
f_w : Load factor

YGG Series -High Rigidity RollerType Linear Guideway

1. Nominal life test

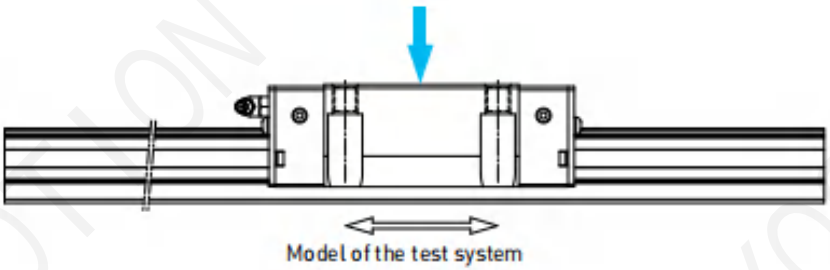


Table 2-5-1

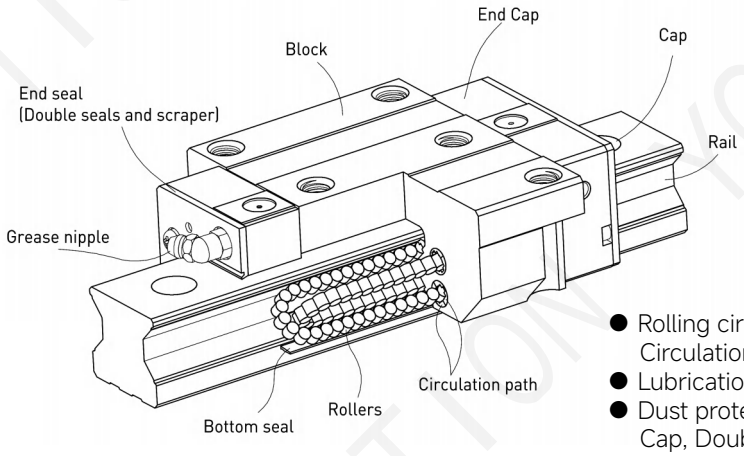
Tested model1: YGG35R Preload: ZA class Max.Speed: 60mmin Acceleration: 1G Stroke: 0.55m Lubrication: grease held every 100km External load: 15kN Traveling distance: 1135km	Test results: The nominal life of YGG35Ris 1000km.After traveling 1135km, fatigue flaking did not appear onthe surface of the raceway or rollers, 

2. Durability Test

Tested model2: YGG35C Preload: ZA class Max.Speed: 120mmin Acceleration: 1G Stroke: 2m Lubrication: oil feed rate: 0.3cm³/hr External load: 0kN Traveling distance: 15000km	Test results: Fatigue flaking did not appear on the surface of theraceway or rollers after traveling 15000km. 

Note:The datalisted are from samples.

2-5-2 Construction of YGG Series



- Rolling circulation system: Block, Rail, End ca p, Circulation path, rollers
- Lubrication system: Grease nipple and piping joint
- Dust protection system: End seal, Bottom seal, Cap, Double seals and Scraper

YGG Series -High Rigidity RollerType Linear Guideway

2-5-3 Model Number of YGG series

YGG series linear guideways are classified into non-interchange able and interchangeable types. The sizes of these twotypes are the same as one another. The main difference is that the interchangeable type of blocks and rails can befreely exchanged and they can maintain P-class accuracy. Because of strict dimensional control, the interchangeabletype line ar guideways are a wise choice for customers when rails do not need to be matched for an axis. The modelnumberof the YGG series identifiesthe size,type, accuracy class, preload class, etc.

(1) Non-interchangeable type

YGG 25 L C/R - 2- - 1200 - N - Z0 -II - U + N3 N3

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

① Nominal Model	② Dimension
YGG	15,20,25,30,35,45,55,65

③ Length of Block	④ Flange Type	⑤ Number of Block Per Rail	⑥ Accessory Code
N:Normal	C:WithFlange	EX:2	□:Standard (Please refer to page A26)
L:Long	R:Quartet		

⑦ Length of Rai	⑧ Accuracy Grade	⑨ Preload	⑩ Two Sets per Axis	⑪ Rail Special Machining
Unit:mm	N:Norma	ZF:Slight Clearance	II	U:Tapped-Hole Rail
	H:High	Z0:No Preload		E:Rail with Special Machining
	P:Precision	Z1:Light Preload		
	SP:Super-Precision	Z2:Medium Preload		
	UP:Ultra-Precision	Z3:Heavy Preload		

⑫ Block Surface Treatment	⑬ Rail Surface Treatment
S:Standard	S:Standard
B1:Black Oxidation	B1:Black Oxidation
N1:Hard Chrome Plating	N1:Hard Chrome Plating
P:Phosphating	P:Phosphating
N3:Nickel Plating	N3:Nickel Plating
N4:Raydent	N4:Raydent
N5:Chrome Plating	N5:Chrome Plating

No symbol required when plating is not needed

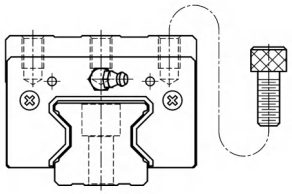
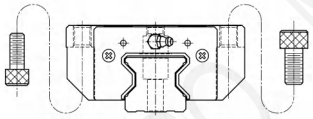
YGG Series -High Rigidity RollerType Linear Guideway

2-5-4 Advantages and features

(1) Block types

YOSO offers two types of guide blocks, flange and square type. Because of the low assembly height and large mounting surface, the flange type is excellent for heavy moment load applications.

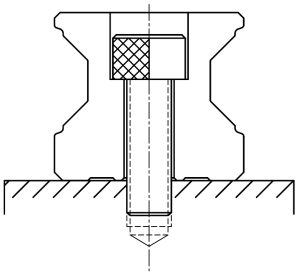
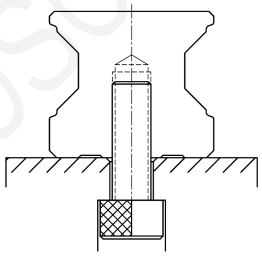
Table 2-5-2

Type	Model	Shape	Height	Rail Length	Main Application
Square	YGG-R YGG-LR		28 90	100 4000	●Automation Systems ●Transportation equipment ●CNC machining centers ●Heavy duty cutting machines ●CNC grinding machines ●Injection molding machines ●Plano millers ●Devices requiring high rigidity ●Devices requiring highloadcapacity ●Electric discharge machines
Flange	YGG-C YGG-LC		24 90	100 4000	

(2) Rail types

In ad ditio n to the stand ard top mounting type, YOSO also offers the bottom mounting type of rails.

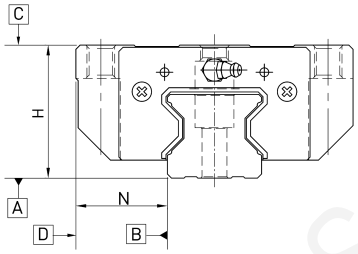
Table 2-5-3

Mounting from Top	Mounting from Bottom
	

YGG Series -High Rigidity RollerType Linear Guideway

2-5-5 Accuracy Classes

The accuracy of the YGG series can be classified into four classes: high (H).precision (P), super precision (SP) and ultra precision (UP). Customersmay choose the class by referencing the accuracy requirements of theapplied equipment.



(1) Non-interchangeable type

Table 2-5-4 Accuracy Standards

Item	YGG-15,20			
Accuracy Classes	High	Precision	Super Precision	Ultra Precision
	(C)	(P)	(SP)	(UP)
Dimensional tolerance of height H	±0.03	0 -0.03	0 -0.015	0 -0.008
Dimensional tolerance of width N	±0.03	0 -0.03	0 -0.015	0 -0.008
Variation of height H	0.01	0.006	0.004	0.003
Variation of width N	0.01	0.006	0.004	0.003
Running parallelism of block surface C to surface A	See Table 2-5-12			
Running parallelism of block surface D to surface B	See Table 2-5-12			

Table 2-5-5 Accuracy Standards

Item	YGG-25,30,35			
Accuracy Classes	High	Precision	Super Precision	Ultra Precision
	(C)	(P)	(SP)	(UP)
Dimensional tolerance of height H	±0.04	0 -0.04	0 -0.02	0 -0.01
Dimensional tolerance of width N	±0.04	0 -0.04	0 -0.02	0 -0.01
Variation of height H	0.015	0.007	0.005	0.003
Variation of width N	0.015	0.007	0.005	0.003
Running parallelism of block surface C to surface A	See Table 2-5-12			
Running parallelism of block surface D to surface B	See Table 2-5-12			

YGG Series -High Rigidity RollerType Linear Guideway

Table 2-5-6 Accuracy Standards

Item	YGG-45,55			
Accuracy Classes	High	Precision	Super Precision	Ultra Precision
	(C)	(P)	(SP)	(UP)
Dimensional tolerance of height H	±0.05	0 -0.05	0 -0.03	0 -0.02
Dimensional tolerance of width N	±0.05	0 -0.05	0 -0.03	0 -0.02
Variation of height H	0.015	0.007	0.005	0.003
Variation of width N	0.02	0.01	0.007	0.003
Running parallelism of block surface C to surface A	See Table 2-5-12			
Running parallelism of block surface D to surface B	See Table 2-5-12			

Table 2-5-7 Accuracy Standards

Item	YGG-65			
Accuracy Classes	High	Precision	Super Precision	Ultra Precision
	(C)	(P)	(SP)	(UP)
Dimensional tolerance of height H	±0.07	0 -0.07	0 -0.05	0 -0.03
Dimensional tolerance of width N	±0.07	0 -0.07	0 -0.05	0 -0.03
Variation of height H	0.02	0.01	0.007	0.005
Variation of width N	0.025	0.015	0.01	0.007
Running parallelism of block surface C to surface A	See Table 2-5-12			
Running parallelism of block surface D to surface B	See Table 2-5-12			

(2) Accuracyof interchangeable

Table 2-5-8 Accuracy Standards

Item	YGG-15,20	
Accuracy Classes	High(H)	Precision(P)
Dimensional tolerance of height H	±0.03	-0.015
Dimensional tolerance of width N	±0.03	-0.015
Variation of height H	0.01	0.006
Variation of width N	0.01	0.006
Running parallelism of block surface C to surface A	See Table 2-5-12	
Running parallelism of block surface D to surface B	See Table 2-5-12	

YGG Series -High Rigidity RollerType Linear Guideway

Table 2-5-9 Accuracy Standards

Item	YGG-25,30,35	
Accuracy Classes	High(H)	Precision(P)
Dimensional tolerance of height H	±0.04	-0.02
Dimensional tolerance of width N	±0.04	-0.02
Variation of height H	0.015	0.007
Variation of width N	0.015	0.007
Running parallelism of block surface C to surface A	See Table 2-5-12	
Running parallelism of block surface D to surface B	See Table 2-5-12	

Table 2-5-10 Accuracy Standards

Item	YGG-45,55	
Accuracy Classes	High(H)	Precision(P)
Dimensional tolerance of height H	±0.05	-0.025
Dimensional tolerance of width N	±0.05	-0.025
Variation of height H	0.015	0.007
Variation of width N	0.02	0.01
Running parallelism of block surface C to surface A	See Table 2-5-12	
Running parallelism of block surface D to surface B	See Table 2-5-12	

Table 2-5-11 Accuracy Standards

Item	YGG-65	
Accuracy Classes	High(H)	Precision(P)
Dimensional tolerance of height H	±0.07	-0.035
Dimensional tolerance of width N	±0.07	-0.035
Variation of height H	0.02	0.01
Variation of width N	0.025	0.015
Running parallelism of block surface C to surface A	See Table 2-5-12	
Running parallelism of block surface D to surface B	See Table 2-5-12	

YGG Series -High Rigidity RollerType Linear Guideway

(3) Accuracy of running parallelism

Table 2-5-12 Accuracy of Running Parallelism

Rail Length (mm)	Accuracy (μm)			
	h	p	SP	UP
100	3	3	2	2
100～200	4	4	2	2
200～300	5	5	3	2
300～500	6	6	3	2
500～700	7	7	4	2
700～900	8	8	5	3
900～1,100	9	9	6	3
1,100～1,500	11	11	7	4
1,500～1,900	13	13	8	4
1,900～2,500	15	15	10	5
2,500～3,100	18	18	11	6
3,100～3,600	20	20	14	7
3,600～4,000	21	21	15	7

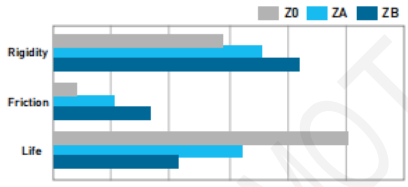
2-5-6 Preload

A preload can be applied to each guideway using oversized rollers. Generally, a linear motion guideway has negative-clearance between the raceway and rollers to improve stifness and maintain high precision. The YGG series linealiguideway offers three standard preloads for various applications and conditions.

Table 2-5-13

Class	Code	Preload	Condition
Light Preload	Z0	0.02C~0.04C	Certain load direction,low impact,low precision required
Medium Preload	ZA	0.07C~0.09C	High rigidity required,high precision required
Heavy Preload	ZB	0.12C~0.14C	Super high rigidity required,withvibration and impact

The figure shows the relationship betweenthe rigidity, friction and nominal life. A preloadno larger than ZA would be recommendedfor smaller model sizes to avoid over-preloadaffecting the life of the guideway.



● Stiffness performance

Stiffness depends on preload. The following table shows stiffness value of each size.

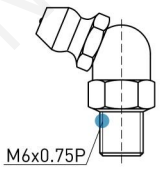
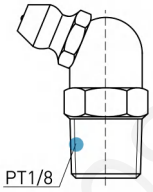
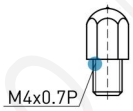
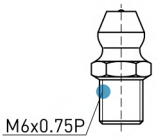
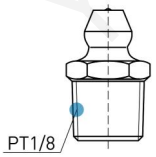
Table 2-5-14 Radial stiffness for YGG Series

Load type	Series/Size	Stiffness (N/μm)		
		Z0	ZA	ZB
Heavy load	YGG 15C	508	727	788
	YGG 20C	625	853	950
	YGG 25C	692	954	1196
	YGG 30C	882	1082	1333
	YGG 35C	1059	1247	1547
	YGG 45C	1642	1851	2332
	YGG 55C	1784	2053	2506
	YGG 65C	2564	2900	3482
Super heavy load	YGG 20H	840	1160	1279
	YGG 25H	887	1242	1549
	YGG 30H	1125	1391	1711
	YGG 35H	1412	1757	2144
	YGG 45H	2207	2511	3172
	YGG 55H	2459	2858	3538
	YGG 65H	3560	4064	4937

2-5-7 Lubrication

(1) Grease

● Grease nipple

	 YGG25 YGG30 YGG35 NO.34320001	 YGG45 YGG55 YGG65 NO.34320003
 YGG15 YGG20 NO.34310002	 YGG25 YGG30 YGG35 NO.34310008(OPTION)	 YGG45 YGG55 YGG65 NO.3431000B(OPTION)

● Mounting location

The standard location of the grease fiting is at bothends of the block, but the nipple can be mounted inthe side or the top of block. For lateralinstallation,we recommend that the nipple be mounted at thenon-reference side,otherwise please contact us. Itis possible to carry out the lubrication by using anoil-piping joint. The figure shows the locations ofthe grease fitting

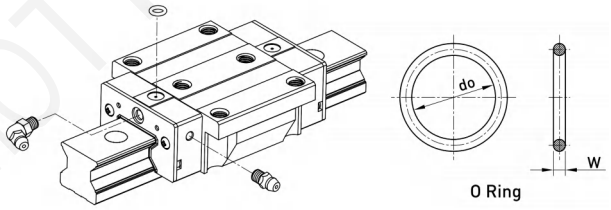
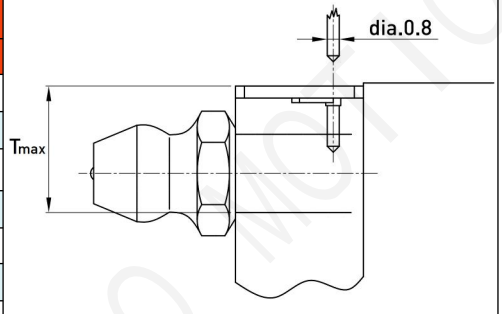


Table 2-5-15 O-Ring sizeand max. permissible depth for piercing

Size	O-Ring		Lube hole at top: max.per mis sible depth for piercing
	do (mm)	W(mm)	T_{MAX}(mm)
YGG15	2.5±0.15	1.5±0.15	3.45
YGG20	2.5±0.15	1.5±0.15	4
YGG25	7.5±0.15	1.5±0.15	5.8
YGG30	7.5±0.15	1.5±0.15	6.2
YGG35	7.5±0.15	1.5±0.15	8.65
YGG45	7.5±0.15	1.5±0.15	9.5
YGG55	7.5±0.15	1.5±0.15	11.6
YGG65	7.5±0.15	1.5±0.15	14.5



● The oil amount for a block filledwith grease

Table 2-5-16 The oil amount for a block flled with grease

Size	Heavy Load(cm^3)	Super Heavy Load(cm^3)	Size	Heavy Load(cm^3)	Super Heavy Load(cm^3)
YGG15	3	-	YGG35	12	14
YGG20	5	6	YGG45	19	23
YGG25	7	8	YGG55	28	35
YGG30	9	10	YGG65	52	63

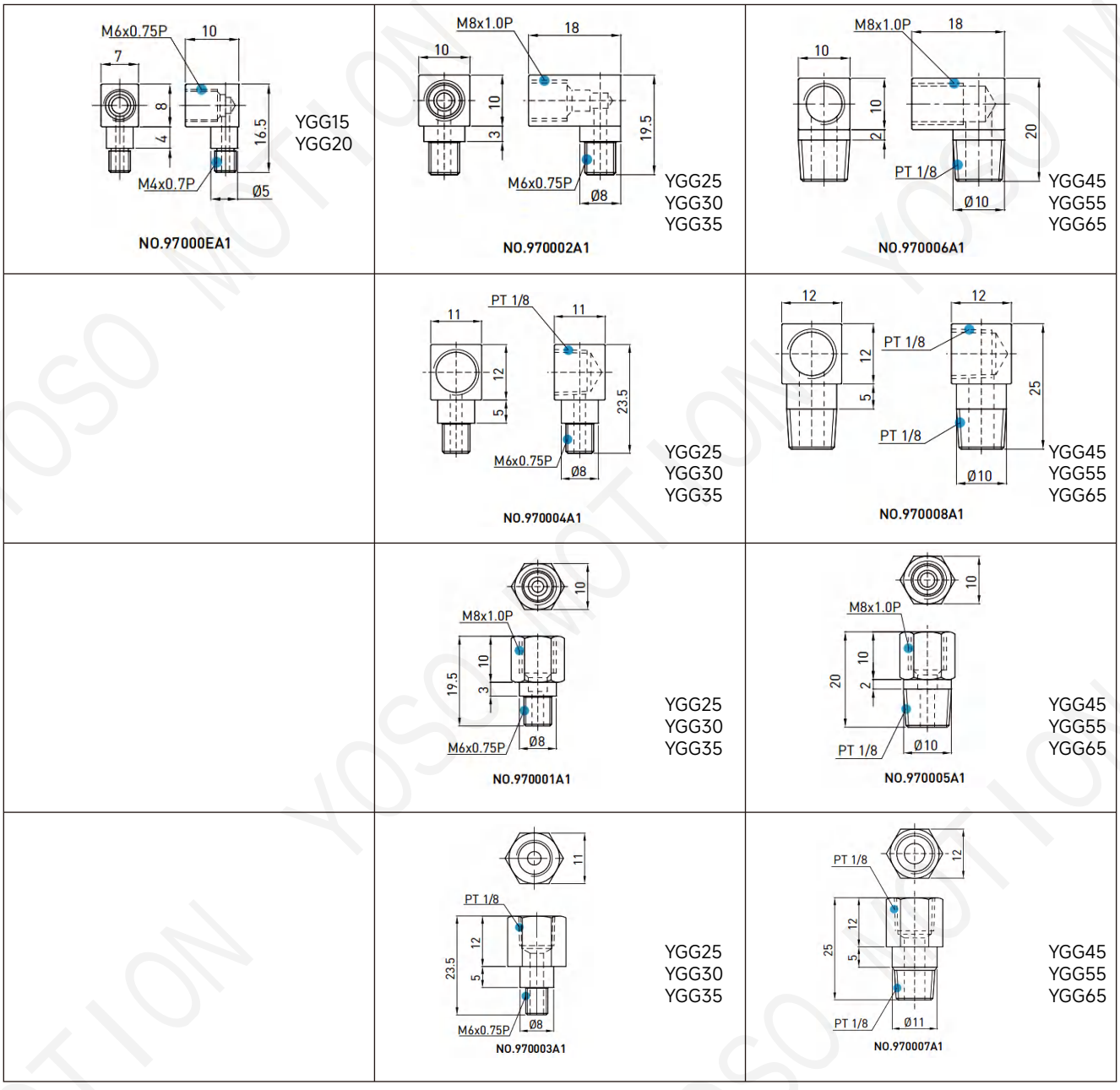
● Frequencyof replenishment

Check the grease every100 km, or every 3-6 months.

YGG Series -High Rigidity RollerType Linear Guideway

(2) Oil

The recommended viscosity of oil is about 32-150cSt. Ifyou need to use oil-type lubrication, please inform us.



● Mounting location

Table 2-5-17 oil feed rate

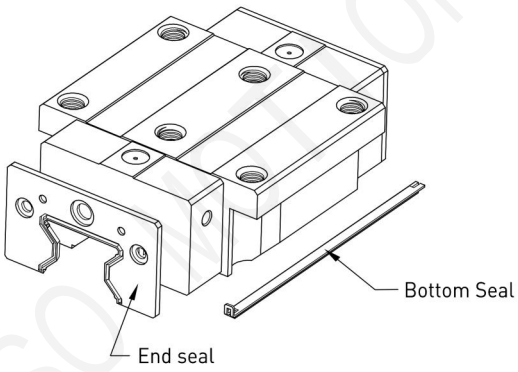
Size	Feed rate (cm^3/hr)	Size	Feed rate (cm^3/hr)
YGG 15	0.14	YGG 35	0.23
YGG 20	0.14	YGG 45	0.3
YGG 25	0.167	YGG 55	0.367
YGG 30	0.2	YGG 65	0.433

YGG Series -High Rigidity RollerType Linear Guideway

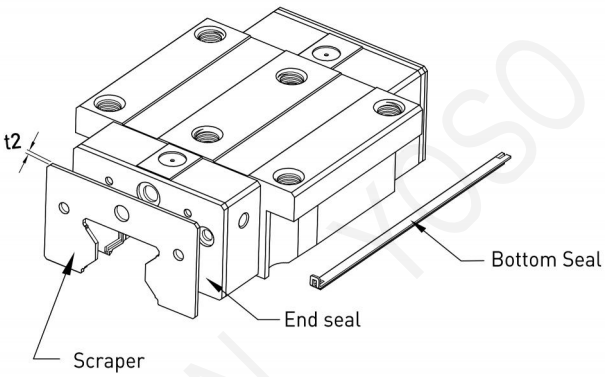
2-5-8 Dust Proof Accessories

(1) Codes of accessories

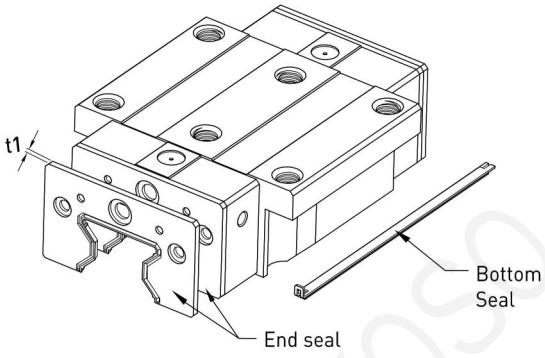
If the fo llowing accessories are needed, please add the code followed by the model number.



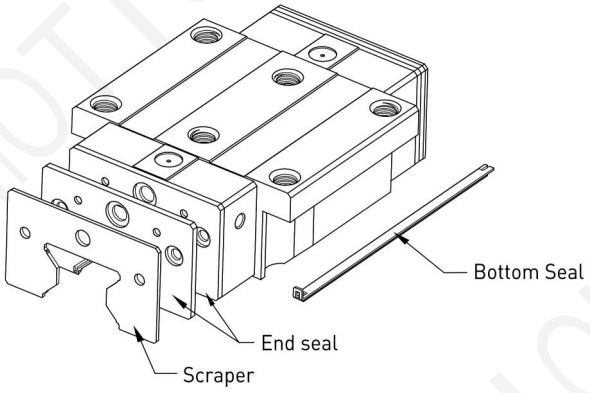
No symbol: Standard Protection (End seal + Bottom Seal)



ZZ (End seal + Bottom Seal + Scraper)



DD (Double seals + Bottom Seal)



KK (Double seals + Bottom Seal + Scraper)

2-5-9 Friction

The maximum value of resistance per end seal are as shown in the table.

Table 2-5-18 Seal Resistance

Size	Resistance N (kgf)	Size	Resistance N (kgf)
YGG 15	2.45(0.25)	YGG 35	4.61(0.47)
YGG 20	2.9(0.3)	YGG 45	4.91(0.5)
YGG 25	3.43(0.35)	YGG 55	5.89(0.6)
YGG 30	4.22(0.43)	YGG 65	7.36(0.75)

Note:

1. 1kgf=9.81N
2. Please inform YOSO if lo friction request is required.

YGG Series -High Rigidity RollerType Linear Guideway

2-5-10 The Accuracy Tolerance of Mounting Surface

(1) The accuracytolerance of rail-mounting surface

As long as the accuracy reguirements of the mounting surfaces shown in the following tables are met, the highaccuracy, high rigidity and long life of the YGG series linear guideway will be maintained without any difficulty.

- The parallelism tolerance of reference surface (P)

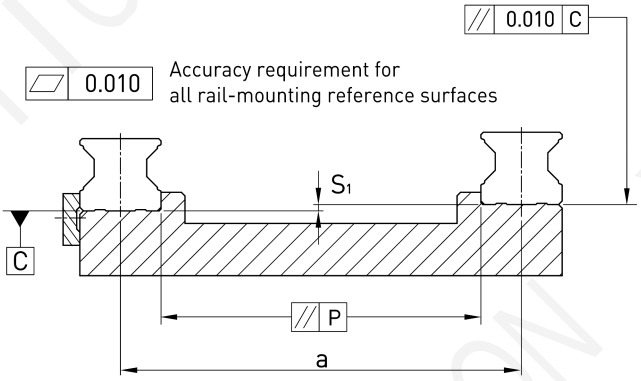


Table 2-5-19 Max, Parallelism Tolerance (P)

Size	Preload classes		
	Light Preload (Z0)	Medium Preload (ZA)	Heavy Preload (ZB)
YGG15	5	3	3
YGG20	8	6	4
YGG25	9	7	5
YGG30	11	8	6
YGG35	14	10	7
YGG45	17	13	9
YGG55	21	14	11
YGG65	27	18	14

- The accuracy tolerance of reference surface height (S_1)

$$S_1 = a \times K - T_H$$

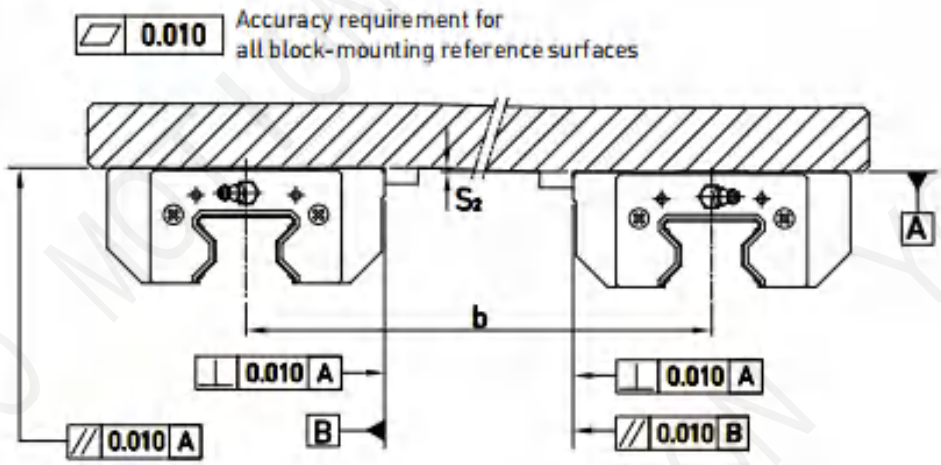
S_1 : Max. tolerance of height
a : Distance between paired rails
K : Coefficient of tolerance of height

Table 4-1-20 Coefhcient of tolerance of height

Size	Preload classes		
	Light Preload (Z0)	Medium Preload (ZA)	Heavy Preload (ZB)
k	2.2×10^{-4}	1.7×10^{-4}	1.2×10^{-4}

(2) The accuracy tolerance of block-mounting surface

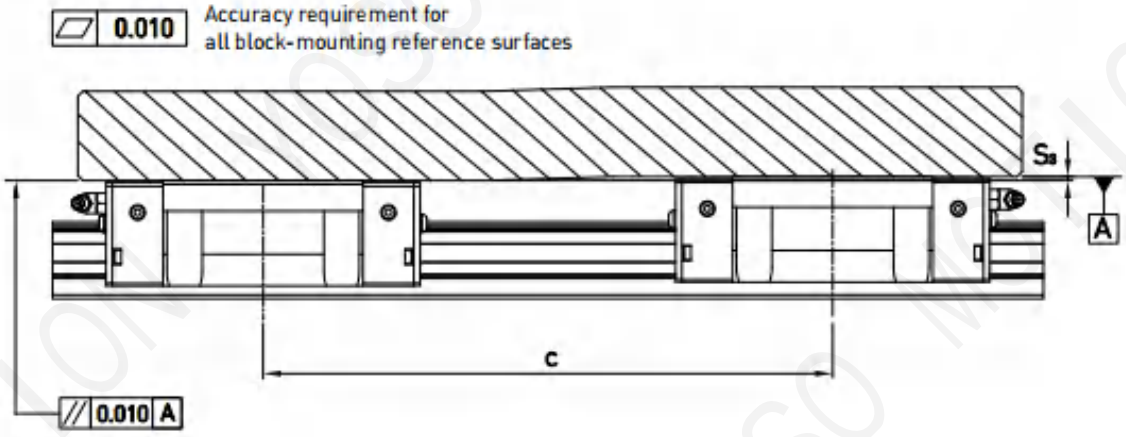
● The tolerance of the height ofreference surface when two or more pieces areused in parallel (S_2)



$$S_2 = b \times 4.2 \times 10^{-5}$$

S_2 : Max. tolerance of height
b : Distance between paired blocks

● The tolerance of the height of reference surface when two or more pieces areused in parallel (S_3)



$$S_3 = c \times 4.2 \times 10^{-5}$$

S_3 : Max. tolerance of height
c : Distance between paired blocks

YGG Series -High Rigidity RollerType Linear Guideway

2-5-11 Cautions for Installation

(1) Shoulder heights and fillets

Improper shoulder heights and fillets of mounting surfaces will cause a deviation in accuracy and the interferencewith the rail or block. As long as the recommended shoulder heights and fillets are followed, installation inaccuraciesshould be eliminated.

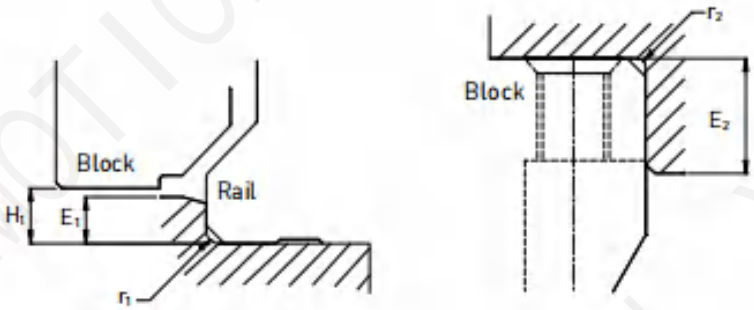


Table 2-5-21

Size	Max.radius of fillets r1 (mm)	Max.radius of fillets r2 (mm)	Shoulder height beside the rail r1 (mm)	Shoulder height beside the block E2 (mm)	Clearance under block H1 (mm)
YGG15	0.5	0.5	3	4	4
YGG20	0.5	0.5	3.5	5	5
YGG25	1.0	1.0	5	5	5.5
YGG30	1.0	1.0	5	5	6
YGG35	1.0	1.0	6	6	6.5
YGG45	1.0	1.0	7	8	8
YGG55	1.5	1.5	9	10	10
YGG65	1.5	1.5	10	10	12

(2) Tightening Torque of Mounting Bolts

Improper tightening of mounting bolts will seriously influence the accuracy of a linear guideway. The following tightening torgue for the different sizes of boltis recommende d.

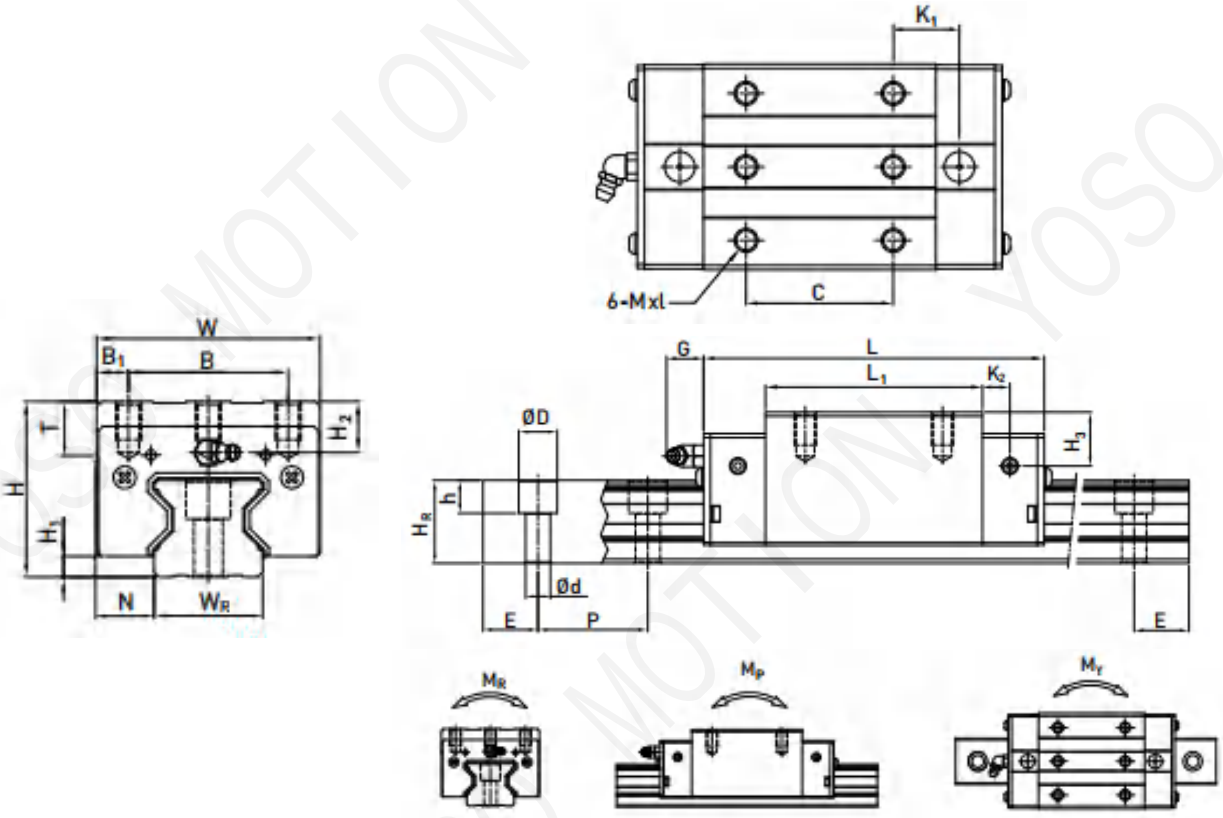
Table 2-5-22

Size	Bolt size	Torque N-cm(kgf-cm)		
		Iron	Casting	Aluminum
YGG15	M4×0.7P×16L	392(40)	274(28)	206(21)
YGG20	M5×0.8P×20L	883(90)	588(60)	441(45)
YGG25	M6×1P×20L	1373(140)	921 (94)	686(70)
YGG30	M8×1.25P×25L	3041 (310)	2010 (205)	1470(150)
YGG35	M8×1.25P×25L	3041 (310)	2010 (205)	1470(150)
YGG45	M12×1.75P×35L	11772(1200)	7840 (800)	5880(600)
YGG55	M14×2P×45L	15696(1600)	10500(1100)	7840(800)
YGG65	M16×2P×50L	19620(2000)	13100(1350)	9800(1000)

YGG Series -High Rigidity RollerType Linear Guideway

2-5-12 Dimensions for YGG series

(1) YGG-R/YGG-LR



Model No.	Dimensions of Assembly (mm)			Dimensions of Block(mm)													Dimensions of Rail(mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	H1	N	W	B	B1	C	L1	L	K1	K2	G	MxI	T	H2	H3	WR	HR	D	h	d	P	E	(mm)	C(kN)	C0(kN)	MR kN-m	MP kN-m	MY kN-m	Block kg	Rail kg/m
YGG15R	28	4	9.5	34	26	4	26	45	68	13.4	4.7	5.3	M4x8	6	7.6	10.1	15	16.5	7.5	5.7	4.5	30	20	M4x16	11.3	24	0.311	0.173	0.173	0.2	1.8
YGG20R	34	5	12	44	32	6	36	57.5	86	15.8	6	5.3	M5x8	8	8.3	8.3	20	21	9.5	8.5	6	30	20	M5x20	21.3	46.7	0.647	0.46	0.46	0.4	2.76
YGG20LR							50	77.5	106	18.8															26.9	63	0.872	0.837	0.837	0.53	
YGG25R	40	5.5	12.5	48	35	6.5	35	64.5	97.9	20.75	7.25	12	M6x8	9.5	10.2	10	23	23.6	11	9	7	30	20	M6x20	27.7	57.1	0.758	0.605	0.605	0.61	3.08
YGG25LR							50	81	114.6	21.5															33.9	73.4	0.975	0.991	0.991	0.75	
YGG30R	45	6	16	60	40	10	40	71	109.8	23.5	8	12	M8x10	9.5	9.5	10.3	28	28	14	12	9	40	20	M8x20	39.1	82.1	1.445	1.06	1.06	0.9	4.41
YGG30LR							60	93	131.8	24.5															48.1	105	1.846	1.712	1.712	1.16	
YGG35R	55	6.5	18	70	50	10	50	79	124	22.5	10	12	M8x12	12	16	19.6	34	30.2	14	12	9	40	20	M8x25	57.9	105.2	2.17	1.44	1.44	1.57	6.06
YGG35LR							72	106.5	151.5	25.25															73.1	142	2.93	2.6	2.6	2.06	
YGG45R	70	8	20.5	86	60	13	60	106	153.2	31	10	12.9	M10x17	16	20	24	45	38	20	17	14	52.5	22.5	M12x35	92.6	178.8	4.52	3.05	3.05	3.18	9.97
YGG45LR							80	139.8	187	37.9															116	230.9	6.33	5.47	5.47	4.13	
YGG55R	80	10	23.5	100	75	12.5	75	125.5	183.7	37.75	12.5	12.9	M12x18	17.5	22	27.5	53	44	23	20	16	60	30	M14x45	130.5	252	8.01	5.4	5.4	4.89	13.98
YGG55LR							95	173.8	232	51.9															167.8	348	11.15	10.25	10.25	6.68	
YGG65R	90	12	31.5	126	76	25	70	160	232	60.8	15.8	12.9	M16x20	25	15	15	63	53	26	22	18	75	35	M16x50	213	411.6	16.2	11.59	11.59	8.89	20.22
YGG65LR							120	223	295	67.3															275.3	572.7	22.55	22.17	22.17	12.13	

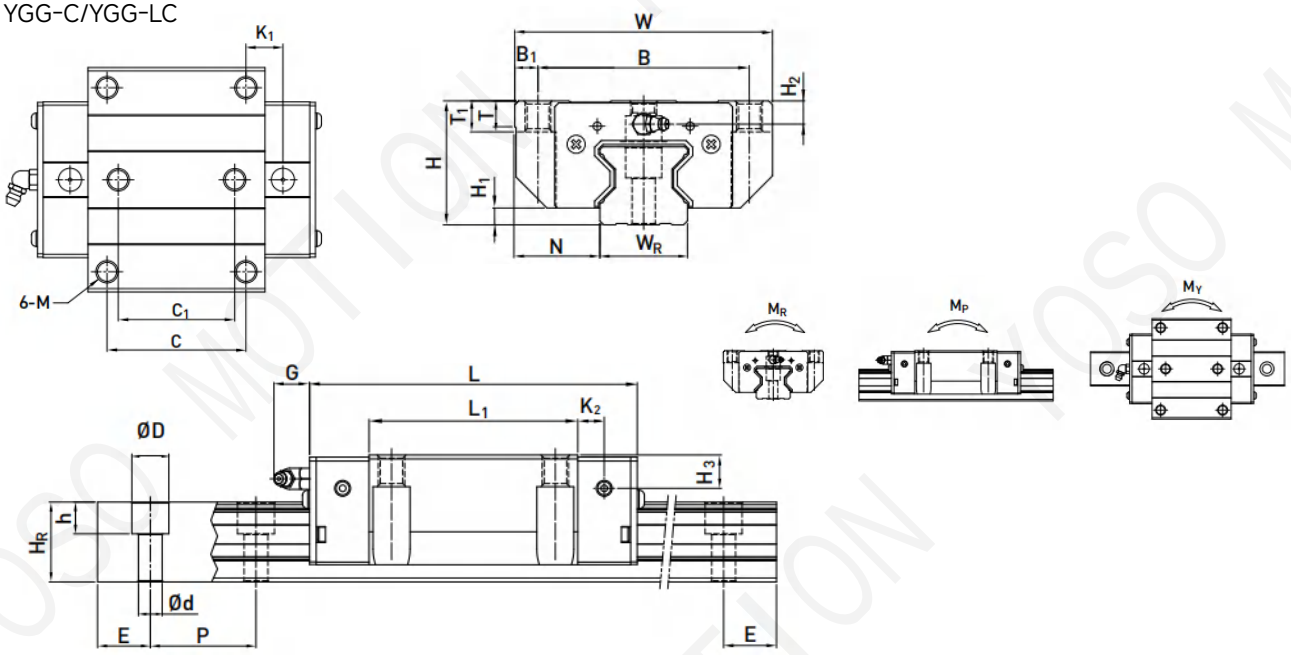
Note:

1.1 kgf=9.81N

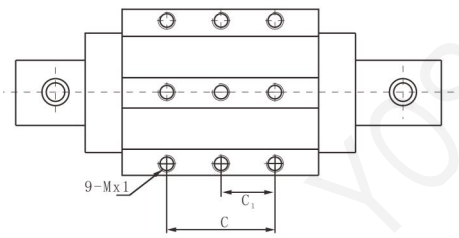
2.The theoretical dynamic rated load is C_{100R},if necessary C_{50R} conversion formulais as follows:$C_{50R}=1.23xC_{100R}$

YGG Series -High Rigidity RollerType Linear Guideway

(1) YGG-C/YGG-LC



Model No.	Dimensions of Assembly (mm)			Dimensions of Block(mm)															Dimensions of Rail(mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	H1	N	W	B	B1	C	C1	L1	L	K1	K2	G	M	T	T1	H2	H3	WR	HR	D	h	d	P	E	(mm)	C(kN)	C0(kN)	MR kN-m	MP kN-m	MY kN-m	Block kg	Rail kg/m
YGG15C	24	4	16	47	38	4.5	30	26	45	68	11.4	4.7	5.3	M5	6	6.95	3.6	6.1	15	16.5	7.5	5.7	4.5	30	20	M4x16	11.3	24	0.311	0.173	0.173	0.2	1.8
YGG20C	30	5	21.5	63	53	5	40	35	57.5	86	13.8	6	5.3	M6	8	10	4.3	4.3	20	21	9.5	8.5	6	30	20	M5x20	21.3	46.7	0.647	0.46	0.46	0.4	2.76
YGG20LC									77.5	106	23.8																26.9	63	0.872	0.837	0.837	0.53	
YGG25C	36	5.5	23.5	70	57	6.5	45	40	64.5	97.9	15.75	7.25	12	M8	9.5	10	6.2	6	23	23.6	11	9	7	30	20	M6x20	27.7	57.1	0.758	0.605	0.605	0.61	3.08
YGG25LC									81	114.6	24																33.9	73.4	0.975	0.991	0.991	0.75	
YGG30C	42	6	31	90	72	9	52	44	71	109.8	17.5	8	12	M10	9.5	10	6.5	7.6	28	28	14	12	9	40	20	M8x20	39.1	82.1	1.445	1.06	1.06	0.9	4.41
YGG30LC									93	131.8	28.5																48.1	105	1.846	1.712	1.712	1.16	
YGG35C	48	6.5	33	100	82	9	62	52	79	124	16.5	10	12	M10	12	13	9	12.6	34	30.2	14	12	9	40	20	M8x25	57.9	105.2	2.17	1.44	1.44	1.57	6.06
YGG35LC									106.5	151.5	30.25																73.1	142	2.93	2.6	2.6	2.06	
YGG45C	60	8	37.5	120	100	10	80	60	106	153.2	21	10	12.9	M12	14	15	10	14	45	38	20	17	14	52.5	22.5	M12x35	92.6	178.8	4.52	3.05	3.05	3.18	9.97
YGG45LC									139.8	187	37.9																116	230.9	6.33	5.47	5.47	4.13	
YGG55C	70	10	43.5	140	116	12	95	70	125.5	183.7	27.75	12.5	12.9	M14	16	17	12	17.5	53	44	23	20	16	60	30	M14x45	130.5	252	8.01	5.4	5.4	4.89	13.98
YGG55LC									173.8	232	51.9																167.8	348	11.15	10.25	10.25	6.68	
YGG65C	90	12	53.5	170	142	14	110	82	160	232	40.8	15.8	12.9	M16	22	23	15	15	63	53	26	22	18	75	35	M16x50	213	411.6	16.2	11.59	11.59	8.89	20.22
YGG65LC									223	295	72.3																275.3	572.7	22.55	22.17	22.17	12.13	



Model No.	Dimensions of Assembly (mm)			Dimensions of Block(mm)															Dimensions of Rail(mm)							Mounting Bolt for Rail	Basic Dynamic Load Rating	Basic Static Load Rating	Static Rated Moment			Weight	
	H	H1	N	W	B	B1	C	C1	L1	L	K1	G	M	T	T1	H2	H3	WR	HR	D	h	d	P	E	(mm)	C(kN)	C0(kN)	MR kN-m	MP kN-m	MY kN-m	Block kg	Rail kg/m
YGG85LC	110	15	65	215	185	-	140	70	254	349	-	14	M20	24	26	21	-	85	73	35	28	24	90	45	M20	460	945.2	45.6	45.6	51.42	21.6	35.2
YGG100LC	120	15	75	250	220	-	200	100	286	394	-	16	M20	25	30	23	-	100	80	39	32	26	105	52.5	M24	547	1330	61.2	61.2	73.14	31.5	46.8
YGG125LC	160	24.5	97.5	320	270	-	205	102.5	360	491	-	16	M20	30	45	23	-	125	115	48	45	33	120	60	M30	1040	1924	123.176	123.176	114.438	65.5	84.6

SE Type-Metal End Cap Linear Guideway

2-6-1 General Information

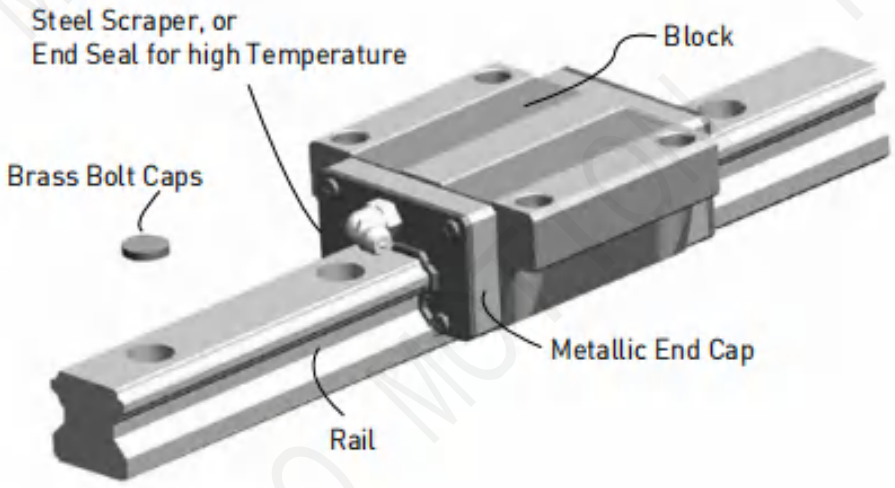
(1) Features

- Use of Metallic parts; （if end seal is needed,the high-temperaturerubber in end seal is available）
- Excellent temperature resistance;service temperature under 150°C.

(2) Applications

- Heat treatment equipment,
- Applications using vacuums (no vapor dispersion from plastic or rubber)
- Welding equipment.

2-6-2 Structure



2-6-3 Specification

(1) Add "/SE" after the specification of linear guideway

YGH20LC21200NZ0IIU+ N3/SE

2-6-4 Dimensions of Bolt Cap

Table 2-6-1 Dimensions of Copper Bolt Cap

Item	Bolt Size	Diameter (mm)		Item	Bolt Size	Diameter (mm)	
		D	H			D	H
C3-C	M3	6.15	1.2	C8-C	M8	14.15	3.5
C4-C	M4	7.65	1.2	C12-C	M12	20.15	4
C5-C	M5	9.65	2.5	C14-C	M14	23.15	4
C6-C	M6	11.15	2.8	C16-C	M16	24.15	4

Table 2-6-2 Dimensions of Stainless Bolt Cap

Item	Bolt Size	Diameter (mm)		Item	Bolt Size	Diameter (mm)	
		D	H			D	H
C3-S	M3	6.15	1.2	C8-S	M8	14.15	3.5
C4-S	M4	7.65	1.2	C12-S	M12	20.15	4
C5-S	M5	9.65	2.5	C14-S	M14	23.15	4
C6-S	M6	11.22	2.8	C16-S	M16	26.20	4

Stainless Steel Linear Guideway

2-7-1 Features

(1) Same features as standard linear guideway

-Stiffness, Hardness, Service Life, Dimensions remain the same

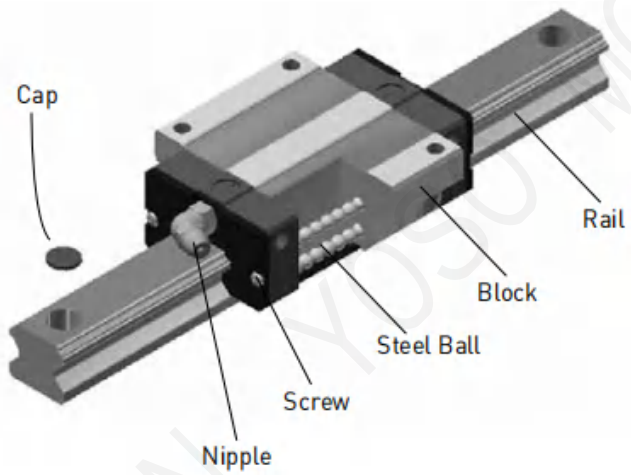
(2) Suitable forspecific extreme environments

-With metal components, it can be used in low and medium vacuum environments

(3) Great corrosion resistance

-Block, Rail, Steel Balls, Grease nipple, Screws are all made of stainless steelmateral

Note:
1.Currently availablein YGH20C、YGH25C、YGH25R、YSR25C
2.Maximum length available is 2000mm
3. Add "/M" after the specification of linear guideway
Ex.YGH25CA2R1600ZAPI /M

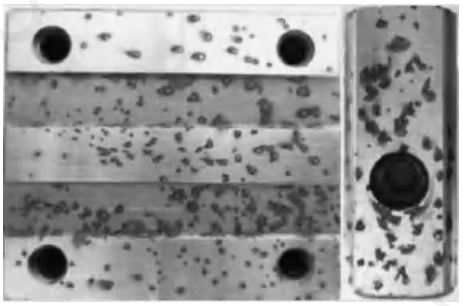


2-7-2 Suitable for belowenvironments

- Chemicals
- Humid

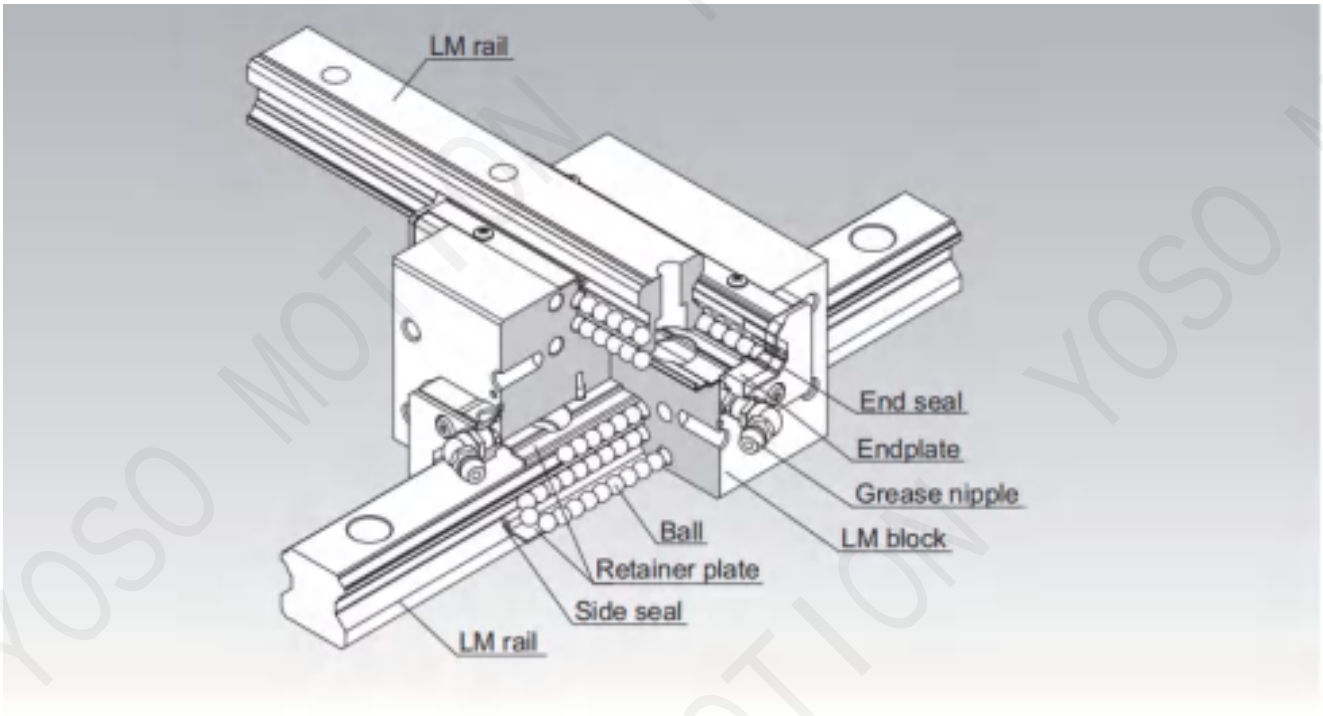
2-7-3 Main Applications

- Food processing,transportation and storage
- Liquid and gas processing equipment
- Vacuum equipment
- Cleanroom equipment

Salt Spray Test		
	Stainless Steel Series	Regular Series
Before		
After		
Result	Slight Corrosion	Severe Corrosion

Note:
Test conditions: -Salt Solution: 5 % NaCl
-Salt spray chamber temperature: 35°C+2°C
-Pressure:1 bar

YS-CSR LM GUIDE CROSS LM GUIDE MODEL



YS-CSR LM GUIDE CROSS LM GUIDE MODEL

2-8-1 Structure and Features

Balls roll in four rows of raceways precision-ground on a LM rail and a LM block, and endplates in-corporated in the Ll block allow the balls to circulate. Since retainer plates hold the balls, they donot fall off even if the LM rail is pulled out.This is an integrated LM Guide that combines two LM rails, which have the same internal structureas the successful and established Model YGH, that intersect each other back to back. It is machinedwith high precision so that the hexahedral perpendicularity of the LM block is within 2um per 100mm. The two rails are also machined with high precision in relative straightness. As a result, ex-tremely high accuracy in orthogonality is achieved. Since an orthogonal LM system can be achievedwith the Model YS-CSR alone, a conventionally reguired saddle is no longer necessary. This enablesthe structure for X-Y motion to be simplified, and the whole system can be downsized.

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 blockare uniform in the four directions (radial, reverse radial and lateral directions), enabling the LM Guide to be used in all orientations.

High Rigidity

Since balls are arranged in four rows in a well-balanced manner, this model is stiff against a mo-ment, and smooth straight motion is ensured even a preload is applied to increase the rigidity.

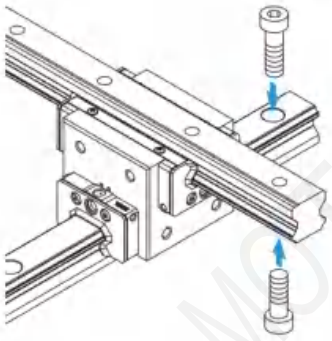
The rigidity of the LM blocks is 50% higher than that of a combination of two YGH LM blocks se.cured together back-to-back with bolts. Thus, YS-CSR is an optimal LM Guide for building an X-Y tablethat requires high rigidity.

2-8-2 Types and Features

ModelYS-CSR-S

This model is a standard type.

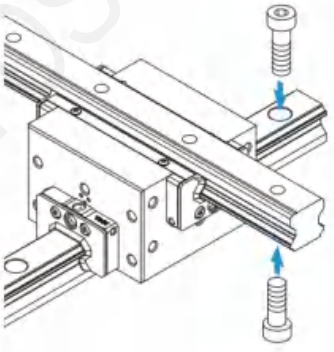
Specification Table



ModelYS-CSR-S

It has a longer overall LM block length (L) and agreater rated load.

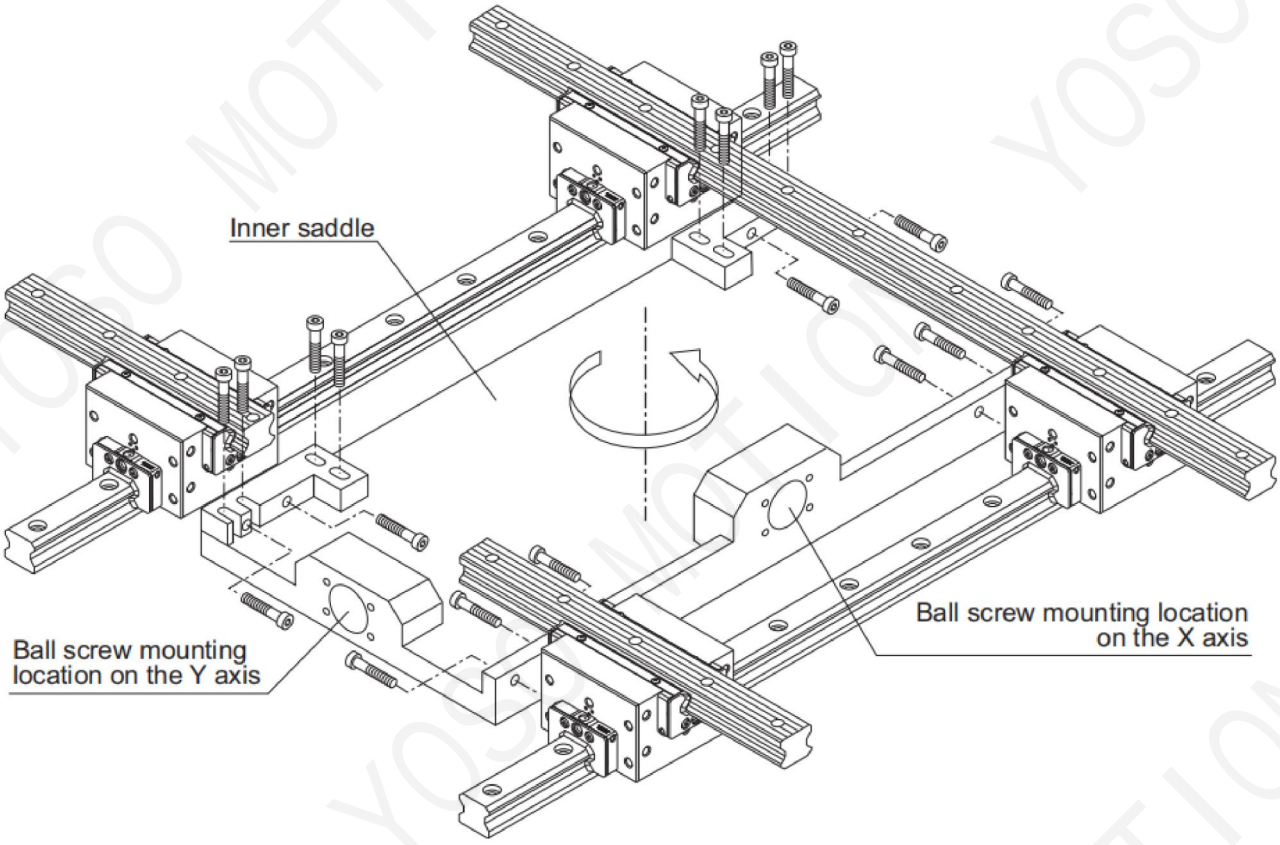
Specification Table



YS-CSR LM GUIDE CROSS LM GUIDE MODEL

2-8-3 Using an inner Saddle

The Model YS-CSR can easily be assembled andadjusted by using an inner saddle to link fourLM blocks together. When installed on aninner saddle,the Model YS-CSR becomes ahighly accurate X-Y guide and achieves highrigidity moment in the yawing direction(as indicated by the arrow in the figure).



2-8-4 Model number coding

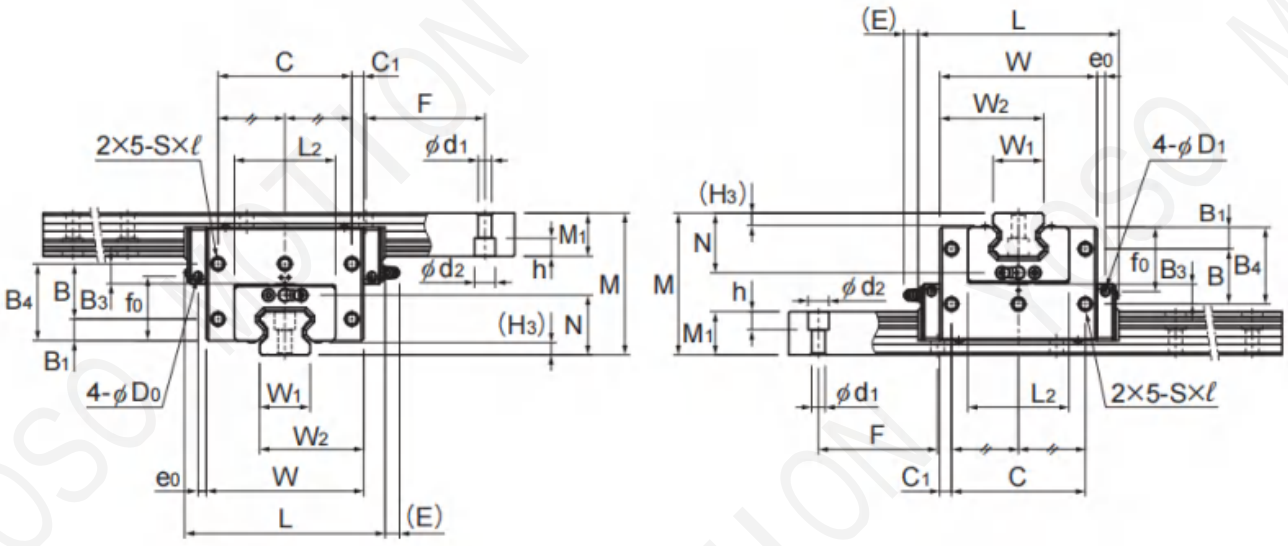
4 CSR25 UU CO +120011000L P

Total No. of LM blocks	Model number	Contamination protection accessory symbol (*1)	Radial clearance symbol (*2) Normal (No symbol)/Light preload (C1) Medium preload (C0)	LM rail length on the X axis (in mm)	LM rail length on the Y axis (in mm)	Accuracy symbol (*3) Precision grade (P)/Super precision grade (SP) Uitra precision grade (UP)

(*1)See contamination protection accessory on

YS-CSR LM GUIDE CROSS LM GUIDE MODEL

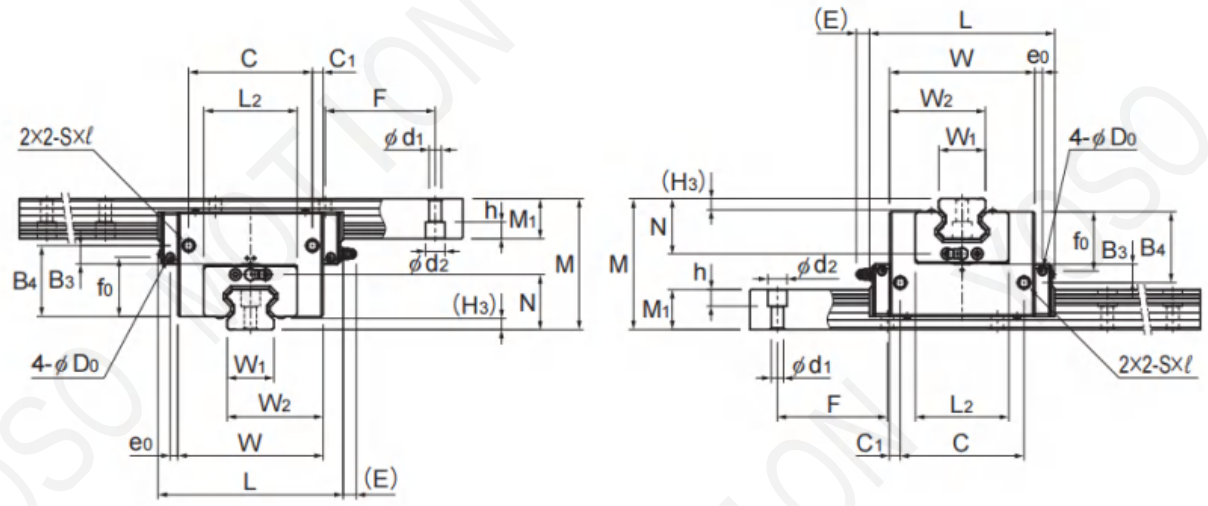
ModelYS-CSR-S



Model No.	Outer dimensions			LM block dimensions														
	Height M	Width W	Length L	B1	B3	B4	B	C	C1	S×ℓ	L2	N	E	e0	f0	D0	Grease nipple
YS-CSR 15	40	38.8	56.6	-	11.0	34.8	-	20	9.4	M4x6	32	19.7	5.5	3.2	22.1	3	PB1021B
YS-CSR 20S YS-CSR 20	57	50.8 66.8	74 90	- 13	12.7 7.2	42.5 37	- 24	20 36	10.4 5.4	M5x8	42	25	12	3.1	24.8	3	B-M6F
YS-CSR 25S YS-CSR 25	70	59.5 78.6	83.1 102.2	- 18	16.4 8.4	52 44	- 26	34 64	12.75 7.3	M6x10	16	30	12	3.5	30.5	3	B-M6F
YS-CSR 30S YS-CSR 30	82	70.4 93	98 120.6	- 21	19.4 11.4	61 53	- 32	40 76	15.2 8.5	M6x10	58	35	12	5.2	38.2	5.2	B-M6F
YS-CSR 35	95	105.8	134.8	24	13.3	61	37	90	7.9	M8x14	68	40	12	5.5	43.1	5.2	B-M6F
YS-CSR 40	118	129.8	170.8	30	15.4	75	45	100	9.9	M10x15	84	50	16	6.4	53.1	5.2	B-PT1/8

YS-CSR LM GUIDE CROSS LM GUIDE MODEL

ModelYS-CSR-S

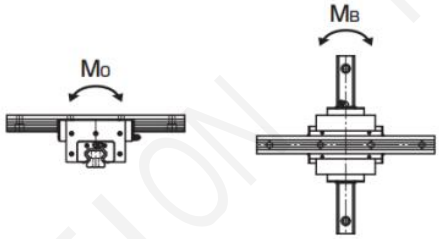


H3	LM rail dimensions						Basic load rating		Static permissible moment*		Mass	
	Width W1 ±0.05	W2	Height M1	Pitch F	d1xd2xh	Length* Max	C kN	C0 kN	M0 kN.m	Ms kN.m	LM block kg	LM rail kg/m
4.7	15	26.9	15	60	4.5x7.5x5.3	3000	10.9	15.7	0.0945	0.0945	0.34	1.5
4	20	35.4 43.4	18	60	6x9.5x8.5	3000	19.8 23.9	27.4 35.8	0.218 0.307	0.218 0.307	0.73 1.3	2.3
5.5	23	41.25 50.8	22	60	7x11x9	3000	27.6 35.2	36.4 51.6	0.324 0.518	0.324 0.518	1.2 2.2	3.3
7	28	49.2 60.5	26	80	9x14x12	3000	40.5 48.9	53.7 70.2	0.599 0.852	0.599 0.995	2 3.6	4.8
7.5	34	69.9	29	80	9x14x12	3000	65	91.7	1.37	1.37	5.3	6.6
10	45	87.4	38	105	14x20x17	3000	100	135	2.59	2.59	9.8	11

Note1)
The maximum length under
Static pemissible moment
Total block length L

"Length*" indicates the standard maximum length of an LM rail.
1 block: the static pemmissible moment with one LM block
The total block length L shown in the table is the length with the dust proof parts, code UU or SS.
If other contamination protection accessories or lubricant equipment are installed, thetotal block length will increase.

Note2)The Model YS-CSR is not available with an upper surface lubrication hole.



YS-CSR LM GUIDE CROSS LM GUIDE MODEL

2-8-5 Standard Length and Maximum Length of the LM Rail

Table1 shows the standard lengths and the maximum lengths of model YS-CSR variations.For special rail lengths, it is recommended to use a value corresponding to the G,g dimension fromthe table. As the G,g dimension increases, this portion becomes less stable, and the accuracy per.formance is severely impacted.

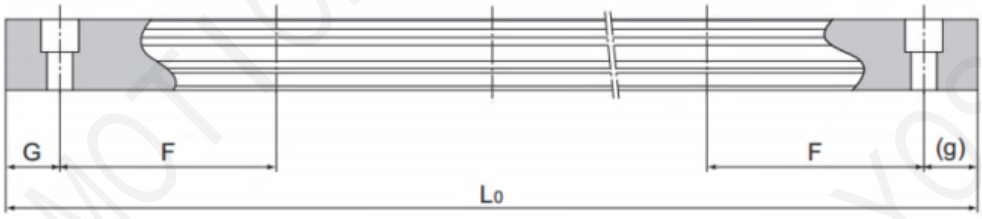


Table1 Standard Length and Maximum Length of the LM Rail for Model CSR

Model No.	YS-CSR15	YS-CSR20	YS-CSR25	YS-CSR30	YS-CSR35	YS-CSR45
LM rail standard length (Lo)	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
Standard pitch F	60	60	60	80	80	105
G,g	20	20	20	20	20	22.5
Max length	3000	3000	3000	3000	3000	3090

Note) The maximum length varies with accuracy grades. Contact YOSO for details.

YS-CSR LM GUIDE CROSS LM GUIDE MODEL

2-8-6 Tapped-Hole Type LM Rail

The model YS-CSR variations include a type with its LM rail bottom tapped. With the X-axis LM rail having tapped holes, this model can be secured with bolts from the top.

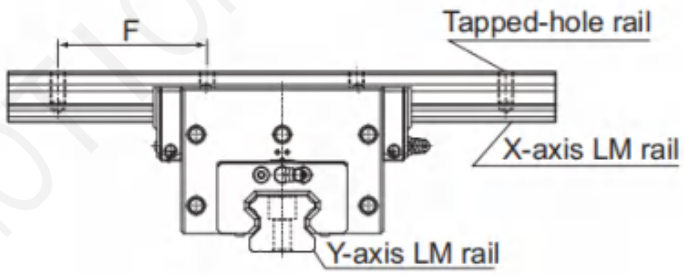


Table2 Dimensions of the LM Rail Tap

Model No.	S_1	Effective tap depth ℓ_1
15	M5	8
20	M6	10
25	M6	12
30	M8	15
25	M8	17
45	M12	24

2-8-7 Model number coding

4YS-CSR25UUC0+1200LPK1000LP

Symbol for
tapped-hole LM rail type

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