

Read position information from encoders with Synchronous Serial Interface (SSI).

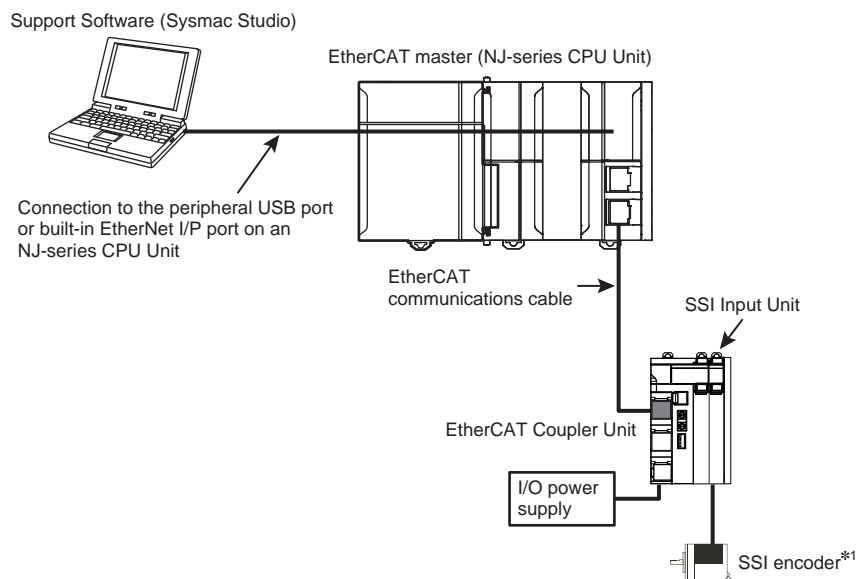
- Process SSI encoder input data using the MC Function Modules of the NJ-series Machine Automation Controller.
- Encoder data can be synchronised with the control cycle and EtherCAT Distributed Clock.



Features

- SSI clock frequency is supported up to 2 MHz.
- Free-run refreshing or Synchronous I/O refreshing can be selected for refreshing with the NX-series EtherCAT Coupler.
- When the MC Function Modules of the NJ-series Machine Automation Controller are used, the encoder input can be used for motion control instructions as an “axis”.
- Choice of SSI Coding Methods (No conversion, binary code, or gray code)
- Input edge time stamps
- Multi turn and single turn SSI encoders are supported.
- Data Refresh Status (Data refreshing can be checked on the host controller.)
- Maximum connecting SSI cable length:400m

System Configuration




*1. The SSI encoder is supplied with 24-VDC power from the SSI Input Unit.

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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	Specification					Model	Standards
		Number of channels	Input/Output form	Maximum data length	Encoder power supply	Type of external connections		
NX Series Position Interface Unit	SSI Input Units 	1	EIA standard RS-422-A	32 bits	DC24V, 0.3A/CH	Screwless push-in terminal block (12 terminals)	NX-ECS112	UC1, CE, KC
		2	EIA standard RS-422-A	32 bits	DC24V, 0.3A/CH	Screwless push-in terminal block (12 terminals)	NX-ECS212	UC1, CE, KC

Option

Product Name	Specification	Model	Standards
Unit/Terminal Block Coding Pins	For 10 Units (Terminal Block: 30 pins, Unit: 30 pins)	NX-AUX02	-

Accessories


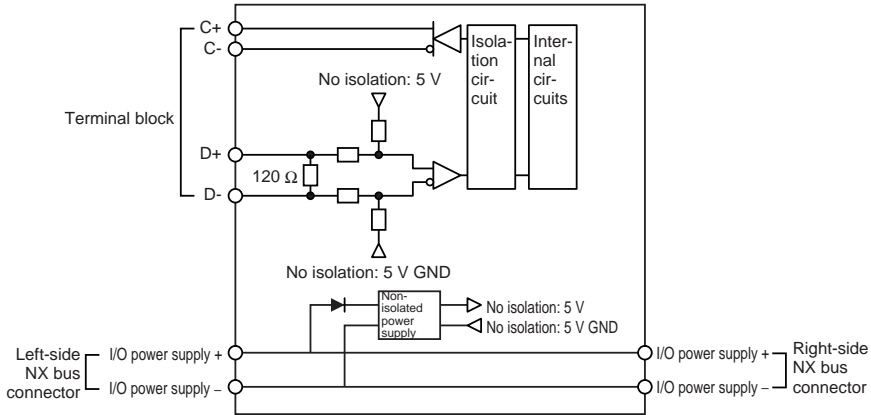
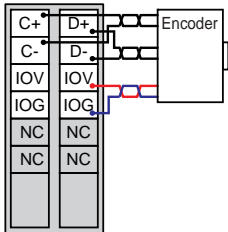
Not included.

General Specification

Item		Specification
Enclosure		Mounted in a panel
Grounding method		Ground to less than 100 Ω
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


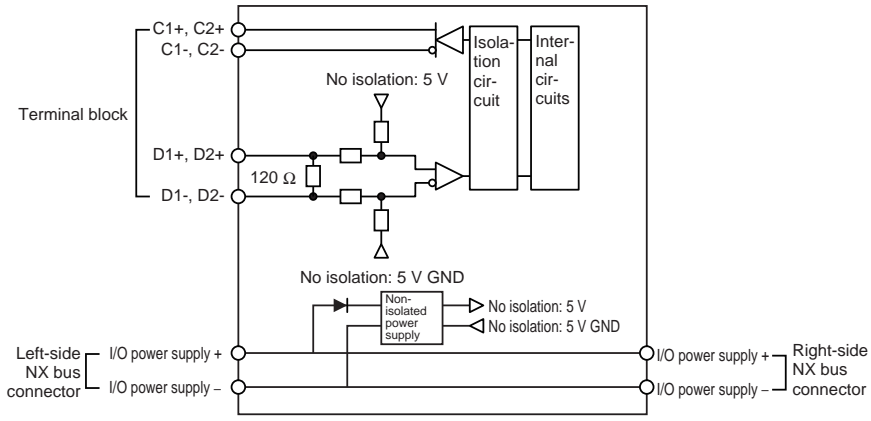
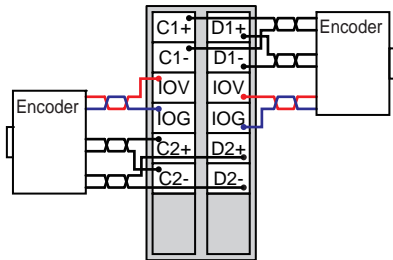
Specification

SSI Input Units 1 channel NX-ECS112

Unit name	SSI Input Units		Model	NX-ECS112
Number of channels	1 channel	Type of external connections	Screwless clamping terminal block (12 terminals)	
I/O refreshing method	Free-Run refreshing or synchronous I/O refreshing *1			
Indicators		Input signals	External inputs: 2 Data input (D+,D-) External outputs: 2 Clock output (C+, C-)	
I/O interface	Synchronized serial interface (SSI)			
Clock output	EIA standard RS-422-A line driver levels			
Data input	EIA standard RS-422-A line receiver levels			
Maximum data length	32 bits (The single-turn, multi-turn, and status data length can be set.)			
Coding method	No conversion, binary code, or gray code			
Baud Rate	100 kHz, 200 kHz, 300 kHz, 400 kHz, 500 kHz, 1.0 MHz, 1.5 MHz, or 2.0 MHz			
Dimensions	12 x 100 x 71 mm (WxHxD)	Isolation method	Digital isolator	
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)	Dielectric strength	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.	
I/O power supply source	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%/–15%)	Current capacity of I/O power supply terminals	IOV: 0.3 A max. per terminal IOG: 0.3 A max. per terminal	
NX Unit power consumption	0.85 W	Current consumption from I/O power supply	20 mA	
Maximum transmission distance *2	Baud Rate	Maximum transmission distance		
	100 kHz	400 m		
	200 kHz	190 m		
	300 kHz	120 m		
	400 kHz	80 m		
	500 kHz	60 m		
	1.0 MHz	25 m		
	1.5 MHz	10 m		
2.0 MHz	5 m			
Weight	65 g			
Circuit layout	<p>SSI Clock Output and Data Input</p> 			
Installation orientation and restrictions	Installation orientation: 6 possible orientations Restrictions: There are no restrictions.			
Terminal connection diagram				
Failure detection	None	Protection	None	

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.
 *2. The maximum transmission distance for an SSI Input Unit depends on the baud rate due to the delay that can result from the responsiveness of the connected encoder and cable impedance. The maximum transmission distance is only a guideline. Review the specifications for the cables and encoders in the system and evaluate the operation of the equipment before use.

SSI Input Units 2 channel NX-ECS212

Unit name	SSI Input Units		Model	NX-ECS212
Number of channels	2 channels		Type of external connections	Screwless clamping terminal block (12 terminals)
I/O refreshing method	Free-Run refreshing or synchronous I/O refreshing *1			
Indicators			Input signals	External inputs: 2 Data input (D+, D-) External outputs: 2 Clock output (C+, C-)
I/O interface	Synchronized serial interface (SSI)			
Clock output	EIA standard RS-422-A line driver levels			
Data input	EIA standard RS-422-A line receiver levels			
Maximum data length	32 bits (The single-turn, multi-turn, and status data length can be set.)			
Coding method	No conversion, binary code, or gray code			
Baud Rate	100 kHz, 200 kHz, 300 kHz, 400 kHz, 500 kHz, 1.0 MHz, 1.5 MHz, or 2.0 MHz			
Dimensions	12 x 100 x 71 mm (WxHxD)		Isolation method	Digital isolator
Insulation resistance	20 MΩ min. between isolated circuits (at 100 VDC)		Dielectric strength	510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max.
I/O power supply source	Supplied from the NX bus. 20.4 to 28.8 VDC (24 VDC +20%/−15%)		Current capacity of I/O power supply terminals	IOV: 0.3 A max. per terminal IOG: 0.3 A max. per terminal
NX Unit power consumption	0.9 W		Current consumption from I/O power supply	30 mA
Maximum transmission distance *2	Baud Rate		Maximum transmission distance	
	100 kHz		400 m	
	200 kHz		190 m	
	300 kHz		120 m	
	400 kHz		80 m	
	500 kHz		60 m	
	1.0 MHz		25 m	
	1.5 MHz		10 m	
2.0 MHz		5 m		
Weight	65 g			
Circuit layout	<p>SSI Clock Output and Data Input</p> 			
Installation orientation and restrictions	<p>Installation orientation: 6 possible orientations Restrictions: There are no restrictions.</p>			
Terminal connection diagram				
Failure detection	None		Protection	None

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.

*2. The maximum transmission distance for an SSI Input Unit depends on the baud rate due to the delay that can result from the responsiveness of the connected encoder and cable impedance. The maximum transmission distance is only a guideline. Review the specifications for the cables and encoders in the system and evaluate the operation of the equipment before use.

Version Information

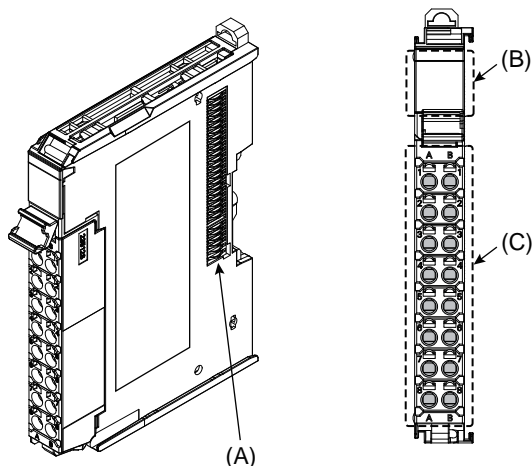
Unit NX Series and Sysmac Studio

SSI Input Unit NX Series	Sysmac Studio	
	Version 1.05 or lower	Version 1.06 or higher
NX-ECS112	Not supported	Supported
NX-ECS212	Not supported	Supported

External Interface

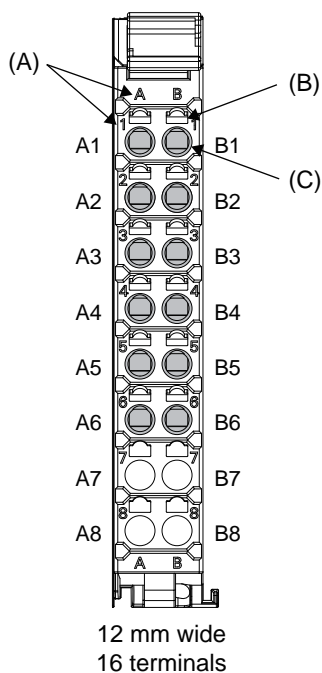
SSI Input Unit

NX-ECS112/212



Letter	Item	Specification
(A)	NX bus connector	This connector is used to connect to another Unit.
(B)	Indicators	The indicators show the current operating status of the Unit.
(C)	Terminal block	The terminal block is used to connect to external devices. The number of terminals depends on the Unit.

Terminal Blocks



Letter	Item	Specification
(A)	Terminal number indication	The terminal number is identified by a column (A and B) and a row (1 through 8). Therefore, terminal numbers are written as a combination of columns and rows, A1 through A8 and B1 through B8. The terminal number indication is the same regardless of the number of terminals on the terminal block, as shown above.
(B)	Release hole	A flat-blade screwdriver is inserted here to attach and remove the wiring.
(C)	Terminal hole	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.

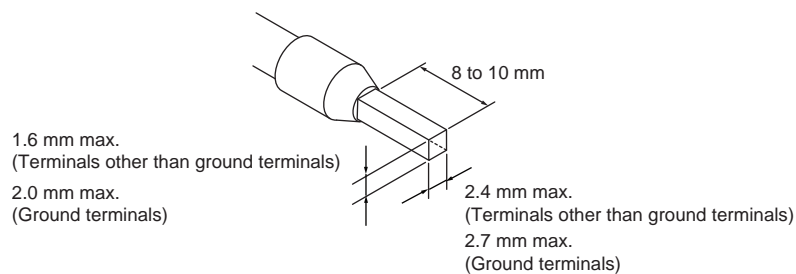
Always use one-pin ferrules. Do not use two-pin ferrules.

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.

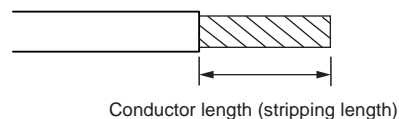


Using Twisted Wires/Solid Wires

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.

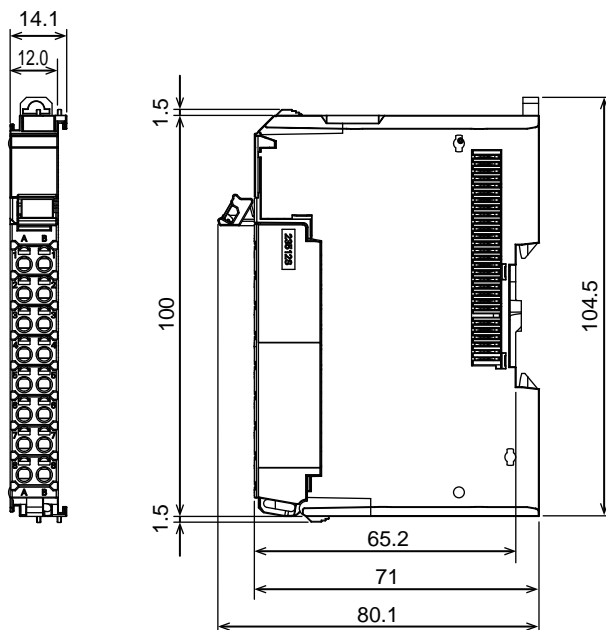
Terminal types	Applicable wires range	Conductor length (stripping length)
Ground terminals	2.0 mm ²	9 to 10 mm
Terminals other than ground terminals	0.08 to 1.5 mm ² AWG28 to 16	8 to 10 mm



Dimensions

(Unit: mm)

SSI Input Unit NX-ECS112/212



Related Manuals

Man. No	Model	Manual	Application	Description
W524	NX-EC0□□□□ NX-ECS□□□□ NX-PG0□□□□	NX-series Position Interface Units User's Manual	Learning how to use NX-series Position Interface Units	The hardware, setup methods, and functions of the NX-series Incremental Encoder Input Units, SSI Input Units, and Pulse Output Unit are described.

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