CKD

Speed Controller Outdoor

SC1-□-W Series

INSTRUCTION MANUAL

SM-P00103-A

- Read this Instruction Manual before using the product.
- Read the safety notes carefully.
- Keep this Instruction Manual in a safe and convenient place for future reference.

CKD Corporation

PREFACE

Thank you for purchasing CKD's **"SC1-□-W Series" speed controller outdoor**.
This Instruction Manual contains basic matters such as installation and usage instructions in order to ensure optimal performance of the product. Please read this Instruction Manual thoroughly and use the product properly.
Keep this Instruction Manual in a safe place and be careful not to lose it.

Product specifications and appearances presented in this Instruction Manual are subject to change without notice.

- The product is intended for users who have basic knowledge about materials, piping, electricity, and mechanisms of pneumatic components. CKD shall not be responsible for accidents caused by persons who selected or used the product without knowledge or sufficient training.
- Since there are a wide variety of customer applications, it is impossible for CKD to be aware of all of them. Depending on the application or usage, the product may not be able to exercise its full performance or an accident may occur due to fluid, piping, or other conditions. It is the responsibility of the customer to check the product specifications and decide how the product shall be used in accordance with the application and usage.

SAFETY INFORMATION

When designing and manufacturing any device incorporating the product, the manufacturer has an obligation to ensure that the device is safe. To that end, make sure that the safety of the machine mechanism of the device, the pneumatic control circuit, and the electric system that controls such mechanism is ensured.

To ensure the safety of device design and control, observe organization standards, relevant laws and regulations, which include the following:

ISO 4414 and JIS B 8370 (the latest edition of each standard)

In order to use our products safely, it is important to select, use, handle, and maintain the products properly.
Observe the warnings and precautions described in this Instruction Manual to ensure device safety.

Although various safety measures have been adopted in the product, customer's improper handling may lead to an accident. To avoid this:

Thoroughly read and understand this Instruction Manual before using the product.

To explicitly indicate the severity and likelihood of a potential harm or damage, precautions are classified into three categories: "DANGER", "WARNING", and "CAUTION".

⚠ **DANGER**	Indicates an imminent hazard. Improper handling will cause death or serious injury to people.
⚠ **WARNING**	Indicates a potential hazard. Improper handling may cause death or serious injury to people.
⚠ **CAUTION**	Indicates a potential hazard. Improper handling may cause injury to people or damage to property.

Precautions classified as "CAUTION" may still lead to serious results depending on the situation.
All precautions are equally important and must be observed.

Other general precautions and tips on using the product are indicated by the following icon.

	Indicates general precautions and tips on using the product.

Precautions on Product Use

⚠ WARNING

The product must be handled by a qualified person who has extensive knowledge and experience.

The product is designed and manufactured as a device or part for general industrial machinery.

Use the product within the specifications.

The product must not be used beyond its specifications. Also, the product must not be modified and additional work on the product must not be performed.

The product is intended for use in devices or parts for general industrial machinery. It is not intended for use outdoors (Except for outdoor specification products) or in the conditions or environment listed below.

- In applications for nuclear power, railroad system, aviation, ship, vehicle, medical equipment, and equipment that directly touches beverage or food.
- For special applications that require safety including amusement equipment, emergency shut-off circuit, press machine, brake circuit, and safety measures.
- For applications where life or properties may be adversely affected, and special safety measures are required.

(Exception is made if the customer consults with CKD prior to use and understands the specifications of the product. However, even in that case, safety measures must be taken to avoid danger in case of a possible failure.)

Do not handle the product or remove pipes and devices until confirming safety.

- Inspect and service the machine and devices after confirming the safety of the entire system. Also, turn off the energy source (air supply or water supply) and power to the relevant facility. Release compressed air and fluid from the system and use extreme care to avoid water or electric leakage.
- Since there may be hot or live parts even after operation has stopped, use extreme care when handling the product or removing pipes and devices.
- When starting or restarting a machine or device that incorporates pneumatic components, make sure that a safety measure (such as a pop-out prevention mechanism) is in place and system safety is secured.

CONTENTS

1. PRODUCT OVERVIEW

1.1 Model Number Indication

SC1 – 8 – W

(a)

(a) Port size	
8	Rc1/4
10	Rc3/8
15	Rc1/2

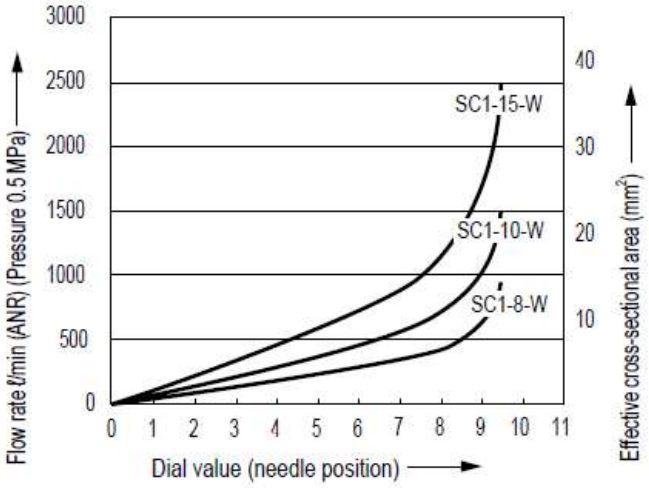
1.2 Specifications

1.2.1 Product specifications

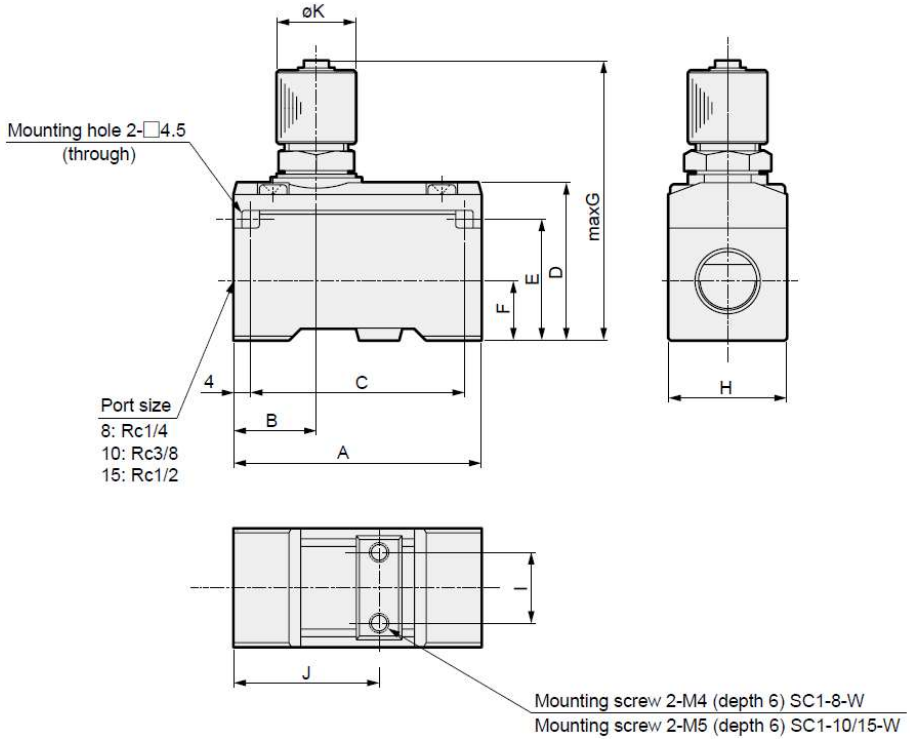
Model no. / Descriptions		SC1-8-W	SC1-10-W	SC1-15-W
Working fluid		Compressed air		
Max. working pressure	MPa	1.0		
Min. working pressure	MPa	0.05		
Proof pressure	MPa	1.5		
Fluid temperature	°C	5 to 60 (no freezing)		
Ambient temperature	°C	-10 to +60 (no freezing)		
Port size		Rc1/4	Rc3/8	Rc1/2
Weight	g	95	205	195
Applicable cylinder tube bore size	mm	ø32 to ø75	ø50 to ø140	ø80 to ø160
Needle rotation	turns	10	10	10
Free flow	Flow rate [Note 1] /min (ANR)	930	2600	2900
	Effective cross-sectional area mm^2	14	39	43
Controlled flow	Flow rate [Note 1] ℓ/min (ANR)	870	1500	2400
	Effective cross-sectional area mm^2	13	22	36

Note 1: This is the flow rate at pressure of 0.5 MPa.

1.2.2 Flow characteristics

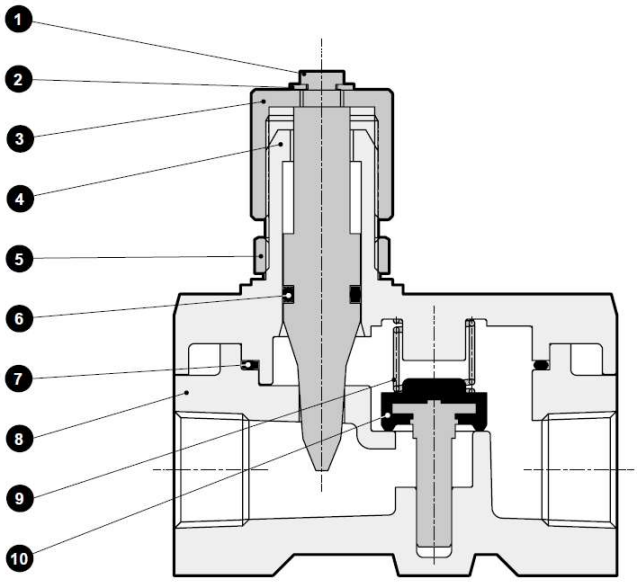


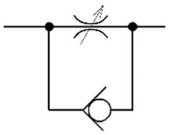
1.3 Dimensions



Model no.	A	B	C	D	E	F	G	H	I	J	K
SC1-8-W	50	20	42	31	23	11	67	22	12	31	19
SC1-10・15-W	63	21	55	40	31	15	83	30	18	37	23

1.4 Internal Structure





JIS symbol

No.	Part name	Material	No.	Part name	Material
1	Needle	Stainless steel	6	O-ring	Fluoro rubber
2	E type snap ring	Stainless steel	7	Gasket	Fluoro rubber
3	Knob	Aluminum	8	Body	Aluminum alloy die-casting
4	Needle guide	Aluminum alloy die-casting	9	Spring	Stainless steel
5	Lock nut	Stainless steel	10	Valve seat	Copper alloy / fluoro rubber

2. INSTALLATION

2.1 Environment

Do not use the product in an environment where:

- Ambient temperature is outside the range of -10°C to 60°C
  (If you use it in an environment exposed to direct sunlight, the product temperature may become higher than the ambient temperature.)
- Air can freeze
- Atmosphere contains corrosive gas, fluids, or chemicals
- A lot of dust
- There is a stapper atmosphere
- There is a heat source in the surroundings, and it is exposed to radiant heat
- Ozone is generated

2.2 Unpacking

⚠ CAUTION

Do not open the packing of the product until just before piping.
Foreign matters may enter the product and cause a failure or malfunction.

- Check that the model number ordered and the model number indicated on the product are the same.
- Check the exterior of the product for any damage.

2.3 Mounting

⚠ CAUTION

Do not apply a lateral load to the main body during or after mounting.
It may cause leakage or damage.

The product can be rotated and installed in any orientation but must not be used in applications that involve constant turning and swaying.

- For the lock nut recommended tightening torque, refer to the table below. Be careful not to damage the nut by over-tightening it.

Lock nut recommended tightening torque

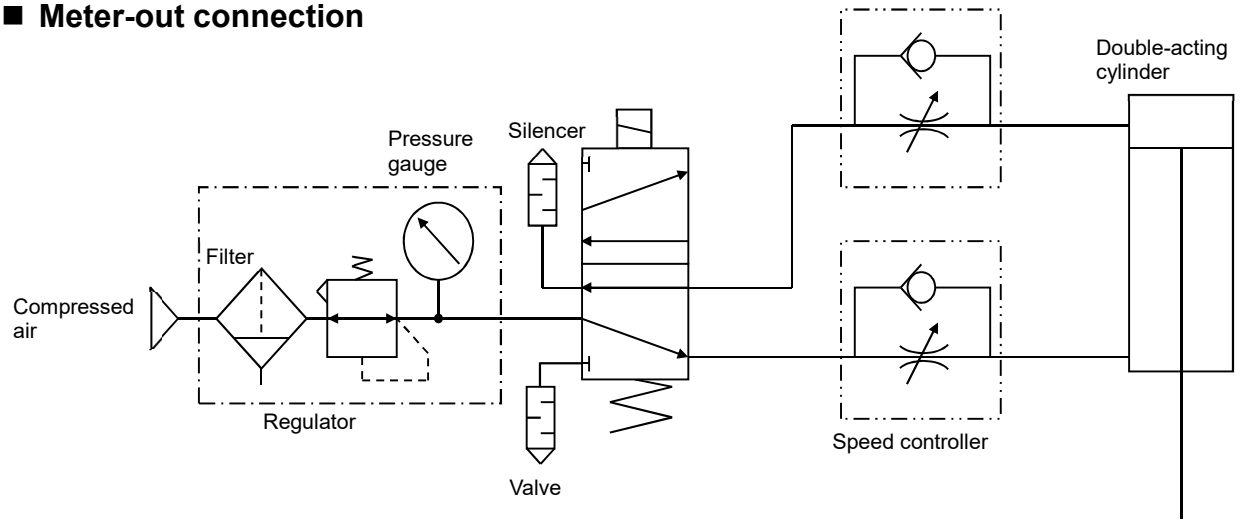
Screw size	Tightening torque (N·m)
Rc1/4	6～8
Rc3/8	13～15
Rc1/2	16～18

2.4 Piping

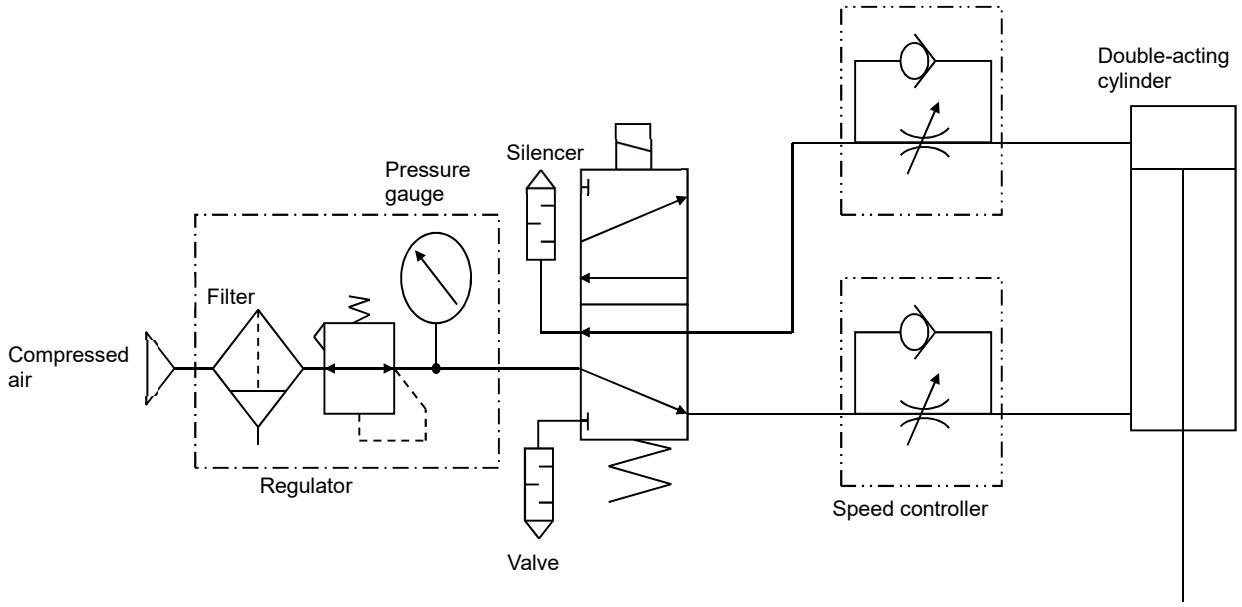
2.4.1 Basic Circuit

The figures below show the basic circuit diagrams of the speed controller.

■ Meter-out connection



■ Meter-in connection



2.4.2 Piping

⚠ CAUTION

Fully flush and clean the pipes before use.
Residual dust or foreign matter in a pipe may cause operation fault.

Connect the pipes correctly according to the direction of flow by checking the direction of the arrow.

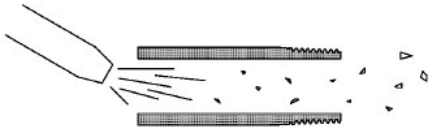
Prevent foreign matters from entering the pipes while piping and connecting the fitting.
Be careful not to allow cutting chips from the piping screw and seal material from entering the pipes while piping and connecting the fitting.
Residual dust or foreign matter in a pipe may cause lower performance of the product.

Tighten the pipes with the appropriate tightening torque.

Do not subject the body and the pipes to a bending moment that is due to pipe loads.

■ Pipe cleaning

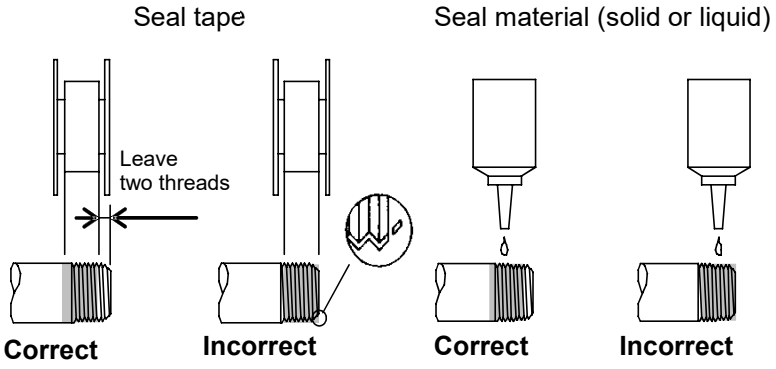
Before piping, blow air into the pipes to clean the interior and to remove cutting chips and foreign matters.



■ Seal material

Apply a seal tape or seal material to the screw threads leaving two or more threads at the pipe end uncovered or uncoated. If the pipe end is fully covered or coated, a shred of seal tape or residue of seal material may enter inside of the pipes or device and cause a failure.

When using a seal tape, wind it around the screw threads in the direction opposite from the screw threads and press it down with your fingers to attach it firmly.
When using a liquid seal material, be careful not to apply it to resin parts. The resin parts can become damaged and this may lead to a failure or malfunction.
Also, do not apply seal material to the internal threads.



3. USAGE

3.1 Safety Instructions

⚠ WARNING

Use the product within the specifications.

Control the speed by gradually turning the needle from the fully closed position.
Turning the needle counterclockwise will lift the needle to an open position.

- The product is designed for compressed air. Do not use other fluids.
- When supplying compressed air for the first time after piping is complete, make sure that there is no air leakage at the joints. Also, do not apply high pressure suddenly.
- The product is provided with a needle retaining mechanism and the needle can only be turned up to the number of needle rotations specified for each model. Do not turn the needle more than the specified number to avoid damage to the needle.
- Since the product is intended for use with compressed air, a small amount of leakage to internal and external parts that do not affect product performance is permitted.
- Since a small amount of leakage is expected even when the needle is in the fully closed position, do not use the product as a stop valve.
- Please note that when using at low pressure (0.05MPa or less), when the front and rear pipes are extremely throttled, when the cylinder speed is fast, or when the differential pressure is small, vibration noise is likely to occur.

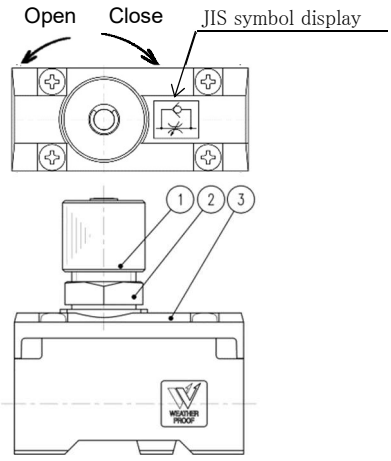
3.2 Operation

1 Turn the knob ① clockwise to close the valve, and turn it counterclockwise to open the valve.

2 Cylinder speed slow with clockwise rotation and fast with counterclockwise rotation.

3 When using the meter, turn the handle ① to the right before piping to fully close it, and then pipe so that the JIS symbol shown on the main body ③ becomes the circuit diagram shown in the 2.4.1 basic circuit. Please connect and pressure.

4 Then, rotate the handle ① to the left until the required cylinder speed is reached, and be sure to tighten the locknut ② after the position of the handle ① is determined.



Since the handle ① goes out of the flow control range after turning counterclockwise 8 to 10 times from the fully closed position of right rotation, the cylinder speed cannot be increased even if it is turned more than that.

4. MAINTENANCE AND INSPECTION

⚠ CAUTION

Use and maintain after carefully reading the handling precautions attached to the product and understanding the contents.
Do not disassemble the speed controller.
Store in a hot and humid place or in a place below 40 ° C away from direct sunlight.
This product is guaranteed for outdoor use, but it does not guarantee corrosion resistance (no rust, no discoloration).

4.1 Daily Inspection

- Thoroughly read and understand this Instruction Manual before maintenance and inspection.
- Check that the product operates properly before starting use.

4.2 Periodic Inspection

- In order to use the product under optimum conditions, perform a periodic inspection every six months.
- It is recommended to check that there is no leakage from the pipes.

5. TROUBLESHOOTING

5.1 Problems, Causes, and Solutions

If the product does not operate as intended, check the table below for a possible solution.

Problem	Cause	Solution
Drainage occurs immediately after startup.	Incorrect piping connection direction.	Check the symbol indicating the flow direction of compressed air.
	There is garbage inside.	Remove dust by alternating airbrushing from both ports.

If you have any other questions or concerns, contact your nearest CKD sales office or distributor.

6. WARRANTY PROVISIONS

6.1 Warranty Conditions

■ Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded from this warranty:

- Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or this Instruction Manual.
- Failure caused by incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.
- Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

■ Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.

■ Others

The terms and conditions of this warranty stipulate basic matters.
When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

6.2 Warranty Period

The product is warranted for one (1) year from the date of delivery to the location specified by the customer.