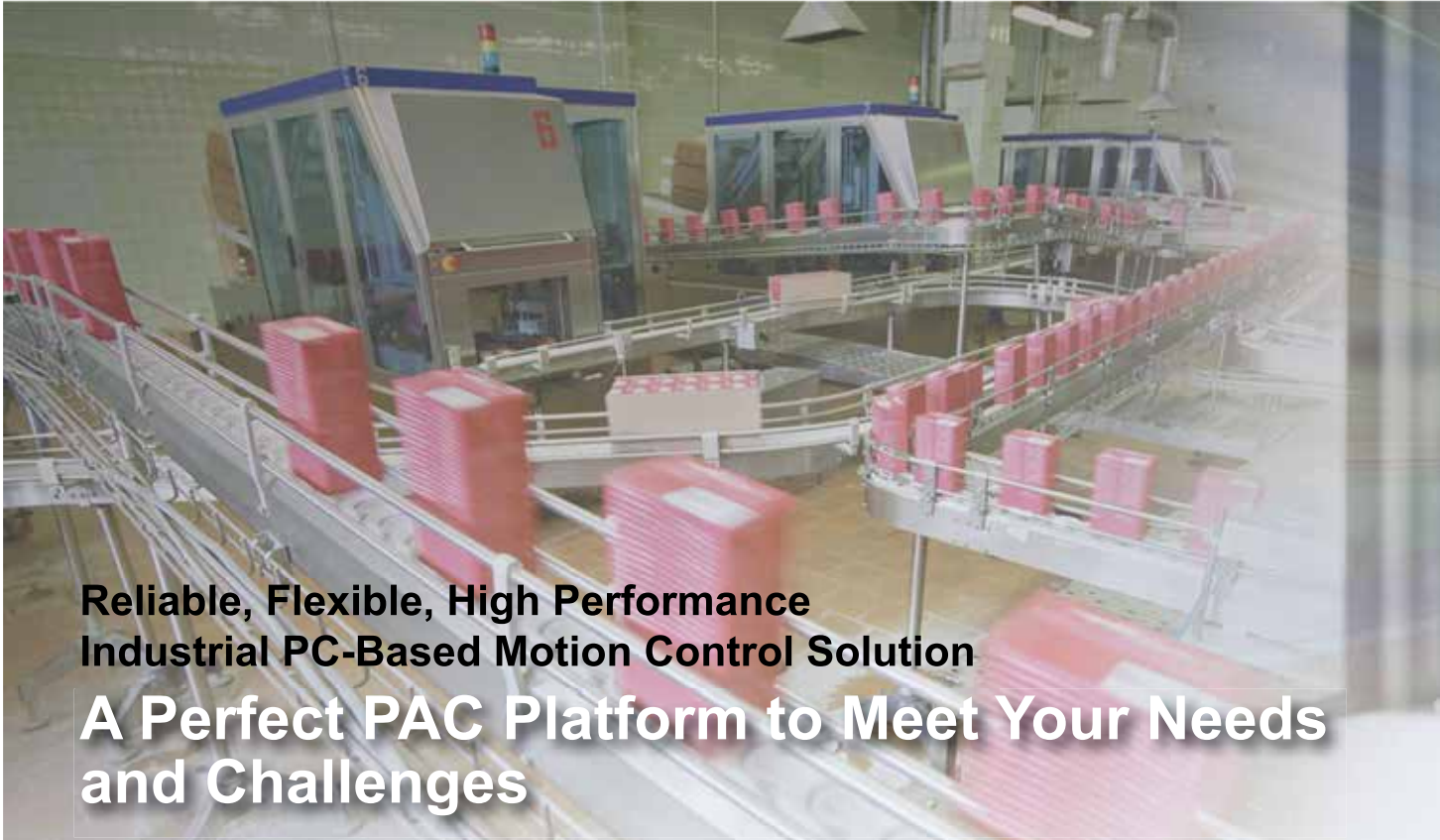




Automation for a Changing World

Delta Programmable Automation Controller (PAC)



Reliable, Flexible, High Performance Industrial PC-Based Motion Control Solution

A Perfect PAC Platform to Meet Your Needs and Challenges

Delta's programmable automation controller (PAC) is a cost effective platform with high reliability, integrated network communication capability, and high-end motion control functions for advanced automation solutions. This PAC platform enables better synchronization with EtherCAT and DMCNET communication, offering high response and high precision control for more flexible operation, and is ideal for high-performance multi-axis and synchronous motion control.

Its cable-less and fan-less design increases reliability, which is resistant to harsh environments and contaminants. It is also a high-performance controller base on a 1.2 GHz to 2.7 GHz dual-code processor and offers multiple communication interfaces for fast and convenient data transmission. This controller differentiates itself from the competition thanks to integrated advanced application specific APIs and the EtherCAT and DMCNET communication dynamic-link library (DLL) which dramatically eases the implementation process and saves development time. In addition, the integrated versatile software platform offers a perfect integration of logic programming control, human machine interface, numeric control and robot control, supporting IEC61131-3 programming languages and high performance motion control for various applications and industries.

When connected to various slave modules and servo systems with either an EtherCAT or DMCNET network interface, Delta's PAC enables a more effective industrial PC-based motion control solution to establish a simpler system featuring simple wiring, quick installation, fast communication, and superior performance, while requiring less integration effort.



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Product Features

Rugged, Flexible and Energy Saving Hardware

Delta's PAC adopts a cable-less and fan-less design which increases reliability and reduces power consumption. It offers multiple storage interfaces, such as CFast card and SSD slots for fast and stable data transmission. In addition, the MP1 Series is equipped with a 10.1-inch touchscreen and an Atom 1.33 GHz dual-core processor for more flexible operation.



MH1 Series

Multiple Peripheral Interfaces for Communication

Delta's PAC features abundant peripheral interfaces for communication between adjacent devices and equipment.

MH1 Series: one built-in USB port, one RS-232 COM port, two Gbps Ethernet ports and two PCI/PCIe extension slots

MP1 Series: two COM ports, one RS-232 COM port, three built-in USB ports and one 1 Gbps Ethernet port.

Support of EtherCAT and DMCNET Master and Slave Modules

Delta's PAC enables better synchronization with EtherCAT and DMCNET communication. With the DMCNET structure, up to 24 units of DMCNET modules and 12 servo axes of motion control can be connected. With the EtherCAT structure, up to 100 units of EtherCAT modules and 64 servo axes of motion control can be controlled by a single PAC platform. To implement multiple I/O extensions and achieve more axes of motion control, users can choose the PCI-DMC-B01, PCI-DMC-F01, PCI-L221-P1 and other Delta motion control cards to meet their application requirements.

Highly Secure Software

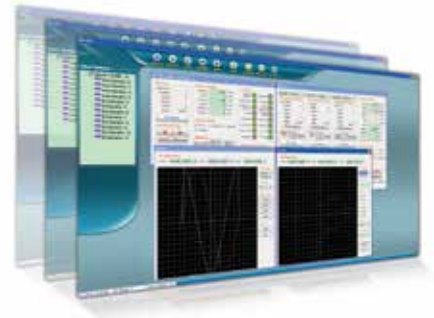
Each PAC has a high-security IC device for secured confidential programming protection. This design illustrates the necessary qualities that are essential for the development of highly secure software. The application specific APIs and software authority management also offer programs developed and designed to be safe and to prevent copying and theft of information. No need for third-party configuration and set-up costs.



Compatible with Versatile Operating Systems

Both of the MH1 and MP1 Series support Windows XP Embedded and Windows 7 Embedded operating systems and allow real-time applications running on OSs such as Windows CE, and RTX Runtime. Both also support various software libraries for user selection.

*Support of real-time operating systems is available on request. Please consult your distributors or your local sales representatives for availability.

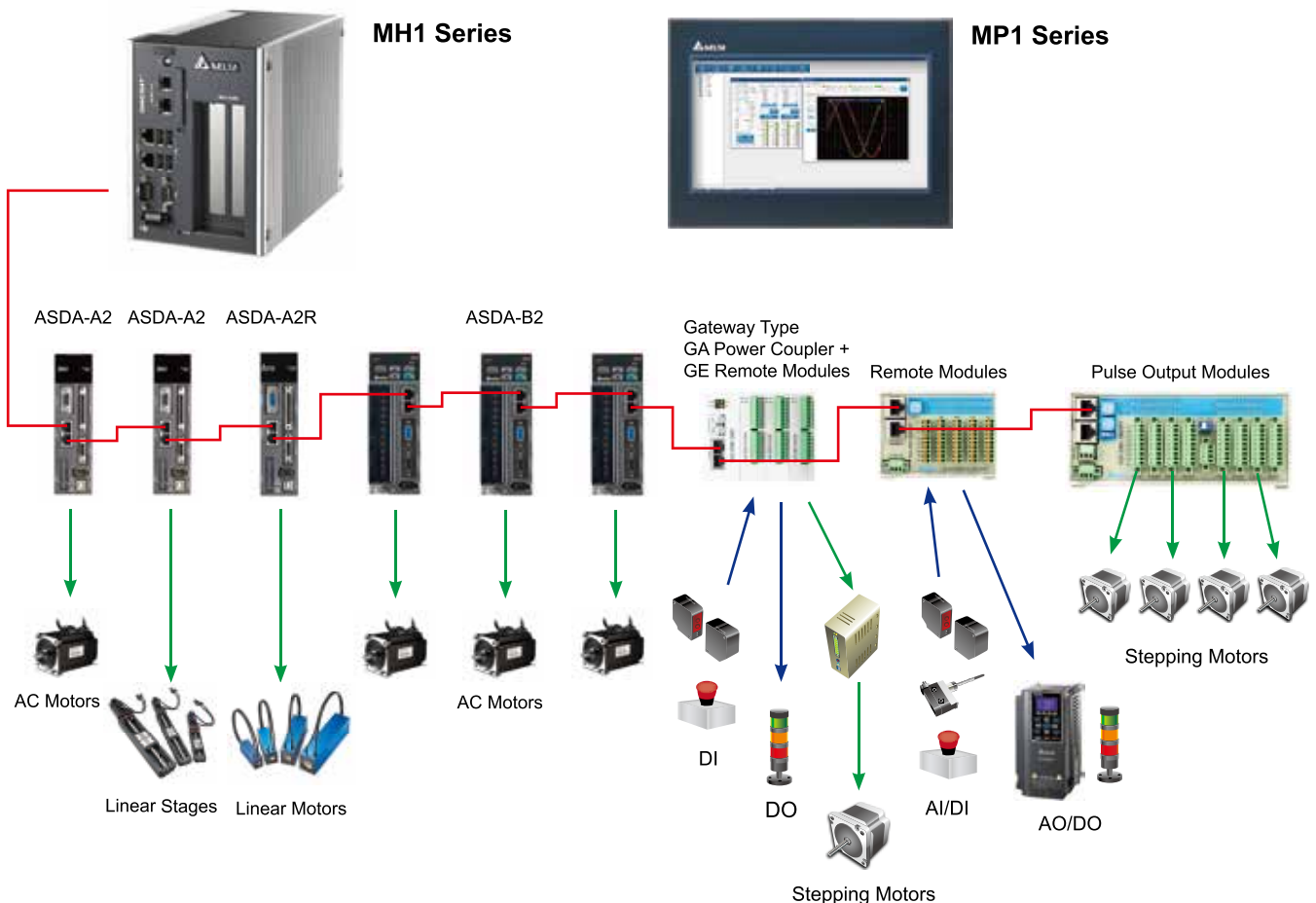


Integrated Motion Control Platform

Delta's PAC provides an integrated motion control platform and supports many software development tools with domain know-how and literature, such as SoftPLC (supporting IEC61131-3), SoftHMI, Soft Numeric Control (SNC) and Soft Robot Control (SRC), perfectly suited for customized requirements of many different types of machines: laser engraving, frame cutting, robot arms, 5-axis CNC machine tools, EDM, waterjet cutting, injection, woodworking and more.

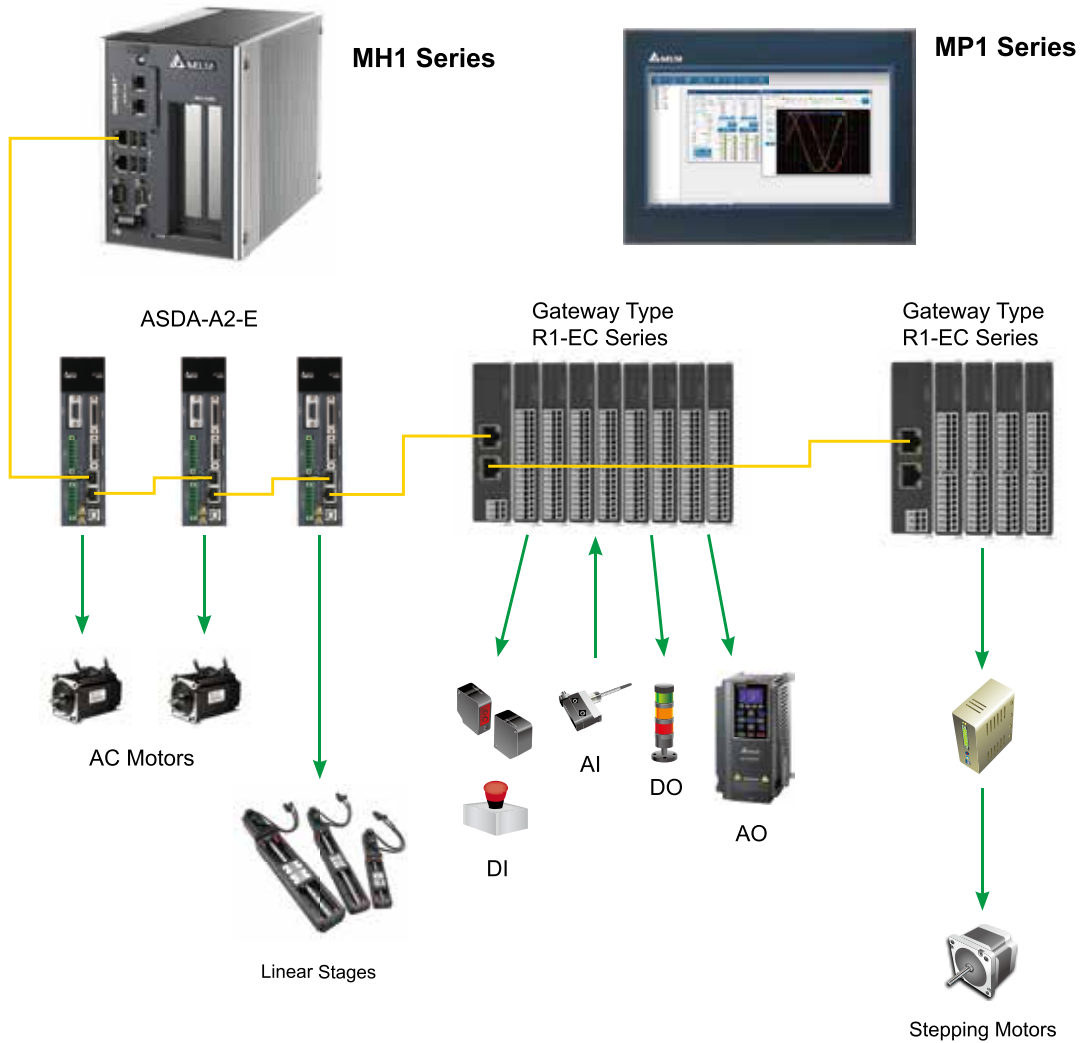
System Configuration

DMCNET Communication Structure



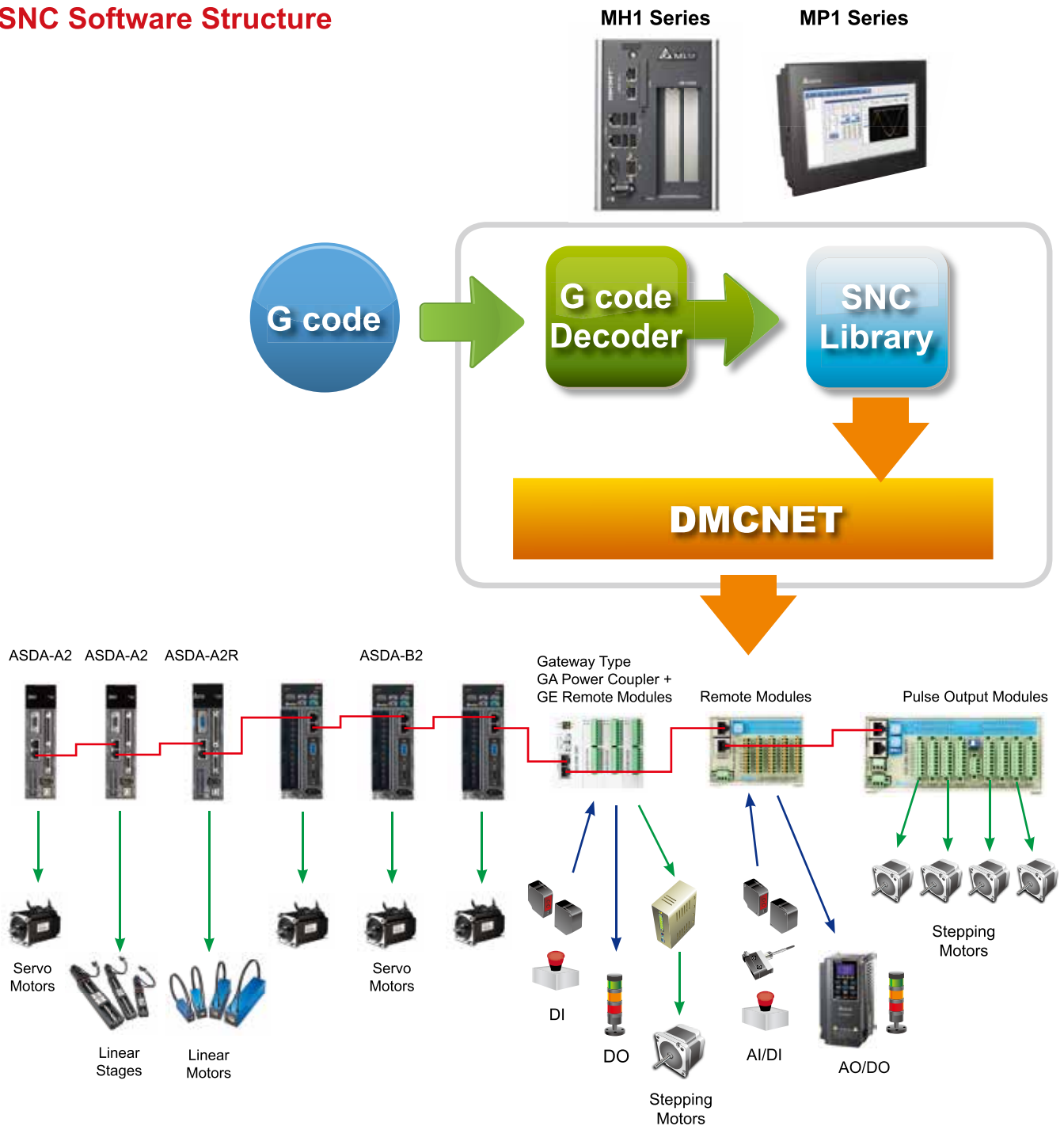
System Configuration

EtherCAT Communication Structure



Soft Numeric Control (SNC)

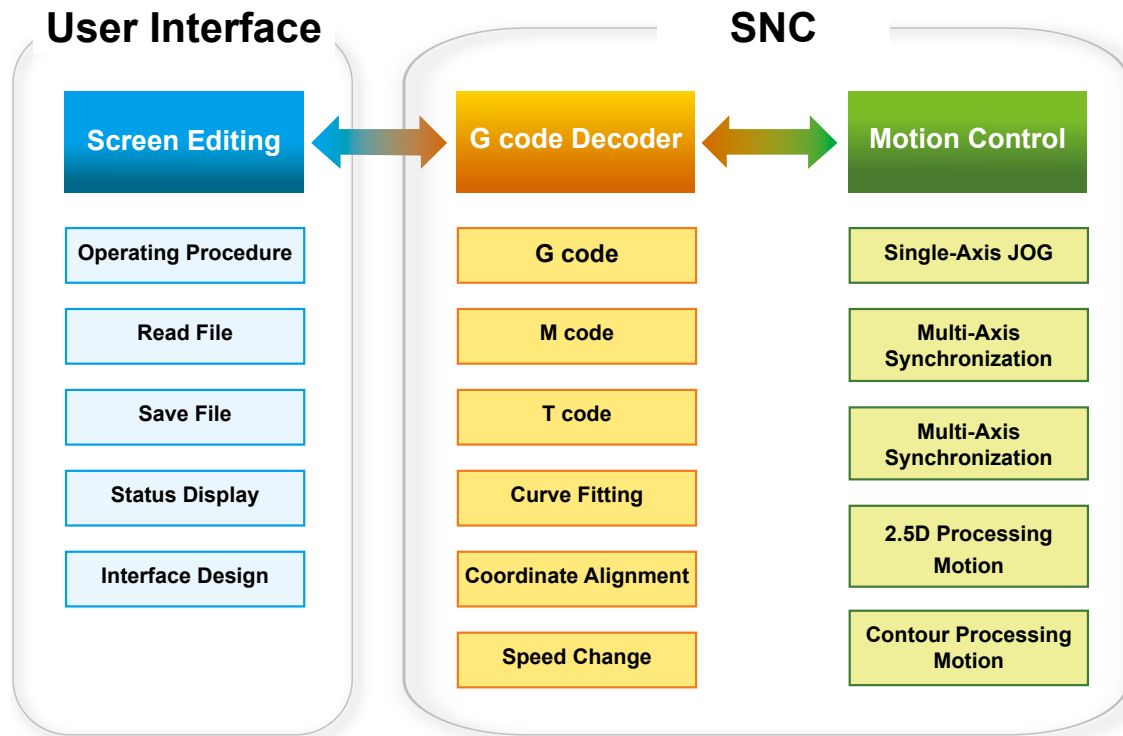
SNC Software Structure



Soft Numeric Control (SNC) Library

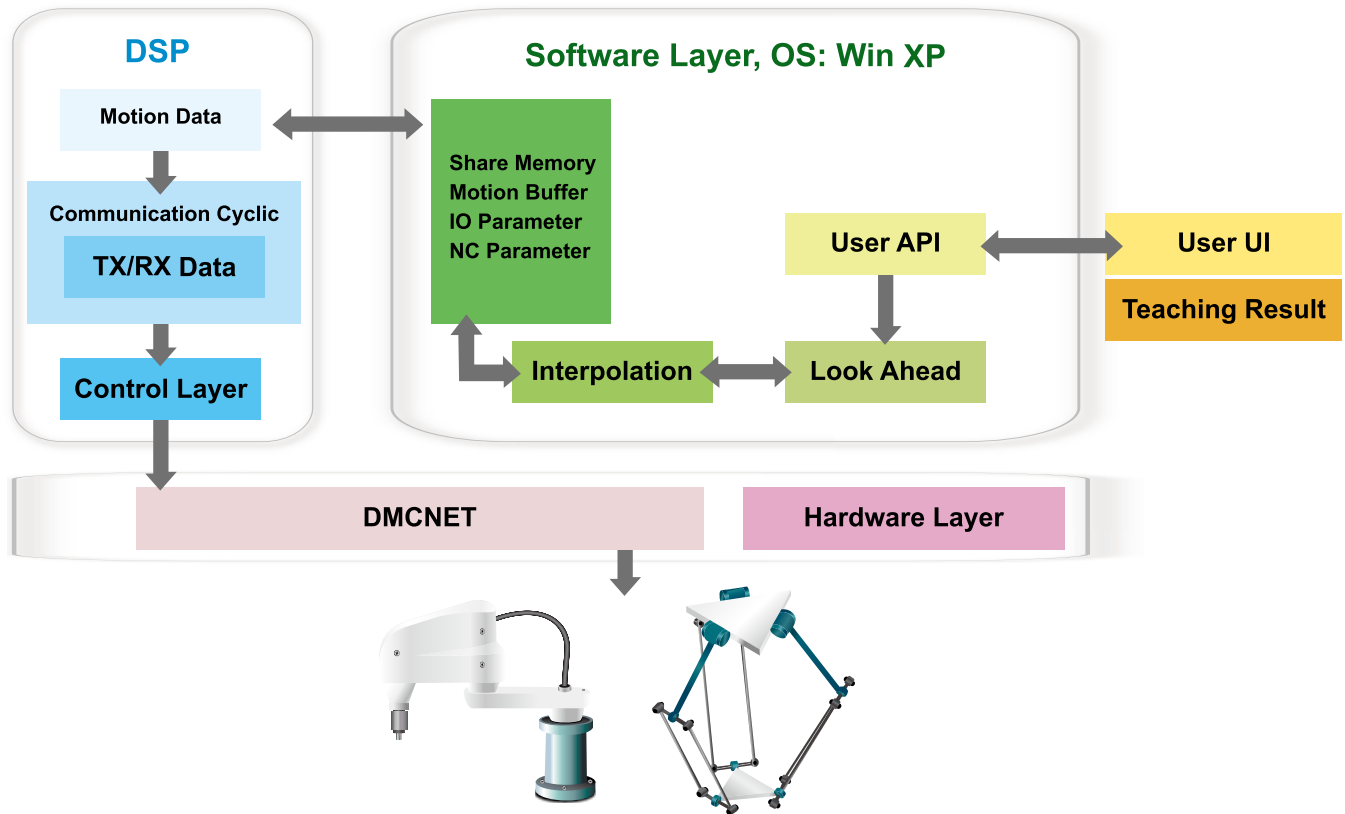
The SNC Library offers abundant DLLs, such as built-in G code decoder, Jerk control, S-curve smoothing, automatic corner deceleration, high speed multi-block look-ahead, curve fitting, tool management and other functions to make BCB, C#, Delphi, VB, VB.Net, and VC easy to develop user-defined NC programs.

G code Decoder



Soft Robot Control (SRC)

Software Structure

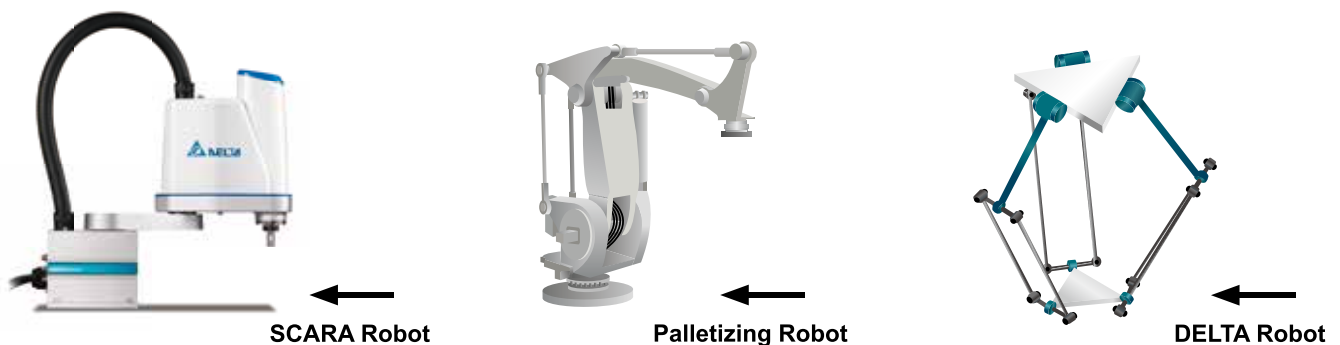


Soft Robot Control (SRC) Library

The SRC Library offers abundant DLLs, and supports BCB, C#, Delphi, VB, VB.Net, VC and other development platforms for easy programming and actual graphical functions for robot control.

Comprehensive Robot Control Functions

Integrated advanced application specific APIs aid in quickly defining the motion control commands to dramatically ease the implementation of controlling different types of robots, such as SCARA robot, palletizing robots, DELTA robots and 6-axis robots.



Soft Programmable Logic Controller (SoftPLC)

SoftPLC Software Features

Standard PLC Programming Languages

The SoftPLC supports IEC 61131-3 standard Part 1, Part 2 and Part 4 function blocks for motion control, and three kinds of PLC programming languages for programmable control systems: FBD (Function Block Diagram), LD (Ladder Diagram), and ST (Structured Text, Pascal type language) to help users save development time, and lower maintenance and support costs while eliminating confusion.

It makes engineering easier and the software is reusable across Delta's PAC platform.



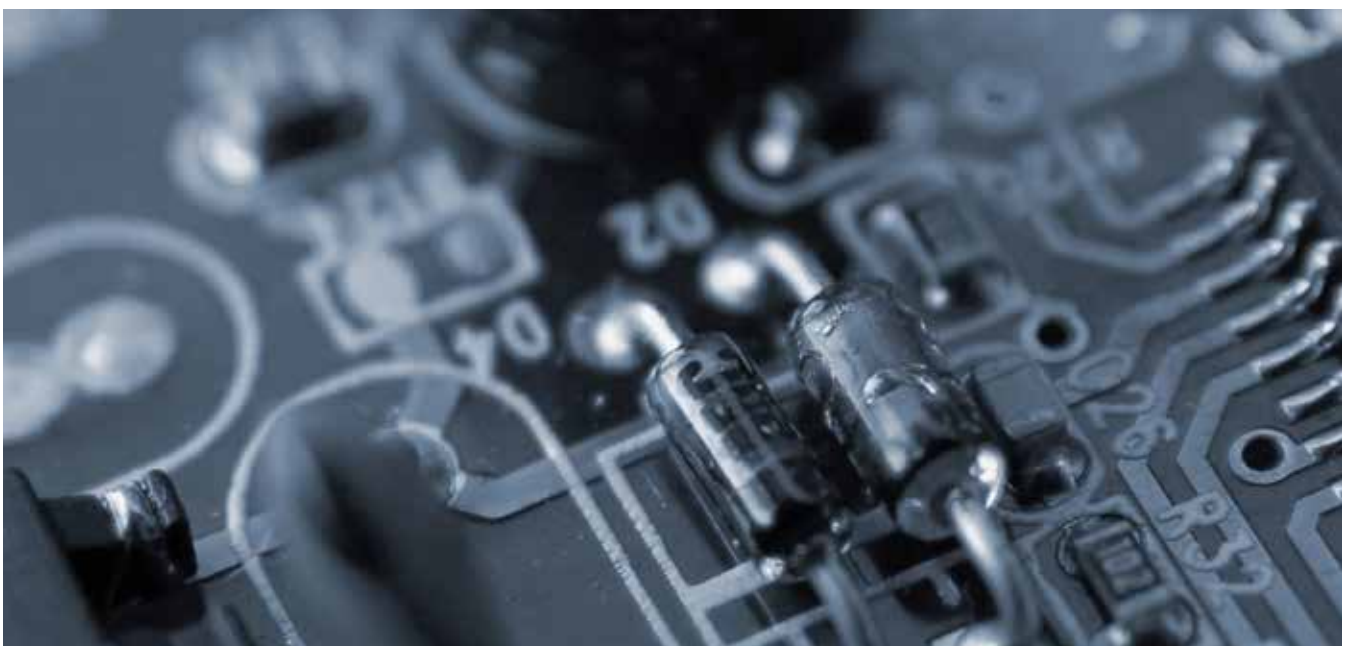
EtherCAT and DMCNET Communication Protocols

The SoftPLC employs high-speed EtherCAT and DMCNET communication protocols to enable better synchronization for high-speed motion and I/O extension. It connects a maximum of 100 EtherCAT slave module units or 24 DMCNET slave module units without interfering with wiring across different solutions.



Tasks and Function Blocks

To tackle various applications and increase developer efficiency, the SoftPLC offers up to 8 kinds of individual tasks. Each task can edit a maximum of 10,000 function block numbers for PLCopen programming, I/O control or motion control. In this way programming is less hardware dependent, application development requires less effort, and it saves costs involved in training and support.



Ordering Information

Model Explanation - MH1 Series

M H 1 - S 3 0 D - A 1 1 D 0

Product Name:
Motion Control Hub 1st Generation

Version:
D0 = Standard Version

CPU Information:
S30 = VIA Nano X2 Dual Core 1.2GHz
A12 = Intel Atom E3845 Quad Core 1.91GHz
C50 = Intel Core i5-3610ME Dual Core 2.7GHz
C70 = Intel Core i7-3612QE Quad Core 2.1GHz

DRAM & Micro-SD Card Options:

| | CFast | SSD |
|---|-------|-----|
| 0 | - | - |
| 1 | 4GB | 4GB |

Extension Interface:
D = DMCNET
E = EtherCAT
G = Giga LAN

CFast Card & SSD Card Options:

| | DRAM | micro-SD |
|---|------|----------|
| 0 | - | - |
| 1 | 4GB | 4GB |

Extension Slot Interface:
0 = No Extension Slot
A = 2 PCI slots
B = 2 PCIe slots x1 + x1
C = 2 PCIe slots x4 + x1

Model Explanation - MP1 Series

M P 1 - A 1 0 D - 10 1 1 D 0

Product Type:
Motion Control Panel 1st Generation

Version:
D0 = Standard Version

CPU Information:
A10 = Intel Atom E3825 Dual Core 1.33GHz
A12 = Intel Atom E3845 Quad Core 1.91GHz
C50 = Intel Core i5-3610ME Dual Core 2.7GHz
C70 = Intel Core i7-3612QE Quad Core 2.1GHz

DRAM & Micro-SD Card Options:

| | CFast | SSD |
|---|-------|------|
| 0 | 16GB | - |
| 1 | 16GB | - |
| 2 | - | 16GB |

Communication:
D = DMCNET
E = EtherCAT
G = Giga-LAN

CFast Card & SSD Card Options:

| | DRAM | micro-SD |
|---|------|----------|
| 0 | 4GB | - |
| 1 | 2GB | - |
| 2 | - | 4GB x 2 |

Display Size:
05 = 5"
10 = 10"
12 = 12"
15 = 15"

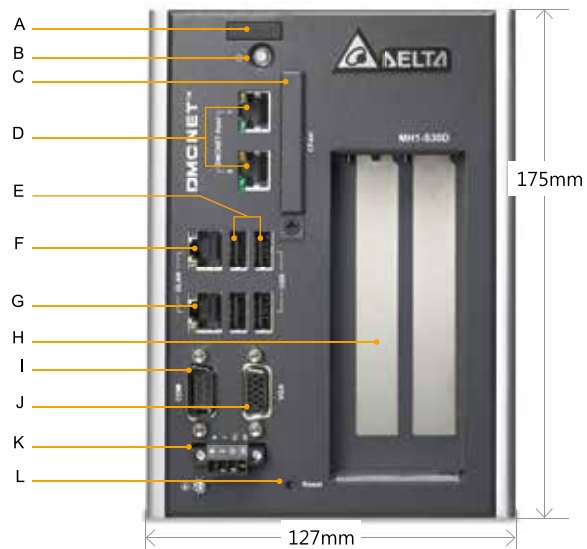
Ordering Information

Specifications - MH1 Series

| Model Name | | MH1-S30D | MH1-A12D | MH1-A12E | MH1-C50D | MH1-C50E | MH1-C70D | MH1-C70E |
|------------------------|--------------------------|---|--------------------------------------|----------|---|----------|---------------------------------------|----------|
| Processor System | Processor | VIA Nano X2 Dual Core 1.2GHz | Intel Atom E3845 Quad Core 1.91GHz | | Intel Core i5-3610ME Dual Core 2.7GHz | | Intel Core i7-3612QE Quad Core 2.1GHz | |
| | System Chipset | VIA VX900 | x | | Intel QM77 | | | |
| | MRAM | 128KB | | | | | | |
| | BIOS | AMI BIOS | | | | | | |
| Display Interface | System Memory | 1 x DDR3-1066 Max. up to 8 GB | DDR3L-1333 4 GB, supports ECC | | 2 x DDR3-1600 Max. up to 16 GB, supports ECC | | | |
| | CRT | 2048x1536 / 75Hz | 2560x1600 / 60Hz | | 2048x1536 / 75Hz | | | |
| I/O Interface | Ethernet | 2 x IEEE 802.3/802.3u/802.3ab 1Gbps | | | | | | |
| | DMCNET | √ | √ | x | √ | x | √ | x |
| | EtherCAT | x | x | √ | x | √ | x | √ |
| | USB | 4 x USB 2.0 | | | | | | |
| | Serial Port | 1 x RS-232 (Hardware auto flow control) | | | | | | |
| | Digital Input | x | 1-CH isolated, 24VDC Sink (5mA/CH) | x | 1-CH isolated, 24VDC Sink (5mA/CH) | x | 1-CH isolated, 24VDC Sink (5mA/CH) | x |
| | Digital Output | x | 1-CH isolated, 24VDC Sink (10mA/CH) | x | 1-CH isolated, 24VDC Sink (10mA/CH) | x | 1-CH isolated, 24VDC Sink (10mA/CH) | x |
| | Encoder Input | x | 4-CH isolated, QEP± | x | 4-CH isolated, QEP± | x | 4-CH isolated, QEP± | x |
| | Compare Output | x | 2-CH isolated, CMP± | x | 2-CH isolated, CMP± | x | 2-CH isolated, CMP± | x |
| | Expansion | [2 x PCI slot] [2 x PCIe slot]x1 | 2 x PCI slot 2 x PCIe slotx1 | | [2 x PCI slot] x1 [2 x PCIe slot]x1 [1 x PCIe slot] x4 + [1 x PCIe slot] x1 | | | |
| Storage | CFast card | 1 x CFast Cat (optional) | | | | | | |
| | Micro-SD card (optional) | 1 x Micro-SD card (optional) | x | x | x | x | x | x |
| | eMMC | x | 1 x eMMC (optional) | | x | x | x | x |
| | Solid State Disk | 1 x 2.5" SATA SSD (optional) | | | | | | |
| Power Requirements | Input Voltage | DC12~30V±10% | | | | | | |
| | Input Type | ATX | | | | | | |
| Certification | Safety | CE | | | | | | |
| Dimensions (W x H x D) | | 127 x 175 x 250 mm (5"x6.89"x9.85") | | | | | | |
| Operation Temperature | | 0°C ~50°C | | | | | | |
| Weight | | 4.7 Kg | | | | | | |
| Software Support | | Windows 7.0, Windows XP/7 Embedded, RTX | Windows 7.0, Windows 7 Embedded, RTX | | Windows 7.0, Windows XP/7 Embedded, RTX | | | |

Exterior Description

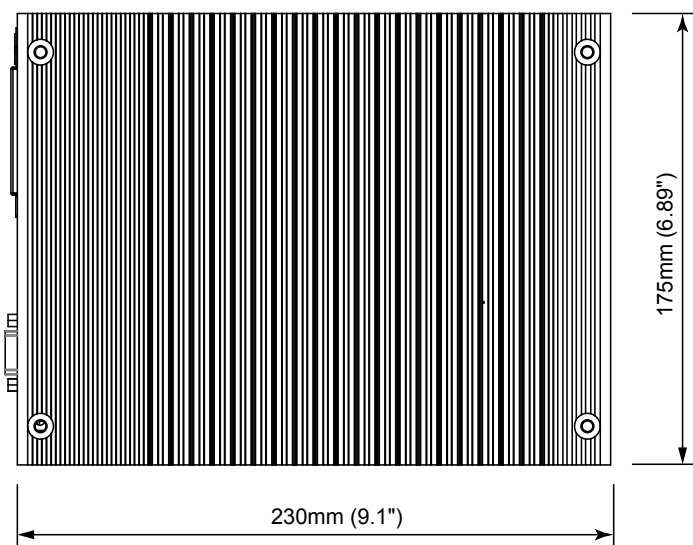
| 端口說明 | |
|------|-----------------------------|
| A. | Status Indicator |
| B. | Power Switch |
| C. | CFast Card Slot |
| D. | DMCNET |
| E. | SUSB 2.0 Port |
| F. | EtherCAT Communication Port |
| G. | 1 Gbps Ethernet Port |
| H. | PCI / PCIe Extension Slot |
| I. | Serial Communication Port |
| J. | VGA Output Connector |
| K. | Power Supply Terminal |
| L. | Reset Switch |



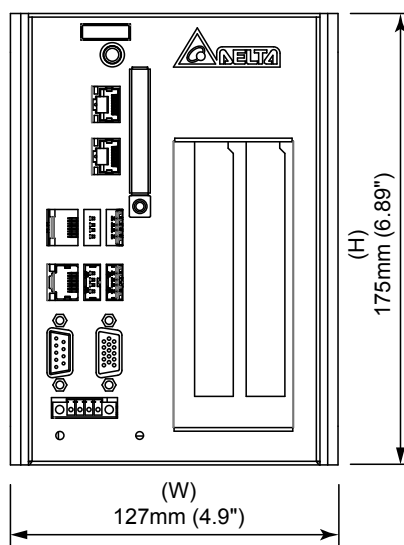
Dimensions - MH1 Series

MH1-S30D Dimensions: 230mm(L)x 127mm(W)x 175mm(H)

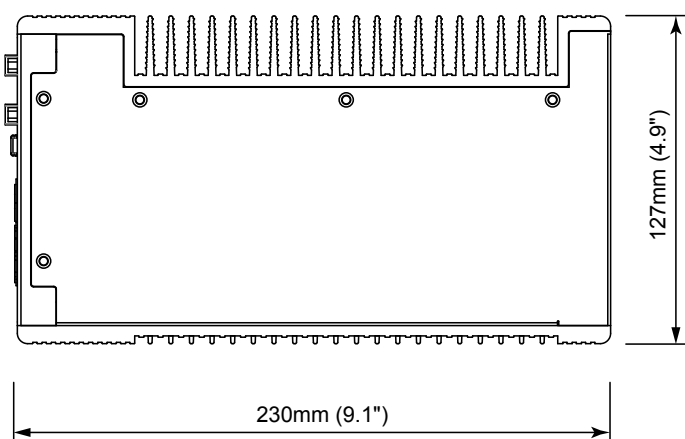
Lateral View



Front View



Rear View

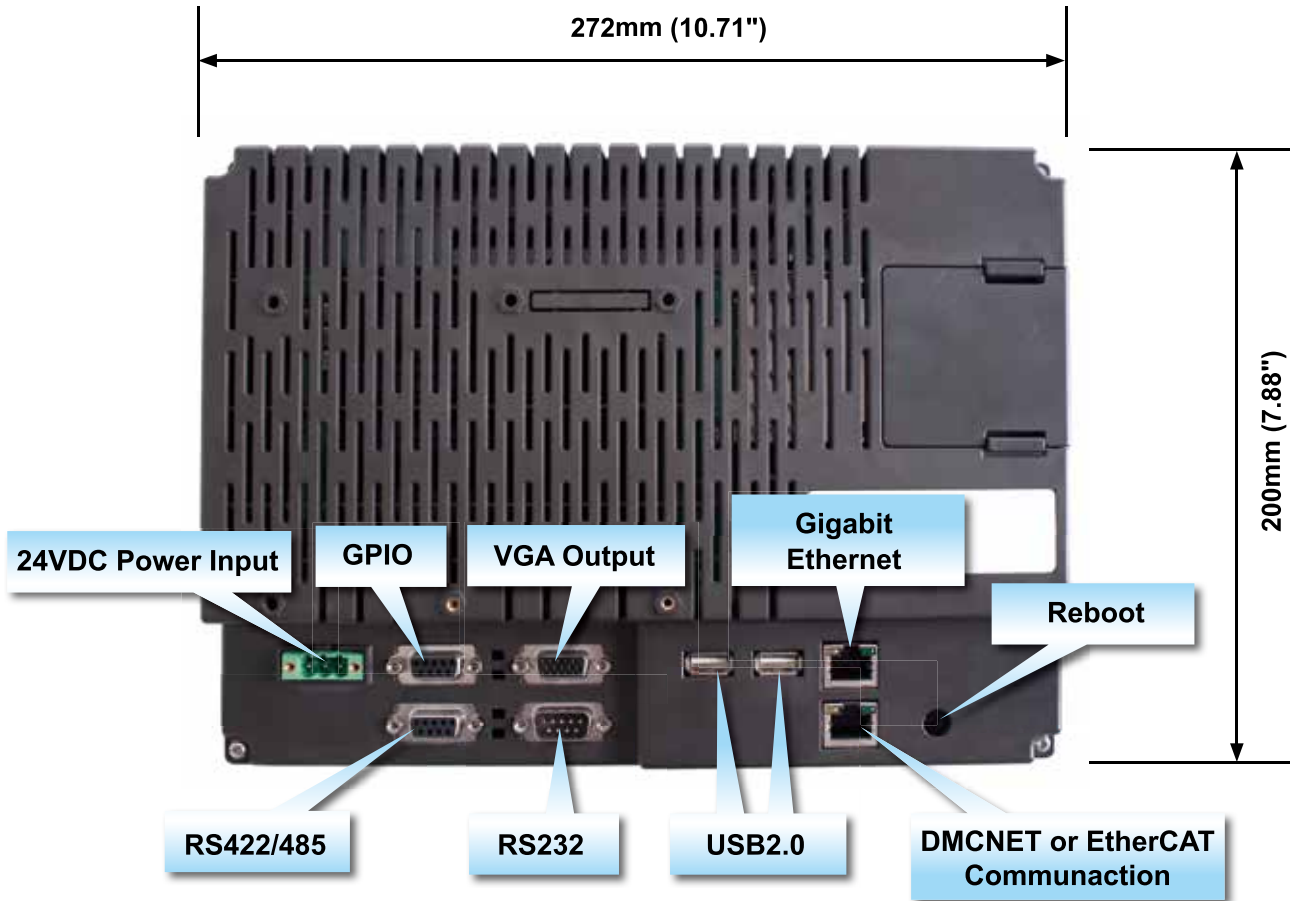


Ordering Information

Specifications - MH1 Series

| Model Name | | MP1-A10D-10 | MP1-A10G-10 | MP1-A12D-12 | MP1-A12G-12 | MP1-C50D-12 | MP1-C50G-12 | MP1-C70D-12 | MP1-C70G-12 |
|------------------------|------------------|--|---|--|--|---|--|---|--|
| Processor System | Processor | Intel Atom E3825 Quad Core 1.33GHz | | Intel Atom E3845 Quad Core 1.91GHz | | Intel Core i5-3610ME Dual Core 2.7GHz | | Intel Core i7-3612QE Quad Core 2.1GHz | |
| | System Chipset | x | x | x | x | Intel QM77 | | | |
| | MRAM | 128KB | | | | | | | |
| | BIOS | AMI BIOS | | | | | | | |
| | System Memory | DDR3L-1333 2 GB, supports ECC | | DDR3L-1333 4 GB, supports ECC | | 2 x DDR3-1600 Max. up to 16 GB, supports ECC | | | |
| Display Interface | LCD Panel | 10.1" TFT LCD (262,144 color) 1024 x 600 pixels (WXGA) LED backlight 222.72(H) x 125.28(V) mm | | 12.1" TFT-LCD (262k/16.2M color) 1024 x 768 pixels (XGA) LED backlight 245.76(H) x 184.32(V) mm | | | | | |
| | Touch Panel | 4-wire Resistive (Max. 10-bit Resolution) | | | | | | | |
| | LED | POWER/RUN/ERROR | | | | | | | |
| | CRT | 2560x1600 / 60Hz | | | | 2048x1536 / 75Hz | | | |
| I/O Interface | Ethernet | 1 x IEE 802.3/802.3u/ 802.3ab 1 Gbps | 2 x IEE 802.3/802.3u/ 802.3ab 1 Gbps | 4 x IEE 802.3/802.3u/ 802.3ab 1 Gbps | 1 x IEE 802.3/802.3u/ 802.3ab 1 Gbps | 4 x IEE 802.3/802.3u/ 802.3ab 1 Gbps | 1 x IEE 802.3/802.3u/ 802.3ab 1 Gbps | 4 x IEE 802.3/802.3u/ 802.3ab 1 Gbps | 1 x IEE 802.3/802.3u/ 802.3ab 1 Gbps |
| | Ethernet w/ POE | x | x | x | 4 x IEE 802.3/802.3u/ 802.3ab 1 Gbps PoE IEEE 802.3af | x | 4 x IEE 802.3/802.3u/ 802.3ab 1 Gbps PoE IEEE 802.3af | x | 4 x IEE 802.3/802.3u/ 802.3ab 1 Gbps PoE IEEE 802.3af |
| | DMCNET | √ | x | √ | x | √ | x | √ | x |
| | EtherCAT | x | √ | x | √ | x | √ | x | √ |
| | USB | 2 x USB 2.0 | | 1 x USB 3.0 4 x USB 2.0 | | | 4 x USB 3.0 2 x USB 2.0 | | |
| | Serial Port | 1 x RS-232 (w/ Hardware auto flow control) 1 x RS-422/485 | | 1 x RS-232 (w/ Hardware auto flow control) 2 x RS-422/485 | | | 2 x RS-232 (w/ Hardware auto flow control) 2 x RS-422/485 | | |
| | Digital Input | 8-CH isolated, 24VDC Sink/Source (5mA/CH) | | | | | | | |
| | Digital Output | 4-CH isolated, 24VDC Sink (500mA/CH) | | | | | | | |
| | Encoder Input | x | 2-CH isolated, QEP± | | | | | | |
| | Compare Output | x | 2-CH isolated, CMP± | | | | | | |
| Storage | CFast card | 1 x CFast Cat (optional) | | | | | | | |
| | Solid State Disk | 16GB SSD | | 1 x 2.5" SATA SSD | | | | | |
| | eMMC | 1 x eMMC (Optional) | | | | x | | | |
| Power Requirements | Input Voltage | DC12~30V±10% | | | | | | | |
| | Input Type | ATX | | | | | | | |
| Certification | Safety | CE | | | | | | | |
| Dimensions (W x H x D) | | 271 x 200 x 61 mm | | 2015 Q4 | | | 2015 Q4 | | |
| Operation Temperature | | 0°C ~50°C | | | | | | | |
| Weight | | 1.75 KG | | 2015 Q4 | | | 2015 Q4 | | |
| Software Support | | Windows 7.0, Windows XP/7 Embedded, RTX | | | | | | | |

Dimensions - MP1 Series



Ordering Information

Optional Accessories

| Hardware | |
|-------------------|--------------------------------------|
| Delta Part Number | IPC-CFAMB01611 |
| Descriptions | CFAST MLC SATA III 16GB INNODISK |
| Delta Part Number | IPC-CFASA01610 |
| Descriptions | CFAST SLC SATA II 16GB TRANSCEND |
| Delta Part Number | IPC-SSDMB06411 |
| Descriptions | SSD 2.5" MLC SATA III 64GB INNODISK |
| Delta Part Number | IPC-SSDMB12811 |
| Descriptions | SSD 2.5" MLC SATA III 128GB INNODISK |

| Software | |
|-------------------|--------------------------------------|
| Delta Part Number | SAS-0WEMXPE |
| Descriptions | SW OS WINDOWS XP EMBEDDED |
| Delta Part Number | SAS-0RTXX86 |
| Descriptions | SW OS RTX RTOS 32-BIT |
| Delta Part Number | SAS-1COMECM |
| Descriptions | SW COMM ETHERCAT MASTER EC-MASTER |



Smarter. Greener. Together.

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