NX Controller

CPU Selection Guide

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Choosing an OMRON Machine Automation Controller

OMRON's machine automation controllers have been designed to give manufacturing facilities robust safety, accurate motion, and transparent control by harnessing Sysmac's One Controller, One Connection, and One Software architecture. No matter if automation is required for a single task or an entire factory, the NX portfolio of controllers can be selected to meet today's demands and allow for scalability needs of tomorrow.

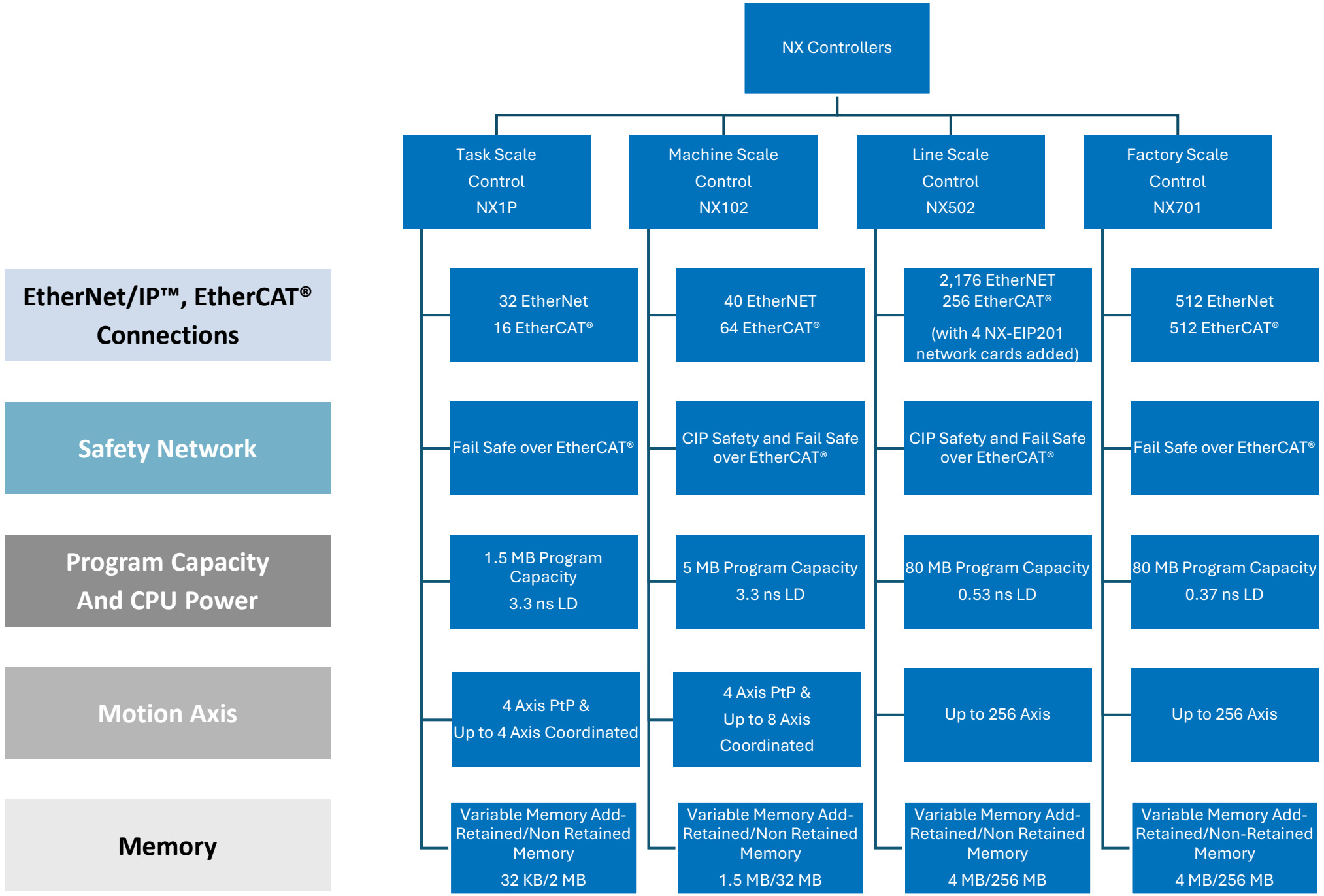
When selecting between OMRON NX Controllers,

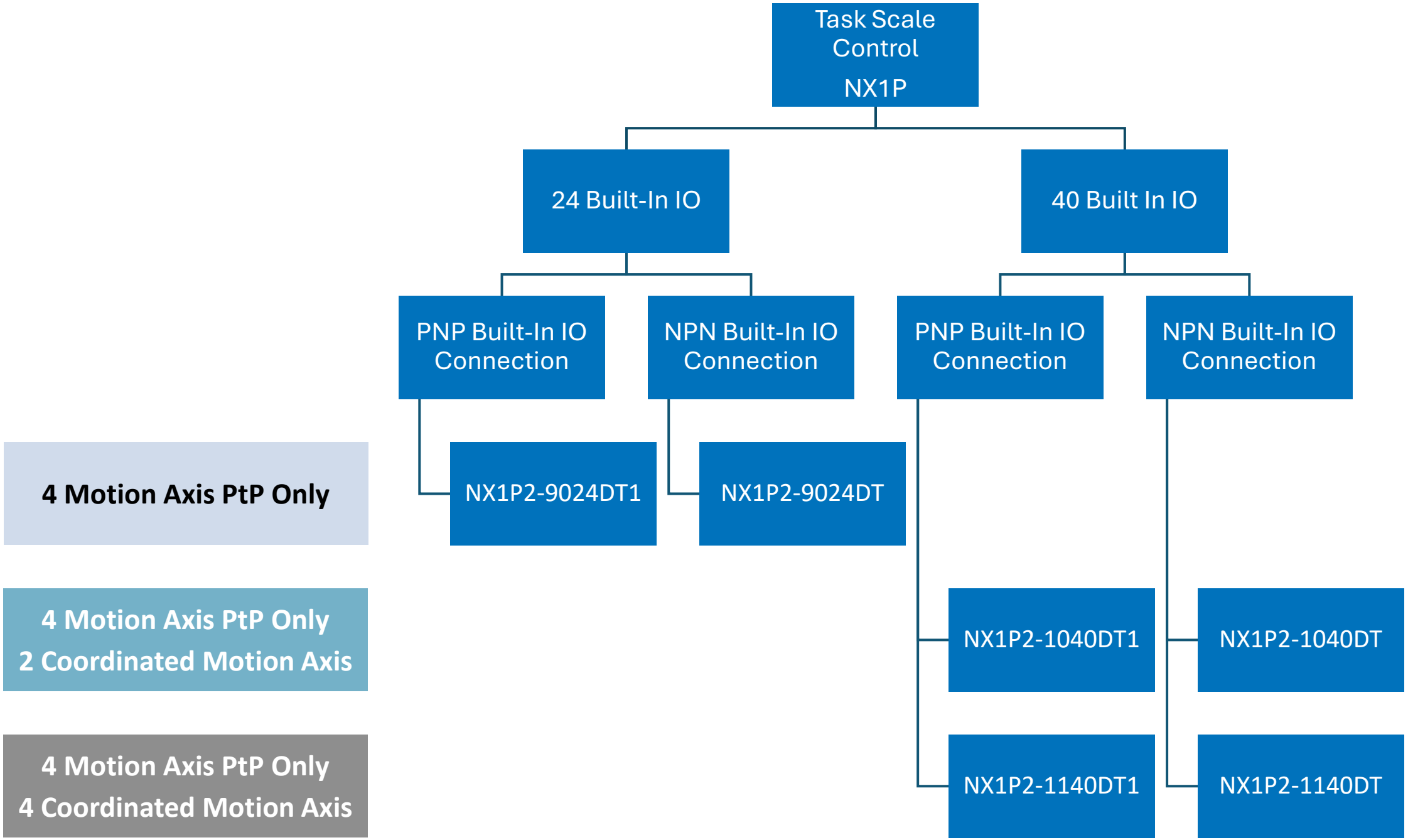
- Integration into Native Architectures Quickly – Globally open industrial protocols IO Link, EtherCAT®, and EtherNET/IP™ are all used as designed to provide an effective path from digital devices to a single controller. Control multi-vendor automation for greater impact using your native communication network. Decrease future automation costs with EtherNet/IP™ and EtherCAT® dedicated built-in ports. Where future projects can leverage EtherNet/IP™ for larger packet data size to achieve HMI visualization and EtherCAT® for guaranteed packet delivery to achieve deterministic network communication to safety and motion.

- Prioritize safety without compromising performance – Decrease the installation cost of an additional safety controller with the integration of an OMRON safety CPU by leveraging CIP Safety and Fail Safe Over EtherCAT® Connections.

- Integration into Digitization Network – With MQTT, OPC UA®, and SQL, the NX controllers can efficiently transfer data to a central location in a web server or simply keep data on edge. Decreasing automation cost by eliminating the need to broker data with a separate computer on the factory floor.

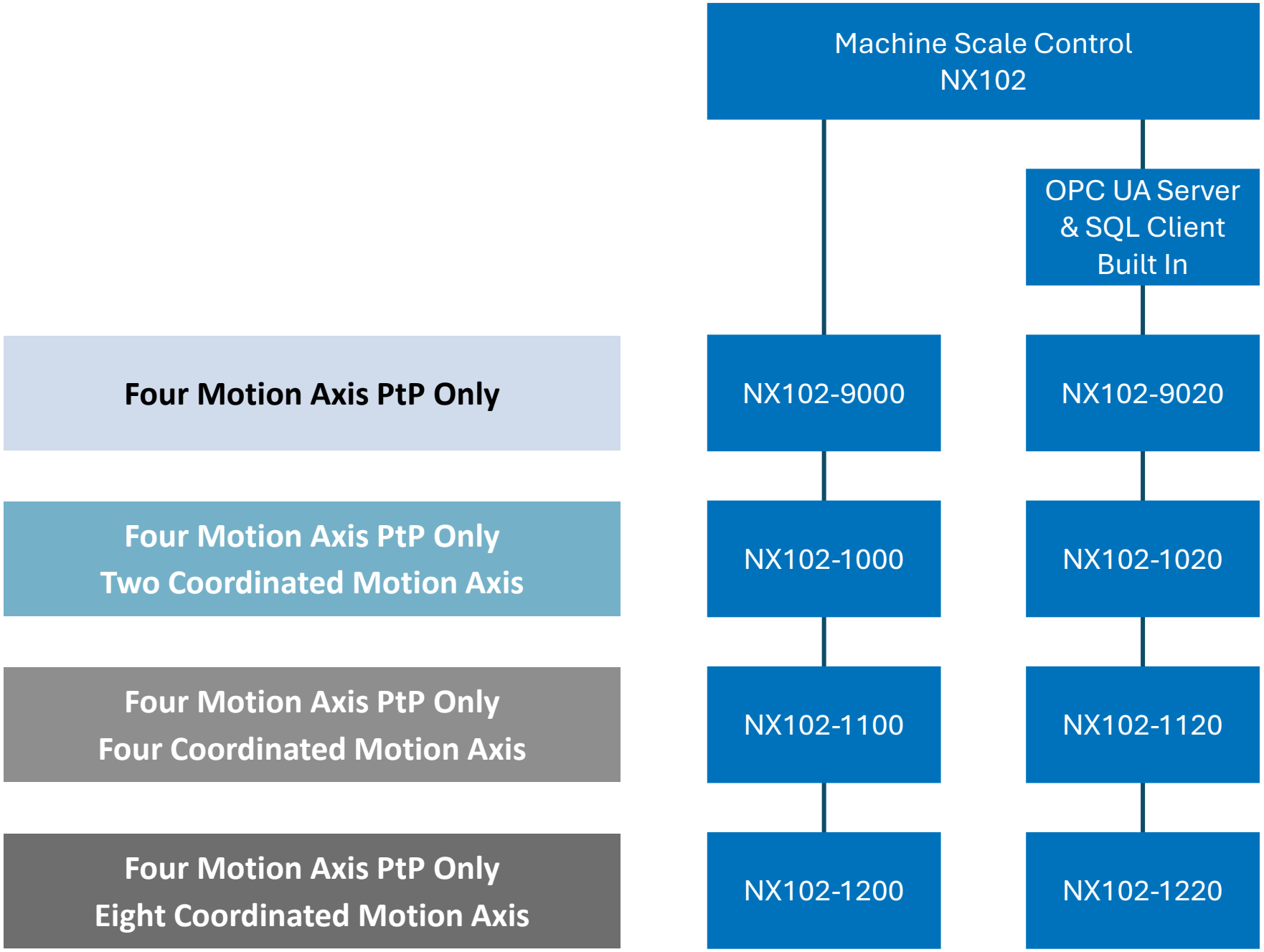
- Maintain Machine Certifications Longer – OMRON controllers are notoriously long lived and industrially hardened to survive tough factory conditions. For machines which require specific certifications, a machine automation controller remains constant for longer.


NX Controllers
Task Scale Control NX1P
Machine Scale Control NX102
Line Scale Control NX502
Factory Scale Control NX701
EtherNet/IP™, EtherCAT® Connections
32 EtherNet 16 EtherCAT®
40 EtherNET 64 EtherCAT®
2,176 EtherNET 256 EtherCAT® (with 4 NX-EIP201 network cards added)
512 EtherNet 512 EtherCAT®
Safety Network
Fail Safe over EtherCAT®
CIP Safety and Fail Safe over EtherCAT®
CIP Safety and Fail Safe over EtherCAT®
Fail Safe over EtherCAT®
Program Capacity And CPU Power
1.5 MB Program Capacity 3.3 ns LD
5 MB Program Capacity 3.3 ns LD
80 MB Program Capacity 0.53 ns LD
80 MB Program Capacity 0.37 ns LD
Motion Axis
4 Axis PtP & Up to 4 Axis Coordinated
4 Axis PtP & Up to 8 Axis Coordinated
Up to 256 Axis
Up to 256 Axis
Memory
Variable Memory Add-Retained/Non Retained Memory 32 KB/2 MB
Variable Memory Add-Retained/Non Retained Memory 1.5 MB/32 MB
Variable Memory Add-Retained/Non Retained Memory 4 MB/256 MB
Variable Memory Add-Retained/Non-Retained Memory 4 MB/256 MB


Task Scale Control
NX1P
24 Built-In IO
40 Built In IO
PNP Built-In IO Connection
NPN Built-In IO Connection
PNP Built-In IO Connection
NPN Built-In IO Connection
NX1P2-9024DT1
NX1P2-9024DT
NX1P2-1040DT1
NX1P2-1040DT
NX1P2-1140DT1
NX1P2-1140DT
4 Motion Axis PtP Only
4 Motion Axis PtP Only
2 Coordinated Motion Axis
4 Motion Axis PtP Only
4 Coordinated Motion Axis

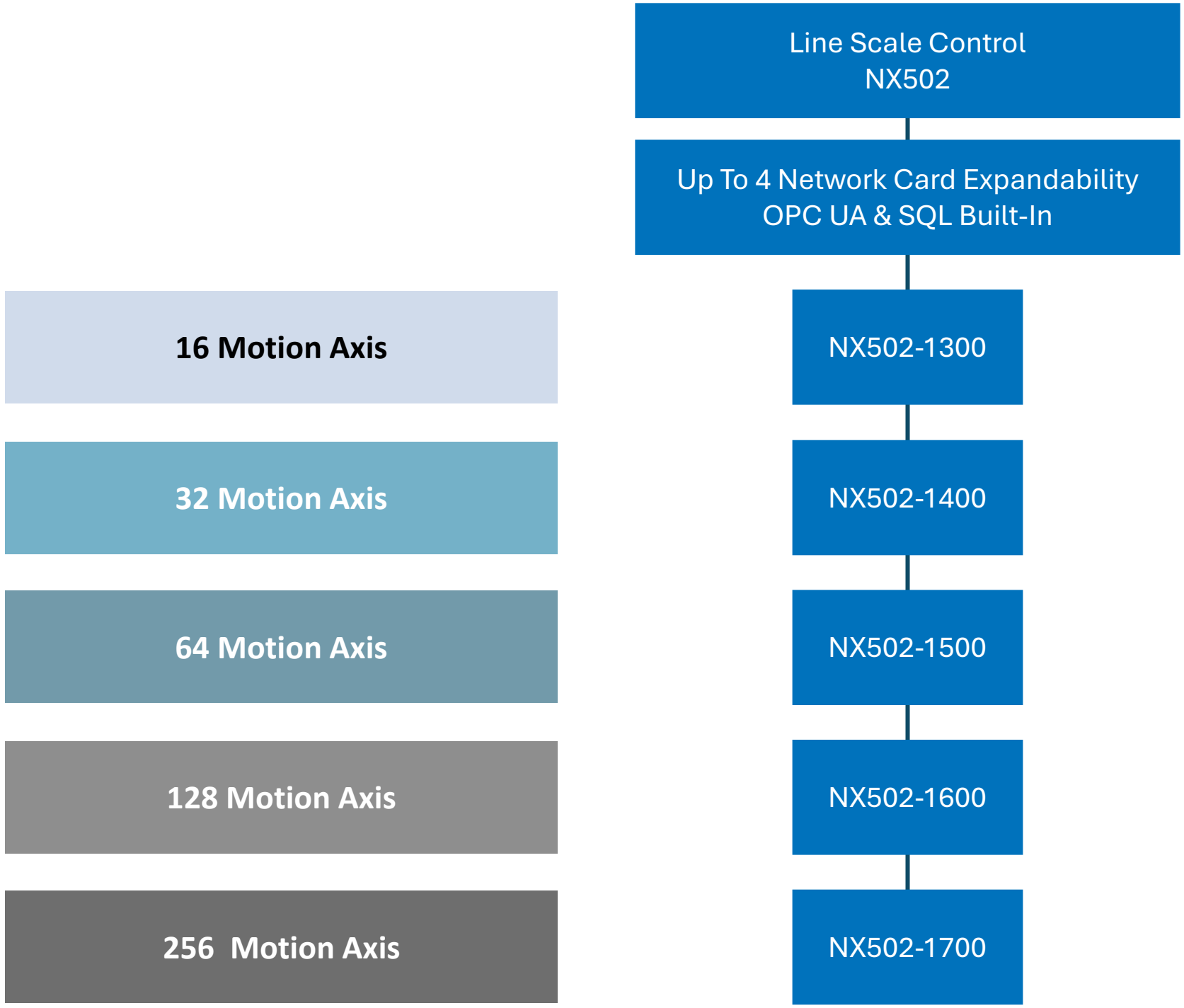
Suggested Part Numbers

Part Number	EtherCAT® Slaves	Motion Control Axes	Program capacity	Built-in Inputs	Built-in Outputs	Built-in network ports	Primary Period / EtherCAT® Update Time
NX1P2-9024DT	Up to 16	4 (4 PtP Axes)	1.5 MB	14	10	EtherCAT® (x1) EtherNet/IP™ (x1)	2 to 8ms
NX1P2-9024DT1		4 (4 PtP Axes)					
NX1P2-1040DT		6 (4 PtP Axes)		24	16		
NX1P2-1040DT1		6 (4 PtP Axes)					
NX1P2-1140DT		8 (4 PtP Axes)		24	16		
NX1P2-1140DT1		8 (4 PtP Axes)					


Machine Scale Control
NX102
OPC UA Server
& SQL Client
Built In
Four Motion Axis PtP Only
NX102-9000
NX102-9020
Four Motion Axis PtP Only
Two Coordinated Motion Axis
NX102-1000
NX102-1020
Four Motion Axis PtP Only
Four Coordinated Motion Axis
NX102-1100
NX102-1120
Four Motion Axis PtP Only
Eight Coordinated Motion Axis
NX102-1200
NX102-1220

Suggested Part Numbers

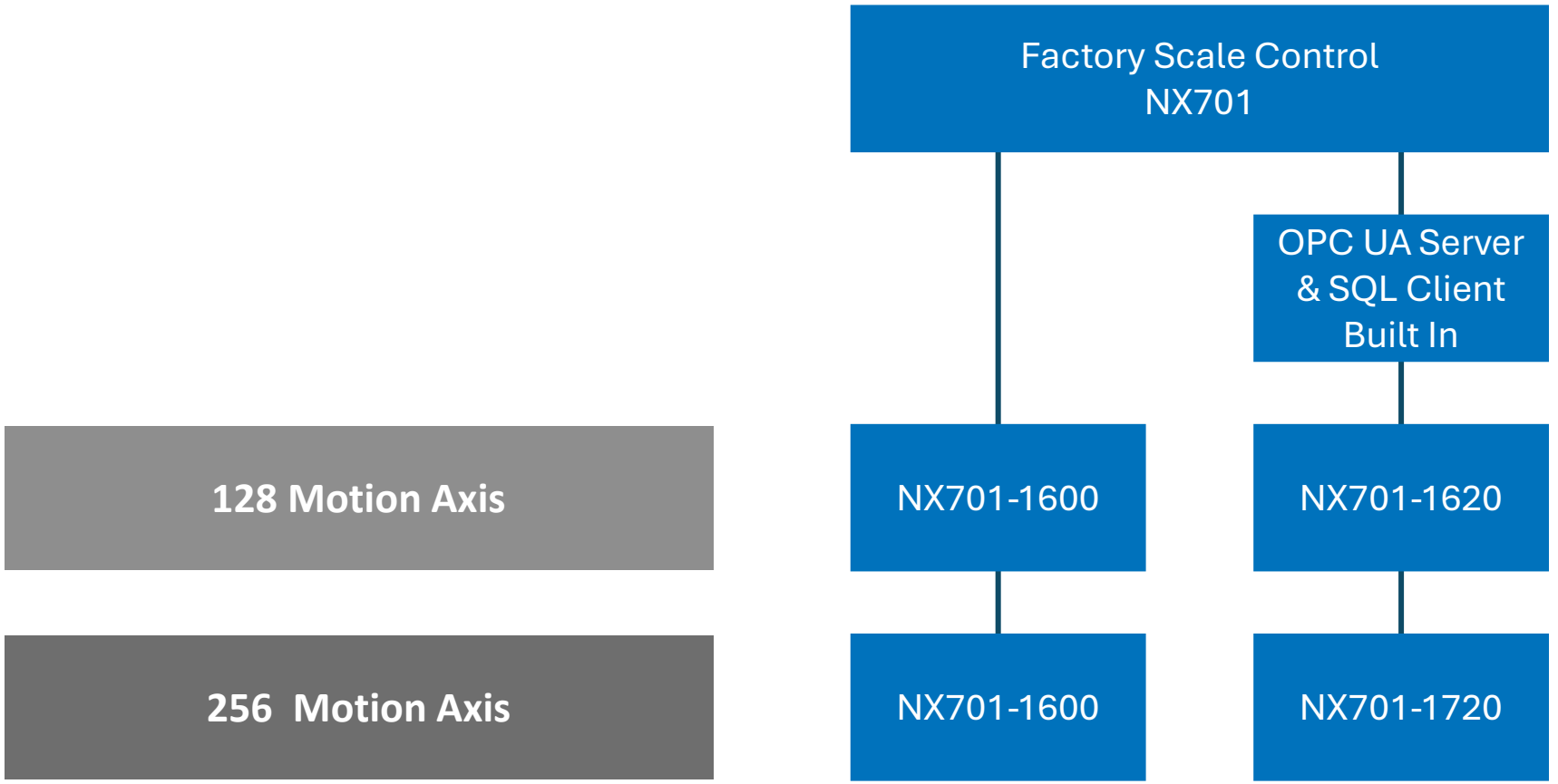
Part Number	EtherCAT® Slaves	Motion Control Axes	OPC UA Client	SQL Server	Program Capacity	Maximum local units	Built-in Network Ports	Primary Period / EtherCAT® Update Time
NX102-9000	Up to 64	0 (4 PTP Axes)	✓		5 MB (100K step, 3000 POU, 32 MB Variable)	32 local per CPU; 400 total per CPU with Remote NX I/O	EtherCAT® (x1) EtherNet/IP (x2)	1 to 32ms
NX102-1000		2 (4 PTP Axes)	✓					
NX102-1100		4 (4 PTP Axes)	✓					
NX102-1200		8 (4 PTP Axes)	✓					
NX102-9020		0 (4 PTP Axes)	✓	✓				
NX102-1020		2 (4 PTP Axes)	✓	✓				
NX102-1120		4 (4 PTP Axes)	✓	✓				
NX102-1220		8 (4 PTP Axes)	✓	✓				


Line Scale Control
NX502
Up To 4 Network Card Expandability
OPC UA & SQL Built-In
16 Motion Axis
32 Motion Axis
64 Motion Axis
128 Motion Axis
256 Motion Axis
NX502-1300
NX502-1400
NX502-1500
NX502-1600
NX502-1700

Suggested Part Numbers

Part Number	EtherCAT® Slaves	Motion Control Axes	OPC UA Server	SQL Client	Program Capacity	Maximum local units	Built-in Network Ports	Primary Period / EtherCAT® Update Time
NX502-1300	Up to 256	16 Axes	✓	✓	80 MB	63 local per CPU; 4,000 total per CPU with Remote NX I/O	EtherCAT® (x1) EtherNet/IP (x2)	0.25 ms to 8 ms
NX502-1400		32 Axes	✓	✓				
NX502-1500		64 Axes	✓	✓				
NX502-1600		128 Axes	✓	✓				
NX502-1700		256 Axes	✓	✓				

Part Number	RPI	Allowed Communications Bandwidth per Unit	Maximum Number of Tagset EtherNET I/P	Maximum Number of CIP Safety Connections
NX-EIP201	0.5 to 1000 ms	40,000 PPS Per Unit	256 Per Port (512 Per Unit)	88


Factory Scale Control
NX701
OPC UA Server
& SQL Client
Built In
128 Motion Axis
NX701-1600
NX701-1620
256 Motion Axis
NX701-1600
NX701-1720

Suggested Part Numbers

Part Number	EtherCAT® Slaves	Maximum number of used real axes	OPC UA Server	SQL Client	Program capacity	Built-in network ports	Primary Period / EtherCAT® Update Time
NX701-1600	Up To 512	128	✓		80 MB	EtherCAT® (x1) EtherNet/IP™ (x2)	0.125ms to 0.250ms
NX701-1620		128	✓	✓			
NX701-1700		256	✓				
NX701-1720		256	✓	✓			