CKD

SM－329974－A

INSTRUCTIN MANUAL

SELEX Rotary

(Vane Type)

RV3※

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

CKD Corporation

The 3rd edition

To Operate This Product Safely

For safety use, it is necessary to have a fundamental knowledge as to the pneumatic device, including the material, piping, electricity and mechanism or the like. (ISO 4414*1 and JIS B 8370*2)

Our company is, therefore, not in a position to assume the responsibility for any accident attributable to a person having no such knowledge and wrong handling.

Since the applications are extremely varied among customers, we cannot grasp such various uses. No performance may be displayed, depending on the operating conditions, and such conditions may lead to an accident; it is, therefore, necessary to completely check the product specifications according to the applications and uses at customer's end and understand the directions for use thoroughly before making a decision.

Various safety measures are taken for this product, however customer's mis-handling may lead to an accident. To avoid this, "be sure to read the Instruction Manual carefully and have a thorough understanding of the contents before use."

In addition to the precautions for handling that are described in this Manual, also pay special attention to the following items.

These precautions are classified into "CAUTION", "WARNING" and "DANGER" as described below to indicate the harm and damage level and possibility of their occurrence:

⚠ **DANGER** : "DANGER" is used when a person may be exposed to an impending danger that mishandling this product leads to an accident resulting in death or serious injury.

⚠ **WARNING** : "WARNING" is used when a person may possibly die or be seriously injured if this product is handled inadvertently.

⚠ **CAUTION** : "CAUTION" is used when a person may possibly be injured if this product is mis-handled and there may arise physical damage.

*1) ISO 4414 : Pneumatic fluid power ··· Recommendations for the application of equipment to transmission and control systems.

*2) JIS B 8370 : Pneumatic System Rules

[SM-329974-A]

⚠ WARNING :

a) Avoid stopping and holding the product halfway due to air sealing to the product.

b) When load fluctuations, up and down operation and frictional resistance or drag changes are present, safety design should be carried out with due consideration given thereto.

c) Do not use the rotary actuator as a shock absorbing mechanism.

d) Tighten the fixed part and coupling part securely so that they do not get loose.

e) Do not modify or remodel the rotary actuator.

⚠ CAUTION :

a) Prior to disassembly and inspection of the rotary actuator, be sure to relieve the residual pressure, and after checkup, start operations work.

b) When driving the rotary actuator, avoid entering the rotary actuator driving area and touching its driving mechanism.

c) Do not apply external torque exceeding the rated output to the product.

d) When the precision of measurement in the partial different conditions is required for the oscillating angle, provide an external stopper to stop the load directly.

e) Use the rotary actuator within the range of the oscillating time as given in the Specification.

f) The rotary actuator oscillating speed should be controlled with the speed controller attached.

g) When 2 or more adjacent rotary actuators with switch are used or the magnetic substance moves extremely near the rotary actuator, there is a possibility that the switch malfunctions due to mutual magnetic intensity interference; it is, therefore, necessary to provide the rotary actuators at intervals of 40 mm or more.

h) When the switch is set to the mid-position of the oscillating angle and the load is driven during magnet passage, note that the operating time may be short and no load may be able to work completely even when the switch is ON if the oscillating speed is too high.

CONTENTS

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SELEX Rotary

(Vane Type)

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1
Installation

1. Installation Related Items

⚠ WARNING :

a) When adjusting the angle with pressure supplied, take proper action in advance so that the equipment does not rotate more than required.

b) No startup is allowed until it is ensured that the equipment operates adequately.

c) Since coating to the resin part may adversely affect the resin due to paint and solvent, contact our company in advance as to the necessity of coating thereto.

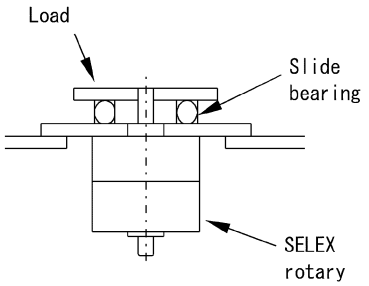
d) With the rotary actuator having variable oscillating angles, tighten the angle adjusting screw always within the adjustment range.

e) The shaft joint used should have some degree of freedom.

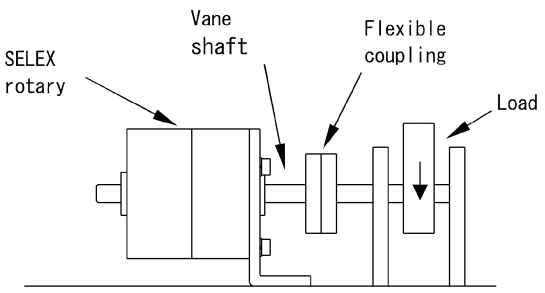
f) Maintain the space required for maintenance check.

1. 1 Installation

a) Do not apply axial load since the axial load of vane shaft (thrust load) results in malfunction.
In an unavoidable case, the structure should be such that a thrust bearing is used.



b) Avoid bending load to the SELEX rotary shaft end; otherwise malfunctioning may result. If this load is unavoidable, the mechanism should be such that only rotating force is transmitted. To prevent vane shaft breakage and bearing friction and seizure or the like, the vane shaft end part and load connecting part should be connected with a flexible coupling or the like in any position within the oscillating range so that no gouging occurs.

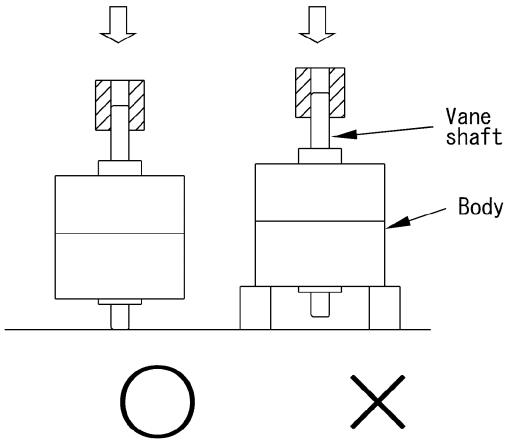


c) If the external stopper is provided near the rotation axis, the reaction acting on the stopper due to the generating torque of product itself is applied to the rotation axis, thus causing damage to the rotation axis and bearing, whereby trouble and damage are also caused to the human body, equipment and device.

d) Avoid bending load to the SELEX rotary shaft end; otherwise malfunctioning may result. If this load is unavoidable, the mechanism should be such that only rotating force is transmitted. To prevent vane shaft breakage and bearing friction and seizure or the like, the vane shaft end part and load connecting part should be connected with a flexible coupling or the like in any position within the oscillating range so that no gouging occurs.

e) When the load mass (weight) is large and the oscillating speed is high, there arises a shock due to inertia force, and the internal cushion dumper alone may not absorb a shock completely, thereby leading to damage on the SELEX rotary shaft. In such a case, provide a shock killer to absorb inertia energy.

f) Attach a load and jig or the like to the SELEX rotary vane shaft always in such a manner that no load is received at the body.

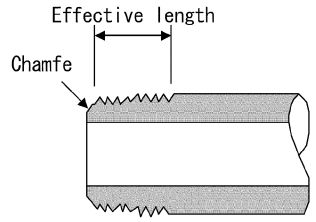


g) Prevent seizure in the rotary part. Apply grease to the rotary part (pin, etc.) to protect it from seizure.

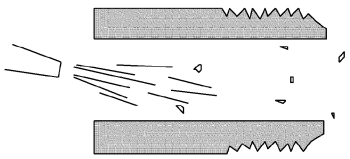
h) Do not put your foot direct on the shaft and the equipment mounted to the shaft.

1. 2 Piping

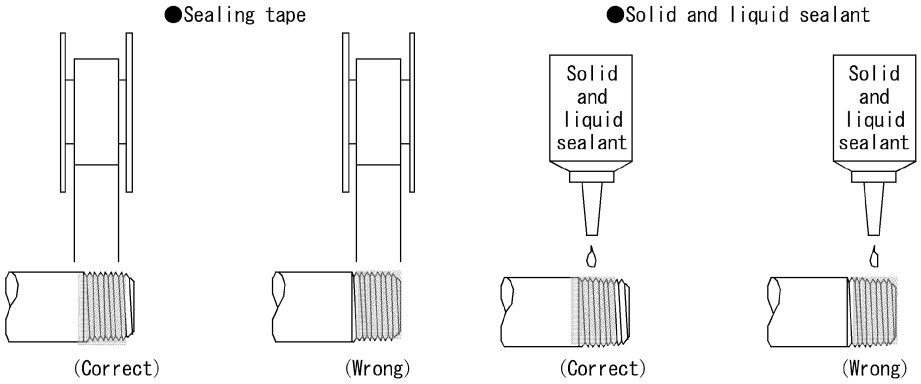
1) Use a hard-to-corrode piping material posterior to the filter, such as the galvanized pipe, nylon tube and rubber pipe.
2) Use the piping connecting the SELEX rotary shaft and solenoid valve such that the SELEX rotary shaft has the effective cross-sectional area enough to produce the specified speed.
3) To remove rust, foreign matter and drain from inside the pipe, attach a filter as close to the solenoid valve as possible.
4) The gas tube thread length used should be the effective length of threaded part. Also, chamfer the threaded part by approx. 1/2 pitch from its edge.



5) Prior to piping, tube internal flushing (air blowing) is required to eliminate foreign matter and chips or the like inside the tube.

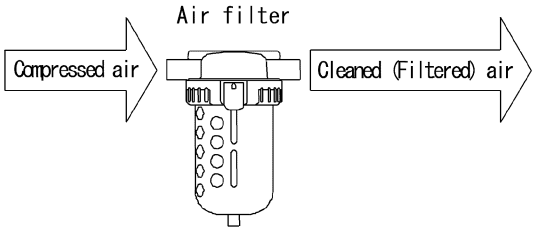


6) For piping, a sealing tape or sealant is used; in this case, however, use it with approx. 2 threads left from the thread tip as illustrated at the left end below and take care so that no residual tape chips or sealant intrudes into the tube and equipment.

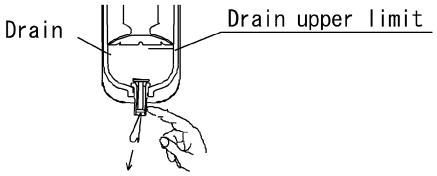


1. 3 Fluid

1) The compressed air used should be dry air that is purified and free from moisture which passed through the air filter. It is, therefore, necessary to use an air filter for the circuit and give care to its filtration rating (5 μm max. is desirable), fluid and attaching location (preferably closer to the directional control valve) or the like.



2) Discharge the drain staying in the filter periodically before the designated line is exceeded.

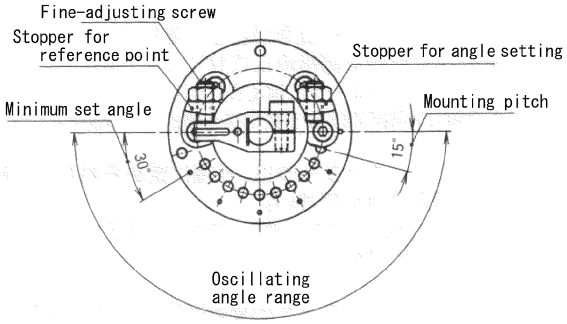


3) Inclusion of compressor oil carbide (carbon or tarry substance) on the circuit causes malfunctions to the solenoid valve and cylinder. Pay utmost attention to compressor maintenance and checkup.

4) This SELEX rotary shaft is pre-lubricated for oilless use.
When this shaft is lubricated, use Turbine Oil Class 1 (no additions) ISO VG32.

1. 4Variable oscillating type (RV3※A)

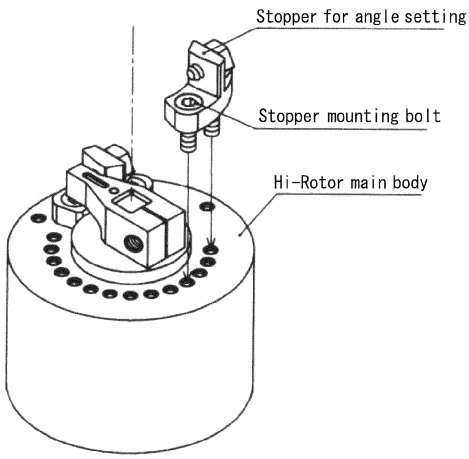
This type is used by attaching the external stopper to the tap hole provided in the SELEX rotary shaft body. This stopper has 2 types stopper for reference point and stopper for angle setting. The stopper for reference point is secured to the fixing position (oscillation starting point), while the stopper for angle setting is fixed to the location where the desired setting angle is obtained. Also, the jaw (claw) attached to the shaft comes into contact with the stopper, and the shaft comes to a halt at the set angle. The angle can be fine-adjusted with the adjusting screw attached to the stopper.



1. 4. 1 Oscillating angle setting

1) When no set angle is designated (standard):
Only the stopper for reference point is fixed, and the stopper for angle setting is not fixed, which is accompanied by the product. When used, therefore, this stopper must be attached to the position in which the set angle is obtained. The mounting pitch is 15 degrees.

2) When the set angle is designated (order-made):
The stoppers for reference point and angle setting are factory attached at the predetermined angle before shipment. However, be sure to turn the fine-adjust screw attached to each stopper for fine-adjustment before use in order to set it to the precise angle.



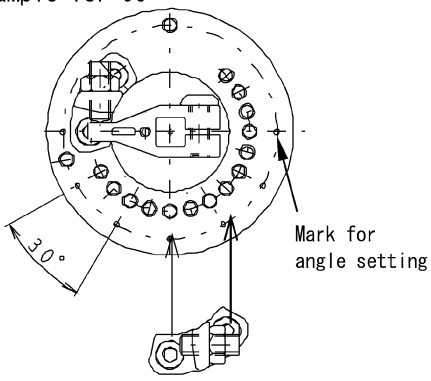
1. 4. 2 To Set Oscillating Angle

1) When the set angle is integral multiple the stopper mounting pitch (15°):
Attach the stopper to the tap hole corresponding to the set angle and fix it.
In this case, attach this stopper with the angle setting mark put by the tap hole at a pitch of 30° as a guide.

Set Angle

SELEX Rotary Shaft Main Body	Set Angle (Integral multiple the mounting pitch 15°)
RV3SA3・RV3DA3	30°、45°、60°、75°、90°、105°、120°、135°、150°、165°、180°
RV3SA10・RV3DA10	
RV3SA20・RV3DA20	
RV3SA30・RV3DA30	30°、45°、60°、75°、90°、105°、120°、135°、150°、165°、180°、195°、210°、225°、240°、255°、270°

Example for 90°



Next, turn the fine-adjust screw attached to the stoppers for reference point and for angle setting for fine-adjustment, and set it to the precise angle. After completion of this setting, do not forget to tighten the lock nut.

Angle Fine-Adjustment Width

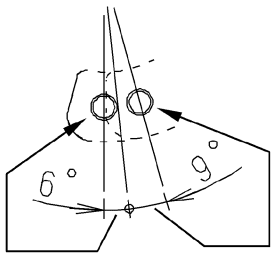
Fine-adjustment width of stopper for reference point	±3° (See NOTE 1 below)
Fine-adjustment width of stopper for angle setting	-9° to +6°
Fine-adjustment width of stopper for angle setting at the maximum set angle	-9° to +3° (See NOTE 2 below)

NOTE 1: -1 to +3° C for RV3DA3

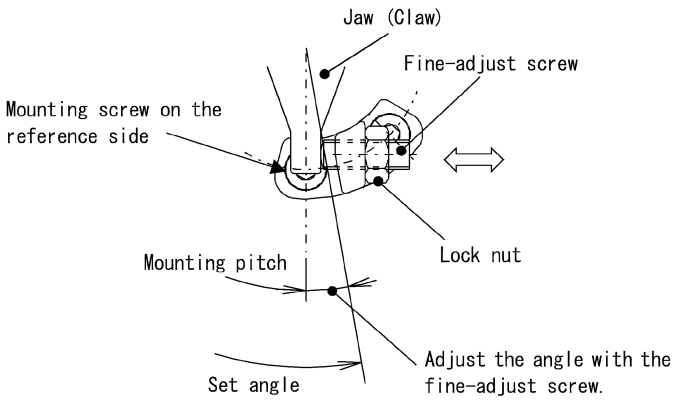
NOTE 2: -9 to +1° C for RV3DA3

2) When the set angle is intermediate in integral multiple the stopper mounting pitch (15°), attach the stopper to the tap hole indicated by the arrow in the figure below and fix it.

In the range of 6°in front between the stopper mounting pitches (15°), attach the stopper to the forward mounting screw and attach it to the aft mounting screw in the range of 9°in rear so that the stopper reference side is located.



Next, turn the fine-adjust screw attached to the stopper for fine-adjustment, and set it to the precise angle. After completion of this setting, do not fail to tighten the lock nut.



1. 5 Shock Killer Mounting

⚠ CAUTION :

a) Avoid loosening or disassembling other sections than the needle for adjustment; otherwise oil leakage may result.

b) Since the hexagon bolt in the adjusting needle base part is not a lock nut, avoid turning it; otherwise oil leakage may result.

c) Avoid using this unit where it is exposed to dust or coarse particulate, chips or cutting dust and liquid, such as water and oil; otherwise lower durability and failure may result.

1. 5. 1 Shock Killer Attaching Method

1) For shock killer mounting, use the mounting hole of main body, and attach it to the angular axis of SELEX rotary shaft.

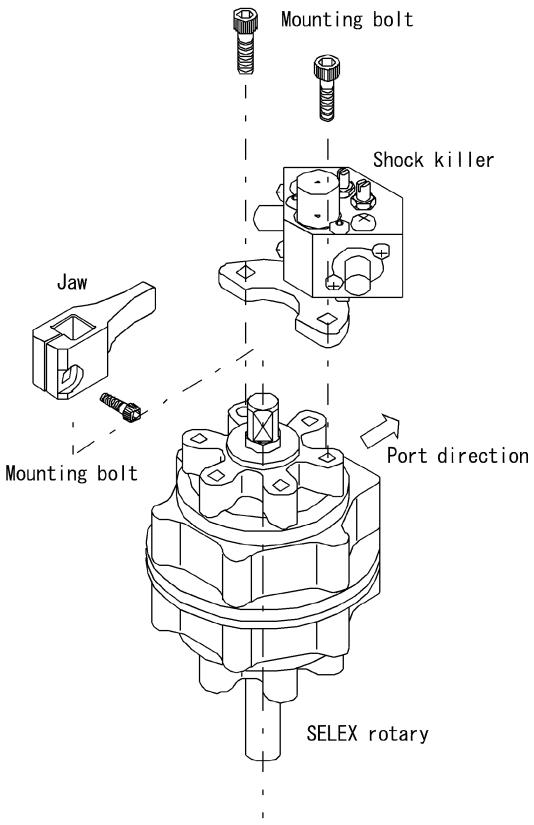
2) Attach the shock killer where it is located on the port of SELEX rotary shaft.

3) Mount a jaw for shock killer: in this case, however, check to see if the SELEX rotary shaft is in the oscillation starting point position. (Refer to the oscillation starting point position.)

4) Since the jaw for shock killer does not enter due to contact with the shock killer piston in the oscillation starting point position, turn the shaft angle axis counterclockwise up to the position in which the jaw enters to attach it.

5) The shock killer cannot be used as a stopper.

6) The shock killer is a consumable part.
When there are signs of lower shock absorbing function, replace the shock killer.



1. 6 Switch Installation

1. 6. 1 SR Switch

(1) Switch Installation

Since this SR switch is of a fixed type, no positional adjustment is possible.

① Arrange the rotor so that the magnet insertion hole is located on the outside.

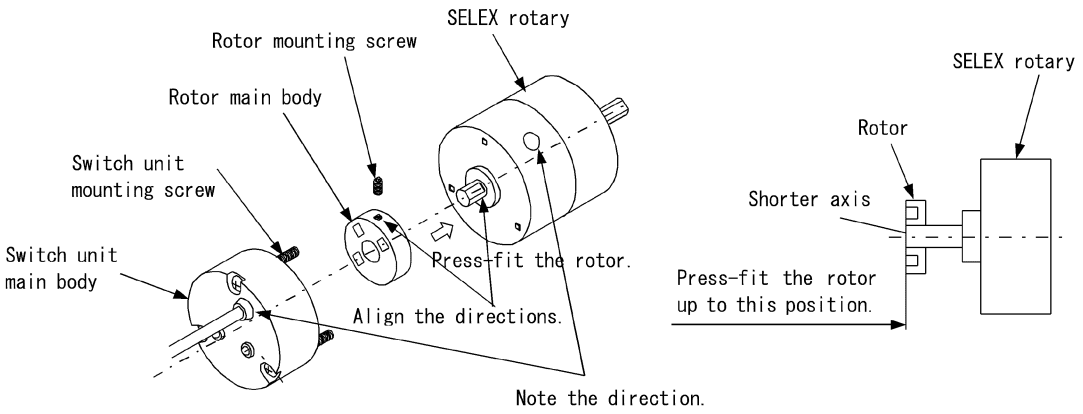
② Align the "D" cut part of SELEX rotary shaft with the rotor mounting screw hole direction.

③ Press-fit the rotor into the short axis side of SELEX rotary shaft.

④ Ensure that the rotor and SELEX rotary shaft short axis side are flush with each other.

⑤ Tighten the hexagon socket set screw (rotor mounting screw) supplied with the rotor to fix the rotor.

⑥ Align the switch unit lead wire outlet direction and SELEX rotary shaft port direction with each other, and fix it with the supplied cross-recessed screw (switch mounting screw).



The rotor mounting screw tightening torque should be 0.3 N-m.

The switch unit mounting screw should be tightened to the torque of 0.4N-m.

(2) Operating range and response differentiation (hysteresis)

The range from piston motion, switch-ON, then piston motion in the same direction to switch-OFF is the operating range. The response differentiation refers to the distance between piston motion, then motion in the opposite direction from switch-ON position and switch-OFF.

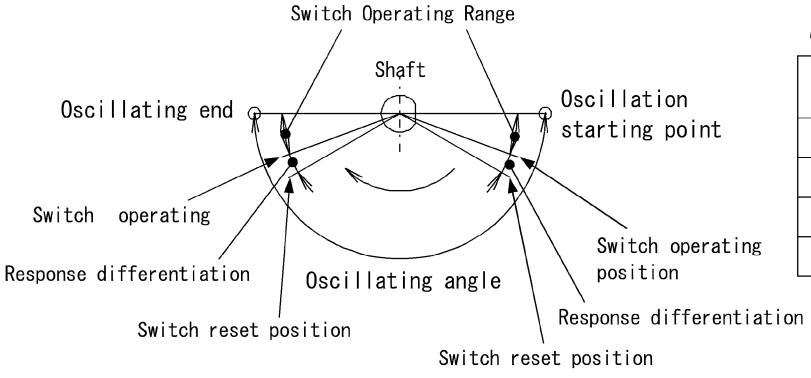


Table 1

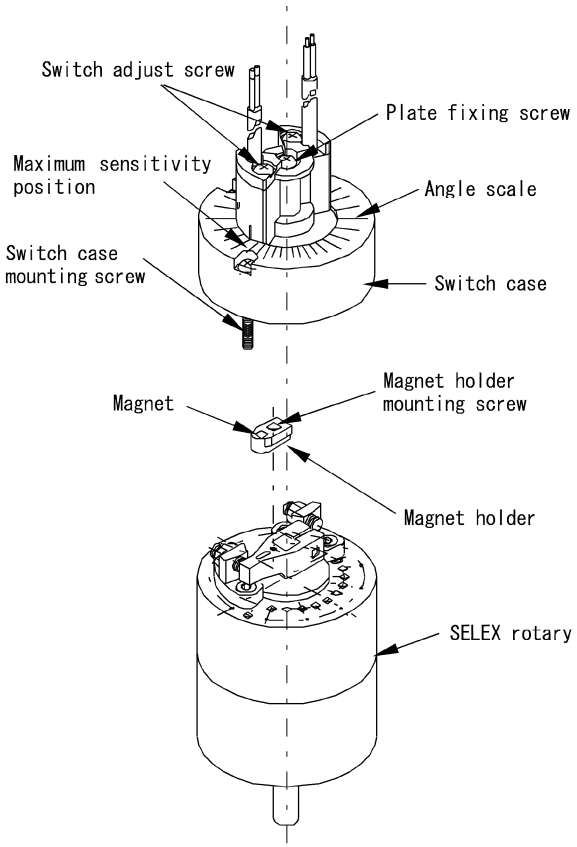
SELEX Rotary Main Body	Operating Range	Response differentiation
RV3S3・RV3D3	15° ±7°	3°max.
RV3S10・RV3D10		
RV3S20・RV3D20		
RV3S30・RV3D30		

1. 6. 2 FR Switch

(1) Switch unit main body mounting

Using the switch case mounting screw, attach this switch to Hi-Rotor. For the tightening torque, refer to the table below.

Model and Model No.	Tightening Torque (N·m)
RV3SA3·RV3DA3	0.06 to 0.2
RV3SA10·RV3DA10	0.1 to 0.2
RV3SA20·RV3DA20	0.2 to 0.3
RV3SA30·RV3DA30	



- Switch position adjustment

  Loosen the switch adjust screw to adjust the maximum sensitivity position of the switch to the angle scale corresponding to the SELEX rotary shaft set angle, and fix the switch. The tightening torque should be 0.4 to 0.5N·m. Since the angle scale is just standard, ensure that the LED lights up, and carry out the final adjustment.

- Switch replacement

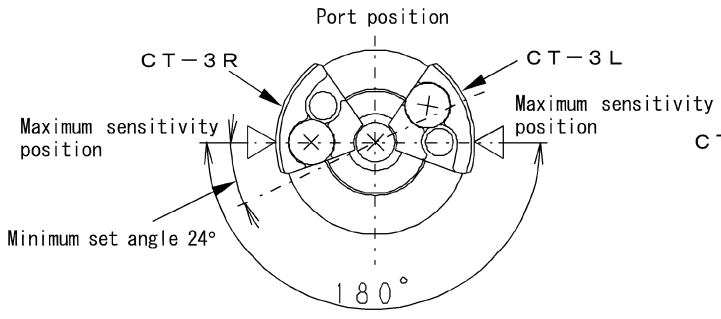
  Remove the switch adjust screw and plate fixing screw to replace the switch.

  For re-installation, reverse the removal procedure described above, and be sure to adjust the switch position.

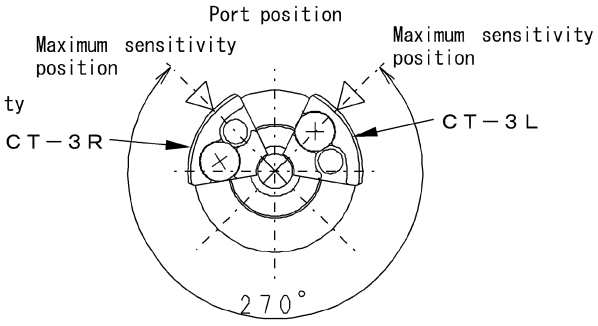
(2) When Variable Oscillating Angle type RV3※A series is ordered with a switch, the switch unit is supplied with the main unit. Attach the stopper for angle setting at the set angle, and after adjustment, mount the switch according to the combinations shown in the table below.

Oscillating Angle	Switch Combinations
30° to 186°	Combination A
187° to 270°	Combination B

Combination A



Combination B

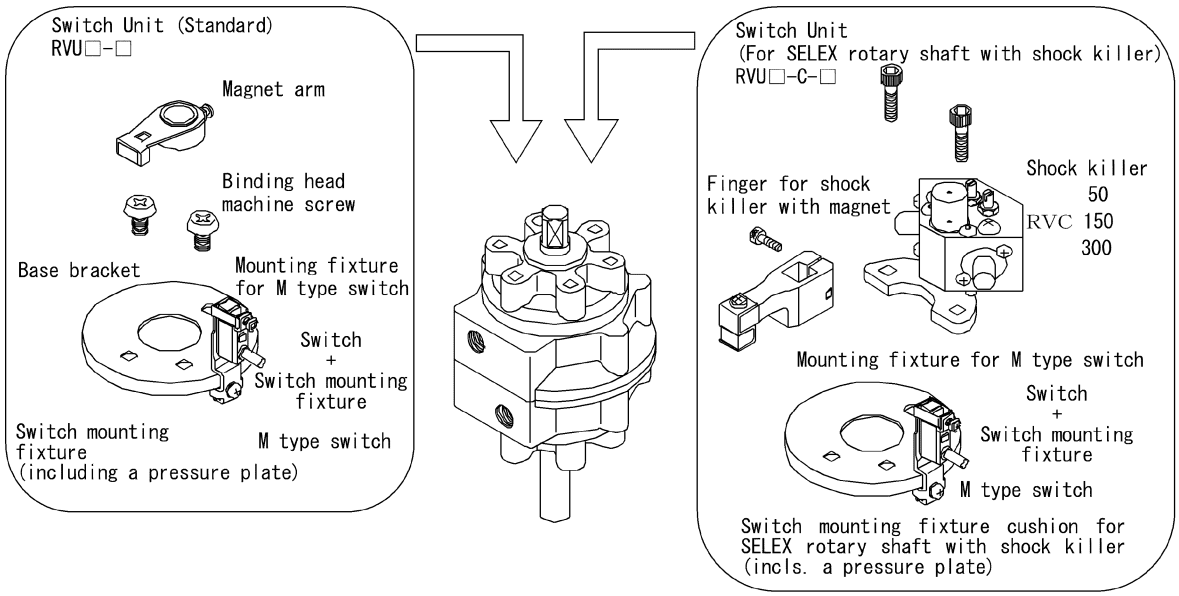


1. 6. 3 M Type Switch

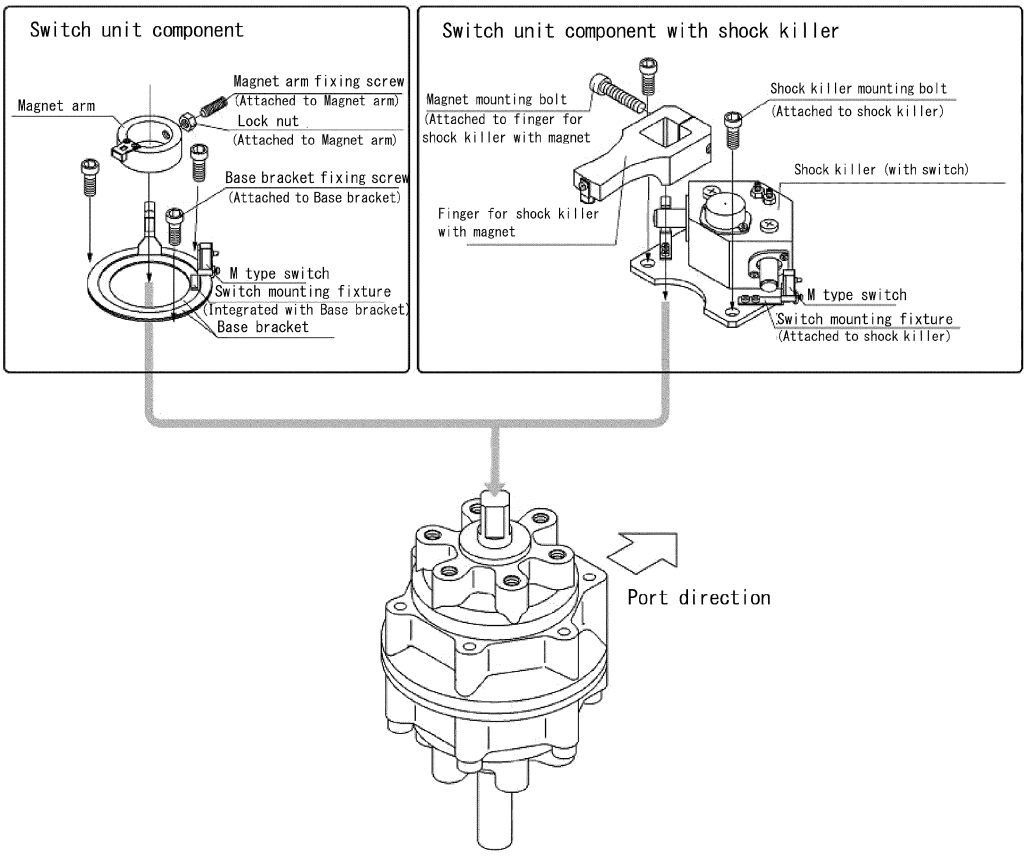
(1) Switch mounting

Attach the switch so that it is actuated in the maximum sensitivity position. In this case, tighten the mounting screw for M type switch to the specified torque: 0.5 to 0.7N-m.

SELEX Rotary Shaft with Switch

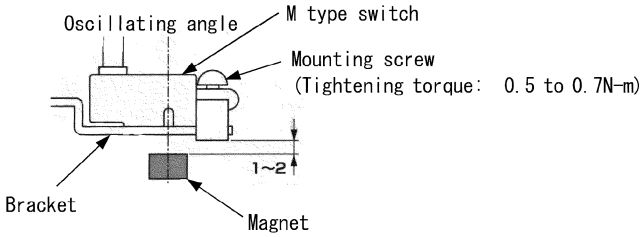


NOTE: The shock killer main body is not included in the switch unit



[Switch Adjustment Method]

When the switch unit is attached later, bend the bracket a little for adjustment if the clearance between the switch and magnet does not fall inside the dimensions shown in the right figure.



(2) Operating Range and Response Differentiation

The range from piston motion, switch-ON, then piston motion in the same direction to switch-OFF is the operating range. The response differentiation refers to the distance between piston motion, then motion in the opposite direction from switch-ON position and switch-OFF.

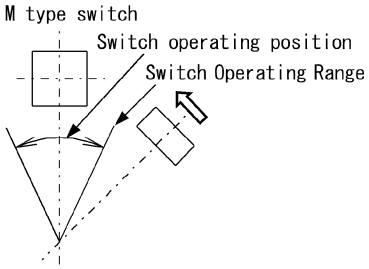


Table 2

Item / Model No.	M2V・M3V		M0V・M5V	
	Operating Range	Response differentiation	Operating Range	Response differentiation
RV3S50・RV3D50	Approx. 40°	Approx. 3°	Approx. 25°	Approx. 2°
RV3S150・RV3D150	Approx. 25°	Approx. 2°	Approx. 15°	Approx. 1°
RV3S300・RV3D300	Approx. 25°	Approx. 2°	Approx. 15°	Approx. 1°
RV3S800・RV3D800	Approx. 25°	Approx. 2°	Approx. 15°	Approx. 1°

2. Operation Method

2. 1 How to use SELEX rotary shaft

2. 1. 1 General Caution

1) The supply pressure for SELEX rotary shaft is as described in the Product Specification column. Always use the unit within this pressure range.
2) When the kinetic energy is larger than in Table 3, for example, the load is heavy and the rotating speed is high, take a shock absorber (cushion damper) into consideration separately.
3) For the rotating speed, attach a speed controller to adjust the speed.

Table 3

Size	Allowable energy absorption (mJ)
RV3S1・RV3D1	0.6
RV3S3・RV3D3	1.5
RV3S10・RV3D10	3
RV3S20・RV3D20	15
RV3S30・RV3D30	25
RV3SA3・RV3DA3	1
RV3SA10・RV3DA10	2
RV3SA20・RV3DA20	3
RV3SA30・RV3DA30	7
RV3S50・RV3D50	49
RV3S150・RV3D150	225
RV3S300・RV3D300	1078
RV3S800・RV3D800	3820

2. 1. 2 Standard

1) Output (Effective Torque)

Use this unit within the range of output given in Table 4 below.

Table 4 Unit: N-m

Supply Pressure (MPa) / Model No.	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
RV3S1	—	0.07	0.10	0.12	0.15	0.18	—	—	—
RV3S3	0.1	0.17	0.24	0.31	0.38	0.45	—	—	—
RV3S10	0.35	0.56	0.75	0.98	1.2	1.39	—	—	—
RV3S20	0.59	0.95	1.33	1.7	2.1	2.48	2.87	3.26	3.68
RV3S50	1.25	2.59	3.69	4.79	5.9	7	8.29	9.5	10.6
RV3S150	5.5	8.5	11.5	15	18	21	24	27.3	30.5
RV3S300	10.5	16.5	22.5	28.5	34.5	40.5	46	51.8	57.5
RV3S800	37.8	59.1	81	102	123	144	166	186	205
RV3D1	—	0.16	0.22	0.27	0.34	0.41	—	—	—
RV3D3	0.25	0.39	0.54	0.71	0.86	1.01	—	—	—
RV3D10	0.76	1.17	1.62	2.11	2.54	3.03	—	—	—
RV3D20	1.4	2.22	3.06	3.88	4.17	5.53	6.38	7.17	8.07
RV3D30	2.7	4.4	6	7.7	9.5	11.2	12.99	14.8	16.6
RV3D50	3.3	5.79	8.29	10.4	12.8	15.1	17.6	20.1	22.5
RV3D150	12.5	19	27	35	41.5	48	55	62	69
RV3D300	25.5	39	54	68	83	97	110	124	137
RV3D800	77.4	120	161	206	247	288	332	371	411

2) Oscillating Time

The oscillating time used should be within the range specified in Table 5 below. If it is used outside this range, stick slip phenomena disable its smooth operation. If the unit is used at a low speed with the range in the table exceeded, use a low oil-pressure (hydraulic) type.

Table 5 Unit: s

Oscillating Angle / Model No.	90°	180°	270°
RV3S1・RV3D1	0.03 to 0.6	0.06 to 1.2	0.09 to 1.8
RV3S3・RV3D3	0.04 to 0.8	0.08 to 1.6	0.12 to 2.4
RV3S10・RV3D10	0.045 to 0.9	0.09 to 1.8	0.15 to 3.0
RV3S20・RV3D20	0.05 to 1.0	0.10 to 2.0	0.15 to 3.0
RV3S30・RV3D30	0.07 to 0.7	0.14 to 1.4	0.21 to 2.1

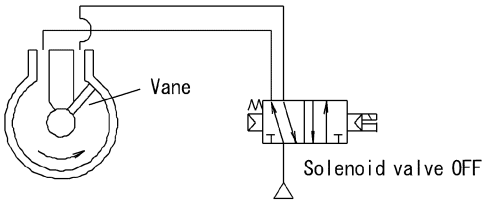
Oscillating Angle / Model No.	90°	100°	180°	270°	280°
RV3S150・RV3D50	0.08 to 0.8	0.09 to 0.9	0.16 to 1.6	0.24 to 2.4	0.25 to 2.5
RV3S150・RV3D150	0.12 to 1.2	0.13 to 1.3	0.24 to 2.4	0.36 to 3.6	0.37 to 3.7
RV3S300・RV3D300	0.16 to 1.6	0.17 to 1.7	0.32 to 3.2	0.48 to 4.8	0.49 to 4.9
RV3S800・RV3D800	0.22 to 2.2	0.24 to 2.4	0.44 to 4.4	0.66 to 6.6	0.68 to 6.8

2. 1. 3 With valve

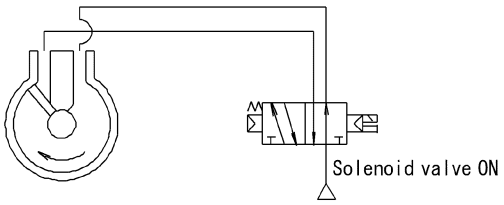
1) Operation

The unit is actuated as illustrated below.

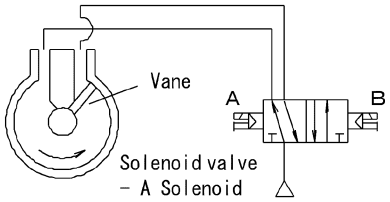
(1) Single solenoid



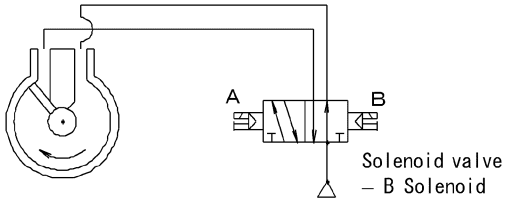
The vane returns to the oscillation starting point position with the solenoid valve "OFF".



(2) Double solenoid



The vane returns to the oscillation starting point position with the solenoid valve A Solenoid "ON".



The vane moves in the oscillating direction with the solenoid valve B Solenoid "ON".

With a double solenoid type solenoid valve, the self-keeping state is maintained when both A and B solenoids are "OFF", but during vane motion, this valve should be used in the energized condition.

2. 1. 4 Low Hydraulic Type

1) Oscillating Time

For the shortest oscillating time, refer to Table 6.

Table 6 Unit: s

Model No. / Item		RV3※H50	RV3※H150	RV3※H300	RV3※H800	Number of Vanes
Oscillating Angle	90°	0.3	0.4	0.4	0.7	Single
	180°	0.5	0.7	0.7	1.3	
	270°	0.7	0.9	1.0	1.8	
	280°	0.7	1.0	1.0	1.8	
	90°	0.6	1.3	1.9	2.4	Double
	100°	0.7	1.4	2.1	2.6	

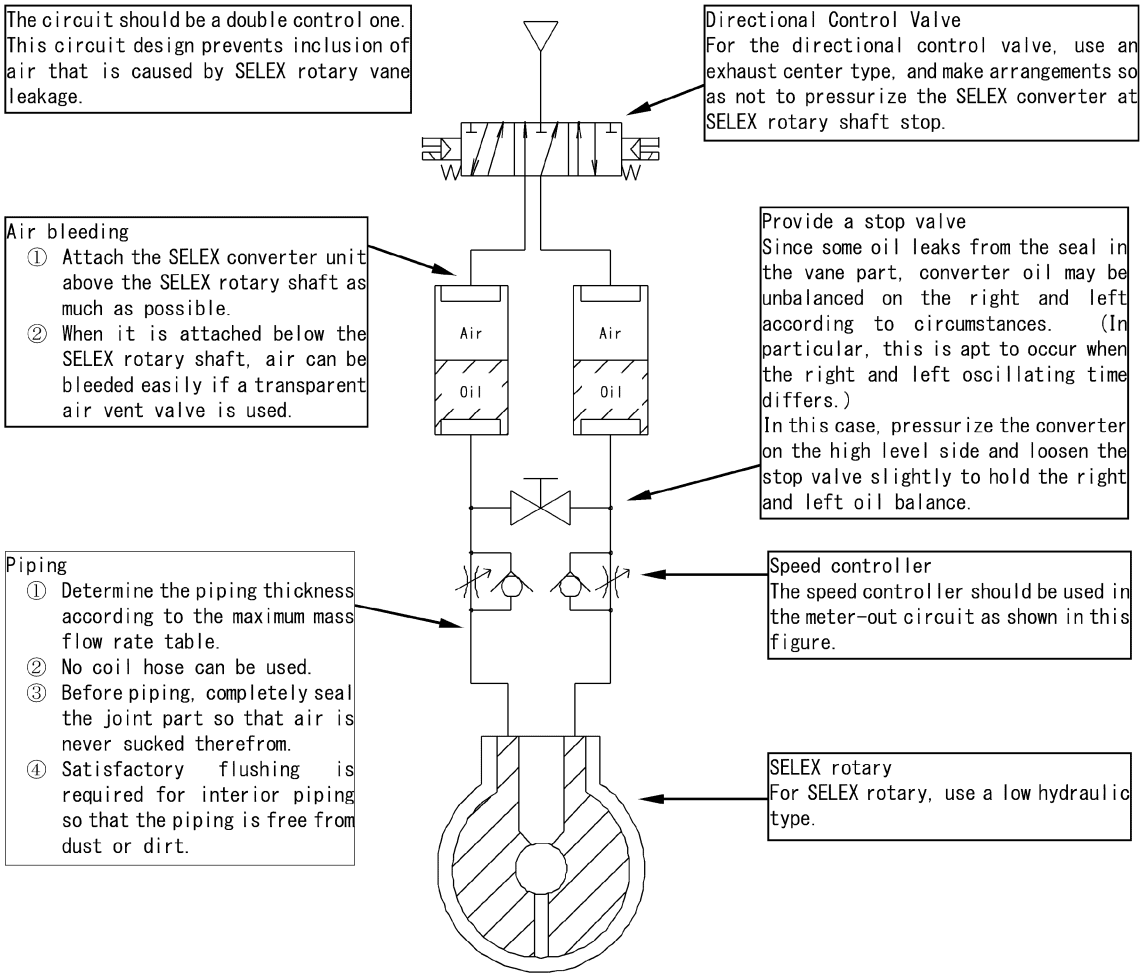
2) Structure

The basic structure is the same as in a pneumatic type.

Table 7

Model No. / Item		RV3※H50	RV3※H150	RV3※H300	RV3※H800
Port size		Rc1/8	Rc1/4	Rc3/8	Rc1/2
Orifice Diameter	Low Hydraulic SPEC	ϕ7	ϕ9.5	ϕ13	ϕ16
	For Pneumatic Type	ϕ2.8	ϕ4	ϕ4.5	ϕ6

4) Precautions



Hydraulic Oil Used

(1) For this purpose, use petroleum hydraulic operating oil whose viscosity is 20 to 100 mm2/s (20 to 10cSt) in the range of oil temperature 5 to 50 ℃. It is impossible to use fire-resistant hydraulic fluid, machine oil and spindle oil.

(2) Recommendable oil

It is recommended that the hydraulic oil whose viscosity is 40 mm2/s (40cSt) max. at the oil temperature during operation should be used.

FUJI KOHSAN	:	FUKKORU HYDROLL X22
NISSEKI (ENEOS Shin Nihon Sekiyu)	:	HIGHLAND WIDE 22
MITSUBISHI (ENEOS)	:	DIAMOND POWER FLUID 18
SHELL	:	SHELL TELLUS OIL 22
ESSO	:	CONVIS J26
MOBIL	:	MOBIL DTE 22
MARUZEN	:	SWIRL FLUID 22

2. 2 Switch Operation Method

2. 2. 1 Common Items

1) Magnetic environment

Avoid using this switch in a place where a strong magnetic field and large current (large magnet and spot welding machine, etc.) are present therearound. When the cylinders with switch are adjacently attached in parallel and the magnetic substance moves extremely near the cylinder, there arises mutual interference, which may have an influence upon detecting accuracy.

2) Protection of lead wire

Pay special attention to wiring so that repeated bending (flex) stress and tensile force are not applied to the lead wire. Connect an electric wire for robot or the like, which is excellent in elasticity, to the movable part in order to use this switch.

3) Ambient temperature

This switch cannot be used at a high temperature. (Refer to each switch specification.)
Avoid using this switch in a high-temperature environment due to temperature characteristics of magnetic parts and electronic parts.

4) Detection in the intermediate position

It should be noted that when the switch is set to the intermediate position of oscillating angle and the load is driven during magnet passage, the operating time is short, and the load may be unable to be operated completely even when the switch is turned "ON" if the oscillating speed is too high.
The oscillating speed in that case is

$V = \{\text{Switch operating range (deg.)}/\text{load operating time (ms)}\} \times 1{,}000$ (deg./s)

5) Shock

When the SELEX rotary shaft is transported, and the switch is attached and adjusted, no large vibration and shock should be applied thereto.

2. 2. 2 Matters to be attended to non-contact switches (SR, FR, M2 and M3)

1) Lead Wire Connection

According to lead wire color coding, connect all lead wires correctly. At this time, be sure to turn the equipment in the electric circuit on the connecting side "OFF" before connection.
Wrong wiring and shorted load lead to damage on the load side electric circuit as well as the switch. Also, the operations work in the energized state may lead to switch and load side electric circuit damage, depending on the working procedure, even in the absence of improper wire connection.

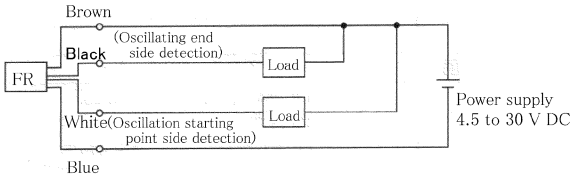


Fig.1 SR Basic Circuit Example (1)
(When the switch power supply and power supply for load are the same)
NOTE: For switch and load power supplies, use the same power supply.

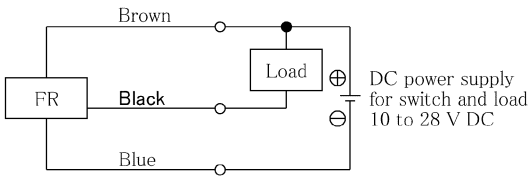


Fig.2 Basic Circuit Example (2)
(When the switch power supply and power supply for load are the same)

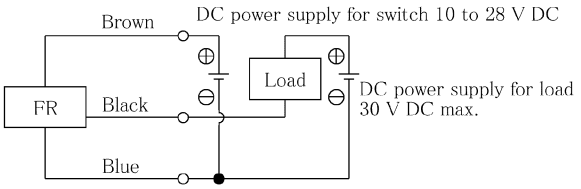


Fig.3 FR Basic Circuit Example (3)
(When the switch power supply differs from power supply for load)

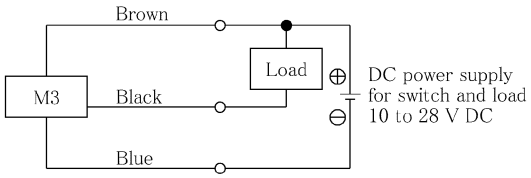


Fig.4 Basic Circuit Example (4)
(When the switch power supply and power supply for load are the same)

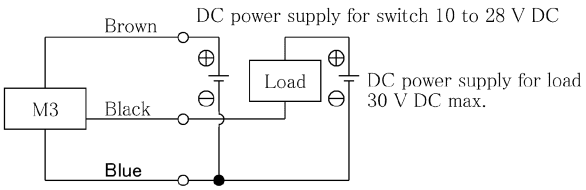


Fig.5 FR Basic Circuit Example (5)
(When the switch power supply differs from power supply for load)

2) Output Circuit Protection

When an induction type load, such as a relay and solenoid valve, is connected and used, surge voltage is generated with the switch "OFF"; it is, therefore, necessary to always provide a protective circuit shown in Fig. 6.

When a capacitive load, such as a capacitor, is connected and used, rush current is generated with the switch "ON"; it is, therefore, necessary to always provide a protective circuit shown in Fig. 7.

When the lead wire length exceeds 10 m, be sure to provide a protective circuit shown in Figs. 8 and 9 (for M2) and Fig. 10 (for M3).

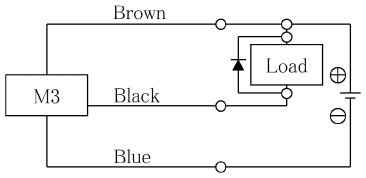


Fig.6 Sample Use of Surge Absorbing Element (Diode) for Inductive Load –
For a diode, use HITACHI V06C or its equivalent.

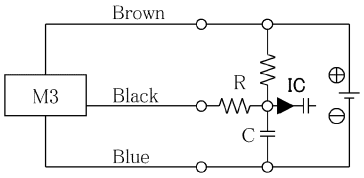


Fig.7 Sample Circuit of Current Limiting Resistor R in Capacitive Load –
At this time, resistor R (Ω) used should exceed the value given in the equation below.

$$\frac{V}{0.05} = R(\Omega)$$

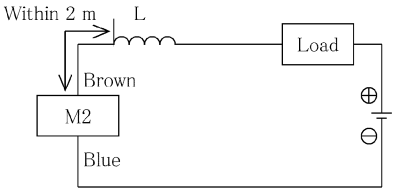


Fig.8 • Choke Coil
L = A few hundred μH to a few mH
The choke coil should be excellent in high-frequency characteristics.
• Wiring near the switch is required. (Within 2 m)

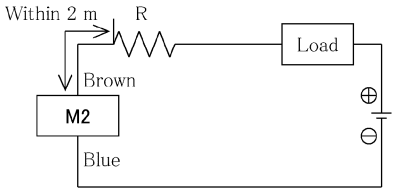


Fig.9 • Rush Current Limiting Resistance
R = Resistance that is large enough for the load side circuit to permit
• Wiring near the switch is required. (Within 2 m)

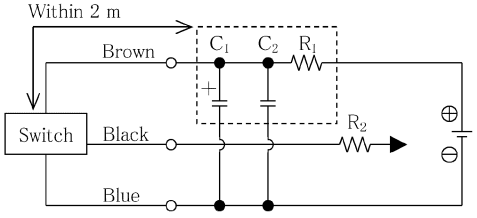


Fig.10 • Source noise absorption circuit
C_1=20 to 50 μF electrolytic capacitor (Withstand voltage 50 V or more)
C_2=0.01 to 0.1 μF ceramic capacitor
R_1=20 to 30 Ω

• Rush current limiting resistor
R_2=A resistor large enough for the load side circuit to permit is used.

• Wiring near the switch is required. (2 m or within)

3) Connection to Programmable Controller (Sequencer)

The connection method differs, depending on the type of programmable controller.
The connection given in Figs. 11 to 15 below is required.

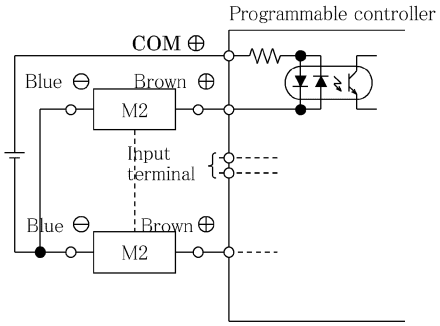


Fig.11 Sample Connection of M2 to Source Input (Power supply externally mounted) type

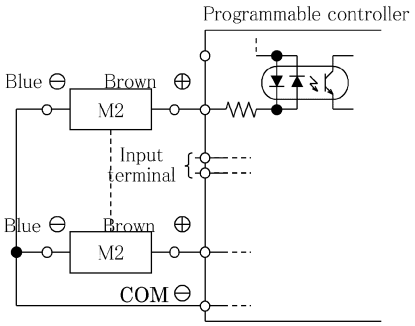


Fig.12 Sample connection of M2 to source input (Power supply built-in) type

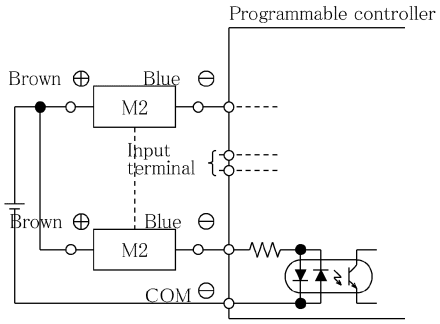


Fig.13 Sample connection of M2 to Sink Input (Power supply externally mounted) type

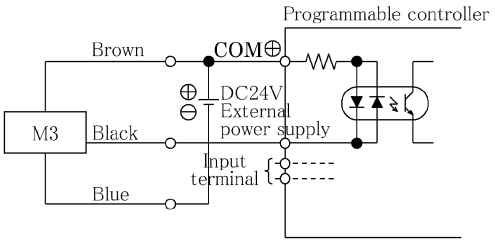


Fig.14 Sample connection of M3 to source input (Power supply externally mounted) type

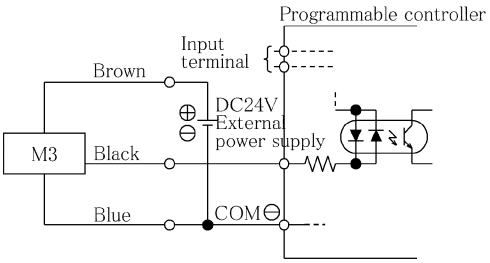


Fig.15 Sample connection of M3 to source input (Power supply built-in) type

4) Parallel Connection

Since leakage current increases by the number of M2 switches connected, determine the number of M2 switches connected after checking the input specifications of programmable controller that is a connecting load. However, the indicator light may become dark and may not light up.
With M3 switch, leakage current increases by the number of M3 switches connected, but since the leakage current value is extremely small (10 μA max.), no problem arises in normal use. Also, no indicator light dims or ceases to light up.

2. 2. 3 Precautions for Contact Point Switches (M0 and M5)

1) Lead wire connection

Without connecting the switch lead wire directly to the power supply, be sure to connect the loads in series. Also, with M0 switch, note the following (1) and (2).

(1) When this switch is used for DC, connect the brown wire to "+" side and the blue wire to "-" side. If this wire is connected reversely, the switch is actuated, but the indicator light does not light up.

(2) When this switch is connected to AC relay and programmable controller input, the switch indicator light may not light up if half-wave rectification is carried out in those circuits. In that case, the indicator light will light up if the polarity for switch lead wire connection is inversed.

2) Countermeasures for contact point protection

When this switch is used in an inductive load, such as a relay, and the wiring path (passage) length exceeds the length given in Table 1, be sure to provide a contact protection circuit.

Table 1

Power Supply	Wire Length
DC	100m
AC	10m

(1) Protection of contact point in connecting an inductive load

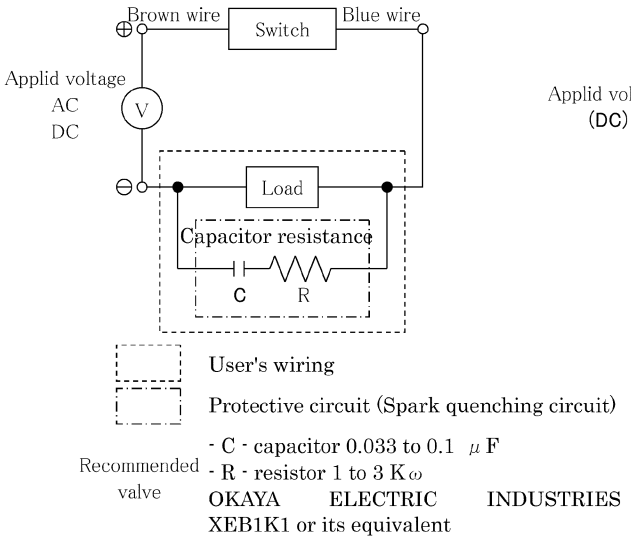


Fig.1 When a capacitor and resistor are used

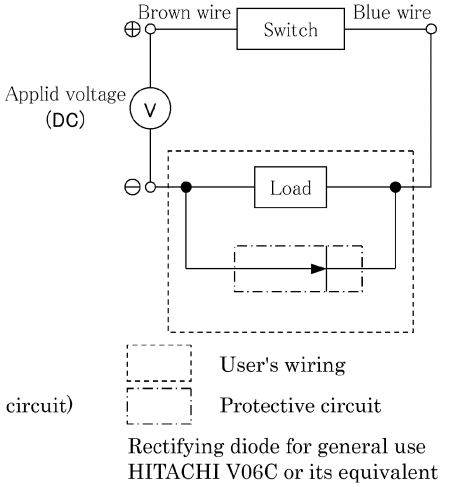
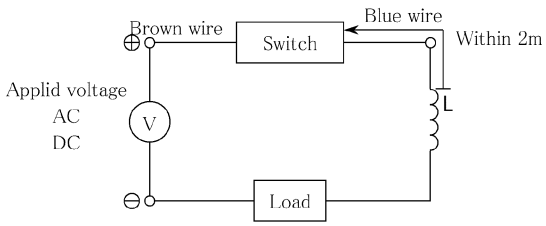


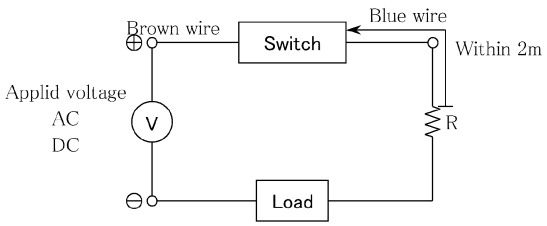
Fig.2 When a diode is used

(2) Protection given when the wiring path length exceeds the specifications in Table 1 above



・ Choke coil
L = A few hundred μH to a few mH
Surpassing high-frequency characteristics are required.

・ Wiring connections should be made near the switch. (Within 2 m)



・ Rush current limiting resistance
R = Larger resistance required as far as the load circuit side permits

・ Wiring connections should be made near the switch. (Within 2 m)

Fig. 4

3) Contact Capacity

Avoid using a load exceeding the maximum contact capacity of the switch. Also, when the rated current value is not exceeded, the indicator light may not light up.

4) Relay

Always use the following or its equivalent.

OMRON ····· MY type
FUJI ELECTRIC ····· HH5 type
Panasonic, Ltd. ····· HC type

5) Series Connection

When several M0 switches are connected in series for use, the voltage drop at the switch corresponds to the total voltage drop of all switches thus connected.
If one M0 switch is used for operation check and T5 is also used for this purpose, this voltage drop will correspond to that for a single M0 switch (approx. 2.4 V).
The indicator light lights up only when all switches were turned "ON".

6) Parallel Connection

When several switches are parallel connected for use, there is no limit to the number of switches connected. In the case of M0 switch, however, the switch indicator light may dim or it may cease to light up.

3. Maintenance

3. 1 Periodic Inspection

1) To use "SELEX Rotary" in the optimum condition over a long period of time, carry out periodic inspection once to twice per year.

2) Checking Item

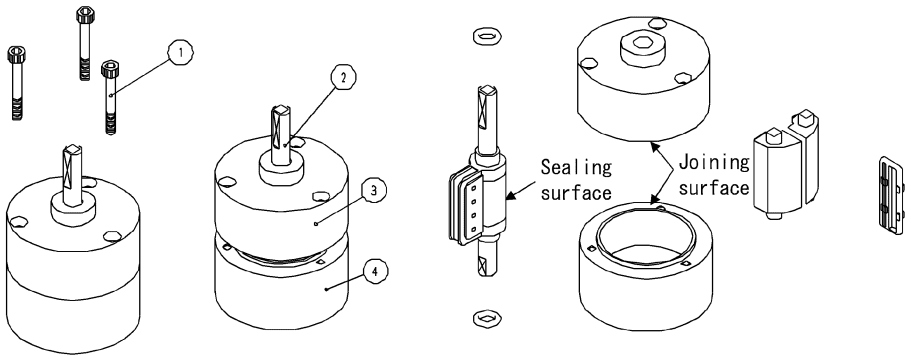
(1) Loose metal bracket at vane shaft tip, bolts and nuts for mounting bracket installation
(2) Check to see if the operating condition is smooth.
(3) Changes in cycle time
(4) External and internal leakage
(5) Vane shaft damage or flaw and deformation
(6) Check to see if no abnormality is present in the stroke.

Check the points described above, if an abnormal condition is identified, refer to "4. Troubleshooting". Also, retighten all bolts and nuts, etc. if loose.

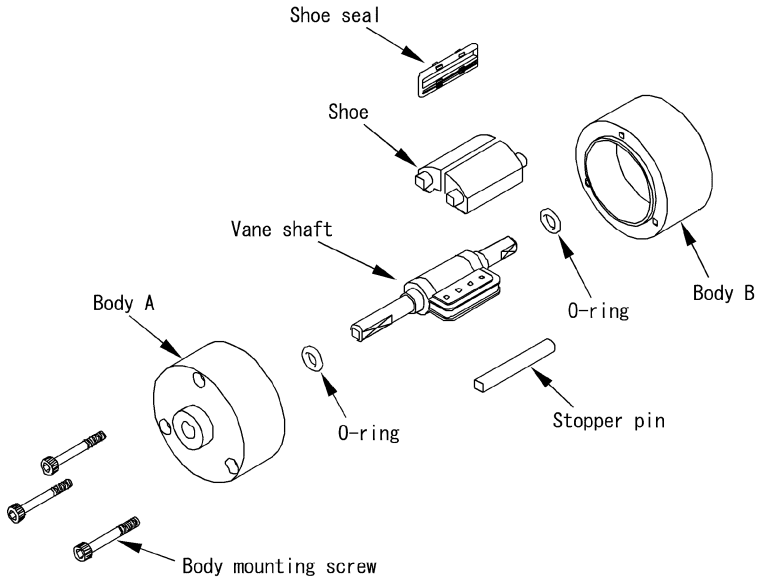
3. 2 Disassembly Procedure

"SELEX Rotary" can be disassembled.

1) When a deficiency or nonconformity, such as air leakage, occurred, disassemble "SELEX Rotary" while referring to the internal structural drawing, and replace the parts given in the consumable parts list.
   (1) Stop the fluid (media) to relieve the residual pressure.
   (2) Remove the piping and load, etc. so that "SELEX Rotary" can be handled as a unit.
   (3) Remove mounting bolt ①.
   (4) After striking vane shaft ② with a plastic hammer or the like, disassemble body A ③ and body B ④. At this time, take care not to damage the joining surface of bodies A and B.



Disassembly Drawing



3. 3 Re-assembly Procedure

1) Clean the respective parts.
2) After cleaning, for assembly, reverse the disassembly procedure, careful reassembly is required.
3) Apply superior grease (lithium base grease) to the body internal surface, vane shaft and packing, etc.
4) The recommendable tightening torque for "SELEX Rotary" is as shown in Table 10.

Table 10 Tightening Torque (N・m)

(1) Body A and Body B

RV3※1	0.83
RV3※3	1.08
RV3※10	1.27
RV3※20	3.33
RV3※50	6.86
RV3※150	11.76
RV3※300	28.42
RV3※800	96.04

(2) Mounting Fixture (FA/LS)

RV※1	1.47
RV※3	
RV※10	
RV※20	
RV※50	12.05
RV※150	29.4
RV※300	57.8
RV※800	100.9

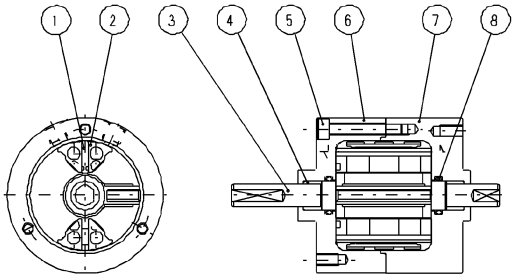
(3) Valve Related Parts

	Valve Mounting Screw	Sub-base Mounting Screw
RV※10	0.3 to 0.4	0.6 to 0.7
RV※20		
RV※50		1.4 to 1.6
RV※150	0.6 to 0.7	2.5 to 3.0
RV※300		

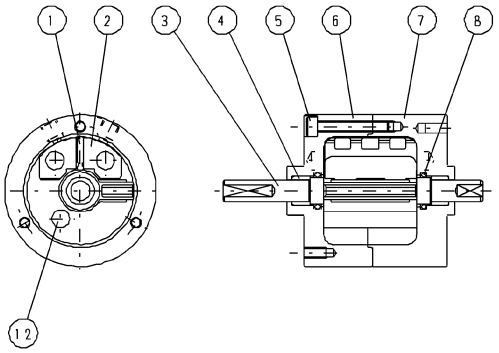
3. 4 Internal Structure, Consumable Parts Kit and Spare Parts List

3. 4. 1 Internal Structure

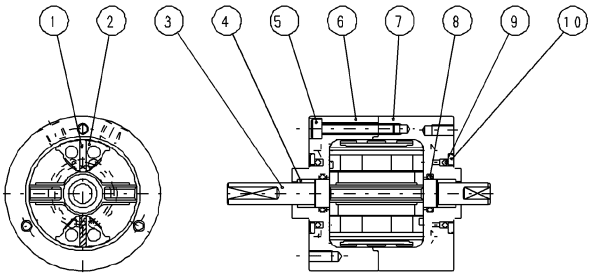
・ RV3S1 to 30
Oscillation starting (original) point 45°



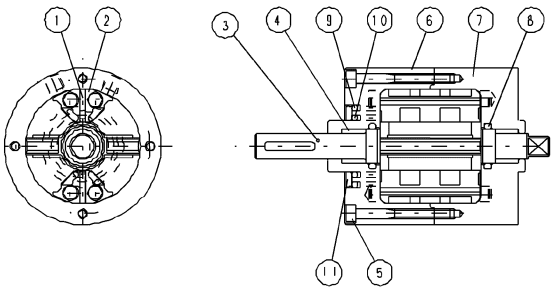
・ RV3S1 to 20
Oscillation starting (original) point 90°



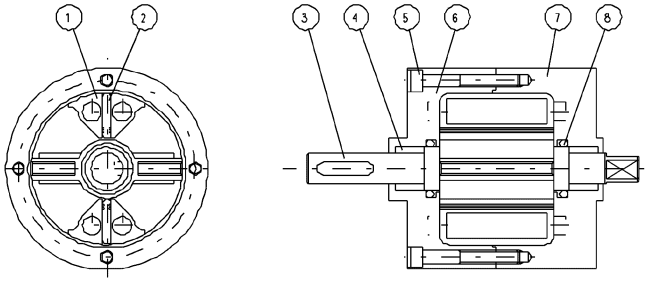
・ RV3D1 to 10



・ RV3D20



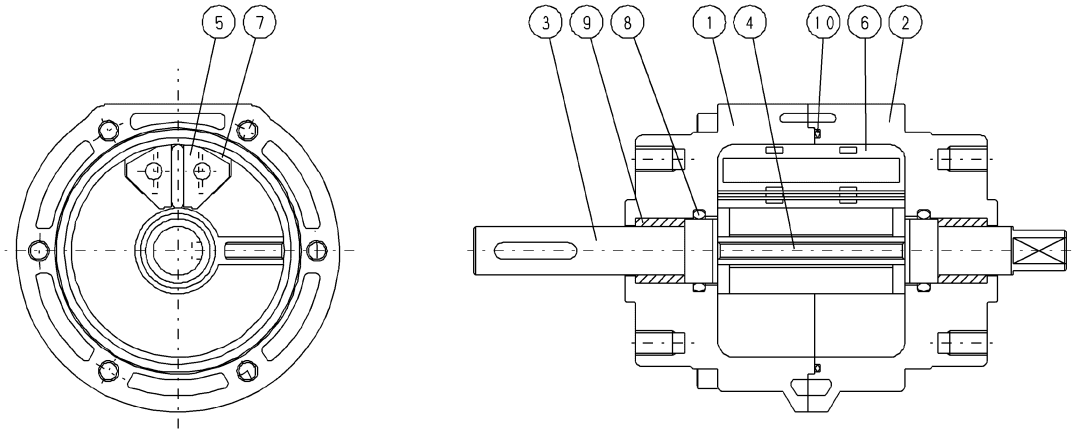
・ RV3D30



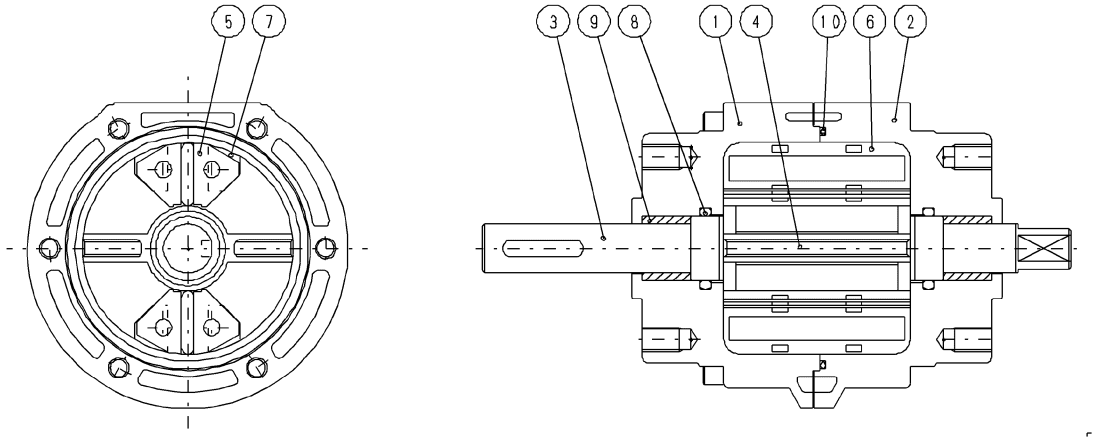
Parts No.	Parts Name	Material
1	Shoe seal	Nitrile rubber
2	Shoe	Resin
3	Vane shaft	Steel + resin + nitrile rubber
4	Bearing	Oil impregnated sintered material
5	Mounting bolt	Steel
6	Body A	Aluminum alloy

Parts No.	Parts Name	Material
7	Body B	Aluminum alloy
8	O-ring	Nitrile rubber
9	O-ring	Nitrile rubber
10	O-ring	Nitrile rubber
11	Plate	Steel
12	Stopper pin	Steel

- RV3S50・150・300



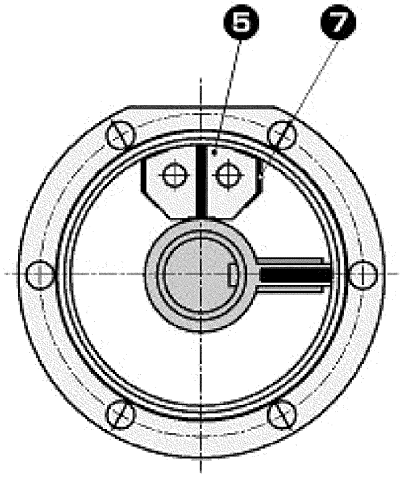
- RV3D50・150・300

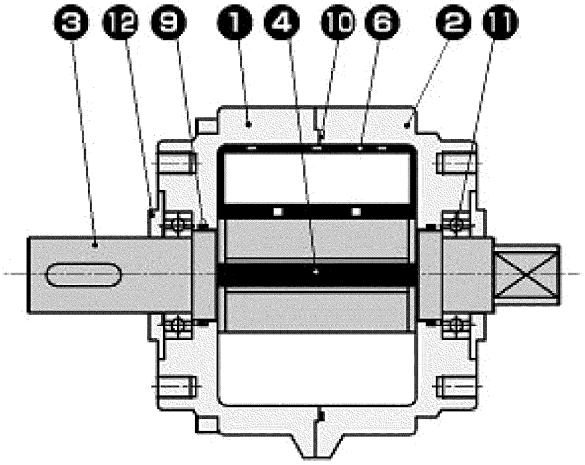


Parts No.	Parts Name	Material
1	Body A	Aluminum die-casting
2	Body B	Aluminum die-casting
3	Vane shaft	Steel
4	Vane seal (Vane shaft)	Nitrile rubber
5	Shoe	Zinc alloy diecasting

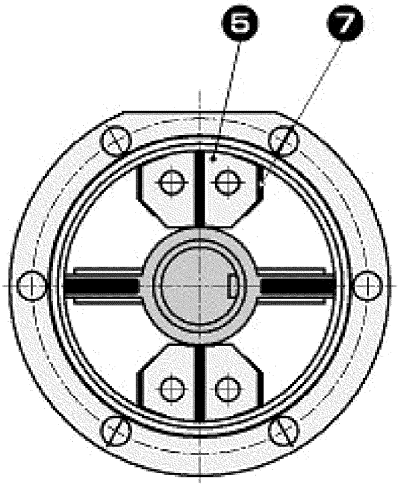
Parts No.	Parts Name	Material
6	Shoe seal	Nitrile rubber
7	Damper	Elastollan
8	O-ring	Nitrile rubber
9	Bearing	Oil impregnated sintered material
10	O-ring	Nitrile rubber

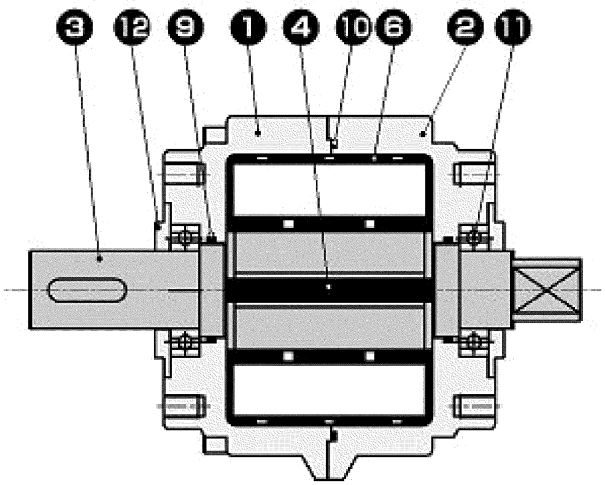
- RV3S800





- RV3D800



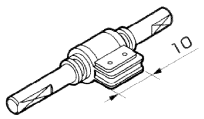
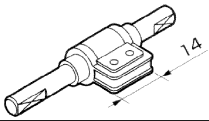
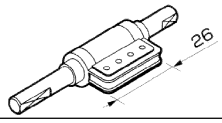
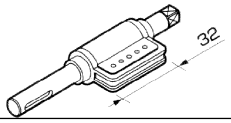
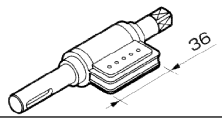
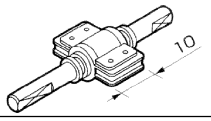
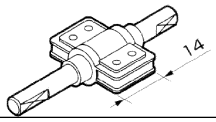
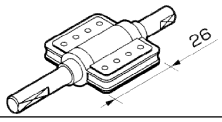
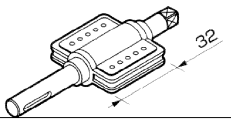
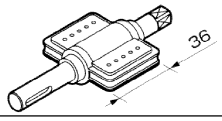


Parts No.	Parts Name	Material
1	Body A	Aluminum die-casting
2	Body B	Aluminum die-casting
3	Vane shaft	Steel
4	Vane seal (Vane shaft)	Nitrile rubber
5	Shoe	Zinc alloy diecasting
6	Shoe seal	Nitrile rubber

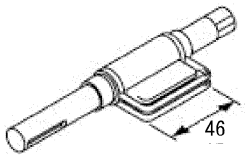
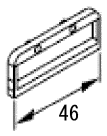
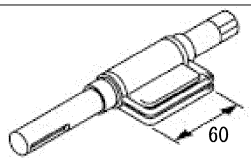
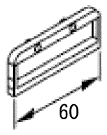
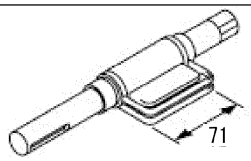
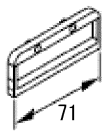
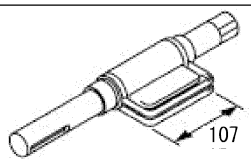
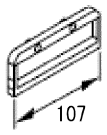
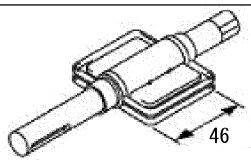
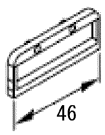
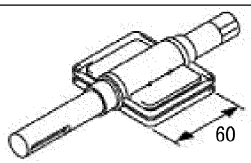
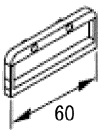
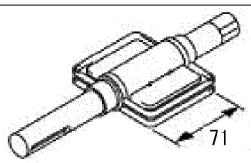
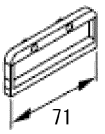
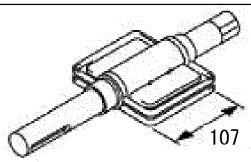
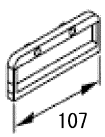
Parts No.	Parts Name	Material
7	Damper	Elastollan
8	O-ring	Nitrile rubber
9	Bearing	Oil impregnated sintered material
10	O-ring	Nitrile rubber
11	Bearing	Steel
12	Cover plate	Steel

3. 4. 2 Consumable Parts Kit

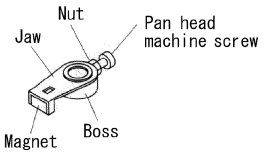
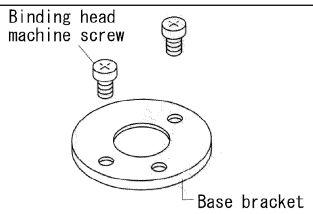
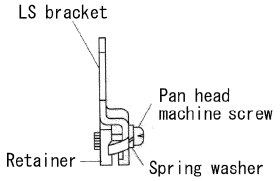
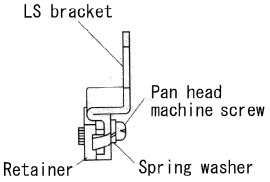
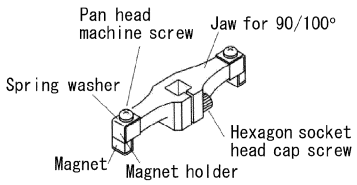
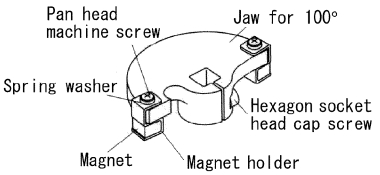
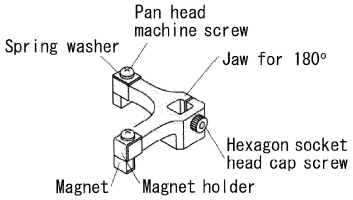
Compact SELEX Rotary Shaft

Parts No. / Parts Name Model	Parts No. Kit No. / Parts Name	3 Vane Shaft	1 Shoe Seal	8 O-ring (2 ea.)
RV3S1	RV3S1-K			φ1× φ3.8
RV3S3	RV3S3-K			φ1.42× φ6.8
RV3S10	RV3S10-K			φ1.5× φ8
RV3S20	RV3S20-K			φ2× φ10.5
RV3S30	RV3S30-K			P-14
RV3D1	RV3D1-K			φ1× φ3.8
RV3D3	RV3D3-K			φ1.42× φ6.8
RV3D10	RV3D10-K			φ1.5× φ8
RV3D20	RV3D20-K			φ2× φ10.5
RV3D30	RV3D30-K			P-14

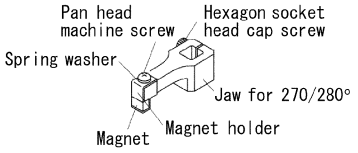
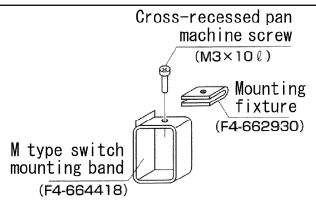
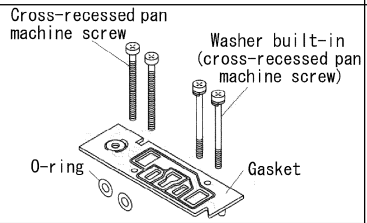
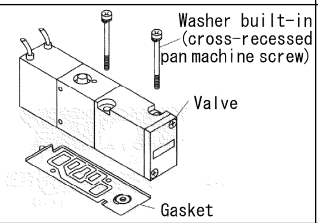
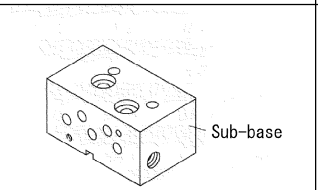
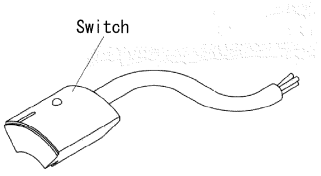
Large SELEX Rotary

Parts No./Parts Name / Model	Parts No. / Kit No. / Parts Name	4	6	8	10
		Vane Shaft	Shoe Seal	O-ring (2 ea,)	O-ring
RV3S50	RVS50-K			P-16	φ1.8× φ56.2
RV3S150	RVS150-K			P-22	φ1.9× φ82
RV3S300	RVS300-K			P-31	φ3× φ105
RV3S800	RVS800-K			P-48	φ3.1× φ150
RV3D50	RVD50-K			P-16	φ1.8× φ56.2
RV3D150	RVD150-K			P-22	φ1.9× φ82
RV3D300	RVD300-K			P-31	φ3× φ105
RV3D800	RVS800-K			P-48	φ3.1× φ150

Spare Parts Kit

Description	Kit No.	Appearance	Parts Name	Q'ty
Jaw with magnet	● RVU50-A1 RVU150-A1 RVU300-A1 RVU800-A1		Jaw Boss Magnet Pan head machine screw Nut	1 1 1 1 1
Base bracket	● RVU50-A2 RVU150-A2 RVU300-A2 RVU800-A2		Base bracket Binding head machine screw	1 2
Switch mounting fixture	● RVU50-A3 RVU150-A3 RVU300-A3		LS bracket Retainer Pan head machine screw Hexagon socket head cap screw	1 1 1 1
Switch mounting fixture for shaft with shock killer	● RVU50-A3-C RVU150-A3-C RVU300-A3-C		LS bracket Retainer Pan head machine screw Spring washer	1 1 1 1
Jaw for shock killer with magnet	● RVU50-90-A1-C RVU150-90-A1-C RVU300-90-A1-C RVU800-90-A1-C		Jaw Magnet Magnet holder Hexagon socket head cap screw Pan head machine screw Spring washer	1 2 2 1 2 2
	● RVU50-100-A1-C RVU150-100-A1-C RVU300-100-A1-C RVU800-100-A1-C			
	● RVU50-180-A1-C RVU150-180-A1-C RVU300-180-A1-C RVU800-180-A1-C			

Spare Parts Kit

Description	Kit No.	Appearance	Parts Name	Q'ty
Jaw for shock killer with magnet and jaw for shock killer with magnet for 280°not manufacturable	● RVU50-270-A1-C RVU150-270-A1-C RVU300-270-A1-C RVU800-270-A1-C		Jaw Magnet Magnet holder Hexagon socket head cap screw Pan head machine screw Spring washer	1 1 1 1 1 1
Mounting fixture for M type SW	● RVU-00-A1		M type switch mounting band Mounting fixture Cross-recessed pan machine screw	1 1 1
Packing screw kit	● RVU10-B1 RVU20-B1 RVU30-B1 RVU50-B1 RVU150-B1 RVU300-B1		O-ring Gaske Cross-recessed pan machine screw Washer built-in cross-recessed pan machine screw	2 1 2 2
Valve kit	● RVU□□-□-B2 10 20 30 50 1 : AC100V 150 2 : AC200V 300 3 : DC24V V : Single solenoid W : Double solenoid		Valve Washer built-in cross-recessed pan machine screw Gaske	1 2 1
Sub-base	● RV3U10-B3 RV3U20-B3 RV3U30-B3 RV3U50-B3 RV3U150-B3 RV3U300-B3		Sub-base	1
Variable angle type switch	● RV3U-CT-□ 3R : For right mounting 3L : left mounting 3RU : right mounting at lead wire right angle 3LU : left mounting at lead wire left angle		Switch	1

4. Troubleshooting

1) Cylinder part

Irregular Phenomenon (Trouble)	Probable Cause	Countermeasure
No operation	No pressure is present - lack of pressure.	Secure the pressure source.
	No signal is transmitted to the directional control valve.	Correct the control circuit.
	No centering for mounting.	Correct the installation state and/or change the mounting style.
	The packing is damaged.	Replace the packing.
No smooth operation	The speed falls below the low speed limit.	Relax the load fluctuations.
	No centering for mounting.	Correct the installation state and/or change the mounting style.
	Horizontal load is applied.	Provide a guide. Correct the installation state and/or change the mounting style.
	Load is large.	Increase the pressure. Increase the nominal size.
	The speed control valve is forming the meter-in circuit.	Change the speed control valve mounting direction.
Damage and deformation	Impulsive force caused by high-speed operation	Reduce the speed. Reduce the load. Provide a more reliable cushion mechanism. (External cushion mechanism)
	Horizontal load is applied.	Correct the installation state and/or change the mounting style.

2) Switch part

Irregular Phenomenon (Trouble)	Probable Cause	Countermeasure
No indicator light lights up.	Contact point deposition adhesion	Replace the switch.
	Exceeding the rated load	Replace the relay with a recommendable one or replace the switch.
	Indicator light damaged	Replace the switch.
	External signal failure	Re-check the external circuit.
Switch not actuated.	Broken circuit (wire disconnection)	Replace the switch.
	External signal failure	Re-check the external circuit.
	Wrong voltage	The voltage should be as specified.
	Wrong mounting position	Mount the switch in the normal position.
	Mounting position deviation or shift	Correct the deviation and re-tighten the switch.
	Relay can not respond switch direction reversed	Set the switch in the normal direction.
	During detection in the course of the stroke.	Reduce the speed. Replace the relay with a recommendable one.
	Load over-rating	Replace the relay with a recommendable one or replace the switch.
Switch is not reset.	The jaw is not moving.	Move the jaw.
	Contact adhesion	Replace the switch.
	Relay over-rating	Replace the relay with a recommendable one or replace the switch.
	Wrong ambient temperature	The ambient temperature should be within the specified temperature range.
	A magnetic field exists nearby.	Provide a magnetic shield.
	External signal failure	Re-check the external circuit.

3) Solenoid valve part (only with valve)

Irregular Phenomenon (Trouble)	Probable Cause	Faulty Place	Countermeasure
No operation	Electric circuit fault	Supply voltage drop ・Frequency ・Check to see if the electric circuit is energized. Presence of fuse burnout Switch circuit failure	Correct the power supply.
	Coil failure	Coil voltage and coil frequency error Poor connection (Wiring) Burning (caused by overload) Wire disconnection	Replace the coil with a new one. Check. Replace. Replace.
	Pressure	Higher than the specified pressure Lower than the specified pressure	Adjust. Adjust.
	Blocking	Clogged piping Valve main body blocked Poor valve operation	Disassemble and clean. Disassemble and clean. Disassemble and clean.
No reset	Electric circuit failure	Switch relay, limit switch, etc. Instrument (Controller) Wiring	Correct or replace the defective parts with new ones. Correct or replace the defective parts with new ones. Correct or replace the defective parts with new ones.
	Packless pipe failure	Valve, core and pipe	Replace the defective parts with new ones.
	Improper pressure	Piping	Correct.
	Residual magnetism	Spring deteriorated	Replace the defective parts with new ones.
Leakage	● Valve seat failure caused by foreign matter from the OUT side Spring deterioration	Plunger Valve seat Spring	Clean. Replace. Replace.
	● Leakage to other external sides other than the OUT side Packing twist Failure to insert the packing Poor tightening or looseness Leakage caused by foreign matter	Gasket Core Core and O-ring	Replace. Re-tighten. Clean.

5. Product Related Item

5. 1 Specifications

5. 1. 1 Compact SELEX Rotary Shaft

1) Standard type

Model No. / Item		RV3S								
Size		1			3			10		
Effective torque	N-m	0.12			0.31			0.98		
Actuation		Single vane								
Working fluid		Compressed air								
Max. working pressure	MPa	0.7								
Min. working pressure	MPa	0.2								
Proof pressure	MPa	1.05								
Ambient temperature	℃	-5 to 80 (NOTE 3)								
Port size		M5								
Oscillating angle tolerance	deg.	90^{+4}_{0}	180^{+4}_{0}	270	90^{+4}_{0}	180^{+4}_{0}	270^{+4}_{0}	90^{+4}_{0}	180^{+4}_{0}	270^{+4}_{0}
Original (Starting) point of oscillationd	deg.	45 , 90		45	45 , 90		45	45 , 90		45
Allowable energy absorption (NOTE 1)	mJ	0.6			1.5			3		
Max. operating frequency (NOTE 2)	cycle/min	300	180	96	240	150	60	240	150	90
Volumetric capacity	cm^3	1.4	1.4	1.5	3.4		4	9.8		12
Allowable radial load	N	30			40			50		
Allowable thrust load	N	3			4					
Weight	kg	0.036			0.07			0.14		
Lubrication		Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)								

Model No. / Item		RV3S					
Size		20			30		
Effective torque	N-m	1.70			0.31		
Actuation		Single vane					
Working fluid		Compressed air					
Max. working pressure	MPa	1.0					
Min. working pressure	MPa	0.2					
Proof pressure	MPa	1.5					
Ambient temperature	℃	-5 to 80 (NOTE 3)			-5 to 60 (NOTE 3)		
Port size		M5			Rc1/8		
Oscillating angle tolerance	deg.	90^{+3}_{0}	180^{+3}_{0}	270^{+3}_{0}	90^{+3}_{0}	180^{+3}_{0}	270^{+3}_{0}
Original (Starting) point of oscillation	deg.	45 , 90		45	45		
Allowable energy absorption (NOTE 1)	mJ	15			25		
Max. operating frequency (NOTE 2)	cycle/min	210	120	84	180	90	60
Volumetric capacity	cm^3	17		21	37		43
Allowable radial load	N	300			400		
Allowable thrust load	N	25			30		
Weight	kg	0.25			0.47		0.46
Lubrication		Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)					

NOTE 1: Allowable energy refers to inertia energy that the SELEX rotary shaft can permit: calculate this energy as follows.
(Allowable energy) $\geqq 1/2\omega^2 \times 10^3$

NOTE 2: The maximum operating frequency is given at supply pressure 0.5 MPa (in no-load state).

NOTE 3: The ambient temperature for "SELEX Rotary" with switch is 5 to 60 ℃.

NOTE 4: A key is supplied to "SELEX Rotary" with the key groove.

NOTE 5: For an off-spec product, contact CKD separately.

Model No. / Item	RV3D				
Size	1	3	10	20	30
Effective torque (NOTE 1) N-m	0.28	0.71	2.11	3.88	7.70
Actuation	Single vane				
Working fluid	Compressed air				
Max. working pressure MPa	0.7			1.0	
Min. working pressure MPa	0.2				
Proof pressure MPa	1.05			1.5	
Ambient temperature ℃	-5 to 80 (NOTE 3)				−5 to 60 (NOTE 3)
Port size	M5				Rc1/8
Oscillating angle tolerance deg.	90^{+4}_{0}				90^{+3}_{0}
Original (Starting) point of oscillation deg.	45				
Allowable energy absorption (NOTE 2) mJ	0.6	1.5	3	15	25
Maximum operating frequency (NOTE 3) cycle/min	300	240		210	180
Volumetric capacity cm^3	1.1	2.8	8.1	15	34
Allowable radial load N	30	40	50	300	400
Allowable thrust load N	3	4		25	30
Weight kg	0.037	0.072	0.14	0.26	0.48
Lubrication	Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)				

NOTE 1: Allowable energy refers to inertia energy that the SELEX rotary shaft can permit: calculate this energy as follows. (Allowable energy) $\geqq 1/2\,\omega^2 \times 10^3$

NOTE 2: The maximum operating frequency is given at supply pressure 0.5 MPa (in no-load state).

NOTE 3: The ambient temperature for "SELEX Rotary" with switch is 5 to 60 ℃.

NOTE 4: A key is supplied to "SELEX Rotary" with the key groove.

NOTE 5: For an off-spec product, contact CKD separately.

2) With Valve

Model No. / Item	RV3S $^{V}_{W}$								
Size	10			20			30		
Effective torque N-m	0.98			1.70			3.19		
Actuation	Single vane								
Working fluid	Compressed air								
Max. working pressure MPa	0.7								
Min. working pressure MPa	0.2								
Proof pressure MPa	1.05								
Ambient temperature ℃	-5 to 50								
Port size	M5			Rc1/8					
Oscillating angle tolerance deg.	90^{+4}_{0}	180^{+4}_{0}	270^{+4}_{0}	90^{+4}_{0}	180^{+4}_{0}	270^{+4}_{0}	90^{+3}_{0}	180^{+3}_{0}	270^{+3}_{0}
Original (Starting) point of oscillation deg.	45, 90		45	45, 90		45	45		
Allowable energy absorption (NOTE 1) mJ	3			15			25		
Maximum operating frequency (NOTE 2) cycle/min	240	150	90	210	120	84	180	90	60
Volumetric capacity cm^3	9.8		12	17		21	37		43
Allowable radial load N	50			300			400		
Allowable thrust load N	4			25			30		
Weight kg	0.28			0.37			0.59		0.58
Lubrication	Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)								

NOTE 1: Allowable energy refers to inertia energy that the SELEX rotary shaft can permit: calculate this energy as follows. (Allowable energy) $\geqq 1/2\,\omega^2 \times 10^3$

NOTE 2: The maximum operating frequency is given at supply pressure 0.5 MPa (in no-load state).

NOTE 3: The ambient temperature for "SELEX Rotary" with switch is 5 to 50 ℃.

NOTE 4: A key is supplied to "SELEX Rotary" with the key groove.

NOTE 5: For an off-spec product, contact CKD separately.

Model No. / Item		RV3D V/W		
Size		10	20	30
Effective torque	N-m	2.11	3.88	7.70
Actuation		Double vane		
Working fluid		Compressed air		
Max. working pressure	MPa	0.7		
Min. working pressure	MPa	0.2		
Proof pressure	MPa	1.05		
Ambient temperature	℃	-5 to 50 (NOTE 3)		
Port size		M5	Rc1/8	
Oscillating angle tolerance	deg.	90 $^{+4}_{0}$		90 $^{+3}_{0}$
Original (Starting) point of oscillation	deg.	45		
Allowable energy absorption (NOTE 1)	mJ	3	15	25
Maximum operating frequency (NOTE 2)	cycle/min	240	210	180
Volumetric capacity	cm^3	8.1	15	34
Allowable radial load	N	50	300	400
Allowable thrust load	N	4	25	30
Weight	kg	0.28	0.38	0.60
Lubrication		Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)		

NOTE 1: Allowable energy refers to inertia energy that the SELEX rotary shaft can permit: calculate this energy as follows.
(Allowable energy) $\geqq 1/2\,\omega^2 \times 10^3$

NOTE 2: The maximum operating frequency is given at supply pressure 0.5 MPa (in no-load state).

NOTE 3: The ambient temperature for "SELEX Rotary" with switch is 5 to 50 ℃.

NOTE 4: A key is supplied to "SELEX Rotary" with the key groove.

NOTE 5: For an off-spec product, contact CKD separately.

Valve Specifications

Item		SPEC (4KB1 Series)		
Rated voltage (See NOTE 1 below)	V	AC100V (50/60Hz)	AC200V (50/60Hz)	DC24V
Starting current	A	0.056 / 0.044	0.034 / 0.026	0.075
Holding current	A	0.028 / 0.022	0.017 / 0.013	
Power consumption	W	1.8 / 1.4	2.1 / 1.6	1.8
Voltage fluctuation range		±10%		
Thermal class		Class B molded coil		

NOTE 1: Rated voltage 100/200 V AC is also available for 110/220 V AC (60 Hz).

NOTE 2: For valve details, refer to "Pneumatic Valve In General" CB-23S.

Switch Specifications

Item	Non-Contact Switch SR-※(-U)
Applications	Programmable controller, relay, IC circuit and low-wattage solenoid valve
Power supply voltage	5 to 30 V DC
Load voltage and current	5 to 30 V DC, 200 mA max.
Current consumption	20 mA max. at 24 V DC
Internal voltage drop	1.5 V max.
Indicator light	Light emitting diode ("ON" lighting)
Leakage current	10 μA max.
Lead wire length	1 m (Oil-resistant PVC insulated and cabtyre cable, 4 cores, 0.2 mm2)
Shock resistance	490 m/s2 {50G}
Insulation resistance	100 MΩ min. with a 500 V megger
Withstand voltage	No abnormality is allowed after 1,000 V AC was applied for one minute.
Ambient temperature	5 to 60 ℃
Degree of protection	IEC Standard IP67, JIS C0920 (Watertight type)

3) Variable Angle Type

Model No. / Item	RV3SA			
Size	3	10	20	30
Effective torque N-m	0.31	0.98	1.70	3.19
Actuation	Single vane			
Working fluid	Compressed air			
Max. working pressure MPa	0.7		1.0	
Min. working pressure MPa	0.2			
Proof pressure MPa	1.05		1.5	
Ambient temperature ℃	-5 to 80 (NOTE 4)			-5 to 60
Port size	M5			Rc1/8
Oscillating angle tolerance deg.	30 to 180			30 to 270
Original (Starting) point of oscillation deg.	90			45
Allowable energy absorption (NOTE 2) mJ	1	2	3	7
Maximum operating frequency (NOTE 3) cycle/min	150	150	120	90
Volumetric capacity cm^3	3.3	9.8	18	43
Allowable radial load N	40	50	300	400
Allowable thrust load N	4.0		25	30
Weight kg	0.085	0.17	0.28	0.51
Lubrication	Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)			

Model No. / Item	RV3DA			
Size	3	10	20	30
Effective torque N-m	0.71	2.11	3.88	7.7
Actuation	Double vane			
Working fluid	Compressed air			
Max. working pressure MPa	0.7		1.0	
Min. working pressure MPa	0.2			
Proof pressure MPa	1.05		1.5	
Ambient temperature ℃	-5 to 80 (NOTE 4)			-5 to 60
Port size	M5			Rc1/8
Oscillating angle tolerance deg.	30 to 90			
Original (Starting) point of oscillation deg.	45			
Allowable energy absorption (NOTE 2) mJ	1	2	3	7
Maximum operating frequency (NOTE 3) cycle/min	240	240	180	180
Volumetric capacity cm^3	2.8	8.1	15	34
Allowable radial load N	40	50	300	400
Allowable thrust load N	4.0	25		30
Weight kg	0.087	0.18	0.29	0.53
Lubrication	Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)			

NOTE 1: Allowable energy absorption differs from that for Compact SELEX Rotary RV3※ Series.

NOTE 2: Allowable energy refers to inertia energy that the SELEX rotary shaft can permit: calculate this energy as follows. (Allowable energy) $\geqq 1/2\,\omega^2 \times 10^3$

NOTE 3: The maximum operating frequency is given at supply pressure 0.5 MPa (in no-load state).

NOTE 4: The ambient temperature for "SELEX Rotary" with switch is 5 to 60℃.

NOTE 5: A key is supplied to "SELEX Rotary" with the key groove.

NOTE 6: For an off-spec product, contact CKD separately.

Switch Specifications

Item	Non-Contact Switch SR-※(-U)
Applications	Programmable controller, relay, IC circuit and low-wattage solenoid valve
Supply voltage	5 to 30 V DC
Load voltage and current	5 to 30 V DC
	5mA to 200mA
Current consumption	20 mA max. at 24 V DC 10 mA max. at 12 V DC 4 mA max. at 5 V DC
Internal voltage drop	1.5 V max.
Indicator light	Light emitting diode ("ON" lighting)
Leakage current	10 μA max.
Lead wire length	1 m (Oil-resistant, black, 3-core cable)
Shock resistance	490m/S^2{50G}
Insulation resistance	100 MΩ min. with a 500 V megger
Withstand voltage	No abnormality is allowed after 1,000 V AC was applied for one minute.
Ambient temperature	5 to 60 ℃
Degree of protection	IEC Standard IP67, JIS C0920 (Watertight type)

5. 1. 2 Large SELEX Rotary

1) Standard type

Model No. / Item		RV3S											
Size		50				150				300			
Effective torque	N-m	4.7				14.7				27.9			
Actuation		Single vane											
Working fluid		Compressed air											
Max. working pressure	MPa	1.0											
Min. working pressure	MPa	0.2											
Proof pressure	MPa	1.5											
Ambient temperature	℃	5 to 60											
Port size		Rc1/8				Rc1/4				Rc3/8			
Oscillating angle tolerance	deg.	90	180	270	280	90	180	270	280	90	180	270	280
Original (Starting) point of oscillation	deg.	45			40	45			40	45			40
Allowable energy absorption (NOTE 2)	mJ	49				225				1078			
Maximum operating frequency (NOTE 3)	cycle/min	180	90	60		120	80	50		90	60	40	
Volumetric capacity	cm^3	51		61	62	146		179	185	244	283	352	365
Allowable radial load	N	588				1176				1960			
Allowable thrust load	N	44.1				88.2				147			
Weight	kg	0.82	0.79	0.73	0.7	2.0	1.9	1.7	1.6	3.7			3.6
Lubrication		Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)											

Model No. / Item		RV3S			
Size		800			
Effective torque	N-m	102			
Actuation		Single vane			
Working fluid		Compressed air			
Max. working pressure	MPa	1.0			
Min. working pressure	MPa	0.2			
Proof pressure	MPa	1.5			
Ambient temperature	℃	5 to 60			
Port size		Rc1/2			
Oscillating angle tolerance	deg.	90	180	270	280
Original (Starting) point of oscillation	deg.	45			40
Allowable energy absorption (NOTE 2)	mJ	3820			
Maximum operating frequency (NOTE 3)	cycle/min	70	45	30	
Volumetric capacity	cm^3	754	869	1036	1046
Allowable radial load	N	4900			
Allowable thrust load	N	490			
Weight	kg	12.7	12.2	11.2	11.0
Lubrication		Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)			

Model No. / Item		RV3D							
Size		50		150		300		800	
Effective torque	N-m	10.1		34.3		66.6		206	
Actuation		Single vane							
Working fluid		Compressed air							
Max. working pressure	MPa	1.0							
Min. working pressure	MPa	0.2							
Proof pressure	MPa	1.5							
Ambient temperature	℃	5 to 60							
Port size		Rc1/8		Rc1/4		Rc3/8		Rc1/2	
Oscillating angle tolerance	deg.	90^{+3}_{0}	100^{+3}_{0}	90^{+3}_{0}	100^{+3}_{0}	90^{+3}_{0}	100^{+3}_{0}	90^{+3}_{0}	100^{+3}_{0}
Original (Starting) point of oscillation	deg.	45	40	45	40	45	40	45	40
Allowable energy absorption (NOTE 2)	mJ	49		225		1078		3820	
Maximum operating frequency (NOTE 3)	cycle/min	180		120		90		90	70
Volumetric capacity	cm^3	42	43	127	123	244	271	754	774
Allowable radial load	N	588		1176		1960		4900	
Allowable thrust load	N	44.1		88.2		147		490	
Weight	kg	0.82	0.8	2.0	1.9	4.3	4.1	12.7	12.5
Lubrication		Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)							

NOTE 1: Allowable energy refers to inertia energy that the SELEX rotary shaft can permit: calculate this energy as follows.
(Allowable energy) $\geqq 1/2\,\omega^2 \times 10^3$

NOTE 2: The maximum operating frequency is given at supply pressure 0.5 MPa (in no-load state).

NOTE 3: The ambient temperature for "SELEX Rotary" with switch is 5 to 60 ℃.

NOTE 4: A key is supplied to "SELEX Rotary" with the key groove.

NOTE 5: For an off-spec product, contact CKD separately.

2) With Valve

Model No. / Item		RV3SV / RV3SW											
Size		50			150				300				
Effective torque	N-m	4.7			14.7				27.9				
Actuation		Single vane											
Working fluid		Compressed air											
Max. working pressure	MPa	0.7											
Min. working pressure	MPa	0.2											
Proof pressure	MPa	1.05											
Ambient temperature	℃	5 to 50											
Port size(inlet)		Rc1/8			Rc1/4				Rc3/8				
Port size(outlet)		M5			Rc1/4								
Oscillating angle tolerance	deg.	90^{+3}_{0}	180^{+3}_{0}	270^{+3}_{0}	280^{+3}_{0}	90^{+3}_{0}	180^{+3}_{0}	270^{+3}_{0}	280^{+3}_{0}	90^{+3}_{0}	180^{+3}_{0}	270^{+3}_{0}	280
Original (Starting) point of oscillation	deg.	45		40	45		40		45		40		
Allowable energy absorption (NOTE 1)	mJ	49			225				1078				
Maximum operating frequency (NOTE 2)	cycle/min	180	90	60	120	80	50		90	60	40		
Volumetric capacity	cm^3	51		61	62	146		179	185	244	283	352	365
Allowable thrust load	N	588			1176				1960				
Allowable radial load	N	44.1			88.2				147				
Mounted solenoid valve		4KB119・4KB129			4KB219・4KB229								
Weight	kg	0.9		0.84	0.81	2.2		2.0	1.9	4.1			4.0
Lubrication		Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)											

Model No. / Item		RV3DV / RV3DW					
Size		50		150		300	
Effective torque	N-m	10.1		34.3		66.6	
Actuation		Double vane					
Working fluid		Compressed air					
Max. working pressure	MPa	0.7					
Min. working pressure	MPa	0.2					
Proof pressure	MPa	1.05					
Ambient temperature	℃	5 to 50					
Port size(inlet)		Rc1/8		Rc1/4		Rc3/8	
Port size(outlet)		M5		Rc1/4			
Oscillating angle tolerance	deg.	90^{+3}_{0}	100^{+3}_{0}	90^{+3}_{0}	100^{+3}_{0}	90^{+3}_{0}	100^{+3}_{0}
Original (Starting) point of oscillation	deg.	45	40	45	40	45	40
Allowable energy absorption (NOTE 1)	mJ	49		225		1078	
Maximum operating frequency (NOTE 2)	cycle/min	180		120		90	
Volumetric capacity	cm^3	42	43	127	123	244	271
Allowable thrust load	N	588		1176		1960	
Allowable radial load	N	44.1		88.2		147	
Mounted solenoid valve		4KB119・4KB129		4KB219・4KB229			
Weight	kg	0.93	0.91	2.3	2.2	4.7	4.5
Lubrication		Not required (Turbine oil class 1 ISO VG32 is used for lubrication.)					

NOTE 1: Allowable energy refers to inertia energy that the SELEX rotary shaft can permit: calculate this energy as follows.
(Allowable energy) $\geqq 1/2\,\omega^2 \times 10^3$

NOTE 2: The maximum operating frequency is given at supply pressure 0.5 MPa (in no-load state).

NOTE 3: The ambient temperature for "SELEX Rotary" with switch is 5 to 60 ℃.

NOTE 4: A key is supplied to "SELEX Rotary" with the key groove.

NOTE 5: For an off-spec product, contact CKD separately.

Item		SPEC (4KB1 Series)		
Rated voltage (See NOTE 1 below)	V	AC100V (50/60Hz)	AC200V (50/60Hz)	DC24V
Starting current	A	0.056 / 0.044	0.034 / 0.026	0.075
Holding current	A	0.028 / 0.022	0.017 / 0.013	
Power consumption	W	1.8 / 1.4	2.1 / 1.6	1.8
Voltage fluctuation range		±10%		
Thermal class		Class B molded coil		

Item		SPEC (4KB2 Series) (NOTE 2)		
Rated voltage (See NOTE 1 below)	V	AC100V (50/60Hz)	AC200V (50/60Hz)	DC24V
Starting current	A	0.056 / 0.044	0.028 / 0.022	0.075
Holding current	A	0.028 / 0.022	0.014 / 0.011	
Power consumption	W	1.8 / 1.4		1.8
Voltage fluctuation range		±10%		
Thermal class		Class B molded coil		

NOTE 1: Rated voltage 100/200 V AC is also available for 110/220 V AC (60 Hz).
NOTE 2: For valve details, refer to "Pneumatic Valve In General" CB-23S.

3) Low hydraulic type

Model No. / Item		RV3SH / RV3DH			
Size		50	150	300	800
Working fluid		Hydraulic oil			
Max. working pressure	MPa	1.0			
Min. working pressure	MPa	0.2			
Proof pressure	MPa	1.5			
Ambient temperature	℃	5 to 60			

NOTE: For working oil, use JIS Turbine Oil Class 1 ISO VG32 or hydraulic oil with its equivalent viscosity. However, be careful that some flame-resistant hydraulic oil is unsuitable.
The hydraulic oil with viscosity 40 mm2/s {40 cSt} at the oil temperature during operation is recommendable. For this oil, use FUJI KOSAN "FUKKORU Hydroll X22" or its equivalents, such as MITSUBISHI (SHIN NIHON SEKIYU) "Diamond Power Fluid 18", SHOWA SHELL "Shell Tellus Oil 22", ESSO "Convis J26", MOBIL "Mobil DTE22", COSMO "COSMO Hydro HV22", NISSEKI (SHIN NIHON SEKIYU) "Highland Wide 22" and IDEMITSU "Daphne Super Hydro 22WR".

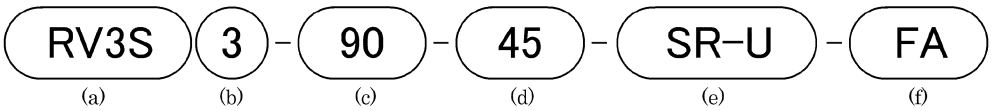
Switch Specifications

Item	Non-Contact 2-Wire System	Non-Contact 3-Wire System
	M2V	M3V
Applications	Only for programmable controller	Programmable controller, relay, IC circuit and low-wattage solenoid valve
Supply voltage	—	4.5 to 28 V DC
Load voltage and current	10 to 30 V DC 5 to 30 mA	30 V DC max. 200 mA max.
Indicator light	LED ("ON" lighting)	

Item	Contact point (reed), 2-wire system	
	M0V	M5V
Applications	Programmable controller	Programmable controller, relay, IC circuit (without indicator light), for series connection
Load voltage and current	5 to 50 mA at 12/24 V DC 7 to 20 mA at 110 V AC	50 mA max. at 12/24 V DC 20 mA max. at 110 V AC
Indicator light	LED ("ON" lighting)	Without indicator light

5. 2 Product Model No.

1) Compact SELEX Rotary (Standard type) RV3※



		(a) Model No.									
		Single Vane Type					Double Vane Type				
Symbol	Contents	RV3S					RV3D				
(b) Nominal Size											
1	Effective torque at 0.5 MPa	0.12N・m					0.27N・m				
3		0.31N・m					0.71N・m				
10		0.98N・m					2.11N・m				
20		1.70N・m					3.88N・m				
30		3.19N・m					7.70N・m				
(c) Oscillating angle											
90	90°	●					●				
180	180°	●									
270	270°	●									
(d) Starting point of oscillation											
Nominal Size		1	3	10	20	30	1	3	10	20	30
45	45°	●	●	●	●	●	●	●	●	●	●
90	90°(excluding oscillating angle 270°)	●	●	●	●						
(e) Switch type											
Nominal Size		1	3	10	20	30	1	3	10	20	30
No marking (code)	Without switch	●	●	●	●	●	●	●	●	●	●
SR	With lead wire axial switch		●	●	●	●		●	●	●	●
SR-U	With lead wire axis right-angled switch		●	●	●	●		●	●	●	●
(f) Optional	(NOTE1, NOTE 2)										
Nominal Size		1	3	10	20	30	1	3	10	20	30
No marking (code)	No option	●	●	●	●	●	●	●	●	●	●
S	Axial port position	●	●	●	●		●	●	●	●	
FA	With flange metal bracket	●	●	●	●	●	●	●	●	●	●
LS	With foot metal bracket	●	●	●	●	●	●	●	●	●	●

NOTE 1: In the case of axial port position "S", "SELEX Rotary" with switch cannot be manufactured.
NOTE 2: The mounting bracket (FA/LS) is accompanied by the unit for shipment.

<Sample Model Numbering>
RV3S3-90-45-SR-U-FA

Model: Compact SELEX Rotary (Shaft)

(a) Model No.	: Single vane type RV3S
(b) Nominal size	: 3
(c) Oscillating angle	: 90°
(d) Starting point of oscillation	: 45°
(e) S type	: With lead wire axial right-angled switch
(f) Option	: With flange metal brack

2) Compact SELEX Rotary (with Valve) RV3※ V/W

RV3S (a) V (b) 10 (c) – 90 (d) – 45 (e) – 1 (f) – SR-U (g) – LS (h)

		(a) Model No.					
		Single Vane Type			Double Vane Type		
Symbol	Contents	RV3S			RV3D		
(b) Valve							
V	Single solenoid	●			●		
W	Double solenoid	●			●		
(c) Nominal Size							
10	Effective torque at 0.5 MPa	0.98N・m			2.11N・m		
20		1.70N・m			3.88N・m		
30		3.19N・m			7.70N・m		
(d) Oscillating angle							
90	90°	●			●		
180	180°	●					
270	270°	●					
(e) Starting point of oscillation							
Nominal Size		10	20	30	10	20	30
45	45°	●	●	●	●	●	●
90	90°(excluding oscillating angle 270°)	●	●				
(f) Valve voltage							
1	AC100V	●			●		
2	AC200V	●			●		
3	DV24V	●			●		
(g) Switch type							
No marking (code)	Without switch	●			●		
SR	With lead wire axial switch	●			●		
SR-U	With lead wire axis right-angled switch	●			●		
(h) Optional	(NOTE1)						
No marking (code)	No option	●			●		
FA	Axial port position	●			●		
LS	With flange metal bracket	●			●		

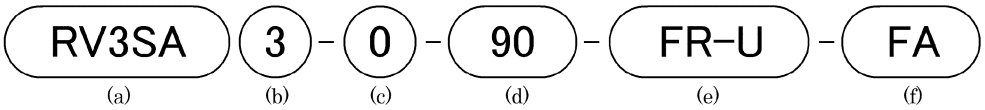
NOTE 1: The mounting bracket (FA and LS) is accompanied by the unit for shipment.

<Sample Model Numbering>
RV3SV10-90-45-1-SR-U-LS

Model: Compact SELEX Rotary (Shaft) with Valve

(a) Model No.	: RV3S
(b) Valve	: Single solenoid
(c) Size	: 10
(d) Oscillating angle	: 90°
(e) Starting point of oscillation	: 45°
(f) Valve voltage	: 100 V AC
(g) Switch Type	: With lead wire axial right-angled switch
(h) Option	: With foot metal bracket

3) Compact SELEX Rotary (Variable Angle Type) RV3※A



		(a) Model No.							
		Single Vane Type				Double Vane Type			
Symbol	Contents	RV3SA				RV3DA			
(b) Nominal Size									
3	Effective torque at 0.5 MPa	0.31N・m				0.71N・m			
10		0.98N・m				2.11N・m			
20		1.70N・m				3.88N・m			
30		3.19N・m				7.70N・m			
(c) Oscillating angle (NOTE1, NOTE2)									
0	No angle designated	●				●			
Desired angle	Angle designated	●				●			
(d) Starting point of oscillation									
Nominal Size		3	10	20	30	3	10	20	30
45	45°				●	●	●	●	●
90	90°	●	●	●					
(e) Switch type (NOTE3, NOTE4)									
No marking (code)	Without switch	●				●			
FR	With lead wire axial switch	●				●			
FR-U	With lead wire axis right-angled switch	●				●			
(f) Optional (NOTE5, NOTE6)									
No marking (code)	No option	●				●			
FA	With flange metal bracket	●				●			
LS	With foot metal bracket	●				●			
K	With protection cover	●				●			

NOTE 1: In the absence of set angle, the stopper for reference point is attached, and the stopper for angle setting is accompanied by the unit for shipment; prior to use, therefore, be sure to attach this stopper.

NOTE 2: The desired angle is set to an approximate angle from the starting point of oscillation. Prior to use, therefore, carry out final angle adjustments with the fine-adjusting screw.

NOTE 3: 2 switches are to be provided.

NOTE 4: When a switch is provided, the switch unit is accompanied by the main body for shipment. Assemble the unit after adjusting the external stopper.

NOTE 5: When a switch is provided, option "K" - with protection cover cannot be selected.

NOTE 6: The mounting bracket (FA/LS) is shipped together with "SELEX Rotary".

<Sample Model Numbering>
RV3SA3-0-45-FR-FA

Model: Compact SELEX Rotary (Shaft), Variable Angle Type

(a) Model No. : RV3SA
(b) Size : 3
(c) Oscillating angle : No angle designated
(d) Starting point of oscillation : 90°
(e) Switch type : With lead wire axial right-angled switch
(f) Option : With flange metal bracket

4) Large SELEX Rotary (Standard type) RV3※

RV3S (a) 50 (b) – 90 (c) – 45 (d) – M2V (e) – R (f) – C (g)

Symbol	Contents			(a) Model No. Single Vane Type RV3S	(a) Model No. Double Vane Type RV3D
(b) Nominal Size					
50	Effective torque at 0.5 MPa			4.7N・m	10.1N・m
150				14.7N・m	34.3N・m
300				27.9N・m	66.6N・m
800				102N・m	206N・m
(c) Oscillating angle					
90	90°			●	●
100	100°				●
180	180°			●	
270	270°			●	
280	280° (When a shock killer is provided, "SELEX Rotary" with switch cannot be manufactured.)			●	
(d) Starting point of oscillation (NOTE1)					
40	40°			●	●
45	45°			●	●
(e) Switch type					
No marking	Without switch			●	●
M2V	Non-contact (Solid state)	Monochromatic indicating system	2 wires	●	●
M3V			3 wires	●	●
M0V	Contact point (Reed)		2 wires	●	●
M5V				●	●
※ Lead Wire Length					
No marking	1 m (Standard)			●	●
3	3 m (Optional)			●	●
5	5 m (Optional)			●	●
(f) Number of switches					
R	Single switch for clockwise detection			●	●
L	Single switch for counterclockwise			●	●
D	With 2 switches			●	●

(g) Optional (NOTE2, NOTE3) Nominal Size		50	150	300	50	150	300
No marking	No option	●	●	●	●	●	●
FA	With flange metal bracket	●	●		●	●	
LS	With foot metal bracket	●	●	●	●	●	●
C	With shock killer	●	●	●	●	●	●

NOTE 1: For the relationship between the oscillating angle and starting point of oscillation, refer to the table below.

Relation between Oscillating Angle and Original Point of Oscillation

(d) Starting point of / (c) Oscillating angle	40°	45°
90°		●
100°	●	
180°		●
270°		●
280°	●	

<Sample Model Numbering>
RV3S50-90-45-M2V-D-C
Model: Large SELEX Rotary (Shaft)
(a) Model No. : RV3S
(b) Size : 50
(c) Oscillating angle : 90°
(d) Starting point of oscillation : 45°
(e) Switch type : M2V switch - lead wire length 1 m
(f) Number of switches : 1 for clockwise rotating detection
(g) Option : With shock killer

NOTE 2: The mounting bracket (FA/LS) is shipped together with the main body.
NOTE 3: The unit with shock killer of oscillating angle 280°cannot be provided with a switch.

5) Large SELEX Rotary (With Valve) RV3※ V/W

RV3S (a) | V (b) | 150 (c) – 90 (d) – 45 (e) – 1 (f) – M2V (g) – R (h) – C (i)

Symbol	Contents			(a) Model No. Single Vane Type RV3S	(a) Model No. Double Vane Type RV3D
(b) Valve					
V	Single solenoid			●	●
W	Double solenoid			●	●
(b) Nominal Size					
50	Effective torque at 0.5 MPa			4.7N・m	10.1N・m
150				14.7N・m	34.3N・m
300				27.9N・m	66.6N・m
(c) Oscillating angle					
90	90°			●	●
100	100°				●
180	180°			●	
270	270°			●	
280	280° (When a shock killer is provided, "SELEX Rotary" with switch cannot be manufactured.)			●	
(d) Starting point of oscillation (NOTE1)					
40	40°			●	●
45	45°			●	●
(e) Switch type					
No marking	Without switch			●	●
M2V	Non-contact (Solid state)	Monochromatic indicating system	2 wires	●	●
M3V			3 wires	●	●
M0V	Contact point (Reed)		2 wires	●	●
M5V				●	●
※ Lead Wire Length					
No marking	1 m (Standard)			●	●
3	3 m (Optional)			●	●
5	5 m (Optional)			●	●
(f) Number of switches					
R	Single switch for clockwise detection			●	●
L	Single switch for counterclockwise			●	●
D	With 2 switches			●	●

(g) Optional (NOTE2, NOTE3) Nominal Size		50	150	300	50	150	300
No marking	No option	●	●	●	●	●	●
FA	With flange metal bracket	●	●		●	●	
LS	With foot metal bracket	●	●	●	●	●	●
C	With shock killer	●	●	●	●	●	●

NOTE 1: For the relationship between the oscillating angle and starting point of oscillation, refer to the table below.

Relation between Oscillating Angle and Original Point of Oscillation

(d) Starting point of oscillation / (c) Oscillating angle	40°	45°
90°		●
100°	●	
180°		●
270°		●
280°	●	

<Sample Model Numbering>
RV3S150-90-45-M2V-R-C
Model: Large SELEX Rotary (Shaft) with Valve
(a) Model No. : RV3S
(b) Valve : Single solenoid
(c) Size : 150
(d) Oscillating angle : 90°
(e) Starting point of oscillation : 45°
(f) Valve voltage : AC100V
(g) Switch type : M2V switch - lead wire length 1 m
(h) Number of switches : 1 for clockwise rotating detection
(i) Option : With shock killer

NOTE 2: The mounting bracket (FA/LS) is shipped together with the main body.

NOTE 3: The unit with shock killer of oscillating angle 280°cannot be provided with a switch.

6) Large SELEX Rotary (Low Hydraulic Type) RV3※H

RV3SH (a) 50 (b) – 90 (c) – 45 (d) – M2V (e) – R (f) – C (g)

Symbol	Contents			(a) Model No. Single Vane Type RV3SH	(a) Model No. Double Vane Type RV3DH
(b) Nominal Size					
50	Effective torque at 0.5 MPa			4.7N・m	10.1N・m
150				14.7N・m	34.3N・m
300				27.9N・m	66.6N・m
800				102N・m	206N・m
(c) Oscillating angle					
90	90°			●	●
100	100°				●
180	180°			●	
270	270°			●	
280	280° (When a shock killer is provided, "SELEX Rotary" with switch cannot be manufactured.)			●	
(d) Starting point of oscillation (NOTE1)					
40	40°			●	●
45	45°			●	●
(e) Switch type					
No marking	Without switch			●	●
M2V	Non-contact (Solid state)	Monochromatic indicating system	2 wires	●	●
M3V			3 wires	●	●
M0V	Contact point (Reed)		2 wires	●	●
M5V				●	●
※ Lead Wire Length					
No marking	1 m (Standard)			●	●
3	3 m (Optional)			●	●
5	5 m (Optional)			●	●
(f) Number of switches					
R	Single switch for clockwise detection			●	●
L	Single switch for counterclockwise			●	●
D	With 2 switches			●	●

(g) Optional (NOTE2, NOTE3)

Symbol	Contents	Nominal Size 50	150	300	50	150	300
No marking	No option	●	●	●	●	●	●
FA	With flange metal bracket	●	●		●	●	
LS	With foot metal bracket	●	●	●	●	●	●
C	With shock killer	●	●	●	●	●	●

NOTE 1: For the relationship between the oscillating angle and starting point of oscillation, refer to the table below.

Relation between Oscillating Angle and Original Point of Oscillation

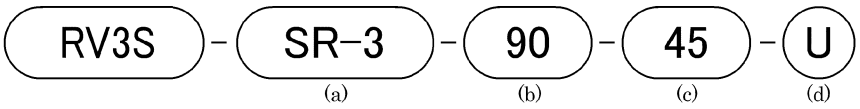
(d) Starting point of oscillation / (c) Oscillating angle	40°	45°
90°		●
100°	●	
180°		●
270°		●
280°	●	

<Sample Model Numbering>
RV3S50-90-45-M2V-D-C
Model: Large SELEX Rotary (Shaft)
(a) Model No. : RV3S
(b) Size : 50
(c) Oscillating angle : 90°
(d) Starting point of oscillation : 45°
(e) Switch type : M2V switch - lead wire length 1 m
(f) Number of switches : 1 for clockwise rotating detection
(g) Option : With shock killer

NOTE 2: The mounting bracket (FA/LS) is shipped together with the main body.
NOTE 3: The unit with shock killer of oscillating angle 280°cannot be provided with a switch.

5. 3 Parts No.

1) SR Switch Unit

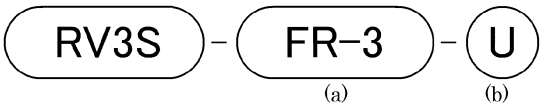


Symbol		Contents			
(a) Model					
SR-3		Applicable actuator : RV3$^{S}_{D}$3			
SR-10		Applicable actuator : RV3$^{S}_{D}$10			
SR-20		Applicable actuator : RV3$^{S}_{D}$20			
ER-30		Applicable actuator : RV3$^{S}_{D}$30			
(b) Oscillating angle					
90		90°			
180		180°			
270		270°			
(c) Starting point of oscillation					
Model		SR-3	SR-10	SR-20	SR-30
45	45°	●	●	●	●
90	90°	●	●	●	
(d) Lead wire outlet direction					
No marking		Without switch			
U		With lead wire axial right-angled switch			

NOTE 1: In the case of axial port position "S", no product with switch can be manufactured.

<Sample Model Numbering>
RV3S-SR-3-90-45-U
Model: Switch unit
(a) Model No. : For RV3S3
(b) Oscillating angle : 90°
(c) Starting point of oscillation : 45°
(d) Lead wire outlet direction : Lead wire taking-out at right angles to the axis

2) FR Switch Unit



Symbol	Contents
(a) Model	
FR-3	Applicable actuator : RV3$^{S}_{D}$A3
FR-10	Applicable actuator : RV3$^{S}_{D}$A10
FR-20	Applicable actuator : RV3$^{S}_{D}$A20
FR-30	Applicable actuator : RV3$^{S}_{D}$A30
(b) Lead wire outlet direction	
No marking	Without switch
U	With lead wire axial right-angled switch

<Sample Model Numbering>
RV3S-FR-3-U
Model: Switch unit - variable right-angle type
(a) Model : For RV3SA3
(b) Lead wire outlet direction : Lead wire taking-out at right angles to the axis

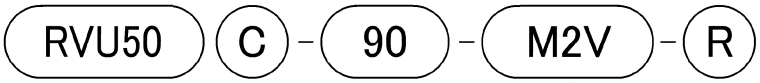
Oscillating angle and switch mounting location

Oscillating Angle	Switch Combinations
30° to 186°	Combination A
187° to 270°	Combination B

Switch Unit Assembly and Switch Adjustment Method

Model No.	Tightening Torque (N・m)
For RV3 $^{S}_{D}$A3	0.06 to 0.2
For RV3 $^{S}_{D}$A10	0.1 to 0.2
For RV3 $^{S}_{D}$A20	0.2 to 0.3
For RV3 $^{S}_{D}$A30	

3) M Type Switch Unit



Symbol	Contents		
(a) Model Name l			
RVU50	Applicable actuator : For RV3S/D50		
RVU150	Applicable actuator : For RV3S/D150		
RVU300	Applicable actuator : For RV3S/D300		
RVU800	Applicable actuator : For RV3S/D800		
(b) Unit Type			
No marking (code)	Standard product		
C	For the unit with shock killer		
(c) Oscillating Angle			
90	90°		
100	100°		
180	180°		
270	270°		
280	280 ° ("C" (for the unit with shock killer) cannot be selected.)		
(d) Switch Model No.			
M2V※	Non-contact	Monochromatic indicating system	2 wires
M3V※			3 wires
M0V※	Contact point		2 wires
M5V※			
※ Lead Wire Length			
No marking	1m (Standard)		
3	3m (Optional)		
5	5m (Optional)		
(e) Number of Switches			
R	1 for clockwise rotation detection		
L	1 for counterclockwise rotation detection		
D	With 2 switches		

NOTE: When the unit is provided with a shock killer, purchase the shock killer main unit separately.

<Sample Model Numbering>
RVU50-C-90-M2V-R
Model: Switch unit
(a) Model name : For RV3S/D50
(b) Unit type : For the unit with shock killer
(c) Oscillating angle : 90°
(d) Switch type : M2V switch - lead wire length 1 m
(e) Number of switches : 1 for clockwise rotation detection

4) Shock Killer

● Main Unit

Model

Model Name	Applicable "SELEX Rotary"
RVC50	RV3※50
RVC150	RV3※150
RVC300	RV3※300
RVC800	RV3※800

● JAW for Shock Killer

RVC50 – 90 – T

(a) (b) (c)

Symbol	Contents
(a) Model Name	
RVC50	For RV3※50
RVC150	For RV3※150
RVC300	For RV3※300
RVC800	For RV3※800
(b) Oscillating angle	
90	90°
100	100°
180	180°
270	270°
280	280°
(c) Parts (Jaw)	
T	Jaw for shock killer

5) Flange Metal Bracket ・ Foot Metal Bracket

● Flange Metal Bracket

Model – FA

Flange metal bracket

Model Name
RVS1
RVS3
RVS10
RVS20
RVS30
RVS50
RVS150

● Foot Metal Bracket

Model – LS

Foot metal bracket

Model Name
RVS1
RVS3
RVS10
RVS20
RVS30
RVS50
RVS150
RVS300
RVS800

6) Consumable parts kit

RV A B - R

(A) Vane Type	
Symbol	Contents
S	Single vane
D	Double vane

(B) Size									
1	3	10	20	30	50	150	150	300	800

7) Jaw for magnet

RVU B - A1

(B) Size				
50	150	150	300	800

8) Base bracket

RVU B - A2

(B) Size				
50	150	150	300	800

9) Switch mounting fixture

RVU B - A3

(B) Size			
50	150	150	300

10) Switch mounting fixture for shock killer

RVU B - A3 - C

(B) Size			
50	150	150	300

11) Jaw for shock killer with magnet

RVU B - C - A1 - C

(B) Size	(C) Oscillating Angle	
50	Symbol	Contents
150	90	90°
300	100	100°
800	180	180°
	270	270°

12) Mounting fixture for M type switch

RVU 00 - A1

13) Packing screw set

RVU B - B1

(B) Size					
10	20	30	50	150	300

14) Valve Kit

RVU D B - E - B2

(B) Size	(D) Solenoid		(E) Valve Voltage	
10	Symbol	Contents	Symbol	Contents
20	V	Single solenoid	1	AC100V
30	W	Double solenoid	2	AC200V
500			3	DC24V
150				
300				

15) Sub-base

RVU D - B3

(B) Size					
10	20	30	50	150	300

16) Variable Angle Switch

RV3U - CT - F

(F) Switch	
Symbol	Contents
3R	For right mounting
3L	For left mounting
3RU	For right mounting at right angles to the lead wire
3LU	For left mounting at right angles to the lead wire