OMRON

Machine Automation Controller

NX-series Analog I/O Units

User's Manual for Analog Input Units and Analog Output Units

NX-AD

Analog I/O Units





W522-E1-07

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Introduction

Thank you for purchasing an Analog Input Unit or Analog Output Unit.

This manual contains information that is necessary to use these Analog Input Units and Analog Output Units, which are classified as NX-series Analog I/O Units. Please read this manual and make sure you understand the functionality and performance of the NX-series Analog I/O Unit before you attempt to use it in a control system.

Keep this manual in a safe place where it will be available for reference during operation.

Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- · Personnel in charge of introducing FA systems.
- · Personnel in charge of designing FA systems.
- Personnel in charge of installing and maintaining FA systems.
- · Personnel in charge of managing FA systems and facilities.

For programming, this manual is intended for personnel who understand the programming language specifications in international standard IEC 61131-3 or Japanese standard JIS B 3503.

Applicable Products

This manual covers the following product.

- NX-series Analog Input Units
 NX-AD
- NX-series Analog Output Units
 NX-DA

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Relevant Manuals

The table below provides the relevant manuals for the NX-series Analog I/O Units.

Read all of the manuals that are relevant to your system configuration and application to make the most of the NX-series Analog I/O Units.

Other manuals, such as related product manuals, are necessary for specific system configurations and applications. Refer to *Related Manuals* on page 27 for the related manuals.

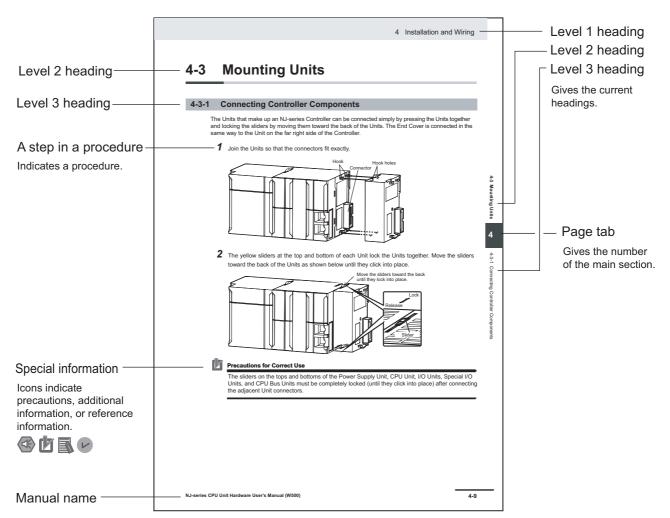
Manual name	Application
NX-series Analog I/O Units	Learning how to use NX-series Analog Input Units and Analog Output Units
User's Manual for Analog Input	
Units and Analog Output Units ^{*1}	
NX-series Data Reference Man-	Referencing lists of the data that is required to configure systems with
ual	NX-series Units

*1. From revision 05 of this manual, information on the NX-series Temperature Input Units (NX-TS —) that were included in previous revisions was moved to the following manual: *NX-series Analog I/O Units User's Manual for Temperature Input Units and Heater Burnout Detection Units* (Cat. No. W566). Accompanying that change, the name of this manual was changed from the *NX-series Analog I/O Units User's Manual* (Cat. No. W522) to the *NX-series Analog I/O Units User's Manual for Analog I/O Units User's Manual for Analog Output Units* (Cat. No. W522).

Manual Structure

Page Structure and Icons

The following page structure and icons are used in this manual.



Note This illustration is provided only as a sample. It may not literally appear in this manual.

Special Information

Special information in this manual is classified as follows:

Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.

Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.



Additional Information

Additional information to read as required.

This information is provided to increase understanding or make operation easier.



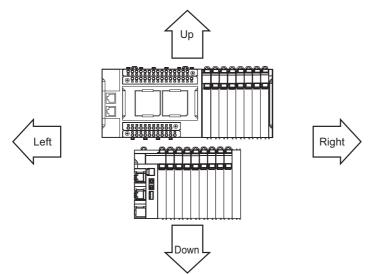
Version Information

Information on differences in specifications and functionality for CPU Units, Industrial PCs, and Communications Coupler Units with different unit versions and for different versions of the Support Software is given.

Note References are provided to more detailed or related information.

Precaution on Terminology

- In this manual, "download" refers to transferring data from the Support Software to a physical device and "upload" refers to transferring data from a physical device to the Support Software.
- In this manual, the directions in relation to the Units are given in the following figure, which shows upright installation.



• This user's manual refers to the NY-series IPC Machine Controller Industrial Panel PCs and Industrial Box PCs as simply *Industrial PCs* or as *NY-series Industrial PCs*.

- This user's manual refers to the built-in EtherCAT port on an NJ/NX-series Controller or NY-series Industrial PC as simple a built-in EtherCAT port.
- This user's manual may omit manual names and manual numbers in places that refer to the user's manuals for CPU Units and Industrial PCs. The following table gives some examples. When necessary, refer to *Related Manuals* on page 27 to determine the appropriate manual based on the common text for the omitted contents.

Examples:

Manual name	Omitted contents	Common text
NJ/NX-series CPU Unit Software	Software user's manual	Software User's Manual
User's Manual	for the connected CPU	
NY-series	Unit or Industrial PC	
IPC Machine Controller Industrial		
Panel PC / Industrial Box PC		
Software User's Manual		
NJ/NX-series CPU Unit Built-in Ether-	User's manual for built-in	Built-in EtherCAT port
CAT® Port User's Manual	EtherCAT port on the	
NY-series	connected CPU Unit or	
IPC Machine Controller Industrial	Industrial PC	
Panel PC / Industrial Box PC		
Built-in EtherCAT® Port		
User's Manual		

• This user's manual may omit manual names and manual numbers in places that refer to the user's manuals for Communications Coupler Units. If you will use a Communications Coupler Unit, refer to *Related Manuals* on page 27 to identify the manual for your Unit.

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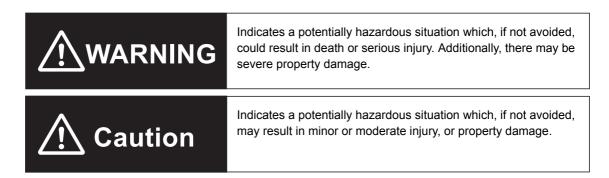
Safety Precautions

Definition of Precautionary Information

The following notation is used in this manual to provide precautions required to ensure safe usage of the NX-series Analog Input Units and Analog Output Units.

The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.

The following notation is used.



Symbols



The circle and slash symbol indicates operations that you must not do. The specific operation is shown in the circle and explained in text. This example indicates prohibiting disassembly.



The triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text. This example indicates a precaution for electric shock.



The triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text. This example indicates a general precaution.



The filled circle symbol indicates operations that you must do. The specific operation is shown in the circle and explained in text.

This example shows a general precaution for something that you must do.

Safety Precautions

Warnings

🕂 WARNING

During Power Supply

Do not touch the terminal section while power is ON.

Electric shock may occur.

Do not attempt to take any Unit apart.

In particular, high-voltage parts are present in Units that supply power while power is supplied or immediately after power is turned OFF. Touching any of these parts may result in electric shock. There are sharp parts inside the Unit that may cause injury.

Fail-safe Measures

Provide safety measures in external circuits to ensure safety in the system if an abnormality occurs due to malfunction of the CPU Unit, Industrial PC, other Units, or slaves or due to other external factors affecting operation.

Not doing so may result in serious accidents due to incorrect operation.

Emergency stop circuits, interlock circuits, limit circuits, and similar safety measures must be provided in external control circuits.

The CPU Unit or Industrial PC will turn OFF all outputs from Output Units in the following cases. The remote I/O slaves will operate according to the settings in the slaves.

- If a power supply error occurs.
- · If the power supply connection becomes faulty.
- If a CPU watchdog timer error or CPU reset occurs.
- · If a Controller error in the major fault level occurs.
- While the CPU Unit is on standby until RUN mode is entered after the power is turned ON

External safety measures must be provided to ensure safe operation of	f the system in such
cases.	

The outputs may remain ON or OFF due to deposition or burning of the output relays or destruction of the output transistors. As a countermeasure for such problems, external safety measures must be provided to ensure safe operation of the system.

If external power supplies for slaves or other devices are overloaded or short-circuited, the voltage will drop, outputs will turn OFF, and the system may be unable to read inputs. Provide external safety measures in control with monitoring of external power supply voltage as required so that the system operates safely in such a case.

You must take fail-safe measures to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causes.

Not doing so may result in serious accidents due to incorrect operation.















Voltage and Current Inputs

Make sure that the voltages and currents that are input to the Units and slaves are within the specified ranges.

Inputting voltages or currents that are outside of the specified ranges may cause accidents or fire.



Always confirm safety at the destination node before you transfer Unit configuration information, parameters, settings, or other data from tools such as the Sysmac Studio.

The devices or machines may operate unexpectedly, regardless of the operating mode of the Controller.

Cautions

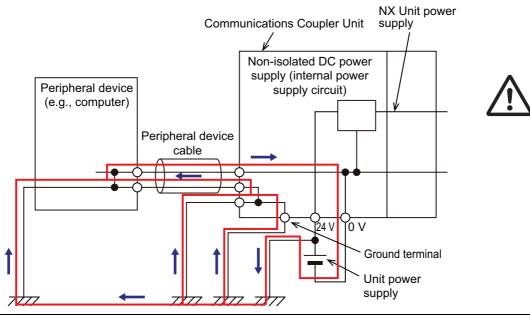


Wiring

When you connect a computer or other peripheral device to a Communications Coupler Unit that has a non-isolated DC power supply, either ground the 0-V side of the external power supply (i.e. Unit power supply) or do not ground it at all.

If the peripheral devices are grounded incorrectly, the external power supply (i.e. Unit power supply) may be short-circuited.

Never ground the 24-V side of the power supply, as shown in the following figure.



Be sure that all terminal screws and cable connector screws are tightened to the torque specified in the relevant manuals. The loose screws may result in fire or malfunction.



Online Editing

Execute online editing only after confirming that no adverse effects will be caused by deviations in the timing of I/O. If you perform online editing, the task execution time may exceed the task period, I/O may not be refreshed with external devices, input signals may not be read, and output timing may change.



Precautions for Safe Use

Transporting

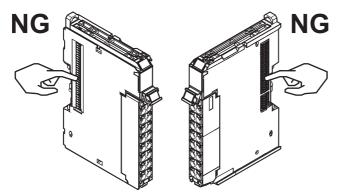
- When transporting any Unit, use the special packing box for it. Also, do not subject the Unit to excessive vibration or shock during transportation.
- Do not drop any Unit or subject it to abnormal vibration or shock. Doing so may result in Unit malfunction or burning.

Mounting

- · Mount terminal blocks and connectors only after checking the mounting location carefully.
- Be sure that the terminal blocks, expansion cables, and other items with locking devices are properly locked into place.

Installation

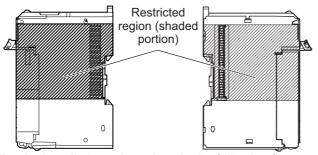
- Do not apply labels or tape to the Unit. When the Unit is installed or removed, adhesive or scraps may adhere to the pins in the NX bus connector, which may result in malfunctions.
- Do not touch the pins in the NX bus connector on the Unit. Dirt may adhere to the pins in the NX bus connector, which may result in malfunctions.



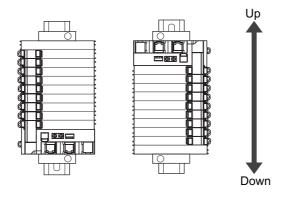
Example: NX Unit (12 mm width)

• Do not write on an NX Unit with ink within the restricted region that is shown in the following figure. Also do not get this area dirty. When the Unit is installed or removed, ink or dirt may adhere to the pins in the NX bus connector, which may result in malfunctions in the CPU Rack or the Slave Terminal.

Refer to the user's manual for the connected CPU Unit or Communications Coupler Unit for the restricted region of CPU Unit and Communications Coupler Unit.

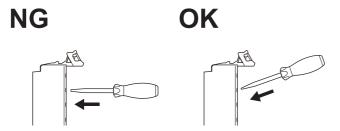


• For the installation orientations in the following figure, support the cables, e.g., with a duct, so that the End Plate on the bottom is not subjected to the weight of the cables. The weight of the cables may cause the bottom End Plate to slide downward so that the Slave Terminal is no longer secured to the DIN Track, which may result in malfunctions.

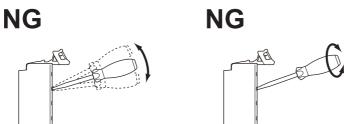


Wiring

- Double-check all switches and other settings and double-check all wiring to make sure that they are correct before turning ON the power supply.
- Use the correct wiring parts and tools when you wire the system.
- Do not pull on the cables or bend the cables beyond their natural limit. Also, do not place heavy objects on top of the cables or other wiring lines. Doing so may break the cable.
- When wiring or installing the Units, do not allow metal fragments to enter the Units.
- Do not press the flat-blade screwdriver straight into the release holes on a screwless clamping terminal block. Doing so may damage the terminal block.



- When you insert a flat-blade screwdriver into a release hole on a screwless clamping terminal block, press it down with a force of 30N or less. Applying excessive force may damage the terminal block.
- Do not incline or twist the flat-blade screwdriver while it is in a release hole on a screwless clamping terminal block. Doing so may damage the terminal block.



• Use crimp terminals for wiring the M3 screw terminal blocks. Do not connect bare stranded wires directly to the M3 screw terminal blocks.

Power Supply Design

- Use all Units within the I/O power supply ranges that are given in the specifications.
- Use the I/O power supply current for the CPU Rack of the NX-series NX1P2 CPU Unit at 4 A or less. Using the currents that are outside of the specifications may cause failure or damage.
- · Supply sufficient power according to the contents of this manual.
- Use the power supply voltage that is specified in this manual.
- · Do not apply voltages that exceed the rated value to any Input Unit.
- Do not apply voltages or connect loads to the Output Units or slaves in excess of the maximum ratings.
- Inrush current occurs when the power supply is turned ON. When selecting fuses or breakers for
 external circuits, consider their fusing and detection characteristics as well as the above precautions
 and allow sufficient margin in shut-off performance.
- Install external breakers and take other safety measures against short-circuiting and overcurrents in external wiring.

Turning ON the Power Supply

• When you set the Operating Mode at Startup, confirm that no adverse effect will occur in the system.

Actual Operation

- Before you start operation, always register the NX Units that are connected to the Communications Coupler Unit in the host communications master as the Unit Configuration Information.
- Check the user program, data, and parameter settings for proper execution before you use them for actual operation.
- If you change the fail-soft operation setting, the output status when the error occurs may also change. Confirm safety before you change the fail-soft operation setting.
- If you use fail-soft operation, write programming to determine whether Unit I/O data is valid. Without such programming, the user program cannot distinguish between Units for which I/O refreshing is continued and Units for which I/O refreshing is stopped.

Turning OFF the Power Supply

- Do not disconnect the cable or turn OFF the power supply to the Controller or a Slave Terminal when downloading data or the user program from the Support Software.
- Always turn OFF the external power supply to the Units before attempting any of the following.

Mounting or removing an NX Unit, Communications Coupler Unit, CPU Unit, or Industrial PC Assembling Units

Setting DIP switches or rotary switches

Connecting or wiring cables

Attaching or removing terminal blocks or connectors

Units that supply power continue to supply power to the Units for up to several seconds after the power supply is turned OFF. The PWR indicator remains lit as long as power is supplied. Confirm that the PWR indicator is not lit before you perform any of the above.

Operation

• Confirm that the controlled system will not be adversely affected before you perform any of the following operations.

Changing the operating mode of the CPU Unit or the Industrial PC (including changing the setting of the Operating Mode at Startup)

Changing the user program or settings

Changing set values or present values

Forced refreshing

• Always sufficiently check the safety at the connected devices before you change the settings of a slave or Unit.

General Communications

- Do not exceed the ranges that are given in the specifications for the communications distance and number of connected Units.
- Refer to the user's manual for the Communications Coupler Unit for precautions for the safe use of communications with the connected Communications Coupler Unit.

Unit Replacement

• When you replace a Unit, start operation only after you transfer the settings and variables that are required for operation to the new Unit.



• Dispose of the product according to local ordinances as they apply.

Precautions for Correct Use

Storage, Mounting, and Wiring

- · Follow the instructions in this manual to correctly perform installation and wiring.
- Do not operate or store the Units in the following locations. Doing so may result in malfunction, in operation stopping, or in burning.

Locations subject to direct sunlight Locations subject to temperatures or humidity outside the range specified in the specifications Locations subject to condensation as the result of severe changes in temperature Locations subject to corrosive or flammable gases Locations subject to dust (especially iron dust) or salts Locations subject to exposure to water, oil, or chemicals Locations subject to shock or vibration

• Take appropriate and sufficient countermeasures during installation in the following locations.

Locations subject to strong, high-frequency noise Locations subject to static electricity or other forms of noise Locations subject to strong electromagnetic fields Locations subject to possible exposure to radioactivity Locations close to power lines

- Before touching a Unit, be sure to first touch a grounded metallic object in order to discharge any static build-up.
- Use the rated power supply voltage for the Units that supply power. Take appropriate measures to
 ensure that the specified power with the rated voltage and frequency is supplied in places where the
 power supply is unstable.
- Install the Units away from sources of heat and ensure proper ventilation. Not doing so may result in malfunction, in operation stopping, or in burning.
- Do not allow foreign matter to enter the openings in the Unit. Doing so may result in Unit burning, electric shock, or failure.

Actual Operation

• If you change the event level of an error, the output status when the error occurs may also change. Confirm safety before you change an event level.

Turning OFF the Power Supply

- Do not turn OFF the power supply while data is being transferred.
- Do not turn OFF the power supply while parameters are being written to the CPU Unit, the Communications Coupler Unit or NX Units.

General Communications

• Refer to the user's manual for the Communications Coupler Unit for precautions for the correct use of communications with the connected Communications Coupler Unit.

Regulations and Standards

Conformance to EU Directives

Applicable Directives

- EMC Directives
- Low Voltage Directive

Concepts

• EMC Directives

OMRON devices that comply with EU Directives also conform to the related EMC standards so that they can be more easily built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards.*1

Whether the products conform to the standards in the system used by the customer, however, must be checked by the customer. EMC-related performance of the OMRON devices that comply with EU Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.

 *1. Applicable EMC (Electromagnetic Compatibility) standards are as follows: EMS (Electromagnetic Susceptibility): EN 61131-2 EMI (Electromagnetic Interference): EN 61131-2 (Radiated emission: 10-m regulations).

• Low Voltage Directive

Always ensure that devices operating at voltages of 50 to 1,000 VAC and 75 to 1,500 VDC meet the required safety standards. The applicable directive is EN 61010-2-201.

Conformance to EU Directives

The NX-series Units comply with EU Directives. To ensure that the machine or device in which the NX-series Units are used complies with EU Directives, the following precautions must be observed.

- The NX-series Units must be installed within a control panel.
- You must use SELV power supply for the DC power supplies that are connected as the Unit power supplies and I/O power supplies for the NX-series Units.

We recommend that you use the OMRON S8VK-S series Power Supplies for the CPU Racks with NX-series NX1P2 CPU Units. We recommend that you use the OMRON S8JX-series Power Supplies for Slave Terminals. EMC standard compliance was confirmed for these recommended Power Supplies.

 NX-series Units that comply with EU Directives also conform to the Common Emission Standard (EN 61131-2). Radiated emission characteristics (10-m regulations) may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions.

You must therefore confirm that the overall machine or equipment in which the NX-series Units are used complies with EU Directives.

You must use power supplies with an output hold time of 10 ms or longer for the DC power supplies that are connected as the Unit power supplies and I/O power supplies for the NX-series Units.

This is a Class A product (for industrial environments). In a residential environment, it may cause
radio interference. If radio interference occurs, the user may be required to take appropriate measures.

Conformance Requirement to EU Directives

The immunity test conditions for the NX-series Analog Input Units and Analog Output Units are as follows:

Unit Type	Conversion time	Overall accuracy
Analog Input Units	250 μs/point	+3% / -6%
	10 µs/point	+6% / -6%
Analog Output Units	250 μs/point	+4% / -4%
	10 µs/point	+4.5% / -4.5%

Use a shield wire (2 conductors, twisted wire) or a shield wire (3 conductors) to connect the Analog Input Units and Analog Output Units. The compatibility was confirmed in a condition that the shield wire was not connected.

Conformance to UL and CSA Standards

Some NX-series products comply with UL and CSA standards. If you use an NX-series product that complies with UL or CSA standards and the machinery or system in which you use the NX-series product must also comply with the standards, refer to the *Instruction Sheet* that is provided with the product. The *Instruction Sheet* provides the application conditions for complying with the standards.

Conformance to Shipbuilding Standards

Some NX-series products comply with shipbuilding standards. If you use an NX-series product that complies with shipbuilding standards and the machinery or system in which you use the NX-series product must also comply with the standards, consult with your OMRON representative. Application conditions are defined according to the installation location. Application may not be possible for some installation locations.

For usage conditions for shipbuilding standards, refer to *Conformance to Shipping Standards* in the user's manual for the CPU Unit or Communications Coupler Unit that the NX Units are connected to.

Conformance to KC Standards

Observe the following precaution if you use NX-series Units in Korea.

A 급 기기 (업무용방송통신기자재) 이 기기는 업무용(A 급) 전저파작합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Class A Device (Broadcasting Communications Device for Office Use)

This device obtained EMC registration for office use (Class A), and it is intended to be used in places other than homes.

Sellers and/or users need to take note of this.

Software Licenses and Copyrights

This product incorporates certain third party software. The license and copyright information associated with this software is available at http://www.fa.omron.co.jp/nj_info_e/.

Unit Versions

This section describes the notation that is used for unit versions, the confirmation method for unit versions, and the relationship between unit versions and Support Software versions.

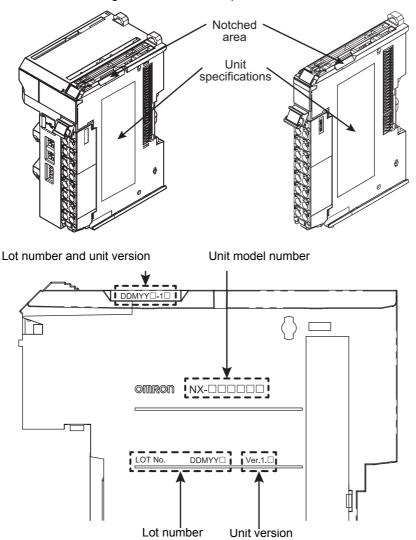
Unit Versions

A "unit version" has been introduced to manage the Units in the NX Series according to differences in functionality accompanying Unit upgrades.

An example is provided below for Communications Coupler Units and NX Units. For the notation that is used for the unit versions of CPU Units or Industrial PCs and the confirmation method for unit versions, refer to the user's manual for each Unit.

Notation of Unit Versions on Products

The unit version is given with the Unit specifications on the side of the Unit or in the notched area.



The following information is provided in the Unit specifications on the Unit.

Name	Function
Unit model number	Gives the model of the Unit.
Unit version	Gives the unit version of the Unit.
Lot number	Gives the lot number of the Unit.
	DDMYY : Lot number, : Used by OMRON.
	"M" gives the month (1 to 9: January to September, X: October, Y: November, Z: December)

The following information is provided in the notched area on the Unit.

Name	Function
Lot number and	Gives the lot number and unit version of the Unit.
unit version	 DDMYY^[]: Lot number, ^[]: Used by OMRON. "M" gives the month (1 to 9: January to September, X: October, Y: November, Z: December) 1^[]: Unit version The decimal portion of the unit version is omitted. (It is provided in the Unit specifications.)

Confirming Unit Versions with the Support Software

If your NX Unit is connected to a CPU Unit, refer to the user's manual of the connected CPU Unit for the confirmation method for the unit version of the NX Unit.

If your NX Unit is connected to a Communications Coupler Unit, refer to the user's manual of the connected Communications Coupler Unit for the confirmation method for the unit version of the Communications Coupler Unit and NX Unit.

Unit Versions and Support Software Versions

The functions that are supported depend on the unit version of the Unit. The version of Support Software that supports the functions that were added for an upgrade is also required to use those functions.

Refer to A-5 Version Information with CPU Units on page A-55 or A-6 Version Information with Communications Coupler Units on page A-57 for the functions that are supported by each unit version.

Related Manuals

Manual name	Cat. No.	Model numbers	Application	Description
NX-series Analog I/O	W522	NX-AD	Learning how to	The hardware, setup methods, and
Units User's Manual for		NX-DA	use NX-series	functions of the NX-series Analog Input
Analog Input Units and			Analog Input Units	Units and Analog Output Units are
Analog Output Units ^{*1}			and Analog Out-	described.
NIX assists Data Data			put Units	
NX-series Data Refer- ence Manual	W525	NX-00000	Referencing lists of the data that is	Lists of the power consumptions, weights, and other NX Unit data that is
			required to config-	required to configure systems with
			ure systems with	NX-series Units are provided.
			NX-series Units	
NX-series System Units	W523	NX-PD1	Learning how to	The hardware and functions of the
User's Manual		NX-PF0	use NX-series	NX-series System Units are described.
			System Units	
		NX-TBX01		
Sysmac Studio Version	W504	SYSMAC-	Learning about the	Describes the operating procedures of
1 Operation Manual		SE2□□□	operating proce-	the Sysmac Studio.
			dures and func-	
			tions of the	
		OVONE	Sysmac Studio	Describes the exercting procedures of
NX-IO Configurator Operation Manual	W585	CXONE- AL□□D-V4	Learning about the operating proce-	Describes the operating procedures of the NX-IO Configurator.
			dures and func-	
			tions of the NX-IO	
			Configurator.	
NJ/NX-series Trouble-	W503	NX701-□□□□	Learning about the	Concepts on managing errors that may
shooting Manual		NJ501-□□□□	errors that may be	be detected in an NJ/NX-series Con-
		NJ301-□□□□	detected in an	troller and information on individual
		NJ101-□□□□	NJ/NX-series Con- troller	errors are described.
		NX1P2-000	lioner	
NY-series Troubleshoot-	W564	NY532-000	Learning about the	Concepts on managing errors that may
ing Manual		NY512-000	errors that may be	be detected in an NY-series Controller
			detected in an	and information on individual errors are
			NY-series Indus-	described.
			trial PC	
NX-series EtherCAT®	W519	NX-ECC20	Learning how to	The following items are described: the
Coupler Unit User's Manual			use an NX-series EtherCAT Coupler	overall system and configuration meth- ods of an EtherCAT Slave Terminal
wallua			Unit and Ether-	(which consists of an NX-series Ether-
			CAT Slave Termi-	CAT Coupler Unit and NX Units), and
			nals	information on hardware, setup, and
				functions to set up, control, and monitor
				NX Units through EtherCAT.

The following table shows related manuals. Use these manuals for reference.

Manual name	Cat. No.	Model numbers	Application	Description
NX-series Ether-	W536	NX-EIC202	Learning how to	The following items are described: the
Net/IP TM Coupler Unit			use an NX-series	overall system and configuration meth-
User's Manual			EtherNet/IP Cou-	ods of an EtherNet/IP Slave Terminal (which consists of an NX-series Ether-
			pler Unit and Eth- erNet/IP Slave	Net/IP Coupler Unit and NX Units), and
			Terminals	information on hardware, setup, and
				functions to set up, control, and monitor
				NX Units.
NX-series CPU Unit	W535	NX701-□□□□	Learning the basic	An introduction to the entire NX701
Hardware User's Man-			specifications of	CPU Unit system is provided along with
ual			the NX-series	the following information on the CPU
			NX701 CPU Units, including introduc-	Unit.
			tory information,	 Features and system configuration
			designing, installa-	Overview
			tion, and mainte-	 Part names and functions
			nance.	General specifications
			Mainly hardware	 Installation and wiring
			information is pro- vided.	Maintenance and Inspection
NX-series NX1P2 CPU	W578	NX1P2-000	Learning the basic	An introduction to the entire NX1P2
Unit Hardware User's			specifications of	CPU Unit system is provided along with
Manual			the NX-series	the following information on the CPU
			NX1P2 CPU Units,	Unit.
			including introduc- tory information,	Features and system configuration
			designing, installa-	Overview
			tion, and mainte-	Part names and functions
			nance. Mainly	 General specifications
			hardware informa-	 Installation and wiring
			tion is provided.	Maintenance and Inspection
NJ-series CPU Unit	W500	NJ501-□□□□	Learning the basic	An introduction to the entire NJ-series
Hardware User's Man-		NJ301-□□□□	specifications of	system is provided along with the fol-
ual		NJ101-□□□□	the NJ-series CPU Units, including	lowing information on the CPU Unit.
			introductory infor-	Features and system configuration
			mation, designing,	• Overview
			installation, and	Part names and functions
			maintenance.	General specifications
			Mainly hardware	Installation and wiring
			information is pro- vided.	Maintenance and Inspection
			indou.	Use this manual together with the
				NJ-series CPU Unit Software User's Manual (Cat. No. W501).
NY-series IPC Machine	W557	NY532-000	Learning the basic	An introduction to the entire NY-series
Controller Industrial			specifications of	system is provided along with the fol-
Panel PC Hardware			the NY-series	lowing information on the Industrial
User's Manual			Industrial Panel	Panel PC.
			PCs, including	 Features and system configuration
			introductory infor-	Introduction
			mation, designing, installation, and	Part names and functions
			maintenance.	General specifications
			Mainly hardware	Installation and wiring
			information is pro-	Maintenance and inspection
			vided.	

Manual name	Cat. No.	Model numbers	Application	Description
NY-series IPC Machine	W556	NY512-000	Learning the basic	An introduction to the entire NY-series
Controller Industrial Box			specifications of	system is provided along with the fol-
PC Hardware User's			the NY-series	lowing information on the Industrial Box
Manual			Industrial Box PCs,	PC.
			including introduc-	 Features and system configuration
			tory information, designing, installa-	Introduction
			tion, and mainte-	 Part names and functions
			nance. Mainly	 General specifications
			hardware informa-	 Installation and wiring
			tion is provided.	Maintenance and inspection
NJ/NX-series CPU Unit	W501	NX701-□□□□	Learning how to	The following information is provided
Software User's Manual		NJ501-□□□□	program and set up an	on an NJ/NX-series CPU Unit.
		NJ301-□□□□	NJ/NX-series CPU	CPU Unit operation
		NJ101-□□□	Unit.	CPU Unit features
		NX1P2-000	Mainly software	Initial settings Drogramming based on IEC 61121 2
			information is pro- vided.	Programming based on IEC 61131-3 language specifications
NY-series IPC Machine	W558	NY532-□□□□	Learning how to	The following information is provided
Controller Industrial Panel PC / Industrial		NY512-□□□	program and set up the Controller	on NY-series Machine Automation Con- trol Software.
Box PC Software User's			functions of an	
Manual			NY-series Indus-	Controller operation
			trial PC	Controller features
				Controller settings
				Programming based on IEC 61131-3 language specifications
NJ/NX-series CPU Unit	W505	NX701-□□□□	Using the built-in	Information on the built-in EtherCAT
Built-in EtherCAT® Port		NJ501-□□□□	EtherCAT port on	port is provided.
User's Manual		NJ301-□□□□	an NJ/NX-series CPU Unit	This manual provides an introduction
		NJ101-□□□□		and provides information on the config-
		NX1P2-000		uration, features, and setup.
NY-series IPC Machine	W562	NY532-000	Using the built-in	Information on the built-in EtherCAT
Controller Industrial		NY512-000	EtherCAT port on	port is provided.
Panel PC / Industrial Box PC Built-in			an NY-series Industrial PC	This manual provides an introduction
EtherCAT® Port			industrial PC	and provides information on the config-
User's Manual				uration, features, and setup.
NJ/NX-series Instruc-	W502	NX701-□□□	Learning detailed	The instructions in the instruction set
tions Reference Manual		NJ501-□□□□	specifications on	(IEC 61131-3 specifications) are
		NJ301-□□□□	the basic instruc- tions of an	described.
		NJ101-□□□□	NJ/NX-series CPU	
		NX1P2-000	Unit	
NY-series Instructions	W560	NY532-□□□□	Learning detailed	The instructions in the instruction set
Reference Manual		NY512-□□□□	specifications on	(IEC 61131-3 specifications) are
			the basic instruc-	described.
			tions of an	
			NY-series Indus- trial PC	

*1. From revision 05 of this manual, information on the NX-series Temperature Input Units (NX-TS□□□□) that were included in previous revisions was moved to the following manual: *NX-series Analog I/O Units User's Manual for Temperature Input Units and Heater Burnout Detection Units* (Cat. No. W566). Accompanying that change, the name of this manual was changed from the *NX-series Analog I/O Units User's Manual* (Cat. No. W522) to the *NX-series Analog I/O Units User's Manual for Analog Input Units and Analog Output Units* (Cat. No. W522).

Terminology

Term	Abbre- viation	Description
application layer status, AL status		Status for indicating information on errors that occur in an application on a slave.
CAN application protocol over Ether- CAT	CoE	A CAN application protocol service implemented on EtherCAT.
CAN in Automation	CiA	CiA is the international users' and manufacturers' group that develops and supports higher-layer protocols.
Communications Coupler Units		The generic name of an interface unit for remote I/O communications on a network between NX Units and a host network master.
CPU Rack		A rack to which a CPU Unit is mounted. For an NX-series NX1P2 CPU Unit, a CPU Rack has a CPU Unit with NX Units and an End Cover mounted to it.
DC time		Time indicated by the clock shared between the CPU Unit and the NX Units in a CPU Rack for an NX-series NX1P2 CPU Unit.
		EtherCAT slaves that support distributed clock synchronization have a clock that is shared by all slaves in the network. The time that is based on this distributed clock is called the DC time. The same clock is shared by an NX-series NX1P2 CPU Unit, NX Units connected to the CPU Unit, and applicable EtherCAT slaves.
device profile		A collection of device dependent information and functionality providing consistency between similar devices of the same device type.
device variable		A variable that is used to access a specific device through an I/O port by an NJ/NX-series CPU Unit or NY-series Industrial PC. Process data on an EtherCAT slave is allocated to this variable. For an NX-series NX1P2 CPU Unit, I/O data for the NX Units on a CPU Unit is allocated. A user application on a CPU Unit or Industrial PC accesses a device that can be connected, by directly reading and writing this device variable.
distributed clock	DC	Clock distribution mechanism used to synchronize EtherCAT slaves and the EtherCAT master.
EtherCAT slave controller	ESC	A controller for EtherCAT slave communications.
EtherCAT slave information	ESI	An XML file that contains setting information for an EtherCAT slave.
EtherCAT state machine	ESM	An EtherCAT communications state machine.
EtherCAT Technology Group	ETG	The ETG is a global organization in which OEM, end users, and technol- ogy providers join forces to support and promote the further technology development.
I/O map settings		Settings that assign variables to I/O ports. Assignment information between I/O ports and variables.
I/O port		A logical interface that is used by the NJ/NX-series CPU Unit or NY-series Industrial PC to exchange data with an external device (slave or Unit).
I/O refreshing		Cyclic data exchange with external devices that is performed with prede- termined memory addresses.
index		Address of an object within an application process.
network configuration information		The EtherCAT network configuration information held by the EtherCAT master.
NX bus		The NX-series internal bus.
object		An abstract representation of a particular component within a device, which consists of data, parameters, and methods.
object dictionary	OD	Data structure that contains description of data type objects, communi- cation objects and application objects.

Term	Abbre- viation	Description
Operational		A state in EtherCAT communications where SDO communications and
		I/O are possible.
PDO communications		An acronym for process data communications.
Pre-Operational		A state in EtherCAT communications where only SDO communications
		are possible with the slaves, i.e., no I/O can be performed.
primary periodic task		The task with the highest priority.
process data		Collection of application objects designated to be downloaded cyclically
		or acyclically for the purpose of measurement and control.
process data communications		One type of EtherCAT communications in which process data objects
		(PDOs) are used to exchange information cyclically and in realtime. This
		is also called PDO communications.
process data object	PDO	A structure that describes the mappings of parameters that have one or
		more process data entities.
receive PDO	RxPDO	A process data object received by an EtherCAT slave.
Safe-Operational		A state in EtherCAT communications where only SDO communications
		and reading input data from slaves are possible. Outputs from slaves are
		not performed.
SDO communications		One type of EtherCAT communications in which service data objects
		(SDOs) are used to transmit information whenever required.
service data object	SDO	CoE asynchronous mailbox communications where all objects in the
		object dictionary can be read and written.
Slave Information Interface	SII	Slave information that is stored in non-volatile memory in the slave.
Slave Terminal		A building-block remote I/O terminal to which a Communications Cou-
		pler Unit and NX Units are mounted
subindex		Sub-address of an object within the object dictionary.
Sync0		A signal that gives the interrupt timing based on the distributed clock
		(DC) in EtherCAT communications. The slaves execute controls accord-
		ing to this interrupt timing.
Sync Manager	SM	Collection of control elements to coordinate access to concurrently used
		objects.
task period		The interval at which the primary periodic task or a periodic task is exe-
		cuted.
transmit PDO	TxPDO	A process data object sent from an EtherCAT slave.

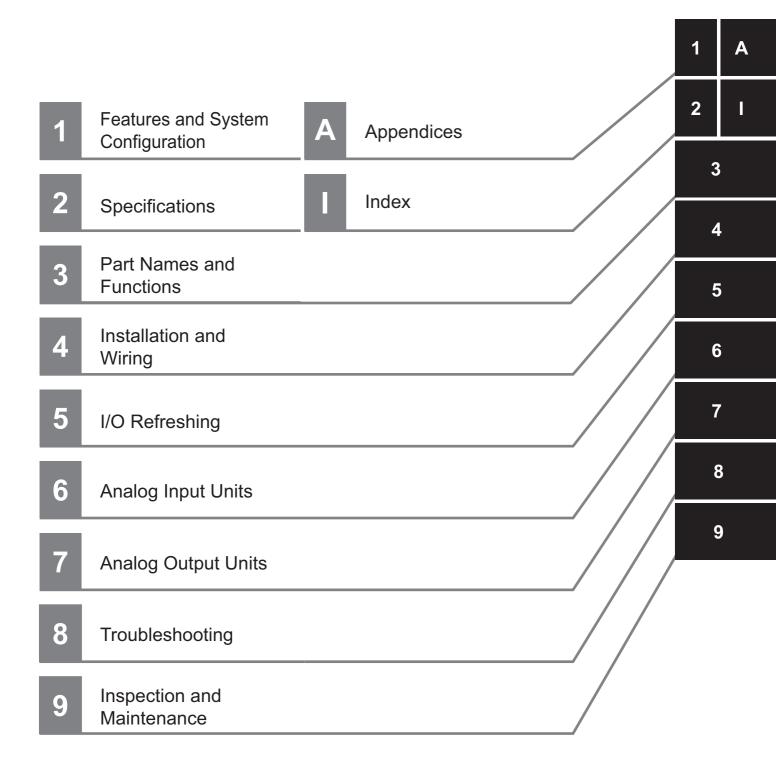
Revision History

A manual revision code appears as a suffix to the catalog number on the front and back covers of the manual.



Revision code	Date	Revised content
01	April 2013	Original production
02	June 2013	Corrected mistakes
03	September 2013	 Made changes accompanying release to unit version 1.1 of the Tem- perature Input Units.
		 Added information on the NX-TS 02/TS 04.
		Corrected mistakes.
04	April 2015	Made changes accompanying the addition of the NX-series CPU Unit and EtherNet/IP Coupler Unit.
		Corrected mistakes.
05	April 2016	• Deleted information on Temperature Input Units because it was moved to the NX-series Analog I/O Units User's Manual for Temperature Input Units and Heater Burnout Detection Units (Cat. No. W566).
		Corrected mistakes.
06	October 2016	Made changes accompanying the addition of NY-series IPC Machine Controller Industrial Panel PCs and Industrial Box PCs.
		Made changes accompanying the addition of the NX-series NX1P2 CPU Unit.
		Corrected mistakes.
07	June 2017	• Made changes accompanying the upgrade of the NX-ECC203 unit version to version 1.5.
		• Made changes accompanying the upgrade of the NX-EIC202 unit version to version 1.2.
		Corrected mistakes.

Sections in this Manual



Features and System Configuration

This section describes NX system configuration and the applications of the Analog Input Units and Analog Output Units.

1-1	Featu	res and Applications	1-2
	1-1-1	Features of the Analog Input Units and Analog Output Units	
	1-1-2	Applications of the Analog Input Units and Analog Output Units	. 1-3
1-2	Syste	m Configuration	1-4
	1-2-1	System Configuration in the Case of a CPU Unit	. 1-4
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1-3	Model	List	1-7
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	1-3-2	Analog Input Units	. 1-9
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1-1 Features and Applications

This section describes the features and applications of the Analog Input Units and Analog Output Units.

1-1-1 Features of the Analog Input Units and Analog Output Units

The Analog Input Units and Analog Output Units are used to process inputs and outputs of analog signals.

The NX-series Analog Input Units and Analog Output Units have the following features.

Can be Connected to a CPU Unit or Communications Coupler Unit

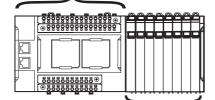
NX Unit NX-series Analog Input Units and Analog Output Units can be connected to the following Units.^{*1}

- NX-series CPU Unit
- NX-series Communications Coupler Unit

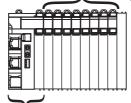
When a CPU Unit and a Communications Coupler Unit are used together, you can unify the methods for installing, wiring, and setting up NX Units, and eventually reduce design costs.

Example:

NX-series NX1P2 CPU Unit



NX Units: NX-series Analog Input Units and Analog Output Units



NX-series EtherCAT Coupler Unit

*1. For whether NX Units can be connected to the CPU Unit or Communications Coupler Unit to be used, refer to the user's manual for the CPU Unit or Communications Coupler Unit to be used.

Synchronous I/O with Refresh Cycle of the NX Bus

When the NX-series CPU Unit or EtherCAT Coupler Unit is used together with NX Units that support synchronous I/O refreshing, the I/O control of multiple NX Units can be synchronized at the time to synchronize with the refresh cycle of the NX bus.

This provides an accurate I/O control because it suppresses jitter in the I/O timing of multiple NX Units.

Simple I/O Wiring with a Screwless Clamping Terminal Block

The terminal block is a screwless clamping terminal block.

You can connect the wires simply by pushing the ferrules into the terminals. The amount of wiring work is reduced without requiring the use of screws.

1-1-2 Applications of the Analog Input Units and Analog Output Units

This section describes the applications of the Analog Input Units and Analog Output Units.

Туре	Application
Analog Input Units	These are Units with functionality to convert analog input signals to digital values.
Analog Output Units	These are Units with functionality to convert output set values set by a user program etc. to analog signals.

Refer to 1-3 Model List on page 1-7 for details on the models of the Analog Input Units and Analog Output Units and to 1-4 List of Functions on page 1-12 for details on their functions.

1-2 System Configuration

NX Unit NX-series Analog Input Units and Analog Output Units can be connected to the following Units.

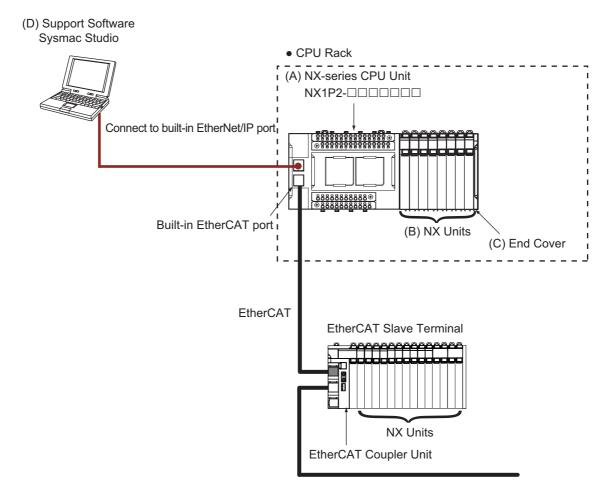
- NX-series CPU Unit
- NX-series Communications Coupler Unit

The following explains the system configuration for each NX Unit connection destination.

1-2-1 System Configuration in the Case of a CPU Unit

The following figure shows a system configuration when a group of NX Units is connected to an NX-series CPU Unit.

You can connect the EtherCAT Slave Terminal to the built-in EtherCAT port on the CPU Unit. Refer to 1-2-2 System Configuration of Slave Terminals on page 1-5 for details on the system configuration of a Slave Terminal.



Symbol	Item	Description
(A)	NX-series CPU Unit	The Unit that serves as the center of control for a Machine Automation Con- troller. It executes tasks, refreshes I/O for other Units and slaves, etc. NX Units can be connected to an NX1P2 CPU Unit.
(B)	NX Units	The NX Units perform I/O processing with connected external devices. The NX Units exchange data with the CPU Unit through I/O refreshing. A maximum of eight NX Units can be connected to an NX1P2 CPU Unit.
(C)	End Cover	The End Cover is attached to the end of a CPU Rack.

Symbol	ltem	Description
(D)	Support Software (Sysmac Studio)	A computer software application for setting, programming, debugging, and troubleshooting NJ/NX/NY-series Controllers.
		For an NX1P2 CPU Unit, this application performs setting operation by making a connection to a built-in EtherNet/IP port.

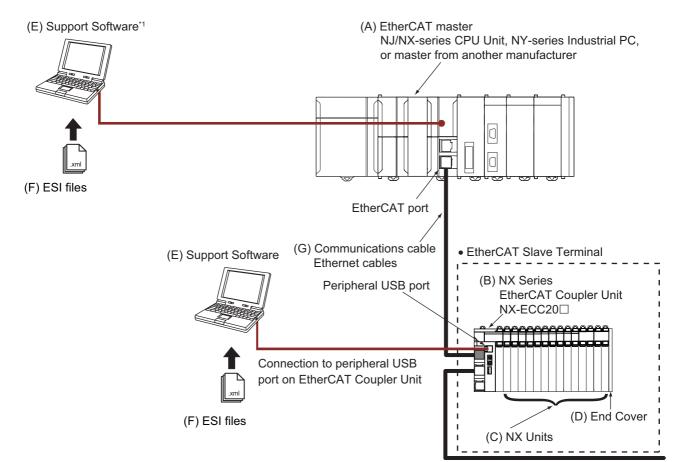
1-2-2 System Configuration of Slave Terminals

A building-block remote I/O slave provided with a group of NX Units connected to a Communications Coupler Unit is generically called a Slave Terminal.

The NX Units can be flexibly combined with a Communications Coupler Unit to achieve the optimum remote I/O slave for the application with less wiring, less work, and less space.

The following figure shows an example of the system configuration when an EtherCAT Coupler Unit is used as a Communications Coupler Unit.

Refer to the user's manual for the connected Communications Coupler Unit for details on how to configure the system when any other type of Communications Coupler Unit is used.



*1. The connection method for the Support Software depends on the model of the CPU Unit or Industrial PC.

Let- ter	ltem	Description
(A)	EtherCAT master *1	The EtherCAT master manages the network, monitors the status of slaves, and exchanges I/O data with slaves.
(B)	EtherCAT Coupler Unit	The EtherCAT Coupler Unit serves as an interface for process data communi- cations on the EtherCAT network between the NX Units and the EtherCAT master.
		The I/O data for the NX Units is accumulated in the EtherCAT Coupler Unit and then all of the data is exchanged with the EtherCAT master at the same time.
		The EtherCAT Coupler Unit can also perform message communications (SDO communications) with the EtherCAT master.
(C)	NX Units	The NX Units perform I/O processing with connected external devices.
		The NX Units perform process data communications with the EtherCAT mas- ter through the EtherCAT Coupler Unit.
(D)	End Cover	The End Cover is attached to the end of the Slave Terminal.
(E)	Support Software *2 *3	The Support Software runs on a personal computer and it is used to configure the EtherCAT network and EtherCAT Slave Terminal, and to program, monitor, and troubleshoot the Controllers.
(F)	ESI (EtherCAT Slave Information) file	The ESI file contains information that is unique to the EtherCAT Slave Termi- nal in XML format. You can load an ESI file into the Support Software to easily allocate Slave Terminal process data and make other settings.
		The ESI files for OMRON EtherCAT slaves are installed in the Support Soft- ware. You can obtain the ESI files for the latest models through the Support Software's automatic update function.
(G)	Communications cable	Use a double-shielded cable with aluminum tape and braiding of Ethernet cat- egory 5 (100Base-TX) or higher, and use straight wiring.

*1. An EtherCAT Slave Terminal cannot be connected to any of the OMRON CJ1W-NC□81/□82 Position Control Units even though they can operate as EtherCAT masters.

*2. The term Support Software indicates software that is provided by OMRON. If you connect to a master from another company, use the software tool corresponding to that master.

*3. Refer to 1-5 Support Software on page 1-14 for information on Support Software.

1-3 Model List

1-3-1 Model Notation

The model numbers of the Analog Input Units and Analog Output Units are assigned based on the following rules.

			NX - <u></u>
	nit type – AD : Ana DA : Ana	log input log output	
Nu	umber of 2 : 2 poir 3 : 4 poir 4 : 8 poir	nts nts	
I/C) range		
	Number	AD/DA	
	1	_	
	2	4 to 20 mA	
-	6	–10 to +10 V	- -

Other specifications -

Refer to Other specifications on the next page.

Other Specifications

• Analog Input Units

				I/O refreshing method		
Num ber	Resolution	Conversion time	Input method	Free-Run refresh- ing ^{*1} only	Switching Syn- chronous I/O refreshing ^{*2} and Free-Run refresh- ing	
03	1/8000	250 µs/point	Single-ended	Yes		
04	1/8000	250 µs/point	Differential	Yes		
08	1/30000	10 µs/point	Differential		Yes	

*1. Free-Run refreshing

*2. Synchronous I/O refreshing

• Analog Output Units

			I/O refreshing method		
Num ber	Resolution	Conversion time	Free-Run refresh- ing ^{*1} only	Switching Syn- chronous I/O refreshing ^{*2} and Free-Run refresh- ing	
03	1/8000	250 µs/point	Yes		
05	1/30000	10 µs/point		Yes	

*1. Free-Run refreshing

*2. Synchronous I/O refreshing

Refer to Section 5 I/O Refreshing for details on the I/O refreshing method.

1-3-2 Analog Input Units

This section shows the specifications for Analog Input Units.

Refer to A-1-2 Analog Input Units on page A-4 for details on the specifications of individual Analog Input Units.

Analog Input Units (Screwless Clamping Terminal Block, 12 mm Width)

Model	Num ber of point s	Input range	Resolu- tion	Input method	I/O refresh- ing method	Conver- sion time	Reference
NX-AD2203			1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-5
NX-AD2204							P. A-7
NX-AD2208	2 point	4 to 20 mA	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-8
NX-AD2603	s		1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-9
NX-AD2604							P. A-10
NX-AD2608		-10 to +10 V	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-11
NX-AD3203		4 to 20 mA	1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-12 P. A-13
NX-AD3204				Differen-) tial	Switching Synchronous I/O refreshing 10 µs/pc and Free-Run refreshing		P. A-13
NX-AD3208	4		1/30000			10 µs/point	P. A-14
NX-AD3603	- point s		1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-15
NX-AD3604							P. A-16
NX-AD3608		-10 to +10 V	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-17

Model	Num ber of point s	Input range	Resolu- tion	Input method	I/O refresh- ing method	Conver- sion time	Reference
NX-AD4203			1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-18
NX-AD4204							P. A-19
NX-AD4208	8 - point s	4 to 20 mA	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-20
NX-AD4603			1/8000	Sin- gle-ende d	Free-Run refreshing 25	250 µs/point	P. A-21
NX-AD4604							P. A-22
NX-AD4608		-10 to +10 V	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-23

1-3-3 Analog Output Units

This section shows the specifications for Analog Output Units.

Refer to *A-1-3 Analog Output Units* on page A-24 for details on the specifications of individual Analog Output Units.

Analog Output Units (Screwless Clamping Terminal Block, 12 mm Width)

Model	Num ber of point s	Output range	Resolu- tion	I/O refreshing method	Conversion time	Reference
NX-DA2203			1/8000	Free-Run refreshing	250 µs/point	P. A-25
NX-DA2205	2	4 to 20 mA	1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-27
NX-DA2603	point s	-10 to +10 V	1/8000	Free-Run refreshing	250 µs/point	P. A-29
NX-DA2605	. 5		1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-30
NX-DA3203			1/8000	Free-Run refreshing	250 µs/point	P. A-31
NX-DA3205	4	4 to 20 mA	1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-33
NX-DA3603	point s		1/8000	Free-Run refreshing	250 µs/point	P. A-35
NX-DA3605		-10 to +10 V	1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-36

1-4 List of Functions

This section provides an overview of functions that Analog Input Units and Analog Output Units have. Refer to the specifications of each model in *A-1 Data Sheet* on page A-2 for details on the functions.

1-4-1 Analog Input Units

Function name	Description	Reference
Free-Run Refreshing	With this I/O refreshing method, the refresh cycle of the NX bus and the I/O refresh cycles of the NX Units are asynchronous.	5-2-4 Free-Run Refreshing on page 5-8
Synchronous I/O Refresh- ing	With this I/O refreshing method, the timing to read inputs or to refresh outputs is synchronized on a fixed interval between more than one NX Unit connected to a CPU Unit. In addition, with this I/O refreshing method, the timing to read inputs or to refresh outputs is synchronized on a fixed interval between more than one NX Unit on more than one Slave Terminal.	5-2-5 Synchro- nous Input Refreshing on page 5-12
Selecting Channel To Use	This function omits the conversion processing for unused inputs. It is used to reduce the conversion cycle for its own Unit.	6-5-2 Selecting Channel To Use on page 6-13
Moving Average	This function uses the average value of inputs of the set time as the converted value. When the input value fluctuates fre- quently due to noises, averaging can be used to obtain a sta- ble converted value.	6-5-3 <i>Moving Aver- age</i> on page 6-17
	This function can be used only for Free-Run refreshing.	
Input Disconnection Detection	This function detects disconnections of the analog input signal lines. It can be used only for models with an input range of 4 to 20 mA.	6-5-4 Input Discon- nection Detection on page 6-23
Over Range/Under Range Detection	This function detects when the input signal exceeds the range for which conversion is possible.	6-5-5 Over Range/Under Range Detection on page 6-24
User Calibration	This function corrects offsets in the converted values that occur due to the deterioration of the NX Units and calibrate the Units.	6-5-6 User Calibra- tion on page 6-25

1-4-2 Analog Output Units

Function name	Description	Reference
Free-Run Refreshing	-Run Refreshing With this I/O refreshing method, the refresh cycle of the NX bus and the I/O refresh cycles of the NX Units are asynchronous.	
Synchronous I/O Refresh- ing	ynchronous I/O Refresh- With this I/O refreshing method, the timing to read inputs or to	
Selecting Channel To Use	This function omits the conversion processing for unused inputs. It is used to reduce the conversion cycle for its own Unit.	7-5-2 Selecting Channel To Use on page 7-10
Load Rejection Output Setting	A function that performs the preset output operation when the Analog Output Unit cannot receive output data due to an NX bus error or CPU Unit watchdog timer error, in the case of Units connected to a CPU Unit.	7-5-3 Load Rejec- tion Output Setting on page 7-14
	A function that performs the preset output operation when the Analog Output Unit cannot receive output data due to a host error on the Communications Coupler Unit or an error on the NX bus, in the case of Slave Terminals.	
Over Range/Under Range Detection	This function detects when the output set value exceeds the range for which conversion is possible.	7-5-4 Over Range/Under Range Detection on page 7-19
User Calibration	This function corrects offsets in the converted values that occur due to the deterioration of the NX Units and calibrate the Units.	7-5-5 User Calibra- tion on page 7-20

1-5 Support Software

The Support Software that is used depends on the system configuration.

• Support Software for a System Configured with a CPU Unit

If your system is configured by connecting an NX Unit to a CPU Unit, the Sysmac Studio is used as the Support Software.

• Support Software for a System Configured with a Slave Terminal

If your system is configured by connecting an NX Unit to a Communications Coupler Unit, refer to the user's manual for the Communications Coupler Unit for information on the Support Software.

Refer to A-5 Version Information with CPU Units on page A-55 or A-6 Version Information with Communications Coupler Units on page A-57 for information on the Support Software versions.

2

Specifications

This section describes the general specifications and individual specifications of the Analog Input Units and Analog Output Units.

2-1	General Specifications	2-2
2-2	Individual Specifications	2-3

2-1 General Specifications

This section provides the general specifications of the Analog Input Units and Analog Output Units.

Item		Specification
Enclosure		Mounted in a panel
Grounding methods		Ground of 100 Ω or less
	Ambient operating tem- perature	0 to 55°C
	Ambient operating humid- ity	10 to 95% RH (with no icing or condensation)
	Atmosphere	Must be free from corrosive gases.
	Ambient storage tempera- ture	-25 to 70°C (with no icing or condensation)
	Altitude	2,000 m max.
	Pollution degree	Pollution degree 2 or less: Conforms to JIS B 3502 and IEC 61131-2.
Operat-	Noise immunity	Conforms to IEC 61000-4-4, 2 kV (power supply line)
ing envi-	Overvoltage category	Category II: Conforms to JIS B 3502 and IEC 61131-2.
ronment	EMC immunity level	Zone B
		Conforms to IEC 60068-2-6. 5 to 8.4 Hz with amplitude of 3.5 mm,
	Vibration resistance	8.4 to 150 Hz, acceleration of 9.8 m/s ²
		100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total)
	Shock resistance	Conforms to IEC 60068-2-27, 147 m/s ² , 3 times each in X, Y, and Z directions
	Insulation resistance	*1
	Dielectric strength	*1
Applicable standards ^{*2}		cULus: Listed (UL 508), ANSI/ISA 12.12.01, EU: EN 61131-2, C-Tick, KC (KC Registration), NK, and LR

*1. Varies with NX Unit Models. Refer to A-1 Data Sheet on page A-2 for the specifications of individual NX Units.

*2. Refer to the OMRON website (www.ia.omron.com) or ask your OMRON representative for the most recent applicable standards for each model.

2-2 Individual Specifications

Refer to A-1 Data Sheet on page A-2 for the specifications of individual Analog Input Units and Analog Output Units.

3

Part Names and Functions

This section describes the names and functions of the parts of the Analog Input Units and Analog Output Units.

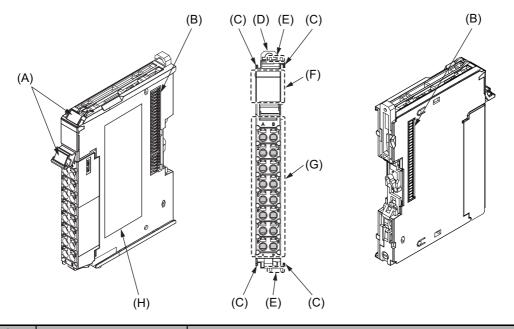
3-1	Part Names		
	3-1-1	Screwless Clamping Terminal Block Type	3-2
3-2	Indica	tors	3-6
	3-2-1	TS Indicator	. 3-7

3-1 Part Names

This section describes the names and functions of the parts of the Analog Input Units and Analog Output Units.

3-1-1 Screwless Clamping Terminal Block Type

• 12 mm Width

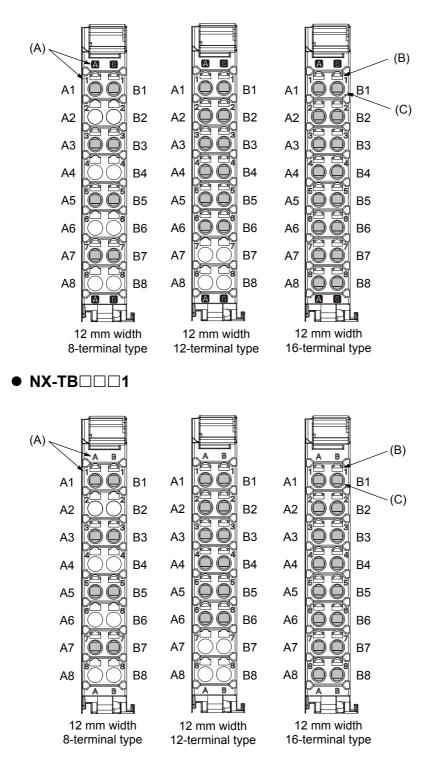


Let- ter	Name	Function	
(A)	Marker attachment loca- tions	The locations where markers are attached. The markers made by OMRON are installed for the factory setting. Commercially available markers can also be installed.	
_		Refer to 4-1-2 Attaching Markers on page 4-4	
(B)	NX bus connector	This connector is used to connect each Unit.	
(C)	Unit hookup guides	These guides are used to connect two Units.	
(D)	DIN Track mounting hooks	These hooks are used to mount the NX Unit to a DIN Track.	
(E)	Protrusions for removing the Unit	The protrusions to hold when removing the Unit.	
(F)	Indicators	The indicators show the current operating status of the Unit.	
		Refer to 3-2 Indicators on page 3-6	
(G)	Terminal block	The terminal block is used to connect external devices.	
		The number of terminals depends on the type of Unit.	
(H)	Unit specifications	The specifications of the Unit are given.	

Terminal Blocks

There are two models of screwless clamping terminal blocks: NX-TB 2 and NX-TB 1. Each model has three types of terminal blocks: 8-terminal type, 12-terminal type, and 16-terminal type.

● NX-TB□□□2



Let- ter	Name	Function	
(A)	Terminal number indi- cations	Terminal numbers for which A to D indicate the column, and 1 to 8 indicate the line are displayed.	
		The terminal number is a combination of column and line, i.e. A1 to A8 ar B1 to B8.	
		The terminal number indications are the same regardless of the number of terminals on the terminal block.	
(B)	Release holes	Insert a flat-blade screwdriver into these holes to connect and remove the wires.	
(C)	Terminal holes	The wires are inserted into these holes.	

The NX-TBDDD2 and NX-TBDDD1 Terminal Blocks have different terminal current capacities. The NX-TBDDD2 has 10 A and NX-TBDD1 has 4 A.

To differentiate between the two models of terminal blocks, use the terminal number column indications. The terminal block with white letters on a dark background is the NX-TB $\Box\Box\Box$ 2.

You can mount either NX-TB 1 or NX-TB 2 Terminal Blocks to the Units that the current capacity specification of the terminals is 4 A or less.

You can only mount the NX-TB \square \square 2 Terminal Block to the Units that the current capacity specification of the terminals is greater than 4 A.



Additional Information

- Each of the Analog Input Units and Analog Output Units is compatible with only one of three types of terminal blocks. You cannot use a terminal block with a number of terminals that differs from the specifications for a particular Unit.
- The 8-terminal type and 12-terminal type do not have terminal holes and release holes for following terminal numbers.

8-terminal type: A2, A4, A6, A8, B2, B4, B6, and B8

12-terminal type: A7, A8, B7, and B8

• Applicable Terminal Blocks for Each Unit Model

The following indicates the terminal blocks that are applicable to each Unit.

Unit model num-	Terminal block			
ber	Model	Number of terminals	Ground terminal mark	Current capacity
NX-AD2	NX-TBA081	8	Not provided	4 A
	NX-TBA082	1		10 A
NX-AD3	NX-TBA121	12		4 A
	NX-TBA122	1		10 A
NX-AD4	NX-TBA161	16		4 A
	NX-TBA162	1		10 A
NX-DA2	NX-TBA081	8		4 A
	NX-TBA082	1		10 A
NX-DA3	NX-TBA121	12	1	4 A
	NX-TBA122	1		10 A



Precautions for Correct Use

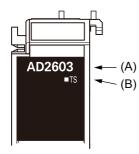
You can mount either NX-TB 1 or NX-TB 2 Terminal Blocks to the Units that the current capacity specification of the terminals is 4 A or less.

However, even if you mount the NX-TB $\Box\Box\Box$ 2 Terminal Block, the current specification does not change because the current capacity specification of the terminals on the Units is 4 A or less.

Refer to A-4 List of Screwless Clamping Terminal Block Models on page A-54 for information on the models of terminal blocks.

3-2 Indicators

There is an indicator that shows the current operating status of the Analog Input Unit or Analog Output Unit. The indicator is shown below.

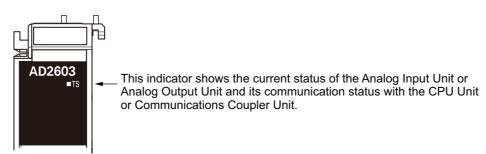


12 mm width

Let- ter	Name	Function	
(A)	Model number indications	The model numbers of the NX Unit are displayed.	
		(Example) "AD2603" in the case of NX-AD2603	
		The NX Units are separated in the following color depending on the type of inputs and outputs.	
		Analog Input Unit: Orange	
		Analog Output Unit: Yellow	
(B)	TS indicator	The indicator shows the current operating status of the NX Unit.	

The following section describes the specifications of the TS indicator.

3-2-1 TS Indicator



The meanings of light statuses are described as follows:

Color	Status	Description
Green	Lit	The Unit is operating normally.
		The Unit is ready for I/O refreshing.
		 I/O checking is operating.^{*1}
	Flashing at 2-s	Initializing
	intervals.	Restarting is in progress for the Unit.
		Downloading
Red	Lit	A hardware failure, WDT error, or other fatal error that is common to all I/O Units occurred.
	Flashing at 1-s intervals.	A communications error or other NX bus-related error that is common to all I/O Units occurred.
	Not lit	No Unit power supply
		Restarting is in progress for the Unit.
		Waiting for initialization to start

*1. Refer to the manual for the Communications Coupler Unit for the status of the indicator on the Communications Coupler Units when I/O checking is in progress.

4

Installation and Wiring

This section describes how to install the NX Units, the types of power supplies provided to the NX Units and wiring methods, and how to wire the NX Units.

4-1	Install	ing NX Units	2
	4-1-1	Installing NX Units 4-	-2
	4-1-2	Attaching Markers 4-	4
	4-1-3	Removing NX Units 4-	6
	4-1-4	Installation Orientation 4-	7
4-2	Power	Supply Types and Wiring 4-	9
	4-2-1	Applications of I/O Power Supply and Supply Methods 4-	.9
	4-2-2	Calculating the Total Current Consumption from I/O Power Supply4-1	1
4-3	Wiring	the Terminals	2
4-3	Wiring 4-3-1	the Terminals 4-1 Wiring to the Screwless Clamping Terminal Block 4-1	
4-3	-		2
	4-3-1 4-3-2	Wiring to the Screwless Clamping Terminal Block	2 8
	4-3-1 4-3-2	Wiring to the Screwless Clamping Terminal Block 4-1 Checking the Wiring 4-2	2 8 9
	4-3-1 4-3-2 Wiring	Wiring to the Screwless Clamping Terminal Block 4-1 Checking the Wiring 4-2 Examples 4-2	2 8 9
	4-3-1 4-3-2 Wiring 4-4-1	Wiring to the Screwless Clamping Terminal Block 4-1 Checking the Wiring 4-2 Examples 4-2 Wiring the Analog Input Units 4-2	2 8 9

4-1 Installing NX Units

This section describes how to install NX Units.

Refer to the user's manual for the CPU Unit or Communications Coupler Unit to which NX Units are connected for information on preparations of installation and installation in a control panel.

4-1-1 Installing NX Units

This section describes how to mount two NX Units to each other.

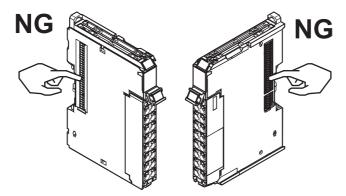
Always turn OFF the power supply before you mount NX Units.

Always mount NX Units one at a time. If you attempt to mount multiple NX Units that are already connected together, the connections between the NX Units may separate from each other and fall.



Precautions for Safe Use

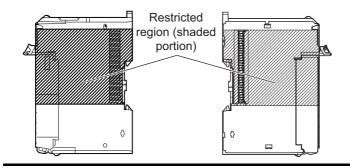
- Do not apply labels or tape on the NX Units. When the Unit is installed or removed, adhesive or scrap may adhere to the pins of the NX bus connector, which may cause malfunctions.
- Do not touch the pins in the NX bus connector on the Unit. Dirt may adhere to the pins in the NX bus connector, which may result in malfunctions.



Example: NX Unit (12 mm width)

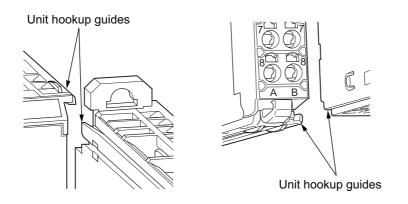
 Do not write on an NX Unit with ink within the restricted region that is shown in the following figure. Also do not get this area dirty. When the Unit is installed or removed, ink or dirt may adhere to the pins in the NX bus connector, which may result in malfunctions in the Slave Terminal.

Refer to the user's manual for the connected CPU Unit or Communications Coupler Unit for the restricted region of CPU Unit and Communications Coupler Unit.

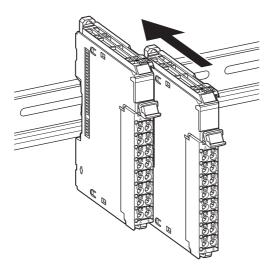


Precautions for Correct Use

- When you install an NX Unit, do not touch or bump the pins in the NX bus connector.
- When you handle an NX Unit, be careful not to apply any stress to the pins in the NX bus connector. If you install an NX Unit and turns ON the power supply when the pins in the NX bus connector are deformed, a contact defect may cause malfunctions.
- **1** From the front of the previously mounted NX Unit, engage the Unit hookup guides on a new Unit with the Unit hookup guides on the previously mounted NX Unit.



2 Slide the NX Unit in on the hookup guides.



3 Press the NX Unit with a certain amount of force against the DIN Track until you hear the DIN Track mounting hook lock into place.

When you mount the NX Unit, it is not necessary to release the DIN track mounting hook on the NX Unit.

After you mount the NX Unit, make sure that it is locked to the DIN Track.



Additional Information

- Normally, it is not necessary to release the DIN track mounting hook when you mount the NX Unit. However, if you mount the NX Unit on a DIN Track that is not a recommended DIN Track, the DIN track mounting hook may not lock correctly. If that happens, first unlock the DIN track mounting hook, mount the NX Unit to the DIN Track, then lock the DIN track mounting hook.
- Refer to the user's manual for the CPU Unit to which NX Units can be connected for information on how to mount the CPU Unit, and how to mount NX Units to the CPU Unit.
- Refer to the user's manual for the Communications Coupler Unit for information on how to mount the Communications Coupler Unit, and how to mount the NX Unit to the Communications Coupler Unit.

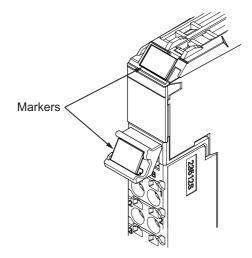
4-1-2 Attaching Markers

Markers can be attached to the NX Units and terminal blocks on NX Units to identify them.

The plastic markers made by OMRON are installed for the factory setting. The ID information can be written on them.

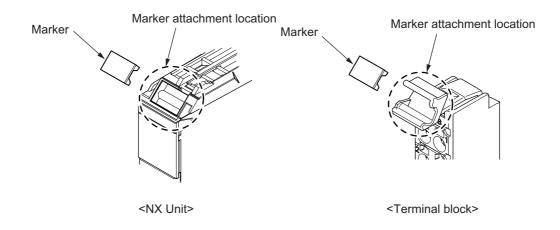
Commercially available markers can also be installed.

Replace the markers made by OMRON if you use commercially available markers now.



Installation Method

Insert the protrusions on the markers into the marker attachment locations on the NX Units and terminal blocks on NX Units.



• Commercially Available Markers

Commercially available markers are made of plastic and can be printed on with a special printer. To use commercially available markers, purchase the following products.

Product name	Model number		
FIGUUCI name	Manufactured by Phoenix Contact	Manufactured by Weidmuller	
Markers	UC1-TMF8	DEK 5/8	
Special marker printer	UM EN BLUEMARK X1	PrintJet PRO	

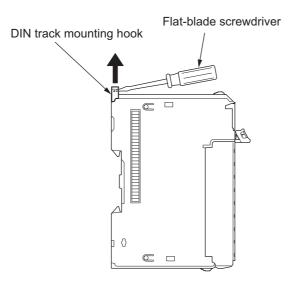
The markers made by OMRON cannot be printed on with commercially available special printers.

4-1-3 Removing NX Units

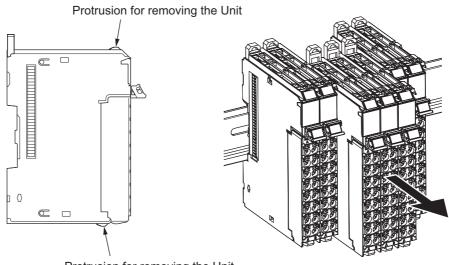
Precautions for Safe Use

Always turn OFF the Unit power supply and I/O power supply before you remove the NX Unit.

1 Use a flat-blade screwdriver to pull up the DIN Track mounting hook on the Unit to remove.



2 Put your fingers on the protrusions for removing multiple NX Units including the Unit to be removed, then pull out straight forward to remove.





Precautions for Correct Use

- When removing an NX Unit, remove multiple Units together which include the one you want to remove. If you attempt to remove only one Unit, it is stuck and hard to pull out.
- Do not unlock the DIN track mounting hooks on all of the NX Units at the same time. If you
 unlock the DIN Track mounting hooks on all of the NX Units at the same time, all of the Units
 may come off.

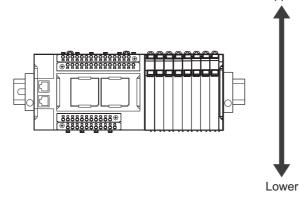
4-1-4 Installation Orientation

The following explains the installation orientation for each NX Unit connection destination.

Installation Orientation in the Case of a CPU Unit

Upper

Orientation is possible only in the upright installation orientation.



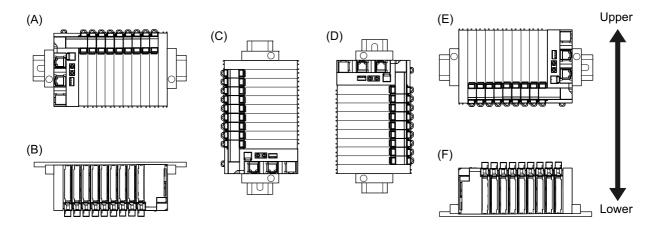
However, there are restrictions on the specifications depending on the NX Units to be used.

Refer to the user's manuals for the NX Units and System Units that you will use for details on restrictions.

Installation Orientation in the Case of a Slave Terminal

Orientation is possible in the following six directions.

(A) is the upright orientation and (B) to (F) are other orientations.



However, there are restrictions on the installation orientation and restrictions to the specifications that can result from the Communications Coupler Units and NX Units that are used.

Refer to the user's manuals for the Communications Coupler Units, NX Units and System Units that you will use for details on restrictions.



Precautions for Safe Use

For installation orientations (C) and (D) in the above figure, support the cables, e.g., with a duct, so that the End Plate on the bottom is not subjected to the weight of the cables. The weight of the cables may cause the bottom End Plate to slide downward so that the Slave Terminal is no longer secured to the DIN Track, which may cause malfunctions.

4-2 Power Supply Types and Wiring

There are the following two types of power supplies that supply power to the NX Units.

Power supply name	Description
NX Unit power supply	This power supply is used for operating the NX Units.
I/O power supply	This power supply is used for driving the I/O circuits of the NX Units and for the connected external devices.

The method for supplying power to the NX Units and the wiring method depend on the specifications for the CPU Unit to which NX Units are connected or the specifications for the Slave Terminal. Refer to *Designing the Power Supply System or Wiring*, which are described both in the hardware user's manual for the CPU Unit to which NX Units are connected and user's manual for the Communications Coupler Unit, for details on the method for supplying power to the NX Units and the wiring method.

The subsequent sections describe the applications of I/O power supply for the Analog Input Units and Analog Output Units and supply methods, and how to calculate the total current consumption from the I/O power supply.

4-2-1 Applications of I/O Power Supply and Supply Methods

The applications of I/O power supply and supply methods for the Analog Input Units and Analog Output Units are given as follows:

Applications of I/O Power Supply

The I/O power supply is used for the following applications.

- · Driving the I/O circuits of the Analog Input Units and Analog Output Units
- · Power supply for the connected external devices

I/O Power Supply Method

This power is supplied by one of the following two methods. Refer to *A-1 Data Sheet* on page A-2 for the supply methods for the individual Analog Input Units and Analog Output Units.

• Supply from the NX Bus

This power is supplied through the NX bus connectors by connecting an I/O power supply to the I/O power supply terminals on the Communications Coupler Unit or Additional I/O Power Supply Unit.

For the Units to which I/O power supply is provided by a CPU Rack, refer to *Designing the Power Supply System* or *Wiring* in the hardware user's manual for the CPU Unit to which NX Units are connected.

For the Units to which I/O power supply is provided by a Slave Terminal, refer to *Designing the Power Supply System* or *Wiring* in the user's manual for the Communications Coupler Unit to be connected.

Supply from External Source

This power is supplied to the Units from an external source.

I/O power is supplied by connecting an I/O power supply to the I/O power supply terminals on the Units.

Additional Information

Power Supply-related Units for the NX-series

The following three NX-series Units are related to power supply.

- Additional NX Unit Power Supply Unit
- · Additional I/O Power Supply Unit
- I/O Power Supply Connection Unit

Refer to the NX-series System Unit User's Manual (Cat. No. W523) for the specifications of these Units.

For a complete list of the latest power supply Units in the NX Series, refer to the product catalog or OMRON websites, or contact your OMRON representatives.

4-2-2 Calculating the Total Current Consumption from I/O Power Supply

The total current consumption of I/O power supplied from the NX bus must be within the range of the maximum I/O power supply current of the Communications Coupler Unit or the Additional I/O Power Supply Unit. However, for a CPU Rack, the specification for the maximum I/O power supply current is restricted regardless of the model of the Additional I/O Power Supply Unit. Refer to the hardware user's manual for the CPU Unit to which NX Units are connected for information on the restrictions for the CPU Rack.

To confirm this and to calculate the I/O power supply capacity, calculate the total current consumption from I/O power supply from the NX bus.

The total current consumption from I/O power supply from the NX bus is the total sum of current consumption from I/O power supply of the NX Unit that supplies the I/O power from the NX bus, the current of each applicable I/O circuit, and current consumption of any connected external devices.

Note that the current consumption from I/O power supply indicated in the data sheet for each Unit type does not include the load current of any external connection load and current consumption of any connected external devices.

The total current consumption from I/O power supply of the Analog Input Units and Analog Output Units is calculated as follows:

• Total Current Consumption from I/O Power Supply of the Analog Input Units

= (Current consumption from I/O power supply of the Analog Input Units) + (Total current consumption of connected external devices)

• Total Current Consumption from I/O Power Supply of the Analog Output Units

= (Current consumption from I/O power supply of the Analog Output Units) + (Total current consumption of connected external devices)

Refer to *A-1 Data Sheet* on page A-2 for the current consumption from the I/O power supply for the individual Analog Input Units and Analog Output Units.



Precautions for Safe Use

Use the I/O power supply current for the CPU Rack of the NX-series NX1P2 CPU Unit at 4 A or less. Using the currents that are outside of the specifications may cause failure or damage.

4

4-3 Wiring the Terminals

This section describes how to wire the terminals on the Analog Input Units and Analog Output Units.

\land WARNING



Make sure that the voltages and currents that are input to the Units and slaves are within the specified ranges.

Inputting voltages or currents that are outside of the specified ranges may cause accidents or fire.

4-3-1 Wiring to the Screwless Clamping Terminal Block

This section describes how to connect wires to the screwless clamping terminal block, the installation and removing methods, and functions for preventing incorrect attachment.

You can connect ferrules that are attached to the twisted wires to the screwless clamping terminal block. You can also connect the twisted wires or the solid wires to the screwless clamping terminal block. If you connect the ferrules, all you need to do to connect the wires is to insert the ferrules into the terminal holes.

Wiring Terminals

The terminals to be wired are as follows.

- · I/O power supply terminals
- I/O terminals

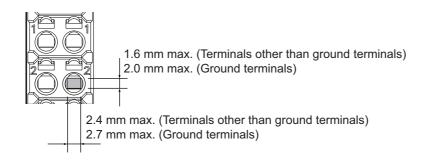
Applicable Wires

The wires that you can connect to the screwless clamping terminal block are twisted wires, solid wires, and ferrules that are attached to the twisted wires. The following section describes the dimensions and processed methods for applicable wires.

• Dimensions of Wires Connected to the Terminal Block

The dimensions of wires that you can connect into the terminal holes of the screwless clamping terminal block are as in the figure below.

Process the applicable wires that are specified in the following description to apply the dimensions.



• Using Ferrules

If you use ferrules, attach the twisted wires to them.

Observe the application instructions for your ferrules for the wire stripping length when attaching ferrules.

Always use plated one-pin ferrules. Do not use unplated ferrules or two-pin ferrules.

The applicable ferrules, wires, and crimping tools are listed in the following table.

Terminal types	Manufac- turer	Ferrule model	Applica- ble wire (mm ² (AWG))	Crimping tool
Terminals	Phoenix	AI0,34-8	0.34 (#22)	Phoenix Contact (The figure in parentheses is the
other than	Contact	AI0,5-8	0.5 (#20)	applicable wire size.)
ground ter-		AI0,5-10		CRIMPFOX 6 (0.25 to 6 mm ² , AWG24 to 10)
minals		AI0,75-8	0.75 (#18)	
		AI0,75-10		
		AI1,0-8	1.0 (#18)	
		AI1,0-10		
		AI1,5-8	1.5 (#16)	
		AI1,5-10		
Ground ter- minals		AI2,5-10	2.0 *1	
Terminals	Weidmuller	H0.14/12	0.14 (#26)	Weidmuller (The figure in parentheses is the appli-
other than		H0.25/12	0.25 (#24)	cable wire size.)
ground ter-		H0.34/12	0.34 (#22)	PZ6 Roto (0.14 to 6 mm ² , AWG26 to 10)
minals		H0.5/14	0.5 (#20)	
		H0.5/16		
		H0.75/14	0.75 (#18)	
		H0.75/16		
		H1.0/14	1.0 (#18)	
		H1.0/16	1	
		H1.5/14	1.5 (#16)	
		H1.5/16		

*1. Some AWG14 wires exceed 2.0 mm² and cannot be used in the screwless clamping terminal block.

When you use any ferrules other than those in the above table, crimp them to the twisted wires so that the following processed dimensions are achieved.

8 to 10mm 1.6 mm max. (Terminals other than ground terminals) 2.4 mm max. 2.0 mm max. (Terminals other than ground terminals) (Ground terminals) 2.7 mm max. (Ground terminals)

• Using Twisted Wires/Solid Wires

If you use twisted wires or solid wires, use the following table to determine the correct wire specifications.

Terminals			Wire type				Conductor
Classifica-	Current	Twisted	Twisted wires		d wire	Wire size	length (strip-
tion	capacity	Plated	Unplated	Plated	Unplated		ping length)
All terminals	2 A max.	Possible	Possible	Possible	Possible	0.08 to 1.5	8 to 10 mm
except	Greater			Possible	Not possi-	mm ² (AWG	
ground	than 2 A			*1	ble	28 to 16)	
terminals	and 4 A or						
	less						
	Greater	Possible *1	Not pos-	Not pos-			
	than 4 A		sible	sible			
Ground		Possible	Possible	Possible	Possible*2	2.0 mm ²	9 to 10 mm
terminals				*2			

*1. Secure wires to the screwless clamping terminal block. Refer to Securing Wires on page 4-20 for how to secure wires.

*2. With the NX-TB 1 Terminal Block, use twisted wires to connect the ground terminal. Do not use a solid wire.

←

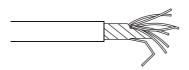
Conductor length (stripping length)

Precautions for Correct Use

- Use cables with suitable wire sizes for the carrying current. There are also restrictions on the current due to the ambient temperature. Refer to the manuals for the cables and use the cables correctly for the operating environment.
- For twisted wires, strip the sheath and twist the conductor portion. Do not unravel or bend the conductor portion of twisted wires or solid wires.

NG

NG



Unravel wires



Bend wires

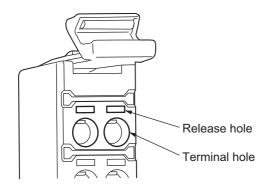
Additional Information

If more than 2 A will flow on the wires, use plated wires or use ferrules.

Connecting/Removing Wires

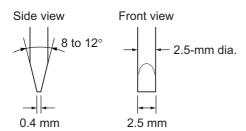
This section describes how to connect and remove wires.

• Terminal Block Parts and Names



• Required Tools

Use a flat-blade screwdriver to connect and remove wires. Use the following flat-blade screwdriver.



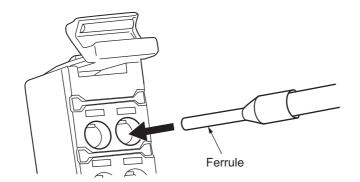
Recommended screwdriver

Model	Manufacturer
SZF 0-0,4×2,5	Phoenix Contact

Connecting Ferrules

Insert the ferrule straight into the terminal hole.

It is not necessary to press a flat-blade screwdriver into the release hole.



After you make a connection, make sure that the ferrule is securely connected to the terminal block.

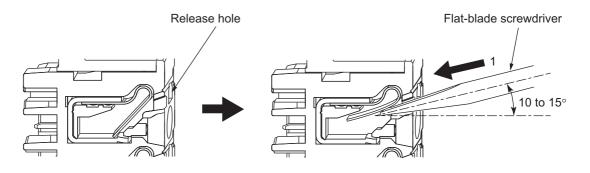
• Connecting Twisted Wires/Solid Wires

Use the following procedure to connect the twisted wires or solid wires to the terminal block.

1 Press a flat-blade screwdriver diagonally into the release hole.

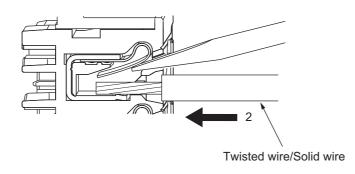
Press at an angle of 10° to 15° .

If you press in the screwdriver correctly, you will feel the spring in the release hole.

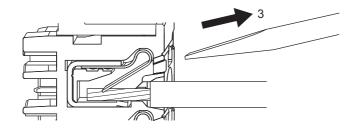


2 Leave the flat-blade screwdriver pressed into the release hole and insert the twisted wire or the solid wire into the terminal hole.

Insert the twisted wire or the solid wire until the stripped portion is no longer visible to prevent shorting.



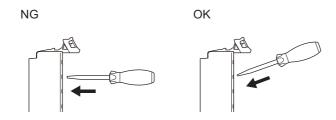
3 Remove the flat-blade screwdriver from the release hole.



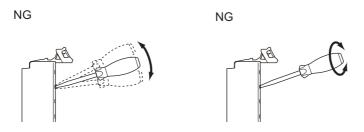
After you make a connection, make sure that the twisted wire or the solid wire is securely connected to the terminal block.

Precautions for Safe Use

• Do not press the flat-blade screwdriver straight into the release hole. Doing so may break the terminal block.



- When you insert a flat-blade screwdriver into a release hole, press it down with a force of 30 N max. Applying excessive force may damage the terminal block.
- Do not tilt or twist the flat-blade screwdriver while it is pressed into the release hole. Doing so may break the terminal block.



- Make sure that all wiring is correct.
- Do not bend the cable forcibly. Doing so may sever the cable.

4

• Securing Wires

It is necessary to secure wires to the screwless clamping terminal block depending on the wire types that are used or the current flows on the wires.

The following table gives the necessity for securing wires.

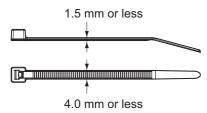
Terminals		Wire type				
Terminais		Twisted w		wires Solid		l wire
Classifica- tion	Current capacity	Ferrule	Plated	Unplated	Plated	Unplated
Allterminals	2 A max.	No	No	No	No	No
except	Greater than			Not Possible	Yes	Not Possible
ground	2 A and 4 A or					
terminals	less					
	Greater than		Yes		Not Possible	
	4 A					
Ground		1	No	No	No	No
terminals						

Use the following procedure to secure the wires.

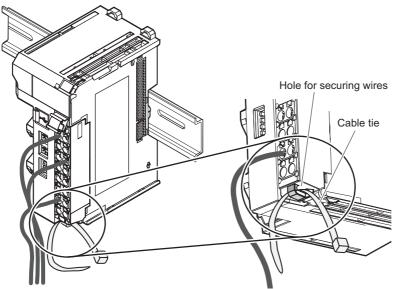
1 Prepare a cable tie.

A cable tie can be used with a width of 4 mm or less and a thickness of 1.5 mm or less.

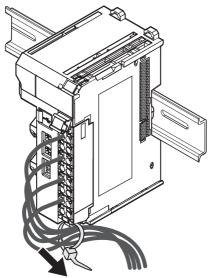
Select a cable tie correctly for the operating environment.



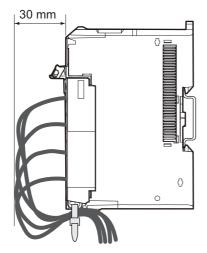
2 Pass a cable tie through the hole for securing wires on the bottom of the screwless clamping terminal block.



3 Bundle the wires with a cable tie and secure them to the screwless clamping terminal block.



Secure wires within the range of 30 mm from the screwless clamping terminal block.

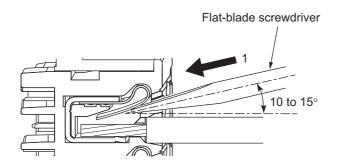


• Removing Wires

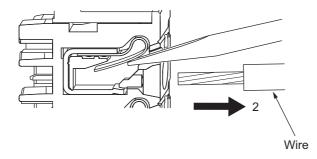
Use the following procedure to remove the wires from the terminal block. The removal method is the same for ferrules, twisted wires, and solid wires.

If wires are secured firmly to the terminal block, release them first

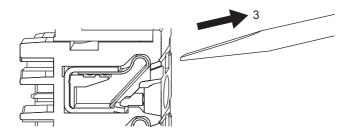
Press the flat-blade screwdriver diagonally into the release hole.
 Press at an angle of 10° to 15°.
 If you press in the screwdriver correctly, you will feel the spring in the release hole.



2 Leave the flat-blade screwdriver pressed into the release hole and pull out the wire.

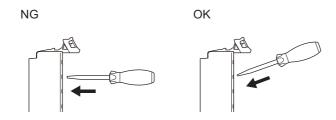


3 Remove the flat-blade screwdriver from the release hole.

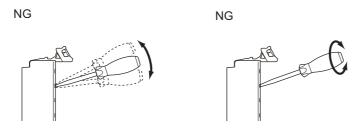


Precautions for Safe Use

• Do not press the flat-blade screwdriver straight into the release hole. Doing so may break the terminal block.



- When you insert a flat-blade screwdriver into a release hole, press it down with a force of 30 N max. Applying excessive force may damage the terminal block.
- Do not tilt or twist the flat-blade screwdriver while it is pressed into the release hole. Doing so may break the terminal block.

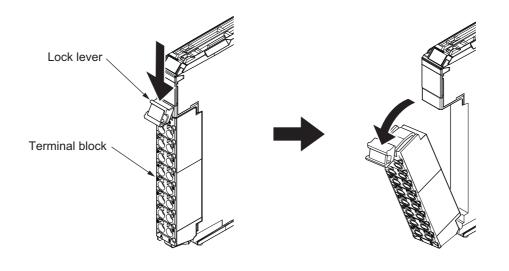


- Make sure that all wiring is correct.
- Do not bend the cable forcibly. Doing so may sever the cable.

4

Removing a Terminal Block

1 Press the lock lever on the terminal block and pull out the top of the terminal block to remove it.

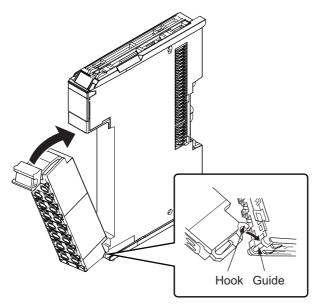


Attaching a Terminal Block

1 Mount the terminal block hook on the guide at the bottom of the NX Unit, lift up the terminal block, and press in on the top of the terminal block until you hear it engage.

The terminal block will click into place on the Unit.

After you mount the terminal block, make sure that it is locked to the Unit.



Mount a terminal block that is applicable to each Unit model.

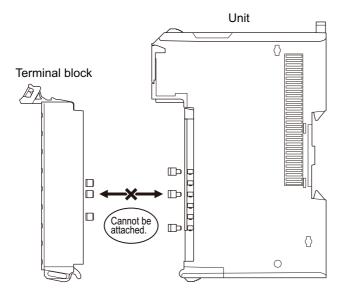
Refer to *Applicable Terminal Blocks for Each Unit Model* on page 3-5 for the applicable terminal blocks.

Preventing Incorrect Attachment of Terminal Blocks

In order to prevent unintentionally installing the wrong terminal block, you can limit the combination of a Unit and a terminal block.

Insert three Coding Pins (NX-AUX02) into three of the six incorrect attachment prevention holes on the Unit and on the terminal block. Insert these pins into positions so that they do not interfere with each other when the Unit and terminal block are connected to each other.

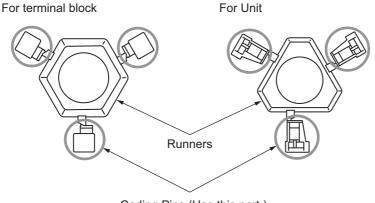
You can use these pins to create a combination in which the wrong terminal block cannot be attached because the pin patterns do not match.



• Types of Coding Pins

There are two types of Coding Pins, both with their own unique shape: one for terminal blocks and one for Units.

Three pins come with each runner.



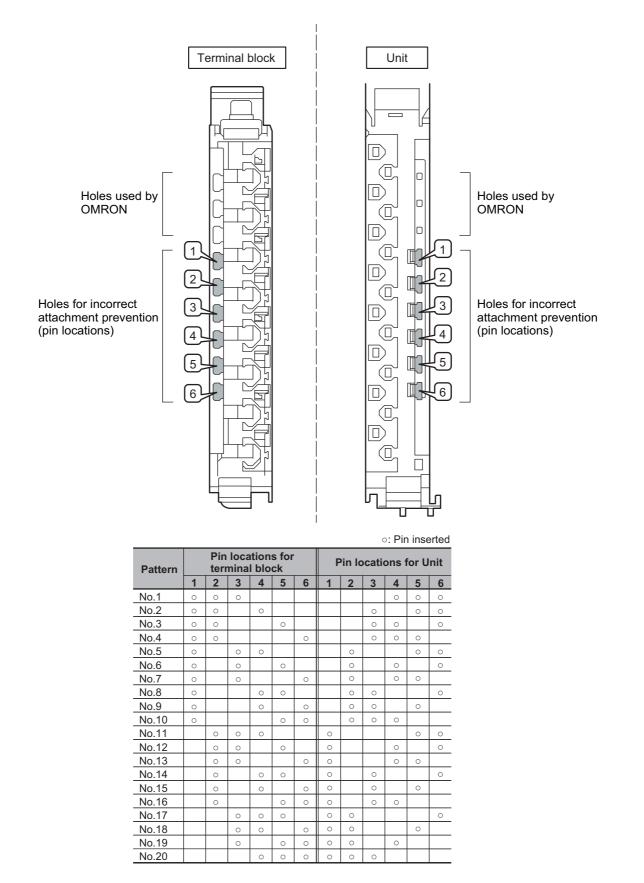
Coding Pins (Use this part.) Use the following Coding Pins.

Name	Model	Specification
Coding Pin	NX-AUX02	For 10 Units
		(Terminal block: 30 pins, Unit: 30 pins)

Insertion Locations and Patterns of Coding Pins

Insert three Coding Pins of each on the terminal block and on the Unit at the positions designated by the numbers 1 through 6 in the figure below.

As shown in the following table, there are 20 unique pin patterns that can be used.



To make the maximum of 20 patterns, purchase two sets of NX-AUX02 Pins. (One set for 10 Units.)



Precautions for Correct Use

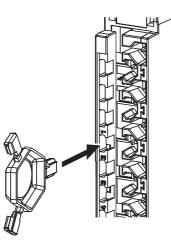
- OMRON uses the holes other than No. 1 to 6 in the figure on the previous page. If you insert a Coding Pin into one of the holes used by OMRON on the terminal block side, this makes it impossible to mount the terminal block on a Unit.
- Do not use Coding Pins that have been attached and removed.

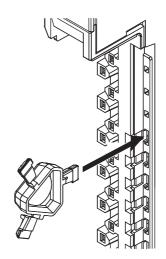
Inserting the Coding Pins

1 Hold the pins by the runner and insert a pin into one of the incorrect attachment prevention holes on the terminal block or on the Unit.

Terminal block

Unit

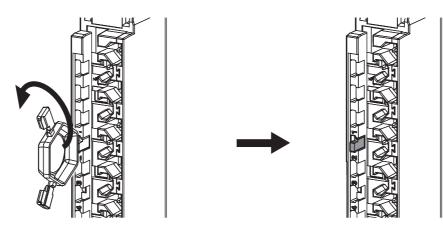




2

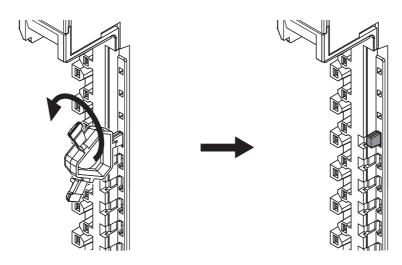
Rotate the runner to break off the Coding Pins.

Terminal block



4

Unit



4-3-2 Checking the Wiring

Check the wiring by reading input data or writing output data from Slave Terminals using the Watch Tab Page of the Support Software.

For Input Units, you can turn ON/OFF the inputs from external devices that are connected to the target Units and monitor the results.

For Output Units, you can execute the I/O outputs of the target Units and check the operation of the connected external devices.

For details on monitoring and I/O output operations using the Support Software, refer to the operation manual for the Support Software that you are using.



Additional Information

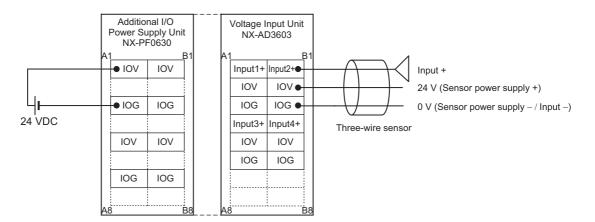
- In the Sysmac Studio, you can check the wiring from the I/O Map or Watch Tab Page. If you use the I/O Map, you can also monitor and perform forced refreshing even if the variables are not defined or the algorithms are not created. Therefore, you can easily check the wiring. Refer to the Sysmac Studio Version 1 Operation Manual (Cat. No. W504) for details on monitoring and forced refreshing operations.
- Some Communications Coupler Units support I/O checking that allows you to check wiring with only the Slave Terminal. Refer to the user's manual of the Communications Coupler Unit for detailed information on the support and functionality of I/O checking for your Communications Coupler Unit.

4-4 Wiring Examples

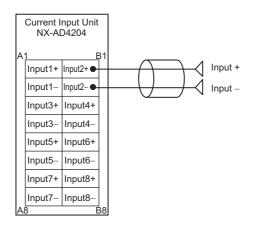
This section gives wiring examples for the Analog Input Units and Analog Output Units and precautions for wiring.

4-4-1 Wiring the Analog Input Units

• Wiring Example 1 (Input method: Single-ended input)

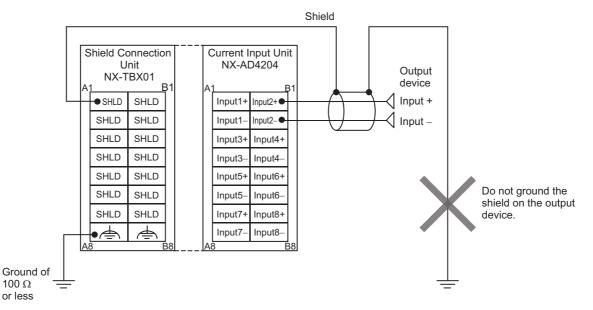


• Wiring Example 2 (Input method: Differential input)



It is not necessary to connect the shield normally. However, if noise affects the Unit, ground the end of the shield on the Input Unit side. In this case, do not connect the end of the shield anywhere on output device.

You can use the NX-TBX01 Shield Connection Unit to ground more than one shield.



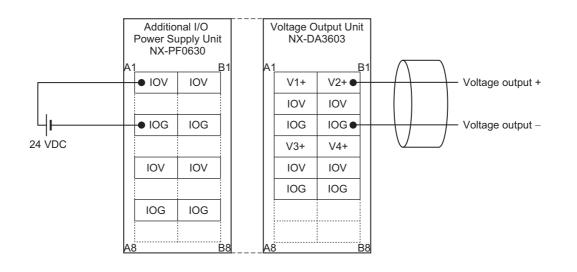
Connect the shield of the cable to the SHLD terminal. And ground the functional ground terminal to 100 Ω or less.

Precautions for Correct Use

To ensure this NX Unit is kept in the best operating condition, observe the following points when wiring to avoid the effects of the noise.

- Use a shield wire (2 conductors, twisted wire) or a shield wire (3 conductors) as the input connection line for each input. Use the shield without connecting to anything normally.
- Wire the input connection lines and power lines (e.g., AC power supply lines or power lines) separately. Do not place such lines in the same duct.
- Insert a noise filter into the power supply input section if noise comes from power supply lines when using the same power supply to power an electrical welder or an electric discharge machine, or there is a high-frequency source nearby.

4-4-2 Wiring the Analog Output Units





Precautions for Correct Use

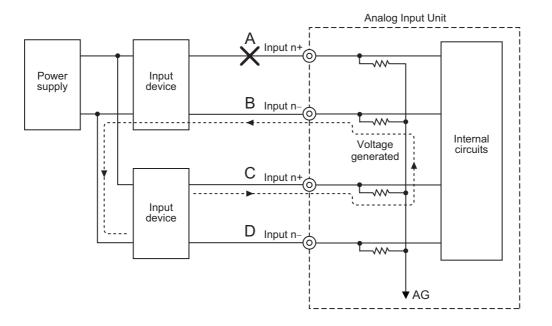
To ensure this NX Unit is kept in the best operating condition, observe the following points when wiring to avoid the effects of the noise.

- Use a shield wire (2 conductors, twisted wire) or a shield wire (3 conductors) as the input connection line for each output. Connect the shield according to the specifications of the input device.
- Wire the output connection lines and power lines (e.g., AC power supply lines or power lines) separately. Do not place such lines in the same duct.
- Insert a noise filter into the power supply input section if noise comes from power supply lines when using the same power supply to power an electrical welder or an electric discharge machine, or there is a high-frequency source nearby.

4

4-4-3 Precautions when Using Common Power Supply for Input Devices of Analog Input Units

If you use Analog Input Units that take differential input, when more than one input device is using the same power supply, and voltage input is being supplied, a disconnection will occur as follows.



If a disconnection occurs in section A in the figure above, unwanted voltage paths occur as indicated by the arrow. As a result, about 1/3 to 1/2 of the voltage between C and D, which is normally connected, is generated between A and B. The same applies when B is disconnected.

When this kind of voltage is generated, disconnection detection may not work.

When voltage input is being supplied, either set up the input devices so that they are not using the same power supply, or use isolators for each input.

This does not apply when current input is being supplied.

5

I/O Refreshing

This section describes the types and functions of I/O refreshing for the NX Units.

5-1	I/O Re	freshing	5-2
	5-1-1	I/O Refreshing from CPU Units to NX Units	5-2
	5-1-2	I/O Refreshing from CPU Units or Industrial PCs to Slave Terminal	5-3
5-2	I/O Re	freshing Methods	5-5
	5-2-1	Types of I/O Refreshing Methods	5-5
	5-2-2	Setting the I/O Refreshing Methods	5-7
	5-2-3	Selecting NX Units	5-8
	5-2-4	Free-Run Refreshing	5-8
	5-2-5	Synchronous Input Refreshing	5-12
	5-2-6	Synchronous Output Refreshing	5-16

5

5-1 I/O Refreshing

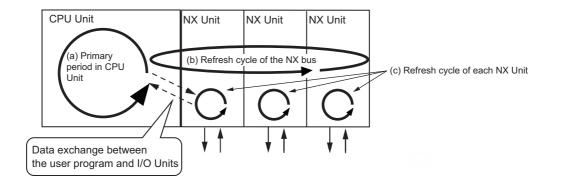
This section describes I/O refreshing for NX Units.

5-1-1 I/O Refreshing from CPU Units to NX Units

An NX-series NX1P2 CPU Unit cyclically performs I/O refreshing with the NX Units.

The following period and two cycles affect operation of the I/O refreshing between the CPU Unit and the NX Units.

- (a) Primary period in CPU Unit
- (b) Refresh cycle of the NX bus
- (c) Refresh cycle of each NX Unit



The following operation occurs.

- The refresh cycle of the NX bus in item (b) is automatically synchronized with the primary period of the CPU Unit in item (a).
- The refresh cycle of each NX Unit in item (c) depends on the I/O refreshing method which is given below.

Refer to the *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501-E1-16 or later) for detailed information on I/O refreshing between the NX1P2 CPU Unit and the NX Units.

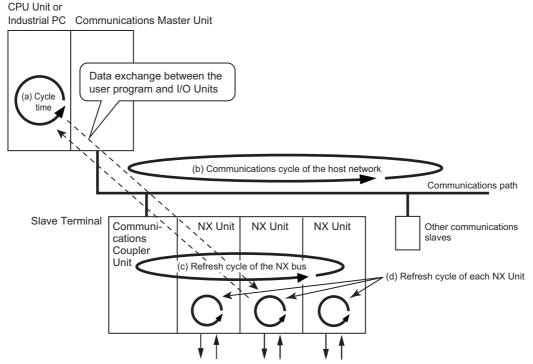
Refer to the *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501-E1-16 or later) for the I/O response times of NX Units in a CPU Rack.

5-1-2 I/O Refreshing from CPU Units or Industrial PCs to Slave Terminal

The CPU Unit or Industrial PC cyclically performs I/O refreshing with the Slave Terminal through the Communications Master and Communications Coupler Units.

The following four cycles affect operation of the I/O refreshing between the NX Unit on a Slave Terminal and the CPU Unit or Industrial PC.

- (a) Cycle time of the CPU Unit or Industrial PC
- (b) Communications cycle of the host network
- (c) Refresh cycle of the NX bus
- (d) Refresh cycle of each NX Unit



The cycle time of the CPU Unit or Industrial PC and communications cycle of the host network and the I/O refresh cycle of the NX bus are determined by the CPU Unit or Industrial PC types and the communications types.

The following explains operations when the built-in EtherCAT port on the NJ/NX-series CPU Unit or NY-series Industrial PC is used for communications with an EtherCAT Slave Terminal, with symbols in the figure.

Refer to the user's manual for the connected Communications Coupler Unit for details on the operation of I/O refreshing on Slave Terminals other than EtherCAT Slave Terminals.

Operation of I/O Refreshing with NX-series CPU Units

The following shows the operation of I/O refreshing when the built-in EtherCAT port on the NX-series CPU Unit is used for communications with an EtherCAT Slave Terminal.

- The process data communications cycle in item (b) and the refresh cycle of the NX bus in item (c) are automatically synchronized with the primary period or the task period of the priority-5 periodic task of the CPU Unit in item (a).^{*1}
- The refresh cycle of each NX Unit in item (d) depends on the I/O refreshing method which is given below.
- *1. This applies when the distributed clock is enabled in the EtherCAT Coupler Unit.

The priority-5 periodic task must be supported by the connected CPU Unit model. Refer to the *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501-E1-16 or later) for the periodic tasks supported by each model of NX-series CPU Unit.

Operation of I/O Refreshing with NJ-series CPU Units or NY-series Industrial PCs

The following shows the operation of I/O refreshing when the built-in EtherCAT port on the NJ-series CPU Unit or NY-series Industrial PC is used for communications with an EtherCAT Slave Terminal.

- The process data communications cycle in item (b) and the refresh cycle of the NX bus in item (c)^{*1} are automatically synchronized with the primary period of the CPU Unit or Industrial PC in item (a).
- The refresh cycle of each NX Unit in item (d) depends on the I/O refreshing method which is given below.
- *1. This applies when the distributed clock is enabled in the EtherCAT Coupler Unit.

Refer to the *NX-series EtherCAT Coupler Unit User's Manual* (Cat. No. W519-E1-08 or later) for detailed information on I/O refreshing between the built-in EtherCAT port and EtherCAT Slave Terminals.

In addition, refer to the user's manual for the connected Communications Coupler Unit for the I/O response times of NX Units on Slave Terminals.

5-2 I/O Refreshing Methods

This section describes I/O refreshing methods for the NX Units.

5-2-1 Types of I/O Refreshing Methods

Methods of I/O Refreshing between the CPU Unit and NX Units

The I/O refreshing methods that you can use between the CPU Unit and the NX Units depend on the connected CPU Unit.

Refer to the software user's manual for the connected CPU Unit for information on the I/O refreshing methods that you can use between the CPU Unit and the NX Units.

As an example, the I/O refreshing methods that you can use between the NX-series NX1P2 CPU Unit and the NX Units are shown below.

I/O refreshing method name ^{*1}	Outline of operation
Free-Run refreshing	With this I/O refreshing method, the refresh cycle of the NX bus and I/O
	refresh cycles of the NX Units are asynchronous.
Synchronous I/O refreshing	With this I/O refreshing method, the timing to read inputs or to refresh out-
	puts is synchronized on a fixed interval between more than one NX Unit con-
	nected to a CPU Unit.
Time stamp refreshing	With this I/O refreshing method, the NX Units record the DC times when
	inputs change or perform outputs at specified DC times. These times are
	asynchronous to the NX bus refresh cycles. Data exchange between the NX
	Units and CPU Unit are performed cyclically on the NX bus refresh cycles.
Input refreshing with input	With this I/O refreshing method, the Input Units record the DC times when
changed time	inputs changed.
Output refreshing with	With this I/O refreshing method, the Output Units refresh outputs at specified
specified time stamp	DC times.

*1. Task period prioritized refreshing cannot be used for the NX1P2 CPU Unit.

Since the NX1P2 CPU Unit can execute all I/O refreshing methods at the same time, you can use NX Units with different I/O refreshing methods together.

5

Methods of I/O Refreshing between the Communications Coupler Unit and NX Units

The I/O refreshing methods that you can use between the Communications Coupler Unit and the NX Units depend on the Communications Coupler Unit that is used.

Refer to the user's manual for the connected Communications Coupler Unit for information on the I/O refreshing methods that you can use between the Communications Coupler Unit and the NX Units.

As an example, when an EtherCAT Coupler Unit is connected to the built-in EtherCAT port on an NJ/NX-series CPU Unit or NY-series Industrial PC, the I/O refreshing methods that you can use between the EtherCAT Coupler Unit and the NX Units are shown below.

I/O refreshing method name	Outline of operation
Free-Run refreshing	With this I/O refreshing method, the refresh cycle of the NX bus and the I/O
	refresh cycles of the NX Units are asynchronous.
Synchronous I/O refreshing	With this I/O refreshing method, the timing to read inputs or to refresh out-
	puts is synchronized on a fixed interval between more than one NX Unit on
	more than one Slave Terminal.
Time stamp refreshing ^{*1}	With this I/O refreshing method, the NX Units record the DC times when
	inputs change or perform outputs at specified DC times. These times are
	asynchronous to the NX bus refresh cycles. Data exchange between the NX
	Units and EtherCAT Coupler Unit are performed cyclically on the NX bus
	refresh cycles.
Input refreshing with input	With this I/O refreshing method, the Input Units record the DC times when
changed time	inputs changed.
Output refreshing with	With this I/O refreshing method, the Output Units refresh outputs at specified
specified time stamp	DC times.
Task period prioritized refresh-	With this I/O refreshing method, shortening the task period is given priority
ing ^{*2}	over synchronizing the I/O timing with other NX Units. With this I/O refreshing
-	method, the timing of I/O is not consistent with the timing of I/O for NX Units
	that use synchronous I/O refreshing.

*1. Neither the Analog Input Unit nor Analog Output Unit supports time stamp refreshing.

*2. Necessary to use an EtherCAT Coupler Unit NX-ECC203. Neither the Analog Input Unit nor Analog Output Unit supports task period prioritized refreshing.

Since the EtherCAT Coupler Unit can execute all I/O refreshing methods at the same time, you can use NX Units with different I/O refreshing methods together in the EtherCAT Slave Terminal.

5-2-2 Setting the I/O Refreshing Methods

Setting Methods between the CPU Unit and the NX Units

How to set an I/O refreshing method between the CPU Unit and the NX Units is determined by the connected CPU Unit.

Refer to the software user's manual for the connected CPU Unit for information on how to set an I/O refreshing method between the CPU Unit and the NX Units.

An example of the setting operation for the NX-series NX1P2 CPU Unit is shown below. For the NX1P2 CPU Unit, no setting operation is required, and the method is determined according to the following table.

NX Units that support only Free-Run refresh- ing	NX Units that support both Free-Run refresh- ing and synchronous I/O refreshing	NX Units that support Free-Run refreshing, synchronous I/O refreshing, and task period prioritized refreshing	NX Units that support only time stamp refresh- ing ^{*1}
Free-Run refreshing	Synchronous I/O refreshing		Time stamp refreshing

*1. Two types of time stamp refreshing are available: one is input refreshing with input changed time and the other is output refreshing with specified time stamp.

Setting Methods between the Communications Coupler Unit and the NX Units

How to set an I/O refreshing method between the Communications Coupler Unit and the NX Units is determined by the connected Communications Coupler Unit.

Refer to the user's manual for the connected Communications Coupler Unit for information on how to set an I/O refreshing method between the Communications Coupler and the NX Units.

An example when the EtherCAT Coupler Unit is connected to the built-in EtherCAT port on an NJ/NX-series CPU or NY-series Industrial PC is shown below.

The I/O refreshing method between the EtherCAT Coupler Unit and each NX Unit depends on whether the DC is enabled in the EtherCAT Coupler Unit.

DC enable setting in the EtherCAT Coupler Unit	NX Units that sup- port only Free-Run refreshing	NX Units that sup- port both Free-Run refreshing and synchronous I/O refreshing	NX Units that sup- port Free-Run refreshing, syn- chronous I/O refreshing, and task period priori- tized refreshing	NX Units that sup- port only time stamp refreshing ^{*1}
Enabled (DC for	Free-Run refreshing	Synchronous I/O refreshing	Synchronous I/O refreshing	Time stamp refresh- ing
synchronization)*2		renesining		ing .
Enabled (DC with			Task period priori-	
priority in cycle			tized refreshing	
time) ^{*2}				
Disabled		Free-Run refreshing	Free-Run refreshing	Operation with time
(FreeRun) ^{*3}				stamp refreshing is
· · · ·				not possible. ^{*4}

- *1. Two types of time stamp refreshing are available: one is input refreshing with input changed time and the other is output refreshing with specified time stamp.
- *2. The EtherCAT Slave Terminal operates in DC Mode.
- *3. The EtherCAT Slave Terminal operates in Free-Run Mode.
- *4. Refer to the manuals for the specific NX Units for details on the operation when the DC is set to *Disabled* (*FreeRun*).

5-2-3 Selecting NX Units

The I/O refreshing methods that you can use depend on the model of the NX Unit. After you decide on which I/O refreshing method to use, select the NX Units.

5-2-4 Free-Run Refreshing

With this I/O refreshing method, the refresh cycle of the NX bus and I/O refresh cycles of the NX Units are asynchronous.

NX Units read inputs or refresh outputs at the time of I/O refreshing.

This method is used when it is not necessary to be aware of factors such as the I/O timing jitter and the concurrency of the timing to read inputs and refresh outputs between the NX Units.

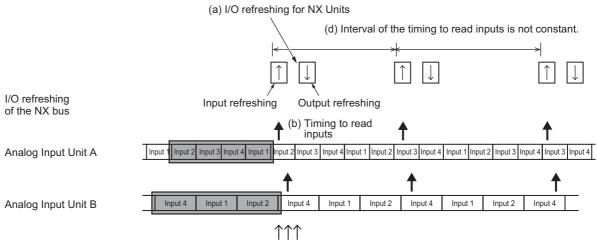
Description of CPU Unit Operation

The following describes the operation of Free-Run refreshing between the NX-series NX1P2 CPU Unit and the NX Units.

- The CPU Unit performs I/O refreshing for NX Units. (Refer to (a) in the figure below.)
- The NX Units read inputs or refresh outputs at the time of I/O refreshing. (Refer to (b) in the figure below.)
- The CPU Unit can read the most recent input value at the I/O refreshing and the NX Units can control with the most recent output value at the I/O refreshing. However, timing to read inputs or to refresh outputs for each NX Unit does not occur at the same time. (Refer to (c) in the figure below.)
- The interval of I/O refreshing varies with the processing conditions of the CPU Unit. Therefore, the
 interval of the timing to read inputs or to refresh outputs for NX Unit is not always the same. (Refer to
 (d) in the figure below.)

Inputs

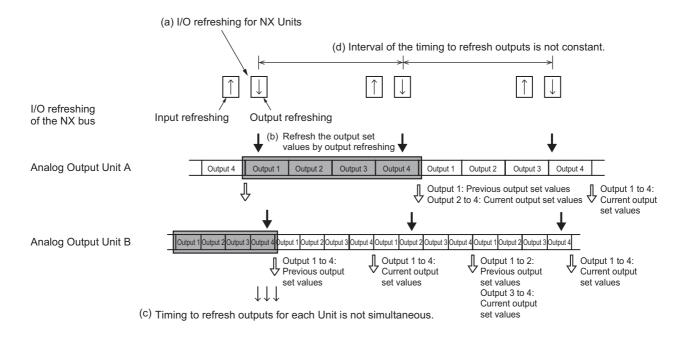
- The Analog Input Units repeatedly perform AD conversion in the order of inputs for which the used channels are set to enable. AD conversion is not synchronized with I/O refreshing of the NX bus.
- At the time of I/O refreshing, the CPU Unit reads the converted values from the NX Unit for one Unit that AD conversion is complete before the timing to read inputs.



(c) Timing to read inputs for each Unit is not simultaneous.

Outputs

- The Analog Output Units repeatedly perform DA conversion in the order of outputs for which the used channels are set to enable. The outputs are refreshed once per DA conversion cycle for one Unit when DA conversion of the last output is complete. The refreshing is not synchronized with I/O refreshing of the NX bus.
- At the time of I/O refreshing, the Analog Output Units perform DA conversion with the refreshed output set values from the outputs before the start of conversion.

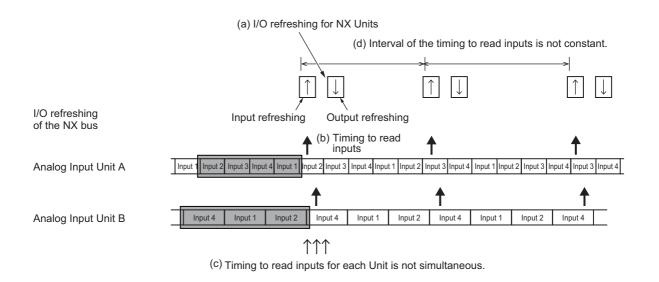


Description of Slave Terminal Operation

- The Communications Coupler Unit performs I/O refreshing for NX Units. (Refer to (a) in the figure below.)
- The NX Units read inputs or refresh outputs at the time of I/O refreshing. (Refer to (b) in the figure below.)
- The Communications Coupler Unit can read the most recent input value at the time of I/O refreshing and the NX Units can control the most recent output value at the time of I/O refreshing. However, the timing to read inputs or to refresh outputs for each NX Unit in the Slave Terminal does not occur at the same time. (Refer to (c) in the figure below.)
- The interval of I/O refreshing varies with the processing conditions of the Communications Coupler Unit or the host communications master. Therefore, the interval of the timing to read inputs or to refresh outputs for NX Units is not always the same. (Refer to (d) in the figure below.)

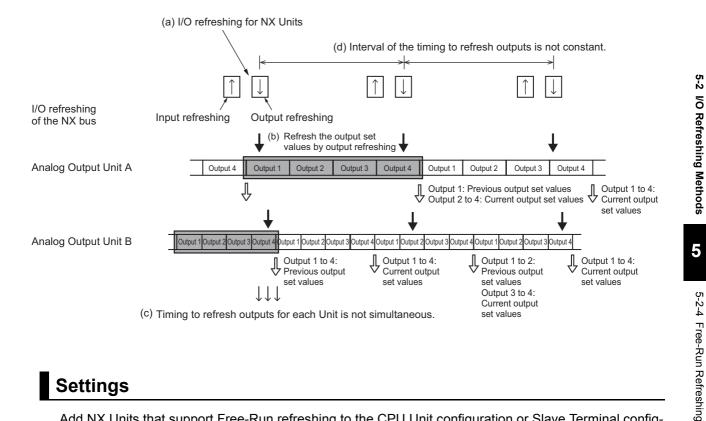
Inputs

- The Analog Input Units repeatedly perform AD conversion in the order of inputs for which the used channels are set to enable. AD conversion is not synchronized with I/O refreshing of the NX bus.
- At the time of I/O refreshing, the Communications Coupler Unit reads the converted values from the NX Unit for one Unit that AD conversion is complete before the timing to read inputs.



Outputs

- The Analog Output Units repeatedly perform DA conversion in the order of outputs for which the used channels are set to enable. The outputs are refreshed once per DA conversion cycle for one Unit when DA conversion of the last output is complete. The refreshing is not synchronized with I/O refreshing of the NX bus.
- At the time of I/O refreshing, the Analog Output Units perform DA conversion with the refreshed output set values from the outputs before the start of conversion.



Settings

Add NX Units that support Free-Run refreshing to the CPU Unit configuration or Slave Terminal configuration.

After you add the NX Units, set an I/O refreshing method depending on the connected CPU Unit or Communications Coupler Unit so that these NX Units operate with Free-Run refreshing.

Refer to 5-2-2 Setting the I/O Refreshing Methods on page 5-7 for the setting procedure of the I/O refreshing method.

5-2-5 Synchronous Input Refreshing

The I/O refreshing method described below. Among Slave Terminals, only EtherCAT Slave Terminals support this refreshing method.

- The timing to read inputs is synchronized on a fixed interval between more than one NX Unit connected to a CPU Unit.
- The timing to read inputs is synchronized on a fixed interval between more than one NX Unit on more than one Slave Terminal.

This method is used when the problem such as input timing jitter or offset of timing to read inputs between more than one NX Unit happens.

Description of Operation

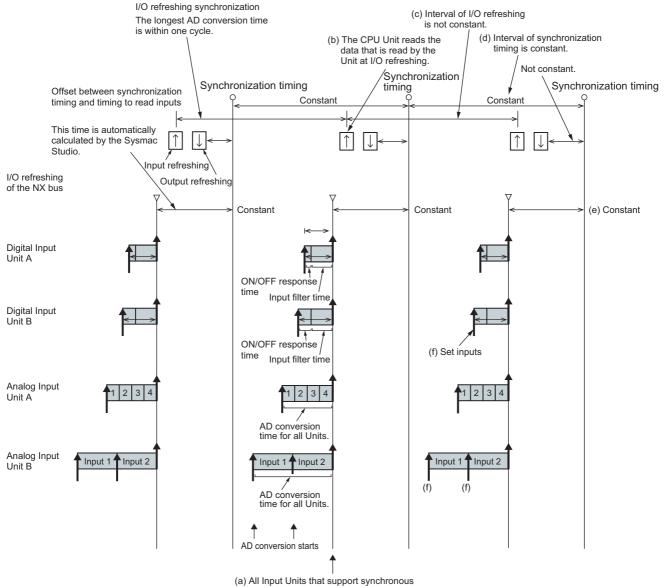
• CPU Unit Operation

The following describes the operation of synchronous input refreshing between the NX-series NX1P2 CPU Unit and the NX Units.

- All Digital Input Units and Analog Input Units that are connected to the CPU Units and operate with synchronous input refreshing read their inputs at the same time at a fixed interval based on the synchronization timing. (Refer to (a) in the figure below.)
- The Analog Input Units perform AD conversion once for each refresh cycle of the NX bus in order to obtain the AD converted values of all inputs for which the used channels are set to enable at the time to read inputs.

AD conversion is performed in order from the lowest channel number, so that the timing to convert is different for each input.

- The CPU Unit reads the input values, which are read by the Unit at the timing of reading inputs, at immediate I/O refreshing. (Refer to (b) in the figure below.)
- The interval of I/O refreshing varies with the processing conditions of the CPU Unit. (Refer to (c) in the figure below.) The timing to read inputs will be at a fixed interval. (Refer to (d) and (e) in the figure below.)
- The timing of reading inputs, the synchronization timing, and the maximum NX bus I/O refresh cycle are automatically calculated by the Sysmac Studio according to the input refresh cycles of the NX Units on the CPU Unit when a Unit configuration in the CPU Unit is created and set up.



input refreshing read their inputs simultaneously.

5-2 I/O Refreshing Methods

5

5-2-5 Synchronous Input Refreshing

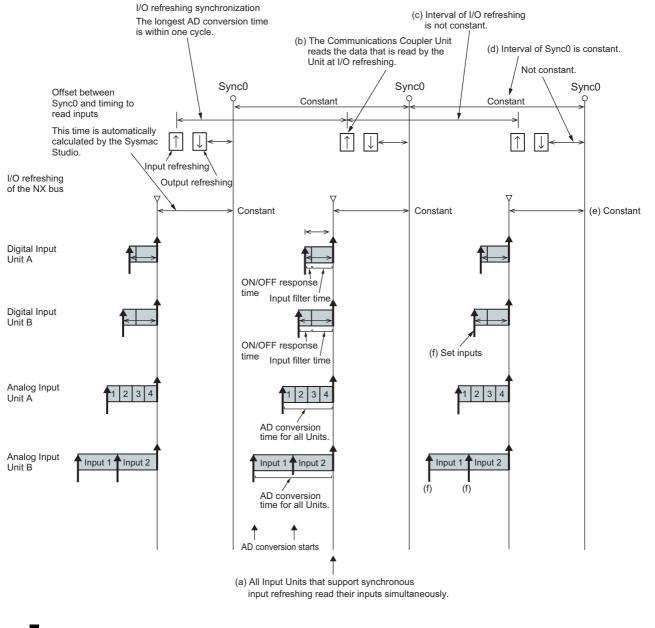
• Slave Terminal Operation

The following describes the operation of synchronous input refreshing of an EtherCAT Slave Terminal connected to the built-in EtherCAT port.

- All Digital Input Units and Analog Input Units that operate with synchronous input refreshing in the Slave Terminal read their inputs at the same time at a fixed interval based on Sync0. (Refer to (a) in the figure below.)^{*1}
- The Analog Input Units perform AD conversion once for each refresh cycle of the NX bus in order to obtain the AD converted values of all inputs for which the used channels are set to enable at the time to read inputs.

AD conversion is performed in order from the lowest channel number, so that the timing to convert is different for each input.

- The Communications Coupler Unit reads the input values, which are read by the Unit at the timing of reading inputs, at immediate I/O refreshing. (Refer to (b) in the figure below.)
- The interval of I/O refreshing varies with the processing conditions of the Communications Coupler Unit or the host communications master. (Refer to (c) in the figure below.) The timing to read inputs will be at a fixed interval. (Refer to (d) and (e) in the figure below.)
- The Sync0, the timing to read inputs and the maximum NX bus I/O refresh cycle of the Slave Terminals are automatically calculated by the Sysmac Studio according to the input refresh cycle of the NX Units in the Slave Terminals when the Slave Terminals are configured and set up.
- *1. If multiple Slave Terminals are present on the same EtherCAT network, refer to the *NX-series EtherCAT Coupler Unit User's Manual* (Cat. No. W519-E1-05 or later) for the range of available Slave Terminals that operate at the same timing.



Settings

Add NX Units that support synchronous I/O refreshing to the CPU Unit configuration or Slave Terminal configuration.

After you add the NX Units, set an I/O refreshing method depending on the connected CPU Unit or Communications Coupler Unit so that these NX Units operate with synchronous I/O refreshing.

Refer to 5-2-2 Setting the I/O Refreshing Methods on page 5-7 for the setting procedure of the I/O refreshing method.

5-2-6 Synchronous Output Refreshing

The I/O refreshing method described below. Among Slave Terminals, this refreshing method is supported only by EtherCAT Slave Terminals.

- The timing to refresh outputs is synchronized on a fixed interval between more than one NX Unit connected to a CPU Unit.
- The timing to refresh outputs is synchronized on a fixed interval between more than one NX Unit on more than one Slave Terminal.

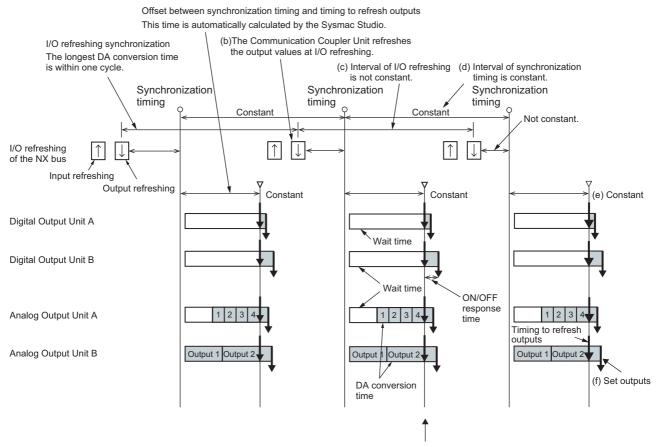
This method is used when the problem such as input timing jitter or offset of timing to refresh outputs between more than one NX Unit happens.

Description of Operation

CPU Unit Operation

The following describes the operation of synchronous output refreshing between the NX-series NX1P2 CPU Unit and the NX Units.

- All Digital Output Units and Analog Output Units that are connected to the CPU Units and operate with synchronous output refreshing refresh their outputs at the same time at a fixed interval based on the synchronization timing. (Refer to (a) in the figure below.)
- The CPU Unit refreshes the output values at I/O refreshing. (Refer to (b) in the figure below.)
- The Analog Output Units perform DA conversion with the output set values that are refreshed once for each refresh cycle of the NX bus in order to output the DA converted values of all outputs for which the used channels are set to enable at the time to refresh outputs.
- The interval of I/O refreshing varies with the processing conditions of the CPU Unit. (Refer to (c) in the figure below.) The timing to refresh outputs will be at a fixed interval. (Refer to (d) and (e) in the figure below.)
- The timing of refreshing outputs, the synchronization timing, and the maximum NX bus I/O refresh
 cycle are automatically calculated by the Sysmac Studio according to the output refresh cycles of
 the NX Units on the CPU Unit when a Unit configuration in the CPU Unit is created and set up.
- The ON/OFF response time is needed from the timing to refresh outputs until setting the output status of external terminals on the NX Units. (Refer to (f) in the figure below.)



(a) All Outputs Units that support synchronous output refreshing read their outputs simultaneously.

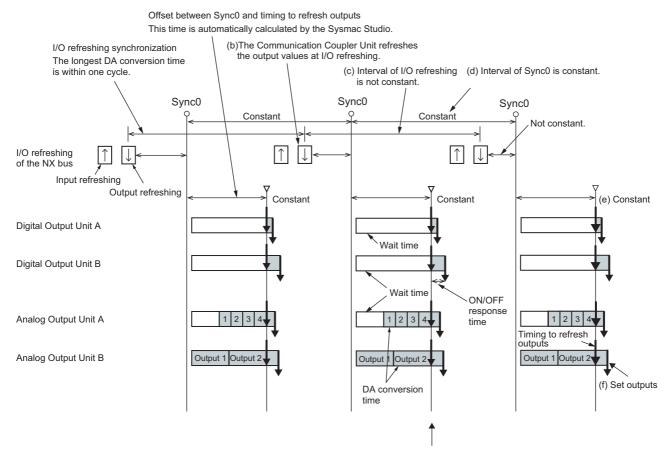
• Slave Terminal Operation

The following describes the operation of synchronous output refreshing of an EtherCAT Slave Terminal connected to the built-in EtherCAT port.

- All Digital Output Units and Analog Output Units that operate with synchronous output refreshing in the Slave Terminal refresh their outputs at the same time at a fixed interval based on Sync0. (Refer to (a) in the figure below.)^{*1}
- The Communication Coupler Unit refreshes the output values at I/O refreshing. (Refer to (b) in the figure below.)
- The Analog Output Units perform DA conversion with the output set values that are refreshed once for each refresh cycle of the NX bus in order to output the DA converted values of all outputs for which the used channels are set to enable at the time to refresh outputs.
- The interval of I/O refreshing varies with the processing conditions of the Communications Coupler Unit or the host communications master. (Refer to (c) in the figure below.) The timing to refresh outputs will be at a fixed interval. (Refer to (d) and (e) in the figure below.)
- The Sync0, the timing to refresh outputs and the maximum NX bus I/O refresh cycle of the Slave
 Terminals are automatically calculated by the Sysmac Studio according to the output refresh cycle

of the NX Units in the Slave Terminals when the Slave Terminals are configured and set up.

- The ON/OFF response time is needed from the timing to refresh outputs until setting the output status of external terminals on the NX Units. (Refer to (f) in the figure below.)
- *1. If multiple Slave Terminals are present on the same EtherCAT network, refer to the *NX-series EtherCAT Coupler Unit User's Manual* (Cat. No. W519-E1-05 or later) for the range of available Slave Terminals that operate at the same timing.



(a) All Outputs Units that support synchronous output refreshing read their outputs simultaneously.

Settings

Same as the settings for synchronous input refreshing. Refer to *Settings* in 5-2-5 *Synchronous Input Refreshing* on page 5-12 for details.

6

Analog Input Units

This section describes the types and functions of Analog Input Units.

Types	of Analog Input Units	6-2
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6-1 Types of Analog Input Units

Analog Input Units are the NX Units with functionality to convert analog input signals such as -10 to +10 V and 4 to 20 mA to digital values.

The Analog Input Unit types are described below.

Analog Input Units (Screwless Clamping Terminal Block, 12 mm Width)

Model	Num ber of point s	Input range	Resolu- tion	Input method	I/O refresh- ing method	Conver- sion time	Reference
NX-AD2203			1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-5
NX-AD2204							P. A-7
NX-AD2208	2 point	4 to 20 mA	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-8
NX-AD2603	s		1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-9
NX-AD2604							P. A-10
NX-AD2608		-10 to +10 V	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-11
NX-AD3203			1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-12
NX-AD3204				-			P. A-13
NX-AD3208	4 point	4 to 20 mA	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-14
NX-AD3603	s		1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-15
NX-AD3604		40.1					P. A-16
NX-AD3608		-10 to +10 V	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-17

Model	Num ber of point s	Input range	Resolu- tion	Input method	I/O refresh- ing method	Conver- sion time	Reference
NX-AD4203			1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-18
NX-AD4204							P. A-19
NX-AD4208	8 point	4 to 20 mA	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-20
NX-AD4603	point s		1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-21
NX-AD4604		101 101					P. A-22
NX-AD4608		-10 to +10 V	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 μs/point	P. A-23

6-2 Input Range and Converted Values

Input analog signals are converted to digital values according to the input range shown below.

If the input range exceeds the value range for which conversion is possible, the converted value is fixed at the upper or lower limit.

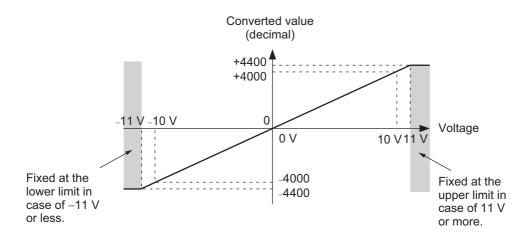
Input Range: -10 to +10 V

1/8000 Resolution

A voltage of -10 to +10 V is converted to a signed integer value (-4000 to +4000).

The input voltage range for which conversion is possible is -11 to +11 V and here the converted value is a signed integer value (-4400 to +4400).

There is no disconnection detection function.

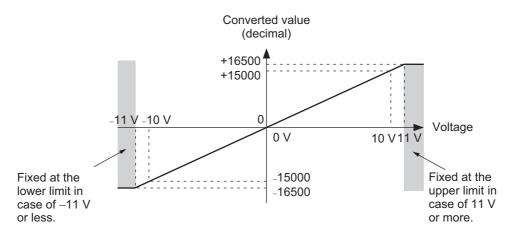


1/30000 Resolution

A voltage of -10 to +10 V is converted to a signed integer value (-15000 to +15000).

The input voltage range for which conversion is possible is -11 to +11 V and here the converted value is a signed integer value (-16500 to +16500).

There is no disconnection detection function.



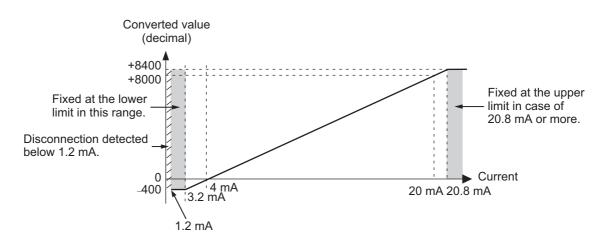
Input Range: 4 to 20 mA

1/8000 Resolution

A current of 4 to 20 mA is converted to a signed integer value (0 to 8000).

The input current range for which conversion is possible is 3.2 to 20.8 mA and here the converted value is a signed integer value (-400 to +8400).

If the input value falls below the input range such as for a disconnection, and the input current is less than 1.2 mA, the disconnection detection function activates and the converted value is 32767.

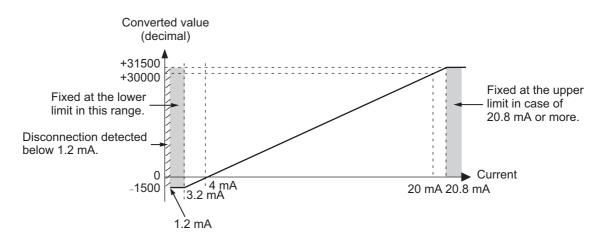


1/30000 Resolution

A current of 4 to 20 mA is converted to a signed integer value (0 to 30000).

The input current range for which conversion is possible is 3.2 to 20.8 mA and here the converted value is a signed integer value (-1500 to +31500).

If the input value falls below the input range such as for a disconnection, and the input current is less than 1.2 mA, the disconnection detection function activates and the converted value is 32767.



6

6-3 Specifications of I/O Data

This section describes the I/O data for the Analog Input Units.

6-3-1 Allocable I/O Data

This section describes the allocable I/O data in the Analog Input Unit.

An I/O entry mapping is assigned to the I/O allocation settings for the Analog Input Unit.

A specific I/O entry is assigned to the I/O entry mapping for each NX Unit model. These allocations are fixed, so you cannot add others or change them.

An I/O entry means the I/O data described in this section. An I/O entry mapping means a collection of I/O entries.

To assign the I/O allocation information of the NX Unit or Slave Terminal to an NJ/NX-series CPU Unit or NY-series Industrial PC, use the I/O ports for the allocated I/O data.

However, for Slave Terminals, I/O ports may not be used depending on the type of communications master or Communications Coupler Unit.

Refer to the user's manual for the connected Communications Coupler Unit for details on how to use I/O data for Slave Terminals.

• Two-point Input Units

Data name	Description	Data type	Default value	I/O port name	Index	Subin- dex
Ch1 Analog Input Value	Value of analog input 1	INT	0	Ch1 Analog Input Value	6000 hex	01 hex
Ch2 Analog Input Value	Value of analog input 2	INT	0	Ch2 Analog Input Value		02 hex

• Four-point Input Units

Data name	Description	Data type	Default value	I/O port name	Index	Subin- dex
Ch1 Analog Input	Value of analog input 1	INT	0	Ch1 Analog	6000 hex	01 hex
Value				Input Value		
Ch2 Analog Input	Value of analog input 2	INT	0	Ch2 Analog		02 hex
Value				Input Value		
Ch3 Analog Input	Value of analog input 3	INT	0	Ch3 Analog		03 hex
Value				Input Value		
Ch4 Analog Input	Value of analog input 4	INT	0	Ch4 Analog		04 hex
Value				Input Value		

Data name	Description	Data type	Default value	I/O port name	Index	Subin- dex
Ch1 Analog Input Value	Value of analog input 1	INT	0	Ch1 Analog Input Value	6000 hex	01 hex
Ch2 Analog Input Value	Value of analog input 2	INT	0	Ch2 Analog Input Value		02 hex
Ch3 Analog Input Value	Value of analog input 3	INT	0	Ch3 Analog Input Value	Ī	03 hex
Ch4 Analog Input Value	Value of analog input 4	INT	0	Ch4 Analog Input Value	Ī	04 hex
Ch5 Analog Input Value	Value of analog input 5	INT	0	Ch5 Analog Input Value	Ī	05 hex
Ch6 Analog Input Value	Value of analog input 6	INT	0	Ch6 Analog Input Value		06 hex
Ch7 Analog Input Value	Value of analog input 7	INT	0	Ch7 Analog Input Value	Ī	07 hex
Ch8 Analog Input Value	Value of analog input 8	INT	0	Ch8 Analog Input Value	1	08 hex

• Eight-point Input Units

6-4 List of Settings

The followings are the setting descriptions, setting ranges, and default values of the functions that can be used in the Analog Input Units.

The settings are reflected after the Unit is restarted.

Precautions for Safe Use

The Unit is required to restart after the transfer of Unit operation settings on the Support Software is completed. Always sufficiently check the safety at the connected devices before you transfer the Unit operation settings.

Precautions for Correct Use

Set the Ch□ Enable/Disable parameter to *Enable* for at least one channel for a Unit.

If you disabled all channels for a Unit, an NX Unit Initialization Error event (event code: 84C10000 hex) occurs.

Two-point Input Units

Setting name	Description	Default value	Setting range	Unit	Index	Subin- dex	Refer- ence
Ch1 Enable/Disable	Set to enable or disable the channel.	TRUE	TRUE or FALSE		5002 hex	01 hex	P. 6-13
Ch2 Enable/Disable	FALSE: Disable TRUE: Enable	TRUE	TRUE or FALSE			02 hex	
Ch1 Range Setting	Set the range.	*1	*1		5003	01 hex	P. 6-4
Ch2 Range Setting	0: 4 to 20 mA 1: 0 to 10 V 2: -10 to +10 V 3: 0 to 5 V 4: 1 to 5 V 5: 0 to 20 mA	*1	*1		hex	02 hex	
Ch1 Input Moving Aver- age Time	Set the time to process moving average.	0	*2	μs	5004 hex	01 hex	P. 6-17
Ch2 Input Moving Aver- age Time		0	*2	μs		02 hex	

*1. The default value and setting range of Ch□ Range Setting depend on the model. The default value and setting range for each NX Unit are as follows.

NX Units	Default value	Setting range
NX-AD2203/AD2204/AD2208	0	0
NX-AD2603/AD2604/AD2608	2	2

*2. The setting range of Ch Input Moving Average Time depends on the model. The setting range for each model is as follows.

NX Units	Setting range
NX-AD2203/AD2204/AD2603/AD2604	0 to 32000
NX-AD2208/AD2608	0 to 640

• Four-point Input Units

Setting name	Description	Default value	Setting range	Unit	Index	Subin- dex	Refer- ence
Ch1 Enable/Disable	Set to enable or disable	TRUE	TRUE or		5002	01 hex	P. 6-13
	the channel.		FALSE		hex		
Ch2 Enable/Disable	FALSE: Disable	TRUE	TRUE or			02 hex	
	TRUE: Enable		FALSE				
Ch3 Enable/Disable		TRUE	TRUE or			03 hex	
			FALSE				
Ch4 Enable/Disable		TRUE	TRUE or			04 hex	
			FALSE				
Ch1 Range Setting	Set the range.	*1	*1		5003	01 hex	P. 6-4
Ch2 Range Setting	0: 4 to 20 mA	*1	*1		hex	02 hex	
Ch3 Range Setting	1: 0 to 10 V	*1	*1			03 hex	
Ch4 Range Setting	2: -10 to +10 V	*1	*1			04 hex	
	3: 0 to 5 V						
	4: 1 to 5 V						
	5: 0 to 20 mA						
Ch1 Input Moving Aver-	Set the time to process	0	*2	μs	5004	01 hex	P. 6-17
age Time	moving average.				hex		
Ch2 Input Moving Aver-		0	*2	μs		02 hex	
age Time							
Ch3 Input Moving Aver-		0	*2	μs		03 hex	
age Time							
Ch4 Input Moving Aver-		0	*2	μs]	04 hex	
age Time							

*1. The default value and setting range of Ch□ Range Setting depend on the model. The default value and setting range for each NX Unit are as follows.

NX Units	Default value	Setting range
NX-AD3203/AD3204/AD3208	0	0
NX-AD3603/AD3604/AD3608	2	2

*2. The setting range of Ch Input Moving Average Time depends on the model. The setting range for each model is as follows.

NX Units	Setting range
NX-AD3203/AD3204/AD3603/AD3604	0 to 32000
NX-AD3208/3608	0 to 640

• Eight-point Input Units

		Default	Setting			Subin-	Refer-
Setting name	Description	value	range	Unit	Index	dex	ence
Ch1 Enable/Disable	Set to enable or disable	TRUE	TRUE or		5002	01 hex	P. 6-13
	the channel.		FALSE		hex		
Ch2 Enable/Disable	FALSE: Disable	TRUE	TRUE or			02 hex	
	TRUE: Enable		FALSE				
Ch3 Enable/Disable		TRUE	TRUE or			03 hex	
			FALSE				
Ch4 Enable/Disable		TRUE	TRUE or			04 hex	
	_		FALSE				
Ch5 Enable/Disable		TRUE	TRUE or			05 hex	
	-		FALSE				
Ch6 Enable/Disable		TRUE	TRUE or			06 hex	
	-		FALSE		-		
Ch7 Enable/Disable		TRUE	TRUE or			07 hex	
	-		FALSE		-		
Ch8 Enable/Disable		TRUE	TRUE or			08 hex	
			FALSE				
Ch1 Range Setting	Set the range.	*1	*1		5003	01 hex	P. 6-4
Ch2 Range Setting	0: 4 to 20 mA	*1	*1		hex	02 hex	
Ch3 Range Setting	1: 0 to 10 V	*1	*1		-	03 hex	
Ch4 Range Setting	2: -10 to +10 V	*1	*1		-	04 hex	
Ch5 Range Setting	3: 0 to 5 V	*1	*1			05 hex	
Ch6 Range Setting	4: 1 to 5 V	*1	*1			06 hex	
Ch7 Range Setting	5: 0 to 20 mA	*1	*1			07 hex	
Ch8 Range Setting		*1	*1			08 hex	
Ch1 Input Moving Aver-	Set the time to process	0	*2	μs	5004	01 hex	P. 6-17
age Time	moving average.				hex		
Ch2 Input Moving Aver-		0	*2	μs		02 hex	
age Time	_						
Ch3 Input Moving Aver-		0	*2	μs		03 hex	
age Time	-				-		
Ch4 Input Moving Aver-		0	*2	μs		04 hex	
age Time	-				-		
Ch5 Input Moving Aver-		0	*2	μs		05 hex	
age Time	-		10				
Ch6 Input Moving Aver-		0	*2	μs		06 hex	
age Time	4				-	071	
Ch7 Input Moving Aver-		0	*2	μs		07 hex	
age Time	4				-		
Ch8 Input Moving Aver-		0	*2	μs		08 hex	
age Time							

*1. The default value and setting range of Ch Range Setting depend on the model. The default value and setting range for each NX Unit are as follows.

NX Units	Default value	Setting range
NX-AD4203/AD4204/AD4208	0	0
NX-AD4603/AD4604/AD4608	2	2

*2. The setting range of Ch Input Moving Average Time depends on the model. The setting range for each model is as follows.

NX Units	Setting range
NX-AD4203/AD4204/AD4603/AD4604	0 to 32000
NX-AD4208/4608	0 to 640

6

6-5 Function

This section describes the Analog Input Unit functions.

Refer to the specifications of each model in A-1 Data Sheet on page A-2 for details on the functions.

6-5-1 List of Analog Input Unit Functions

Function name	Description	Reference
Free-Run Refreshing	With this I/O refreshing method, the refresh cycle of the NX bus and the I/O refresh cycles of the NX Units are asynchronous.	5-2-4 Free-Run Refreshing on page 5-8
Synchronous I/O Refresh- ing	With this I/O refreshing method, the timing to read inputs or to refresh outputs is synchronized on a fixed interval between more than one NX Unit connected to a CPU Unit. In addition, with this I/O refreshing method, the timing to read inputs or to refresh outputs is synchronized on a fixed interval between more than one NX Unit on more than one Slave Terminal.	5-2-5 Synchro- nous Input Refreshing on page 5-12
Selecting Channel To Use	This function omits the conversion processing for unused inputs. It is used to reduce the conversion cycle for its own Unit.	6-5-2 Selecting Channel To Use on page 6-13
Moving Average	This function uses the average value of inputs of the set time as the converted value. When the input value fluctuates fre- quently due to noises, averaging can be used to obtain a sta- ble converted value.	6-5-3 Moving Aver- age on page 6-17
	This function can be used only for Free-Run refreshing.	
Input Disconnection Detection	This function detects disconnections of the analog input signal lines. It can be used only for models with an input range of 4 to 20 mA.	6-5-4 Input Discon- nection Detection on page 6-23
Over Range/Under Range Detection	This function detects when the input signal exceeds the range for which conversion is possible.	6-5-5 Over Range/Under Range Detection on page 6-24
User Calibration	This function corrects offsets in the converted values that occur due to the deterioration of the NX Units and calibrate the Units.	6-5-6 User Calibra- tion on page 6-25

6-5-2 Selecting Channel To Use

Purpose

This function skips the conversion processing and error detection processing for unused inputs, and shortens the conversion time.

Details on the Function

Normally in this Unit, the input signals for the number of input points are converted in sequence. The setting can be changed, so that unused inputs are not converted.

By reducing the number of conversion points, the conversion time is shortened.

Whether the channel is enabled or disabled is settable for each input.

However, set the Ch Enable/Disable parameter to *Enable* for at least one channel for a Unit.

If you disabled all channels for a Unit, an NX Unit Initialization Error event (event code: 84C10000 hex) occurs.

Refer to the user's manual for the Communications Coupler Unit for details on events.

• Two-point Input Units

Setting name	Description	Default value	Unit
Ch1 Enable/Disable	Set to enable or disable the channel.	TRUE	
Ch2 Enable/Disable	FALSE: Disable TRUE: Enable	TRUE	

• Four-point Input Units

Setting name	Description	Default value	Unit
Ch1 Enable/Disable	Set to enable or disable the channel.	TRUE	
Ch2 Enable/Disable	FALSE: Disable	TRUE	
Ch3 Enable/Disable	TRUE: Enable	TRUE	
Ch4 Enable/Disable		TRUE	

• Eight-point Input Units

Setting name	Description	Default value	Unit
Ch1 Enable/Disable	Set to enable or disable the channel.	TRUE	
Ch2 Enable/Disable	FALSE: Disable	TRUE	
Ch3 Enable/Disable	TRUE: Enable	TRUE	
Ch4 Enable/Disable		TRUE	
Ch5 Enable/Disable		TRUE	
Ch6 Enable/Disable		TRUE	
Ch7 Enable/Disable		TRUE	
Ch8 Enable/Disable		TRUE	

Target NX Units

All Analog Input Units

Setting Method

This section describes how to configure settings with the Sysmac Studio.

When you are using Support Software other than the Sysmac Studio, in the Edit Unit Operation Settings Tab Page, set the parameters described in the procedure and transfer the settings to the target NX Unit.

For details on how to display the Edit Unit Operation Settings Tab Page and to transfer settings to an NX Unit with Support Software other than the Sysmac Studio, refer to the operation manual for the Support Software that you are using.

1 Display the Edit Unit Operation Settings Tab Page.

For the display methods, refer to A-7 Displaying the Edit Unit Operation Settings Tab Page on page A-61.

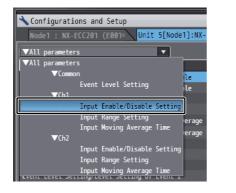
2 Select *True* (Enable) or *False* (Disable) from the list of Input Enable/Disable Setting for which the channel you want to set.

Configurations and Setup		
Node1 : NX-ECC201 (E007× Unit 5[Node1]:NX-AD2203× +		
All parameters		
Item name	Value	
Input Enable/Disable Setting/Ch1 Enable/Disable	True 🗸	
Input Enable/Disable Setting/Ch2 Enable/Disable	True	
Input Range Setting/Ch1 Range Setting	False	
Input Range Setting/Ch2 Range Setting	4 to 20 mA	
Input Moving Average Time/Ch1 Input Moving Average Time	0 ps	
Input Moving Average Time/Ch2 Input Moving Average Time	0 us	
Event Level Setting/Event 1	Unit Over Range	
Event Level Setting/Level Setting of Event 1	Observation 🔻	

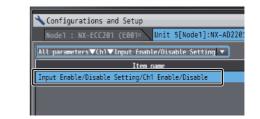
Additional Information

• Click a list button on the tab page to display the item in the Edit Unit Operation Settings Tab Page.

Example:



Select Input Enable/Disable Setting under Ch1



Only Input Enable/Disable Setting under Ch1 is displayed

- If you set a value different from the default value, the Value on the Sysmac Studio is displayed in a different color.
- You can click the **Return to Default Value** Button to return all set values on the Sysmac Studio to the default values.
- Help for the settings is displayed at the bottom of the Edit Unit Operation Settings Tab Page.

3 Click the **Transfer to Unit** Button.

The settings are transferred from the Sysmac Studio to the NX Unit.



The settings are reflected after the Unit is restarted.

Precautions for Safe Use

The Unit is required to restart after the transfer of Unit operation settings on the Support Software is completed. Always sufficiently check the safety at the connected devices before you transfer the Unit operation settings.

Calculating Conversion Time

The conversion time per unit according to the number of available conversion channels is as follows.

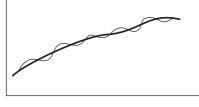
Number of available	Conversion time per unit (µs)		
conversion channels	Conversion time: 250 μs/point	Conversion time: 10 µs/point	
1 channel	250	10	
2 channels	500	20	
3 channels	750	30	
4 channels	1000	40	
5 channels	1250	50	
6 channels	1500	60	
7 channels	1750	70	
8 channels	2000	80	

6-5-3 Moving Average

Purpose

This function averages the inputs if they fluctuate minutely due to noise and so on as shown in the figure below, and obtains smooth input values.





Actual input
 Input after averaging processing

Time

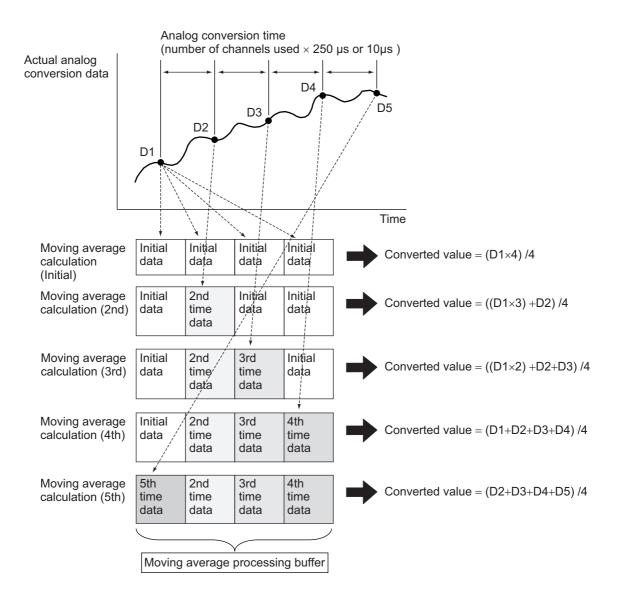
Details on the Function

For the inputs for which the used channels are set to enable, the average value (moving average) of analog inputs is calculated for a maximum of 32000 μ s (conversion time: 250 μ s/ point) or 640 μ s (conversion time: 10 μ s/point) and it is used as the converted value.

However, if the Analog Input Unit is set to operate with synchronous I/O refreshing, the moving average function does not operate regardless of the set value of the input moving average time.

The processing contents in the Unit are shown below as an example, in which an NX Unit with a conversion time of 250 μ s/point is used, 4 points are enabled and the input moving average time is set to 4000 μ s.

At the initial calculation, the initial data is stored in all moving average buffers to perform the moving average processing.



The settings are made by the "input moving average time (µs)".

The input moving average time can be set for each input.

The input moving average time is:

The number of data items for which the moving average is processed x analog conversion time (number of channels used x 250 $\mu s)$

Note that if 0 is set, the moving average processing is not performed.

[Setting example of input moving average time]

When the number of channels used is to be set to 4 and the number of sampling data items to 4:

Input moving average time = $4 \times (4 \times 250 \ \mu s) = 4000 \ \mu s$ (set value: 4000)

• Two-point Input Units

Setting name	Description	Default value	Setting range	Unit
Ch1 Input Moving Aver- age Time	Set the time to process moving average.	0	*1	μs
Ch2 Input Moving Aver- age Time		0	*1	μs

*1. The setting range of Ch Input Moving Average Time depends on the model. The setting range for each model is as follows.

NX Units	Setting range
NX-AD2203/AD2204/AD2603/AD2604	0 to 32000
NX-AD2208/AD2608	0 to 640

• Four-point Input Units

Setting name	Description	Default value	Setting range	Unit
Ch1 Input Moving Aver- age Time	Set the time to process moving average.	0	*1	μs
Ch2 Input Moving Aver- age Time		0	*1	μs
Ch3 Input Moving Aver- age Time		0	*1	μs
Ch4 Input Moving Aver- age Time		0	*1	μs

*1. The setting range of Ch Input Moving Average Time depends on the model. The setting range for each model is as follows.

NX Units	Setting range
NX-AD3203/AD3204/AD3603/AD3604	0 to 32000
NX-AD3208/AD3608	0 to 640

• Eight-point Input Units

Setting name	Description	Default value	Setting range	Unit
Ch1 Input Moving Aver-	Set the time to process moving average.	0	*1	μs
age Time				
Ch2 Input Moving Aver-		0	*1	μs
age Time				
Ch3 Input Moving Aver-		0	*1	μs
age Time				
Ch4 Input Moving Aver-		0	*1	μs
age Time				
Ch5 Input Moving Aver-		0	*1	μs
age Time				
Ch6 Input Moving Aver-		0	*1	μs
age Time				
Ch7 Input Moving Aver-		0	*1	μs
age Time				
Ch8 Input Moving Aver-	1	0	*1	μs
age Time				

*1. The setting range of Ch Input Moving Average Time depends on the model. The setting range for each model is as follows.

NX Units	Setting range
NX-AD4203/AD4204/AD4603/AD4604	0 to 32000
NX-AD4208/AD4608	0 to 640

Target NX Units

All Analog Input Units

Setting Method

This section describes how to configure settings with the Sysmac Studio.

When you are using Support Software other than the Sysmac Studio, in the Edit Unit Operation Settings Tab Page, set the parameters described in the procedure and transfer the settings to the target NX Unit.

For details on how to display the Edit Unit Operation Settings Tab Page and to transfer settings to an NX Unit with Support Software other than the Sysmac Studio, refer to the operation manual for the Support Software that you are using.

1 Display the Edit Unit Operation Settings Tab Page.

For the display methods, refer to A-7 Displaying the Edit Unit Operation Settings Tab Page on page A-61.

2 Enter the time to process moving average (0 to 32000 or 0 to 640 μs) in the text box of Input Moving Average Time for the channel you want to set.

🔧 Configurations and Setup		[□] €, €,
Node1 : NX-ECC201 (E001× Unit 5[Node1]:NX-AD2203×	+	
All parameters 🔹		
Item name	Value	
Input Enable/Disable Setting/Ch1 Enable/Disable	True	•
Input Enable/Disable Setting/Ch2 Enable/Disable	True	•
Input Range Setting/Ch1 Range Setting	4 to 20 mA	•
Input Range Setting/Ch2 Range Setting	4 to 20 mA	•
Input Moving Average Time/Ch1 Input Moving Average Time	5000	μs
Input Moving Average Time/Ch2 Input Moving Average Time	0	hz
Event Level Setting/Event 1	Unit Over Range	•
Event Level Setting/Level Setting of Event 1	Observation	•
Event Level Setting/Event 2	Unit Under Range	T
Event Level Setting/Level Setting of Event 2	Observation	•
Event Level Setting/Event 3	Ch1 Disconnection Detected	T
Event Level Setting/Level Setting of Event 3	Minor Fault	•
Event Level Setting/Event 4	Ch2 Disconnection Detected	T
Event Level Setting/Level Setting of Event 4	Minor Fault	•

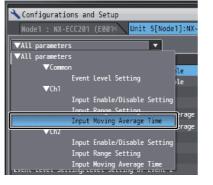
6



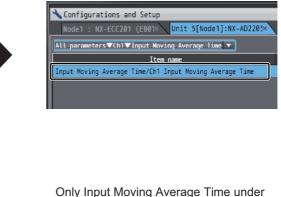
Additional Information

• Click a list button on the tab page to display the item in the Edit Unit Operation Settings Tab Page.

Example:



Select Input Moving Average Time under Ch1



Ch1 is displayed

- If you set a value different from the default value, the Value on the Sysmac Studio is displayed in a different color.
- You can click the **Return to Default Value** Button to return all set values on the Sysmac Studio to the default values.
- Help for the settings is displayed at the bottom of the Edit Unit Operation Settings Tab Page.

3 Click the **Transfer to Unit** Button.

The settings are transferred from the Sysmac Studio to the NX Unit.



The settings are reflected after the Unit is restarted.

Precautions for Safe Use

The Unit is required to restart after the transfer of Unit operation settings on the Support Software is completed. Always sufficiently check the safety at the connected devices before you transfer the Unit operation settings.

6-5-4 Input Disconnection Detection

Purpose

This function detects disconnections of the analog input signal lines.

However, it is only available when the input range is 4 to 20 mA.

Details on the Function

- If any analog input signal line (current inputs) of the inputs that are enabled by the selecting channel to use function is disconnected, or the input current is less than 1.2 mA, the converted value is 32767. At this time, the Disconnection Detection Status turns ON and a Unit I/O Disconnection Detected for Channel
 event (event code: 65030000 hex to 65A00000 hex) occurs.
- If the input returns to the conversion range again, the value becomes the normal converted value. When the cause of the error is removed and the error is reset, the Disconnection Detection Status turns OFF.
- Refer to A-3 List of NX Objects on page A-39 for details on status and 8-3-3 Event Codes and Corrections for Errors on page 8-7 for details on events.

Target NX Units

Analog Input Units with the input range of 4 to 20 mA

Setting Method

No setting is required.

6-5-5 Over Range/Under Range Detection

Purpose

This function detects when the input signal exceeds the range for which conversion is possible.

Details on the Function

- If the input signal exceeds the upper limit of the conversion range, the converted value is fixed at the upper limit. At this time, the Over Range Status turns ON and a Unit Over Range for Channel□ event (event code: 64F00000 to 64F70000 hex) occurs.
- If the input signal falls below the lower limit of the conversion range, the converted value is fixed at the lower limit. At this time, the Under Range Status turns ON and a Unit Under Range for Channel□ event (event code: 64F80000 to 64FF0000 hex) occurs.
- When the input signal returns to the conversion range, the fixing is cancelled and the value becomes the normal converted value. When the cause of the error is removed and the error is reset, the Over Range/Under Range Status turns OFF.
- Refer to A-3 List of NX Objects on page A-39 for details on status and 8-3-3 Event Codes and Corrections for Errors on page 8-7 for details on events.

Target NX Units

All Analog Input Units

Setting Method

No setting is required.

6-5-6 User Calibration

Purpose

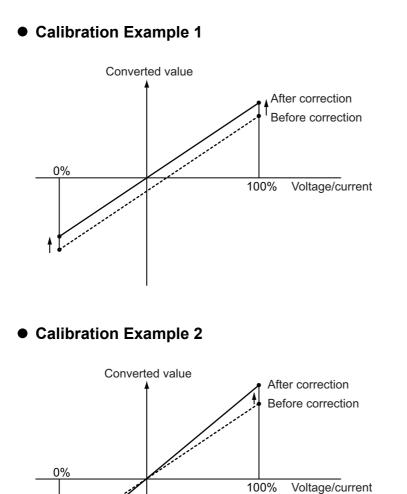
This function corrects offsets in the converted values that occur due to the deterioration of the NX Units and calibrate the Units again.

You can use this function to calibrate the equipment that requires the periodic calibration.

Details on the Function

This function corrects the converted values of input voltages and input currents at 2 points, 0% and 100%, as shown in the figure below.

The calibration result is saved in the NX Unit.



6

• Correctable Range

The correctable range is -5 to 5% of the input full scale. The correctable range for each input range is as follows.

Input range	Correctable range		
input range	0%	100%	
-10 to +10 V	-11 to -9.0 V	9.0 to 11 V	
4 to 20 mA	3.2 to 4.8 mA	19.2 to 20.8 mA	

Target NX Units

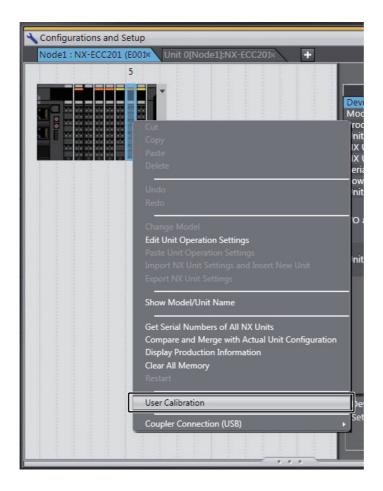
All Analog Input Units

Setting Method

This section describes how to configure settings with the Sysmac Studio.

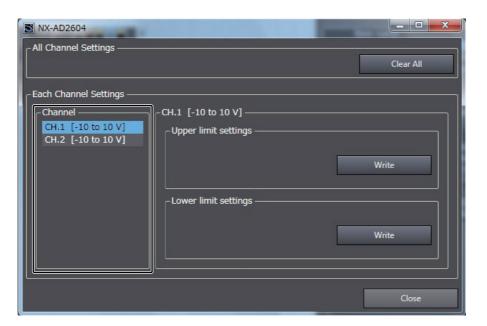
You can perform the user calibration even if you are using Support Software other than the Sysmac Studio.

For details on how to configure the user calibration settings with Support Software other than Sysmac Studio, refer to the operation manual for the Support Software that you are using.



1 Right-click the NX Unit, then select *User Calibration* from the menu.

2 Select the channel you want to calibrate from Channel.



3 Enter the voltage or current corresponding to upper limit (100%) to the Unit terminal, then click the **Write** Button under **Upper limit settings**.

Channel Settings Channel CH.1 [-10 to 10 V] CH.2 [-10 to 10 V] CH.2 [-10 to 10 V] Channel CH.2 [-10 to 10 V] Channel CH.2 [-10 to 10 V]	
- Lower limit settings	Write
	Write

4 Click the **Yes** Button on the confirmation message.

Sysmac Studio	
1?	Upper limit calibration value will be written. Are you sure to execute?
	Yes No

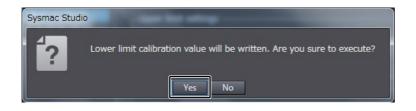
When the writing is completed successfully, the following message is displayed. Click the $\ensuremath{\text{OK}}$ Button.

Sysmac Studio
Successed to write calibration value.
ОК

5 Enter the voltage or current corresponding to lower limit (0%) to the Unit terminal, then click the Write Button under Lower limit settings.

NX-AD2604		Clear All
Each Channel Settings		
Channel CH.1 [-10 to 10 V] CH.2 [-10 to 10 V]	CH.1 [-10 to 10 V] — Upper limit settings —	Write
	Lower limit settings	Write
		Close

6 Click the **Yes** Button on the confirmation message.

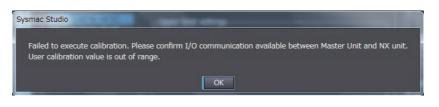


When the writing is completed successfully, the following message is displayed. Click the **OK** Button.

Sysmac Studio
Successed to write calibration value.
ОК

Additional Information

- · A new calibration value is reflected immediately after you write it.
- When you write a calibration value, if the voltage or current that is input to the Unit terminal is outside the correctable range, the following message will be displayed and calibration will fail. The following message appears in the case of a Slave Terminal.



• Reset the Calibration Value to the Default

You can reset the calibration value to the default.

1 Right-click the NX Unit, then select **User Calibration** from the menu.

Node1 : NX-ECC201 (E001) 5 5 Cut Copy Paste Delete Undo Redo Change Model Edit Unit Operation Settings Paste Unit Operation Settings Import NX Unit Settings and Insert New Unit Export NX Unit Settings Show Model/Unit Name Get Serial Numbers of All NX Units Compare and Merge with Actual Unit Configuration Display Production Information Clear All Memory Restart User Calibration	🔧 Configurations and Se	etup	
Cut Copy Paste Delete Undo Redo Change Model Edit Unit Operation Settings Paste Unit Operation Settings Import NX Unit Settings and Insert New Unit Export NX Unit Settings Show Model/Unit Name Get Serial Numbers of All NX Units Compare and Merge with Actual Unit Configuration Display Production Information Clear All Memory Restart User Calibration	Node1 : NX-ECC201 (E001× Unit 0[Node1]:NX-ECC201× +	
User Calibration		Cut. Copy Paste Delete Undo Redo Change Model Edit Unit Operation Settings Paste Unit Operation Settings Import NX Unit Settings and Insert New Unit Export NX Unit Settings Show Model/Unit Name Get Serial Numbers of All NX Units Compare and Merge with Actual Unit Configuration Display Production Information Clear All Memory	Mi ir i) i) e in ir
		User Calibration	٦
		Coupler Connection (USB)	_

2 Click the Clear All Button under All Channel Settings.

NX-AD2604		_ D X
All Channel Settings —		Clear All
Fach Channel Settings		
Channel	-CH.1 [-10 to 10 V]	i [
CH.1 [-10 to 10 V] CH.2 [-10 to 10 V]	- Upper limit settings]
		Write
	- Lower limit settings]
		Write
		Close

3 Click the **Yes** Button on the confirmation message.



When the writing is completed successfully, the following message is displayed. Click the $\ensuremath{\text{OK}}$ Button.

Sysmac Studio
Successed to write calibration value.
ОК

Analog Output Units

This section describes the types and functions of Analog Output Units.

7-1	Types	of Analog Output Units 7-2
7-2	Outpu	t Range and Output Set Values
7-3	Specif	ications of I/O Data
	7-3-1	Allocable I/O Data
7-4	List of	Settings
7-5	Functi	ons
	7-5-1	List of Analog Output Unit Functions
	7-5-2	Selecting Channel To Use
	7-5-3	Load Rejection Output Setting
	7-5-4	Over Range/Under Range Detection
	7-5-5	User Calibration

7-1 Types of Analog Output Units

Analog Output Units are the NX Units with functionality to convert output set values set by the user program to analog signals such as -10 to 10 V and 4 to 20 mA.

The Analog Output Unit types are described below.

Analog Output Units (Screwless Clamping Terminal Block, 12 mm Width)

Model	Num ber of poin ts	Output range	Resolu- tion I/O refreshing method		Conversion time	Reference
NX-DA2203			1/8000	Free-Run refreshing	250 µs/point	P. A-25
NX-DA2205	2	4 to 20 mA	1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-27
NX-DA2603	point s		1/8000	Free-Run refreshing	250 µs/point	P. A-29
NX-DA2605		-10 to +10 V	1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-30
NX-DA3203			1/8000	Free-Run refreshing	250 µs/point	P. A-31
NX-DA3205	4	4 to 20 mA	1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-33
NX-DA3603	point s		1/8000	Free-Run refreshing	250 µs/point	P. A-35
NX-DA3605		-10 to +10 V	1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-36

7-2 Output Range and Output Set Values

Output set values set by the user program are converted to analog signals according to the output range shown below.

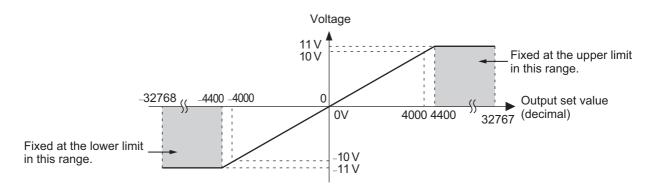
If the output set value exceeds the value range for which conversion is possible, the analog value is fixed at the upper or lower limit.

Output Range: -10 to +10 V

1/8000 Resolution

The output set value of the signed integer (-4000 to +4000) is converted to voltage from -10 to +10 V and output.

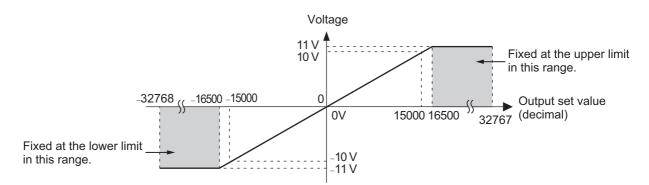
The output set value range for which conversion is possible is the signed integer (-4400 to +4400) and for this case the output voltage becomes from -11 to +11 V.



1/30000 Resolution

The output set value of the signed integer (-15000 to +15000) is converted to voltage from -10 to +10 V and output.

The output set value range for which conversion is possible is the signed integer (-16500 to +16500) and for this case the output voltage becomes from -11 to +11 V.

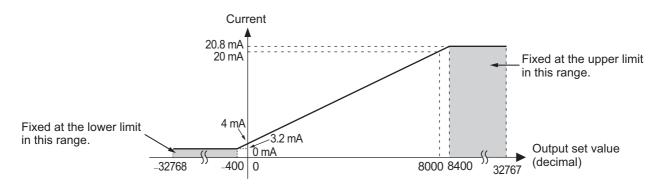


Output Range: 4 to 20 mA

1/8000 Resolution

The output set value of the signed integer value (0 to 8000) is converted to currents from 4 to 20 mA and output.

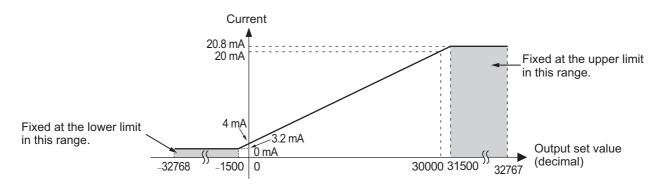
The output set value range for which conversion is possible is the signed integer (-400 to +8400) and for this case the output voltage becomes from 3.2 to 20.8 mA.



• 1/30000 Resolution

The output set value of the signed integer (0 to 30000) is converted to current from 4 to 20 mA and output.

The output set value range for which conversion is possible is the signed integer (-1500 to +31500) and for this case the output voltage becomes from 3.2 to 20.8 mA.



7-3 Specifications of I/O Data

This section describes the I/O data for the Analog Output Units.

7-3-1 Allocable I/O Data

This section describes the allocable I/O data in the Analog Output Unit.

An I/O entry mapping is assigned to the I/O allocation settings for the Analog Output Unit.

A specific I/O entry is assigned to the I/O entry mapping for each NX Unit model. These allocations are fixed, so you cannot add others or change them.

An I/O entry means the I/O data described in this section. An I/O entry mapping means a collection of I/O entries.

To assign the I/O allocation information of the NX Unit or Slave Terminal to an NJ/NX-series CPU Unit or NY-series Industrial PC, use the I/O ports for the allocated I/O data.

However, for Slave Terminals, I/O ports may not be used depending on the type of communications master or Communications Coupler Unit.

Refer to the user's manual for the connected Communications Coupler Unit for details on how to use I/O data for Slave Terminals.

• Two-point Output Units

Data name	Description	Data type	Default value	I/O port name	Index	Subin- dex
Ch1 Analog Output Value	Value of analog output Ch1	INT	0	Ch1 Analog Output Value	7000 hex	01 hex
Ch2 Analog Output Value	Value of analog output Ch2	INT	0	Ch2 Analog Output Value		02 hex

• Four-point Output Units

Data name	Description	Data type	Default value	I/O port name	Index	Subin- dex
Ch1 Analog Output Value	Value of analog output Ch1	INT	0	Ch1 Analog Output Value	7000 hex	01 hex
Ch2 Analog Output Value	Value of analog output Ch2	INT	0	Ch2 Analog Output Value		02 hex
Ch3 Analog Output Value	Value of analog output Ch3	INT	0	Ch3 Analog Output Value		03 hex
Ch4 Analog Output Value	Value of analog output Ch4	INT	0	Ch4 Analog Output Value		04 hex

7-4 List of Settings

The followings are the setting descriptions, setting ranges, and default values of the functions that can be used in the Analog Output Units.

The settings are reflected after the Unit is restarted.

Precautions for Safe Use

The Unit is required to restart after the transfer of Unit operation settings on the Support Software is completed. Always sufficiently check the safety at the connected devices before you transfer the Unit operation settings.

Two-point Output Units

Setting name	Description	Default value	Setting range	Unit	Index	Subin- dex	Refer- ence
Ch1 Enable/Disable	Set to enable or disable	TRUE	TRUE or		5010	01 hex	P. 7-10
	the channel.		FALSE		hex		
Ch2 Enable/Disable	FALSE: Disable	TRUE	TRUE or			02 hex	
	TRUE: Enable		FALSE				
Ch1 Range Setting	Set the range.	*1	*1		5011	01 hex	P. 7-3
Ch2 Range Setting	0: 4 to 20 mA	*1	*1		hex	02 hex	
	1: 0 to 10 V						
	2: -10 to +10 V						
	3: 0 to 5 V						
	4: 1 to 5 V						
	5: 0 to 20 mA						
Ch1 Hold Value Setting	Set the value to output at	4	0 to 4 *2		5012	01 hex	P. 7-14
	load OFF.				hex		
Ch1 User-specified	Set the value to output	0	-32768 to			02 hex	
Value Setting	when the Load OFF Out-		32767				
	put Setting is set to output						
	the user specified value.				-		
Ch2 Hold Value Setting	Set the value to output at	4	0 to 4 *2			03 hex	
	load OFF.						
Ch2 User-specified	Set the value to output	0	-32768 to			04 hex	
Value Setting	when the Load OFF Out-		32767				
	put Setting is set to output						
	the user specified value.						

*1. The default value and setting range of Ch□ Range Setting depend on the model. The default value and setting range for each NX Unit are as follows.

NX Units	Default value	Setting range
NX-DA2203/DA2205	0	0
NX-DA2603/DA2605	2	2

*2. The descriptions of Ch \square Hold Value Setting are as follows.

Set value	Setting description
0	Hold Last State
1	Low Limit
2	High Limit
3	User Count
4	Zero Count

• Four-point Output Units

Setting name	Description	Default value	Setting range	Unit	Index	Subin- dex	Refer- ence
Ch1 Enable/Disable	Set to enable or disable	TRUE	TRUE or		5010	01 hex	P. 7-10
	the channel.	INCL	FALSE		hex	OTTICX	1.7 10
Ch2 Enable/Disable	FALSE: Disable	TRUE	TRUE or			02 hex	
	TRUE: Enable		FALSE				
Ch3 Enable/Disable		TRUE	TRUE or			03 hex	
			FALSE				
Ch4 Enable/Disable		TRUE	TRUE or			04 hex	
			FALSE				
Ch1 Range Setting	Set the range.	*1	*1		5011	01 hex	P. 7-3
Ch2 Range Setting	0: 4 to 20 mA	*1	*1		hex	02 hex	
Ch3 Range Setting	1: 0 to 10 V	*1	*1			03 hex	
Ch4 Range Setting	2: -10 to +10 V	*1	*1			04 hex	
	3: 0 to 5 V						
	4: 1 to 5 V						
	5: 0 to 20 mA		*0		5040	04 h ave	D 7 4 4
Ch1 Hold Value Setting	Set the value to output at load OFF.	4	0 to 4 ^{*2}		5012	01 hex	P. 7-14
Ch1 User-specified	Set the value to output	0	-32768 to		hex	02 hex	
Value Setting	when the Load OFF Out-	0	32767			02 Hex	
value ootting	put Setting is set to output		02101				
	the user specified value.						
Ch2 Hold Value Setting	Set the value to output at	4	0 to 4 *2			03 hex	
· ·	load OFF.		0.01				
Ch2 User-specified	Set the value to output	0	-32768 to			04 hex	
Value Setting	when the Load OFF Out-		32767				
	put Setting is set to output						
	the user specified value.						
Ch3 Hold Value Setting	Set the value to output at	4	0 to 4 *2		5012	05 hex	P. 7-14
	load OFF.	0	00700.4-		hex	00 h	
Ch3 User-specified	Set the value to output when the Load OFF Out-	0	-32768 to 32767			06 hex	
Value Setting	put Setting is set to output		32/0/				
	the user specified value.						
Ch4 Hold Value Setting	Set the value to output at	4	0 to 4 ^{*2}		1	07 hex	1
	load OFF.		0104				
Ch4 User-specified	Set the value to output	0	-32768 to		1	08 hex	1
Value Setting	when the Load OFF Out-		32767				
	put Setting is set to output						
	the user specified value.						

*1. The default value and setting range of Ch□ Range Setting depend on the model. The default value and setting range for each NX Unit are as follows.

NX Units	Default value	Setting range
NX-DA3203/DA3205	0	0
NX-DA3603/DA3605	2	2

*2. The descriptions of Ch \square Hold Value Setting are as follows.

Set value	Setting description
0	Hold Last State
1	Low Limit
2	High Limit
3	User Count
4	Zero Count

7-5 Functions

This section describes the Analog Output Unit functions.

Refer to the specifications of each model in A-1 Data Sheet on page A-2, for details on the functions.

7-5-1 List of Analog Output Unit Functions

Function name	Description	Reference
Free-Run Refreshing	With this I/O refreshing method, the refresh cycle of the NX bus and the I/O refresh cycles of the NX Units are asynchronous.	5-2-4 Free-Run Refreshing on page 5-8
Synchronous I/O Refresh- ing	With this I/O refreshing method, the timing to read inputs or to refresh outputs is synchronized on a fixed interval between more than one NX Unit connected to a CPU Unit. In addition, with this I/O refreshing method, the timing to read inputs or to refresh outputs is synchronized on a fixed interval between more than one NX Unit on more than one Slave Terminal.	5-2-6 Synchro- nous Output Refreshing on page 5-16
Selecting Channel To Use	This function omits the conversion processing for unused inputs. It is used to reduce the conversion cycle for its own Unit.	7-5-2 Selecting Channel To Use on page 7-10
Load Rejection Output Setting	A function that performs the preset output operation when the Analog Output Unit cannot receive output data due to an NX bus error or CPU Unit watchdog timer error, in the case of Units connected to a CPU Unit.	7-5-3 Load Rejec- tion Output Setting on page 7-14
	A function that performs the preset output operation when the Analog Output Unit cannot receive output data due to a host error on the Communications Coupler Unit or an error on the NX bus, in the case of Slave Terminals.	
Over Range/Under Range Detection	This function detects when the output set value exceeds the range for which conversion is possible.	7-5-4 Over Range/Under Range Detection on page 7-19
User Calibration	This function corrects offsets in the converted values that occur due to the deterioration of the NX Units and calibrate the Units.	7-5-5 User Calibra- tion on page 7-20

7-5-2 Selecting Channel To Use

Purpose

This function skips the conversion processing and error detection processing for unused outputs, and shortens the conversion time.

Details on the Function

Normally in this Unit, the output set values for the number of input points mounted are converted in sequence. The setting can be changed so that unused outputs are not converted.

By reducing the number of conversion points, the conversion time is shortened.

Whether the channel is enabled or disabled is settable for each output.

However, set the Ch Enable/Disable parameter to *Enable* for at least one channel for a Unit.

If you disabled all channels for a Unit, an NX Unit Initialization Error event (event code: 84C10000 hex) occurs.

Refer to the user's manual for the Communications Coupler Unit for details on events.

• Two-point Output Units

Setting name	Description	Default value	Unit
Ch1 Enable/Disable	Set to enable or disable the channel.	TRUE	
Ch2 Enable/Disable	FALSE: Disable TRUE: Enable	TRUE	

• Four-point Output Units

Setting name	Description	Default value	Unit
Ch1 Enable/Disable	Set to enable or disable the channel.	TRUE	
Ch2 Enable/Disable	FALSE: Disable	TRUE	
Ch3 Enable/Disable	TRUE: Enable	TRUE	
Ch4 Enable/Disable		TRUE	

Target NX Units

All Analog Output Units

Setting Method

This section describes how to configure settings with the Sysmac Studio.

When you are using Support Software other than the Sysmac Studio, in the Edit Unit Operation Settings Tab Page, set the parameters described in the procedure and transfer the settings to the target NX Unit.

For details on how to display the Edit Unit Operation Settings Tab Page and to transfer settings to an NX Unit with Support Software other than the Sysmac Studio, refer to the operation manual for the Support Software that you are using.

1 Display the Edit Unit Operation Settings Tab Page.

For the display methods, refer to A-7 Displaying the Edit Unit Operation Settings Tab Page on page A-61.

2 Select *True* (Enable) or *False* (Disable) from the list of Output Enable/Disable Setting for which the channel you want to set.

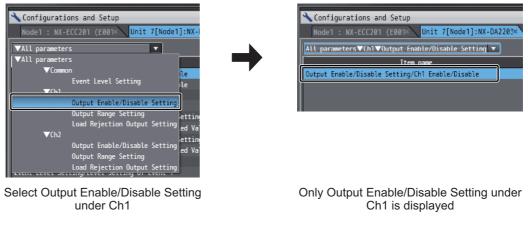
Configurations and Setup	<u> </u>	
Node1 : NX-ECC201 (E001× Unit 7[Node1]:NX-DA2203× +		
All parameters 🔻		
Item name	Value	
Output Enable/Disable Setting/Ch1 Enable/Disable	True 🔻	
Output Enable/Disable Setting/Ch1 Enable/Disable Output Enable/Disable Setting/Ch2 Enable/Disable Output Range Setting/Ch1 Range Setting Output Range Setting/Ch2 Range Setting Load Rejection Output Setting/Ch1 Hold Value Setting Load Rejection Output Setting/Ch1 User-specified Value Set… Load Rejection Output Setting/Ch2 Hold Value Setting	True	
Output Range Setting/Ch1 Range Setting	False	
Output Range Setting/Ch2 Range Setting	4 to 20 mA	
Load Rejection Output Setting/Ch1 Hold Value Setting	Zero Count 🔍	
Load Rejection Output Setting/Ch1 User-specified Value Set…	0	
Load Rejection Output Setting/Ch2 Hold Value Setting	Zero Count 🔍	
Load Rejection Output Setting/Ch2 User-specified Value Set	0	
Event Level Setting/Event 1	Unit Over Range 🔍 🔽	
Event Level Setting/Level Setting of Event 1	Observation 🔻	
Event Level Setting/Event 2	Unit Under Range 📃 🔽	
Event Level Setting/Level Setting of Event 2	Observation 🔻	



Additional Information

• Click a list button on the tab page to display the item in the Edit Unit Operation Settings Tab Page.

Example:



- If you set a value different from the default value, the Value on the Sysmac Studio is displayed in a different color.
- You can click the **Return to Default Value** Button to return all set values on the Sysmac Studio to the default values.
- Help for the settings is displayed at the bottom of the Edit Unit Operation Settings Tab Page.

3 Click the **Transfer to Unit** Button.

The settings are transferred from the Sysmac Studio to the NX Unit.



The settings are reflected after the Unit is restarted.



Precautions for Safe Use

The Unit is required to restart after the transfer of Unit operation settings on the Support Software is completed. Always sufficiently check the safety at the connected devices before you transfer the Unit operation settings.

Calculating Conversion Time

The conversion time per Unit according to the number of available conversion channels is as follows.

Number of available	Conversion time per unit (μs)		
conversion channels	Conversion time: 250 μs/point	Conversion time: 10 µs/point	
1 channel	250	10	
2 channels	500	20	
3 channels	750	30	
4 channels	1000	40	
5 channels	1250	50	
6 channels	1500	60	
7 channels	1750	70	
8 channels	2000	80	

7-5-3 Load Rejection Output Setting

Purpose

This function maintains a safe output status by performing the preset output operations when the Analog Output Unit connected to the CPU Unit cannot receive output data from the CPU Unit due to an NX bus error or CPU Unit watchdog timer error

In Slave Terminals, this function sets the value to be output when Analog Output Units cannot receive the output set value from the Communications Coupler Unit due to a host error on the Communications Coupler Unit or an error on the NX bus.

Details on the Function

	Set valu		value
Setting description	Meaning	Output range -10 to +10 V	Output range 4 to 20 mA
Hold Last State	Hold and output the value immediately before the error occurred.	Hold	Hold
Low Limit	Output the lower limit of each output range.	-11 V	3.2 mA
High Limit	Output the upper limit of each output range	11 V	20.8 mA
User Count	Output the user-specified value.	User specified value	User specified value
Zero Count	Output the analog value if the output set value of each output range is 0 (default).	0 V	4 mA

Set the output value from any of the following for each output when an error occurs.

• Two-point Output Units

Setting name	Description	Default value	Unit
Ch1 Hold Value Setting	Set the value to output at load OFF. *1	4	
Ch1 User-specified Value Setting	Set the value to output when the Load OFF Out- put Setting is set to output the user specified value.	0	
Ch2 Hold Value Setting	Set the value to output at load OFF. *1	4	
Ch2 User-specified Value Setting	Set the value to output when the Load OFF Out- put Setting is set to output the user specified value.	0	

*1. The descriptions of $Ch\Box$ Hold Value Setting are as follows.

Set value	Setting description
0	Hold Last State
1	Low Limit
2	High Limit
3	User Count
4	Zero Count

• Four-point Output Units

Setting name	Description	Default value	Unit
Ch1 Hold Value Setting	Set the value to output at load OFF. *1	4	
Ch1 User-specified Value Setting	Set the value to output when the Load OFF Out- put Setting is set to output the user specified value.	0	
Ch2 Hold Value Setting	Set the value to output at load OFF. *1	4	
Ch2 User-specified Value Setting	Set the value to output when the Load OFF Out- put Setting is set to output the user specified value.	0	
Ch3 Hold Value Setting	Set the value to output at load OFF. *1	4	
Ch3 User-specified Value Setting	Set the value to output when the Load OFF Out- put Setting is set to output the user specified value.	0	
Ch4 Hold Value Setting	Set the value to output at load OFF. *1	4	
Ch4 User-specified Value Setting	Set the value to output when the Load OFF Out- put Setting is set to output the user specified value.	0	

*1. The descriptions of Ch \square Hold Value Setting are as follows.

Set value	Setting description
0	Hold Last State
1	Low Limit
2	High Limit
3	User Count
4	Zero Count

Target NX Units

All Analog Output Units

Setting Method

This section describes how to configure settings with the Sysmac Studio.

When you are using Support Software other than the Sysmac Studio, in the Edit Unit Operation Settings Tab Page, set the parameters described in the procedure and transfer the settings to the target NX Unit.

For details on how to display the Edit Unit Operation Settings Tab Page and to transfer settings to an NX Unit with Support Software other than the Sysmac Studio, refer to the operation manual for the Support Software that you are using.

1 Display the Edit Unit Operation Settings Tab Page.

For the display methods, refer to A-7 Displaying the Edit Unit Operation Settings Tab Page on page A-61.

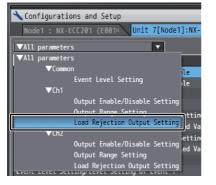
2 Select the output from the list of Load Rejection Output Setting for which the channel you want to set.

🔪 Configurations and Setup		
Node1 : NX-ECC201 (E001× Unit 7[Node1]:NX-DA2203×	+	
All parameters 🔹		
Item name	Value	
Output Enable/Disable Setting/Ch1 Enable/Disable	True 🔻	
Output Enable/Disable Setting/Ch2 Enable/Disable	True 🔻	
Output Range Setting/Ch1 Range Setting	4 to 20 mA 🔻	
Output Range Setting/Ch2 Range Setting	4 to 20 mA	
Load Rejection Output Setting/Ch1 Hold Value Setting	Zero Count 🔻	
Load Rejection Output Setting/Ch1 User-specified Value Set	Hold Last State	
Load Rejection Output Setting/Ch2 Hold Value Setting	Low Limit	
Load Rejection Output Setting/Ch2 User-specified Value Set	High Limit	
Event Level Setting/Event 1	User Count Zero Count	
Event Level Setting/Level Setting of Event 1		
Event Level Setting/Event 2	Unit Under Range 🔍 🔻	
Event Level Setting/Level Setting of Event 2	Observation 🔻	

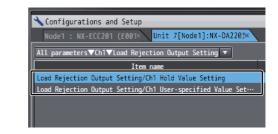
Additional Information

• Click a list button on the tab page to display the item in the Edit Unit Operation Settings Tab Page.

Example:



Select Load Rejection Output Setting under Ch1



Only Load Rejection Output Setting under Ch1 is displayed

- If you set a value different from the default value, the Value on the Sysmac Studio is displayed in a different color.
- You can click the Return to Default Value Button to return all set values on the Sysmac Studio to the default values.
- Help for the settings is displayed at the bottom of the Edit Unit Operation Settings Tab Page.

If you select *User Count*, enter an analog output value (-32768 to 32767) in the text box of $Ch\Box$ User-specified Value Setting.

🔧 Configurations and Setup 📃 🔍 🔍				
Node1 : NX-ECC201 (E001× Unit 7[Node1]:NX-DA2203×	+			
All parameters				
Item name	Value			
Output Enable/Disable Setting/Ch1 Enable/Disable	True 🔻			
Output Enable/Disable Setting/Ch2 Enable/Disable	True 🔻			
Output Range Setting/Ch1 Range Setting	4 to 20 mA 🔻			
Output Range Setting/Ch2 Range Setting	4 to 20 mA 🔻			
Load Rejection Output Setting/Ch1 Hold Value Setting	User Count 🔻			
Load Rejection Output Setting/Ch1 User-specified Value Set…	10000			
Load Rejection Output Setting/Ch2 Hold Value Setting	Zero Count 🔹			
Load Rejection Output Setting/Ch2 User-specified Value Set…	0			
Event Level Setting/Event 1 Unit Over Range				
Event Level Setting/Level Setting of Event 1 Observation				
Event Level Setting/Event 2	Unit Under Range 🔍 👻			
Event Level Setting/Level Setting of Event 2	Observation 🔻			

Additional Information

This set value is invalid except for User Count.

3 Click the **Transfer to Unit** Button.

The settings are transferred from the Sysmac Studio to the NX Unit.



The settings are reflected after the Unit is restarted.

<<> P

Precautions for Safe Use

The Unit is required to restart after the transfer of Unit operation settings on the Support Software is completed. Always sufficiently check the safety at the connected devices before you transfer the Unit operation settings.

7-5-4 Over Range/Under Range Detection

Purpose

This function detects when the output set value exceeds the range for which conversion is possible.

Details on the Function

- If the output set value exceeds the upper limit of the conversion range, the converted value is fixed at the upper limit. At this time, the Over Range Status turns ON and a Unit Over Range for Channel□ event (event code: 64F00000 to 64F70000 hex) occurs.
- If the output set value falls below the lower limit of the conversion range, the converted value is fixed at the lower limit. At this time, the Under Range Status turns ON and a Unit Under Range for Channel□ event (event code: 64F80000 to 64FF0000 hex) occurs.
- When the output set value returns to the conversion range, the fixing is cancelled and the value becomes the normal converted value. When the cause of the error is removed and the error is reset, the Over Range/Under Range Status turns OFF.
- Refer to A-3 List of NX Objects on page A-39 for details on status and 8-3-3 Event Codes and Corrections for Errors on page 8-7 for details on events.

Target NX Units

All Analog Output Units

Setting Method

No setting is required.

7-5-5 User Calibration

Purpose

This function corrects offsets in the output voltages and output currents that occur due to the deterioration of the NX Units and calibrate the Units again.

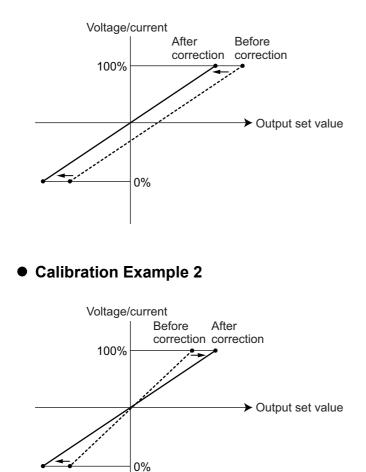
You can use this function to calibrate the equipment that requires the periodic calibration.

Details on the Function

This function corrects the converted values of output voltages and output currents at 2 points, 0% and 100%, as shown in the figure below.

The calibration result is saved in the NX Unit.

• Calibration Example 1



• Correctable Range

The correctable range is -5 to +5% of the output full scale. The correctable range for each output range is as follows.

Output range	Correctable range	
Output range	0%	100%
-10 to +10 V	-11 to -9.0 V	9.0 to 11 V
4 to 20 mA	3.2 to 4.8 mA	19.2 to 20.8 mA

Target NX Units

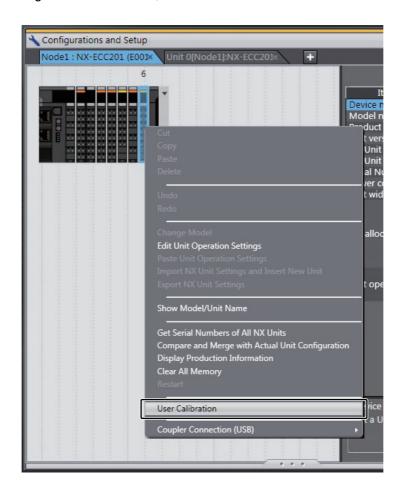
All Analog Output Units

Setting Method

This section describes how to configure settings with the Sysmac Studio.

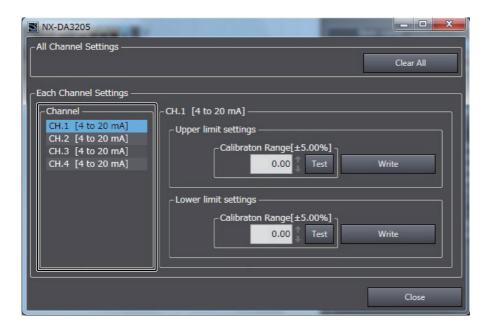
You can perform the user calibration even if you are using Support Software other than the Sysmac Studio.

For details on how to configure the user calibration settings with Support Software other than Sysmac Studio, refer to the operation manual for the Support Software that you are using.



1 Right-click the NX Unit, then select **User Calibration** from the menu.

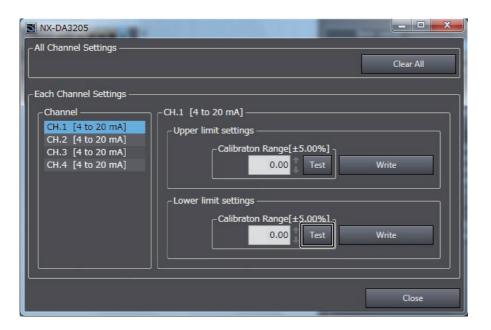
2 Select the channel you want to calibrate from Channel.



- **3** Set the minimum value (0%) of Output Unit as the output set value for the channel you want to calibrate.
- 4 Change the value of **Calibration Range** under **Lower limit settings** to calibrate the value of an analog signal that is output from the terminal.

NX-DA3205	
- All Channel Settings	Clear All
- Each Channel Settings	
Channel CH.1 [4 to 20 mA] CH.2 [4 to 20 mA] CH.3 [4 to 20 mA] CH.4	Write
	Close

5 Click the **Test** Button to output the value of an analog signal that was calibrated in Procedure 4.



Make the calibration to correctly output the value of 0% analog signal from the terminal.

6 After you complete the calibration, click the **Write** Button under **Lower limit settings**.

All Channel Settings	Clear All
Channel Ch.1 [4 to 20 mA] CH.2 [4 to 20 mA] CH.3 [4 to 20 mA] CH.4 [4 to 20 mA]	CH.1 [4 to 20 mA] Upper limit settings Calibraton Range[±5.00%] Lower limit settings Calibraton Range[±5.00%] 0.00 Test Write
	Close

7 Click the **Yes** Button on the confirmation message.



When the writing is completed successfully, the following message is displayed. Click the $\ensuremath{\text{OK}}$ Button.

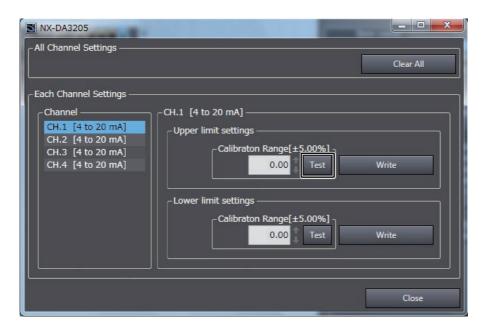
Sysmac Studio
Successed to write calibration value.
ОК

8 Set the maximum value (100%) of Output Unit as the output set value for the channel you want to calibrate.

9 Change the value of **Calibration Range** under **Upper limit settings** to calibrate the value of an analog signal that is output from the terminal.

All Channel Settings		Clear All
Channel Settings Channel CH.1 [4 to 20 mA] CH.2 [4 to 20 mA] CH.3 [4 to 20 mA] CH.4 [4 to 20 mA]	- CH.1 [4 to 20 mA]	Write
	Lower limit settings Calibraton Range[±5.00%] 0.00 Test	Write
		Close

10 Click the **Test** Button to output the value of an analog signal that was calibrated in Procedure 9.

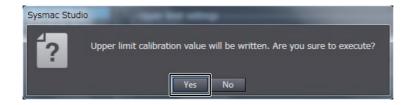


Make the calibration to correctly output the value of 100% analog signal from the terminal.

11 After you complete the calibration, click the **Write** Button under **Upper limit settings**.

MX-DA3205	
All Channel Settings Channel Channel Channel Ch.1 [4 to 20 mA] CH.2 [4 to 20 mA] CH.3 [4 to 20 mA] CH.4 [4 to 20 mA] CH.4 [4 to 20 mA] Lower limit settings Calibraton Range 0.00 Calibraton Range Calibraton Range 0.00 Calibraton Range Calibrat	Test Write
	Close

 $12 \ {\rm Click \ the \ Yes \ Button \ on \ the \ confirmation \ message}.$



When the writing is completed successfully, the following message is displayed. Click the $\ensuremath{\text{OK}}$ Button.

Sysmac Studio
Successed to write calibration value.
ОК

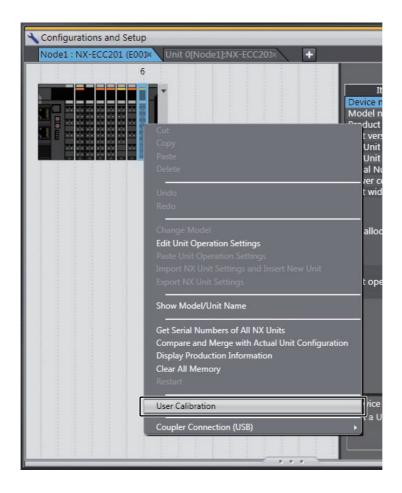
Additional Information

For the upper limit calibration value and lower limit calibration value, you cannot write the calibration value on the Unit if only click the **Test** Button. To write the calibration value, click the **Write** Button.

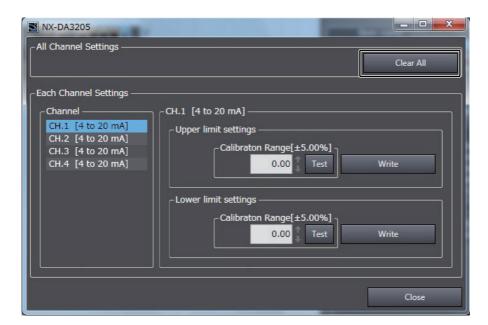
• Reset the Calibration Value to the Default

You can reset the calibration value to the default.

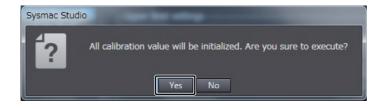
1 Right-click the NX Unit, then select **User Calibration** from the menu.



2 Click the Clear All Button under All Channel Settings.



3 Click the **Yes** Button on the confirmation message.



When the writing is completed successfully, the following message is displayed. Click the $\ensuremath{\text{OK}}$ Button.



8

Troubleshooting

This section provides error information and corrections for errors that can occur when the Analog Input Units and Analog Output Units are used.

8-1	How to Check for Errors 8-2				
8-2	Checking for Errors with the Indicators				
8-3	Check 8-3-1 8-3-2 8-3-3 8-3-4	king for Errors and Troubleshooting on the Support Software 8-5 Checking for Errors from the Sysmac Studio 8-5 Checking for Errors from Support Software Other Than the Sysmac Studio 8-6 Event Codes and Corrections for Errors 8-7 Meaning of Error 8-13			
8-4	Resetting Errors				
8-5	Troub 8-5-1 8-5-2 8-5-3	Ies Specific to Each Type of NX Units 8-36 Troubles Common to All Analog Input Units and Analog Output Units 8-36 Analog Input Units 8-36 Analog Output Units 8-36 Analog Output Units 8-37			
8-6	Troubleshooting Flowchart 8-38				

8-1 How to Check for Errors

Use one of the following error checking methods.

- · Checking the indicators
- · Troubleshooting with the Support Software

Refer to the user's manual for the CPU Unit or Communications Coupler Unit that the NX Units are connected to for information on checking errors with the troubleshooting functions of the Support Software.

8-2 Checking for Errors with the Indicators

You can use the TS indicators on the NX Units to check the NX Unit status and level of errors.

This section describes the meanings of errors that the TS indicator shows and the troubleshooting procedures for them.

In this section, the status of the indicator is indicated with the following abbreviations.

Abbreviation	Indicator status		
Lit	Lit		
Not Lit	Not lit		
FS()	Flashing. The numeric value in parentheses is the flashing interval.		
	Undefined		

Main Errors and Corrections

The main errors and corrections for the Analog Input Units and Analog Output Units are given in the following table.

TS indicator				
Green	Red	Cause	Correction	
Lit	Not Lit		(This is the normal status.)	
FS (2 s)	Not Lit	Initializing	(Normal. Wait until the processing is com-	
		Downloading	pleted.)	
Lit	Lit	This status is not present.		
Not Lit	Not Lit	The Unit power supply is not supplied.	Check the following items and supply the Unit power supply correctly.	
			[Check items for power supply]	
			 Make sure that the power supply cable is wired correctly. 	
			 Make sure that the power supply cable is not disconnected. 	
			 Make sure that power supply voltage is within the specified range. 	
			 Make sure that the power supply has enough capacity. 	
			Make sure that power supply has not failed.	
		Waiting for initialization to start	(Normal. Wait until the processing is com-	
		Restarting	pleted.)	
		If you cannot resolve the problem	after you check the above items and cycle the	
		Slave Terminal power supply, the Unit may have a hardware failure. If this ha		
		replace the Unit.		
Not Lit	Lit	Hardware failure	If this error occurs after you cycle the Unit power	
			supply, replace the Unit.	
Not Lit	Lit	Non-volatile Memory Hardware	Refer to Event Non-volatile Memory Hardware	
		Error	Error on page 8-14.	
Not Lit	Lit	Analog Unit Calibration Parame-	Refer to Event Analog Unit Calibration Parame-	
		ter Error	ter Error on page 8-15.	

TS indicator		Cause	Correction	
Green	Red	Cause	Correction	
Not Lit	Lit	Control Parameter Error in Mas-	Refer to Event Control Parameter Error in Mas-	
		ter	<i>ter</i> on page 8-16.	
Not Lit	Lit	Unit Calibration Value Parity Error	Refer to Event Unit Calibration Value Parity	
			Error on page 8-17.	
Not Lit	Lit	NX Unit Clock Not Synchronized	Refer to Event NX Unit Clock Not Synchronized	
		Error	Error on page 8-25.	
Not Lit	FS (1 s)	NX Unit I/O Communications	Refer to Event NX Unit I/O Communications	
		Error	Error on page 8-22.	
Not Lit	FS (1 s)	NX Unit Output Synchronization	Refer to Event NX Unit Output Synchronization	
		Error	Error on page 8-24.	
The indicator	r status is	Unit I/O Disconnection Detected	Refer to Event Unit I/O Disconnection Detected	
held immediately before		for Channel 🗌	for Channel 1 on page 8-17.	
the event occurred.		Unit Over Range for Channel	Refer to Event Unit Over Range for Channel 1	
			on page 8-26.	
		Unit Under Range for Channel 🗌	Refer to Event Unit Under Range for Channel 1	
			on page 8-30.	

8-3 Checking for Errors and Troubleshooting on the Support Software

Error management on the NX Series is based on the methods used for the NJ/NX/NY-series Controllers.

This allows you to use the Support Software to check the meanings of errors and troubleshooting procedures. The confirmation method depends on the Support Software that is used.

8-3-1 Checking for Errors from the Sysmac Studio

When an error occurs, you can place the Sysmac Studio online to the Controller or the Communications Coupler Unit to check current Controller errors and the log of past Controller errors.

Refer to the user's manual for the connected CPU Unit or Communications Coupler Unit for details on how to check errors.

Current Errors

Open the Sysmac Studio's Controller Error Tab Page to check the current error's level, source, source details, event name, event codes, details, attached information 1 to 4, and correction. Errors in the observation level are not displayed.

Additional Information

Number of Current Errors

The following table gives the number of errors that are reported simultaneously as current errors in each Unit.

Unit	Number of simultaneous error notifications
Analog Input Units Analog Output Units	When these Units are connected to the CPU Unit, since current errors are managed in the CPU Unit, the number of current errors is limited by the number of errors for the CPU Units.
	For Slave Terminals, since current errors are managed in the Communications Coupler Unit, the number of current errors is lim- ited by the number of errors for the Communications Coupler Unit.

If the number of errors exceeds the maximum number of reportable current errors, errors are reported with a priority given to the oldest and highest-level errors. Errors that exceed the limit on simultaneous error notifications are not reported.

Errors that are not reported are still reflected in the error status.

8-3-1 Checking for Errors from the Sysmac Studic

Log of Past Errors

Open the Sysmac Studio's Controller Event Log Tab Page to check the times, levels, sources, source details, event names, event codes, details, attached information 1 to 4, and corrections for previous errors.

Additional Information

Number of Logs of Past Errors

Event logs in the Analog I/O Units are stored in the CPU Unit or Communications Coupler Unit to which they are connected.

Refer to the user's manual for the connected CPU Unit or Communications Coupler Unit for details on the amount of event logs that are stored in the Unit.

Refer to the troubleshooting manual for the connected CPU Unit or Industrial PC and the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504) for the items that you can check and the procedures to check for errors.

Refer to 8-3-3 Event Codes and Corrections for Errors on page 8-7 for details on event codes.

8-3-2 Checking for Errors from Support Software Other Than the Sysmac Studio

You can check the error descriptions and logs with Support Software other than the Sysmac Studio. For the error checking methods, refer to the user's manual for the connected Communications Coupler Unit and the operation manual for the Support Software.

Refer to 8-3-3 Event Codes and Corrections for Errors on page 8-7 for details on event codes.

The number of current errors and the number of error log errors that occurred in the past in the Analog Input Units or Analog Output Units are the same as for the Sysmac Studio.

8-3-3 Event Codes and Corrections for Errors

The errors (i.e., events) that occur in the Analog Input Units and Analog Output Units are given below.

The following abbreviations are used in the event level column.

Abbreviation	Name					
Мај	Major fault level					
Prt	Partial fault level					
Min	Minor fault level					
Obs	Observation					
Info	Information					

Symbol	Meaning
S	Event levels that are defined by the system.
U	Event levels that can be changed by the user. *1

*1. This symbol appears only for events for which the user can change the event level.

Refer to the troubleshooting manual for the connected CPU Unit or Industrial PC for information on NJ/NX/NY-series event codes.

Event eede	Event name		Assumed cause			Deference			
Event code	Event code Event hame		Meaning Assumed cause		Prt	Min	Obs	Info	Reference
00200000 hex	Non-volatile Memory Hardware Error	An error occurred in non-volatile mem- ory.	Non-volatile memory failure			S			P. 8-14
1040 0000 hex	Analog Unit Calibration Parameter Error	An error occurred for the calibration data in the Analog Unit.	• The power supply to the Analog Unit was turned OFF or Support Software communications were disconnected while writing the calibration values to the Ana- log Unit.			S			P. 8-15
10410000 hex	Control Parameter Error in Mas- ter	An error occurred in the control parame- ters that are saved in the master.	 For the NX bus of CPU Units The power supply to the CPU Unit was turned OFF while writ- ing the Unit operation settings was in progress. Or there is an error in the area of the non-vol- atile memory in the CPU Unit in which the Unit operation set- tings for the relevant NX Unit are saved. For Communications Coupler Units The power supply to the Com- munications Coupler Unit was turned OFF while writing the Unit operation settings was in progress. Or there is an error in the area of the non-volatile memory in the Communications Coupler Unit in which the Unit operation settings for the rele- vant NX Unit are saved. 			S			P. 8-16

Event ende	Event neme	Maaning	A			Leve	I		Deference
Event code	Event name	Meaning	Assumed cause	Maj	Prt	Min	Obs	Info	Reference
14C00000 hex	Unit Calibra- tion Value Parity Error	An error occurred in the user calibration data in the NX Unit.	 An error was detected in the calibration data. 			S			P. 8-17
65030000 hex	Unit I/O Dis- connection Detected for Channel 1	A disconnected input was detected for channel 1.	Input wiring is broken.Input wiring is disconnected.			S	U		P. 8-17
65040000 hex	Unit I/O Dis- connection Detected for Channel 2	A disconnected input was detected for channel 2.	Input wiring is broken.Input wiring is disconnected.			S	U		P. 8-18
65050000 hex	Unit I/O Dis- connection Detected for Channel 3	A disconnected input was detected for channel 3.	Input wiring is broken.Input wiring is disconnected.			S	U		P. 8-18
65060000 hex	Unit I/O Dis- connection Detected for Channel 4	A disconnected input was detected for channel 4.	Input wiring is broken.Input wiring is disconnected.			S	U		P. 8-19
65070000 hex	Unit I/O Dis- connection Detected for Channel 5	A disconnected input was detected for channel 5.	Input wiring is broken.Input wiring is disconnected.			S	U		P. 8-19
65080000 hex	Unit I/O Dis- connection Detected for Channel 6	A disconnected input was detected for channel 6.	Input wiring is broken.Input wiring is disconnected.			S	U		P. 8-20
65090000 hex	Unit I/O Dis- connection Detected for Channel 7	A disconnected input was detected for channel 7.	Input wiring is broken.Input wiring is disconnected.			S	U		P. 8-20
650A0000 hex	Unit I/O Dis- connection Detected for Channel 8	A disconnected input was detected for channel 8.	Input wiring is broken.Input wiring is disconnected.			S	U		P. 8-21

Eventeede	Event	Mooning	Accument			Leve	I		Deference
Event code	Event name	Meaning	Assumed cause	Мај	Prt	Min	Obs	Info	Reference
80200000 hex	NX Unit I/O Communica- tions Error	An I/O communica- tions error occurred in an NX Unit.	 For the NX bus of CPU Units An error that prevents normal NX bus communications occurred in a CPU Unit. 			S			P. 8-22
			 An NX Unit is not mounted properly. 						
			 The power cable for the Unit power supply is disconnected, or the wiring from the Unit power supply to the NX Units is incorrect. 						
			 The power cable for the Unit power supply is broken. 						
			• The voltage of the Unit power supply is outside the specified range, or the capacity of the Unit power supply is insuffi- cient.						
			 There is a hardware error in an NX Unit. 						
			For Communications Coupler Units						
			 An error that prevents normal NX bus communications occurred in a Communications Coupler Unit. The NX Unit is not mounted property. 						
			 properly. The power cable for the Unit power supply is disconnected. Or, the wiring from the Unit power supply to the NX Units is incorrect. 						
			 The power cable for the Unit power supply is broken. 						
			• The voltage of the Unit power supply is outside the specified range. Or, the capacity of the Unit power supply is insuffi- cient.						
			There is a hardware error in the NX Unit.						
80210000 hex	NX Unit Out- put Synchro- nization Error	An output synchro- nization error occurred in the NX Unit.	 For the NX bus of CPU Units I/O refreshing on the NX bus is not performed normally due to an error in the CPU Unit. 			S			P. 8-24
			For Communications Coupler Units						
			 The communications cable con- nected to the Communications Coupler Unit is broken or the connection is faulty. 						
			The communications cable is affected by noise.						

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	-					Leve	I		Poforonco
Event code	Event name	Meaning	Assumed cause	Мај	Prt	Min	Obs	Info	Reference
80240000 hex	NX Unit Clock Not Synchro- nized Error	A time information error occurred in an NX Unit.	 For the NX bus of CPU Units There is a hardware error in an NX Unit. There is a hardware error in a CPU Unit. For Communications Coupler Units There is a hardware error in an NX Unit. There is a hardware error in an EtherCAT Coupler Unit. 			S			P. 8-25
64F00000 hex	Unit Over Range for Channel 1	The analog input data for input chan- nel 1 exceeded the upper limit of the input range. Or, the analog output data for output channel 1 exceeded the upper limit of the output range.	• The analog input data exceeded the upper limit of the input range. Or, the analog out- put data exceeded the upper limit of the output range.			U	S		P. 8-26
64F10000 hex	Unit Over Range for Channel 2	The analog input data for input chan- nel 2 exceeded the upper limit of the input range. Or, the analog output data for output channel 2 exceeded the upper limit of the output range.	The analog input data exceeded the upper limit of the input range. Or, the analog out- put data exceeded the upper limit of the output range.			U	S		P. 8-26
64F20000 hex	Unit Over Range for Channel 3	The analog input data for input chan- nel 3 exceeded the upper limit of the input range. Or, the analog output data for output channel 3 exceeded the upper limit of the output range.	The analog input data exceeded the upper limit of the input range. Or, the analog out- put data exceeded the upper limit of the output range.			U	S		P. 8-27
64F30000 hex	Unit Over Range for Channel 4	The analog input data for input chan- nel 4 exceeded the upper limit of the input range. Or, the analog output data for output channel 4 exceeded the upper limit of the output range.	The analog input data exceeded the upper limit of the input range. Or, the analog out- put data exceeded the upper limit of the output range.			U	S		P. 8-27
64F40000 hex	Unit Over Range for Channel 5	The analog input data for input chan- nel 5 exceeded the upper limit of the input range. Or, the analog output data for output channel 5 exceeded the upper limit of the output range.	• The analog input data exceeded the upper limit of the input range. Or, the analog out- put data exceeded the upper limit of the output range.			U	S		P. 8-28

Event code	Event name	Meaning	Assumed cause			Leve			Reference
Event code	Event name	Meaning	Assumed cause	Мај	Prt	Min	Obs	Info	Reference
64F50000 hex	Unit Over Range for Channel 6	The analog input data for input chan- nel 6 exceeded the upper limit of the input range. Or, the analog output data for output channel 6 exceeded the upper limit of the output range.	The analog input data exceeded the upper limit of the input range. Or, the analog out- put data exceeded the upper limit of the output range.			U	S		P. 8-28
64F60000 hex	Unit Over Range for Channel 7	The analog input data for input chan- nel 7 exceeded the upper limit of the input range. Or, the analog output data for output channel 7 exceeded the upper limit of the output range.	• The analog input data exceeded the upper limit of the input range. Or, the analog out- put data exceeded the upper limit of the output range.			U	S		P. 8-29
64F70000 hex	Unit Over Range for Channel 8	The analog input data for input chan- nel 8 exceeded the upper limit of the input range. Or, the analog output data for output channel 8 exceeded the upper limit of the output range.	The analog input data exceeded the upper limit of the input range. Or, the analog out- put data exceeded the upper limit of the output range.			U	S		P. 8-29
64F80000 hex	Unit Under Range for Channel 1	The analog input data for input chan- nel 1 went below the lower limit of the input range. Or, the analog output data for output channel 1 went below the lower limit of the output range.	The analog input data went below the lower limit of the input range. Or, the analog out- put data went below the lower limit of the output range.			U	S		P. 8-30
64F90000 hex	Unit Under Range for Channel 2	The analog input data for input chan- nel 2 went below the lower limit of the input range. Or, the analog output data for output channel 2 went below the lower limit of the output range.	The analog input data went below the lower limit of the input range. Or, the analog out- put data went below the lower limit of the output range.			U	S		P. 8-30
64FA0000 hex	Unit Under Range for Channel 3	The analog input data for input chan- nel 3 went below the lower limit of the input range. Or, the analog output data for output channel 3 went below the lower limit of the output range.	The analog input data went below the lower limit of the input range. Or, the analog out- put data went below the lower limit of the output range.			U	S		P. 8-31

Eventeede	Eventneme	Mooning	Accument		_		Poforonco		
Event code	Event name	Meaning	Assumed cause	Мај	Prt	Min	Obs	Info	Reference
64FB 0000 hex	Unit Under Range for Channel 4	The analog input data for input chan- nel 4 went below the lower limit of the input range. Or, the analog output data for output channel 4 went below the lower limit of the output range.	• The analog input data went below the lower limit of the input range. Or, the analog out- put data went below the lower limit of the output range.			U	S		P. 8-31
64FC0000 hex	Unit Under Range for Channel 5	The analog input data for input chan- nel 5 went below the lower limit of the input range. Or, the analog output data for output channel 5 went below the lower limit of the output range.	• The analog input data went below the lower limit of the input range. Or, the analog out- put data went below the lower limit of the output range.			U	S		P. 8-32
64FD 0000 hex	Unit Under Range for Channel 6	The analog input data for input chan- nel 6 went below the lower limit of the input range. Or, the analog output data for output channel 6 went below the lower limit of the output range.	• The analog input data went below the lower limit of the input range. Or, the analog out- put data went below the lower limit of the output range.			U	S		P. 8-32
64FE0000 hex	Unit Under Range for Channel 7	The analog input data for input chan- nel 7 went below the lower limit of the input range. Or, the analog output data for output channel 7 went below the lower limit of the output range.	• The analog input data went below the lower limit of the input range. Or, the analog out- put data went below the lower limit of the output range.			U	S		P. 8-33
64FF 0000 hex	Unit Under Range for Channel 8	The analog input data for input chan- nel 8 went below the lower limit of the input range. Or, the analog output data for output channel 8 went below the lower limit of the output range.	• The analog input data went below the lower limit of the input range. Or, the analog out- put data went below the lower limit of the output range.			U	S		P. 8-33
90400000 hex	Event Log Cleared	The event log was cleared.	The event log was cleared by the user.					S	P. 8-34

8-3-4 Meaning of Error

This section describes the information that is given for individual errors.

How to Read Error Descriptions

The items that are used to describe individual errors (events) are described in the following copy of an error table.

Event name	Gives the nam	e of the error.		Event code	Gives the code	of the error.				
Meaning	Gives a short of	description of the error.			•					
Source	Gives the sour	ce of the error.	Source details	Gives details on the source of the error.	Detection timing	Tells when the error is detected.				
Error attributes	Level	Tells the level of influe trol. ^{*1}	ence on con-	Log category	Tells which log the error is saved in. ^{*2}					
	Recovery	Gives the recovery me	y method. ^{*3}							
Effects	User program	Tells what will hap- pen to execution of the user program.*4	Operation	Provides special results from the e	al information on the operation that e error.					
Indicators		Gives the status of the built-in EtherNet/IP port and built-in EtherCAT port indicators. Indicator status is given only for errors in the EtherCAT Master Function Module and the EtherNet/IP Function Module.								
System-defined	Variable		Data type		Name					
variables	Lists the variable names, data types, and meanings for system-defined variables that provide direct error notification, that are directly affected by the error, or that contain settings that cause the error.									
Cause and	Assumed cau	ISE	Correction		Prevention					
correction	Lists the possi	ble causes, corrections	, and preventi	ve measures for th	ne error.					
Attached information	This is the atta	ched information that is	s displayed by	the Support Softw	/are or an HMI. ^{*5}	5,*6				
Precautions/ Remarks	event levels th	Provides precautions, restrictions, and supplemental information. If the user can set the event level, the event levels that can be set, the recovery method, operational information, and other information are also provided.								

- One of the following: Major fault: Major fault level Partial fault: Partial fault level Minor fault: Minor fault level Observation Information
- *2. One of the following: System: System event log Access: Access event log
- *3. One of the following:

Automatic recovery: Normal status is restored automatically when the cause of the error is removed. Error reset: Normal status is restored when the error is reset after the cause of the error is removed. Cycle the power supply: Normal status is restored when the power supply to the Controller is turned OFF and then back ON after the cause of the error is removed. Controller reset: Normal status is restored when the Controller is reset after the cause of the error is removed. Depends on cause: The recovery method depends on the cause of the error.

*4. One of the following: Continues: Execution of the user program will continue. Stops: Execution of the user program stops. Starts: Execution of the user program starts.

*5. "System information" indicates internal system information that is used by OMRON.

*6. Refer to the appendices of the troubleshooting manual for the connected CPU Unit or Industrial PC for the applicable range of the HMI Troubleshooter.

Error Descriptions

This section describes the information that occurs on the Analog Input Units and Analog Output Units.

Event name	Non-volatile Mer	nory Hardware Err	or	Event code	00200000 hex				
Meaning	An error occurre	d in non-volatile m	emory.		•				
Source	Depends on whe Software is conn system configura	ected and the	Source details	NX Unit	Detection timing	When power is turned ON to the NX Unit			
Error	Level	Minor fault		Log category	System				
attributes	Recovery	For the NX bus of	of CPU Units						
		Cycle the power	supply to the Unit	or restart the NX b	ous.				
		For Communicat	ions Coupler Units						
		Cycle the power	supply to the Unit	or restart the Slav	e Terminal.				
		If the errors are o	detected in the Cor	ntroller, reset all of	the errors in the	Controller.			
Effects	User program	Continues.	Operation	I/O refreshing for	r the NX Unit sto	ps. Messages can-			
				not be sent to the					
Sys-	Variable		Data type		Name				
tem-defined variables	None								
Cause and	Assumed cause	9	Correction		Prevention				
correction	Non-volatile mer	nory failure.	For the NX bus o	of CPU Units	None				
			or restart the NX persists even after						
			For Communicat Units	ions Coupler					
				tion, replace the					
Attached information Precautions/	None None		•						
Remarks									

Event name	Analog Unit Calib	oration Parameter	Error	Event code	10400000 hex				
Meaning	An error occurred	for the calibration	data in the Analog	g Unit.	•				
Source	Depends on whe Software is conne system configura	ected and the	Source details	NX Unit	Detection When power is timing turned ON to the NX Unit the NX Unit				
Error	Level	Minor fault		Log category	System				
attributes	Recovery	For the NX bus o	f CPU Units						
			When Fail-soft O	peration Is Set to	Stop				
			Restart the NX Unit and then reset the error in the NX Bus Function Module.						
			When Fail-soft Operation Is Set to Fail-soft						
			Restart the NX Unit. cations Coupler Units When Fail-soft Operation Is Set to <i>Stop</i> Restart the NX Unit.						
		For Communicati							
			If the errors are d	letected in the Cor	ntroller, reset all of	the errors in the			
			When Fail-soft O	peration Is Set to	Fail-soft				
			Restart the NX U	-					
Effects	User program	Continues.	Operation	I/O refreshing for	the NX Unit stops	6.			
Sys-	Variable	1	Data type		Name				
tem-defined variables	None								
Cause and	Assumed cause	1	Correction		Prevention				
correction	The power supply Unit was turned (Software commu	OFF or Support nications were	Write the calibration values to the Do not turn OFF the power to the Analog Unit again. Analog Unit again. Support Software communic						
	disconnected whi ibration values to	ile writing the cal- the Analog Unit.	Ŭ						
Attached information	None								
Precautions/ Remarks	None								

Event name	Control Paramete	er Error in Master		Event code	10410000 hex		
Meaning			ameters that are s				
Source	Depends on whe Software is conne system configura	re the Support ected and the tion.	Source details	NX Unit	Detection timing	When power is turned ON to the NX Unit	
Error	Level	Minor fault		Log category	System		
attributes	Recovery	For the NX bus o					
			When Fail-soft O	peration Is Set to	Stop		
			Restart the NX U Module.	nit and then reset	the error in the N	X Bus Function	
			When Fail-soft O	peration Is Set to	Fail-soft		
			Restart the NX U	nit and then reset	the error in the N	X Unit.	
		For Communications Coupler Units When Fail-soft Operation Is Set to <i>Stop</i>					
				letected in the Cor rors in the Control		NX Unit and then	
				ot detected in the or in the Commur	•		
			When Fail-soft Operation Is Set to Fail-soft				
			When Fail-soft Operation Is Set to <i>Fail-soft</i> Restart the NX Unit and then reset the error in the Communications Coupler Unit.				
Effects	User program	Continues.	Operation	I/O refreshing for	r the NX Unit stop	S.	
Sys-	Variable		Data type		Name		
tem-defined variables	None						
Cause and	Assumed cause		Correction		Prevention		
correction	For the NX bus o		oonection		Trevention		
		while writing the ttings was in e is an error in on-volatile mem- nit in which the ttings for the rel- e saved. ons Coupler Units	the above correc CPU Unit.	nit again. If the en after you make tion, replace the	to the CPU Unit while transfer of the Unit operation settings for the		
	The power supply nications Coupler OFF while writing tion settings was there is an error i non-volatile mem munications Coup the Unit operation relevant NX Unit	Unit was turned the Unit opera- in progress. Or n the area of the ory in the Com- oler Unit in which n settings for the	s turned tings of the NX Unit ag opera- error occurs again eve make the above corre- a of the replace the Communic pler Unit.		to the Communi Unit while transport operation setting by the Support	gs for the NX Unit Software or save meters by a mes-	
Attached information	None		L		·		
Precautions/ Remarks	None						

Event name	Unit Calibration \	/alue Parity Error		Event code	14C00000 hex		
Meaning	An error occurred	d in the user calibrate	ation data in the N	X Unit.			
Source	Depends on whe Software is conne system configura	ected and the	Source details	NX Unit	Detection Continuous timing		
Error	Level	Minor fault		Log category	System		
attributes	Recovery	For the NX bus o	of CPU Units				
		Restart the NX b	us.				
		For Communicat	ions Coupler Units				
		Restart the Slave	e Terminal.				
Effects	User program	Continues.	Operation	The NX Unit will continue to operate. Input data: Updating input values stops. Output data: The output values depend on th Rejection Output Setting.		tops.	
Sys-	Variable		Data type Name		Name		
tem-defined variables	None						
Cause and	Assumed cause)	Correction		Prevention		
correction	An error was detected in the cali- bration data.		Cycle the power supply to the NX Unit. If this error occurs again even after you cycle the power supply, replace the NX Unit.		None		
Attached	None None						
information							

Event name	Unit I/O Disconne	ection Detected fo	or Channel 1	Event code	65030000 hex		
Meaning	A disconnected i	A disconnected input was detected for channel 1.					
Source	Depends on whe Software is conn system configura	ected and the	Source details NX Unit Detection timing		Detection timing	Continuously	
Error	Level Minor fault			Log category	System		
attributes	Recovery	Reset error in th	e NX Unit.				
Effects	User program	Continues.	Operation	The converted va	alue will be 32,767		
				Operation continues and the converted value to normal when the connection is restored.			
Sys-	Variable		Data type	Name			
tem-defined variables	None						
Cause and	Assumed cause	•	Correction		Prevention		
correction	Input wiring is broken.		Check the input of and replace the of found.	•		for broken wires.	
	Input wiring is disconnected.		Check the input wiring for bad connections and reconnect any bad connections that are found.		Make sure that the wiring is con- nected properly.		
Attached information	None	None					
Precautions/ Remarks	You can change	the event level to	the observation lev	rel.			

Event name	Unit I/O Disconne	ection Detected fo	r Channel 2	Event code	65040000 hex	
Meaning	A disconnected in	nput was detected	for channel 2.			
Source	Depends on whe Software is conne system configura	ected and the	Source details NX Unit		Detection timing	Continuously
Error	Level	vel Minor fault		Log category	System	
attributes	Recovery	Reset error in the	e NX Unit.			
Effects	User program	Continues.	Operation	The converted v	alue will be 32,76	7.
				Operation continues and the converted valu to normal when the connection is restored.		
Sys-	Variable		Data type		Name	
tem-defined variables	None					
Cause and	Assumed cause)	Correction	Prevention		
correction	Input wiring is broken.		Check the input of and replace the of found.	-	-	
	Input wiring is disconnected.		Check the input wiring for bad connections and reconnect any bad connections that are found.		Make sure that the wiring is con- nected properly.	
Attached information	None					
Precautions/ Remarks	You can change	the event level to	the observation lev	/el.		

Event name	Unit I/O Disconne	ection Detected for	r Channel 3	Event code	65050000 hex		
Meaning	A disconnected in	A disconnected input was detected for channel 3.					
Source	Depends on whe Software is conne system configura	ected and the			Detection timing	Continuously	
Error	Level	Minor fault	•	Log category	System		
attributes	Recovery	Reset error in the	e NX Unit.				
Effects	User program	Continues.	Operation	The converted va	alue will be 32,767		
			Operation continues and the converted va to normal when the connection is restored				
Sys-	Variable		Data type		Name		
tem-defined	None						
variables							
Cause and	Assumed cause		Correction	Prevention			
correction	Input wiring is bro	oken.	Check the input v and replace the of found.	-	Check the cable	for broken wires.	
	Input wiring is dis	connected.	Check the input wiring for bad connections and reconnect any bad connections that are found.		Make sure that the wiring is con- nected properly.		
Attached information	None	None					
Precautions/ Remarks	You can change	the event level to t	the observation lev	el.			

Event name	Unit I/O Disconne	ection Detected for	r Channel 4	Event code	65060000 hex	
Meaning	A disconnected in	nput was detected	for channel 4.			
Source	Depends on whe Software is conne system configura	ected and the	Source details NX Unit		Detection timing	Continuously
Error	Level	Minor fault		Log category	System	
attributes	Recovery	Reset error in the	e NX Unit.			
Effects	User program	Continues.	Operation	The converted va	alue will be 32,767	
			Operation continues and the co to normal when the connection			
Sys-	Variable		Data type	Name		
tem-defined variables	None					
Cause and	Assumed cause	1	Correction	Prevention		
correction	Input wiring is bro	oken.	Check the input v and replace the of found.	-	Check the cable for broken wires.	
connections		Check the input of connections and bad connections	reconnect any nected properly.		ne wiring is con-	
Attached information	None					
Precautions/ Remarks	You can change	the event level to t	the observation lev	vel.		

Event name	Unit I/O Disconne	ection Detected for	r Channel 5	Event code	65070000 hex	
Meaning	A disconnected in	nput was detected	for channel 5.		•	
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously
Error	Level	Minor fault		Log category	System	
attributes	Recovery	Reset error in the	e NX Unit.			
Effects	User program	Continues.	Operation	The converted va	alue will be 32,767	
				Operation continues and the converted va to normal when the connection is restored		
Sys-	Variable		Data type	Name		
tem-defined variables	None					
Cause and	Assumed cause		Correction	Prevention		
correction	Input wiring is bro	oken.	Check the input v and replace the of found.	-		for broken wires.
	Input wiring is disconnected. Check the input wiring for bad connections and reconnect any bad connections that are found.		reconnect any	Make sure that the wiring is con- nected properly.		
Attached information	None					
Precautions/ Remarks	You can change	the event level to t	he observation lev	el.		

8-3-4 Meaning of Error

Event name	Unit I/O Disconne	ection Detected fo	r Channel 6	Event code	65080000 hex		
Meaning	A disconnected in	nput was detected	for channel 6.				
Source	Depends on whe Software is conne system configura	ected and the	Source details NX Unit		Detection timing	Continuously	
Error	Level	Minor fault		Log category	System		
attributes	Recovery	Reset error in the	e NX Unit.				
Effects	User program	Continues.	Operation	The converted v	alue will be 32,76	7.	
				Operation continues and the converted valu to normal when the connection is restored.			
Sys-	Variable		Data type		Name		
tem-defined variables	None						
Cause and	Assumed cause	1	Correction	Prevention			
correction	Input wiring is broken.		Check the input v and replace the o found.	-	-		
	Input wiring is disconnected.		Check the input wiring for bad connections and reconnect any bad connections that are found.		Make sure that the wiring is con- nected properly.		
Attached information	None						
Precautions/ Remarks	You can change	the event level to t	the observation lev	/el.			

Event name	Unit I/O Disconne	ection Detected for	r Channel 7	Event code	65090000 hex		
Meaning	A disconnected in	nput was detected	for channel 7.		•		
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously	
Error	Level	Minor fault		Log category	System		
attributes	Recovery	Reset error in the	e NX Unit.				
Effects	User program	Continues.	Operation	The converted va	alue will be 32,767		
			Operation continues and the converted v to normal when the connection is restored				
Sys-	Variable		Data type		Name		
tem-defined	None						
variables							
Cause and	Assumed cause		Correction	Prevention			
correction	Input wiring is bro	oken.	Check the input v and replace the of found.	•	Check the cable	for broken wires.	
	Input wiring is disconnected. Check the input wiring for bad connections and reconnect any bad connections that are found.		Make sure that the wiring is con- nected properly.				
Attached information	None						
Precautions/ Remarks	You can change	the event level to t	he observation lev	vel.			

Event name	Unit I/O Disconne	ection Detected for	r Channel 8	Event code	650A0000 hex		
Meaning	A disconnected in	A disconnected input was detected for channel 8.					
Source	Depends on whe Software is conne system configura	ected and the			Detection timing	Continuously	
Error	Level	Minor fault		Log category	System		
attributes	Recovery	Reset error in the	e NX Unit.				
Effects	User program	Continues.	Operation	The converted va	alue will be 32,767		
			Operation continues and the conv to normal when the connection is				
Sys-	Variable		Data type	Name			
tem-defined variables	None						
Cause and	Assumed cause	1	Correction		Prevention		
correction	Input wiring is bro	oken.	Check the input v and replace the of found.	-			
Input wiring is disconnected. Check the input w connections and r bad connections t		reconnect any	Make sure that the wiring is con- nected properly.				
Attached information	None						
Precautions/ Remarks	You can change	the event level to t	the observation lev	vel.			

Event name	NX Unit I/O Com	munications Error		Event code	80200000 hex		
Meaning	An I/O communio	cations error occur	red in an NX Unit.				
Source	Depends on whe Software is conn system configura	ected and the	Source details	NX Unit	Detection timing	Continuously	
Error	Level	Minor fault		Log category	System		
attributes	Recovery	For the NX bus of	of CPU Units				
			When Fail-soft O	peration Is Set to	Stop		
			Reset the error in the NX Bus Function Module.				
			When Fail-soft O	peration Is Set to	Fail-soft		
			Reset the error ir	the NX Unit.			
		For Communications Coupler Units					
		When Fail-soft Operation Is Set to Stop					
			If the errors are detected in the Controller, reset all of the errors in the Controller.				
			If the errors are not detected in the Controller, reset errors in the Com- munications Coupler Unit and NX Unit.				
			When Fail-soft O	peration Is Set to	Fail-soft		
			Reset errors in th	e Communication	s Coupler Unit and	d NX Unit.	
Effects	User program	Continues.	Operation	The NX Unit will	continue to operat	e.	
				Input data: Upda	ting input values s	tops.	
				Output data: The Rejection Output	e output values der t Setting.	pend on the Load	
Sys-	Variable		Data type		Name		
tem-defined variables	None						

Cause and	Assumed cause	Correction	Prevention				
correction	For the NX bus of CPU Units						
	An error that prevents normal NX	Check the error that occurred in	Take preventive measures against				
	bus communications occurred in a	the CPU Unit and perform the	the error that occurred in the CPU				
	CPU Unit.	required corrections.	Unit.				
	An NX Unit is not mounted prop-	Mount the NX Units and End	Mount the NX Units and End				
	erly.	Cover securely and secure them	Cover securely and secure them				
		with End Plates.	with End Plates.				
	The power cable for the Unit	Wire the Unit power supply to the	Wire the Unit power supply to the				
	power supply is disconnected, or	NX Units securely.	NX Units securely.				
	the wiring from the Unit power						
	supply to the NX Units is incorrect.						
	The power cable for the Unit	If the power cable between the	None				
	power supply is broken.	Unit power supply and the NX					
		Units is broken, replace it.					
	The voltage of the Unit power sup-	Configure the power supply sys-	Configure the power supply sys-				
	ply is outside the specified range,	tem configuration correctly	tem configuration correctly				
	or the capacity of the Unit power	according to the power supply	according to the power supply				
	supply is insufficient.	design method.	design method.				
	There is a hardware error in an	If the error persists even after you	None				
	NX Unit.	make the above correction, replace the NX Unit.					
	For Communications Coupler Units	•					
	For Communications Coupler Units An error that prevents normal NX Check the error that occurred in Take preventive measures against						
	bus communications occurred in a		Take preventive measures against the error that occurred in the Com-				
	Communications Coupler Unit.	the Communications Coupler Unit and perform the required correc-	munications Coupler Unit.				
		tions.					
	The NX Unit is not mounted prop-	Mount the NX Units and End	Mount the NX Units and End				
	erly.	Cover securely and secure them	Cover securely and secure them				
		with End Plates.	with End Plates.				
	The power cable for the Unit	Correctly wire the Unit power sup-	Correctly wire the Unit power sup-				
	power supply is disconnected. Or,	ply to the NX Units.	ply to the NX Units.				
	the wiring from the Unit power						
	supply to the NX Units is incorrect.						
	The power cable for the Unit	If the power cable between the	None				
	power supply is broken.	Unit power supply and the NX					
		Units is broken, replace it.					
	The voltage of the Unit power sup-	Correctly configure the power sup-	Correctly configure the power sup-				
	ply is outside the specified range.	ply system according to the power	ply system according to the power				
	Or, the capacity of the Unit power	supply design methods.	supply design methods.				
	supply is insufficient.						
	There is a hardware error in the	If the error occurs again even after	None				
	NX Unit.	you make the above correction,					
		replace the NX Unit.					
Attached	None	•	·				
information							
Precautions/	None						
Remarks							

Event name	NX Unit Output S	Synchronization Er	ror	Event code	80210000 hex			
Meaning	An output synch	ronization error occ	curred in the NX U	nit.				
Source	Depends on whe Software is conr system configura	nected and the	Source details	NX Unit	Detection timing	Continuously		
Error	Level	Minor fault		Log category	System			
attributes	Recovery	For the NX bus of	of CPU Units					
		Reset the error ir	n the NX Bus Fund	tion Module.				
		For Communicat	For Communications Coupler Units					
		Reset all of the errors in the Controller.						
Effects	User program	Continues.	Operation	The NX Unit will	continue to opera	ate.		
				Input data: Upda	ting input values	stops.		
				Output data: The	output values de	epend on the Load		
				Rejection Output Setting.				
Sys-	Variable		Data type		Name			
tem-defined	None							
variables					D			
Cause and correction	Assumed cause For the NX bus of CPU Units		Correction		Prevention			
correction			Check the error t	hat accurred in	Taka provontiva	e measures agains		
	I/O refreshing on the NX bus is not performed normally due to an		the CPU Unit and			courred in the CPL		
	error in the CPU Unit.		required corrections.		Unit.			
	For Communica	tions Coupler Units						
	The communications cable con-		Replace the communications		Wire the communications cable			
	nected to the Communications		cable or wire the cable correctly.		correctly.			
	Coupler Unit is broken or the con-							
	nection is faulty. The communication		Set the Consecutive					
	affected by noise		Communications Error Detection		Implement noise countermeasures. Refer to the			
			Count parameter for the			als for the specific		
				Coupler Unit to a		countermeasures.		
			suitable value that					
			problems in oper	ation.				
			Implement noise					
			countermeasures if there is					
Attached	Nono		excessive noise.					
Attached information	None							
Precautions/	None							
Remarks								

Event name	NX Unit Clock No	ot Synchronized E	rror	Event code	80240000 hex			
Meaning	A time informatio	n error occurred ir	n an NX Unit.					
Source	Depends on whe Software is conn system configura	ected and the	Source details	NX Unit	Detection timing	Continuously		
Error	Level	Minor fault		Log category	System			
attributes	Recovery	For the NX bus of	of CPU Units	•				
		Cycle the power	supply to the Unit.					
		For Communicat	ions Coupler Units	i				
		Cycle the power	supply to the Unit	and then reset all	of the errors in the	Controller.		
Effects	User program	Continues.	Operation	The NX Unit will	continue to operat	e.		
				Input data: Upda	ting input values s	tops.		
				Output data: The output values depend on the Load Rejection Output Setting.				
Sys-	Variable		Data type	Name				
tem-defined variables	None							
Cause and	Assumed cause)	Correction		Prevention			
correction	For the NX bus of CPU Units							
	There is a hardware error in an NX Unit.		If the error occurs only in a spe- cific NX Unit, replace the relevant NX Unit.		None			
	There is a hardware error in a CPU Unit.		If the error occurs in all of the NX Units mounted on a CPU Unit, replace the CPU Unit.		None			
	For Communicat	For Communications Coupler Units						
	There is a hardware error in an NX Unit.		If the error occurs only in a spe- cific NX Unit, replace the relevant NX Unit.		None			
	There is a hardware error in an EtherCAT Coupler Unit.		If the error occurs in all of the NX Units mounted on a Communica- tions Coupler Unit, replace the Communications Coupler Unit.		None			
Attached information	None							
Precautions/ Remarks	None							

Event name	Unit Over Range	for Channel 1		Event code	64F00000 hex			
Meaning		-	nnel 1 exceeded th the upper limit of		e input range. Or,	the analog output		
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously		
Error	Level Observation			Log category	System			
attributes	Recovery	Recovery Reset error in the NX Unit.						
Effects	User program	Continues.	Operation	will be the upper	limit of the input rand	is exceeded, the converted value limit of the input range. If the output d, the analog output will be the output range.		
Sys-	Variable		Data type		Name			
tem-defined variables	None							
Cause and	Assumed cause	•	Correction	Correction		Prevention		
correction	The analog input data exceeded the upper limit of the input range. Or, the analog output data exceeded the upper limit of the output range.		Find the reason for exceeding the upper limit of the input or output range and make suitable correc- tions.		Find the reasons for exceeding the upper limit of the input or out- put range and take suitable pre- ventive measures.			
Attached information	None		1		1			
Precautions/ Remarks	You can change the event level to the minor fault level. If you change the level to the minor fault le Recovery column above will be changed to "Reset error in the NX Unit."					or fault level, the		

Event name	Unit Over Range	Jnit Over Range for Channel 2 Event code 64F10000 hex								
Meaning	· · · · ·		nnel 2 exceeded th			the analog output				
Meaning	• .	The analog input data for input channel 2 exceeded the upper limit of the input range. Or, the analog output data for output channel 2 exceeded the upper limit of the output range.								
Course				: •	Detection	Continuously				
Source	Depends on whe	• •	Source details	NX Unit	Detection	Continuously				
	Software is conne				timing					
	system configura									
Error	Level Observation			Log category	System					
attributes	Recovery									
Effects	User program	Continues.	Operation	If the input range	is exceeded, the	converted value				
				will be the upper	limit of the input range. If the output					
				range is exceede	ed, the analog outp	out will be the				
				upper limit of the	output range.					
Sys-	Variable		Data type		Name					
tem-defined	None									
variables										
Cause and	Assumed cause	•	Correction		Prevention					
correction	The analog input	data exceeded	Find the reason for exceeding the		Find the reasons for exceeding					
	the upper limit of	the input range.	upper limit of the	input or output	the upper limit of	the input or out-				
	Or, the analog ou	itput data	range and make	suitable correc-	put range and take suitable pre-					
	exceeded the up	per limit of the	tions.	0		S.				
	output range.									
Attached	None		•		•					
information										
Precautions/	You can change	the event level to t	he minor fault leve	I. If you change th	e level to the mind	or fault level, the				
Remarks	-	n above will be cha								

Event name	Unit Over Range	Jnit Over Range for Channel 3 Event code 64F20000 hex						
Meaning	•		nnel 3 exceeded th			the analog output		
wearing		-	I the upper limit of		e input range. Oi, t	ine analog output		
Courses					Detection	Cantinuaualu		
Source	Depends on whe		Source details	NX Unit	Detection	Continuously		
	Software is conne				timing			
	system configura			-				
Error	Level	Observation		Log category	System			
attributes	Recovery	Reset error in the	e NX Unit.					
Effects	User program	Continues.	Operation	If the input range	is exceeded, the	converted value		
				will be the upper limit of the input range. If the output				
				range is exceede	ed, the analog outp	out will be the		
				upper limit of the output range.				
Sys-	Variable		Data type		Name			
tem-defined	None							
variables								
Cause and	Assumed cause	l.	Correction		Prevention			
correction	The analog input	data exceeded	Find the reason for exceeding the		Find the reasons for exceeding			
	the upper limit of	the input range.	upper limit of the	input or output	the upper limit of	the input or out-		
	Or, the analog ou	tput data	range and make suitable correc-		put range and take suitable pre-			
	exceeded the up	per limit of the	tions.		ventive measures.			
	output range.							
Attached	None		1		1			
information								
Precautions/	You can change	the event level to t	he minor fault leve	l. If you change th	e level to the mind	or fault level, the		
Remarks	•		inged to "Reset err					

		for Channel 4		Event code	64F30000 hex		
Event name	Unit Over Range			Event code			
Meaning	• •	•	nnel 4 exceeded th I the upper limit of	••	e input range. Or, t	the analog output	
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously	
Error	Level Observation			Log category	System		
attributes	Recovery	Reset error in the	e NX Unit.		1 -		
Effects	User program	Continues.	Operation	will be the upper	is exceeded, the converted value imit of the input range. If the output d, the analog output will be the		
Sys-	Variable		Data type		Name		
tem-defined variables	None						
Cause and	Assumed cause	l.	Correction		Prevention		
correction	The analog input data exceeded the upper limit of the input range. Or, the analog output data exceeded the upper limit of the output range.		Find the reason for exceeding the upper limit of the input or output range and make suitable correc- tions.		Find the reasons for exceeding the upper limit of the input or out- put range and take suitable pre- ventive measures.		
Attached information	None						
Precautions/ Remarks	-		he minor fault leve anged to "Reset en			or fault level, the	

Event name	Unit Over Range	for Channel 5		Event code	64F40000 hex		
Meaning		-	nnel 5 exceeded th d the upper limit of		e input range. Or,	the analog output	
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously	
Error	Level Observation			Log category	System		
attributes	Recovery	ecovery Reset error in the NX Unit.					
Effects	User program	Continues.	Operation	will be the upper	e is exceeded, the converted value r limit of the input range. If the output ded, the analog output will be the e output range.		
Sys-	Variable		Data type		Name		
tem-defined variables	None						
Cause and	Assumed cause	•	Correction	Correction		Prevention	
correction	The analog input data exceeded the upper limit of the input range. Or, the analog output data exceeded the upper limit of the output range.		Find the reason for exceeding the upper limit of the input or output range and make suitable correc- tions.		Find the reasons for exceeding the upper limit of the input or out- put range and take suitable pre- ventive measures.		
Attached information	None				1		
Precautions/ Remarks	You can change the event level to the minor fault level. If you change Recovery column above will be changed to "Reset error in the NX L					or fault level, the	

Event name	Unit Over Range	Unit Over Range for Channel 6 Event code 64F50000 hex						
Meaning			nnel 6 exceeded th			the analog output		
Meaning	• •	•	I the upper limit of		e input runge. Oi,	ine analog output		
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously		
Error	Level Observation			Log category	System			
attributes	Recovery	Reset error in the	e NX Unit.	0 0 7	,			
Effects	User program	Continues.	Operation	ration If the input range is exceeded, the con will be the upper limit of the input range range is exceeded, the analog output v		inge. If the output		
				upper limit of the	•			
Sys-	Variable	ı	Data type	Data type				
tem-defined variables	None							
Cause and	Assumed cause)	Correction	Correction		Prevention		
correction	The analog input	data exceeded	Find the reason for exceeding the		Find the reasons for exceeding			
	the upper limit of	the input range.	upper limit of the	input or output	the upper limit of the input or out-			
	Or, the analog ou	itput data	range and make	suitable correc-	put range and take suitable pre-			
	exceeded the up	per limit of the	tions.		ventive measure	S.		
	output range.	output range.						
Attached	None		•		•			
information								
Precautions/	You can change	the event level to t	he minor fault leve	I. If you change th	e level to the mind	or fault level, the		
Remarks	Recovery column	n above will be cha	inged to "Reset eri	or in the NX Unit."	,			

Event name	Unit Over Range	for Channel 7		Event code	Jnit Over Range for Channel 7 Event code 64F60000 hex						
Meaning	•		nnel 7 exceeded th			the analog output					
wearing		-	I the upper limit of		e input range. Oi, t	ine analog output					
Courses					Detection	Cantinuaualu					
Source	Depends on whe		Source details	NX Unit	Detection	Continuously					
	Software is conne				timing						
	system configura			-							
Error	Level	Observation		Log category	System						
attributes	Recovery	Reset error in the	e NX Unit.								
Effects	User program	Continues.	Operation	If the input range	is exceeded, the	converted value					
				will be the upper limit of the input range. If the output							
				range is exceede	ed, the analog outp	out will be the					
				upper limit of the output range.							
Sys-	Variable		Data type		Name						
tem-defined	None										
variables											
Cause and	Assumed cause	•	Correction		Prevention						
correction	The analog input	data exceeded	Find the reason for exceeding the		Find the reasons for exceeding						
	the upper limit of	the input range.	upper limit of the	input or output	the upper limit of	the input or out-					
	Or, the analog ou	itput data	range and make suitable correc-		put range and take suitable pre-						
	exceeded the up	per limit of the	tions.		ventive measures.						
	output range.										
Attached	None		1		1						
information											
Precautions/	You can change	the event level to t	he minor fault leve	l. If you change th	e level to the mind	or fault level, the					
Remarks	Recovery column	n above will be cha	inged to "Reset eri	ror in the NX Unit."	,						

F		fan Obannal 0		Et.	04570000 h		
Event name	Unit Over Range			Event code	64F70000 hex		
Meaning	• •	•	nnel 8 exceeded th I the upper limit of	ne upper limit of the the output range.	e input range. Or, t	he analog output	
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously	
Error	Level Observation			Log category	System	-	
attributes	Recovery	Reset error in the	e NX Unit.		•		
Effects	User program	Continues.	Operation	will be the upper	is exceeded, the converted value imit of the input range. If the output d, the analog output will be the		
Sys-	Variable		Data type		Name		
tem-defined variables	None						
Cause and	Assumed cause		Correction		Prevention		
correction	The analog input data exceeded the upper limit of the input range. Or, the analog output data exceeded the upper limit of the output range.		Find the reason for exceeding the upper limit of the input or output range and make suitable correc- tions.		Find the reasons for exceeding the upper limit of the input or out- put range and take suitable pre- ventive measures.		
Attached information	None						
Precautions/ Remarks	-			I. If you change th or in the NX Unit."		r fault level, the	

Event name	Unit Under Rand	Jnit Under Range for Channel 1 Event code 64F80000 hex						
Meaning	The analog input	data for input char hannel 1 went belo		the lower limit of th	ie input range. Or,	the analog output		
Source	Depends on whe Software is conn system configura	ected and the	Source details	NX Unit	Detection timing	Continuously		
Error	Level	Observation		Log category	System			
attributes	Recovery	Reset error in the	e NX Unit.					
Effects	User program	Continues.	Operation	verted value will If the output data	ata goes below the input range, the con- will be the lower limit of the input range. data goes below the output range, the ut will be the lower limit of the output			
Sys-	Variable		Data type		Name			
tem-defined variables	None							
Cause and	Assumed cause)	Correction		Prevention			
correction	The analog input data went below the lower limit of the input range. Or, the analog output data went below the lower limit of the output range.		Find the reason for going below the lower limit of the input or out- put range and make suitable cor- rections.		Find the reasons for going below the lower limit of the input or out- put range and take suitable pre- ventive measures.			
Attached information	None							
Precautions/	You can change	the event level to t	he minor fault leve	el. If you change th	e level to the mind	or fault level, the		
Remarks	Recovery colum							

Event name	Unit Under Rang	e for Channel 2		Event code	64F90000 hex		
Meaning	The analog input	data for input char	nnel 2 went below the lower limit of the input range. Or, the analog output w the lower limit of the output range.				
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously	
Error	Level	Observation		Log category	System		
attributes	Recovery	Reset error in the	e NX Unit.				
Effects	User program	Continues.	Operation	verted value will If the output data	but data goes below the input range, the con- ralue will be the lower limit of the input range. Itput data goes below the output range, the putput will be the lower limit of the output		
Sys-	Variable		Data type		Name		
tem-defined variables	None						
Cause and	Assumed cause	•	Correction		Prevention		
correction	The analog input data went below the lower limit of the input range. Or, the analog output data went below the lower limit of the output range.		Find the reason for going below the lower limit of the input or out- put range and make suitable cor- rections.		Find the reasons for going below the lower limit of the input or out- put range and take suitable pre- ventive measures.		
Attached information	None		I		1		
Precautions/ Remarks	-		he minor fault leve anged to "Reset er			or fault level, the	

Event name	Unit Under Rang	e for Channel 3		Event code	64FA0000 hex		
Meaning	The analog input	The analog input data for input channel 3 went below the lower limit of the input range. Or, the analog output data for output channel 3 went below the lower limit of the output range.					
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously	
Error	Level	Observation		Log category	System		
attributes	Recovery	Reset error in the	e NX Unit.				
Effects	User program	Continues.	Operation	ration If the input data goes below the input verted value will be the lower limit of If the output data goes below the ou analog output will be the lower limit range.		of the input range. utput range, the	
Sys-	Variable		Data type		Name		
tem-defined variables	None						
Cause and	Assumed cause)	Correction		Prevention		
correction	The analog input data went below the lower limit of the input range. Or, the analog output data went below the lower limit of the output range.		Find the reason for going below the lower limit of the input or out- put range and make suitable cor- rections.		Find the reasons for going below the lower limit of the input or out- put range and take suitable pre- ventive measures.		
Attached	None				1		
information							
Precautions/	You can change	the event level to t	he minor fault leve	el. If you change th	ne level to the mind	or fault level, the	
Remarks	Recovery column	n above will be cha	anged to "Reset en	ror in the NX Unit.	"		

Event name	Unit Under Rang	e for Channel 4		Event code	64FB0000 hex	
Meaning	The analog input data for input channel 4 went below the lower limit of the input range. Or, the analog output data for output channel 4 went below the lower limit of the output range.					
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously
Error	Level	Observation		Log category	System	•
attributes	Recovery	Reset error in the	e NX Unit.			
Effects	User program	Continues.	Operation	If the input data goes below the input range, the verted value will be the lower limit of the input ra If the output data goes below the output range, analog output will be the lower limit of the output range.		f the input range. utput range, the
Sys-	Variable		Data type		Name	
tem-defined variables	None					
Cause and	Assumed cause)	Correction		Prevention	
correction	The analog input data went below the lower limit of the input range. Or, the analog output data went below the lower limit of the output range.		Find the reason for going below the lower limit of the input or out- put range and make suitable cor- rections.		Find the reasons for going below the lower limit of the input or out- put range and take suitable pre- ventive measures.	
Attached information	None					
Precautions/ Remarks		the event level to t above will be cha				r fault level, the

8-3-4 Meaning of Error

Event name	Unit Under Rang	e for Channel 5		Event code	64FC0000 hex	
Meaning	The analog input	data for input char nannel 5 went belo				the analog output
Source	Depends on whe Software is conn system configura	ected and the	Source details	NX Unit	Detection timing	Continuously
Error	Level	Observation		Log category	System	
attributes	Recovery	Reset error in the	e NX Unit.			
Effects	User program	Continues.	Operation	If the input data goes below the input range, the verted value will be the lower limit of the input ran If the output data goes below the output range, the analog output will be the lower limit of the output range.		of the input range. utput range, the
Sys-	Variable		Data type Name			
tem-defined variables	None					
Cause and	Assumed cause)	Correction		Prevention	
correction	The analog input data went below the lower limit of the input range. Or, the analog output data went below the lower limit of the output range.		the lower limit of	son for going below it of the input or out- id make suitable cor- id make suitable cor-		the input or out- ke suitable pre-
Attached information	None					
Precautions/	You can change	the event level to t	he minor fault leve	el. If you change th	e level to the mind	or fault level, the
Remarks	Recovery colum	n above will be cha	anged to "Reset er	ror in the NX Unit	"	

Event name	Unit Under Rang	e for Channel 6		Event code	64FD0000 hex	
Meaning	The analog input data for input channel 6 went below the lower limit of the input range. Or, the analog output data for output channel 6 went below the lower limit of the output range.					
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously
Error	Level	Observation		Log category	System	
attributes	Recovery	Reset error in the	e NX Unit.			
Effects	verted value will If the output data		goes below the input range, the con- be the lower limit of the input range. a goes below the output range, the ill be the lower limit of the output			
Sys-	Variable		Data type Name			
tem-defined variables	None					
Cause and	Assumed cause)	Correction		Prevention	
correction	The analog input data went below the lower limit of the input range. Or, the analog output data went below the lower limit of the output range.		Find the reason for going below the lower limit of the input or out- put range and make suitable cor- rections.		Find the reasons for going below the lower limit of the input or out- put range and take suitable pre- ventive measures.	
Attached information	None		l		1	
Precautions/ Remarks		the event level to t above will be cha				or fault level, the

Meaning The analog input data for input channel 7 went below the lower limit of the input range. Or, the analog ou data for output channel 7 went below the lower limit of the output range. Source Depends on where the Support Software is connected and the system configuration. Source details NX Unit Detection timing Continuous Error attributes Level Observation Log category System Continuous Effects User program Continues. Operation If the input data goes below the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the output data goes below the output range, the output data goes below the output range, the verted value will be the lower limit of the output range, the output data goes below the output range, the output data goes below the output range, the verted value will be the lower limit of the output range, the output data goes below the output range, the output data goes below the output range, the verted value will be the lower limit of the output range. Sys- tem-defined variables Variable Data type Name Cause and correction Assumed cause Correction Prevention The analog input data went below the lower limit of the input range. Find the reasons for going below the lower limit of the input or out-			(0)) =						
data for output channel 7 went below the lower limit of the output range. Source Depends on where the Support Software is connected and the system configuration. Source details NX Unit Detection timing Continuous Error attributes Level Observation Log category System Effects User program Continues. Operation If the input data goes below the input range, the verted value will be the lower limit of the input range, the verted value will be the lower limit of the output range. Sys- tem-defined variables Variable Data type Name Cause and correction Assumed cause Correction Prevention Find the reason for going below the lower limit of the input range. Find the reason for going below the lower limit of the input range. Find the reason for going below the lower limit of the input or out-	Event name	Unit Under Rang	e for Channel 7		Event code	64FE0000 hex			
Source Depends on where the Support Software is connected and the system configuration. Source details NX Unit Detection timing Continuous Error attributes Level Observation Log category System System Effects User program Continues. Operation If the input data goes below the input range, the verted value will be the lower limit of the input range, the input data goes below the output range, the analog output will be the lower limit of the output range. Sys- tem-defined variables Variable Data type Name Cause and correction Assumed cause Correction Prevention Find the reason for going below the lower limit of the input range. Find the reason for going below the lower limit of the input or out-	Meaning	The analog input	data for input char	nnel 7 went below t	the lower limit of th	e input range. Or, t	the analog output		
Software is connected and the system configuration. Log category System Error attributes Level Observation Log category System Effects User program Continues. Operation If the input data goes below the input range, the verted value will be the lower limit of the input range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range. Sys- tem-defined variables Variable Data type Name Cause and couse Correction Prevention The analog input data went below the lower limit of the input range. Find the reason for going below the lower limit of the input or out- Find the reasons for going below the lower limit of the input or out-		data for output ch	annel 7 went belo	w the lower limit o	f the output range.				
Error attributes Level Observation Log category System Effects Recovery Reset error in the NX Unit. If the input data goes below the input range, the verted value will be the lower limit of the input range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range. Sys- tem-defined variables Variable Data type Name Cause and correction Assumed cause Correction Prevention The analog input data went below the lower limit of the input range. Find the reason for going below the lower limit of the input or out-	Source	Depends on whe	re the Support	Source details	NX Unit	Detection Continuous			
Error attributes Level Observation Log category System Recovery Reset error in the NX Unit. Reset error in the NX Unit. If the input data goes below the input range, the verted value will be the lower limit of the input range, the verted value will be the lower limit of the input range, the analog output will be the lower limit of the output range, the verted fined variables Sys- tem-defined variables Variable Data type Name Cause and correction Assumed cause Correction Find the reason for going below the lower limit of the input range.		Software is conne	ected and the			timing			
attributes Recovery Reset error in the NX Unit. Effects User program Continues. Operation If the input data goes below the input range, the verted value will be the lower limit of the input range, the verted value will be the lower limit of the output range, the analog output will be the lower limit of the output range. System-defined variables Variable Data type Name Cause and correction Assumed cause Correction Find the reason for going below the lower limit of the input range.		system configura	tion.			-			
Effects User program Continues. Operation If the input data goes below the input range, the verted value will be the lower limit of the input range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range, the verted value will be the lower limit of the output range. Sys- tem-defined variables Variable Data type Name None Cause and course Correction Prevention The analog input data went below the lower limit of the input or out- the lower l	Error	Level	Observation		Log category	System			
Sys- tem-defined variables Variable Data type Name Cause and correction Assumed cause Correction Find the reason for going below the lower limit of the input range.	attributes	Recovery	Reset error in the	e NX Unit.		-			
Sys- tem-defined variables Variable Data type Name Cause and correction Assumed cause Correction Prevention The analog input data went below the lower limit of the input range. Find the reason for going below the lower limit of the input range. Find the reason for going below the lower limit of the input range.	Effects	User program	Continues.	Operation	If the input data g	goes below the inp	ut range, the con-		
Sys- tem-defined variables Variable Data type Name None Cause and correction Assumed cause Correction Find the reason for going below the lower limit of the input range. Find the reason for going below the lower limit of the input or out- Find the reason for going below the lower limit of the input or out-					verted value will	be the lower limit c	of the input range.		
Sys- tem-defined variables Variable Data type Name Cause and correction Assumed cause Correction Find the reason for going below the lower limit of the input range. Find the reason for going below the lower limit of the input range.					If the output data	a goes below the output range, the			
Sys- tem-defined variables Variable Data type Name Cause and correction Assumed cause The analog input data went below the lower limit of the input range. Find the reason for going below the lower limit of the input range. Find the input or out- the lower limit of the input or out-					analog output wil	I be the lower limit of the output			
tem-defined variables None Cause and correction Assumed cause Correction Prevention The analog input data went below the lower limit of the input range. Find the reason for going below the lower limit of the input range. Find the reason for going below the lower limit of the input or out- Find the reasons for going below the lower limit of the input or out-					range.				
variables Assumed cause Correction Prevention Cause and correction Assumed cause Correction Find the reason for going below the lower limit of the input range. Find the reason for going below the lower limit of the input or out- Find the reasons for going below the lower limit of the input or out-	Sys-	Variable		Data type		Name			
Cause and correctionAssumed causeCorrectionPreventionThe analog input data went below the lower limit of the input range.Find the reason for going below the lower limit of the input range.Find the reason for going below the lower limit of the input or out-	tem-defined	None							
correctionThe analog input data went below the lower limit of the input range.Find the reason for going below the lower limit of the input or out-Find the reasons for going below the lower limit of the input or out-	variables								
the lower limit of the input range. the lower limit of the input or out-	Cause and	Assumed cause		Correction		Prevention			
	correction	The analog input	data went below	Find the reason f	or going below	Find the reasons	for going below		
Or, the analog output data went put range and make suitable cor- put range and take suitable pr		the lower limit of	the input range.	the lower limit of	e lower limit of the input or out-		the lower limit of the input or out-		
		Or, the analog output data went below the lower limit of the output		put range and make suitable cor- rections.		put range and take suitable pre-	ke suitable pre-		
below the lower limit of the output rections. ventive measures.						ventive measures.			
range.		range.							
Attached None	Attached	None							
information	information								
Precautions/ You can change the event level to the minor fault level. If you change the level to the minor fault level, the minor fault level to the minor fault level.	Precautions/	You can change	the event level to t	he minor fault leve	el. If you change th	e level to the mind	or fault level, the		
Remarks Recovery column above will be changed to "Reset error in the NX Unit."	Remarks	Recovery column	above will be cha	inged to "Reset er	ror in the NX Unit.'	9			

Event name	Unit Under Rang	e for Channel 8		Event code	64FF0000 hex	
Meaning	The analog input data for input channel 8 went below the lower limit of the input range. Or, the analog output data for output channel 8 went below the lower limit of the output range.					
Source	Depends on where the Support Software is connected and the system configuration.		Source details	NX Unit	Detection timing	Continuously
Error	Level	Observation		Log category	System	•
attributes	Recovery	Reset error in the	e NX Unit.			
Effects	User program	Continues.	Operation	If the input data goes below the input range, the verted value will be the lower limit of the input ra If the output data goes below the output range, analog output will be the lower limit of the output range.		f the input range. utput range, the
Sys-	Variable		Data type		Name	
tem-defined variables	None					
Cause and	Assumed cause)	Correction		Prevention	
correction	The analog input data went below the lower limit of the input range. Or, the analog output data went below the lower limit of the output range.		Find the reason for going below the lower limit of the input or out- put range and make suitable cor- rections.		Find the reasons for going below the lower limit of the input or out- put range and take suitable pre- ventive measures.	
Attached information	None					
Precautions/ Remarks		the event level to t above will be cha				r fault level, the

8-3-4 Meaning of Error

Event name	Event Log Cleare	h		Event code	90400000 hex	
Meaning	The event log wa			Event code	50400000 nex	
Source	Depends on whe Software is conne system configura	re the Support ected and the	Source details	NX Unit	Detection timing	When commanded from user
Error	Level	Information		Log category	Access	•
attributes	Recovery					
Effects	User program	Continues.	Operation	Not affected.		
Sys-	Variable		Data type		Name	
tem-defined	None					
variables						
Cause and	Assumed cause	•	Correction	Prevention		
correction	The event log was cleared by the					
	user.					
Attached	Attached information: Events that were cleared					
information	1: The systen	n event log was cle	eared.			
	2: The access	s event log was cle	eared.			
Precautions/	None					
Remarks						

8-4 Resetting Errors

Refer to the user's manual for the connected CPU Unit or Communications Coupler Unit for information on how to reset errors.

8-5 Troubles Specific to Each Type of NX Units

8-5-1 Troubles Common to All Analog Input Units and Analog Output Units

Problem	Assumed cause	Correction
The converted values or analog signal values are	The user calibration error is too large.	Execute the user calibration again.
different from expected or the error is too large.	The required input or output is disabled.	Check to see if the setting is enabled.
	Wiring is incorrect. (Positive and negative are reversed etc.)	Check that the wiring is correct.

8-5-2 Analog Input Units

Problem	Assumed cause	Correction
The disconnection indica-	The sensor is disconnected.	Restore the sensor connection.
tion does not clear.		Check the connected sensor and input type.
	The input is significantly out of sensor measurement range.	Check that the input is correct.
	Wiring is incorrect. (Positive and negative are reversed etc.)	Check that the wiring is correct.
	The user calibration error is too large.	Execute the user calibration again.
The disconnection detec- tion is not performed.	The disconnection detection cannot be performed with input types other than 4 to 20 mA.	Check the input type.
The user calibration is not accepted.	Attempted to make calibration with inputs outside the correction range.	Input the voltage/current within the correction range from the input device and make the calibration again.
		If the voltage/current within the correction range cannot be input, change the connecting method to the input device.

8-5-3 Analog Output Units

Problem	Assumed cause	Correction
The expected output is not held when NX bus error or communications errors occur.	The output settings at load rejection are incorrect.	Set the output value at load rejection.
The user calibration is not accepted.	Attempted to make calibration with values outside the cor-	Set the voltage/current within the correction range and make the calibration again.
	rection range.	If the final output values cannot be calibrated within the correctable range, change the connecting method to the output device.
The output is not per- formed.	The Unit is not wired correctly with the connected external device.	Check the wiring with the connected external device.
	The wiring to the connected external device is discon- nected.	Check the wiring with the connected external device.
	A connected external device is defective.	Replace the connected external device.

8-6 Troubleshooting Flowchart

Refer to the user's manual for the connected CPU Unit or Communications Coupler Unit for details on the standard troubleshooting process when an error occurs.

Inspection and Maintenance

This section describes how to clean, inspect, and maintain the system.

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	9-1-2	Periodic Inspection	. 9-2
9-2	Mainte	enance Procedures	9-5

9-1 Cleaning and Inspection

This section describes daily device maintenance such as cleaning and inspection.

Make sure to perform daily or periodic inspections in order to maintain the functions of the Analog Input Units and Analog Output Units in the best operating condition.

9-1-1 Cleaning

Perform the following cleaning procedures periodically to ensure the Analog Input Units and Analog Output Units are maintained in the best operating condition.

- · Wipe the equipment over with a soft, dry cloth when performing daily cleaning.
- If dirt remains even after wiping with a soft, dry cloth, wipe with a cloth that has been wet with a sufficiently diluted detergent (2%) and wrung dry.
- Units will become stained if items such as rubber, vinyl products, or adhesive tape are left on the NX Unit for a long period. Remove such items during regular cleaning.



Precautions for Correct Use

- Never use benzene, thinners, other volatile solvents, or chemical cloths.
- Do not touch the NX bus connectors.

9-1-2 Periodic Inspection

NX Units do not have parts with a specific life. However, its elements can deteriorate under improper environmental conditions. Periodic inspections are thus required to ensure that the required conditions are being maintained.

Inspection is recommended at least once every six months to a year, but more frequent inspections may be necessary depending on the severe environments.

Take immediate steps to correct the situation if any of the conditions in the following table are not met.

Periodic Inspection Items

No.	Inspec- tion item	Inspection details	Criteria	Correction
1	External power sup- ply	Is the power supply voltage mea- sured at the terminal block within standards?	Within the power supply voltage range	Use a voltage tester to check the power supply at the terminals. Take necessary steps to bring the power supply within the power supply voltage range.
2	I/O power supply	Is the power supply voltage mea- sured at the I/O terminal block within standards?	Voltages must be within I/O specifications of each NX Unit.	Use a voltage tester to check the power voltage at the terminals. Take necessary steps to bring the I/O power supply within NX Unit standards.
3	Ambient environ- ment	Is the ambient operating tem- perature within standards?	0 to 55°C	Use a thermometer to check the tem- perature and ensure that the ambient operating temperature remains within the allowed range of 0 to 55°C.
		Is the ambient operating humid- ity within standards?	Relative humidity must be 10% to 95% with no condensation.	Use a hygrometer to check the humidity and ensure that the ambient operating humidity remains between 10% and 95%.
				Make sure that condensation does not occur due to rapid changes in tempera- ture.
		Is it subject to direct sunlight?	Not in direct sunlight	Protect the Controller if necessary.
		Is there an accumulation of dirt, dust, salt, metal powder, etc.?	No accumulation	Clean and protect the Controller if neces- sary.
		Is there water, oil, or chemical sprays hitting the Controller?	No spray	Clean and protect the Controller if neces- sary.
		Are there corrosive or flammable gases in the area of the Control- ler?	No spray	Check by smell or use a sensor.
		Is the Unit subject to shock or vibration?	Vibration resistance and shock resistance must be within specifications.	Install cushioning or other vibration and shock absorbing equipment if necessary.
		Are there noise sources near the Controller?	No significant noise sources	Either separate the Controller and noise source, or protect the Controller.
4	Installa- tion and wiring	Are the DIN track mounting hooks for each NX Unit securely locked?	No looseness	Securely lock the DIN track mounting hooks.
		Are the cable connectors fully inserted and locked?	No looseness	Correct any improperly installed connec- tors.
		Are there any loose screws on the End Plates (PFP-M)?	No looseness	Tighten loose screws with a Phil- lips-head screwdriver.
		Are the NX Units connected to each other along the hookup guides and until they touch the DIN track?	You must connect and fix the NX Units to the DIN track.	Connect the NX Units to each other along the hookup guides and until they touch the DIN track.
		Are there any damaged external wiring cables?	No visible damage	Check visually and replace cables if nec- essary.

Tools Required for Inspections

• Required Tools

- · Phillips screwdriver
- Flat-blade screwdriver
- · Voltage tester or digital voltmeter
- · Industrial alcohol and pure cotton cloth

• Tools Required Occasionally

- Oscilloscope
- Thermometer and hygrometer

9-2 Maintenance Procedures

When you replace an Analog Input Unit or Analog Output Unit, follow the procedure in the user's manual for the connected CPU Unit or Communications Coupler Unit.

A

Appendices

The appendices provide the data sheets of the Analog Input Units and Analog Output Units, and the dimensions of the Analog Input Units and Analog Output Units.

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This section provides the specifications of individual Analog Input Units and Analog Output Units.

A-1-1 Model List

Analog Input Units (Screwless Clamping Terminal Block, 12 mm Width)

Model	Num ber of poin ts	Input range	Resolu- tion	Input method	I/O refresh- ing method	Conver- sion time	Reference
NX-AD2203			1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-5
NX-AD2204							P. A-7
NX-AD2208	2	4 to 20 mA	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-8
NX-AD2603	point s		1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-9
NX-AD2604		-10 to +10 V	1/30000	Differen- tial	0		P. A-10
NX-AD2608		-10 to +10 v			Switching Synchronous I/O refreshing and Free-Run refreshing	10 μs/point	P. A-11
NX-AD3203			1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-12
NX-AD3204							P. A-13
NX-AD3208	4 point	4 to 20 mA	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-14
NX-AD3603	s	3	1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-15
NX-AD3604							P. A-16
NX-AD3608		-10 to +10 V	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-17

A-1-1 Model List

Model	Num ber of poin ts	Input range	Resolu- tion	Input method	I/O refresh- ing method	Conver- sion time	Reference
NX-AD4203			1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-18
NX-AD4204	-	4 to 20 mA					P. A-19
NX-AD4208	8 point		1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-20
NX-AD4603	- point s		1/8000	Sin- gle-ende d	Free-Run refreshing	250 µs/point	P. A-21
NX-AD4604		404 4034					P. A-22
NX-AD4608		-10 to +10 V	1/30000	Differen- tial	Switching Synchronous I/O refreshing and Free-Run refreshing	10 μs/point	P. A-23

Analog Output Units (Screwless Clamping Terminal Block, 12 mm Width)

Model	Num ber of poin ts	Output range	Resolu- tion	I/O refreshing method	Conversion time	Reference
NX-DA2203			1/8000	Free-Run refreshing	250 µs/point	P. A-25
NX-DA2205	2	4 to 20 mA	1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-27
NX-DA2603	point s	-10 to +10 V	1/8000	Free-Run refreshing	250 µs/point	P. A-29
NX-DA2605			1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-30
NX-DA3203			1/8000	Free-Run refreshing	250 µs/point	P. A-31
NX-DA3205	4	4 to 20 mA	1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-33
NX-DA3603	point s		1/8000	Free-Run refreshing	250 µs/point	P. A-35
NX-DA3605		-10 to +10 V	1/30000	Switching Synchronous I/O refreshing and Free-Run refreshing	10 µs/point	P. A-36

A-1-2 Analog Input Units

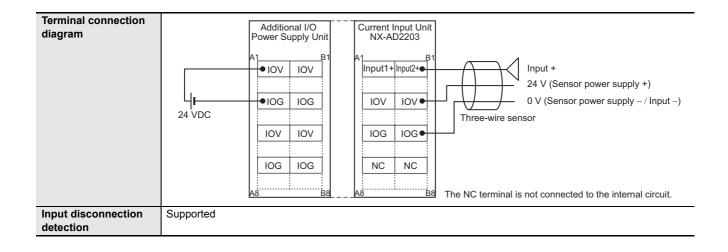
Description of Items on Data Sheet of the Analog Input Unit

The meanings of the items on the data sheet of the Analog Input Unit are explained in the table below.

Item	Description
Unit name	The name of the Unit.
Model	The model of the Unit.
Number of points	The number of analog input points provided by the Unit.
External connection ter- minals	The type of terminal block and connector that is used for connecting the Unit. The number of terminals on the terminal block is also described when a screwless clamping terminal block is used.
I/O refreshing method	The I/O refreshing methods that are used by the Unit. Free-Run refreshing and synchronous I/O refreshing are available.
Indicators	The type of indicators on the Unit and the layout of those indicators.
Input method	The analog signal input method provided by the Unit. Single-ended input and differential input are available.
Input range	The input range of the Unit.
Input conversion range	The conversion range of converted values for the full scale of the Unit. Input converted values range is fixed to the conversion limit value.
Absolute maximum rating	The maximum value of analog input signals of the Unit. If a signal exceeding this range is input, the Unit may be damaged.
Input impedance	The input impedance of the Unit.
Resolution	The resolution of converted values of the Unit.
Overall accuracy	The analog conversion input accuracy of the Unit. It is defined under the conditions of 25°C and 0 to 55°C.
Conversion time	The time required to convert analog input signals of the Unit to the converted values.
Dimensions	The dimensions of the Unit. They are described as W x H x D. The unit is "mm".
Isolation method	The isolation method between the input circuits and internal circuits and between the input circuits of the Unit.
Insulation resistance	The insulation resistance between the input circuits and internal circuits and between each input circuit of the Unit.
Dielectric strength	The dielectric strength between the input circuits and internal circuits and between each input circuit of the Unit.
I/O power supply method	The method for supplying I/O power for the Unit. The supply method is determined for each Unit. The power is supplied from the NX bus or the external source.
Current capacity of I/O power supply terminal	The current capacity of the I/O power supply terminals (IOV/IOG) of the Unit. Do not exceed this value when supplying the I/O power to the connected external devices.
NX Unit power consump- tion	The power consumption of the NX Unit power supply of the Unit. The power consumption when NX Units are connected to a CPU Unit and the power consumption when NX Units are connected to a Communications Coupler Unit.
Current consumption from I/O power supply	The current consumption from I/O power supply of the Unit. The above input current and cur- rent consumption of any connected external devices are excluded.
Weight	The weight of the Unit.
Circuit layout	The input circuit layout of the Unit.
Installation orientation and restrictions	The installation orientation of a CPU Unit containing the Unit and the installation orientation of a Slave Terminal containing the Unit. Any restrictions to specifications that result from the installation orientation are also given.
Terminal connection dia- gram	A diagram of the connection between the Unit and connected external devices. When an I/O Power Supply Connection Unit or a Shield Connection Unit is required to be connected to the connected external devices, the description for such is included.
Input disconnection detection	The function of the Unit to detect an input disconnection. This function is provided for models with the 4 to 20 mA input range.

Analog Input Units (Screwless Clamping Terminal Block, 12 mm Width)

Unit name	Analog Input Unit (current input type)	Model		NX-AD2203	
Number of points	2 points	External connection terminals		Screwless clamping terminal block (8 ter- minals)	
I/O refreshing method	Free-Run refreshing			·	
Indicators	TS indicator	Input method		Single-ended input	
		Input range		4 to 20 mA	
	AD2203	Input conve	rsion range	-5 to 105% (full scale)	
	■TS	Absolute m rating	naximum	±30 mA	
		Input imped	lance	250 Ω	
		Resolution		1/8000 (full scale)	
		Overall	25 °C	±0.2% (full scale)	
		accuracy	0 to 55°C	±0.4% (full scale)	
		Conversion	time	250 μs/point	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation method		Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)	
Insulation resistance	20 M Ω min. between isolated circuits (at 100 VDC)	Dielectric strength		510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.	
I/O power supply method	Supply from the NX bus	Current capacity of I/O power supply terminal		IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.	
NX Unit power con- sumption	 Connected to a CPU Unit 1.25 W max. Connected to a Communications Coupler Unit 0.90 W max. 	Current consumption from I/O power supply		No consumption	
Weight	70 g max.				
Circuit layout					
	Terminal block	250 Ω AG AG: A	nalog circuit in	ternal GND I/O power supply + NX bus connector (right)	
Installation orienta- tion and restrictions	 Installation orientation: Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupl Possible in 6 orientations. 	er Unit			
	Restrictions: No restrictions				



Unit name	Analog Input Unit (current input type)	Model		NX-AD22	204	
Number of points	2 points	External connection			s clamping terminal block (8 ter-	
•		terminals		minals)		
I/O refreshing method	Free-Run refreshing	Innut method Differentia				
Indicators	TS indicator	Input metho		Differential input		
	4.5020.4	Input range		4 to 20 m		
	AD2204 ■TS	Input conve			% (full-scale)	
		Absolute m rating	laximum	±30 mA		
		Input imped	ance	250 Ω		
		Resolution		1/8000 (f	ull scale)	
		Overall	25°C	±0.2% (fu	ull scale)	
		accuracy	0 to 55°C	±0.4% (fu	Ill scale)	
		Conversion	time	250 µs/po	oint	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me	ethod	= Transfo	the input and the NX bus: Power ormer, Signal = Digital isolator (no between inputs)	
Insulation resistance	$20 \text{ M}\Omega$ min. between isolated circuits (at 100 VDC)	Dielectric st	trength		between isolated circuits for 1 a leakage current of 5 mA max.	
I/O power supply method	No supply	Current cap		Without I	/O power supply terminals	
NX Unit power con-	Connected to a CPU Unit	power supp		No consu	Imption	
sumption	 1.25 W max. Connected to a Communications Coupler Unit 0.90 W max. 	from I/O power supply			Isumption	
Weight	70 g max.					
Circuit layout					1	
	Terminal block Input1- to 2-	Input1- to 2- AG AG AG AG AG AG AG			I/O power supply + NX bus connector (right)	
Installation orienta-	Installation orientation:					
tion and restrictions	 Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupl Possible in 6 orientations. 	er Unit				
	Restrictions: No restrictions					
Terminal connection diagram	Current Input Unit NX-AD2204 1					
Input disconnection detection	Supported					

Unit name	Analog Input Lipit (current input type)	Model		NX-AD2208	
Number of points	Analog Input Unit (current input type) 2 points	External connection terminals		Screwless clamping terminal block (8 ter-	
I/O refreshing method	Switching synchronous I/O refreshing and Fi			minals)	
Indicators	TS indicator	Input method Differential input			
Indicators		Input range		4 to 20 mA	
	AD2208	Input conversion r	ange	-5 to 105% (full scale)	
	TS	Absolute maximu	-	±30 mA	
		rating		100 111	
		Input impedance		250 Ω	
		Resolution		1/30000 (full scale)	
		Overall 25°C		±0.1% (full scale)	
		accuracy 0 to 5	5°C	±0.2% (full scale)	
		Conversion time		10 μs/point	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation method		Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)	
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	Dielectric strength		510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.	
I/O power supply method	No supply	Current capacity or power supply term	inal	Without I/O power supply terminals	
NX Unit power con- sumption	 Connected to a CPU Unit 1.25 W max. Connected to a Communications Coupler Unit 	Current consumption from I/O power supply		No consumption	
	0.90 W max.				
Weight Circuit layout	70 g max.				
	NX bus connector (left) I/O power supply + O	510 KΩ 510 KΩ AG	AG: Ana	alog circuit rnal GND I/O power supply + NX bus connector (right)	
Installation orienta- tion and restrictions	Installation orientation: • Connected to a CPU Unit Possible in upright installation. • Connected to a Communications Coupler Unit Possible in 6 orientations. Restrictions: No restrictions				
diagram	Current Input Unit NX-AD2208 A1 B1 Input + Input1+Input2+ AG AG NC NC AG terminal is connected to 0 V of analog circuit inside the Unit. It is not necessary to wire AG terminal normally.				
Input disconnection detection	Supported				

Unit name	Analog Input Unit (voltage input type)	Model		NX-AD2603		
Number of points	2 points	External connection terminals			amping terminal block (8 ter-	
•				minals)		
I/O refreshing method	Free-Run refreshing			1		
Indicators	TS indicator	Input method		Single-ended input		
	AD2603	Input range		-10 to +10 V		
		-	ersion range	-5 to 105% (fu	ull scale)	
		Absolute m rating	naximum	±15 V		
		Input imped	lance	1 MΩ min.		
		Resolution		1/8000 (full so	cale)	
		Overall	25°C	±0.2% (full sc	,	
		accuracy	0 to 55°C	±0.4% (full sc	ale)	
		Conversion	time	250 µs/point		
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me	ethod	Between the i	input and the NX bus: Power r, Signal = Digital isolator (no /een inputs)	
Insulation resistance	$\begin{array}{c} 20 \ \text{M}\Omega \ \text{min. between isolated circuits (at} \\ 100 \ \text{VDC}) \end{array}$	Dielectric st	trength		veen isolated circuits for 1 akage current of 5 mA max.	
I/O power supply	Supply from the NX bus	Current cap	-		minal max., IOG: 0.1 A/termi-	
method		power supp	-	nal max.		
NX Unit power con- sumption	 Connected to a CPU Unit 1.35 W max. Connected to a Communications Coupler Unit 1.07 W max. 	Current consumption No from I/O power supply		No consumpti	No consumption	
Weight	1.05 W max.					
Weight Circuit layout	70 g max.					
	Terminal block Input1+ to 2+	AG AG: Analog circuit internal GND I/O power supply + I/O power supply - NX bus connector (right)				
Installation orienta- tion and restrictions	Installation orientation: Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupl Possible in 6 orientations. Restrictions: No restrictions	ler Unit				
Terminal connection diagram	Additional I/O Power Supply Unit A1 B1 I OV IOV IOV IOV 24 VDC IOG IOG IOG IOG A8 B8 A8	Voltage Input Unit NX-AD2603 A Input1+Input2+ INput1+Input2+ INPUT2+ IN				
Input discourse the		J	B8 The NC te	minar is not com		
Input disconnection detection	Not supported.					

Unit name	Analog Input Linit (voltago input typo)	Model		NX-AD26	04
Number of points	Analog Input Unit (voltage input type) 2 points				s clamping terminal block (8 ter-
Number of points				minals)	
I/O refreshing method	Free-Run refreshing				
Indicators	TS indicator	-		Differential input	
		Input range		-10 to +10) V
	AD2604 ■TS	Input conversion	n range	-5 to 105	% (full scale)
		Absolute maxim	num	±15 V	
		rating		1 110	
		Input impedance)	1 MΩ min	
		Resolution Overall 25°0	<u> </u>	1/8000 (fu ±0.2% (fu	/
			C) 55°C	±0.2% (lu ±0.4% (fu	,
		- 010			
Dimensions	12 (W) x 100 (H) x 71 (D)	Conversion time Isolation method		250 µs/pc	the input and the NX bus: Power
Dimensions		Isolation method	1		rmer, Signal = Digital isolator (no
					petween inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at	Dielectric strengt	lth	510 VAC	between isolated circuits for 1
	100 VDC)			minute at	a leakage current of 5 mA max.
I/O power supply	No supply	Current capacity		Without I/	O power supply terminals
method		power supply ter			ana tina
NX Unit power con- sumption	Connected to a CPU Unit 1.35 W max.	Current consum from I/O power s		No consu	mption
p	Connected to a Communications Cou-				
	pler Unit				
	1.05 W max.				
Weight	70 g max.				
Circuit layout					
	Terminal block Input1– to 2– AG NX bus connector (left) I/O power supply +	AMP KΩξ 510 KΩ AG: Analog circuit AG internal GND I/O power supply + I/O power supply - I/O power supply -			
Installation orienta- tion and restrictions	Installation orientation:				
tion and restrictions	Connected to a CPU Unit				
	Possible in upright installation.	a			
	Connected to a Communications Coupl Possible in 6 orientations.				
	Restrictions: No restrictions				
Terminal connection					
diagram	Voltage Input Unit NX-AD2604				
	AG AG AG AG AG AG AG terminal is connected AB B8 AG terminal is connected It is not necessary to with	ıt – ed to 0 V of analog cir	rcuit inside ally.	e the Unit.	
Input disconnection detection	Not supported.				

Unit name	Analog Input Unit (voltage input type)	Model		NX-AD26	608	
Number of points	2 points	External connection		Screwles	s clamping terminal block (8 ter-	
		terminals		minals)		
I/O refreshing method	Switching synchronous I/O refreshing and F	-				
Indicators	TS indicator			Differential input		
	AD2608	Input range		-10 to +1		
	TS	Absolute n	ersion range	-5 to 105 ±15 V	% (full scale)	
		rating	laximum	±15 V		
		Input imped	dance	1 MΩ mir	٦.	
		Resolution		1/30000	(full scale)	
		Overall	25°C	±0.1% (fu	ull scale)	
		accuracy	0 to 55°C	±0.2% (fu	ull scale)	
		Conversion	time	10 µs/po	int	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation m	ethod	= Transfo	the input and the NX bus: Power ormer, Signal = Digital isolator (no between inputs)	
Insulation resistance	$20\ \text{M}\Omega$ min. between isolated circuits (at 100 VDC)	Dielectric s	trength		between isolated circuits for 1 t a leakage current of 5 mA max.	
I/O power supply method	No supply		bacity of I/O	Without I	/O power supply terminals	
NX Unit power con- sumption	 Connected to a CPU Unit 1.35 W max. Connected to a Communications Coupler Unit 1.05 W max. 	Current consumption from I/O power supply		umption		
Weight	70 g max.					
Circuit layout						
	Terminal block Input1+ to 2+	ΑΜ Ω 510 KΩ ΑG	O I/O power supply + Connector O I/O power supply – (right)			
Installation orienta- tion and restrictions	Installation orientation: Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupler Unit Possible in 6 orientations. Restrictions: No restrictions					
diagram	Voltage Input Unit NX-AD2608 A Input1+Input2+ AG AG AG AG AG AG terminal is connect It is not necessary to w	ut – ed to 0 V of ana		le the Unit.		
Input disconnection detection	Not supported.					

Unit name	Analog Input Unit (current input type)	Model		NX-AD32	203	
Number of points	4 points				s clamping terminal block (12 ter-	
•	•			minals)		
I/O refreshing method	Free-Run refreshing					
Indicators	TS indicator	Input metho	d	Single-ended input		
	400000	Input range		4 to 20 mA		
	AD3203	Input conver			% (full scale)	
		Absolute m rating	aximum	±30 mA		
		Input impeda	ance	250 Ω		
		Resolution	ance	1/8000 (fr	ull scale)	
		Overall	25°C	±0.2% (ft	,	
		accuracy	0 to 55°C	±0.4% (fu	,	
		Conversion		250 µs/pc		
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me			the input and the NX bus: Power	
Dimensions		150 attorn me	liiou		ormer, Signal = Digital isolator (no	
				isolation I	between inputs)	
Insulation resistance	$20 \text{ M}\Omega$ min. between isolated circuits (at	Dielectric st	rength		between isolated circuits for 1	
	100 VDC)				a leakage current of 5 mA max.	
I/O power supply method	Supply from the NX bus	Current capa power suppl	•	IOV: 0.1 / nal max.	A/terminal max., IOG: 0.1 A/termi-	
NX Unit power con-	Connected to a CPU Unit	Current con	-	No consu	Imption	
sumption	1.25 W max.	from I/O por				
	Connected to a Communications Cou-					
	pler Unit					
	0.90 W max.					
Weight	70 g max.					
Circuit layout]	
	Terminal block	AG AG: Analog circuit internal GND I/O power supply + I/O power supply - I/O power supply -				
Installation orienta-	Installation orientation:					
tion and restrictions	Connected to a CPU Unit					
	Possible in upright installation.					
	Connected to a Communications Coupl	er Unit				
	Possible in 6 orientations.					
	Restrictions: No restrictions					
Terminal connection diagram	Power Supply Unit A1 B1 A1 EIOV IOV EIOG IOG 24 VDC EIOV IOV EIOG IOG EIOG IOG EIOG IOG EIOG IOG EIOG IOG EIOG IOG EIOS	Input1+ Input2+ IOV IOV IOG IOG Input3+ Input4+ IOV IOV IOG IOG		24	out + V (Sensor power supply +) √ (Sensor power supply – / Input –)	
Input disconnection detection	Supported					

Unit name	Analog Input Unit (current input type)	Model		NX-AD32	204	
Number of points	4 points	External connection			ss clamping terminal block (12 ter-	
•		terminals		minals)		
I/O refreshing method	Free-Run refreshing	-		-		
Indicators	TS indicator Input me				Differential input	
	402004	Input range		4 to 20 m		
	AD3204 ■TS	-	ersion range		% (full scale)	
		Absolute n rating	naximum	±30 mA		
		Input imped	lanco	250 Ω		
		Resolution		1/8000 (f	ull scale)	
		Overall	25°C	±0.2% (fu	,	
		accuracy	0 to 55°C	±0.4% (fu	1	
		Conversion		250 µs/p	,	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me			the input and the NX bus: Power	
Dimensions		1301ation m	eniou	= Transfo	between inputs)	
Insulation resistance	20 M Ω min. between isolated circuits (at 100 VDC)	Dielectric s	trength		between isolated circuits for 1 t a leakage current of 5 mA max.	
I/O power supply	No supply	Current cap		Without I	/O power supply terminals	
method	Operated a ODULU II	power supp				
NX Unit power con- sumption	Connected to a CPU Unit 1.25 W max.	Current co	nsumption ower supply	No consu	umption	
Sumption	 Connected to a Communications Cou- 		wei suppiy			
	pler Unit					
	0.90 W max.					
Weight	70 g max.					
Circuit layout					1	
	Terminal block Input1- to 4- AG NX bus connector (left) I/O power supply +	\$510 KΩ\$510	 I/O power supply + connector I/O power supply − (right) 			
Installation orienta-	Installation orientation:					
tion and restrictions	Connected to a CPU Unit					
	Possible in upright installation.					
	Connected to a Communications Coup	ler Unit				
	Possible in 6 orientations.					
	Restrictions: No restrictions					
Terminal connection diagram		ut + ut – ed to 0 V of ana ire AG terminal	alog circuit insid normally.	e the Unit.		
detection						

Unit name	Analog Input Unit (current input type)	Model		NX-AD32	208	
Number of points	4 points	External cor	nection		s clamping terminal block (12 ter-	
I/O refreshing method	Switching synchronous I/O refreshing and Fr	terminals		minals)		
Indicators	TS indicator	Input method Differential input				
indicators	13 mulcator			4 to 20 mA		
	AD3208	Input range	rsion rango		% (full scale)	
	TS	Absolute m		±30 mA		
		rating		±30 IIIA		
		Input imped	ance	250 Ω		
		Resolution		1/30000 ((full scale)	
		Overall	25°C	±0.1% (fu	III scale)	
		accuracy	0 to 55°C	±0.2% (fu	III scale)	
		Conversion	time	10 µs/poi	nt	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me	ethod	= Transfo	the input and the NX bus: Power ormer, Signal = Digital isolator (no between inputs)	
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	Dielectric st	rength	510 VAC	between isolated circuits for 1 a leakage current of 5 mA max.	
I/O power supply method	No supply	Current cap			O power supply terminals	
NX Unit power con- sumption	 Connected to a CPU Unit 1.30 W max. Connected to a Communications Coupler Unit 	Current consumption from I/O power supply		No consumption		
	0.95 W max.					
Weight	70 g max.					
	Terminal block Input1+ to 4+ 3250Ω Input1- to 4- $4G$ AG NX bus connector (left) I/O power supply + $1/O$ power supply - 6	AG: Analog circuit internal GND AG I/O power supply + I/O power supply –				
Installation orienta- tion and restrictions	Installation orientation: Connected to a CPU Unit Possible in upright installation. Connected to a Communications Couple Possible in 6 orientations. Restrictions: No restrictions	er Unit				
	A1 B1 Input1+Input2+ Input3+Input4+ Input3-Input4- AG AG AG AG AG AG AG terminal is connected It is not necessary to with	ıt – ed to 0 V of ana	log circuit insid normally.	le the Unit.		

Α

A-1-2 Analog Input Units

Unit name	Analog Input Unit (voltage input type)	Model		NX-AD3603		
Number of points	4 points	External connection terminals		Screwless clamping terminal block (12 ter- minals)		
I/O refreshing method	Free-Run refreshing					
Indicators	TS indicator	Input metho		Single-ended input		
	402602	Input range		-10 to +10 V		
	AD3603 ■TS		rsion range	-5 to 105% (full scale)		
		Absolute m rating	aximum	±15 V		
		Input imped	ance	1 MΩ min.		
		Resolution		1/8000 (full scale)		
		Overall	25°C	$\pm 0.2\%$ (full scale)		
		accuracy	0 to 55°C	±0.4% (full scale)		
		Conversion		250 μs/point		
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me	ethod	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)		
Insulation resistance	$20\ \text{M}\Omega$ min. between isolated circuits (at 100 VDC)	Dielectric st	trength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.		
I/O power supply	Supply from the NX bus	Current cap		IOV: 0.1 A/terminal max., IOG: 0.1 A/termi		
method		power supp	-	nal max.		
NX Unit power con- sumption	Connected to a CPU Unit 1.35 W max.	Current con from I/O po	wer supply	No consumption		
	Connected to a Communications Cou- pler Unit 1.10 W max.					
Weight	70 g max.					
	Terminal block	AMP AG AG: A	NX bus NX bus connector (right)			
Installation orienta- tion and restrictions	 Installation orientation: Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupl Possible in 6 orientations. Restrictions: No restrictions 	ler Unit				
Terminal connection diagram	Additional I/O Power Supply Unit A1 B1 A I OV IOV 24 VDC IOV IOV IOV IOV IOG IOG A8 B8 A	Voltage Input Unit NX-AD3603 A1 B1 Input1+Input2+ IOV IOV IOG IOG ING IOG A8 B8				
Input disconnection	Not supported.					
detection						

Unit name	Analog Input Unit (voltage input type)	Model		NX-AD36	604
Number of points	4 points			_	s clamping terminal block (12 ter-
		terminals		minals)	
I/O refreshing method	Free-Run refreshing				
Indicators	TS indicator	· · ·			al input
		Input range		-10 to +10 V	
	AD3604	Input conve	rsion range	-5 to 105	% (full scale)
	■TS	Absolute m	aximum	±15 V	
		rating		4.140	
		Input imped Resolution	ance	1 MΩ mir 1/8000 (fr	
		Overall	25°C	±0.2% (ft	/
		accuracy	25 C 0 to 55°C	±0.2 % (ft ±0.4% (ft	/
		Conversion			
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me		250 µs/po	the input and the NX bus: Power
Dimensions		ISOIdtion me	linou	= Transfo	prmer, Signal = Digital isolator (no between inputs)
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	Dielectric st	rength	510 VAC	between isolated circuits for 1 a leakage current of 5 mA max.
I/O power supply	No supply	Current cap			O power supply terminals
method		power supp	-		
NX Unit power con-	Connected to a CPU Unit	Current cor from I/O po		No consu	Imption
sumption	1.35 W max.Connected to a Communications Cou-	nom i/o po	wersuppry		
	pler Unit				
	1.10 W max.				
Weight	70 g max.				
Circuit layout]
	Terminal block Input1– to 4– AG NX bus connector (left) I/O power supply +	ΑΜΙ 25510 KΩ AG	/	(> I/O power supply + Connector > I/O power supply – (right)
Installation orienta-	Installation orientation:				
tion and restrictions	Connected to a CPU Unit				
	Possible in upright installation.				
	Connected to a Communications Coupl	er Unit			
	Possible in 6 orientations.				
	Restrictions: No restrictions				
Terminal connection	Voltage Input Unit				
diagram				e the Unit.	
Input disconnection	Not supported.				
detection					

Α

A-1-2 Analog Input Units

Unit name	Analog Input Unit (voltage input type)	Model		NX-AD36	608	
Number of points	4 points	External connection		Screwles minals)	s clamping terminal block (12 ter-	
I/O refreshing method	Switching synchronous I/O refreshing and F					
Indicators	TS indicator	Input metho	bd	Differenti	Differential input	
		Input range		-10 to +1	0 V	
	AD3608		ersion range		% (full scale)	
	-13	Absolute m	naximum	±15 V		
		rating Input imped	10000	1 MΩ mir	2	
		Resolution	Jance		(full scale)	
		Overall	25°C	±0.1% (fu	, ,	
		accuracy	0 to 55°C	±0.1% (ft	,	
		Conversion		10 µs/poi	;	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me		Between = Transfo	the input and the NX bus: Power ormer, Signal = Digital isolator (no between inputs)	
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	Dielectric s	trength	510 VAC	between isolated circuits for 1 t a leakage current of 5 mA max.	
I/O power supply method	No supply	Current cap power supp	oly terminal		/O power supply terminals	
NX Unit power con- sumption	 Connected to a CPU Unit 1.45 W max. Connected to a Communications Coupler Unit 	Current co from I/O pc	nsumption ower supply	No consu	Imption	
	1.10 W max.					
Weight	70 g max.			1		
	Terminal block Input1– to 4– AG ↓ § 510 K AG ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	AMP AMP AG: Analog circuit AG I/O power supply + I/O power supply -				
Installation orienta- tion and restrictions	Installation orientation: Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coup Possible in 6 orientations. Restrictions: No restrictions Voltage Input Unit NX-AD3608	ler Unit				
Input disconnection				e the Unit.		
detection						

Unit name	Analog Input Unit (current input type)	Model	NX-AD4203			
Number of points	8 points	External connection	Screwless clamping terminal block (16 ter-			
•		terminals	minals)			
I/O refreshing method	Free-Run refreshing					
Indicators	TS indicator	Input method	Single-ended input			
		Input range	4 to 20 mA			
	AD4203	Input conversion range	-5 to 105% (full scale)			
		Absolute maximum rating	±30 mA			
		Input impedance	85 Ω			
		Resolution	1/8000 (full scale)			
		Overall 25°C	±0.2% (full scale)			
		accuracy 0 to 55°C	±0.4% (full scale)			
		Conversion time	250 μs/point			
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation method	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)			
Insulation resistance	20 MΩ min. between isolated circuits (at	Dielectric strength	510 VAC between isolated circuits for 1			
	100 VDC)	3 *	minute at a leakage current of 5 mA max.			
I/O power supply method	Supply from the NX bus	Current capacity of I/O power supply terminal	IOV: 0.1 A/terminal max.			
NX Unit power con- sumption	Connected to a CPU Unit	Current consumption from I/O power supply	No consumption			
Sumption	1.40 W max.Connected to a Communications Cou-					
	pler Unit					
	1.05 W max.					
Weight	70 g max.		1			
Circuit layout						
	Terminal block Input1+ to 8+ NX bus connector (left) I/O power supply + I/O power supply –	AMP AG	I/O power supply + NX bus connector (right)			
Installation orienta-	Installation orientation:					
tion and restrictions	 Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupl Possible in 6 orientations. Restrictions: No restrictions 	er Unit				
Terminal connection diagram	Additional I/O Power Supply Unit	y Current Input Unit NX-AD4203				
	● IOV IOV IOG IOG </th <th colspan="5">G IOV IOV G Input3+Input4+ 24 V (Sensor power suppl G IOV IOV G IOV IOV G IOV IOV G Input5+Input6+ G IOV G IOV Input7+Input8+</th>	G IOV IOV G Input3+Input4+ 24 V (Sensor power suppl G IOV IOV G IOV IOV G IOV IOV G Input5+Input6+ G IOV G IOV Input7+Input8+				
Input disconnection detection	Supported					

Unit name	Analog Input Unit (current input type)	Model		NX-AD42	04	
Number of points	8 points	External connection			s clamping terminal block (16 ter-	
-				minals)		
I/O refreshing method	Free-Run refreshing					
Indicators	TS indicator	Input metho			Differential input	
	AD4204	Input range		4 to 20 m		
	AD4204		ersion range		% (full scale)	
		Absolute m rating	naximum	±30 mA		
		Input imped	lance	85 Ω		
		Resolution		1/8000 (ft	Ill scale)	
		Overall	25°C	±0.2% (fu	,	
		accuracy	0 to 55°C∼	±0.4% (fu	ll scale)	
		Conversion	time	250 µs/po	int	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation mo	ethod	= Transfo	the input and the NX bus: Power rmer, Signal = Digital isolator (no between inputs)	
Insulation resistance	20 M Ω min. between isolated circuits (at 100 VDC)	Dielectric s	trength		between isolated circuits for 1 a leakage current of 5 mA max.	
I/O power supply method	No supply	Current cap power supp	oly terminal		O power supply terminals	
NX Unit power con- sumption	 Connected to a CPU Unit 1.40 W max. Connected to a Communications Coupler Unit 1.05 W max. 	Current consumption from I/O power supply		No consumption		
Weight	70 g max.					
	Terminal block Input1– to 8–		AG: A		> I/O power supply + connector > I/O power supply –] (right)	
Installation orienta- tion and restrictions		ler Unit ut + ut –				
Input disconnection detection	Input5 Input6+ Input5-Input6- Input7-Input8+ Input7-Input8- A8 B8					

Number of points B points External connection terminals Screwless champing terminal block (16 ter- minals) I/O refreshing method Switching synchronous I/O refreshing and Pree-Run refreshing Differential input minals) Indicators TS indicator Input method Differential input Differential input AD4203 Absolute maximum rating 40 20 mA Differential input 30 mA Input conversion range 5 to 105% (full scale) Absolute maximum rating 430 mA 30 mA Input conversion range 5 to 105% (full scale) Conversion time 10 upshoint 10 upshoint Dimensions 12 (W) x 100 (H) x 71 (D) Isolation method Between the Input and the NX bus: Power isolation between inputs) Solation (full scale) Insulation resistance 20 MC min. between isolated circuits (at 100 VDC) Dielectric strength 100 VDC 510 VAC between isolated circuits for 1 minals 510 VAC between isolated circuits for 1 minals NX Unit power con- sumption • Connected to a CPU Unit 1, put 1: to 8+ (eff) Current consumption No consumption NX Unit power con- per Unit 1.10 W max. Installation orientation: (log power supply + (log power supply - (log power supply - (log power supply -	Unit name	Analog Input Unit (current input type)	Model		NX-AD42	08
terminals terminals Indicators Switching synchronous ID refreshing and Free-Run refreshing Indicators TS indicator AD4208 Implementation Indicators AD4208 Implementation Switching synchronous ID refreshing and Free-Run refreshing Implementation AD4208 Implementation Switching synchronous ID refreshing and Free-Run refreshing Implementation Switching synchronous ID refreshing and refree-Run refreshing Implementation Switching synchronous ID refreshing and refree-Run refreshing Implementation Switching synchronous ID refreshing refresh					_	
Indicators TS indicator Input method Differential input AD4208 •••• •••• •••• AD4208 •••• •••• •••• Input tended Differential input Input tended Differential input Input tended 5 to 105% (full scale) AD50/UE maximum 130 mA atting 1100000 (full scale) Dimensions 12 (W) x 100 (H) x 71 (D) Insulation resistance 20 MC min. between isolated drcuits (at 100 VDC) Insulation resistance 20 MC min. between isolated drcuits (at 100 VDC) No supply Current capacity of I/O power supply No supply Current capacity of I/O power supply terminal NX Unit power con- sumption • Connected to a CPU Unit 1.45 W max. Or op mex. • Connected to a CPU Unit 1.45 W max. Installation orientation: • Consected to a CPU Unit 1.45 W max. Installation orientation: • Consected to a CPU Unit 1.45 W max. Internet at all through + + to fail the failed orients in the 100 power supply + 100 power supply + 100 power supply + 100 power supply - 100 po						
Imput mage 4 to 20 mA Input mage 4 to 20 mA Input may and so to 10% (ull scale) 230 mA Absolute maximum 230 mA nature 100000 (ull scale) Overall 25 C 10 pays rule 20 mA 10 pays rule 10 pays (ull scale) 10 pays rule 20 MO min. between isolated circuits (at 100 VDC). 10 pays rule 20 MO min. between isolated circuits (at 100 VDC). 10 pays rule 20 MO min. between isolated circuits (at 100 VDC). 10 pays rule 510 VMC between isolated circuits (at 100 VDC). 10 pays rule 10 pays rule 10 pays rule 50 VMC between isolated circuits (at 100 VDC). 10 pays rule 10 pays rule 10 pays rule 10 pays rule 10 pays rule 10 pays rule 110 VD max. 100	I/O refreshing method	Switching synchronous I/O refreshing and F	ree-Run refres	shing		
AD4203 •••••••••••••••••••••••••••••••	Indicators	TS indicator	Input metho	bd	Differentia	al input
13 Absolute maximum 23 mA Input impedance 25 G Resolution 112000 (full scale) Overall 22 G 20 MG min. between isolated circuits (at 100 VCC) Dielectric strength 100 voc 20 MG min. between isolated circuits (at 100 VCC) Dielectric strength 100 voc 20 MG min. between isolated circuits (at 100 VCC) Dielectric strength 100 voc 20 MG min. between isolated circuits (at 100 VCC) Dielectric strength 100 voc 0 or supply No supply 00 voer supply No supply Current capacity of I/O method NX Unit power con- sumption - Connected to a CPU Unit 1.0 W max. Current consumption 1.0 W power supply Weight 70 g max. Circuit layout Insulation orienta- tion and restrictions Installation orienta- tion and restrictions Insulation: Coupler supply + (Ht) Installation orienta- tion and restrictions Insulation: Corrent top out any pit / (Ht) Terminal connection of NAAAA238 Insulations: No consumption Terminal connection of NAAAA238 Input + Input + Input - Input + Input - Input - I			Input range		4 to 20 mA	
Ausonue maximum 200 m/m Input impodance 85 0 m/m Input impodance 85 0 m/m Input impodance 1300000 full scale) Overall 25°C 40.1% (full scale) Orrenting 10 poor 10 poor Dimensions 12 (W) x 100 (H) x 71 (D) Isolation method Between the input and the ND bus: Poore Insulation resistance 20 MD min. between isolated dircuits (at 100 VOC) Delectric strength 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. VD power supply No supply Current capacity of I/O Whotu I/O power supply terminal NV Unit power construction 1.6 W max. Current capacity of I/O Without I/O power supply terminal Wolght 70 g max. Terminal act [Input1+ 10 8+ full scale for 100 power supply terminal No consumption Installation orientation: . Connected to a COPU Unit . Adv Adv S to NCA As Analog circuit internal Stole (Input1+ 10 8+ full scale for Adv S to NCA As Analog circuit internal Stole (Input1+ 10 8+ full scale for Adv S to NCA As Analog circuit internal Stole (Input1+ 10 8+ full scale for Adv S to NCA As Analog circuit internal Stole (Input1+ 10 8+ full scale for Adv S to NCA As Analog circuit internal Stole (Input1+ 10 8+ full scale for Adv S to NCA As Analog circuit internal Stole (Input1+ 10 8+ full scale for Adv S to NCA As Analog circuit internal Stole (Input1+ 10 8+ full scale for Adv S to NCA As Analog circuit internal Stole (Input1+ 10 8+ full scale for Adv S to NCA As			Input conve	ersion range	-5 to 105	% (full scale)
Imput impedance 95 0 Resolution 1/30000 (full scale) Overall 25°C 40.7% (full scale) Output 10 55°C 40.2% (full scale) Dimensions 12 (W) x 100 (H) x 71 (D) Isolation method 10 40.5% (full scale) Insulation resistance 20 MQ min. between isolated circuits (at 100 VDC) Delectric strongth 510 VAC between isolated circuits (at 100 VDC) IN o supply No supply Current capacity of 1/0 Without I/O power supply terminal NN Unit power consumption Connected to a CPU Unit 1.00 VDC; Connected to a CPU Unit 1.00 VDC; Connected to a CONTUNICATIONS Cou- Connected to a Communications Cou- Perform I/O power supply No consumption No supply Connected to a Communications Cou- Perform I/O power supply No consumption Insulation orientation: Connected to a CPU Unit 1.00 VDC; Insulation orientation: Connected to a CPU Unit 1.00 VDC; Installation orientation: Connected to a CPU Unit 1.00 VDC; Installation orientation: Connected to a CPU Unit Poster supply Installation orientation: Connected to a CPU Unit Poster supply Installation orientation: Connected to a CPU Unit Poster supply Possible in 0 orientations. Restrictions: No restrictions Restrictions: No restrictions Restrictions: No r		■IS		naximum	±30 mA	
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Insulation resistance 20 MG min. between isolated circuits (at 100 VDC) Delectric strength 510 VAC between isolated circuits for 1 minule at a leakage current of 5 mA max. W0 power supply mothod No supply Current capacity of I/O power supply terminals No consumption NX Unit power con- sumption • Connected to a CPU Unit 1.45 W max. • Connected to a Communications Cou- per Unit 1.10 W max. Current capacity of I/O power supply terminals No consumption Weight 70 g max. • Connected to a CPU Unit 1.10 W max. State of the	_					
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I/O power supply method No supply Current capacity of UO power supply terminal power supply terminal Without I/O power supply terminals Sumption Connected to a CPU Unit 1.45 W max. Connected to a Communications Cou- pler Unit 1.10 W max. Connected to a Communications Cou- pler Unit 1.10 W max. Weight 70 g max. Circuit layout Terminal block Input1+ to 8+ (left) Input1+ (left) Input1+ (left) Input1+ (left) Input1+ (left) Input1+ (left) Connected to a CPU Unit Possible in orientation. Connected to a CPU Unit Possible in orientations. Restrictions: No restrictions Current Input1 Unit (left) Input1+ (left) Input3- (left) In	Insulation resistance	•	Dielectric st	trength	510 VAC	between isolated circuits for 1
sumption 1.45 W max. • Connected to a Communications Cou- from I/O power supply Weight 70 g max. Circuit layout Terminal bloc Input1+ to 8+ NX bus Input1+ to 8+ Input1+ to 8+ Vietght 1/O power supply + NX bus Installation orientation: I/O power supply + I/O power supply + Installation orientation: • Connected to a CPU Unit Possible in upright installation. Possible in 0 prientations: • Connected to a CPU Unit Possible in 6 orientations: Possible in 6 orientations: • Connected to a Communications Coupler Unit Possible in 6 orientations: • Connected to a Communications Coupler Unit Possible in 6 orientations: • Connected to a Communications Coupler Unit Possible in 6 orientations: • Connected to a Communications Coupler Unit Possible in 6 orientations: • Connected to a Communications Coupler Unit Possible in 6 orientations: • Connected to a Communications Coupler Unit Possible in 6 orientations: • Input1+input2+input4+input3+input4+input3+input4+input3+input4+input3+input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input4+input3-input	I/O power supply method	No supply				
initial connection • Connected to a Communications Coupler Unit 1.10 W max. Weight 70 g max. Circuit layout Imput + to 8+ Imput - to 8- (remaind block internal GND) Imput + to 8+ Imput - to 8- (remaind block internal GND) NX bas (remaind block internal GND) IVO power supply + (remaind block internal GND) IVO power supply + (remaind GND) Installation orientation: • Connected to a CPU Unit Possible in upright installation. • Connected to a CPU Unit Possible in G orientations. Terminal connection diagram Current Input Unit NX-AD4208 imput + input + input - input + input - input + input - input + input - input - input - input - input - Imput + input - input + input - input + input - input -	NX Unit power con-				No consu	mption
pler Unit 1.10 W max. Weight 70 g max. Circuit layout Input1+ to 8+ Input1- to 8- (left) Input1+ to 8+ Input1- to 8- (left) Input1+ to 8+ Input1- to 8- (left) NX bus cornector (left) I/O power supply + VO power supply + VO power supply - (left) Installation orientation: VO power supply - VO power supply - VO power supply - (left) Installation orientation: • Connected to a CPU Unit Possible in upright installation. Connected to a CPU Unit Possible in 6 orientations. Restrictions: Restrictions Terminal connection diagram Current Input Unit Input1- input2- input1- input2- input2- input1- input2- input1- inpu	sumption		from I/O po	ower supply		
Veight 70 g max. Circuit layout Terminal block Input + to 8+ (Input - to						
Weight 70 g max. Circuit layout Imput1+ to 8+ Terminal blox Input1+ to 8+ Input1- to 8- AG: Analog circuit internal GNU NX bus concector (left) I/O power supply + Installation orienta- tion and restrictions Installation orientation: • Connected to a CPU Unit Possible in 0 orientations. • Connected to a CPU Unit Possible in 0 orientations. Restrictions: No restrictions Restrictions Terminal connection diagram Imput1+input2+ input3-input4- input3-inpu						
Circuit layout Terminal block Terminal block Terminal block Terminal block Terminal block Terminal block Terminal block Terminal block Terminal connector tion and restrictions Terminal connector diagram Terminal connection Terminal conn	Woight					
Installation orienta- tion and restrictions Installation orientation: INC bus connector (left) Installation orientation: INC bus connector (left) Installation orientation: INC power supply + INC bus connector (left) Installation orientation: INC power supply + INC bus connector INC power s	-					-
tion and restrictions Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupler Unit Possible in 6 orientations. Terminal connection diagram Current Input Unit NX-AD4208 Input 1+ Input2+ Input1-Input2+ Input3+ Input14+ Input1- Input3+ Input14+ Input3+ Input4+ Input3+ Input4+ Input3+ Input6+ Input3+ Input3+ Input6+ Input3+ Input3+ Inpu		NX bus [I/O power supply + 0	l l	AG: Ar	ernal GND	connector
tion and restrictions Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupler Unit Possible in 6 orientations. Terminal connection diagram Current Input Unit NX-AD4208 Input 1+ Input2+ Input1-Input2+ Input3+ Input14+ Input1- Input3+ Input14+ Input3+ Input4+ Input3+ Input4+ Input3+ Input6+ Input3+ Input3+ Input6+ Input3+ Input3+ Inpu	In - 4 - 11 - 41 - 11 - 11 - 11 - 11 - 11					-
Imput disconnection • Connected to a CP of ont Possible in upright installation. • Connected to a Communications Coupler Unit Possible in 6 orientations. Restrictions: No restrictions Terminal connection						
• Connected to a Communications Coupler Unit Possible in 6 orientations. Restrictions: No restrictions Terminal connection diagram Imput 1 input - input 0 int input - input - input - input + input - input + input - input + input - input - input + input - in						
Possible in 6 orientations. Restrictions: No restrictions Terminal connection diagram Output Input1+Input2+ Input1+Input2+ Input1+Input2+ Input1+Input2+ Input1+Input2+ Input1+Input2+ Input5+Input6+ Input5-Input6+ Input7-Input8+ B			or l Init			
Restrictions: No restrictions Terminal connection diagram Imput 1 input 2 + 0 + 1 input 2 + 0						
Terminal connection diagram Current Input Unit NX-AD4208 A1 B1 Input1+Input2+0 Input + Input3-Input4- Input4- Input5-Input6- Input7+ Input7-Input8- B8						
diagram diagram Low the second seco	Terminal composition	Restrictions: No restrictions				
	diagram	NX-AD4208 A1B1 Input1+Input2+ Input3+Input4+ Input3-Input6+ Input5-Input6- Input7+Input8+ Input7-Input8- A8B8				
		Supported				

Unit name	Analog Input Unit (voltage input type)	Model		NX-AD4603	
Number of points	8 points	External connection		Screwless clamping terminal block (16 ter-	
-		terminals		minals)	
I/O refreshing method	Free-Run refreshing				
Indicators	TS indicator	Input metho	d	Single-ended input	
	AD4603			-10 to +10 V	
		Input conver Absolute m		-5 to 105% (full scale) ±15 V	
		rating	aximum	±15 V	
		Input imped	ance	1 MΩ min.	
		Resolution		1/8000 (full scale)	
		Overall	25°C	±0.2% (full scale)	
		accuracy	0 to 55°C	±0.4% (full scale)	
		Conversion	time	250 μs/point	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me	thod	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)	
Insulation resistance	20 M Ω min. between isolated circuits (at 100 VDC)	Dielectric st	rength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.	
I/O power supply method	Supply from the NX bus	Current capa power suppl	•	IOG: 0.1 A/terminal max.	
NX Unit power con-	Connected to a CPU Unit	Current con		No consumption	
sumption	1.45 W max.	from I/O pov	wer supply		
	Connected to a Communications Coupler Unit				
	1.15 W max.				
Weight	70 g max.			1	
Circuit layout					
	Terminal block AG	AG: Analog circuit AG internal GND I/O power supply + I/O power supply – NX bus connecto (right)			
Installation orienta-	Installation orientation:				
tion and restrictions	 Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupl 	er Unit			
	Possible in 6 orientations.				
	Restrictions: No restrictions				
Terminal connection diagram	Additional I/O Power Supply Unit Connection I	upply Voltage Unit NX-/	e Input Unit AD4603		
	A1 B1 IOV IOV IOV IO IOV IOV IO IOV IOV IOV IOV IOV IOV IOV IOV IOV IOV	V IOG V Input3 V IOG V IOG V IOG V Input5 V Input5 V Input5 V Input5 V Input5 V Input5	3+Input4+ IOG IOG IOG i+Input6+ IOG IOG IOG '+Input8+ IOG	Input + 24 V (Sensor power supply +) 0 V (Sensor power supply – / Input –) Three-wire sensor	
Input disconnection detection	Not supported.				

Unit name	Analog Input Unit (voltage input type)	Model		NX-AD46	Ω4	
Number of points	8 points			-	s clamping terminal block (16 ter-	
-		terminals		minals)		
I/O refreshing method	Free-Run refreshing	luoneet us ath a	al	Differentia	1	
Indicators	TS indicator	Input range		Differential input -10 to +10 V		
	AD4604					
	AD4604 ■TS	Input conve			% (full scale)	
		Absolute m rating	naximum	±15 V		
		Input imped	lance	1 MΩ min		
		Resolution		1/8000 (fu	III scale)	
		Overall	25°C	±0.2% (fu	ll scale)	
		accuracy	0 to 55°C	±0.4% (fu	ll scale)	
		Conversion	time	250 µs/po	int	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me		Between t = Transfor	the input and the NX bus: Power rmer, Signal = Digital isolator (no	
	00 MO min hat was included insults (at	Distantal and			etween inputs)	
Insulation resistance	$20 \text{ M}\Omega$ min. between isolated circuits (at 100 VDC)	Dielectric st		minute at	between isolated circuits for 1 a leakage current of 5 mA max.	
I/O power supply method	No supply	Current cap power supp		Without I/	O power supply terminals	
NX Unit power con-	Connected to a CPU Unit	Current con		No consu	mption	
sumption	1.45 W max.	from I/O po	wer supply			
	Connected to a Communications Cou- pler Unit					
Waight	1.15 W max.					
Weight Circuit layout	70 g max.					
	Terminal block Input1– to 8– S 510 K AG NX bus connector (left) I/O power supply +	AG AG: Analog circuit internal GND AG AG: Analog circuit internal GND I/O power supply + I/O power supply –				
In						
Installation orienta- tion and restrictions	 Installation orientation: Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupl Possible in 6 orientations. Restrictions: No restrictions 	er Unit				
diagram Input disconnection	Voltage Input Unit NX-AD4604 A1B1 Input1+Input2+ Input3+Input4+ Input3-Input6+ Input5+Input6+ Input7+Input8+ Input7-Input8- A8B8 Not supported.	ut + ut –				
detection						

Unit name	Analog Input Unit (voltage input type)	Model		NX-AD4608
Number of points	8 points	External connection		Screwless clamping terminal block (16 ter-
		terminals		minals)
I/O refreshing method	Switching synchronous I/O refreshing and F		-	Differential input
Indicators	TS indicator	Input metho Input range	a	Differential input -10 to +10 V
	AD4608	Input range	rsion range	-5 to 105% (full scale)
	TS	Absolute m		±15 V
		rating		
		Input imped	ance	1 MΩ min.
		Resolution	-	1/30000 (full scale)
		Overall	25°C	±0.1% (full scale)
		accuracy	0 to 55°C	±0.2% (full scale)
		Conversion		10 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation me	ethod	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	$20 \text{ M}\Omega$ min. between isolated circuits (at 100 VDC)	Dielectric st	-	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	No supply	Current cap power supp	ly terminal	Without I/O power supply terminals
NX Unit power con- sumption	Connected to a CPU Unit 1.45 W max.	Current cor from I/O po		No consumption
Sumption	Connected to a Communications Cou-		nei suppiy	
	pler Unit 1.15 W max.			
Weight	70 g max.			
Circuit layout				
	Terminal block Input1- to 8- \$510 K AG NX bus connector (left) I/O power supply +	AG AG: A	I/O power supply + NX bus NX bus connector (right)	
Installation orienta-	Installation orientation:			
tion and restrictions		ler Unit ut + ut –		
Input disconnection	Input7+Input8+ Input7-Input8- A8 B8 Not supported.			
detection				

A-1-3 Analog Output Units

Description of Items on the Data Sheet of the Analog Output Unit

The meanings of the items on the data sheet of the Analog Output Unit are explained in the table below.

ltem	Description				
Unit name	The name of the Unit.				
Model	The model of the Unit.				
Number of points	The number of analog output points provided by the Unit.				
External connection ter- minals	The type of terminal block and connector that is used for connecting the Unit. The number of terminals on the terminal block is also described when a screwless clamping terminal block is used.				
I/O refreshing method	The I/O refreshing methods that are used by the Unit. Free-Run refreshing and synchronous I/O refreshing are available.				
Indicators	The type of indicators on the Unit and the layout of those indicators.				
Output range	The output range of the Unit.				
Output conversion range	The conversion range from the converted values of the Unit to analog output signals for the full scale. Output converted values range is fixed to the conversion limit value.				
Allowable load resistance	The resistance value of external load that can be connected to the Unit. The minimum value is written for voltage output and the maximum value is written for current output.				
Output impedance	The output impedance of the Unit.				
Resolution	The resolution of converted values of the Unit.				
Overall accuracy	The conversion accuracy of analog outputs of the Unit. It is defined under the conditions of 25° C and 0 to 55° C.				
Conversion time	The time required to convert output set values of the Unit to the analog output signals.				
Dimensions	The dimensions of the Unit. They are described as W x H x D. The unit is "mm".				
Isolation method	The isolation method between the output circuits and internal circuits and between the output circuits of the Unit.				
Insulation resistance	The insulation resistance between the output circuits and internal circuits and between the output circuits of the Unit.				
Dielectric strength	The dielectric strength between the output circuits and internal circuits and between the output circuits of the Unit.				
I/O power supply method	The method for supplying I/O power for the Unit. The supply method is determined for each Unit. The power is supplied from the NX bus or the external source.				
Current capacity of I/O power supply terminal	The current capacity of the I/O power supply terminals (IOV/IOG) of the Unit. Do not exceed this value when supplying the I/O power to the connected external devices.				
NX Unit power consump- tion	The power consumption of the NX Unit power supply of the Unit. The power consumption when NX Units are connected to a CPU Unit and the power consumption when NX Units are connected to a Communications Coupler Unit.				
Current consumption from I/O power supply	The current consumption from I/O power supply of the Unit. The above input current and cur- rent consumption of any connected external devices are excluded.				
Weight	The weight of the Unit.				
Circuit layout	The output circuit layout of the Unit.				
Installation orientation and restrictions	The installation orientation of a CPU Unit containing the Unit and the installation orientation of a Slave Terminal containing the Unit. Any restrictions to specifications that result from the installation orientation are also given.				
Terminal connection dia- gram	A diagram of the connection between the Unit and connected external devices. When an I/O Power Supply Connection Unit or a Shield Connection Unit is required to be connected to the connected external devices, the description for such is included.				

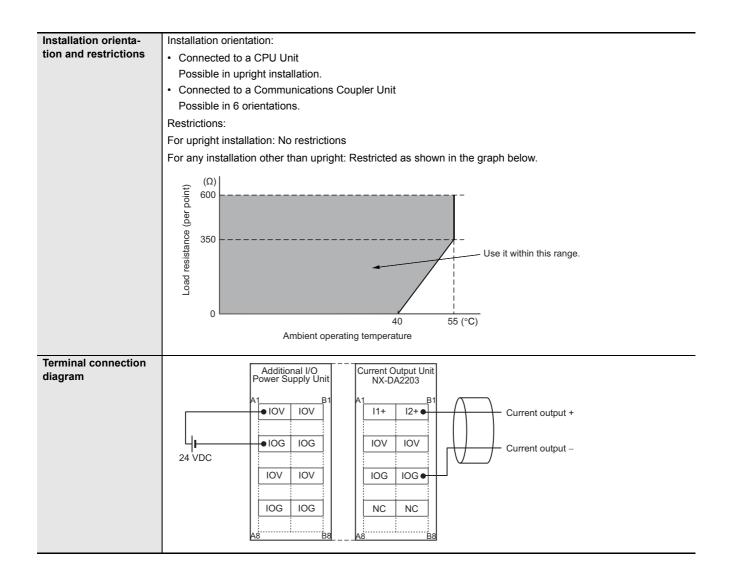
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A-1-3 Analog Output Units

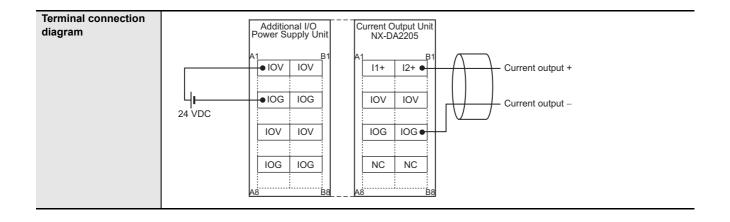
Analog Output Units (Screwless Clamping Terminal Block, 12 mm Width)

Unit name	Analog Output Unit (current output type)	Model		NX-DA2203	
Number of points	2 points	External connection terminals		Screwless clamping terminal block (8 ter- minals)	
I/O refreshing method	Free-Run refreshing				
Indicators	TS indicator	Output range		4 to 20 mA	
	DA2203	Output conversion range		-5 to 105% (full scale)	
	■TS	Allowable load resis- tance		600 Ω max.	
		Resolution		1/8000 (full scale)	
		Overall	25°C	±0.3% (full scale)	
		accuracy	0 to 55°C	±0.6% (full scale)	
		Conversion time		250 μs/point	
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation method		Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)	
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC) Dielectric strength		510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.		
I/O power supply method	Supply from the NX bus	Current capacity of I/O power supply terminal		IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.	
NX Unit power con-	Connected to a CPU Unit	Current co		No consumption	
sumption	2.10 W max.	from I/O power supply			
	Connected to a Communications Coupler Unit				
	1.75 W max.				
Weight	70 g max.				
Circuit layout	NX bus connector (left) I/O power supply + I/O power supply –			IOV Output I1+ to I2+ IOG I/O power supply + I/O power supply – I/O power supply –	

Appendices



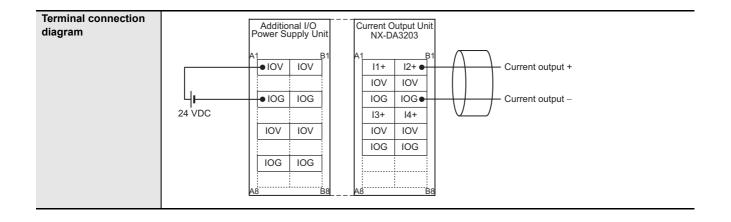
halog Output Unit (current output type) points witching synchronous I/O refreshing and Fr S indicator DA2205 TS 2 (W) x 100 (H) x 71 (D) 2 (W) x 100 (H) x 71 (D) 0 MΩ min. between isolated circuits (at 00 VDC) upply from the NX bus	Model External con terminals ee-Run refres Output rang Output com range Allowable lo tance Resolution Overall accuracy Conversion Isolation me	shing ge version bad resis- 25°C 0 to 55°C time	NX-DA2205 Screwless clamping terminal block (8 terminals) 4 to 20 mA -5 to 105% (full scale) 600 Ω max. 1/30000 (full scale) ±0.1% (full scale) ±0.3% (full scale) 10 µs/point	
S indicator DA2205 ■TS 2 (W) x 100 (H) x 71 (D) 0 MΩ min. between isolated circuits (at 00 VDC)	ee-Run refres Output range Output conv range Allowable lo tance Resolution Overall accuracy Conversion Isolation me	ge version pad resis- 25°C 0 to 55°C time	4 to 20 mA -5 to 105% (full scale) 600 Ω max. 1/30000 (full scale) ±0.1% (full scale) ±0.3% (full scale) 10 μs/point	
S indicator DA2205 ■TS 2 (W) x 100 (H) x 71 (D) 0 MΩ min. between isolated circuits (at 00 VDC)	Output rang Output conv range Allowable lo tance Resolution Overall accuracy Conversion Isolation me	ge version pad resis- 25°C 0 to 55°C time	-5 to 105% (full scale) 600 Ω max. 1/30000 (full scale) ±0.1% (full scale) ±0.3% (full scale) 10 μs/point	
DA2205 ■TS 2 (W) x 100 (H) x 71 (D) 0 MΩ min. between isolated circuits (at 00 VDC)	Output com range Allowable lo tance Resolution Overall accuracy Conversion Isolation me	version bad resis- 25°C 0 to 55°C time	-5 to 105% (full scale) 600 Ω max. 1/30000 (full scale) ±0.1% (full scale) ±0.3% (full scale) 10 μs/point	
■TS 2 (W) x 100 (H) x 71 (D) 0 MΩ min. between isolated circuits (at 00 VDC)	range Allowable lo tance Resolution Overall accuracy Conversion Isolation me	25°C 0 to 55°C time	600 Ω max. 1/30000 (full scale) ±0.1% (full scale) ±0.3% (full scale) 10 μs/point	
2 (W) x 100 (H) x 71 (D) 0 MΩ min. between isolated circuits (at 00 VDC)	tance Resolution Overall accuracy Conversion Isolation me	25°C 0 to 55°C time	1/30000 (full scale) ±0.1% (full scale) ±0.3% (full scale) 10 μs/point	
) M Ω min. between isolated circuits (at 00 VDC)	Overall accuracy Conversion Isolation me	0 tO 55°C time	±0.1% (full scale) ±0.3% (full scale) 10 μs/point	
) M Ω min. between isolated circuits (at 00 VDC)	accuracy Conversion Isolation me	0 tO 55°C time	±0.3% (full scale) 10 μs/point	
) M Ω min. between isolated circuits (at 00 VDC)	Conversion Isolation me	time	10 μs/point	
) M Ω min. between isolated circuits (at 00 VDC)	Isolation me			
) M Ω min. between isolated circuits (at 00 VDC)		ethod		
00 VDC)	Dielectric st		Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)	
upply from the NX bus	Dicicotino St	trength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.	
	Current cap power supp		IOV: 0.1 A/terminal max., IOG: 0.1 A/terminal max.	
Connected to a CPU Unit	Current cor		No consumption	
2.10 W max.	from I/O po	ower supply		
Connected to a Communications Cou-				
pler Unit 1.75 W max.				
70 g max.				
- 3				
AG: Analog circuit internal GND (left) I/O power supply +			Output I1+ to I2+ IOG I/O power supply + I/O power supply - NX bus connector (right)	
stallation orientation:				
 Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupler Unit Possible in 6 orientations. Restrictions: For upright installation: No restrictions For any installation other than upright: Restricted as shown in the graph below. 				
	600	600		



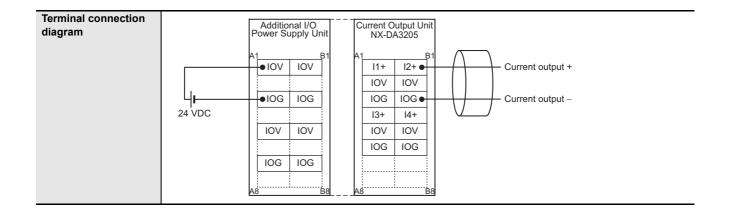
Unit name	Analog Output Unit (voltage output type)	NX-DA2603			
Number of points	2 points	External connection	Screwless clamping terminal block (8 ter-		
		terminals	minals)		
I/O refreshing method	Free-Run refreshing				
Indicators	TS indicator	Output range Output conversion	-10 to +10 V -5 to 105% (full scale)		
	DA2603	range			
	■TS	Allowable load resis-	5 kΩ min.		
		Output impedance	0.5 Ω max.		
		Resolution	1/8000 (full scale)		
		Overall 25°C accuracy 0 to 55°C	±0.3% (full scale) ±0.5% (full scale)		
		• • • • • • • • •			
Dimensions	12 (W) x 100 (H) x 71 (D)	Conversion time Isolation method	250 μs/point Between the input and the NX bus: Power		
Dimensions		Isolation method	= Transformer, Signal = Digital isolator (no isolation between inputs)		
Insulation resistance	20 M Ω min. between isolated circuits (at	Dielectric strength	510 VAC between isolated circuits for 1		
	100 VDC) Supply from the NX bus	Current capacity of I/O	minute at a leakage current of 5 mA max.		
I/O power supply method	Supply from the NX bus	power supply terminal	IOV: 0.1 A/terminal max., IOG: 0.1 A/termi- nal max.		
NX Unit power con-	Connected to a CPU Unit	Current consumption	No consumption		
sumption	1.40 W max.	from I/O power supply			
	Connected to a Communications Cou-				
	pler Unit				
Moisht	1.10 W max.				
Weight Circuit layout	70 g max.				
	AG: Analog internal GNI connector (left) I/O power supply + 0		Output V1+ to V2+ IOG I/O power supply + I/O power supply - NX bus connector (right)		
Installation orienta- tion and restrictions	Installation orientation:				
tion and restrictions	Connected to a CPU Unit				
	Possible in upright installation.Connected to a Communications Coupl	or Lipit			
	Possible in 6 orientations.				
	Restrictions: No restrictions				
Terminal connection diagram	Additional I/O Power Supply Unit A				

Unit name	Analog Output Unit (voltage output type) Model NX-DA2605				
Number of points	2 points	External connection	Screwless clamping terminal block (8 ter-		
•		terminals	minals)		
I/O refreshing method	Switching synchronous I/O refreshing and Free-Run refreshing				
Indicators	TS indicator	Output range Output conversion	-10 to +10 V		
	DA2COF	-5 to 105% (full scale)			
	DA2605 ■TS	E 10 min			
		5 kΩ min.			
		tance Output impedance	0.5 Ω max.		
		1/30000 (full scale)			
		Overall 25°C	±0.1% (full scale)		
		accuracy 0 to 55°C	c ±0.3% (full scale)		
		Conversion time	10 µs/point		
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation method	Between the input and the NX bus: Power		
			= Transformer, Signal = Digital isolator (no		
			isolation between inputs)		
Insulation resistance	20 M Ω min. between isolated circuits (at	Dielectric strength	510 VAC between isolated circuits for 1		
	100 VDC)	Current or reside of the	minute at a leakage current of 5 mA max.		
I/O power supply method	Supply from the NX bus	Current capacity of I/ power supply termina			
NX Unit power con-	Connected to a CPU Unit	Current consumptio			
sumption	1.40 W max.	from I/O power supp			
	Connected to a Communications Cou-				
	pler Unit				
	1.10 W max.				
Weight	70 g max.				
Circuit layout					
	AG: Analog circuit internal GND NX bus connector (left) I/O power supply + I/O power supply - I/O power supply -				
Installation orienta-	Installation orientation:				
tion and restrictions	 Connected to a CPU Unit 				
	Possible in upright installation.				
	Connected to a Communications Couple	er Unit			
	Possible in 6 orientations.				
	Restrictions: No restrictions				
Terminal connection diagram	Additional I/O Power Supply Unit A1 9 10V 10V 24 VDC 10C 10C 10C 10C 10C 10C 10C 10C 10C 10				

Unit name	Analog Output Unit (current output type)	NX-DA3203				
Number of points	4 points	Jnit (current output type) Model External connection terminals		Screwless clamping terminal block (12 ter- minals)		
I/O refreshing method	Free-Run refreshing					
Indicators	TS indicator	Output range Output conversion		4 to 20 mA -5 to 105% (full scale)		
	DA3203	range Allowable loa	ad resis-	350 Ω max.		
		tance				
		Resolution Overall	25°C	1/8000 (full scale)		
			25°C 0 to 55°C	±0.3% (full scale) ±0.6% (full scale)		
		-				
Dimensions	12 (W) x 100 (H) x 71 (D)	Conversion time Isolation method		250 μs/point Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no		
Insulation resistance	$20 \text{ M}\Omega$ min. between isolated circuits (at	Dielectric str	ength	isolation between inputs) 510 VAC between isolated circuits for 1		
	100 VDC)			minute at a leakage current of 5 mA max.		
I/O power supply method	Supply from the NX bus	Current capa power supply	y terminal	IOV: 0.1 A/terminal max., IOG: 0.1 A/termi- nal max.		
NX Unit power con-	Connected to a CPU Unit	Current cons		No consumption		
sumption	 2.10 W max. Connected to a Communications Coupler Unit 1.80 W max. 	from I/O pow	ver supply			
Weight	70 g max.			1		
Installation orienta- tion and restrictions	NX bus connector I/O power supply + I/O power supply + AG: Analog circuit internal GND I/O power supply + I/O power supply + I/O power supply - NX bus connector Installation orientation: I/O power supply - Connected to a CPU Unit Possible in upright installation. NX bus connector Connected to a Communications Coupler Unit Possible in 6 orientations. Restrictions: For upright installation: No restrictions For upright installation. For upright installation other than upright: Restricted as shown in the graph below. No restrictions					
	(Ω) 600 350 0 Ambient operating t	40 temperature		lse it within this range.		



Unit name	Analog Output Unit (current output type)	Model		NX-DA3205
Number of points	4 points	External conn terminals		Screwless clamping terminal block (12 ter- minals)
I/O refreshing method	Switching synchronous I/O refreshing and F		-	
Indicators	TS indicator	Output range		4 to 20 mA
	DA3205 ■TS	Output conve range		-5 to 105% (full scale)
		Allowable loa tance	d resis-	350 Ω max.
		Resolution		1/30000 (full scale)
			25°C 0 to 55°C	±0.1% (full scale) ±0.3% (full scale)
		Conversion ti		10 µs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation meth		Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	$20 \text{ M}\Omega$ min. between isolated circuits (at 100 VDC)	Dielectric stre	ength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	Current capac power supply	-	IOV: 0.1 A/terminal max., IOG: 0.1 A/termi- nal max.
NX Unit power con- sumption	 Connected to a CPU Unit 2.10 W max. Connected to a Communications Coupler Unit 1.80 W max. 	Current cons from I/O pow	sumption	No consumption
Weight	70 g max.			I
	NX bus connector (left) I/O power supply + O			Output I1+ to I4+ IOG I/O power supply + I/O power supply – NX bus connector (right)
Installation orienta- tion and restrictions	Installation orientation: • Connected to a CPU Unit Possible in upright installation. • Connected to a Communications Coupl Possible in 6 orientations. Restrictions: For upright installation: No restrictions For any installation other than upright: Restrictions for any installation other than upright: Restrictions 0 Ambient operating to	stricted as show		aph below. se it within this range.

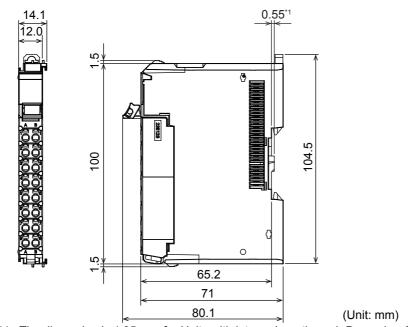


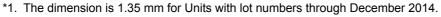
Unit name	Analog Output Unit (voltage output type)	Model	NX-DA3603
Number of points	4 points	External connection	Screwless clamping terminal block (12 ter-
		terminals	minals)
I/O refreshing method	Free-Run refreshing	1	
Indicators	TS indicator	Output range	-10 to +10 V
	DA3603	Output conversion range	-5 to 105% (full scale)
	■TS	Allowable load resis- tance	5 kΩ min.
		Output impedance	0.5 Ω max.
		Resolution	1/8000 (full scale)
		Overall 25°C	±0.3% (full scale)
		accuracy 0 to 55°C	±0.5% (full scale)
		Conversion time	250 μs/point
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation method	Between the input and the NX bus: Power = Transformer, Signal = Digital isolator (no isolation between inputs)
Insulation resistance	$20 \text{ M}\Omega$ min. between isolated circuits (at 100 VDC)	Dielectric strength	510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max.
I/O power supply method	Supply from the NX bus	Current capacity of I/O power supply terminal	IOV: 0.1 A/terminal max., IOG: 0.1 A/termi- nal max.
NX Unit power con-	Connected to a CPU Unit	Current consumption	No consumption
sumption	1.35 W max.	from I/O power supply	
	Connected to a Communications Coupler Unit		
	1.25 W max.		
Weight Circuit layout	70 g max.		
	AG: Analog internal GNE connector (left) I/O power supply – O		Output V1+ to V4+ IOG I/O power supply + I/O power supply - NX bus connector (right)
Installation orienta-	Installation orientation:		
tion and restrictions	 Connected to a CPU Unit Possible in upright installation. Connected to a Communications Coupl Possible in 6 orientations. 	er Unit	
Terminal connection diagram	Additional I/O Power Supply Unit A1 B1 A1 I I I I I I I I I I I I I I I I I I I	B1 B1 V1+ V2+• IOV IOV IOG IOG V3+ V4+ IOV IOV IOG IOG B2 B8	Voltage output +

Unit name	Analog Output Unit (voltage output type)	Model	NX-DA3605							
Number of points	4 points	External connection	Screwless clamping terminal block (12 ter-							
•		terminals	minals)							
I/O refreshing method	Switching synchronous I/O refreshing and Fi	vitching synchronous I/O refreshing and Free-Run refreshing								
Indicators	TS indicator	Output range	-10 to +10 V							
		Output conversion	-5 to 105% (full scale)							
	DA3605	range								
	-13	Allowable load resis- tance	5 kΩ min.							
		Output impedance	0.5 Ω max.							
		Resolution	1/30000 (full scale)							
		Overall 25°C	±0.1% (full scale)							
		accuracy 0 to 55°C	±0.3% (full scale)							
		Conversion time	10 µs/point							
Dimensions	12 (W) x 100 (H) x 71 (D)	Isolation method	Between the input and the NX bus: Power							
Dimensions			= Transformer, Signal = Digital isolator (no							
			isolation between inputs)							
Insulation resistance	$20 \text{ M}\Omega$ min. between isolated circuits (at	Dielectric strength	510 VAC between isolated circuits for 1							
	100 VDC)		minute at a leakage current of 5 mA max.							
I/O power supply	Supply from the NX bus	Current capacity of I/O	IOV: 0.1 A/terminal max., IOG: 0.1 A/termi-							
method NX Unit power con-	Connected to a CPU Unit	power supply terminal Current consumption	nal max. No consumption							
sumption	1.60 W max.	from I/O power supply								
	Connected to a Communications Cou-									
	pler Unit									
	1.25 W max.									
Weight	70 g max.									
Circuit layout										
	NX bus connector (left) I/O power supply + O		Output V1+ to V4+ IOG I/O power supply + I/O power supply - I/O power supply – I/O power supply –							
Installation orienta-	Installation orientation:									
tion and restrictions	Connected to a CPU Unit									
	Possible in upright installation.									
	Connected to a Communications Couple	er Unit								
	Possible in 6 orientations.									
	Restrictions: No restrictions									
Terminal connection diagram		Ditage Output Unit NX-DA3605 V1+ V2+ IOV IOG IOG IOV IOV IOV IOG IOG IOG IOG IOG IOG	Voltage output + Voltage output –							

A-2-1 Screwless Clamping Terminal Block Type

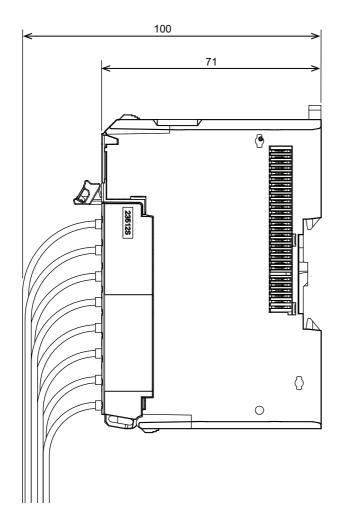
12 mm Width





A

Installation Height



(Unit: mm)

Α

A-3 List of NX Objects

This section describes the NX objects of the Analog Input Units and Analog Output Units.

The method to access NX objects through instructions or other messages depends on where the NX Unit is connected.

If the NX Unit is connected to a CPU Unit, access is possible with the Read NX Unit Object instruction and the Write NX Unit Object instruction.

When the NX Unit is connected to a Communications Coupler Unit, the method depends on the connected communications master and Communications Coupler Unit.

Refer to the user's manual for the connected Communications Coupler Unit for method to use messages to access NX objects on Slave Terminals.

A-3-1 Format of Object Descriptions

In this manual, NX objects are described with the following format.

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute

Index (Hex)	: This is the index of the NX object that is expressed as a four-digit hexadecimal number.
Subindex (Hex)	: This is the subindex of the NX object that is expressed as a two-digit hexadeci- mal number.
Object name	: This is the name of the object. For a subindex, this is the name of the subindex.
Default value	: This is the value that is set by default.
Data range	: For a read-only (RO) NX object, this is the range of the data you can read. For a read-write (RW) NX object, this is the setting range of the data.
Unit	: The unit is the physical units.
Data type	: This is the data type of the object.
Access	: This data tells if the object is read-only or read/write.
	RO: Read only
	RW: Read/write
I/O allocation	: This tells whether I/O allocation is allowed.
Data attribute	: This is the timing when changes to writable NX objects are enabled.
	Y: Enabled by restarting
	N: Enabled at all times
	: Write-prohibited

A-3-2 Analog Input Units

Unit Information Objects

This object gives the product information.

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cation	Data attri- bute
1000		NX Bus Identity							
	00	Number of Entries	7	7		USINT	RO	Not possible	
	02	Model	*1			ARRAY [011]OF BYTE	RO	Not possible	
	03	Device Type	*2			UDINT	RO	Not possible	
	04	Product Code	*3			UDINT	RO	Not possible	
	05	Vendor Code	00000001 hex ^{*4}			UDINT	RO	Not possible	
	06	Unit Version	*5			UDINT	RO	Not possible	
	07	Serial Number	*6	00000000 to FFFFFFF hex		UDINT	RO	Not possible	
1001		Production Info							
	00	Number of Entries	2	2		USINT	RO	Not possible	
	01	Lot Number	*7	00000000 to FFFFFFF hex		UDINT	RO	Not possible	
	02	Hardware Version	*8			ARRAY [019] OF BYTE	RO	Not possible	

- *1. The product models are assigned in ascending order from the lowest number of array elements. Any remainder elements are filled with spaces.
- *2. The device types are assigned for each product Unit type. Bits 0 to 31: Device type
- *3. The product codes are assigned for each product model. Bits 0 to 31: Product code
- *4. OMRON vendor code
- *5. Bits 24 to 31: Integer part of the Unit version. Bits 16 to 23: Fractional part of the Unit version. Bits 0 to 15: Reserved (Example) For Ver.1.0, 0100□□□ hex
- *6. A unique serial number is assigned for each product unit. Bits 0 to 31: Serial number
- *7. The year, month, and day of production are assigned to the "lot number". Bits 24 to 31: Date of production Bits 16 to 23: Month of production Bits 8 to 15: Year of production Bits 0 to 7: Reserved
- *8. The hardware version is assigned in ascending order from the earliest number of array elements. Any remainder elements are filled with spaces.

Objects That Accept I/O Allocations

These objects accept I/O allocations.

You cannot access the objects that are described below with the Read NX Unit Object instruction, Write NX Unit Object instruction, or other messages.

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute
6000		Analog Input Value							
	00	Number of Entries	*1	*1		USINT	RO	Not pos- sible	
	01	Ch1 Analog Input Value	0	-32768 to 32767		INT	RO	Pos- sible	
	02	Ch2 Analog Input Value	0	-32768 to 32767		INT	RO	Pos- sible	
	03	Ch3 Analog Input Value	0	-32768 to 32767		INT	RO	Pos- sible	
	04	Ch4 Analog Input Value	0	-32768 to 32767		INT	RO	Pos- sible	
	05	Ch5 Analog Input Value	0	-32768 to 32767		INT	RO	Pos- sible	
	06	Ch6 Analog Input Value	0	-32768 to 32767		INT	RO	Pos- sible	
	07	Ch7 Analog Input Value	0	-32768 to 32767		INT	RO	Pos- sible	
	08	Ch8 Analog Input Value	0	-32768 to 32767		INT	RO	Pos- sible	

*1. The default value and data range for Number of Entries are as follows.

NX Units	Default value	Data range
NX-AD2203/AD2204/AD2208/	2	2
AD2603/AD2604/AD2608		
NX-AD3203/AD3204/AD3208/	4	4
AD3603/AD3604/AD3608/		
NX-AD4203/AD4204/AD4208/	8	8
AD4603/AD4604/AD4608/		
Other models	0	0

Α

Other Objects

This section lists other objects.

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute
5002		Input Enable/Disable Set- ting							
	00	Number of Entries	*1	*1		USINT	RO	Not pos- sible	
	01	Ch1 Enable/Disable	TRUE	TRUE or FALSE ^{*2}		BOOL	RW	Not pos- sible	Y
	02	Ch2 Enable/Disable	TRUE			BOOL	RW	Not pos- sible	Y
	03	Ch3 Enable/Disable	TRUE			BOOL	RW	Not pos- sible	Y
	04	Ch4 Enable/Disable	TRUE			BOOL	RW	Not pos- sible	Y
	05	Ch5 Enable/Disable	TRUE			BOOL	RW	Not pos- sible	Y
	06	Ch6 Enable/Disable	TRUE			BOOL	RW	Not pos- sible	Y
	07	Ch7 Enable/Disable	TRUE			BOOL	RW	Not pos- sible	Y
	08	Ch8 Enable/Disable	TRUE			BOOL	RW	Not pos- sible	Y

*1. The default value and data range for Number of Entries are as follows.

NX Units	Default value	Data range
NX-AD2203/AD2204/AD2208/	2	2
AD2603/AD2604/AD2608		
NX-AD3203/AD3204/AD3208/	4	4
AD3603/AD3604/AD3608		
NX-AD4203/AD4204/AD4208/	8	8
AD4603/AD4604/AD4608		
Other models	0	0

*2. The meanings of the set values for $Ch\Box$ Enable/Disable are as follows.

Set value	Meaning
FALSE	Disable
TRUE	Enable

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute
5003		Input Range Setting							
	00	Number of Entries	*1	*1		USINT	RO	Not pos- sible	
	01	Ch1 Range Setting	*2	*2		UINT	RW	Not pos- sible	Y
	02	Ch2 Range Setting				UINT	RW	Not pos- sible	Y
	03	Ch3 Range Setting				UINT	RW	Not pos- sible	Y
	04	Ch4 Range Setting				UINT	RW	Not pos- sible	Y
	05	Ch5 Range Setting				UINT	RW	Not pos- sible	Y
	06	Ch6 Range Setting				UINT	RW	Not pos- sible	Y
	07	Ch7 Range Setting				UINT	RW	Not pos- sible	Y
	08	Ch8 Range Setting				UINT	RW	Not pos- sible	Y

*1. The default value and data range for Number of Entries are as follows.

NX Units	Default value	Data range
NX-AD2203/AD2204/AD2208/	2	2
AD2603/AD2604/AD2608		
NX-AD3203/AD3204/AD3208/	4	4
AD3603/AD3604/AD3608		
NX-AD4203/AD4204/AD4208/	8	8
AD4603/AD4604/AD4608		
Other models	0	0

*2. The default value and data range for $Ch\Box$ Range Setting are as follows.

NX Units	Set value	Meaning	Default value	Data range
NX-AD2203/AD2204/AD2208/	0	4 to 20 mA	0	0
AD3203/AD3204/AD3208/	1	0 to 10 V		
AD4203/AD4204/AD4208	2	-10 to +10 V		
	3	0 to 5 V		
	4	1 to 5 V		
	5	0 to 20 mA		

NX Units	Set value	Meaning	Default value	Data range
NX-AD2603/AD2604/AD2608/	0	4 to 20 mA	2	2
AD3603/AD3604/AD3608/	1	0 to 10 V		
AD4603/AD4604/AD4608	2	-10 to +10 V		
	3	0 to 5 V		
	4	1 to 5 V		
	5	0 to 20 mA		

A-3 List of NX Objects

A

A-3-2 Analog Input Units

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute													
5004		Input Moving Average Time																				
	00	Number of Entries	*1	*1		USINT	RO	Not pos- sible														
	01	Ch1 Input Moving Average Time	0	*2	μs	UINT	RW	Not pos- sible	Y													
	02	Ch2 Input Moving Average Time	0				UINT	RW	Not pos- sible	Y												
	03	Ch3 Input Moving Average Time	0				•	-	-	-			UINT	RW	Not pos- sible	Y						
	04	Ch4 Input Moving Average Time	0				UINT	RW	Not pos- sible	Y												
	05	Ch5 Input Moving Average Time	0												-						UINT	RW
	06	Ch6 Input Moving Average Time	0	-		UINT	RW	Not pos- sible	Y													
	07	Ch7 Input Moving Average Time	0	-		UINT	RW	Not pos- sible	Y													
	08	Ch8 Input Moving Average Time	0			UINT	RW	Not pos- sible	Y													

*1. The default value and data range for Number of Entries are as follows.

NX Units	Default value	Data range
NX-AD2203/AD2204/AD2208/	2	2
AD2603/AD2604/AD2608		
NX-AD3203/AD3204/AD3208/	4	4
AD3603/AD3604/AD3608		
NX-AD4203/AD4204/AD4208/	8	8
AD4603/AD4604/AD4608		
Other models	0	0

*2. The setting range of Ch Input Moving Average Time depends on the model. The input moving average time data range for each type is as follows.

NX Units	Data range
NX-AD2203/AD2204/AD2603/	0 to 32000
AD2604/AD3203/AD3204/	
AD3603/AD3604/AD4203/	
AD4204/AD4603/AD4604	
NX-AD2208/AD2608/AD3208/	0 to 640
AD3608/AD4208/AD4608	

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute
5005		Disconnection Detection Status							
	00	Number of Entries	*1	*1		USINT	RO	Not pos- sible	
	01	Ch1 Disconnection Detec- tion Status	FALSE	TRUE or FALSE ^{*2}		BOOL	RO	Not pos- sible	
	02	Ch2 Disconnection Detec- tion Status	FALSE			BOOL	RO	Not pos- sible	
	03	Ch3 Disconnection Detec- tion Status	FALSE			BOOL	RO	Not pos- sible	
	04	Ch4 Disconnection Detec- tion Status	FALSE			BOOL	RO	Not pos- sible	
	05	Ch5 Disconnection Detec- tion Status	FALSE			BOOL	RO	Not pos- sible	
	06	Ch6 Disconnection Detec- tion Status	FALSE			BOOL	RO	Not pos- sible	
	07	Ch7 Disconnection Detec- tion Status	FALSE			BOOL	RO	Not pos- sible	
	08	Ch8 Disconnection Detec- tion Status	FALSE			BOOL	RO	Not pos- sible	

*1. The default value and data range for Number of Entries are as follows.

NX Units	Default value	Data range
NX-AD2203/AD2204/AD2208/	2	2
AD2603/AD2604/AD2608		
NX-AD3203/AD3204/AD3208/	4	4
AD3603/AD3604/AD3608		
NX-AD4203/AD4204/AD4208/	8	8
AD4603/AD4604/AD4608		
Other models	0	0

*2. The meanings of the set values for Ch \square Disconnection Detection Status are as follows.

Value	Meaning			
FALSE	Disconnection Undetected			
TRUE	Disconnection Detected			

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute
5006		Input Over Range/Under Range Status							
	00	Number of Entries	*1	*1		USINT	RO	Not pos- sible	
	01	Ch1 Over Range Status	FALSE	TRUE or FALSE ^{*2}		BOOL	RO	Not pos- sible	
	02	Ch1 Under Range Status	FALSE			BOOL	RO	Not pos- sible	
	03	Ch2 Over Range Status	FALSE			BOOL	RO	Not pos- sible	
	04	Ch2 Under Range Status	FALSE			BOOL	RO	Not pos- sible	
	05	Ch3 Over Range Status	FALSE			BOOL	RO	Not pos- sible	
	06	Ch3 Under Range Status	FALSE			BOOL	RO	Not pos- sible	
	07	Ch4 Over Range Status	FALSE			BOOL	RO	Not pos- sible	
	08	Ch4 Under Range Status	FALSE			BOOL	RO	Not pos- sible	
	09	Ch5 Over Range Status	FALSE	-		BOOL	RO	Not pos- sible	
	0A	Ch5 Under Range Status	FALSE	-		BOOL	RO	Not pos- sible	
	0B	Ch6 Over Range Status	FALSE			BOOL	RO	Not pos- sible	
	0C	Ch6 Under Range Status	FALSE			BOOL	RO	Not pos- sible	
	0D	Ch7 Over Range Status	FALSE	1		BOOL	RO	Not pos- sible	
	0E	Ch7 Under Range Status	FALSE			BOOL	RO	Not pos- sible	
	0F	Ch8 Over Range Status	FALSE			BOOL	RO	Not pos- sible	
	10	Ch8 Under Range Status	FALSE	1		BOOL	RO	Not pos- sible	

A-3 List of NX Objects

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*1. The default value and data range for Number of Entries are as follows.

NX Units	Default value	Data range
NX-AD2203/AD2204/AD2208/	4	4
AD2603/AD2604/AD2608		
NX-AD3203/AD3204/AD3208/	8	8
AD3603/AD3604/AD3608		
NX-AD4203/AD4204/AD4208/	16	16
AD4603/AD4604/AD4608		
Other models	0	0

*2. The meanings of Ch \square Over Range Status/Ch \square Under Range Status are as follows.

Value	Meaning			
FALSE	Over Range/Under Range Undetected			
TRUE	Over Range/Under Range Detected			

A-3-3 Analog Output Units

Unit Information Objects

This object gives the product information.

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cation	Data attri- bute
1000		NX Bus Identity							
	00	Number of Entries	7	7		USINT	RO	Not possible	
	02	Model	*1			ARRAY [011]OF BYTE	RO	Not possible	
	03	Device Type	*2			UDINT	RO	Not possible	
	04	Product Code	*3			UDINT	RO	Not possible	
	05	Vendor Code	00000001 hex ^{*4}			UDINT	RO	Not possible	
	06	Unit Version	*5			UDINT	RO	Not possible	
	07	Serial Number	*6	00000000 to FFFFFFF hex		UDINT	RO	Not possible	
1001		Production Info							
	00	Number of Entries	2	2		USINT	RO	Not possible	
	01	Lot Number	*7	00000000 to FFFFFFF hex		UDINT	RO	Not possible	
	02	Hardware Version	*8			ARRAY [019] OF BYTE	RO	Not possible	

*1. The product models are assigned in ascending order from the lowest number of array elements. Any remainder elements are filled with spaces.

- *2. The device types are assigned for each product Unit type. Bits 0 to 31: Device type
- *3. The product codes are assigned for each product model. Bits 0 to 31: Product code
- *4. OMRON vendor code
- *5. Bits 24 to 31: Integer part of the Unit version. Bits 16 to 23: Fractional part of the Unit version. Bits 0 to 15: Reserved (Example) For Ver.1.0, 0100
- *6. A unique serial number is assigned for each product unit. Bits 0 to 31: Serial number
- *7. The year, month, and day of production are assigned to the "lot number". Bits 24 to 31: Date of production Bits 16 to 23: Month of production Bits 8 to 15: Year of production Bits 0 to 7: Reserved
- *8. The hardware version is assigned in ascending order from the earliest number of array elements. Any remainder elements are filled with spaces.

Α

Objects That Accept I/O Allocations

These objects accept I/O allocations.

You cannot access the objects that are described below with the Read NX Unit Object instruction, Write NX Unit Object instruction, or other messages.

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute
7000		Analog Output Value							
	00	Number of Entries	*1	*1		USINT	RO	Not pos-	
								sible	
	01	Ch1 Analog Output Value	0	-32768 to 32767		INT	RW	Pos- sible	N
	02	Ch2 Analog Output Value	0	-32768 to 32767		INT	RW	Pos- sible	N
	03	Ch3 Analog Output Value	0	-32768 to 32767		INT	RW	Pos- sible	N
	04	Ch4 Analog Output Value	0	-32768 to 32767		INT	RW	Pos- sible	N

*1. The default value and data range for Number of Entries are as follows.

NX Units	Default value	Data range
NX-DA2203/DA2205/DA2603/	2	2
DA2605		
NX-DA3203/DA3205/DA3603/	4	4
DA3605		
Other models	0	0

NX-series Analog I/O Units User's Manual for Analog Input Units and Analog Output Units (W522)

Other Objects

This section lists other objects.

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute
5010		Output Enabled/Disabled Setting							
	00	Number of Entries	*1	*1		USINT	RO	Not pos- sible	
	01	Ch1 Enable/Disable	TRUE	TRUE or FALSE ^{*2}		BOOL	RW	Not pos- sible	Y
	02	Ch2 Enable/Disable	TRUE			BOOL	RW	Not pos- sible	Y
	03	Ch3 Enable/Disable	TRUE			BOOL	RW	Not pos- sible	Y
	04	Ch4 Enable/Disable	TRUE			BOOL	RW	Not pos- sible	Y

*1. The default value and data range for Number of Entries are as follows.

NX Units	Default value	Data range
NX-DA2203/DA2205/DA2603/	2	2
DA2605		
NX-DA3203/DA3205/DA3603/	4	4
DA3605		
Other models	0	0

*2. The meanings of the set values for $Ch\Box$ Enable/Disable are as follows.

Set value	Meaning
FALSE	Disable
TRUE	Enable

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute
5011		Output Range Setting							
	00	Number of Entries	*1	*1		USINT	RO	Not	
								pos-	
								sible	
	01	Ch1 Range Setting	*2	*2		UINT	RW	Not	Y
								pos-	
								sible	
	02	Ch2 Range Setting				UINT	RW	Not	Y
								pos-	
								sible	
	03	Ch3 Range Setting				UINT	RW	Not	Y
								pos-	
								sible	
	04	Ch4 Range Setting				UINT	RW	Not	Y
								pos-	
								sible	

*1. The default value and data range for Number of Entries are as follows.

NX Units	Default value	Data range
NX-DA2203/DA2205/DA2603/	2	2
DA2605		
NX-DA3203/DA3205/DA3603/	4	4
DA3605		
Other models	0	0

*2. The default value and data range for Ch \square Range Setting are as follows.

NX Units	Set value	Meaning	Default value	Data range
NX-DA2203/DA2205/DA3203/	0	4 to 20 mA	0	0
DA3205	1	0 to 10 V		
	2	-10 to +10 V		
	3	0 to 5 V		
	4	1 to 5 V		
	5	0 to 20 mA		
NX-DA2603/DA2605/DA3603/	0	4 to 20 mA	2	2
DA3605	1	0 to 10 V		
	2	-10 to +10 V		
	3	0 to 5 V		
	4	1 to 5 V		
	5	0 to 20 mA		

A-3 List of NX Objects

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A-3-3 Analog Output Units

Index (hex)	Subindex (hex)	Object name	Default value	Data range	Unit	Data type	Acc ess	I/O allo- cat- ion	Data attri- bute
5012		Load Rejection Output Set- ting							
	00	Number of Entries	*1	*1		USINT	RO	Not pos- sible	
	01	Ch1 Hold Value Setting	4	0 to 4 ^{*2}		USINT	RW	Not pos- sible	Y
	02	Ch1 User-specified Value Setting	0	-32768 to 32767		INT	RW	Not pos- sible	Y
	03	Ch2 Hold Value Setting	4	0 to 4 *2		USINT	RW	Not pos- sible	Y
	04	Ch2 User-specified Value Setting	0	-32768 to 32767		INT	RW	Not pos- sible	Y
	05	Ch3 Hold Value Setting	4	0 to 4 *2		USINT	RW	Not pos- sible	Y
	06	Ch3 User-specified Value Setting	0	-32768 to 32767		INT	RW	Not pos- sible	Y
	07	Ch4 Hold Value Setting	4	0 to 4 *2		USINT	RW	Not pos- sible	Y
	08	Ch4 User-specified Value Setting	0	-32768 to 32767		INT	RW	Not pos- sible	Y

*1. The default value and data range for Number of Entries are as follows.

NX Units	Default value	Data range
NX-DA2203/DA2205/DA2603/	4	4
DA2605		
NX-DA3203/DA3205/DA3603/	8	8
DA3605		
Other models	0	0

*2. The meanings of the set values for $Ch\Box$ Hold Value Setting are as follows.

Set value	Meaning
0	Hold Last State
1	Low Limit
2	High Limit
3	User Count
4	Zero Count

A-4 List of Screwless Clamping Terminal Block Models

This section explains how to read the screwless clamping terminal block model numbers and shows the model number table.

A-4-1 Model Notation

The screwless clamping terminal block models are assigned based on the following rules.

Product type TB: Terminal block
Terminal specifications A: Column letter indication A/B, without functional ground terminal B: Column letter indication C/D, without functional ground terminal C: Column letter indication A/B, with functional ground terminal
Number of terminals 08: 8 terminals 12: 12 terminals 16: 16 terminals
Other specifications 1: Terminal current capacity of 4 A 2: Terminal current capacity of 10 A

A-4-2 List of Terminal Block Models

The following table shows a list of screwless clamping terminal blocks.

Terminal block model	Number of terminals	Ground terminal mark	Terminal current capacity
NX-TBA081	8	Not provided	4 A
NX-TBA121	12		
NX-TBA161	16		
NX-TBB121	12		
NX-TBB161	16	1	
NX-TBA082	8	1	10 A
NX-TBA122	12		
NX-TBA162	16		
NX-TBB082	8		
NX-TBB122	12		
NX-TBB162	16		
NX-TBC082	8	Provided	7
NX-TBC162	16	7	

Note When you purchase a terminal block, purchase an NX-TB $\Box\Box\Box$ 2.

A-5 Version Information with CPU Units

This section provides version-related information when connecting Units to a CPU Unit. This section describes the relationships between the unit versions of each Unit and the CPU Unit, and Sysmac Studio version, and the specification changes for each unit version of each Unit.

A-5-1 Relationship between Unit Versions of Units

The relationship between the unit versions of each Unit and the CPU Unit, and Sysmac Studio version are shown below.

Interpreting the Version Combination Tables

The items that are used in the version combination tables are given below.

Refer to the user's manual for the CPU Unit for the models of CPU Unit to which NX Units can be connected.

NX Unit		Corresponding unit versions/versions		
Model	Unit version	CPU Unit	Sysmac Studio	
Model numbers of NX	Unit versions of NX Units.	Unit versions of the CPU	Sysmac Studio versions	
Units.		that are compatible with	that are compatible with	
		the NX Units.	the NX Units and CPU	
			Unit.	

Version Combination Tables

- With the combinations of the unit versions/versions shown below, you can use the functions that are supported by the unit version of the Unit model. Use the unit versions/versions (or the later/higher unit versions/versions) that correspond to the NX Unit models and the unit versions. You cannot use the specifications that were added or changed for the relevant NX Unit models and the unit versions unless you use the corresponding unit versions/versions.
- Depending on the type and model of the Unit to which the NX Unit is connected, some Units do not have the corresponding versions given in the table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.
- If you use the corresponding unit versions/versions given in the following table or later/higher versions, refer to the version information in the user's manual for the CPU Unit.

Α

Ν	X Unit	Corresponding unit versions/versions			
Model	Unit version	CPU Unit	Sysmac Studio		
NX-AD2203	Ver.1.0	Ver.1.13	Ver.1.17		
NX-AD2204					
NX-AD2208					
NX-AD2603					
NX-AD2604					
NX-AD2608					
NX-AD3203					
NX-AD3204					
NX-AD3208					
NX-AD3603					
NX-AD3604					
NX-AD3608					
NX-AD4203					
NX-AD4204					
NX-AD4208					
NX-AD4603					
NX-AD4604					
NX-AD4608					
NX-DA2203					
NX-DA2205					
NX-DA2603					
NX-DA2605					
NX-DA3203					
NX-DA3205					
NX-DA3603					
NX-DA3605					

A-6 Version Information with Communications Coupler Units

This section provides version-related information when connecting Units to a Communications Coupler Unit.

Version information is provided separately for each Communications Coupler Unit that an NX Unit is connected to.

A-6-1 Connection to an EtherCAT Coupler Unit

The relationship between the unit versions of each Unit, EtherCAT Coupler Unit, CPU Unit and Industrial PC, and versions of the Sysmac Studio are shown below.

Relationship between Unit Versions of Units

The items that are used in the version combination table are given below.

NX	Unit	Corresponding unit versions/versions		ersions
Model	Unit version	EtherCAT Coupler Unit	CPU Unit or Industrial PC	Sysmac Studio
Model numbers of NX Units.	Unit versions of NX Units.	Unit versions of Ether- CAT Coupler Units that are compatible with the NX Units.	Unit versions of NJ/NX-series CPU Units or NY-series Industrial PCs that are compatible with the EtherCAT Coupler Units.	Sysmac Studio ver- sions that are compati- ble with the NX Units, EtherCAT Coupler Units, CPU Units, and Industrial PCs.

The version combination table is given below.

- With the combinations of the unit versions/versions shown below, you can use the functions that are supported by the unit version of the Unit model. Use the unit versions/versions (or the later/higher unit versions/versions) that correspond to the NX Unit models and the unit versions. You cannot use the specifications that were added or changed for the relevant NX Unit models and the unit versions unless you use the corresponding unit versions/versions.
- Depending on the type and model of the Unit to which the NX Unit is connected, some Units do not have the corresponding versions given in the table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.
- You cannot connect the relevant NX Unit to the target Communications Coupler Unit if "---" is shown in the corresponding unit versions/versions column.
- If you use the corresponding unit versions/versions given in the following table or later/higher versions, refer to the version information in the user's manual for the Communications Coupler Unit, CPU Unit, and Industrial PC.

Α

N	NX Unit		Corresponding unit versions/versions			
Model	Unit Version	EtherCAT Coupler Unit	CPU Unit or Industrial PC	Sysmac Studio		
NX-AD2203	Ver.1.0	Ver.1.0	Ver.1.05	Ver.1.06		
NX-AD2204						
NX-AD2208						
NX-AD2603						
NX-AD2604						
NX-AD2608						
NX-AD3203						
NX-AD3204						
NX-AD3208						
NX-AD3603						
NX-AD3604						
NX-AD3608						
NX-AD4203						
NX-AD4204						
NX-AD4208						
NX-AD4603						
NX-AD4604						
NX-AD4608						
NX-DA2203						
NX-DA2205						
NX-DA2603						
NX-DA2605	7					
NX-DA3203	7					
NX-DA3205	7					
NX-DA3603						
NX-DA3605						

A

A-6-2 Connection to an EtherNet/IP Coupler Unit

The relationship between the unit versions of each Unit, EtherNet/IP Coupler Unit, CPU Unit and Industrial PC, and versions of the Sysmac Studio and NX-IO Configurator are shown below.

Relationship between Unit Versions of Units

The items that are used in the version combination tables are given below.

NX	Unit	Corresponding unit versions/versions					
		Application with an NJ/NX/NY-series Con- troller			Application with a CS/CJ/CP-series PL		
Model	Unit version	EtherNet/IP Coupler Unit	CPU Unit or Industrial PC	Sysmac Stu- dio	EtherNet/IP Coupler Unit	Sysmac Stu- dio	NX-IO Con- figurator
Model num- ber of NX Unit	Unit version of the NX Unit	Unit version of Ether- Net/IP Cou- pler Unit that is compati- ble with the NX Unit	Unit version of NJ/NX-series CPU Unit or NY-series Industrial PC that is com- patible with the Ether- Net/IP Cou- pler Unit	Sysmac Stu- dio version that is com- patible with the NX Unit, EtherNet/IP Coupler Unit, CPU Unit, and Industrial PC	Unit version of Ether- Net/IP Cou- pler Unit that is compati- ble with the NX Unit	Sysmac Stu- dio version that is com- patible with the NX Unit, EtherNet/IP Coupler Unit, and CPU Unit	NX-IO Con- figurator ver- sion that is compatible with the NX Unit, Ether- Net/IP Cou- pler Unit, and CPU Unit

The version combination table is given below.

- With the combinations of the unit versions/versions shown below, you can use the functions that are supported by the unit version of the Unit model. Use the unit versions/versions (or the later/higher unit version/versions) that correspond to the NX Unit models and the unit versions. You cannot use the specifications that were added or changed for the relevant NX Unit models and the unit versions unless you use the corresponding unit versions/versions.
- Depending on the type and model of the Unit to which the NX Unit is connected, some Units do not have the corresponding versions given in the table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.
- You cannot connect the relevant NX Unit to the target Communications Coupler Unit if "---" is shown in the corresponding unit versions/versions column.
- If you use the corresponding unit versions/versions given in the following table or later/higher versions, refer to the version information in the user's manual for the Communications Coupler Unit, CPU Unit, and Industrial PC.

NX U	Init		Corr	responding uni	it versions/version	ıs		
Madal	Unit ver-	Application with	h an NJ/NX/NY-s Ier ^{*1}	eries Control-	rol- Application with a CS/CJ/CP-series		-series PLC *2	
Model	sion	EtherNet/IP Coupler Unit	CPU Unit or Industrial PC	Sysmac Studio	EtherNet/IP Coupler Unit	Sysmac Studio	NX-IO Config- urator *3	
NX-AD2203	Ver. 1.0	Ver. 1.2	Ver. 1.14	Ver. 1.19	Ver. 1.0	Ver. 1.10	Ver. 1.00	
NX-AD2204								
NX-AD2208								
NX-AD2603								
NX-AD2604								
NX-AD2608								
NX-AD3203								
NX-AD3204								
NX-AD3208								
NX-AD3603								
NX-AD3604								
NX-AD3608								
NX-AD4203								
NX-AD4204								
NX-AD4208								
NX-AD4603								
NX-AD4604								
NX-AD4608								
NX-DA2203								
NX-DA2205								
NX-DA2603								
NX-DA2605								
NX-DA3203								
NX-DA3205								
NX-DA3603								
NX-DA3605								

*1. Refer to the user's manual for the EtherNet/IP Coupler Units for information on the unit versions of EtherNet/IP Units that are compatible with EtherNet/IP Coupler Units.

*2. Refer to the user's manual for the EtherNet/IP Coupler Units for information on the unit versions of CPU Units and EtherNet/IP Units that are compatible with EtherNet/IP Coupler Units.

*3. For connection to an EtherNet/IP Coupler Unit with unit version 1.0, connection is supported only for a connection to the peripheral USB port on the EtherNet/IP Coupler Unit. You cannot connect by any other path. If you need to connect by another path, use an EtherNet/IP Coupler Unit with unit version 1.2 or later.

A-7 Displaying the Edit Unit Operation Settings Tab Page

A-7-1 Connection to the CPU Unit

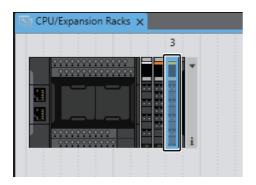
This section describes how to display the Edit Unit Operation Settings Tab Page that is used to create Unit operation settings on the Sysmac Studio for the NX Units connected to the CPU Unit.

You can use the methods described below to display the Edit Unit Operation Settings Tab Page on the CPU and Expansion Racks Tab Page on the Sysmac Studio.

Refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504) for the method of displaying the CPU and Expansion Racks Tab Page.

• Method 1

Double-click the NX Unit to set.



Method 2

Right-click the NX Unit and select **Edit Unit Operation Settings** from the menu.

CPU/Expansion Racks 🗙		
	-	
	Cut Copy Paste Delete	Ctrl+X Ctrl+C Ctrl∔V Del
	Undo Redo	Ctrl+Z Ctrl+Y
ſ	Change Model Edit Unit Operation Settings	
	Paste Unit Operation Settings Import NX Unit Settings and Insert New Unit Export NX Unit Settings	
	Show Model/Unit Name	

• Method 3

Select the NX Unit and click the Edit Unit Operation Settings Button.

CPU/Expansion Racks 🗙		*
3		
	Item name	Value
	Device name	N2
	Model name	NX-0D2154
	Product name	Transistor Output Unit
	Unit version	1.0
	NX Unit Number	3
	NX Unit Mounting Setting	Enabled 🗸
	Serial Number	0x0000000
	Power consumption	0.85 W
	Unit width	12 mm
	I/O allocation settings	Output Bit 00 : 1 [bits] Output Bit 01 : 1 [bits] Output Bit 00 Time Stamp : 64 [bits] Output Bit 01 Time Stamp : 64 [bits] Output Bit 01 Output Status : 1 [bits] Output Bit 01 Output Status : 1 [bits] Edit I/O Allocation Settings
	Unit operation settings	Edit Unit Operation Settings

Α

A-7-2 Slave Terminal

A-7-2 Slave Terminal

This section describes how to display the Edit Unit Operation Settings Tab Page that is used to create Unit operation settings on the Sysmac Studio for NX Units in the Slave Terminal.

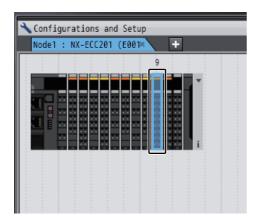
You can use the methods described below to display the Edit Unit Operation Settings Tab Page on the Edit Slave Terminal Configuration Tab Page on the Sysmac Studio.

Refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504) for the method of displaying the Edit Slave Terminal Configuration Tab Page.

Refer to the operation manual for the Support Software that you are using for the method of displaying the Edit Slave Terminal Configuration Tab Page or Edit Unit Operation Settings Tab Page with Support Software other than Sysmac Studio.

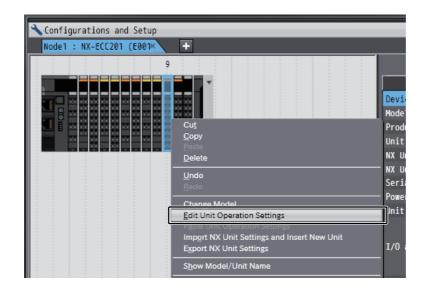
Method 1

Double-click the NX Unit to set.



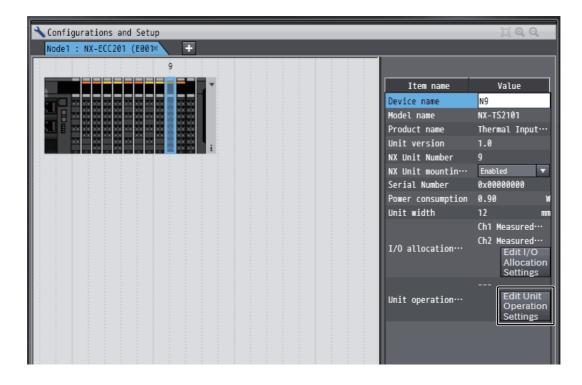
Method 2

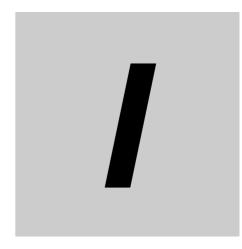
Right-click the NX Unit and select Edit Unit Operation Settings from the menu.



• Method 3

Select the NX Unit and click the Edit Unit Operation Settings Button.





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12 mm	Width	2
32767		5

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------------------------	------------------------	--

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