

RRC

Selex Rotary

Size 8, 32, 63

Swing/Rotary Type



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Swing/Rotary Type

RRC

GRC

RV3□

Cylinder
Switch

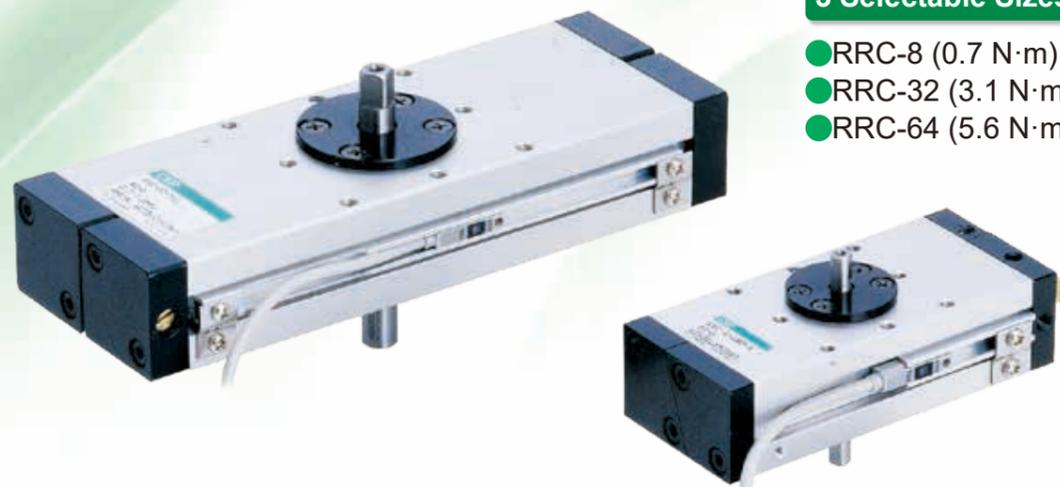
Ending

Rack & pinion type, compact oscillating type

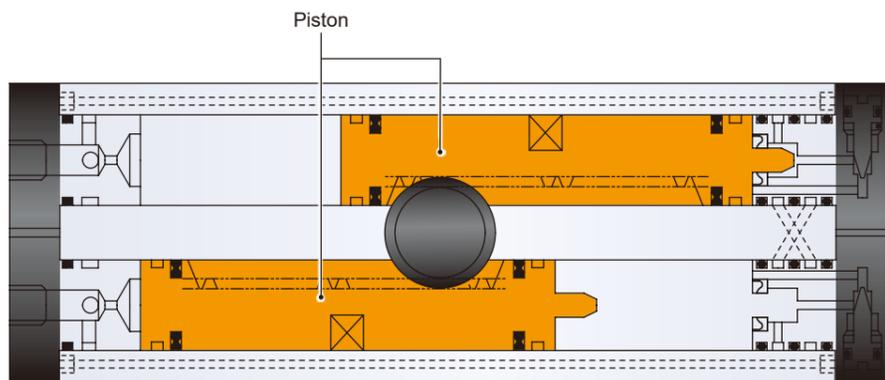
Oscillating/Rotary Drive Type 0.7 to 5.6 N·m (at 0.5 MPa)
Max Oscillation Angle 90°, 180°, 270°

3 Selectable Sizes

- RRC-8 (0.7 N·m)
- RRC-32 (3.1 N·m)
- RRC-64 (5.6 N·m)



Adopts double piston system, compact with high torque, eliminates backlash

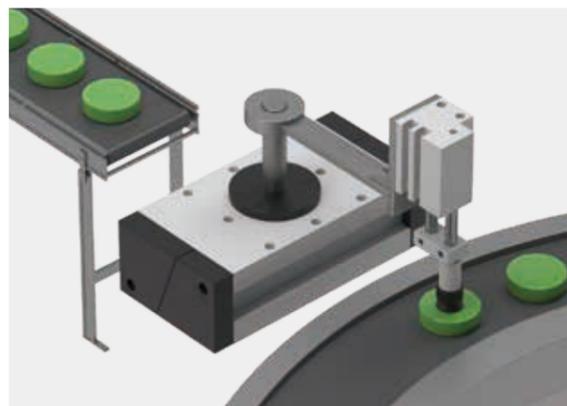


Application Example

Conveyor Stopper Opening/Closing

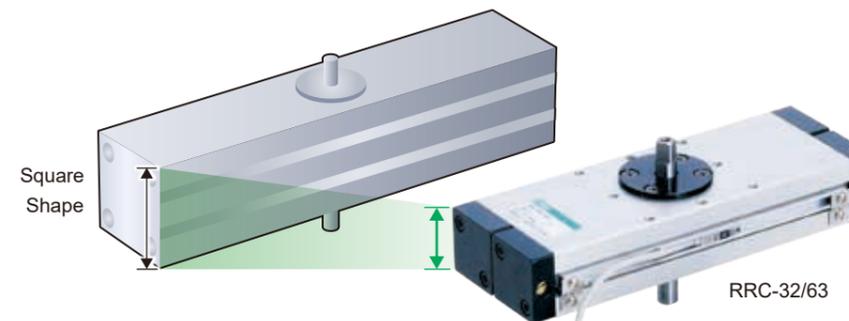


Conveyor Workpiece Transfer



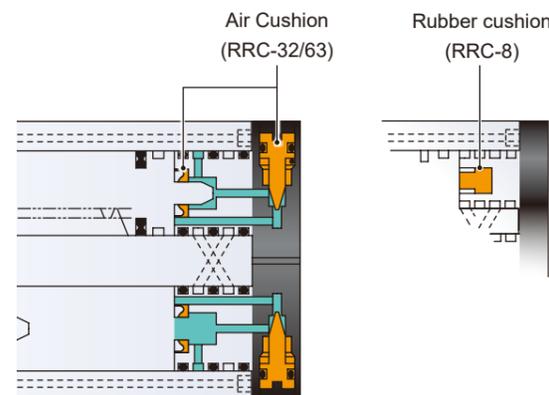
Space saving

Compact and thin design allows for installation in small spaces.



Cushion Standard Equipped

Rubber cushion or air cushion standard equipped.



Stable Torque/Long Life

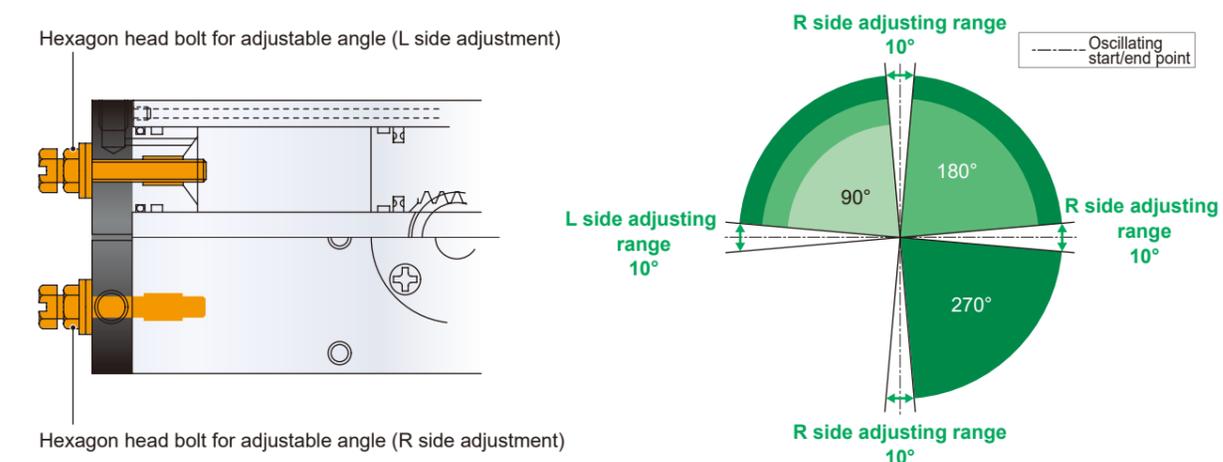
Adopts a unique mechanism combining two cylinders and a rack & pinion. Torque is stable even at low pressure, with minimal internal/external leakage*, and long life.

*Compared to the vane type (RV3□ Series), air leakage is less, saving energy.



With Angle Adjustment (Option)

Angle adjustment of 10° is possible at each oscillation end point. (Max Oscillation Angle Tolerance (+1 to +8°))



●: Standard, ◎: Option, ○: Custom Products, ■: Not Available

Variation	Model No. Circuit Diagram Code	Size	Effective Torque (at 0.5 MPa) (N·m)	Max Swing Angle (°)			Max Oscillation Angle (°)		Option	Switch	Page
				90	180	270	With Angle Adjustment	A			
Rack Pinion Type	RRC 	8	0.7	●	●	●	◎	◎		1230	
		32	3.1								
		63	5.6								

Swing/Rotary Type
RRC
GRC
RV3□

Swing/Rotary Type
RRC
GRC
RV3□

Cylinder Switch
Ending

Cylinder Switch
Ending



Selex Rotary Rack & Pinion Type

RRC Series

- Size: 8, 32, 63
- Oscillation Angle: 90°, 180°, 270°

Circuit Diagram Code



RRC Series Model Number Notation

4 Number of Switches

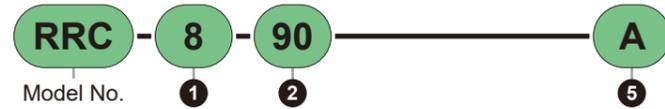
Code	Content
R	With 1 Right Rotation Detection
L	With 1 Left Rotation Detection
D	With 2 pcs

5 Option

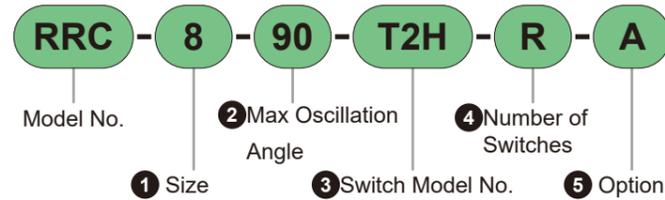
Code	Content
A	With Angle Adjustment 

Model Number Notation

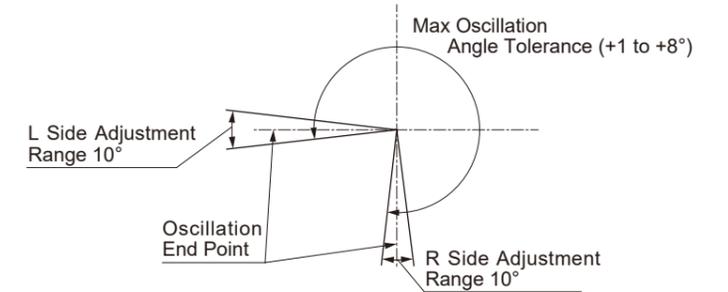
Without Switch
(Built-in magnet for switch)



With Switch
(Built-in magnet for switch)



*Turning the angle adjustment Hexagon Bolt clockwise reduces the cylinder oscillation angle.



1 Size

Model No.	Effective Torque
8	0.7 N·m
32	3.1 N·m
63	5.6 N·m

2 Max Oscillation Angle

Code	Content
90	90°
180	180°
270	270°

3 Switch Model No.

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

Contact	Indicator LED Special Function	Wiring (Output)	Load Voltage (V)		Load Current (mA)		Lead wire *1		Image
			AC	DC	AC	DC	Straight	L-shape	
Solid State	1-Color	2-wire	85 to 265	—	5 to 100	—	T1H□	T1V□	
			—	10 to 30	—	5 to 20 *2	T2H□	T2V□	
		3-wire (NPN)	—	—	100 or less	—	T3H□	T3V□	
	2-Color	2-wire	—	24 ± 10%	—	5 to 20 *2	T2WH□	T2WV□	
			3-wire (NPN)	—	30 or less	—	50 or less	T3WH□	
		3-wire (NPN)	—	30 or less	—	50 or less	T3WH□	T3WV□	
1-Color Flexible Lead Wire Type	2-wire	—	24 ± 10%	—	5 to 20	T2WLH□	T2WLV□		
		—	10 to 30	—	5 to 20 *2	T2HR3	T2VR3		
Reed	1-Color	2-wire	110	12/24	7 to 20	5 to 50	T0H□	T0V□	
			110	5/12/24	20 or less	50 or less	T5H□	T5V□	
	No Indicator LED	110/220	12/24	7 to 20 / 7 to 10	5 to 50	T8H□	T8V□		

*Lead wire length, connector specification

Code	Content
Blank	1 m (Standard)
3	3 m (Option)
5	5 m (Option)
W	M8 Connector, 1PIN (+), 4PIN (-) Lead Wire 0.3 m

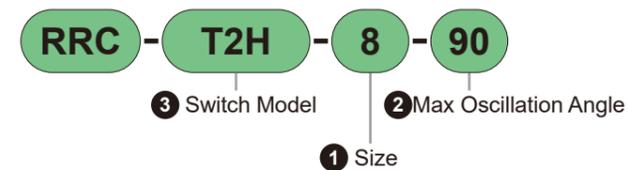
*5: Only T2WLH and T2WLV can be selected.

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

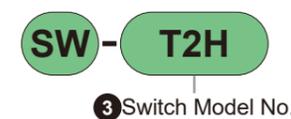
*1: For "□" in the switch model number, enter the code selected from the "Lead wire length, connector specification" table.
*2: The maximum load current value above, 20 mA, is at 25°C. If the switch operating Ambient Temperature is higher than 25°C, it will be lower than 20 mA. (At 60°C, it will be 5 to 10 mA.)
*3: This does not guarantee the water resistance of the cylinder.
*4: Switches other than the model numbers listed above are also available. (Custom Product) For details, refer to P. 1457.

Switch Single Unit Model No. Notation

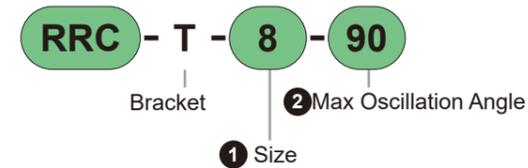
● Switch Body+Mounting Bracket Set (including rail)



● Switch Body Only



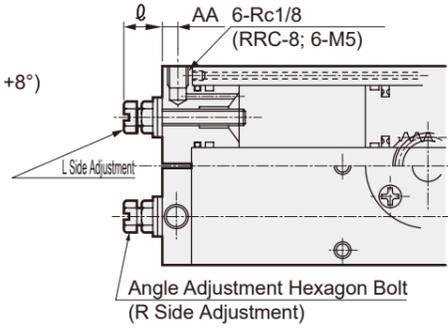
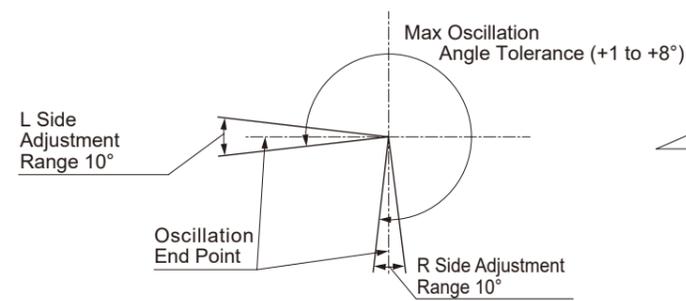
● Mounting Bracket Set (including rail)



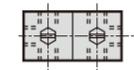
Dimensional Drawings with Option

●With Angle Adjustment

Turning the angle adjustment Hexagon Bolt clockwise reduces the cylinder oscillation angle.



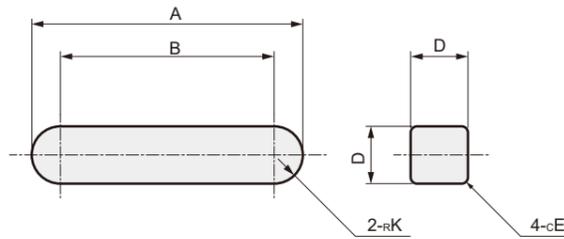
L side R side



There are 3 port positions on both the R and L sides as shown in the figure above.

Code Model No.	L		AA	Allowable Absorption Energy J (When angle adjustment is 10° on one side)	Angle Adjustment Hexagon Bolt Dimensions (Common for R, L)
	MIN	MAX			
RRC-8	10.7	11.5	4	0.02	M5×0.5
RRC-32	13.4	15.5	6	0.06	M6×0.75
RRC-63	13.5	16.0	7	0.13	M6×0.75

●Key Dimension Drawing

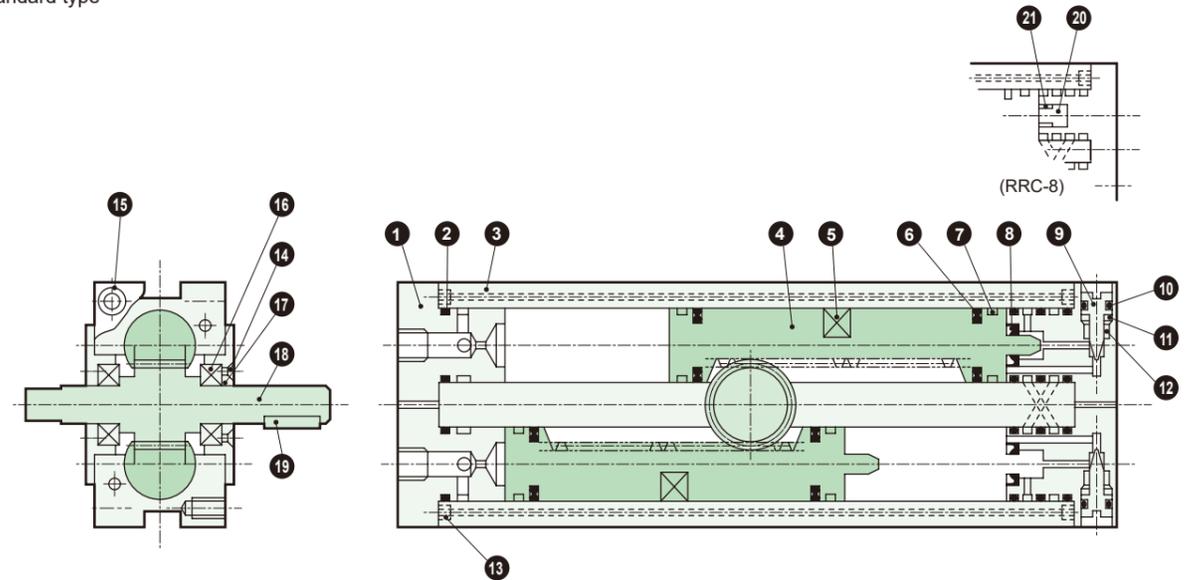


Code Model No.	A	B	K	D	E
RRC-32	16 ⁰ _{-0.18}	13	1.5	3 ⁰ _{-0.025}	0.2
RRC-63	20 ⁰ _{-0.21}	16	2	4 ⁰ _{-0.030}	0.2

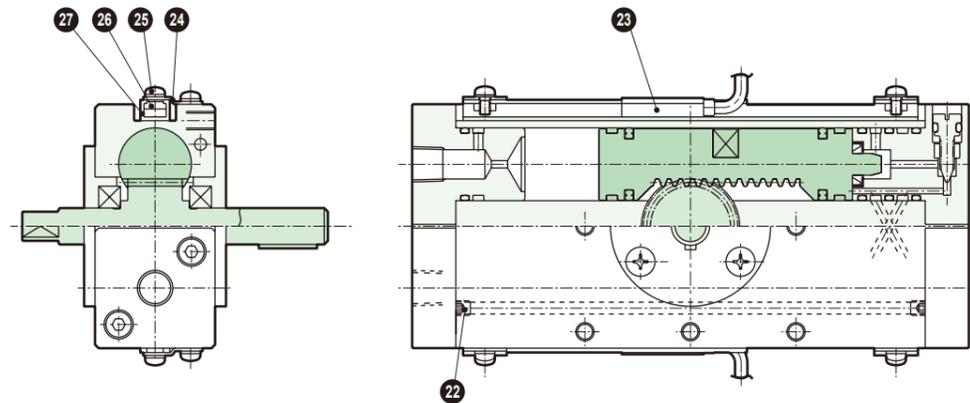
Internal Structure Diagram/Material

Internal Structure Diagram/Material

●Standard type



●With Switch

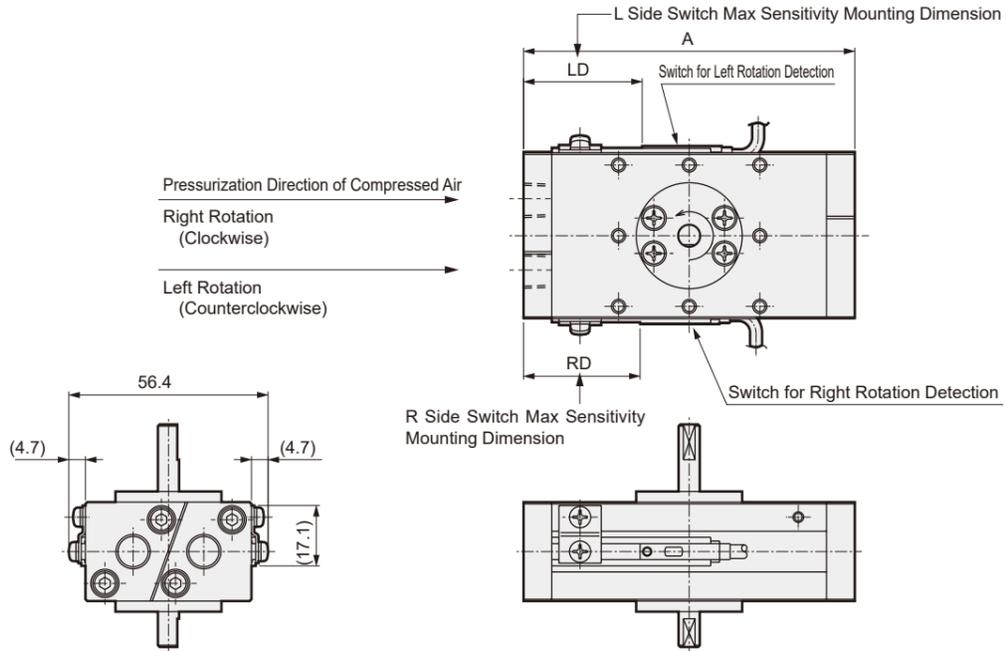


Part No.	Part Name	Material	Remarks	Part No.	Part Name	Material	Remarks
1	Cap (2)	Aluminum Alloy		15	Hexagon Socket Head Cap Screw	Alloy Steel	
2	Cap gasket	Nitrile Rubber		16	Bearing		
3	Body	Aluminum Alloy		17	Cover	Aluminum Alloy	
4	Piston	Stainless Steel		18	Shaft	Steel	
5	Magnet	Plastic		19	Key	Steel	
6	Piston Packing	Nitrile Rubber		20	Cushion Rubber	Urethane Rubber	RRC-8 only
7	Wear Ring	Polyacetal		21	Bushing	Bearing Alloy	RRC-8 only
8	Cushion Packing	Nitrile Rubber	RRC-32, 63 only	22	Hexagon Socket Set Screw	Steel	
9	Needle	Copper Alloy	RRC-32, 63 only	With Switch			
10	Needle Gasket	Nitrile Rubber	RRC-32, 63 only	23	Switch		
11	Cap (1)	Aluminum Alloy		24	Stopper plate	Stainless Steel	
12	U-nut	Steel	RRC-32, 63 only	25	Cross-Recessed pan head machine screw with washer	Steel	
13	Hexagon Socket Set Screw	Alloy Steel		26	Fixing Nut	Stainless Steel	
14	Phillips flat head screw	Steel		27	Switch Rail	Aluminum Alloy	

For maintenance parts, please visit the CKD Equipment Product Site (<https://www.ckd.co.jp/kiki/en/>) → "model No." → Maintenance Parts.

RRC Series Outline Dimension Drawing with Switch

• $\phi 8$

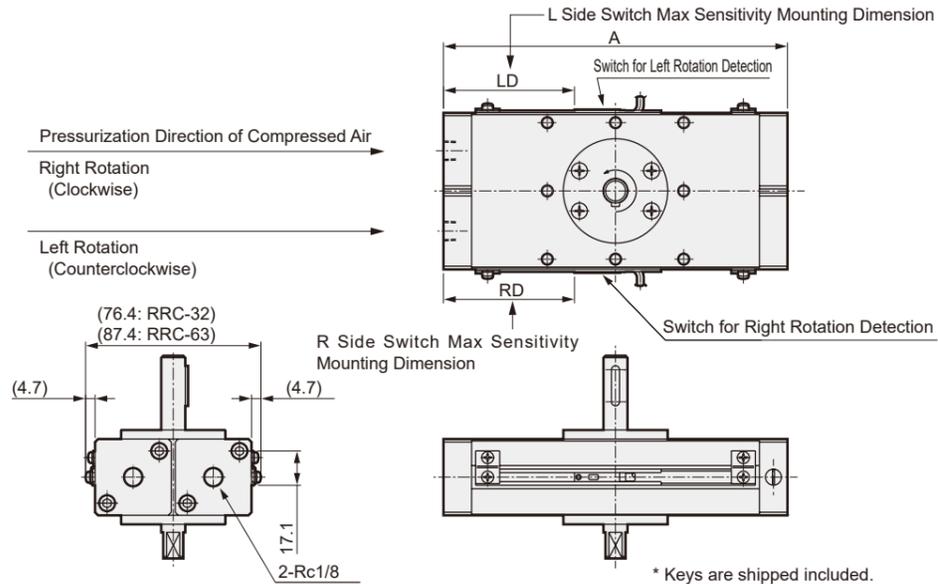


Code	A						RD											
	T1			T2, T3, T2□R3			T0, T5			T8			T2W, T3W, T2WL					
Oscillation Angle	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°
Model No.	94	109	124	31	36	40	33	37	41	30	37	41	24	31	35	34	39	43
RRC-8																		

Code	LD														
	T1			T2, T3, T2□R3			T0, T5			T8			T2W, T3W, T2WL		
Oscillation Angle	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°
Model No.	31	36	40	33	37	41	30	37	41	24	31	35	34	39	43
RRC-8															

Note: Dimensions other than the above are the same as those without switch.

• $\phi 32, \phi 63$



Code	A						RD											
	T1			T2, T3, T2□R3			T0, T5			T8			T2W, T3W, T2WL					
Oscillation Angle	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°
Model No.	153	191	229	56	66	75	58	67	77	57	67	76	51	61	70	59	69	78
RRC-32																		
RRC-63	172	216	260	64	75	86	65	76	87	65	76	87	59	70	81	67	78	89

Code	LD														
	T1			T2, T3, T2□R3			T0, T5			T8			T2W, T3W, T2WL		
Oscillation Angle	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°	90°	180°	270°
Model No.	56	66	75	58	67	77	57	67	76	51	61	70	59	69	78
RRC-32															
RRC-63	64	75	86	65	76	87	65	76	87	59	70	81	67	78	89

Note: Dimensions other than the above are the same as those without switch.

MEMO

Swing/Rotary Type

RRC

GRC

RV3□

Swing/Rotary Type

RRC

GRC

RV3□

Cylinder Switch

Ending

Cylinder Switch

Ending

Selex Rotary Model Selection Guide

Diagram for calculating moment of inertia

Step 1 Oscillation Time Check

Use the oscillation time within the range shown in the table below. Unit: S

Oscillation Angle (°)	90	180	270
Model No.			
RRC-8	0.015 to 0.151	0.030 to 0.302	0.045 to 0.452
RRC-32	0.038 to 0.377	0.075 to 0.754	0.113 to 1.131
RRC-63	0.073 to 0.440	0.147 to 0.880	0.220 to 1.320

* The oscillation time in the table is the time from the start of movement until the oscillation end is reached.

Step 2 Size Selection

When simple static force is required, such as clamping

For Static Load

- Determine the Operating Pressure. P (MPa) F (N)
- Determine the required force. (N)
- Determine the arm length from the Selex Rotary. ℓ (m)

Calculation of Required Torque T = F ℓ (N·m)

When Moving a Load

For Resistive Load

When force due to friction, gravity, or other external forces (resistive load) is applied.

- Determine the Operating Pressure. P (MPa)
- Determine the required force. F_R (N)
- Determine the arm length from the Selex Rotary. ℓ (m)

Calculation of Resistive Torque T_R = K × F_R × ℓ (N·m)
 K: Margin coefficient
 No load fluctuation K=2
 With load fluctuation K=5
 (When resistance torque due to gravity acts) If K<5 with load fluctuation, the change in angular velocity becomes large.

For Inertial Load

When rotating an object.

- Determine the oscillation angle, oscillation time, and Operating Pressure.
 Oscillation Angle θ (rad)
 Oscillation Time t (s)
 Operating Pressure P (MPa)
 90° = 1.5708 (rad)
 180° = 3.1416 (rad)
 270° = 4.7124 (rad)
- Calculate the moment of inertia of the load from its shape and weight. Refer to the moment of inertia table for the calculation formula.
 I (kg·m²)
- Calculate the Max angular acceleration.
 $\alpha = \frac{2\theta}{t^2}$ (rad/s²)
 θ: Oscillating angle (rad)
 t: Oscillation Time (S)

Calculation of Acceleration Torque T_A = 5 × I × α (N·m)
 T_A is the torque required to accelerate an inertial load to a constant speed.

Required Torque T = T_R + T_A

Determine the size of the Selex Rotary from the output torque graph.

Step 3 Allowable Energy Check

For inertial load, use so that the load energy is below the allowable energy of the Selex Rotary.

- Calculation of Angular Velocity at Oscillation End $\omega = \frac{2\theta}{t}$ (rad/s)
 θ: Oscillating angle (rad) t: Oscillation Time (S)
- Calculation of Load Inertial Energy $E = \frac{1}{2} \times I \times \omega^2$ (J)
 I: Load moment of inertia (kg·m²)
- Confirm that the load inertial energy E is below the allowable energy of the Selex Rotary. If the allowable energy is exceeded, an external shock absorption device such as a shock absorber is required.

Diagram for calculating moment of inertia

When the rotating shaft passes through the workpiece

Shape	Diagram	Required Items	Moment of Inertia I (kg·m ²)	Radius of gyration	k _r ²	Remarks
Disk		● Diameter d (m) ● Weight M (kg)	$I = \frac{Md^2}{8}$	$\frac{d^2}{8}$		● No particular mounting direction ● Consider separately when used by sliding
Stepped disk		● Diameter d ₁ (m) ● Diameter d ₂ (m) ● Weight d ₁ Part M ₁ (kg) ● Weight d ₂ Part M ₂ (kg)	$I = \frac{1}{8} (M_1 d_1^2 + M_2 d_2^2)$	$\frac{d_1^2 + d_2^2}{8}$		● If the d ₂ part is very small compared to the d ₁ part, it can be ignored.
Rod (center of rotation is at the end)		● Rod length R (m) ● Weight M (kg)	$I = \frac{MR^2}{3}$	$\frac{R^2}{3}$		● Mounting direction is horizontal ● When the mounting direction is vertical, the oscillation time changes.
Thin rod		● Rod length R ₁ ● Rod length R ₂ ● Weight M ₁ ● Weight M ₂	$I = \frac{M_1 R_1^2}{3} + \frac{M_2 R_2^2}{3}$	$\frac{R_1^2 + R_2^2}{3}$		● Mounting direction is horizontal ● When the mounting direction is vertical, the oscillation time changes.
Rod (center of rotation is the center of gravity)		● Rod length R (m) ● Weight M (kg)	$I = \frac{MR^2}{12}$	$\frac{R^2}{12}$		● No particular mounting direction
Thin rectangular plate (cuboid)		● Plate length a ₁ ● Side length a ₂ ● Side length b ● Weight M ₁ ● Weight M ₂	$I = \frac{M_1}{12} (4a_1^2 + b^2) = \frac{M_2}{12} (4a_2^2 + b^2)$	$\frac{(4a_1^2 + b^2) + (4a_2^2 + b^2)}{12}$		● Mounting direction is horizontal ● When the mounting direction is vertical, the oscillation time changes.
Cuboid		● Side length a (m) ● Side length b (m) ● Weight M (kg)	$I = \frac{M}{12} (a^2 + b^2)$	$\frac{a^2 + b^2}{12}$		● No particular mounting direction ● Consider separately when used by sliding

Concentrated load

- Shape of concentrated load
- Length to the center of gravity of the concentrated load R₁ (m)
- Arm length R₂ (m)
- Weight of concentrated load M₁ (kg)
- Weight of arm M₂ (kg)

$I = M_1(R_1^2 + k_1^2) + \frac{M_2 R_2^2}{3}$

k₁² is calculated based on the shape of the concentrated load

● Mounting direction is horizontal
● If M₂ is very small compared to M₁, you can calculate with M₂=0.

Method of converting the load J_L via gears to the rotary actuator shaft axis

Gear

- Gear Rotary Side (Number of Teeth) a
- Load Side (Number of Teeth) b
- Moment of Inertia of Load N·m

Moment of inertia around the rotary axis of the load $I_H = \left(\frac{a}{b}\right)^2 J_L$

● If the shape of the gear is large, it is necessary to consider the moment of inertia of the gear.

Swing/Rotary Type

Swing/Rotary Type

RRC

RRC

GRC

GRC

RV3□

RV3□

Cylinder Switch

Cylinder Switch

Ending

Ending



To Use This Product Safely

Be sure to read this before use. For general cylinder information, see Intro 41, and for cylinder switches, see P. 1512.

Individual Precautions: Selex Rotary Rack & Pinion RRC Series

Design / Selection

CAUTION

Do not apply torque exceeding rated output to the product.

If an external force exceeding the rated output of the product is applied to the product, it will cause damage to the product.

If oscillating angle repeatability is required, directly stop external load.

Even for products with angle adjustment, the initial oscillation angle may change.

If the axial load (thrust load) on the shaft exceeds the allowable value, faulty operation could occur. Therefore, do not apply a load in excess of the allowable value. If unavoidable, use a structure with a thrust bearing as shown in Figure 1.

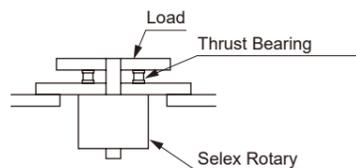


Figure 1

Avoid applying bending (radial) load exceeding the allowable value onto the shaft end, or operation faults could occur.

If unavoidable, use a mechanism where only rotational force is transmitted, as shown in Figure 2. To prevent shaft breakage, bearing wear/seizure, etc., connect the shaft tip and load with a flexible coupling, etc., that does not cause prying at any position within the oscillation range.

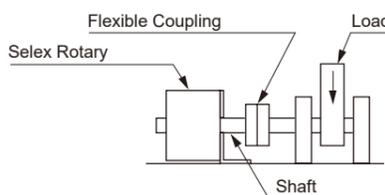


Figure 2 Radial Load

Install the external stopper in a position far from the rotary shaft.

If a stopper is installed near the rotating shaft, the reaction force acting on the stopper due to the torque generated by the product itself will be applied to the rotating shaft, causing damage to the rotating shaft and bearings, which may cause injury or damage to personnel, equipment, and devices.

If the load weight is large and oscillation is fast, large inertia could be generated and allowable absorbed energy exceeded, possibly damaging the rotary actuator.

Install a shock absorber to absorb inertia.

The retention torque of the oscillating end is about half that of the effective torque, so a load factor of 50% or less should be used.

Generally, select a model so that the output torque is twice or more the torque required by the load. Since the RRC series adopts a double piston method, if the oscillation angle is adjusted with a stopper bolt, the holding torque at the oscillation end will be half the effective torque. is included.

Even if the required torque of the load is small during oscillating motion, the inertial force of the load may cause damage to the actuator. Be sure to consider the moment of inertia of the load, kinetic energy, and oscillation time, and use below the allowable energy.

During Use

CAUTION

When installing a load or jig, etc., on the rotary actuator shaft, check that load is not applied to the body as shown in Fig.3.

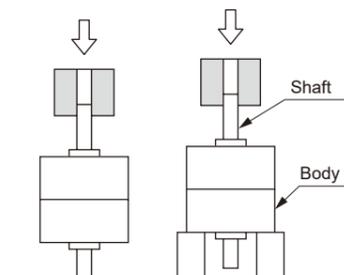


Fig. 3

When adjusting the angle by supplying pressure, do not rotate the device too much in advance.

Adjustment by supplying pressure may cause rotation and falling during adjustment depending on the mounting posture of the device, etc., which may cause injury or damage to personnel, equipment, and devices.

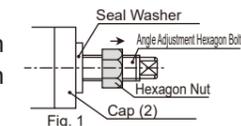
Do not loosen the angle adjustment Hexagon Bolt beyond the adjusting range.

Loosening beyond the adjustment range may cause the angle adjustment Hexagon Bolt to come off, which may cause injury or damage to personnel, equipment, and devices. Turning the angle adjustment Hexagon Bolt clockwise reduces the cylinder oscillation angle.

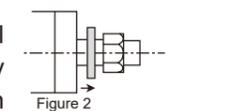
Observe steps to when adjusting the angle. If adjustment is not performed by this method, the seal washer will be damaged after 1 or 2 adjustments.

[Angle Adjustment Procedure]

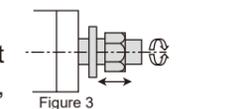
(1) First, loosen the Hexagon Nut to the state shown in Figure 1.



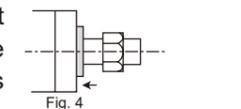
(2) Next, release the seal washer from the cap (2) by hand to the state shown in Figure 2.



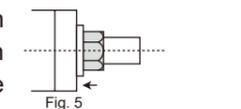
(3) Turn the angle adjustment Hexagon Bolt, Hexagon Nut, and seal washer together as shown in Fig.3, and adjust the angle. At this time, be careful not to let the rubber part of the seal washer get caught in the threaded part.



(4) After angle adjustment, first bring the seal washer close to the cap (2) by hand as shown in Figure 4.



(5) Then, securely tighten with the Hexagon Nut as shown in Figure 5. At this time, be careful not to let the rubber part of the seal washer get caught in the threaded part.



Securely tighten the Hexagon Nut after adjusting the angle. If tightening is insufficient, the Hexagon Nut will loosen during use, causing external leakage.

For precautions during mounting, installation, adjustment, use, and maintenance, refer to "During Use" in this catalog and the CKD Components Product website (<https://www.ckd.co.jp/kiki/en/>) -> "Model No." -> [Instruction Manual](#).

Swing/Rotary Type

RRC

GRC

RV3□

Swing/Rotary Type

RRC

GRC

RV3□

Cylinder Switch

Ending

Cylinder Switch

Ending