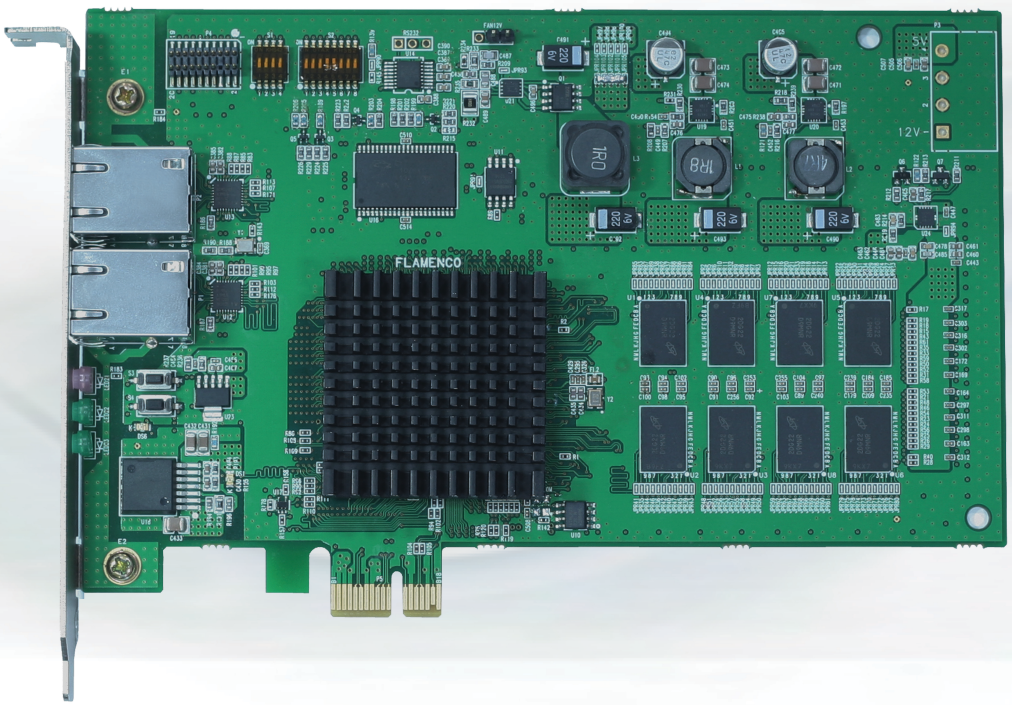
Reliable
& Smart™

NMC Series

EtherCAT-based High Performance Motion Controller

EtherCAT

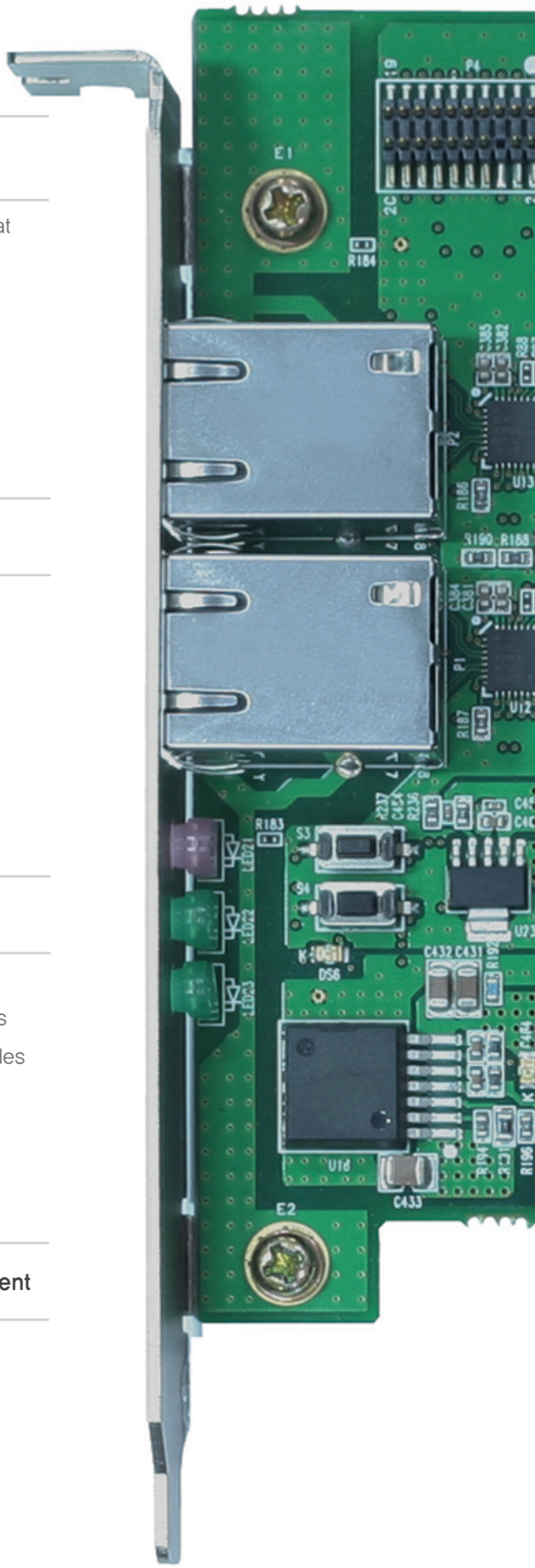
NMC: Network Motion Controller



RS Reliable & Smart Automation

NMC Series

NMC series is the best motion controller that has been developed based on 20 year's field experience.



It is the best product to avoid complex equipment configuration

- A NMC can control up to 64 axes of Servo drives and 5,440 points of I/Os at every 1msec in position loop
- NMC can control Pulse/Analog Servo drive through function module.
- Max. four NMCs can be installed in a PC

RS Reliable & Smart Automation

NMC lower the cost of a equipment

- Low-price PC can be used because of using PCIe slot
- Does not require Real Time OS
  (An advantage compared with software-motion-controller)
- Decreasing the number of wire can reduce wiring costs

PCI EXPRESS™

Choose a EtherCAT master that you want

The reasons are
- to support standard EtherCAT CoE
- to support connection with all kinds of EtherCAT products
- to support communication distance of 100m between nodes

EtherCAT®

Apply our standardized and advanced Motion Controller to your equipment

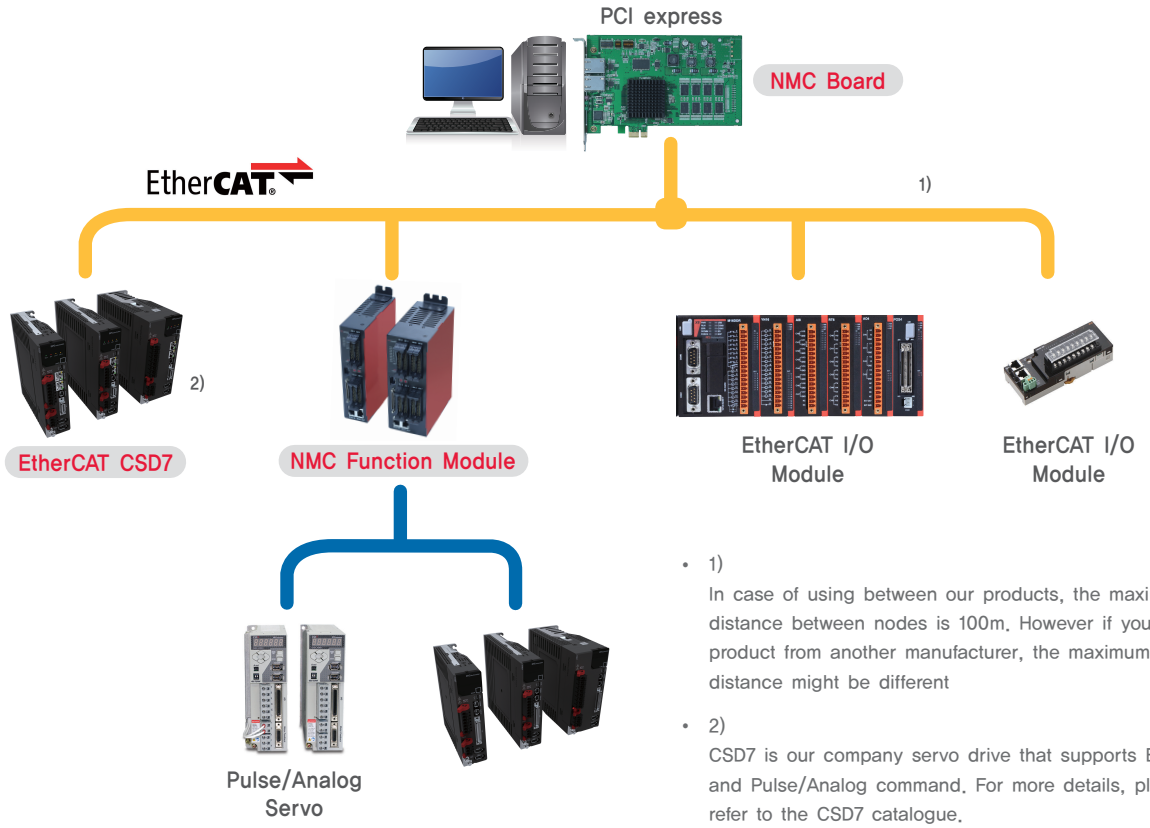
- Perfectly realization of PLC Open Motion standard
- Overriding speed/position profile through various blending motion function
- API design that is familiar with PLC users

PLCopen®
for efficiency in automation

EtherCAT System Configuration

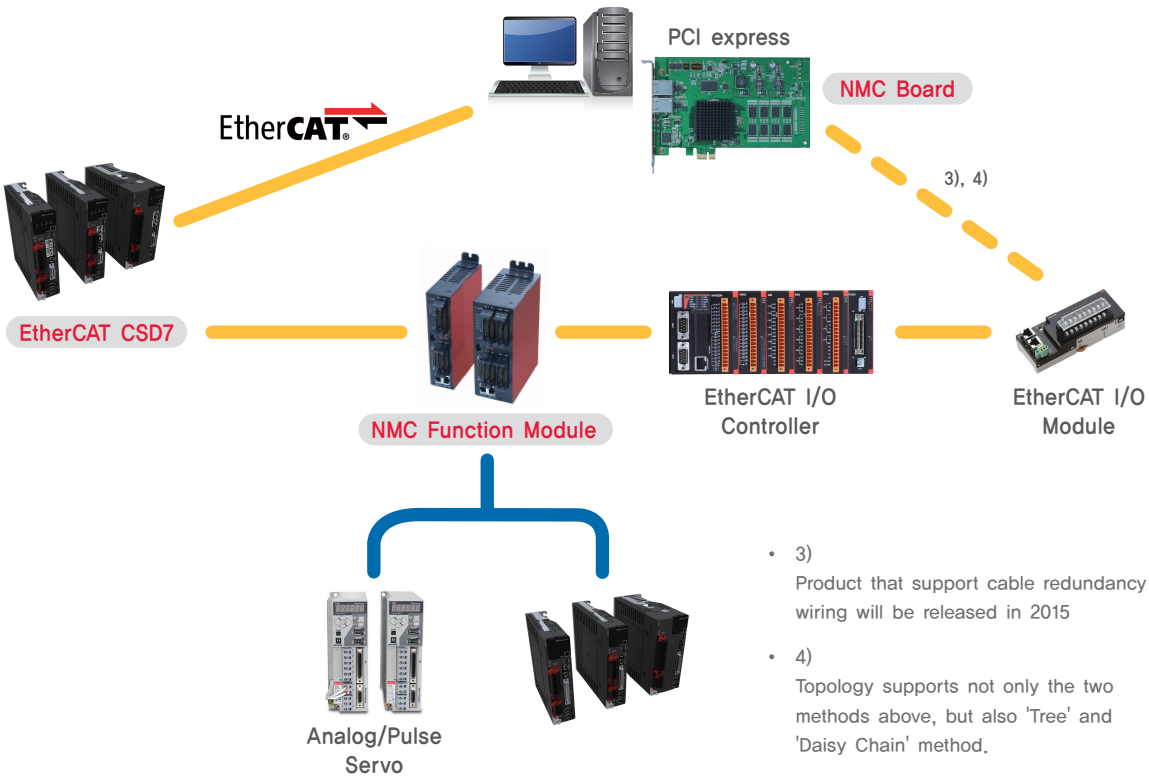
Possible to build EtherCAT system you want as the lowest price.

■ Star wiring method



- 1)
  In case of using between our products, the maximum distance between nodes is 100m. However if you use a product from another manufacturer, the maximum distance might be different
- 2)
  CSD7 is our company servo drive that supports EtherCAT and Pulse/Analog command. For more details, please refer to the CSD7 catalogue.

■ Line wiring method



- 3)
  Product that support cable redundancy wiring will be released in 2015
- 4)
  Topology supports not only the two methods above, but also 'Tree' and 'Daisy Chain' method.

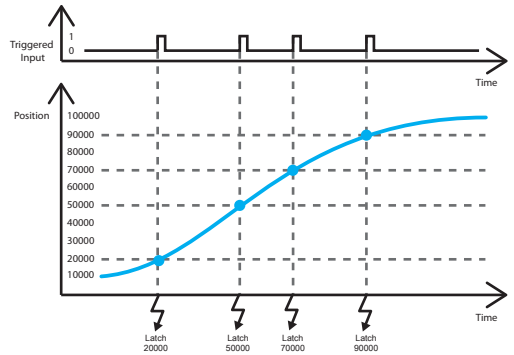
Major functions of NMC (1)

Offers motion function suitable for gear controlling.

* Planned

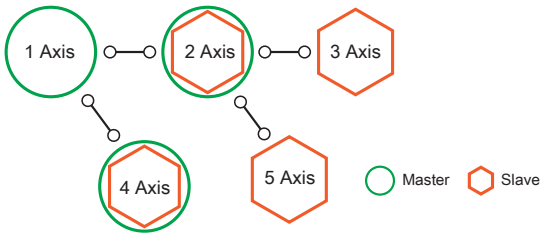
Touch Probe

- A function that records actual position when specified input is triggered
- Processing time : 2ms



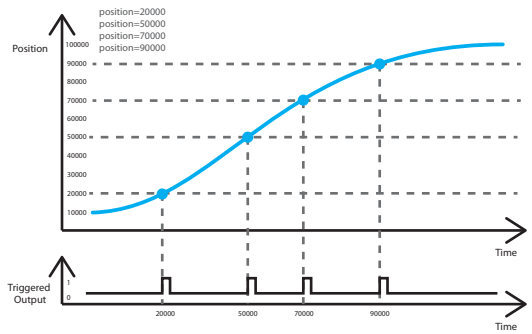
Geared Motion

- A function that sets velocity ratio between Master axis and Slave axis
- No limitation about the number of Master axis and Slave axis
- A Master axis can have lots of Slaves, and one of these Slaves can be a Master of another axis



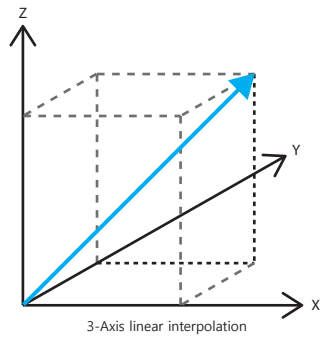
Digital CAM Switch*

- Function to output specified signal according to the condition of the certain switch set by selected axis
- Processing time : 2msec



Linear Absolute

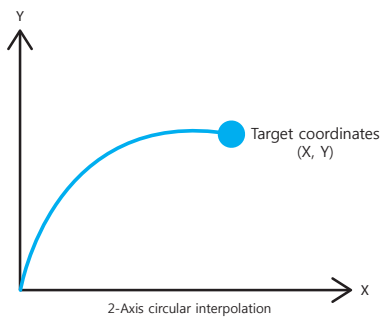
- Functin of rectilinear movement of the selected axes in a certain track
- Supports up to 3 axes
- Supports BLENDING *



3-Axis linear interpolation

Linear Circular

- This function enables the selected two axes to draw a circle arc to end position through auxiliary position.
- Supports up to 2 axes
- Supports two modes of 'Border' and 'Center'
- Supports BLENDING *



2-Axis circular interpolation

Major functions of NMC (2)

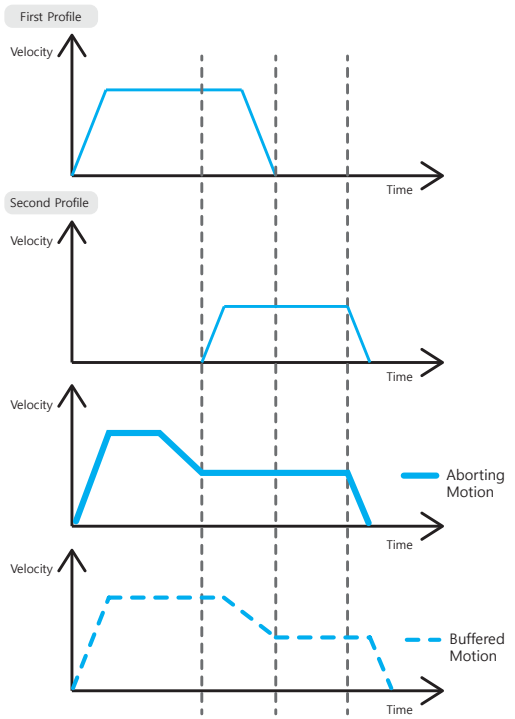
NMC Series offers Position/Velocity Override function through six types of Blending as below.
The function can be used on the Group Motion.

Buffered

- Immediately starts a new movement after completion of the current movement
- Occurrence of a halt section as the speed zero between two movements
- There is no blending

Aborting

- Default mode without buffering
- It makes an ongoing motion stop immediately



BlendingLow

- The current movement is the same as buffered mode, but the axis will not stop between the movements.
- The velocity of the new movement is blended with the lowest velocity of the current and new movement at the end-position of the current movemnet

BlendingHigh

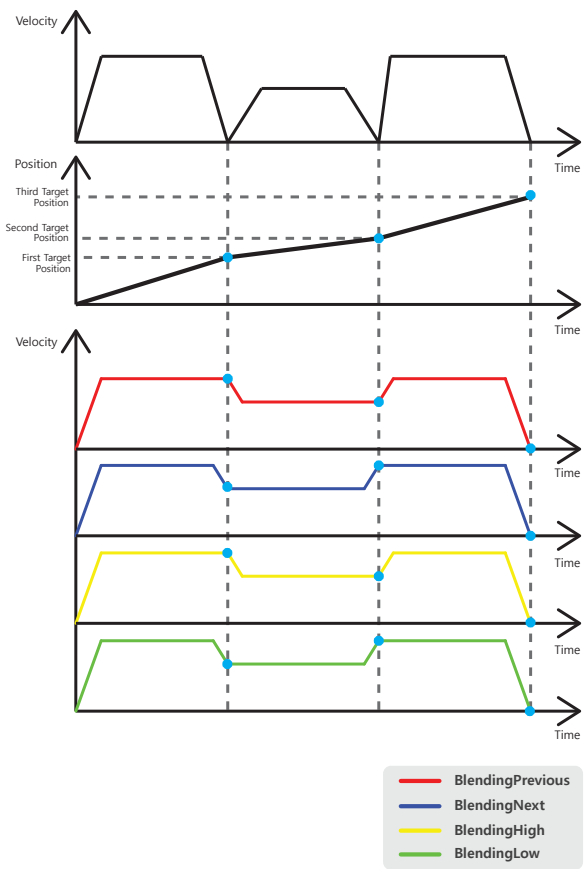
- The current movement is the same as buffered mode, but the axis will not stop between the movements.
- The velocity of the new movement is blended with the highest velocity of the current and new movement at the end-position of the current movement

BlendingPrevious

- The current movement is the same as buffered mode, but the axis will not stop between the movements.
- The velocity of the new movement is blended with the velocity of the current movement at the end-position of the current movement

BlendingNext

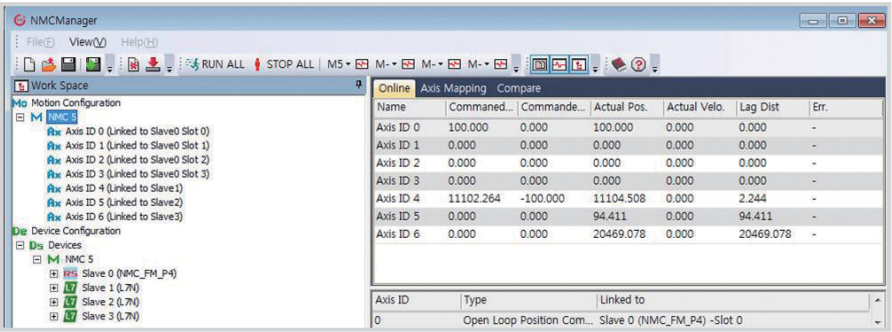
- The current movement is the same as buffered mode, but the axis will not stop between the movements.
- The velocity of the new movement is blended with the velocity of the new movement at the end-position of the current movement



NMC Manager

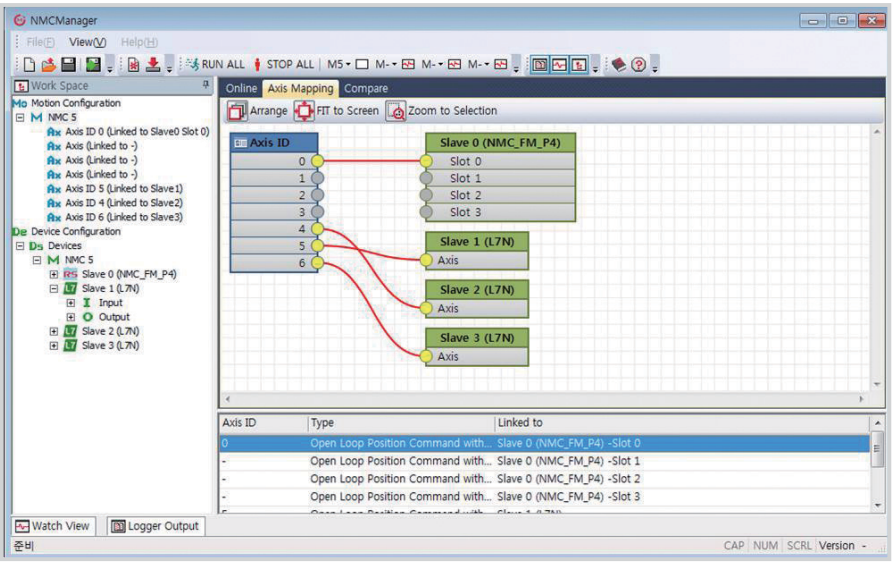
■ UI visible at a glance

NMC Manager is the tool developed by our company using the UI anyone can test our products without programming. Basically, it consists of the Motion Configuration that can test the axis operation directly, and the Device Configuration that can view the device information.



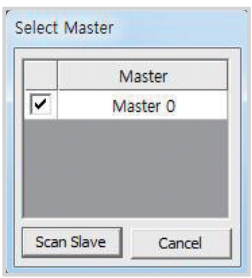
■ More comfortable composition of Axis Mapping

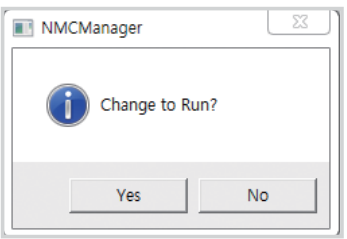
Any axis number and slave number can be changed as user desires using the Manager Software to avoid the axes configuration of the system.

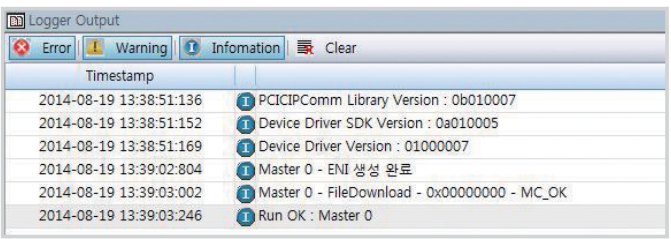


■ Convenient NMC Manager with automated SCAN SLAVE

It can be loaded the Project used before and the ENI file at the start of NMC Manager. It can operate up to the motor run easily without pressing any buttons using operation of automated SCAN SLAVE after a Master scan.





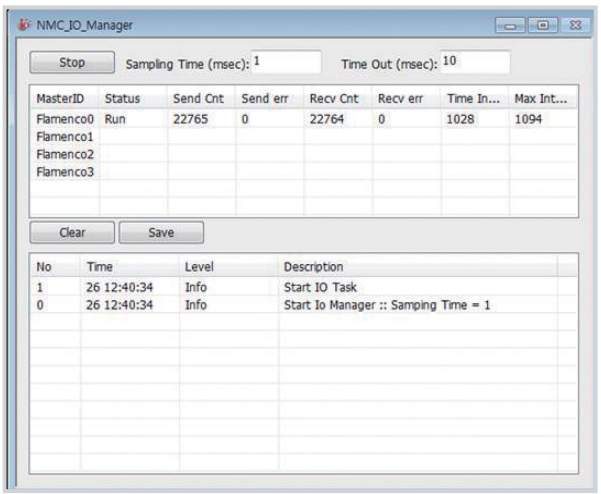


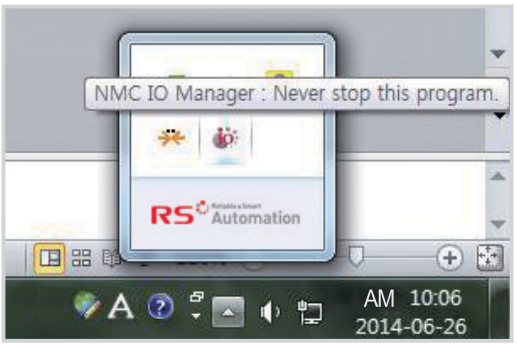
NMC I/O Manager

■ Real time monitoring of EtherCAT Data being processed

It can read the communication status quickly and precisely because of sending and receiving real time processing data with NMC Manage connection.

It is a stand-alone and convenient software tool, because it is operated automatically after PC booting, without any actions, regardless of the NMC Manager.

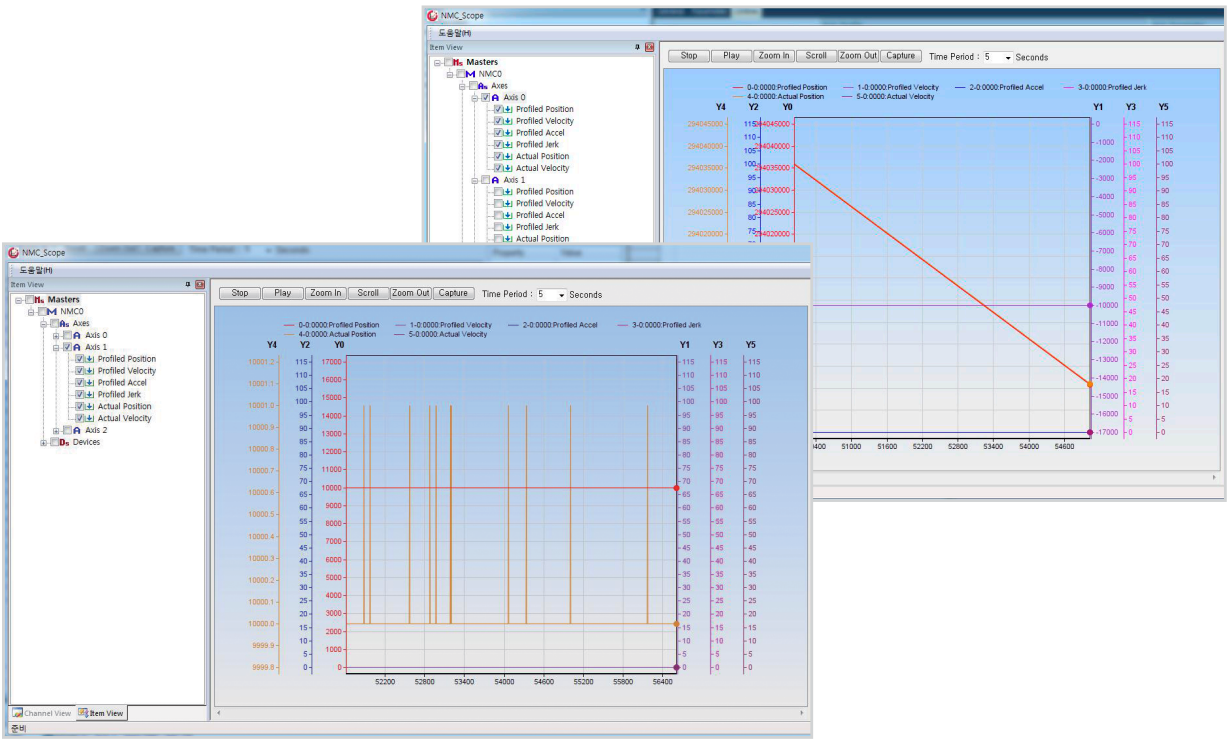




NMC Scope

■ Individual NMC Scope Monitoring that is linked with NMC Manager

NMC Scope can check the data quickly and easily because it shows the position of the operating axes as the graph under the connection with NMC Manager. And multiful NMC Scope programs can be carried out for user convenience without mixing numbers of axes.

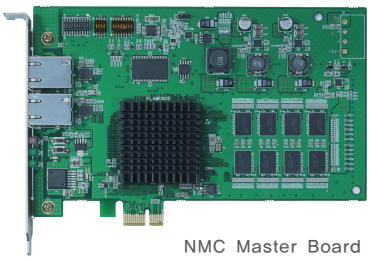


NMC Master Board

The followings are the specification of the NMC series. NMC is the product that supports EtherCAT CoE and FoE. A NMC can control max. 64 axes and 5440 point I/Os.

■ Types of Product

Catalog / Item	Control axes	Possible control mode	I/O support
MMC_BDPO08PCA	8	Position control	540 points
MMC_BDPO16PCA	16	Position control	1360 points
MMC_BDPO32PCA	32	Position control	2720 points
MMC_BDPO64PCA	64	Position control	5440 points

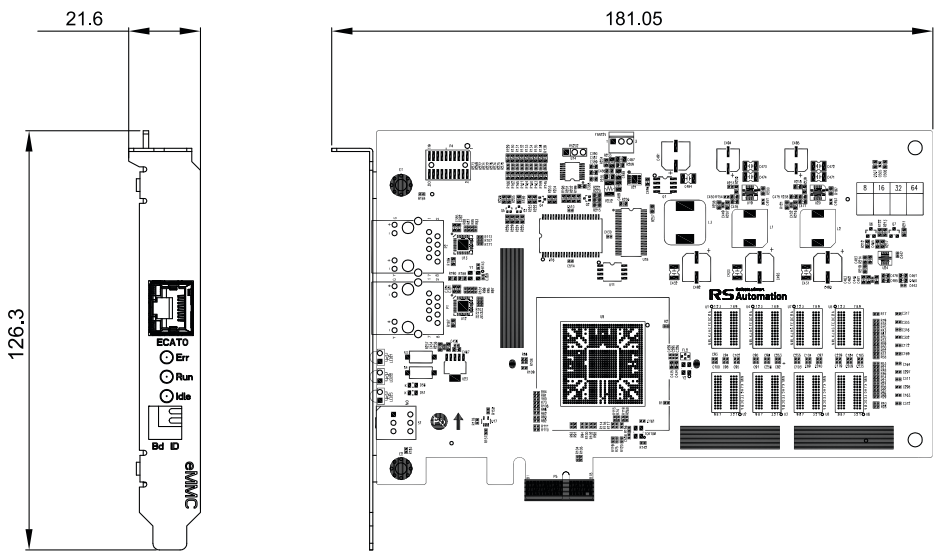


NMC Master Board

■ Basic specifications

Item / specifications	Basic specifications
Communication method	EtherCAT 100Mbps Full Duplex
Control period	Position 1msec / 64 axes
Interface	PCI-Express 1x to PC EtherCAT to Slave
Controllable axes	Max. 64Axis / Board
Usable I/O	Max. 5,440Points / Board
Installable NMC quantities per a PC	4EA (256 Axis, 21,760 Points IO)
Speed profile	Symmetry/Asymmetry trapezoid, Symmetry/Asymmetry acceleration or deceleration.
Operating method	Linear interpolation, Circular interpolation, Spline interpolation, Override, Touch probe
Inpuit power	PC Power 3.3V, 12V Main Power source
Using environment	0℃ ~ 50℃ (5~85%, Non-condensing)
OS	32/64 bit, Windows 7, Windows 8
Software	Visual C++, Visual Basic

■ Dimensions



NMC Function Module

The followings are the specification of the Function Module that is option product to connect Pulse/ Analog Servo drive or step motor drive that don't have EtherCAT function.

■ Types of product

Catalog / Item	Control axes	Controllable Servo drive	Built-in I/O
MMC_CSO4A	4	Position control type	10/10 points
MMC_CSO8A	8	Position control type	20/20 points

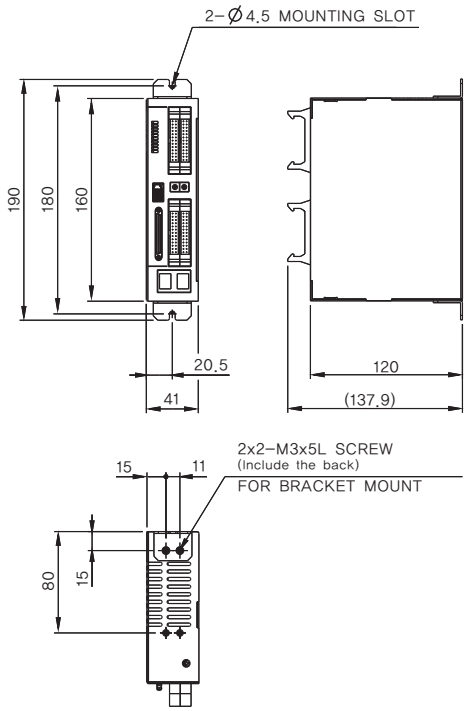
NMC Function Module

■ Basic specifications

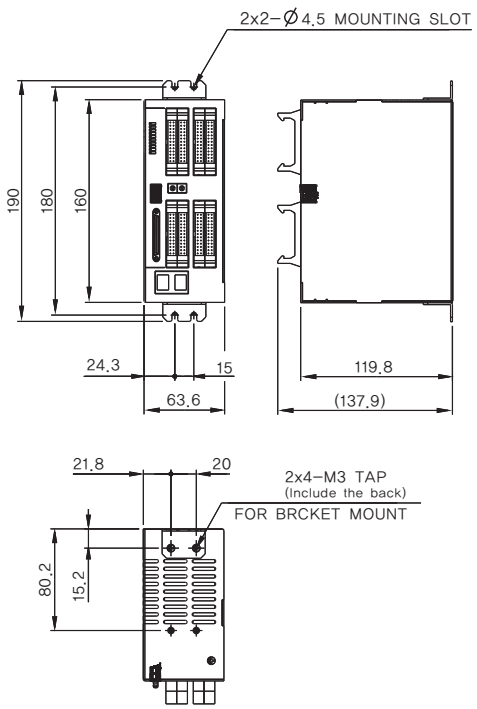
Item / specifications	Basic specifications
Communication method	EtherCAT 100Mbps Full Duplex
Pulse command	Max 16MHz
Encoder counter input	Max 32MHz (x4 Based)
System I/O	Axis Enable, Axis Fault Reset
	Axis Alarm In, In Position
User I/O	Max. 20/20 point (8 axes module)
Limit sensor	3 Limit sensors (Home, Positive, Negative)
Input Power	DC 24±10%, Max 2.7A
Using environment	0℃ ~ 50℃ (5~85%, Non-condensing)
Mounting method	Wall Mount, Rack Mount support
Size	4 axes : 41mm(W) x 160mm(H) x 120mm(D)
	8 axes : 64mm(W) x 160mm(H) x 120mm(D)

■ Dimensions (Unit of measure : mm)

NMC Function Module (4-axes)

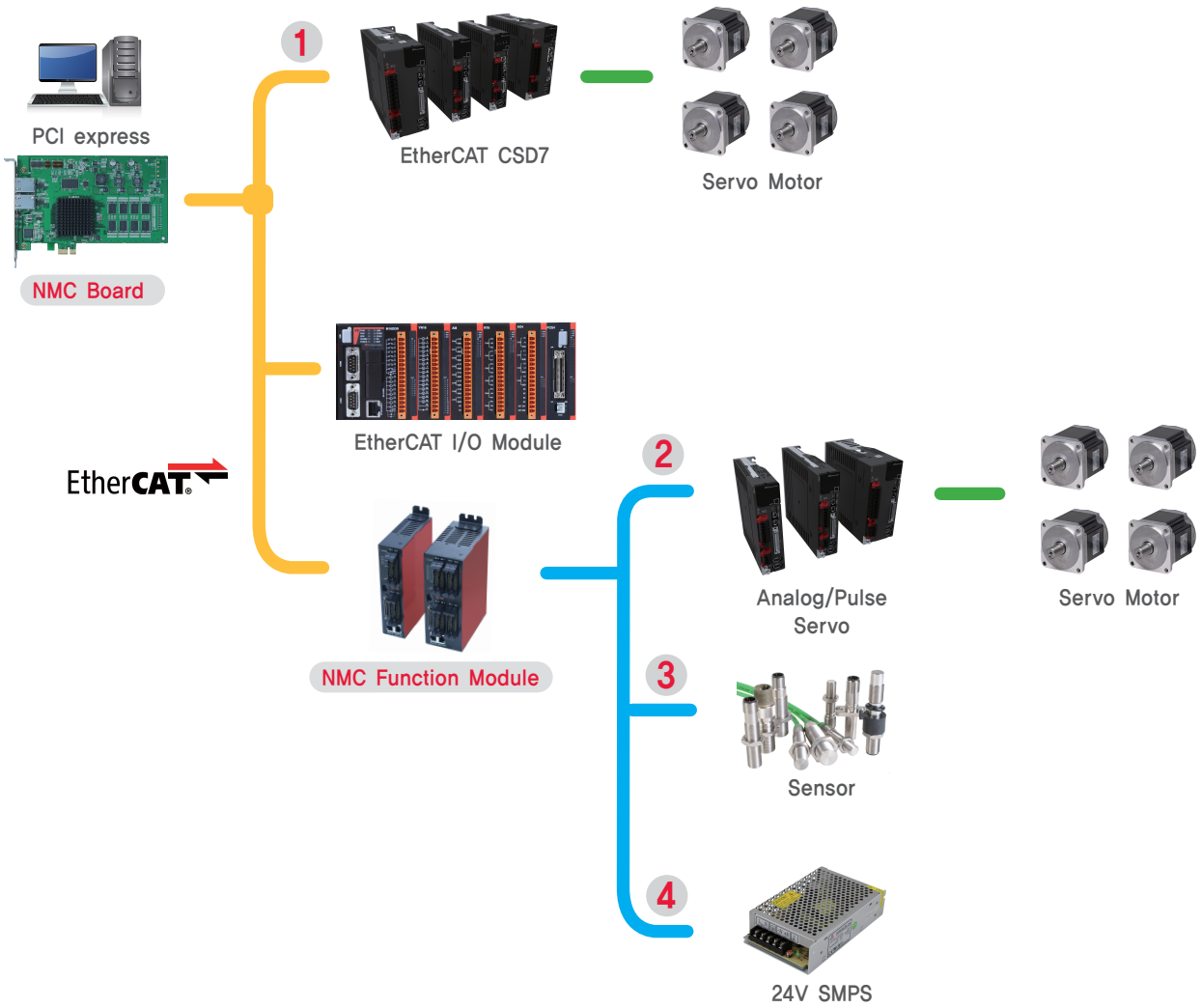


NMC Function Module (8-axes)

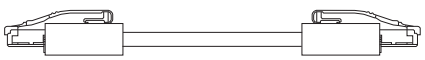
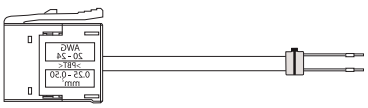


NMC wiring

The following specification of the cable is the recommendation from our company.



■ Basic specifications

No.	Use	Shape of Cable harness	Connector spec.	Max. length	Remark
1	EtherCAT Cable		3R108-0000-000 CE [3M]	100M	Please use the recommended cable, cable length and connector.
2	AX 0~7 (Axis Cable)		HIF3BA-26DA [HIROSE]	5M	Servo drive connectors are in conformity with its manufacturer
3	I/O Cable		HDRA-E68MA1 HDRA-E68GKPE [HONDA]	–	The length is in comformity with sensor
4	DC(Power) Cable		372 Series [3M]	–	The Connector is provided by our company

[Notice] 1. Please refer to the page on the right to search a detailed pin map of wiring.
2. We don't sell any wiring cables for NMC Series.

NMC Function Module

■ DC IN

Pin	Signal	Description
1	+	24V Power

Pin	Signal	Description
2	FG	Frame Ground

Pin	Signal	Description
3	–	24V Ground

■ AX0 – AX7

Pin	Signal	Description
A1	ANALOGx	Analog output
A2	DGND	Digital Ground
A3	Z+	Z pulse(or index)+
A4	Z–	Z pulse(or index)–
A5	B+	Encoder B+
A6	B–	Encoder B–
A7	A+	Encoder A+
A8	A–	Encoder A–
A9	ABS+	Encoder ABS+
A10	ABS–	Encoder ABS–
A11	PCLR+	Pulse Clear+
A12	PCLR–	Pulse Clear–
A13	CCW+	Step Sign(CCW)+

Pin	Signal	Description
A14	CCW–	Step Sign(CCW)–
A15	CW+	Step Sign(CW)+
A16	CW–	Step Sign(CW)–
A17	N/C	N/C
A18	N/C	N/C
A19	AMP_On	Servo ON Output
A20	ALARM	Servo Alarm Input
A21	ALM_RSTx	Servo Alarm Reset
A22	INPOS	In Position Input
A23	N/C	N/C
A24	N/C	N/C
A25	IO_G24V	IO 24V Ground
A26	IO_P24V	IO 24V Power

■ I/O

Pin	Signal	Description
1	OUTPUT 0	Digital Output 0
2	OUTPUT 10	Digital Output 10
3	OUTPUT 1	Digital Output 1
4	OUTPUT 11	Digital Output 11
5	OUTPUT 2	Digital Output 2
6	OUTPUT 12	Digital Output 12
7	OUTPUT 3	Digital Output 3
8	OUTPUT 13	Digital Output 13
9	OUTPUT 4	Digital Output 4
10	OUTPUT 14	Digital Output 14
11	OUTPUT 5	Digital Output 5
12	OUTPUT 15	Digital Output 15
13	OUTPUT 6	Digital Output 6
14	OUTPUT 16	Digital Output 16
15	OUTPUT 7	Digital Output 7
16	OUTPUT 17	Digital Output 17
17	OUTPUT 8	Digital Output 8
18	OUTPUT 18	Digital Output 18
19	OUTPUT 9	Digital Output 9
20	OUTPUT 19	Digital Output 19
21	INPUT 0	Digital Input 0
22	INPUT 10	Digital Input 10
23	INPUT 1	Digital Input 1
24	INPUT 11	Digital Input 11
25	INPUT 2	Digital Input 2
26	INPUT 12	Digital Input 12
27	INPUT 3	Digital Input 3
28	INPUT 13	Digital Input 13
29	INPUT 4	Digital Input 4
30	INPUT 14	Digital Input 14
31	INPUT 5	Digital Input 5
32	INPUT 15	Digital Input 15
33	INPUT 6	Digital Input 6
34	INPUT 16	Digital Input 16

Pin	Signal	Description
35	INPUT 7	Digital Input 7
36	INPUT 17	Digital Input 17
37	INPUT 8	Digital Input 8
38	INPUT 18	Digital Input 18
39	INPUT 9	Digital Input 9
40	INPUT 19	Digital Input 19
41	POS_LIMIT 0	Positive Limit 0
42	POS_LIMIT 4	Positive Limit 4
43	POS_LIMIT 1	Positive Limit 1
44	POS_LIMIT 5	Positive Limit 5
45	POS_LIMIT 2	Positive Limit 2
46	POS_LIMIT 6	Positive Limit 6
47	POS_LIMIT 3	Positive Limit 3
48	POS_LIMIT 7	Positive Limit 7
49	HOME 0	Home input 0
50	HOME 4	Home input 4
51	HOME 1	Home input 1
52	HOME 5	Home input 5
53	HOME 2	Home input 2
54	HOME 6	Home input 6
55	HOME 3	Home input 3
56	HOME 7	Home input 7
57	NEG_LIMIT 0	Negative Limit 0
58	NEG_LIMIT 4	Negative Limit 4
59	NEG_LIMIT 1	Negative Limit 1
60	NEG_LIMIT 5	Negative Limit 5
61	NEG_LIMIT 2	Negative Limit 2
62	NEG_LIMIT 6	Negative Limit 6
63	NEG_LIMIT 3	Negative Limit 3
64	NEG_LIMIT 7	Negative Limit 7
65	IO_P24V	24V Power
66	IO_P24V	24V Power
67	IO_G24V	24V Ground
68	IO_G24V	24V Ground

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