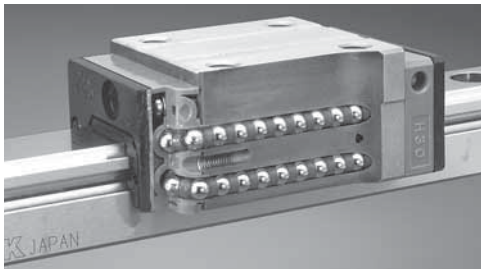
A-5-1.2 SS Series



(1) Features

1. Lower noise and gentler tone
Incorporating a retainer piece and optimizing the circulation path enables steel ball circulation stability and the prevention of ball collision, resulting in noise reduction.

2. Smoother motion
Improved steel ball circulation stability, free of interference between the balls improves dynamic friction characteristics, resulting in smooth and stable motion, which is especially effective for low speed motion.

3. Low dust generation
A resin retaining piece, which prevents steel balls collision, features effective low dust generation characteristics compared to conventional products.

4. High self-aligning capability (rolling direction)
Same as the DF combination in angular contact bearings, self-aligning capability is high because the cross point of the contact lines of balls and grooves comes inside, reducing moment rigidity. This increases the capacity to absorb errors in installation.

5. High load carrying capacity to vertical direction
The contact angle is set at 50 degrees, increasing load carrying capacity as well as rigidity in vertical direction.

6. High resistance against impact load
The bottom ball groove is formed in Gothic arch and the center of the top and bottom grooves are offset as shown in Fig. 2. The vertical load is generally carried by the top rows, at where balls are contacting at two points. Because of this design, the bottom rows will carry load when a large impact load is applied vertically as shown in Fig. 3. This assures high resistance to the impact load.

7. High accuracy
As showing in Fig. 4, fixing the master rollers is easy thanks to the Gothic arch groove. This makes easy and accurate measuring of ball grooves.

8. Fast delivery
Lineup of random-matching rails and ball slides supports and facilitates fast delivery.

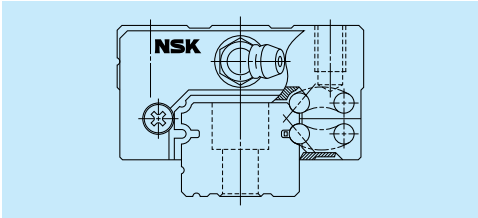


Fig. 1 SS Series

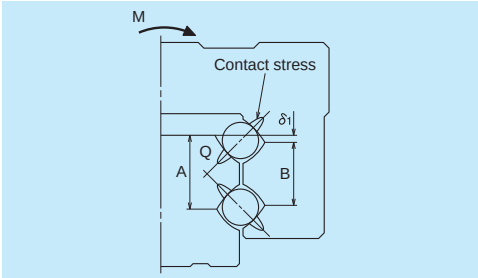


Fig. 2 Enlarged illustration of the offset Gothic arch groove

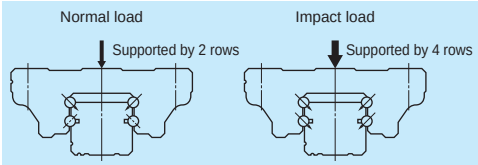


Fig. 3 When load is applied

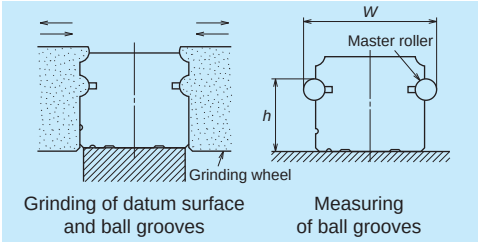
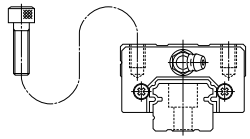
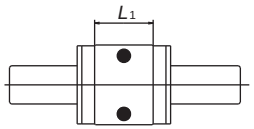
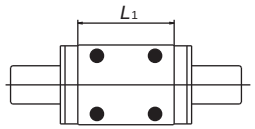
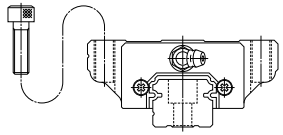
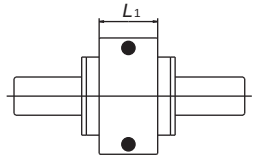
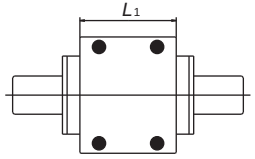
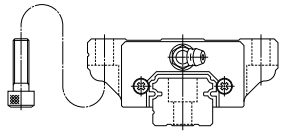
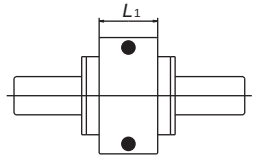
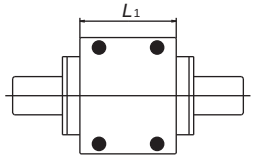
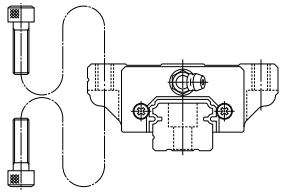
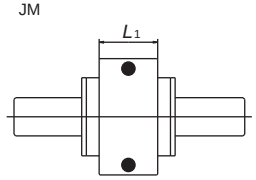
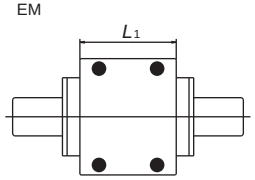


Fig. 4 Rail grinding and measuring

(2) Ball slide shape

Ball slide Model	Shape/installation method	Type: Medium-load type	Type: High-load type
AL CL		CL  L_1	AL  L_1
EL JL		JL  L_1	EL  L_1
FL KL		KL  L_1	FL  L_1
EM JM		JM  L_1	EM  L_1

(3) Accuracy and preload

1. Running parallelism of ball slide

Table 1

Unit: μm

Rail over all length (mm) over	or less	Preloaded assembly (not random matching) Ultra precision P3	Super precision P4	High precision P5	Precision grade P6	Normal grade PN	Random-matching type Normal grade PC
–	50	2	2	2	4.5	6	6
50	80	2	2	3	5	6	6
80	125	2	2	3.5	5.5	6.5	6.5
125	200	2	2	4	6	7	7
200	250	2	2.5	5	7	8	8
250	315	2	2.5	5	8	9	9
315	400	2	3	6	9	11	11
400	500	2	3	6	10	12	12
500	630	2	3.5	7	12	14	14
630	800	2	4.5	8	14	16	16
800	1000	2.5	5	9	16	18	18
1000	1250	3	6	10	17	20	20
1250	1600	4	7	11	19	23	23
1600	2000	4.5	8	13	21	26	26
2000	2500	5	10	15	22	29	29
2500	3150	6	11	17	25	32	32
3150	4000	9	16	23	30	34	34

2. Accuracy standard

The preloaded assembly has five accuracy grades; Ultra precision P3, Super precision P4, High precision P5, Precision P6 and Normal PN grades, while the random-matching type has Normal PC grade.

• Tolerance of preloaded assembly

Table 2

Unit: μm

Characteristics \ Accuracy grade	Ultra precision P3	Super precision P4	High precision P5	Precision grade P6	Normal grade PN
Mounting height H	±10	±10	±20	±40	±80
Variation of H (All ball slides on a set of rails)	3	5	7	15	25
Mounting width W_2 or W_3	±15	±15	±25	±50	±100
Variation of W_2 or W_3 (All ball slides on reference rail)	3	7	10	20	30
Running parallelism of face C to face A Running parallelism of face D to face B	Shown in Table 1, Fig. 5, and Fig. 6				

• Tolerance of random-matching type; Normal grade PC

Table 3

Unit: μm

Characteristics \ Model No.	SS15, 20, 25, 30, 35
Mounting height H	±20
Variation of mounting height H	15①
	30②
Mounting width W_2 or W_3	±30
Variation of mounting width W_2 or W_3	25
Running parallelism of face C to face A Running parallelism of face D to face B	See Table 1, Fig. 5, and Fig. 6

Note: ① Variation on the same rail
② Variation on multiple rails

3. Combinations of accuracy and preload

Table 4

		Accuracy grade: Ultra precision	Super precision	High precision	Precision grade	Normal grade	Normal grade
Without NSK K1 lubrication unit		P3	P4	P5	P6	PN	PC
With NSK K1 lubrication unit		K3	K4	K5	K6	KN	KC
Preload	Fine clearance Z0	○	○	○	○	○	—
	Slight preload Z1	○	○	○	○	○	—
	Medium preload Z3	○	○	○	○	—	—
	Random-matching type with slight preload ZZ	—	—	—	—	—	○

4. Assembled accuracy

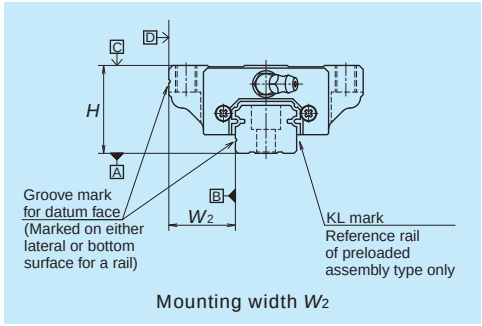


Fig. 5 Special high carbon steel

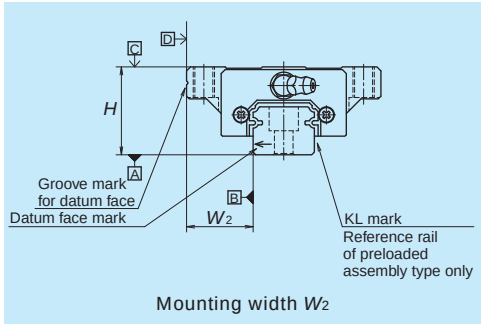


Fig. 6 Stainless steel

5. Preload and rigidity

We offer four levels of preload: slight preload Z1, medium preload Z3 and fine clearance Z0, along with random-matching type of slight preload ZZ. Values for preload and rigidity of the preloaded assembly are shown in Table 5. Rigidities are for the median of the preload range.

• Preload and rigidity of preloaded assembly

Table 5

	Model No.	Preload (N)		Rigidity (N/μm)			
				Vertical direction		Lateral direction	
		Slight preload (Z1)	Medium preload (Z3)	Slight preload (Z1)	Medium preload (Z3)	Slight preload (Z1)	Medium preload (Z3)
High-load type	SS15 AL, EL, FL, EM	69	392	118	216	88	157
	SS20 AL, EL, FL, EM	88	490	147	255	108	186
	SS25 AL, EL, FL, EM	147	833	196	353	137	255
	SS30 AL, EL, FL, EM	245	1370	245	441	176	323
	SS35 AL, EL, FL, EM	294	1860	284	539	205	392
Medium-load type	SS15 CL, JL, KL, JM	39	245	69	127	49	88
	SS20 CL, JL, KL, JM	59	343	88	157	59	118
	SS25 CL, JL, KL, JM	98	588	108	206	78	147
	SS30 CL, JL, KL, JM	147	882	127	235	98	176
	SS35 CL, JL, KL, JM	196	1180	166	304	117	225

Note: Clearance for fine clearance Z0 is 0 to 3 μm. Therefore, preload is zero.
However, Z0 of PN grade is 0 to 15 μm.

• Clearance and preload of random-matching type

Table 6 unit: μm

Model No.	Slight preload ZZ
SS15	–4 – 0
SS20	–4 – 0
SS25	–5 – 0
SS30	–5 – 0
SS35	–6 – 0

(4) Available length of rail

Table 7 shows the limitations of rail length (maximum length). However, the limitations vary by accuracy grade.

Table 7 Length limitation of rails Unit : mm

Series	Size / Material	15	20	25	30	35
SS	Special high carbon steel	2000	3960	3960	4000	4000
	Stainless steel	1700	3500	3500	3500	3500

Note: Rails can be butted if user requirement exceeds the rail length shown in the Table. Please consult NSK.

(5) Installation

1. Permissible values of mounting error

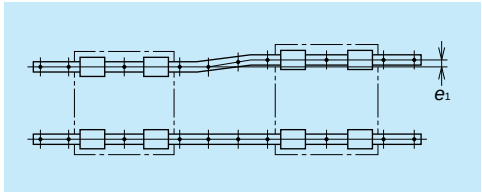


Fig. 7

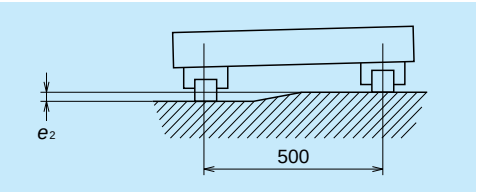


Fig. 8

Table 8 Unit : μm

Value	Preload	Model No. SS15	SS20	SS25	SS30	SS35
Permissible values of parallelism in two rails e_1	Z0, ZT	20	22	30	35	40
	Z1, ZZ	15	17	20	25	30
	Z3	12	15	15	20	25
Permissible values of parallelism (height) in two rails e_2	Z0, ZT	375 μm/500 mm				
	Z1, ZZ, Z3	330 μm/500 mm				

2. Shoulder height of the mounting face and corner radius r

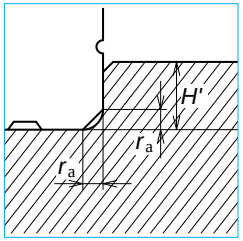


Fig. 9 Shoulder for the rail datum face

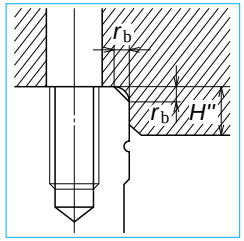


Fig. 10 Shoulder for the ball slide datum face

Table 9 Unit : mm

Model No.	Corner radius (maximum) r_a	r_b	Shoulder height H'	H''
SS 15	0.5	0.5	4	4
SS20	0.5	0.5	4.5	5
SS 25	0.5	0.5	5	5
SS 30	0.5	0.5	6	6
SS 35	0.5	0.5	6	6

(6) Lubrication components

Refer to page A38 and D13 for the lubrication of linear guides.

1. Types of lubrication accessories

Figure 11 and Table 10 show grease fittings and tube fittings.

We provide lubrication accessories with extended thread body length (L) for the addition of dust proof accessories such as NSK K1 lubrication unit, double seal and protector.

We provide a suitable lubrication accessory for the special requirement on dust proof accessories.

Consult NSK for a lubrication accessory with extended length of thread body for your convenience of replenishing lubricant.

Please ask NSK for stainless lubrication accessories.

2. Mounting position of lubrication accessories

The standard position of grease fittings is the end face of ball slide. We mount them on a side of end cap for an option. (Fig. 12)

Please consult NSK for installation of grease or tube fittings to the ball slide body or side of end cap.

When using a piping unit with thread of M6 × 1, you require a connector to connect to a grease fitting mounting hole with M6 × 0.75. The connector is available from NSK.

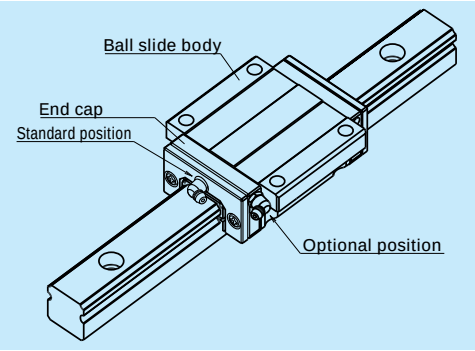


Fig. 12 Mounting position of lubrication accessories

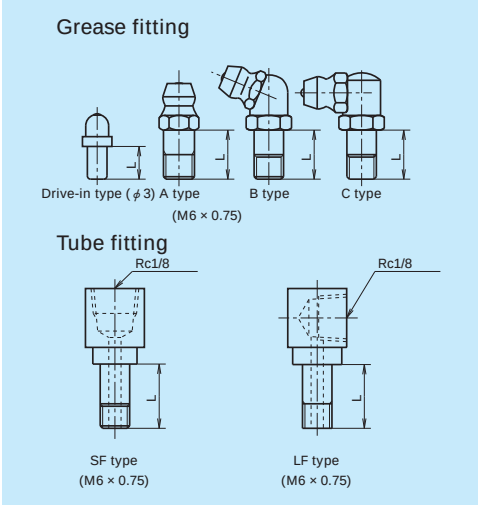


Fig. 11 Grease fitting and tube fitting

Table 10 Unit : mm

Model No.	Dust proof specification	Grease fitting	Tube fitting
		Thread body length L	Thread body length L
SS15	Standard	5	–
	With NSK K1	10	–
	Double seal	*	–
	Protector	*	–
SS20	Standard	5	–
	With NSK K1	10	–
	Double seal	8	–
	Protector	8	–
SS25	Standard	5	6
	With NSK K1	12	11
	Double seal	10	9
	Protector	10	9
SS30	Standard	5	6
	With NSK K1	14	13
	Double seal	12	11
	Protector	12	11
SS35	Standard	5	6
	With NSK K1	14	13
	Double seal	12	11
	Protector	12	11

*) Please contact NSK as a connector is required.

(7) Dust proof components

1. Standard specification

To keep foreign matters from entering inside the ball slide, SS Series has an end seal on both ends, and bottom seals at the bottom.

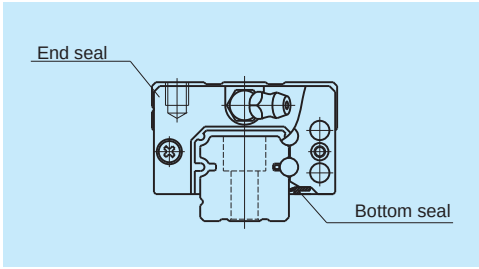


Fig. 13

Table 11 Seal friction per ball slide (maximum value)

Unit : N

Series \ Size	15	20	25	30	35
SS	8	9	9	9	10

2. NSK K1™

Table 12 shows the dimension of linear guides equipped with the NSK K1.

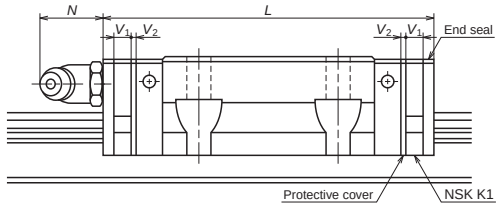


Table 12 Unit: mm

Model No.	Ball slide length	Ball slide model	Standard ball slide length	Ball slide length installed with two NSK K1 *L*	Per NSK K1 thickness V_1	Protective cover thickness V_2	Protruding area of the grease fitting *N*
SS15	Standard	AL, EL, FL, EM	56.8	66.4	4.0	0.8	(5)
	Short	CL, JL, KL, JM	40.4	50			
SS20	Standard	AL, EL, FL, EM	65.2	75.8	4.5	0.8	(14)
	Short	CL, JL, KL, JM	47.2	57.8			
SS25	Standard	AL, EL, FL, EM	81.6	92.2	4.5	0.8	(14)
	Short	CL, JL, KL, JM	59.6	70.2			
SS30	Standard	AL, EL, FL, EM	96.4	108.4	5.0	1.0	(14)
	Short	CL, JL, KL, JM	67.4	79.4			
SS35	Standard	AL, EL, FL, EM	108	121	5.5	1.0	(14)
	Short	CL, JL, KL, JM	77	90			

Note: Ball slide length equipped with NSK K1 = (Standard ball slide length) + (Thickness of NSK K1, V_1 × Number of NSK K1) + (Thickness of the protective cover, V_2 × 2)

3. Double seal

Use a double seal set as showing in Table 13, when installing an extra seal to completed standard products. (Fig. 14)
When installing a grease fitting after the installation of double seals, a connector is required.

4. Protector

Use a protector set as showing Table 14, when installing a protector to completed standard products. (Fig.15)
When installing a grease fitting after the installation of protectors, a connector is required.

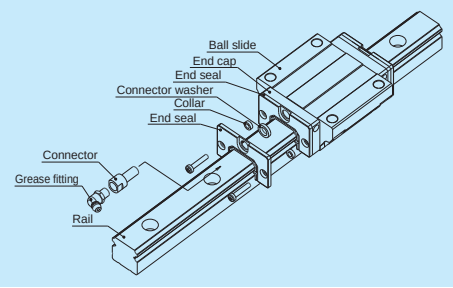


Fig. 14 Double seal

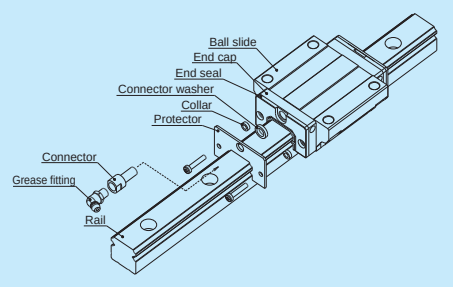


Fig. 15 Protector

Table 13 Double-seal set

Model No.	Reference No.		Increased thickness V_1
	Without connector	With connector	
SS15	LS15WS-01	*	2.8
SS20	LS20WS-01	LS20WSC-01	2.5
SS25	LS25WS-01	LS25WSC-01	2.8
SS30	LS30WS-01	LS30WSC-01	3.6
SS35	LS35WS-01	LS35WSC-01	3.6

Table 14 Protector set

Model No.	Reference No.		Increased thickness V_2
	Without connector	With connector	
SS15	LS15PT-01	*	3
SS20	LS20PT-01	LS20PTC-01	2.7
SS25	LS25PT-01	LS25PTC-01	3.2
SS30	LS30PT-01	LS30PTC-01	4.2
SS35	LS35PT-01	LS35PTC-01	4.2

*) For installation of a connector to a drive-in type grease fitting, contact NSK.

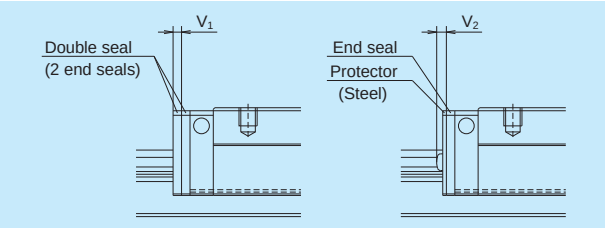


Fig. 16

5. Cap to cover the bolt hole for rail mounting

Table 15 Caps to cover rail bolt hole

Model No.	Bolt to secure rail	Cap reference No.	Quantity /case
SS15	M3	LG-CAP/M3	20
SS15	M4	LG-CAP/M4	20
SS20	M5	LG-CAP/M5	20
SS25, SS30	M6	LG-CAP/M6	20
SS35	M8	LG-CAP/M8	20

6. Inner seal

Inner seal can be manufactured for models shown below.

Table 16

Series	Model No.
SS	SS20, SS25, SS30, SS35

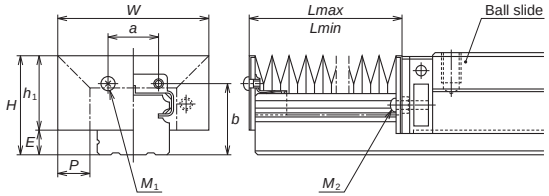
7. Bellows

Use a bellows fastener kit as showing Table 17, when installing bellows to completed standard products. A bellows fastener kit is supplied with one of bellows fastener, two of M1 set screws, two of M2 set screws, and two collars for M2 set screw.

Table 17 Bellows fastner kit reference No.

Model No.	Kit reference No.
SS15	LS15FS-01
SS20	LS20FS-01
SS25	LS25FS-01
SS30	LS30FS-01
SS35	LS35FS-01

Dimension tables of bellows
SS Series



Bellows reference number

J A S 15 L 08

- J A S: Bellows
  - A: Bellows for the ends
  - B: Middle bellows
  - For SS and LS series
- 15: Size number of linear guide
- L: Low type
- 08: Number of BL (fold number)

Fig. 17 Dimension of bellows

Table 18 Dimensions of bellows Unit: mm

Model No.	*H*	h_1	*E*	*W*	*P*	*a*	*b*	BL minimum length	M_1Tap x depth	M_2Tap x depth
JAS15L	23.5	18.9	4.6	43	10	8	16.5	17	M3×5	M3×14
JAS20L	27	21	6	48	10	13	19.7	17	M3×5	M2.5×14
JAS25L	32	25	7	51	10	15	23.2	17	M3×5	M3×18
JAS30L	41	32	9	66	15	16	29	17	M4×6	M4×19
JAS35L	47	36.5	10.5	72	15	22	33.5	17	M4×6	M4×22

Table 19 Numbers of folds (BL) and lengths of bellows Unit: mm

Model No.	Number of BL	2	4	6	8	10	12	14	16	18	20
	L_{min}	34	68	102	136	170	204	238	272	306	340
JAS15L	Stroke	106	212	318	424	530	636	742	848	954	1060
	L_{max}	140	280	420	560	700	840	980	1120	1260	1400
JAS20L	Stroke	106	212	318	424	530	636	742	848	954	1060
	L_{max}	140	280	420	560	700	840	980	1120	1260	1400
JAS25L	Stroke	106	212	318	424	530	636	742	848	954	1060
	L_{max}	140	280	420	560	700	840	980	1120	1260	1400
JAS30L	Stroke	176	352	528	704	880	1056	1232	1408	1584	1760
	L_{max}	210	420	630	840	1050	1260	1470	1680	1890	2100
JAS35L	Stroke	176	352	528	704	880	1056	1232	1408	1584	1760
	L_{max}	210	420	630	840	1050	1260	1470	1680	1890	2100

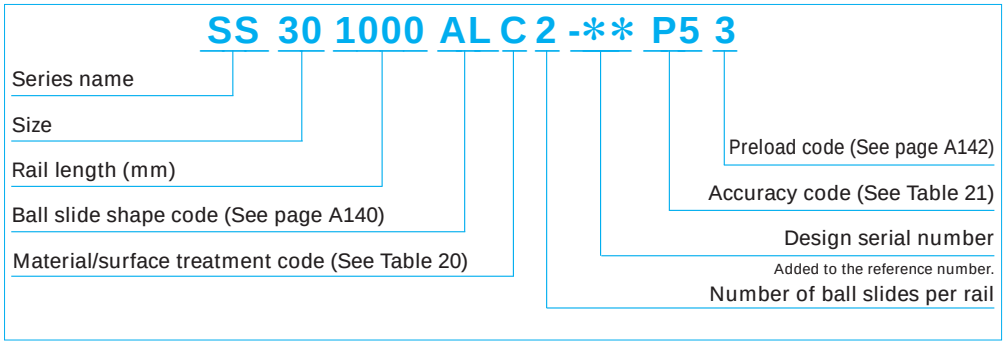
Remarks: Values of odd number BL (3, 5, 7, ...) can be obtained by adding two values of even number BLs on both side, then dividing the sum by two.

Note: We recommend using SS Series in a clean environment in order to utilize their full range of capabilities.

(8) Reference number

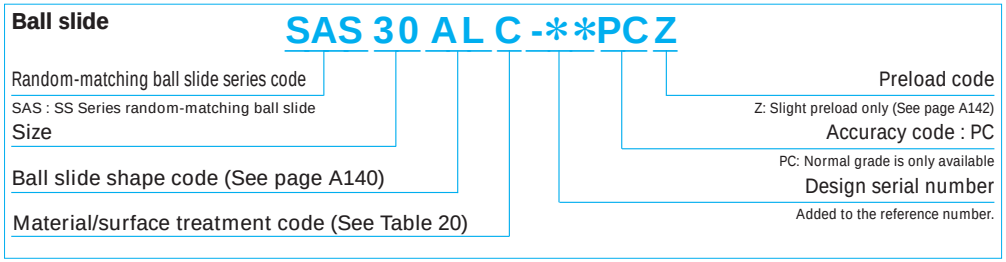
Reference numbers shall be set to individual NSK linear guide when its specifications are finalized, and it is indicated on its specification drawing.
Please specify the reference number, except design serial number, to identify the product when ordering, requiring estimates, or inquiring about specifications from NSK.

1. Reference number for preloaded assembly

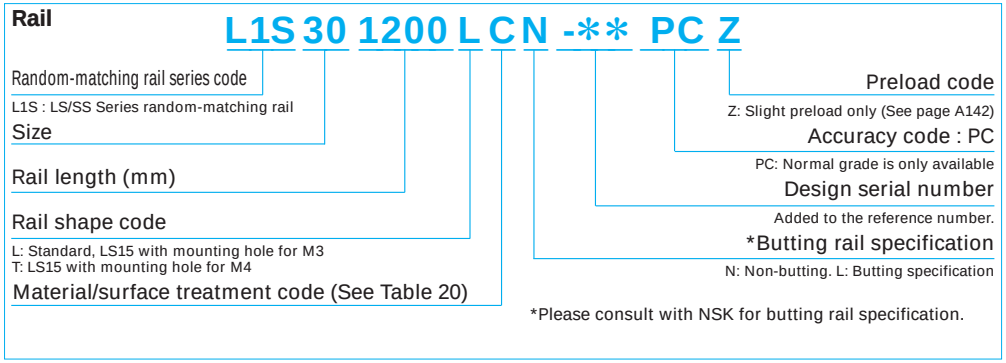


2. Reference number for random-matching type

Ball slide



Rail



*Please consult with NSK for butting rail specification.

Reference number for assembly of random-matching ball slide and rail is the same as the coding of preloaded assembly. However, preload code is slight preload "Z" (Refer to page A142).

Table 20 Material/surface treatment code

Code	Description
C	Special high carbon steel (NSK standard)
K	Stainless steel
D	Special high carbon steel with surface treatment
H	Stainless steel with surface treatment
Z	Other, special

Table 21 Accuracy code

Accuracy	Standard (Without NSK K1)	With NSK K1
Ultra precision grade	P3	K3
Super precision grade	P4	K4
High precision grade	P5	K5
Precision grade	P6	K6
Normal grade	PN	KN
Normal grade (random-matching type)	PC	KC

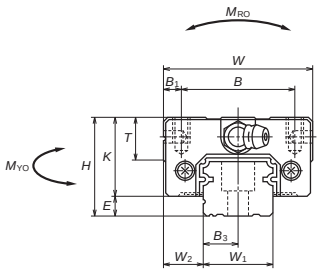
Note: Refer to Page A38 for NSK K1 lubrication unit.

(9) Dimensions
SS-CL (Medium-load type)
SS-AL (High-load type)

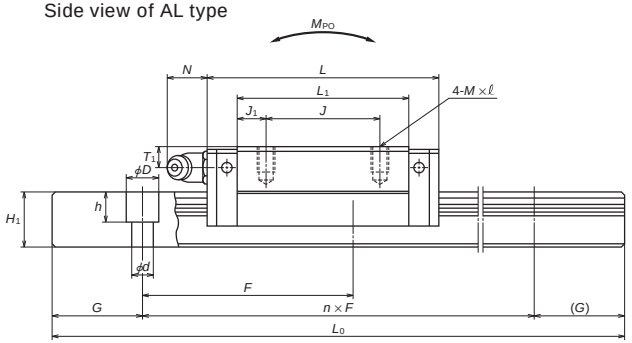
SS 30 1000 AL C 2 - P5 3**

- Series name
- Size
- Rail length (mm)
- Ball slide shape code (See page A140)
- Material/surface treatment code (See Table 20)
- Number of ball slides per rail
- Design serial number (Added to the reference number.)
- Accuracy code (See Table 21)
- Preload code (See page A142)

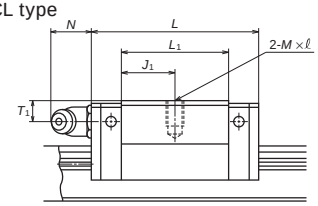
Front view of AL and CL types



Side view of AL type



Side view of CL type



Model No.	Assembly			Ball slide												
	Height			Width	Length	Mounting hole								Grease fitting		
	H	E	W_2	W	L	B	J	M×pitch×ℓ	B_1	L_1	J_1	K	T	Hole size	T_1	N
SS15CL	24	4.6	9.5	34	40.4	26	–	M4×0.7×6	4	23.6	11.8	19.4	10	ϕ 3	6	3
SS15AL					56.8		26			40	7					
SS20CL	28	6	11	42	47.2	32	–	M5×0.8×7	5	30	15	22	12	M6×0.75	5.5	11
SS20AL					65.2		32			48	8					
SS25CL	33	7	12.5	48	59.6	35	–	M6×1×9	6.5	38	19	26	12	M6×0.75	7	11
SS25AL					81.6		35			60	12.5					
SS30CL	42	9	16	60	67.4	40	–	M8×1.25×12	10	42	21	33	13	M6×0.75	8	11
SS30AL					96.4		40			71	15.5					
SS35CL	48	10.5	18	70	77	50	–	M8×1.25×12	10	49	24.5	37.5	14	M6×0.75	8.5	11
SS35AL					108		50			80	15					

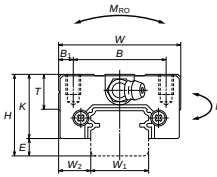
Remarks: 1) The external appearance of stainless steel ball slides differs from those of standard material ball slide.

Reference number for ball slide of random-matching type

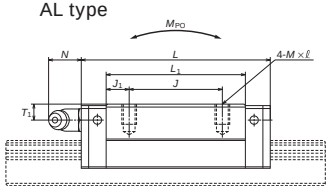
Ball slide **SAS 30 AL C -**PC Z**

- Random-matching ball slide series code (SAS : SS Series random-matching ball slide)
- Size
- Ball slide shape code (See page A140)
- Material/surface treatment code (See Table 20)
- Preload code (Z: Slight preload only (See page A142))
- Accuracy code : PC (PC: Normal grade is only available)
- Design serial number (Added to the reference number.)

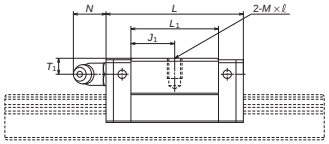
AL and CL types



AL type



CL type

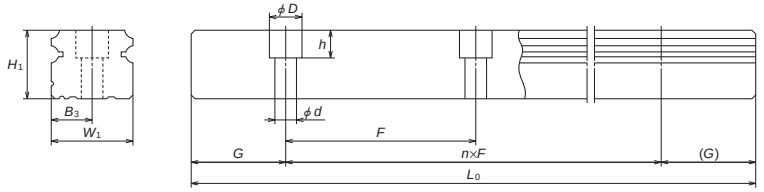


Reference number for rail of random-matching type

Rail **L1S 30 1200 L C N -** PC Z**

- Random-matching rail series code (L1S : LS/SS Series random-matching rail)
- Size
- Rail length (mm)
- Rail shape code (L: Standard, LS15 with mounting hole for M3; T: LS15 with mounting hole for M4)
- Material/surface treatment code (See Table 20)
- *Butting rail specification (N: Non-butting. L: Butting specification)
- Design serial number (Added to the reference number.)
- Accuracy code : PC (PC: Normal grade is only available)
- Preload code (Z: Slight preload only (See page A142))

*Please consult with NSK for butting rail specification.



Unit: mm

Rail							Basic load rating					Ball dia.	Weight	
Width	Height	Pitch	Mounting bolt hole		G	Max. length	Dynamic	Static	Static moment				Ball slide	Rail
W_1	H_1	F	d ×D ×h	B_3	(reference)	L_{0max} ( ) for stainless	C (N)	C_0 (N)	M_{RO} (N·m)	M_{PO} (N·m)	M_{YO} (N·m)	D_W	(kg)	(kg/m)
15	12.5	60	*3.5×6×4.5	7.5	20	2 000	4 900	7 800	39	21.1	17.7	2.778	0.14	1.4
			4.5×7.5×5.3			(1 700)	7 900	15 600	78	73.5	61.5		0.2	
20	15.5	60	6×9.5×8.5	10	20	3 960	7 250	11 800	80	40.5	34	3.175	0.19	2.3
						(3 500)	11 100	21 800	149	124	104		0.28	
23	18	60	7×11×9	11.5	20	3 960	12 700	20 800	164	96.5	81	3.968	0.34	3.1
						(3 500)	17 900	33 500	266	242	203		0.51	
28	23	80	7×11×9	14	20	4 000	18 700	29 600	282	153	128	4.762	0.58	4.8
						(3 500)	27 300	50 500	480	415	350		0.85	
34	27.5	80	9×14×12	17	20	4 000	26 000	40 000	465	234	196	5.556	0.86	7
						(3 500)	38 000	68 500	800	620	520		1.3	

2) The basic dynamic load rating is a load that furnishes 50 km rating fatigue life; it is a vertical and constant load to the ball slide mounting surface. When converting the basic dynamic load rating C to the dynamic load rating C_{100} for 100 km rating fatigue life, divide the C by 1.26.

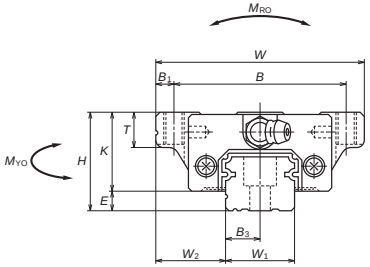
* Standard mounting hole of SS15 rail is for M3 bolts (Hole size: 3.5×6×4.5). If you require the mounting hole for M4 bolts (Hole size: 4.5×7.5×5.3), please specify it when ordering.

SS-JL (Medium-load type)
SS-EL (High-load type)

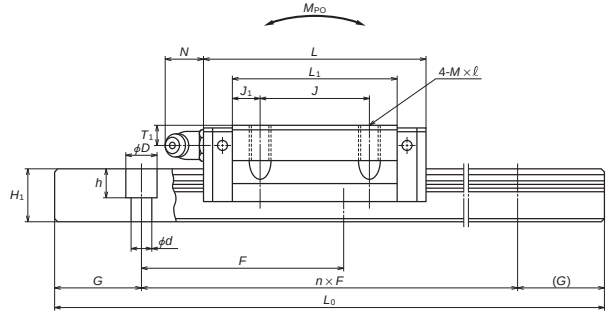
SS 30 1000 EL C 2 - P5 3**

- Series name: SS
- Size: 30
- Rail length (mm): 1000
- Ball slide shape code (See page A140): EL
- Material/surface treatment code (See Table 20): C
- Number of ball slides per rail: 2
- Design serial number: -** (Added to the reference number.)
- Accuracy code (See Table 21): P5
- Preload code (See page A142): 3

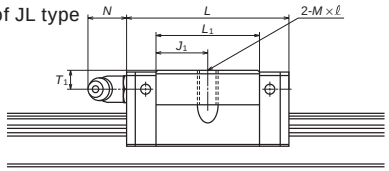
Front view of EL and JL types



Side view of EL type



Side view of JL type



Model No.	Assembly			Ball slide												Grease fitting		
	Height			Width	Length	Mounting hole			B_1	L_1	J_1	K	T	Hole size	T_1	N
	H	E	W_2	W	L	B	J	M×pitch×ℓ								
SS15JL	24	4.6	18.5	52	40.4	41	–	M5×0.8×6	5.5	23.6	11.8	19.4	8	φ3	6	3
SS15EL					56.8		26			40	7					
SS20JL	28	6	19.5	59	47.2	49	–	M6×1×10	5	30	15	22	10	M6×0.75	5.5	11
SS20EL					65.2		32			48	8					
SS25JL	33	7	25	73	59.6	60	–	M8×1.25×12	6.5	38	19	26	11	M6×0.75	7	11
SS25EL					81.6		35			60	12.5		(12)			
SS30JL	42	9	31	90	67.4	72	–	M10×1.5×18	9	42	21	33	11	M6×0.75	8	11
SS30EL					96.4		40	(M10×1.5×15)		71	15.5		(15)			
SS35JL	48	10.5	33	100	77	82	–	M10×1.5×20	9	49	24.5	37.5	12	M6×0.75	8.5	11
SS35EL					108		50	(M10×1.5×15)		80	15		(15)			

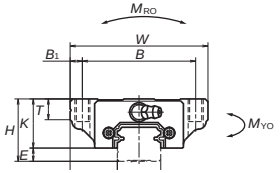
Remarks: 1) Parenthesized dimensions are applicable to stainless steel products.
2) The external appearance of stainless steel ball slides differs from those of standard material ball slide.

Reference number for ball slide of random-matching type

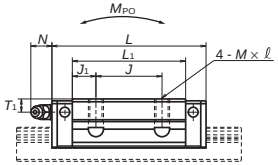
Ball slide **SAS 30 EL C -**PC Z**

- Random-matching ball slide series code: SAS (SAS : SS Series random-matching ball slide)
- Size: 30
- Ball slide shape code (See page A140): EL
- Material/surface treatment code (See Table 20): C
- Design serial number: -** (Added to the reference number.)
- Accuracy code : PC (PC: Normal grade is only available)
- Preload code: Z (Z: Slight preload only (See page A142))

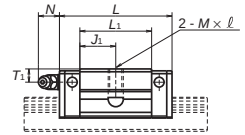
EL and JL types



EL type



JL type

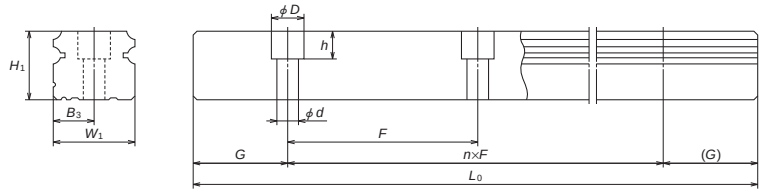


Reference number for rail of random-matching type

Rail **L1S 30 1200 L C N -** PC Z**

- Random-matching rail series code: L1S (L1S : LS/SS Series random-matching rail)
- Size: 30
- Rail length (mm): 1200
- Rail shape code: L (L: Standard, LS15 with mounting hole for M3; T: LS15 with mounting hole for M4)
- Material/surface treatment code (See Table 20): C
- *Butting rail specification: N (N: Non-butting. L: Butting specification)
- Design serial number: -** (Added to the reference number.)
- Accuracy code : PC (PC: Normal grade is only available)
- Preload code: Z (Z: Slight preload only (See page A142))

*Please consult with NSK for butting rail specification.



Unit: mm

Rail							Basic load rating					Ball dia.	Weight	
Width	Height	Pitch	Mounting bolt hole	B_3	G	Max. length	Dynamic	Static	Static moment				Ball slide	Rail
W_1	H_1	F	$d \times D \times h$		(reference)	L_{0max} ( ) for stainless	C (N)	C_0 (N)	M_{RO} (N·m)	M_{PO} (N·m)	M_{YO} (N·m)	D_W	(kg)	(kg/m)
15	12.5	60	*3.5×6×4.5	7.5	20	2 000	4 900	7 800	39	21.1	17.7	2.778	0.17	1.4
			4.5×7.5×5.3			(1 700)	7 900	15 600	78	73.5	61.5		0.26	
20	15.5	60	6×9.5×8.5	10	20	3 960	7 250	11 800	80	40.5	34	3.175	0.24	2.3
						(3 500)	11 100	21 800	149	124	104		0.35	
23	18	60	7×11×9	11.5	20	3 960	12 700	20 800	164	96.5	81	3.968	0.44	3.1
						(3 500)	17 900	33 500	266	242	203		0.66	
28	23	80	7×11×9	14	20	4 000	18 700	29 600	282	153	128	4.762	0.76	4.8
						(3 500)	27 300	50 500	480	415	350		1.2	
34	27.5	80	9×14×12	17	20	4 000	26 000	40 000	465	234	196	5.556	1.2	7
						(3 500)	38 000	68 500	800	620	520		1.7	

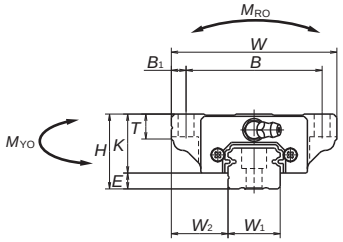
3) The basic dynamic load rating is a load that furnishes 50 km rating fatigue life; it is a vertical and constant load to the ball slide mounting surface. When converting the basic dynamic load rating C to the dynamic load rating C_{100} for 100 km rating fatigue life, divide the C by 1.26.
* Standard mounting hole of SS15 rail is for M3 bolts (Hole size: 3.5×6×4.5). If you require the mounting hole for M4 bolts (Hole size: 4.5×7.5×5.3), please specify it when ordering.

SS-KL (Medium-load type)
SS-FL (High-load type)

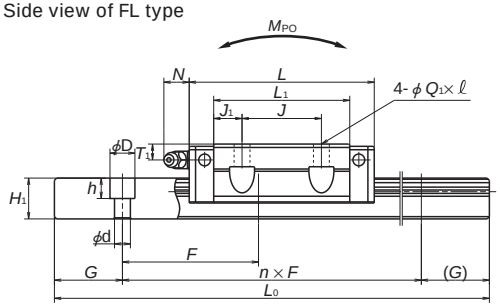
SS 30 1000 FL C 2 - P5 3**

- Series name: SS
- Size: 30
- Rail length (mm): 1000
- Ball slide shape code (See page A140): FL
- Material/surface treatment code (See Table 20): C
- Number of ball slides per rail: 2
- Design serial number: -** (Added to the reference number.)
- Accuracy code (See Table 21): P5
- Preload code (See page A142): 3

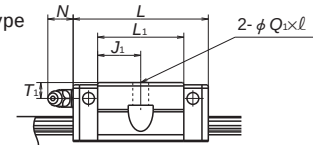
Front view of FL and KL types



Side view of FL type



Side view of KL type



Model No.	Assembly Height H	E	W_2	Ball slide Width W	Length L	Mounting hole B	J	Q_1×ℓ	B_1	L_1	J_1	K	T	Grease fitting Hole size	T_1	N
SS15KL	24	4.6	18.5	52	40.4	41	–	4.5×7	5.5	23.6	11.8	19.4	8	φ 3	6	3
SS15FL					56.8		26			40	7					
SS20KL	28	6	19.5	59	47.2	49	–	5.5×9(5.5×9.5)	5	30	15	22	10	M6×0.75	5.5	11
SS20FL					65.2		32			48	8					
SS25KL	33	7	25	73	59.6	60	–	7×10(7×11.5)	6.5	38	19	26	11	M6×0.75	7	11
SS25FL					81.6		35			60	12.5		(12)			
SS30KL	42	9	31	90	67.4	72	–	9×12(9×14.5)	9	42	21	33	11	M6×0.75	8	11
SS30FL					96.4		40			71	15.5		(15)			
SS35KL	48	10.5	33	100	77	82	–	9×13(9×14.5)	9	49	24.5	37.5	12	M6×0.75	8.5	11
SS35FL					108		50			80	15		(15)			

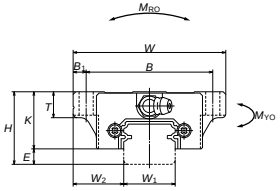
Remarks: 1) Parenthesized dimensions are applicable to stainless steel products.
2) The external appearance of stainless steel ball slides differs from those of standard material ball slide.

Reference number for ball slide of random-matching type

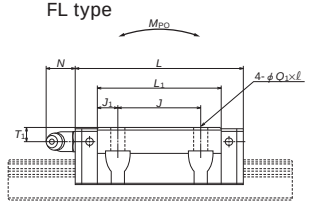
Ball slide **SAS 30 FL C -**PC Z**

- Random-matching ball slide series code: SAS (SAS : SS Series random-matching ball slide)
- Size: 30
- Ball slide shape code (See page A140): FL
- Material/surface treatment code (See Table 20): C
- Design serial number: -** (Added to the reference number.)
- Accuracy code : PC (PC: Normal grade is only available)
- Preload code: Z (Z: Slight preload only (See page A142))

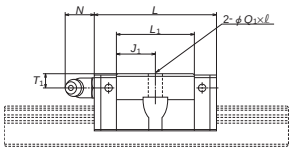
FL and KL types



FL type



KL type

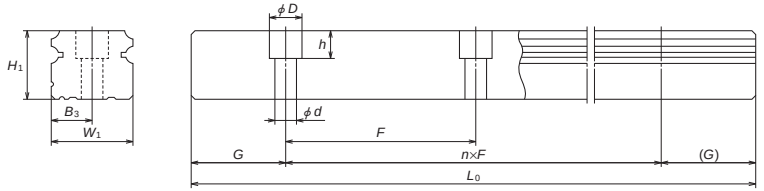


Reference number for rail of random-matching type

Rail **L1S 30 1200 L C N -** PC Z**

- Random-matching rail series code: L1S (L1S : LS/SS Series random-matching rail)
- Size: 30
- Rail length (mm): 1200
- Rail shape code: L (L: Standard, LS15 with mounting hole for M3; T: LS15 with mounting hole for M4)
- Material/surface treatment code (See Table 20): C
- *Butting rail specification: N (N: Non-butting. L: Butting specification)
- Design serial number: -** (Added to the reference number.)
- Accuracy code : PC (PC: Normal grade is only available)
- Preload code: Z (Z: Slight preload only (See page A142))

*Please consult with NSK for butting rail specification.



Unit: mm

Rail Width W_1	Height H_1	Pitch F	Mounting bolt hole d×D×h	B_3	G (reference)	Max. length L_{0max} ( ) for stainless	Basic load rating Dynamic C (N)	Static C_0 (N)	Static moment M_{RO} (N·m)	M_{PO} (N·m)	M_{YO} (N·m)	Ball dia. D_W	Weight Ball slide (kg)	Rail (kg/m)
15	12.5	60	* 3.5×6×4.5 4.5×7.5×5.3	7.5	20	2000 (1700)	4900 7900	7800 15600	39 78	21.1 73.5	17.7 61.5	2.778	0.17 0.26	1.4
20	15.5	60	6×9.5×8.5	10	20	3960 (3500)	7250 11100	11800 21800	80 149	40.5 124	34 104	3.175	0.24 0.35	2.3
23	18	60	7×11×9	11.5	20	3960 (3500)	12700 17900	20800 33500	164 266	96.5 242	81 203	3.968	0.44 0.66	3.1
28	23	80	7×11×9	14	20	4000 (3500)	18700 27300	29600 50500	282 480	153 415	128 350	4.762	0.76 1.2	4.8
34	27.5	80	9×14×12	17	20	4000 (3500)	26000 38000	40000 68500	465 800	234 620	196 520	5.556	1.2 1.7	7

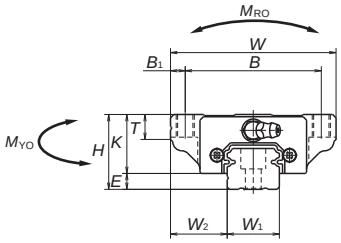
3) The basic dynamic load rating is a load that furnishes 50 km rating fatigue life; it is a vertical and constant load to the ball slide mounting surface. When converting the basic dynamic load rating C to the dynamic load rating C_{100} for 100 km rating fatigue life, divide the C by 1.26.
* Standard mounting hole of SS15 rail is for M3 bolts (Hole size: 3.5×6×4.5). If you require the mounting hole for M4 bolts (Hole size: 4.5×7.5×5.3), please specify it when ordering.

SS-JM (Medium-load type)
SS-EM (High-load type)

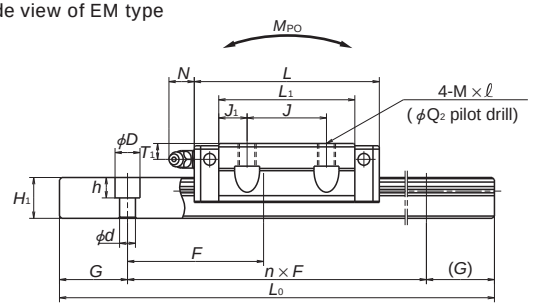
SS 30 1000 EM C 2 - P5 3**

- Series name: SS
- Size: 30
- Rail length (mm): 1000
- Ball slide shape code (See page A140): EM
- Material/surface treatment code (See Table 20): C
- Number of ball slides per rail: 2
- Design serial number (Added to the reference number.): -**
- Accuracy code (See Table 21): P5
- Preload code (See page A142): 3

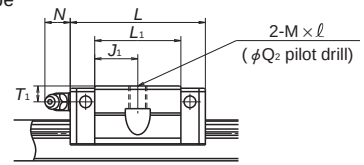
Front view of EM and JM types



Side view of EM type



Side view of JM type



Model No.	Assembly Height H	Assembly E	Assembly W2	Ball slide Width W	Ball slide Length L	Mounting hole B	Mounting hole J	Mounting hole M×pitch×ℓ	Mounting hole Q2	B1	L1	J1	K	T	Grease fitting Hole size	Grease fitting T1	Grease fitting N
SS15JM	24	4.6	18.5	52	40.4	41	–	M5×0.8×7	4.4	5.5	23.6	11.8	19.4	8	ϕ3	6	3
SS15EM					56.8		26				40	7					
SS20JM	28	6	19.5	59	47.2	49	–	M6×1×9	5.3	5	30	15	22	10	M6×0.75	5.5	11
SS20EM					65.2		32	(M6×1×9.5)			48	8					
SS25JM	33	7	25	73	59.6	60	–	M8×1.25×10	6.8	6.5	38	19	26	11	M6×0.75	7	11
SS25EM					81.6		35	(M8×1.25×11.5)			60	12.5		(12)			
SS30JM	42	9	31	90	67.4	72	–	M10×1.5×12	8.6	9	42	21	33	11	M6×0.75	8	11
SS30EM					96.4		40	(M10×1.5×14.5)			71	15.5		(15)			
SS35JM	48	10.5	33	100	77	82	–	M10×1.5×13	8.6	9	49	24.5	37.5	12	M6×0.75	8.5	11
SS35EM					108		50	(M10×1.5×14.5)			80	15		(15)			

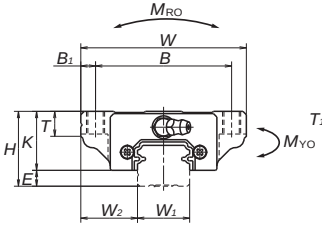
Remarks: 1) Parenthesized dimensions are applicable to stainless steel products.
2) The external appearance of stainless steel ball slides differs from those of standard material ball slide.

Reference number for ball slide of random-matching type

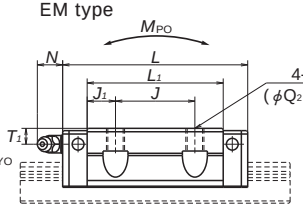
Ball slide **SAS 30 EM C -** **PC Z**

- Random-matching ball slide series code: SAS (SAS : SS Series random-matching ball slide)
- Size: 30
- Ball slide shape code (See page A140): EM
- Material/surface treatment code (See Table 20): C
- Design serial number (Added to the reference number.): -**
- Accuracy code : PC (PC: Normal grade is only available)
- Preload code (Z: Slight preload only (See page A142)): Z

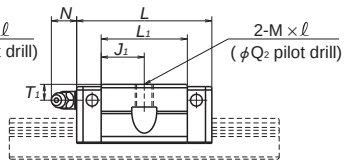
EM and JM types



EM type



JM type

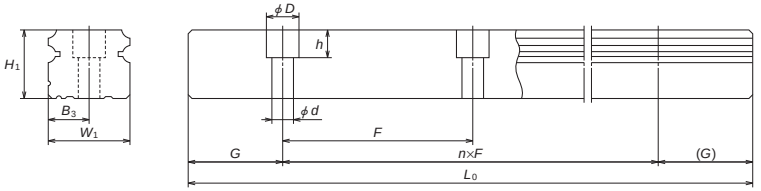


Reference number for rail of random-matching type

Rail **L1S 30 1200 L C N -** **PC Z**

- Random-matching rail series code: L1S (L1S : LS/SS Series random-matching rail)
- Size: 30
- Rail length (mm): 1200
- Rail shape code: L (L: Standard, LS15 with mounting hole for M3; T: LS15 with mounting hole for M4)
- Material/surface treatment code (See Table 20): C
- *Butting rail specification (N: Non-butting. L: Butting specification): N
- Design serial number (Added to the reference number.): -**
- Accuracy code : PC (PC: Normal grade is only available)
- Preload code (Z: Slight preload only (See page A142)): Z

*Please consult with NSK for butting rail specification.



Unit: mm

Rail Width W1	Rail Height H1	Rail Pitch F	Rail Mounting bolt hole d×D×h	Rail B3	Rail G (reference)	Rail Max. length L0max ( ) for stainless	Basic load rating Dynamic C (N)	Basic load rating Static C0 (N)	Static moment MRO (N·m)	Static moment MPO (N·m)	Static moment MYO (N·m)	Ball dia. Dw	Weight Ball slide (kg)	Weight Rail (kg/m)
15	12.5	60	*3.5×6×4.5 4.5×7.5×5.3	7.5	20	2000 (1700)	4900 7900	7800 15600	39 78	21.1 73.5	17.7 61.5	2.778	0.17 0.26	1.4
20	15.5	60	6×9.5×8.5	10	20	3960 (3500)	7250 11100	11800 21800	80 149	40.5 124	34 104	3.175	0.24 0.35	2.3
23	18	60	7×11×9	11.5	20	3960 (3500)	12700 17900	20800 33500	164 266	96.5 242	81 203	3.968	0.44 0.66	3.1
28	23	80	7×11×9	14	20	4000 (3500)	18700 27300	29600 50500	282 480	153 415	128 350	4.762	0.76 1.2	4.8
34	27.5	80	9×14×12	17	20	4000 (3500)	26000 38000	40000 68500	465 800	234 620	196 520	5.556	1.2 1.7	7

3) The basic dynamic load rating is a load that furnishes 50 km rating fatigue life; it is a vertical and constant load to the ball slide mounting surface. When converting the basic dynamic load rating C to the dynamic load rating C_{100} for 100 km rating fatigue life, divide the C by 1.26.

* Standard mounting hole of SS15 rail is for M3 bolts (Hole size: 3.5×6×4.5). If you require the mounting hole for M4 bolts (Hole size: 4.5×7.5×5.3), please specify it when ordering.