

# NX-series RFID Units

## NX-V680C

CSM\_NX-V680C\_DS\_E\_1\_1

**RFID V680 communications units create faster and more consistent field networks, supports controller distribution, and enables better traceability**

- The NX series of CPU Units support direct connectivity, features built-in EtherCAT Coupler Units and EtherNet/IP™ Coupler Units, and can connect directly to the globally deployable RFID V680 series of devices
- Supports burst communication of 8-kbytes data



## Features

- Data reads/writes are easily performed by simply setting parameters in the machine automation controller memory area.
- Simple device configuration, in comparison with serial communication, coupled with high-speed data processing.
- Communication programs can be easily built using the ladder program function blocks "Sysmac Library RFID Communications Library (SYSMAC-XR019)".

**Note:** Refer to the *V680 series catalog* (Q266) and *V680 series data sheet* (Q267) for more information on RFID system V680 series system configurations.

Refer to the corresponding manual of each controller for more information on controller specifications.

## System Configurations

### Connected to a CPU Unit

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

Support Software  
Sysmac Studio



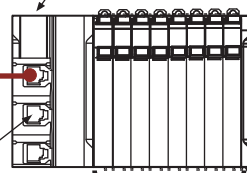
Connect to built-in EtherNet/IP port

Built-in EtherCAT port

• CPU Rack

NX-series CPU Unit

NX1P2-□□□□□□ or NX102-□□□□



NX Units

End Cover

Sysmac is a trademark or registered trademark of OMRON Corporation in Japan and other countries for OMRON factory automation products.

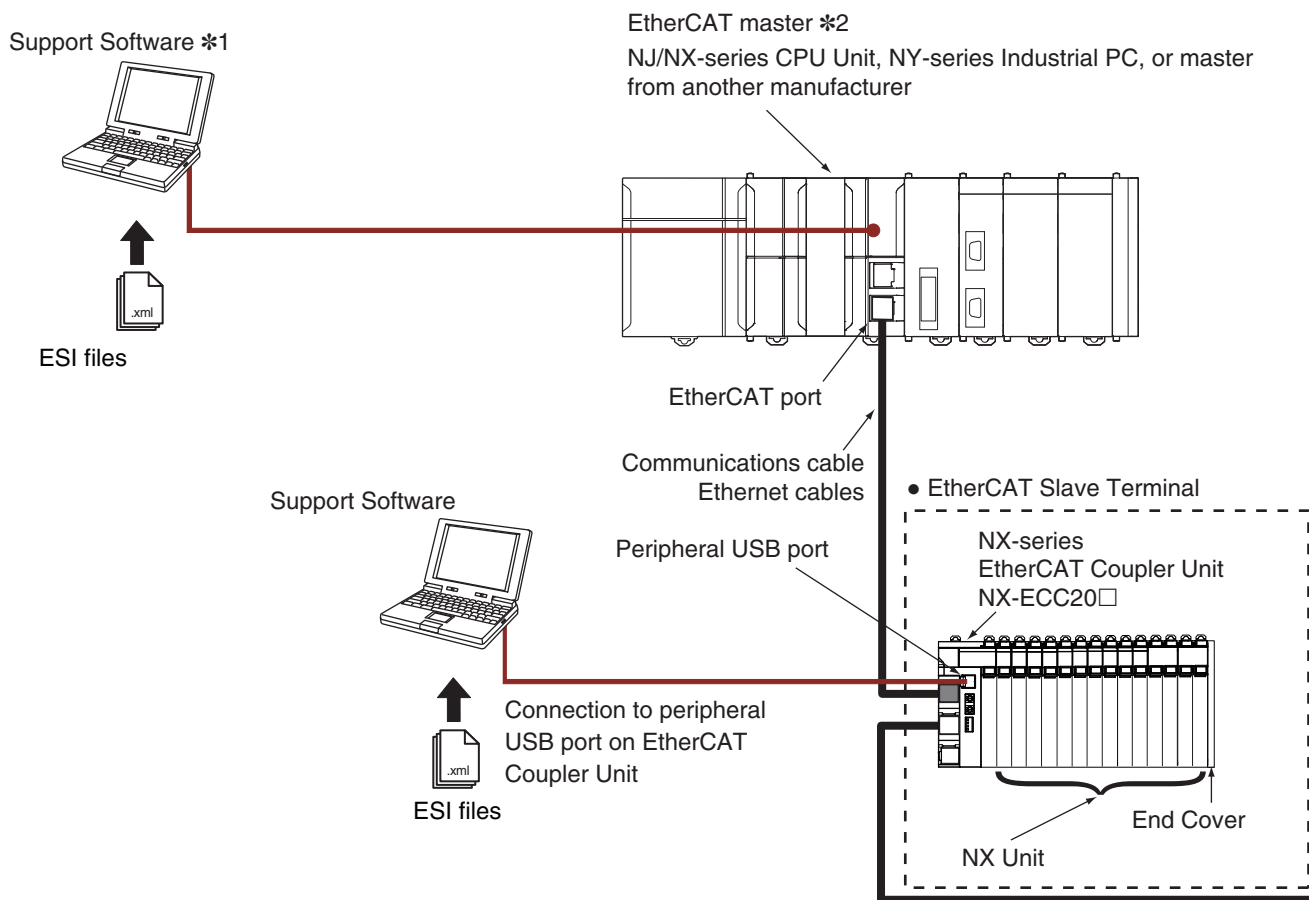
EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

• EtherNet/IP™ is a trademark of ODVA.

Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.

## Connected to an EtherCAT Coupler Unit

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

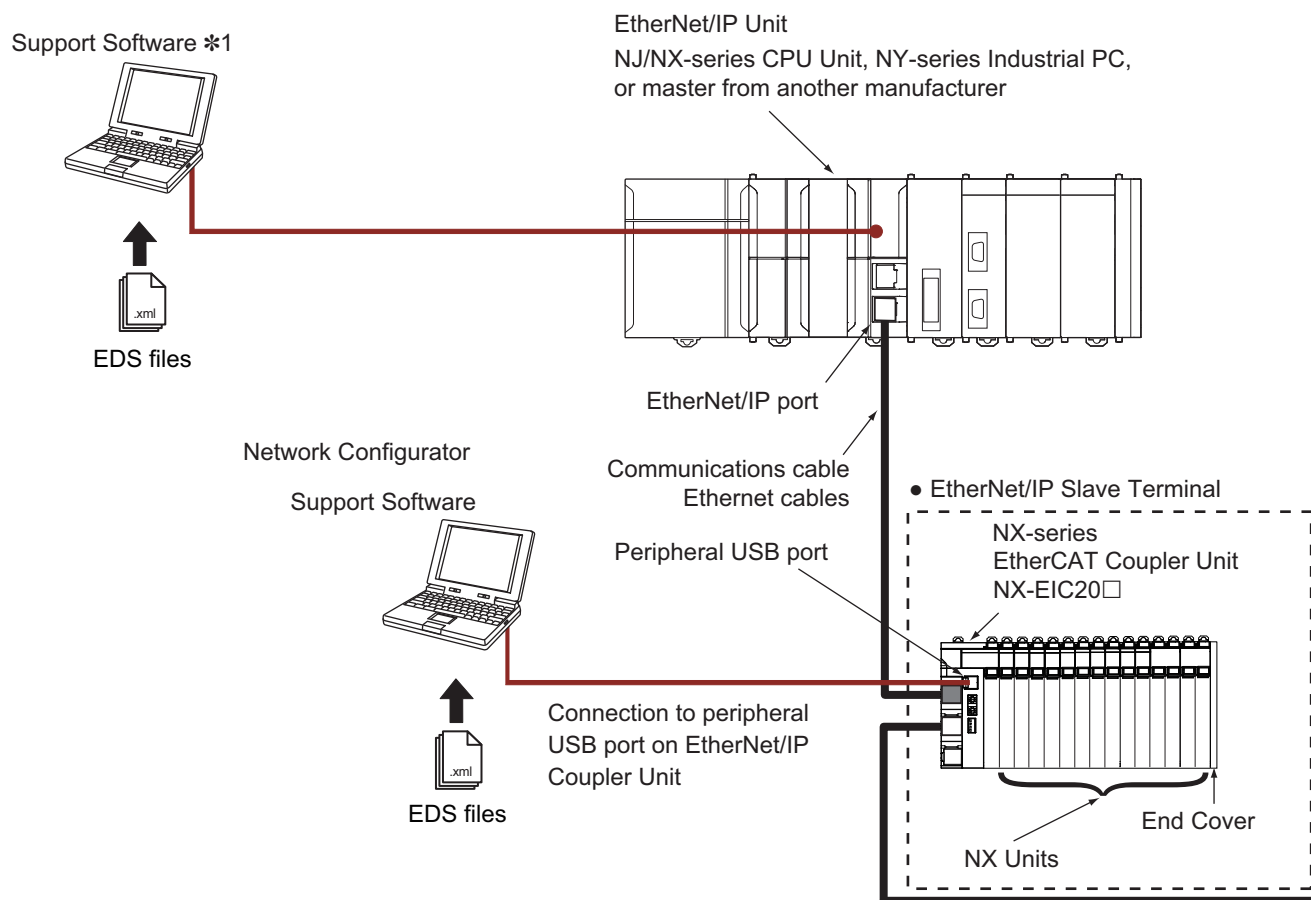


\*1. The term Support Software indicates software that is provided by OMRON. If you connect to a master from another company, use the software tool corresponding to that master.

\*2. 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.

## Connected to an EtherNet/IP™ Coupler Unit

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





\* 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.

Ordering Information

**Applicable standards**  
Refer to the OMRON website ([www.ia.omron.com](http://www.ia.omron.com)) or ask your OMRON representative for the most recent applicable standards for each model.

RFID Units

RFID Units	Appearance	Product name	Amplifier/Antenna	Number of Units connected	Model
NX-series RFID Units		RFID Units	V680 series	1	NX-V680C1
				2	NX-V680C2

## General Specifications

Item		Specifications
Enclosure		Mounted in a panel
Grounding Methods		Ground to less than 100 $\Omega$
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	2 or less: Conforms to JIS B3502 and IEC 61131-2
	Noise immunity	2 kV on power supply line (Conforms to IEC61000-4-4.)
	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 amplitude of 3.5 mm, 8.4 to 150 Hz, acceleration of 9.8 m/s <sup>2</sup> 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 <sup>2</sup> , 3 times each in X, Y, and Z directions
Applicable standards		cULus: Listed (UL61010-2-201), ANSI/ISA12.12.01, EU: EN61131-2, RCM, KC: KC Registration, EAC

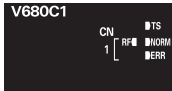
## Functions

This section describes the functions provided in an RFID Unit.


Function name	Description
RF Communications option function	This function switches the operation sequence during communications with an RF Tag.
Communications command function	This function reads or writes the memory for a RF Tag on the antenna communications area.
Write protection function	This function prevents the loss of data due to overwriting by specifying the areas in which it is not possible to write to an RF Tag.
RF Tag service life detection function	This function records the number of times data is rewritten to an RF Tag, and determines the maximum rewrite count.
RF Tag memory error detection function	This function detects an error during reading by performing CRC calculation for the memory of an RF Tag.
RF Tag memory error correction function	This function detects an error during reading by performing ECC calculation for the memory of an RF Tag, and corrects the error to an appropriate value.
Test command function	This function checks the margin in communications with an RF Tag, and measures the surrounding noise.

## Individual Specifications

### NX-V680C1

<b>Unit name</b>	One-channel RFID Unit	<b>Model</b>	NX-V680C1
<b>Number of antennas connected</b>	1	<b>External connection terminal</b>	FG terminal block (1 terminal)
<b>I/O refreshing method</b>	Free-Run Refreshing		
<b>Indicators</b>	TS indicator, RF indicator, NORM indicator, and ERR indicator  	<b>Communications protocol</b>	ISO/IEC18000-3 (15693)
		<b>Connectable Antennas</b>	V680-series Antenna with Separate Amplifier: V680-HS□□ Antenna with Built-in Amplifier: V680-H01-V2
		<b>Applicable RF Tags</b>	V680S-series RF or V680-series RF Tags
		<b>RF Tag reading/writing size</b>	8,192 bytes max.
		<b>Divided data size</b>	16 to 128 bytes
		<b>Backup function</b>	Supported.
<b>Dimensions</b>	30 mm (W) x 100 mm (H) x 71 mm (D)	<b>Isolation method</b>	Digital isolator isolation
<b>Insulation resistance</b>	20 MΩ min. between isolated circuits (at 100 VDC)	<b>Dielectric strength</b>	510 VAC between isolated circuits for 1 minute with a leakage current of 5 mA max.
<b>I/O power supply method</b>	Supplied from the NX bus	<b>Current consumption from I/O power supply</b>	<ul style="list-style-type: none"> <li>V680-H01-V2 connection 250 mA max.</li> <li>V680-HA63□ connection 210 mA max.</li> </ul>
<b>NX Unit power consumption</b>	<ul style="list-style-type: none"> <li>Connected to a CPU Unit 1.00 W max.</li> <li>Connected to Communications Coupler Unit 0.90 W max.</li> </ul>	<b>Weight</b>	120 g max.
<b>Installation orientation and restrictions</b>	Installation orientation: <ul style="list-style-type: none"> <li>Connected to a CPU Unit Possible in upright installation.</li> <li>Connected to a Communications Coupler Unit Possible in 6 orientations</li> </ul> Restrictions: No restrictions		

## NX-V680C2

Unit name	Two-channels RFID Unit	Model	NX-V680C2
Number of antennas connected	2	External connection terminal	FG terminal block (1 terminal)
I/O refreshing method	Free-Run Refreshing		
Indicators	[TS] LED, [RF] LED, [NORM] LED, [ERR] LED  TS indicator, RF indicator, NORM indicator, and ERR indicator  	Communications protocol	ISO/IEC18000-3 (15693)
		Connectable Antennas	V680-series Antenna with Separate Amplifier: V680-HS□□
		Applicable RF Tags	V680S-series RF or V680-series RF Tags
		RF Tag reading/writing size	8,192 bytes max.
		Divided data size	16 to 128 bytes
		Backup function	Supported.
Dimensions	30 mm (W) x 100 mm (H) x 71 mm (D)	Isolation method	Digital isolator isolation
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	Dielectric strength	510 VAC between isolated circuits for 1 minute with a leakage current of 5 mA max.
I/O power supply method	Supplied from the NX bus.	Current consumption from I/O power supply	V680-HA63□ connection 380 mA max
NX Unit power consumption	<ul style="list-style-type: none"> <li>Connected to a CPU Unit 1.00 W max.</li> <li>Connected to Communications Coupler Unit 0.90 W max.</li> </ul>	Current consumption from I/O power supply	130 g max.
Installation orientation and restrictions	Installation orientation: <ul style="list-style-type: none"> <li>Connected to a CPU Unit Possible in upright installation.</li> <li>Connected to a Communications Coupler Unit Possible in 6 orientations</li> </ul> Restrictions: No restrictions		

## Version Information

### Connected to a CPU Unit

Refer to the user's manual for the CPU Unit for the models of CPU Unit to which RFID Units can be connected.

NX Units,		Corresponding unit versions/versions	
Model	Units Versions	CPU Units	Sysmac Studio
NX-V680C1	Ver. 1.0	Version 1.13 or higher	Version 1.25 or higher
NX-V680C2			

### Connected to an EtherCAT Coupler Unit

NX Unit		Corresponding unit versions/versions		
Model	Unit Version	EtherCAT Couplers Units	CPU Unit or Industrial PC	Sysmac Studio
NX-V680C1	Ver. 1.0	1.0 or later *	1.05 or higher	Version 1.25 or higher
NX-V680C2				

\* When connecting with other manufacturer's master, use the EtherCAT Coupler Unit with unit version Ver.1.5 or later.

### Connected to an EtherNet/IP Coupler Unit

NX Unit		Corresponding unit versions/versions					
Model	Unit Version	Use with an NJ/NX/NY-series Controller *1			Use with an CS/CJ/CP-series PLC *2		
		EtherNet/IP Coupler Unit	CPU Unit or Industrial PC	Sysmac Studio	EtherNet/IP Coupler Unit	Sysmac Studio	NX-IO Configurator
NX-V680C1	Ver. 1.0	Version 1.2 or later	Version 1.14 or later	Version 1.25 or higher	Version 1.2 or later	Version 1.25 or higher	Version 1.13 or later
NX-V680C2							

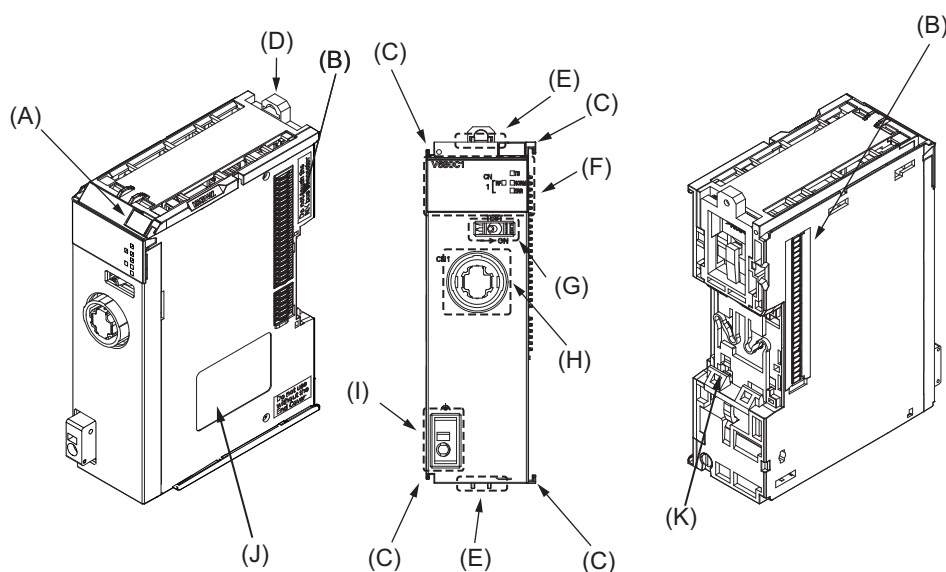
\*1. Refer to the user's manual of the EtherNet/IP Coupler Unit for the unit versions of EtherNet/IP Units corresponding to EtherNet/IP Coupler Units.

\*2. Refer to the user's manual of the EtherNet/IP Coupler Unit for the unit versions of CPU Units and EtherNet/IP Units corresponding to EtherNet/IP Coupler Units.

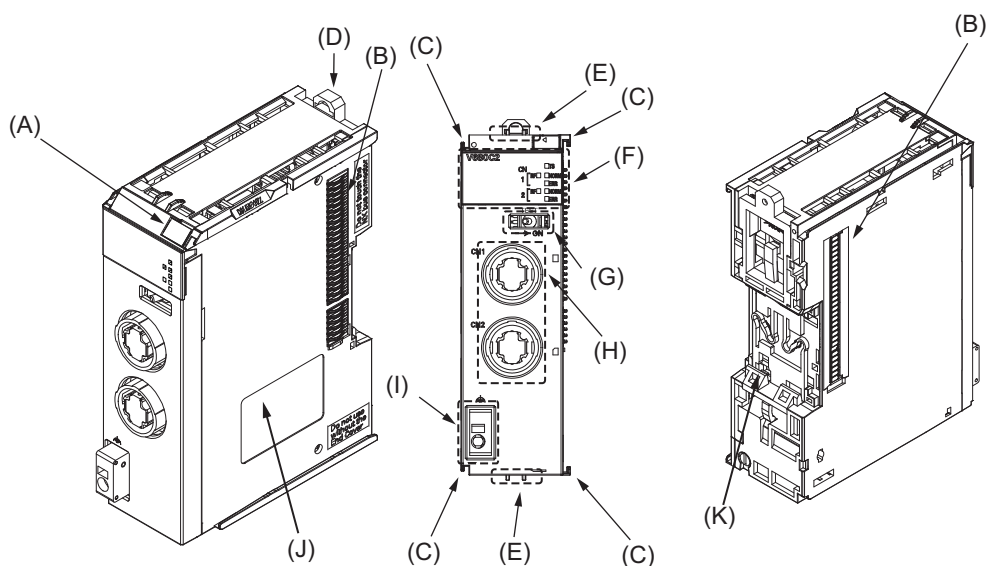


## Parts and Names

### NX-V680C1 One-channel RFID Unit



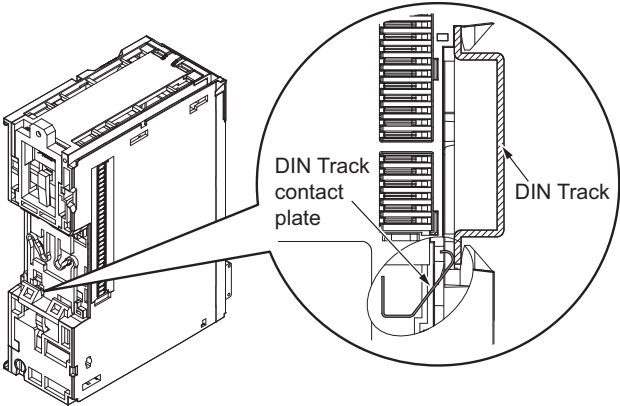
### NX-V680C2 Two-channel RFID Unit



Letter	Name	Function
(A)	Marker attachment locations	The locations where markers are attached. The markers made by OMRON are installed for the factory setting. Commercially available markers can also be installed.
(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 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.
(G)	Test switch	This is used to switch between the normal mode and the test mode. The test switch can be used when it has been enabled in the Unit operation settings.
(H)	Amplifier/antenna connector	This is a connector for connecting a V680-series amplifier or antenna (with a built-in amplifier).
(I)	FG terminal	This is an external connection terminal for grounding. It is shaped like a screwless clamping terminal.
(J)	Unit specifications	The specifications of the Unit are given.
(K)	DIN Track Contact Plates	This plate is connected internally to the functional ground terminal on the terminal block.

# Wiring the FG Terminal

An RFID Unit has a functional ground terminal (FG terminal), which requires grounding. However, if the material of DIN Track to mount CPU Rack or Slave Terminals are made of steel and the surface is not insulated, you can omit the grounding wire to the FG terminal of the RFID Unit. This is because the functional ground terminal of the RFID Unit is electrically connected to the DIN Track through the DIN Track contact plate.

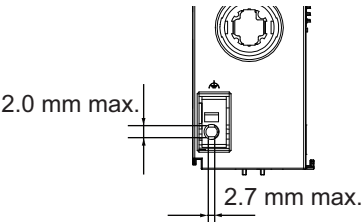


## Wires Applicable to the FG Terminal

The wires that you can connect to the FG 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 FG Terminal Block

The dimensions of wires that you can connect into the terminal holes of the FG terminal block are as in the figure below. Process the applicable wires that are specified in the following description to apply the dimensions.



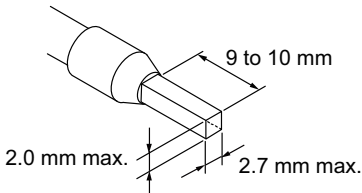
### Using Ferrules

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.

Manufacturer	Ferrule model	Applicable wire (mm <sup>2</sup> (AWG))	Crimping tool
Phoenix Contact	Al2.5-10	2.0 *	Phoenix Contact (The figure in parentheses is the applicable wire size.) CRIMPFOX 6 (0.25 to 6 mm <sup>2</sup> , AWG24 to 10)

\* Some AWG14 wires exceed 2.0 mm<sup>2</sup> and cannot be used in the FG terminal block.

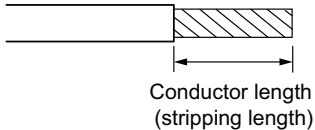
When you use any ferrules other than those in the above table, crimp them to the twisted wires so that the following processed dimensions are achieved.



### Using Twisted Wires/Solid Wires

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

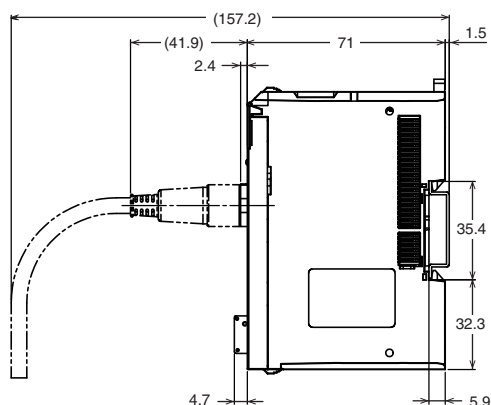
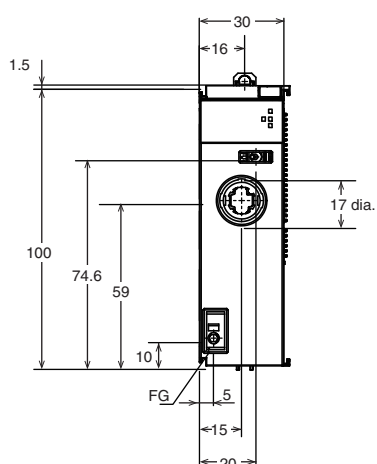
Wire type				Wire size	Conductor length (stripping length)
Twisted wires		Solid wire			
Plated	Unplated	Plated	Unplated		
Supported	Possible	Possible	Possible	2.0 mm <sup>2</sup>	9 to 10 mm



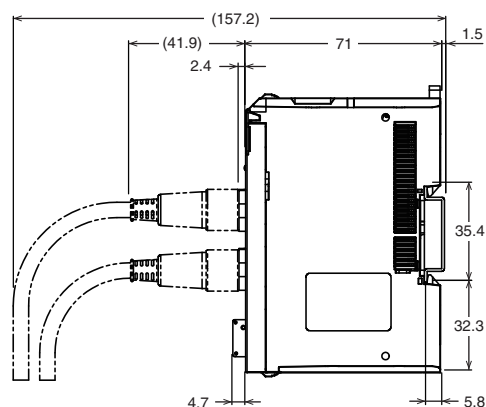
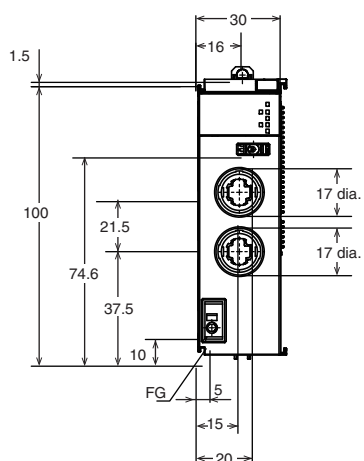
## Dimensions

(Unit: mm)

### NX-V680C1 (One-channel)



### NX-V680C2 (Two-channels)



## Related Manual

Man.No.	Model	Manual name	Application	Description
Z401	NX-V680C□	NX-series RFID Units User's Manual	Learning how to use NX-series RFID Units	The hardware, setup methods, and functions of the NX-series RFID Units are described.
W609	SYSMAC-XR019	Sysmac Library User's Manual for RFID Communications Library	Learning how to use Sysmac Library for RFID Communications Library	The setup methods, and functions of the RFID Communications Library are described.

## Terms and Conditions Agreement

### Read and understand this catalog.

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

### Warranties.

(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

(b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.

Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

See <http://www.omron.com/global/> or contact your Omron representative for published information.

### Limitation on Liability: Etc.

OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

### Suitability of Use.

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

### Programmable Products.

Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

### Performance Data.

Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

### Change in Specifications.

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

### Errors and Omissions.

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.