Omron NX-ECT101-HL

Product Introduction



NX-ECT101-HL Introduction

The purpose of this presentation is to introduce the EtherCAT[®] Slave Module.

The NX-ECT101-HL is the UL-certified NC-ECT101 product offered by Omron.



Sysmac – One connection

One Connection - Seamless machine control and factory automation

A single connection to the machine automation controller allows for control and access to all devices on the network.

This is empowered by a single software environment and a machine controller that networks to all technologies through EtherCAT, Ethernet/IP, and other factory automation protocols.



MACHINE CONTROL



 Motion Control is integrated within the IDE, and operating in real-time Standard PLCopen Function Blocks plus Onton generated motion FBS Direct synchronous control for position, speed and torque



All safety related data is synchronized with the whole network
The PLCopen* FBD simplifies and

The PLCopen* FBD simplifies and accelerates the development process through structuring safety circuits and enhancing reuse.





processing time

Shape search technology provides

more stable and accurate object

detection for Pick & Place projects



from the NJ/NX/NY Controller using

Ladder and Structured Text



 High precision detection and positioning data synchronized on the network

Image from Sysmac Family Brochure

Sysmac – One software

One Software - One integrated development environment software

Design **Reusable programs Development by multiple developers** For advanced machine control Sysmac Studio is the IDE (integrated development Motion programmin Model-Based design Programming with variable environment) for configuring, programming, and monitoring the Sysmac platform. One Integrated Development When you develop a project at the same Advanced motion control Complex feedback control that i Environment software Sysmac time as your colleagues, the Sysmac designed with MATLAB®/Simulink® applications can be created guickly IEC 61131 ladder and structured text Studio is fully compliant with the Studio combined with the version by simply combining PLCopen® can be imported into programs. control system (Git™) merges changes open standard IEC 61131-3. Function Blocks for Motion Control. MathMahrk automatically and resolves conflicting Programming with variables eliminates the need to learn the changes. This makes merging easier PLCOpen function blocks • and faster. You can even revert to the internal memory map of the PLC and allows the programs previous revision after graphically to be reused. comparing the current project with a Configure networks previous one. • Maintenance Verification Configure devices • **Highly efficient maintenance** Fast system debugging Troubleshooting Remote maintenance Virtual mechanical debugging 3D simulation Simulation Data trace for tuning and setup Troubleshooting in the Sysmac Movement of the machine Motion trajectories in 3D can be pre-tested with advanced Before the mechanical prototype Studio and NA Programmable connected online can be displayed is completed motion can be simulation of sequence and motion control. Simulation of checked and the program can be single Function Blocks, POU's (Program Organization Unit) or on the CAD in real time, and Terminal can manage errors across debugged. This cuts design time. the entire program can be performed. In addition all standard the entire system including the movement can also be reproduced controller You can check details from the trace data Maintenance VIDECH features such as Break & Step are available. Easy tuning of errors and solutions without and troubleshooting can be and debugging reduce the set-up times of machines and reading manuals. performed in remote locations. production lines.

Sysmac – One controller

One Controller - Powerful, yet easy to configure

The controller is the heart of the Sysmac platform.

One integrated controller is designed to meet extreme requirements for logic sequence and motion control speed and accuracy.



Image from Sysmac Family Brochure

Automation Connectivity Pain Points

Pain Point	Root Cause	Sysmac Solution	
Increasing system complexity	Multiple protocols on multiple machines	Standardize protocols	
	Scalability adds complexity	Modularity reduces scaled complexity	
Machine design time	Central controllers increase design complexity	Distributed models reduce complexity	
Lack of repeatability	Low-speed protocols create system jitter	High speed protocols communicate in real time	
Partial connection disruption shuts down system	Central system monitoring requires central system control	Stable operation by ring connection	

NX-ECT101-HL Solution In Sysmac Ecosystem

Sysmac Solution	NX-ECT101-HL Delivering the Solution	
Standardize protocols	Ensure repeatability with consistent controller cycle times on EtherCAT [®] deterministic network	
Modularity reduces scaled complexity	Compatibility across Sysmac portfolio	
Distributed models reduce complexity	Free-run refreshing mode data exchange between EtherCAT master and CPU unit allows for quicker node identification during failure	
High-speed protocols communicate in real time	EtherCAT [®] 1,204 bytes data input and output	
Stable operation by ring connection	NX-ECT-101-HL supports ring connection	

NX-ECT101-HL Architecture Example



NX-ECT101-HL Architecture Example



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NX-EXT101-HL Specification

		NX-ECT101-HL Features		Feature Value
ECT101 RUN TS ERR L/A IN L/A OUT	LED Status Display	Enclosure		Mounted in a panel
		Grounding method		Ground of 100 Ω or less
	EtherCAT® Connectivity	Operating Conditions	Ambient operating temperature	0 to 55°C
			Ambient operating humidity	10% to 95% RH
			Ambient storage temperature	-25 to 70°C
			Altitude	2,000 m max.
			Noise immunity	Conforms to IEC 61000-4-4
			Overvoltage category	Category II: Conforms to IEC 61010-2-201
			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/s2 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/s2, 3 times each in X, Y, and Z directions
			Applicable standards	cULus: Listed (UL61010-2-201), EU: EN 61131-2, RCM, KC (KC Registration), EAC, and UKCA

NX-EXT101-HL Comparison



Feature	NX-ECT	CJ1W-ECT21	
Applicable PLCs	NX CPU Cannot be connected to NX CJ/NJ CPU coupler		
PDO data size	64、128、192、256、320、384、 448、512byte	0、50、100、200、400byte	
Mailbox data size	Input : 512byte Output : 512byte	Input : 512byte Output : 512byte	
Refreshing methods	Free-Run Mode	Free-Run Mode	
Node address setting range	1 to 255 (hardware switch setting) 1 to 65535 (software switch setting)	1 to 255 (hardware switch setting) 1 to 65535 (software switch setting)	
Ring connection	available	available	
Dimensions(mm)	W30×H100×D71	W31×H90×D65	
Performance (IO Data update)	About 1.5ms	About 1.5ms	





NX Controller Compatibility

The NX-ECT101-HL is compatible with both the NX1 Series (NX1P2 and NX102) and Sysmac Studio (version 1.50 or later).

NX Controller Comparison



Model		NX1P2	NX102
Instruction execution time	LD instruction	3.3ns	3.3ns
	Arithmetic instruction	70ns~	70ns
Control cycle		2 ms~	1 ms~
Program capacity		1.5MB	1 KHz~
Variable	Non-Retained	2MB	5MB
capacity	Retained	32kB	32MB
Motion control axis		4/6/8	1.5MB
S	ynchronous control axis	0/2/4	4/6/8/12
	PTP control axis	4/4/4	0/2/4/8
Ethernet/IP port		1 port	4/4/4/4
EtherCAT port		1 port	2 ports
	# of slaves	Up to 16	1 port
	# of NX units	Up to 16	Up to 64
Built-in I/O		24/40/40	Up to 400
Total Local NX I/O Capacity		8	n/a
Enterprise Connectivity		n/a	32

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