



Automation for a Changing World

Delta Woodworking Motion Control Solution



High-end Woodworking Motion Control Solution

With the advance of industrial technology, wooden furniture and interior decoration requirements have gradually turned to fast assembly and customized design with various styles and types. However, the traditional production and manufacturing of woodworking relies heavily on manual operation which causes problems such as low production efficiency and inconsistent quality. Moreover, traditional woodworking machine can only perform single processing functions. Complex processes such as side-milling and engraving require different machines to operate. The styles are also unchanging and lack variety. Since traditional production no longer meets market requirements, manufacturers in the woodworking industry seek equipment and production line upgrades.

As a world-class industrial automation brand, Delta is launching a new High-speed Woodworking Motion Control Solution to meet the needs of multiple applications. Providing both the high-speed motion control system, EtherCAT and Delta's own DMCNET, the PAC and CNC controllers can be applied to a variety of woodworking machines such as automatic labelling machine, router with automatic labeling and conveyor system, point-to-point (PTP) router, 5-side drilling & boring machine, machining center for woodworking, solid wood door machine, mortise & tenon machine, and more, offering an optimized woodworking production line for our customers.

Delta's High-speed Woodworking Motion Control Solution provides both Delta PAC controller and CNC controller. The PAC controller adopts a high-performance CPU (Intel® Core™ processors) and Windows IoT system. The CNC controller employs the Advanced RISC Machine (ARM) system structure that provides a comprehensive software control platform and motion control programming environment that support the SNC interpreter and G-code language. The system also offers functions such as tool management and coordinates setting to ensure high-precision controlling on multiple servo motors and enhance overall processing quality, while saving labor cost and reducing material waste. Combining with third-party CAD / CAM software and numeric control system, users are able to simulate complicated procedures such as slot-milling, notch cutting, drilling, sawing, cutting and more to elevate overall processing efficiency. To meet the needs of the woodworking market, Delta's High-speed Woodworking Motion Control Solution helps our customers rapidly produce ornate and practical wooden products in small-volume and large variety orders with machines that effectively perform multiple functions, realizing our promise of "Automation for a Changing World."



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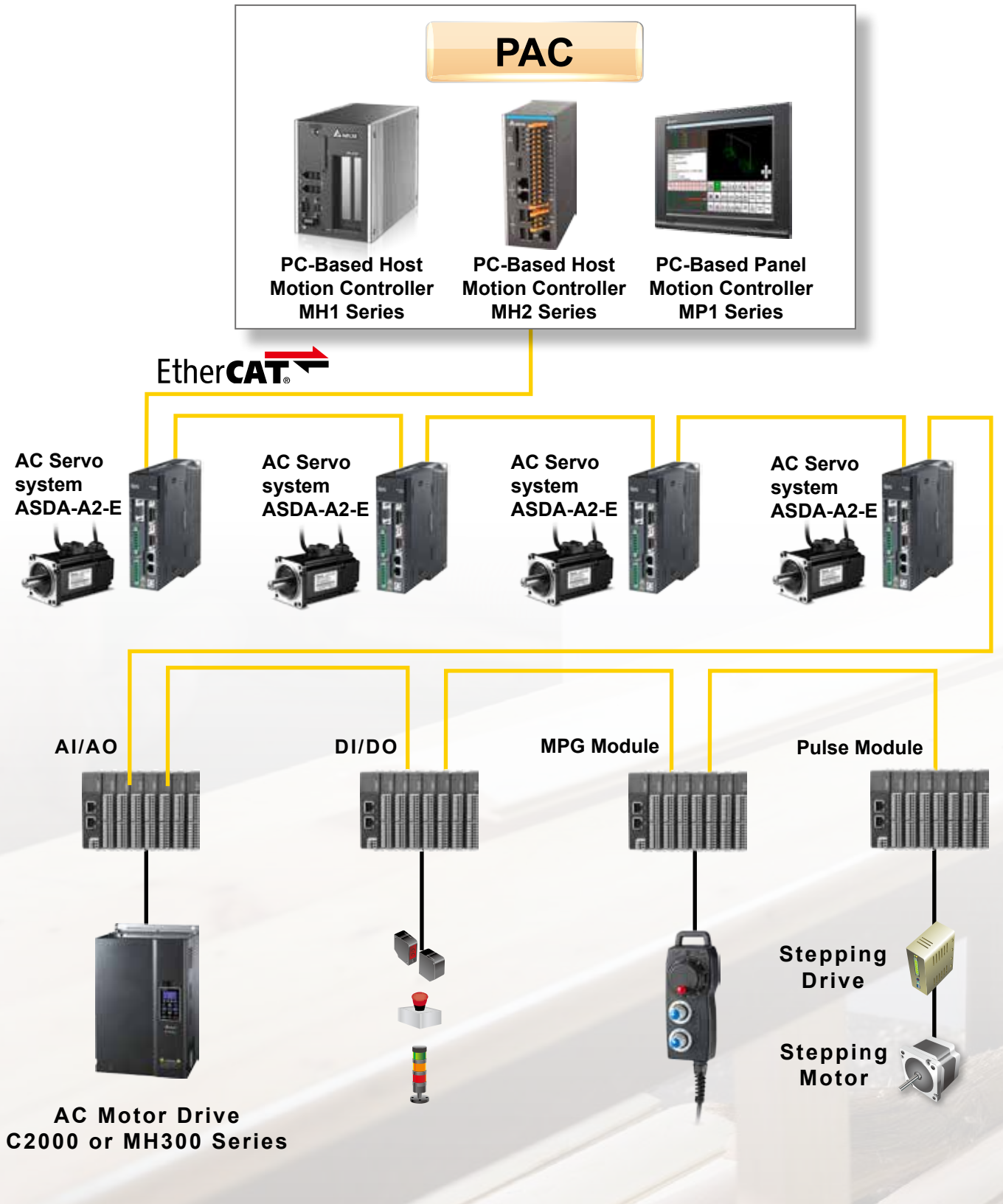
Other Selectable Products

Modules for EtherCAT System

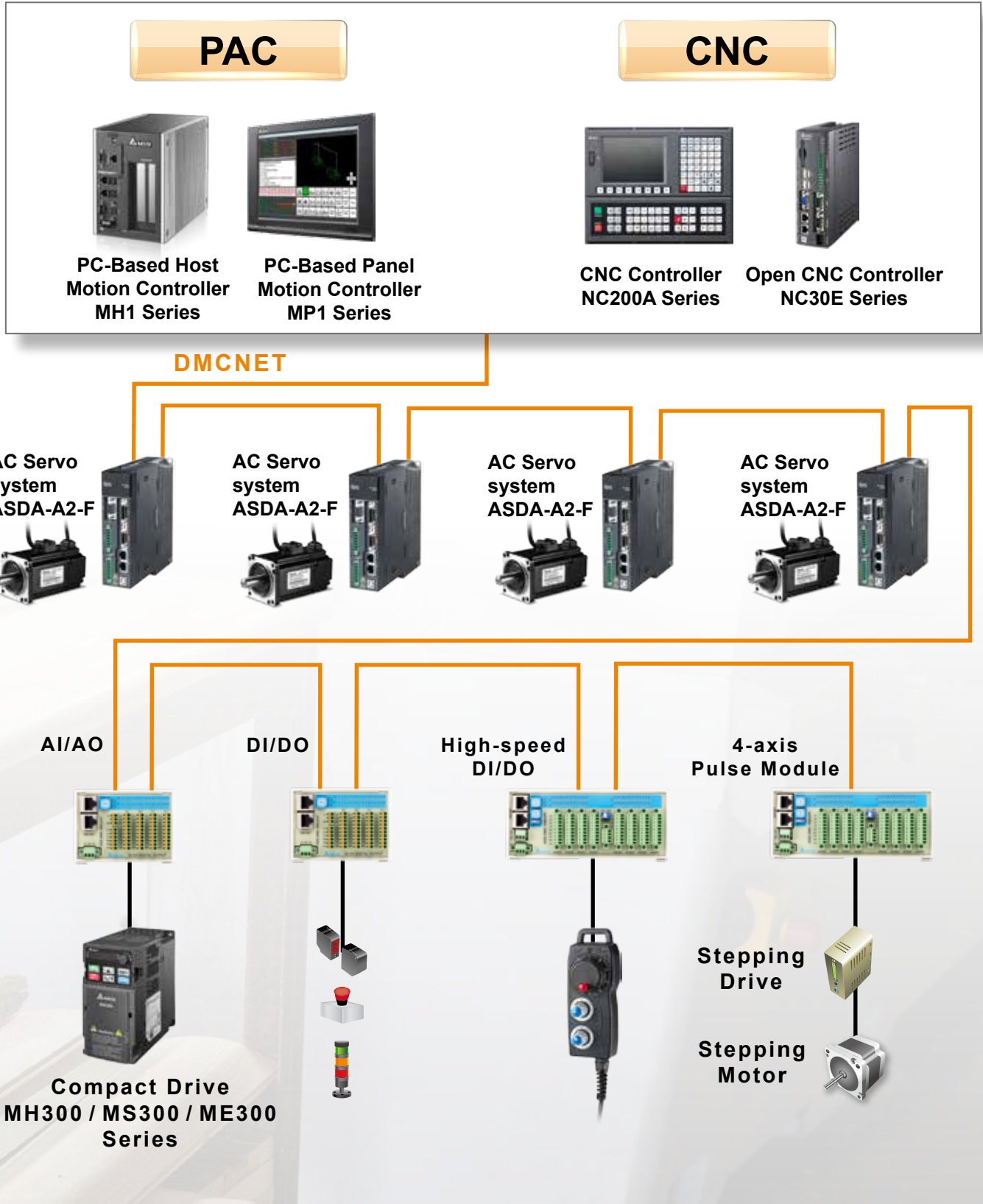
Modules for DMCNET System

Woodworking Machine Motion Control Structure

EtherCAT High-speed Motion Control System



DMCNET High-speed Motion Control System



* DMCNET stands for Delta Motion Control Network

Woodworking Machine

Automatic Labeling Machine

- ▶ Performs wooden material loading and barcode sticker labeling
- ▶ Features
 - Operating with specialized labeling software, the machine performs labeling before router operation to avoid label misplacement and improve identification efficiency of wooden parts
 - Suitable for processing before router operation



Router with Automatic Labeling and Conveyor System

- ▶ Performs automated loading and labeling for wood material
- ▶ Executes drilling, slotting, cutting, unloading, and more in router process to enhance processing efficiency of woodworking
- ▶ Features
 - Adopts G-code programming for easier processing and time-saving
 - Matches CAD / CAM software for router process to help arrange optimized cutting path and elevate production efficiency



Point-to-Point (PTP) Router

- ▶ Suitable for a variety of complex woodworking applications: engraving, side-milling, slot-milling, vertical drilling, notch cutting, sawing, and more
- ▶ Small pieces of wood material can be processed simultaneously
- ▶ Features
 - Utilizes G-code to execute PTP router operation and process milling, cutting, engraving, cutting, and more
 - Motion Program Macro (MPM) can be used with router toolpath to make programming easier and more flexible
 - Built-in tool management function to save 100 sets of tool information directly via tool setting



5-side Drilling & Boring Machine

- ▶ Executes wooden board bottom & side drilling and boring
- ▶ Features
 - Automatically performs toolpath planning and woodpiece drilling by setting woodpiece dimensions and drilling pattern
 - Drilling and boring process can be performed by G-code or point-to-point coordinate setting, offering a more convenient and flexible programming



Machining Center for Woodworking

▶ **Processes a variety of wood material such as plywood and solid wood piece, suitable for nesting cut application for cabinet or engraving for solid wood pieces**

▶ **Features**

- Adopting G-code for router processing and ACT with built-in tool management function make engraving, drilling, and boring processing easier
- Matches with CAD / CAM or nesting software to generate the most efficient toolpath and enhance processing efficiency



Solid Wood Door Machine

▶ **Processes solid wood pieces into various component parts such as stiles, rails mullions, and crossrails for doors**

▶ **Multiple woodpieces can be processed simultaneously**

▶ **Features**

- Utilizes CAD / CAM software to design stile and rail pattern; the processing of door component is performed by G-code to increase accuracy and production efficiency
- Supports EtherCAT system and Delta's AC Motor Drive VFD Series which allows to use multi-axis high speed spindles for stiles and rails processing



Mortise & Tenon Machine

▶ **Processes wooden stick or pillar into a variety of mortise and tenon.**

▶ **Multiple woodpieces can be processed simultaneously**

▶ **Features**

- Able to utilize CAD / CAM software to pre-design and simulate patterns of mortise and tenon in advance
- Adopts G-code to perform machining and achieve easy, flexible, accurate manufacturing
- Processes wooden mortise and tenon automatically by simply setting the patterns and dimensions with the software



Product Application

PC-based Host Motion Controller

MH1 Series



Introduction

- Adopts Intel Atom and Core i5 / i7 CPU
- Adopts cable-less and fan-less hardware design to increase reliability
- Provides multiple built-in USB ports, Ethernet ports, and RS-232 serial communication interface
- Adopts CFAST card for storage; built-in SATA and supports PCI/PCIe interfaces
- Built-in Security IC chip for safer software protection
- Adopts Windows 7 embedded / Windows 10 IoT OS system and provides DLL Library for various programming environment
- Supports third-party software for flexible extension

Features

- Supports DMCNET or EtherCAT communication
- Under the IMP environment, controls up to 36 slave nodes / axes via DMCNET or EtherCAT communications*
- Offers Soft Numeric Control function which supports standard G-code program
- Provides a variety of motion functions: single-axis movement, multi-axis linear interpolation, circular / helical interpolation, and MPG function
- Available to connect with DMCNET or EtherCAT motion control cards for further extension

* The supporting axis may differ due to different models or software applied.
For more details, please refer to product manual or product catalogue.

PC-based Host Motion Controller MH2 Series



Introduction

- Adopts Intel Celeron CPU
- Display output adopts HDMI interface, providing digital signal transmission without deterioration of the picture quality
- Adopts compact, fanless and low-power consumption hardware design with isolated 8 points DI/DO terminals
- Built-in two sets of USB v2.0, two sets of Ethernet port and RS232 / RS485 serial communication interfaces
- Built-in isolation A B Z Encoder input interface, supporting MPG input.
- Adopts compact sized M.2 SATA 32GB SSD for media storage with high speed performance and space saving
- Built-in Security IC chip for safer software protection
- Adopts Windows 10 OS system with DLL Library for various programming environment
- Supports third-party software for flexible extension

Features

- Supports EtherCAT communication
- Controls up to to 36 slave nodes / axes via EtherCAT communications* under the IMP environment
- Soft Numeric Control function, supporting standard G-code program
- Various motion functions: single-axis movement, multi-axis linear interpolation, circular /helical interpolation, and MPG function

* The supporting axis may differ due to different models or software applied.
For more details, please refer to product manual or product catalogue.

Product Application

PC-based Panel Motion Controller

MP1 Series



Introduction

- Adopts Intel Atom and Celeron CPU
- Built-in isolated digital input and digital points
- Provides multiple built-in USB ports, Ethernet ports, and RS-232 serial communication interface
- Support CFAST / eMMC storage interface
- Built-in Security IC chip for safer software protection
- Adopts Windows 7 embedded / Windows 10 IoT OS system and provides DLL Library for various programming environment
- Supports third-party software for flexible extension

Features

- Supports DMCNET or EtherCAT communication and software
- Under IMP environment, controls up to 12 slave nodes / axes via DMCNET and 36 nodes slaves / axes via EtherCAT communication*
- Offers Soft Numeric Control function which supports standard G-code program
- Provides a variety of motion functions: single-axis movement, multi-axis linear interpolation, circular / helical interpolation, and MPG function

* The supporting axis may differ due to different models or software applied.
For more details, please refer to product manual or product catalogue.

PAC Control System



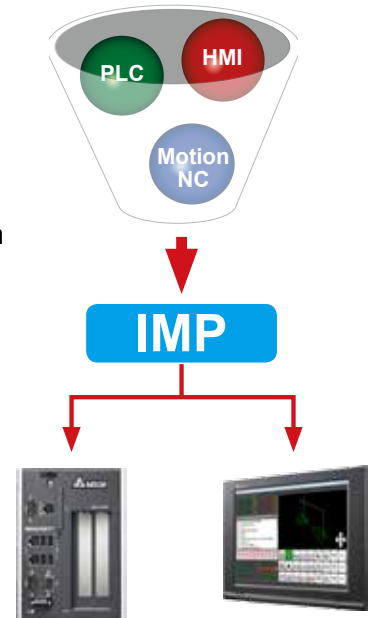
Features

- ▶ **High performance with durable design:** PC-based Controllers with Intel CPU and Windows OS system provide prominent computing performance
- ▶ **Flexible and scalable field bus system:** Supports the high-speed motion control system, the EtherCAT or Delta's DMCNET, that offers convenient and flexible system extension when planning projects or application
- ▶ **Highly integrated software platform:** Built-in specialized motion control software, the IPC Motion Platform (IMP), that combines HMI and PLC softwares (DOPSoft & Ladder Editor) to create a more powerful, functional, and easy-to-use programming environment and shorten developing time
- ▶ **Excellent combination of numerical control:** Supports SNC interpreter, standard G-code (T/M Code is programmable), built-in tool management, settings of NC and work coordinates, and tool compensation. Uses CAM/CAM software to increase motion and processing efficiency
- ▶ **User-friendly programming environment:** Supports Ladder language, 100 sets of MPM (Motion Program Macro), and high-level programming languages such as Visual Studio or LabView, providing a flexible programming environment for SNC and PLC motion and logic controls
- ▶ **High-precision synchronous multi-axis field control:** With EtherCAT or DMCNET communications, the PAC is available to rapidly connect to multiple axis of servo drives and motor drives (EtherCAT). The built-in serial communication can support various peripheral devices to enhance system integration and flexibility

Software Features of PAC System

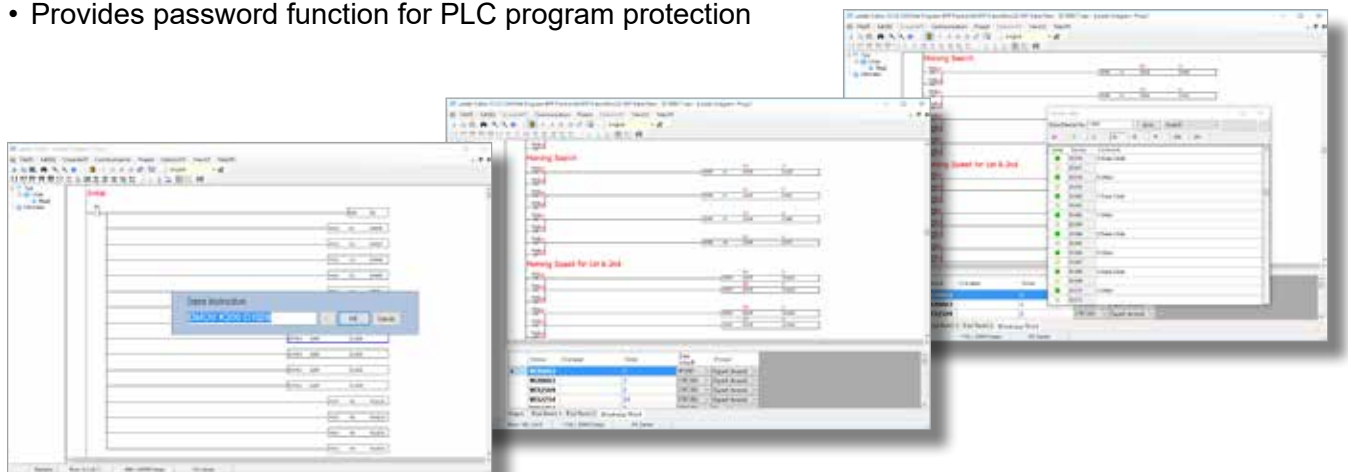
IPC Motion Platform- IMP

- Integrates HMI and PLC softwares (DOPSoft & Ladder Editor) into one development platform to provide a convenient programming environment
- Controls up to 36 slave nodes / axes via DMCNET or EtherCAT communications
- Supports SNC control and MPM language for easy program modification and toolpath adjustment based on needs
- Built-in Modbus and Modbus TCP communication interfaces to enhance the integration of peripheral devices
- Supports Visual Studio to create Graphic User Interface (GUI) or connect to third-party software under IMP environment
- Built-in hardware configuration IMP Quick Start enables users to test motion control functions and check status of slave devices and module configuration via specific parameter settings



PLC Programming Software- Ladder Editor

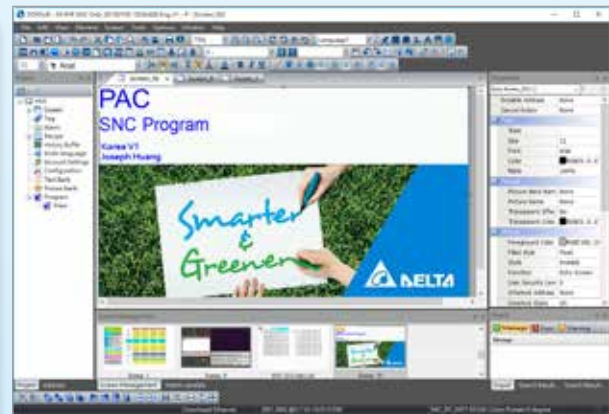
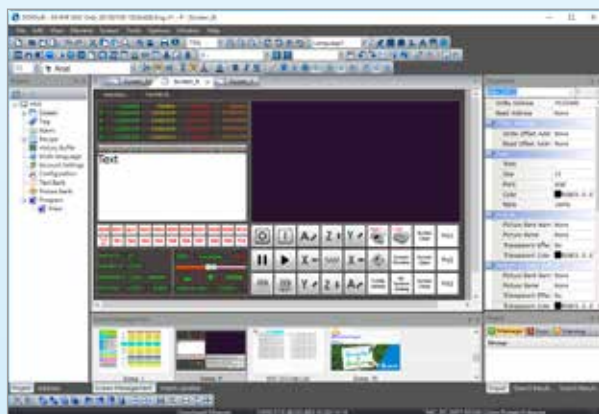
- Provides a convenient programming environment with ladder language and built-in functions such as online monitoring, break-point debug, device table, device monitoring, and more
- Offers a variety of motion control instructions: single-axis movement, multi-axis linear interpolation, circular / helical interpolation, JOG, torque / speed control, and others
- Allows MPM in PLC program
- PLC structure supports main program and sub-program
- Provides password function for PLC program protection



Software Features of PAC System

HMI Programming Software - DOPSoft

- Delta's new HMI programming Software, DOPSoft, provides comprehensive editing functions and simple parameter setting to develop GUI
- Provides a variety of Macro editing functions such as Macro of Screen, on/off Macro buttons, etc, and can be utilized with Macro Wizard to reduce programming error and enhance efficiency
- Built-in multiple icons, buttons, and indicators that meet the needs of various industrial GUI applications
- Provides advanced alarm setting to identify alarm information quickly
- Built-in alarm triggering with handling function that informs managers with emails to eliminate issues
- Provides a user-friendly and convenient multi-language setting function (up to 16 languages) for GUI
- Offers up to 8 levels of authorization with different passwords for GUI to enhance operation security



Product Application

CNC Controller NC200A-MI-AS Series

Introduction

- Supports drives and motors: 4 axis
- Provides G-code function (conforms with ISO Standard)
- Customized software interfaces
- Supports USB port
- Input / output point: max. 256 points each

Features

- Adopts CNC structure and interface for fast and convenient control adjustment and standardization
- Offers easy wiring and tuning with high-speed motion control structure for controlling servo drives of the feeding axis and machine tools
- Built-in gantry control to elevate processing precision
- Open platform structure for customized interface design



Open CNC Controller NC30E Series

Introduction

- Supports drives and motors: 4 axis
- Provides G-code function (conforms with ISO Standard)
- Allows third-party hardware ports for VGA, USB, mouse, and keyboard
- Simultaneous connection with 5 personal computers for multi-monitoring with single device
- Input / output point: max. 256 points each

Features

- Adopts CNC structure for easy turning with background process management system
- Available to connect with VGA monitor and operation panel for higher resolution and clearer display
- Offers easy wiring and tuning with high-speed motion control structure for controlling servo drives of the feeding axis and machine tools tuning
- Open platform structure for customized interface design
- Available to perform motion control programming with HMI software



CNC Control System



Features

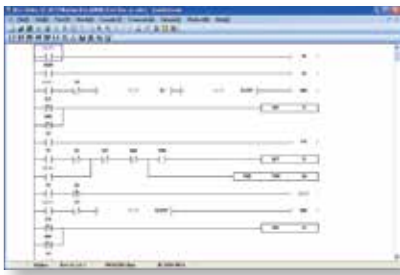
- ▶ **ARM embedded system structure:** With the close-loop embedded structure, the system features lower power consumption, better stability, and a longer lifetime than open structure
- ▶ **High-precision processing cores:** Built-in 3 main high-speed cores to process HMI, motion control, and procedure control individually, enhancing overall control performance and meeting the high-speed and precise needs of cutting applications
- ▶ **Multi-functional programming library:** Supports standard G-code system, which allows users to design T-code / M-code, and provides functions such as machine tool management, numerical control interface setting, coordinates settings, cutter compensation, and more to enhance processing efficiency
- ▶ **Comprehensive MPM instruction function:** Performs arithmetic and trigonometric functions and allows different combinations of macro instructions according to users' needs
- ▶ **High-precision multi-axis synchronous control:** Applies Delta's AC Servo System ASDA-A2 & ASDA-B2 Series, which allows serial or parallel I/O connection with peripheral devices and enhances system integration and flexibility
- ▶ **Multiple woodworking functions for various applications:** Built-in specific functions for woodworking applications, including scanner, program scheduling and adjustment, and more

Software Features of CNC Controller

CNC Software Tools

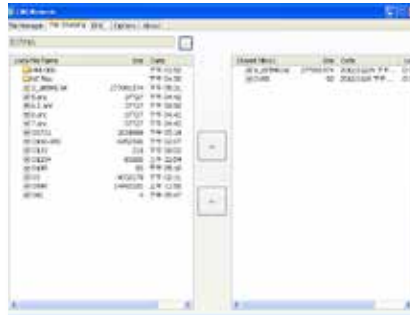
MLC Editor

- Provides a user-friendly interface and complete functions for users to design user-defined programs according to their need



Direct Files Access from PC Side

- The data and files for NC control and machine operation can be directly edited and executed via a PC



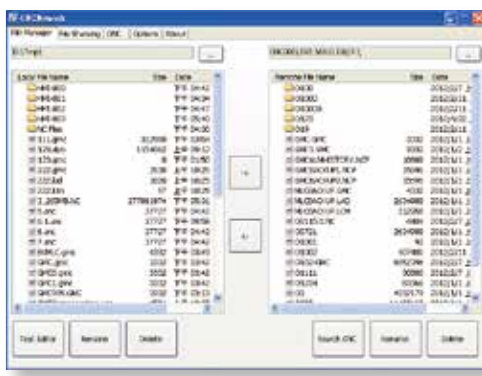
Parameter Editor

- Provides accessing, editing, and storing functions to adjust and backup parameters



Files and Data Management

- Allows file management and data backup on a PC or an NC simultaneously with a simple setup



Ethernet






Software Screen Editor

- Provides a user-friendly interface and a gallery that allows a user to self-design the desired functions and screen displays



Product Information

PAC Ordering Information

<p>MH1</p>		<table border="1"> <thead> <tr> <th colspan="2">DMCNET</th> </tr> </thead> <tbody> <tr> <td>MH1-A12D</td> <td rowspan="3">Available</td> </tr> <tr> <td>MH1-C50D</td> </tr> <tr> <td>MH1-C70D</td> </tr> <thead> <tr> <th colspan="2">EtherCAT</th> </tr> </thead> <tbody> <tr> <td>MH1-A12N</td> <td rowspan="3">2019.Q4 Available</td> </tr> <tr> <td>MH1-C50N</td> </tr> <tr> <td>MH1-C70N</td> </tr> </tbody> </tbody></table>	DMCNET		MH1-A12D	Available	MH1-C50D	MH1-C70D	EtherCAT		MH1-A12N	2019.Q4 Available	MH1-C50N	MH1-C70N
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<p>MH2</p>		<table border="1"> <thead> <tr> <th colspan="2">EtherCAT</th> </tr> </thead> <tbody> <tr> <td>MH2-P10N</td> <td>2019.Q4 Available</td> </tr> </tbody> </table>	EtherCAT		MH2-P10N	2019.Q4 Available								
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DMCNET														
MP1-A12D	Available													
MP1-P10D	2019.Q4 Available													
EtherCAT														
MP1-P10D	2019.Q4 Available													

* For more details of PAC models and specifications, please refer to PAC product manual or catalog.

Global Operations

ASIA (Taiwan)



Taoyuan Technology Center (Green Building)



Taoyuan Plant 1



Tainan Plant (Diamond-rated Green Building)

ASIA (China)



Wujiang Plant 3



Delta Electronics



ASIA (Japan)



Tokyo Office



ASIA (India)



Rudrapur Plant
(Green Building)

EUROPE



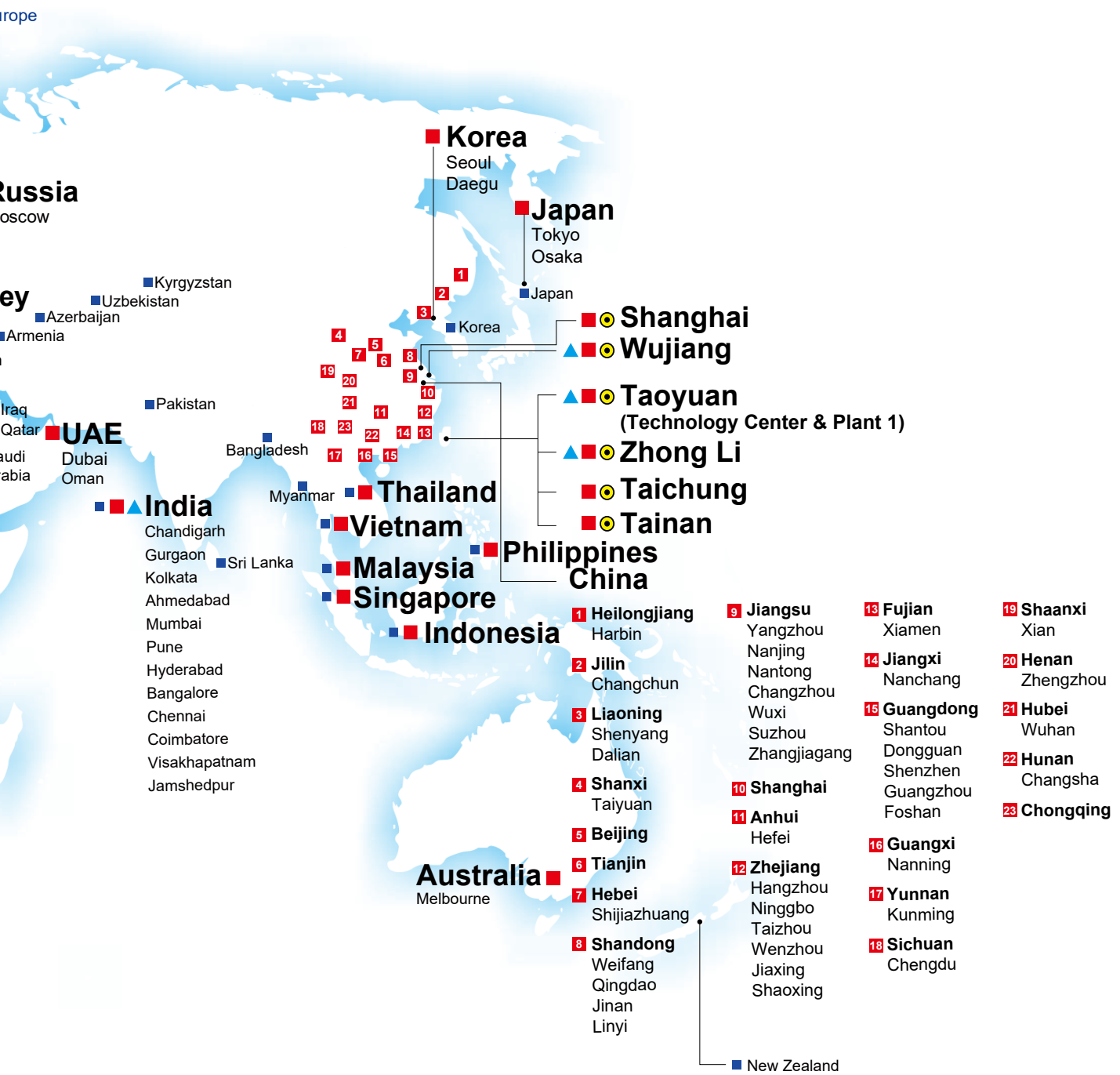
Amsterdam, Netherlands

AMERICA



Research Triangle Park

▲ Factories 5 ■ Branch Offices 102 ● R&D Centers 6 ■ Distributors 824



Product Information

AC Servo Drives

Model Name	ASDA-A2	ASDA-B2
Power Range / Phase (220Vac)	100W - 1.5kW single / three phases 2kW - 7.5kW three phases	100W - 1.5kW single / three phases 2kW - 3kW three phases
Power Range / Phase (400Vac)	750W - 7.5kW three phases	-
Resolution	Incremental type: 20-bit Absolute type: 17-bit	Incremental type : 17-bit
Drives for EtherCAT System	ASDA-A2-E	-
Drives for DMCNET System	ASDA-A2-F、ASDA-A2R-F	ASDA-B2-F

*For more details, please refer to the product manual or catalogue

Servo Motors

Model Name	ASDA-A2		ASDA-B2
Power Range	220V	420V	200V
Inertia	Low	50W - 3kW	100W - 3kW
	Low / Middle		400W - 2kW
	Middle	500W - 3.5kW	
	Middle / High	500W - 7.5kW	500W - 3kW
	High	400W - 900W	

*For more details, please refer to the product manual or catalogue








Other Selectable Products

AC Motor Drive		HMI		Others	
					
Vector Control Drive C2000 / CT2000 / CH2000 Series	Compact Drive MH300 / MS300 / ME300 Series	DOP-100 Series	DOP-H Series	Laser Displacement LD Series	Manual Pulse Generator (MPG)

The PAC / CNC controllers support Modbus / TCP, RS232 / RS485 (RTU, ASCII) communications, providing more flexible and convenient extensions for different applications.





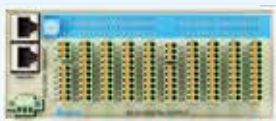
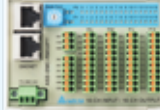

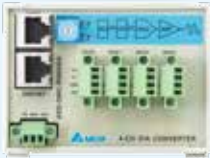

Product Information

Modules for EtherCAT System

Gateway Type Remote Modules	Pulse Remote Module
<p data-bbox="181 949 448 981">Emote Power Coupler</p>  <p data-bbox="126 1364 496 1395">R1-EC5500D0 R1-EC5512D0</p>	<p data-bbox="620 584 823 640">1-Channel Pulse Remote Module</p>  <p data-bbox="999 595 1177 622">R1-EC5621D0</p>
	<h3 data-bbox="539 804 906 835">Digital Remote Modules</h3>
	<p data-bbox="560 943 754 999">16-Digital Input Remote Module</p> <p data-bbox="608 1010 754 1066">R1-EC6002D0 R1-EC6022D0</p>   <p data-bbox="1075 909 1270 965">16-Digital Input Remote Module</p> <p data-bbox="1075 976 1222 1111">R1-EC7062D0 R1-EC70A2D0 R1-EC70E2D0 R1-EC70F2D0</p>
	<h3 data-bbox="539 1200 916 1232">Analog Remote Modules</h3>
	<p data-bbox="560 1346 754 1435">4-Channel Analog Output Remote Module</p> <p data-bbox="608 1447 754 1469">R1-EC8124D0</p>   <p data-bbox="1075 1346 1270 1435">4-Channel Analog Output Remote Module</p> <p data-bbox="1075 1447 1222 1469">R1-EC9144D0</p>
<h3 data-bbox="539 1597 954 1628">Functional Remote Module</h3>	
<p data-bbox="628 1771 839 1827">Manual Pulse Generator (MPG)</p> <p data-bbox="692 1839 839 1861">R1-EC5614D0</p> 	

Product Information

Modules for DMCNET System

Digital Remote Modules		<p>32-Point DI Remote Module ASD-DMC-RM32MN</p>		<p>64-Point DI Remote Module ASD-DMC-RM64MN</p>		<p>Digital I/O Remote Module HMC-RIO3232RT5</p>	
		<p>32-Point DO Remote Module ASD-DMC-RM32NT</p>		<p>64-Point DO Remote Module ASD-DMC-RM64NT</p>		<p>32-Point DI / DO Remote Module ASD-DMC-RM32PT</p>	
	Pulse Remote Module						
							
	Analog Remote Modules						
							
Gateway Type Remote Modules							
							



Smarter. Greener. Together.

Industrial Automation Headquarters

Delta Electronics, Inc.

Taoyuan Technology Center
No.18, Xinglong Rd., Taoyuan District,
Taoyuan City 33068, Taiwan
TEL: 886-3-362-6301 / FAX: 886-3-371-6301

Asia

Delta Electronics (Shanghai) Co., Ltd.

No.182 Minyu Rd., Pudong Shanghai, P.R.C.
Post code : 201209
TEL: 86-21-6872-3988 / FAX: 86-21-6872-3996
Customer Service: 400-820-9595

Delta Electronics (Japan), Inc.

Tokyo Office
Industrial Automation Sales Department
2-1-14 Shibadaimon, Minato-ku
Tokyo, Japan 105-0012
TEL: 81-3-5733-1155 / FAX: 81-3-5733-1255

Delta Electronics (Korea), Inc.

Seoul Office
1511, 219, Gasan Digital 1-Ro., Geumcheon-gu,
Seoul, 08501 South Korea
TEL: 82-2-515-5305 / FAX: 82-2-515-5302

Delta Energy Systems (Singapore) Pte Ltd.

4 Kaki Bukit Avenue 1, #05-04, Singapore 417939
TEL: 65-6747-5155 / FAX: 65-6744-9228

Delta Electronics (India) Pvt. Ltd.

Plot No.43, Sector 35, HSIIDC Gurgaon,
PIN 122001, Haryana, India
TEL: 91-124-4874900 / FAX : 91-124-4874945

Delta Electronics (Thailand) PCL.

909 Soi 9, Moo 4, Bangpoo Industrial Estate (E.P.Z),
Pattana 1 Rd., T.Phraksa, A.Muang,
Samutprakarn 10280, Thailand
TEL: 66-2709-2800 / FAX : 662-709-2827

Delta Energy Systems (Australia) Pty Ltd.

Unit 20-21/45 Normanby Rd., Notting Hill Vic 3168, Australia
TEL: 61-3-9543-3720

Americas

Delta Electronics (Americas) Ltd.

Raleigh Office
P.O. Box 12173, 5101 Davis Drive,
Research Triangle Park, NC 27709, U.S.A.
TEL: 1-919-767-3813 / FAX: 1-919-767-3969

Delta Greentech (Brasil) S/A

São Paulo Office
Rua Itapeva, 26 – 3º Andar - Bela Vista
CEP: 01332-000 – São Paulo – SP - Brasil
TEL: 55-11-3530-8642 / 55-11-3530-8640

Delta Electronics International Mexico S.A. de C.V.

Mexico Office
Vía Dr. Gustavo Baz No. 2160, Colonia La Loma,
54060 Tlalnepanitla Estado de Mexico
TEL: 52-55-2628-3015 #3050/3052

EMEA

Headquarters: Delta Electronics (Netherlands) B.V.

Sales: Sales.IA.EMEA@deltaww.com
Marketing: Marketing.IA.EMEA@deltaww.com
Technical Support: iatechnicalsupport@deltaww.com
Customer Support: Customer-Support@deltaww.com
Service: Service.IA.emea@deltaww.com
TEL: +31(0)40 800 3800

BENELUX: Delta Electronics (Netherlands) B.V.

De Witbogt 20, 5652 AG Eindhoven, The Netherlands
Mail: Sales.IA.Benelux@deltaww.com
TEL: +31(0)40 800 3800

DACH: Delta Electronics (Netherlands) B.V.

Coesterweg 45, D-59494 Soest, Germany
Mail: Sales.IA.DACH@deltaww.com
TEL: +49(0)2921 987 0

France: Delta Electronics (France) S.A.

ZI du bois Challand 2, 15 rue des Pyrénées,
Lisses, 91090 Evry Cedex, France
Mail: Sales.IA.FR@deltaww.com
TEL: +33(0)1 69 77 82 60

Iberia: Delta Electronics Solutions (Spain) S.L.U

Ctra. De Villaverde a Vallecas, 265 1º Dcha Ed.
Hormigueras – P.I. de Vallecas 28031 Madrid
TEL: +34(0)91 223 74 20

Carrer Llacuna 166, 08018 Barcelona, Spain

Mail: Sales.IA.Iberia@deltaww.com

Italy: Delta Electronics (Italy) S.r.l.

Ufficio di Milano Via Senigallia 18/2 20161 Milano (MI)
Piazza Grazioli 18 00186 Roma Italy
Mail: Sales.IA.Italy@deltaww.com
TEL: +39 02 64672538

Russia: Delta Energy System LLC

Vereyskaya Plaza II, office 112 Vereyskaya str.
17 121357 Moscow Russia
Mail: Sales.IA.RU@deltaww.com
TEL: +7 495 644 3240

Turkey: Delta Greentech Elektronik San. Ltd. Sti. (Turkey)

Şerifaii Mah. Hendem Cad. Kule Sok. No:16-A
34775 Ümraniye – İstanbul
Mail: Sales.IA.Turkey@deltaww.com
TEL: + 90 216 499 9910

GCC: Delta Energy Systems AG (Dubai BR)

P.O. Box 185668, Gate 7, 3rd Floor, Hamarain Centre
Dubai, United Arab Emirates
Mail: Sales.IA.MEA@deltaww.com
TEL: +971(0)4 2690148

Egypt + North Africa: Delta Electronics

511 Cairo Business Plaza, North 90 street,
New Cairo, Cairo, Egypt
Mail: Sales.IA.MEA@deltaww.com