

# General Specification

## F3NC97-0N Positioning Module (with MECHATROLINK-III Interface)

FA-M3

GS 34M06H60-03E

### ■ General

This positioning module is to be installed on the base module of an FA-M3 range-free controller system, and supports MECHATROLINK-III<sup>1</sup> communications.

It provides the C1 master function of the MECHATROLINK-III communications, transmitting MECHATROLINK-III commands to external equipment (slaves) according to instructions from a CPU module and receiving MECHATROLINK-III responses from external equipment.

It enables:

- (1) Independent axis movements using MECHATROLINK-III commands
- (2) Linear interpolation movement (starting and stopping multiple axes simultaneously)
- (3) Reading of the statuses (target position, current position, etc.) of external equipment
- (4) Reading and writing of the parameters of external equipment
- (5) Input from and output to external equipment

### ■ Features

This module has the following features:

- **Latest open motion field network**
  - MECHATROLINK-III is a high-performance, advanced, open-architecture motion field network standard published by the MECHATROLINK Members Association. It adopts proven Ethernet as its physical layer.
- **Fewer cables, simpler configuration, lower wiring cost**
  - The module implements position control for up to 15 axes from a single slot. It can be networked with servo drives, servomotors and other external equipment using fewer cables terminated with easy-to-attach connectors, contributing to lower wiring cost.
- **High-speed, accurate position control through high-speed communication**
  - High transmission rate of 100 Mbps and short cycle time of 0.25, 0.5, or 1 ms for 4-, 8-, or 15-axis control respectively enable shorter control cycle, faster startup, better control performance, shorter tact time, and higher productivity.
  - Statuses (target position, current position, speed, torque and other statuses) for up to 8 axes can be read concurrently for better monitoring of external equipment operation.
  - Control by transmitted commands enables full exploitation of motor performance (high speed and high resolution) to achieve fast and accurate position control.
  - Versatile position control includes linear interpolation movement of up to 15 axes (starting and stopping multiple axes simultaneously), simultaneous linear interpolation movement of any combination of axes, and change in speed or target position during movement.
- **Flexible system configuration**
  - Cascade and star network topologies with inter-station distance up to 100 m are supported, enabling optimal system configuration.
- **Future support for more equipment**
  - In addition to AC servomotors from Yaskawa Electric Corporation, stepping motors, I/O devices, and inverters from other manufacturers will be supported in the future.



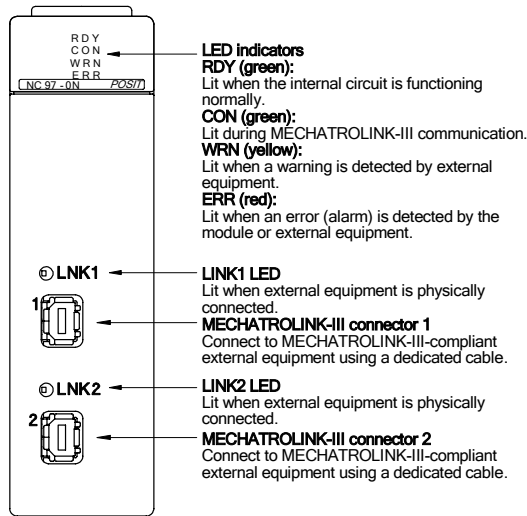
### ■ Specifications

Item	Specifications	
Interface	MECHATROLINK-III compliant	
Physical layer	Ethernet	
Transmission rate	100 Mbps	
Cycle time / No. of stations	0.25 ms for 4 axes, 0.5 ms for 8 axes, or 1.0 ms for 15 axes	
Transmission bytes	16, 32, 48, or 64 bytes (mixed usage allowed)	
Communications method	Cyclic communication	
Network topology	Cascade or star	
Transmission media	Ethernet STP Cat5e (dedicated cable)	
Maximum transmission distance	100 m (between stations)	
Minimum distance between stations	0.2 m	
Supported profiles	- Standard servo profile - Standard I/O profile	
Positioning functions	Position reference	-2,147,483,648 to 2,147,483,647 (reference unit)
	Functions	- Independent axis movement using standard servo profile commands (availability dependent on connected external equipment and supported standard servo profile commands) - Linear interpolation movement (starting and stopping multiple axes simultaneously) and speed/target position change during movement
	Others	- Status monitoring of external equipment (target position, current position, speed, and torque) - Reading and writing of parameters of external equipment - Input from and output to external equipment using standard I/O profile commands
Number of installed modules	8 modules max. (controlling 120 axes max.)	
Current consumption	530 mA (at 5 V DC)	
External connection	Two MECHATROLINK-III connectors (industrial mini-connector)	
External dimensions	28.9 (W) x 100 (H) x 83.2 (D) mm <sup>2</sup>	
Weight	130 g	

\*1: MECHATROLINK is a trademark of the MECHATROLINK Members Association.

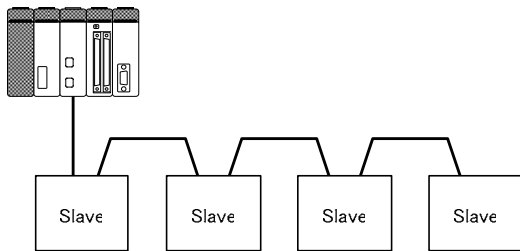
\*2: Excluding protrusions (for details, see the external dimensions drawing)

**Components and Functions**

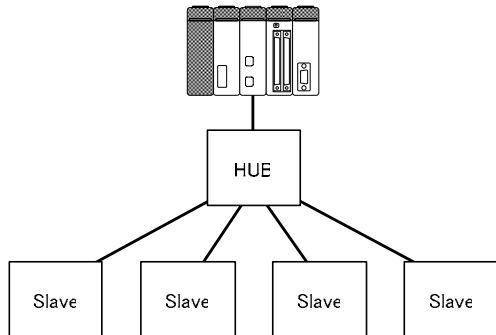


**System Configuration Examples**

**- Cascade topology**



**- Star topology**



**External Connection Diagram**

Connector Specifications

Pin No.	Signal	Function
1	TXP	Send data (+)
2	TXN	Send data (-)
3	RXP	Receive data (+)
4	—	—
5	—	—
6	RXN	Receive data (-)
7	—	—
8	—	—

Note: The connector shell is connected to the FG terminal. These signal lines are isolated from the internal circuitry by pulse transformers.

**Operating Environment**

This module is compatible with the following CPU modules:

CPU Modules	Style Code and ROM version
F3SP28-3N, F3SP38-6N, F3SP53-4H, F3SP58-6H	Rev. 7 or later
Other CPU modules	No restriction

**Model and Suffix Code**

Model	Suffix Code	Style Code	Option Code	Description
F3NC97	-0N	—	—	Controls up to 15 axes with MECHATROLINK-III interface

**Compatible External Equipment and Cables**

**● Servo drive, I/O equipment**

- Products from Yaskawa Electric Corporation

Products	Model	Remarks
Σ-V series AC servo drive	SGDV-□□□□□□□□	
64-point I/O module	JEPMC-MTD2310-E	Available soon.

**● MECHATROLINK-III communications cable**

- Products from Yaskawa Electric Corporation

Products	Model	Remarks
MECHATROLINK-III communications cable	JEPMC-W6012-□□-E	No core
	JEPMC-W6013-□□-E	With core
	JEPMC-W6014-□□-E	No core; no connector on the other end

**● Others**

- Products from Yaskawa Electric Corporation

Products	Model	Remarks
MECHATROLINK-III compatible hub module	JEPMC-MT2000-E	

**External Dimensions**

