

# ARD-D Series

## INSTRUCTION MANUAL

TCD210180AB



Thank you for choosing our Autonics product.

**Read and understand the instruction manual and manual thoroughly before using the product.**

**For your safety, read and follow the below safety considerations before using. For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.**

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Follow Autonics website for the latest information.

### Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

**⚠ Warning** Failure to follow instructions may result in serious injury or death.

**01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**

Failure to follow this instruction may result in personal injury, economic loss or fire.

**02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.**

Failure to follow this instruction may result in explosion or fire.

**03. Do not disassemble or modify the unit.**

Failure to follow this instruction may result in fire.

**04. Do not connect, repair, or inspect the unit while connected to a power source.**

Failure to follow this instruction may result in fire.

**05. Check 'Connections' before wiring.**

Failure to follow this instruction may result in fire.

**⚠ Caution** Failure to follow instructions may result in injury or product damage.

**01. Use the unit within the rated specifications.**

Failure to follow this instruction may result in fire or product damage.

**02. Use a dry cloth to clean the unit, and do not use water or organic solvent.**

Failure to follow this instruction may result in fire or electric shock.

**03. Keep the product away from metal chip, dust, and wire residue which flow into the unit.**

Failure to follow this instruction may result in fire or product damage.

**04. Do not cut off power or disconnect terminals while operating the unit.**

Failure to follow this instruction may result in fire or malfunction.

### Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 24 VDC≐ model power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Keep away from high voltage lines or power lines to prevent inductive noise. In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line. Do not use near the equipment which generates strong magnetic force or high frequency noise.
- Do not connect or disconnect the expansion unit when power is being supplied.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution Degree 2
  - Installation Category II

### Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

**ARD - ① ② ③ ④ ⑤**

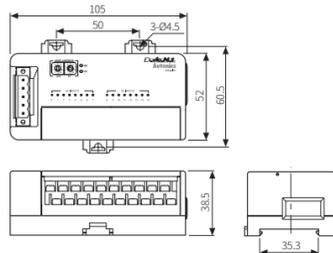
- ① Type**  
D: Digital
- ② I/O config.**  
I: input  
O: output  
X: I/O mixed
- ③ I/O points**  
08: 8-point  
16: 16-point
- ④ I/O specifications**  
N: NPN open collector  
P: PNP open collector  
A: AC voltage  
S: SSR  
R: Relay
- ⑤ Unit**  
No mark: basic unit  
E: expansion unit

### Product Components

Model	ARD-D□□□□	ARD-D□□□E
Product components	Product, instruction manual	
Network connector	× 1	-
Terminating resistance	× 2	-

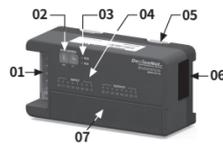
### Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.
- Same dimensions are applied to both basic and expansion unit.



### Unit Descriptions

#### Basic unit



- Network connector**
- Rotary switch**  
For setting NODE ADDRESS
- Status indicator**  
For unit status (MS) and network status (NS)
- I/O Status indicator**  
For I/O status
- Rail lock**  
For the DIN rail and panel mount
- Connector output part**  
For connecting the expansion unit
- I/O terminal block**  
For I/O with the external device

#### Expansion unit



- Connector input part**  
For connecting the basic and expansion units
- I/O status indicator**  
For I/O status
- Rail lock**  
For the DIN rail and panel mount
- Connector output part**  
For connecting the expansion unit
- I/O terminal block**  
For I/O with the external device

#### Network connector

No.	Color	Function	Pinout
5	Red	24 VDC≐ (+)	
4	White	CAN_H	
3	None	SHIELD	
2	Blue	CAN_L	
1	Black	24 VDC≐ (-)	

#### I/O status indicator

<b>Input</b>	Green LED, ON
<b>Output</b>	Red LED, ON

#### Status indicator

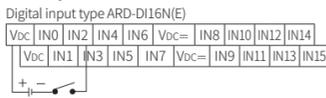
	Red LED	Green LED	Description
<b>Unit status (MS) indicator</b>	ON	OFF	Unrecoverable error
	Flashing	OFF	Recoverable error & expansion unit communication error
	OFF	ON	Normal operation
	OFF	OFF	Power is not supplied.
	OFF	Flashing	Normal operation standby
<b>Network status (NS) indicator</b>	OFF	ON	Network On-Line
	ON	OFF	Dupl. MAC ID / Bus-Off
	Flashing	OFF	Time out
	OFF	OFF	Network Off-Line

### Connections

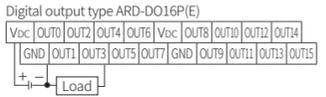
- For more information, refer to the 'Specifications.'
- When wiring the input/output terminal, tighten the connector screw with a tightening torque of 0.5 N m.
- When wiring the communication connector, use cable and tap which meet DeviceNet standard, and tighten the connector screw with a tightening torque of 0.5 N m.
- Connect terminating resistances (recommended: 120 Ω, 1 % of the metallic film, 1/4 W) on both ends of the network cables. Otherwise, impedance fluctuation could cause communication errors.
- Refer to the table below for the cable depending on the communication speed.

Comm. speed	Comm. distance	Length of branch line	Length of extended branch line
125 kbps	≤ 500 m	≤ 6 m	≤ 156 m
250 kbps	≤ 250 m	≤ 6 m	≤ 78 m
500 kbps	≤ 100 m	≤ 6 m	≤ 39 m

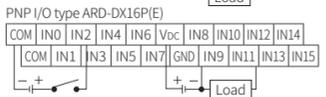
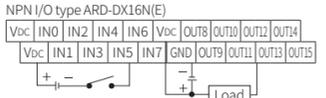
#### NPN open collector



#### PNP open collector



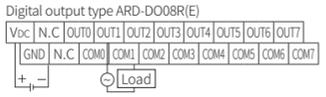
#### I/O mixed



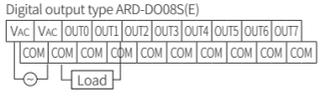
#### AC voltage



#### Relay



#### SSR



### Set NODE ADDRESS

- The NODE ADDRESS of the connected unit must not be duplicated.
- When changing the NODE ADDRESS during operation, the unit status (MS) LED flashes in red, and the unit communicates as the address before. To apply the changed NODE ADDRESS, be sure to power on again.
- The communication speed is automatically set to that of the Master (PC, PLC, etc.). When changing the communication speed during operation, the network status (NS) LED flashes in red, and communication is not possible. Power on again to operate in the normal state.

**01. Turn the two rotary switches to set the NODE ADDRESS.**  
(NODE ADDRESS range: 00 to 63)

[e.g.]

Rotary switch	X10 (tens digit)	X1 (ones digit)	NODE ADDRESS
	3	3	33

### Installation

#### Mounting on the DIN rail

- Pull three Rail locks on the rear part of a unit.
- Place the unit on the DIN rail to be mounted.
- Press the Rail locks to fix the unit tightly.

#### Mounting on the panel

- Pull three rail locks on the rear part of a unit, and there is a fixing bolt hole.
- Place the unit on a panel to be mounted.
- Make a hole on a fixing bolt hole position.
- Fasten the bolt to fix the unit tightly. (tightening torque: ≤ 0.5 N m)

### Connect Expansion Unit

- Turn OFF the power of a basic unit.
- Place an expansion unit to be installed next to the basic unit.
- Mount the expansion connector and connector input part of the expansion unit.
- Connect the expansion unit to the connector output part of the basic unit.
- Power on the basic unit, recognizing the expansion unit.

### Specifications

Model	ARD-DI16□□	ARD-DO16□□	ARD-DX16□□
<b>I/O points</b>	NPN or PNP input 16-point	NPN or PNP output 16-point	NPN or PNP I/O each 8-point (total 16-point)
<b>Control I/O</b>	Voltage	10-28 VDC≐	10-28 VDC≐ (voltage drop: ≤ 0.5 VDC≐)
	Current	10 mA/point	0.5 A/point (leakage current: ≤ 0.5 mA)
	COMMON method	8-point, common	
<b>Protection circuit</b>	Surge, short-circuit and overheat protection, reverse power protection circuit, overcurrent protection circuit (NPN type: operate at ≥ 1.9 A, PNP type: operate at ≥ 0.7 A)		
<b>Certification</b>	CE, ENEC, ETL, DeviceNet		
<b>Unit weight</b>	≈ 140 g		

Model	ARD-DI08A□	ARD-DO08S□	ARD-DO08R□
<b>I/O points</b>	AC input 8-point	SSR output 8-point	Relay output 8-point
<b>Control I/O</b>	Voltage	75-250 VAC~	30-250 VAC~
	Current	13 mA/point	1 A/point
	COMMON method	8-point, common	
<b>Protection circuit</b>	Surge, reverse power protection circuit		
<b>Certification</b>	ETL, DeviceNet		
<b>Unit weight</b>	≈ 150 g	≈ 170 g	≈ 160 g

<b>Power supply</b>	Rated voltage: 24 VDC≐, voltage range: 12-28 VDC≐		
<b>Power consumption</b>	≤ 3 W		
<b>Number of connected expansion unit</b>	8-point type: ≤ 7 units, 16-point type: ≤ 3 units		
<b>I/O points</b>	≤ 64-point		

**Communication spec.**  
I/O Slave messaging (group 2 only slave)  
: supporting Poll command, Bit\_strobe command, Cyclic command, COS command

**Communication speed (comm. distance)**  
125 kbps (≤ 500 m), 250 kbps (≤ 250 m), 500 kbps (≤ 100 m)

**Protocol**  
DeviceNet

**Approval**  
ODVA Conformance tested

**Insulation method**  
I/O and internal circuit: photocoupler insulation, DeviceNet and internal circuit: non-insulation, DeviceNet power: non-insulation

**Insulation resistance**  
≥ 200 MΩ (500 VDC≐ megger)

**Noise immunity**  
±240 VDC≐ the square wave noise (pulse width: 1 μs) by the noise simulator

**Dielectric strength**  
Between the charging part and the case: 1,000 VAC~ at 50/60 Hz for 1 min

**Vibration**  
1.5 mm amplitude at frequency 10 to 55 Hz in each X, Y, Z direction for 2 hours

**Shock**  
500 m/s<sup>2</sup> (≈ 50 G) in each X, Y, Z direction for 3 times

**Ambient temperature**  
-10 to 55 °C, storage: -25 to 75 °C (no freezing or condensation)

**Ambient humidity**  
35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)

**Protection rating**  
IP20 (IEC standard)

**Indicator**  
Network status (NS) and unit status (MS) indicator (green, red LED), I/O status indicator (input: green LED, output: red LED)

**Material**  
Front and body case: PC, rubber cap: NBR

**Mounting method**  
DIN rail or panel mounting