ARIO-C-EI

EtherNet/IP ™

Coupler Manual MTO-ARIOCEIU1-V2.4-EN

Thank you for purchasing an Autonics product.
This user manual contains information about the product and its proper use,
and should be kept in a place where it will be easy to access.

Autonics

Contents

Preface

Thank you for purchasing Autonics products.
Be sure to read and follow the **Safety Precautions** thoroughly before use.
This manual contains information about the product and how to use it properly, so keep it in a place where users can easily find it.

Manual Guide

- Use the product after fully reading the contents of the manual.
- The manual explains the product functions in detail and does not guarantee the contents other than the manual.
- Any or all of the manual may not be edited or copied without permission.
- The manual is not provided with the product.
- Download and use from our website (www.autonics.com).
- The contents of the manual are subject to change without prior notice according to the improvement of the product's performance, and upgrade notices are provided through our website.
- We put a lot of effort to make the contents of the manual a little easier and more accurate. Nevertheless, if you have any corrections or questions, please feel free to comment through our website.

Common Symbols in the Manual

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

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

Supplementary explanation of the function

Example of that function

Important information about the feature

Safety Considerations

Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.

Warning

1. 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, fire or economic loss.
2. 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.
3. Do not disassemble or modify the unit.
   Failure to follow this instruction may result in fire.
4. Do not connect, repair, or inspect the unit while connected to a power source.
   Failure to follow this instruction may result in fire.
5. Check ‘Connections’ before wiring.
   Failure to follow this instruction may result in fire.

Caution

1. Use the unit within the rated specifications.
   Failure to follow this instruction may result in fire or shortening the life cycle of the product.
2. Use 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.
3. When connecting the power input and output, use AWG 22-16 cable and check the connecting method of crimp terminal.
   Failure to follow this instruction may result in fire or malfunction due to contact failure.
4. 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.
5. Do not connect or disconnect connector (terminal) wire or power, when the product is operating.
   Failure to follow this instruction may result in fire or malfunction of the product.

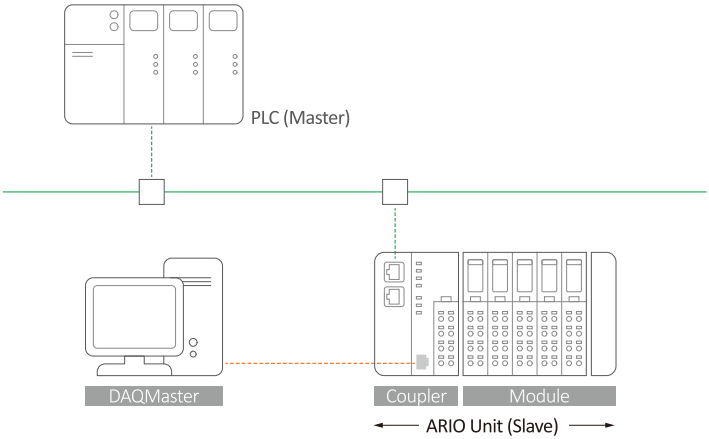
Cautions during Use

1. Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
2. BUS power and I/O power should be insulated by the individually insulated power device.
3. Power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
4. 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. For stable operation, use shield wire and ferrite core, when wiring communication wire, power wire, or signal wire.
5. Do not use near the equipment which generates strong magnetic force or high frequency noise.
6. Use the rated standard cables and connectors. Do not apply excessive power when connecting or disconnecting the connectors of the product.
7. Do not touch the module communication connector part of the base.
8. Do not connect, or remove the base while connected to a power source.
   For removing the terminal, body or base, do not operate units for a long time without it.
9. This unit may be used in the following environments.
   ① Indoors (in the environment condition rated in 'Specifications')
   ② Altitude max. 2,000 m
   ③ Pollution degree 2
   ④ Installation category II

The specifications and dimensions of this manual are subject to change without any notice for product improvement. Be sure to read and follow the considerations written in the instruction manual, other manuals, and technical information on our Autonics website.

1. Reference Manuals

Be sure to read the reference manuals below to use the product correctly and follow the precautions written in these manuals.
You can download the reference manuals on our Autonics website.



Product manual

It contains information for you to setup and install the ARIO Unit.

1. Key features of ARIO Series
2. Environmental conditions and handling method for installation
3. Installation precautions
4. Instructions about maintenance, etc.

Coupler manual

It contains information for you to configure and use the coupler in the field network.

1. Communication protocol overview
2. Hardware information: specifications, indicators, connection diagram, and dimensions, etc.
3. Software information: process images, and mapping information, etc.

Module manual

It contains information on the modules provided by Autonics.

1. Hardware information: specifications, indicators, connection diagram, and dimensions, etc.

DAQMaster user manual

It contains information and usage guides on ARIO-related functions supported by DAQMaster, the comprehensive device management program.

1. Change properties of the coupler and modules
2. Module configuration via virtual mode
3. Check the address map of the Unit
4. Update the firmware version of the coupler, etc.

2. Overview of the ARIO-C-EI

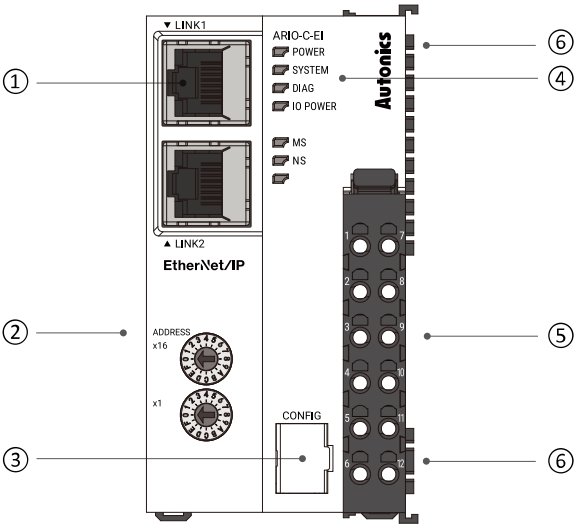
2.1. EtherNet/IP Protocol

EtherNet/IP is an open industrial network that is extended from the Ethernet. It supports the Common Industrial Protocol (CIP) for compatibility with DeviceNet, one of ODVA's Fieldbus protocols, increasing flexibility between communication protocols.

EtherNet/IP utilizes IEEE 802 Ethernet to define functions for the physical, data-link, network, and transport layers and supports object-oriented design based on the CIP protocol. It allows you to manage control-related data provided by services and profiles for real-time control applications.

The ARIO-C-EI supports the EtherNet/IP protocol. This coupler composes the physical structure of connected modules and devices and creates input and output process images linked with the data of EtherNet/IP. The process images make it possible to experience a flexible installation environment, such as the mixed arrangement of analog and digital modules.

2.2. Unit Descriptions



1. EtherNet/IP Communication Connectors

It is a connector to connect with EtherNet/IP Master (Scanner) such as PLC.
For detailed information on the communication cable, refer to the 2.3, “EtherNet/IP Communication Connector”.

2. Hexadecimal Rotary Switches

It is a setting switch to designate the IP address of the coupler (or adapter) in the EtherNet/IP communication network.
You can also set the IP address in the DAQMaster.
For detailed information on addressing method, refer to the 2.4, “Assign the IP Address”.

3. CONFIG Port

It is a port to connect to the PC where DAQMaster is installed.

1. Port type: USB 2.0 type Micro B

4. Indicators

It displays the status of the coupler and communication connection as shown below. For detailed information on the indicators, refer to the 3, Indicators.

1. Power and operating status of the coupler
2. EtherNet/IP communication status

5. Power Supply Terminal

It is a terminal block that supplies power to the coupler and peripherals.
For detailed information on the device supply, refer to the 2.5, “Connections of the Power Terminal”.

6. Power Supply Contacts

It is a contact that feeds the power input from the power supply terminal.

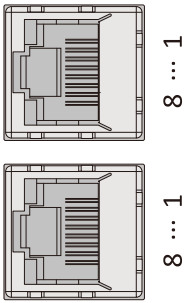
1. Top input contacts: feed the power supply for the coupler, module, and ABUS to be operated.
2. Bottom input contacts: feed the power supply for input and output signals of the connected module.

2.3. EtherNet/IP Communication Connector

- Be sure to use the connector and cable approved by the Open DeviceNet Vendors Association (ODVA). Otherwise, use an Ethernet connector and cable that meets the specifications of at least category 5e.
- Be sure not to exceed the cable length of 100 meters.

The RJ45 connector is used for EtherNet/IP communication connection.
For more information on the pin assignment, refer to the table below.

▼ IN



▲ OUT

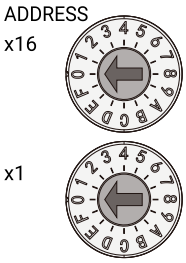
Pin no.	Color of conductor based on T568A	Signal	Description
1	Green/White	TD +	Transmit Data +
2	Green	TD -	Transmit Data -
3	Orange/White	RD +	Receive Data +
6	Orange	RD -	Receive Data -

2.4. Assign the IP Address

- It is recommended to designate the IP address of the coupler the same as the value of the rotary switches.
- The IP address cannot be applied while the coupler is operating.
- Be sure to start the coupler again to apply the changed IP address.
- The IP addresses of the master and coupler should be the same up to the network area of the subnet mask. For more information on the range of IP addresses in each class, refer to the table below.

Class	Default subnet mask	IP address range (Master = Coupler)
A	255.0.0.0	The first octet
B	255.255.0.0	The first to second octets
C	255.255.255.0	The first to third octets

You can assign the coupler's IP address via two hexadecimal rotary switches.
The last octet of the IP address is changed.

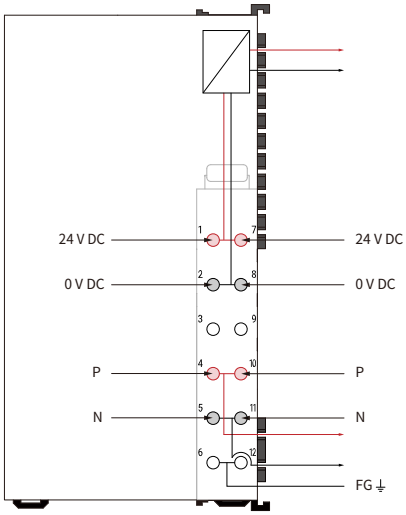


Assign mode	Rotary switches (x16, x1)	Value
Default IP address	0x00	Factory default: 192.168.2.3
IP address	0x01 to 0xFF	192.168.2.**1** to 192.168.2.**255**

2.4.1. Assign the IP address in the DAQMaster

1. Set the positions of the coupler's rotary switches to 0x00.
2. To designate the IP address in the DAQMaster, go to the **Comm Mode** » **Property tab of the coupler** » **Coupler IP(Node Address)** and press the Enter key.
3. Reset the ARIO unit in the DAQMaster.
4. The IP address assigned by the DAQMaster is applied.

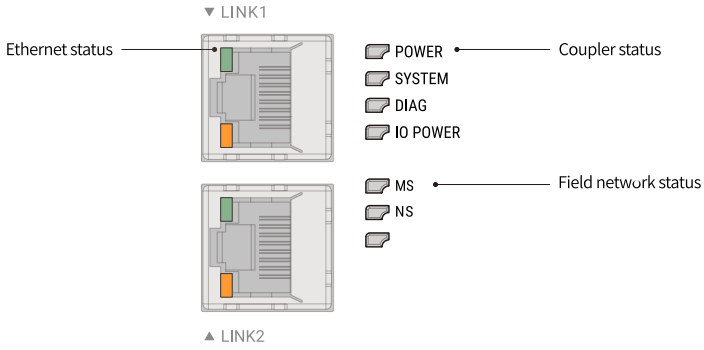
2.5. Connections of the Power Terminal



Power category	Terminal no.	Function
System Bus Power	1	Input/output for power supply (24 V_{DC})
	2	Input/output for power supply (0 V_{DC})
	3	Not connected
Field Power	4	Input/output for power supply (+)
	5	Input/output for power supply (−)
-	6	Frame Ground
System Bus Power	7	Input/output for power supply (24 V_{DC})
	8	Input/output for power supply (0 V_{DC})
	9	Not connected
Field Power	10	Input/output for power supply (+)
	11	Input/output for power supply (−)
-	12	Frame Ground

3. Indicators

The indicators of the ARIO-C-EI coupler consist of elements indicating the operating status for the coupler, connection status for the field network (EtherNet/IP), and Ethernet as shown in the figure below. For detailed information on each indicator, refer to the following tables below.



3.1. LEDs for the Coupler Status

1. The power supply status of the coupler

Indicator	LED color	Status	Description
POWER	Green	ON	Supply voltage: Normal
		OFF	Supply voltage: None

2. The status of the standby mode

Indicator	LED color	Status	Description
SYSTEM	Green	ON	Normal operation
		Flashing	Standby for connecting the master after initialization of the coupler
		OFF	Stop
	Red	ON	• Coupler initialization failure (non-recoverable) • An unrecoverable error occurred. • The type of field network and firmware version mismatch (non-recoverable)
		Flashing	• Field network initialization failure (non-recoverable) • Changing the settings of rotary switches (applicable models)
		OFF	Normal operation

3. The status of the module communication (ABUS)

Indicator	LED color	Status	Description
DIAG	Green	ON	Normal operation: Multi/Single-packet works
		Flashing	Hot-swap (normal state)
		OFF	• The operation of the coupler stopped • An error occurred
	Red	ON	ABUS communication error
		Flashing	The models of the replaced module and the previous one mismatch (normal operation)
		Flashing (2 times)	No module connection (non-recoverable)
		Flashing (3 times)	Abnormal module operation (non-recoverable)
		Flashing (4 times)	The number of modules and data size exceeded
		OFF	Normal operation

4. The status of power supply for the module

Indicator	LED color	Status	Description
IO POWER	Green	ON	I/O supply voltage of the module: Normal
		OFF	I/O supply voltage of the module: None

3.2. LEDs for the Field Network Status

1. The module status

Indicator	LED color	Status	Description
MS	Green	ON	The device is operating correctly.
		Flashing	Standby: The device has not been configured.
	Red	ON	Major fault: Unrecoverable error occurred
		Flashing	Minor fault: Recoverable error occurred • Configuration error
	Green/Red	OFF	Supply voltage: None
		Flashing	Self-test: The device is performing its power up testing.

2. The network status

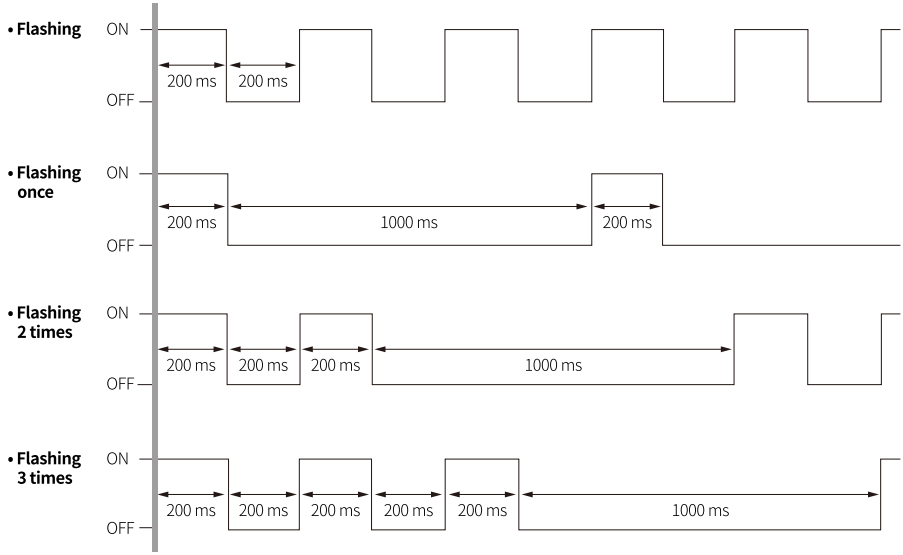
Indicator	LED color	Status	Description
NS	Green	ON	Network connected (at least one established connection)
		Flashing	No network connection (but has obtained an IP address)
	Red	ON	Duplicate IP address : A device with the same IP address exists
		Flashing	Connection timeout
	Green/Red	OFF	No supply voltage and IP address
		Flashing	Self-test: The device is performing its power up testing.

3.3. LEDs for the Ethernet Status

1. The status of the Ethernet connection

Indicator	LED color	Status	Description
LINK 1, 2	Green	ON	**Link**: The device is linked to the Ethernet.
		OFF	The device has no link to the Ethernet.
	Orange	Flashing	**Activity**: The device sends/receives Ethernet frames.
		OFF	The device does not send/receive Ethernet frames.

Refer to the timing chart below for the flashing operation of indicators.
The operation is repeated as flashing every 200 microseconds and standby for 1 second.

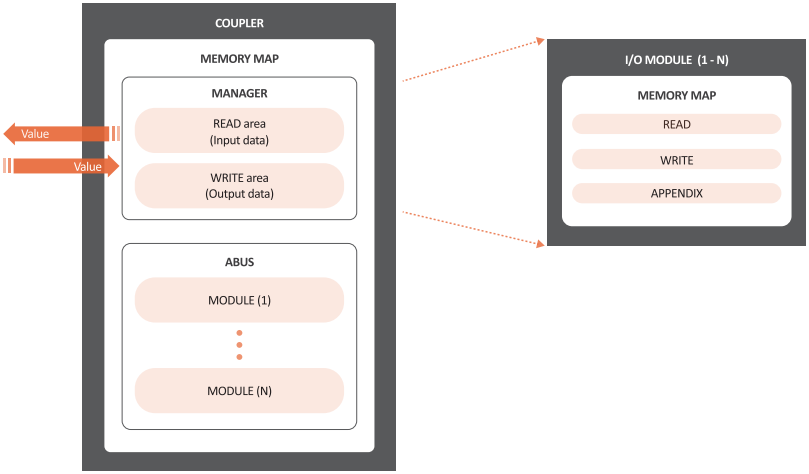


4. Process Images

4.1. Memory Map

The ARIO unit composes the memory map in its memory space to assign and manage the data collected by the coupler and modules. The master in the field network controls the input and output devices via this memory map generated by the ARIO unit.

The memory map is created based on the arrangement and data structure of the ARIO unit as shown in the figure below. The memory map of modules consists of each module and contains its data.
The memory map of the coupler allocates the data considering the type (input or output) and sequence of connected modules (e.g., the slot number of each module), and data size to the read and write areas, making it easy to calculate the location of the master's register. In this way, the memory map comprised by the ARIO unit creates the input and output process images for data exchange.



- **READ area**
  It is the area that transmits the data collected by the unit to the master in the field network.
  It contains the input data.
- **WRITE area**
  It is the area that transmits the output commands from the master of the field network.
  It contains the output data.

4.2. Data Processing in the Modules

The data of the module is processed depending on the input and output signals.

- **Digital modules**
  The bit-oriented digital module indicates the value of the corresponding bit position as 1.
  The size of each channel is 1 bit and is grouped into bytes.
- **Analog modules**
  The byte-oriented analog module indicates the value of the input or output signal to the corresponding bytes. The size of each channel is grouped into words.

Module	Example of input/output format	Data processing size
Digital input/output : Bit-oriented	2 channels/module (2-CH/module)	1-byte
	4 channels/module (4-CH/module)	1-byte
	8 channels/module (8-CH/module)	1-byte
	16 channels/module (16-CH/module)	2-byte (= 1-word)
Analog input/output : Byte-oriented	8-bit/channel (8-bit/CH)	1-byte
	12-bit/channel (12-bit/CH)	2-byte (= 1-word)
	16-bit/CH (16-bit/CH)	2-byte (= 1-word)
	24-bit/channel (24-bit/CH)	4-byte (= 2-word)

4.2.1. Check the Data of the Modules

You can check the data of modules connected with the coupler as shown in the figure below.
To check the data, go to **Comm Mode** » **Run** » **I/O Monitor** in the DAQMaster.
The binary, decimal, and hexadecimal are supported as the display format in the DAQMaster.

1. The value of input signals on the point (or channels) 1 and 2 of the digital input module
   - **Binary 0000 0011 (0x03)**

Slot Number : Module Name	Type	Channel	Data	Diagnostic Byte
1 : DI08N	R	8	0x03	
Point 1			1	
Point 2			1	
Point 3			0	
Point 4			0	
Point 5			0	
Point 6			0	
Point 7			0	
Point 8			0	

2. The value of a voltage of 10.000 V applied to channel 1 of the analog input module
   - **Big endian: 0x270D (≈ $10{,}000_{DEC}$)**

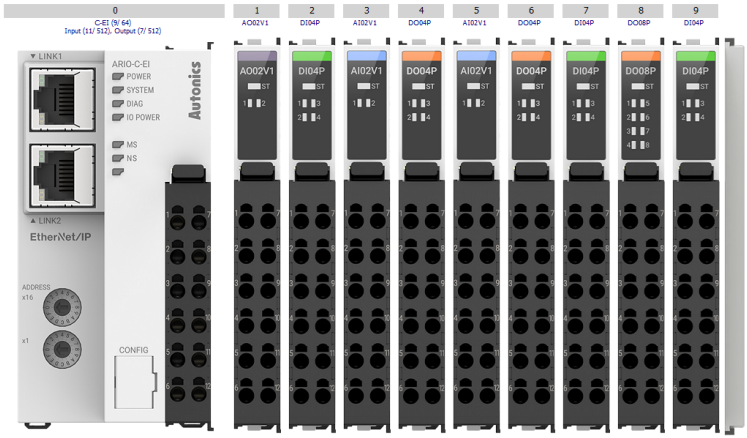
Slot Number : Module Name	Type	Channel	Data	Diagnostic Byte
1 : AI04V1	R	4	0x270D 0003 0003 0000	
Channel 1			0x270D	
Channel 2			0x0003	
Channel 3			0x0003	
Channel 4			0x0000	
2 : AO04V1	W	4	0x2710 0000 0000 0000	
Channel 1			0x2710	
Channel 2			0x0000	
Channel 3			0x0000	
Channel 4			0x0000	

The data arrangements (the order or sequence) of the analog signal can be expressed as big-endian or little-endian in the DAQMaster.
To select the endianness, go to **Comm Mode** » **Property tab of the coupler** » **Endian**. (factory default: Big-endian)

4.3. Example of the Process Image

You can check the input and output process images of the unit (coupler + modules) on the **AddressMap** menu in the DAQMaster. Firstly, the input modules are mapped, and then the output modules are mapped.

DAQMaster: An arrangement example of the ARIO unit



DAQMaster: The address map of the ARIO unit

Slot Number : Module Name	Address	Type	7	6	5	4	3	2	1	0
2 : DI04P	0	R					P3	P2	P1	P0
3 : AI02V1 - Channel 0	1	R	C1H	C1H	C1H	C1H	C1H	C1H	C1H	C1H
3 : AI02V1 - Channel 1	2	R	C1L	C1L	C1L	C1L	C1L	C1L	C1L	C1L
3 : AI02V1 - Channel 2	3	R	C2H	C2H	C2H	C2H	C2H	C2H	C2H	C2H
3 : AI02V1 - Channel 3	4	R	C2L	C2L	C2L	C2L	C2L	C2L	C2L	C2L
5 : AI02V1 - Channel 0	5	R	C1H	C1H	C1H	C1H	C1H	C1H	C1H	C1H
5 : AI02V1 - Channel 1	6	R	C1L	C1L	C1L	C1L	C1L	C1L	C1L	C1L
5 : AI02V1 - Channel 2	7	R	C2H	C2H	C2H	C2H	C2H	C2H	C2H	C2H
5 : AI02V1 - Channel 3	8	R	C2L	C2L	C2L	C2L	C2L	C2L	C2L	C2L
7 : DI04P	9	R					P3	P2	P1	P0
9 : DI04P	10	R					P3	P2	P1	P0
1 : AO02V1 - Channel 0	0	W	C1H	C1H	C1H	C1H	C1H	C1H	C1H	C1H
1 : AO02V1 - Channel 1	1	W	C1L	C1L	C1L	C1L	C1L	C1L	C1L	C1L
1 : AO02V1 - Channel 2	2	W	C2H	C2H	C2H	C2H	C2H	C2H	C2H	C2H
1 : AO02V1 - Channel 3	3	W	C2L	C2L	C2L	C2L	C2L	C2L	C2L	C2L
4 : DO04P	4	W					P3	P2	P1	P0
6 : DO04P	5	W					P3	P2	P1	P0
8 : DO08P	6	W	P7	P6	P5	P4	P3	P2	P1	P0

4.3.1. Input Process Image

Byte		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	2: DI04P	-				Ch.4	Ch.3	Ch.2	Ch.1
1	3: AI02V1	Ch.1 High Byte							
2		Ch.1 Low Byte							
3		Ch.2 High Byte							
4		Ch.2 Low Byte							
5	5: AI02V1	Ch.1 High Byte							
6		Ch.1 Low Byte							
7		Ch.2 High Byte							
8		Ch.2 Low Byte							
9	7: DI04P	-				Ch.4	Ch.3	Ch.2	Ch.1
10	9: DI04P	-				Ch.4	Ch.3	Ch.2	Ch.1

4.3.2. Output Process Image

Byte		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	1: AO02V1	Ch.1 High Byte							
1		Ch.1 Low Byte							
2		Ch.2 High Byte							
3		Ch.2 Low Byte							
4	4: DO04P	-				Ch.4	Ch.3	Ch.2	Ch.1
5	6: DO04P	-				Ch.4	Ch.3	Ch.2	Ch.1
6	8: DO08P	Ch.8	Ch.7	Ch.6	Ch.5	Ch.4	Ch.3	Ch.2	Ch.1

5. Object Models

In the EtherNet/IP network, the method and procedures of data exchange among the nodes are designed via multiple object groups. An object is a collection of abstract representations of a specific component in an EtherNet/IP device, including their class and instances together with services and functions.

- **Terms and definitions for the object model**

Term	Definition
Object	It is an abstract expression of the components of a product, defining its attributes and data, services and functions, and behaviors to determine an object.
Class	It is the generalization of an object, containing the components implemented by the instances.
Instance	It consists of multiple attributes and has the same attributes, behaviors, and services even though the instances within the class are different.
Attributes	It represents the attributes of data or objects provided by the EtherNet/IP device. It contains the information of the slave device and values of input/output data.
Services	It is the procedure or action performed by an object, applicable to the classes and attributes. CIP defines common services applied to attributes.
Behaviors	It defines the object functions to a specific event.

5.1. Supported Object Classes

Object	Class Code	Reference
Identity	0x01	→ 5.3, “Identity Class (0x01)”
Message Router	0x02	→ 5.4, “Message Router Class (0x02)”
Assembly	0x04	→ 5.5, “Assembly Class (0x04)”
Connection Manager	0x06	→ 5.6, “Connection Manager Class (0x06)”
Quality of Service	0x48	→ 5.7, “Quality of Service Class (0x48)”
TCP/IP Interface	0xF5	→ 5.8, “TCP/IP Interface Class (0xF5)”
Ethernet Link	0xF6	→ 5.9, “Ethernet Link Class (0xF6)”

5.2. Data Types

Data Type	Data Size	Data Unit
USINT (Unsigned Short Integer)	8-bit	1-byte
UINT (Unsigned Integer)	16-bit	1-word
UDINT (Unsigned Double Integer)	32-bit	2-word
BOOL (Boolean)	True (1) / False (0)	8-bit
STRUCT (Structure of...)	-	-
ARRAY (Array of...)	-	-

5.3. Identity Class (0x01)

It provides the product information about Vendor ID and Device Type to identify the slave device.

5.3.1. Services

Service Code	Service Name	Description
0x0E	Get_Attribute_Single	It returns the value of a specific attribute.
0x10	Set_Attribute_Single	It modifies the value of a specific attribute.
0x05	Reset	It executes the service to reset the device. 0: Restart the device 1: Restart the device to proceed the factory reset

5.3.2. Instance Attributes

• Instance 0 (class attribute)

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	UINT	Revision of the Identity Object Default: 1 (0x0001)
2	Get	Max Instance	UINT	The maximum instance number of the Identity Object Default: 1 (0x0001)

• **Instance 1**

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Vendor ID	UINT	Vender ID info.: 801 (0x0321)
2	Get	Device Type	UINT	Device type: 12 (0x000C)
3	Get	Product Code	UINT	Product code assigned by the vendor : 202 (0x00CA)
4	Get	Revision	STRUCT	F/W Revision info.: Ver 1.2 (Major = 1, Minor = 2)
		Major	USINT	
		Minor	USINT	
5	Get	Status	WORD	The current status of the device
6	Get	Serial Number	UDINT	Serial number of the device
7	Get	Product Name	SHORT_ STRING	Product name: ARIO_C_EI

5.4. Message Router Class (0x02)

It transfers the explicit messages to another object.
The services and instance attributes are not supported.

5.5. Assembly Class (0x04)

The instances of Assembly class get the input and output data of the connected modules.
The information of supported instances for exchanging process data is shown in the table below.

Instance	Data Size	Index	Description
Instance 100 (0x64)	504-byte	0 to 504	Output process data
Instance 101 (0x65)	504-byte	0 to 504	Input process data

5.5.1. Services

Service Code	Service Name	Description
0x0E	Get_Attribute_Single	It returns the value of a specific attribute.
0x10	Set_Attribute_Single	It modifies the value of a specific attribute.

5.5.2. Instance Attributes

• Instance 0 (class attribute)

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	UINT	Revision of the Assembly Object Default: 2 (0x0002)
2	Get	Max Instance	UINT	The maximum instance number of the Assembly Object Default: 101 (0x0065)
3	Get	Number of Instances	UINT	The number of instances created in the Assembly class Default: 2 (0x0002)

• Instance 1

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Vendor ID	UINT	Number of Vender ID
2	Get	Member List	UINT	-
3	Get	Data	Array of Octet	Reference for input/output process image
4	Get	Size	UINT	The byte size of attribute 3 (process image)

5.6. Connection Manager Class (0x06)

The Connection Manager Class allocates and manages internal resources related to the I/O connections and explicit message connections. A Connection instance or Connection object is created by the Connection Manager class. The Connection parameter is generated by the Forward_Open service.

5.6.1. Services

Service Code	Service Name	Description
0x0E	Get_Attribute_Single	It returns the value of a specific attribute.
0x10	Set_Attribute_Single	It modifies the value of a specific attribute.
0x4E	Forward_Open	It opens new connection.
0x54	Forward_Close	It closes the connection.

5.6.2. Instance Attributes

- **Instance 0 (class attribute)**

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	UINT	Revision of the Connection Manager object Default: 1 (0x0001)
2	Get	Max Instance	UINT	The maximum instance number of the Connection Manager Object Default: 1 (0x0001)
3	Get	Number of Instances	UINT	The number of instances created in the Connection Manager class Default: 1 (0x0001)

5.7. Quality of Service Class (0x48)

Quality of Service (QoS) is a mechanism used to apply an action to traffic streams with different priorities or delivery characteristics.
The QoS class allows the EtherNet/IP devices to configure QoS-related behavior and is required for devices that support sending EtherNet/IP messages with DiffServ code points (DSCP) or sending EtherNet/IP messages in 802.1Q tagged frames.

5.7.1. Services

Service Code	Service Name	Description
0x0E	Get_Attribute_Single	It returns the value of a specific attribute.
0x10	Set_Attribute_Single	It modifies the value of a specific attribute.

5.7.2. Instance Attributes

• Instance 0 (class attribute)

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	UINT	Revision of the QoS Object Default: 1 (0x0001)
2	Get	Max Instance	UINT	The maximum instance number of the QoS Object Default: 1 (0x0001)

- **Instance 1**

Attribute ID	Access Rule	Name	Data Type	Description
4	Set	DSCP PTP Urgent	USINT	DSCP value for implicit messages (Priority: Urgent) Default: 55 (Binary 0011 0111)
5	Set	DSCP PTP Scheduled	USINT	DSCP value for implicit messages (Priority: Scheduled) Default: 47 (Binary 0010 1111)
6	Set	DSCP PTP High	USINT	DSCP value for implicit messages (Priority: High) Default: 43 (Binary 0010 1011)
7	Set	DSCP PTP Low	USINT	DSCP value for implicit messages (Priority: Low) Default: 31 (Binary 0001 1111)
8	Set	DSCP PTP Explicit	USINT	DSCP value for explicit messages Default: 27 (Binary 0001 1011)

5.8. TCP/IP Interface Class (0xF5)

The TCP/IP Interface class supports the mechanisms to configure the coupler's TCP/IP network interface, including the device's IP address, subnet mask, gateway address, etc.

5.8.1. Services

Service Code	Service Name	Description
0x01	Get_Attribute_All	It returns the attribute value of an instance or class.
0x0E	Get_Attribute_Single	It returns the value of a specific attribute.
0x10	Set_Attribute_Single	It modifies the value of a specific attribute.

5.8.2. Instance Attributes

• Instance 0 (class attribute)

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	UINT	Revision of the TCP/IP Interface Object Default: 4 (0x0004)
2	Get	Max Instance	UINT	The maximum instance number of the TCP/IP Interface Object Default: 1 (0x0001)

- **Instance 1**

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Status	DWORD	Interface status
2	Get	Config. Capability	DWORD	Interface flags that describe configurable items Default: 0x00000015
3	Set	Config. Control	DWORD	Interface control flags
4	Get	Physical Link Object	STRUCT of:	Configuration of Physical Link Object
		Path size	UINT	Default: 2 (0x0002)
		Path	Padded EPATH	Path of Physical Link Object Default: 0x20 0xF6 0x24 0x01
5	Set	Interface Config.	STRUCT of:	Interface configuration Default: 0
		IP Address	UDINT	IP address Default: 192.168.2.3
		Network Mask	UDINT	Network mask Default: 255.255.255.0
		Gateway Address	UDINT	Gateway address Default: 192.168.2.1
		Name Server	UDINT	Address of primary name server
		Name Server 2	UDINT	Address of secondary name server
		Domain Name	STRING	Default domain name
6	Set	Host Name	STRING	Host name of the device
13	Set	Encap. Inactivity Timeout	UINT	Number of seconds until TCP connection is closed on encapsulation inactivity state Default: 0x0078

5.9. Ethernet Link Class (0xF6)

The Ethernet Link class contains the link and status information on the IEEE 802.3 communication interface.

5.9.1. Services

Service Code	Service Name	Description
0x01	Get_Attribute_All	It returns the attribute value of an instance or class.
0x0E	Get_Attribute_Single	It returns the value of a specific attribute.
0x10	Set_Attribute_Single	It modifies the value of a specific attribute.

5.9.2. Instance Attributes

• Instance 0 (class attribute)

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Revision	UINT	Revision of the Ethernet Link Object Default: 4 (0x0004)
2	Get	Max Instance	UINT	The maximum instance number of the Ethernet Link Object Default: 2 (0x0002)
3	Get	Number of Instances	UINT	The number of instances created in the Ethernet Link class Default: 2 (0x0002)

• **Instance 1, 2**

Attribute ID	Access Rule	Name	Data Type	Description
1	Get	Interface Speed	UDINT	Baud rate Default: 100 (0x64)
2	Get	Interface Flags	DWORD	Interface configuration and status information Bit 0: Link status Bit 1 : Half/full Duplex Bit 2...4: Detection status Bit 5: Manual setting (reset required) Bit 6: Local hardware error Bit 7...31 : Reserved Default: It depends on Ethernet connection status.
3	Get	Physical Address	ARRAY of 6 UINT	MAC layer address Default: 0x58 0xE8 0x08 □ □ □
6	Set	Interface Control	STRUCT of	Configuration of physical interface
		Control Bits	WORD	Interface configuration bits Bit 0: Automatic detection Bit 1 : Default Duplex mode Bit 2...15 : Reserved Default: 1 (0x01)
		Forced Interface Speed	UINT	Set the interface baud rate (preset) 0 : Auto-negotiate
7	Get	Interface Type	USINT	Interface type : Twisted pair, fiber optic cable 0 : Unknown 1: Internal interface (e.g., Integrated switch) 2: Twisted pair (e.g., 100Base-TX) 3: Fiber glass (e.g., 100Base-FX) 4...256 : Reserved Default: 2 (0x02)

Attribute ID	Access Rule	Name	Data Type	Description
8	Get	Interface State	USINT	The current status of the interface 0 : Unknown 1: Interface active and ready to send/receive 2: Interface deactivated 3: Interface is testing 4..256 : Reserved
9	Set	Admin State	USINT	Admin status 0 : Reserved 1: Interface active 2: Interface deactivated (If there is only one CIP interface, the deactivation request will be received with error code 0x09) 3..256 : Reserved Default: 1 (0x01)
10	Get	Interface Label	SHORT_ STRING	Interface identification (Port 1, Port 2) Default: Port 1
11	Get	Interface Capability	STRUCT of	Indication of Interface Capabilities 10/HD, 10/FD, 100/HD, 100/FD
		Capability Bits	DWORD	Supported functions of the interface Bit 0: Manual setting (reset required) Bit 1: Auto-Negotiate Bit 2: Auto-MDIX Bit 3 : Manual Speed/Duplex setting Default: 0x0000000E
		Speed Duplex Options	STRUCT of	List of supported Speed/Duplex settings
			USINT	Number of Speed/Duplex combinations Default: 4 (0x04)
			ARRAY of, STRUCT of	Supported Speed/Duplex combinations 10 Mbit/s HD : 0x0A 0x00 0x00 10 Mbit/s FD : 0x0A 0x00 0x01 100 Mbit/s HD : 0x64 0x00 0x00 100 Mbit/s FD: 0x64 0x00 0x01 (default)
			UINT	Interface speed
			USINT	Interface Duplex mode

6. Studio 5000 Guide

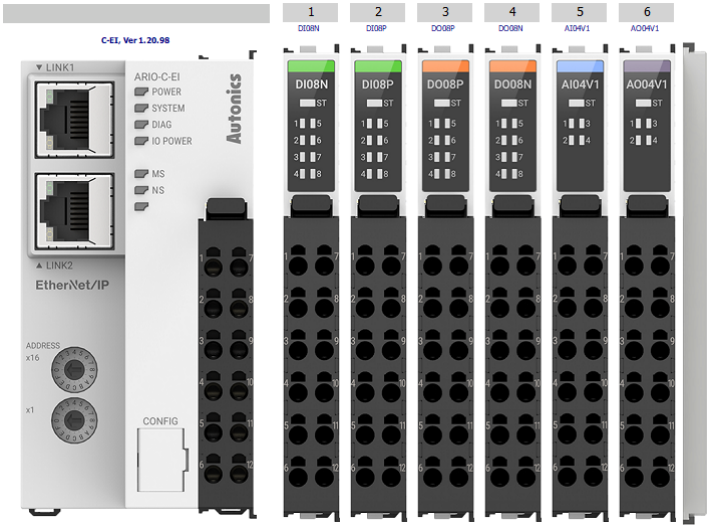
If the coupler's software (firmware) requires an update, refer to the DAQMaster user manual to update it to the latest version.

6.1. Before You Begin

Firstly, this chapter describes how to connect the ARIO unit, arranged as shown in the figure below, to the EtherNet/IP master.
After that, the following descriptions are given in this chapter:

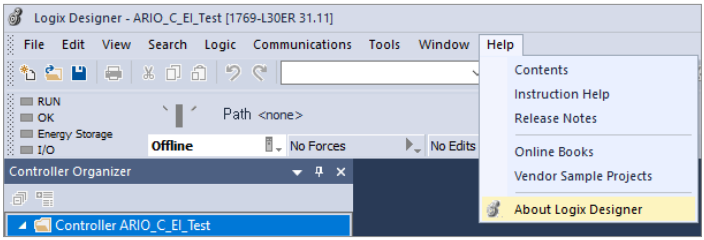
- Read the input signals on channel 1 to 4 of the digital input module (DI08N, slot 1).
- Write the output signals on channel 1 to 4 of the digital output module (DO08N, slot 3).
- Monitor the data of connected modules.

Configuration of the ARIO unit



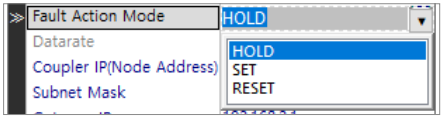
Configuration of the EtherNet/IP Master

- Allen-Bradley controller: 1769-L30ER CompactLogix™ 5370
- Project planning software: Studio 5000 Logix Designer® Ver 31.02.00
  The version of Studio 5000 can be found on the **Help** » **About Logix Designer** in the top menu.



Settings of the ARIO Coupler

- The setting of hexadecimal rotary switches: 0x06 (The last octet of IP address)
- Fault Action setting: HOLD
  To select the HOLD in the DAQMaster, go to **communication mode** » **Properties tab of coupler** » **Fault Action Mode**.



Fault Action function:
In the event of a field communication disruption, the output status of the expansion output module is automatically switched to a predefined value.

Setting range:
SET / RESET / HOLD

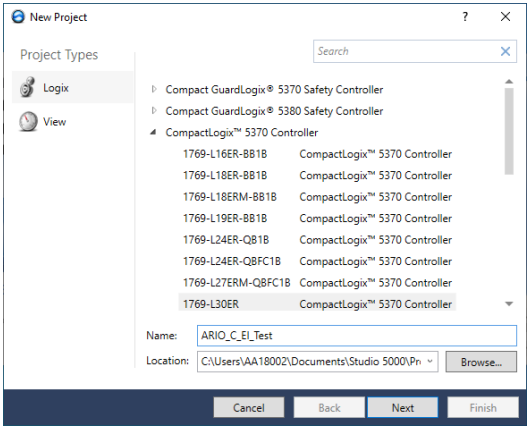
Setting	Digital output model	Analog output model
SET	All outputs of the module are switched to ON.	The default voltage/current setting is switched to the maximum value within the rated voltage/current range. (Ex. If the voltage range is ±10 V_{DC}, then upon SET operation, 10 V_{DC} is applied.)
RESET	All outputs of the module are switched to OFF.	**Voltage output model:** The default voltage setting is switched to 0 V_{DC}. (Ex. If the voltage range is ±10 V_{DC}, then upon RESET operation, 0 V_{DC} is applied.) **Current output model:** The default current setting is applied as the minimum value within the rated current range. (Ex. If the current range is 4 to 20 mA, then upon RESET operation, 4 mA is applied.)
HOLD	The module's output status is maintained as it was prior to the communication disruption.	The module's output status is maintained as it was prior to the communication disruption.

This chapter only describes based on the Allen-Bradley's master (PLC) and software. For detailed information on communication connection and usage method with the master, refer to the user manuals provided by the specific manufacturer.

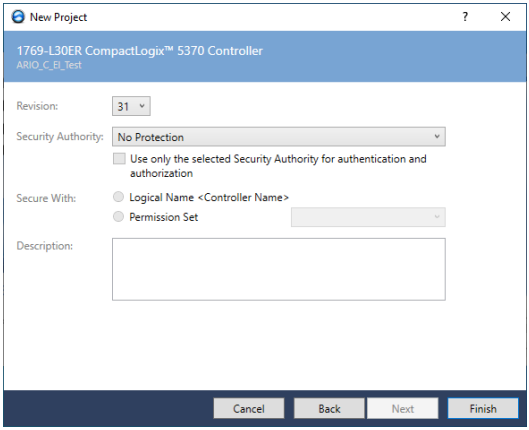
6.2. Create a AB PLC Project

1. Launch the Studio 5000 and click the **New Project**.

2. Select the connected controller model on the Logix Project Types and designate a project name. Click the **Next**.



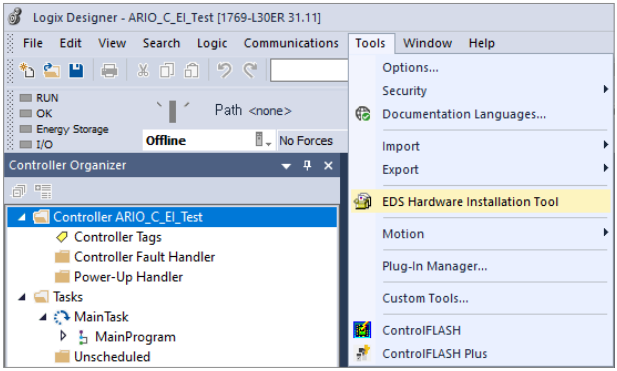
3. Select the same Revision with the version of Studio 5000 and click the **Finish**.



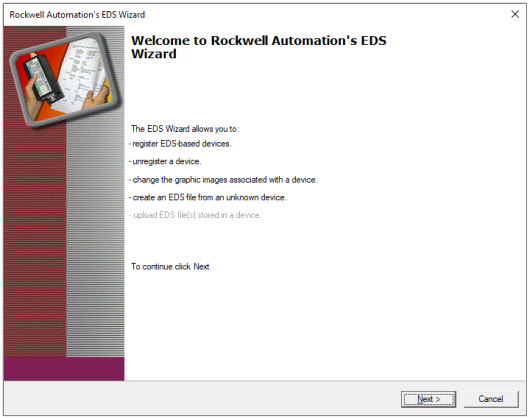
6.3. Install the EDS File

Electronic Data Sheets (EDS) files contain information about the data and communication functions of the coupler for EtherNet/IP connection.
You can install and manage EDS files on your project planning software.

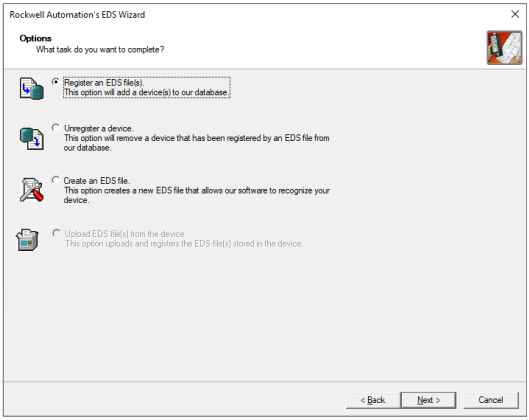
1. Download the EDS file of the ARIO-C-EI on our Autonics website.
2. Refer to the README.txt in the downloaded folder and select the EDS file suitable for the S/W version of the coupler.
3. Launch the Studio 5000.
4. Select the **Tools** » **EDS Hardware Installation Tool**.



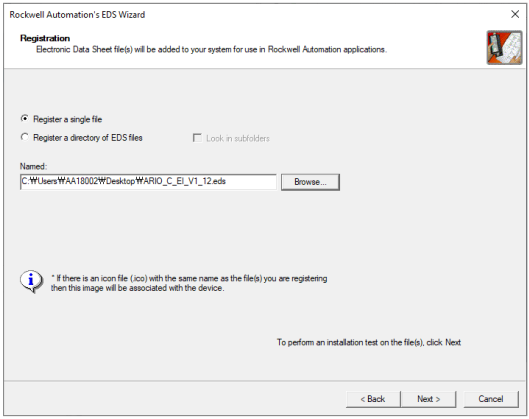
5. The EDS installation wizard will be launched. Click the **Next**.



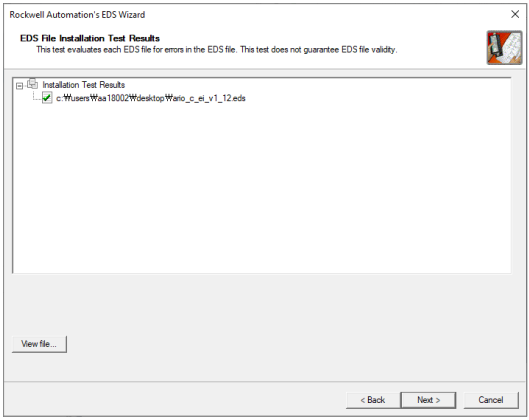
6. Select the Register an EDS file(s) and click the **Next**.



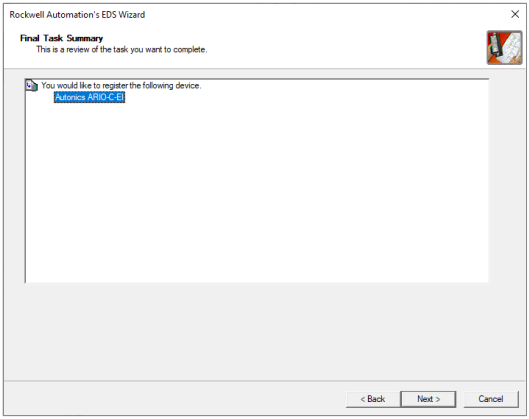
7. Click the **Browse** to specify the path of the EDS file and click the **Next**.



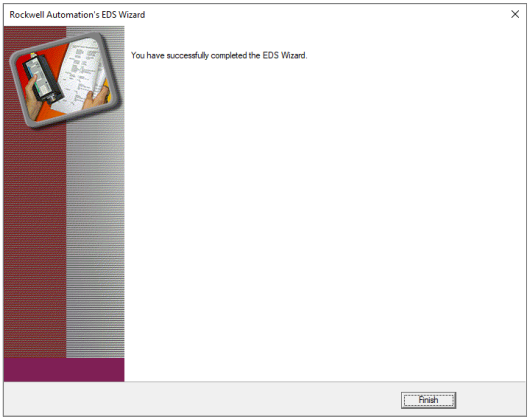
8. Click the **Next**.



9. Click the **Next**.



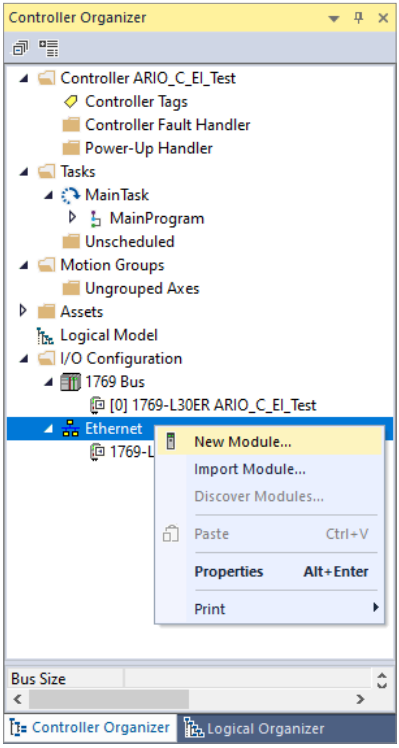
10. Click the **Finish**. The installation of EDS file is completed.



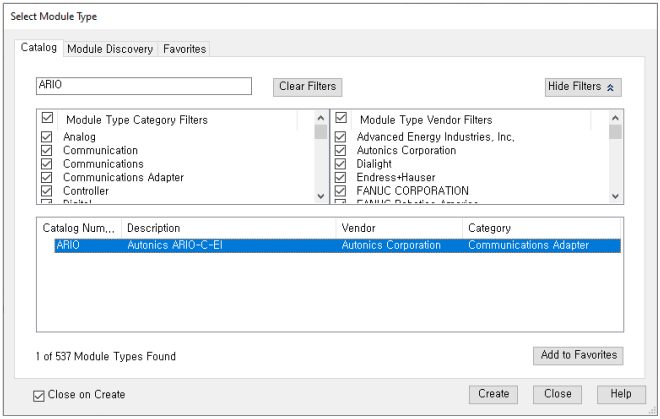
6.4. Add the ARIO Unit

Be sure to set the controller state to the **Offline** mode for integrating the modules.

1. Right-click on the **Controller Organizer** » **I/O Configuration** » **Ethernet** and select the **New Module**.

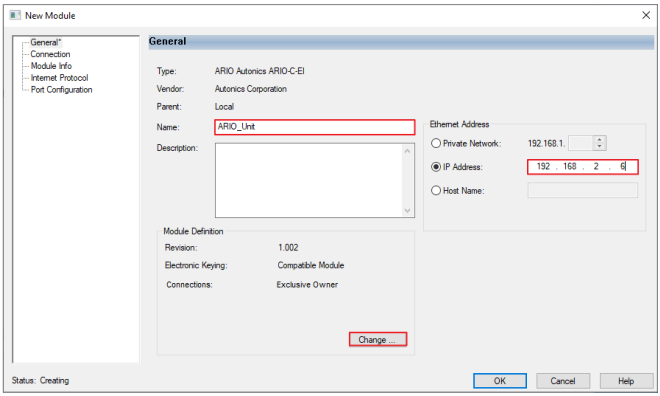


2. Enter the ARIO and select the ARIO-C-EI from the search results. Click the **Create**.



3. Assign a module name and IP address.

   When assigning an IP address, enter the value of the rotary switches to the last octet of the IP address. Click the **Change** to open the **Module Definition** window.



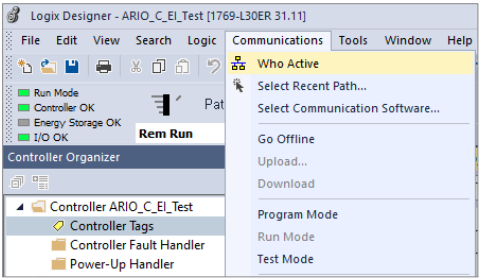
How to set the IP address and communication path

- Be sure to set the IP addresses of the master and coupler to be the same up to the network portion of the subnet mask.
- Refer to the table below for the range of IP address range depending on the rotary switches settings of the coupler.

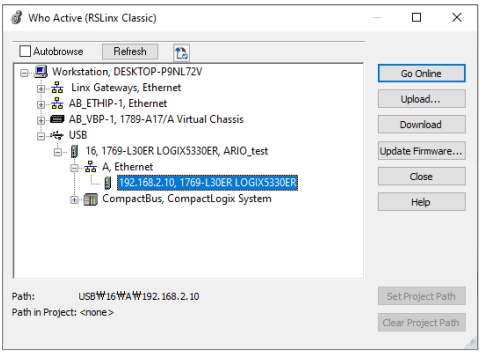
Assign mode	Rotary switches (x16, x1)	Value
Default IP address	0x00	192.168.2.3
IP address	0x01 to 0xFF	192.168.2.**1** to 192.168.2.**255**

- You can check or specify the communication path with the Master in the **RSWho**.

1. Click the **Communications** » **Who Active**.

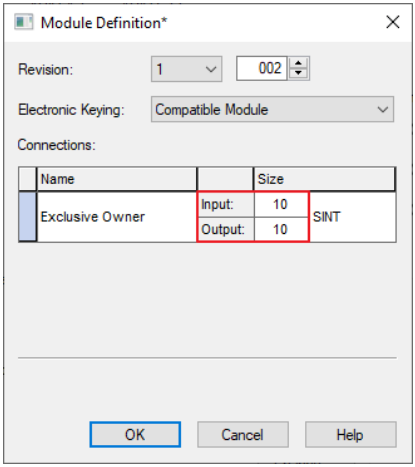


2. Select the connected controller (PLC) and click the **Go Online**.



3. The communication path is displayed in the project file as shown below.

4. Specify the data size of the ARIO I/O modules referring to the explanations below and click the **OK**.



• **Revision** - It is defined by the EDS file, or set considering the Electronic Keying

• **Name** - Exclusive Owner

• **Input, Output Size** - It is the data size of input and output modules connected to the coupler.

- DI08N + DI08P + AI04V1
  = 1-byte (8-CH) + 1-byte (8-CH) + 8-byte (4-CH)
  = 10-byte (SINT)
- DO08N + DO08P + AO04V1
  = 1-byte (8-CH) + 1-byte (8-CH) + 8-byte (4-CH)
  = 10-byte (SINT)

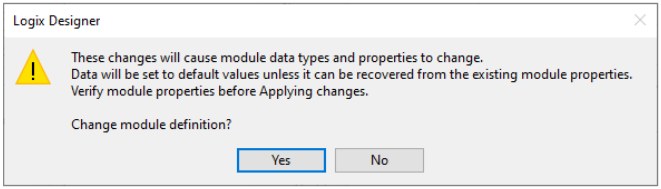
Electronic Keying

You can reduce the possibility of incorrect device connection through the electronic keying function which compares the attributes [01] of the installed device with the defined device in the project.

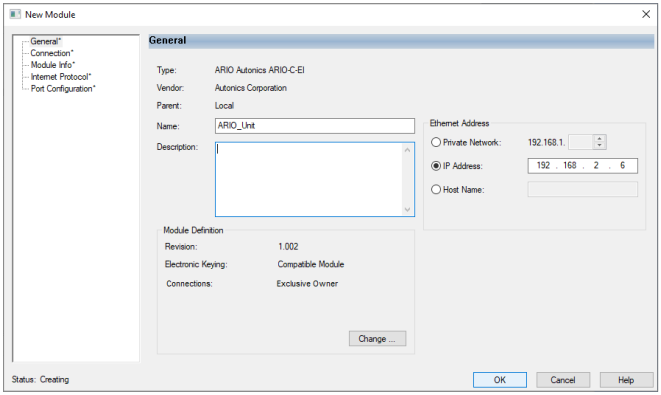
1. **Compatible Module** - The communication can be established even though the versions (or keying attributes) of the coupler and EDS file do not exactly match.
2. **Disable Keying** - The keying attributes of the coupler and EDS file are not considered when attempting to communicate with a device so that the communication can be established with a device other than the device specified in the project.
   We strongly recommend that you do not use Disable Keying.
3. **Exact Match** - All keying attributes of the coupler and EDS file must match to establish communication.
4. **Connection Fault Indication** - An existence of fault is indicated on the controller (PLC), but the communication can be established even though the keying attributes of the coupler and EDS file do not exactly match.

01) Attributes - Vendor, Device Type, Product Code, Major Revision, Minor Revision

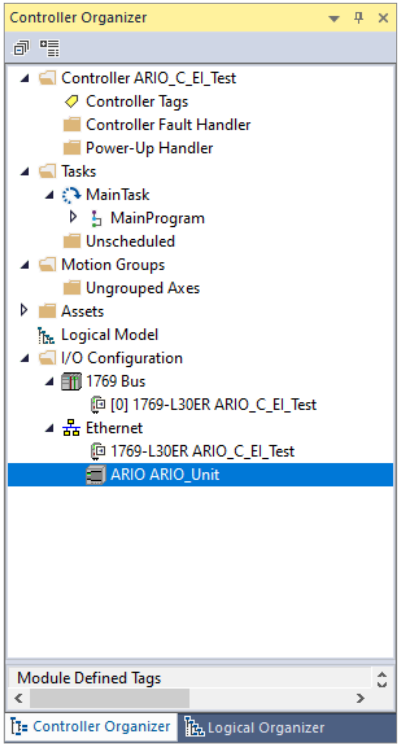
5. Click the **YES** in the pop-up window.



6. Click the **OK** in the New Module window to complete the configuration of ARIO unit.



7. The ARIO module will be created in the **Controller Organizer** » **I/O Configuration** » **Ethernet**.

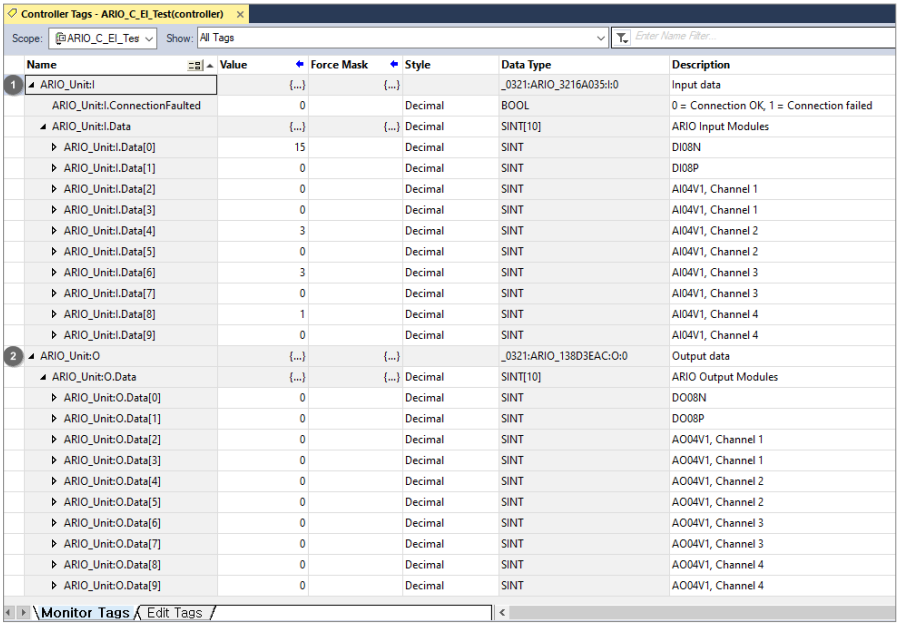


6.5. Controller Tags

The controller tags defined in the ARIO-C-EI are created when you install the EDS file in your project. With this EDS file, you can set and monitor the input/output process data on the controller tags tab.

Structure of the instance

1. **module name:I** - Input process data (instance 101 of assembly object)
2. **module name:O** - Output process data (instance 100 of assembly object)



	Name	Value	Force Mask	Style	Data Type	Description
1	ARIO_Unit:I	{...}	{...}		_0321:ARIO_3216A035:I:0	Input data
	ARIO_Unit:I.ConnectionFaulted	0		Decimal	BOOL	0 = Connection OK, 1 = Connection failed
	ARIO_Unit:I.Data	{...}	{...}	Decimal	SINT[10]	ARIO Input Modules
	ARIO_Unit:I.Data[0]	15		Decimal	SINT	DI08N
	ARIO_Unit:I.Data[1]	0		Decimal	SINT	DI08P
	ARIO_Unit:I.Data[2]	0		Decimal	SINT	AI04V1, Channel 1
	ARIO_Unit:I.Data[3]	0		Decimal	SINT	AI04V1, Channel 1
	ARIO_Unit:I.Data[4]	3		Decimal	SINT	AI04V1, Channel 2
	ARIO_Unit:I.Data[5]	0		Decimal	SINT	AI04V1, Channel 2
	ARIO_Unit:I.Data[6]	3		Decimal	SINT	AI04V1, Channel 3
	ARIO_Unit:I.Data[7]	0		Decimal	SINT	AI04V1, Channel 3
	ARIO_Unit:I.Data[8]	1		Decimal	SINT	AI04V1, Channel 4
	ARIO_Unit:I.Data[9]	0		Decimal	SINT	AI04V1, Channel 4
2	ARIO_Unit:O	{...}	{...}		_0321:ARIO_138D3EAC:O:0	Output data
	ARIO_Unit:O.Data	{...}	{...}	Decimal	SINT[10]	ARIO Output Modules
	ARIO_Unit:O.Data[0]	0		Decimal	SINT	DO08N
	ARIO_Unit:O.Data[1]	0		Decimal	SINT	DO08P
	ARIO_Unit:O.Data[2]	0		Decimal	SINT	AO04V1, Channel 1
	ARIO_Unit:O.Data[3]	0		Decimal	SINT	AO04V1, Channel 1
	ARIO_Unit:O.Data[4]	0		Decimal	SINT	AO04V1, Channel 2
	ARIO_Unit:O.Data[5]	0		Decimal	SINT	AO04V1, Channel 2
	ARIO_Unit:O.Data[6]	0		Decimal	SINT	AO04V1, Channel 3
	ARIO_Unit:O.Data[7]	0		Decimal	SINT	AO04V1, Channel 3
	ARIO_Unit:O.Data[8]	0		Decimal	SINT	AO04V1, Channel 4
	ARIO_Unit:O.Data[9]	0		Decimal	SINT	AO04V1, Channel 4

Channel structure of the controller tags and modules

1. **Digital I/O module**

Index	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Ch.8	Ch.7	Ch.6	Ch.5	Ch.4	Ch.3	Ch.2	Ch.1

With the mapping of the bits shown in the table above, the digital module has a size of 1 bit in each channel. Check the bit number from the **Module Name:I/O.Data[Index].Bit**.

• **[Example]** ARIO_Unit:I.Data[0].1

- Channel 1 of the module which is arranged at the first slot in the input process image

2. **Analog I/O module**

Index	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Ch.1 (High Byte)							
1	Ch.1 (Low Byte)							

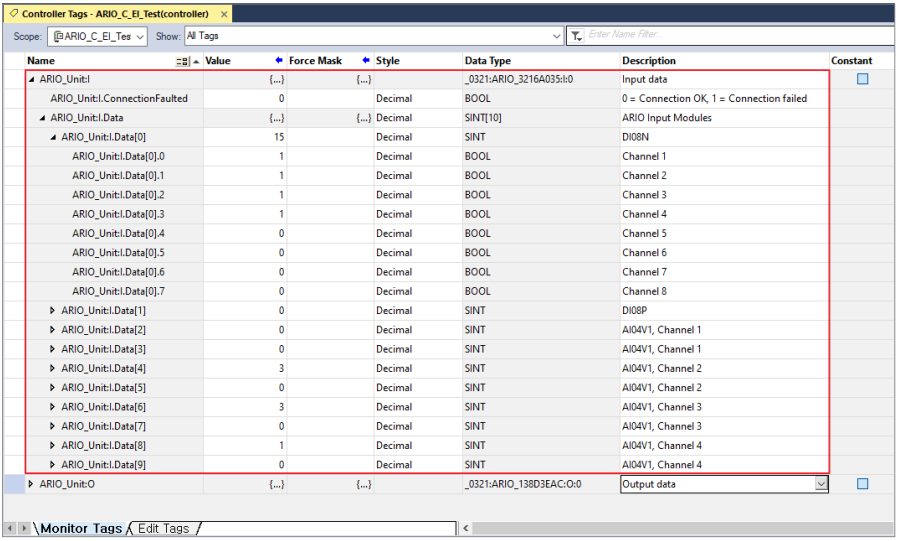
With the mapping of the bits shown in the table above, the analog module has a size of 1 word (= 2 bytes) in each channel. Check the number of index from the **Module Name:I/O.Data[Index]**.

• **[Example]** ARIO_Unit:I.Data[0 to 1]

- Channel 1 of the module which is arranged at the first slot in the input process image

6.6. Read the Input Data

Expand the **Module Name:I** to check the data of the connected input modules.
The input process image is represented as shown in the figure below in the Studio 5000.

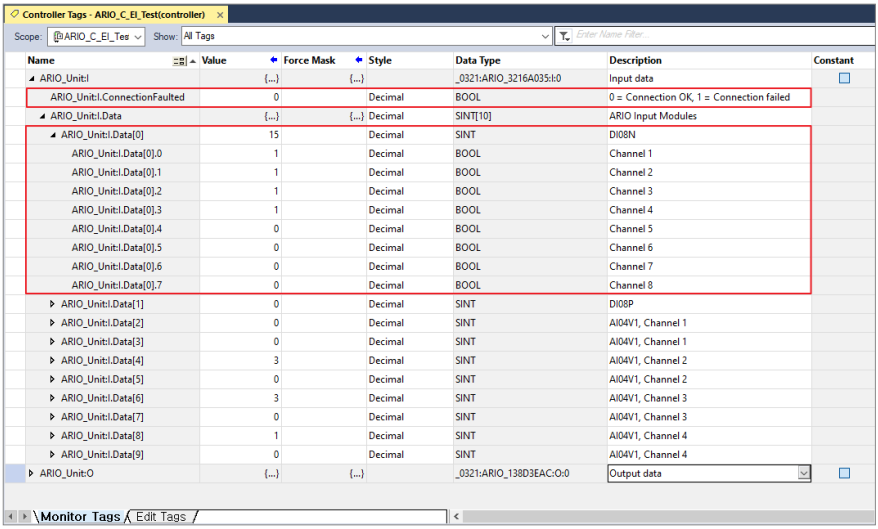


6.6.1. Example Usage

How to check the channels which are receiving input signals
- Module: Digital input module (slot 1)
- Channel range: Channel 1 to 4

(channel indicator of the module: Green LED lights up)

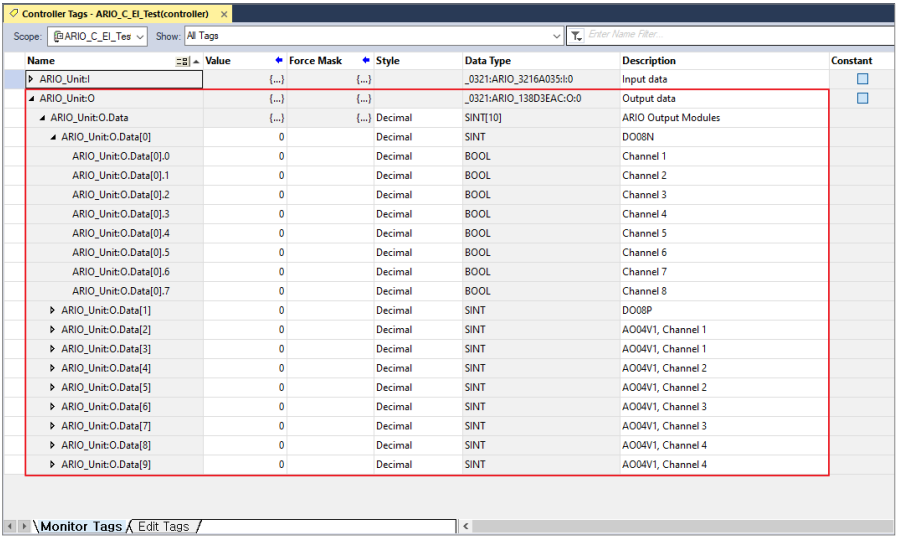
1. Set the state of controller to the Online mode.
2. Firstly, check the state of a communication connection between the Master and ARIO unit through the Value of **Module Name: I.ConnectionFaulted**. Expand the **Module Name:I.Data[0]** to check whether the Value of **Module Name:I.Data[0].0 to 3** is 1.
   (Binary 0000 1111 = 15 $_{DEC}$)



Name	Value	Force Mask	Style	Data Type	Description	Constant
ARIO_Unit:I	{...}	{...}		_0321:ARIO_3216A035:I:0	Input data	
ARIO_Unit:I.ConnectionFaulted	0		Decimal	BOOL	0 = Connection OK, 1 = Connection failed	
ARIO_Unit:I.Data	{...}	{...}	Decimal	SINT[10]	ARIO Input Modules	
ARIO_Unit:I.Data[0]	15		Decimal	SINT	DI08N	
ARIO_Unit:I.Data[0].0	1		Decimal	BOOL	Channel 1	
ARIO_Unit:I.Data[0].1	1		Decimal	BOOL	Channel 2	
ARIO_Unit:I.Data[0].2	1		Decimal	BOOL	Channel 3	
ARIO_Unit:I.Data[0].3	1		Decimal	BOOL	Channel 4	
ARIO_Unit:I.Data[0].4	0		Decimal	BOOL	Channel 5	
ARIO_Unit:I.Data[0].5	0		Decimal	BOOL	Channel 6	
ARIO_Unit:I.Data[0].6	0		Decimal	BOOL	Channel 7	
ARIO_Unit:I.Data[0].7	0		Decimal	BOOL	Channel 8	
ARIO_Unit:I.Data[1]	0		Decimal	SINT	DI08P	
ARIO_Unit:I.Data[2]	0		Decimal	SINT	AI04V1, Channel 1	
ARIO_Unit:I.Data[3]	0		Decimal	SINT	AI04V1, Channel 1	
ARIO_Unit:I.Data[4]	3		Decimal	SINT	AI04V1, Channel 2	
ARIO_Unit:I.Data[5]	0		Decimal	SINT	AI04V1, Channel 2	
ARIO_Unit:I.Data[6]	3		Decimal	SINT	AI04V1, Channel 3	
ARIO_Unit:I.Data[7]	0		Decimal	SINT	AI04V1, Channel 3	
ARIO_Unit:I.Data[8]	1		Decimal	SINT	AI04V1, Channel 4	
ARIO_Unit:I.Data[9]	0		Decimal	SINT	AI04V1, Channel 4	
ARIO_Unit:O	{...}	{...}		_0321:ARIO_138D3EAC:O:0	Output data	

6.7. Write the Output Data

Expand the **Module Name:O** to check the arrangement of the connected output modules.
The output process image is represented as shown in the figure below in the Studio 5000.



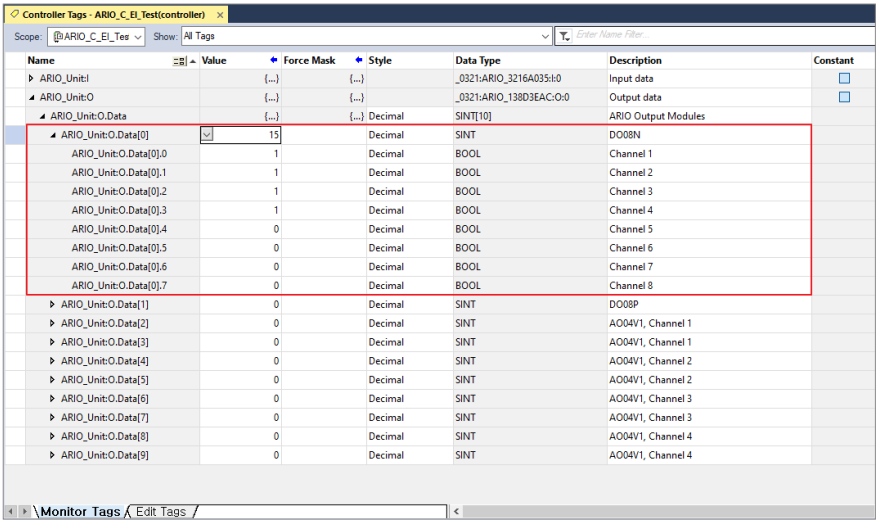
Name	Value	Force Mask	Style	Data Type	Description	Constant
ARIO_Unit:I	{...}	{...}		_0321:ARIO_3216A035:I:0	Input data	
ARIO_Unit:O	{...}	{...}		_0321:ARIO_138D3EAC:O:0	Output data	
ARIO_Unit:O.Data	{...}	{...}	Decimal	SINT[10]	ARIO Output Modules	
ARIO_Unit:O.Data[0]	0		Decimal	SINT	DO08N	
ARIO_Unit:O.Data[0].0	0		Decimal	BOOL	Channel 1	
ARIO_Unit:O.Data[0].1	0		Decimal	BOOL	Channel 2	
ARIO_Unit:O.Data[0].2	0		Decimal	BOOL	Channel 3	
ARIO_Unit:O.Data[0].3	0		Decimal	BOOL	Channel 4	
ARIO_Unit:O.Data[0].4	0		Decimal	BOOL	Channel 5	
ARIO_Unit:O.Data[0].5	0		Decimal	BOOL	Channel 6	
ARIO_Unit:O.Data[0].6	0		Decimal	BOOL	Channel 7	
ARIO_Unit:O.Data[0].7	0		Decimal	BOOL	Channel 8	
ARIO_Unit:O.Data[1]	0		Decimal	SINT	DO08P	
ARIO_Unit:O.Data[2]	0		Decimal	SINT	AO04V1, Channel 1	
ARIO_Unit:O.Data[3]	0		Decimal	SINT	AO04V1, Channel 1	
ARIO_Unit:O.Data[4]	0		Decimal	SINT	AO04V1, Channel 2	
ARIO_Unit:O.Data[5]	0		Decimal	SINT	AO04V1, Channel 2	
ARIO_Unit:O.Data[6]	0		Decimal	SINT	AO04V1, Channel 3	
ARIO_Unit:O.Data[7]	0		Decimal	SINT	AO04V1, Channel 3	
ARIO_Unit:O.Data[8]	0		Decimal	SINT	AO04V1, Channel 4	
ARIO_Unit:O.Data[9]	0		Decimal	SINT	AO04V1, Channel 4	

6.7.1. Example Usage

How to set the channels to send the output signals

- Module: Digital output module (slot 3)
- Channel range: Channel 1 to 4

1. Expand the **Module Name:O.Data[0]** and enter 1 to the Value of **Module Name:O.Data[0].0 to 3**. (Binary 0000 1111 = 15 DEC)



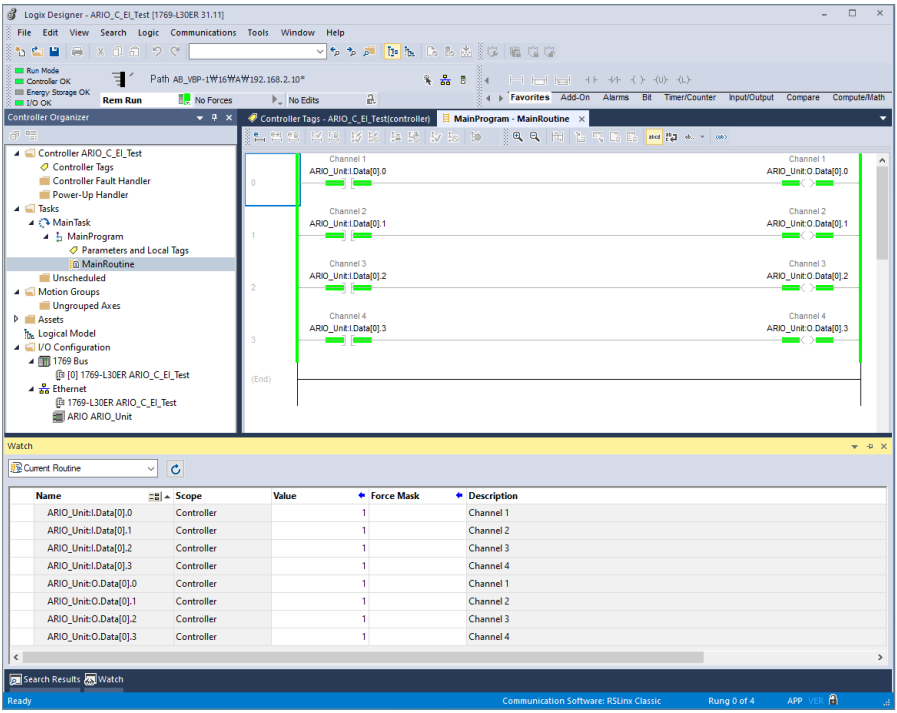
Name	Value	Force Mask	Style	Data Type	Description	Constant
ARIO_Unit:I	{...}	{...}		_0321:ARIO_3216A035:I:0	Input data	
ARIO_Unit:O	{...}	{...}		_0321:ARIO_138D3EAC:O:0	Output data	
ARIO_Unit:O.Data	{...}	{...}	Decimal	SINT[10]	ARIO Output Modules	
ARIO_Unit:O.Data[0]	15		Decimal	SINT	DO08N	
ARIO_Unit:O.Data[0].0	1		Decimal	BOOL	Channel 1	
ARIO_Unit:O.Data[0].1	1		Decimal	BOOL	Channel 2	
ARIO_Unit:O.Data[0].2	1		Decimal	BOOL	Channel 3	
ARIO_Unit:O.Data[0].3	1		Decimal	BOOL	Channel 4	
ARIO_Unit:O.Data[0].4	0		Decimal	BOOL	Channel 5	
ARIO_Unit:O.Data[0].5	0		Decimal	BOOL	Channel 6	
ARIO_Unit:O.Data[0].6	0		Decimal	BOOL	Channel 7	
ARIO_Unit:O.Data[0].7	0		Decimal	BOOL	Channel 8	
ARIO_Unit:O.Data[1]	0		Decimal	SINT	DO08P	
ARIO_Unit:O.Data[2]	0		Decimal	SINT	AO04V1, Channel 1	
ARIO_Unit:O.Data[3]	0		Decimal	SINT	AO04V1, Channel 1	
ARIO_Unit:O.Data[4]	0		Decimal	SINT	AO04V1, Channel 2	
ARIO_Unit:O.Data[5]	0		Decimal	SINT	AO04V1, Channel 2	
ARIO_Unit:O.Data[6]	0		Decimal	SINT	AO04V1, Channel 3	
ARIO_Unit:O.Data[7]	0		Decimal	SINT	AO04V1, Channel 3	
ARIO_Unit:O.Data[8]	0		Decimal	SINT	AO04V1, Channel 4	
ARIO_Unit:O.Data[9]	0		Decimal	SINT	AO04V1, Channel 4	

2. The green LEDs light up on channel 1 to 4 indicators of the modules.

Ladder example

The figure below shows the following operation -

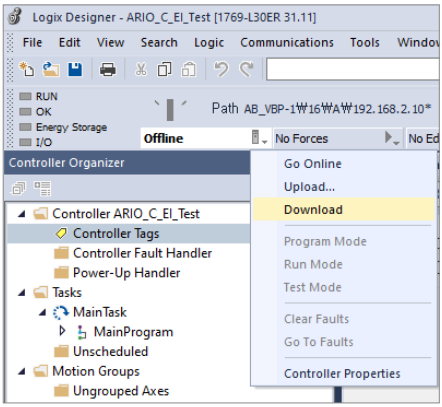
- Input signals are received to channel 1 to 4 of the digital input module.
- Send the output signals to channel 1 to 4 of the digital output module.



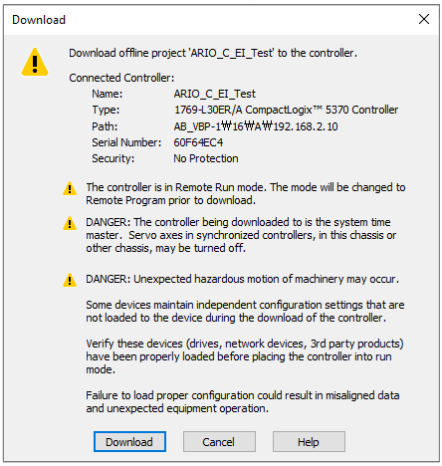
- You can create a ladder on the **Controller Organizer** » **Tasks** » **MainProgram** » **MainRoutine**
- Click the **Watch** tab at the bottom of the project file to monitor the I/O process data.

6.8. Download the Program

1. Click the **Offline** and select the **Download**.



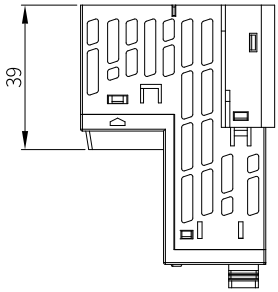
2. Select the **Download** in the pop-up window.

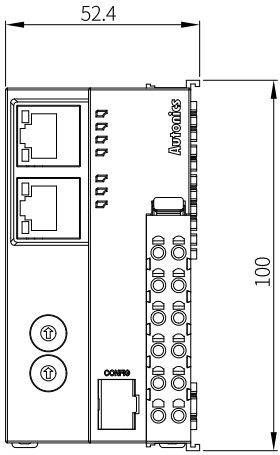


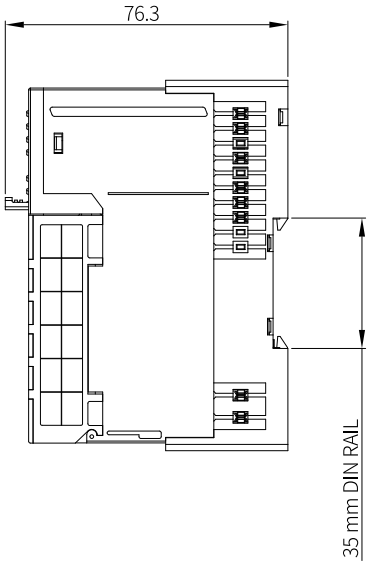
7. Dimensions

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

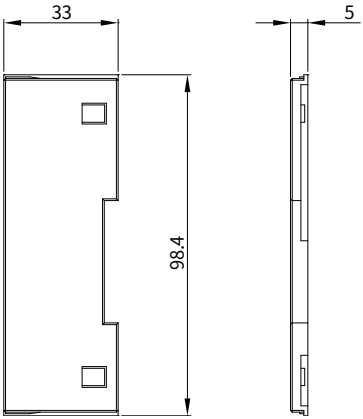
Coupler







End module



8. Specifications

8.1. Electrical/Mechanical Specifications

Protection circuit	Reverse field and supply power protection circuit
Power supply	• Unit (coupler + module): ≤ 9.6 W, ≤ 400 mA (≤ 200 mA/CH, 2-CH/COM) • I/O: ≤ 96 W, ≤ 4,000 mA (≤ 2,000 mA/CH, 2-CH/COM)
Supply voltage	• Coupler input voltage: 24 V_{DC} • ABUS supply voltage: 5 V_{DC}, ≤ 960 mA • I/O supply voltage: 24 V_{DC}
Current consumption	• The standby and run mode: 200 mA • The maximum load: 400 mA (at coupler max. load)
Comm. connector	RJ45 X 2
CONFIG port	USB 2.0 type Micro B
Installation method	DIN rail mounting
Material	Terminal: PBT, Body: PC, Base: PA6, POM
Unit weight (packaged)	≈ 165 g (≈ 265 g)

8.2. Environmental Conditions

Insulation resistance	≥ 100 MΩ (500 V_{DC} megger)
Dielectric strength	Between the charging part the case: 1000 V_{AC} 50 / 60 Hz for 1 minute
Noise immunity	±500 V_{DC} the square wave noise (pulse width: 1 μs) by the noise simulator
Vibration	0.7 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 1 hour
Vibration (malfunction)	0.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 10 minutes
Shock	300 m/s² (≈ 30 G) in each X, Y, Z direction for 3 times
Shock (malfunction)	100 m/s² (≈ 10 G) in each X, Y, Z direction for 3 times
Ambient temperature	-10 to 55 °C, storage: -25 to 70 °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)

8.3. Certification

Certification	CE, UKCA, UL Listed, KC, EAC, EtherNet/IP ™

9. Communication Interface

9.1. Ethernet

Ethernet standard	100BASE-TX
Memory size	• Input: 504-byte • Output: 504-byte
Max. number of connectable modules	≤ 64 (The length of connected modules: ≤ 768 mm)
Transmission rate	10/100 Mbps [01)]
Cable spec.	The cable approved by ODVA or meets at least Cat 5e
Cable length	≤ 100 m
Protocol	EtherNet/IP
Connection object	Explicit messages, I/O messages
Number of nodes	Depends on the network configuration
Address settings	Hexadecimal rotary switches, DAQMaster
Topology	Bus, Line, Star
EDS file	Download the EDS file on our Autonics website

01) The transmission rate is determined after performing Auto-negotiation depending on the network quality.

9.2. ABUS

Transmission rate	4 Mbps
Topology	Bus, Drop Line

Autonics

Dimensions or specifications on this manual are subject to change and some models may be discontinued without notice.

www.autonics.com