CKD

SM－282157－A

# INSTRUCTION MANUAL

## COMPACT SEL CYLINDER

## CKV2-D

- 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

# For Safety Use

To use this product safety, 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.

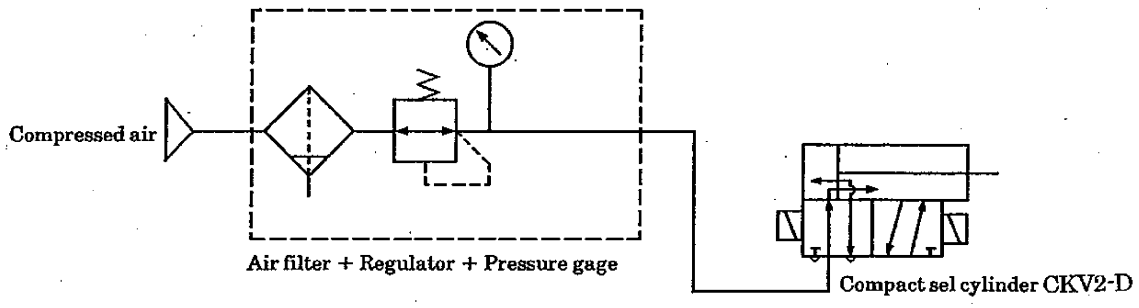
# 1. PRODUCT

## 1-1. Specifications

| Media | Compressed air |
|---|---|
| Maximum load pressure MPa {kgf/cm²} | 1 {10} |
| Minimum load pressure MPa {kgf/cm²} | 0.15 {1.5} |
| Withstanding pressure MPa {kgf/cm²} | 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 |
| PermissibleVoltage flactuation | ±10 |
| Class of insulation | Equivalent to Class B (130°C) |

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

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

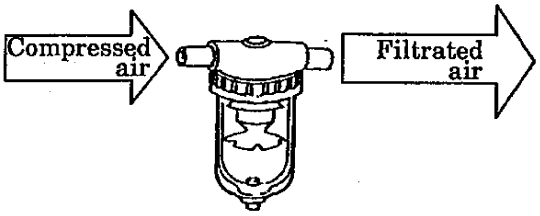


2
WARNING

## 2. CAUTION

### 2-1. Fluid

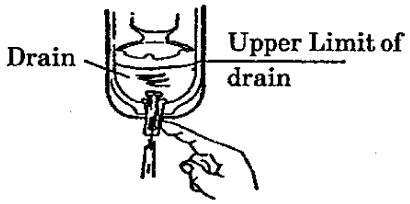
1) Use the compressed air, filtrated and dehumidified. Carefully select a filter of an adequate filtration rate (5$\mu$m or lower preferred), flow rate and its mounting location (as closest to directional control valve as possible).




2) Be sure to drain out the accumulation in filter periodically.

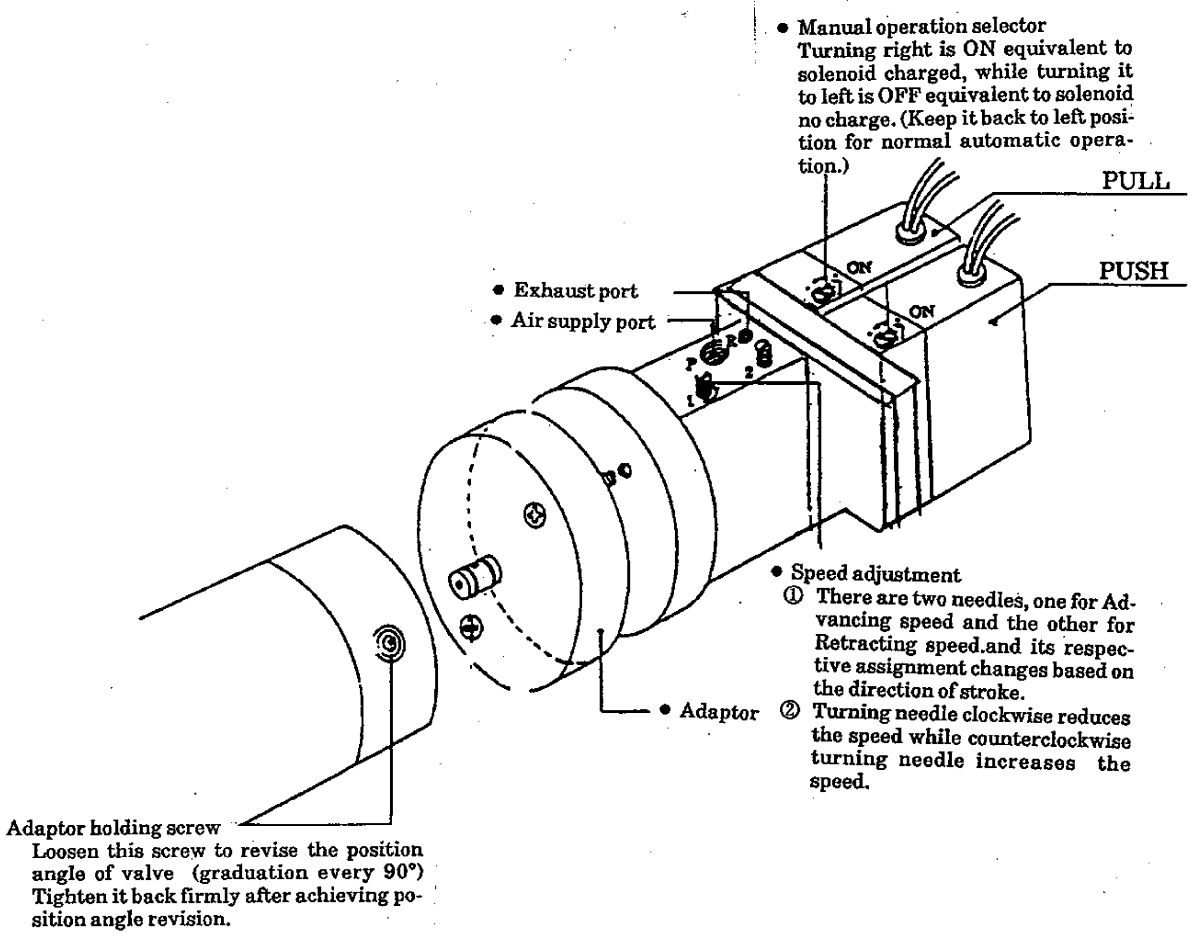
3) Note that the intrusion of carbide of compressor oil (such as carbon or tarry substance) into the circuit causes malfunction of solenoid valve and cylinder. Be sure to carry out thorough inspection and maintenance of compressor.

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.



## 3. OPERATION

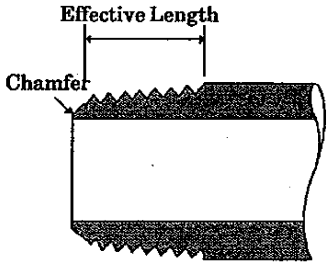
1) The pressure supply range is 0.15~1MPa {1.5~10kgf/cm$^2$}. Operate the system within this range.
2) The absorbable kinetic energy by cushion of the cylinder of this type is minimal because of being made of rubber. Anticipate of using external stopper in the event that the kinetic energy is estimated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



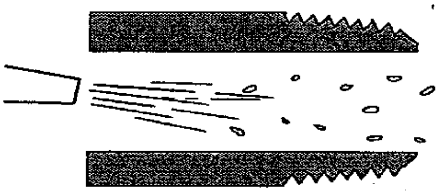
# 4. INSTALLATION

## 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.

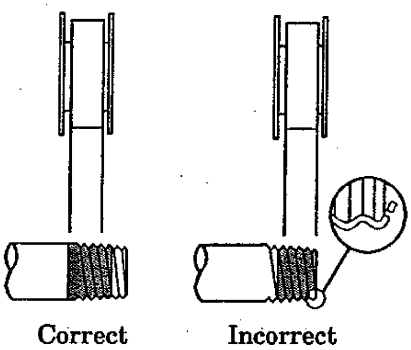



5) Flush air into the pipe to blow out foreign substances and chips before piping.

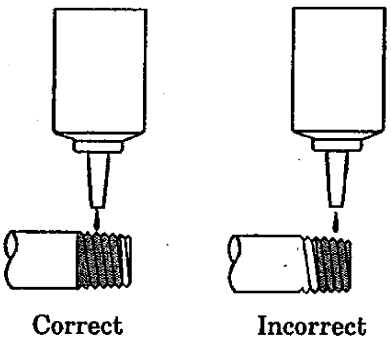


6) Refrain applying sealant or sealing tape approx. two pitches of thread off the tip of pipe to avoid residual substances from falling into piping system.

● Seal Tape




● Sealant (Paste or liquid)

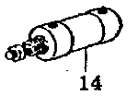


## 4-2. Installation

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.

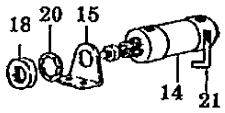
Supporting metal bracket assembly

CKV2-00 (Basic type)

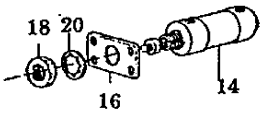



Nut 18 and toothed washer 20 are supplied with unit.

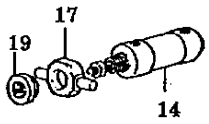
CKV2-LB (Foot type along axis)




CKV2-FA (Flange type)




CKV2-TA (Trunnion type)



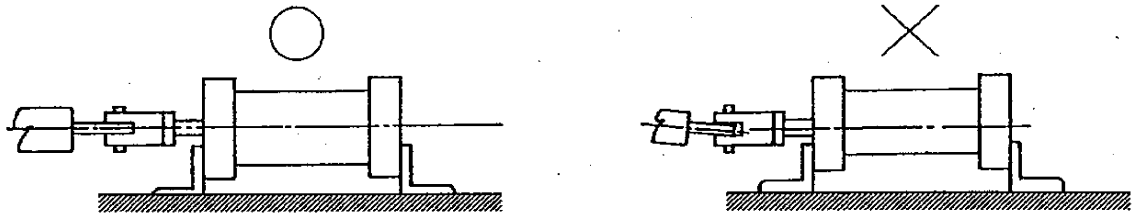

| No. | Parts name | No. | Parts name |
|---|---|---|---|
| 14 | Cylinder body | 19 | Nut (for both TA type ) |
| 15 | Foot bracket | 20 | Toothed washer |
| 16 | Flange | 21 | (for LB type and FA type.) Head end bracket |
| 17 | Trunnion (Axis type) | | |
| 18 | Nut (LB type and FA type) | | |

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".

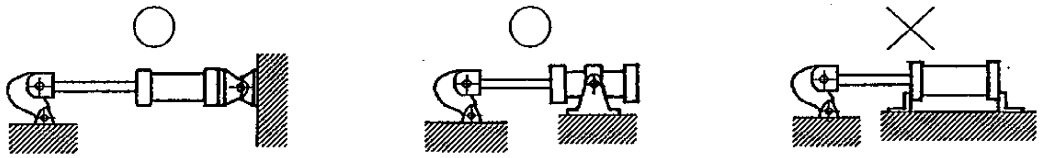
6) When cylinder is fixed type and rod end is connected with pin joint

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.



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.



Clevis type　　Trunnion type　　Foot type

(2) CAV2, Wiring

Momentary electrification to prospective solenoid for respective direction of piston motion enables solenoid to set holding because two individual solenoids have been installed to shift SEL cylinder 9 CAV2). Therefore, a momentary electrification only is required instead of continuous current to shift cylinder motion for complete stroke.

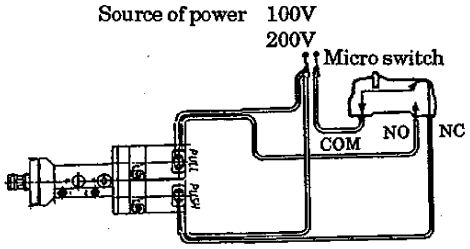



Fig. 1

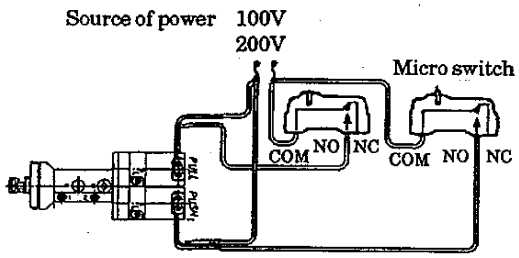



Fig. 2

Wire in accordance with the diagram on the name plate of Power source.

Use electric cord of the sectional area of more than 0.75mm$^2$.

Design wiring so as to have each one of two solenoids alters its actuation.

Build in a protective fuse. (Fuse capacity 1A)

Build the circuit so as to keep voltage drop minimum.

Wire it as per illustrated in Fig. 1 above when intending to utilize one only micro switch.

Wire it as per illustrated in Fig. 2 above when intending to utilize two micro switches

Confirm that solenoids function by turning switch ON and OFF without supplying operation medium. Click sounds should be heard when turning switch ON and OFF.

# 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

ⓐ Check the bolts and nuts fitting the piston rod end fittings and supporting fittings for slackening.

ⓑ Check to see that the cylinder operates smoothly.

ⓒ Check any change of the piston speed and cycle time.

ⓓ Check for internal and/or external leakage.

ⓔ Check the piston rod for flaw (scratch) and deformation.

ⓕ Check the stroke for abnormality.

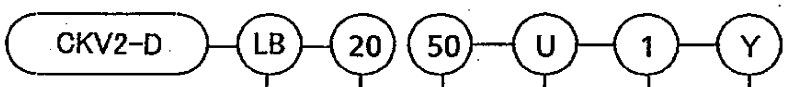
See "Trouble shooting", 5-2, should there be any trouble found, also carry out additional tightening if bolts, nuts, etc.are slackened.

## 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




| Mounting bracket type (mm) | |
|---|---|
| OO | Basic |
| LB | Foot, along axis (Both ends) |
| FA | Flange, rod end |
| TA | Trunnion, rod end |
| TB | Trunnion, head end |

Note : Bracket is supplied with Unit delived.

| Tube bore (mm) | |
|---|---|
| 20 | ϕ 20 |
| 25 | ϕ 25 |
| 32 | ϕ 32 |
| 40 | ϕ 40 |

| Wiring | |
|---|---|
| No marking | Grommet w/lead wire |
| U | DIN terminal |
| Z | Terminal |

| Voltage for Solenoid | |
|---|---|
| 1 | AC100V |
| 2 | AC200V |
| 3 | DC24V |

| Accessories & options | | |
|---|---|---|
| I | Single Knuckle | |
| Y | Double Knuckle | |
| B2 | Second bracket | |
| B3 | Second bracket (Clivis type) | |
| J | ϕ20 | Bellows, Nylon tarpaulin |
| | ϕ20~ϕ40 | Bellows,Polyoflane, elastomer |
| K | ϕ20 | Bellows, Neoprene sheet |
| M | Piston rod, material revised<br>Piston rod, variation of extruded length | |
| N | and threaded portion | |
| W | w/Silencer | |
| G | w/Surge Absorber | |
| E | w/Neon lamp | |

| Stroke (mm) | | |
|---|---|---|
| Std. stroke | Max. stroke | |
| | Tube ID | Stroke |
| 25 | 20 | 700 |
| 50 | 25 | 700 |
| 75 | 32 | 700 |
| 100 | 40 | 700 |
| 150 | | |
| 200 | | |

Note 1 : Pin and washer are delivered together with Unit when Double knuckle or Second bracket is ordered.

Note 2 : Polyoflane Elastomer, material bellows fulfill the charateristics (Use under max. temperature) of Kneoplane sheet.

Example of model code shown above denotes :
Compact SEL cylinder, 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.

## OUTSIDE DRAWING