Rodless type

SRM3

High precision guided Rodless cylinder

ø25, ø32, ø40, ø63 or equiv.



Overview

This is a high precision guided rodless cylinder with two high precision linear guides integrated into the Rodless Cylinder Bore Size equivalent to ø25 to ø63. It is ideal for high precision transport of components, etc.

Features

Strong against bending moments

Thin profile design

Safety
(Drop prevention unit available as an option)

A drop prevention unit capable of mechanical locking at any position throughout the entire stroke can be installed, improving the safety of mechanical equipment.

The full stroke adjustment unit is securely fixed

The unit with full stroke adjustment shock absorber is securely fixed with a dedicated plate nut, eliminating the need for a spacer between the covers and preventing misalignment at the stroke end.

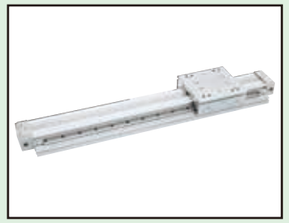
CONTENTS

Product Introduction	2
Series System Chart	144
● Double Acting (SRM3)	146
● Double Acting/position locking (SRM3-Q)	146
Switch External Dimensions	157
Model Selection Guide	160
Technical Data	166
⚠Precautions for Use	170

High precision guided Rodless cylinder SRM3 Series

●: Standard, ◎: Option, : Not available

Variations	Model Number / Circuit Diagram Code	Bore Size (mm)	Standard Stroke (mm) 200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	Min Stroke (mm)	Max Stroke (mm)	Intermediate Stroke (Every mm)	Cushion: No cushion N	With both sides cushion B	With R side cushion R	With L side cushion L	Options: With full stroke adjustment both sides shock absorber A	With full stroke adjustment R side shock absorber A1	With full stroke adjustment L side shock absorber A2	Full stroke adjustment bracket retrofit type A3	With full stroke adjustment both sides light load shock absorber E	With full stroke adjustment R side light load shock absorber E1	With full stroke adjustment L side light load shock absorber E2	Switch	Page
Double Acting	SRM3	Equivalent to ø25 / ø32	●	●	●	●	●	●	●	●	●											50	1000	1	●	●	●	●	◎	◎	◎	◎	◎	◎	◎	◎	146
		Equivalent to ø40/ø63	●	●	●	●	●	●	●	●	●	●	●	●	●							80	2000		●	●	●	●	◎	◎	◎	◎	◎	◎	◎		
Double Acting / Drop prevention	SRM3-Q	Equivalent to ø25 / ø32	●	●	●	●	●	●	●	●	●											50	1000	1	●	●	●	●	◎	◎	◎	◎	◎	◎	◎	◎	146
		Equivalent to ø40 / ø63	●	●	●	●	●	●	●	●	●	●	●	●	●							80	2000		●	●	●	●	◎	◎	◎	◎	◎	◎	◎		



Rodless Cylinder with High-Precision Guide

Double Acting Type SRM3 Series

Double Acting/Fall Prevention Type SRM3-Q Series

● Bore Size: ø25, ø32, ø40, ø63 Equivalent

Circuit Diagram Code



RoHS

Model No. Notation

Without Switch
(Built-in Magnet for Switch)

SRM3 - 25 - B - 500 ——— C0 - A

1 2 3 4 7 Built-in Magnet 8

With Switch
(Built-in Magnet for Switch)

SRM3 - 25 - B - 500 - T0H - R ——— A

1 Model Number
3 Cushion
5 Switch Model
8 Option
2 Bore Size
4 Stroke
6 Number of Switches

1 Model Number

Code	Description
SRM3	Standard Type
SRM3-Q	Fall Prevention Type

Note: Square nuts (2 types, 8 pcs each) are included to allow use of T-slots.

2 Bore Size (mm)

Code	Description
25	ø25 Equivalent
32	ø32 Equivalent
40	ø40 Equivalent
63	ø63 Equivalent

3 Cushion

Code	Description
B	Cushion on Both Sides
R	Cushion on R Side
L	Cushion on L Side
N	Without Cushion

4 Stroke (mm)

Bore Size	Stroke	Intermediate Stroke
ø25, ø32 Equivalent	50 to 1000	in 1mm increments
ø40, ø63 Equivalent	80 to 2000	

Note: Refer to P. 148 for the minimum stroke with switch.

5 Switch Model

For switch details, refer to P. 1457. Switches are shipped with the product.

Contact	Indicator Light Special Function	Wiring (Output)	Load Voltage (V) AC	Load Voltage (V) DC	Load Current (mA) AC	Load Current (mA) DC	Lead Wire *1 Straight	Lead Wire *1 L-shaped	
Non-contact	2-color	2-wire	-	24+/-10%	-	5 to 20	T2WH□	T2WV□	
		3-wire (NPN)	-	30 or less	-	50 or less	T3WH□	T3WV□	
	2-color/Improved Water Resistance	2-wire	-	24+/-10%	-	5 to 20	T2WLH□	T2WLV□	 *2
	For 2-color AC Magnetic Field		-	24+/-10%	-		T2YD□	-	
			-		-		T2YDT□	-	
Contact	1-color	2-wire	110	12/24	7 to 20	5 to 50	T0H□	T0V□	
	Without Indicator Lamp		110	5/12/24	20 or less	50 or less	T5H□	T5V□	
	1-color		110/220	12/24	7 to 20/ 7 to 10	5 to 50	T8H□	T8V□	

*1: Enter the code selected in the "*Lead wire length, connector specifications" table into "□" of the Switch Model.
*2: It does not guarantee the water resistance of the cylinder.
*3: Switches other than the above models are also available. (Custom Product) For details, see P. 1457.

*Lead wire length, connector specifications

Code	Description
No Code	1m (Standard)
3	3m (Option)
5	5m (Option)
W	M8 connector, 1PIN (+) 4PIN (-) Lead wire 0.3 m

*4: Only T2WLH and T2WLV can be selected.

Example) Lead wire length
1 m T0H
3 m T0H3
5 m T0H5

6 Number of Switches

Code	Description
R	1 pc on R Side
L	1 pc on L Side
D	2 pcs
T	3 pcs
4	4 pcs (Indicate number of switches for 4 pcs or more)

7 Built-in Magnet

Code	Description
C0	Built-in Magnet for Contact Switch
C1	Built-in Magnet for Non-contact Switch

*1: Select only when switch model No. is not selected.
*2: The built-in magnet cannot be changed after shipment.

Rechargeable Battery Compatible Specification
(Catalog No. CC-1226AA)

●Structure usable in rechargeable battery manufacturing process

SRM3 - . . . . - P4*

SRM3-Q - . . . . - P4*

*Contact us for details.

Switch Individual Model No. Notation

● Switch Body Only

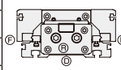
SW - T0H

5 Switch Model

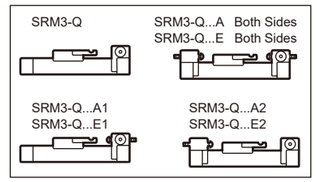
Shock Absorber Unit Model No. Notation

Model	Shock Absorber Unit Model	
	Standard Type (-A)	Light Load Type (-E)
SRM3-25	NCK-00-1.2	NCK-00-0.7-C
SRM3-32	NCK-00-2.6	NCK-00-1.2
SRM3-40	NCK-00-7	NCK-00-2.6
SRM3-63	NCK-00-12	NCK-00-7

8 Option

	Code	Full Stroke Adjustment		Cushion Needle Position	
	A		Both Sides, with Shock Absorber		
	A1		R Side Only, with Shock Absorber		
	A2		L Side Only, with Shock Absorber		
*1	A3		Bracket Retrofit Type		
	E		Both Sides, with Light Load Shock Absorber		
	E1		R Side Only, with Light Load Shock Absorber		
	E2		L Side Only, with Light Load Shock Absorber		
	No Code	Port Position	F (Standard)	F (Standard)	
*3	R		R (Concentrated Port)	F	
	B		F	B	
*3	T		R (Concentrated Port)	B	
	D		D	F	
*4	S		D	D	

*1: To retrofit the full stroke adjustment bracket, it is necessary to remove the cover and assemble the plate nut. "A3" is an option with a mounting plate nut assembled for retrofitting the full stroke adjustment bracket.
*2: When model No. SRM3-Q is selected, the full stroke adjustment bracket on the R side becomes a standard part for drop prevention. When "A1" or "E1" is indicated, only the shock absorber is added to the R side. When "A" is indicated, the R side has fall prevention, full stroke adjustment, and shock absorber, and the L side has full stroke adjustment and shock absorber. (Figure below)



*3: For equivalent to ø63, option "R" or "T" cannot be selected.
*4: For equivalent to ø25, option "S" cannot be selected.

Replacement Parts Model No. Notation

SRM3 - 40 K - 200

2 Bore Size
4 Stroke

Full Stroke Adjustment Bracket Kit Model No. Notation (Applicable to option symbol A3.)

SRM3 - 40 — A1 (Full Stroke Adjustment Bracket Kit with Shock Absorber)
— E1 (Full Stroke Adjustment Bracket Kit with Light Load Shock Absorber)

2 Bore Size

(Refer to the Full Stroke Adjustment Bracket Kit on P. 158 for the component configuration.)

Specifications

Item		SRM3 Standard Type/With Switch				SRM3-Q Fall Prevention Type/With Switch			
Bore Size	mm	ø25 Equivalent	ø32 Equivalent	ø40 Equivalent	ø63 Equivalent	ø25 Equivalent	ø32 Equivalent	ø40 Equivalent	ø63 Equivalent
Operating Method		Double Acting Type				Double Acting/Fall Prevention Type			
Operating Fluid		Compressed Air							
Max Operating Pressure	MPa	0.7							
Min Operating Pressure	MPa	0.15		0.1		0.15		0.1	
Proof Pressure	MPa	1.05							
Ambient Temperature	°C	5 to 60							
Port Size	Cylinders Body Port	Rc1/8	Rc1/4		Rc3/8	Rc1/8	Rc1/4		Rc3/8
	Fall Prevention Port	-				Rc1/8			
Stroke Tolerance	mm	$^{+2.0}_{0}$ (up to 1000) $^{+2.5}_{0}$ (up to 2000)							
Operating Piston Speed	mm/s	50 to 1500 *1, *2							
Cushion		Air Cushion							
Lubrication		Not Required							
Repeatability	mm	±0.03							
Fall Prevention Mechanism		-				Installed on Cover R Side			
Holding Force	N	-				Max Thrust x 0.7			

*1: Piston speed with concentrated port piping varies depending on the stroke, so please consult us separately.
*2: ①When operating at a speed of 500 to 1500 mm/s, please decelerate so that the entry speed into the fall prevention mechanism is 500 mm/s or less.
②As a deceleration method, please use a method such as installing an external shock absorber or a deceleration circuit.
③Apply grease periodically to the sliding part of the lock lever.

Allowable Absorbed Energy

Bore Size (mm)	With Cushion		Without Cushion	With Shock Absorber (Initial Setting Value)	
	Allowable Absorbed Energy (J)	Cushion Stroke (mm)	Allowable Absorbed Energy (J)	Absorbed Energy (J)	Effective Stroke (mm)
ø25 Equivalent	1.40	20.9	0.015	10	9
ø32 Equivalent	2.57	23.5	0.030	18	13
ø40 Equivalent	4.27	23.9	0.050	50	16.5
ø63 Equivalent	17.4	29.6	0.138	86	21

Stroke

Bore Size (mm)	Standard Stroke (mm)	Max Stroke (mm)	Min Stroke (mm)
ø25, ø32 Equivalent	200, 300, 400, 500, 600, 700, 800, 900, 1000	1000	50
ø40, ø63 Equivalent	200, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000	2000	80

Note: Intermediate strokes can be manufactured in 1mm increments.

Number of Switches Mounted and Min Stroke (mm)

Number of Switches	1				2			
Switch Model / Bore Size (mm)	T□V	T□H	T2WLV	T2WLH	T□V	T□H	T2WLV	T2WLH
ø25 Equivalent	50	50	50	50	50	50	50	56
ø32 Equivalent	50	50	50	50	50	50	50	56
ø40 Equivalent	80	80	80	80	80	80	80	86
ø63 Equivalent	80	80	80	80	80	80	80	86

Cylinders Weight

Unit: kg

Bore Size (mm)	Weight at 0mm stroke: Basic Type (SRM3)	Weight at 0mm stroke: Fall Prevention Type (SRM3-Q)	Weight at 0mm stroke: Switch Weight	Additional Weight per 100mm Stroke
ø25 Equivalent	2.4	2.9	Refer to the Weight listed in the Switch Specifications on P. 1457.	0.59
ø32 Equivalent	3.3	4.2		0.72
ø40 Equivalent	4.8	6.0		1.20
ø63 Equivalent	15.1	17.8		1.99

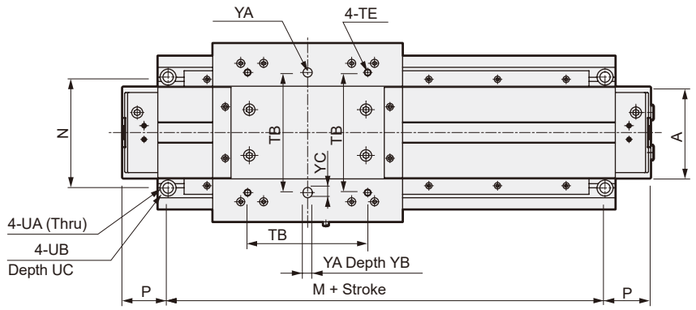
Theoretical Thrust Table

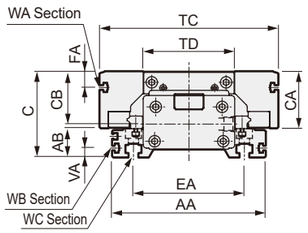
(Unit: N)

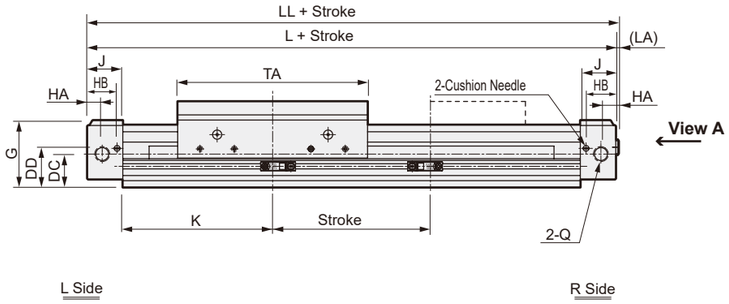
Bore Size (mm)	Operating Direction	Operating Pressure MPa 0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7
ø25 Equivalent	Push/Pull	-	81.4	$1.08x10^2$	$1.63x10^2$	$2.17x10^2$	$2.71x10^2$	$3.25x10^2$	$3.80x10^2$
ø32 Equivalent	Push/Pull	-	$1.21x10^2$	$1.63x10^2$	$2.44x10^2$	$3.26x10^2$	$4.07x10^2$	$4.88x10^2$	$5.70x10^2$
ø40 Equivalent	Push/Pull	-	$1.90x10^2$	$2.53x10^2$	$3.80x10^2$	$5.06x10^2$	$6.33x10^2$	$7.60x10^2$	$8.86x10^2$
ø63 Equivalent	Push/Pull	$3.14x10^2$	$4.70x10^2$	$6.27x10^2$	$9.41x10^2$	$1.25x10^3$	$1.57x10^3$	$1.88x10^3$	$2.20x10^3$

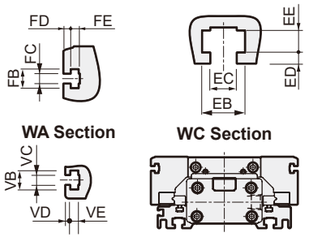
Dimensional Drawings

● Standard Type (SRM3)

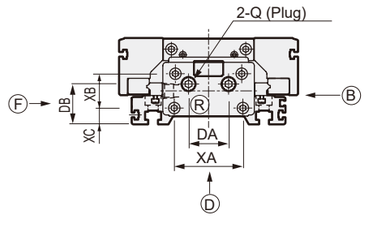








Note: SRM3-25 and 32 do not have WB section.



Code / Bore Size (mm)	A	AA	AB	C	CA	CB	DA	DB	DC	DD	EA	EB	EC	ED	EE
ø25 Equivalent	53	102	18	57	39	37	26	22	20	21.9	71	9.5	5.5	2.5	4.5
ø32 Equivalent	66	116	20	62	41.5	39.5	27	25	22.5	25.5	80	11	6.6	2.5	6
ø40 Equivalent	80	134	25	75	49.5	46	35	35	29	34	97	14.5	9	3.5	7.5
ø63 Equivalent	118	188	31.5	100	68	62.5	39	44.5	37.5	45.5	140	18	11	4	9

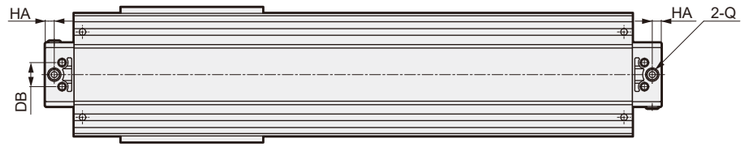
Code / Bore Size (mm)	FA	FB	FC	FD	FE	G	HA	HB	HE	J	K	L	LA	LL
ø25 Equivalent	10	8.5	4.5	3	3.7	43.5	7.5	20	-	24	98	244	2	246
ø32 Equivalent	10	8.5	4.5	3	3.7	47.5	10	23.5	17	28	106	268	2.5	270.5
ø40 Equivalent	14	8.5	4.5	3	3.7	58.5	13	26	22.3	31	131	324	2.5	326.5
ø63 Equivalent	20	9.5	5.5	3	4.5	76.5	15	32	31	39	187	452	2.5	454.5

*1: Please note that after shipment, the cylinder switch cannot be changed from contact switch to non-contact switch, or from non-contact switch to contact switch.
*2: For ø25 equivalent, option: S is not available.
***3: For dimensions with each switch, refer to P. 157.**

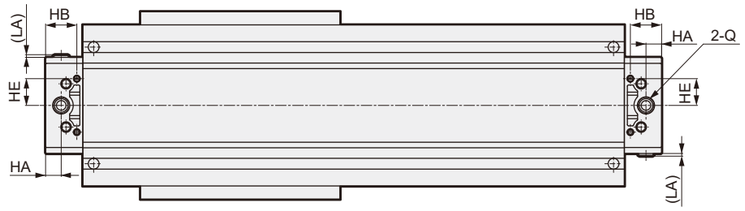
Dimensional Drawings

● Bottom Piping (SRM3-□□-□□□-D/S)

•ø25 Equivalent



•ø32 Equivalent to ø63 Equivalent



Code / Bore Size (mm)	LL	M	N	P	Q	TA	TB	TC	TD	TE	UA	UB
ø25 Equivalent	246	182	71	31	Rc1/8	118	75	112	61	M5 Depth 12	5.5	9.5 Counterbore Depth 6.5
ø32 Equivalent	270.5	196	80	36	Rc1/4	132	85	128	65	M6 Depth 13	6.6	11 Counterbore Depth 6.5
ø40 Equivalent	326.5	244	97	40	Rc1/4	166	105	156	81	M6 Depth 15	9	14 Counterbore Depth 8.5
ø63 Equivalent	454.5	350	140	51	Rc3/8	250	160	224	118	M8 Depth 20	11	17.5 Counterbore Depth 10.5

Code / Bore Size (mm)	VA	VB	VC	VD	VE	XA	XB	XC	YA	YC
ø25 Equivalent	-	-	-	-	-	38	23	8.5	6 $^{+0.07}_{+0.02}$ Depth 6	7
ø32 Equivalent	-	-	-	-	-	48	25	10	6 $^{+0.07}_{+0.02}$ Depth 6	7
ø40 Equivalent	8	8.5	4.5	2	3.7	60	30	14	8 $^{+0.07}_{+0.02}$ Depth 8	9
ø63 Equivalent	10	9.5	5.5	2.5	4.5	96	42	16.5	10 $^{+0.07}_{+0.02}$ Depth 10	12

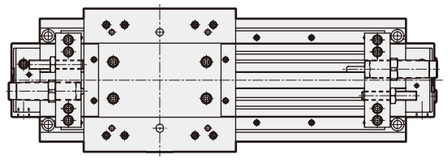
Note: For dimensions with each switch, refer to P. 157.

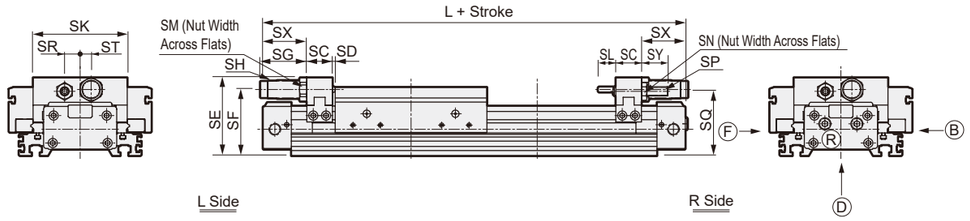
Dimensional Drawings

● Full Stroke Adjustment, with Standard Shock Absorber (SRM3-□□-□□□-A)]

Note: For SRM3-25-A, the shock absorber is inside the cover.







● Full Stroke Adjustment, with Light Load Shock Absorber (SRM3-□□-□□□-E)



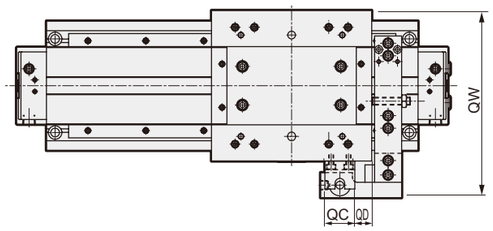
Code / Bore Size (mm)	SC	SD	SE	SF	SG			SH		SK	SL	SM	SN	SP	SQ	SR	ST
					At MAX	At MIN	Adjustment Range	Outer Diameter Thread	Max Absorbed Energy (J)								
ø25 Equivalent	24	2	66	54.5	22.5	12.5	10	M12x1.0	12	78	11	17	10	M6	53	12	10
ø32 Equivalent	24	2	70.5	59.5	47	37	10	M14x1.5	26	86	15	19	13	M8	57.5	14	12
ø40 Equivalent	28	3	85.5	72.5	51	41	10	M20x1.5	70	103	19.5	24	17	M10	70.5	17	12
ø63 Equivalent	36	4	114.5	96	68	58	10	M25x1.5	120	150	25	32	24	M16	91.5	25	20

Code / Bore Size (mm)	SX	SY	NE	NF	NG			NH		NN	NP	NQ	NR	NT	NY	L
					At MAX	At MIN	Adjustment Range	Outer Diameter Thread	Max Absorbed Energy (J)							
ø25 Equivalent	37	14	56.5	50	24	14	10	M10x1.0	7	10	M6	50	11	8	14	244
ø32 Equivalent	42	24	61.5	54	22.5	12.5	10	M12x1.0	12	10	M6	54	12	11	14	268
ø40 Equivalent	48	29	74.5	66	42	32	10	M14x1.5	26	13	M8	66.5	16	13	19	324
ø63 Equivalent	61	40	99.5	87.5	42	32	10	M20x1.5	70	19	M12	88	16	20	30	452

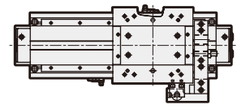
Note: For dimensions with each switch, refer to P. 157.

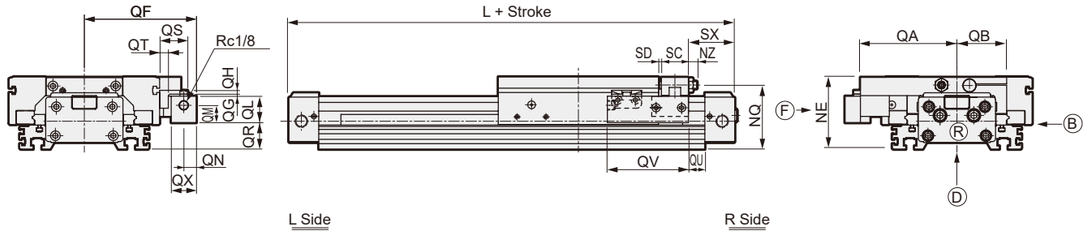
Dimensional Drawings

● Fall Prevention Type (SRM3-Q)



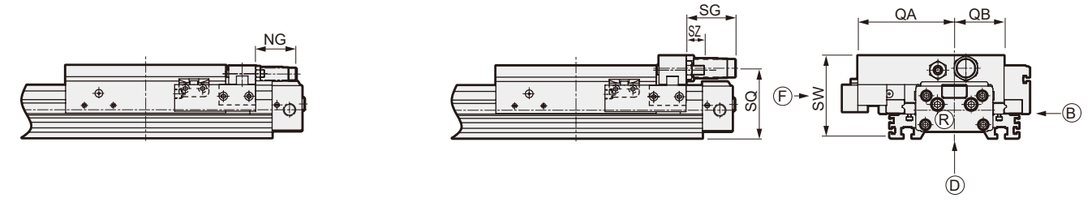
Note:
For SRM3-Q (Fall Prevention Type) -25, 32, 40, a T-type switch is assembled at the position shown in the figure below.





● Fall Prevention/Full Stroke Adjustment, with Light Load Shock Absorber (SRM3-Q-□□-□□□-E1)

● Fall Prevention/Full Stroke Adjustment, with Standard Shock Absorber (SRM3-Q-□□-□□□-A1)

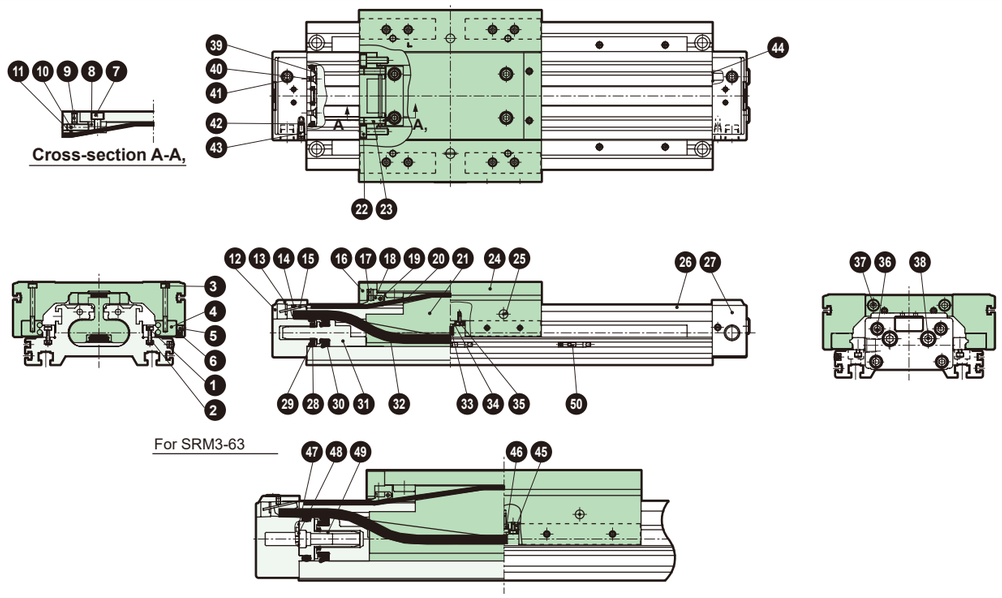


Code / Bore Size (mm)	QA	QB	QC	QD	QF	QG	QH	QL	QM	QN	QR	QS	QT	QV	QU
ø25 Equivalent	78	39	31	26.5	94	2	4	27.5	18	13	13	29	9	84	17
ø32 Equivalent	86	43	31	26.5	102	2	4	27.5	18	13	16.5	29	9	84	18
ø40 Equivalent	100	51.5	31	17.5	116	2	4	27.5	18	13	27.5	29	9	84	17
ø63 Equivalent	140	75	34	20.5	156	2	5	33	21.5	15	41	36	12	100	22

Code / Bore Size (mm)	QX	QW	NE	NG	NQ	NZ	SC	SD	SW	SG	SQ	SX	SZ	L
ø25 Equivalent	26	150	56.5	24	50	4	24	2	66	22.5	53	37	4	244
ø32 Equivalent	26	166	61.5	22.5	54	4	24	2	69.5	47	57.5	42	9	268
ø40 Equivalent	26	194	74.5	42	66.5	9	28	3	85.5	51	70.5	48	19	324
ø63 Equivalent	30	268	99.5	42	88	15	36	4	114.5	68	91.5	61	20	452

Note: For dimensions with each switch, refer to P. 157.

Internal Structure and Materials



No.	Part Name	Material	Remarks	No.	Part Name	Material	Remarks
1	Hexagon Socket Head Cap Screw	Alloy Steel	Black Oxide	28	Cushion Packing	Urethane Rubber	
2	Nut Rail	Steel	Black Oxide	29	Cylinders Gasket	Nitrile Rubber	
3	Hexagon Socket Head Cap Screw	Alloy Steel	Black Oxide	30	Piston Packing	Nitrile Rubber	
4	High Precision Guide	Steel		31	Piston	Polyacetal	
5	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate	32	Seal Belt	Urethane Rubber	
6	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate	33	Magnet		
7	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Chromate	34	Magnet Case	Polyamide	
8	Yoke Holder	Steel	Black Oxide	35	Hexagon Socket Head Cap Screw	Stainless Steel	
9	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate	36	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Chromate
10	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate	37	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Chromate
11	Dust Wiper	Polyacetal		38	Plug	Steel	Zinc Chromate
12	Belt Cover	Polyamide		39	Cushion Adapter	Polyacetal	ø25 to ø40 equivalent only
13	Cover (L)	Aluminum Alloy	Painted	40	Cross-Recessed Countersunk Head Screw	ø25, ø63 equivalent: Steel ø32, ø40 equivalent: Alloy Steel	Zinc Chromate
14	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate				
15	Belt Spacer	Steel	Zinc Chromate	41	Hexagon Socket Set Screw (ø25, ø32 equivalent)	Alloy Steel	Zinc Chromate
16	Table Cover	Steel	Zinc Chromate		Plug (ø40, ø63 equivalent)	Steel	Zinc Chromate
17	Spring	Steel	Black Oxide	42	Needle Gasket	Nitrile Rubber	
18	Belt Holder	Polyacetal		43	Cushion Needle	Steel	Zinc Chromate
19	Parallel Pin	Steel	Zinc Chromate	44	Concentrated Port O-Ring	Nitrile Rubber	
20	Dust Proof Belt	Stainless Steel, Nitrile Rubber		45	Spacer	Aluminum Alloy	
21	Yoke	Aluminum Alloy	Alumite	46	Hexagon Socket Head Cap Screw	Stainless Steel	
22	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Chromate	47	Cushion Ring Gasket	Nitrile Rubber	ø63 only
23	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate	48	O-Ring	Nitrile Rubber	
24	Table	Aluminum Alloy	Alumite	49	Cushion Ring	Polyacetal	
25	Grease Nipple	Copper	Nickel Plating	With Switch			
26	Cylinders Body	Aluminum Alloy	Alumite	50	Switch		
27	Cover (R)	Aluminum Alloy	Painted				

Replacement Parts List

No./Part Name / Bore Size (mm)	Kit Number	Replacement Part Number
ø25 Equivalent	SRM3-25K-□	⑪ ⑳ ㉘ ㉙ ㉚ ㉜ ㊷ ㊹
ø32 Equivalent	SRM3-32K-□	
ø40 Equivalent	SRM3-40K-□	
ø63 Equivalent	SRM3-63K-□	⑪ ⑳ ㉘ ㉙ ㉚ ㉜ ㊷ ㊹ ㊼

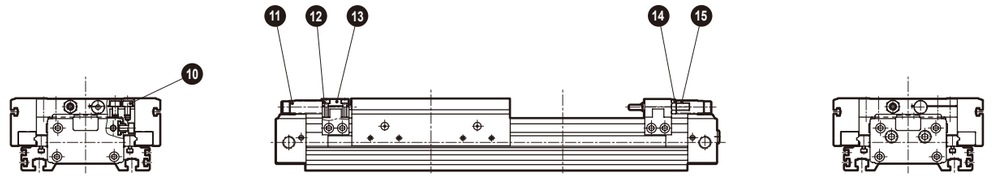
Note: Specify the kit number when ordering. Specify the stroke for □.

Internal Structure and Materials: with Shock Absorber

● Full Stroke Adjustment, with Standard Shock Absorber (SRM3-□□-□□□-A)



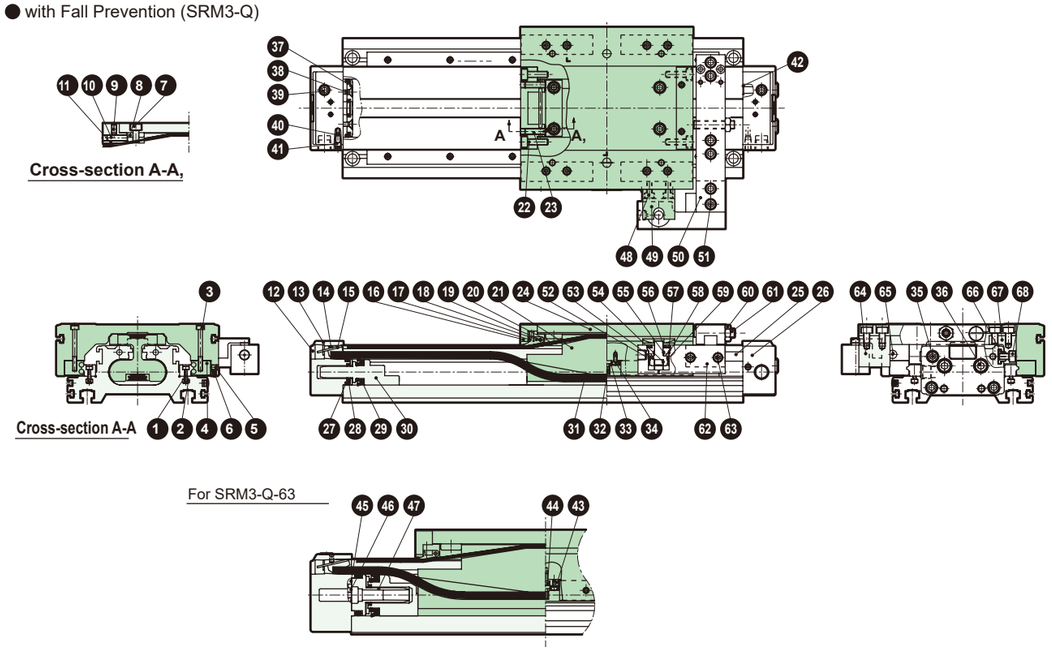
● Full Stroke Adjustment, with Light Load Shock Absorber (SRM3-□□-□□□-E)



No.	Part Name	Material	Remarks	No.	Part Name	Material	Remarks
1	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Plated	9	Hexagon Socket Set Screw	Alloy Steel	Zinc Plated
2	Adapter Nut	Steel	Black Oxide	10	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Plated
3	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Plated	11	Shock Absorber		
4	Shock Absorber			12	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Plated
5	Hexagon Nut	Steel	Zinc Plated	13	Plate (3)	Aluminum Alloy	Alumite
6	Adapter	Steel	Zinc Plated	14	Hexagon Nut	Steel	Zinc Plated
7	Plate (1)	Aluminum Alloy	Alumite	15	Hexagon Socket Set Screw	Alloy Steel	Zinc Plated
8	Hexagon Nut	Steel	Zinc Plated				

Internal Structure and Materials: with Fall Prevention

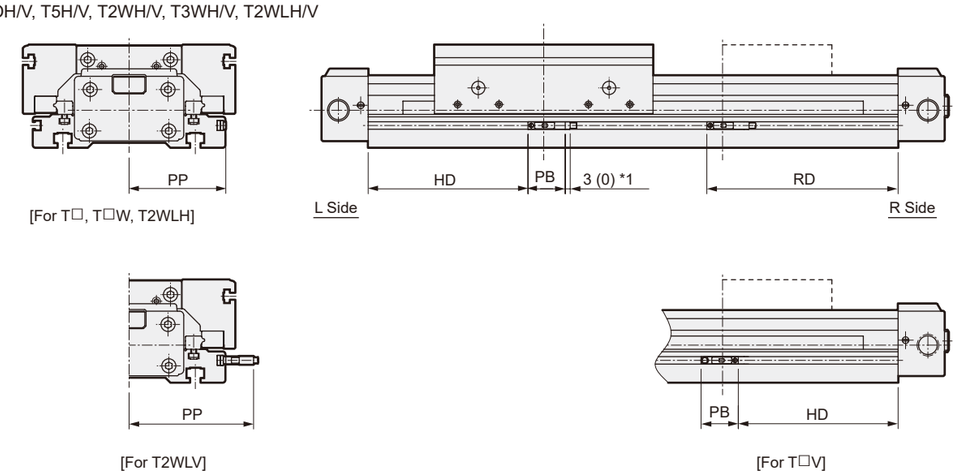
● with Fall Prevention (SRM3-Q)



No.	Part Name	Material	Remarks	No.	Part Name	Material	Remarks
1	Hexagon Socket Head Cap Screw	Alloy Steel	Black Oxide	36	Plug	Steel	Zinc Chromate
2	Nut Rail	Steel	Black Oxide	37	Cushion Adapter	Polyacetal	ø25 to ø40 equivalent only
3	Hexagon Socket Head Cap Screw	Alloy Steel	Black Oxide	38	Cross-Recessed Countersunk Head Screw	ø25, ø63 equivalent: Steel ø32, ø40 equivalent: Alloy Steel	Zinc Chromate
4	High Precision Guide	Steel					
5	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate	39	Hexagon Socket Set Screw (ø25, ø32 equivalent)	Alloy Steel	Zinc Chromate
6	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate		Plug (ø40, ø63 equivalent)	Steel	Zinc Chromate
7	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Chromate	40	Needle Gasket	Nitrile Rubber	
8	Yoke Holder	Steel	Black Oxide	41	Cushion Needle	Steel	Zinc Chromate
9	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate	42	Concentrated Port O-Ring	Nitrile Rubber	
10	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate	43	Spacer	Aluminum Alloy	
11	Dust Wiper	Polyacetal		44	Hexagon Socket Head Cap Screw	Stainless Steel	
12	Belt Cover	Polyamide		45	Cushion Ring Gasket	Nitrile Rubber	ø63 equivalent only
13	Cover (L)	Aluminum Alloy	Painted	46	O-Ring	Nitrile Rubber	
14	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate	47	Cushion Ring	Polyacetal	
15	Belt Spacer	Steel	Zinc Chromate	48	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Plated
16	Table Cover	Steel	Zinc Chromate	49	Lock Lever	Steel	Zinc Plated
17	Spring	Steel	Black Oxide	50	Plate (4)	Aluminum Alloy	Alumite
18	Belt Holder	Polyacetal		51	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Plated
19	Parallel Pin	Steel	Zinc Chromate	52	Piston Packing	Nitrile Rubber	
20	Dust Proof Belt	Stainless Steel, Nitrile Rubber		53	Lock Pin	Alloy Steel	Zinc Chromate
21	Yoke	Aluminum Alloy	Alumite	54	Cylindrical Spring	Piano Wire	Electrodeposition Coating
22	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Chromate	55	Rod Packing	Nitrile Rubber	
23	Hexagon Socket Set Screw	Alloy Steel	Zinc Chromate	56	Rod Cover	Aluminum Alloy	Hard Alumite
24	Table	Aluminum Alloy	Alumite	57	C-Ring for Hole	Steel	Black Oxide
25	Cylinders Body	Aluminum Alloy	Alumite	58	O-Ring	Nitrile Rubber	
26	Cover (R)	Aluminum Alloy	Painted	59	Wear Ring	Polyacetal	
27	Cushion Packing	Urethane Rubber		60	Hexagon Nut	Steel	Zinc Plated
28	Cylinders Gasket	Nitrile Rubber		61	Hexagon Socket Set Screw	Alloy Steel	Zinc Plated
29	Piston Packing	Nitrile Rubber		62	Fall Prevention Body	Aluminum Alloy	Alumite
30	Piston	Polyacetal		63	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Plated
31	Seal Belt	Urethane Rubber		64	Mounting Block	Aluminum Alloy	Alumite
32	Magnet			65	Grease Nipple	Copper	Nickel Plating (ø32 to 63 equivalent only)
33	Magnet Case	Polyamide		66	Adapter Nut	Steel	Black Oxide
34	Hexagon Socket Head Cap Screw	Stainless Steel		67	Adapter	Steel	Zinc Plated
35	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Chromate	68	Hexagon Socket Head Cap Screw	Alloy Steel	Zinc Plated

SRM3 Series Switch External Dimensions Diagram

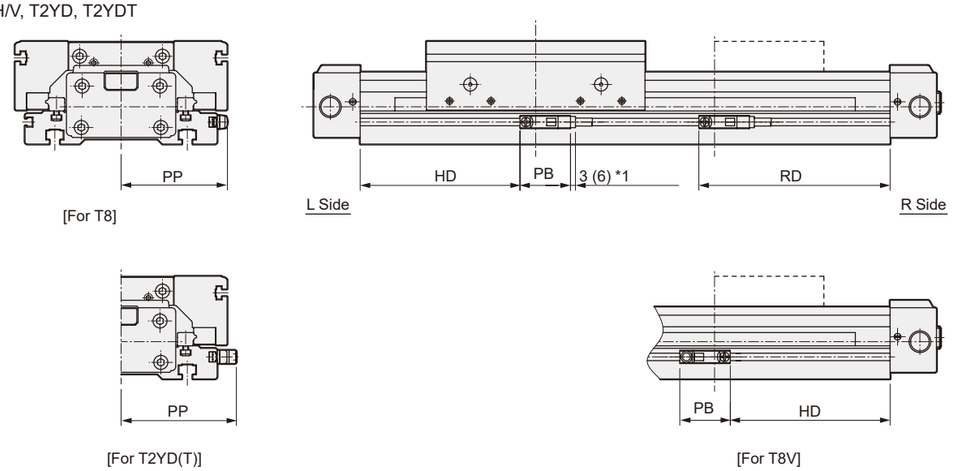
● TOH/V, T5H/V, T2WH/V, T3WH/V, T2WLH/V



Code	SRM3-Standard, Q													
	T0, T5				T2W, T3W				T2WL					
Bore Size (mm)	PB	PP	HD	RD *2	PB	PP	HD	RD *2	PB		PP		HD	RD *2
									Straight	L-shaped	Straight	L-shaped		
ø25 Equivalent	22.5	51.5	88.5	107.5	22.5	51.5	90.5	105.5	31	10	51.5	68.3	90.5	105.5
ø32 Equivalent	22.5	58.5	96.5	115.5	22.5	58.5	98.5	113.5	31	10	51.5	68.3	98.5	113.5
ø40 Equivalent	22.5	67.5	121.5	140.5	22.5	67.5	123.5	138.5	31	10	51.5	68.3	123.5	138.5
ø63 Equivalent	22.5	94.5	177.5	196.5	22.5	94.5	179.5	194.5	31	10	51.5	68.3	179.5	194.5

*1: Values in ( ) are dimensions at T2WLH.
*2: RD dimension does not apply to L-shaped lead wire type.
*3: For switch mounting availability, refer to the Model No. Notation for each variation.

● T8H/V, T2YD, T2YDT



Code	SRM3-Standard, Q							
	T8				T2YD, T2YDT			
Bore Size (mm)	PB	PP	HD	RD *2	PB	PP	HD	RD *2
ø25 Equivalent	30.5	57.3	81.5	102.5	29.5	62.7	87.5	108.5
ø32 Equivalent	30.5	64.3	89.5	110.5	29.5	69.7	95.5	116.5
ø40 Equivalent	30.5	73.3	114.5	135.5	29.5	78.7	120.5	141.5
ø63 Equivalent	30.5	100.3	170.5	191.5	29.5	105.7	176.5	197.5

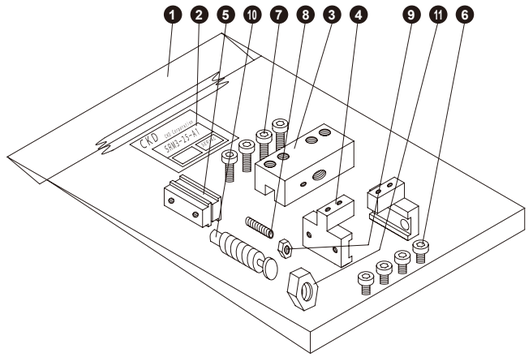
*1: Values in ( ) are dimensions for T2YD and T2YDT.
*2: RD dimension does not apply to L-shaped lead wire type.
*3: For switch mounting availability, refer to the Model No. Notation for each variation.

Full Stroke Adjustment Bracket Kit

● Full Stroke Adjustment Bracket Kit (with Shock Absorber)

SRM3 - 25 - A1

❷ Bore Size
(P. 146)

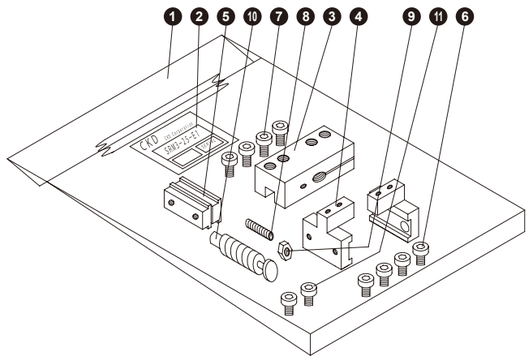


No.	Part Name	Quantity
1	Plastic Bag	1
2	Package Label	1
3	Plate (1)	1
4	Adapter	2
5	Adapter Nut	2
6	Hexagon Socket Head Cap Screw	4
7	Hexagon Socket Head Cap Screw	4
8	Hexagon Socket Set Screw	1
9	Hexagon Nut	1
10	Shock Absorber	1
11	Hexagon Nut	1

● Full Stroke Adjustment Bracket Kit (with Light Load Shock Absorber)

SRM3 - 25 - E1

❷ Bore Size
(P. 146)



No.	Part Name	Quantity
1	Plastic Bag	1
2	Package Label	1
3	Plate (3)	1
4	Adapter	2
5	Adapter Nut	2
6	Hexagon Socket Head Cap Screw	4
7	Hexagon Socket Head Cap Screw	4
8	Hexagon Socket Set Screw	1
9	Hexagon Nut	1
10	Shock Absorber	1
11	Hexagon Nut	1

List of Various Kit Weight

Replacement Parts Kit

Kit Number	Weight (g)
SRM3-25K-□	29+10 x Stroke/100
SRM3-32K-□	33+10 x Stroke/100
SRM3-40K-□	66+18 x Stroke/100
SRM3-63K-□	115+18 x Stroke/100

Full Stroke Adjustment Bracket Kit (with Light Load Shock Absorber)

Kit Number	Weight (g)
SRM3-25-E1	174
SRM3-32-E1	207
SRM3-40-E1	349
SRM3-63-E1	930

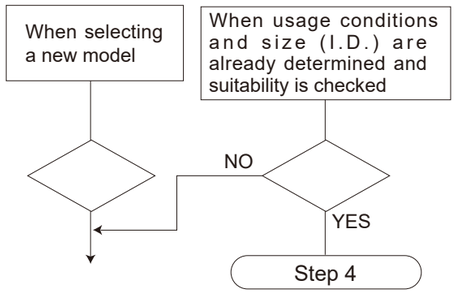
Full Stroke Adjustment Bracket Kit (with Shock Absorber)

Kit Number	Weight (g)
SRM3-25-A1	247
SRM3-32-A1	298
SRM3-40-A1	581
SRM3-63-A1	1316

SRM3 Series Model Selection Guide

The selection conditions differ from general air cylinders, so please check the suitability using the selection guide.

1 Step 1



2 Step 2: Confirmation of operating conditions

1. Operating Pressure (P) (MPa)
2. Load weight (M) (kg)
3. Applied load (F_L) (N)
4. Mounting direction
5. stroke (L) (mm)
6. Travel time: t (s)
7. Operation speed (V) (m/s)

Calculation Formula for Cylinders Average Operating Speed V

$$V = \frac{L}{t} \times \frac{1}{1000} (m/s)$$

[Load Weight]

Value of (Conveyed Object Weight + Jig Weight).

[Mounting Direction]

Operating direction: Horizontal, Vertical

Mounting direction Table facing up, Table facing down

3 Step 3 Selection of Approximate Cylinders Size

● Calculation Formula for Cylinders Size (I.D.)

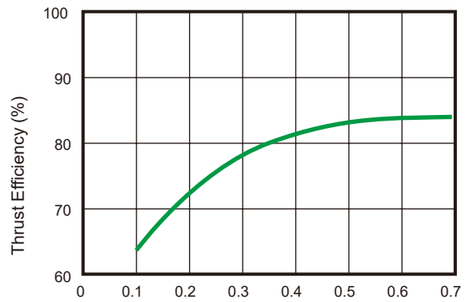
$$F = \frac{\pi}{4} \times D^2 \times P \times \frac{a}{100} (N)$$

$$\therefore D = \sqrt{\frac{4F}{\pi \cdot P \cdot a}} (mm)$$

D : Cylinders I.D. (mm)
P : Operating Pressure (MPa)
a : Thrust Efficiency (%) (Refer to Fig. 1)
F : Cylinders Theoretical Thrust (N)

D= ø

Figure 1 Trend of SRM3 thrust efficiency



● When obtaining from the theoretical thrust values in Table 1, approximate required thrust ≥ Load Weight x 2
(The x 2 in Load Weight x 2 is assuming a load factor of about 50% as a safety factor)

[Example] Operating Pressure 0.5 MPa
Load 20N

*Required thrust is 20 x 2 = 40 N

Selecting a Bore Size with a theoretical thrust of 40 N or more at an Operating Pressure of 0.5 MPa from Table 1 gives ø25.

D= ø25

[Cylinder Theoretical Thrust]

Table 1 Cylinders theoretical thrust values Unit: N

Bore Size (mm)	Pressure Area (mm^2)	Operating Pressure MPa							
		0.1	0.15	0.2	0.3	0.4	0.5	0.6	0.7
ø25 Equivalent	542	-	81.4	108	163	217	271	325	380
ø32 Equivalent	814	-	121	163	244	326	407	488	570
ø40 Equivalent	1266	-	190	253	380	506	633	760	886
ø63 Equivalent	3137	314	470	627	941	1255	1568	1882	2196

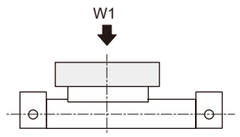
Note: The values in Table 1 do not include thrust efficiency.

4 Step 4 Calculation of Load (W) and Each Moment Value

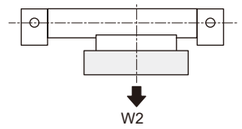
Vertical load and static moment act depending on the cylinder mounting direction and the position of the center of gravity of the load.

[Vertical Load]

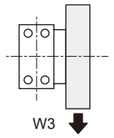
[W1 (Horizontal upward, vertical)]

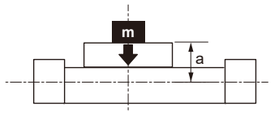


[W2 (Horizontal downward)]



[W3 (Horizontal lateral)]



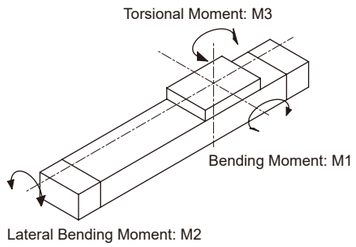


Value of a

Bore Size	a (m)
ø25 Equivalent	0.057
ø32 Equivalent	0.040
ø40 Equivalent	0.046
ø63 Equivalent	0.063

[Static Moment]

● Types of Moment Generated by Load

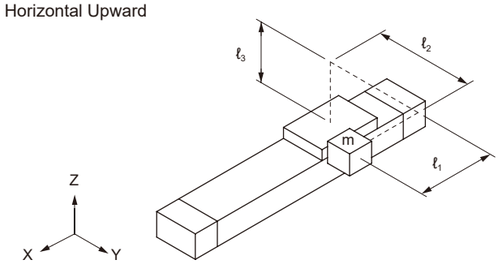


Unit: N·m

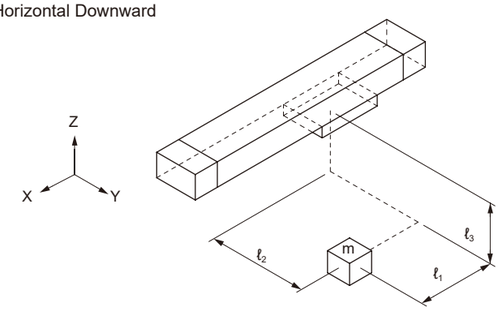
Mounting Direction		Horizontal Upward	Horizontal Downward	Horizontal Lateral	Vertical
Vertical LoadW		m x 9.8			-
Static Moment	M1	W x ℓ_1	W x ℓ_1	-	W x (ℓ_3 + a)
	M2	W x ℓ_2	W x ℓ_2	W x (ℓ_3 + a)	-
	M3	-	-	W x ℓ_1	W x ℓ_2

m : Load weight (kg)
ℓ_1 : Stroke distance from the center of table to the center of gravity of load [m]
ℓ_2 : Length in the width direction from the center of table to the center of gravity of load [m]
ℓ_3 : Length in the vertical direction from the center of table to the center of gravity of load [m]

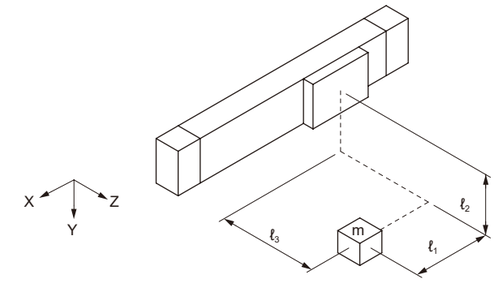
Horizontal Upward



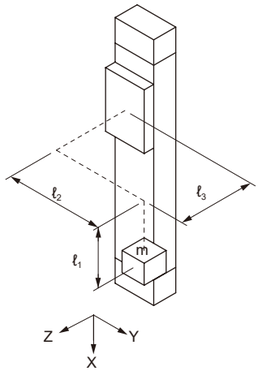
Horizontal Downward



Horizontal Lateral



Vertical



5 Step 5 Confirmation of Combined Value of Load and Moment

● Divide each load by the allowable value read from Fig. 3 to Fig. 8 to obtain the load and moment ratio, and check that the total value is 1.0 or less.

Calculation Formula

$$\frac{W}{Wmax'} + \frac{M1}{M1max'} + \frac{M2}{M2max'} + \frac{M3}{M3max'} \leq 1.0$$

Wmax', M1max', M2max', M3max' are readings from Fig. 2 to Fig. 7

● If the total value is greater than 1.0:

1. Re-examine the load,
2. Review such as selecting a larger cylinder I.D.

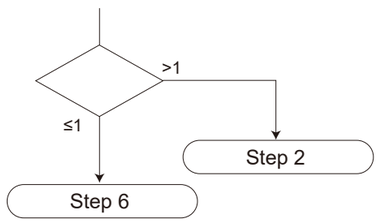


Fig. 2: SRM3-25, 32 Allowable Load for W1, W2, W3

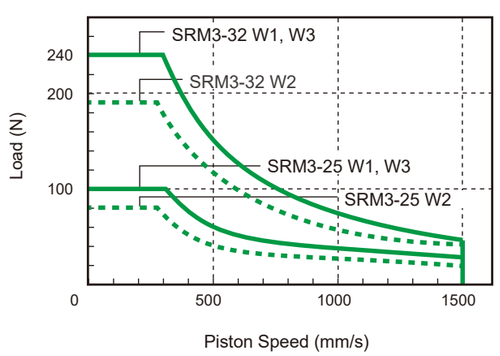


Fig. 3: SRM3-40, 63 Allowable Load for W1, W2, W3

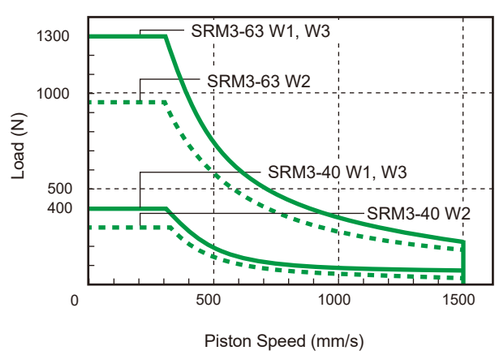


Fig. 4: SRM3-25, 32 Allowable Moment for M1, M3

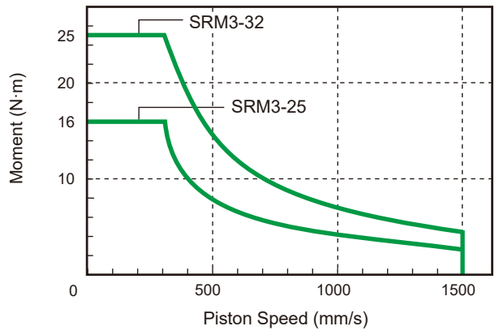


Fig. 5: SRM3-40, 63 Allowable Moment for M1, M3

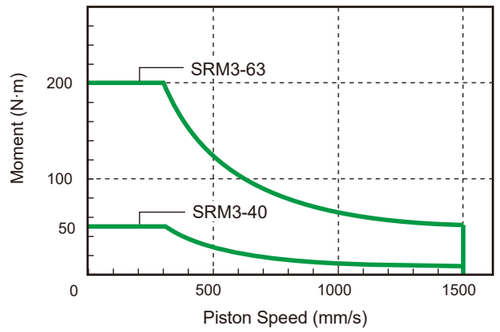


Fig. 6: SRM3-25, 32 Allowable Moment for M2

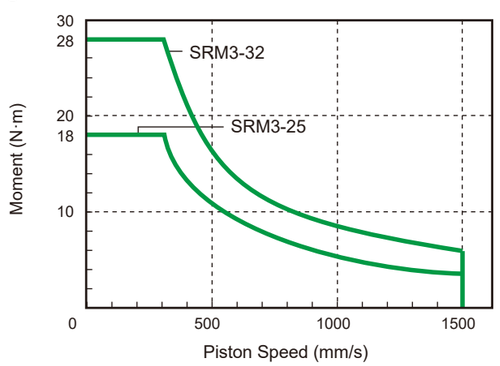
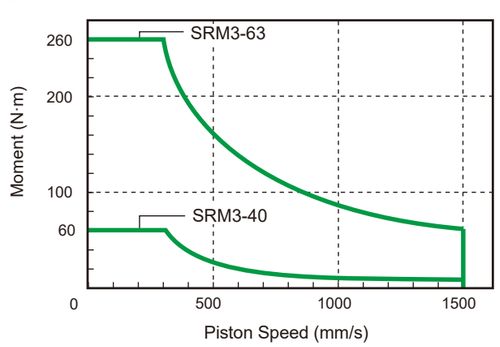


Fig. 7: SRM3-40, 63 Allowable Moment for M2



6 Step 6 Calculation of Required Thrust

Calculate the required cylinder thrust (F_N).

1. During horizontal operation
   F_N=W x 0.2 (N)

2. During vertical operation
   F_N=W (N)

7 Step 7 Confirmation of Load Factor

● The load factor is determined by considering usage conditions such as stability of cylinder operating speed, margin, and service life.

● Calculation Formula for Load Factor (α)

$$\alpha = \frac{\text{Required Thrust } (F_N)}{\text{Cylinders Thrust } (F)} \times 100\ \%$$

$$F = \frac{\pi}{4} \times D^2 \times P \times \eta \frac{\mu}{100}\ (N)$$

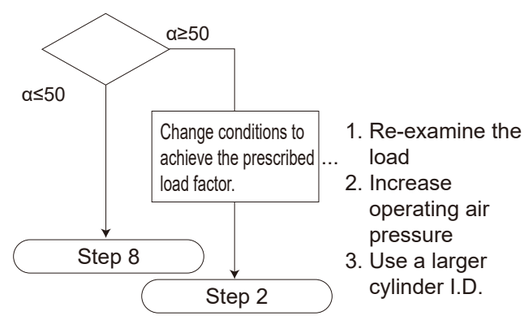
D: Cylinders I.D.(mm)

$\frac{\pi}{4} \times D^2$ = Pressurized area (mm^2)

●The theoretical thrust value of the cylinder in Table 4 may be used as the value for $\frac{\pi}{4} \times D^2 \times P$.

P: Operating Pressure MPa

μ: Thrust efficiency (Use the values in Figure 1.)



[Appropriate Range of Load Factor]

● Although piston speed varies depending on load factor, the range in Table 2 below is desirable for general use.

Table 2 (Appropriate Range of Load Factor - Reference Value)

Operating Pressure MPa	Load Factor %
0.2 to 0.3	α≤40
0.3 to 0.6	α≤50
0.6 to 0.7	α≤60

[Example] Cylinder size to be used: Equivalent to ø25,
Required thrust 4N
When Operating Pressure is 0.5 MPa

$$\alpha = \frac{4}{542 \times 0.5 \times \frac{83}{100}} \times 100$$

=2%

OK because α≤50%.

8 Step 8 Confirmation of Cushion Capacity

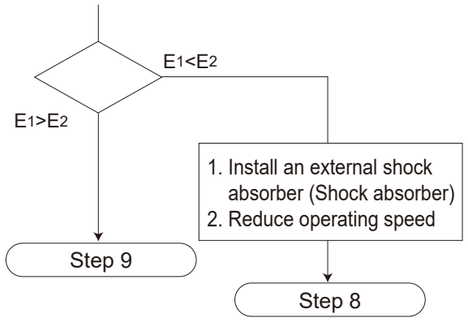
Check whether the kinetic energy due to the motion of the actual load can be absorbed by the cylinder's own cushion capacity.

[Allowable Absorbed Energy of Cylinder]

● The value of kinetic energy absorption capacity by the cylinder's cushion mechanism varies depending on the cylinder I.D. Compare with the values in Table 3 for SRM3.

Table 3 SRM3 Allowable absorption energy (E_1)

Bore Size (mm)	Allowable Absorbed Energy (J)
ø25 Equivalent	1.40
ø32 Equivalent	2.57
ø40 Equivalent	4.27
ø63 Equivalent	17.4



[Piston Kinetic Energy]

● Calculation Formula for Piston Kinetic Energy (E_2)

$$E_2 = \frac{1}{2} \times M \times Va^2 \ (J)$$

M : Applied load weight (kg)

Va : Piston Cushion Entry Speed (m/s)

$$Va = \frac{L}{t} \times (1 + 1.5 \times \frac{\alpha}{100})$$

L : Stroke (m)

t : Operation Time (S)

α : Load Factor (%)

9 Step 9 Confirmation of Inertial Load

● Check if the inertial force acting from the load due to piston operation is within the cylinder's capability range.

(1) Obtain the G coefficient from the entry speed into the cushion part (Va) and the trend of the inertial force coefficient of SRM3 in Fig. 8. The entry speed into the cushion part (Va) is the value calculated in Step 8.

Va: Piston Cushion Entry Speed (m/s)

$$Va = \frac{L}{t} \times (1 + 1.5 \times \frac{\alpha}{100})$$

L : Stroke (m)

t : Operation Time (S)

α : Load Factor (%)

(2) Calculate bending moment (M1i) and torsional moment (M3i) due to inertial force.

Unit: N·m

Mounting Direction		Horizontal Upward	Horizontal Downward	Vertical	Horizontal Lateral
Dynamic Moment	M1i	W x (ℓ_3 + a) x G			
	M2i	Dynamic moment M2i does not occur			
	M3i	W x ℓ_2 x G			

Moment due to inertial force is calculated as above regardless of mounting direction.

(3) Add the moment due to static load (M1 and M3) and the moment due to inertial force (M1i and M3i) and confirm that the combined value is less than or equal to the maximum allowable value in Table 4.

$$M1 + M1i \leq M1max$$
$$M3 + M3i \leq M3max$$

M1max, M3max are values in Table 4

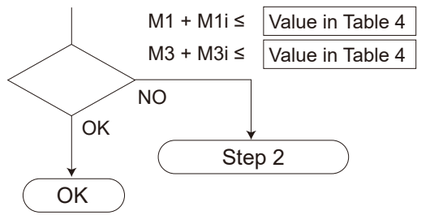


Figure 8 Trend of SRM3 inertial force coefficient

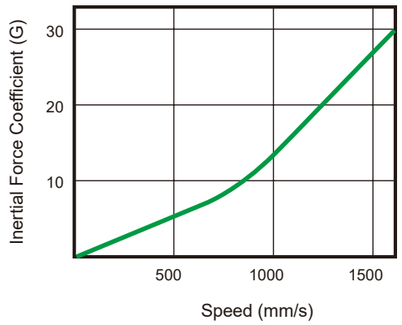


Table 4 Max allowable values of load and moment

Item / Bore Size (mm)	Vertical Load W1max (N)	Vertical Load W2max (N)	Vertical Load W3max (N)
ø25 Equivalent	100	80	100
ø32 Equivalent	240	190	240
ø40 Equivalent	400	320	400
ø63 Equivalent	1300	1000	1300

Item / Bore Size (mm)	Bending Moment M1max (N·m)	Lateral Bending Moment M2max (N·m)	Torsional Moment M3max (N·m)
ø25 Equivalent	16	18	16
ø32 Equivalent	25	28	25
ø40 Equivalent	50	60	50
ø63 Equivalent	200	260	200

Table 4 shows the maximum allowable value. Allowable values depend on operating speed conditions as shown in Fig. 2 to Fig. 7. (The range on the lower left side of the characteristic curves in Fig. 2 to Fig. 7 is usable.)

1 Cushion Characteristics and Kinetic Energy

(1) About Cushion

● Cushion

A cushion utilizes the compressibility of air to absorb the kinetic energy possessed by the piston and prevent the piston and cover from colliding impactfully at the stroke end. Therefore, the cushion is not intended to operate the piston at low speed from near the stroke end. Table 5 shows the kinetic energy that can be absorbed by the cushion. If the kinetic energy exceeds this value or if you want to avoid bouncing due to air compressibility, select a model with shock absorber or consider a separate shock absorber. (Refer to Step 8 above.)

● SRM3 Cushion Characteristic Value

Table 5 Allowable absorbed energy of cushion (E_1)

Bore Size (mm)	Effective Cushion Length (mm)	Allowable Absorbed Energy (J)	
		With Cushion	Without Cushion
ø25 Equivalent	20.9	1.40	0.015
ø32 Equivalent	23.5	2.57	0.030
ø40 Equivalent	23.9	4.27	0.050
ø63 Equivalent	29.6	17.4	0.138

● Calculation Formula for Kinetic Energy (E2)

$E_2 = \frac{1}{2} \times M \times V^2$ (J)

M: Load Weight (kg)

V : Piston Cushion entry speed (m/s)

L : Cylinder Stroke (m)

t : Piston Operation Time (s)

α: Cylinder Load Factor (%)

$\alpha = \frac{\text{Load Weight}}{\text{Cylinders Thrust}} \times 100$

$V = \frac{L}{t} \times (1 + 1.5 \times \frac{\alpha}{100})$

(2) About Shock Absorber

Shock absorbers used with SRM3 with shock absorber are shown in Table 7. Please use within the specification range of the shock absorber shown in Table 6.

Table 6 Specifications

Shock Absorber Model Number / Item		NCK-00-0.7-C	NCK-00-1.2	NCK-00-2.6	NCK-00-7	NCK-00-12
Type/Classification		Without adjuster Spring return type				
Max Absorbed Energy	J	7	12	26	70	120
Stroke	mm	8	10	15	20	25
Per Hour Max Absorbed Energy	KJ/h	12.6	21.6	39.0	84.0	86.4
Max Collision Speed	m/s	1.5	2.0		2.5	3.0
Max Repetition Frequency	cycles/min	30		25	20	12
Ambient Temperature	°C	-10 to 80 (14.0 to 176.0°F)				
Mount Required Strength	N	6150	8400	12100	24400	33500
Return Time	S	0.3 or less			0.4 or less	
Product Weight	kg	0.02	0.04	0.07	0.2	0.3
Return Spring Force	Extended N	2.0	2.9	5.9	9.8	16.3
	Compressed N	4.3	5.9	11.8	21.6	33.3

● The allowable absorbed energy in SRM3 differs depending on the collision speed. When the collision speed is 1000 mm/s to 1500 mm/s, do not exceed 1/2 of the maximum absorbed energy in Table 9.

Table 7 Applicable shock absorber model No.

Model	Shock Absorber Applicable Model Number	
	Standard Type (-A)	Light Load Type (-E)
SRM3-25	NCK-00-1.2	NCK-00-0.7-C
SRM3-32	NCK-00-2.6	NCK-00-1.2
SRM3-40	NCK-00-7	NCK-00-2.6
SRM3-63	NCK-00-12	NCK-00-7

● Confirmation of Allowable Collision Energy of Shock Absorber

Calculate the collision equivalent Weight Me and collision energy E using the formula in the table below, and confirm that Me and E are below the allowable values in Fig. 9. Also, confirm that specifications such as repetition frequency and collision speed are below the allowable values according to the table. Please note that the allowable values for collision equivalent Weight Me and collision energy E differ depending on the magnitude of the collision speed.

● Code

E : Collision Energy (J)
Me : Collision Equivalent Weight (kg)
m : Workpiece Weight (kg)
F : Cylinder Thrust (N)
V : Collision Speed (m/s)
St : Shock Absorber Stroke (m)
g : Gravitational Acceleration 9.8 (m/s^2)

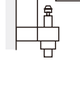
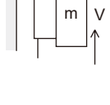
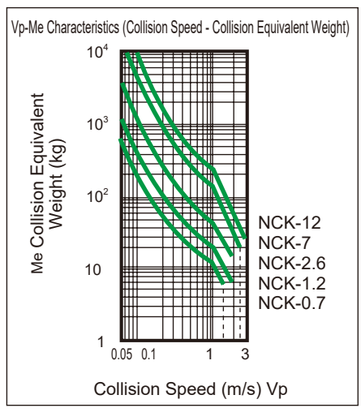
Application Example	Horizontal Movement	Vertical Downward	Vertical Upward
			
Collision Equivalent Weight Me (kg)	$Me=m+\frac{2F \cdot St}{V^2}$	$Me=m+\frac{2 \cdot St\,(F+mg)}{V^2}$	$Me=m+\frac{2 \cdot St\,(F-mg)}{V^2}$
Energy E (J)	$E=\frac{mV^2}{2}+F \cdot St$	$E=\frac{mV^2}{2}+(F+mg) \cdot St$	$E=\frac{mV^2}{2}+(F-mg) \cdot St$

Figure 9 Allowable value of equivalent collision weight

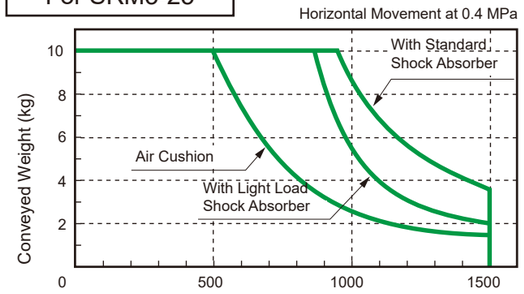


● With cushion/shock absorber Transfer weight - speed characteristics

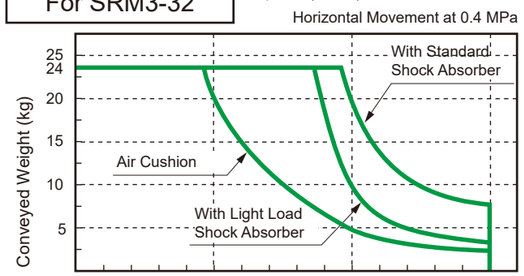
The figure below shows the conveyed Weight - speed characteristics. Since it changes depending on the usage conditions, confirm that it is below the allowable value shown in Table 6.

SRM3 With Cushion/Shock Absorber Conveyed Weight - Speed Characteristics

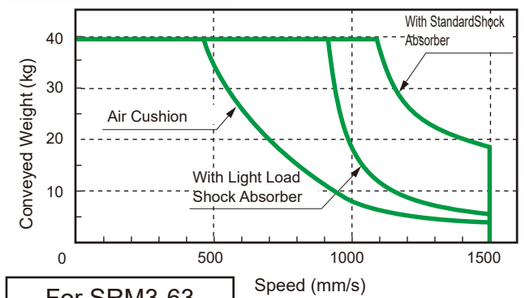
For SRM3-25



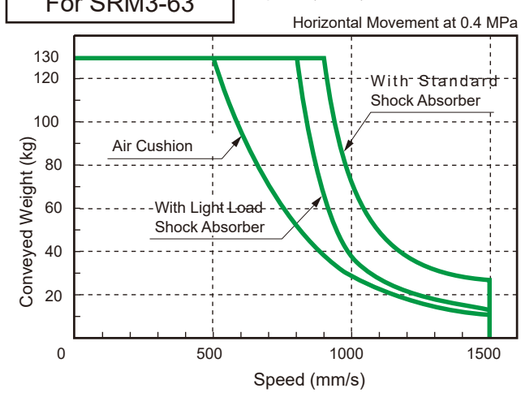
For SRM3-32



For SRM3-40



For SRM3-63

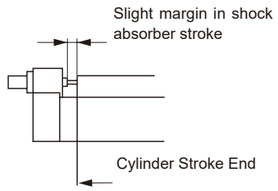


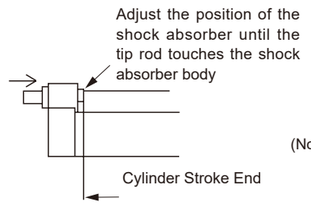
Precautions for Use

The shock absorber absorbs the rated energy with the rated stroke, but the mounting position of the shock absorber at the time of product shipment is set to leave a slight margin in the stroke of the shock absorber at the cylinder stroke end. Therefore, the absorbed energy will be a value smaller than the allowable absorbed energy (Table 11), so if the rated absorbed energy is required, adjust so that the full stroke of the shock absorber can be used.

Table 11 Specification of initial setting value with shock absorber

Model	Standard Type (-A)		Light Load Type (-E)	
	Absorbed Energy (J)	Effective Stroke (mm)	Absorbed Energy (J)	Effective Stroke (mm)
SRM3-25	10	9	5.7	7
SRM3-32	18	13	10	9
SRM3-40	50	16.5	18	13
SRM3-63	86	21	50	16.5





(Note) This is the description of the shock absorber attached to the full stroke adjustment type.

Shock Absorber Adjustment

The absorbed energy of the shock absorber can be adjusted by changing the operating stroke of the shock absorber.

● Calculation Example (For SRM3-25-A)

Shock Absorber Used NCK-00-1.2

● Calculation Example (1) During Ascent, During Descent

Usage Conditions

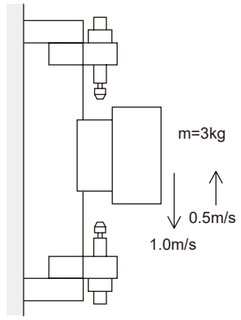
● Load weight m 3 kg

● Collision Speed

Ascending 0.5 m/s

Descending: 1.0 m/s

● Operating Pressure 0.5 MPa (245 N)



①Kinetic Energy During Ascent (E_1)

$$E_1=\frac{3 \times 0.5^2}{2}+(245-3 \times 9.8) \times 0.01$$

=2.5 (J)

It is less than the maximum absorbed energy in Table 6, and kinetic energy (E1) can be absorbed.

$$Me=3+\frac{2 \times 0.01 \times (245-3 \times 9.8)}{0.5^2}$$

=20 (kg)

The Me of the shock absorber used for SRM3-25-A is 32 kg at V=0.5 m/s from Fig. 10, making it absorbable.

②Kinetic Energy During Descent (E_1)

$$E_1=\frac{3 \times 1.0^2}{2}+(245+3 \times 9.8) \times 0.01$$

=4.2 (J)

It is 1/2 or less of the maximum absorbed energy in Table 6, and kinetic energy (E1) can be absorbed.

$$Me=3+\frac{2 \times 0.01 \times (245+3 \times 9.8)}{1.0^2}$$

=8.5 (kg)

The Me value of the shock absorber used for SRM3-25-A is 24 kg at V=1.0 m/s from Fig. 9, making it absorbable.

● Calculation Example (2)

Horizontal

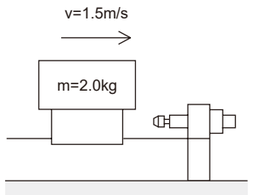
Usage Conditions

Load Weight M = 2 kg

Collision Speed

Horizontal direction: 1.5 m/s

Operating Pressure: 0.3 MPa (147 N)



Horizontal Kinetic Energy (E1)

$$E_1=\frac{2 \times 1.5^2}{2}+147 \times 0.01$$

=3.7 (J)

It is 1/2 or less of the maximum absorbed energy in Table 6, and kinetic energy (E1) can be absorbed.

$$Me=2+\frac{2 \times 147 \times 0.01}{1.5^2}$$

=3.3 (kg)

From Fig. 9, the Me value of the shock absorber for SRM3-25-A at V=1.5 m/s is 10 kg, so 3.4 < 10, making it absorbable.

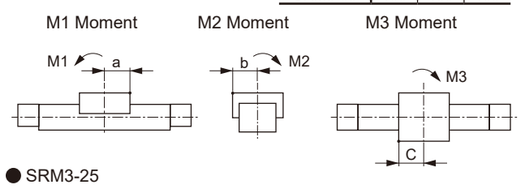
(Note) Regarding inertial load, refer to Selection Guide 9 Step 9 Confirmation of Inertial Load and ensure it does not exceed the allowable value.

2 Table Deflection (Displacement at Table Edge)

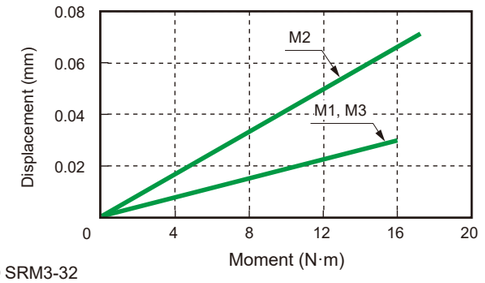
The figure below shows the displacement at the table edge when a moment acts. The table on the right shows the position of the table edge.

mm

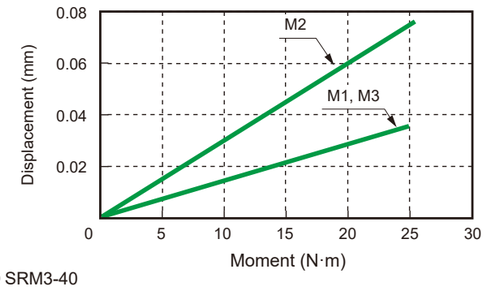
Model	a	b	c
SRM3-25	50	50	50
SRM3-32	55	55	55
SRM3-40	70	70	70
SRM3-63	100	100	100



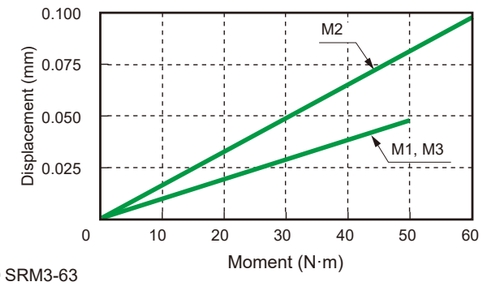
● SRM3-25



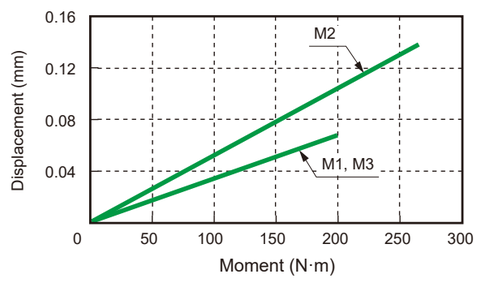
● SRM3-32



● SRM3-40



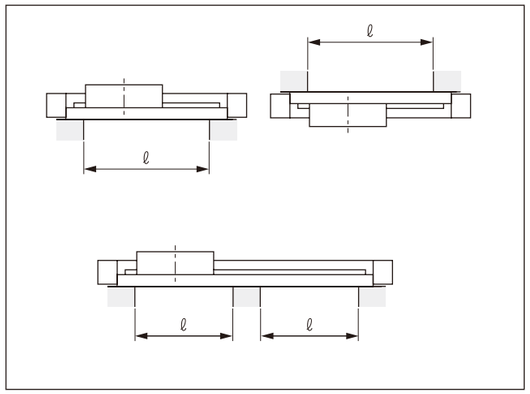
● SRM3-63



3 Support Spacing

If the stroke is long and the load or bending moment is large, the deflection of the tube will be large. Secure the tube using the spacing shown in the table below as a guide.

Model	Recommended Support Spacing (ℓ) mm
SRM3-25	400
SRM3-32	400
SRM3-40	500
SRM3-63	600



For Safe Use of This Product

Please read before use. Check P. 41 at the beginning for general cylinders and P. 1512 for cylinder switches.

Specific Precautions: Rodless Cylinder with High Precision Guide SRM3 Series

Design / Selection

1. Common

⚠ CAUTION

■ Please be careful when designing the intermediate stop control circuit.

Since slit type rodless cylinders represented by SRL3 structurally have slight external air leakage, intermediate stop control using an all-port block 3-position valve will cause a failure where the table stop position cannot be maintained. Therefore, please use a both-side pressurization control circuit using a PAB connection 3-position valve. However, please note that if air is pressurized in a non-energized state during both-start after a pressure drop, the table may move and deviate from the origin.

■ Basic Circuit Diagram

● For Horizontal Load

Piping as shown in Fig. 1 applies equal pressure to both sides of the piston when stopped, preventing the table from shooting out when restarting.

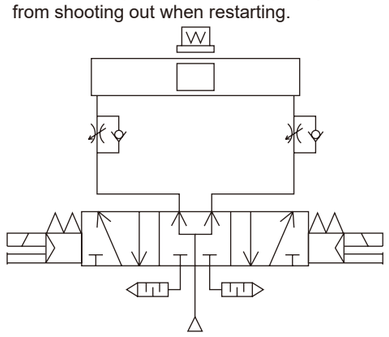


Fig. 1

● For Vertical Load

If a vertical load acts as shown in Fig. 2, the table moves in the Load Direction, so install a pressure reducing valve with check valve on the upper side to reduce the thrust in the Load Direction and balance the load.

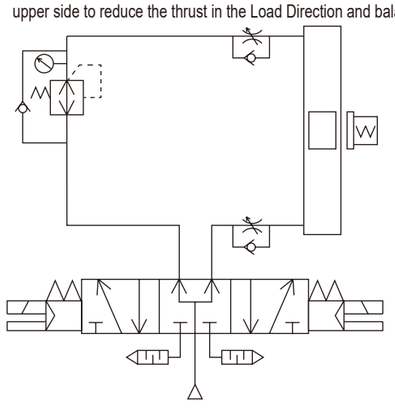
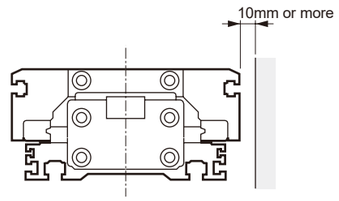


Fig. 2

■ If there is a magnetic material such as an iron plate near the cylinder switch, it may cause a malfunction of the cylinder switch, so keep a distance of 10 mm or more from the side of the table.



■ Cannot be used in places where cutting oil, coolant fluid, oil mist, etc. come directly into contact with the cylinder.

If it is unavoidable due to cylinder installation, be sure to provide a cover etc. to protect the cylinder.

■ Cannot be used in environments where foreign matter such as chips, dust, dirt, spatter, etc., come directly into contact with the cylinder or fly around.

If unavoidable due to cylinder installation, install a cover, etc., to protect it. Also, be sure to consult us when using in such an environment.

■ Be careful not to generate negative pressure inside the cylinder tube. When used as an air balancer or when the table is driven by external force, inertial force, etc. with all ports blocked, negative pressure may be generated in the cylinder, causing the seal belt to detach and air leakage to occur. Be careful not to generate negative pressure in the cylinder by driving with external force, inertial force, etc.

2. Fall Prevention Type SRM3-Q

⚠ CAUTION

■ The cylinder load factor should be 50% or less.

If the load factor is high, the lock may not be released or the lock part may be damaged.

■ When operating the cylinder at a speed of 500 mm/s or more, please decelerate so that the entry speed into the fall prevention mechanism is 500 mm/s or less. As a deceleration method, please use a method such as installing an external shock absorber or a deceleration circuit.

During Use

1. Common

⚠ WARNING

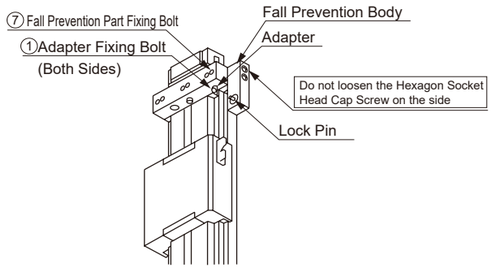
■ Adjustment of Shock Absorber

● Since the gap between the shock absorber and the stopper bolt is narrow, it is recommended to remove the stroke adjustment plate for adjustment.

2. Fall Prevention Type SRM3-Q

⚠ WARNING

■ Adjustment method of stroke adjustment unit



Loosen the ⑦drop prevention part fixing bolt in the figure above to adjust the stroke. Do not loosen the Hexagon Socket Head Cap Screw on the side in the figure above, as the position of the fall prevention part lock pin will shift.

● By loosening the adapter fixing bolt, the fall prevention body can be moved. In this case, use with shock absorber (A, A1, E, E1). Also, if the stroke is finely adjusted with the shock absorber, the fall prevention position will shift and it will not be possible to lock reliably, so please make fine adjustments with the adapter fixing bolt.

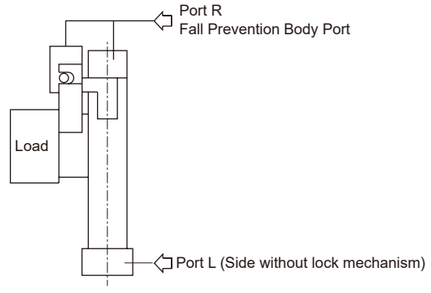
● After moving to an arbitrary position, tighten the adapter fixing bolt with the value in the table below to fix it. If tightened below the value in the table below, the fall prevention body part may shift, so be sure to observe it.

● When setting the load, be sure to confirm that the lock mechanism works before installation.

Model	① Adapter Fixing Bolt ⑦ Fall prevention part fixing bolt Tightening Torque Tightening torque
SRM3-Q-25	6.2 to 7.6
SRM3-Q-32	6.2 to 7.6
SRM3-Q-40	10.4 to 12.8
SRM3-Q-63	19.4 to 23.8

■ About Piping

● Piping to the fall prevention body is required.



● Branch the piping to the R side of the rodless cylinder with a tee etc., and pipe to the fall prevention body with equivalent piping.

● Please note that if the piping to the fall prevention body is thin and long, or if the speed controller is far from the cylinder port, the exhaust speed will be slow and it may take time for the lock to engage. Also, clogging of the silencer attached to the EXH. port of the valve will lead to the same result.

■ Be sure to supply pressure equal to or higher than the minimum Operating Pressure to the fall prevention body port.

■ About Manual Release

● Push in the lock pin for fall prevention with a rod-shaped object to release it. In this case, be sure to supply pressure to port L so that no load is applied to the lock mechanism, and then release the lock.

● It is very dangerous if pressure is supplied to port R while both ports R and L are exhausted and the piston is locked, as the lock may be released and the table may shoot out.

■ About Valve

● If the cylinder is held with pressure applied to the lock mechanism side, the lock pin may come off, which is very dangerous, so do not use 3-position closed center and 3-position PAB connection valves.

● If back pressure is applied during locking, the lock may be released, so use a single valve or an individual exhaust type manifold.

● In a usage method where the descent speed is increased with a quick exhaust valve, the start of movement of the Cylinder Body is faster than the operation of the lock pin, and normal release may not be possible. Do not use a quick exhaust valve for fall prevention type cylinders.

■ During equipment maintenance, for safety, please take separate measures to prevent the load from falling due to its own weight.

■ In the case of a cylinder with air cushion, if the air cushion needle on the lock mechanism side is tightened too much, the piston will bounce at the stroke end, the lock lever and lock pin will contact impactfully, leading to damage of the lock mechanism. Also, if the air cushion needle is opened too much, the piston will rebound at the stroke end, leading to damage as well. Adjust the needle so that the air cushion does not bounce. When stopping with external buffer equipment (shock absorber, etc.), similarly adjust so that there is no bounce. Also, please perform periodic inspection 1 to 2 times/year to check for damage to the holding part due to this phenomenon.

3. Common

⚠CAUTION

■Do not apply strong impact or excessive moment to the table.

■Perform sufficient alignment when connecting to a load that has an external guide mechanism.

● The longer the stroke, the larger the variation in the axis center, so please consider a connection method (floating) that can absorb the displacement amount.

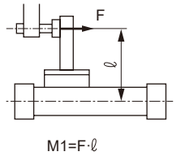
■Ensure that the moment including the inertial force generated during load movement or stopping does not exceed the allowable load. If this value is exceeded, damage will occur.

(When overhang is large)

● When the overhang is large and stopping at both ends with the piston, a bending moment acts due to the inertial force of the load even if it is within the range of the internal cushion's absorbed energy. When kinetic energy is large and an external cushion etc. is used, please hit the workpiece center of gravity as much as possible. (When using an external stopper)

● When an external stopper is used, please select taking into account the bending moment due to cylinder thrust.

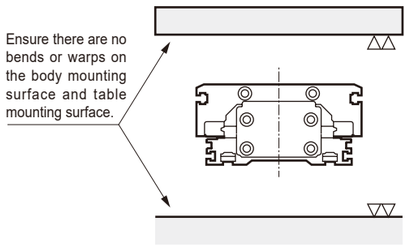
● Moment acting when stopped by an external stopper



M1=F·ℓ

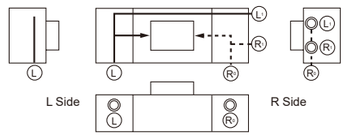
F : Cylinders Thrust
ℓ : Distance from cylinder center to stopper

■Do not make dents or scratches that would impair flatness on the body (tube) mounting surface and table mounting surface.



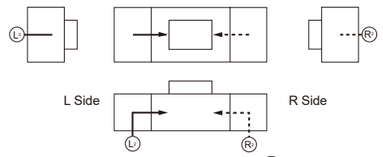
■About Piping Port Position and Operation Direction

● In case of Option Code (No Code, R, B, T)



Ⓡ indicates right side pressurization port, Ⓛ indicates left side pressurization port. At the time of shipment from the factory, ports other than ⓇⓁ(1 location each) are sealed with plugs. Piping to other ports is possible by removing the plugs. However, bottom piping is not possible. If bottom piping is required, please select option (D, S). Ⓛport is for ø25, ø32, ø40 only. ø63 Ⓛ port type is not available.

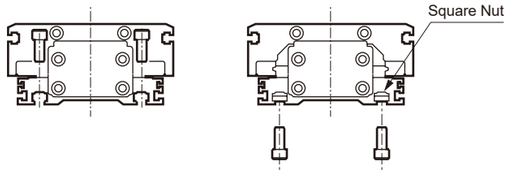
● In case of Option (D, S) (Bottom Piping)

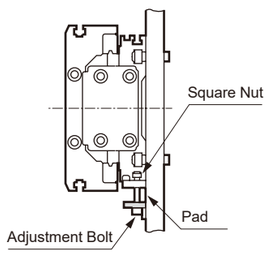


Ⓡ indicates R side pressurization port, Ⓛ indicates L side pressurization port. There are no ports for piping other than Ⓡ and Ⓛ.

■About Body Mounting

SRM3 can be mounted from 2 directions as shown in the figure below. Also, flexible mounting from the side direction is possible using the T-slots. In that case, installation will be easier if level adjustment is possible.





■About T-slots and Square Nuts

SRM3 is provided with T-slots for square nuts as shown in the figure below, and the square nuts in the table below are attached as accessories upon shipment.

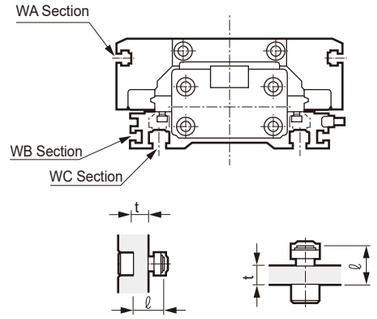
● Accessory square nuts (8 each)

Model	Included Square Nut	
SRM3-25	M4	M5
SRM3-32	M4	M6
SRM3-40	M4	M8
SRM3-63	M5	M10

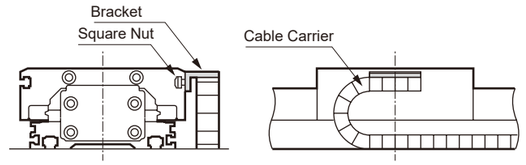
● The following dimensions are recommended for T-slot bolt length R.

mm

Model	WA Section	WB Section	WC Section
SRM3-25	M4 ℓ=t+6	–	M5 ℓ=t+6
SRM3-32	M4 ℓ=t+6	–	M6 ℓ=t+8
SRM3-40	M4 ℓ=t+6	M4 ℓ=t+6	M8 ℓ=t+10
SRM3-63	M5 ℓ=t+7	M5 ℓ=t+7	M10 ℓ=t+12



[Table T-slot Usage Example]

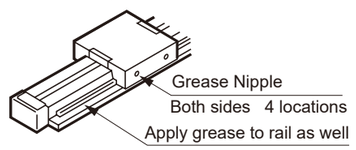


■Please treat our shock absorber as a consumable part.
Replace it when a decrease in energy absorption capacity is observed or when operation is no longer smooth.

■The guide part of the SRM3 series is adjusted for proper pressurization at the time of shipment.
Do not carelessly adjust the pressurization during use.

■For normal use, apply lithium-based grease to the guide of the SRM3 series approximately every 100 km of travel distance (about 6 months in time).
Grease application recommended grease gun
THK: Grease Gun Unit MG70

Tip Shape P Type



4. Fall Prevention Type SRM3-Q

⚠CAUTION

■When the lock mechanism is operated manually, be sure to return it to its original state after manual confirmation before use. Also, do not perform manual operation except during adjustment as it is dangerous.

■Release the lock when mounting or adjusting the cylinder. If mounting work is performed while the lock is engaged, the lock part may be damaged.

■Do not use multiple cylinders in synchronization. Do not use a method where two or more fall prevention type cylinders are synchronized to move one workpiece. The lock of one of the cylinders may not be releasable.

■Use the speed controller with meter-out control. The lock may not be releasable with meter-in control.

■Be sure to use up to the cylinder stroke end on the side with the lock. If the cylinder piston does not reach the stroke end, the lock may not engage or the lock may not be releasable.

■Apply grease periodically to the sliding part of the lock lever.

For precautions during installation, adjustment, use, and maintenance, please refer to "During Use" in this catalog and the Instruction Manual on the CKD Component Product Site (https://www.ckd.co.jp/kiki/en/) -> "Model Number".