

# ARD-A Series

## INSTRUCTION MANUAL

TCD210182AC



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.
- 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

① Type

A: Analog

② I/O configuration

I: Input  
O: Output

③ I/O points

04: 4-point

Product Components

- Product × 1
- Network connector × 1
- Instruction manual × 1
- Terminating resistance × 2

Manual

For proper use of the product, refer to the manuals and be sure to follow the safety considerations in the manuals.

Download the manuals from the Autonics website.

Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.

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

■ ARD-AI04

01) For the current input, short between V0+ and I0+.

■ ARD-AO04

Unit Descriptions

01. Network connector

02. Rotary switch  
For setting NODE ADDRESS

03. Status indicator  
For unit status (MS) and network status (NS)

04. Rail lock  
For the DIN rail and panel mount

05. DIP switch  
For setting the I/O range

06. 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≐ (-)	

■ Status indicator

Status indicator		Description	Troubleshooting
Unit (MS)	Network (NS)		
Green LED ON	Green LED ON	Normal operation	-
Green LED ON	OFF	Standby of checking duplicated NODE ADDRESS	-
Green LED ON	Green LED Flashing	Standby of normal operation	-
Red LED ON	OFF	Watchdog timer error	Replace the Slave unit.
Red LED Flashing	OFF	Switch setting error	Change the switch setting to valid value and supply the power again.
Red LED Flashing	Green LED ON	Changed NODE ADDRESS during normal operation	Change to the initial NODE ADDRESS when the power was supplied at first.
Green LED ON	Red LED ON	Invalid NODE ADDRESS	Change to the valid NODE ADDRESS and supply the power again.
Red LED ON	Red LED ON	Duplicated NODE ADDRESS	Change NODE ADDRESS not to be duplicated.
Red LED ON	Red LED ON	Bus-Off error	Power on the Slave unit again. Check the Master unit, communication cable, terminating resistance and noise of network.
Green LED ON	Red LED Flashing	I/O Connection time out	Check the setting of Master and the user program.

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

01. Pull two Rail locks on the rear part of a unit.

02. Place the unit on the DIN rail to be mounted.

03. Press the Rail locks to fix the unit tightly.

■ Mounting on the panel

01. Pull two rail locks on the rear part of a unit, and there is a fixing bolt hole.

02. Place the unit on a panel to be mounted.

03. Make a hole on a fixing bolt hole position.

04. Fasten the bolt to fix the unit tightly. (tightening torque: ≤ 0.5 N m)

DIP Switch Setting

- The input/output range can be set via the DIP switch. However, CH0 - CH1 / CH2 - CH3 cannot be set separately.
- SW7: Not used
- SW8: [ON] DIP switch setting [OFF] communication setting (each channel)
- ON: ■ / OFF: □

■ ARD-AI04

No.	Input range	Max. allowable input range	CH0, CH1			CH2, CH3		
			SW1	SW2	SW3	SW4	SW5	SW6
1	0 to 5 VDC≐	-0.25 to 5.25 VDC≐	□	□	□	□	□	□
2	1 to 5 VDC≐	0.8 to 5.2 VDC≐	■	□	□	■	□	□
3	0 to 10 VDC≐	-0.5 to 10.5 VDC≐	□	■	□	□	■	□
4	-5 to 5 VDC≐	-5.5 to 5.5 VDC≐	■	■	□	■	■	□
5	-10 to 10 VDC≐	-11 to 11 VDC≐	□	□	■	□	□	■
6	DC 4 to 20 mA	DC 3.2 to 20.8 mA	■	□	■	■	□	■
7	DC 0 to 20 mA	DC 0 to 21 mA	□	■	■	□	■	■

■ ARD-AO04

No.	Output range	Max. allowable output range	CH0, CH1			CH2, CH3		
			SW1	SW2	SW3	SW4	SW5	SW6
1	0 to 5 VDC≐	-0.25 to 5.25 VDC≐	□	□	□	Not used		
2	1 to 5 VDC≐	0.8 to 5.2 VDC≐	■	□	□			
3	0 to 10 VDC≐	-0.5 to 10.5 VDC≐	□	■	□			
4	-5 to 5 VDC≐	-5.5 to 5.5 VDC≐	■	■	□			
5	-10 to 10 VDC≐	-11 to 11 VDC≐	□	□	■			
6	DC 4 to 20 mA	DC 3.2 to 20.8 mA	Not used			□	□	□
7	DC 0 to 20 mA	DC 0 to 21 mA				■	□	□

Specifications

Model		ARD-AI04	ARD-AO04
Power supply		Rated voltage: 24 VDC≐, voltage range: 12-28 VDC≐	
Power consumption		≤ 3 W	
Output points		Input 4-point (switchable voltage/current)	Output 4-point (voltage 2 CH, current 2 CH)
Control I/O	Voltage	0-10 VDC≐, -10-10 VDC≐, 0-5 VDC≐, 1-5 VDC≐, -5-5 VDC≐ (input impedance: ≥ 1 MΩ)	0-10 VDC≐, -10-10 VDC≐, 0-5 VDC≐, 1-5 VDC≐, -5-5 VDC≐ (load resistance: ≥ 1 kΩ)
	Current	DC 4-20 mA, DC 0-20 mA (input impedance: 250 Ω)	DC 4-20 mA, DC 0-20 mA (load resistance: ≤ 600 Ω)
	Max. allowable I/O	± 5 % F.S. of I/O range	
	Resolution	14 bits, 1/16,000	
	Accuracy	At room temperature (25 °C ± 5 °C) range: ± 0.3 % F.S. Out of room temperature range: ± 0.6 % F.S.	
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	
Insulation method		I/O and internal circuit: non-insulation, DeviceNet and internal circuit: insulation, DeviceNet power: insulation	
Insulation resistance		≥ 200 MΩ ( 500 VDC≐ megger)	
Noise immunity		± 500 VDC≐ the square wave noise (pulse width: 1 μs) by the noise simulator	
Dielectric strength		Between the charging part and the case: 500 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 50 °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)	
Protection circuit		Surge and ESD protection, reverse power protection circuit	
Indicator		Network status (NS) and unit status (MS) indicator (green, red LED)	
Material		Front and body case: PC	
Mounting method		DIN rail or panel mounting	
Certification		CE 标志 ENEC DeviceNet	CE 标志 ENEC DeviceNet compatible
Unit weight (packaged)		≈ 145 g (≈ 210 g)	≈ 145 g (≈ 210 g)