INSTRUCTION MANUAL

DISCRETE INPUT OUTPUT MODULE
(Di 8 points (internal power), Do 8 points (photo MOSFET relay), connector type)

MODEL **R3Y-DAC16D**

BEFORE USE ....

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.
If you have any problems or questions with the product, please contact our sales office or representatives.

■ PACKAGE INCLUDES:

Discrete input output module..(1)

■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

POINTS OF CAUTION

■ HOT SWAPPABLE MODULES

• Replacing the module does not affect other modules on the same base. Thus, the module can be replaced while the power is ON. However, replacing multiple modules at once may greatly change live voltage levels. We highly recommend to replace them one by one.

• ON/OFF control output mode and One-shot output mode have the function of preventing erroneous output right after hot swapping modules. Data is synchronized with data stored in the interface module in the initial communication after hot swapping.
Data will not be output from a channel even if '1' is previously written in Do before hot swapping or the PLC/PC writes '1' to Do when communication has started after hot swapping. Be sure to write '0' then '1' to Do in the initial communication.
When R3Y-DAC16D is used in combination with a Modbus interface module (model: R3-NM1, R3-NE1, etc.) that does not support cyclic communication, be sure to write output data immediately before hot swapping.

■ GENERAL PRECAUTIONS

• DO NOT set the switches on the module while the power is supplied. The switches are used only for maintenance without the power.

■ ENVIRONMENT

• Indoor use.
• When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
• Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
• Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

■ WIRING

• Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
• Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

■ AND ....

• This unit is not designed to be used with the following types of interface modules (models: R3-NC2, R3-NEIP1, R3-NFx, R3-NLx).
• Output completion status data is compatible with interface modules (models: R3-NC1, R3-NC3, R3-NDx, R3-NE1, R3-NFL1, R3-NM1, R3-NM4, R3-NP1) of firmware version V2.00 or higher, and interface modules (models: R3-NM3, R3-NML3) of firmware version V1.00 or higher.
• When the pause period set in the PLC/PC is long, internal data of R3Y-DAC16D will be cleared due to communication timeout. In order to hold the internal data, set the timeout period so as to be longer than the pause period via the PC configurator software (model:R3CON).
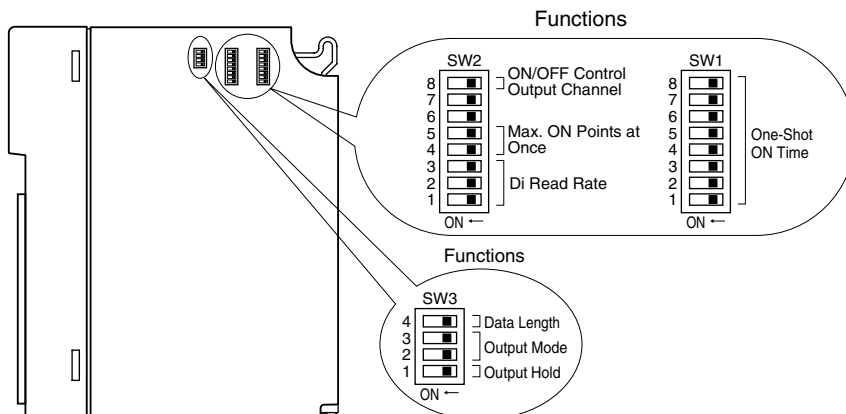
INSTALLATION

Use the Installation Base (model: R3-BSx).

COMPONENT IDENTIFICATION
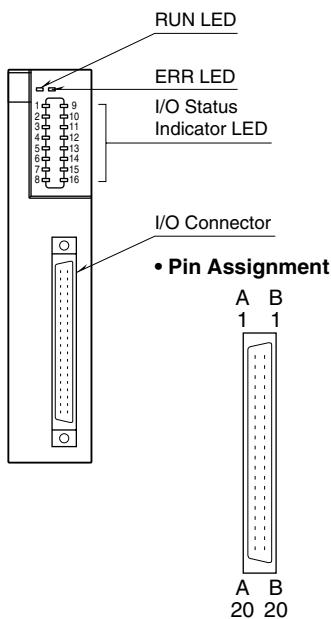
■ **FRONT VIEW**　　　　　　　■ **SIDE VIEW**

■ STATUS INDICATOR LED

RUN indicator: Bi-color (red/green) LED;
　　　　　　　　Red when the bus A operates normally;
　　　　　　　　Green when the bus B operates normally;
　　　　　　　　Amber when both buses operate normally.
ERR indicator: Bi-color (red/green) LED;
　　　　　　　　Red in error conditions;
　　　　　　　　Green in normal operating conditions.
I/O status indicator: Red LED
• 1 – 8: Input status, turns on with the inputs ON.
• 9 – 16: Output status, turns on with the outputs ON.

■ SIDE DIP SW

(*) Factory setting

• **One-Shot ON Time: SW1-1 through 1-8**

For setting Output ON time, DIP switch 1 through 8 correspond to each binary digit 1st through 8th digit. For every setting, ON time will be as indicated below.

SW	ONE-SHOT ON TIME (sec.)							
	0.1 (*)	0.2	0.3	0.4	0.5	···	25.5	25.6
SW1-1	OFF	ON	OFF	ON	OFF		OFF	ON
SW1-2	OFF	OFF	ON	ON	OFF		ON	ON
SW1-3	OFF	OFF	OFF	OFF	ON		ON	ON
SW1-4	OFF	OFF	OFF	OFF	OFF	···	ON	ON
SW1-5	OFF	OFF	OFF	OFF	OFF		ON	ON
SW1-6	OFF	OFF	OFF	OFF	OFF		ON	ON
SW1-7	OFF	OFF	OFF	OFF	OFF		ON	ON
SW1-8	OFF	OFF	OFF	OFF	OFF		ON	ON

• **Di Read Rate: SW2-1 through 2-3**

SW	Di INPUT READ RATE (≤ msec)							
	10 (*)	1	5	20	50	70	100	200
SW2-1	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW2-2	OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW2-3	OFF	OFF	OFF	OFF	ON	ON	ON	ON

• **Max. ON Points at Once: SW2-4, 2-5**

SW		MAX. ON POINTS AT ONCE
SW2-4	SW2-5	
ON	OFF	1
OFF	ON	2
OFF	OFF	4 (*)
ON	ON	8

• **ON/OFF Control Output: SW2-8**

ON/OFF control output is swappable with its pair.

SW	ON/OFF CONTROL OUTPUT	
	Not Swapped	Swapped
SW2-8	OFF (*)	ON

• **Output Hold: SW3-1**

Effective only in continuous output mode.

SW	OUTPUT HOLD	
	HOLD (*)	OFF
SW3-1	OFF	ON

• **Output Mode: SW3-2, 3-3**

SW		OUTPUT MODE
SW3-2	SW3-3	
OFF	OFF	One-Shot Output Mode (*)
ON	OFF	ON/OFF Control Output Mode
OFF	ON	Continuous Output Mode

• **Data Length: SW3-4**

Effective only in ON/OFF control output mode.

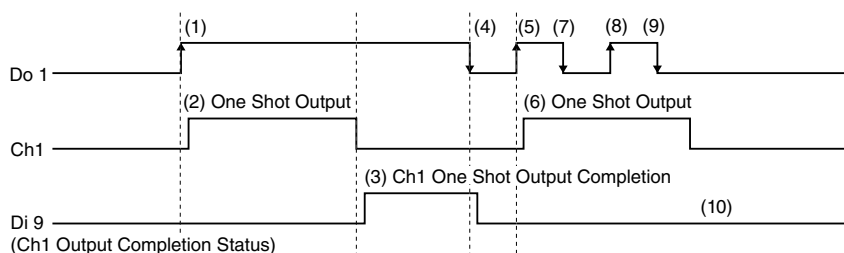| SW	DATA LENGTH	
	8 bit	4 bit
SW3-4	OFF (*)	ON

Note: Be sure to set unused SW2-6 and 2-7 to OFF.

EXAMPLE OF OPERATION MODES

■ **ONE-SHOT OUTPUT MODE** (1 through 4 show changes after Do 1 is completed. 5 through 10 changes Do 1 during output state.)

(1) Output data Do 1 changes from 0 to 1.

(2) After Do 1's rising edge, Ch1's one-shot output turns ON for a fixed period of time (SW1's time set).

(3) After one-shot output completion, Di 9 (Ch1 output completed status) changes from 0 to 1.

(4) When Do 1 changes from 1 to 0, Di 9 changes from 1 to 0.

(5) Output Data Do 1 changes from 0 to 1 again.

(6) After Do 1's rising edge, Ch1's one-shot output turns ON for a fixed period of time (SW1's time set).

(7) (8) (9) During one-shot output is ON, Do 1 changes from 0 to 1 to 0.

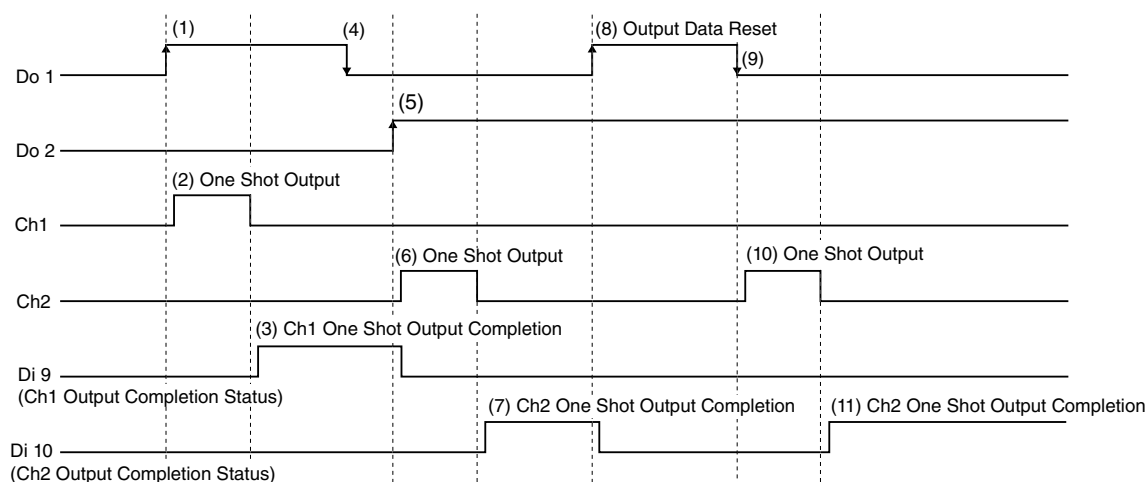(10) Since Do 1 changes to 0 during one-shot output is 1, Di 9 (Ch1 output completion status) doesn't change.

Note: During one shot output is on, rising edge and sinking edge are not detected.

■ **ON/OFF CONTROL OUTPUT MODE**

• **Data Length: 8 bits**

Example that ON/OFF control outputs sequentially Ch1 to Ch2 to Ch2 is shown below. (SW2-8 is OFF: Not Swapped)

(1) Output data Do 1 changes from 0 to 1.

(2) After Do 1's rising edge, Ch1's one-shot output turns ON for a fixed period of time (SW1's time set).

(3) After one-shot output completion, Di 9 (Ch1 output completed status) changes from 0 to 1.

(4) Do 1 changes from 1 to 0.

(5) When output data Do 2 changes from 0 to 1, Di 9 will change from 1 to 0.

(6) After Do 2's rising edge, Ch2's one-shot output turns ON for a fixed period of time (SW1's time set).

(7) After Ch2's one-shot output completion, Di 10 changes from 0 to 1.

(8) When Do 1 changes 0 to 1 during Do 2 is 1, Di 10 changes 1 to 0 (output data reset).

(9) Do 1 changes from 1 to 0.

(10) After Do 1's sinking edge, Ch2's one-shot output turns ON for a fixed period of time (SW1's time set).

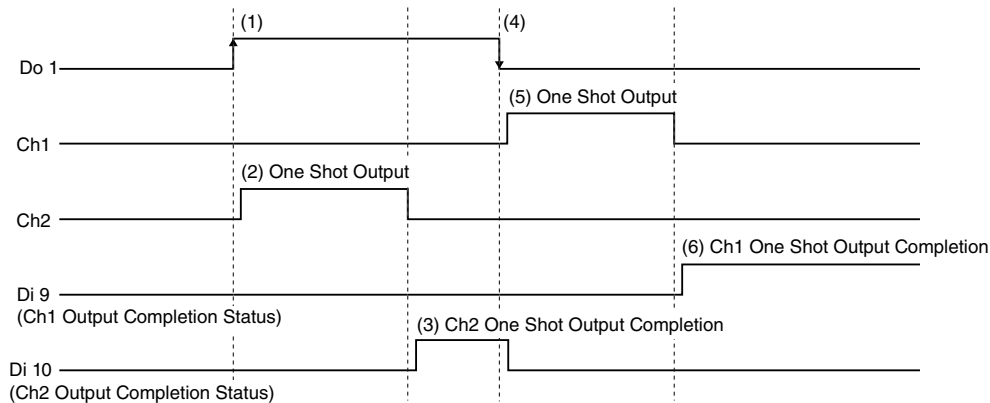(11) After Ch2's one-shot output completion, Di 10 changes from 0 to 1.

Note: During one shot output is on, rising edge and sinking edge are not detected.

• Data Length: 4 bits

Example that ON/OFF control outputs sequentially Ch2 to Ch1 is shown below. (SW2-8 is OFF: Not Swapped)

(1) Output data Do 1 changes from 0 to 1.

(2) After Do 1's rising edge, Ch2's one-shot output turns ON for a fixed period of time (SW1's time set).

(3) After one-shot output completion, Di 10 (Ch2 output completed status) changes from 0 to 1.

(4) When Do 1 changes from 1 to 0, Di 10 changes from 1 to 0.

(5) After Do 1's sinking edge, Ch1's one-shot output turns ON for a fixed period of time (SW1's time set).

(6) After one-shot output completion, Di 9 (Ch1 output completed status) changes from 0 to 1.

Note: During one shot output is on, rising edge and sinking edge are not detected.

■ **CONTINUOUS OUTPUT MODE**

Example of Ch1 is shown below.
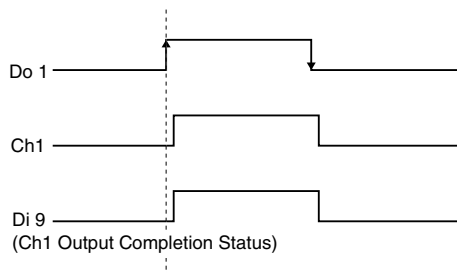
I/O DATA DESCRIPTIONS

■ ONE-SHOT OUTPUT MODE

8-bit output data (Do 1 through 8) and output (Ch1 through 8) are assigned 1:1.

Do	WRITE	ONE-SHOT OUTPUT/RESET	Di	OUTPUT COMPLETION STATUS
Do 1	1	Ch1 Output	Di 9	Ch1 Output Completion Status
	0	Ch1 Output Completion Reset		
Do 2	1	Ch2 Output	Di 10	Ch2 Output Completion Status
	0	Ch2 Output Completion Reset		
Do 3	1	Ch3 Output	Di 11	Ch3 Output Completion Status
	0	Ch3 Output Completion Reset		
Do 4	1	Ch4 Output	Di 12	Ch4 Output Completion Status
	0	Ch4 Output Completion Reset		
Do 5	1	Ch5 Output	Di 13	Ch5 Output Completion Status
	0	Ch5 Output Completion Reset		
Do 6	1	Ch6 Output	Di 14	Ch6 Output Completion Status
	0	Ch6 Output Completion Reset		
Do 7	1	Ch7 Output	Di 15	Ch7 Output Completion Status
	0	Ch7 Output Completion Reset		
Do 8	1	Ch8 Output	Di 16	Ch8 Output Completion Status
	0	Ch8 Output Completion Reset		

■ ON/OFF CONTROL OUTPUT MODE

• Data Length: 8 bits

Do 1 through 8 are assigned to Ch1 through 8.

Do	WRITE	ONE-SHOT OUTPUT/RESET	Di	OUTPUT COMPLETION STATUS
Do 1 Do 2	0 0	Not Operating		
	1 0	Ch1 Output	Di 9	Ch1 Output Completion Status
	0 1	Ch2 Output	Di 10	Ch2 Output Completion Status
	1 1	Output Data Reset		
Do 3 Do 4	0 0	Not Operating		
	1 0	Ch3 Output	Di 11	Ch3 Output Completion Status
	0 1	Ch4 Output	Di 12	Ch4 Output Completion Status
	1 1	Output Data Reset		
Do 5 Do 6	0 0	Not Operating		
	1 0	Ch5 Output	Di 13	Ch5 Output Completion Status
	0 1	Ch6 Output	Di 14	Ch6 Output Completion Status
	1 1	Output Data Reset		
Do 7 Do 8	0 0	Not Operating		
	1 0	Ch7 Output	Di 15	Ch7 Output Completion Status
	0 1	Ch8 Output	Di 16	Ch8 Output Completion Status
	1 1	Output Data Reset		

The above table shows the case of Not Swapped (SW2-8: OFF). ON/OFF control output is swapped with its pair when SW2-8 is ON. The following is an example of Do 1 and Do 2.

Do	WRITE	ONE-SHOT OUTPUT/RESET	Di	OUTPUT COMPLETION STATUS
Do 1 Do 2	0 0	Not Operating		
	1 0	Ch2 Output	Di 10	Ch2 Output Completion Status
	0 1	Ch1 Output	Di 9	Ch1 Output Completion Status
	1 1	Output Data Reset		

• Data Length: 4 bits

Do 1 through 4 are assigned to Ch1 through 8 as 1:2.

Do	WRITE	ONE-SHOT OUTPUT/RESET	Di	OUTPUT COMPLETION STATUS
Do 1	0	Ch1 Output	Di 9	Ch1 Output Completion Status
	1	Ch2 Output	Di 10	Ch2 Output Completion Status
Do 2	0	Ch3 Output	Di 11	Ch3 Output Completion Status
	1	Ch4 Output	Di 12	Ch4 Output Completion Status
Do 3	0	Ch5 Output	Di 13	Ch5 Output Completion Status
	1	Ch6 Output	Di 14	Ch6 Output Completion Status
Do 4	0	Ch7 Output	Di 15	Ch7 Output Completion Status
	1	Ch8 Output	Di 16	Ch8 Output Completion Status

The above table shows the case of Not Swapped (SW2-8: OFF). ON/OFF control output is swapped with its pair when SW2-8 is ON. The following is an example of Do 1.

| Do	WRITE	ONE-SHOT OUTPUT/RESET	Di	OUTPUT COMPLETION STATUS
Do 1	0	Ch2 Output	Di 10	Ch2 Output Completion Status
	1	Ch1 Output	Di 9	Ch1 Output Completion Status

■ CONTINUOUS OUTPUT MODE

Do 1 through 8 are assigned to and Ch1 through 8. When data Do is "1" output is ON and when it is "0" output is OFF. Output completion status Di is related to Do.

Do	CONTINUOUS OUTPUT	Di	OUTPUT COMPLETION STATUS
Do 1	Ch1 Output	Di 9	Ch1 Output Completion Status
Do 2	Ch2 Output	Di 10	Ch2 Output Completion Status
Do 3	Ch3 Output	Di 11	Ch3 Output Completion Status
Do 4	Ch4 Output	Di 12	Ch4 Output Completion Status
Do 5	Ch5 Output	Di 13	Ch5 Output Completion Status
Do 6	Ch6 Output	Di 14	Ch6 Output Completion Status
Do 7	Ch7 Output	Di 15	Ch7 Output Completion Status
Do 8	Ch8 Output	Di 16	Ch8 Output Completion Status

DATA ASSIGNMENT

■ Do

```
15                                    0
```
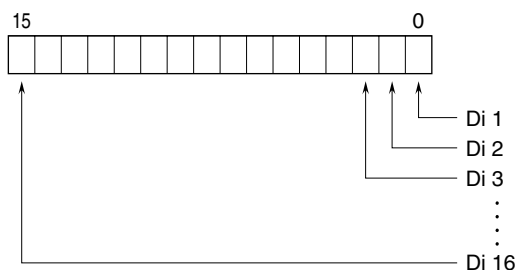
Do 1
Do 2
Do 3
⋮
Do 8
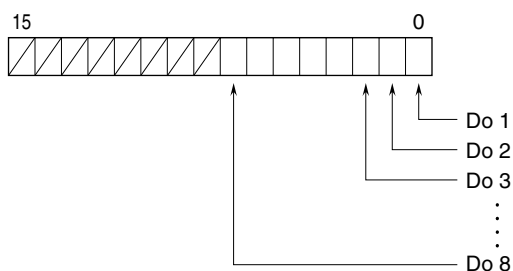
Note 1: For 4-bit length ON/OFF control mode, Do 5 through Do 8 are unavailable.
Note 2: For the combination with Modbus communication module (model: R3-NE1, R3-NM1 and such), use the addresses of Coil (0X) for Modbus I/O assignment.

■ Di

```
15                                    0
```
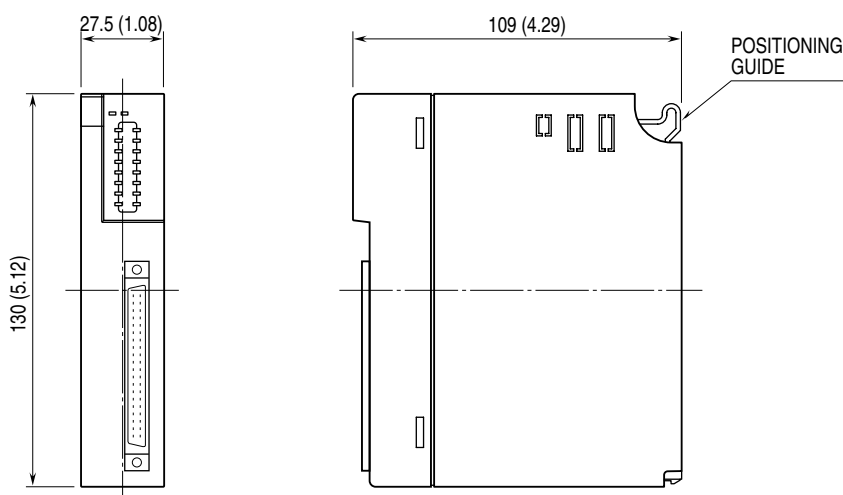
Di 1
Di 2
Di 3
⋮
Di 16

Note 1: Di 9 – 16 data is not practical discrete input data. It is "output completion status" internal data.
Note 2: For the combination with Modbus communication module (model: R3-NE1, R3-NM1 and such), use the addresses of Input (1X) for Modbus I/O assignment.
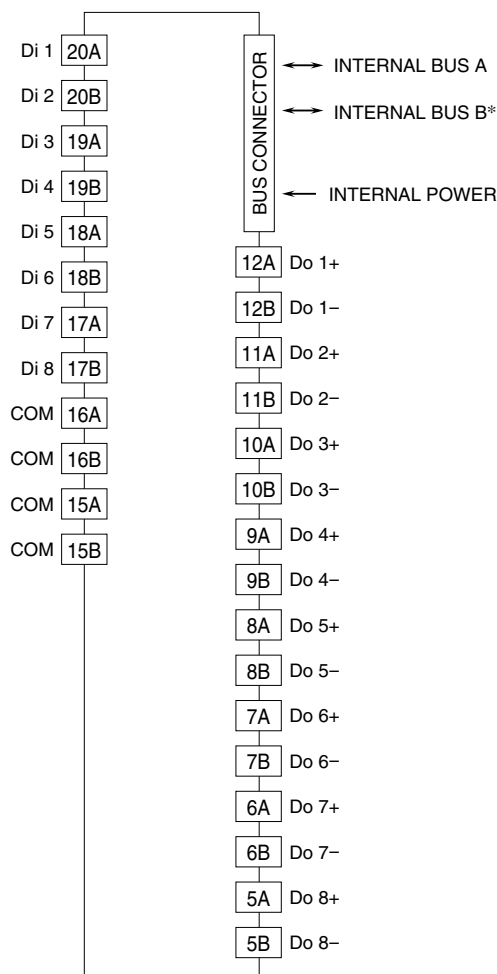
TERMINAL CONNECTIONS

Connect the unit as in the diagram below.

■ EXTERNAL DIMENSIONS unit: mm (inch)

27.5 (1.08)

130 (5.12)

109 (4.29)

POSITIONING GUIDE

■ CONNECTION DIAGRAM

Di 1 — 20A
Di 2 — 20B
Di 3 — 19A
Di 4 — 19B
Di 5 — 18A
Di 6 — 18B
Di 7 — 17A
Di 8 — 17B
COM — 16A
COM — 16B
COM — 15A
COM — 15B

BUS CONNECTOR ←→ INTERNAL BUS A
←→ INTERNAL BUS B*
←— INTERNAL POWER

12A — Do 1+
12B — Do 1−
11A — Do 2+
11B — Do 2−
10A — Do 3+
10B — Do 3−
9A — Do 4+
9B — Do 4−
8A — Do 5+
8B — Do 5−
7A — Do 6+
7B — Do 6−
6A — Do 7+
6B — Do 7−
5A — Do 8+
5B — Do 8−

*For dual redundant communication.

I/O CONNECTOR (40-pin)

PIN No.	ASSIGNMENT	PIN No.	ASSIGNMENT
1A	NC	1B	NC
2A	NC	2B	NC
3A	NC	3B	NC
4A	NC	4B	NC
5A	Do 8 +	5B	Do 8 −
6A	Do 7 +	6B	Do 7 −
7A	Do 6 +	7B	Do 6 −
8A	Do 5 +	8B	Do 5 −
9A	Do 4 +	9B	Do 4 −
10A	Do 3 +	10B	Do 3 −
11A	Do 2 +	11B	Do 2 −
12A	Do 1 +	12B	Do 1 −
13A	NC	13B	NC
14A	NC	14B	NC
15A	COM	15B	COM
16A	COM	16B	COM
17A	Di 7	17B	Di 8
18A	Di 5	18B	Di 6
19A	Di 3	19B	Di 4
20A	Di 1	20B	Di 2

FUNCTIONS

■ OUTPUT HOLD or OUTPUT OFF

In normal conditions, the module outputs the signal from the preferred bus A.

When an error is detected, the output is switched to the data from the bus B.

• Output Hold

If both are in error, the module holds the signal and stands by until one of the communications recovers.

• Output OFF

If both are in error, the module outputs OFF signals and stands by until one of the communications recovers.

At the startup, it outputs OFF until the communication is established and normal data is received.

■ MAX. ON POINTS AT ONCE

Function available for One-Shot Output Mode and ON/OFF Control Output Mode.

Divide the points to be ON at once. When the total of load current exceeds the maximum load current, "Max. ON Points at Once" function is activated.

The number of the channel turned ON is output in order from the lowest.

[Example]
Max. ON Points at Once: 1 point;
One-shot ON Time setting: 1 sec.;
Ch1, 2, 4, 8 all ON: Ch1 → Ch2 → Ch4 → Ch8 are turned ON in this order in a total time of 4 seconds.

Note: When writing in the same channel two or more times, check the previous output completion status to set the output.