

# Rotary Cylinder

# MRQ Series

Size: 32, 40

## How to Order

MRQ **B** **S** **32** - **50** **C** **A** - **J79W** -

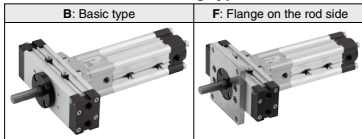
● **Made to Order or port type**

Refer to page 427 for the Made to Order details.

Nil	Rc 1/8
XF*	G 1/8
XN*	NPT 1/8

\* The combination with Made to Order is not available.

### Mounting type



### Size/Standard stroke (mm)

<b>32</b>	5, 10, 15, 20, 25, 30, 40, 50, 75, 100
<b>40</b>	

\* Refer to pages 436 and 437 for middle and long strokes other than standard stroke.

### Air cushion

<b>C</b>	With air cushion on the linear motion parts
<b>N</b>	Without air cushion on the linear motion parts

### Number of auto switches

Linear motion	Rotation		
	0	1	2
0	—	OS	O2
1	SO	SS	S2
2	2O	2S	Nil

### Auto switch

Nil	Without auto switch (built-in magnet)
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\* For the applicable autoswitch model, refer to the table below.

Nil	Standard
X	Made to Order

### Rotation angle

<b>A</b>	80 to 100°
<b>B</b>	170 to 190°

## Applicable Auto Switches (Common for the linear and the rotary motion parts)

Refer to pages 929 to 983 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m) *				Pre-wired connector	Applicable load		
					DC	AC	Perpendicular	In-line	0.5 (Nil)	3 (L)	5 (Z)	None (N)				
															3-wire (NPN)	3-wire (PNP)
Solid state auto switch	-	Grommet	Yes	3-wire (NPN)	5 V, 12 V	-	<b>F7NV</b>	<b>F79</b>	●	●	○	-	○	IC circuit	Relay, PLC	
				3-wire (PNP)			<b>F7PV</b>	<b>F7P</b>	●	●	○	-	○			
		Connector		2-wire	12 V		<b>F7BV</b>	<b>J79</b>	●	●	○	-	○			-
	Diagnostic indicator (2-color)	Grommet		3-wire (NPN)	5 V, 12 V		<b>F7N WV</b>	<b>F79W</b>	●	●	○	-	○	○		IC circuit
				3-wire (PNP)			-	<b>F7PW</b>	●	●	○	-	○	-		-
		Connector		2-wire	12 V		<b>F7B WV</b>	<b>J79W</b>	●	●	○	-	○	-		-
Water resistant (2-color)	Grommet	2-wire	5 V, 12 V	<b>F7BAV**</b>	<b>F7BA**</b>	-	●	○	-	○	-	○	IC circuit			
		4-wire (NPN)		-	<b>F79F</b>	●	●	○	-	○	-	○	IC circuit			
Reed auto switch	-	Grommet	Yes	3-wire (NPN equivalent)	5 V	-	-	<b>A76H</b>	●	●	-	-	-	IC circuit	-	
				-	200 V	<b>A72</b>	<b>A72H</b>	●	●	-	-	-	-	-		
				100 V	<b>A73</b>	<b>A73H</b>	●	●	●	-	-	-	-			
		Connector		2-wire	100 V or less	<b>A80</b>	<b>A80H</b>	●	●	-	-	-	-	IC circuit		
					-	<b>A73C</b>	-	●	●	●	●	-	-	-		
					-	<b>A80C</b>	-	●	●	●	●	-	-	IC circuit		
Diagnostic indicator (2-color)	Grommet	Yes/No/Yes/No	-	-	-	<b>A79W</b>	-	●	●	-	-	-	-			

\*\* Although it is possible to mount water resistant type auto switches, note that the rotary actuator itself is not of water resistant construction.

\* Lead wire length symbols: 0.5 m..... Nil (Example) A73C  
 3 m..... L (Example) A73CL  
 5 m..... Z (Example) A73CZ  
 None..... N (Example) A73CN

\* Solid state auto switches marked with "○" are manufactured upon receipt of order.

\* Refer to pages 970 and 971 for detailed solid state auto switches with pre-wired connectors.

• Since other auto switches are available other than those listed above, refer to page 434 for details on other applicable auto switches.

\* Auto switch is shipped together (not assembled).

## Standard Specifications

<b>Fluid</b>	Air (Non-lube)
<b>Max. operating pressure (MPa)</b>	0.7 MPa
<b>Min. operating pressure (MPa)</b>	0.15 MPa
<b>Ambient and fluid temperature</b>	0 to 60°C (No freezing)
<b>Mounting</b>	Basic type, Rod side flange type

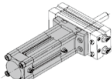



### Made to Order

(Refer to pages 436 and 437 for details.)

Symbol	Specifications/Description
<b>X1</b>	Intermediate stroke
<b>X2</b>	Rod-end female thread
<b>X5</b>	Change of angle adjustable range
<b>X10</b>	Long Stroke (101 to 200 mm)

## Linear Motion Parts, Rotary Motion Parts/Specifications

Linear motion parts	Size	32	40	
		<b>Piston speed</b>	50 to 500 mm/s	
	<b>Cushion</b>	With air cushion, Without air cushion		
	<b>Port size</b>	Rc 1/8		
Rotary motion parts		<b>Output torque (At 0.5 MPa)</b>	1 N·m	1.9 N·m
		<b>Rotation time adjustment range</b>	0.2 to 1 <sup>S</sup> /90°	
		<b>Cushion</b>	None	
		<b>Allowable kinetic energy</b>	0.023J	0.028J
		<b>Port size</b>	1/8, M5 x 0.8 (The port is plugged for delivery.)	
	<b>Backlash</b>	2° or less		

\* For detailed explanation of effective output, refer to the description on page 422.

## Linear Motion Parts/Standard Stroke

Size	Standard stroke (mm)
<b>32, 40</b>	5, 10, 15, 20, 25, 30, 40, 50, 75, 100

\* Refer to page 436 for other intermediate strokes.

## Weight

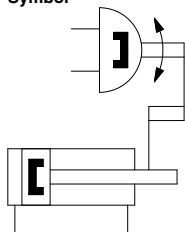
Size	Rotating angle	Basic weight (g)	Add'l stroke weight (g/mm)	Flange (g)
<b>32</b>	80° to 100°	1400	4	500
	170° to 190°	1500		
<b>40</b>	80° to 100°	2100	5	500
	170° to 190°	2300		

Calculation: (Example) **MRQBS32-50CA**

•Basic weight .....	1400 g
•Stroke additional weight .....	$4 \times 50 = 200 \text{ g}$
	Total 1600 g

\* For the weight of auto switch alone, refer to pages 937 to 983.

### Symbol



## Possible to Exchange Basic Type with Flange Type

Specify with the part numbers shown below when ordering flange parts.

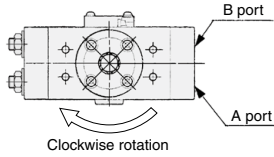
Size	Part no.
<b>32</b>	P317010-7
<b>40</b>	P317020-7

Attached parts: Flange 1 piece  
Hexagon socket head cap screw 4 pieces

# MRQ Series

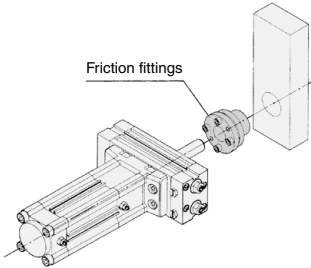
## Rotating Direction

When the pressure is applied from the A port, the rod rotates clockwise.

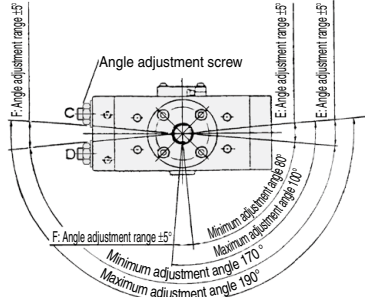


## Allowable Lateral Load to the Piston Rod End

Using friction fittings makes it easier to mount the load to the piston rod end.



## Rotation Angle Adjustable Range/Rotating Angle



- Note) • Can be adjusted  $\pm 5^\circ$  at the rotating ends.  
 • When the cylinder is pressurized from port B, range E can be adjusted by regulating angle adjustment screw C.  
 When the cylinder is pressurized from port A, range F can be adjusted by regulating angle adjustment screw D.

## Manufacturers of Friction Fittings/Model

Size	Miki Pully Co., Ltd. (Position lock)	ISEL Co., Ltd. (Mechanical lock)
32	PSL-K-12	MA-12-26
40	PSL-K-14	MA-14-28

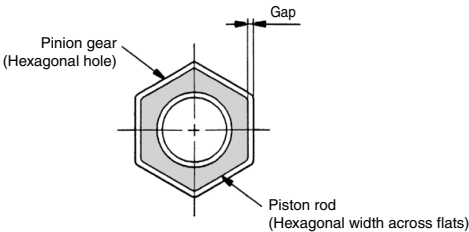
\* Please consult with manufacturers concerning further information on specifications.

Size	Adjusting angle per 1 rotation of angle adjusting screw
32	5.7°
40	4.8°

## Backlash

The rotary motion part has a structure that does not generate backlash. However, the pinion gear has a hexagonal hole, and a slight clearance exists between the hexagonal hole of the rotary motion part and the hexagonal flats of the piston rod of the linear part.

This clearance generates a backlash in the rotational direction of the piston rod.



## ⚠ Precautions

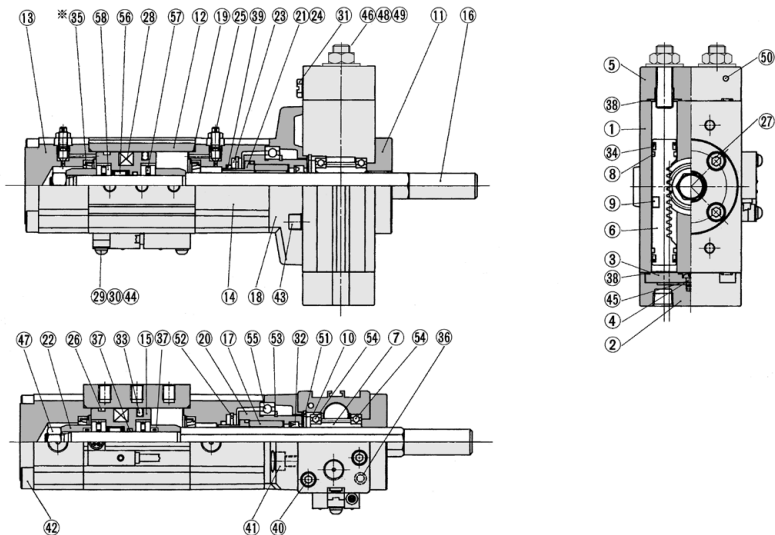
Be sure to read this before handling the products.  
 Refer to page 7 for safety instructions, pages 8 to 13 for rotary actuator precautions, and pages 18 to 22 for auto switch precautions.

## ⚠ Caution

The angle adjustment bolt is adjusted to a random position within the adjustable rotating range when shipped. Readjust the angle as needed before using.

## Construction

\* Part unnecessary for models without a cushion.



### Component Parts

No.	Description	Material	Note
①	Body	Aluminum alloy	Anodized
②	Cover	Aluminum alloy	Anodized
③	Plate	Aluminum alloy	Chromated
④	Seal	NBR	
⑤	End cover	Aluminum alloy	Anodized
⑥	Piston	Stainless steel	
⑦	Pinion gear	Chrome molybdenum steel	
⑧	Wearing	Resin	
⑨	Magnet	-	
⑩	Bearing color	Aluminum alloy	Anodized
⑪	Steady brace cover	Aluminum alloy	Anodized
⑫	Tube	Aluminum alloy	Anodized
⑬	Head cover	Aluminum alloy	Anodized
⑭	Rod cover	Aluminum alloy	Platinum silver
⑮	Piston	Aluminum alloy	Chromated
⑯	Piston rod	Stainless steel	
⑰	Non-rotating guide	Sintered metallic	
⑱	Flange	Aluminum alloy	Platinum silver
⑲	Tube gasket	NBR	
⑳	Rod packing guide	Aluminum alloy	Anodized
㉑	Color	Aluminum alloy	Anodized
㉒	Cushion ring	Rolled steel	Electroless nickel plated
㉓	O-ring retainer	Aluminum alloy	Chromated
㉔	O-ring	NBR	
㉕	Cushion valve assembly	Steel wire	
㉖	Wearing	Resin	
㉗	Hexagon socket head cap screw	Chrome molybdenum steel	
㉘	Plastic magnet	Magnetic material	
㉙	Switch mounting nut	Rolled steel	
㉚	Switch spacer	Resin	
㉛	Plug	Brass	Electroless nickel plated
㉜	Rod packing	NBR	
㉝	Piston seal	NBR	
㉞	Piston seal	NBR	
㉟	Cushion seal	NBR	
㊱	O-ring	NBR	
㊲	O-ring	NBR	
㊳	O-ring	NBR	
㊴	O-ring	NBR	

### Component Parts

No.	Description	Material	Note
④⑩	Hexagon socket head cap screw	Stainless steel	
④①	Hexagon socket head cap screw	Stainless steel	
④②	Hexagon socket head cap screw	Stainless steel	
④③	Hexagon socket head cap screw	Stainless steel	
④④	Round head Phillips screw	Steel wire	
④⑤	Round head Phillips screw	Steel wire	
④⑥	Hexagon socket head set screw	Steel wire	
④⑦	Compact hexagon nut	Stainless steel	
④⑧	Hexagon small nut	Steel wire	
④⑨	Seal washer	Steel wire	
⑤①	Steel ball	Stainless steel	
⑤②	R-shape retaining ring	Steel wire	
⑤③	R-shape retaining ring	Steel wire	
⑤④	Bearing	Bearing steel	
⑤⑤	Bearing	Bearing steel	
⑤⑥	Shell type needle roller bearing	Bearing steel	
⑤⑦	Thrust needle roller bearing	Bearing steel	
⑤⑧	Bearing ring	Bearing steel	

### Replacement Parts

Description	Size	
	32	40
<b>Spare parts assembly part no.</b>	P31701-1	P31702-1
No.	Description	Quantity
④	Seal	1
⑧	Wearing	4
⑱	Tube gasket	2
㉖	Wearing	1
㉚	Rod packing	1
㉜	Piston seal	1
㉝	Piston seal	4
㉞	O-ring	4
㉟	O-ring	4
㉟	O-ring	1
㊱	Seal washer	2

A grease pack (10 g) is included. When you need an additional grease pack, order using the following part number.

**Replacement part/Grease pack part no. : GR-S-010 (10g)**

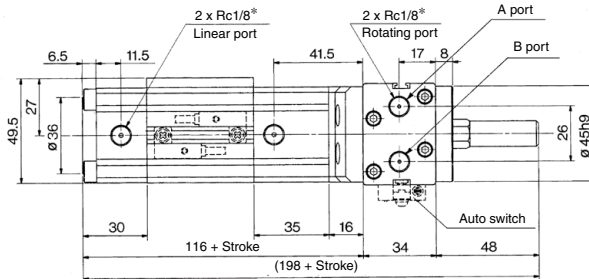
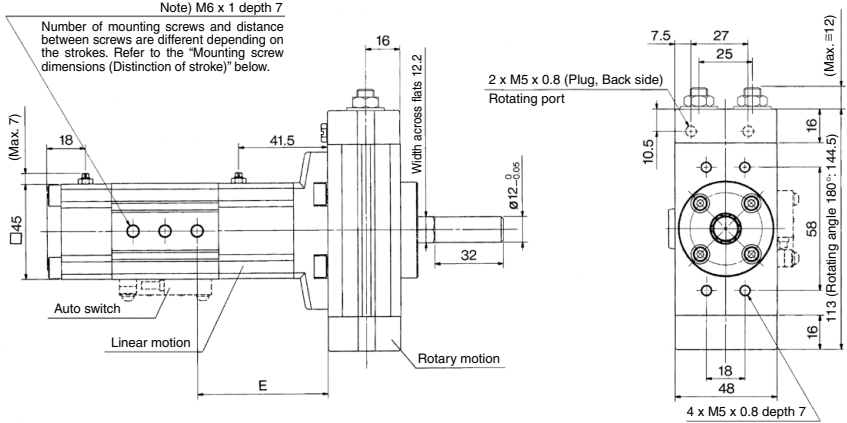
\* Individual part cannot be shipped.

# MRQ Series

## Size 32



## Basic Type: MRQBS32



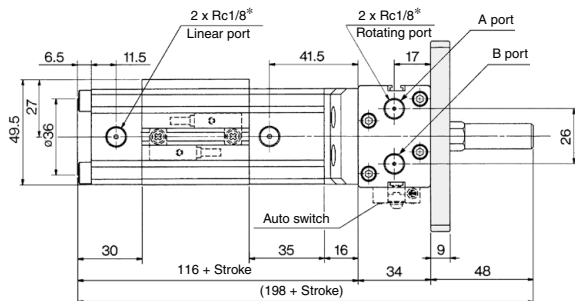
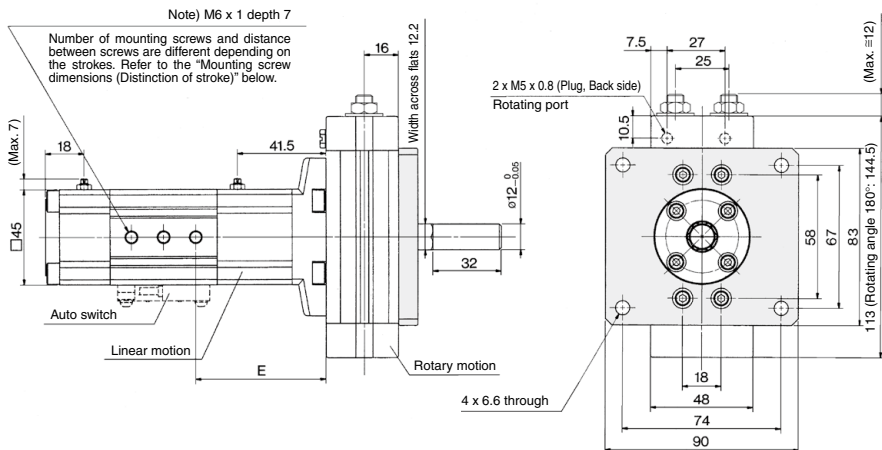
In addition to Rc 1/8, G1/8 and NPT 1/8 are also available.

### Mounting Screw Dimensions (Distinction of stroke)

Stroke	Mounting screw 3 pcs.						Mounting screw 4 pcs.			
	5	10	15	20	25	30	40	50	75	100
Y	12.5	12.5	15	15	20	20	15	17.5	25	30
Q	-	-	-	-	-	-	20	20	20	30
E	58.5	61	61	63.5	61	63.5	63.5	66	71	73.5



**Flange Type: MRQFS32**



In addition to Rc 1/8, G1/8 and NPT 1/8 are also available.

**Mounting Screw Dimensions (Distinction of stroke)**

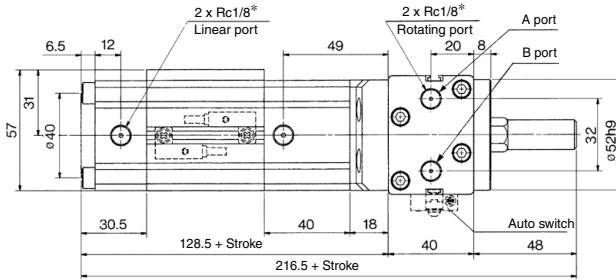
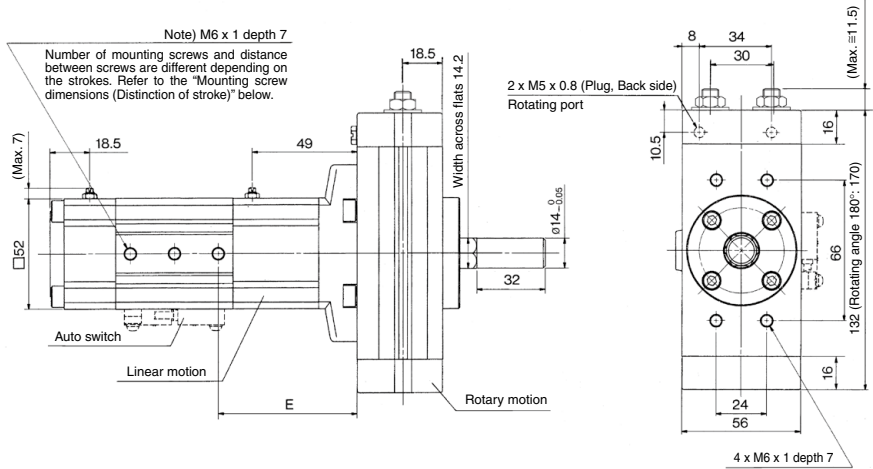
Mounting screw 3 pcs.							Mounting screw 4 pcs.			
	(mm)						(mm)			
Stroke	5	10	15	20	25	30	40	50	75	100
<b>Y</b>	12.5	12.5	15	15	20	20	15	17.5	25	30
<b>Q</b>	-	-	-	-	-	-	20	20	20	30
<b>E</b>	58.5	61	61	63.5	61	63.5	63.5	66	71	73.5

# MRQ Series

## Size 40



## Basic Type: MRQBS40

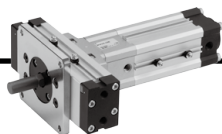


In addition to Rc 1/8, G1/8 and NPT 1/8 are also available.

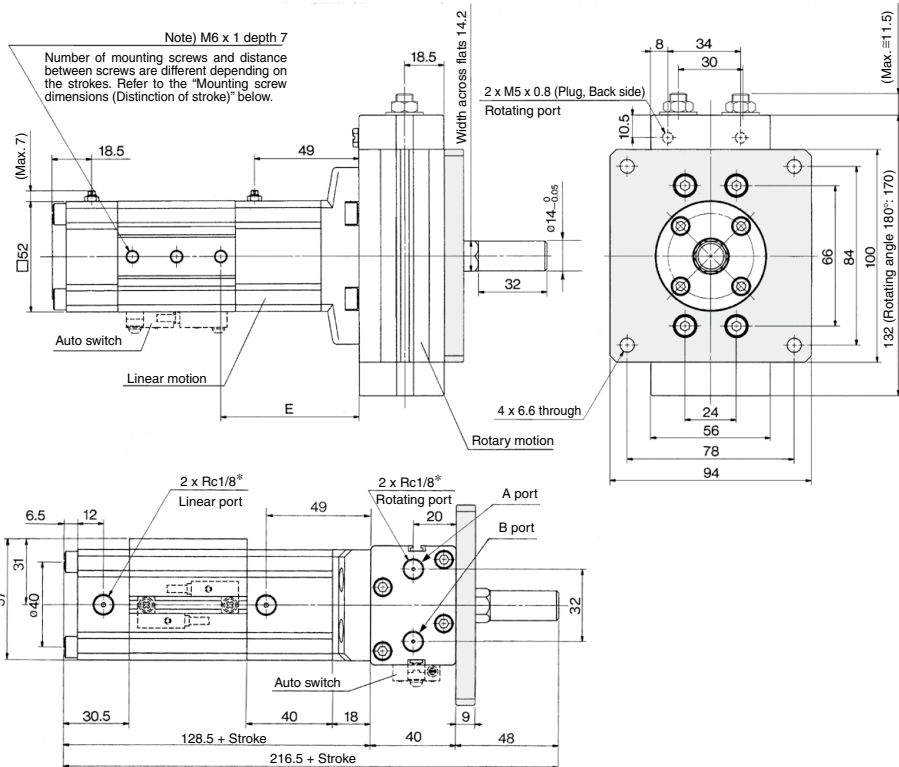
### Mounting Screw Dimensions (Distinction of stroke)

Stroke	Mounting screw 3 pcs.					Mounting screw 4 pcs.				
	5	10	15	20	25	30	40	50	75	100
Y	12.5	15	15	20	20	15	17.5	17.5	25	30
Q	-	-	-	-	-	20	20	20	20	30
E	68	68	70.5	68	70.5	68	70.5	75.5	80.5	83

(mm)



**Flange Type: MRQFS40**



In addition to Rc 1/8, G1/8 and NPT 1/8 are also available.

**Mounting Screw Dimensions (Distinction of stroke)**

Stroke	Mounting screw 3 pcs.					Mounting screw 4 pcs.				
	Y	Y	Y	Y	Y	Y	Q	Y	Y	Y
	(mm)									
5	12.5	15	15	15	20	15	17.5	17.5	25	30
10	-	-	-	-	-	20	20	20	20	30
15	68	68	70.5	70.5	70.5	68	70.5	75.5	80.5	83
25										
30										
40										
50										
75										
100										



# MRQ Series

# With Auto Switch

Refer to pages 937 to 983 concerning further information on specifications of the auto switch single body.



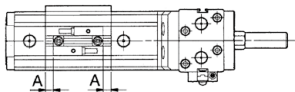
## Applicable Auto Switch

In addition to the applicable auto switches indicated in How to Order, the following auto switches can be also mounted.  
Refer to page 959 concerning further information on specifications of the auto switch single body.

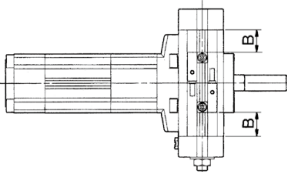
Auto switch type	Part no.	Electrical entry (Fetching direction)	Feature
Solid state	D-F7NT	Grommet (In-line)	With timer

## Operating Range/Hysteresis/Proper Mounting Positions of Auto Switch

Linear motion parts



Linear motion parts		Size	D-A7/A8	D-F7□, F7□V, J79, J79C, F7□W, F7□WV, J79W, F7BA, F7BAV	D-F79F
Linear motion parts	Operating range (mm)	32	12	6	8
		40	11		7
	Hysteresis (mm)	32	2	1	1
		40			
Proper mounting position A (mm)		32	8.5(9)	9	9
		40	11(11.5)	11.5	11.5



Rotary motion parts		Size	Rotating angle	D-A7/A8	D-F7□, F7□V, J79, J79C, F7□W, F7□WV, J79W, F7BA, F7BAV	D-F79F	
Rotary motion parts	Operating range (Degree)	32	—	55	28	40	
		40		46	27	32	
	Hysteresis angle (Degree)	32		10	4	7	
		40		7	3	4	
	Proper mounting position B (mm)	32		80 to 100°	24.5 (25)	25	29
		40		170 to 190°	32 (32.5)	32.5	36.5
80 to 100°			31.5 (32)	32	36		
		170 to 190°	41 (41.5)	41.5	45.5		

The values in parentheses are of D-A72, A7□H, A80H

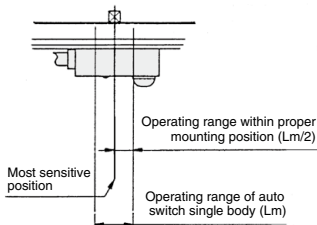
Note) Since the above values are only provided as a guideline, they are not guaranteed. In the actual setting, adjust them after confirming the auto switch performance.

## Mounting and Moving Method of Auto Switch

Auto switch mounting bracket part no.

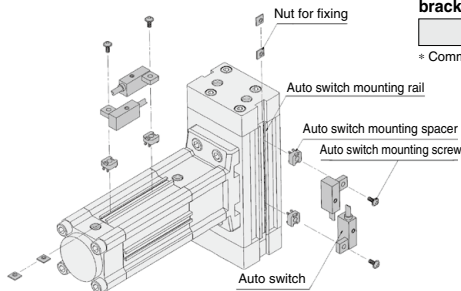
**BQ-2**

\* Common for MRQ32 and 40



**Operating angle** : The value of the individual auto switch's movement range Lm converted into the shaft's rotation angle

**Hysteresis angle** : The value of the auto switch's hysteresis as represented by an angle

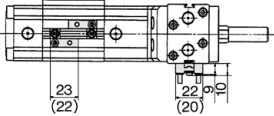


- Slide the auto switch mounting spacer and place it on the auto switch mounting position of the body. (At this time, verify that the auto switch mounting nut that is inserted in the auto switch mounting rail is placed simultaneously in the auto switch mounting position.)
- Engage the tongue portion of the auto switch mounting arm into the groove portion of the auto switch mounting spacer.
- Lightly screw the auto switch mounting screw into the auto switch mounting nut, via the hole in the auto switch mounting arm.
- After verifying the detection position, tighten the mounting screw to secure the auto switch in place. (The tightening torque of the M3 screw is approximately 0.5 N·m.)
- The detection position can be changed under the conditions described in step ③.

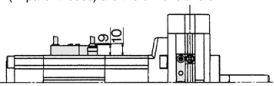
**Auto Switch Mounting Dimensions**

**Reed switch**

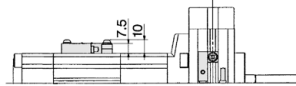
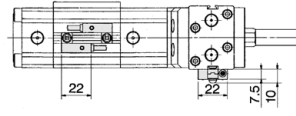
**D-A7□/A80**



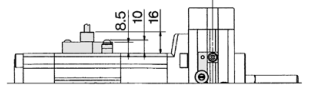
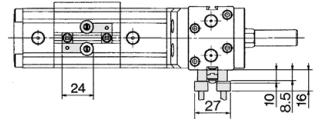
(In parentheses) are the dimensions of "A72".



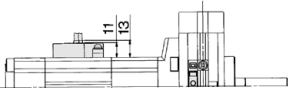
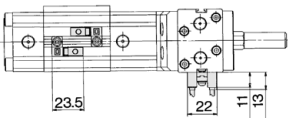
**D-A7□H**



**D-A73C/A80C**

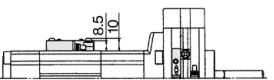
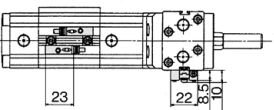


**D-A79W**

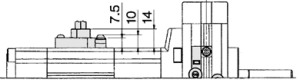
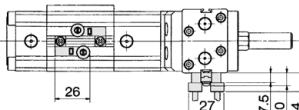


**Solid state switch**

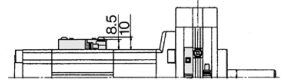
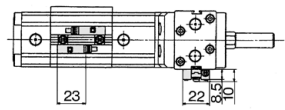
**D-F7□/F7□F/F7BAL/F7NT/J79**



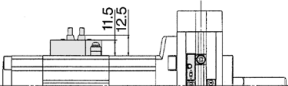
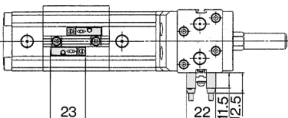
**D-J79C**



**D-F7□W/J79W**



**D-F7□V**



**⚠ Caution**

Be sure to read pages 932 to 936 before handling the products when using auto switches.

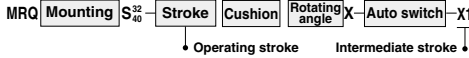
# MRQ Series

# Made to Order Specifications

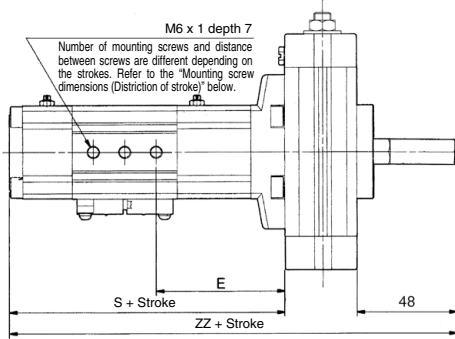


Please contact SMC for detailed dimensions, specifications and lead times.

## 1 Intermediate Stroke Symbol **-X1**



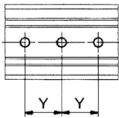
For intermediate strokes other than standard strokes, the full length is shortened by cutting the linear motion side according to the stroke.



### Mounting Screw Dimensions (Distinction of stroke)

Mounting screw 3 pcs.

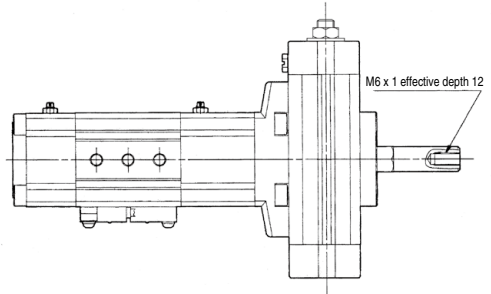
Mounting screw 4 pcs.



Size	Stroke	Y	Q	E	Mounting screw
32	1 to 4	12.5	—	$58.5 - (5 - \text{Stroke})/2$	3
	6 to 9			$61 - (10 - \text{Stroke})/2$	
	11 to 14			$61 - (15 - \text{Stroke})/2$	
	16 to 19	15		$63.5 - (20 - \text{Stroke})/2$	
	21 to 24			$61 - (25 - \text{Stroke})/2$	
	26 to 29	20		$63.5 - (30 - \text{Stroke})/2$	
	31 to 39			$63.5 - (40 - \text{Stroke})/2$	
	41 to 49	17.5		$66 - (50 - \text{Stroke})/2$	
	51 to 65			$66 - (65 - \text{Stroke})/2$	
	66 to 74	25		$71 - (75 - \text{Stroke})/2$	
76 to 90	30		$68.5 - (90 - \text{Stroke})/2$		
91 to 99		30	$73.5 - (100 - \text{Stroke})/2$		
40	1 to 4		12.5	—	$68 - (5 - \text{Stroke})/2$
	6 to 9	$68 - (10 - \text{Stroke})/2$			
	11 to 14	$70.5 - (15 - \text{Stroke})/2$			
	16 to 19	15	$68 - (20 - \text{Stroke})/2$		
	21 to 24		$70.5 - (25 - \text{Stroke})/2$		
	26 to 29	20	$68 - (30 - \text{Stroke})/2$		
	31 to 39		$70.5 - (40 - \text{Stroke})/2$		
	41 to 49	17.5	$75.5 - (50 - \text{Stroke})/2$		
	51 to 65		$75.5 - (65 - \text{Stroke})/2$		
	66 to 74	25	$80.5 - (75 - \text{Stroke})/2$		
76 to 90	30		$78 - (90 - \text{Stroke})/2$		
91 to 99		30	$83 - (100 - \text{Stroke})/2$		

Size	S	ZZ
32	116	198
40	128.5	216.5

## 2 Rod End Female Thread Symbol **-X2**

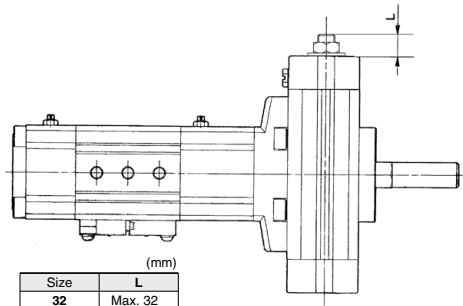


## 3 Non-standard Angle Adjustment Range Symbol **-X5**



Angle adjustment range

\* For rotating angle, fill in either A (90° type) or B (180° type). The standard angle adjustment range of  $\pm 5^\circ$  (one side) is changed to  $+\frac{5^\circ}{-95^\circ}$  in this type.



Size	L
32	Max. 32
40	Max. 31.5

### Possible to Change the Specifications from the Basic Type to "-X5"

Specify the part number for hexagon socket head cap screw for angle adjustment referring to the list below.

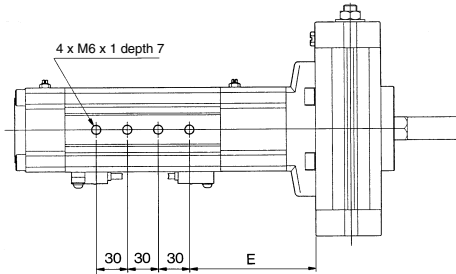
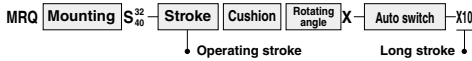
Size	Part no.	Attached parts:	
32	P317010-13	Hexagon socket head cap screw	1 pc.
40		Hexagon nut	1 pc.
		Seal washer	1 pc.

\* One set of the actuator requires two sets of the hexagon socket head cap screws.

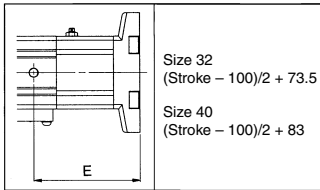
### 4 Long Stroke (101 to 200 mm) -X10

Symbol

\* Refer to the table of number of the auto switches mounted below.



Formula for "E" dimensions



### Acceptable Side Loading to the Tip of Piston Rod F

	Size 32	Size 40
Stroke	F(N)	F(N)
105	9	15
110		
115		
120		
125	8	14
130		
140		
150		
175	7	12
200	5	11

Set at the closer factors to those indicated in the table for the acceptable side loading of strokes not indicated in the table.

### Number of Auto Switches Mounted

Rotation angle		0	1	2
Linear motion				
0	—	0S	0S	02
1		S0	SS	S2
2		20	2S	Nil
n		n0	nS	n2

Combinations of made-to-order products No. **1** to **4** are available. Please contact SMC for further information.