



CKD Corporation

SM-5944-A

INSTRUCTION MANUAL

COMPACT SEL CYLINDER CKV2 - M

Please read this operation manual carefully before using this product, particularly the section describing safety.

Retain this operation manual with the product for further consultation whenever necessary.

For Safety Use

To use this product safely, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism, is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, read this operation manual carefully for proper operation.

Observe the cautions on handling described in this manual, as well as the following instructions :

Precautions

- Before performing an overhaul inspection on the actuator, deactivate residual pressure completely.
- While the actuator is operating, do not step into or place hands in the driving mechanism.
- To prevent an electric shock, do not touch the electric wiring connections (exposed live parts) of the actuator equipped with a solenoid valve or switch.

Perform an overhaul inspection with the power off. Also, do not touch these live parts with wet hands.

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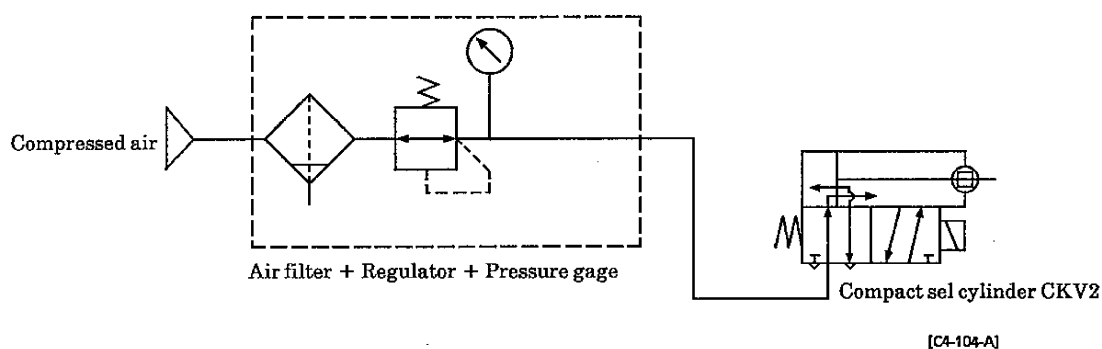
1. PRODUCT

1-1. Specifications

Media	Compressed air
Maximum load pressure MPa {kgf/cm ² }	1 {10}
Minimum load pressure MPa {kgf/cm ² }	0.15 {1.5}
Withstanding pressure MPa {kgf/cm ² }	1.6 {16}
Range of ambient temperature °C	5~60
Lubrication	Not required (Use Turbine oil Class 1, ISO VG32 if required.)
Service piston speed mm/s	50~500
Cushion	Rubber cushion
Available switches to be mounted	Contact Sw. R0, R4, R5, R6
	Proximity Sw. R1, R2, R3
Service voltage	AC100 (50/60Hz), AC200 (50/60Hz), DC24V
Permissible Voltage fluctuation	±10
Class of insulation	Equivalent to Class B (130°C)

1-2. Fundamental Circuit Diagram for double action cylinder (Non-lubrication system)

The following is a fundamental circuit diagram, generally.
It is sufficient to connect the system to the air source only, as the cylinder is provided with solenoid valve and speed control needle.

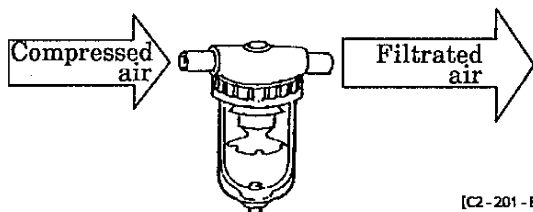




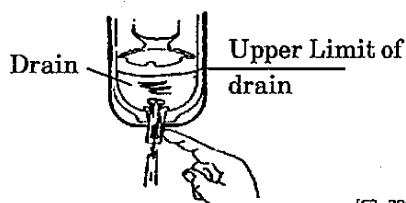
2. CAUTION

2-1. Fluid

- 1) Use the compressed air, filtrated and dehumidified. Carefully select a filter of an adequate filtration rate ($5\mu\text{m}$ or lower preferred), flow rate and its mounting location (as closest to directional control valve as possible).
- 2) Be sure to drain out the accumulation in filter periodically.
- 3) Note that the intrusion of carbide of compressor oil (such as carbon or tarry substance) into the circuit causes malfunction of solenoid valve and cylinder. Be sure to carry out thorough inspection and maintenance of compressor.
- 4) This cylinder does not require lubrication. It is recommended, however, to use Turbine oil Grade 1, ISO VG32 as lubricant if lubrication is preferred.



[C2-201-E]



[C2-201-F]

3. OPERATION

- 1) The pressure supply range is 0.15~1MPa {1.5~10kgf/cm²}. Operate the system within this range.
- 2) The absorbable kinetic energy by cushion of the cylinder of this type is minimal because of being made of rubber. Anticipate of using external stopper in the event that the kinetic energy is estimated to be high.
- 3) Adjust piston speed by means of Speed adjusting needle.
- 4) It is able to revise its function from Advancing type with charge to Retracting type with charge. Revise it referring to the following illustration.
- 5) Position angle of solenoid valve is able to re-set its angle in every 90° apart.

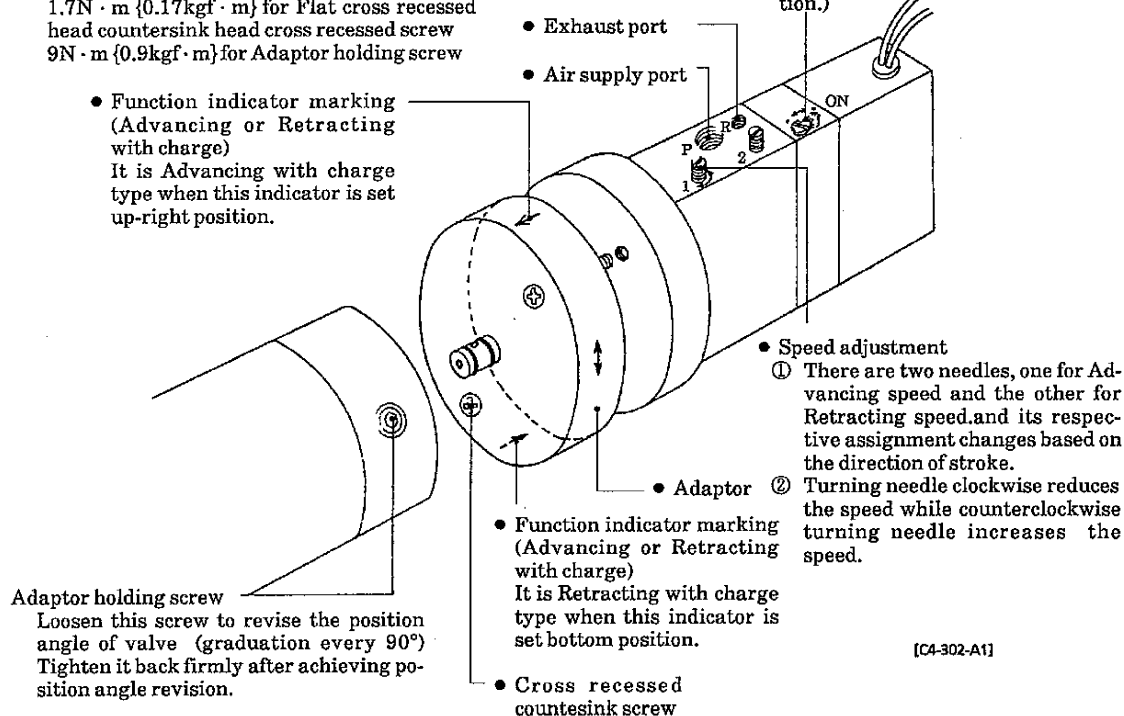
Re-set it as required, referring to the following illustration.

- Revision of Advancing type to Retracting type with charge or vice versa.

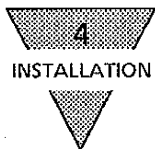
- ① Loosen both Adapter holding screw and cross recessed head countersink screw.
- ② Turn adaptor only for 180° along double headed arrow mark (↔).
- ③ Tighten Cross recessed head countersink screw and Adapter holding screw.
Reasonable tightening torque is:
1.7N · m {0.17kgf · m} for Flat cross recessed head countersink head cross recessed screw
9N · m {0.9kgf · m} for Adaptor holding screw

- Function indicator marking (Advancing or Retracting with charge)
It is Advancing with charge type when this indicator is set up-right position.

- Manual operation selector
Turning right is ON equivalent to solenoid charged, while turning it to left is OFF equivalent to solenoid no charge. (Keep it back to left position for normal automatic operation.)



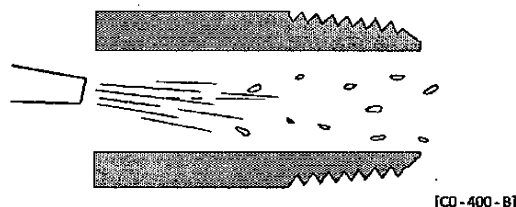
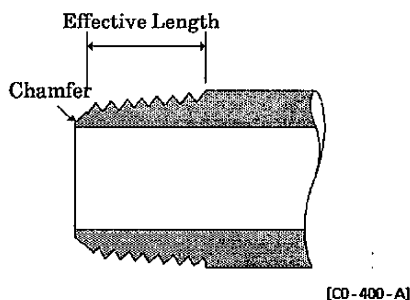
Speed control	Advancing	Retracting
Direction of stroke	control screw	speed control
Advancing with charge	1	2
Retracting with charge	2	1



4. INSTALLATION

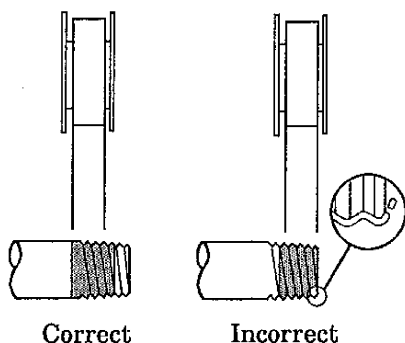
4-1. Piping

- 1) For piping beyond the filter, use pipes that hardly get corroded such as galvanized pipes, nylon tubes, rubber tubes, etc.
- 2) See to it that the pipe connecting cylinder and solenoid valve has effective sectional area needed for the cylinder to drive at specified speed.
- 3) Install filter preferably adjacent upper-stream to solenoid valve for eliminating rust, foreign substance and drain in the pipe.
- 4) Strictly observe the effective thread length of gas pipe and give a chamfer of approx. 1/2 pitch from the threaded end.
- 5) Flush air into the pipe to blow out foreign substances and chips before piping.

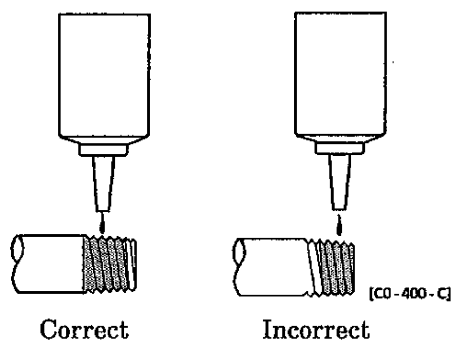


- 6) Refrain applying sealant or sealing tape approx. two pitches of thread off the tip of pipe to avoid residual substances from falling into piping system.

● Seal Tape



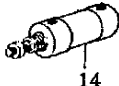
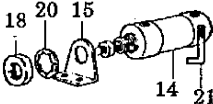
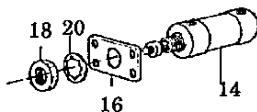
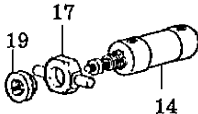
● Sealant (Paste or liquid)



4-2. Installation

- 1) The ambient temperature range for this cylinder is 5 ~ 60°C.
- 2) Use cylinder with bellows over its rod within the area with much dust.
- 3) Carefully avoid excessive tightening or other object from hitting the tube. Otherwise, it may get the tube distorted and cause malfunction of the cylinder.
- 4) Assembly of supporting metal brackets
 Assemble brackets referring the following illustrations. The supporting metal brackets are supplied with the cylinder at the time of delivery
 Carefully avoid twisting torque to the caulked part of cylinder as it may cause loosening the joint.

Supporting metal bracket assembly

<p>CKV2-00 (Basic type)</p>  <p>Nut 18 and toothed washer 20 are supplied with unit.</p>	<p>CKV2-LB (Foot type along axis)</p> 	<p>CKV2-FA (Flange type)</p> 																									
<p>CKV2-TA (Trunnion type)</p> 	<table><tr><th>No.</th><th>Parts name</th><th>No.</th><th>Parts name</th></tr><tr><td>14</td><td>Cylinder body</td><td>19</td><td>Nut (for both TA type)</td></tr><tr><td>15</td><td>Foot bracket</td><td>20</td><td>Toothed washer</td></tr><tr><td>16</td><td>Flange</td><td rowspan="2">21</td><td>(for LB type and FA type.)</td></tr><tr><td>17</td><td>Trunnion (Axis type)</td><td>Head end bracket</td></tr><tr><td>18</td><td>Nut (LB type and FA type)</td><td></td><td></td></tr></table>				No.	Parts name	No.	Parts name	14	Cylinder body	19	Nut (for both TA type)	15	Foot bracket	20	Toothed washer	16	Flange	21	(for LB type and FA type.)	17	Trunnion (Axis type)	Head end bracket	18	Nut (LB type and FA type)		
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[C4-402-A]

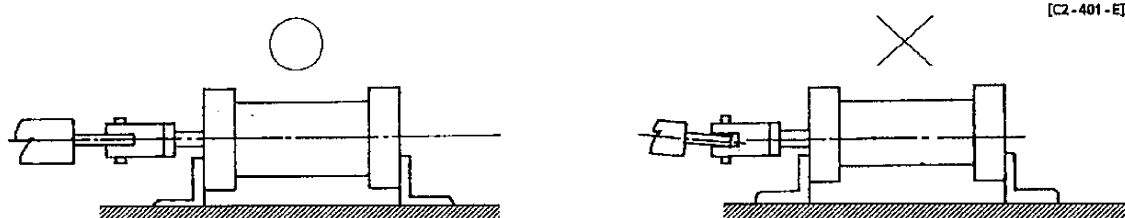
Note: Hold the cover to the side of mounting bracket with spanner or appropriate tool while processing installing bracket.

- 5) When cylinder is fixed type and rod end is guided
 In case the piston rod of cylinder and the load are misaligned, the bushes and packings of the cylinder are extremely worn out. Hence, connect them with CKD's connector "Free joint".

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INSTALLATION

6) When cylinder is fixed type and rod end is connected with pin joint

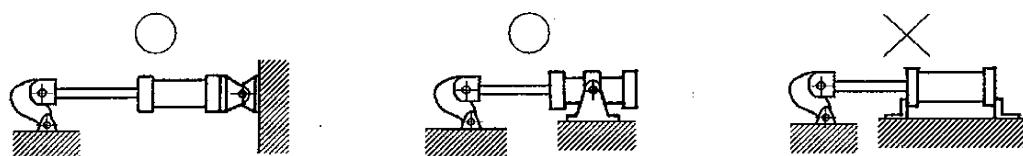
In case the load acting direction is not parallel with the rod axial center, the rod and tube may get entangled causing seizure, etc. Hence, make sure that the rod axial center and the load transfer direction are aligned to each other.



[C2-401-E]

7) When the load acting direction changes with the cylinder operation

Use an oscillating cylinder (clevis type or trunnion type) capable of making sway to a certain angle.



[C2-401-F]

Clevis type

Trunnion type

Foot type

8) Revolving torque

The whirl stop mechanism to this cylinder is provided just for the purpose of holding self-rotation during stroke. Prevent an application of cylinder with intended torque.

9) Mounting bracket or load to the piston rod

When mounting either one of above to the threaded portion on a rod tip, apply a spanner to pair sides of rod to hold its rotation and make sure that rotation torque is not effected to the guide of whirl stopper.

5. MAINTENANCE

5-1. Periodic Inspection

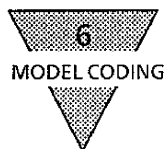
- 1) In order to upkeep the cylinder in optimum condition, carry out periodic inspection once or twice a year.
- 2) Inspection items
 - ① Check the bolts and nuts fitting the piston rod end fittings and supporting fittings for slackening.
 - ② Check to see that the cylinder operates smoothly.
 - ③ Check any change of the piston speed and cycle time.
 - ④ Check for internal and/or external leakage.
 - ⑤ Check the piston rod for flaw (scratch) and deformation.
 - ⑥ Check the stroke for abnormality.

See "Trouble shooting", 5-2, should there be any trouble found, also carry out additional tightening if bolts, nuts, etc. are slackened.

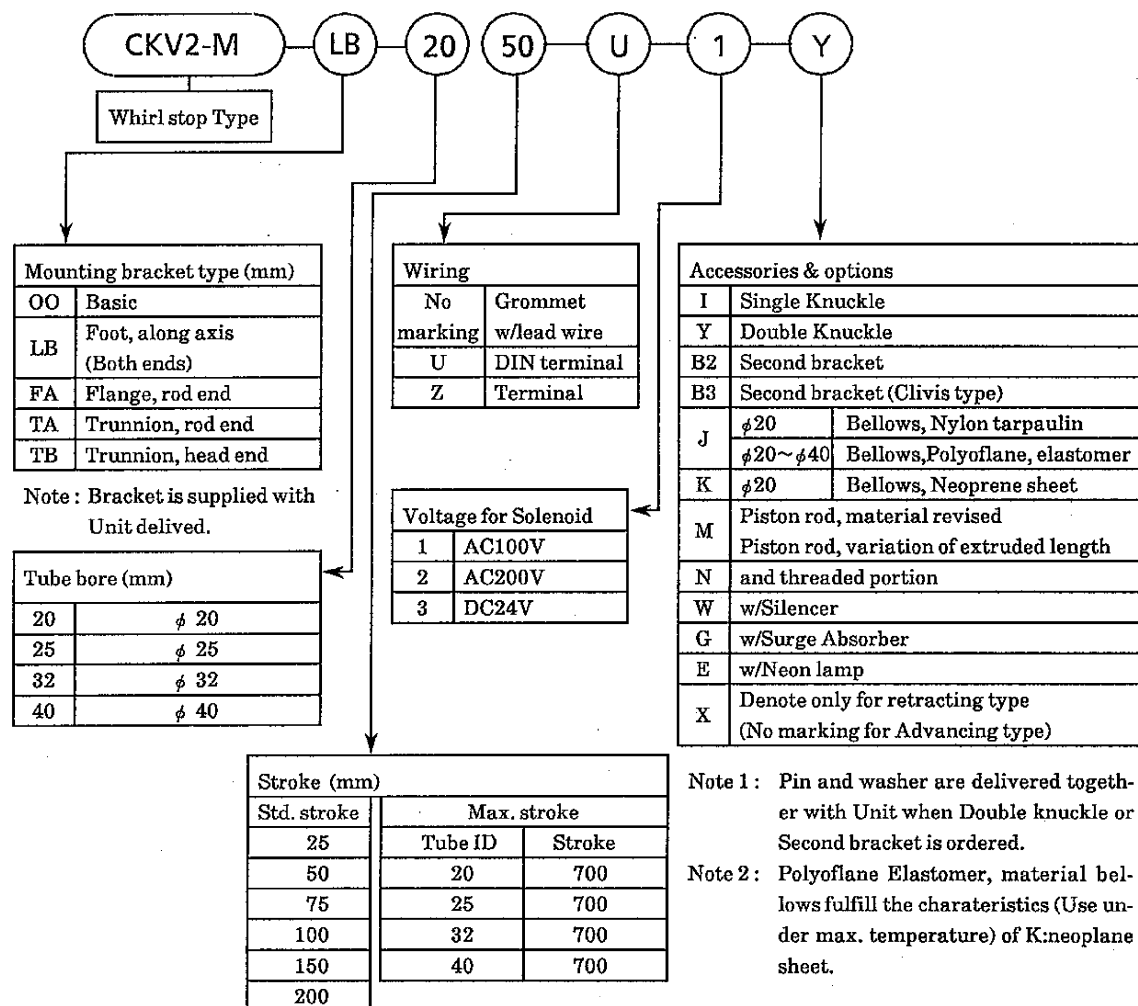
5-2. Trouble Shooting

Trouble	Cause	Countermeasure
Does not operate	No pressure or inadequate pressure	Provide an adequate pressure source.
	Signal is not transmitted to direction control valve	Correct the control circuit.
	Improper or misalignment of installation	Correct the installation state and/or change the supporting system.
	Broken piston packing	Replace the cylinder.
Does not function smoothly	Speed is below the low speed limit	Limit the load variation and consider the adoption of low pressure cylinder.
	Improper or misalignment of installation	Correct the installation state and/or change the supporting system.
	Exertion of transverse (lateral) load	Install a guide. Revise the installation state and/or change the supporting system.
	Excessive load	Increase the pressure itself and/or the inner diameter of the tube.
	Speed control valve is built in the way of "Meter in" circuit	Change the installation direction of the speed control valve.
Breakage and/or deformation	Impact force due to high speed operation	Turn the speed down. Reduce the load and/or install a mechanism with more secured cushion effect (e.g. external cushion mechanism).
	Exertion of transverse load	Install a guide. Reverse the installation state and/or change the supporting system.

Note: The cylinder of this type is unable to be disassembled because of being caulked type assembly. Replace cylinder in its entirety when some trouble is discovered.



6. MODEL CODING



Example of model code shown above denotes:

Compact SEL cylinder, Whirl stop type, Axial direction Foot type bracket, Tube bore φ20, Stroke 50, DIN Terminal, AC100V, with Double knuckle

- Use same principle as above for designating model code when ordering.