

NX-series EtherCAT Coupler Unit

NX-ECC201

CSM_NX-series EtherCAT Coupler Unit_DS_EA

Flexible System Can Be Achieved with High-speed, High-precision Remote I/O for EtherCAT

- The EtherCAT Interface Unit to connect with the Machine Automation Controller. NX-I/O series with screwless terminal blocks for easy wiring can be connected.



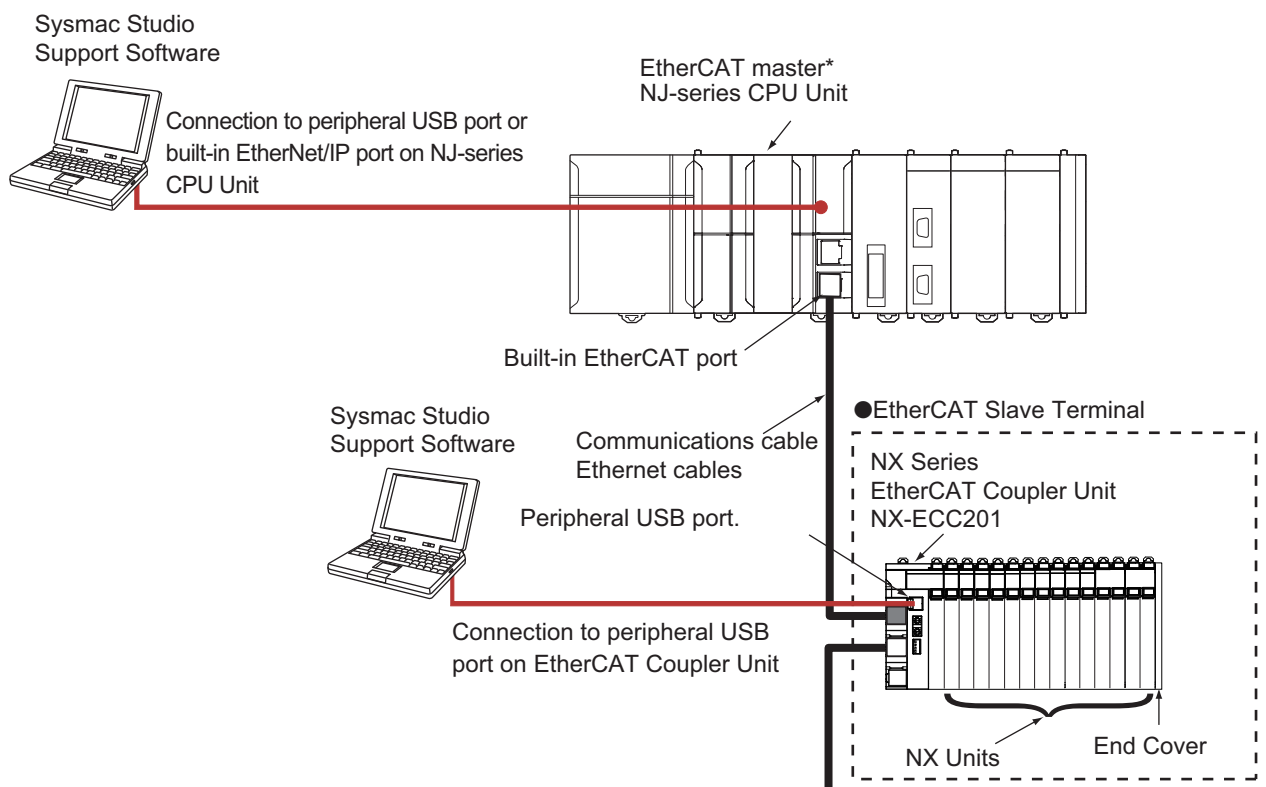
Features

- Up to 63 NX-I/O Units can be connected to one EtherCAT Coupler Unit. This offers flexible and space-saving system configuration.^{*1}
- A single slave enables configuration with different types of I/O Units, which can save nodes to be connected.
- I/O control and safety control can be integrated by connecting Units for safety.^{*2}
- Distributed Clock (DC) that achieves high synchronisation accuracy is supported.
- Smooth start-up just by setting node addresses with rotary switch or with tool software. Setting method can be chosen according to application.
- Setting can be made with only a slave by directly connecting Sysmac Studio to the built-in USB port.

*1 Input per slave: Maximum 1024 bytes, Output per slave: Maximum 1024 bytes

*2 Available soon

System Configuration




* OMRON CJ1W-NC□81/□82 Position Control Units cannot be connected to the EtherCAT Slave Terminal even though they support EtherCAT.

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Ordering Information

International Standards





- The standards are abbreviated as follows: U: UL, U1: UL(Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, CE: EC Directives, and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

Unit type	Product Name	Current consumption	Model	Standards
NX Series EtherCAT Coupler Unit	EtherCAT Coupler Unit 	1.45 W or lower	NX-ECC201	UC1, CE, KC

Recommended EtherCAT Communications Cables

Use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape) for EtherCAT.

Cabel with Connectors

Item	Appearance	Recommended manufacturer	Cable length(m) *1	Model
Standard type Cable with Connectors on Both Ends (RJ45/RJ45) Wire Gauge and Number of Pairs: AWG27, 4-pair Cable Cable Sheath material: LSZH *2 Cable color: Yellow *3		OMRON	0.3	XS6W-6LSZH8SS30CM-Y
			0.5	XS6W-6LSZH8SS50CM-Y
			1	XS6W-6LSZH8SS100CM-Y
			2	XS6W-6LSZH8SS200CM-Y
			3	XS6W-6LSZH8SS300CM-Y
			5	XS6W-6LSZH8SS500CM-Y
Rugged type Cable with Connectors on Both Ends (RJ45/RJ45) Wire Gauge and Number of Pairs: AWG22, 2-pair Cable		OMRON	0.3	XS5W-T421-AMD-K
			0.5	XS5W-T421-BMD-K
			1	XS5W-T421-CMD-K
			2	XS5W-T421-DMD-K
			5	XS5W-T421-GMD-K
			10	XS5W-T421-JMD-K
Rugged type Cable with Connectors on Both Ends (M12 Straight/RJ45) Wire Gauge and Number of Pairs: AWG22, 2-pair Cable		OMRON	0.3	XS5W-T421-AMC-K
			0.5	XS5W-T421-BMC-K
			1	XS5W-T421-CMC-K
			2	XS5W-T421-DMC-K
			5	XS5W-T421-GMC-K
			10	XS5W-T421-JMC-K
Rugged type Cable with Connectors on Both Ends (M12 Right-angle/RJ45) Wire Gauge and Number of Pairs: AWG22, 2-pair Cable		OMRON	0.3	XS5W-T422-AMC-K
			0.5	XS5W-T422-BMC-K
			1	XS5W-T422-CMC-K
			2	XS5W-T422-DMC-K
			5	XS5W-T422-GMC-K
			10	XS5W-T422-JMC-K

*1 Standard type cables length 0.2, 0.3, 0.5, 1, 1.5, 2, 3, 5, 7.5, 10, 15 and 20m are available.

Rugged type cables length 0.3, 0.5, 1, 2, 3, 5, 10 and 15m are available.

*2 The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use.

*3 Cables colors are available in blue, yellow, or Green

Note: For details, refer to Cat.No.G019.


Cables / Connectors

Wire Gauge and Number of Pairs: AWG24, 4-pair Cable

Item	Appearance	Recommended manufacturer	Model
Cables	-	Hitachi Cable, Ltd.	NETSTAR-C5E SAB 0.5 x 4P*
	-	Kuramo Electric Co.	KETH-SB*
	-	SWCC Showa Cable Systems Co.	FAE-5004*
RJ45 Connectors	-	Panduit Corporation	MPS588-C*

* We recommend you to use above cable and connector together.

Wire Gauge and Number of Pairs: AWG22, 2-pair Cable

Item	Appearance	Recommended manufacturer	Model
Cables	-	Kuramo Electric Co.	KETH-PSB-OMR*
	-	Nihon Electric Wire&Cable Co.,Ltd.	PNET/B*
RJ45 Assembly Connector		OMRON	XS6G-T421-1*

* We recommend you to use above cable and connector together.

Note: Connect both ends of cable shielded wires to the connector hoods.

Optional Products

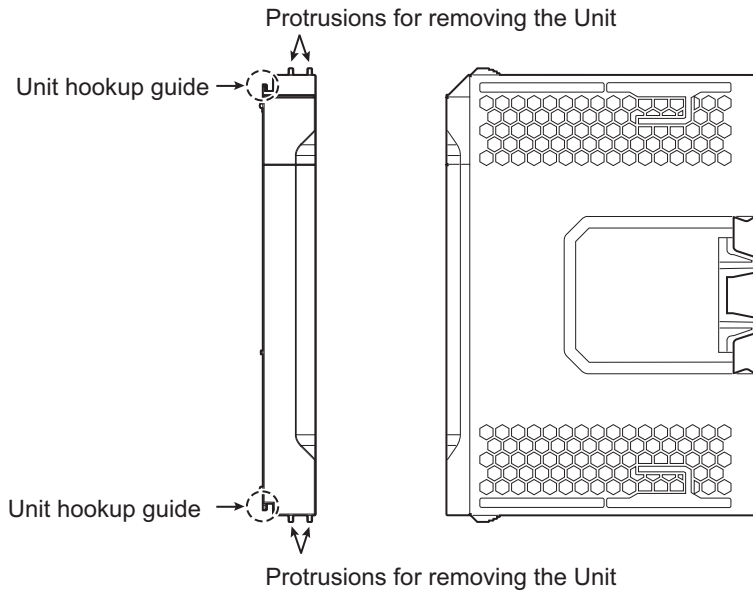
Product name	Specification	Model number	Standards
Cording Pins	Pins for 10 Units (30 terminal block pins and 30 Unit pins)	NX-AUX02	

Accessories

End Cover (NX-END01)

An End Cover is connected to the end of the EtherCAT Slave Terminal.

One End Cover is provided together with the EtherCAT Coupler Unit.



General Specification

Item	Specification	
Enclosure	Mounted in a panel	
Grounding method	Ground to 100 Ω or less	
Operating environment	Ambient operating temperature	0 to 55°C
	Ambient operating humidity	10% to 95% (with no condensation or icing)
	Atmosphere	Must be free from corrosive gases.
	Ambient storage temperature	-25 to 70°C (with no condensation or icing)
	Altitude	2,000 m max.
	Pollution degree	Pollution degree 2 or less: Conforms to JIS B3502 and IEC 61131-2.
	Noise immunity	Conforms to IEC61000-4-4. 2 kV (power supply line)
	Overvoltage category	Category II: Conforms to JIS B3502 and IEC 61131-2.
	EMC immunity level	Zone B
	Vibration resistance	Conforms to IEC 60068-2-6. 5 to 8.4 Hz with 3.5-mm amplitude, 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	
Applicable standards	cULus: Listed UL508 and ANSI/ISA 12.12.01 EC: EN 61131-2 and C-Tick, KC Registration	

Specifications

EtherCAT Coupler Unit NX-ECC201

Item	Specification	
Model	NX-ECC201	
No. of connectable NX Units	63 Units max.	
Send/receive PDO data sizes	Input: 1,024 bytes max. (including input data, status, and unused areas) Output: 1,024 bytes max. (including output data and unused areas)	
Mailbox data size	Input: 256 bytes Output: 256 bytes	
Mailbox	Emergency messages, SDO requests, and SDO information	
Refreshing methods	Free-run refreshing I/O-synchronized refreshing	
Node address setting range	1 to 192 *1	
I/O jitter performance	Inputs: 1 μs max. Outputs: 1 μs max.	
Communications cycle	250 to 100,000 μs*2*3	
Unit power supply	Power supply voltage	24 VDC (20.4 to 28.8 VDC)*4
	NX Unit power supply capacity	10 W max. Refer to Installation orientation and restrictions for details.
	NX Unit power supply efficiency	70%
	Isolation method	No isolation between NX Unit power supply and Unit power supply terminals
	Unwired terminal current capacity	4 A max.
I/O power supply	Power supply voltage	5 to 24 VDC (4.5 to 28.8 VDC)
	Maximum I/O power supply current	4 A max.
	Power supply terminal current capacity	4 A max.
NX Unit power consumption	1.45 W max.	
Current consumption from I/O power supply	10 mA max. (for 24 VDC)	
Dielectric strength	510 VAC for 1 min, leakage current: 5 mA max. (between isolated circuits)	
Insulation resistance	100 VDC, 20 MΩ min. (between isolated circuits)	

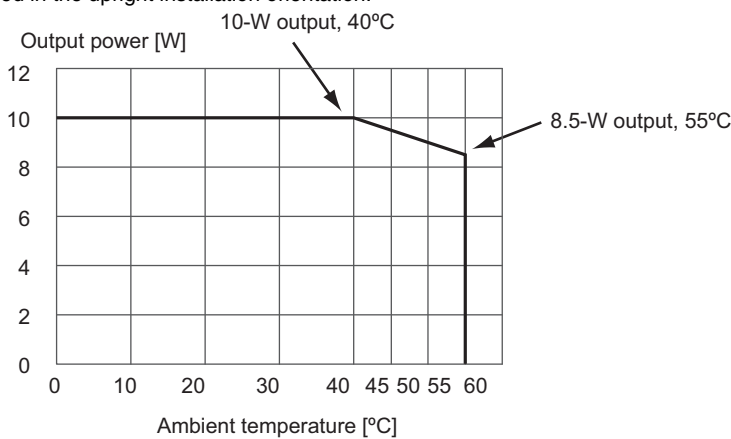
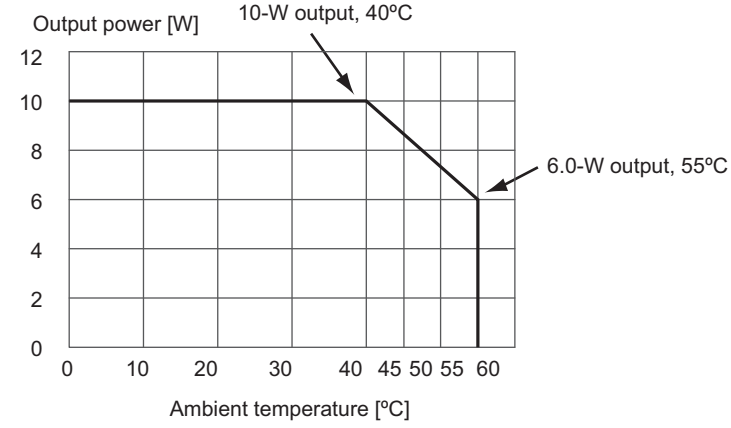
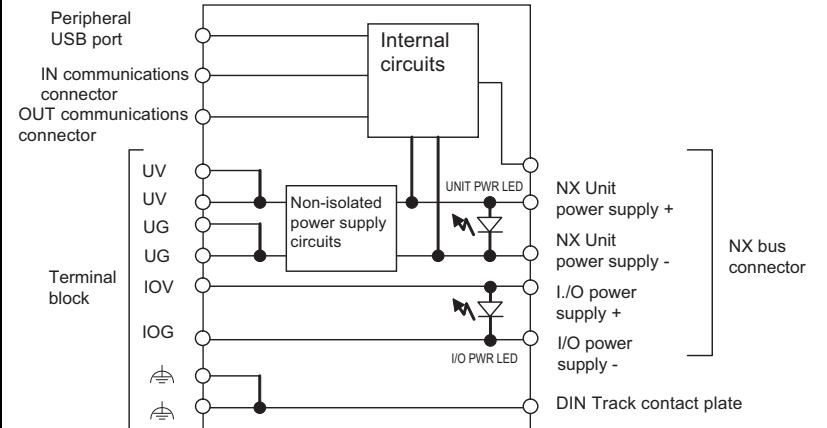
*1. This specification applies to a connection to the built-in EtherCAT port on an NJ-series CPU Unit.

*2. This depends on the specifications of the EtherCAT master. The values are as follows when you are connected to the built-in EtherCAT port on an NJ5-series CPU Unit: 500 μs, 1,000 μs, 2,000 μs, and 4,000 μs. Refer to the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) for the most recent specifications.

*3. This depends on the Unit configuration.

*4. Use an output voltage that is appropriate for the I/O circuits of the NX Units and the connected external devices.

NX-series EtherCAT Coupler Unit

Item	Specification
External connection terminals	Communications Connector For EtherCAT communications. • RJ45 × 2 (shielded) • IN: EtherCAT input data, OUT: EtherCAT output data
	Screwless Clamping Terminal Block (8 terminals) For Unit power supply, I/O power supply, and grounding. Removable.
	Peripheral USB Port For Sysmac Studio connection. • Physical layer: USB 2.0-compliant, B-type connector • Transmission distance: 5 m max.
Dimensions	46 × 103 × 71 mm (W × H × D)
Weight	150 g max.
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: • Used in the upright installation orientation. 
	• Used in another orientation other than the upright installation orientation. 
Circuit layout	

NX-series EtherCAT Coupler Unit

Item	Specification
Terminal arrangement	<p>Unit power supply (24 VDC)</p> <p>I/O power supply (5 to 24 VDC)</p> <p>Ground to 100Ω or less</p> <p>Through-wiring for unwired terminals.</p>
Accessory	End Cover (NX-END0): 1

EtherCAT Communications Specifications

Item	Specification
Communications standard	IEC 61158 Type 12
Physical layer	100BASE-TX (IEEE 802.3)
Modulation	Baseband
Baud rate	100 Mbps
Topology	Depends on the specifications of the EtherCAT master.
Transmission media	Category 5 or higher twisted-pair cable (Recommended cable: double-shielded cable with aluminum tape and braiding)
Transmission distance	Distance between nodes: 100 m or less

Version Information

NX-series EtherCAT Coupler Unit and Sysmac Studio

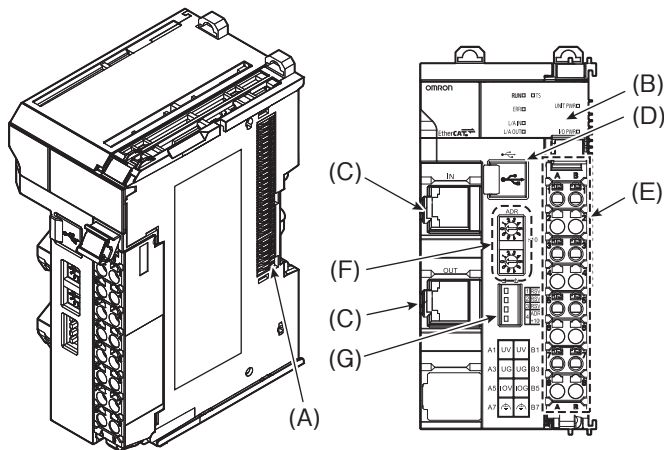
NX-series EtherCAT Coupler Unit	Sysmac Studio	
	Version 1.05 or lower	Version 1.06 or higher
NX-ECC201	Not supported	Supported

EtherCAT Coupler Unit NX Series and CPU Unit

EtherCAT Coupler Unit NX Series	CPU Unit	
	Unit version 1.04 or lower	Unit version 1.05 or higher
NX-ECC201	Not supported	Supported

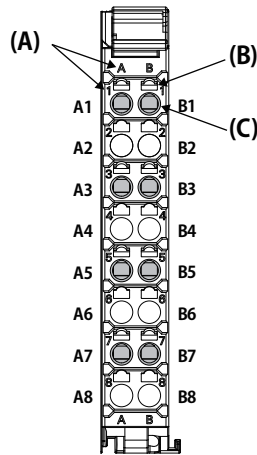
External Interface

EtherCAT Coupler Unit NX-ECC201



Symbol	Name	Function
(A)	NX bus connector	This connector is used to connect each Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Communications connectors	These connectors are connected to the communications cables of the EtherCAT network. There are two connectors, one for the input port and one for the output port.
(D)	Peripheral USB port	This port is used to connect to the Sysmac Studio Support Software.
(E)	Terminal block	The terminal block is used to connect external devices. The number of terminals depends on the type of Unit.
(F)	Rotary switches	These rotary switches are used to set the 1s digit and 10s digit of the node address of the EtherCAT Coupler Unit as an EtherCAT slave. The address is set in decimal.
(G)	DIP switch	The DIP switch is used to set the 100s digit of the node address of the EtherCAT Coupler Unit as an EtherCAT slave.

Terminal Block



Eight-terminal Block

Symbol	Name	Function
(A)	Terminal number indications	The terminal numbers (A1 to A8 and B1 to B8) are displayed. The terminal number indicators are the same regardless of the number of terminals on the terminal block, as shown above.
(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.

Applicable Wires

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.

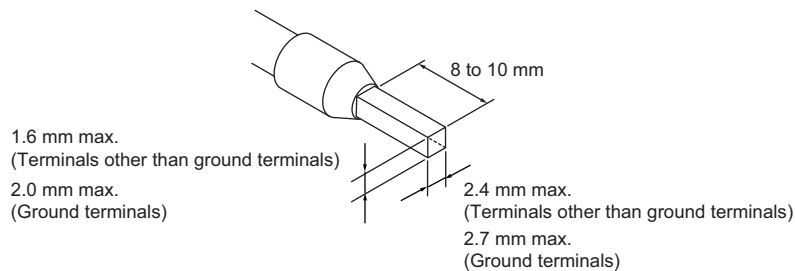
Always use one-pin ferrules. Do not use two-pin ferrules.

The applicable ferrules, wires, and crimping tool are given in the following table.

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

*1. Some AWG 14 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.

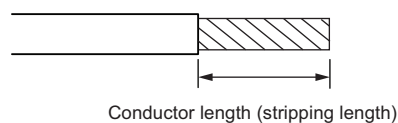


Using Twisted Wires/Solid Wires

If you use the twisted wires or the solid wires, the applicable wire range and conductor length (stripping length) are as follows.

Use the twisted wires to connect the ground wire to a ground of 100 Ω or less. Do not use the solid wires.

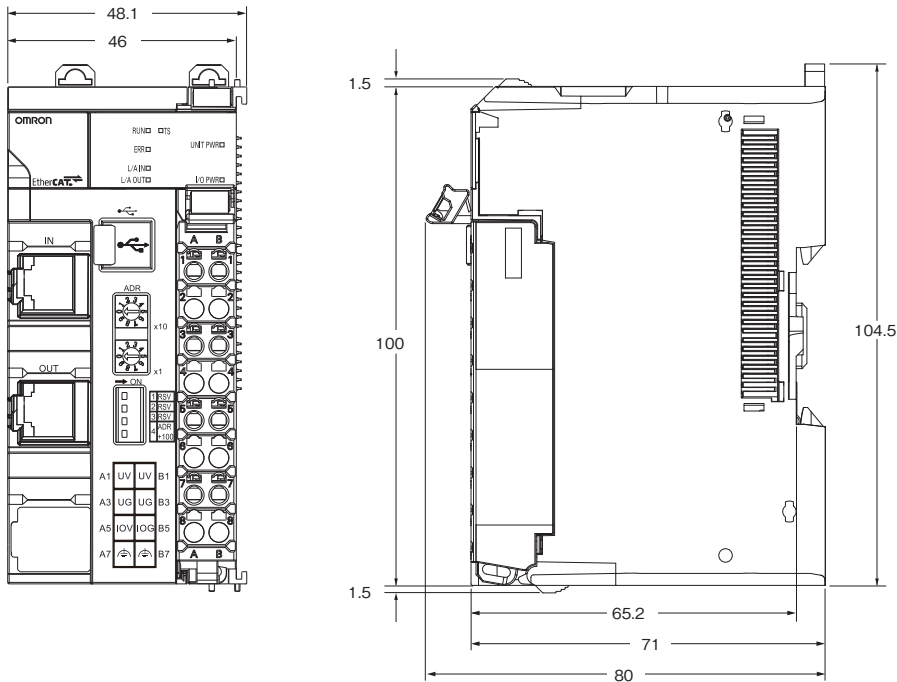
Terminal types	Applicable wire range	Conductor length (stripping length)
Ground terminals	2.0 mm ²	9 to 10 mm
Terminals other than ground terminals	0.08 to 1.5 mm ² AWG28 to 16	8 to 10 mm



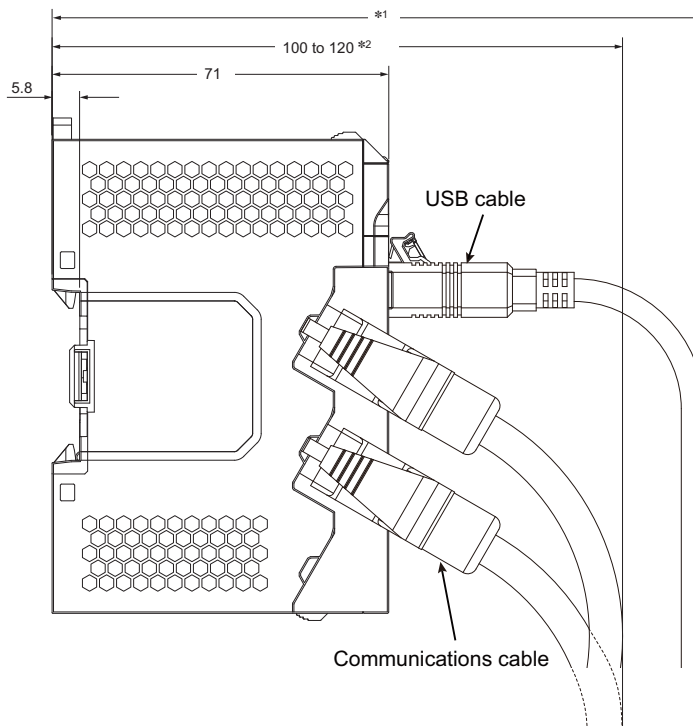
Dimensions

EtherCAT Coupler Unit NX-ECC201

● EtherCAT Coupler Unit Only



● With Cables Connected

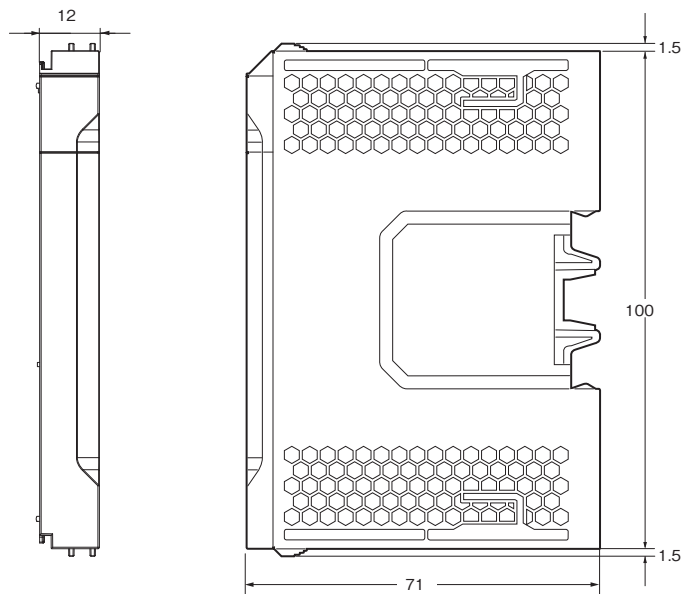


*1. This dimension depends on the specifications of the commercially available USB cable. Check the specifications of the USB cable that is used.

*2. This is the dimension from the back of the Unit to the communications cables.

- 100 mm: When an MPS588-C Connector is used.
- 120 mm: When an XS6G-T421-1 Connector is used.

● End Cover



Related Manuals

Man.No	Model	Manual	Application	Description
W519	NX-ECC201	NX-series EtherCAT Coupler Unit User's Manual	Learning how to use an NX-series EtherCAT Coupler Unit and Ether-CAT Slave Terminals	The following items are described: the overall system and configuration methods of an EtherCAT Slave Terminal (which consists of an NX-series EtherCAT Coupler Unit and NX Units), and information on hardware, setup, and functions to set up, control, and monitor NX Units through EtherCAT.