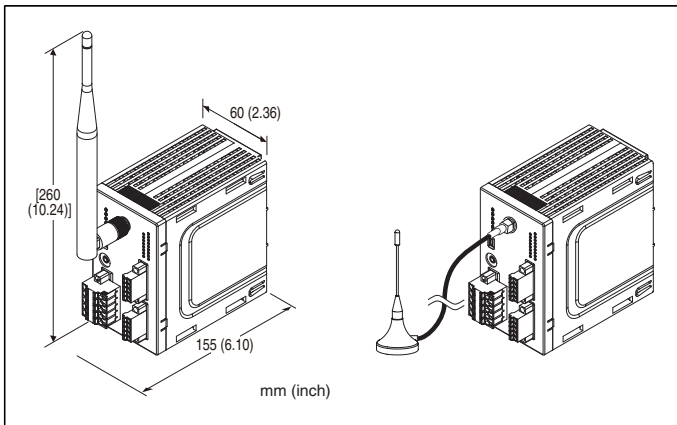


# MODEL: WL40W1F-DAC4A

## Wireless I/O WL40F Series

### WIRELESS I/O UNIT

Modbus-RTU Transparent 900MHz Band Wireless Device (Child Device), Built-in I/O, 2 contact Inputs, 2 NPN Transistor Outputs



### MODEL: WL40W1F-DAC4A-[1][2]

#### ORDERING INFORMATION

- Code number: WL40W1F-DAC4A-[1][2]  
Specify a code from below for each [1] and [2].  
(e.g. WL40W1F-DAC4A-R/E/Q)
- Specify the specification for option code /Q  
(e.g. /C01)

#### I/O TYPE

**DAC4A:** 2 contact inputs, 2 NPN transistor outputs

#### [1] POWER INPUT

##### DC Power

**S:** 12 V DC

(Operational voltage range 12 V  $\pm$ 10 %, ripple 10 %p-p max.)

**R:** 24 V DC

(Operational voltage range 24 V  $\pm$ 10 %, ripple 10 %p-p max.)

#### [2] OPTIONS (multiple selections)

##### Antenna

**/S:** Sleeve antenna

**/E:** Rooftop antenna

##### Other Options

**blank:** none

**/Q:** Option other than the above (specify the specification)

#### SPECIFICATIONS OF OPTION: Q

**COATING (For the detail, refer to M-System's web site.)**

**/C01:** Silicone coating

**/C02:** Polyurethane coating

**/C03:** Rubber coating

#### FUNCTIONS & FEATURES

This unit

- Operates as a 900MHz band wireless device (child device).
- Incorporates the module compliant with FCC Part 15, and can be used only in the United States.
- Connects inputs/outputs by wireless communication using Modbus-RTU protocol.

#### RELATED PRODUCTS

For related products of wireless device, refer to M-System's web site.

- PC configurator software (model: W920FCFG)

Downloadable at M-System's web site.

A dedicated cable is required to connect the unit to the PC. Please refer to the internet software download site or the users manual for the PC configurator software for applicable cable types.

##### Maintenance software

**Maintenance console:** MH920 Console International (model: MH920CI) (OKI)

(Maintenance software is downloadable at M-System's web site.)

##### Coaxial cable

- 7.5 m extension cable for rooftop antenna (model: CX-SAC0SAD0Q0750) (OKI)

Using 7.5 m coaxial cable for extension decreases transmission distance.

#### GENERAL SPECIFICATIONS

##### Connection

**Wireless network:** SMA coaxial connector

**Power supply:** Tension clamp (Front Twinconnection)

**Applicable wire size:** 0.2 - 2.5 mm<sup>2</sup>, stripped length 10 mm

**Input/output:** Separable tension clamp terminal

**Applicable wire size:** 0.2 - 1.5 mm<sup>2</sup>, stripped length 10 mm

**Maintenance:** Mini USB type B female connector

**Isolation:** Power input to FE1 to Contact input to Transistor output to antenna connector

**Indicator LED:** Power

#### WIRELESS SPECIFICATIONS

**Communication Standard:** IEEE 802.15.4g

**Frequency:** 900MHz band (902 - 928 MHz)

**Max. Transmission power:** 20mW

**Bandwidth:** 400 kHz

**Modulation:** GFSK

**Baud rate:** Max. 100 kbps

**Channels:** 1 to 43ch  
**Security:** 128bit AES  
**Indicator LEDs:** 920Run, 920Link, 920ERR  
**Protocol:** Modbus-RTU  
**Communication module:** Coordinator module incorporated (Oki Electric Industry Co., Ltd. )  
**Radio parameters setting:** Configurator software  
**Antenna**

- Sleeve antenna (Model: MH920-ANT-F (S))
  - Indoor use
  - Non-waterproof
  - Non-directional
  - Gain: 3.0dBi max.
- Rooftop antenna (Model: MH920-ANT-F (R))
  - Outdoor/indoor use
  - Cable length: 2.5 m
  - Waterproof performance: IPx6 (except connector)
  - Non-directional
  - Gain: 2.0dBi max.

## INPUT SPECIFICATIONS

### ■CONTACT INPUT (NPN/PNP)

**Number of input:** 2 points  
**Rated input voltage:**  
24 V DC:  $\pm 10\%$ , ripple 5 %p-p max. (for power input 24 V DC)  
12 V DC:  $\pm 10\%$ , ripple 5 %p-p max. (for power input 12 V DC)  
**ON voltage/ON Current:**  
 $\geq 16$  V DC (between input terminal and COM)/  $\geq 3.7$  mA (for power input 24 V DC)  
 $\geq 7.5$  V DC (between input terminal and COM)/  $\geq 3.7$  mA (for power input 12 V DC)  
**OFF voltage/OFF current:**  
 $\leq 5$  V DC (between input terminal and COM)/  $\geq 1$  mA (for power input 24 V DC)  
 $\leq 3$  V DC (between input terminal and COM)/  $\geq 1$  mA (for power input 12 V DC)  
**Input current:**  
 $\leq 5.5$  mA (at 24 V DC) (for power input 24 V DC)  
 $\leq 5.5$  mA (at 12 V DC) (for power input 12 V DC)  
**Input resistance:**  
approx. 4.4 k $\Omega$  (for power input 24 V DC)  
approx. 2.2 k $\Omega$  (for power input 12 V DC)  
**Read rate:**  $\leq 5$  msec.  
**ON delay time:**  $\leq 2.0$  msec.  
**OFF delay time:**  $\leq 2.0$  msec.  
**Contact input status indicator LED:** lights up when the contact is ON (DI1, DI2).

## OUTPUT SPECIFICATIONS

**Output setting:** Configurator software  
**■TRANSISTOR OUTPUT**  
**Number of output:** 2 points  
**Common:** Negative common (NPN)  
**Rated load voltage:**  
24 V DC:  $\pm 10\%$ , ripple 5 %p-p max. (for power input 24 V DC)  
12 V DC:  $\pm 10\%$ , ripple 5 %p-p max. (for power input 12 V DC)  
**Rated output current:** 0.1 A  
**Residual voltage:**  $\leq 1.2$  V  
**Leakage current:**  $\leq 0.1$  mA  
**ON delay time:**  $\leq 2.0$  msec.  
**OFF delay time:**  $\leq 2.0$  msec.  
**Overload current protection function:** Limits the current value when overcurrent is detected.  
**Overheat protection function:** Turns OFF the outputs when overheat is detected. (When driving an inductive load, connect a diode in parallel with the load.)  
**Transistor output status indicator LED:** lights up when the contact is ON (DO1, DO2).

## INSTALLATION

**Current consumption:**  
24 V DC:  $\leq 70$  mA (contact I/O load charge is not included)  
12 V DC:  $\leq 130$  mA (contact I/O load charge is not included)  
**Operating temperature:** -10 to +55°C (14 to 131°F)  
**Storage temperature:** -10 to +55°C (14 to +131°F)  
**Operating humidity:** 10 to 90 %RH (non-condensing)  
**Atmosphere:** No corrosive gas or heavy dust  
**Mounting:** DIN rail  
**Weight**  
**Unit:** Approx. 260 g (0.57 lb)  
**Sleeve antenna (standard):** 27 g (0.95 oz)  
**Rooftop antenna:** 52 g (1.83 oz)

## PERFORMANCE

**Insulation resistance:**  $\geq 100$  M $\Omega$  with 500 V DC  
**Dielectric strength:** 1500 V AC @ 1 minute  
(power input to FE1 to contact input to transistor output to antenna connector)

## STANDARDS & APPROVALS

Module conforming to FCC Part 15 incorporated

## CONFIGURATOR SOFTWARE SETTING

With configurator software, settings shown below are available.  
Refer to the users manual of W920FCFG for detailed operation.

### ■ WIRELESS SETTING

ITEM	SETTING RANGE	DEFAULT
Preferred PAN ID (group number)	0000 – FFFE (hexadecimal, 4 digits)	0000
Radio channel number	1 – 43 (selectable up to 10 channels)	None
Short address	0000 – FFFD (hexadecimal, 4 digits)	0000
Network name	English one-byte characters within 16 characters (one-byte space, “_”, “_”, “_”, “_” are usable.)	Blank
Encryption key	0000...0 – FFFF...F (hexadecimal, 32 digits)	0000...0
Transmitter power output	0.16mW / 1mW / 20mW	20mW
Low-speed moving mode	No / Yes	No
Device type in a network, Number of devices in a network	Child (fixed), 1 to 30 devices / Child (fixed), 31 to 60 devices / Child (fixed), 61 to 100 devices / Child (fixed) + child (moving)	Child (fixed), 1 to 30 devices
Set network quality	Standard (recommended) / Frequency of route switching and delay (higher) / Frequency of route switching and delay (highest)	Standard (recommended)
Network join mode	V3-compatible mode / Fast join mode	V3-compatible mode
Fixed route	No / Yes	No
Destination short address	0000 – FFFD (hexadecimal, 4 digits)	0000
Temporary detour	No / Yes	Yes
Packet filtering	None / Yes (polling type)	Yes (polling type)
Filter timeout on polling	1.0 – 60.0 (sec.)	1.0 (sec.)
920Run timeout	1.0 – 60.0 (sec.)	3.0 (sec.)
Modbus node address	1 – 247	1
Retry times before route switching	Once / Twice / Three times	Three times

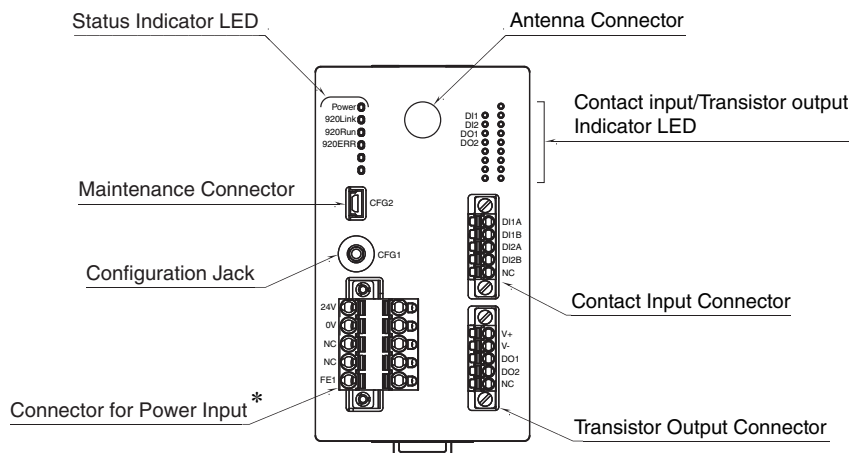
\* For version confirmation of communication module, refer to the users manual of W920FCFG.

### ■ TRANSISTOR OUTPUT SETTING

ITEM	SETTING RANGE	DEFAULT
Output status at time of 920Run communication disconnect	Hold / Clear	Hold

## EXTERNAL VIEW

### ■ FRONT VIEW



\* Power input defers depending on the power input code you select.

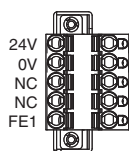
## TERMINAL ASSIGNMENTS

### ■ CONNECTORS FOR POWER INPUT

Unit side connector: MSTBV2,5/5-GF-5,08AU (Phoenix Contact)

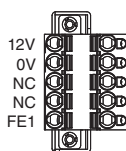
Cable side connector: TFKC2,5/5-STF-5,08AU (Phoenix Contact)

#### • Power input code: R (24 V DC)



ID	FUNCTION
24V	Power input 24 V
0V	Power input 0 V
NC	Not used
NC	Not used
FE1	Power input earth

#### • Power input code: S (12 V DC)



ID	FUNCTION
12V	Power input 12 V
0V	Power input 0 V
NC	Not used
NC	Not used
FE1	Power input earth

### ■ CONTACT INPUT CONNECTOR

Unit side connector: MC1,5/5-GF-3,5 (Phoenix Contact)

Cable side connector: FMC1,5/5-STF-3,5 (Phoenix Contact)



ID	FUNCTION
D11A	Contact input 1A
D11B	Contact input 1B
D12A	Contact input 2A
D12B	Contact input 2B
NC	Not used

### ■ TRANSISTOR OUTPUT CONNECTOR

Unit side connector: MC1,5/5-GF-3,5 (Phoenix Contact)

Cable side connector: FMC1,5/5-STF-3,5 (Phoenix Contact)



ID	FUNCTION
V+	External excitation +
V-	External excitation -
DO1	NPN transistor output 1
DO2	NPN transistor output 2
NC	Not used

## MODBUS FUNCTION CODES & SUPPORTED CODES

Modbus function codes are shown below.

### ■ DATA AND CONTROL FUNCTION

CODE	NAME	
01	Read Coil Status	Digital output from the slave (read / write)
02	Read Input Status	Status of digital inputs to the slave (read only)
03	Read Holding Registers	General purpose register within the slave (read / write)
04	Read Input Registers	Collected data from the field by the slave (read only)
05	Force Single Coil	Digital output from the slave (read / write)
06	Preset Single Registers	General purpose register within the slave (read / write)
15	Force Multiple Coils	Digital output from the slave (read / write)
16	Preset Multiple Registers	General purpose register within the slave (read / write)

### ■ EXCEPTION CODE

CODE	NAME	
01	Illegal Function	Function code is not allowable for the slave
02	Illegal Data Address	Address is not available within the slave
03	Illegal Data Value	Data is not valid for the function
04	Slave Device Failure	
05	Acknowledge	
06	Slave Device Busy	
07	Negative Acknowledge	

## MODBUS I/O ASSIGNMENT

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1, 2		Digital Output 1, 2
	3 – 16		Reserved (unused)
Input (1X)	1, 2		Digital Input 1, 2
	3 – 16		Reserved (unused)
Input Register (3X)	1 – 16	–	Reserved (unused)
Holding Register (4X)	1 – 16	–	Reserved (unused)

Note: DO NOT access addresses other than mentioned above. Such access may cause problems such as inadequate operation.

## I/O DATA DESCRIPTIONS

### ■ CONTACT INPUT DATA/TRANSISTOR OUTPUT DATA (1 BIT)

Contact input data and transistor output data are indicated each by 1 bit.

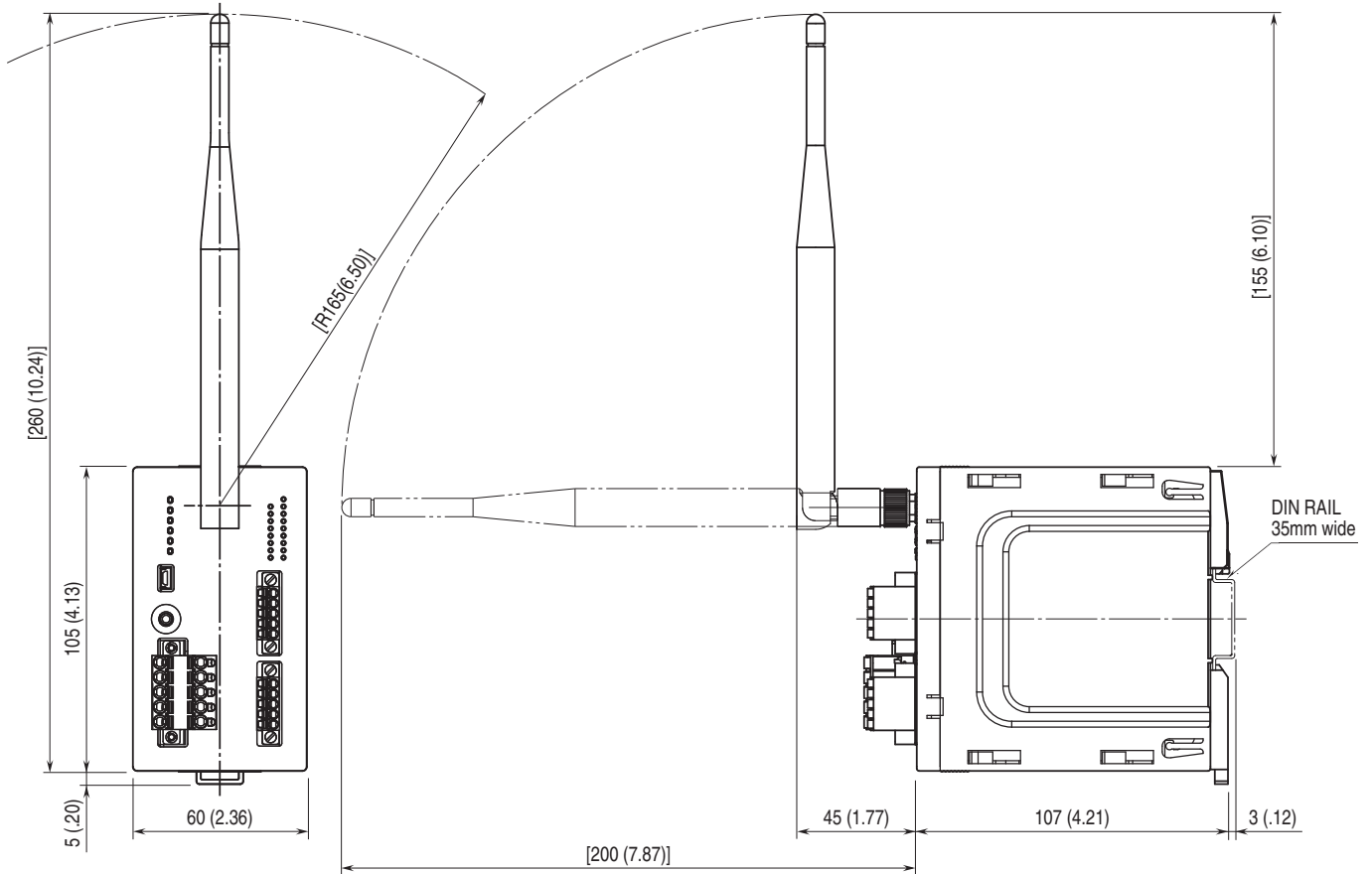
0: OFF

1: ON

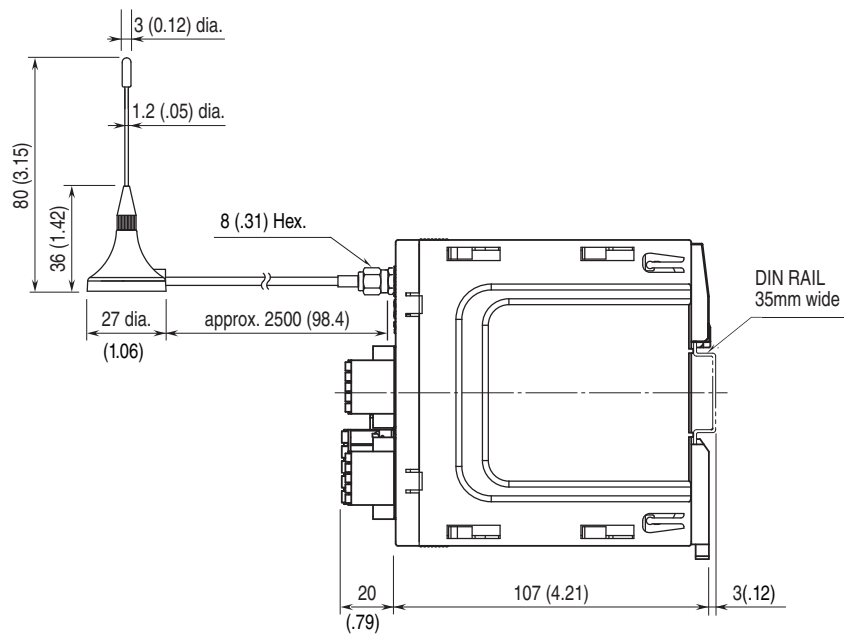
# MODEL: WL40W1F-DAC4A

## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)

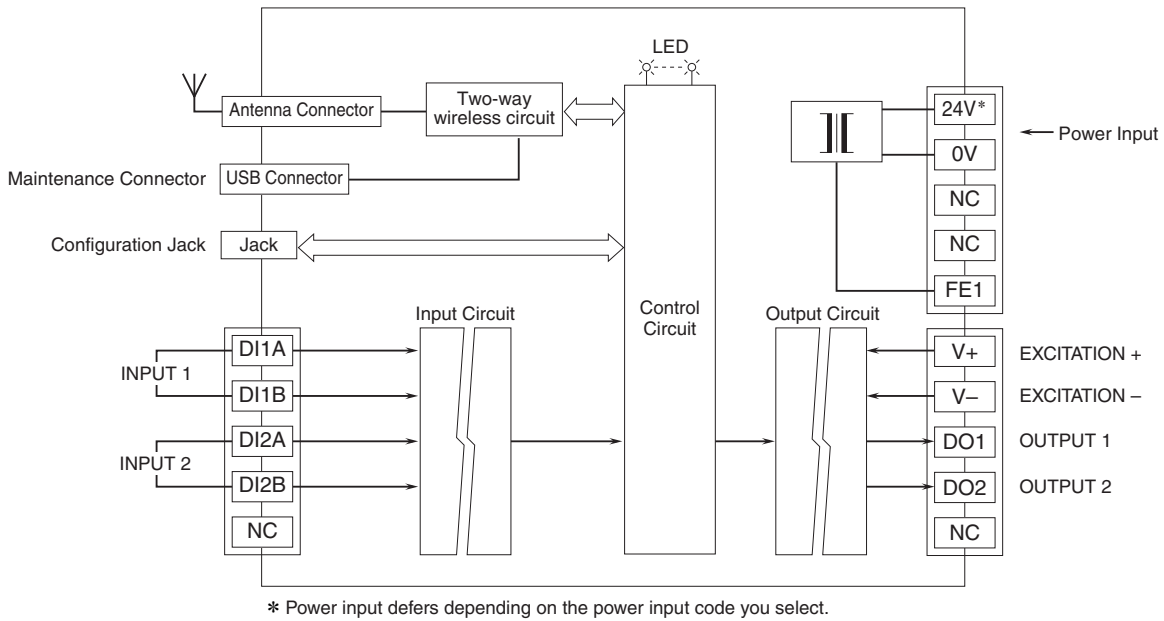
### ● WITH SLEEVE ANTENNA



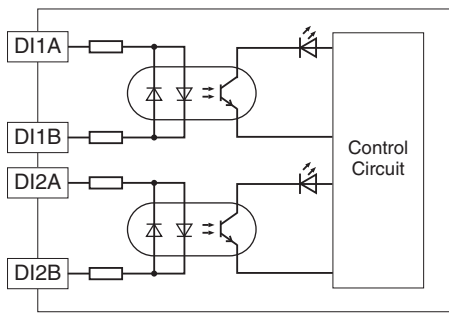
### ● WITH ROOFTOP ANTENNA



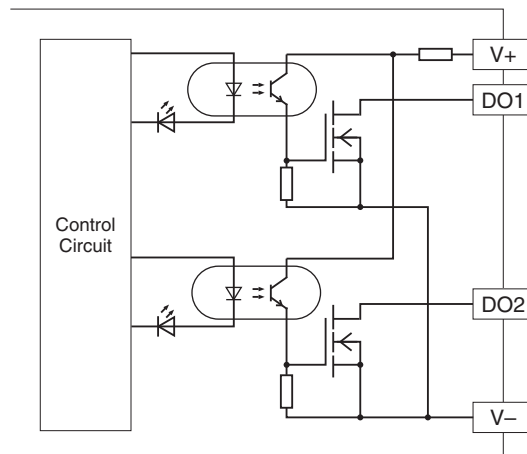
## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



### INPUT CIRCUIT

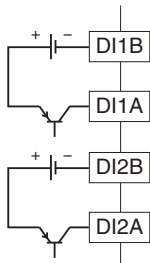


### OUTPUT CIRCUIT

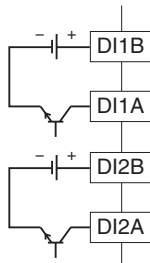


### Input Connection Example

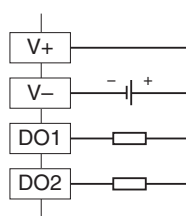
PNP connection



NPN connection



### Output Connection Example



Specifications are subject to change without notice.