WMX Trial Version

WMX Download

WMX Training Registration

MOVENSYS

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MOVENSYS

CEO’s Message of Movensys

First and foremost, I extend my sincere gratitude to all our customers for placing their trust in Movensys and growing alongside us. Thanks to your continued support, Movensys has established itself as a leading provider of software-based automation solutions.

Our journey began in 1995 with a next-generation robot controller project at MIT. In 1998, we founded Soft Servo Systems and pioneered software-based motion control technologies. Responding to the rapidly changing industrial landscape, we declared a “Second Founding” in 2021 and rebranded as Movensys. Since then, we have been delivering optimized automation solutions across industries, including semiconductors, displays, smart manufacturing, and logistics.

Today, the industrial automation market is shifting from hardware-centric systems to software-defined architectures. Traditional hardware-dependent controllers are becoming increasingly limited due to their high cost and closed architecture, while flexible and scalable software platforms are emerging as a new industry standard thanks to their flexibility and scalability.

Amid this transition, Movensys is leading software-centric automation innovation. We empower our customers to harness technology freely without being constrained by hardware dependencies. Our flagship product, “WMX”, is a soft motion control solution that operates on industrial PCs (IPCs) and real-time operating systems (RTOS), offering a new level of automation that overcomes the limitations of conventional hardware controllers.

To further accelerate our technological advancement, in 2023, we acquired a startup based at MIT specializing in Autonomous Mobile Robot (AMR) technology. This led to the development of “NOVA”, the world’s first integrated control software for Mobile Manipulators (MoMa). "NOVA" is a groundbreaking platform that combines all control elements—navigation, mobility, and robotic arms—into a single unified software solution. This innovation significantly reduces hardware dependency and marks a major leap forward in software-defined automation.

Looking ahead, Movensys will continue to lead the transition toward open and software-driven automation. We are committed to delivering solutions that meet the evolving needs of our customers, guided by our founding philosophy: “Contributing to societal transformation through continuous technological innovation.” We will continue to develop innovative solutions that reflect customer needs and shape the next industrial paradigm.

“Control Tomorrow!”

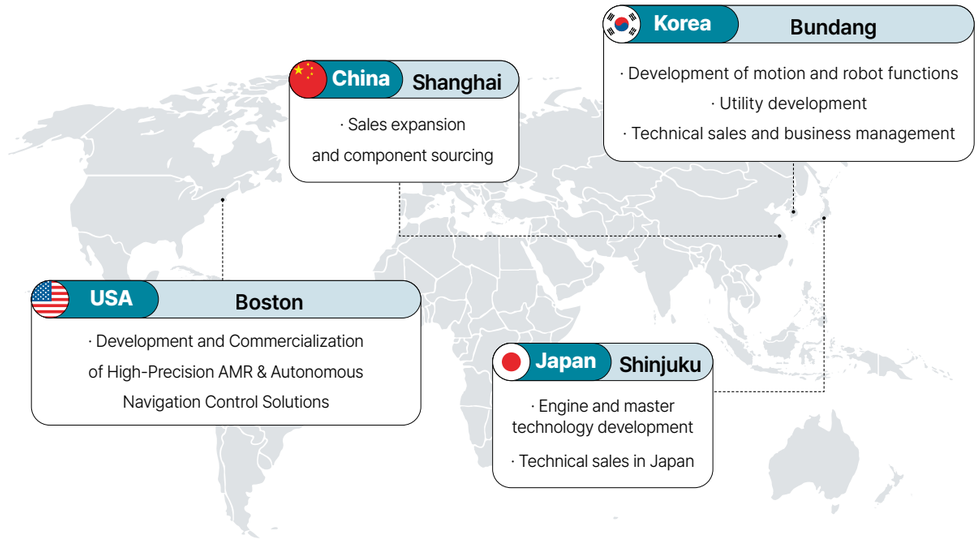
Thank you.

Keehoon Kim
CEO, Movensys

OVERVIEW

Company Name **MOVENSYS Inc.**	CEO **Keehoon Kim**	Established **March 10, 2014**
Head Office **8F Joy City Tower, Bundang, Korea 13595**	Intellectual Property **Soft Motion technology patents (32+ since 2004)**	Certifications **ISO 9001** **ISO 14001** **ISO 45001** **ISO 27001**

Headquarters & Global Offices



Phase 1

Start

Phase 2

Business Growth and Establishment

Phase 3

Business Expansion

Company History

1995 · Initiated the “Next-Generation Robot Controller” development project at MIT

1998 · Established U.S. corporation: Soft Servo Systems, Inc.

1999 · Granted the world’s first U.S. patent for PC-based servo control

2004 · Obtained the world’s first patent for software-based motion control technology

2006 · Established Japanese subsidiary: Soft Servo Systems, Inc. (Japan)

2008 · Developed the world’s second software-based EtherCAT master

2012 · Supplied technology and products to Korea's largest semiconductor equipment manufacturers

2013 · Launched "WMX", an integrated multi-axis motion control solution based on software motion technology and EtherCAT

2014 · Established Korean subsidiary: Soft Servo Korea, Inc.

2018 · Released "WMX3", designed with an open architecture

2019 · Acquired global patents related to software motion architecture

2020 · Launched WMX3 with CC-Link IE TSN
<World’s first CC-Link IE TSN software master>

2020 · Attracted equity investment from Crescendo Equity Partners

2021 · Developed the world’s first MECHATROLINK-4 compatible software master

· Rebranded company as Movensys and relocated headquarters to Bundang, Korea

2022 · Received the "IR52 Jang Young-Shil Award" for software-based motion control solution WMX

2023 · Acquired Skylla Technologies, an MIT-affiliated startup in Boston focused on intelligent AMR control

· Formed strategic business partnership and attracted investment from Mitsubishi Electric (Japan)

2024 · Selected for a national AI-powered autonomous control platform project

· Developed "Skylla Nova", an integrated control solution for MoMa (Mobile Manipulator)

· Awarded Minister’s Prize for Industrial Digital Transformation

Soft Motion Architecture based Total Solutions

01 Soft Motion (WMX)

Versatile Environments
Pure software motion controller compatible with various operating systems

• Compatibility
Compatible with various motors and I/O devices regardless of brand limitations

Real-time Performance (Based on Real-time OS)
Ensures real-time performance through high-speed fieldbus communication such as EtherCAT, CC-Link IE TSN, and MECHATROLINK-4

02 Hardware Solutions

Optimal Compatibility
Hardware solution optimized for WMX

Stability
Ensures stability with in-house developed hardware solutions

· IPC
· IO
· Step/StepServo
· Module

03 IIoT Sensor

Simple Measurement
Simultaneous 3-axis (X, Y, Z) vibration measurement using two MEMS sensors

Automatic Analysis
Enables simultaneous analysis of motion and vibration in conjunction with WMX3

Anti-Vibration Motion Control
Vibration suppression control enabled through real-time vibration analysis and monitoring

Based on its software motion control platform WMX, **Movensys provides hardware and IIoT sensor solutions to deliver uniquely optimized offerings tailored to each customer’s needs.**

Applications

Our motion control technology is applied not only to semiconductor processes such as transfer, etching, cleaning, and inspection, but also extensively across display, logistics, and general manufacturing equipment. Any system requiring precise motion control can benefit from Movensys solutions.

01 Semiconductor

· Front-end / Back-end Processes (Photolithography, Etching, Cleaning, Inspection, Testing, Packaging)
· Wafer Transfer Robots
· Process Logistics Automation Equipment(Stocker, OHT, AMR, etc.)

02 Display

· Front-end / Back-end Processes(Cleaning, Exposure, Coating, Etching, Inspection)
· Glass Transfer Robots
· Process Logistics Automation Equipment(Stocker, OHS, AMR, etc.)

03 Smart Devices

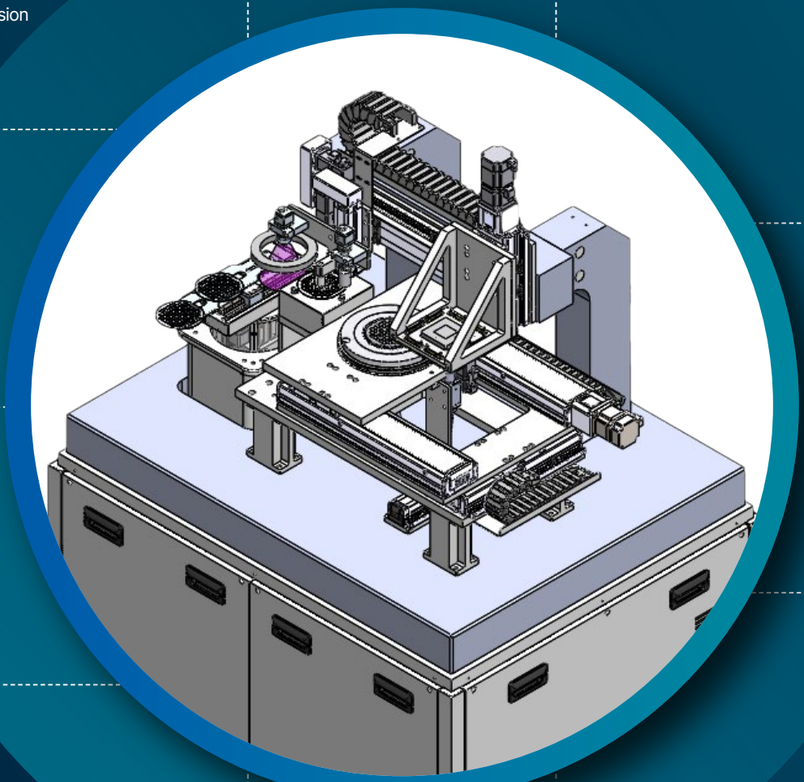
· Camera Inspection Process
· Flex Bending / Dispensing / Assembly Process
· SCARA Robot

04 Secondary Batteries

· Stacking / Packaging / Welding Process
· Activation Process
· Process Logistics Automation Equipment(OHT, AMR, etc.)

Total Solutions Powered by WMX

Movensys provides customized total solutions to help customers achieve high-performance and optimized motion control using the WMX platform.



WMX3

- High-performance, high-precision motion control platform based on software
- Powerful motion and I/O control with over 200 API libraries
- No additional hardware required for axis or performance expansion

Compact IPC

- Compact size optimized for minimal control cabinet space
- System environment tuned for optimal WMX performance
- Real-time stability verification completed

※ Rack mount and wall mount options are also available.

Remote I/O, Slice I/O

- Optimized connectivity and compatibility with WMX
- Easy and convenient connection and integration with devices
- Provides flexible feature expansion using the built-in MCU

IIoT Sensor

- Provides an anti-vibration profile (AVX+VMS) that suppresses vibration by measuring oscillation from the load side
- Enables immediate anti-vibration motion control when integrated with WMX

Step/StepServo

- Supports high-speed, high-precision Micro Stepping and Closed Loop Stepping
- Verified for compatibility and performance optimization with WMX

Servo

- Verified WMX compatibility with various brands including Mitsubishi Electric and Panasonic
- Enables high-precision, high-speed, and high-torque servo control through integration with WMX

Pulse Module

- Provides flexible slave expandability through EtherCAT-to-pulse conversion
- Verified for compatibility and performance optimization with WMX

Trigger Module

- Implements ultra-precise trigger functionality through perfect compatibility with WMX
- Supports future laser control module extension (planned)

Ethernet Selector Module

- A device that enables selective switching of all Ethernet-based communication lines, including EtherCAT
- Enables system redundancy configuration when integrated with WMX

Product Lineup

▸ WMX3 (Soft Motion)

Overview

License Types
Standard, Advanced, I/O

Operating System
Windows

Optional Features
Robot Control, Multi Cycle, Hybrid Network, AVX (Anti-Vibration Control)

WMX3 Communication Specifications

Official Version
- Recommended Specs: Intel Core i5 or higher (For 16 axes at 125 µs or 128 axes at 1 ms, Intel Core i7 or higher is recommended)
- Maximum Performance: EtherCAT: up to 62.5 µs (8 axes); CC-Link IE TSN: up to 31.25 µs (6 axes) — For maximum performance, Intel Core i9 CPU with 3.2 GHz or higher clock speed is recommended

* Communication cycle times may vary depending on the system environment.

Free Version
EtherCAT, Non Real-time, Simulation(Up to 128 axes, 1~8 ms)

* The free version allows continuous communication in 1 hour increments without a license. And, API testing is possible in simulation mode without any functional limitation

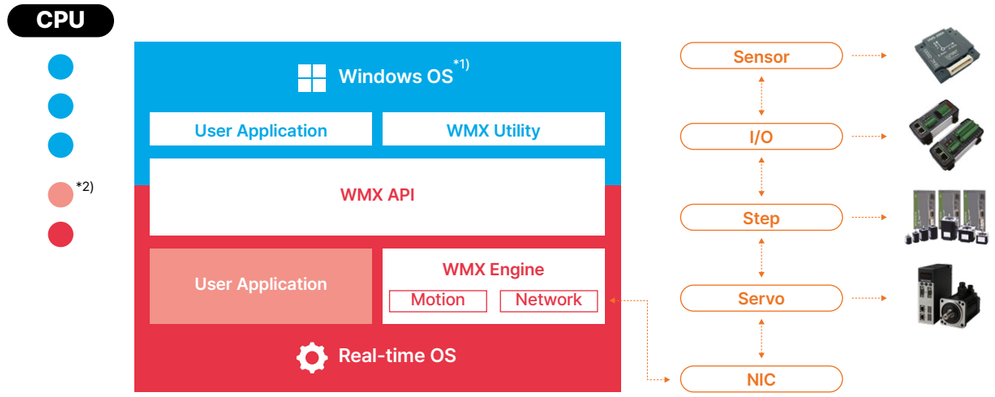
WMX Support

Homepage | Training Registration | Free Version Download | Catalog Download

Key Features

- Secures real-time control and periodicity by occupying one or more cores of a multi-core CPU based on a real-time operating system (RTOS)
- Through the Soft Motion Architecture, users can develop custom features beyond the default motion functions included in WMX
- Enables easy development of user-defined functions using general-purpose programming languages such as C, C++, C#, and Python
- Supports EtherCAT Master Class A, including various advanced features such as Hot Connect and diagnostics as specified in ETG.1500/1510
- Supports communication with EtherCAT, CC-Link IE TSN, and MECHATROLINK-4, allowing hybrid control with up to two networks
- Provides dedicated WMX utilities for main system operation, system management, advanced network configuration, and real-time motion profile analysis

WMX Architecture



Windows OS RTX OS EtherCAT Communication

*1) For Linux-based OS support, please contact the Movensys sales team.
*2) User applications based on a real-time OS can be developed using the RTX64 SDK.

Product Name

WMX3 - EC - AX04 - RTX64 - AD - ☐☐☐
(1) (2) (3) (4) (5) (6)

① WMX Series

Code	Specification
WMX3	Major Version 3

② Communication

Code	Specification
EC	EtherCAT
CT	CC-Link IE TSN
M4	MECHATROLINK-4
EE	EtherCAT + EtherCAT
ET	EtherCAT + CC-Link IE TSN
EM	EtherCAT + MECHATROLINK-4

③ Control

*(I/O : 64,000 points)

Code	Specification
AX04	4-Axis + I/O Control
AX08	8-Axis + I/O Control
AX16	16-Axis + I/O Control
AX24	24-Axis + I/O Control
AX32	32-Axis + I/O Control
AX48	48-Axis + I/O Control
AX64	64-Axis + I/O Control
AX80	80-Axis + I/O Control
AX96	96-Axis + I/O Control
AX128	128-Axis + I/O Control
I/O	I/O Control

④ OS

Code	Specification
RTX64	RTX 64bit
Linux	TBD

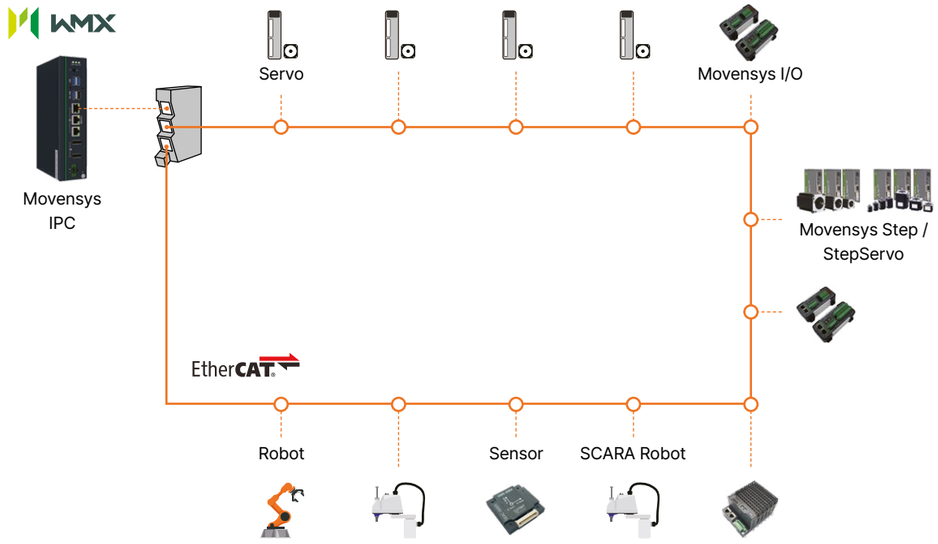
⑤ Motion

Code	Specification
ST	Standard Motion
AD	Advanced Motion
Blank	I/O Control

⑥ Option

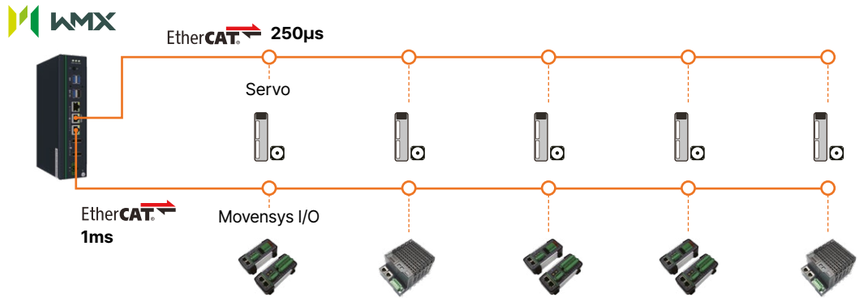
Robot, AVX (Anti-Vibration Control)

System Architecture Diagram

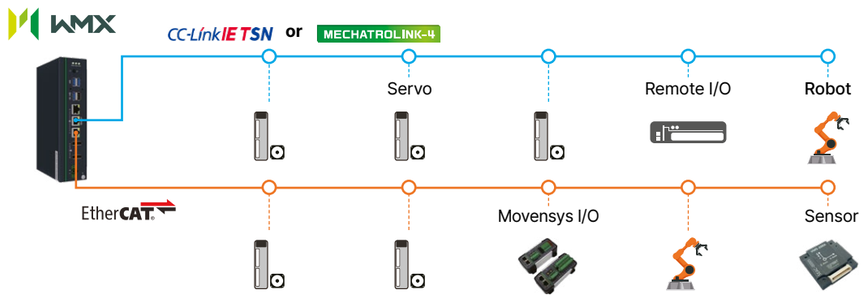


*A separate hub is required only when configuring the WMX ring topology.

Multi Cycle



Hybrid Network



WMX3 Basic Specifications

Category	Specification
Number of Control Axes	4 to 128 axes
Number of Synchronized Axes	Up to 128 axes
Communication Protocols	EtherCAT / CC-Link IE TSN / MECHATROLINK-4
Programming Language	C, C++, C#, Python
Development Environment	Visual Studio 2012 ~ 2022

Recommended PC Specifications for WMX3

Category	Specification
OS	Windows 10 LTSC / Windows 11 LTSC
CPU	Intel Atom, Celeron, Core i (6th to 13th Gen) / Xeon (2nd to 4th Gen)
RAM	Min. 4GB
Base Clock Speed	Recommended processor base frequency: 1.5GHz or higher

* The above specifications are verified for WMX3 operation. Recommended specs may vary depending on hardware/system configuration.

WMX3 Communication Specifications

Category	EtherCAT	CC-Link IE TSN	MECHATROLINK-4
Certification Class	Class A (Highest Grade)	Class B (Highest Grade)	-
Transmission Speed	100Mbps	100Mbps ~ 1Gbps	100Mbps
Communication Distance	Up to 100m	Up to 100m	Up to 100m
Cycle Time	62.5µs~8ms	125µs~16ms * 31.25µs, 62.5µs to be added from ver. 3.6.3	125µs~16ms * 62.5µs to be added from ver. 3.6.3
Cable	CAT 5e or higher	CAT 5e or higher	CAT 5e or higher
Number of Connected Devices	256	253 * Excluding network, broadcast, and master self addresses	127 * Excluding master self address
Topology	· Line · Star · Ring	· Line · Star	· Line · Star
Synchronization	· DC · Free Run	· IEEE 820.1AS & IEEE 1588v2	Supported (Synchronous Communication)
Multi-Cycle Support	Supported * requires dual LAN ports	Supported	Supported * requires dual LAN ports
Communication Profile	· CoE · FoE · EoE · SoE · AoE · VoE · FSoE	· CANopen (CiA402)	· ML-4 Standard Servo Profile, ML-4 Standard I/O Profile
Ethernet Controller Compatibility	· Intel I210 · Intel I211 · Intel I225 · Intel I226 · Intel I350 * Other NICs also supported	· Intel I210 · Intel I211 · Intel I225 · Intel I226 · Intel I350 * Other NICs also supported	· Intel I210 · Intel I211 · Intel I225 · Intel I226 · Intel I350 * Other NICs also supported
Additional Features	· Hot Connect · Diagnostic functions	· Hot Connect · Mixed IP communication · SLMP (Seamless Message Protocol)	· Hot Connect · Retry-based communication redundancy

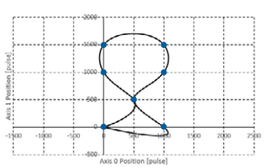
WMX3 Features

Feature		Trial Version		Official License		
		Non-RTOS*1)	RTOS*2)	I/O	Standard	Advance
Periodicity		-	●	●	●	●
Origin (Homing)	Default Origin	●	●	-	●	●
	Gantry Origin	●	●	-	●	●
Basic Motion	PM Motion	●	●	-	●	●
	Motion Profile	●	●	-	●	●
	Interpolation Control	●	●	-	●	●
	Trigger Motion	●	●	-	●	●
	PVT	●	●	-	●	●
	Sync Control	●	●	-	●	●
	Closed Loop (PID)	●	●	-	●	●
Advanced Motion	Spline	●	●	-	-	●
	Path Interpolation with Rotation	●	●	-	-	●
	Path Interpolation Lookahead	●	●	-	-	●
	E-CAM	●	●	-	-	●
Additional Function	API Buffer	●	●	●	●	●
	Event	●	●	●	●	●
	Touch Probe	●	●	-	●	●
	PSO(Position-Sync Output)	●	●	-	●	●
	Speed Override	●	●	-	●	●
	Data Log	●	●	●	●	●
	API Log	●	●	●	●	●
	Position Compensation	●	●	-	-	●
	I/O Control	●	●	●	●	●

*1) Non-RTOS version allows continuous communication in 1 hour increments without a license. And, API testing is possible in simulation mode without any functional limitations.

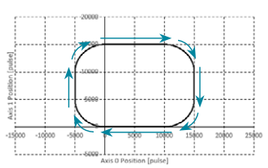
*2) RTOS trial versions can be used for up to 3 months.

1 **Spline**



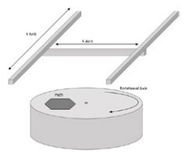
A control method that moves along multiple predefined coordinates by applying separate algorithms or polynomials for each section.

2 **Path Interpolation**



A continuous path interpolation control method that combines linear, circular, and 3D arc interpolation for multiple paths.

3 **Path Interpolation** with Rotation



A continuous path interpolation control method with rotation, where the rotation axis rotates the entire path when the movement direction changes during interpolation.

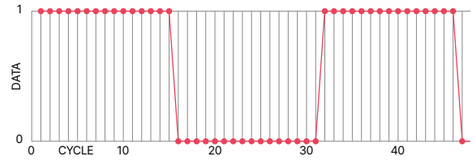
WMX3 Features | API Buffer

The WMX3 API Buffer is one of the most representative features for achieving periodic control. It is used to implement precise sequencing in Windows environments where periodicity is not inherently guaranteed. The graph below illustrates an example of how API Buffer performs under identical PC conditions.

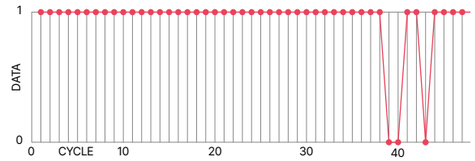
Example Invert Bit data at 1ms intervals in sync with the 1ms communication cycle

Without API Buffer

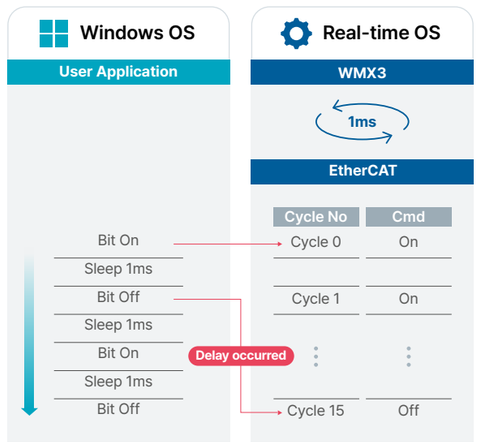
When an API function is called directly from a Windows application, some execution delay may occur because Windows is not a real-time operating system.



Even if a Windows application executes bit control commands at 1ms intervals, the actual execution timing may vary depending on CPU specifications due to other interrupt influences, making it impossible to achieve precise 1ms control.



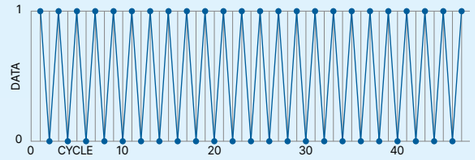
If a heavy CPU load occurs while the Windows application is executing 1ms interval bit control commands, irregular behavior may occur.



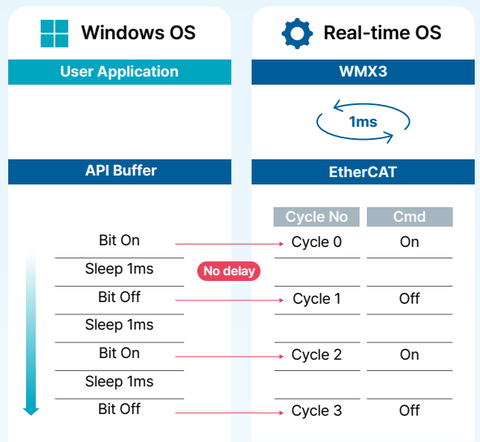
* Although 1ms interval bit control commands were executed, system delays may cause the Off command to be executed several milliseconds after the On command.

With API Buffer

By pre-storing API functions in the API Buffer, such delays can be avoided, and the functions can be executed sequentially with precise timing aligned to the communication cycle.



When implementing 1ms interval bit control commands in a Windows application, using the API Buffer enables precise 1ms control regardless of CPU load.



* With the API Buffer feature, On and Off commands can be executed sequentially at an accurate 1ms interval without delay.

WMX3 Robot Control Options

SCARA Robot

Multiple SCARA robots can be controlled within the maximum number of axes supported by the WMX license.

6-DOF

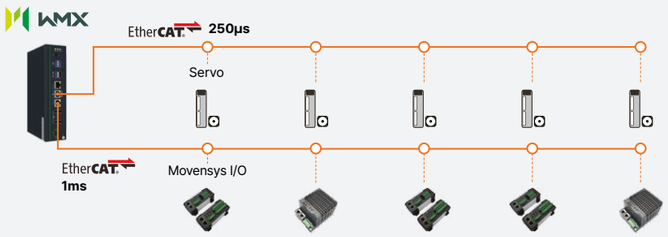
Multiple 6-DOF articulated robots can be operated within the maximum number of axes supported by the WMX license.

WMX3 Additional Options

Multi Cycle

A single PC can independently control multiple networks with different cycle times without separating communication interfaces.

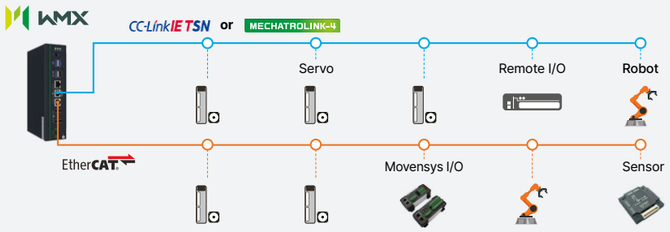
EtherCAT + EtherCAT



Hybrid Network

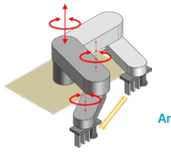
A single PC can simultaneously control two fieldbus protocols from among EtherCAT, CC-Link IE TSN, and MECHATROLINK-4.

EtherCAT + CC-Link IE TSN or MECHATROLINK-4

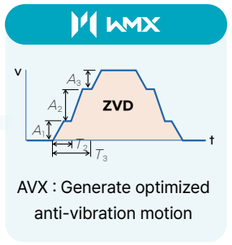


AVX (Anti-Vibration Extended License)

Vibration signals generated during motion execution can be captured via the VMS module, enabling immediate anti-vibration control using input shaping techniques.



Execute Anti-Vibration Motion



AVX : Generate optimized anti-vibration motion

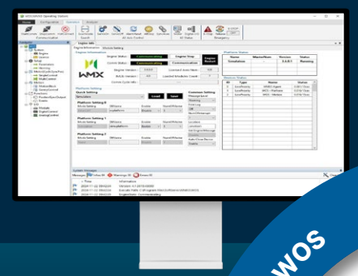
Measure vibration

EdgeLink: Analyze vibration frequency

WMX3 Utility

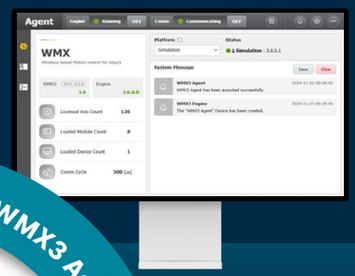
WMX3 Main Operation

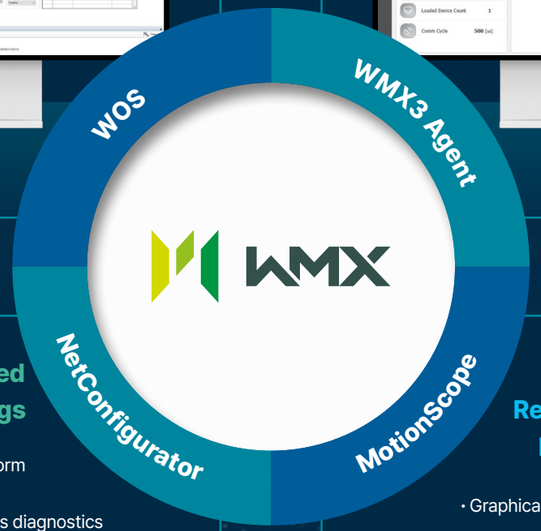
- Supports initial equipment setup
- Tests WMX3 motion functions(e.g., Gantry, Compensation, Event, etc.)
- Tests WMX3 robot functions



WMX3 System Management

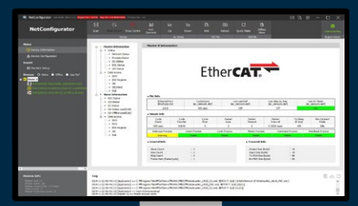
- WMX3 Utility Navigator
- WMX3 Engine management
- Network and license configuration
- WMX3 system log diagnostics





WMX3 Advanced Network Settings

- Communication platform management
- Communication status diagnostics
- Batch management of slave parameters
- Management of PDO mapping and Read/Write operations for SDO, SII, and Register areas



WMX3 Real-Time Motion Profile Analysis

- Graphical visualization of motion profiles and I/O status
- Graph-based condition analysis (including support for large-volume log extraction)

Hardware Product Lineup

Compact IPC

High Compatibility with WMX

MCX-CM220

- Intel® Core™ i5-1145G7E quad-core processor (1.5 GHz base frequency)
- Bundled with WMX at a competitive price
- Rugged design for industrial environments
- Pre-configured and fully optimized for WMX, requiring no additional setup
- Generous I/O: includes 4 serial ports and 3 network ports

Catalog

Manual

MCX-CM100

- Ultra-compact size (W 110 x D 90 x H 29 mm)
- Enhanced convenience and expandability with USB Type-C port
- High energy efficiency with low-power Intel Atom processor
- Fanless design lowers noise and reduces maintenance needs

Catalog

Manual

Step/StepServo

Step EtherCAT Series

- Open-loop stepping system compatible with CiA402 drive profiles
- Available in various frame sizes and motor lengths (20 mm to 60 mm)
- Rugged and field-proven design tailored to diverse industrial environments

Catalog

Manual

StepServo EtherCAT Series

- Closed-loop stepping system compatible with CiA402 drive profiles
- Supports battery-free absolute encoders
- Available in various frame sizes and motor lengths (20 mm to 60 mm)
- Rugged and field-proven design tailored to diverse industrial environments

Catalog

Manual

Remote I/O

Digital IO2 EtherCAT Series

- Supports CoE (compliant with CiA401 profile) and FoE (File over EtherCAT)
- Easy installation using Node ID configuration switch
- Convenient wiring with plug, eCON, and terminal-type connectors
- Offers various models including mixed-type, 16-point, and 32-point configurations

Catalog

Manual

Analog IO2 EtherCAT Series

(Planned release in Q3 2025)

- Supports CoE (compliant with CiA401 profile) and FoE (File over EtherCAT)
- Easy installation using Node ID configuration switch
- Convenient wiring with eCON, and terminal-type connectors
- 8-channel voltage/current input and 4-channel analog voltage/current output

Slice I/O

BHY-ION EtherCAT Series

- Supports CoE (compliant with CiA401 profile) and FoE (File over EtherCAT)
- Includes free utility for WMX users for easy EtherCAT-based configuration and management
- Offers five types of I/O modules, enabling flexible configuration and expansion, simplifying control panel design
- Allows easy maintenance with a simple attach-detach mechanism

Catalog

Manual

Hardware Product Lineup

IIoT Sensor

VMS Vibration Monitoring Sensor

- Enables motion-optimized vibration suppression settings and tip vibration detection via the WMX API
- Provides a dedicated program for vibration measurement and analysis
- Minimizes motion errors via simultaneous 3D measurement and compensation in X, Y, and Z directions

Catalog

Manual

EtherCAT to SSI Module

BHY-DAQ

- Supports fully-closed-loop control in WMX via external encoders or barcode readers

Pulse Module

BHY-AX Series

- Simultaneous control of up to 4-axis pulse-type drivers via EtherCAT, compliant with CoE (CiA402 Profile)
- Compatible with both open-loop and closed-loop systems
- Supports NPN and PNP type sensors depending on wiring
- More compact than previous models, allowing for reduced panel size

Manual

Trigger Module

BHY-IOS Series (Planned release in Q3 2025)

- Configurable trigger pulse width with a minimum resolution of 100 ns
- Supports up to eight PSOs from a single encoder signal
- Provides IPSO and RPSC trigger output modes using encoder counters and position comparators

EtherCAT Selector Module

The EtherCAT Selector Module is designed to support controller switching by selecting the appropriate control path when using dual WMX systems, depending on the situation.

BHY-SEL

- In the event of a controller fault, control can be switched to a sub-PC to minimize equipment downtime
- Reduces equipment downtime caused by controller (PC) failures
- Can be installed in any orientation, maximizing space efficiency
- Input voltage can be freely selected (5V or 24VDC) based on the user environment
- Compatible with all Ethernet-based communication protocols, including EtherCAT

Manual

Compact IPC

MCX-CM220

Key Features

- Compact size
- Intel® Core™ i5-1145G7E quad-core
- Gigabit LAN: 3 ports (built-in)
- USB Ports: 3 × USB 3.2, 1 × USB 2.0 (built-in)
- Serial Ports: 4 ports (built-in)
- Supports M.2 storage
- Expandable with optional extension modules

Product Name

MCX - CM 220 - A A A - WMX3 - EC 04 ST - □

① ② Model Number ③④⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Series : MCX

② Frame Standard

Code	Specification
CM	Compact Mount

③ Ram Spec

Code	Specification
A	DDR4 8GB
B	DDR4 16GB
C	DDR4 32GB

④ SSD Spec

Code	Specification
A	250GB
B	500GB
C	1TB
D	2TB

⑤ Extension Kit

Code	Specification
A	Basic
B	Expansion Kit 1 (PCIe)
C	Expansion Kit 2

⑥ WMX Series

Code	Specification
WMX3	Major Version 3

⑦ Communication

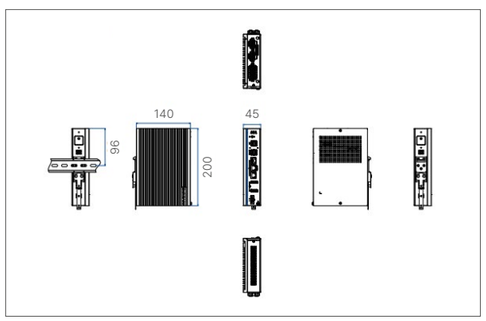
Code	Specification
EC	EtherCAT
CT	CC-Link IE TSN
M4	MECHATROLINK-4
EE	EtherCAT + EtherCAT
ET	EtherCAT + CC-Link IE TSN
EM	EtherCAT + MECHATROLINK-4

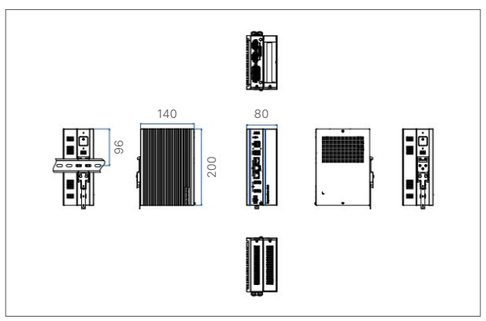
⑧ Number of Axes **⑨ WMX Motion**
⑩ Option

* Please refer to page 9 for the WMX product naming system for items ⑥⑦⑨.
* The OS specification is RTX64.

Dimensions

With optional extension kit (mm)





Specifications

Item		Specifications
Hardware System	BIOS	AMI UEFI 256Mbit
	CPU	Intel® Core™ i5-1145G7E quad-core (up to 4.1 GHz)
	Memory	8GB DDR4 SODIMM-3200 (up to 64 GB, 2 slots supported)
	Graphics Controller	Intel® Iris® X
	LAN	LAN A : Intel® i225-LM 2.5GbE, IEEE 802.3AZ/802.1AS LAN B : Intel® i210-IT GbE, IEEE 802.3AZ/802.1AS LAN C : Intel® i219-LM GbE, IEEE 802.3AZ/802.1AS
	TSN	Supported via the i225 LAN port
	LED	Power x 1, RTC Battery x 1, Operating Status x 1
	Expansion Slots	Full-size PCIe Mini Card (PCIe/USB 2.0 signal) 2230 Wi-Fi module (PCIe signal) or M.2 (E key) x 1 1 × M.2 (M key) for 2280 NVMe (PCIe x 4 signal) 2242 SSD (SATA signal) or 3042/3052 cellular modules (USB signal, M.2 B key) x 1 Nano SIM card slot x 1
	Expansion Kit 1	MCX-CM220-P11EA - PCIe x 4 slot x 1
	Expansion Kit 2	MCX-CM220-IS2EA - iDoor slot x 1 + 2.5" SSD/HDD storage slot
	Watchdog Timer (WDT)	Programmable (1~255 sec)
	Security	TPM2.0
I/O Device	Serial Ports	RS-232/422/485 (terminal block) x 4 50~115.2kbps (isolation voltage: 2500VDC)
	Network Ports	10/100/1000BASE-T Ethernet (RJ45) x 2 10/100/1000/2500BASE-T Ethernet (RJ45) x 1
	USB	USB 3.2 (Gen 2) x 3, USB 2.0 (Type A) x 1
	Digital I/O	8-channel digital input (with 2500VDC isolation) 8-channel digital output
	Display	DP 1.4 × 2, Max. 7680 × 3840 (8K) @ 60 Hz
	Power Connector	2-pin terminal block x 1
General	Certifications	KC, CE, FCC
	Dimensions (W x D x H)	45 × 140 × 200mm (1.4 × 5.5 × 7.8 inch)
	Chassis Material	Aluminum housing
	Mounting Type	DIN rail
	Weight	1.3kg / 2.86lb
	Input Voltage	10 - 36VDC
	Power Consumption	31W (typical), 55W (max)
	Operating System	Windows 10 IoT Enterprise LTSC
Environmental	Operating Temperature	TDP @ 15W, -20 ~ 60°C/-4 ~ 140°F TDP @ 22W, -20 ~ 50°C/-4 ~ 122°F (with fan kit)
	Storage Temperature	-40 ~ 85°C / -40 ~ 185°F
	Relative Humidity	95% RH @ 40°C/104°F (non-condensing)
	Shock Resistance	Operating, IEC 60068-2-27, 50G, half-sine, 11ms
	Vibration Resistance	Operating, IEC 60068-2-64, 4Grms, random, 5~500Hz, 1hr/axis (SSD) Operating, IEC 60068-2-64, 0.3Grms, random, 5~500Hz, 1hr/axis (HDD)
	Ingress Protection	IP20

Compact IPC

MCX-CM100

Key Features

- Ultra-compact size
- High energy efficiency with low-power Intel Atom processor
- Intel Atom® x5-E3940 Processor 1.6GHz (CPU)
- 1000BASE-T/100BASE-TX/10BASE-T × 2 ports (LAN ports)
- USB Ports: 3 × USB 3.2 (built-in)
- DisplayPort: 1 × DisplayPort (built-in)
- Supports M.2 storage

Product Name

MCX - CM 100 - A A A - WMX3 - EC 04 ST - □

① ② Model Number ③④⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Series : MCX

② Frame Standard

Code	Specification
CM	Compact Mount

③ Ram Spec

Code	Specification
A	DDR3 4GB

④ SSD Spec

Code	Specification
A	32GB
B	250GB

⑤ Extension Kit

Code	Specification
A	Basic

⑥ WMX Series

Code	Specification
WMX3	Major Version 3

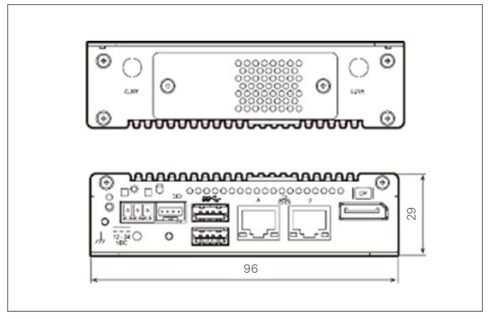
⑦ Communication

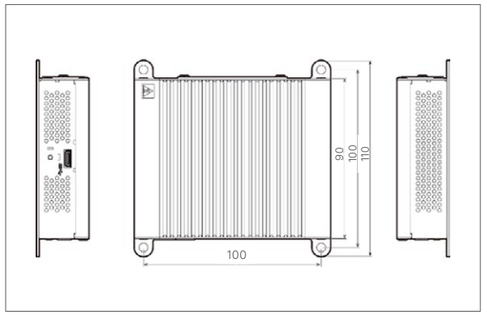
Code	Specification
EC	EtherCAT

⑧ Number of Axes **⑨ WMX Motion** **⑩ Option**

* Please refer to page 9 for the WMX product naming system for items ⑧⑨⑩.
* The OS specification is RTX64.

Dimensions (mm)





Specifications

Item			Specifications
Hard-ware System	BIOS		AMI
	CPU		Intel Atom® x5-E3940 Processor 1.6GHz
	Memory		PC3-10600 (DDR3L, 1333) ECC 4GB, onboard
	Graphics Controller		Intel® HD Graphics 500 (integrated in CPU)
	System Display	Display Ports	Max. 3,840 × 2,160
		USB Type-C (DP Alt Mode)	Max. 3,840 × 2,160
	Storage Device		Slot x 1, M.2 2242, SATAIII
	LAN		Intel® I210 controller, 1000BASE-T/100BASE-TX/10BASE-T x 2 ports
	USB		USB 3.2 Gen 1 (USB3.0) Type-A con x 2, USB 3.2 Gen 1 (USB3.0) Type-C connector x 1
	Watchdog Timer (WDT)		Software programmable timer, 255 levels (1–255 sec), resettable on timeout, selectable via power OFF or external output
	Security		TCG TPM2.0
	Hardware Monitoring		CPU temp, board temp, power input voltage
	Real-Time Clock		Lithium backup battery: life over 10 years
I/O Device	General-purpose I/O		Isolated I/O, 3 input / 3 output channels (Switchable to remote reset or power on/off port)
	Inter-face	Display	DisplayPort x 1, USB Type-C (DP Alt Mode) x 1
		LAN	2 ports (RJ-45 connector)
		USB	USB 3. 2 Gen1 (USB3.0) Type-A x 2, USB 3. 2 Gen1 (USB3.0) Type-C x 1
		Digital I/O	1 port (4-pin connector)
	Power Management		Power management via BIOS settings, power-on support through Ring/Wake on LAN, and ACPI power control supported
General	Certifications		KC, FCC Class A, UKCACE Mark (EMC Class A, RoHS compliant)
	Dimensions (W x D x H)		110 x 90 x 29mm
	Weight		Approx. 0.42kg
	Power Supply	Regulated Voltage Range	12 - 24VDC
		Input Voltage Range	6 - 37VDC
		Power Consumption	12V 3.7A / 24V 1.9A
		External Power Output	USB 3.2 Gen1 (USB3.0) Type-A I/F : +5V 1.8A (900mA x 2), USB 3.2 Gen1 (USB3.0) Type-C I/F : +5V 1.5A
	Operating System		Windows 10 IoT Enterprise LTSC
Environ-mental	Operating Temperature		-30 ~ +60°C, with 0.7m/s airflow, -30 ~ +50°C, without airflow, -30 ~ +70°C, without airflow (with optional fan module installed)
	Storage Temperature		-30 ~ +70°C
	Humidity		10 ~ 90%RH (non-condensing)
	Conductive Dust		Not allowed
	Corrosive Gas		Not allowed
	Line Noise Immu-nity	Line Noise	AC line / ±2kV (IEC61000-4-4 Level 3, EN61000-4-4 Level 3)
		Electrostatic Discharge Immunity	Contact discharge / ±4kV (IEC61000-4-2 Level 2, EN61000-4-2 Level 2) Air discharge / ±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3)
	Shock Resist-ance	VESA Mounting	100G half-sine shock for 6ms in X, Y, and Z directions (compliant with JIS C60068-2-27, IEC 60068-2-27)
		When using BX-DIN-05	15G half-sine shock for 11ms in X, Y, and Z directions (compliant with JIS C60068-2-27, IEC 60068-2-27)
		When using BX-DIN-V05	10G half-sine shock for 11ms in X, Y, and Z directions (compliant with JIS C60068-2-27, IEC 60068-2-27)
	Vibra-tion Resist-ance	Sweep Resistance	10–57Hz / 0.375 mm peak-to-peak amplitude, 57–500Hz / 5.0G, 60 minutes in each of X, Y, and Z directions (compliant with JIS C60068-2-6, IEC 60068-2-6)
	Grounding		Class D grounding, SG-FG / continuity

Micro Stepping System

Step

Key Features

- Supports up to 50,000 resolution steps without an encoder, using microstepping and filtering control
- Minimizes vibration with Software Damping technology
- Provides high holding torque during stop via torque boost function (motor voltage boost and current control)
- Supports various homing functions

Product Name

BHY - Step - EC - 20 S - □

① ② ③ ④ ⑤ ⑥

① Series : BHY ② Device Type : Step

③ Communication

Code	Specification
EC	EtherCAT

④ Motor Size

Code	Specification
20	20mm
28	28mm
42	42mm
56	56mm
60	60mm

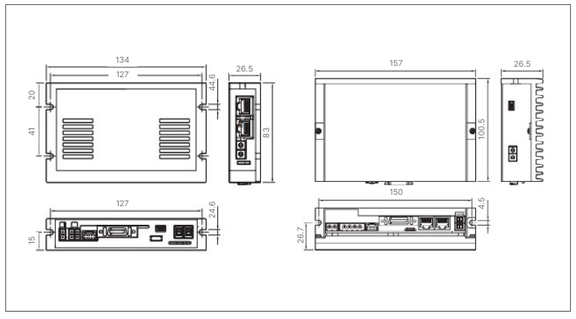
⑤ Motor Length

Code	Specification
S	Short
M	Medium
L	Long
XL	Extra Long

⑥ Brake

Code	Specification
No marking	-
BK	Brake

Drive Size (mm)



Motor Length

Category	S	M	L	XL
20	-	28+(15)	38+(15)	-
28	32+(13.6)	45+(13.6)	50+(13.6)	-
42	-	32+(14)	36+(14)	-
56	34+(16)	40+(16)	48+(16)	60+(16)
60	46+(16)	55+(16)	80+(16)	-

* Length of the body including the encoder, excluding the shaft.

Drive Specifications

Item		Specifications
Input Voltage		DC24V±10%
Control Method		PWM control via 32-bit MCU
Current Consumption		Max. 500mA (excluding motor current)
Environmental	Temperature	·Operating : 0 ~ 50°C ·Storage : -20 ~ 70°C
	Humidity	·Operating : 35 ~ 85%RH (non-condensing) ·Storage : 10 ~ 90%RH (non-condensing)
	Vibration Resistance	0.5g
Functionality	Rotational Speed	0~3,000r/min
	Resolution [P/R]	500 1,000 1,600 2,000 3,200 3,600 4,000 5,000 6,400 8,000 10,000 20,000 25,000 36,000 40,000 50,000 * Resolution can be set via parameter
	Error Types	Overcurrent, overspeed, overheating, regeneration overvoltage, motor disconnection, ROM error
	LED Indicators	Power status, alarm status, run status, Step On status
EtherCAT	Supported Protocols	CoE (CiA402 drive profile), FoE (firmware download)
	Operation Modes	Cyclic synchronous position mode, profile position mode, homing mode
	Communication Synchronization Modes	Free Run mode, SM event synchronization mode, DC SYNC event synchronization mode
I/O Signals	Input	3 fixed inputs (LIMIT+, LIMIT-, ORIGIN), 7 general-purpose inputs (photocoupler input)
	Output	6 general-purpose outputs (photocoupler output), 1 brake signal output

Standard Motor Specifications

Item			Unit	BHY-SM-42 Series				BHY-SM-56 Series			BHY-SM-60	
				Series	42M	42L	42XL	56S	56M	56L	60M	60L
Drive Method			-	Bipolar drive								
Number of Phases			-	2-phase								
Rated Current / Phase			A/phase	1.2	1.2	1.2	1.2	3.0	3.0	3.0	4.0	4.0
Max. Holding Torque			N·m	0.32	0.44	0.5	0.65	0.64	1.0	1.5	1.28	2.4
Rotor Inertia			g·cm2	35	54	77	114	180	280	520	490	690
Weight			kg	0.238	0.303	0.374	0.508	0.548	0.726	1.159	0.793	1.349
Length (L)			mm	34	40	48	60	46	55	80	56	85
Allowable Radial Load	Distance from Motor Shaft End	3mm	N	22	22	22	22	52	52	52	70	70
		8mm		26	26	26	26	65	65	65	87	87
		13mm		33	33	33	33	85	85	85	114	114
		18mm		46	46	46	46	123	123	123	165	165
Allowable Axial Load			N	Less than the motor unit weight								
Insulation Resistance			MΩ	Min. 100 (measured with a DC500V insulation tester)								
Insulation Class			-	Class B (130°C)								
Operating Temperature			°C	0 ~ 55								

Closed Loop Stepping System

StepServo

Key Features

- Supports up to 50,000 resolution steps without an encoder, using microstepping and filtering control
- Minimizes vibration with Software Damping technology
- Provides high holding torque during stop via torque boost function (motor voltage boost and current control)
- Supports various homing functions

Product Name

BHY - StepServo - EC - 20 S - A - □ - □

1 2 3 4 5 6 7 8

① Series : BHY

② Device Type : StepServo

③ Communication

Code	Specification
EC	EtherCAT

④ Motor Size

Code	Specification
20	20mm
28	28mm
35	35mm
42	42mm
56	56mm
60	60mm

⑤ Motor Length

Code	Specification
S	Short
M	Medium
L	Long
XL	Extra Long

⑥ Encoder Resolution

Code	Specification
No marking	Without Brake
A	10,000 P/R
B	20,000 P/R
C	16,000 P/R
D	4,000 P/R

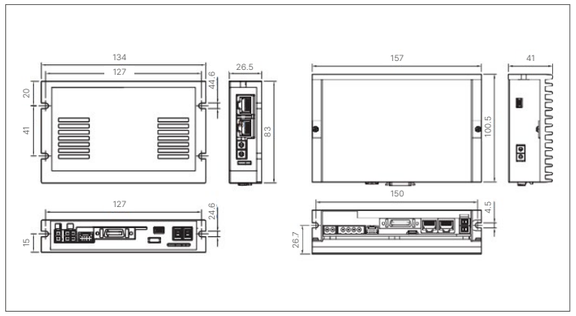
⑦ Brake

Code	Specification
No marking	-
BK	Brake

⑧ Gear Ratio

Code	Specification
No Marking	Without Brake
PN03	1:3
PN05	1:5
PN08	1:8
PN10	1:10
PN15	1:15
PN25	1:25
PN40	1:40
PN50	1:50

Drive Size (mm)



Motor Length

Category	S	M	L	XL
20	-	28	38	-
28	32	45	50	-
35	34	40	48	60
42	46	55	80	-
56	47	56	85	-
60	-	28	38	-

* Length of the body excluding the shaft

Drive Specifications

Item		Specifications
Input Voltage		DC 24V ±10%
Control Method		Closed-loop control via 32-bit MCU
Current Consumption		Max. 500mA (excluding motor current)
Environmental	Temperature	·Operating : 0 ~ 50°C ·Storage : -20 ~ 70°C
	Humidity	·Operating : 35 ~ 85%RH (non-condensing) ·Storage : 10 ~ 90%RH (non-condensing)
	Vibration Resistance	0.5g
Functionality	Rotational Speed	0 ~ 3,000r/min*1)
	Resolution	**Encoder Resolution [P/R]** / **Configurable Resolution [P/R]** 4,000 / 500 1,000 1,600 2,000 3,600 4,000 5,000 6,400 7,200 10,000 10,000 / 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 16,000 / 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 10,000 20,000 / 16,000 500 1,000 1,600 2,000 3,600 5,000 6,400 7,200 * Resolution can be set via parameter / 10,000 20,000
	Error Types	Overcurrent, overspeed, position tracking error, overload, overheating, regeneration overvoltage, motor connection error, encoder connection error, in-position error, ROM error, excessive position deviation
	LED Indicators	Power status, in-position status, Servo On status, alarm status
EtherCAT	Supported Protocols	CoE (CiA402 drive profile), FoE (firmware download)
	Operation Modes	Cyclic synchronous position mode, profile position mode, homing mode
	Communication Synchronization Modes	Free Run mode, SM event synchronization mode, DC SYNC event synchronization mode
I/O Signals	Input	3 fixed inputs (LIMIT+, LIMIT-, ORIGIN), 7 general-purpose inputs (photocoupler input)
	Output	6 general-purpose outputs (photocoupler output), 1 brake signal output

*1) The maximum motor speed depends on the resolution. If the resolution is 10,000 P/R or lower, the maximum speed is 3,000 r/min. If the resolution exceeds 10,000 P/R, the maximum speed will be lower than 3,000 r/min.

Standard Motor Specifications

Item			Unit	BHY-SSM-42 Series				BHY-SSM-56 Series			BHY-SSM-60	
				Series	42M	42L	42XL	56S	56M	56L	60M	60L
Drive Method			-	Bipolar drive								
Number of Phases			-	2-phase								
Rated Current / Phase			A/phase	1.2	1.2	1.2	1.2	3.0	3.0	3.0	4.0	4.0
Max. Holding Torque			N·m	0.32	0.44	0.5	0.65	0.64	1.0	1.5	1.28	2.4
Rotor Inertia			g·cm2	35	54	77	114	180	280	520	490	690
Weight			kg	0.294	0.357	0.426	0.564	0.608	0.784	1.230	0.856	1.419
Length (L)			mm	34	40	48	60	46	55	80	56	85
Allowable Radial Load	Distance from Motor Shaft End	3mm	N	22	22	22	22	52	52	52	70	70
		8mm		26	26	26	26	65	65	65	87	87
		13mm		33	33	33	33	85	85	85	114	114
		18mm		46	46	46	46	123	123	123	165	165
Allowable Axial Load			N	Less than the motor unit weight								
Insulation Resistance			MΩ	Min. 100 (measured with a DC500V insulation tester)								
Insulation Class			-	Class B (130°C)								
Operating Temperature			°C	0 ~ 55								

Digital I/O

BHY-IO2

Key Features

- Supports various synchronization control modes (DC Sync, SM Sync, Free Run)
- Ensures high reliability through multiple alarm functions, including protection from overheating, overvoltage, and overcurrent
- MCU shutdown status can be easily monitored via Heartbeat communication

Product Name

BHY - IO2 - EC - MD 8 N T

① ② ③ ④ ⑤ ⑥ ⑦

① **Series : BHY**

② **Device Type : I/O 2 Series**

③ **Communication**

Code	Specification
EC	EtherCAT

④ **I/O Type**

Code	Specification
DI	Digital Input
DO	Digital Output
MD	Mixed Digital IO

⑤ **Number of I/O Point**

Code	Specification
8	8 Point (MD)
16	16 Point (DI, DO)
32	32 Point (DI, DO)

⑥ **In/Out Type**

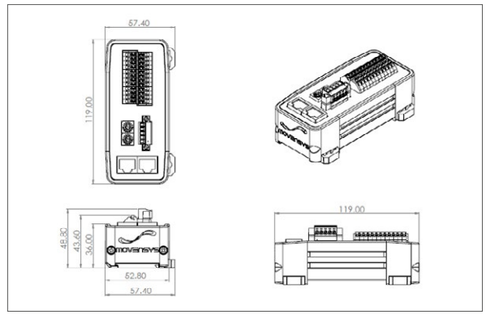
Code	Specification
N	NPN / Sinking

⑦ **Connector Type**

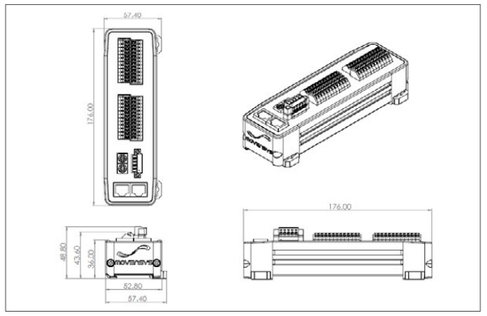
Code	Specification
T	Push-in Terminal Block
P1	Pluggable Terminal Block
P2	Pluggable Push-in Block
E	e-CON

Dimensions (mm)

- BHY-IO2-EC-DI16NT, BHY-IO2-EC-DO16NT, BHY-IO2-EC-MD8NT



- BHY-IO2-EC-DI32NT, BHY-IO2-EC-DO32NT, BHY-IO2-EC-MD16NT



Specifications

Category	Item	BHY-IO2-EC-DI16N□/DI32N□	BHY-IO2-EC-MD8N□/MD16N□	BHY-IO2-EC-DO16N□/DO32N□
Common	Communication Method	EtherCAT		
	Mailbox	CoE (CiA401 I/O Profile), FoE (Firmware Download)		
	Supported Sync Modes	Free Run, SM Event, DC Sync		
	Cable	Category 5e or higher, Max. 100m		
	Voltage	DC 24V ±10%		
	Current	Max. 80mA		
	Number of Contact Points	16 / 32 points		
	Isolation Method	Photocoupler Isolation		
Input Section	Rated Input Voltage	24VDC (-15% ~ +10%)		-
	Rated Input Current	9mA (Typ.)		
	Response Time (Input Filter) OFF→ON / ON→OFF	0ms / 0.5ms / 1ms / 2ms / 4ms / 8ms / 16ms / 32ms (Default : 0ms)		
Output Section	Rated Load Voltage	-	24VDC (-15% ~ +10%)	
	Rated Load Current		0.5A/point, 2.0A/COM	
	OFF Leakage Current		≤ 0.1mA	
	ON Response Time		≤ 0.5ms	
	OFF Response Time		≤ 1.5ms	
	Output Channels per Common		8 point/com	
	Protection Functions		- Overload protection - Overheat protection: Operates per channel - On communication error: Selectable latch output per point (HOLD / SET / CLEAR) - Surge protection: Built-in TVS diode	
Operating Environment	Insulation Resistance	10 MΩ or more between DC external terminals and ground at DC500V (measured with insulation tester)		
	Dielectric Strength	1 minute at AC500V between DC external terminals and ground		
	Protection Rating	IP2X		
	Temperature	Operating : 0 ~ 55°C, Storage : -25 ~ 70°C		
	Operating / Storage Humidity	5% ~ 95%RH (non-condensing)		
	Mounting Method	35mm DIN rail mounting		
	Installation Atmosphere	No corrosive gases		
	Shock Resistance	Compliant with JIS B 3502, IEC 61131-2: 147 m/s², 3 times in each of XYZ directions		
	Vibration Resistance	Compliant with JIS B 3502, IEC 61131-2: intermittent vibration 9.8 m/s² (1G), continuous vibration 4.9 m/s² (0.5G)		
	Noise Immunity	Compliant with IEC 61000-4-4: 2kV (power line), 1kV or higher (EtherCAT line)		

Analog I/O

BHY-IO2 (Planned release in Q3 2025)

Key Features

- Supports various synchronization control modes (DC Sync, SM Sync, Free Run)
- Supports simple voltage/current mode switching via DIP switches
- MCU shutdown status can be easily monitored via Heartbeat communication

Product Name

BHY - IO2 - EC - AD 8 T

① ② ③ ④ ⑤ ⑥

① Series : BHY

② Device Type : I/O 2 Series

④ Analog I/O Type

Code	Specification
AD	Analog Input
DA	Analog Output

⑥ Connector Type

Code	Specification
T	Push-in Terminal Block
E	e-CON

③ Communication

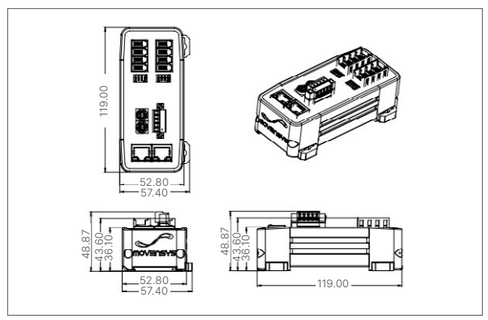
Code	Specification
EC	EtherCAT

⑤ In/Out Type

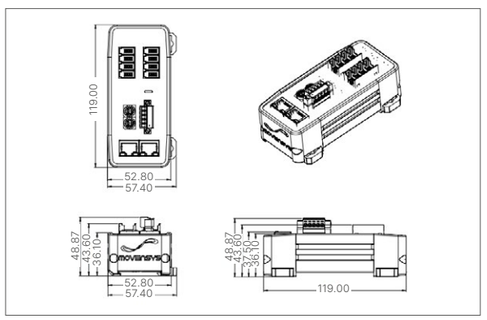
Code	Specification
4	4CH (Voltage / Current)
8	8CH (Voltage / Current)

Dimensions (mm)

BHY-IO2-AD08E



BHY-IO2-DA04E



Specifications

Category	Item		BHY-IO2-EC-AD8□	BHY-IO2-EC-DA4□
Common	Communication Method		EtherCAT	
	Mailbox		CoE (CiA401 I/O Profile), FoE (Firmware Download)	
	Supported Sync Modes		Free Run, SM Event, DC Sync	
	Cable		Category 5e or higher, Max. 100m	
	Voltage		DC24V ± 10%	
	Current		To Be Determined	
I/O Section	Number of Contact Points		8ch Input	4ch Output
	Digital Resolution		Signed 16bit	
	I/O Characteristics	Input / Output	Input / Output Range	Digital Resolution Value / Maximum Resolution
		Voltage	0 to 5V 1 to 5V 0 to10V -10 to +10V	30000 / 0.167mV 30000 / 0.133mV 30000 / 0.333mV -30000 ~ 30000 / 0.333mV
		Current	0 ~ 20mA 4 ~ 20mA	30000 / 0.667uA 30000 / 0.533uA
	Accuracy	25°C	± 0.3%	
		-25 ~ 55°C	± 0.6%	
	Conversion Speed		50 µs/1ch (when using 8 channels: up to 400 µs)	100 µs/1ch (when using 4 channels: up to 400 µs)
	Maximum Input Voltage / Current		Voltage : ± 15V, Current : ± 30mA	Voltage : ± 15V, Current : ± 21mA
	Isolation Method		Photocoupler Isolation	
	Protection Functions		Overheat, overvoltage, overcurrent protection, open contact detection	Overheat, overvoltage, overcurrent protection
Operating Environ-ment	Insulation Resistance		10 MΩ or more at DC500V between DC external terminals and ground (measured with insulation tester)	
	Dielectric Strength		1 minute at AC500V between DC external terminals and ground	
	Protection Rating		IP2X	
	Temperature		Operating : 0 ~ 55°C, Storage : -25 ~ 65°C	
	Operating / Storage Humidity		5% ~ 85%RH (non-condensing)	
	Mounting Method		35mm DIN rail mounting	
	Installation Atmosphere		No corrosive gases	
	Shock Resistance		147 m/s², 3 times in each of XYZ directions	
	Vibration Resistance		Compliant: Intermittent vibration 9.8 m/s² (1 G), continuous vibration 4.9 m/s² (0.5 G)	
	Noise Immunity		2 kV (power line): compliant with IEC 61000-4-4, 1 kV or more (EtherCAT line)	

Slice I/O

BHY-ION

Key Features

- Supports CoE (compliant with CiA401 profile) and FoE (File over EtherCAT)
- Includes free utility for WMX users for easy EtherCAT-based configuration and management
- Offers five types of I/O modules, enabling flexible configuration and expansion, simplifying control panel design
- Allows easy maintenance with a simple attach-detach mechanism
- Supports connection of up to 32 modules

Product Name

BHY - ION - EC - I16N

① ② ③ ④

① **Series : BHY**

② **Device Type : I/O N Series**

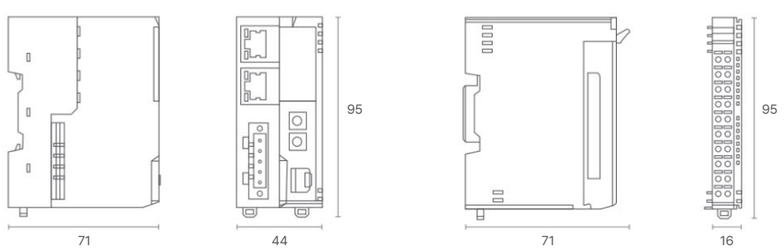
③ **Communication**

Code	Specification
EC	EtherCAT

④ **I/O Type**

Code	Specification
I16N	Digital Input (16 point)
O16N	Digital Output (16 point)
AI8V	Input, Voltage 8ch Single-ended
AI8C	Input, Current 8ch Single-ended
AO4M	Output, Current/Voltage 4ch Single-ended

Dimensions (mm)



Specifications

Item	BHY - ION - EC
Communication Method	EtherCAT
Mailbox	CoE (CiA401 I/O Profile), FoE (Firmware Download)
Supported Sync Modes	Free Run, DC Sync
Cable	Shielded Category 5e or higher, Max. 100m
Connection	RJ45 × 2 (Input/Output, with LED indicator)
Node Address Assignment	Auto (1 ~ 65535) or rotary switch (1 ~ 99)
Maximum Process Data Size	Input data : Max. 256 words Output data : Max. 256 words *Based on fieldbus specification
Service Data (Configuration)	Max. 256 words

Item	BHY-ION-EC-I16N	BHY-ION-EC-O16N
Type	Digital Input, Sink (NPN), 16 points	Digital Output, Sink (NPN),16 points
Control Power	12/24VDC	
On Voltage	11 - 30VDC	10 - 30VDC
On Voltage Drop	-	Max. 0.5VDC
On Current	2 - 8mA	1mA - 0.5A
Off Voltage	0 - 5VDC	-
Off Current	0 - 1mA	-
Off Leakage Current	-	Max. 0.1mA
I/O Delay Time	Input: 0.2ms	Output: 1ms
I/O Data Size	Input : 1word, Output : 0word	Input : 0word, Output : 1word
Fault Action	-	Configurable
Configuration Data	1word	2word
Field Power Supply	24VDC via power bus	
Terminal Block	Push-in type	
Wiring	24 - 16AWG	
Weight	73g	
Operating Temperature	-20 ~ 60°C	
Certification	KC, CE	

Item	BHY-ION-EC-AI8C	BHY-ION-EC-AI8V
Type	Analog Input, Single-Ended, Current 8ch	Analog Input, Single-Ended, Voltage 8ch
Control Power	12/24VDC	
Input Type	0 - 20mA, 4 - 20mA	±5V, ±10V
Input Signal Range	0 - 21mA, 3.2 - 21mA	±5.25V, ±10.5V
Maximum Input	±30mA	±15V
Converted Data (Configurable)	Signed 16bit binary code, user-defined, percentage	
Resolution	Signed 16bit	
I/O Data Size	Input : 10words, Output : 1word	
Configuration Data	7word	
Fault Action	Configurable	-
Field Power Supply	24VDC via power bus	
Terminal Block	Push-in type	
Wiring	24 - 16AWG	28 - 16AWG
Weight	72g	
Operating Temperature	-20 ~ 60°C	
Certification	KC, CE	

Item		BHY-ION-EC-AO4M
Type		Analog Output, Voltage/Current 4ch, Non-isolated
Control Power		12/24VDC
Input Type	Voltage	±5V, ±10V, 0 - 5V, 0 - 10V
	Current	0 - 20mA, 4 - 20mA
Output Type	Voltage	±5.25V, ±10.5V, 0 - 5V, 0 - 10V
	Current	0 - 21mA, 3.2 - 21mA
Converted Data (Configurable)		Signed 16bit binary code, user-defined, percentage
Resolution		Signed 16bit
Conversion Time		1ms
Data Size		Input : 1word, Output : 5words
Configuration Data		11word
Field Power Supply		24VDC via power bus
Terminal Block		Push-in type
Wiring		28 - 16AWG
Weight		72g
Operating Temperature		-20 ~ 60°C
Certification		KC, CE

IIoT Sensor

VMS (Vibration Monitoring Sensor)

Key Features

- Minimizes motion errors via simultaneous 3D measurement and compensation in X, Y, and Z directions
- Measurement range (user-selectable): ±2g, ±4g, ±8g
- Supports sampling rates up to 10kHz

Product Name

VMS - ACS - EC - 02 - 05 - 05

① ② ③ ④ ⑤ ⑥

① Series : VMS

② Device Type

Code	Specification
ACS	Accelerometer

④ Number of Sensor

Code	Specification
01	1ea
02	2ea

⑥ Cable Length

Code	Specification
05	5m
07	7m
10	10m

③ Communication

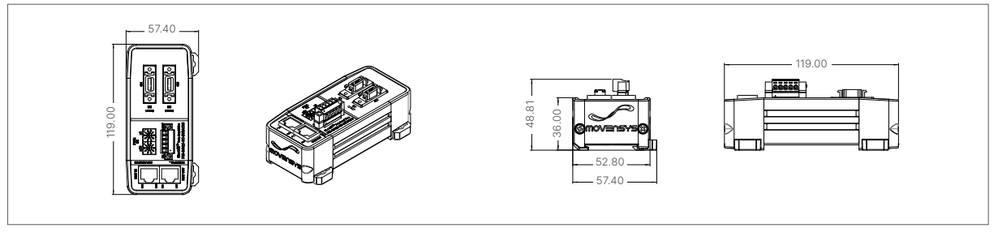
Code	Specification
EC	EtherCAT

⑤ Sampling Rate

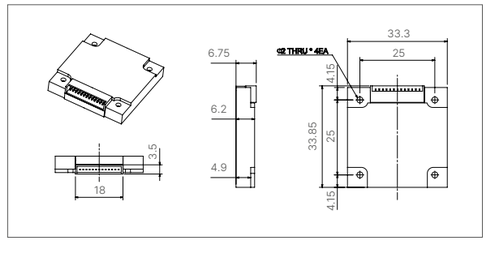
Code	Specification
05	5kHz

Dimensions (mm)

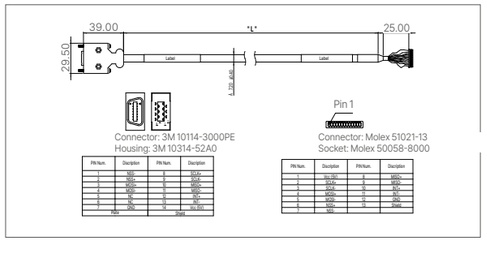
EtherCAT Sensor Interface Module



Sensor Module



Connection Cable



EtherCAT to SSI Module

BHY-DAQ

Product Name

VMS - DAQ - EC - 02 - 05

① ② ③ ④ ⑤

① Series : VMS

② Device Type

Code	Specification
DAQ	Data Acquisition

③ Communication Type

Code	Specification
EC	EtherCAT

④ Channel Count

Code	Specification
02	2ch

⑤ Sampling Rate

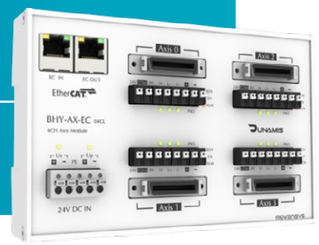
Code	Specification
05	5kHz

Specifications

Category	Item	EtherCAT
Communication Specifications	Connection Connector	RJ45 × 2 (shielded)
	Cable	Category 5e or higher, Max. 100m
	Noise Immunity	Compliant with IEC61000-6-2 and IEC61000-6-4
	Node Address Configuration Method	Node setting via node switch or EtherCAT Master
	Node Address Range	0 ~ 99 : setting range via node switch 0 ~ 65535 : setting range via EtherCAT Master
	Indicator LED	L/A IN x 1, L/A OUT x 1, RUN x 1, ERR x 1
	Process Data (SPI)	Fixed PDO mapping (0x1B01, 0x1B02)
	Synchronization Mode	Supports DC mode (DC enabled), SM Sync mode (DC disabled), and Free Run mode (DC disabled)
Operating Environment	Control Power	DC 24V ±10%
	Sensor Power	DC 24V ±10%
	Temperature	Operating : 0 ~ 55°C, Storage : -25 ~ 70°C
	Operating/Storage Humidity	5% ~ 95%RH (non-condensing)
	Shock Resistance	15G / X, Y, Z directions, 3 times each / 11ms / Half-sine wave
	Vibration Resistance	5≤f<8.4 : 1.75mm / 8.4≤f≤150 : 3.5mm / Continuous : 0.5G / Intermittent : 1G / 1 octave/min / 10 sweep cycles on X, Y, Z axes
	Operating Conditions	No corrosive gas or dust
	Operating Altitude	Max. 2000m
	Cooling Method	Natural convection
	Protection Rating	IP2X

EtherCAT to Pulse Module

BHY-AX Series



Key Features

- Separate interface provided for controller input from limit sensors
- Supports all pulse control command modes: Pulse/Dir, CW/CCW, and A/B
- Maximum encoder pulse input frequency: 5 MHz
- Converts EtherCAT commands to pulse signals to control pulse-type servo drives

Product Name

BHY - AX - EC - 04 CL

① ② ③ ④ ⑤

① **Series : BHY**

② **Device Type**

Code	Specification
AX	EtherCAT to Pulse Module

③ **Communication**

Code	Specification
EC	EtherCAT

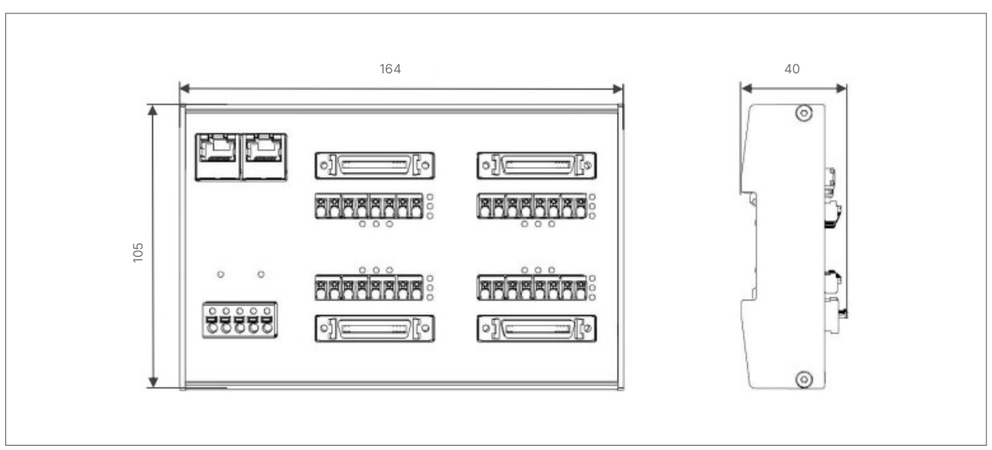
④ **Control Axes**

Code	Specification
04	4

⑤ **Feedback Control Type**

Code	Specification
CL	Closed-loop
OL	Open-loop

Dimensions (mm)



Specifications

Category	Item	Specification	
I/O Device	Axis Pulse Train Output	DS402	
		Number of Outputs	4 axes
		Load Type	RS422 differential input, Opto-isolated, Min. 120Ω
		Short-circuit Current	Protection function supported
		Base Frequency	0 - 1Mbps
		Supported Modes	Pulse/Dir, CW/CCW, A/B
		Driver Type	DC/AC servo drive, Spindle drive, Stepping drive
	Encoder Input	Incremental encoder (A/B)	
		Number of Inputs	4 axes
		Encoder Counter	32 bit / axis
		Maximum Input Frequency	5MHz
	Digital Inputs per Axis	5 (Alarm, Ready, Limit+, Limit-, Home)	
		Input "0" Voltage Range	0 - 5VDC (PNP) / 18 - 30VDC (NPN)
		Input "1" Voltage Range	11 - 30VDC (PNP) / 0 - 7VDC (NPN)
		Input Current Limit	3mA (Typ.)
	Digital Outputs per Axis	2 (Servo on and Reset)	
		2 (Servo on and Reset)	NPN / PNP
		2 (Servo on and Reset)	Max. 50mA
		2 (Servo on and Reset)	60V
Operating Environment	Rated Supply Voltage	24VDC (-15%/+20%)	
	Distributed Clock (64-bit)	Supported	
	Protection	Electrical Isolation	500V
		Protection Rating	IP30
	Temperature	Operating : 0~60°C, Storage : -25~85°C	
	Relative Humidity	10~95% (non-condensing)	
	Dimensions (W x D x H)	~ 164 × 43 × 105mm	
	Weight	~ 470g	
	Housing	Aluminum alloy	
	Installation	35mm DIN rail	
	Certification	CE, KC	

Trigger Module

BHY-IOS (Planned release in Q3 2025)

Key Features

- Configurable trigger pulse width with a minimum resolution of 100 ns
- Supports up to eight PSOs from a single encoder signal
- Provides IPSO and RPSC trigger output modes using encoder counters and position comparators

Product Name

BHY - IOS - EC - TM

① Series : BHY

② Device Type

Code	Specification
IOS	Slice I/O Series

③ Communication Type

Code	Specification
EC	EtherCAT

④ Module Type

Code	Specification
TM	Trigger Module

* Coupler module name: BHY-IOS-EC-CO

Specifications and Functions

Category	Item	Description
Communication	Mailbox	CoE, FoE
	Supported Sync Modes	DC Sync, Free Run, SM Sync
	Supported DC Time	Min. 500 µs
Specifications	Encoder Type	Incremental encoder (A/B phase)
	Maximum Encoder Input Frequency	20 MHz line driver
	Encoder Counter	32 bit / axis
	Maximum Trigger Pulse Width	User configurable
	Minimum Trigger Pulse Width	Distance-based configuration available (minimum time: 100 ns)
	Trigger Output Voltage	24V
	Maximum Trigger Output Current	500 mA per channel
	Number of Trigger Output Channels	8
	LED	Displays input wiring errors, alarms, and current mode
	Operating Temperature	0 ~ 60°C
Functions	One-Shot Function	Trigger output generated by setting a specific bit at current position
	2D Trigger Mode	Trigger output at X-Y intersection coordinates
	Interval Trigger Mode	Trigger output at regular distance intervals
	Trigger Control	Output enable/disable setting
	Trigger Output Inversion	Positive, Negative
	Trigger Output Format	One Pulse, Toggle, PWM
	Number of Trigger Outputs	Trigger output count can be monitored
	Trigger Direction Selection	Configurable output direction depending on movement direction
	Trigger Signal Inversion	Trigger output level selectable (High or Low)
	Delayed Trigger Output	Configurable delay time before trigger output

EtherCAT Selector Module

BHY-SEL

Key Features

- Both Open Frame and Frame Type options are available to fit the customer's design
- Reduces equipment downtime caused by controller (PC) failures
- Can be installed in any orientation, maximizing space efficiency
- In the event of a controller fault, control can be switched to a sub-PC to minimize equipment downtime
- Input voltage can be freely selected (5V or 24VDC) based on the user environment
- Compatible with all Ethernet-based communication protocols, including EtherCAT

Product Name

BHY - SEL - □□ - □□ □□

① ② ③ ④ ⑤

① Series : SEL

② Device Type : Selector

③ Communication Type

Code	Specification
EC	EtherCAT

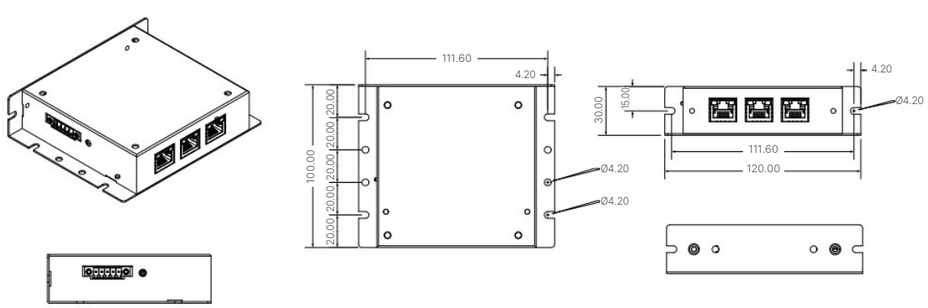
④ Product Type

Code	Specification
OP	Open Frame
FR	Frame

⑤ SEL Signal Level

Code	Specification
01	5V
02	24V
03	Switch (5V/24V)

Dimensions (mm)



Specifications

Category	Item	Description
Communication	Communication Type	Ethernet
	Modulation	Base Band
	Communication Speed	100Mbps
	Physical Layer	100BASE-TX (IEEE802.3)
	Connection Connector	RJ45 × 3 (shielded)
	Cable	Category 5e or higher (Use STP cable)
	Maximum Communication Distance	Max. 50m (distance between product and node)
	LED Indicators	PWR LED, Primary Master Connection LED, Sub Master Connection LED
Operating Environment	Control Power	DC 24V ±10%
	Input Signal	DC 5V ±10%, DC 24V ±10%, DC 5V / 24V ±10%
	Temperature	Operating : 0 ~ 55°C, Storage : -25 ~ 70°C
	Operating/Storage Humidity	5% ~ 95%RH (non-condensing)
	Operating Environment	No corrosive gas or dust
	Operating Altitude	Max. 2000m
	Cooling Method	Natural convection
	Isolation Method	Photocoupler isolation
	Rated Input Voltage	DC 5V ±10% , DC 24V ±10%, DC 5V / 24V ±10%
	Rated Input Current	5mA (Typ.)
	Input Impedance	680Ω (Typ.), 4.7kΩ (Typ.), 5V : 680Ω (Typ.), 24V : 4.7kΩ (Typ.)

MEMO

MEMO