

# Autonics

## Modbus Digital Remote I/O Sensor Connector Type

### ARM SERIES

#### INSTRUCTION MANUAL



Thank you for choosing our Autonics product.  
Please read the following safety considerations before use.

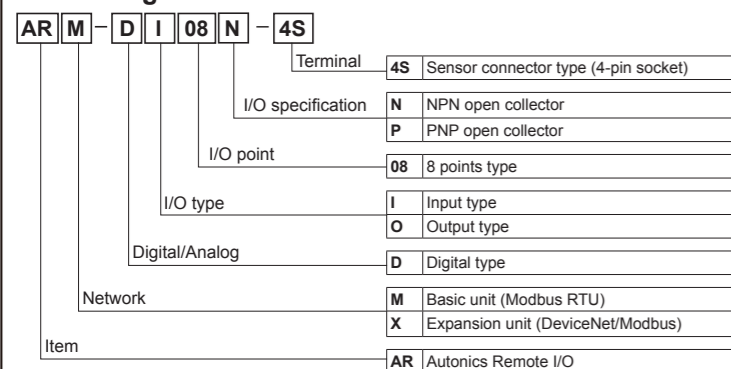
### Safety Considerations

- ⚠ Please observe all safety considerations for safe and proper product operation to avoid hazards.
  - ⚠ symbol represents caution due to special circumstances in which hazards may occur.
  - Warning** Failure to follow these instructions may result in serious injury or death.
  - Caution** Failure to follow these instructions may result in personal injury or product damage.
- Warning**
- Fall-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 fire, personal injury, or economic loss.
  - Do not disassemble or modify the unit.**  
Failure to follow this instruction may result in fire.
  - Do not connect, repair, or inspect the unit while connected to a power source.**  
Failure to follow this instruction may result in fire.
  - Check 'Connections' before wiring.**  
Failure to follow this instruction may result in fire.

### Caution

- Use the unit within the rated specifications.**  
Failure to follow this instruction may result in fire or product damage.
- Use dry cloth to clean the unit, and do not use water or organic solvent.**  
Failure to follow this instruction may result in fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**  
Failure to follow this instruction may result in fire or explosion.
- Keep metal chip, dust, and wire residue from flowing into the unit.**  
Failure to follow this instruction may result in fire or product damage.
- Do not disconnect connector or power, when the product is operating.**  
Failure to follow this instruction may result in fire or malfunction.

### Ordering Information



### Functions

- Low-speed (16-bit/30CPS) counter function**
- Auto communication speed recognition:** The unit enables to recognize communication speed automatically when connecting with upper system (PC, PLC).
- Additional expansion units:** Available to connect expansion units up to 7. I/O points can be expanded up to max. 64.
- Reading the number of expansion units:** Reads the number of connected expansion units.
- Reading the unit model name:** Reads the model name of connected units.
- Reading the unit specification:** Reads the specification of connected units.
- Setting for address in the EEPROM:** For setting the address, user can set directly in the EEPROM MAC ID parameter besides the rotary switch for address.

### Manual

For the detail information and instructions of communication setting and Modbus mapping table, please refer to user manual for communication, and be sure to follow cautions written in the technical descriptions (catalog, homepage).  
Visit our homepage ([www.autonics.com](http://www.autonics.com)) to download manuals.

⚠ The above specifications are subject to change and some models may be discontinued without notice.  
⚠ Be sure to follow cautions written in the instruction manual, communication manual, and the technical descriptions (catalog, homepage).

### Models

Models	Expansion unit	Specification
ARM-DI08N-4S	ARX-DI08N-4S	10-28VDC NPN input 8-point, low-speed counter (10mA/point)
ARM-DI08P-4S	ARX-DI08P-4S	10-28VDC PNP input 8-point, low-speed counter (10mA/point)
ARM-DO08N-4S	ARX-DO08N-4S	10-28VDC NPN output 8-point, low-speed counter (0.3A/point)
ARM-DO08P-4S	ARX-DO08P-4S	10-28VDC PNP output 8-point, low-speed counter (0.3A/point)

⚠ Low speed counter of digital output type is available only when using with digital input type.

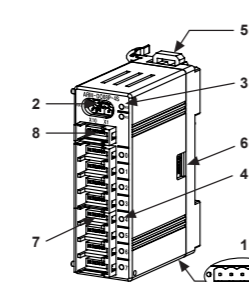
### Specifications

Model	Basic unit	ARM-DI08N-4S	ARM-DI08P-4S	ARM-DO08N-4S	ARM-DO08P-4S
Power supply	Expansion unit	ARX-DI08N-4S	ARX-DI08P-4S	ARX-DO08N-4S	ARX-DO08P-4S
Power consumption	Max. 3W				
I/O points	NPN input 8-point		PNP input 8-point	NPN output 8-point	
Control I/O	Voltage	10-28VDC= input		10-28VDC= output (voltage drop: max. 0.5VDC=)	
	Current	10mA/point (sensor current: 150mA/points)		0.3A/point (leakage current: max. 0.5mA)	
	Common	8-point, common			
Special function (input)	Counter for 16-bit (30CPS*) (only when using digital input of ARM, ARX)				
Communication speed**	2400, 4800, 9600, 19200, 38400, 57600, 115200bps (default: 9600bps)				
Communication method	2-wire half duplex				
Communication distance	Max. 800m				
Multi-drop	Max. 32 multi-drop				
Medium access	POLL				
Application standard	Compliance with EIA RS485				
Protocol	Modbus RTU				
Data bit	8-bit				
Stop bit	1-bit or 2-bit (default: 2-bit)				
Parity bit	None/Odd/Even (default: none)				
Isolation method	I/O and inner circuit: photocoupler insulation Modbus to internal bus and inner circuit: insulation Unit power: non-insulation				
Insulation resistance	Over 200MΩ (at 500VDC megger)				
Noise immunity	±240V the square wave noise (pulse width: 1us) by the noise simulator				
Dielectric strength	1,000VAC 50/60Hz for 1 minute				
Vibration	1.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours				
Shock	500m/s <sup>2</sup> (approx. 50G) in each X, Y, Z direction for 3 times				
Environment	Ambient temp.	-10 to 55°C, storage: -25 to 75°C			
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH			
Protection structure	IP20 (IEC standards)				
Protection circuit	Surge, short-circuit, overheat (over 165°C) and ESD protection, reversed polarity protection circuit				
Indicator	Network status (NS) LED (green, red), unit status (MS) LED (green, red) I/O status LED (input: green, output: red)				
Material	Front case, body case: Polycarbonate				
Mounting	DIN rail or bolt mounting type				
Approval	CE				
Weight**	Basic	Approx. 123.3g (approx. 61.8g)	Approx. 123.3g (approx. 61.8g)	Approx. 123.3g (approx. 61.8g)	Approx. 123.3g (approx. 61.8g)
	Expansion	Approx. 117.5g (approx. 56g)	Approx. 118.5g (approx. 57g)	Approx. 119.5g (approx. 58g)	Approx. 120.5g (approx. 59g)

\*1: CPS (counter per second): Specification of accepting external signals per second  
\*2: The communication speed is automatically set to the communication speed 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.  
\*3: The weight includes packaging. The weight in parenthesis is for unit only.  
⚠ Environment resistance is rated at no freezing or condensation.

### Unit Description

#### Basic unit

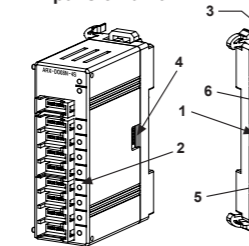


#### 1. Network connector

No.	For	Organization
5	24VDC (+)	5: 24VDC
4	GND	4: GND
3	N-C	3: N-C
2	B	2: B
1	A	1: A

- Rotary switch for address:** Rotary switch for setting the address ×10 represents tens digit and ×1 represents ones digit.
- Status LED:** It displays the status of unit (MS) and network (NS).
- I/O status LED:** It displays each I/O status.
- Rail lock:** It is used for mounting DIN rail or with bolt.
- Connector output part:** It connects an expansion unit.
- Sensor connector:** It is used for connecting external device I/O.
- External power connector:** It is used for supplying external power.

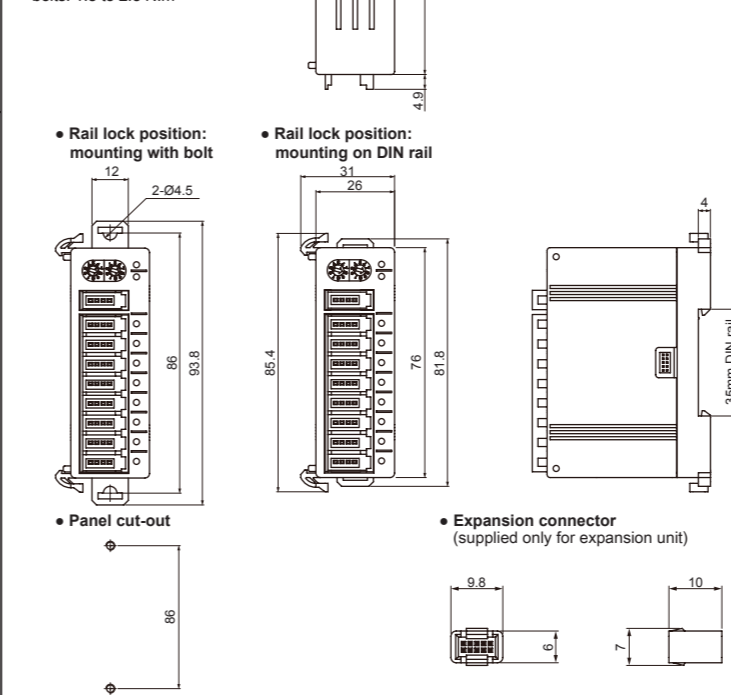
#### Expansion unit



- Connector input part:** It connects expansion unit and is joined into the expansion connector output.
- I/O status LED:** It displays each I/O status.
- Rail lock:** It is used for mounting DIN rail or with bolt.
- Connector output part:** It connects an expansion unit.
- Sensor connector:** It is used for connecting external device I/O.
- External power connector:** It is used for supplying external power.

### Dimensions

⚠ Same dimensions are applied to both basic and expansion unit.  
⚠ Tightening torque for mounting bolts: 1.8 to 2.5 N.m



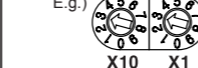
### Setup and Installation

#### Setting address

- Setting address is able to be done by rotary switch for address, or by in the EEPROM.
- If the rotary switch for address' number is "00", the address is available to set by in the EEPROM. The others, the desired number of rotary switch is that address.
- The address of the connected unit must not be duplicated.
- When changing the address during operation, the unit status (MS) LED flashes in red and the unit communicates to the address before the change.

#### By rotary switch for address

- Two rotary switches are used for setting address. The X10 switch represents tens digit and the X1 switch represents ones digit. The address can be set 01 to 99.



- After setting the desired address, re-supply the unit power for applying the changed address.

#### By in the EEPROM for address

- During communicate status with upper system (PLC or PC), set the desired address on the 41029 EEPROM MAC ID parameter.
- The set address is changed after unit power is supplied. Re-supply the unit power for applying the changed address.

#### Unit installation

##### Mounting on panel

- Pull two rail locks on the rear part of a unit, 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. Please set the tightening torque under 0.5N.m.

##### Mounting on DIN rail

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

##### Connection of basic and expansion units

- Turn OFF the power of a basic unit.
- Remove the cover of connector for extension with nippers.
- Connect connector input part of an expansion unit and connector output part of a basic unit with the connector which is enclosed with an expansion unit box.
- Connected expansion units are installed as the right figure.
- Supply power to the basic unit.
- Re-supply power to the basic unit, and it recognizes expansion units.

##### Terminating resistance

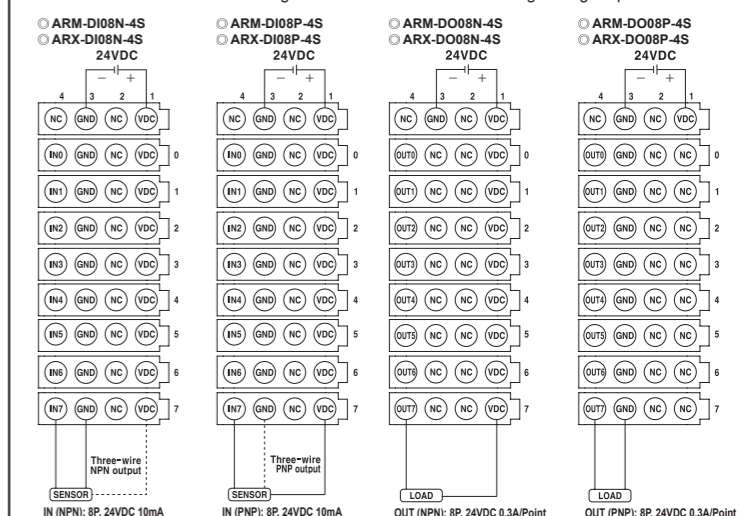
- 120Ω •1% of metallic film •1/4W
- ⚠ Connect terminating resistances on the both ends of the network cables. If not connecting terminating resistances, impedance can be too high or low. It may cause network problems.

### Status LED

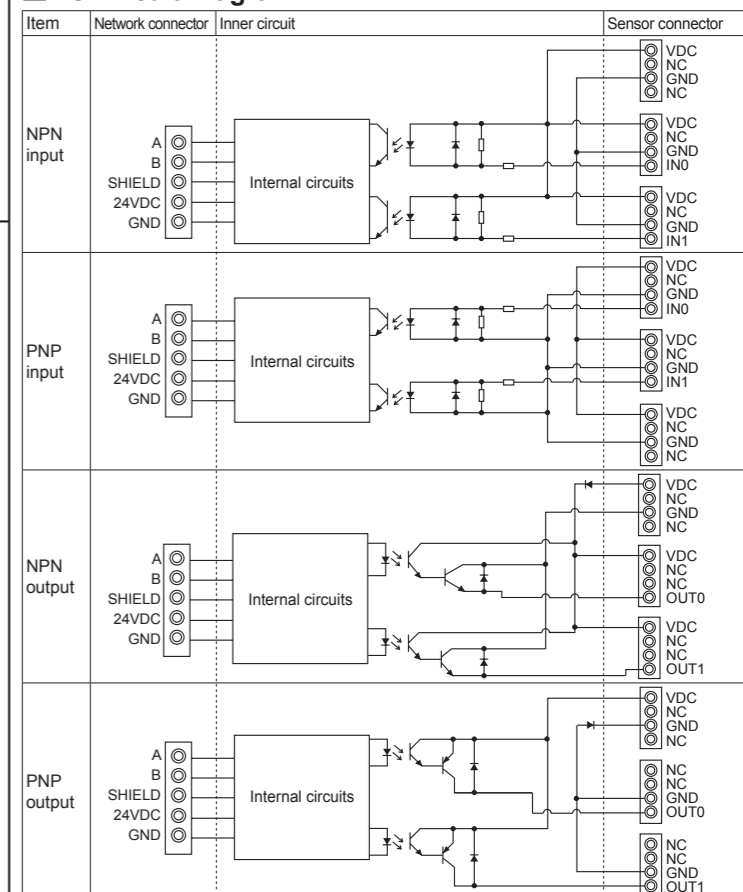
Item	Status LED		Description
	Red	Green	
Unit status (MS) LED	⚠	●	Error of expansion units
	⚠	●	Error of MAC ID
	●	⚠	Normal operation
	●	●	Power is not supplied
Network status (NS) LED	⚠	●	Not supported communication speed (at auto baud rate)
	⚠	●	Error of packet
	●	⚠	Normal communication
	●	⚠	Communication standby

### Connections

⚠When wiring the communication connector, use AWG 20 cable and tighten the connector screw with a tightening torque of 0.5N.m.



### I/O Circuit Diagram



### Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- 24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Use only designated connector and do not apply excessive power when connecting or disconnecting the connectors.
- 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.
  - ①Indoors (in the environment condition rated in 'Specifications')
  - ②Altitude max. 2,000m
  - ③Pollution degree 2
  - ④Installation category II

### Major Products

- Photoelectric Sensors
- Fiber Optic Sensors
- Door Sensors
- Door Side Sensors
- Area Sensors
- Proximity Sensors
- Pressure Sensors
- Rotary Encoders
- Connector/Sockets
- Switching Mode Power Supplies
- Control Switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper Motors/Drivers/Motion Controllers
- Graphic/Logic Panels
- Field Network Devices
- Laser Marking System/Fiber, Co., Nd:YAG
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometers/Pulse(Rate)/Meters
- Display Units
- Sensor Controllers

**Autonics Corporation**  
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