



# OPERATION MANUAL

## E/P REGULATOR

MODEL NAME

**ITV1000, ITV2000, ITV3000 series**

Series

《For CC-Link》

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## SMC Corporation

4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021 JAPAN

Tel: +81 3 52078249

Fax: +81 3 52985362

URL <http://www.smcworld.com>

# Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "CAUTION" "WARNING" or "DANGER". To ensure safety, be sure to observe ISO 4414 and other safety practices.

## Definition

Label	Meaning of label
! WARNING	Operator error could result in serious injury or loss of life.
! CAUTION	Operator error could result in injury or equipment damage.

## ! WARNING

**The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

**Only personnel with appropriate training should operate machinery and equipment.**

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

**Do not service machinery/equipment or attempt to remove the product until safety is confirmed.**

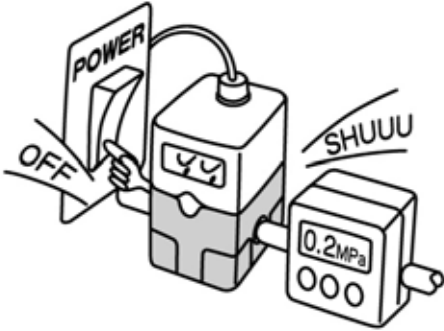
- A. Inspection and maintenance of machinery / equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
- B. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
- C. Before machinery / equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

**Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**

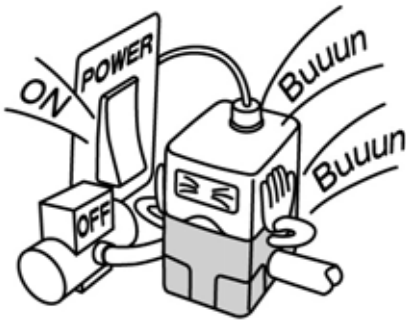
- A. Conditions and environments beyond the given specifications, or if product is used outdoors.
- B. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuit in press applications, or safety equipment.
- C. An application which has the possibility of having negative effects on people, property, or animals requiring special safety analysis.

## Precautions for Handling

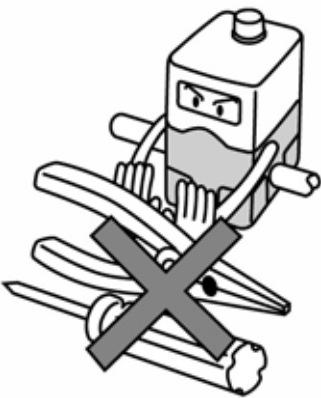
### ! CAUTION



If the power supply for this product is cut due to a power failure during controlling, the output of the secondary side is held temporarily. If the secondary side output is released to the atmosphere, air will keep coming out. Handle with care.



If the pressure supply is cut while power is supplied, the built in solenoid valve will keep operating and may make a buzzing noise. This may affect the life of the solenoid valve. Be sure to cut the power supply to the product when cutting the pressure supply.

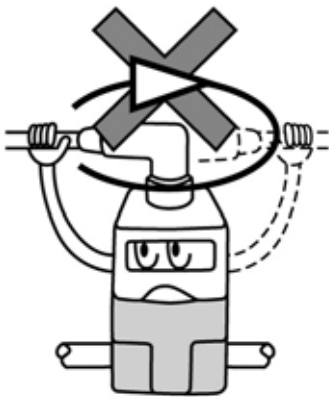
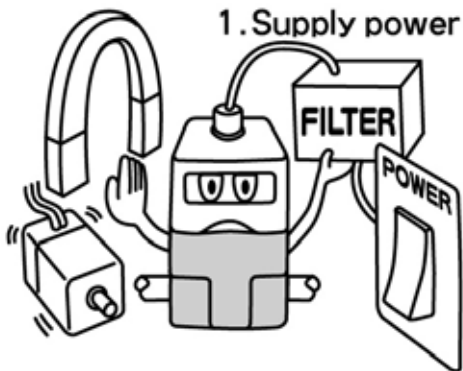


The product is adjusted to each specification at the time of shipment from the factory. Avoid unnecessary disassembly or removal of parts, as this may cause failure.

## ! CAUTION

Take the following measures against malfunction due to noise.

- 1 ) Install a line filter in the AC power supply line to remove noise.
- 2 ) Separate the signal lines from any intense electric field such as motor lines and power transmission lines as far as possible so as not to be affected by noise.
- 3 ) For inductive loads such as solenoid valves and relays, make sure to take measures against load surge.
- 4 ) Ensure the power supply is cut before removing the connector, to avoid the impact of chattering.



The right angle cable connector does not rotate. Do not rotate it.

# Wiring and LED display

## ! CAUTION

Incorrect wiring may lead to breakage.

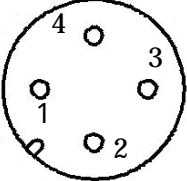
Select a DC power supply with adequate capacity with low ripple.

Insert/pull out the connector after cutting the power supply.

The right angle cable connector does not rotate. Do not rotate it.

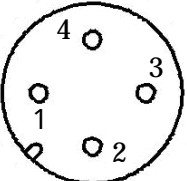
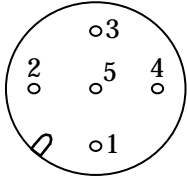
Attached bus adaptor is a part of the product. Please use it putting it on the connector for the communication.

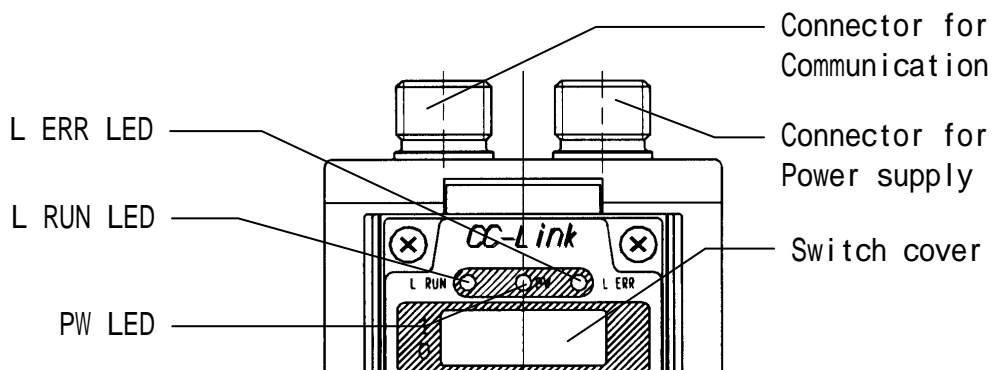
### Pin assign of ITV side connector

Item	Pin assign	Wire color (Note 1)	
Power supply connector		1 . +24[V]	Brown
		2 . F.G.	White
		3 . GND	Blue
		4 . N.C.	-
Communication connector	Please install the bus adaptor (EX9-ACY00-MJ) of the attachment.		

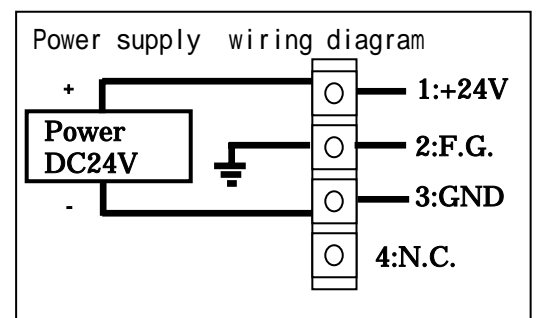
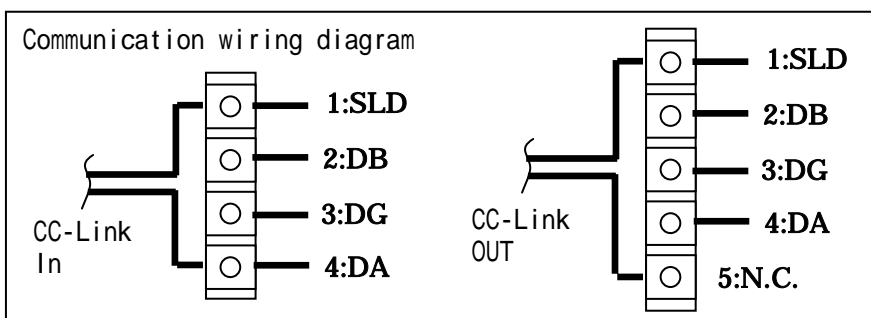
Note1) Wire color when the option cable is used.

### Pin assign of bus adaptor side connector

Item	Pin assign	Item	Socket assign		
CC-Link IN		CC-Link OUT			
				1 . SLD	1 . SLD
				2 . DB	2 . DB
				3 . DG	3 . DG
	4 . DA	4 . DA	5 . N.C.		



### Connection to external equipment



Select a DC power supply with adequate capacity with low ripple.

Ex. : Class 2 voltage source. UL1310 compliant.

For communication master (PLC), we recommend using a product for CC-Link communication with SELV circuit which is compliant to IEC 60950-1, electrical safety standard.

The communications cable recommends the use of our company PCA-1567720 (IN side) and PCA-1567717 (OUT side).

**LED indication**

Item	Turning ON	Turning OFF	Blinking
Power	Power ON	Power OFF	
L RUN	Normal (Red)	Abnormal	
L ERR	Communication error (Red) Switch setting error (Red)	Normal	The switch setting has changed at online.

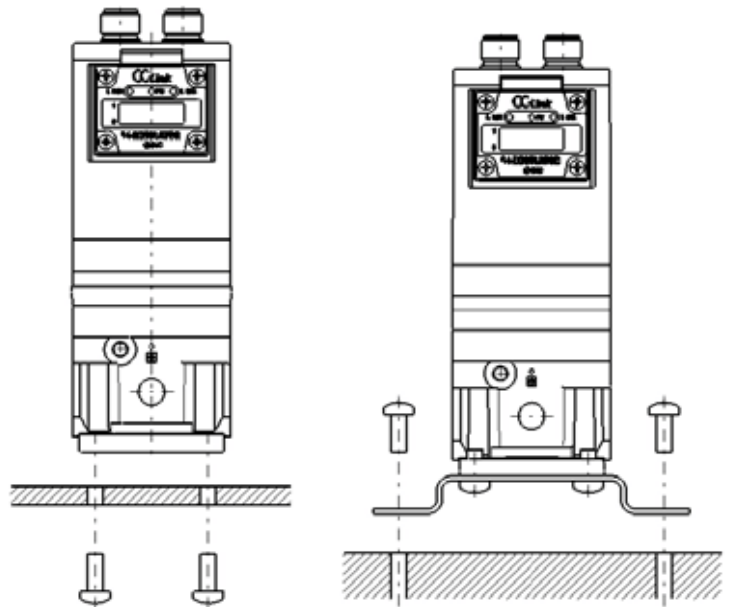
**Mounting and Installation**

**Installation**

**Direct mounting**

When the product is mounted directly onto the panel or device, use screws suitable for the thread holes below. (See drawing on the right)

Series	Mounting thread hole	Tightening torque
ITV1000	M4 × 0.7 (Depth 6)	2 ~ 3N·m
ITV2000, ITV3000	M5 × 0.8 (Through)	5 ~ 6N·m



Direct mounting

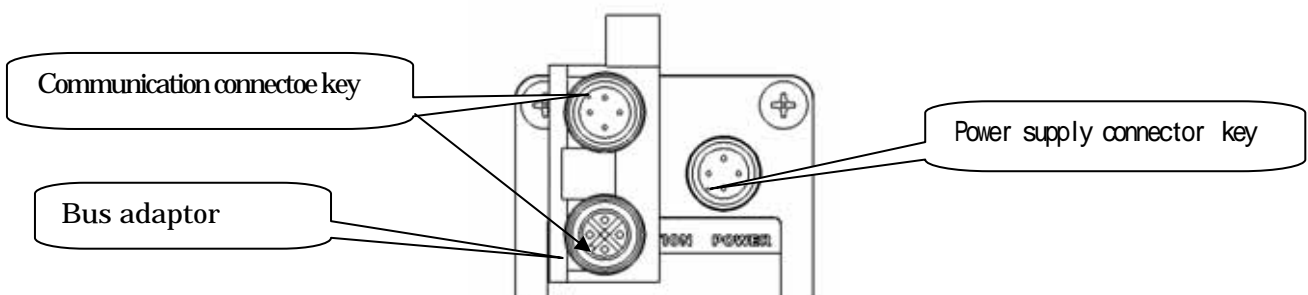
Bracket mounting

**Bracket mounting**

When the bracket is mounted to the product for mounting it onto the panel or device, fix the bracket to the product with the screws provided. (See table above for tightening torque). The hole of 7 has become empty in the bracket for a fixed screw.

**Connector mounting**

When mounting the connector with cable to the product, match up the position of the connector groove (cable side) and key (product side).



# Switch setting

## Safety Instructions for Setting

Turn off the power supply while setting the switch.

- If there is foreign matter or water droplets around the switch cover, clean it off before opening the cover.
- Refer to the drawing below for the setting at the time of shipment from the factory. Confirm the condition of switches before use and reset if necessary.

## Setting procedure

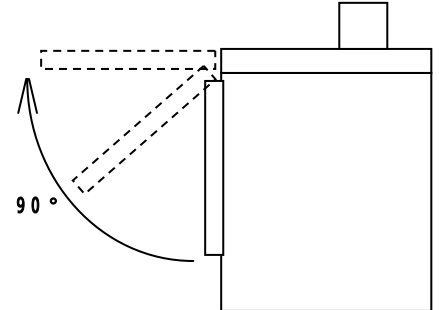
Loosen the screw(s) of the switch cover.

Open the cover from the bottom upwards (See drawing)

Set switch, referring to the setting procedure below.

After setting the switch, tighten the switch cover in the reverse order of the above procedure.

(Tightening torque 0.6 to 0.8Nm)



## Setting of node address and communication rate

Please execute the setting of node address and transmission rate with the dip switch.

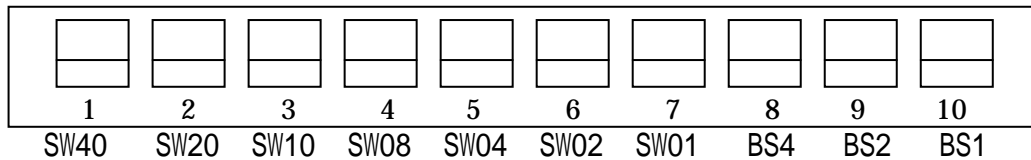


Table 1 Node address

Add.	SW40	SW20	SW10	SW08	SW04	SW02	SW01
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	OFF	ON	OFF
:	:	:	:	:	:	:	:
64	ON	ON	OFF	OFF	ON	OFF	OFF

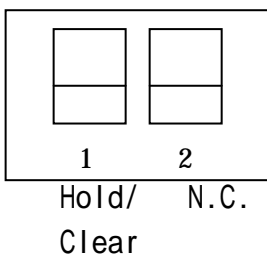
Digit of "10"

Digit of "1"

Table 2 Communication rate

Rate	BS4	BS2	BS1
0(156kbps)	OFF	OFF	OFF
1(625kbps)	OFF	OFF	ON
2(2.5Mbps)	OFF	ON	OFF
3(5.0Mbps)	OFF	ON	ON
4(10Mbps)	ON	OFF	OFF

## Setting of Hold/Clear



Please execute the setting of hold/clear with the dip switch of 2 poles. This switch is selected to hold or clear the output pressure, when the communication error due to disconnection.

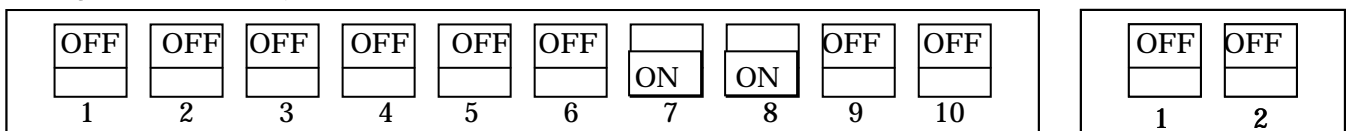
Table 3 Hold/Clear

	Switch 1	Function
Hold	ON	Hold output pressure <sup>Note</sup> .
Clear	OFF	Clear output pressure.

Note : The hold pressure is set depending on the communication data(RY00 ~ RY0F).

RY0F	Hold output pressure
1	Set depending on the data of RY00-RY0B
0	Set pressure immediately before communication abnormality

## Setting when factory is shipped



## Pressure setting and output monitoring

Pressure setting can be done by sending input data using 12bit as F.S. to the electro-pneumatic regulator through the master PLC (e.g. entering a target value to the output word data area).

Set Date	0000h	0FFFh	$[(a / \text{F.S.}) \times 4095]_{\text{HEX}}$
Output pressure	$0\% \times \text{F.S.}$	$100\% \times \text{F.S.}$	a

EX.) To set pressure at 0.3MPa by ITV2030(for 0.5MPa type)

$$(0.3\text{MPa}/0.5\text{MPa}) \times 4095 = 2457 \text{ (DEC)} = 999 \text{ (HEX)}$$

A pressure of 0.3MPa is set by sending input data of "999" to the electro-pneumatic regulator through the master PLC.

## Communication data allocation

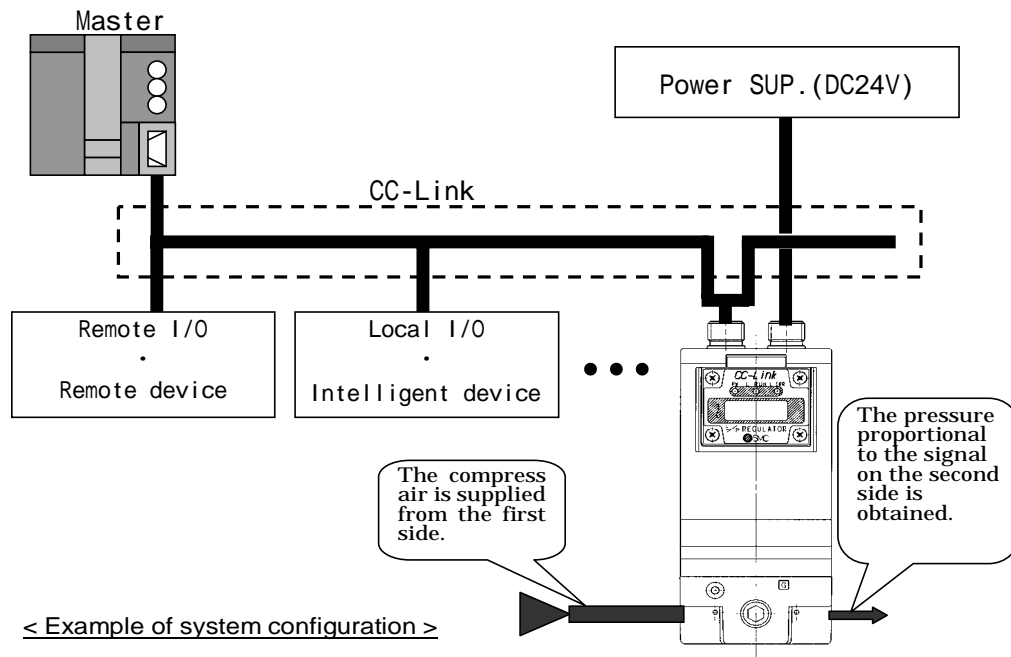
For "1" the number of the station.

Output area			Input area		
Word data area	Output word data	Remarks	Word data area	Input word data	Remarks
RWw0	$b_{15}, b_{14}, \dots, b_1, b_0$	$b_{11} \dots b_0 \text{ } \overline{\text{C}} \text{ } 100\% \text{F.S.}$	RWr0	$b_{15}, b_{14}, \dots, b_1, b_0$	$b_{11} \dots b_0 \text{ } \overline{\text{C}} \text{ } 100\% \text{F.S.}$
RWw1	Unused		RWr1	Unused	
RWw2	Unused		RWr2	Unused	
RWw3	Unused		RWr3	Unused	
Output data occupies 4 words, but uses only the 1 <sup>st</sup> word actually. The pressure is set by $b_{15}, \dots, b_1, b_0$ data. ( $b_{11} \dots b_0$ cover 100%F.S.) The limit is 1198h, data of 110%, but the guaranteed accuracy is up to 100%F.S.			Input data occupies 4 words, but uses only the 1 <sup>st</sup> word. The pressure is monitored by $b_{15}, \dots, b_1, b_0$ data. ( $b_{11} \dots b_0$ cover 100%F.S.)		
Bit data area	Output bit data		Bit data area	Input bit data	
RY00 to RY0B	Set value of holding pressure for error <sup>Note</sup>		RX00 to RX0F	Unused	
RY0C, RY0D	Unused		RX10 to RX19	Invalid (area of system)	
RY0E	Banned for use		RX1A	Flag for error	
RY0F	0: RY00 to RY0B invalid data 1: RY00 to RY0B valid data		RX1B	Remote READY	
RY10 to RY1F	Invalid (area of system)		RX1C to RX1F	Invalid (area of system)	
Note: 12bit of RY00 to RY0B (RY00: $b_0 \dots$ RY0B: $b_{11}$ ) Data will become valid when the hold/clear switch is set to hold, and RY0F is "1". The maximum value 0FFFh of data is the pressure set for 100%F.S.					



# System configuration / Applications / Specifications

This product is connected to the field bus (CC-Link) as a slave.



As shown in the structure example above, this product is to control air pressure for pneumatic equipment. Do not use it for any other application.

## Specifications

Model	ITV1010	ITV1030	ITV1050	-
	ITV2010	ITV2030	ITV2050	ITV2090
	ITV3010	ITV3030	ITV3050	-
Minimum supply pressure	Set pressure + 0.1MPa			Set pressure - 13.3kPa
Maximum supply pressure	0.2MPa	1.0MPa	1.0MPa	- 101kPa
Set pressure range	0.005 ~ 0.1MPa	0.005 ~ 0.5MPa	0.005 ~ 0.9MPa	- 1.3 ~ - 80kPa
Power source	Voltage	DC 24V ± 1.0%		
	Current consumption	0.14A or less		
Linearity	± 1%F.S. or less			
Hysteresis	0.5%F.S. or less			
Repeatability	± 0.5%F.S. or less			
Sensitivity	0.2%F.S. or less			
Temperature characteristics	± 0.12%F.S. or less /			
Operating temperature	0 to 50 (No dew condensation)			
Standards	CE marking, UL(CSA)			
Enclosure	IP65			IP65 equivalent
Model	ITV10 0	ITV20 0	ITV30 0	
Size (mm × mm × mm) (With adaptor)	50 × 50 × 161	50 × 50 × 183	66 × 66 × 204	
Weight (No option)	330 g	430 g	730 g	

## Communication specification (Common)

Item	Specifications	Remarks
Field bus	CC-Link	Ver.1.10
Baud rate (Note)	156k/625k/2.5M/5M/10M bps	Due to the dip switch
Station type	Remote device	
Occupied station number	1 station	Fixed
Node address	1 to 64	Due to the dip switch
Device type	Analog I/O	Code: 04H
Occupied area (Input/output data)	4 word / 4 word 32bit / 32bit	
Communication data resolution	12BIT(4096 resolution)	
Pressure output condition at communication error	Zero clear/ Hold pressure	Due to the dip switch

Note) Baud rate relates to communication distance.

Baud rate	Maximum extended cable length
10Mbps	100m
5Mbps	160m
2.5Mbps	400m
625Kbps	900m
156Kbps	1200m

In the above-mentioned, all equipment and cables are goods for Ver.1.10.  
Please inquire of the CC-Link society about other connection and details.

## Maintenance and inspection

Turn off the power supply, stop the supplied air, exhaust the residual compressed air and verify the release of air before performing maintenance.

Foreign matter caught in the inlet of piping or exhaust may interfere with normal operation. Periodic cleaning is necessary.

Do not use solvents such as benzene, thinner etc. to clean the product including the switch cover. Use a soft cloth to remove stains.

- Refer to the SMC website (URL <http://www.smcworld.com>) for more information about troubleshooting.
- This document describes the general purpose product. Some parts may differ for particular special products.
- This manual is subject to change without prior notice.