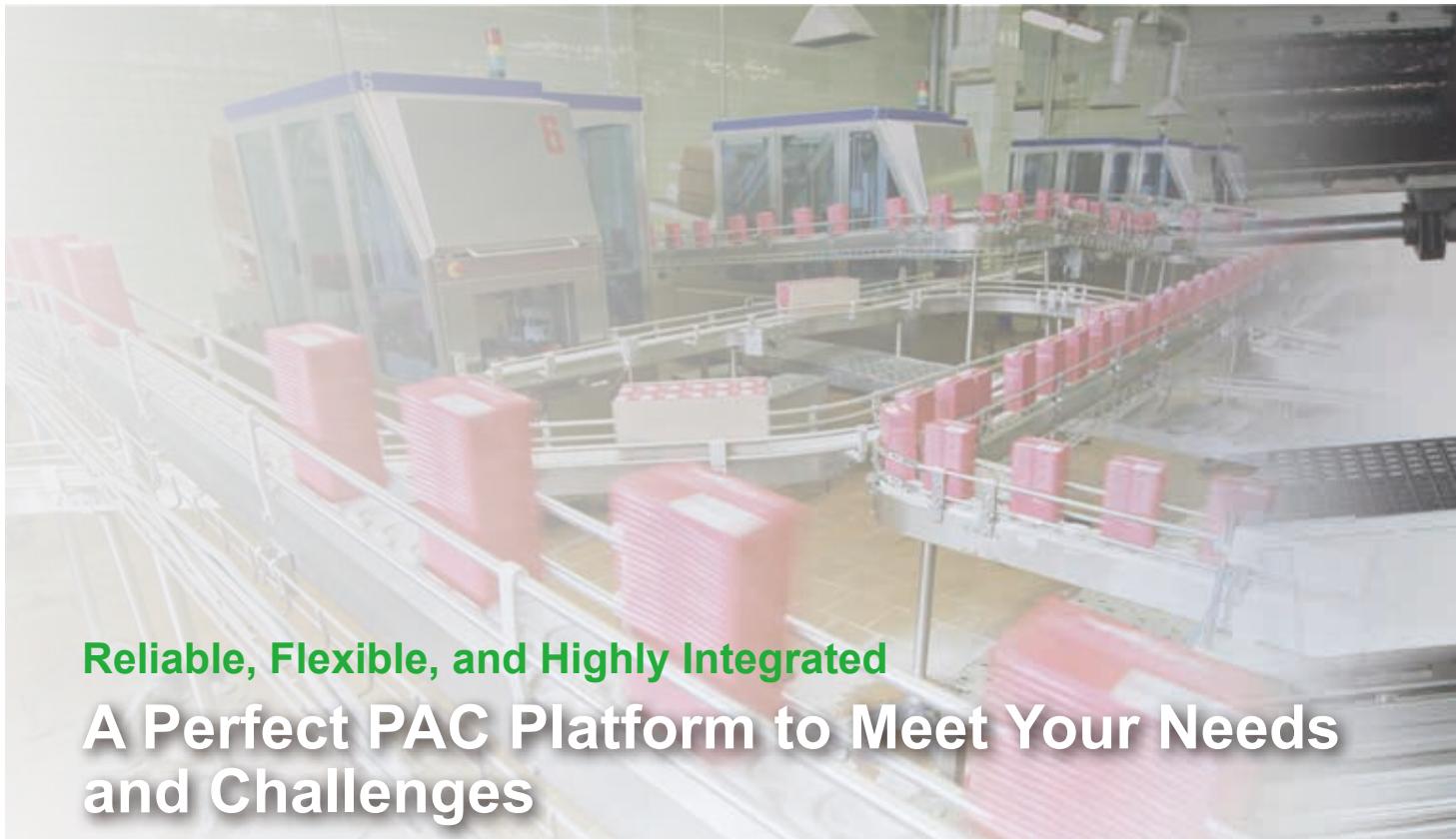




Automation for a Changing World

## **Delta PC-Based Motion Controller PAC Total Solution**



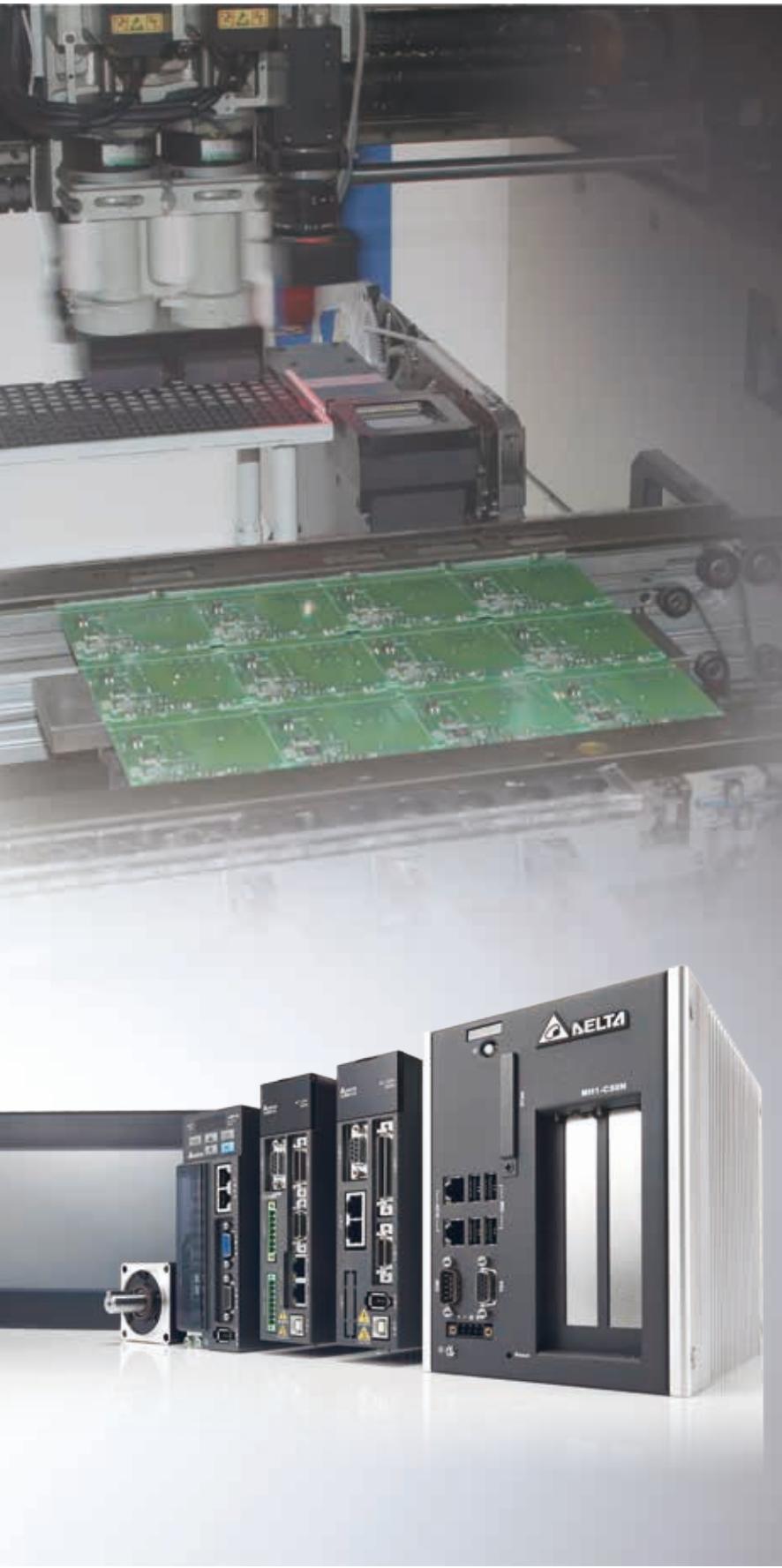
## **Reliable, Flexible, and Highly Integrated A Perfect PAC Platform to Meet Your Needs and Challenges**

Delta's PAC platform is a solution with high reliability, integrated network communication capability, and high-end motion control functions, and is ideal for advanced automation machining. Through EtherCAT or DMCNET communication, the platform is able to perform high-response, high-precision, and synchronous multi-axis motion control with easy and flexible operation.

Its cable-less and fan-less design enhances reliability and resistance for harsh environments and contaminants. It is also implemented with an X86 dual-core processor and EtherCAT or DMCNET communication that enables faster and more convenient data transmission.

With the built-in dynamic-link library (DLL), the controller of the platform effectively simplifies the implementation process and saves development time. In addition, the integrated versatile software of the platform provides a perfect integration of logic programming control (with SoftPLC), human machine interface (with SoftHMI), numeric control and robot control, supporting IEC61131-3 programming languages and high performance motion control for a wide range of applications and industries.

Delta's PAC platform offers a comprehensive, highly integrated, and easy industrial PC-based motion control solution to help optimize customers' competitiveness with capabilities for getting ahead of the game.



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## Product Features

### Energy Efficient and Robust Hardware

- The MH1 Series: provides a cable-less, fan-less and low-power consumption design, increasing reliability and providing CFast card and SSD slots inside for fast and stable data transmission
- The MP1 Series: equipped with a 10.1-inch touchscreen for more flexible operation



**MH1 Series**

### AMP-based EtherCAT Motion Controller

The MH2 Series is an AMP-based EtherCAT motion controller. Delta provides motion control library for users to advanced programming languages for motion control and process development



**MH2 Series**

### Multiple Peripheral Interfaces for Communication

Equipped with USB ports, serial COM ports, Gbps Ethernet ports and PCI/PCIe extension slots, Delta's PACs support CFast card, SD card, SSD, and M.2 SSD storage for quick and stable data transmission and flexible usage



**MP1 Series**

### Supports EtherCAT and DMCNET Master and Slave Modules

Delta provides complete servo systems and modules for DMCNET and EtherCAT fieldbus systems. Users are able to select suitable products based on their own machine cabinet spaces and precision requirements for a highly expandible motion control solution



### High Security

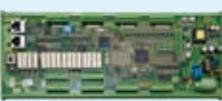
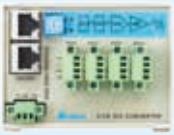
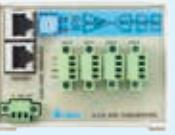
Each PAC provides an IC device for programming security and development protection

### Flexible Operation Interface with Multiple Software Programs

Supports General Windows 7/10; built-in DLL and development modules (IMP) to connect with SoftHMI and SoftPLC for UI development, single or multi-axis motion control. It can also integrate equipment IoT, CAM and image recognition functions for customized requirements



# DMCNET System Structure

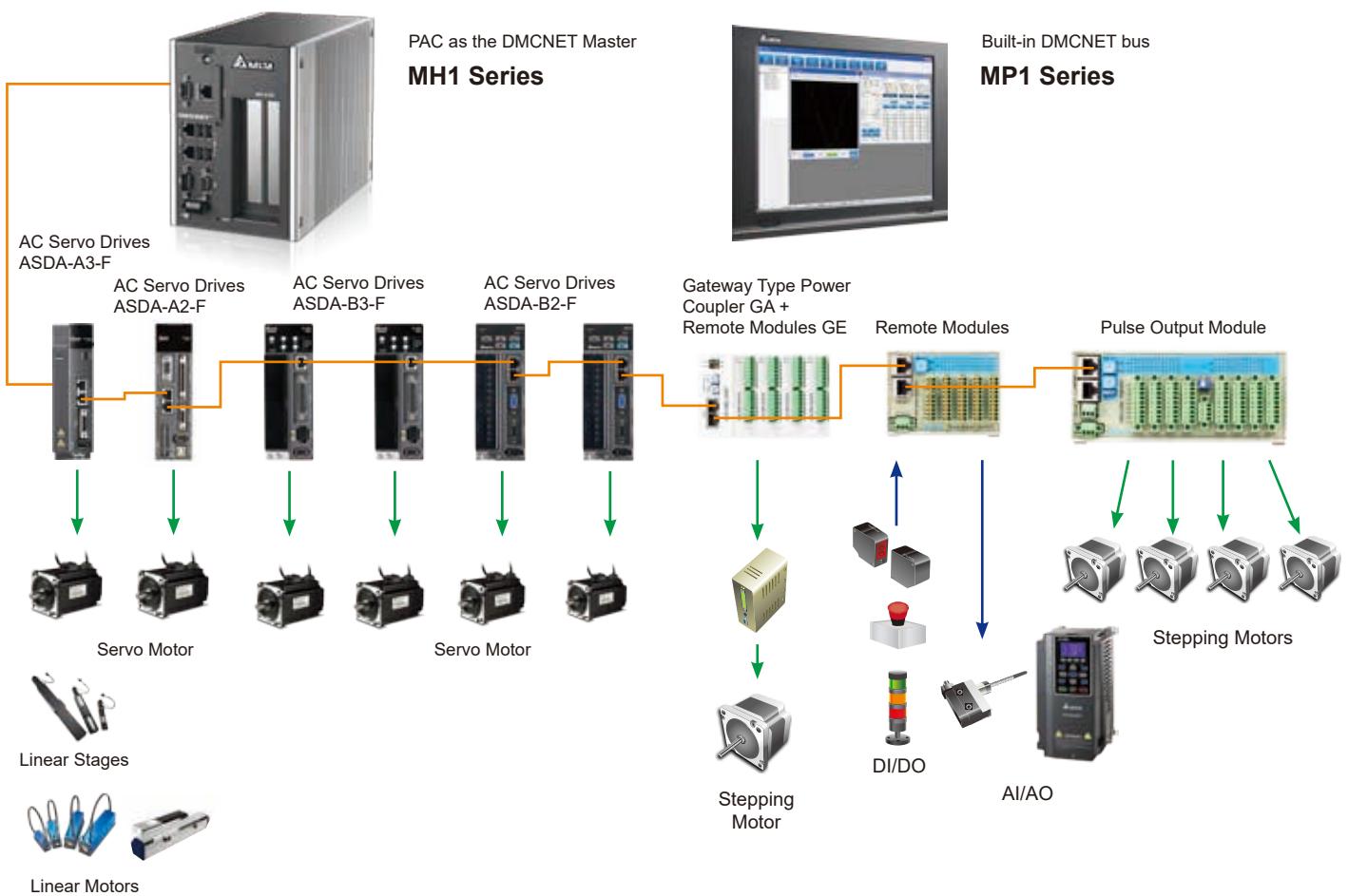
|  |   |  |   |  |
|--|---|--|---|--|
| Motion Controllers   | PC-based Controller<br>MH1 Series<br><a href="#">PAGE 15</a>  |   | MP1 Series<br><a href="#">PAGE 19</a>   |  |
| Servo Systems  | Servo Motors and Drives<br><br>ASDA-A3-F<br><br>ASDA-A2-F<br><br>ASDA-B3-F<br><br>ASDA-B2-F<br><br>ASDA-M |  |   |  |
| ** Please refer to the catalogues of Delta's servo drives and motors ASDA Series for detailed specifications |   |  |   |  |
| Digital Remote Modules   | <br>32 Digital Input Remote Module<br>ASD-DMC-RM32MN   | <br>64 Digital Input Remote Module<br>ASD-DMC-RM64MN                  | <br>Digital I/O Remote Module<br>HMC-RIO3232RT5      |  |
| Digital Remote Modules   | <br>32 Digital Output Remote Module<br>ASD-DMC-RM32NT  | <br>64 Digital Output Remote Module<br>ASD-DMC-RM64NT               | <br>32 Digital I/O Remote Module<br>ASD-DMC-RM32PT | <a href="#">PAGE 21 ~ 23</a>   |
| Pulse Remote Module  |   | <br>4-Channel Pulse Remote Module<br>ASD-DMC-RM04PI                 |   | <a href="#">PAGE 24</a>  |
| Analog Remote Modules  | <br>4-Channel Analog Output<br>Remote Module<br>ASD-DMC-RM04DA   | <br>4-Channel Analog Input<br>Remote Module<br>ASD-DMC-RM04AD      |   | <a href="#">PAGE 25</a>  |
| Gateway Type Remote Modules  | <br>Gateway Type Remote<br>Power Coupler<br>ASD-DMC-GA01   | <br>Gateway Type 1-Channel<br>Pulse Remote Module<br>ASD-DMC-GE01PH |   | <a href="#">PAGE 26</a>  |

# Delta's High-Speed Motion Control System - DMCNET

Delta's Motion Control NETwork (DMCNET) is a high speed, real-time communication system, capable of controlling up to 12 axes of servo system units within 1ms simultaneously: with 3-axis helical and linear interpolation in 4 groups, or 2-axis linear and arc interpolation in 6 groups. It supports 64-bit dual-precision floating point, allowing high-precision system calculations and flexible operation, and also absolute commands, incremental commands and T-curve / S-curve velocity profiles for different uses. With built-in position, speed and torque control modes, and 35 homing modes, it is able to receive real-time servo information, parameters, or change control modes via communication command, offering fast communication and motion control for various applications

## DMCNET Motion Control Structure

In addition to a one-wire communication protocol, the DMCNET also provides various options, such as 6-axis PCI-DMC-F02, 12-axis PCI-DMC-A02, and the PCI-DMC-B01 with pulse compare & capture functions. Based on user's requirements, the servo drive can be combined with Servo Motor ASDA-A3-F Series, ASDA-A2-F Series, ASDA-B2-F Series or ASDA-B3-F Series. Delta provides users achieve best product performance and value with minimum investment



# EtherCAT System Structure

## Motion Controllers

PC-based controller



MH2 Series

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## Servo Systems

AC Servo Drive



ASDA-A3-E

ASDA-A2-E



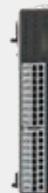
ASDA-B3-E



\*\* Please refer to the catalogues of Delta's servo drives and motors ASDA Series for detailed specifications

## Gateway Type Remote Modules

### Pulse Remote Module



1-Channel  
Pulse Remote  
Module

R1-EC5621D0

PAGE 28

Gateway Type E-Bus  
Remote Power Coupler



R1-EC5500D0

### Digital Remote Modules

16 Digital Input  
Remote Module



R1-EC6002D0  
R1-EC6022D0

16 Digital Input  
Remote Module



R1-EC7062D0  
R1-EC70A2D0  
R1-EC70E2D0  
R1-EC70F2D0

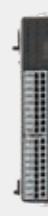
Remote Module  
R2-EC0902D0



PAGE 29~31

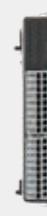
### Analog Remote Modules

4-Channel  
Analog Input  
Remote Module



R1-EC8124D0

4-Channel  
Analog Output  
Remote  
Module



R1-EC9144D0

PAGE 32~33

### Functional Remote Modules

For Manual Pulse  
Generator (MPG)



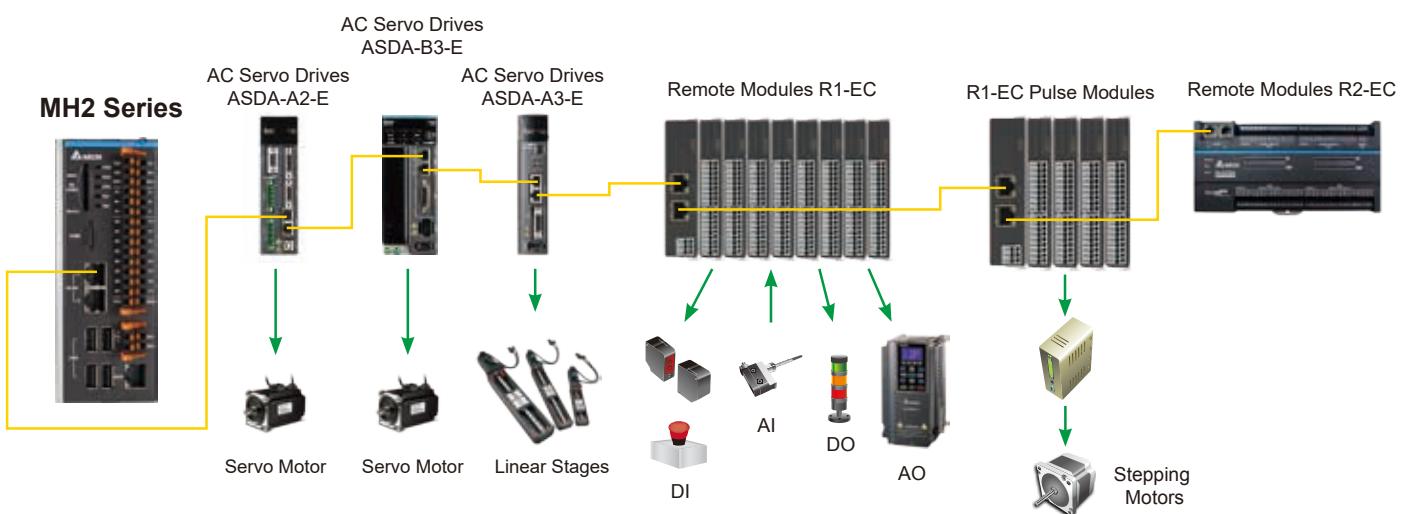
R1-EC5614D0

PAGE 27

PAGE 34

# High-Speed Motion Control System - EtherCAT

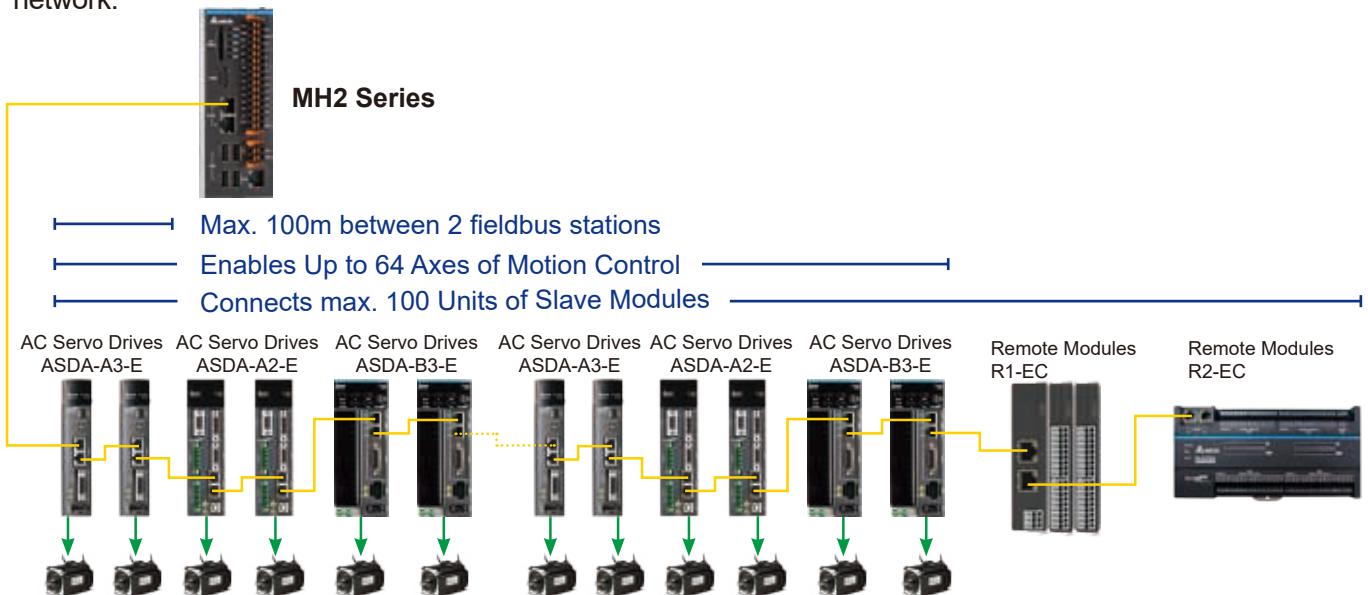
Ethernet Central Automation Technology (EtherCAT) is an open Ethernet-based fieldbus system that provides high-efficiency and high-performance synchronization quality for automation control. Delta's EtherCAT motion control solution achieves rapid and real-time multiple axes of motion control, and is capable of controlling up to 100 slave stations that enable a 64-axis motion control within 1ms cycle time. It also provides 35 homing modes, point-to-point position control, 2-axis interpolation, 3-axis interpolation, multi-axis synchronization, continuous motion, gantry control, speed control, torque control, ECAM and Motion Buffer functions.



## EtherCAT Motion Control Structure

Delta provides a rugged and high-speed motion control solution with complete functions for EtherCAT masters, and that supports device description in XML format (EtherCAT Slave Information - ESI) that are useful for EtherCAT device development.

Delta's EtherCAT motion control solution also allows the system to quickly identify ESI files and offers the capability of real-time connection via EtherCAT for high-level integration. Its rapid communication can update commands between stations within 1ms~0.125ms to ensure accurate and prompt data transfer within the network.

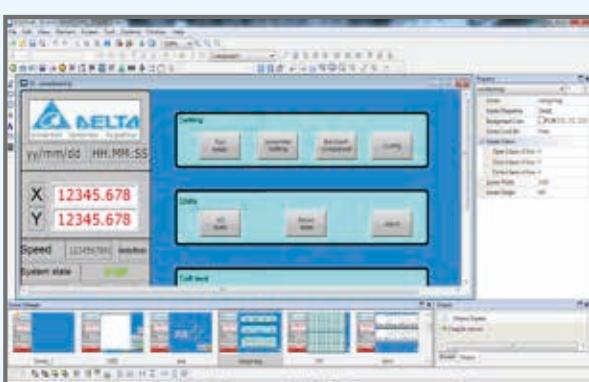


# IPC Motion Platform (IMP 1.5)

## A Simple and Fast Setup Development Platform for Realizing Unsurpassed Motion Control

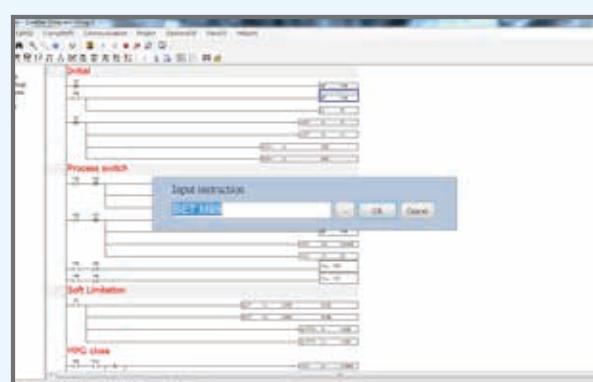
The IMP is a high-speed, flexible and scalable development platform which combines powerful motion control functions and integrates Delta's HMI editing and PLC logic programming software tools to achieve complex and precise motion control based on customers' requirements.

- ▶ **Powerful Motion Control Core:** Upgrades Delta's PAC and PC with a motion control card installed to become an advanced motion controller, which integrates functions of motion control, HMI, PLC and high-speed communication fieldbus in one unit.
- ▶ **Customized Platform for Secondary Development:** Combines with Delta's standard HMI editor DOPSoft and PLC editor WPLSoft in one customer-driven platform, the platform makes complex programming and development easy and time-saving without depending on technical support from the manufacturer.
- ▶ **Scalable Communication for Expandable Network:** Through PCI extension slots, three DMCNET communication networks with up to 36 stations can be established, which means 36 axes of servo motors can be controlled simultaneously without connecting to any remote modules.
- ▶ **Industry-Oriented Controller:** Soft Numeric Control (SNC) and Motion Program Macro (MPM) are provided for users to adjust and modify self-developed motion paths and commands according to changing application requirements.
- ▶ **Standard Communication Interfaces:** Supports built-in standard Modbus and Modbus TCP gateways to enable data transmission and exchange between machines more conveniently.



HMI Editor

After installing on a PC, even without C or C++ programming language, the HMI Editor DOPSoft 3.0 provides a simple path and quick downloading of customized user interfaces to Delta's PAC with the IMP for easy programming and system design. For specific industry applications, such as numerical control (NC), the IMP contains numerous example programs to provide a practical aid in real time for machine verification and evaluation.



PLC Editor

The IMP integrates Delta's PLC editor WPLSoft that offers users a ladder diagram editing environment to develop PLC programs for secondary development and to customize their applications. The PLC editor also accepts motion control commands and allows users to control servo systems and remote I/O modules to complete single-axis motions, multi-axis linear interpolation, arc interpolation, continuous speed and other motions, fulfilling the needs of users who are familiar with the PLC.

## IMP System Configuration with DMCNET



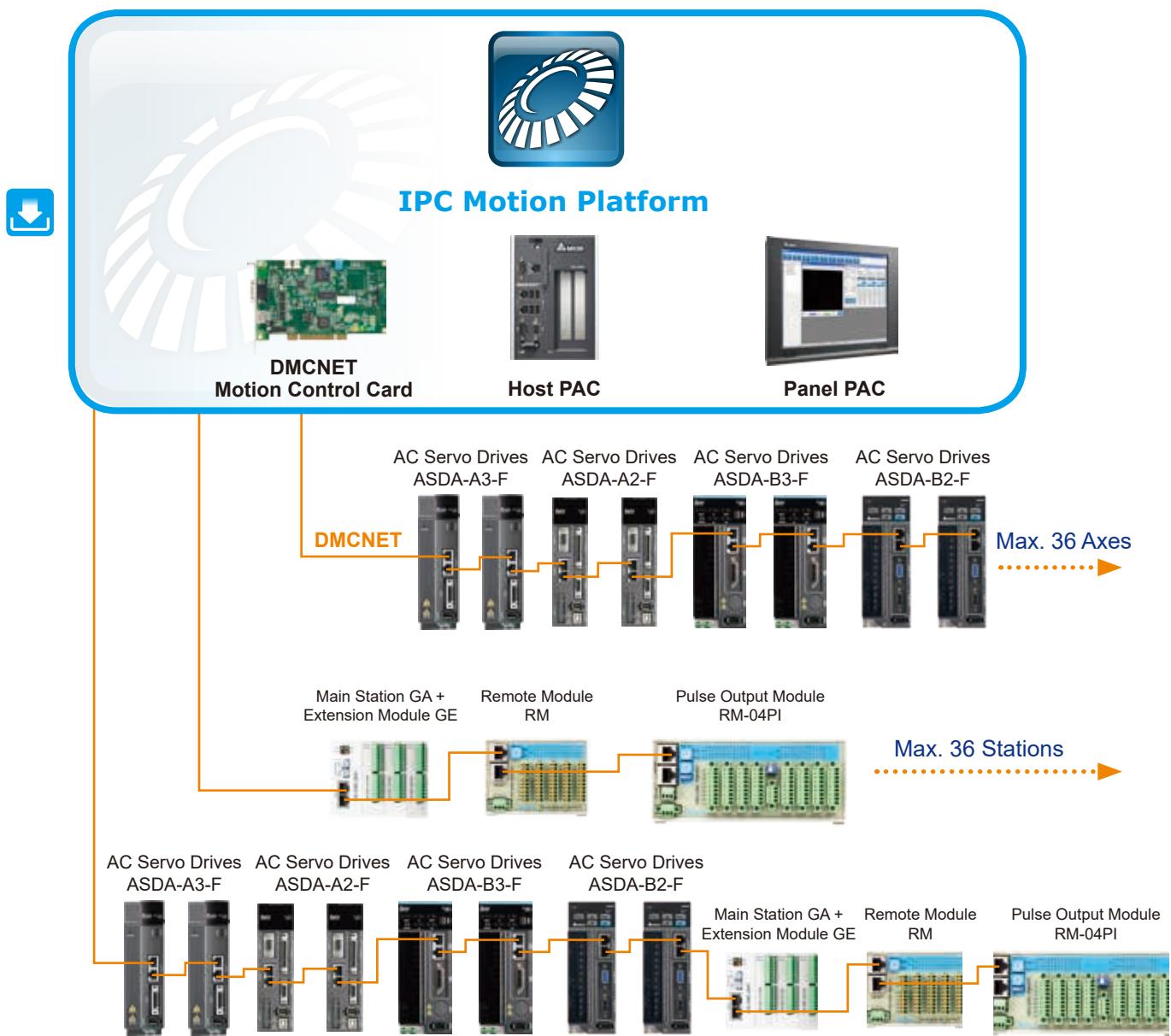
VGA Display

**IMP - Powerful Motion Control Kernel**

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The IMP is the kernel of the system, like the firmware of a motion controller, which runs on one of the processors of a multi-core PC or PAC with a plug-in motion control card. Without adding extra hardware, users can download HMI screens and PLC programs, edit user-defined graphical interfaces and execute programming logic control to run machine applications via software and VGA display only.

The IMP is a powerful motion control kernel and it simplifies connectivity and delivers more flexible functionality for the entire system. Not only is MODBUS communication equipped as standard, Soft Numeric Control (SNC) and Motion Program Macro (MPM) are also provided for users to change and calibrate motion paths and commands for different application requirements.



## IMP System Configuration with EtherCAT

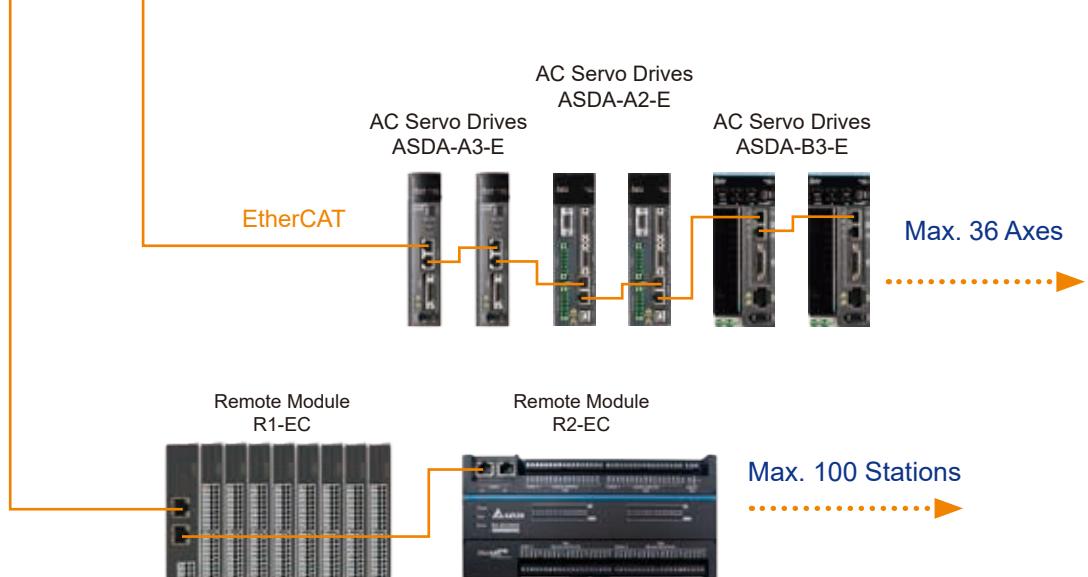


VGA Display

**IMP - Powerful Motion Control Kernel**

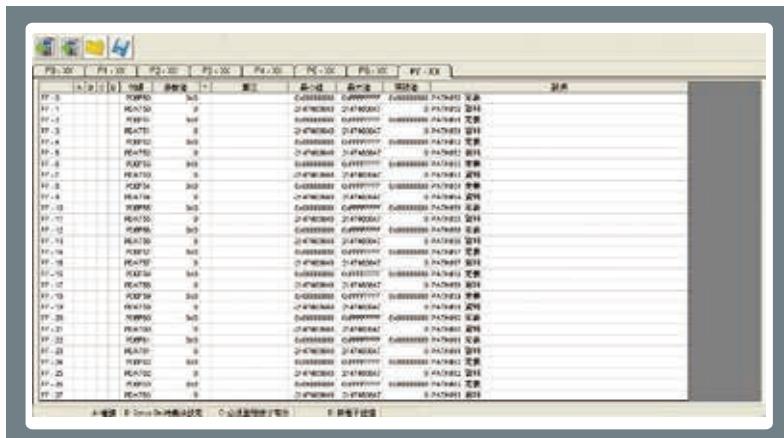
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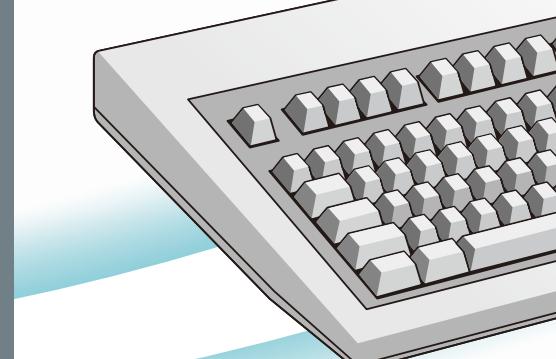
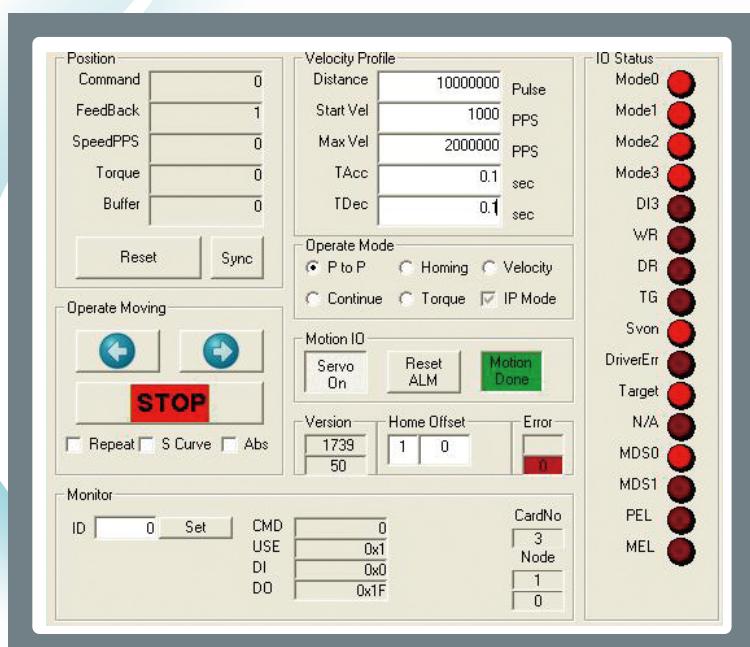
# Fieldbus Verification and Validation - EzDMC Software

EzDMC Software provides simple editing functions for all the relevant parameters of the fieldbus communication and facilitates program development and the hardware system to be easily configurable, even first time users of Delta's DMCNET motion control cards can utilize the motion control card functions.



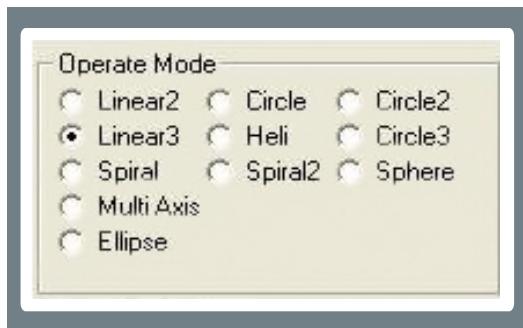
## ► User-Friendly Operation Interface

Helps users create and edit programs with clear images, easy-to-use parameter settings, and instruction disk for programming samples and function keys explanation



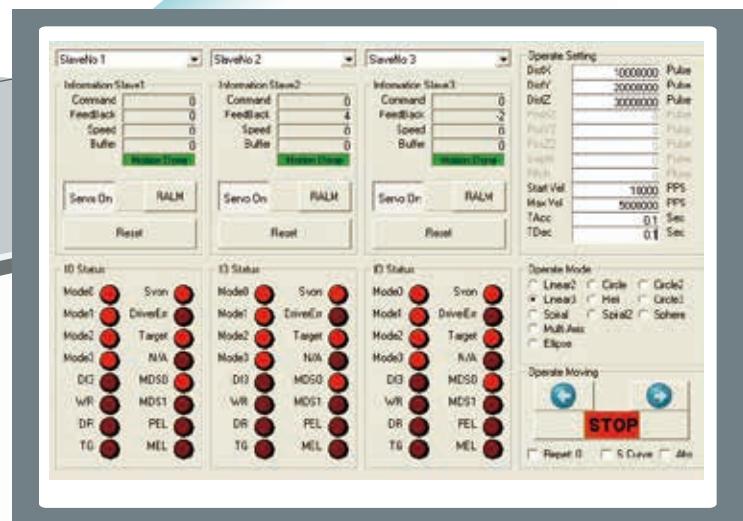
## ► Independent Control Unit

With the independent control unit, users can set up simple motions of the servo drives for flexible operation and management



## ► Multi-Axis Motion Control Modes

Offers a variety of sample programs and control modes (e.g. Linear 2, Linear 3, Heli, Circle, Circle 2 and Circle 3) for linear, arc and helical interpolation to supervise various multi-axis motions and execute programming for multi-axis motion control applications



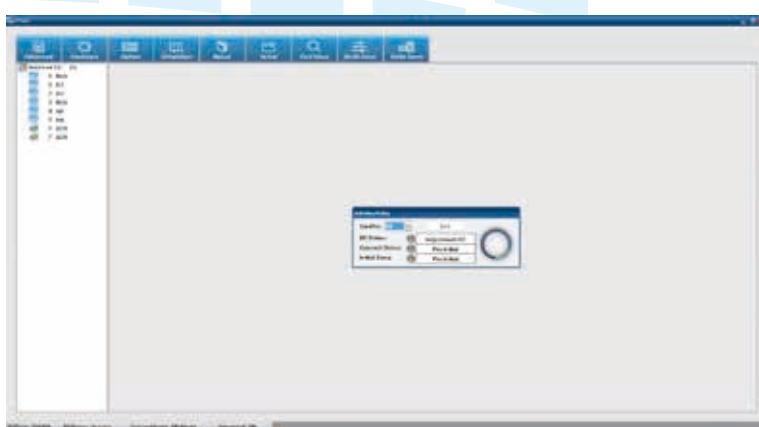
## ► Real Time Response and Feedback

Monitoring and displaying the status of the connected servo drives is completed in a timely and efficient manner

# Fieldbus Verification and Validation - EcNavi Software

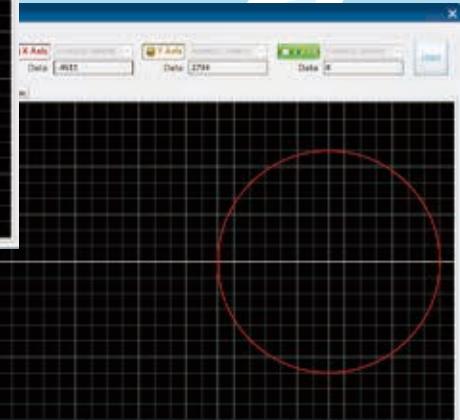
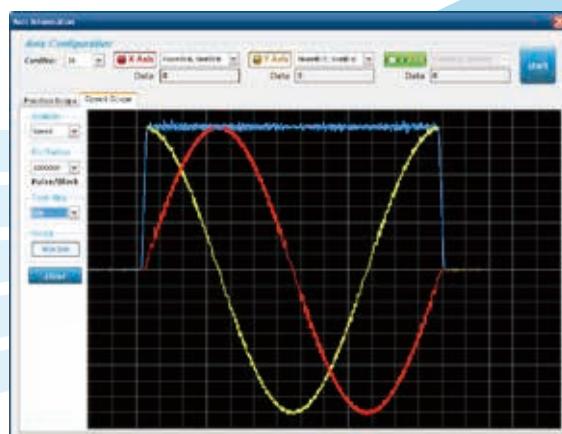
## ► EtherCAT Automation Software

EcNavi development software is for configuring an EtherCAT network that includes an EtherCAT master controller and slave devices for data communication, functional identification, programming and debugging. For new users of Delta's EtherCAT motion control, the EcNavi helps them become familiar with the configuration of the system and to complete the function verification and validation in real time.



## ► Hardware Structure Search

Provides search function for all slaves connected by EtherCAT to check hardware configuration and verify whether the network communication is established successfully via software



## ► Speed Curve Tracing

Offers real-time tracing for speed curves of current motion commands to achieve better synchronization effects between multiple axes



## ► Independent Control Unit

Assists users avoid writing complex programs and immediately verifies all motion commands with the servo drives to meet application requirements



## ► Multi-Axis Motion Control Mode

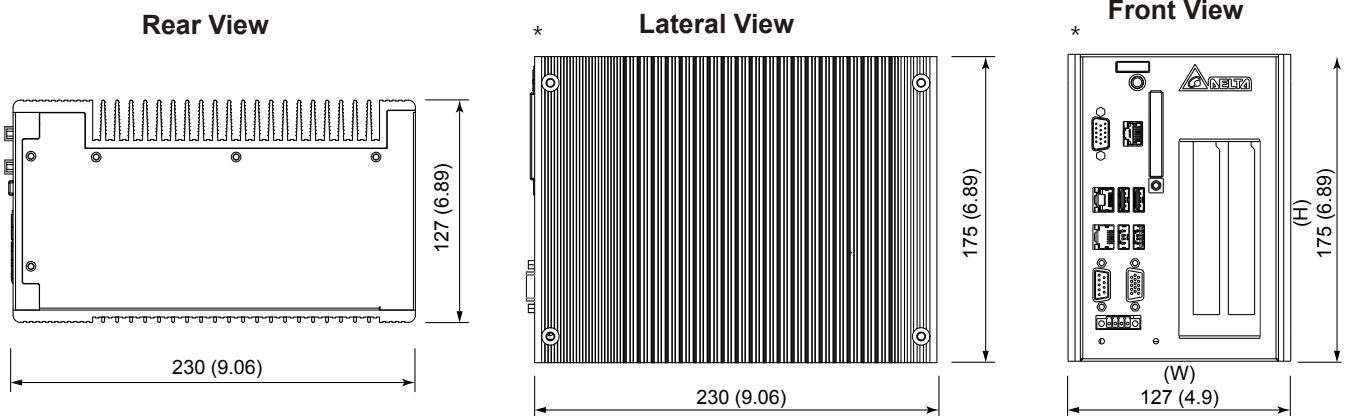
Offers a variety of sample programs and control modes for EtherCAT devices (e.g. Linear 2, Linear 3, Heli, Circle, Circle 2 and Circle 3) to help users easily edit and complete development programs for multi-axis motion control applications

# Dimensions

## MH1 Series

Dimensions: 230mm (L) x 127mm (W) x 175mm (H)

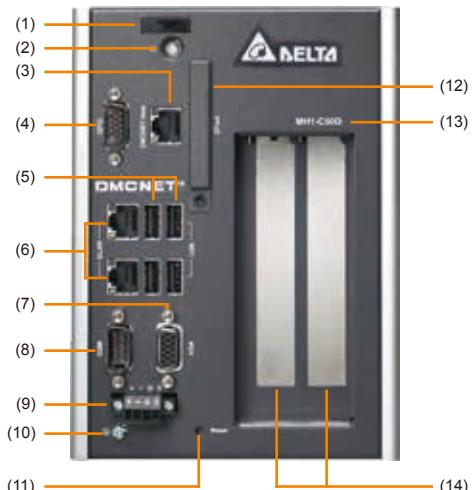
Frame Dimensions: 230mm (L) x 127mm (W) x 175mm (H)



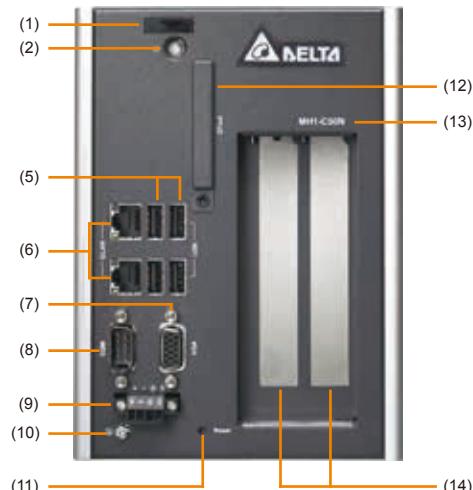
Note: All models of the MH1 Series have the same dimensions

## Exterior Description

MH1-A12/C50/C70 D Series



MH1-A12/C50/C70 N Series



Interface

|     |                       |      |                          |
|-----|-----------------------|------|--------------------------|
| (1) | LED Indicator         | (8)  | RS-232                   |
| (2) | Power Switch          | (9)  | Power Supply Port        |
| (3) | DMCNET Communication* | (10) | Ground Wire Screw        |
| (4) | IO Connector          | (11) | Reset Switch             |
| (5) | USB 2.0 Port          | (12) | CFast Card Slot          |
| (6) | Gigabit LAN Connector | (13) | Product Number           |
| (7) | VGA Output Connector  | (14) | PCI / PCI Extension Slot |

# Model Explanation

## MH1 Series

M H 1 - A 1 2 D - A 0 3 DG

**Product Name:**  
Motion Control Host 1<sup>st</sup> Generation

**CPU Information:**  
A12 = Intel Atom E3845 Quad Core 1.91 GHz  
C50 = Intel Core i5-3610ME Dual Core 2.7 GHz  
C70 = Intel Core i7-3612QE Quad Core 2.1 GHz

**Communications:**  
D = DMCNET  
N = N/A or EtherCAT

**Extension Slot Interface:**  
A = 2 PCI slots  
C = 2 PCIe slots x4 + x1

**Product Version:**  
DG=Windows 7 Embedded(32 bit)  
DH=Windows 7 Embedded(64 bit)  
DM=Windows 7 Embedded(32 bit)  
+IMP(IPC Motion Platform)

\* Please refer to Ordering Information for actual versions

**CFast card and SSD card:**

| SSD   | CFast | None | 16GB | 32GB | 64GB | 128GB |
|-------|-------|------|------|------|------|-------|
| None  |       | 0    | 1    | 3    | A    | B     |
| 16GB  |       | 2    | -    | -    | -    | -     |
| 32GB  |       | 6    | -    | -    | -    | -     |
| 64GB  |       | 4    | -    | -    | -    | -     |
| 128GB |       | 5    | -    | -    | -    | -     |

**DRAM and Micro-SD (eMMC):**

| SD eMMC | DRAM | None | 2GB | 4GB | 8GB | 4GB+4GB |
|---------|------|------|-----|-----|-----|---------|
| None    |      | -    | 1   | 0   | -   | 3       |
| 4GB     |      | -    | -   | -   | -   | -       |
| 8GB     |      | -    | -   | -   | -   | -       |
| 4GB+4GB |      | 2    | -   | -   | -   | -       |

# Ordering Information

## Specifications

|                    | Model Name                           | MH1-A12 D/E/N  | MH1-C50 D/E/N  | MH1-C70 D/E/N                             |
|--------------------|--------------------------------------|--|--|---|
| Processor System   | <b>Processor</b>                     | Intel Atom E3845<br>Quad Core 1.91 GHz   | Intel Core i5-3610ME<br>Dual Core 2.7 GHz                                    | Intel Core i7-3612QE<br>Quad Core 2.1 GHz |
|                    | <b>System Chipset</b>                | N/A  | AMI BIOS   | Intel QM77                                |
|                    | <b>BIOS</b>                          |  |  |   |
|                    | <b>MRAM</b>                          | DDR3L-1333 Default 4 GB,<br>Max. 4 GB, ECC supported   | DDR3-1600 x2, Default 4 GB / Max. 8 GB<br>ECC supported                      |   |
|                    | <b>System Memory</b>                 | 128 KB MRAM  |  | 128 KB MRAM                               |
| I/O Interface      | <b>CRT</b>                           | 2560x1600 / 60Hz   | 2048x1536 / 75 Hz  |   |
|                    | <b>Internet</b>                      |  | 2 x IEEE 802.3/802.3u/802.3ab 1 Gbps   |   |
|                    | <b>Communication</b>                 |  | DMCNET™ (12-Axis) - (A12D/C50D/C70D Series)<br>N/A - (A12N/C50N/C70N Series) |   |
|                    | <b>USB</b>                           |  | 4 x USB 2.0  |   |
|                    | <b>Serial Port</b>                   |  | 1 x RS-232 (Hardware auto flow control)                                      |   |
|                    | <b>Digital Input</b>                 | 1-CH isolated, Sink type, 24 V <sub>DC</sub> (5 mA/CH) - (A12D/C50D/C70D Series)   |  |   |
|                    | <b>Digital Output</b>                | 1-CH isolated, Sink type, 24 V <sub>DC</sub> (10 mA/CH) - (A12D/C50D/C70D Series)  |  |   |
|                    | <b>Encoder Input</b>                 |  | 2-CH isolated, EA± / EB± - (A12D/C50D/C70D Series)                           |   |
|                    | <b>Compare Output</b>                |  | 2-CH isolated, CMP± - (A12D/C50D/C70D Series)                                |   |
| Storage            | <b>Expansion<sup>1</sup></b>         | 2 x PCI slot or 1 x PCIe x4 slot + 1 x PCIe x1 slot ( C50/C70 Series)<br>2 x PCI slot or 1 x PCIe x1 slot + 1 x PCIe x1 slot ( A12E/N Series)<br>2 x PCI slot ( A12D Series) |  |   |
|                    | <b>CFast Card</b>                    |  | 1 x CFast Card (optional)  |   |
|                    | <b>Solid State Disk<sup>1</sup></b>  |  | 1 x 2.5" SATA SSD (optional)   |   |
| Power Requirements | <b>Input Voltage</b>                 |  | 15 ~ 30 V <sub>DC</sub>  |   |
|                    | <b>Power Consumption<sup>2</sup></b> | 24V / 1A / 24W   | 24V / 1.25A / 30W  | 24V / 1.42A / 34W                         |
| Mechanical         | <b>Mounting</b>                      |  | Desk / Wall-mounting   |   |
|                    | <b>Dimensions (W x H x D)</b>        | 3.4 kg   | 3.9 kg   | 3.9 kg                                    |
|                    | <b>Weight</b>                        |  | 127 x 175 x 250 mm (W x H x D)   |   |
| Environment        | <b>Operation Temperature</b>         |  | 0°C ~ 50°C   |   |
|                    | <b>Storage Temperature</b>           |  | -30° C ~ 85° C   |   |
|                    | <b>Humidity</b>                      |  | 0% ~ 90% RH (non-condensing)   |   |
|                    | <b>Anti-pollution Degree</b>         |  | Pollution Degree 2   |   |
|                    | <b>Vibration Resistance</b>          | 2 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis  |  |   |
|                    | <b>Shock Resistance</b>              | 75 G, IEC 60068-2-27, half sine, 11 ms duration  |  |   |
|                    | <b>Safety Certification</b>          |  | CE   |   |
| Software Support   | Microsoft Windows                    |  | Windows 7 Embedded   |   |

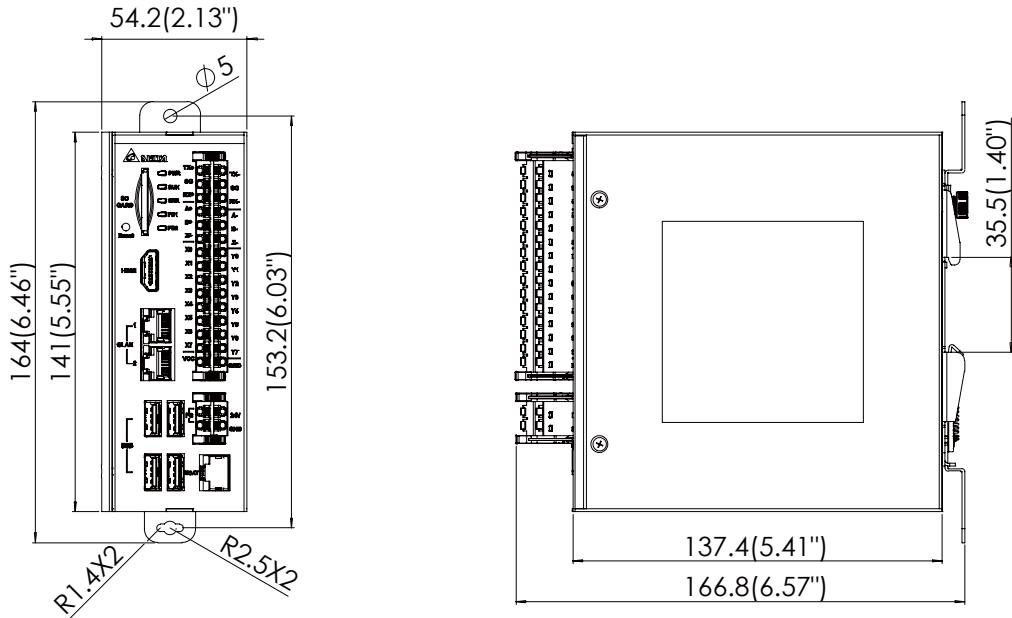
Note 1. Max power constraint: PCIe x 4 (25W), PCIe x1 (10W), PCI (10W), SSD (5W), CFast (5W), POE (72W)

Note 2. CPU under full load; external storage (CFast Card / SSD), PCI / PCIe Card or POE excluded

# Dimensions

## MH2-P10N

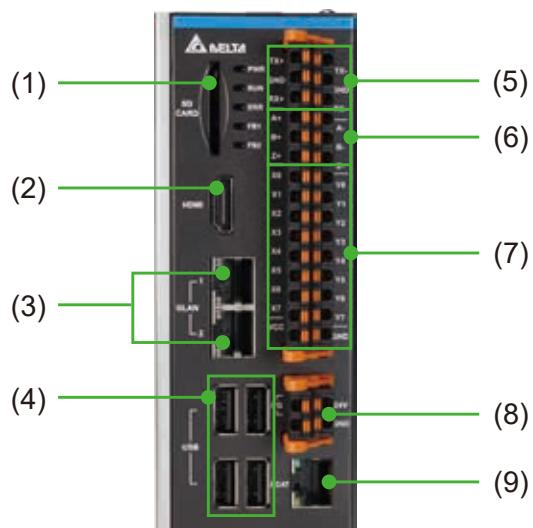
- Dimensions: 54.2 mm(W) × 141 mm(H) × 137.5 mm(L)
- Dimensions (Accessories included): 54.2 mm(W) × 164 mm(H) × 166.8 mm(L)



## Exterior Description



MH2-P10N

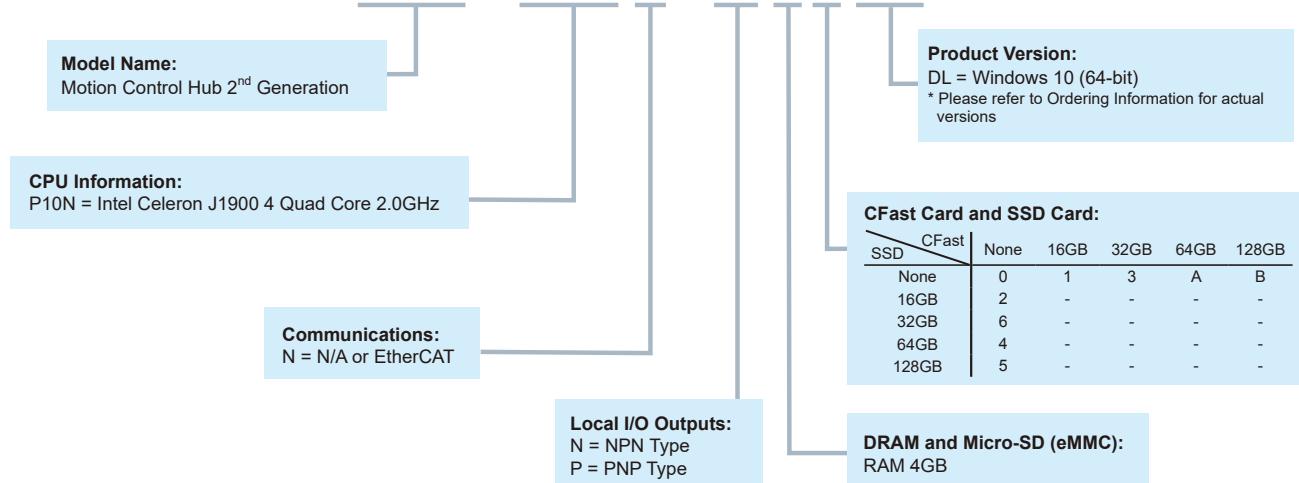


| Interface |                            |     |                    |
|-----------|----------------------------|-----|--------------------|
| (1)       | SD Card Slot               | (6) | Encoder Input Port |
| (2)       | HDMI Output Terminal       | (7) | IO Connector       |
| (3)       | Gigabit LAN Port           | (8) | Power Connector    |
| (4)       | USB 2.0                    | (9) | EtherCAT COM Port  |
| (5)       | RS-422/485 Serial COM Port |     |                    |

# Model Name

## MH2 Series

M H 2 - P 1 0 N - N 0 6 D L



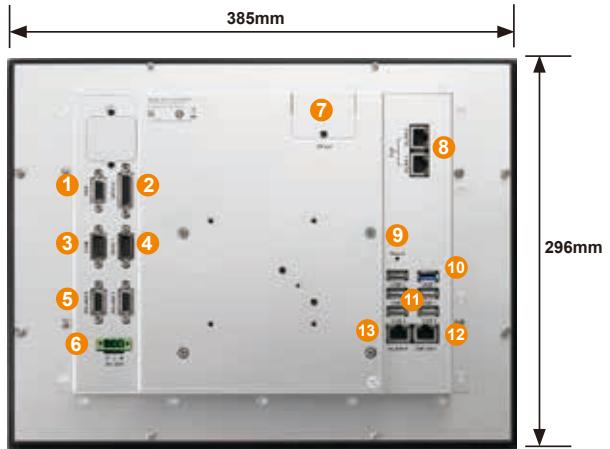
# Ordering Information

## Specifications

| Model Name               |                       | MH2-P10N  |
|--------------------------|-----------------------|---|
| Processor                | CPU                   | Intel Celeron J1900 Quad Core, 2.0GHz   |
|                          | BIOS                  | AMI BIOS  |
|                          | Memory                | Built-in DDR3L-1333 Max. 4GB  |
|                          | Nonvolatile Memory    | 128kB MRAM  |
| Display                  | HDMI                  | HDMI 1.4a × 1   |
|                          | USB                   | USB 2.0 × 4   |
| Input / Output           | Ethernet              | 2 × IEEE 802.3/802.3u/802.3ab 1G bps (Intel I210AT)   |
|                          | Fieldbus              | EtherCAT (Intel I210AT) × 1   |
|                          | Serial Port           | Isolated RS-485/RS-422 × 1  |
|                          | Digital Input         | 8-CH high-speed isolated input, Sink / Source type, 24 VDC (5 mA/CH)  |
|                          | Digital Output        | 8-CH high-speed isolated output, Source type, 24 VDC (200 mA/CH)  |
|                          | Encoder Input         | (Incremental) 1-CH isolated, (EA± / EB± / EZ±) × 1<br>(Absolute) 1-CH isolated (TX± / RX±) (use RS-422 I/F) |
|                          | HDD                   | M.2 module × 1  |
| Storage                  | SD Card               | SD card slot × 1  |
|                          | Security IC           | Built-in software system protection security IC × 1   |
| MISC.                    | LEDs                  | LED display (PWR/RUN/ERR/FB1/FB2) × 5   |
|                          | Watchdog              | Supports Watchdog function  |
|                          | Input Voltage         | DC 24V ±15%   |
| Power Supply Requirement | Power Consumption     | 24V/2A/48W  |
|                          | Power Loss Detection  | Low voltage detection and power loss data saving  |
|                          | Installation          | Wall-mounted / Slide  |
| Mechanism                | Dimensions            | 54.2 × 141 × 137.5 mm (W × H × D)   |
|                          | Operating Temperature | 0°C ~ 50°C  |
| Ambient Environment      | Storage Temperature   | -30°C ~ 85°C  |
|                          | Relative Humidity     | 0% ~ 90% RH (Non-condensing)  |
|                          | Vibration Resistance  | 2 Grms, IEC 60068-2-64, Random continuous shock, 5 ~ 500 Hz, 1 hr/axis                                      |
|                          | Shock Resistance      | 75G IEC 60068-2-27, Half Sinusoid, Continuous for 11ms  |
|                          | Certification         | EN 55022 : 2010 · EN 55024 (EN55011 : 2010)   |
| Software                 | Microsoft Windows     | Windows 10 IoT 64bit  |
|                          | Real-time OS          | N/A   |

# Dimensions

## MP1-A10D-15 Series

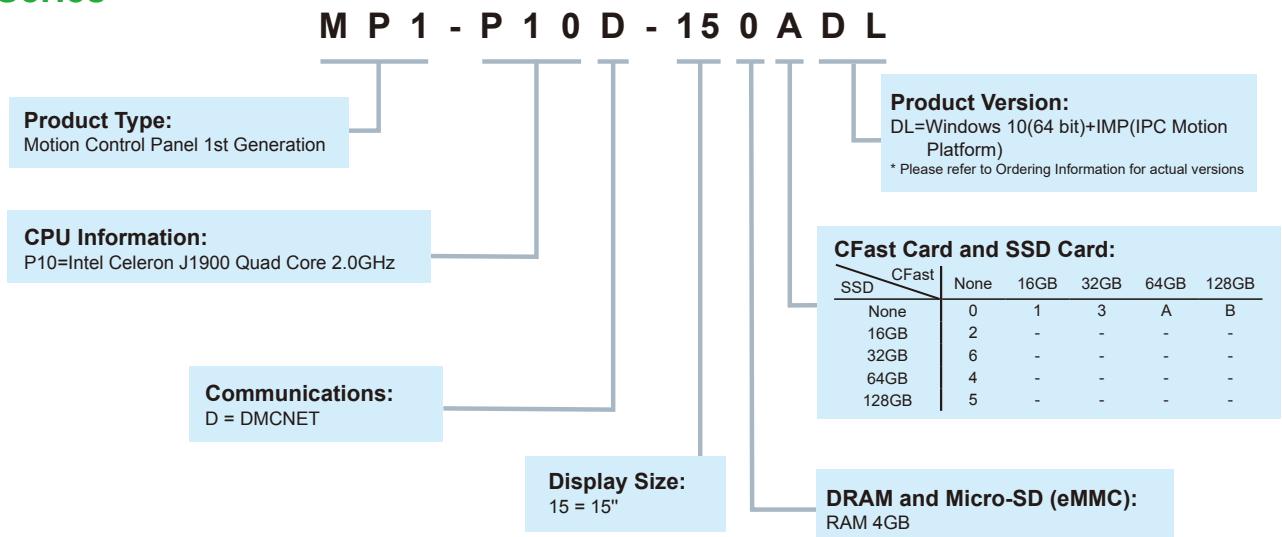


## Exterior Description

|     |   |      |                       |
|-----|---|------|-----------------------|
| (1) | VGA Output Connector                                | (8)  | 2 x Gigabit LAN Ports |
| (2) | Digital Input/ Output Port (12 inputs / 12 outputs) | (9)  | Reset Switch          |
| (3) | MPG Input   | (10) | 1 X USB 3.0           |
| (4) | Digital Input/ Output Port (QEP x 2 / CMP x 2)      | (11) | 5 X USB 2.0           |
| (5) | 2 x RS-485  | (12) | DMCNET Communication  |
| (6) | 24V Power Input                                     | (13) | 1 x Gigabit LAN Port  |
| (7) | CFast Card Slot                                     |      |                       |

## Model Explanation

### MP1Series



## Specifications

| Model Name         |                                | MP1-P10D-15  |
|--------------------|--------------------------------|--|
| Processor System   | Processor                      | Intel Celeron J1900 Quad Core 2.0GHz   |
|                    | MRAM                           | 128KB  |
|                    | BIOS                           | 128KB  |
|                    | System Memory                  | DDR3L-1333 4GB   |
| Display Interface  | LCD Panel                      | 15" TFT-LCD (262k / 16.7M color)<br>1024 x 768 pixels (XGA), LED backlight<br>304.1 (H) x 228.1 (V) mm                     |
|                    | Touch Panel                    | 4-wire Resistive (Max. 10-bit Resolution)  |
|                    | LED                            | POWER / RUN / ERROR  |
|                    | CRT                            | 2560 x 1600 / 60Hz   |
| I/O Interface      | Ethernet                       | 3 x IEEE 802.3 / 802.3u / 802.3ab 1Gbps  |
|                    | DMCNET                         | O  |
|                    | USB                            | 1 x USB 3.0<br>5 x USB 2.0   |
|                    | Serial Port                    | 2 x isolated RS-422 / 485  |
|                    | Digital Input                  | 1-CH isolated, Sink type, 24V <sub>DC</sub> (5mA / CH)<br>12-CH isolated, Sink / Source type, 24V <sub>DC</sub> (5mA / CH) |
|                    | Digital Output                 | 1-CH isolated, Sink type, 24V <sub>DC</sub> (10mA / CH)<br>12-CH isolated, Sink type, 24V <sub>DC</sub> (200mA / CH)       |
|                    | CFast Card                     | 1 x CFast Card (optional)  |
| Storage            | eMMC                           | 1 x eMMC (optional)  |
|                    | Solid State Disk               | 1 x 2.5" SATA SSD (optional)   |
| Power Requirements | Input Voltage                  | 12~30V <sub>DC</sub>   |
|                    | Power Consumption <sup>1</sup> | TBD  |
| Mechanical         | Mounting                       | Wall-mounting  |
|                    | Dimensions (W x H x D)         | 385 x 296 x 55 mm  |
|                    | Weight                         | 3.18 kg  |
| Environment        | Operating Temperature          | 0° C ~ 50° C   |
|                    | Storage Temperature            | 0° C ~ 50° C   |
|                    | Humidity                       | 0% to 90% RH (non-condensing)  |
|                    | Vibration Resistance           | 2 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr / axis  |
|                    | Shock Resistance               | 75 G, IEC 60068-2-27, half sine, 11 ms duration  |
|                    | Safety Certification           | CE   |
|                    | Windows 10 IoT 64 bit          | O  |

1. Full load power consumption without CFast/SSD or any PCI/PCIe card

# DMCNET Remote Modules

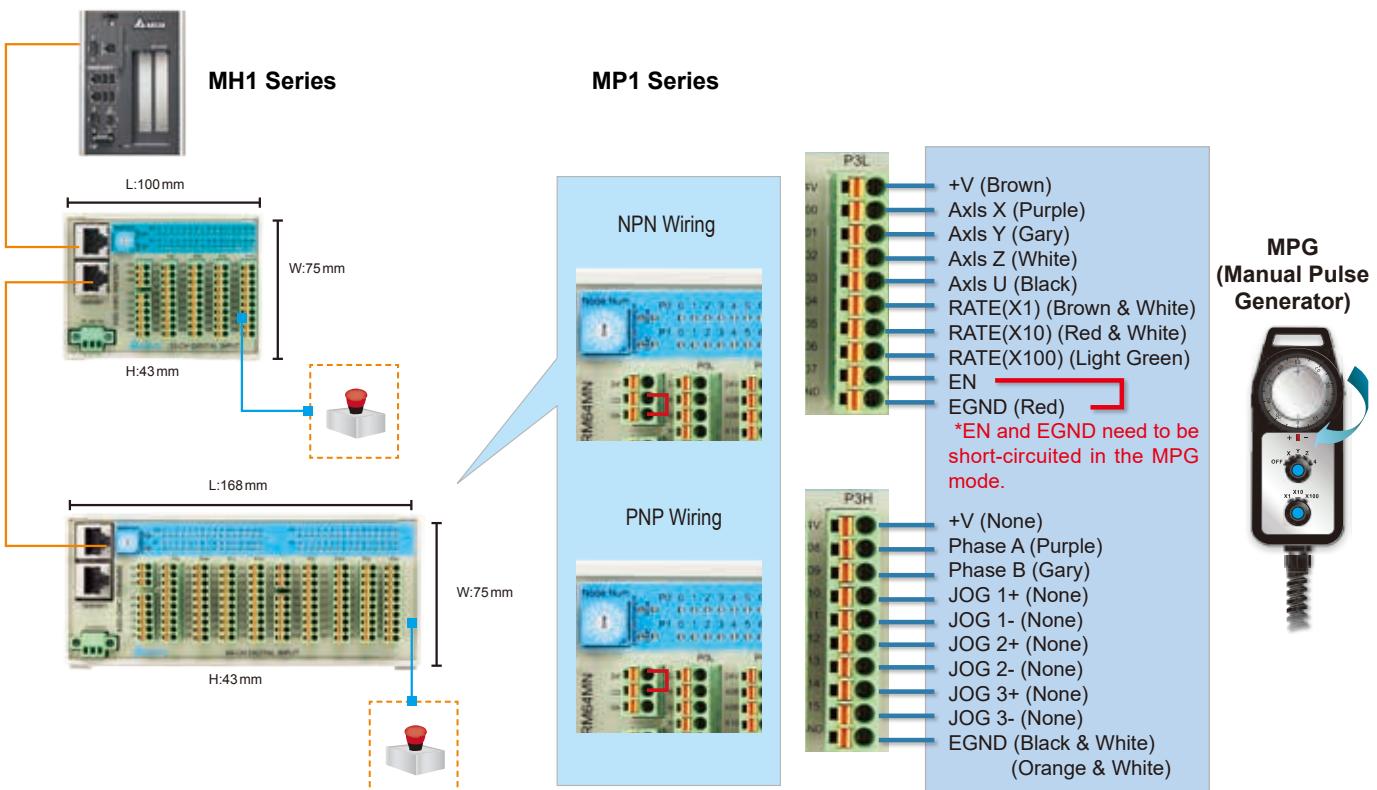
## Digital Input Remote Modules

- ASD-DMC-RM32MN (32 Digital Inputs)
- ASD-DMC-RM64MN (64 Digital Inputs)
- ASD-DMC-RM32PT (16 Digital Inputs / 16 Digital Outputs)

## Electrical Specifications

| Model Name                | RM32MN / RM64MN / RM32PT   |
|---------------------------|--|
| Input Circuit Type        | Single common port input   |
| Input Signal Type         | SINK / SOURCE  |
| Input Signal Voltage      | 24 V <sub>DC</sub> (5mA)   |
| Response Time             | 0 to 3 ms, adjustable  |
| Action Level (OFF > ON)   | > 16.5 V <sub>DC</sub>   |
| Action Level (ON > OFF)   | < 8 V <sub>DC</sub>  |
| Noise Tolerance Threshold | ESD (IEC 61131-2, IEC 61000-4-2): 8 KV Air Discharge<br>EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2KV, Communication I/O: 1 KV<br>RS (IEC 61131-2, IEC 61000-4-3): 80 MHz ~ 1 GHz, 10V/m |
| Environment               | Operating Temperature: 0 °C ~ 50 °C<br>Storage Temperature: -20 °C ~ 70 °C   |

## Installation & Wiring



\*MPG can only be used for the terminals of P3H and P3L of ASD-DMC-RM64MN.

## Digital Output Remote Modules

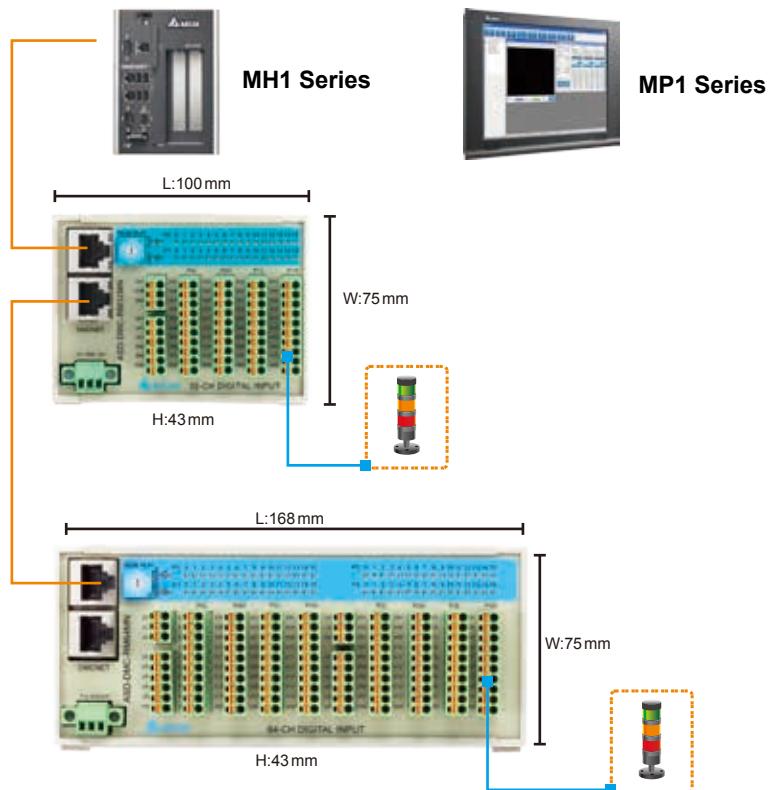
- **ASD-DMC-RM32NT (32 Digital Outputs)**
- **ASD-DMC-RM64NT (64 Digital Outputs)**
- **ASD-DMC-RM32PT (16 Digital Inputs / 16 Digital Outputs)**

- Non-volatile memories can be managed through a software API
- Load Output: 0.1A / 1 Point

## Electrical Specifications

| Model Name                              | RM32NT / RM64NT   |
|---|---|
| Output Circuit Type                     | Transistor  |
| Output Signal Type                      | SINK  |
| Current Specifications                  | 0.1A/1 point  |
| Voltage Specifications                  | 24V <sub>DC</sub>   |
| Maximum Switching (Operating) Frequency | 1KHz  |
| Action Level (OFF > ON)                 | 20 us   |
| Action Level (ON > OFF)                 | 30 us   |
| Noise Tolerance Threshold               | ESD (IEC 61131-2, IEC 61000-4-2): 8 KV Air Discharge<br>EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2 KV, Communication I/O: 1 KV<br>RS (IEC 61131-2, IEC 61000-4-3): 80 MHz ~ 1 GHz, 10V/m |
| Environment                             | Operating Temperature: 0 °C ~ 50 °C<br>Storage Temperature: -20 °C ~ 70 °C  |

## Installation & Wiring



# DMCNET Remote Modules

## • HMC-RIO3232RT5 (Digital I/O Remote Module)

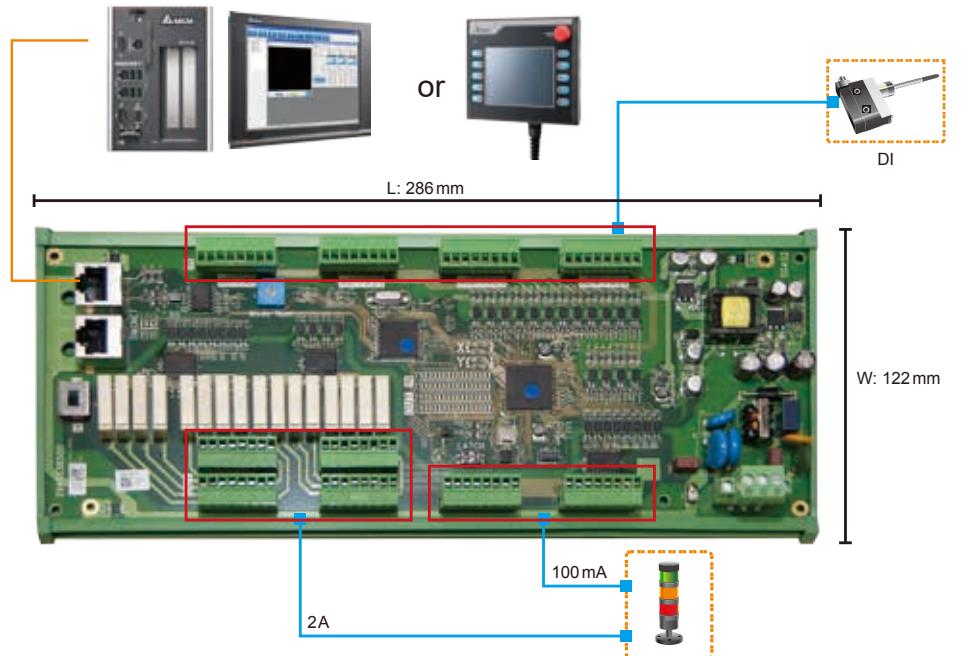
- 16 points relay type output unit, Max. loading: 2A / 1 Point with non-volatile memory function
- 16 points transistor type output unit, Max. loading: 0.1A / 1 Point
- 32 points digital input unit – supports SINK and SOURCE modes

## Electrical Specifications

| Item              | HMC-RIO3232RT5   |
|-------------------|--|
| Supply Voltage    | 24V <sub>DC</sub> (15% ~ 20%)  |
| Power Consumption | 1.2W   |
| Noise Immunity    | RS: Frequency: 80MHz ~ 1GHz, 1.4GHz ~ 2.0GHz, Test level 10V/m<br>ESD: Contact discharge ±8kV Air discharge ±8kV<br>EFT: ±2kV(Power port), ±2kV (I/O line), Surge: ±2kV (RIO power port) |
| Temperature       | Operating: 0°C ~ 55°C (Temperature), 10 ~ 90% (Humidity);<br>Storage: -20°C ~ 60°C (Temperature), 10 ~ 90% (Humidity)  |
| Vibration         | IEC 61131-2 compliant 5Hz ~ 8.3Hz = Continuous: 3.5mm, 8.3Hz ~ 150Hz = Continuous: 1.0g  |
| Shock             | IEC 60068-2-27 compliant 15g peak for 11 ms duration X, Y, Z directions for 6 times  |
| Weight            | Approx. 460g   |

| Item                 | Input Port  | Output Port  |
|----------------------|---|--|
| Input Signal Type    | SINK / SOURCE   | Transistor / Relay   |
| Input Signal Voltage | 24 V <sub>DC</sub> (5 mA)   | 24 V <sub>DC</sub> (-10% ~ +15%) / < 250 V <sub>AC</sub> (Relay Only)                        |
| Input Impedance      | 4.7K ohm  | 100 mA / 1 Point (Transistor),<br>2A / 1 Point (Relay), Resistive Load                       |
| Action Level         | (OFF → ON) > 16.5 V <sub>DC</sub><br>(ON → OFF) < 5 V <sub>DC</sub> | 8 kHz (TR) / 1 Hz (RELAY)  |
|                      |   | TR: (ON → OFF) : 115 μs, (OFF → ON) : 12 μs<br>RELAY: (ON → OFF) : 10 ms, (OFF → ON) : 10 ms |
|                      |   |  |

## Installation & Wiring



# DMCNET Remote Modules

## • ASD-DMC-RM04PI (4-Channel Pulse)

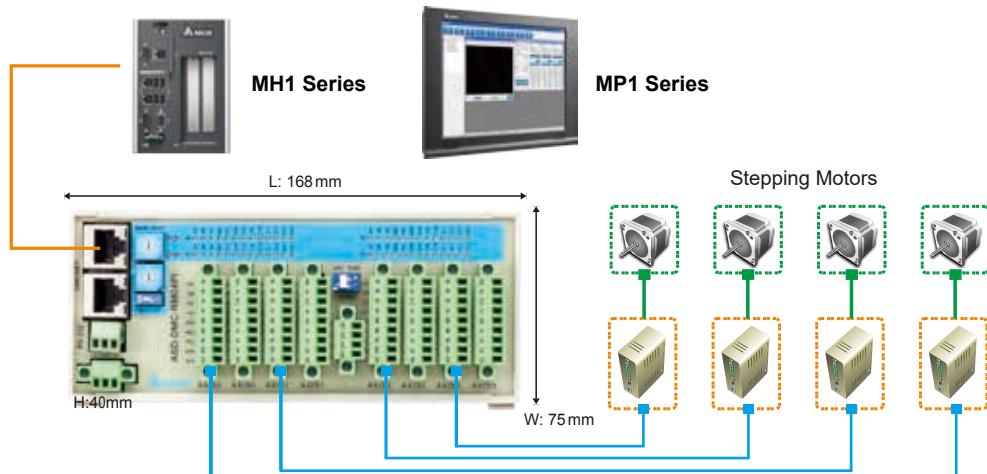
- 4 channels of 200kHz pulse outputs (Pulse +Direction, CCW pulse +CW pulse, A phase + B phase)
- 4 channels of 200kHz pulse inputs (CCW pulse +CW pulse, A phase + B phase)
- Digital Inputs x8 / Digital Outputs x8
- Built-in Positive / Negative Limit and Home for each channel
- In Mode 1, each RM04PI module occupies one node number only, and interpolation motion is carried out within one module.
  - 4 channels occupy 1 node number only
  - 4 channels occupy one PDO and SDO
  - Performs interpolation motion of 4 channels within one RM04PI module only
  - Transfers data in cyclical patterns
  - Motion commands set by parameters
  - Point-to-Point motion mode, motion position calculation is performed within one RM04PI module
- In Mode 2, each RM04PI module occupies node numbers 1~4, which correspond to 4 channels. The interpolation motion can be carried out among different modules.

## Electrical Specifications

| ASD-DMC-RM04PI                |  |
|-------------------------------|--|
| Item                          | Input (QA, QB, QZ, DI1, DI2)   |
| Circuit Type                  | Single   |
| Signal Type                   | SINK   |
| Power Supply Voltage          | 5V <sub>DC</sub>   |
| Work Frequency                | QA, QB, QZ: 200 kHz (5mA / 1 point)<br>DI1, DI2: 1kHz (5mA / 1 point)  |
| Noise Immunity                | ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air Discharge<br>EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2KV<br>Communication I/O: 1KV<br>RS (IEC 61131-2, IEC 61000-4-3): 80MHz ~ 1GHz, 10V/m |
| Operating/Storage Environment | Operating: 0°C ~ 50°C (32°F ~ 122°F)<br>Storage: -20°C ~ 70°C (-4°F ~ 158°F)   |

| ASD-DMC-RM04PI                |  |  |
|-------------------------------|--|--|
| Item                          | Input (MEL, PEL, ORG, SLD)   | Output (CW, CCW, DO1, DO2)   |
| Circuit Type                  | Single   | Transistor   |
| Signal Type                   | SINK / SOURCE  | SINK   |
| Power Supply Voltage          | 24V <sub>DC</sub> (5mA)  | 5~24V <sub>DC</sub> (30mA / 1 point)   |
| Response Time/Work Frequency  | 1ms  | CW, CCW: 200 kHz<br>DO1, DO2: 1kHz   |
| Active Level (OFF > ON)       | > 16.5V <sub>DC</sub>  | -  |
| Active Level (ON > OFF)       | < 8V <sub>DC</sub>   | -  |
| Noise Immunity                | ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air Discharge<br>EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2KV<br>Communication I/O: 1KV<br>RS (IEC 61131-2, IEC 61000-4-3): 80MHz ~ 1GHz, 10V/m | Operating/Storage Environment  |
| Operating/Storage Environment | Operating: 0°C ~ 50°C (32°F ~ 122°F)<br>Storage: -20°C ~ 70°C (-4°F ~ 158°F)   | Operating: 0°C ~ 50°C (32°F ~ 122°F)<br>Storage: -20°C ~ 70°C (-4°F ~ 158°F) |

## Installation & Wiring

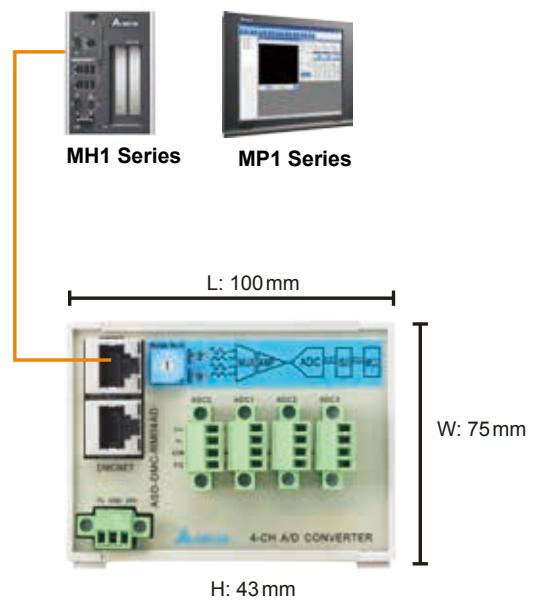


- **ASD-DMC-RM04AD (4-Channel Analog Input)**

### Electrical Specifications

| ASD-DMC-RM04AD               |  |
|------------------------------|--|
| Channel                      | 4 Channels / module  |
| Voltage Analog Input Range   | -10 ~ 10 V / -5 ~ 5 V / 0 ~ 10 V / 0 ~ 5 V   |
| Current Analog Input Range   | 0 ~ 24 mA  |
| Digital Conversion Range     | 0 ~ 65535  |
| Resolution                   | 16 bits  |
| Voltage Input Resistance     | 140 kΩ   |
| Current Input Resistance     | 249 Ω  |
| General Precision            | Within ±0.5% (25°C, 77°F) at full scale<br>Within ±1% (0 ~ 55°C, 32 ~ 131°F) at full scale   |
| Response Time                | Min. 1 ms / Max. 3 ms × the number of channels.  |
| Isolation                    | Internal circuit and analog output terminals are isolated with an optical coupler  |
| Voltage Absolute Input Range | -15 ~ 15   |
| Current Absolute Input Range | 32 mA  |
| Digital Data Format          | 16 significant bits  |
| Sampling Mode                | Five modes which the average number is two (2), four (4), eight (8), sixteen (16) and thirty-two (32) are available for selection. |

### Installation & Wiring

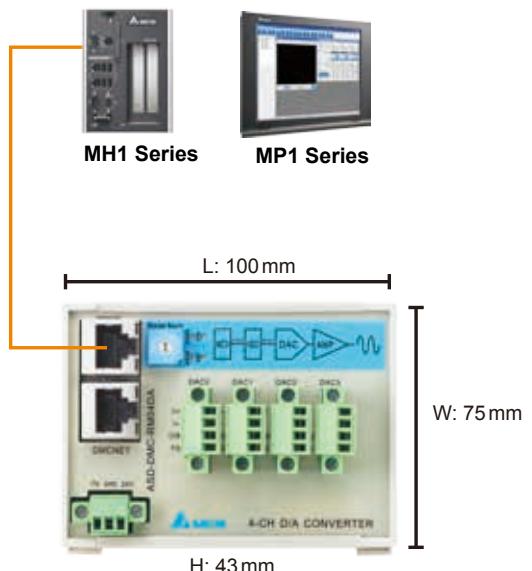


- **ASD-DMC-RM04DA (4-Channel Analog Output)**

### Electrical Specifications

| ASD-DMC-RM04DA                      |  |
|-------------------------------------|--|
| Channel                             | 4 Channels / module  |
| Voltage Output Range                | -10 ~ 10 V / -5 ~ 5 V / 0 ~ 10 V / 0 ~ 5 V   |
| Current Output Range                | 0 ~ 24 mA / 0 ~ 20 mA / 4 ~ 20 mA  |
| Excess Limit (Voltage)              | 10 %   |
| Maximum Output Current (Voltage)    | 20 mA  |
| Allowable Load Resistance (Current) | 0 ~ 500 Ω  |
| Digital Data Range                  | 0 ~ 4096   |
| Resolution                          | 16 bits  |
| DC Output Resistance                | 0.3 Ω  |
| Response Time                       | 1 ms   |
| Digital Data Format                 | 16 bits  |
| Isolation                           | Internal circuit and analog output terminals are isolated with an optical coupler  |
| Protection                          | Voltage output is protected by short circuit, but must be aware of long-lasting short circuit damaging the internal circuits |

### Installation & Wiring



# Gateway Type Remote Power Coupler

## Master Module - GA Series



- One GA01 can connect up to a maximum of 4 GE remote modules, of which there may be a maximum of four GE01PH modules.
- One GE01PH module occupies one node number.
- The EzDMC provides a software auto calculation function for calculating the numbers of start and end stations of the ASD-DMC-GA01.

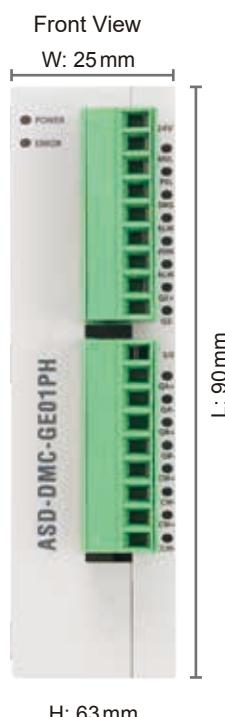
## ASD-DMC-GA01 Switching Settings

| ADDR1  |                    |               |
|--------|--------------------|---------------|
| PIN    | Function           | Explanation   |
| 1 ~ 12 | Start Node Address | Start Station |
| ADDR1  |                    |               |
| PIN    | Function           | Explanation   |
| 1 ~ 12 | End Node Address   | End Station   |

There is no communication when the value is set to 0 and 13 ~ 15.  
When ADDR1 is set to 1 and ADDR2 is set to 2, it indicates that the remote modules have occupied two stations.

# Gateway Type Digital I/O Remote Module

## Slave Module - GE Series



### • Gateway Type 1-Channel Pulse Remote Module ASD-DMC-GE01PH

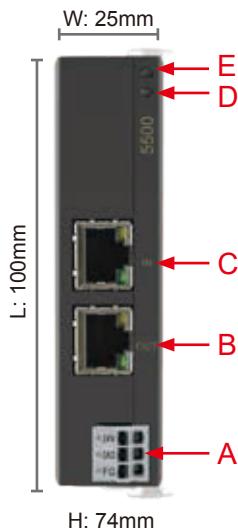
## Electrical Specifications

| ASD-DMC-GE01PH                |  |   |
|-------------------------------|--|---|
| Item                          | Input  | Output  |
| Circuit Type                  | Single common port input                               | Transistor  |
| Signal Type                   | SINK / SOURCE  | SINK  |
| Signal Voltage                | 24V <sub>DC</sub> (5 mA)                               | 5 ~ 24V <sub>DC</sub> (30 mA/1 point)                                   |
| Response Time                 | 1 ms   |   |
| Maximum Input Pulse Frequency | QA+, QB+, QZ+, QA-, QB-, QZ-:<br>4 MHz (5mA / 1 point) | CW, CCW: 4 MHz (30 mA / 1 point)<br>SVON, RALM: 1 kHz (30 mA / 1 point) |
| Action Level (OFF → ON)       | > 16.5V <sub>DC</sub>                                  | -   |
| Trigger Level (ON → OFF)      | < 8V <sub>DC</sub>                                     | -   |
| Output Circuit Type           | -  | RS-422  |
| Output Signal Type            | -  | Differential  |

# EtherCAT Remote Modules

## Gateway Type E-bus Remote Power Coupler

R1-EC5500D0

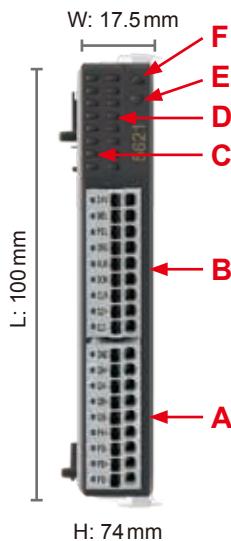


| NO. | Description      |
|-----|------------------|
| A.  | DC Power Input   |
| B.  | EtherCAT Output  |
| C.  | EtherCAT Input   |
| D.  | Status Indicator |
| E.  | Power Indicator  |

| Technical Data              | R1-EC5500D0  |
|-----------------------------|--|
| Task Within EtherCAT System | Connect EtherCAT Slave module with 100baseTX EtherCAT  |
| Data Transfer Medium        | Ethernet/EtherCAT cable (min. CAT 5), shielded   |
| Distance Between Stations   | 100 M (100BASE-TX) between two slaves  |
| Protocol                    | EtherCAT   |
| Data Transfer Rates         | 100 Mbaud  |
| Bus Interface               | RJ 45 x 2  |
| Input Voltage               | 24 V <sub>DC</sub>   |
| Input Current               | 50 mA + (E-bus total E-bus current)/4  |
| Current Supply E-Bus        | 2A   |
| Electrical Isolation        | 500 Vrms (Power contact/Supply voltage/Ethernet)   |
| Vibration/Shock Resistance  | EN 60068-2-6/EN 60068-2-27/29  |
| EMC Immunity                | ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air Discharge<br>EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2KV<br>Communication I/O: 1KV<br>RS (IEC 61131-2, IEC 61000-4-3): 80MHz ~ 1GHz, 10V/m |
| Operating Environment       | Operating temperature: 0°C ~ 50°C<br>Storage temperature: -20°C ~ 70°C   |
| Weight                      | 55 g   |
| Protection Class            | IP20   |
| Mounting Type               | DIN-rail   |

## 1-Channel Pulse Output Remote Module

R1-EC5621D0



| NO. | Description         | No. | Description         |
|-----|---------------------|-----|---------------------|
| A.  | IO Signal Port      | D.  | IO Signal Indicator |
| B.  | IO Signal Port      | E.  | Status Indicator    |
| C.  | IO Signal Indicator | F.  | Power Indicator     |

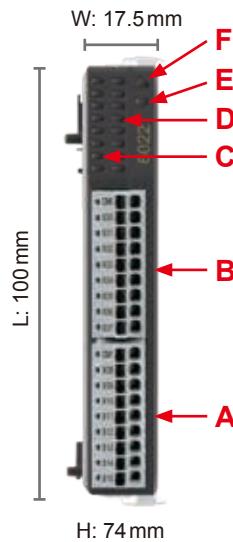
| Input | Description         | Input | Description         |
|-------|---------------------|-------|---------------------|
| 24V   | 24V Power           | GND   | External Ground     |
| MEL   | End Limit (-)       | QA+   | Encoder A Phase (+) |
| PEL   | End Limit (+)       | QA-   | Encoder A Phase (-) |
| ORG   | Home Signal         | QB+   | Encoder B Phase (+) |
| ALM   | Servo Alarm         | QB-   | Encoder B Phase (-) |
| SON   | Servo On            | PA+   | Pulse Signal (+)    |
| CLR   | Reset Servo Alarm   | PA-   | Pulse Signal (-)    |
| QZ+   | Encoder Z Phase (+) | PB+   | Dir. Signal (+)     |
| QZ-   | Encoder Z Phase (-) | PB-   | Dir. Signal (-)     |

| Technical Data                      | R1-EC5621D0   |
|-------------------------------------|---|
| Number of Outputs                   | 1 channel ( PA+, PA-, PB+, PB- )  |
| Number of Inputs                    | 1 channel ( QA+, QA-, QB+, QB-, QZ+, QZ- )  |
| Power Supply                        | Supplied by E-bus   |
| Signal Voltage                      | RS422 standards   |
| Max. Output Current                 | RS422 standards   |
| Base Frequency                      | 1Hz ~ 4MHz  |
| Numbers of 24V Input                | 4 ( MEL, PEL, ORG, ALM)   |
| Numbers of 24V Output               | 2 ( CLR, SON)   |
| Trigger Voltage (On > Off)          | < 8 V <sub>DC</sub>   |
| Trigger Voltage (Off > On)          | > 16.5 V <sub>DC</sub>  |
| Maximum Current of Each Output Port | 30 mA   |
| Current Consumption E-Bus           | 150 mA  |
| Electrical Isolation                | 500 Vrms (E-bus / field potential)  |
| Bit Width in the Process Image      | 32 byte in/out (1 x 16 byte data, 1 x 16 byte control/status)   |
| Vibration/Shock Resistance          | EN 60068-2-6/EN 60068-2-27/29   |
| EMC Immunity                        | ESD (IEC 61131-2, IEC 61000-4-2): 8 KV Air Discharge<br>EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2 KV<br>Communication I/O: 1 KV<br>RS (IEC 61131-2, IEC 61000-4-3): 8 MHz ~ 1 GHz, 10 V/m |
| Operating Environment               | Operating temperature: 0°C ~ 50°C<br>Storage temperature: -20°C ~ 70°C  |
| Weight                              | Approx. 60 g  |
| Protection Class                    | IP20  |
| Mounting Type                       | DIN-rail  |

# EtherCAT Remote Modules

## 16-Channel Input Remote Module

R1-EC6002D0 / R1-EC6022D0



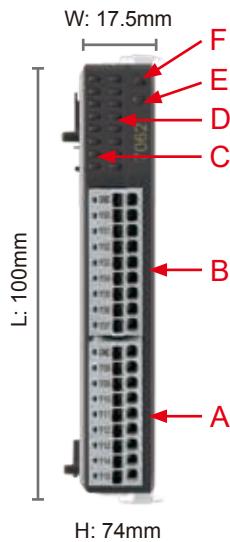
| NO | Description                             | NO. | Description                             |
|----|---|-----|---|
| A. | Port 1 Terminals                        | D.  | Port 1 IO Signal X08~X15 (From the top) |
| B. | Port 0 Terminals                        | E.  | Status Indicator                        |
| C. | Port 0 IO Signal X00~X07 (From the top) | F.  | Power Indicator                         |

| Input | Description | Input | Description |
|-------|-------------|-------|-------------|
| CM0   | Port 0 COM  | CM1   | Port1 COM   |
| X00   | Input 0     | X08   | Input 8     |
| X01   | Input 1     | X09   | Input 9     |
| X02   | Input 2     | X10   | Input 10    |
| X03   | Input 3     | X11   | Input 11    |
| X04   | Input 4     | X12   | Input 12    |
| X05   | Input 5     | X13   | Input 13    |
| X06   | Input 6     | X14   | Input 14    |
| X07   | Input 7     | X15   | Input 15    |

| Technical Data                 | R1-EC6002D0  | R1-EC6022D0                      |
|--------------------------------|--|----------------------------------|
| Connection Technology          |  | single-ended                     |
| Number of Inputs               |  | 16                               |
| Nominal Voltage                |  | 24 V <sub>DC</sub> ±10%          |
| Signal Type                    |  | SINK / SOURCE                    |
| Trigger Voltage (On > Off)     |  | < 8 V <sub>DC</sub>              |
| Trigger Voltage (Off > On)     |  | > 16.5 V <sub>DC</sub>           |
| Input Filter                   | 100µs  | 2ms                              |
| Input Current                  |  | 3mA at each port                 |
| Current Consumption E-Bus      |  | 110mA                            |
| Electrical Isolation           |  | 500 Vrms (E-bus/field potential) |
| Bit Width in the Process Image |  | 16 inputs                        |
| Vibration/Shock Resistance     |  | EN 60068-2-6/EN 60068-2-27/29    |
| EMC Immunity                   | ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air Discharge<br>EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2KV<br>Communication I/O: 1KV<br>RS (IEC 61131-2, IEC 61000-4-3): 80MHz ~ 1GHz, 10V/m |                                  |
| Operating Environment          | Operating temperature: 0°C ~ 50°C<br>Storage temperature: -20°C ~ 70°C   |                                  |
| Weight                         | 55 g   |                                  |
| Protection Rating              | IP20   |                                  |
| Mounting Type                  | DIN-rail   |                                  |

## 16-Channel Output Remote Module

R1-EC7062D0 / R1-EC70E2D0 / R1-EC70A2D0 / R1-EC70F2D0



| NO. | Description                              | NO. | Description                             |
|-----|--|-----|---|
| A.  | Port 1 Terminals                         | D.  | Port 1 IO Signal Y08~Y15 (From the top) |
| B.  | Port 0 Terminals                         | E.  | Status Indicator                        |
| C.  | Port 0 IO Signal Y00~Y07 (From the top ) | F.  | Power Indicator                         |

| Output | Description      | Output | Description |
|--------|------------------|--------|-------------|
| GND*   | Port 0 GND       | GND    | Port 1 GND  |
| 24V**  | Port 0 24V Input |        |             |
| Y00    | Input 0          | Y08    | Input 8     |
| Y01    | Input 1          | Y09    | Input 9     |
| Y02    | Input 2          | Y10    | Input 10    |
| Y03    | Input 3          | Y11    | Input 11    |
| Y04    | Input 4          | Y12    | Input 12    |
| Y05    | Input 5          | Y13    | Input 13    |
| Y06    | Input 6          | Y14    | Input 14    |
| Y07    | Input 7          | Y15    | Input 15    |

\* R1-EC7062D0 / R1-EC70E2D0

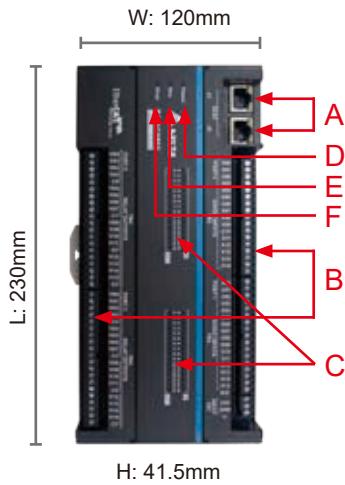
\*\* R1-EC70A2D0 / R1-EC70F2D0

| Technical Data                    | R1-EC7062D0  | R1-EC70E2D0 | R1-EC70A2D0  | R1-EC70F2D0 |  |  |
|-----------------------------------|--|-------------|--------------|-------------|--|--|
| Connection Technology             | MOSFET   |             |              |             |  |  |
| Signal Type                       | SINK   |             |              |             |  |  |
| Nominal Voltage                   | 24 V <sub>DC</sub>   |             |              |             |  |  |
| User-defined Output Disconnection | X  | ✓           | X            | ✓           |  |  |
| Input Current                     | 0.5A (Max.)  |             | 0.25A (Max.) |             |  |  |
| Current Consumption E-Bus         | 120mA  |             | 200mA        |             |  |  |
| Response Time / Frequency         | 1 kHz  |             |              |             |  |  |
| Trigger Time (OFF > ON)           | 140us  |             | 160us        |             |  |  |
| Trigger Time (ON > OFF)           | 150us  |             | 110us        |             |  |  |
| EMC Immunity                      | ESD (IEC 61131-2, IEC 61000-4-2): 8 KV Air Discharge<br>EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2 KV<br>Communication I/O: 1 KV<br>RS (IEC 61131-2, IEC 61000-4-3): 80 MHz ~ 1 GHz, 10 V/m |             |              |             |  |  |
| Operating Environment             | Operating temperature: 0 °C ~ 50 °C<br>Storage temperature : -20 °C ~ 70 °C  |             |              |             |  |  |
| Weight                            | Approx. 60 g   |             |              |             |  |  |
| Protection Rating                 | IP20   |             |              |             |  |  |
| Mounting Type                     | DIN-rail   |             |              |             |  |  |

# EtherCAT Remote Modules

## Digital Input / Output Module

R2-EC0902D0



| NO.             | Description                            | NO.   | Description                 |
|-----------------|--|-------|-----------------------------|
| A.              | EtherCAT DI/DO Terminals               | D.    | Power Indicator             |
| B.              | GPIO DI/DO Terminals                   | E.    | Communication Indicator     |
| C.              | GPIO Status Indicator                  | F.    | Alarm Indicator             |
| DI/DO           | Description                            | DI/DO | Description                 |
| X00<br>⋮<br>X15 | Port 0 Input 1<br>⋮<br>Port 0 Input 16 | 24V   | External Power Supply Input |
| N.C             | Reserved                               | GND   | External Power Ground       |
| X00<br>⋮<br>X15 | Port 1 Input 1<br>⋮<br>Port 1 Input 16 | FG    | Ground                      |
| S/S*            | NPN / PNP Setting                      |       |                             |
| Y00<br>⋮<br>Y15 | Port 2 Input 1<br>⋮<br>Port 2 Input 16 |       |                             |
| Y00<br>⋮<br>Y15 | Port 3 Input 1<br>⋮<br>Port 3 Input 16 |       |                             |

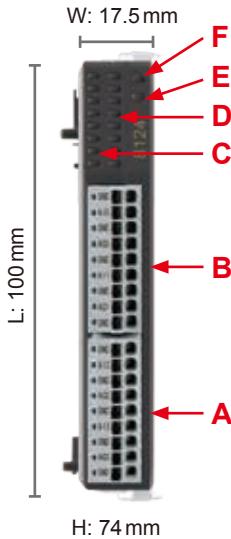
\*1: S/S: NPN / PNP Setting, NPN = Vcc, PNP = GND

| Technical Data                          | R2-EC0902D0  |   |
|---|--|---|
| Nominal Voltage                         | 24 VDC -15% ~+20%  |   |
| Input Current                           | <1A  |   |
| Digital I/O                             | Digital Input  | Digital Output  |
| Insolation                              | Optical Coupler  | Relay   |
| Signal Type                             | Sink / Source  | A (N.O) Dry Contact   |
| I/O Terminals                           | 32-CH  | 32-CH   |
| Max. Operating Voltage / Current        | 30V <sub>DC</sub> @8mA / Per CH  | 30V <sub>DC</sub> @ 2A / Per CH<br>250V <sub>AC</sub> @ 2A / Per CH   |
| Rated Input Voltage / Current           | 24V <sub>DC</sub> @ 5mA  | -   |
| Frequency                               | 1 kHz  | 1 Hz  |
| Response Time (Operation)<br>(OFF > ON) | 300us  | 10 ms   |
| Response Time (Release)<br>(ON > OFF)   | 300us  | 5 ms  |
| Relay ON/OFF Times                      | -  | Inductive : 20000 Times @30V <sub>DC</sub> 2A<br>Resistive : 100000 Times @ 30V <sub>DC</sub> 250V <sub>AC</sub> 2A |
| Dimensions                              | 230 x 120 x 41.5mm (W x H x D)   |   |
| Operating Environment                   | Operating Temperature : 0° C ~ 50° C (32° F ~ 122° F) ;<br>Storage Temperature : -20° C ~ 70° C (-4° F ~ 158° F) |   |
| Mounting Type                           | DIN-rail   |   |
| Vibration / Shock Resistance            | Compliant with EN 60068-2-6 / EN 60068-2-27/29   |   |
| EMC Immunity                            | ESD (IEC 61131-2, IEC 61000-4-2)<br>EFT (IEC 61131-2, IEC 61000-4-4)<br>RS (IEC 61131-2, IEC 61000-4-3)          |   |
| Protection Rating                       | IP20   |   |
| Safety Certification                    |  |   |

# EtherCAT Remote Modules

## 4-Channel Analog Input Remote Module

R1-EC8124D0



| NO. | Description              | NO. | Description              |
|-----|--------------------------|-----|--------------------------|
| A.  | CH3/CH4 Signal Port      | D.  | CH3/CH4 Signal Indicator |
| B.  | CH1/CH2 Signal Port      | E.  | Status Indicator         |
| C.  | CH1/CH2 Signal Indicator | F.  | Power Indicator          |

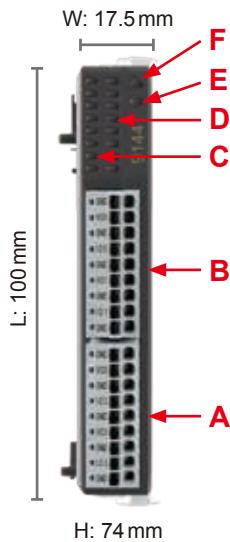
| Input | Description                 | Input | Description                 |
|-------|-----------------------------|-------|-----------------------------|
| GND   | Analog Ground               | GND   | Analog Ground               |
| AI0   | CH1 Voltage /Current Input  | AI2   | CH3 Voltage / Current Input |
| GND   | Analog Ground               | GND   | Analog Ground               |
| AG0   | CH1 Current COM*            | AG2   | CH3 Current COM*            |
| GND   | Analog Ground               | GND   | Analog Ground               |
| AI1   | CH2 Voltage / Current Input | AI3   | CH4 Voltage / Current Input |
| GND   | Analog Ground               | GND   | Analog Ground               |
| AG1   | CH2 Current COM*            | AG3   | CH4 Current COM*            |
| GND   | Analog Ground               | GND   | Analog Ground               |

\* In current mode: please connect current COM to GND ; In voltage mode: please disconnect this COM

| Technical data                 | R1-EC8124D0   |
|--------------------------------|---|
| Number of Inputs               | 4 (single-ended)  |
| Power Supply                   | Supplied by E-bus   |
| Signal Voltage                 | $\pm 10\text{V} / \pm 5\text{V}$  |
| Internal Resistance            | $> 1\text{M}\Omega$   |
| Input Filter Limit Frequency   | 1 kHz ~ 10 kHz  |
| Resolution                     | 16 bit  |
| Over Sampling Rate             | 0 ~ 64  |
| Conversion Time                | 2 us ~ 191 us (depends on Over Sampling Rate)   |
| Measuring Error                | < $\pm 0.2\%$ (relative to full scale value)  |
| Electrical Isolation           | 500 Vrms (E-bus / signal voltage)   |
| Current Consumption E-Bus      | 300 mA  |
| Bit Width in the Process Image | Input : 4 x 16 byte data, 4 x 16 byte control/status  |
| Vibration/Shock Resistance     | 60068-2-6/EN 60068-2-27/29  |
| EMC Immunity                   | ESD (IEC 61131-2, IEC 61000-4-2): 8 KV Air Discharge<br>EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2 KV<br>Communication I/O: 1 KV<br>RS (IEC 61131-2, IEC 61000-4-3): 8 MHz ~ 1 GHz, 10 V/m |
| Operating Environment          | Operating temperature: 0°C ~ 50°C<br>Storage temperature: -20°C ~ 70°C  |
| Weight                         | Approx. 60 g  |
| Protection Rating              | IP20  |
| Mounting Type                  | DIN-rail  |

## 4-Channel Analog Output Remote Module

R1-EC9144D0



| NO. | Description              | NO. | Description              |
|-----|--------------------------|-----|--------------------------|
| A.  | CH3/CH4 Signal Port      | D.  | CH3/CH4 Signal Indicator |
| B.  | CH1/CH2 Signal Port      | E.  | Status Indicator         |
| C.  | CH1/CH2 Signal Indicator | F.  | Power Indicator          |

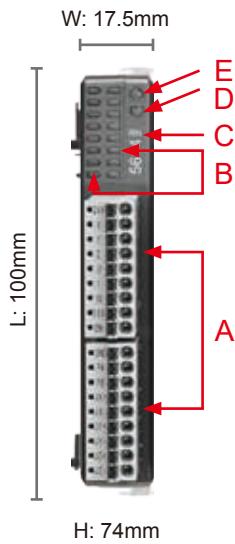
| Output | Description        | Output | Description        |
|--------|--------------------|--------|--------------------|
| GND    | Analog Ground      | GND    | Analog Ground      |
| VO0    | CH1 Voltage Output | VO2    | CH3 Voltage Output |
| GND    | Analog Ground      | GND    | Analog Ground      |
| IO0    | CH1 Current Output | IO2    | CH3 Current Output |
| GND    | Analog Ground      | GND    | Analog Ground      |
| VO1    | CH2 Voltage Output | VO3    | CH4 Voltage Output |
| GND    | Analog Ground      | GND    | Analog Ground      |
| IO1    | CH2 Current Output | IO3    | CH4 Current Output |
| GND    | Analog Ground      | GND    | Analog Ground      |

| Technical Data                 | R1-EC9144D0  |
|--------------------------------|--|
| Number of Inputs               | 4 (single-ended)   |
| Power Supply                   | Supplied by E-bus  |
| Signal Voltage Output          | $\pm 10V$ / $\pm 5V$ / $0 \sim 5V$ / $0 \sim 10V$  |
| Current Output                 | $0 \sim 20mA$ / $4 \sim 24mA$ / $0 \sim 24mA$  |
| Load                           | $> 1K\Omega$ (short-circuit-proof)   |
| Resolution                     | 16 bit   |
| Conversion Time                | 80 us  |
| Measuring Error                | < $\pm 0.2\%$ (relative to full scale value) voltage output<br>< $\pm 0.3\%$ (relative to full scale value) current output   |
| Electrical Isolation           | 1000 Vrms (E-bus/signal voltage)   |
| Current Consumption E-Bus      | 550 mA   |
| Bit Width in the Process Image | Output: 4 x 16 byte, (4 x 16-bit analog output)  |
| Vibration / Shock Resistance   | EN 60068-2-6/EN 60068-2-27/29  |
| EMC Immunity                   | ESD (IEC 61131-2, IEC 61000-4-2): 8 KV Air Discharge<br>EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2 KV<br>Communication I/O: 1 KV<br>RS (IEC 61131-2, EC 61000-4-3): 8 MHz ~ 1 GHz, 10 V/m |
| Operating Environment          | Operating temperature: $0^\circ C \sim 50^\circ C$<br>Storage temperature: $-20^\circ C \sim 70^\circ C$   |
| Weight                         | Approx. 60 g   |
| Protection Rating              | IP20   |
| Mounting Type                  | DIN-rail   |

# EtherCAT Remote Modules

## Manual Pulse Generator (MPG) Module

R1-EC5614D0



| NO. | Description         | NO. | Description      |
|-----|---------------------|-----|------------------|
| A.  | IO Signal Port      | D.  | Status Indicator |
| B.  | IO Signal Indicator | E.  | Power Indicator  |
| C.  | Product No.         |     |                  |

| Input | Description                     | Input | Description                 |
|-------|---------------------------------|-------|-----------------------------|
| GND   | External Ground                 | 24V   | External Power Input        |
| PA    | MPG Pulse Phase A Input         | X     | X-axis Pulse Chosen Signal  |
| PB    | MPG Pulse Phase B Input         | Y     | Y-axis Pulse Chosen Signal  |
| JX+   | JOG X-axis Signal (+)           | Z     | Z-axis Pulse Chosen Signal  |
| JX-   | JOG X-axis Signal (-)           | U     | U-axis Pulse Chosen Signal  |
| JY+   | JOG Y-axis Signal (+)           | 1     | Pulse magnification (x 1)   |
| JY-   | JOG Y-axis Signal (-)           | 10    | Pulse magnification (x 10)  |
| JZ+   | JOG Z-axis Signal (+) / *W-axis | 100   | Pulse magnification (x 100) |
| JZ-   | JOG Z-axis Signal (-) / *V-axis | EN    | Motion / Setting Execution  |

\*Supports 6-axis MPG via software: JZ+ needs to connect to W-axis signal; JZ- needs to connect to V-axis signal

| Technical Data               | R1-EC5614D0  |
|------------------------------|--|
| Control Axes                 | 4/6 axes   |
| Power Supply                 | Supplied by E-bus  |
| Pulse Magnification          | x 1 / x 10 / x 100   |
| JOG Input                    | 3 / 2 sets   |
| Sampling Rate                | 40kHz  |
| FIFO Length                  | 30 sets  |
| Communication Time           | 125us - 3276800us  |
| Trigger Time (ON > OFF)      | < 8V <sub>DC</sub>   |
| Trigger Time (OFF > ON)      | > 16.5V <sub>DC</sub>  |
| Current Consumption E-Bus    | 180mA  |
| Electrical Isolation         | 500 Vrms (E-bus / Signal Power)  |
| Vibration / Shock Resistance | Compliant with EN 60068-2-6 / EN 60068-2-27 / 29   |
| EMC Immunity                 | ESD (IEC 61131-2, IEC 61000-4-2)<br>EFT (IEC 61131-2, IEC 61000-4-4)<br>RS (IEC 61131-2, EC 61000-4-3) |
| Operating Environment        | Operating temperature: 0 °C ~ 50 °C<br>Storage temperature: -20 °C ~ 70 °C                             |
| Weight                       | Approx. 55 g   |
| Protection Class             | IP20   |
| Safety Certification         | CE   |
| Mounting Type                | DIN-rail   |

# Ordering Information

## Programmable Automation Controllers - Motion Control Host PAC

| Model Name     | CPU Type                           | Storage      | Slot Interface | RAM         | OS               | Motion Protocol | Development Tool |  |  |
|----------------|------------------------------------|--------------|----------------|-------------|------------------|-----------------|------------------|--|--|
| MH1-A12D-A03DG | Atom E3845<br>Quad Core 1.91GHz    | 2 PCI        | 32GB CFast     | 4GB         | Win 7 32bit      | DMCNET          | API              |  |  |
| MH1-A12D-A03DM |                                    |              | 128GB SSD      |             |                  |                 | IMP              |  |  |
| MH1-A12D-A05DG |                                    |              |                |             |                  |                 | API              |  |  |
| MH1-C50D-A03DG | Core i5-3610ME<br>Dual Core 2.7GHz | 2 PCI        | 32GB Cfast     | 4GB         | Win 7 32bit      | DMCNET          | API              |  |  |
| MH1-C50D-A03DM |                                    |              | 8GB            | Win 7 64bit |                  |                 | IMP              |  |  |
| MH1-C50D-A33DH |                                    |              | 64GB SSD       | 4GB         | Win 7 32bit      |                 | API              |  |  |
| MH1-C50D-A04DG |                                    | PCIe (x4+x1) | 32GB CFast     |             |                  |                 | API              |  |  |
| MH1-C50D-C03DG |                                    |              |                |             |                  |                 | API              |  |  |
| MH1-C70D-A03DG | Core i7-3612QE<br>Quad Core 2.1GHz | 2 PCI        | 32GB CFast     | 4GB         | Win 7 32bit      | DMCNET          | API              |  |  |
| MH1-C70D-A03DM |                                    |              |                | 8GB         | Win 7 64bit      |                 | IMP              |  |  |
| MH1-C70D-A33DH |                                    | PCIe (x4+x1) |                | 4GB         | Win 7 32bit      |                 | API              |  |  |
| MH1-C70D-C03DG |                                    |              |                |             | Win 7 64bit      |                 | API              |  |  |
| MH1-C70D-C33DH |                                    |              |                |             |                  |                 | API              |  |  |
| MH1-A12N-A03DG | Atom E3845<br>Quad Core 1.91GHz    | 2 PCI        | 32GB CFast     | 4GB         | Win 7 32bit      | NA              | NA               |  |  |
| MH1-A12N-A05DG |                                    |              | 128GB SSD      |             |                  |                 |                  |  |  |
| MH1-C50N-A03DG | Core i5-3610ME<br>Dual Core 2.7GHz | 2 PCI        | 32GB CFast     | 4GB         | Win 7 32bit      | NA              | NA               |  |  |
| MH1-C50N-A05DG |                                    |              | 128GB SSD      |             |                  |                 |                  |  |  |
| MH1-C50N-C03DG |                                    | PCIe (x4+x1) | 32GB CFast     | 8GB         | Win 7 64bit      |                 |                  |  |  |
| MH1-C50N-C33DH |                                    |              |                |             |                  |                 |                  |  |  |
| MH1-C70N-A03DG | Core i7-3612QE<br>Quad Core 2.1GHz | 2 PCI        | 32GB CFast     | 4GB         | Win 7 32bit      | NA              | NA               |  |  |
| MH1-C70N-C03DG |                                    | PCIe (x4+x1) |                | 8GB         | Win 7 64bit      |                 |                  |  |  |
| MH1-C70N-C33DH |                                    |              |                |             |                  |                 |                  |  |  |
| MH2-P10N-N04DL | Celeron J1900<br>Quad Core 2.0GHz  | NA           | 64GB SSD       | 4GB         | Win 10 IoT 64bit | EtherCAT        | API              |  |  |
| MH2-P10N-N06DL |                                    |              | 32GB SSD       |             |                  |                 |                  |  |  |

## Programmable Automation Controllers - Motion Control Panel PC

| Model Name      | CPU Type                          | Storage | Slot Interface            | RAM | OS               | Motion Protocol | Development Tool |
|-----------------|-----------------------------------|---------|---------------------------|-----|------------------|-----------------|------------------|
| MP1-P10D-150ADL | Celeron J1900<br>Quad Core 2.0GHz | 15"     | 64GB CFast<br>128GB CFast | 4GB | Win 10 IoT 64bit | DMCNET          | API/IMP          |
| MP1-P10D-150BDL |                                   |         |                           |     |                  |                 |                  |

# Ordering Information

| Motion Control Cards  |  |
|-----------------------|--|
| PCI-DMC-A02           | DMCNET Standard Type Motion Control Card with Local I/O (32 DI / 24 DO)                            |
| PCI-DMC-B01           | DMCNET Advanced Type Motion Control Card with 2 Groups of Pulse Compare                            |
| PCI-DMC-B02           | DMCNET Advanced Motion Control Card + 2D Pulse Compare   |
| PCI-DMC-B03           | DMCNET Advanced Motion Control Card + 3 Sets of Pulse Compare & 10 Sets of DO                      |
| PCI-DMC-F02           | DMCNET Economic Type Motion Control Card + local IO (32 DI/24 DO)                                  |
| PCle-L221-B1D0        | EtherCAT Advanced Motion Control Card + 2 Sets of Pulse Compare                                    |
| PCI-L221-P1D0         | EtherCAT Standard Type Motion Control Card   |
| PCI-L221-F1D0         | EtherCAT Economic Type Motion Control Card   |
| PCI-L221-B1D0         | EtherCAT Advanced Type Motion Control Card with 2 Groups of Pulse Compare                          |
| PCI-M324-F1D0         | 4-axis Pulse Motion Control Card (Not available in Taiwan)   |
| PCI-D122-XND0         | 32IN/32OUT Digital Signal Capture Card   |
| DB-D1XX-01D0          | Digital Signal Capture Slave Card  |
| DMCNET Remote Modules |  |
| ASD-DMC-RM32MN        | 32 Digital Input Remote Module (NPN / PNP)   |
| ASD-DMC-RM64MN        | 64 Digital Input Remote Module (NPN / PNP) plus MPG Module   |
| ASD-DMC-RM32NT        | 32 Digital Output Remote Module  |
| ASD-DMC-RM64NT        | 64 Digital Output Remote Module  |
| ASD-DMC-RM32PT        | 32 Digital I/O Remote Module with 16 DI (NPN / PNP) & 16 DO (Transistor Output)                    |
| ASD-DMC-RM04PI        | 4-Channel Pulse Remote Module (4 Channels of 200 kHz Pulse Outputs and Inputs)                     |
| ASD-DMC-RM04AD        | 4-Channel Analog Input Module  |
| ASD-DMC-RM04DA        | 4-Channel Analog Output Module   |
| HMC-RIO3232RT5        | Digital I/O Remote Module with 32 DI (NPN / PNP), 16 DO (Relay Output) & 16 DO (Transistor Output) |

## Ordering Information

| DMCNET Gateway Type Remote Modules |   |
|------------------------------------|---|
| ASD-DMC-GA01                       | DMCNET Gateway Type Remote Power Coupler  |
| ASD-DMC-GE01PH                     | DMCNET Gateway Type Pulse Output Remote Module (1-Channel of 4M High-speed Pulse Interface) |
| EtherCAT Remote Modules            |   |
| R1-EC5500D0                        | E-BUS Remote Power Coupler  |
| R1-EC5621D0                        | 1-Channel Pulse Output Remote Module  |
| R1-EC5614D0                        | MPG Extension Module  |
| R1-EC6002D0                        | Digital Input Remote Module (NPN / PNP); response time < 0.1ms                              |
| R1-EC6022D0                        | Input Remote Module (NPN / PNP); response time 2ms  |
| R1-EC7062D0                        | Digital Output Remote Module (NPN)  |
| R1-EC70A2D0                        | Digital Output Remote Module (PNP)  |
| R1-EC70E2D0                        | Digital Output Remote Module (NPN)  |
| R1-EC70F2D0                        | Digital Output Remote Module (PNP)  |
| R2-EC0902D0                        | Digital Input / Output Remote Module with Relay   |





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