Modbus Sensor Connector Type Digital Remote I/O

▣ Features

- Modbus RTU standard protocol
- Saving work time for wiring with sensor connector
  (CNE series, sold separately)
- Compact size
  : Small size with W26×L76×H54mm to install at narrow space
  : Available DIN Rail mounting and screw lock mounting method
- Low-speed (16-bit/30CPS) counter function
- Real-time monitoring by various functions
  : Communication speed auto-recognition
  : Reading number of expansion units and specifications,
  Reading model name of basic and expansion units
  : Monitoring Single byte input/output, Multi byte input/output and status Flag
- Easy expansion
  : Available to connect up to 63 basic units per 1 master unit
  : Available to connect up to 7 expansion units per 1 basic units
  (controllable input/output for max. 64 points)
  : Combines the desired specifications of input/output by various input/output units
  : Organizes power and communication system by only communication cable lines
- High reliability
  : Built-in surge, short, over-heat, reverse power polarity and static prevention circuits

⚠ **Please read "Safety Considerations" in operation manual before using.**

CE

▣ User Manual for Communication

- Visit our website (www.autonics.com) to download the user manual for communication for Modbus communication.
- The user manual for communication describes for Modbus RTU protocol, Modbus Mapping Table.

▣ Ordering Information

AR **M** — **D** **I** **08** **N** — **4S**

Terminal block	4S	Sensor connector 4-pin socket
I/O specifications	N	NPN open collector
	P	PNP open collector
I/O points	08	8 points type
I/O type	I	Input type
	O	Output type
Digital/Analog	D	Digital type
Network	M	Basic unit (Modbus RTU type)
	X	Expansion unit (Use in DeviceNet/Modbus)
Item	AR	Autonics Remote I/O

▣ Model

Model		Specification
Basic unit	Expansion unit	
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 (0.3mA/point)
ARM-DO08P-4S※	ARX-DO08P-4S※	10-28VDC PNP output 8-point, low-speed counter (0.3mA/point)

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

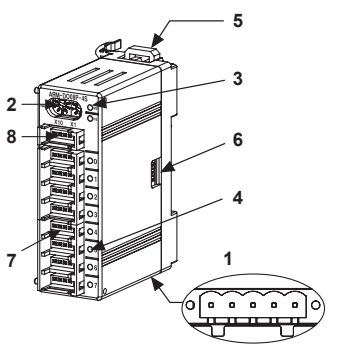
▣ Specifications

Model		ARM-DI08N-4S	ARM-DI08P-4S	ARM-DO08N-4S	ARM-DO08P-4S
	Expansion unit	ARX-DI08N-4S	ARX-DI08P-4S	ARX-DO08N-4S	ARX-DO08P-4S
Power supply		Rated voltage: 24VDC⎓, Voltage range: 12-28VDC⎓			
Power consumption		Max. 3W			
I/O points		8 points of NPN input	8 points of PNP input	8 point of NPN output	8 point of PNP output
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 points, Common			
Special function (input)		Counter for 16-bit (30CPS※1) (only when using digital input unit 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 or 2-bit (default: 2)			
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 in each of X, Y, Z directions for 2 hours			
Shock		500m/s^2 (approx. 50G) in each X, Y, Z direction for 3 times			
Environment	Ambient temp.	-10 to 55℃, storage: -25 to 75℃			
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH			
Protection structure		IP20 (IEC standards)			
Protection circuit		Surge, Short-circuit, overheat (over 165℃) and static protection, Reversed polarity protection circuit			
		Over current protection circuit (operated at max. 0.17A)		Over current protection circuit (operated at max. 0.7A)	
Indicator		Network status (NS) LED (green, red), Module status (MS) LED (green, red) I/O status LED (input: green, output: red)			
Material		Front case: PC, Body case: PC			
Mounting		DIN rail or screw lock type			
Approval		CE			
Weight ※2	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 weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

▣ Unit Descriptions

◎ Basic unit



1. Network connector

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

2. Rotary switch for node address
: Two rotary switches are used for setting address.
X10 switch represents the 10's multiplier and X10 switch represents the 1's multiplier.

3. Status LED
: It is LED for displaying Unit status (MS) and Network status (NS).

4. I/O status LED: It is LED for displaying I/O status.

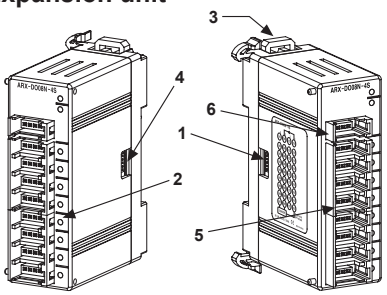
5. Rail Lock: It is used for mounting DIN Rail or with screws.

6. Connnector output part: It is used for connecting an expansion unit.

7. Sensor connector: It is connector for connecting external device I/O.

8. External power connector: It is used for supplying external power.

◎ Expansion unit



1. Connnector input part
:It connects an Expansion unit and is joined into the connnector output part.
2. I/O status LED: It is LED for displaying I/O status.
3. Rail Lock
: It is used for mounting DIN Rail or with screws.
4. Connnector output part: It is used for connecting an expansion unit.
5. Sensor connector: It is connector for connecting external device I/O.
6. External power connector: It is used for supplying external power.

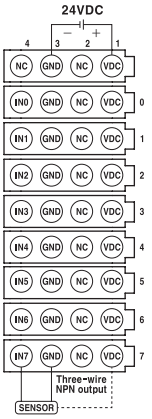
■ I/O Circuit Diagram

Type	Network connector	Inner circuit	Sensor connector
NPN input	24VDC GND N.C B A	Internal circuits	NC GND NC VDC 4 3 2 1 IN□ GND NC VDC 4 3 2 1
PNP input	24VDC GND N.C B A	Internal circuits	NC GND NC VDC 4 3 2 1 IN□ GND NC VDC 4 3 2 1
NPN output	24VDC GND N.C B A	Internal circuits	NC GND NC VDC 4 3 2 1 OUT□ GND NC VDC 4 3 2 1
PNP output	24VDC GND N.C B A	Internal circuits	NC GND NC VDC 4 3 2 1 OUT□ GND NC VDC 4 3 2 1

※IN□: IN0 to IN7, OUT□: OUT0 to OUT7

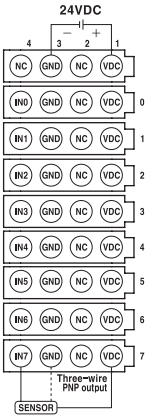
■ Connections

●ARM-DI08N-4S
●ARX-DI08N-4S



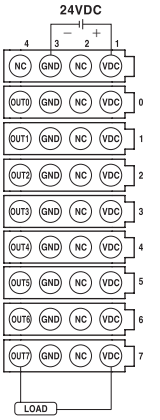
IN (NPN): 8P, 24VDC 10mA

●ARM-DI08P-4S
●ARX-DI08P-4S



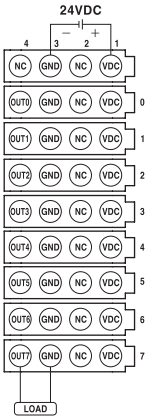
IN (PNP): 8P, 24VDC 10mA

●ARM-DO08N-4S
●ARX-DO08N-4S



OUT (NPN): 8P, 24VDC 0.3A/Point

●ARM-DO08P-4S
●ARX-DO08P-4S

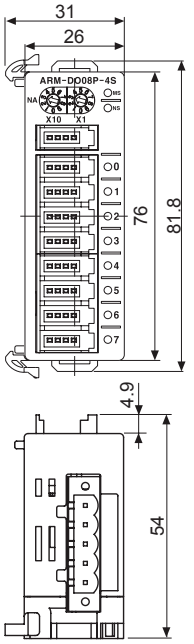


OUT (PNP): 8P, 24VDC 0.3A/Point

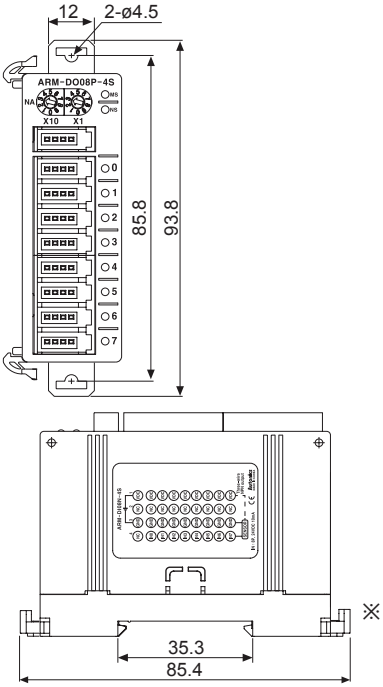
■ Dimensions

(unit:mm)

● Mounting DIN rail



● Mounting with screws



※ Same dimensions are applied to both basic and expansion unit.

■ Status LED

(☼: On, ◑: Flash, ●: Off)

Item	LED status		Description
	Red	Green	
Module 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

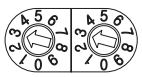
▣ Setup and Installation

◎ Setting node address

- Setup address is by rotary switches or by inner EEPROM.
- If the rotary swithces are “00”, the address is set by inner EEPROM. The others, the desired number of rotary switches is that address.

● By rotary switch for address

① Two rotary switches are used for setting address.
X10 switch represents the 10’s multiplier and X10 switch represents the 1’s multiplier.
Address is settable from 0 to 99.

(E.g.) 

The ×10 and ×1 switches point at '3',
the node address is '33'.

②After setting the desired node address, re-supply the unit power for applying the changed address.

● By in the EEPROM for address

①During communicate status with master system (PLC or PL), set the desired address on the 41029 EEPROM MAC ID parameter.
②The set address is changed after unit power is supplied. Re-supply the unit power for applying the changed address.

◎ Unit Installation

● Mounting on panel

① Pull two Rail locks on the rear part of a unit, there is a fixing screw hole.
② Place unit on a panel to be mounted.
③ Make a hole on a fixing screw hole position.
④ Fasten the screw to fix the unit tightly. Please set the tightening torque under 0.5N·m.

● Mounting on DIN rail

①Pull two Rail locks on the rear part of a unit.
②Place the unit on DIN rail to be mounted.
③Press Rail locks to fix the unit tightly.

● Connection of basic and expansion unit

① Turn OFF the power of a basic unit.
② Remove the cover of connector for extension with nippers.
③ 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.
④ Connected expansion units are installed as the right figure.
⑤ 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.

▣ Cautions during Use

- Turn OFF the power before connecting or disconnecting expansion units.
- 24VAC, 12-28VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Addresses of connected units on network should not be duplicated. If you change an address with rotary switch or EEPROM during operation, unit status (MS) red LED flashes and it communicates with a previous node address. Re-supply power and the changed node address is applied.
- Communication speed which is set on upper system (PC, PLC, etc) is set automatically. If you change the communication speed during operation, network status (NS) red LED turns ON and it does not communicate. Re-supply power and it operates normally.
- Make sure to use standards communication cables. It may cause communication error if non-standards cables are used.
- Make sure to examine disconnection or short-circuit before connecting cables.
- Avoid installing the units where severe dust exists or where corrosion may occur.
- This unit may be used in the following environments.
  - Indoors
  - Altitude: Under 2,000m
  - Pollution degree 2
  - Installation category II