



## SMC VXFC06A Valve Controller User Manual

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## 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.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\*1), and other safety regulations. \*1) ISO 4414: Pneumatic fluid power — General rules relating to systems.

ISO 4413: Hydraulic fluid power — General rules relating to systems.

IEC 60204-1: Safety of machinery — Electrical equipment of machines .(Part 1: General requirements) ISO 10218: Manipulating industrial robots -Safety. etc.

## Warning

### **1. 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.

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

The product specified here may become unsafe if handled incorrectly.

The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

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

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and

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

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper



Caution

1. Allow for sufficient space for maintenance.

When installing the products, allow access for maintenance.

2. Tighten threads with the proper tightening torque.

If the screws are tightened in excessive of the specified torque range, it may damage the mounting screws, mounting brackets, board, etc.

If the tightening torque is insufficient, the mounting screws and brackets may become loose.

Nominal thread size	Appropriate tightening torque (Nm)
M3	0.2 0.3
M4	0.6 0.7



Warning

1. Check the terminal number when wiring. Incorrect wiring can lead to controller failure and malfunction. Please check the terminal number before wiring.
2. Make sure that no excessive force is applied to the lead wires. Broken lead wires will result if bending stresses or tensile forces are applied to the lead wires.

3. Check the insulation of the wiring.

Avoid defective insulation (crossed lines with other circuit, ground fault, defective insulation between terminals, etc.) with the wiring. Excessive current can flow through the controller, which may cause damage.

## **Operating Environment**

**1. Do not use in an atmosphere containing corrosive gases, chemicals, sea water, water, steam, or where there is direct contact with any of these.**

This may cause rust and/or corrosion on metal parts and deterioration of resin parts.

**2. Do not use in environments where Areas where the product may be exposed to particles or dust.**

This may cause burnout of electrical parts such as short circuits on the terminal block.

**3. Avoid direct sunlight or ultraviolet ray.**

It may break/ damage the resin parts.

**4. Do not use in potentially explosive environments.**

It must not be used in an environment with explosive gases, as there is a possibility of explosion.

**5. Do not mount the product in locations where it is exposed to radiant heat or other excessive heat.**

It may lead to damage or malfunction of the board or element.

**6. Do not store in a strong magnetic field atmosphere.**

This may cause electrical components such as transistors to malfunction.

**7. Do not operate in a location subject to vibration or impact.**

It may lead to damage or malfunction of the board or element.

## **Maintenance**

### **Warning**

**1. Perform regular inspections and confirm normal operation.**

Otherwise it may be impossible to guarantee safety due to unexpected malfunction or erroneous operation. Please check once every 6 months.

**2. Inspection before maintenance**

Turn off the power supply and check safety before removing the product.

## Warning

Turn the power switch off before changing the timer settings, etc.

Setting up with the power switch on may cause malfunction or operation non-conformance

## 2. Specifications

Table 1 Specifications

Product No.	VXFC06A	VXFC10A
Number of outputs	6	10
Common	6 in 1 common	10 in 1 common
Power supply voltage	AC85 240V	
Power supply frequency	50/60Hz	
Maximum inrush current for the power supply	15A or less (at AC100V) 30A or less at AC200V	
Load output voltage *1	AC85 to 240V 50/60Hz Same as the input power supply voltage.	
Load output current *2	0.5A/ output	
Peak load output current *3	3A or less/ output	
Minimum load current	20mA	

Leakage current		1.5mA or less at AC200V
Surge voltage suppressor		C R C:0.01μF R:120Ω
ON time	Setting range	0.01 to 0.99sec
	Min. unit	0.01sec
	How to Set	Digital switch 2 digits
	Setting accuracy	±2%
OFF time	Setting range	0 to 299sec
	Min. unit	1sec
	How to Set	Digital switch 3 digits
	Setting accuracy	±2%
Pulse repetition cycle		Possible to set 1 or 2 cycles
Operation	Single	<p>_____ Continuous operation of a single unit _____</p> <p>Temporary Stop / Start Operation</p>
	Interlinking	Cascade transmission

Ground connection	It is recommended to ground with resistance of 100 ohms or less
Ambient temperature	0 to 50°C (no condensation)
Ambient humidity	45 to 80% no condensation

※1: Use within the allowable voltage fluctuation range of the load to be connected.

※2: Check the current of the connected load does not exceed the load output current.

※3: The inrush current of the load to be connected must not exceed the peak load output current.

### 3. Names of Parts

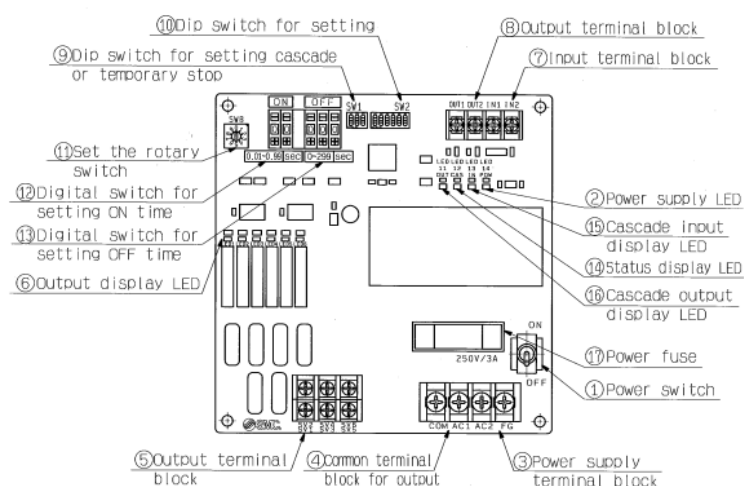


Fig. 1: Names of parts

1. Power switch Powered by turning to ON position. Output is started.
2. Power supply LED Lights up when switch is ON.
3. Power supply terminal block (M4 terminal block)  
Connected voltage becomes the output voltage of the valve.  
Connect the ground with the ground resistance of 100 ohms or less to the FG.
4. Common terminal block for output (M4 terminal block) Common terminal block for valve
5. Output terminal block (M3 terminal block) Output terminal block for valve output Output from SV1 to SV10.
6. Output display LED LED corresponding to the terminal block lights up when the valve outputs. Display color: Green
7. Input terminal block (M3 terminal block) Input terminal block for temporary stop signal or cascade trigger signal.
8. Output terminal block (M3 terminal block) Output terminal block for cascade trigger signal
9. Dip switch for setting cascade or temporary Operation is changed by the combination of the switches.



1	2	3	Operating conditions:
ON	ON	OFF	Cascade base
ON	OFF	OFF	Cascade remote
OFF	ON	OFF	Temporary stop (external power)
OFF	ON	ON	Temporary stop (internal power)
OFF	OFF	OFF	Single Operation

#### 10. DIP switch for setting

Set the number of energisations (1 or 2) for each output.ON side: twice, OFF side: once

#### 11. Set the rotary switch (Refer to 6-4).

Set the number of outputs.

#### 12. Digital switch for setting ON time

Set the output time for the valve.

Set for 6 or 10 points at once.

#### 13. Digital switch for setting OFF time

Set the pause time between outputs.

Set for 6 or 10 points at once.

#### 14. Status display LED

Lights up when cascading connection settings are enabled. (Display color: Green)

#### 15. Cascade input display LED

Lights up when cascade trigger signal is input. (Display color: Green)

Also lights up when a temporary stop signal is input.

#### 16. Cascade output display LED

Lights up when cascade trigger signal is output. (Display color: Green)

#### 17. Power fuse 250V/3A

If they become damaged, please replace them.

## 4. Wiring

### 1. Power input

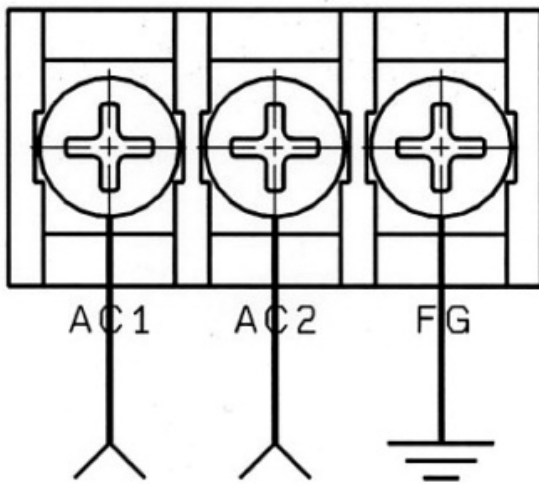


Fig. 2. Wiring diagram

2. Make sure the power switch is off. If Switch is ON Turn the switch to OFF.
3. Connect 85 to 240 VAC to the terminal block.
4. Connect the earth ground (resistance value 100 ohms or less) to the power terminal block (FG)

## 2) Valve output

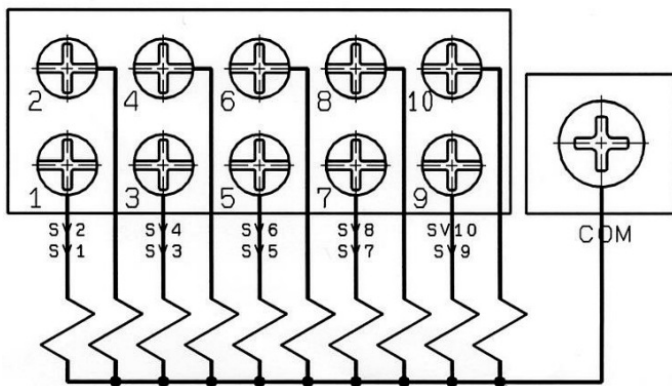


Fig. 3 Valve output wiring

1. Make sure the power supply voltage and valve rated voltage match.
2. Connect the valve to the output terminal block in order from SV1.

## 5. Description of operation

1. Check the wiring before supplying power.
  - 1) Number of output

Set the rotary switch for output setting to the number of valves to be used.  
(0 indicates 10 outputs)  
Setting is read when powered or one cycle is completed.

① "1" is specified

Fig. 4

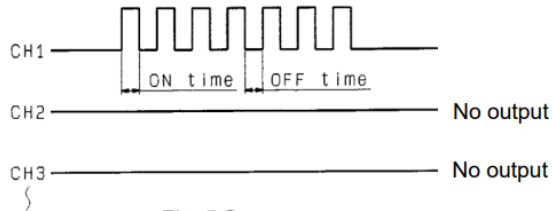


Fig. 5 Sequence

② "3" is specified

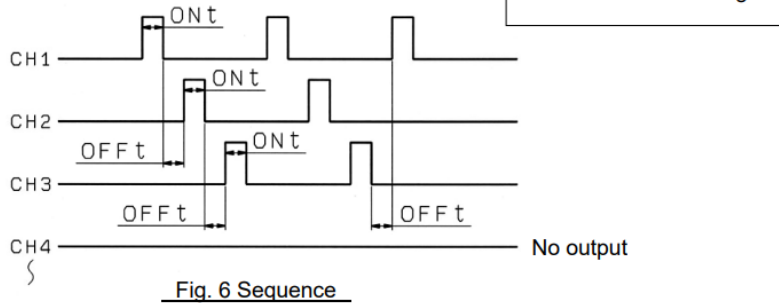


Fig. 6 Sequence

2 Setting the number of energizations (1 or 2).

Determine which valves to have 1 or 2 outputs, and set the dip switch for the correct setting. ON: twice, OFF side: once)

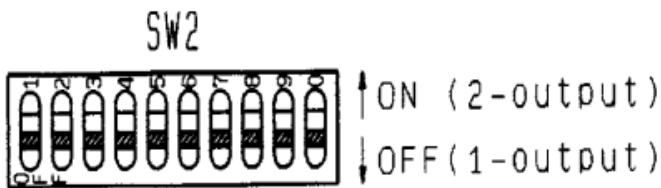


Fig.7

① When there are 4 outputs and "1" and "3" are energized twice

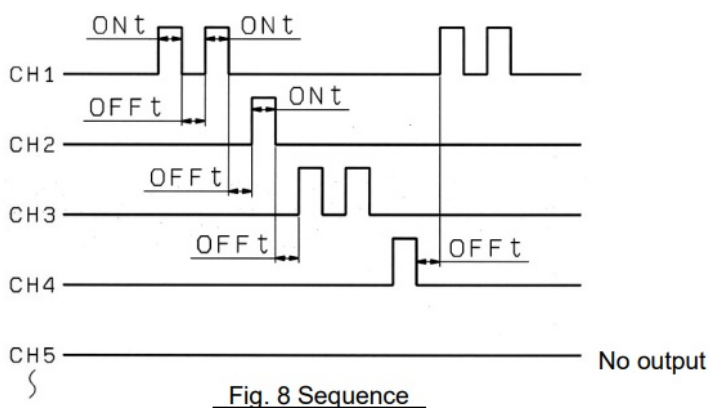


Fig. 8 Sequence

3) Time setting

Set the time to output to the valve (ON time) and the pause time (OFF time) to the next output.

※The above 1) to 3) can be changed even after power is on, but time cannot be set during operation. Changes are enabled from the next ON or OFF time.

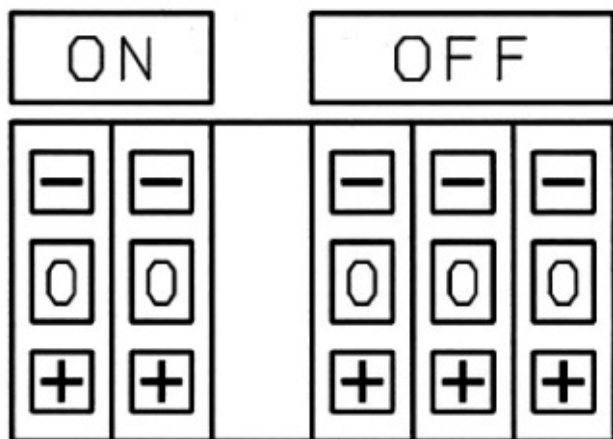


Fig. 9

① Normal output  $OFFt \neq 0$

① Normal output ( $OFFt \neq 0$ )

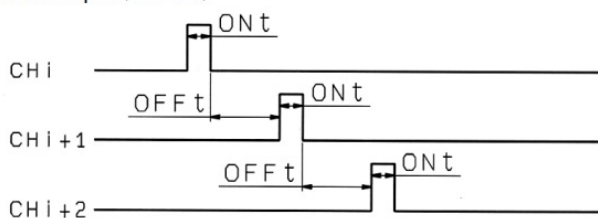


Fig. 10 Sequence

②  $OFF = 0$

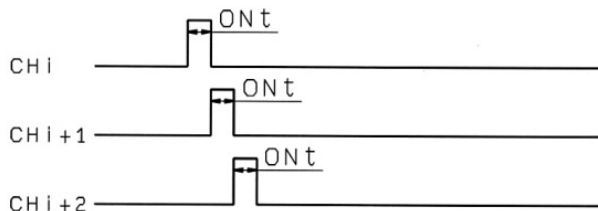


Fig. 11 Sequence

## 6. Cascade connection

There are only outputs up to 10 points (6 points in the case of VXFC06A) on a single board. However, it is possible to increase the output points by cascading (multiple board connection). VXFC06A and VXFC10A can be cascaded to create a 16-point output, and it is possible to increase to any output points by combining boards.

### I. Connection method

#### 1. In the case of no cascading connection (operation of single unit)

Do not connect anything either to the input or output terminal block.

#### 2. When connecting 2 Boards in cascade

① Set the DIP switch for cascading with one board as base and the other as remote.

② Connect the OUT1 of the base board to IN1 of the remote board and OUT2 of the base board to IN2 of the remote board.

③ Connect OUT1 of the remote board to IN1 of the base board and OUT2 of the remote board to IN2 of the base board.

### 3. In case of cascading 3 or more boards

- ① Set only one DIP switch for cascading to base, and configure other boards to the remote.
- ② Connect the OUT1 of the base board to IN1 of the remote board(1) and OUT2 of the base board to IN2 of the remote board(1).
- ③ Connect OUT1 of the remote board(1) to IN1 of the base board(2) and OUT2 of the remote board(1) to IN2 of the base board(2). In the same way, connect the remote board 3, 4 ...n.
- ④ Connect OUT1 of the remote board(n) to IN1 of the base board and OUT2 of the remote board(n) to IN2 of the base board.

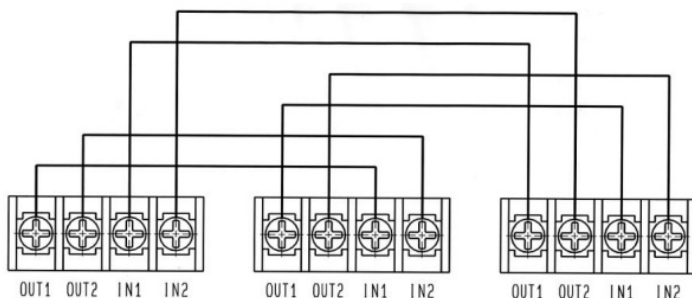


Fig. 12 Cascade connection

## II. Setting of the DIP switch for cascading

### 1) DIP switch setting

For a cascading connection, set the board that operates first to the base.

Boards connected after the base are set as remote

1	2	3	Operating conditions:
ON	ON	OFF	Cascade base
ON	OFF	OFF	Cascade remote

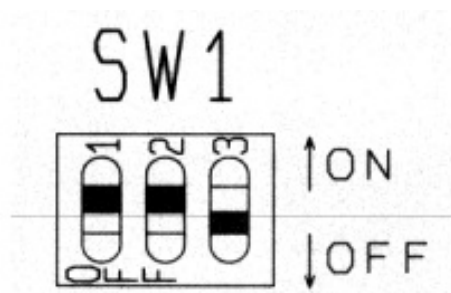


Fig. 13 Base board

## III. Example for cascade connection

### 1) Setting Cascaded board: 3 pcs

Setting	1st. board	2nd board	3rd. board
Cascading	Base	Remote	Remote
Output setting	3 output	2 output	3 output

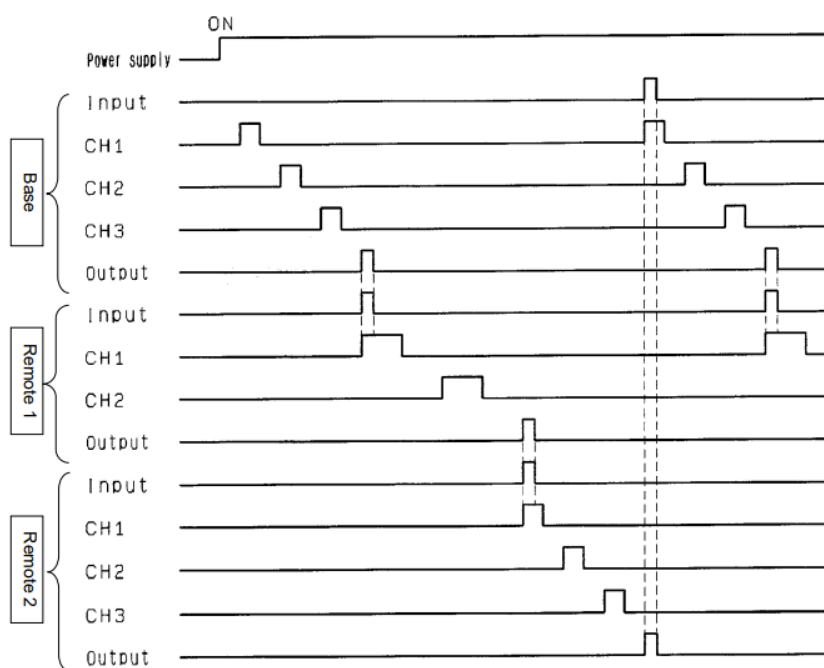
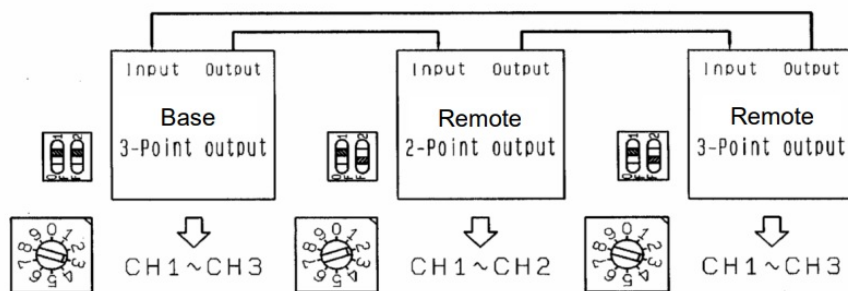


Fig. 15 Sequence

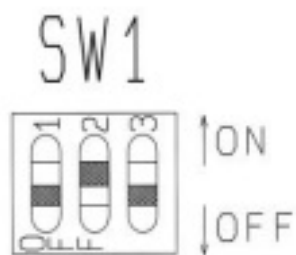
## 7. Temporary stop operation

7-1 When an external power supply is used

I. Setting of DIP switch for temporary stop.

1) DIP switch setting Change the DIP switch as shown below

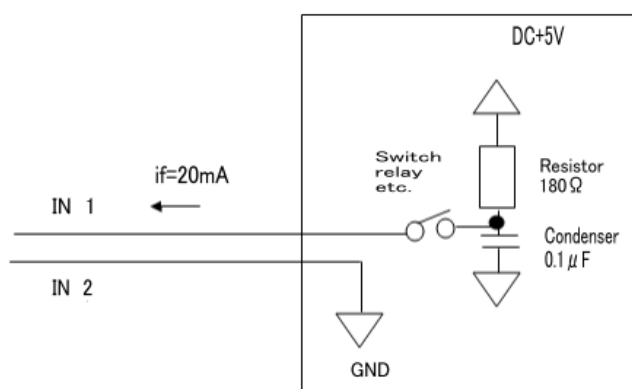
1	2	3	Operating conditions:
OFF	ON	OFF	Temporary stop



**Fig. 16**

## II. How to connect

### 1) Switch contact, relay contact output

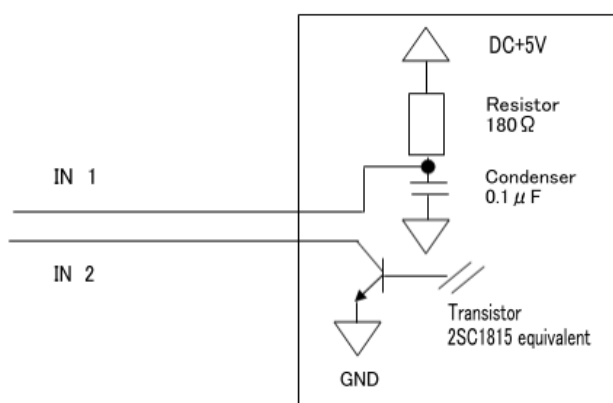


**Fig. 17**

Temporary stop operation: Switch / relay contact OFF

Re-Start Operation: Switch / relay contact ON

### 2) Transistor output



**Fig. 18**

Temporary stop operation : Transistor OFF  
Re-Start Operation: Transistor ON

3) Open collector output

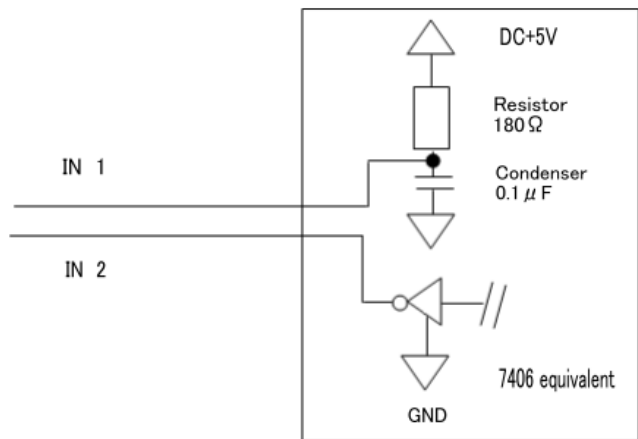


Fig. 19

Temporary stop operation: Open collector OFF  
Re-Start Operation: Open collector ON

7-2 When an internal power supply is used

I. Setting of DIP switch for temporary stop.

1) DIP switch setting

Change the DIP switch as shown below

1	2	3	Operating conditions:
OFF	ON	ON	Temporary stop

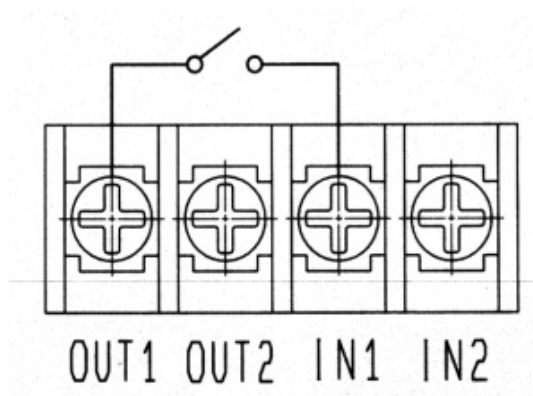


Fig. 20

II. How to Connect

1) Connect a switch with OUT1 on one side and with IN1 on the other.





**Fig. 21. Wiring for temporary stop**

7-3 Sequence when temporary stop is operating

## 1 Operation sequence

The sequence of a temporary stop is shown below.

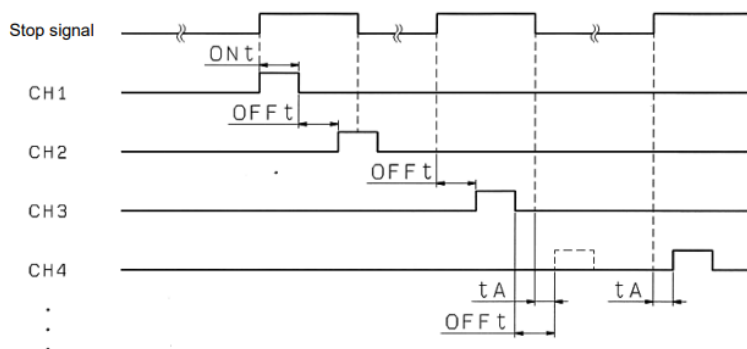
When the Switch is turned ON the temporary stop operation begins.

When the switch is turned OFF the operation stops.

Operation starts from the next output when the switch is ON again.

When the switch is turned OFF during the output, the operation stops after completing the output, and the operation stops until it is in the ON status.


If the power is OFF during operation is stopped, the status returns to the initial status



**Fig. 22 Sequence**

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References

- [!\[\]\(467d80e979964f7f8c752fb22248b5b7\_img.jpg\) SMC](#)
- [!\[\]\(b71552d33dbf62adf5e5199a70ee02bf\_img.jpg\) SMC](#)

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