Sysmac Library for NJ/NX/NY Controller

SYSMAC-XR003
MC Tool Box Library

Sysmac Library

✓ **Easily connect an inverter to a PLC to drive a general-purpose motor.**

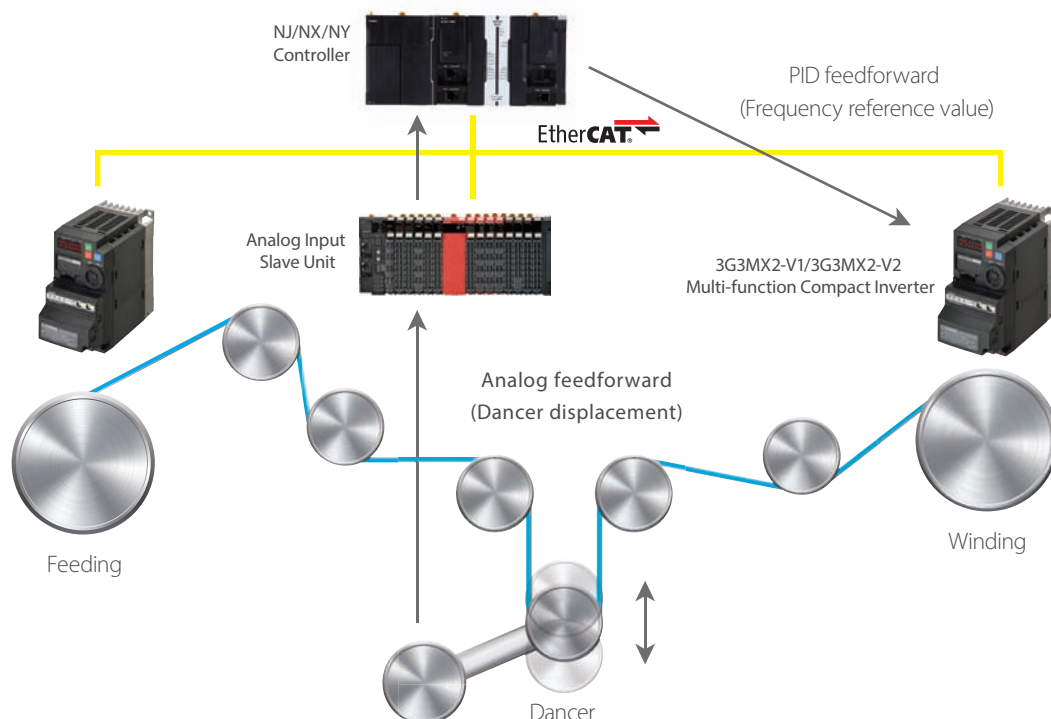| Issue 1 | If an inverter is installed near a motor, the wiring can be complicated due to the long distance between the inverter and PLC. |
| Issue 2 | When an induction motor is used for speed control and simple positioning, it takes time to create a feedback control program. |

MC Tool Box Library offers solution!

The NJ/NX Machine Automation Controller and the NY Industrial PC Platform can be connected to inverters and I/O devices via EtherCAT using LAN cables, which makes wiring simple.
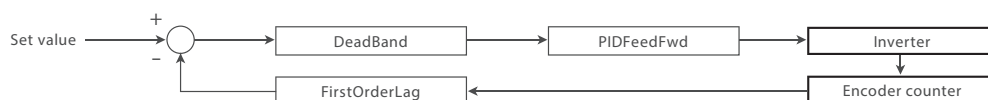Stable control can be achieved by combining Function Blocks in this library even when an inverter is used.
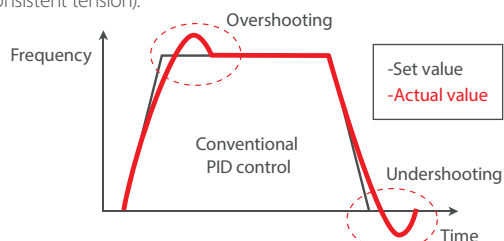
System configuration

NJ/NX/NY Controller

PID feedforward
(Frequency reference value)

EtherCAT

Analog Input Slave Unit

3G3MX2-V1/3G3MX2-V2 Multi-function Compact Inverter

Analog feedforward
(Dancer displacement)

Feeding

Winding

Dancer

sysmac
always in control

[Example] Tension control program using the MC Tool Box Library

NJ/NX/NY Controller

Set value → (+/−) → DeadBand → PIDFeedFwd → Inverter

FirstOrderLag ← Encoder counter

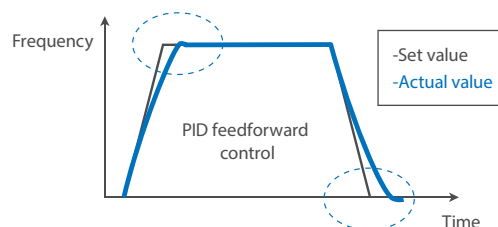| From	To
The motor speed quickly reaches the set speed but is not constant (= inconsistent tension).	The motor speed quickly reaches the set speed and is constant (= constant tension).

From chart:
Frequency / Time
Overshooting
Conventional PID control
Undershooting
- Set value
- Actual value

To chart:
Frequency / Time
PID feedforward control
- Set value
- Actual value

The NJ/NX/NY Controller executes sequence control, motion control, and I/O refreshing in the same control period. The calculation results of feedback control can be output in a short fixed cycle. This means the motor can constantly receive commands.

Compatible Models

Name	Model	Version
Machine Automation Controller NJ/NX CPU Unit	NX701-1□□□/NJ101-□□□□	Version 1.10 or later
	NJ501-□□□□/NJ301-□□□□	Version 1.08 or later
	NX1P2-□□□□□□(1)	Version 1.13 or later
	NX102-□□□□	Version 1.30 or later
	NX502-□□□□	Version 1.60 or later
Industrial PC Platform NY IPC Machine Controller	NY5□□-1	Version 1.12 or later
	NY5□□-5	Version 1.18 or later
Automation Software Sysmac Studio	SYSMAC-BA2□□□/AD□□□/SE2□□□	Version 1.14 or higher
MX2-V1/V2 Multi-function Compact Inverter	3G3MX2-A□□□□-V1/3G3MX2-A□□□□-V2	Version 1.00 or later

Function Block (FB) Specifications

Name	FB name	Description
PID Feedforward	PIDFeedFwd	Performs PID feedforward processing according to a specified parameter table.
First Order Lag	FirstOrderLag	Processes a first order lag according to a specified parameter table.
Phase Lead Lag	LeadLag	Performs phase lead lag processing according to a specified parameter table.
Deadband Control without Output Offset	DeadBand	Controls a deadband that does not create an offset with the processing result.

Note: Do not use this document to operate the Unit.

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