



Automation for a Changing World

# Delta CNC Solution



## **Delta CNC Solution: an integrated system that provides flexibility and completeness, and fulfills all the significant requirements of the machining industry**

Delta Electronics Inc., a leading professional manufacturer of industrial automation products, is pleased to announce the launch of the innovative CNC Solution that offers an outstanding integrated system for the CNC machine tools industry.

The CNC machine tools industry in Taiwan and the rest of the world has relied heavily on European and Japanese brands which usually offer less flexibility, high maintenance costs and additional expenses for more functions, hardware, and software. As a result, for Taiwan's machine tool manufacturers costly and time consuming "Mix-and-Match components" have been the default option to satisfy their customers' needs.









The Delta CNC Solution is the first complete total solution developed and made by a Taiwanese company to assist customers in the CNC machine tool fields that are facing an advanced phase of global market competition.

**Key to Success** - The Delta CNC Solution includes CNC controllers, multi-axis servo drives and up to 20-bit high resolution servo motors, and permanent magnet (PM) spindle drives and motors that provide an embedded system with multiple CPUs to distribute multitasking and raise the operating performance of controllers. Combined with Delta's high speed motion control system DMCNET, the Delta CNC Solution delivers a high speed, high precision system for excellent performance while helping enterprises succeed in business with enhanced productivity and efficiency.

**Win-win Opportunity** - The Delta CNC Solution features high speed, high precision and superior surface finishing to enhance the speed, quality and stability of CNC machine tools. It is suitable for high-speed tapping, engraving and milling processes, tooling machine manufacturing, component processing as well as other manufacturing and related industries. With increasing challenges in the changing global market, the Delta CNC Solution delivers the ultimate in performance to help the machine tools industry excel and stay competitive through continuous innovation and customization.



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**Ethernet**

**High Performance**

**CNC Controller NC300 Series**



**DMCNET**

**High Speed  
Communication  
Protocol**

**Optional Accessories**



**Operation Panels**

**Optional Accessories**



**I/O Boards  
(Max. 256 Inputs, Max. 256 Outputs)**

**Optional Accessories**

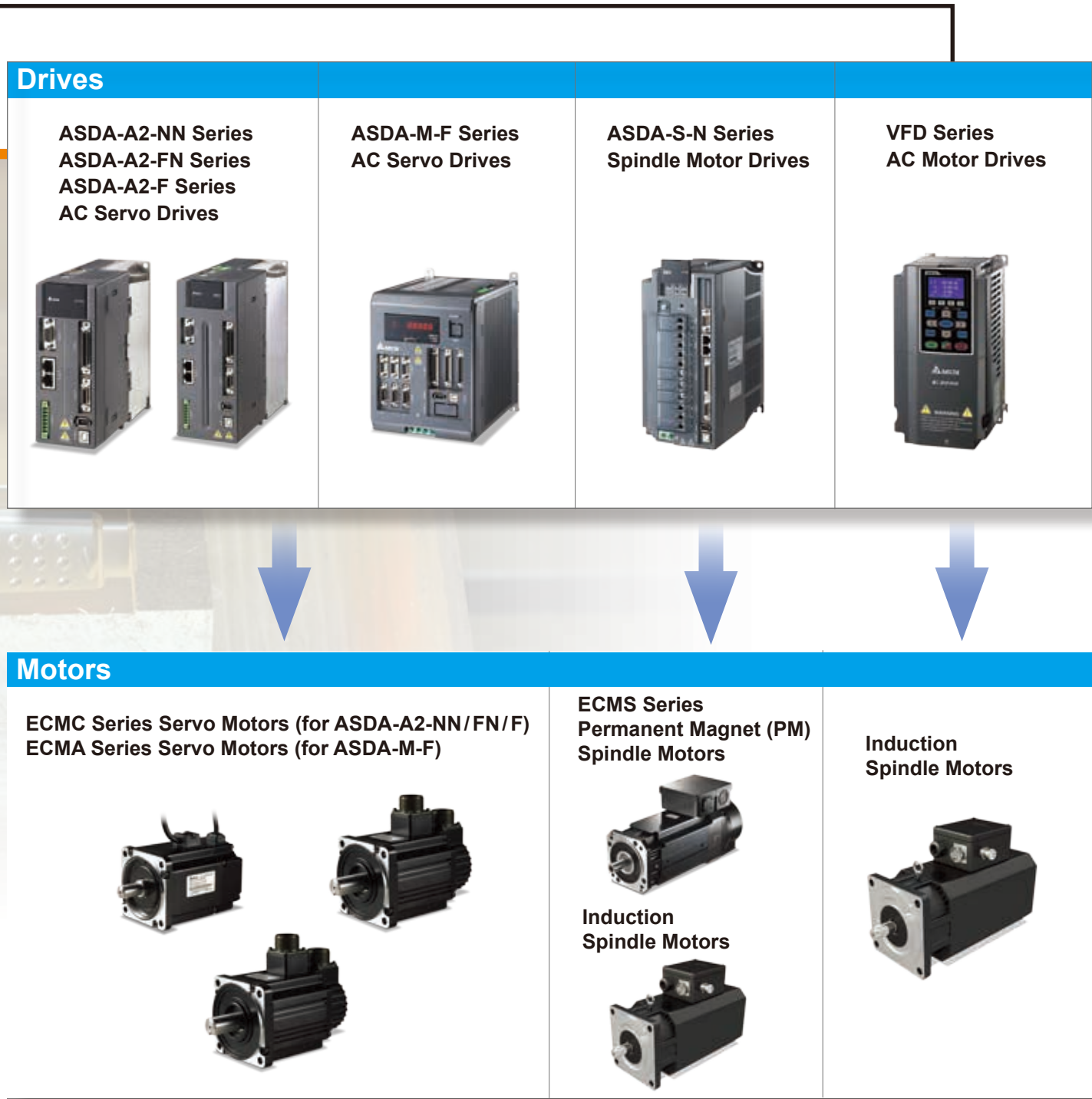


**Manual Pulse Generator (MPG)**





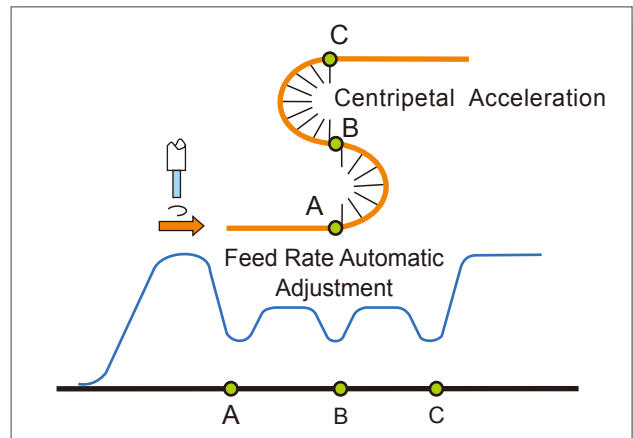
## Analog Voltage Output Signal



# Features - Long Precision Life

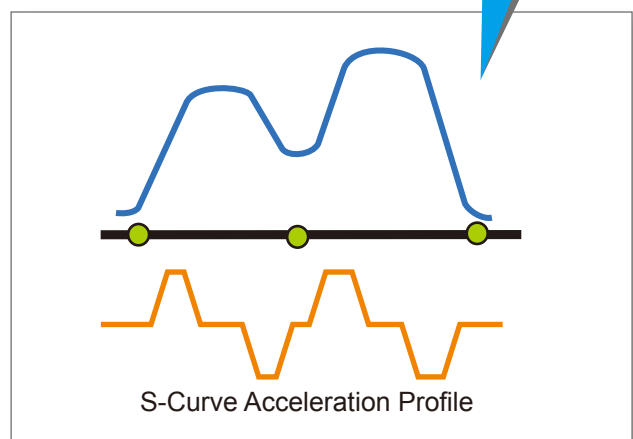
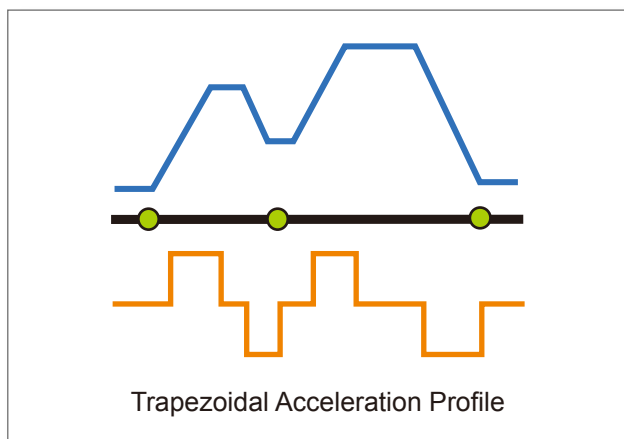
## Jerk Control

- When acceleration changes significantly, or the cutting path changes from a straight line to curve, the Jerk Control decelerates speed to suppress machine vibration and shock, and maintain stability and precision for long term operation.



## S-Curve Smoothing

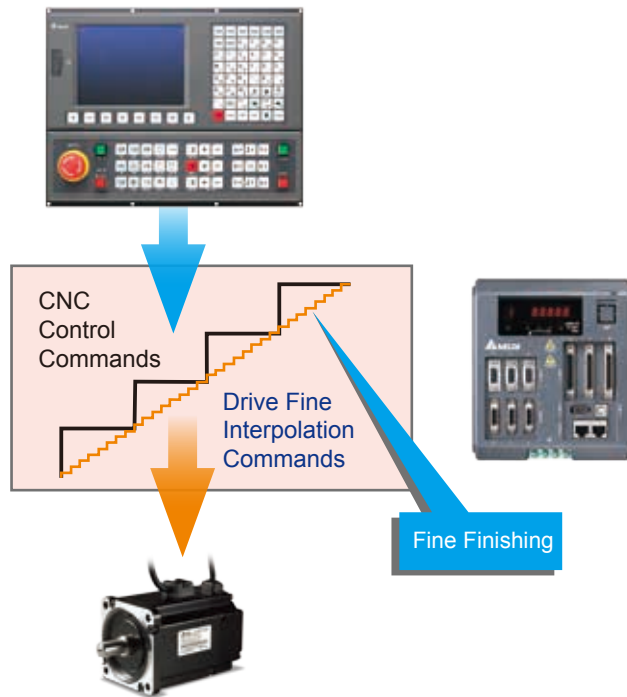
- The S-curve acceleration profile for smooth acceleration and deceleration before interpolation minimizes vibration and offers a stable and high precision machining process.



## Features - High Machining Precision

### Fine Interpolation Commands

- Delta's AC servo drives execute a high sampling interpolation function which smooths the internal drive commands and controls the operation of servo motors with more precision and stability.



### High Speed Motion Control System - DMCNET

- The DMCNET provides fast communication, simple wiring, seamless commands, and solves high speed pulse command loss problems.

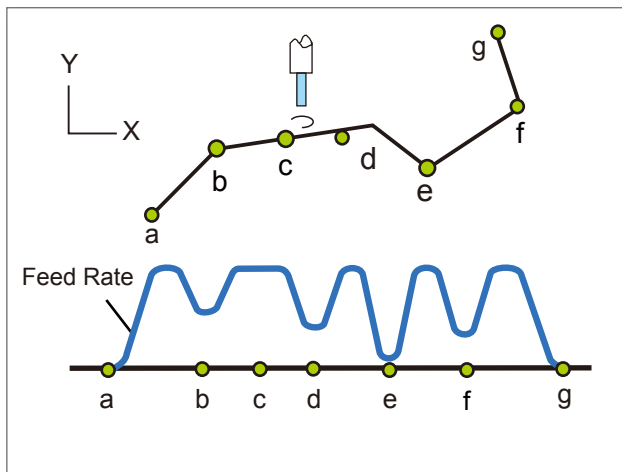


Delta's DMCNET motion control system is a high speed and real time communication system that offers excellent performance and safety with features such as easy installation, high stability and flexible extension.

# Features - High Machining Precision

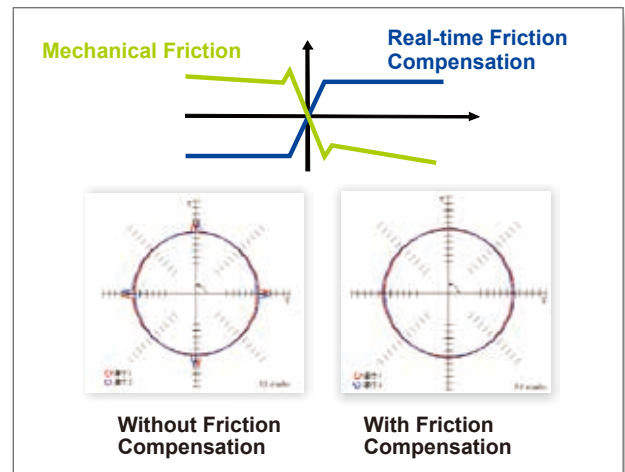
## Automatic Corner Deceleration

- During machining processes, corner deceleration is automatically calculated to help each axis maintain its precision and speed at corners and effectively smooth the process.



## Friction Compensation

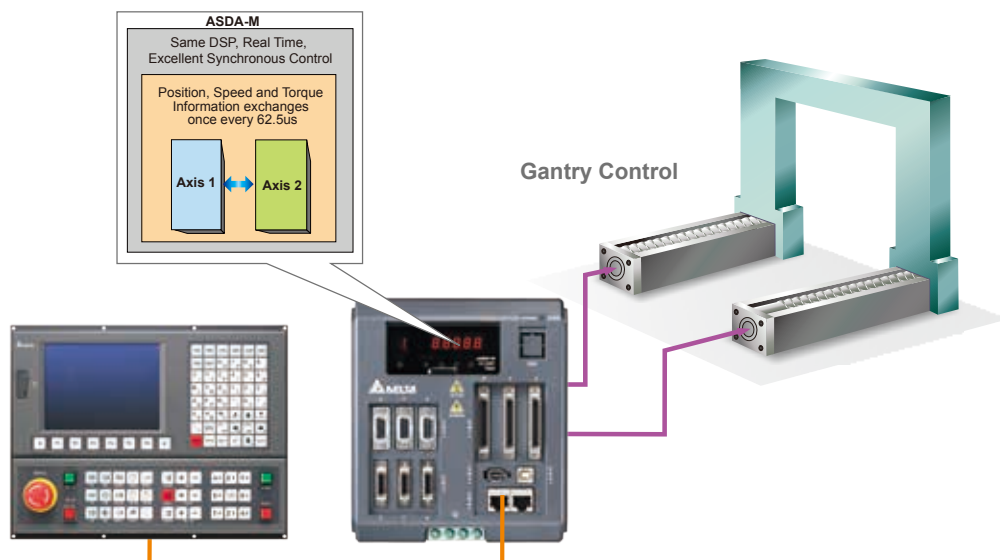
- The servo drives provide real-time and smooth friction compensation with a high sampling speed control loop for correcting the torque.



## Three-in-One Servo Drive with Synchronous Control

### Advanced Gantry Control

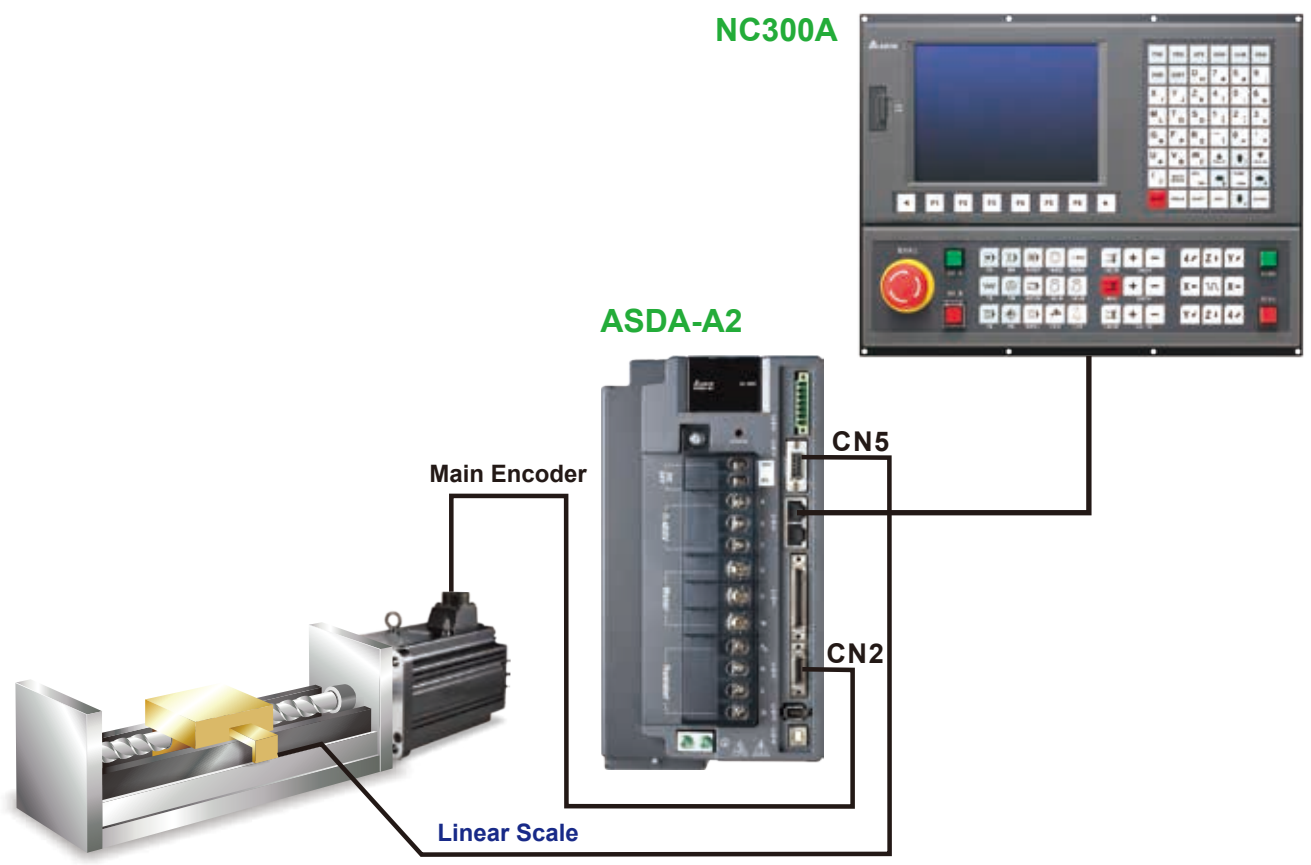
- A large amount of data and calculations among the 3 axes motors can be completed with the same DSP (Digital Signal Processor), which achieves precise synchronization and greatly increases the efficiency and performance of gantry control.
- In rigid or general mechanical systems, whether with equal loading on multiple axes or not, the ASDA-M-F series servo system performs precise and simultaneous motion control.





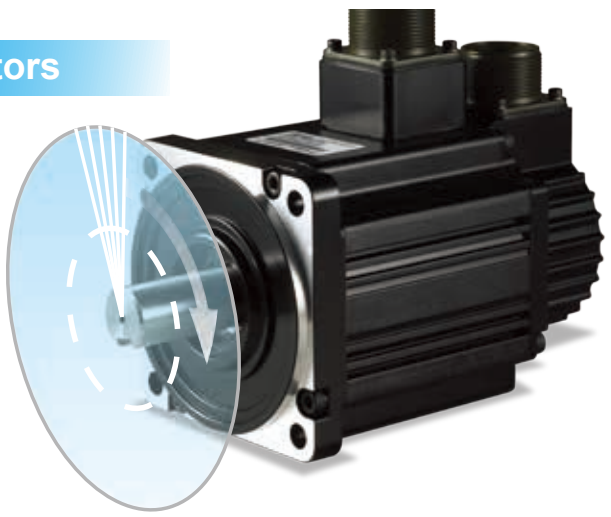
## High Precision Full-closed Loop Control

- The servo drives feedback signals from the main encoders and linear scales to perform real-time compensation, while reducing the effect of backlash and flexibility from the machine and ensures the accuracy of positioning.



## High Resolution Feed Axis Servo Motors

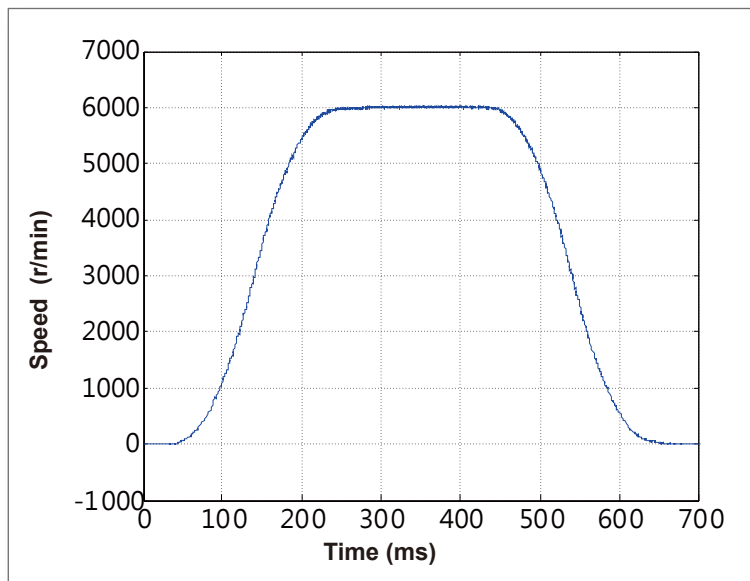
- Delta's ECMC series servo motors are with a 22-bit high resolution encoder to enhance positioning precision and stability during lower speed operation.



## Features - Fast Processing Time

### High Speed Permanent Magnet (PM) Spindle Motors

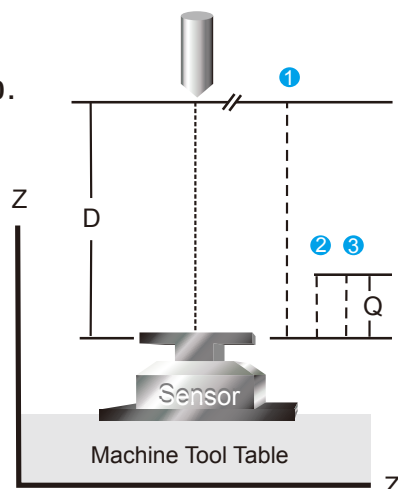
- Delta's ECMS series servo spindle motors are designed for CNC tapping machinery, with rated speed of 6000 r/min and rigid tapping operations speed that reaches a maximum of 12000 r/min. It provides excellent acceleration performance that goes from 0r/min to 6000 r/min in just 250 ms and significantly shortens the processing time.



### Automatic Tool Length Measurement

- By applying the G31 command skip function and sensors, the tool length can be measured automatically: with program editing, the G31 command lowers the Z-Axis and stops while it reaches the sensor on the machine. Then the moving distance is counted as the compensation value for the tool length. The G31 command can also stop the motion path immediately and simultaneously execute the motion for the next block.

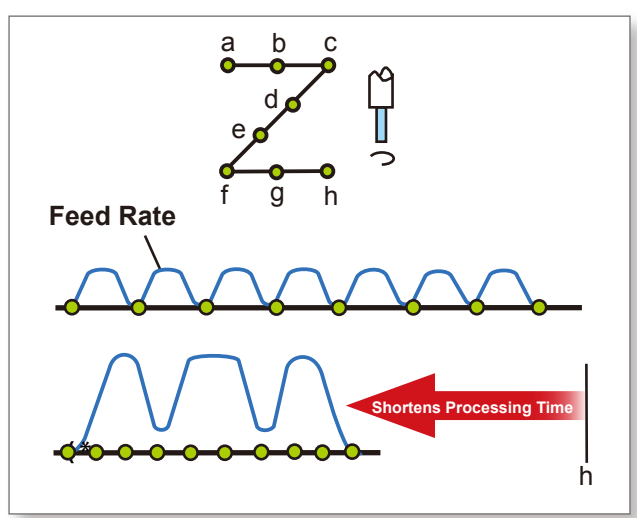
```
G90 G00 Z0.  
G01 G31 Z-80.0 F200.  
G91 Z10. F400.  
G31 Z-10. F50.
```



- Reaches sensor with a medium or low speed of 200 feed rate
- Pulls up Distance Q with a speed of 400 feed rate
- Slowly reaches sensor with a speed of 50 feed rate
- Updates measured deviation value to tool table

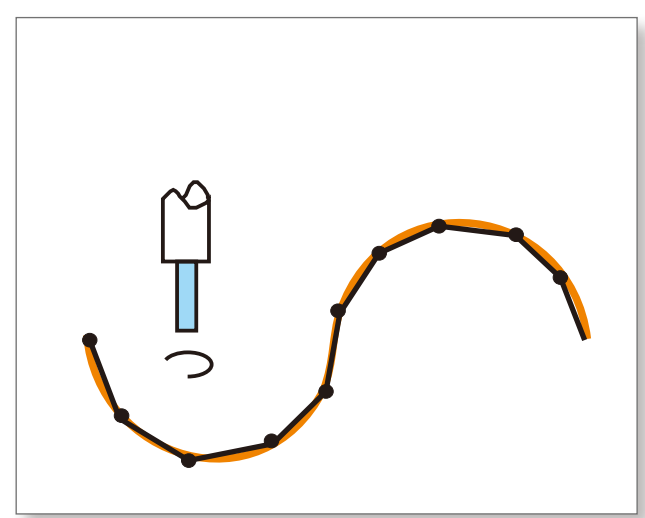
## High Speed Multi-Block Look-Ahead

- The high speed multi-block look-ahead function performs a processing operation according to the preset feed rate and path. This can efficiently reduce unnecessary deceleration and effectively increase production speed.



## Curve Fitting

- The curve fitting function smooths the motion of the processing axis to avoid a noncontinuous turn speed, and enhances the precision and speed of the processing operation while the processing can be evenly applied as well.



## Breakpoint Search

- Through an internal program with breakpoint line number information, users can search breakpoint line numbers, label blocks from previous program executions, and restart its normal execution from the desired breakpoint. This greatly shortens the time for repetitive program execution and applies to searching for large files.

**G-CODE Program**

- Current executing program

**Coordinate Information / Feed Axis Information**

- Mechanical coordinate
- Absolute coordinate
- Cutting feed / Spindle speed / Tool number

**Search Function**

**Program Breakpoint Information / Search Setup**

- Program breakpoint
- Restarts line number/ Label number
- Searches single block's Line number / Inputs specified label number

# Features - Easy Design and Installation

## Workpiece Coordinate / Tool Length Automatic Setup

- Users no longer need to manually input mechanical coordinate values, but simply use various input functions and G54 commands or other workpiece coordinates for setup. This user-friendly design applies to setting up tool length for more convenience.

**Workpiece Coordinate System - Automatic Setup**

- Deletes specified workpiece coordinate data
- Single axis automatic setup (L input)
- Single axis distance / 2 automatic setups (L/2 input)
- Multi-axes setup (P input)

| OFFSET(Cutter register) |        |        |          |          |      |
|-------------------------|--------|--------|----------|----------|------|
| Num                     | Length | Radius | Len wear | Rad wear | LIFE |
| 1                       | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 2                       | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 3                       | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 4                       | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 5                       | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 6                       | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 7                       | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 8                       | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 9                       | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 10                      | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 11                      | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 12                      | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 13                      | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 14                      | 0.000  | 0.000  | 0.000    | 0.000    | 0    |
| 15                      | 0.000  | 0.000  | 0.000    | 0.000    | 0    |

| OFFSET(Set coord system) |          |      |       |
|--------------------------|----------|------|-------|
| OFFSET                   | G54      | MECH | REL   |
| X                        | 4360.623 | X    | 5.942 |
| Y                        | 0.000    | Y    | 5.942 |
| Z                        | 0.000    | Z    | 0.000 |

| OFFSET |       |    |       |
|--------|-------|----|-------|
| G55    | G56   | X1 | X2    |
| X      | 0.000 | X  | 0.000 |
| Y      | 0.000 | Y  | 0.000 |
| Z      | 0.000 | Z  | 0.000 |

**Tool Registration - H Setup**

- Tool length automatic setup (H setup)

## Direct Program Execution and Data Storage on USB Disk

- Equipped with a USB interface that allows high-speed data transferring and large program processing instantly, this feature smartly integrates Motion Logic Control (MLC) software and CNC controller for excellent operation while maintaining high efficiency (AUTO mode).



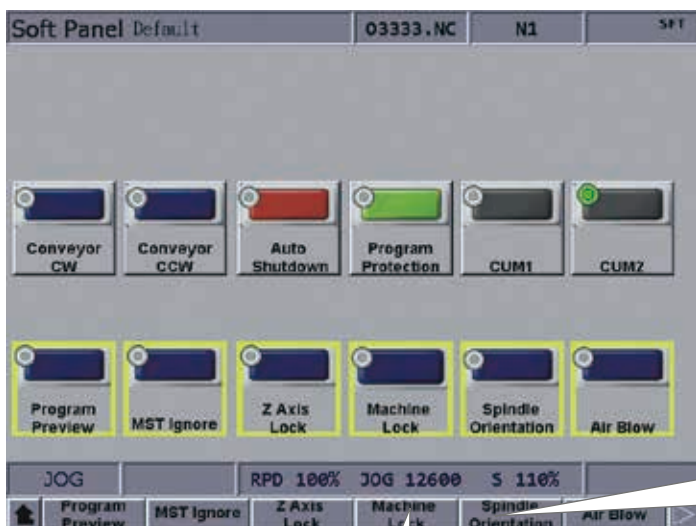
| PROGRAM(Program execute) |    |       |                 |
|--------------------------|----|-------|-----------------|
| PROGRAM                  | N1 | F.act | F 0             |
| O3333                    |    | S.act | S 0             |
| G40G80                   |    | D 0   | H 0             |
| N4G54G90G0X0Y0           |    | T 0   | t 0             |
| N6Z3.000                 |    | CYC   | 00:00:00        |
| N7F2000                  |    |       |                 |
| N8G1X50.294Y-37.881      |    | M00   | G00 G17 G90 G23 |
| N9X50.501Y-38.036Z2.966  |    | G94   | G21 G40 G49 G80 |
| N10X50.694Y-38.181Z2.866 |    | G98   | G50 G64 G69 G15 |
| N11X50.859Y-38.306Z2.707 |    | G54   |                 |
| N12X50.986Y-38.402Z2.500 |    |       |                 |

| MECH  |       |       |       | ABS       |         |        |       | RESIDUAL |       |       |       | G54   |       |       |       |
|-------|-------|-------|-------|-----------|---------|--------|-------|----------|-------|-------|-------|-------|-------|-------|-------|
| X     | Y     | Z     | A     | X         | Y       | Z      | A     | X        | Y     | Z     | A     | X     | Y     | Z     | A     |
| 5.942 | 0.000 | 0.000 | 0.000 | -4354.680 | 177.027 | 15.470 | 0.000 | 0.000    | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

## Software Panel

- By connecting a second operation panel to a CNC controller, the operation system is able to be built via PC software and its functions performed by MLC programming, allowing users to design a variety of shortcut icons for different applications to meet the machining requirements.



### Shortcut Icons for Each Key:

- Each shortcut icon on the software panel can correspond to the real keys and be displayed on the second panel, allowing flexible arrangements based on users' needs.

### System Status Information

- Current system mode
- ALARM messages
- Magnification status : Cutting feed, high-speed feed, spindle speed, JOG speed, MPG magnification
- Current system time

### Function Keys:

- Relative component index
- Moves cursor for switching the function display

## MLC Online Editing and Monitoring

- Displays the changes of I/O points to improve process development and debug maintenance errors.

The screenshot shows two diagnostic interfaces. On the left is the 'DIAGNOSE(MLC Bit Device)' table, and on the right is the 'DIAGNOSE(MLC Edit)' ladder logic diagram.

| DIAGNOSE(MLC Bit Device) |    |    |    |    |    |    |    |    |
|--------------------------|----|----|----|----|----|----|----|----|
|                          | +0 | +1 | +2 | +3 | +4 | +5 | +6 | +7 |
| X0                       | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| X10                      | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| X20                      | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| X30                      | 0  | 0  | 0  | 0  | #  | #  | #  | #  |
| X40                      | #  | #  | #  | #  | #  | #  | #  | #  |
| X50                      | #  | #  | #  | #  | #  | #  | #  | #  |
| X60                      | #  | #  | #  | #  | 0  | 0  | 0  | 0  |
| X70                      | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| X80                      | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| X90                      | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  |
| X100                     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| X110                     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| X120                     | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| X130                     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| X140                     | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  |

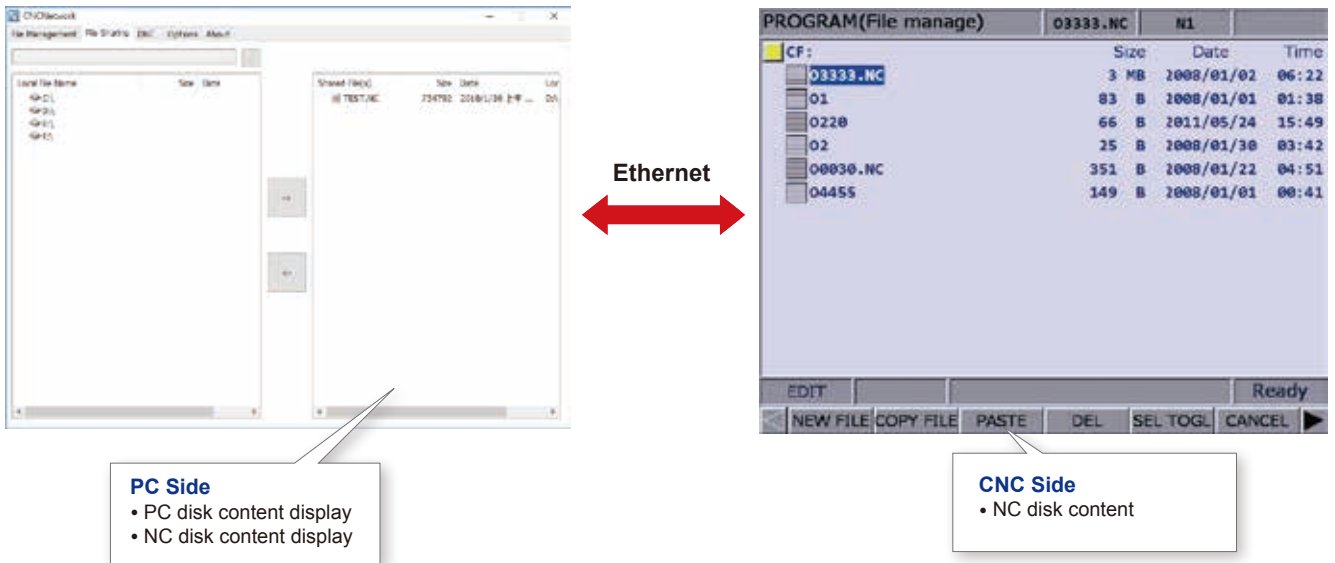
The 'DIAGNOSE(MLC Edit)' interface shows a ladder logic diagram with various components like T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22, T23, T24, T25, T26, T27, T28, T29, T30, T31, T32, T33, T34, T35, T36, T37, T38, T39, T40, T41, T42, T43, T44, T45, T46, T47, T48, T49, T50, T51, T52, T53, T54, T55, T56, T57, T58, T59, T60, T61, T62, T63, T64, T65, T66, T67, T68, T69, T70, T71, T72, T73, T74, T75, T76, T77, T78, T79, T80, T81, T82, T83, T84, T85, T86, T87, T88, T89, T90, T91, T92, T93, T94, T95, T96, T97, T98, T99, T100. The status bar at the bottom shows 'LD M1072', 'JOG', 'R:0, C:1 1416/10240', and 'Ready'.



# Features - Easy Design and Installation

## Data Alignment

- Connecting a Personal Computer (PC) with a Numerical Controller (NC) through an Ethernet communication network, users are able to access and manage files of the NC via PC, while the disk space of the PC can also be accessed, stored and utilized in the NC. This enhances efficiency of data alignment and backup management.



## Tool Management Function

- The tool management function provides functions including setting tool numbers, resetting tool indexes, locking the desired tools, and setting numbers of the required cutters to prevent repeated usage and selecting the incorrect tool. The built-in carousel and armless modules also help speed up tool function setup.

**Tool Indexes Setup**

- Tool number setup
- Tool number reset

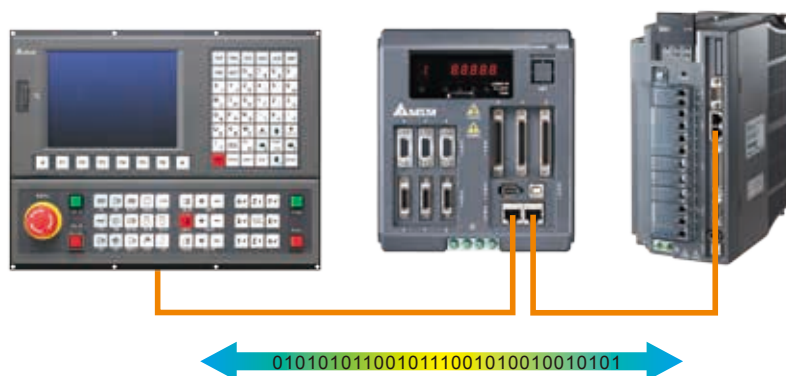
| GTFSET(Register magazine) |            |          |            |
|---------------------------|------------|----------|------------|
| Maga No.                  | 1          | CMD T    | 1          |
| Maga No.                  | Cutter No. | Maga No. | Cutter No. |
| 1                         | 1          | 15       | 15         |
| 2                         | 2          | 16       | 16         |
| 3                         | 3          | 17       | 17         |
| 4                         | 4          | 18       | 18         |
| 5                         | 5          | 19       | 19         |
| 6                         | 6          | 20       | 20         |
| 7                         | 7          | 21       | 21         |
| 8                         | 8          | 22       | 22         |
| 9                         | 9          | 23       | 23         |
| 10                        | 10         | 24       | 24         |
| 11                        | 11         | 25       | 25         |
| 12                        | 12         | 26       | 26         |
| 13                        | 13         | 27       | 27         |
| 14                        | 14         | 28       | 28         |

**Tool Locked Function**

- Lock setup for unused tool position

## Servo Parameters Backup and Import

- The NC 300 Series can backup servo parameters for fast import when changing a new servo drive, making replacement and maintenance easier and more convenient.



## Auto-Gain Tuning for Servo System

- The gain adjustment offers the best motion control during machine tuning. Through mechanical inertia and system bandwidth data, the gain parameters can be automatically calculated and downloaded into servo drives for the ultimate system performance.

**Servo Drive Status Display**

- Servo drive status
- Servo drive alarm message

| DIAGNOSE(Servo Tuning) |                                  |           |          | O3333.NC |       | N1 |  | SFT |  |
|------------------------|----------------------------------|-----------|----------|----------|-------|----|--|-----|--|
| Ch                     | Axis                             | Current   | JL/Jm    | θ %      | JL/Jm |    |  |     |  |
| No.                    | Parameter Name                   | Calculate | In Drive |          |       |    |  |     |  |
| P1-37                  | Lead Inertia Ratio               | 0.0       | 0.0      |          |       |    |  |     |  |
| P2-00                  | Position Loop P gain             | 157       | 157      |          |       |    |  |     |  |
| P2-02                  | Position Feedforward             | 0         | 0        |          |       |    |  |     |  |
| P2-04                  | Speed Loop P gain                | 628       | 628      |          |       |    |  |     |  |
| P2-06                  | Speed Loop I gain                | 100       | 100      |          |       |    |  |     |  |
| P2-25                  | OSC, Reject filter               | 16        | 16       |          |       |    |  |     |  |
| P2-26                  | External Noise Reject            | 0         | 0        |          |       |    |  |     |  |
| P2-49                  | Speed D Filter and J Suppression | [0P]:800  | [0P]:800 |          |       |    |  |     |  |
| P2-47                  | Auto Resonance Suppression Sel   | 0         | 0        |          |       |    |  |     |  |
| P2-23                  | Notch filter Freq(1)             | 1000      | 1000     |          |       |    |  |     |  |
| P2-24                  | Notch filter Gain(1)             | 0         | 0        |          |       |    |  |     |  |
| P2-43                  | Notch filter Freq(2)             | 1000      | 1000     |          |       |    |  |     |  |
| P2-44                  | Notch filter Gain(2)             | 0         | 0        |          |       |    |  |     |  |
| P2-45                  | Notch filter Freq(3)             | 1000      | 1000     |          |       |    |  |     |  |
| P2-46                  | Notch filter Gain(3)             | 0         | 0        |          |       |    |  |     |  |

**Motion Control Testing Items**

- Acceleration/Deceleration constant
- S-curve time constant
- Sentinel moving speed
- Job moving speed
- Time interval

**Servo Parameters Display**

**Automatic Gain Function Key**

- Gain adjustment function index

**Test Stroke Setup**

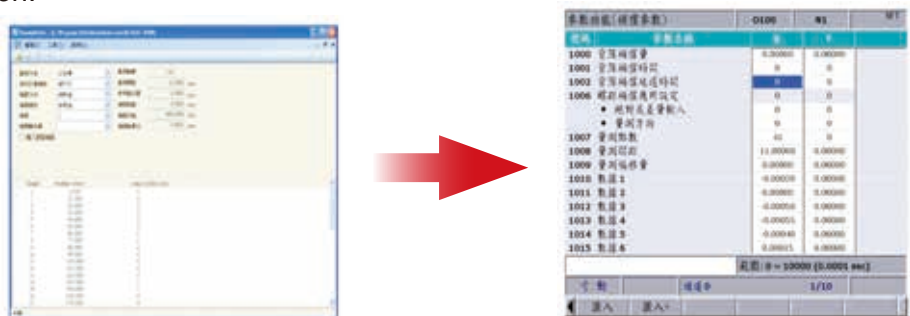
- Start and end point input

**Before/After Gain Parameter Value**

- Compares calculated result and parameter value of the servo drive

## Pitch Error Compensation

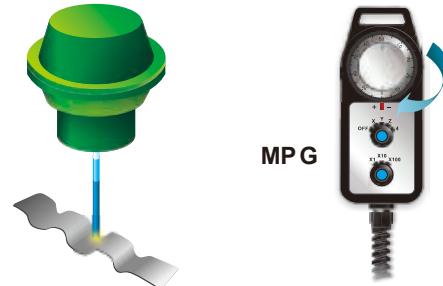
- The pitch error information detected by laser interferometers is transferred into CNC parameter through ParamEditor. The parameters are imported to the CNC controller for pitch error compensation.



# Features - Safe and Energy Saving

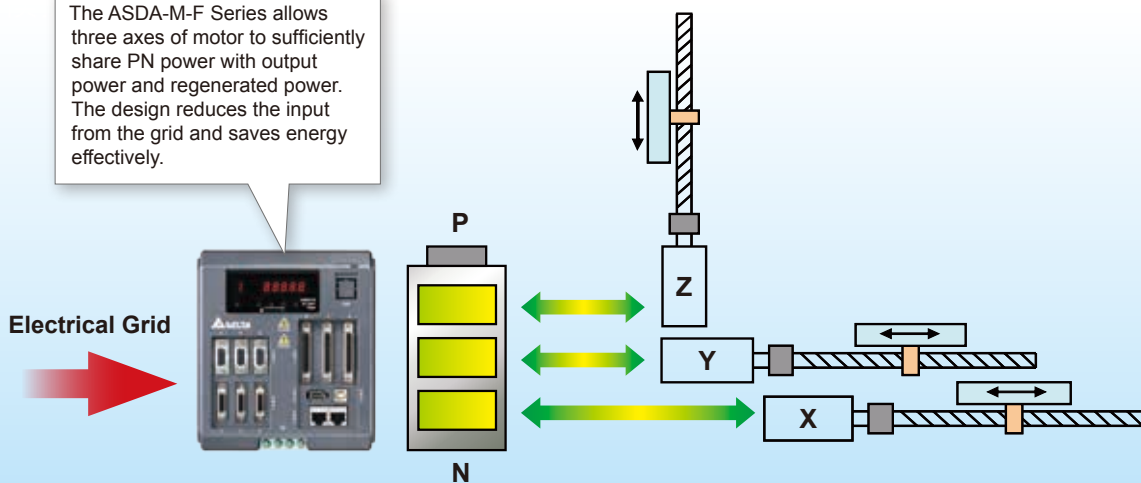
## Manual Pulse Generator (MPG) Simulation

- For first time CNC machining, the MPG simulation function is able to perform an exact simulation of the desired machining process under all operating conditions. It guarantees processing stability and eliminates problems with execution error or cutter / tool crashing, while making processing safer and more accurate.

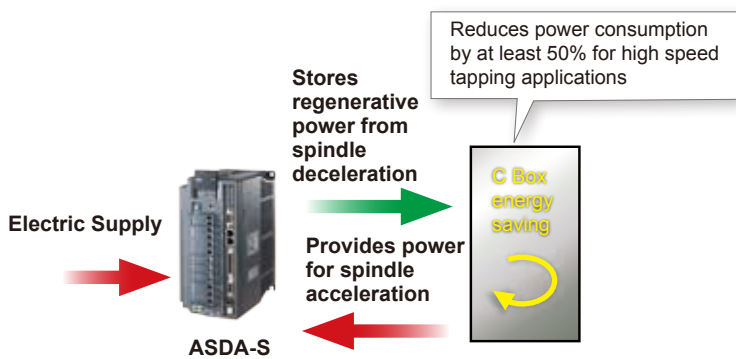


## PN Power Sharing for Multiple Axes

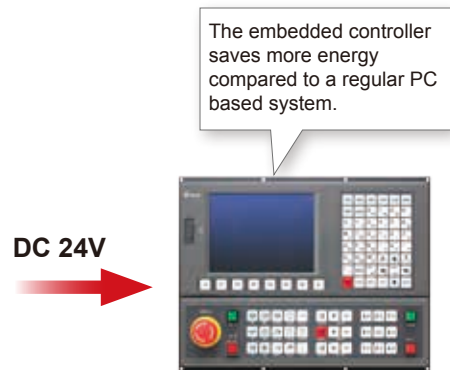
The ASDA-M-F Series allows three axes of motor to sufficiently share PN power with output power and regenerated power. The design reduces the input from the grid and saves energy effectively.



## Capacitor Box (C Box) for Spindle System

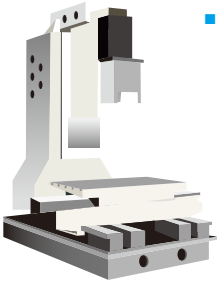


## Embedded Controller with Low Power Consumption



# Applications

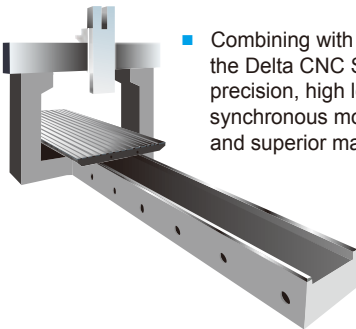
## Engraving and Milling Machines



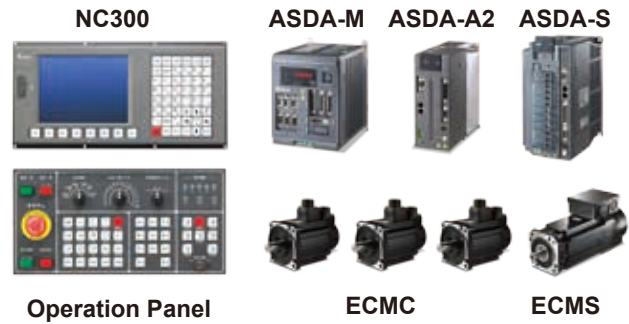
- By integrating Delta's all-in-one CNC controller with high resolution servo drives and motors, the Delta CNC Solution provides practical and user-friendly operation, and is perfect for high speed engraving and milling machines for complex geometric contours processing.



## Gantry Milling Machines



- Combining with a three-in-one AC servo drive, the Delta CNC Solution achieves high precision, high loading, multi-axes and synchronous motion control that offers smooth and superior machining quality.



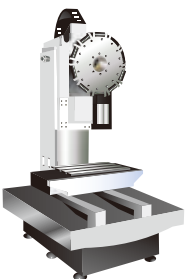
## Woodworking Machine



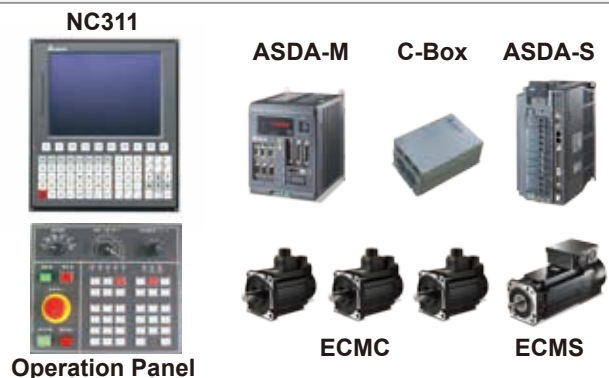
- It can be utilizes CAD / CAM software to design stile and rail pattern; the processing of door component is performed by G-code to increase accuracy and production efficiency
- Supports EtherCAT system and Delta's AC Motor Drive VFD Series which allows to use multi-axis high speed spindles for stiles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



## High Speed Tapping Machines / Machining Centers



- The Delta CNC Solution employs a numerical control interface with tool editing and management functions which is effectively suited for a variety of machine centers and composite processing.



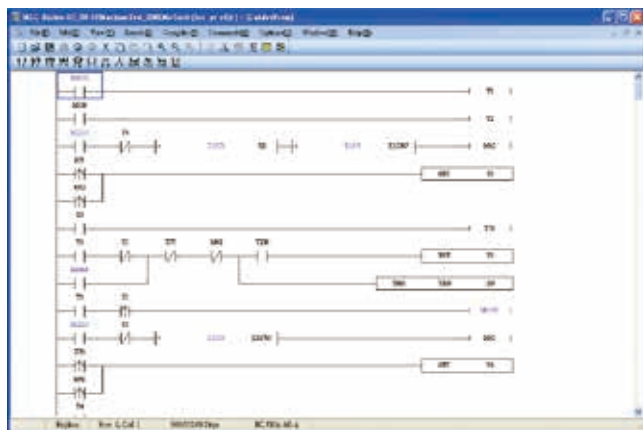




## Software Tools

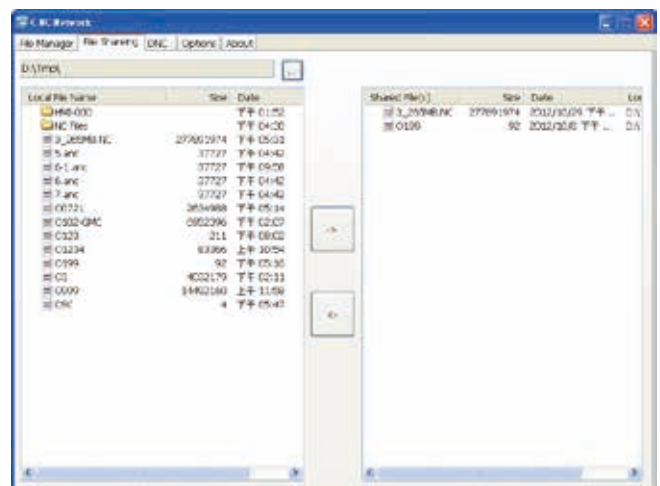
### MLC Editor

- The MLC editor features a user-friendly interface and complete functions for users to design user-defined programs according to their needs.



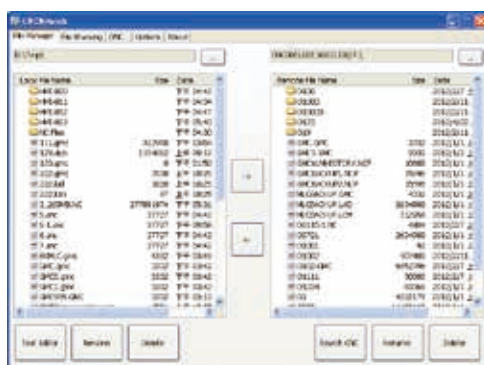
### Direct Files Access from PC Side

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



## Files and Data Management

- By connecting a PC and an NC with a simple setup, users are able to manage files and backup data on a PC and an NC simultaneously.



Ethernet

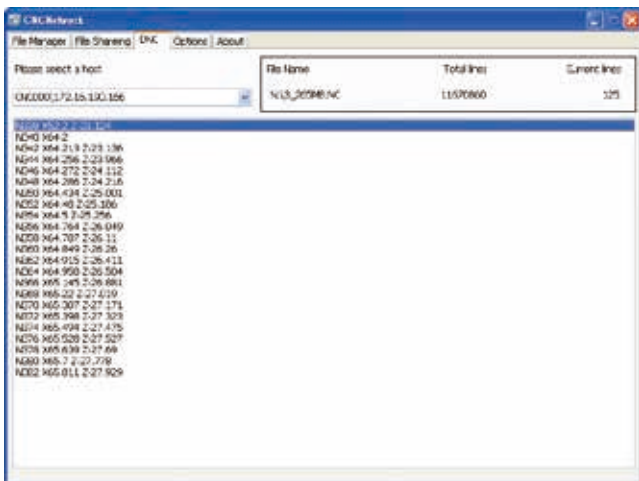






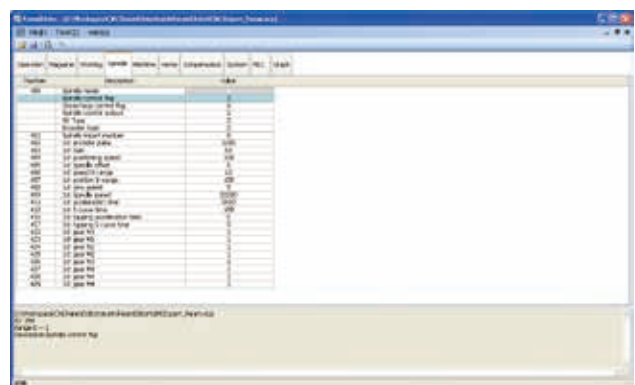
### DNC Monitoring

- When executing and sharing files on an NC (DNC mode), users can monitor the desired machine operation via the DNC screen.



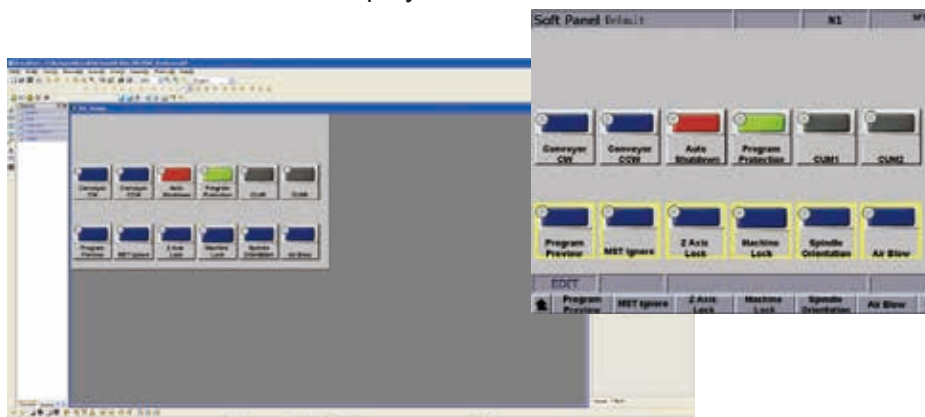
### Parameters Editor

- The parameter editor provides accessing, editing, and storing functions to adjust and backup parameters.

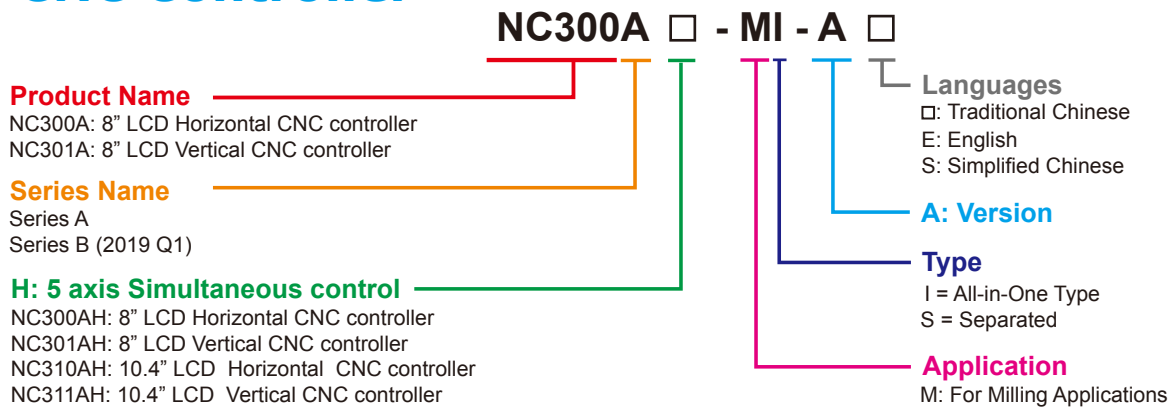


### Software Screen Editor

- The software screen editor provides a user-friendly interface and a gallery that allows a user to self-design the desired functions and screen displays.



# Specifications - Model Name Explanation of CNC Controller



Note: 1. The B Series is the subsequent model of A Series. It offers the same motion control function, more flexible HMI editing and better display quality.  
 2. Hardware: Two more sets of DA terminals and pulse output terminals for dual-axis control. And it supports USB backup on backplane.

## Specifications - CNC Controller

| Type    | Max. NC Axes | Synchronous Interpolation Axes   | Max. Total Axes |
|---------|--------------|--|-----------------|
| NC300A  | 5            | Fast positioning / Linear interpolation / Circular interpolation 4/4/2 | 6               |
| NC301A  | 5            | Fast positioning / Linear interpolation / Circular interpolation 4/4/2 | 6               |
| NC300AH | 5            | Fast positioning / Linear interpolation / Circular interpolation 5/5/2 | 6               |
| NC301AH | 5            | Fast positioning / Linear interpolation / Circular interpolation 5/5/2 | 6               |
| NC310AH | 5            | Fast positioning / Linear interpolation / Circular interpolation 5/5/2 | 6               |
| NC311AH | 5            | Fast positioning / Linear interpolation / Circular interpolation 5/5/2 | 6               |

### Control

|                                     |  |
|-------------------------------------|--|
| Least Input Increment               | 0.001mm / 0.001 deg.   |
| Max. command value                  | ±99999.999mm (±9999.9999in)  |
| Acceleration / Deceleration Control | Acceleration / Deceleration before interpolation, S-shaped curve Acceleration / Deceleration |
| Metric Size                         | Std. (G21)   |
| Machine Lock                        | All Axes   |
| Emergency Stop                      | Standard function  |
| Over-travel                         | Standard function  |
| DMCNET                              | Standard function (DMCNET supports up to 6 axes)   |

### Operation

|                        |                                   |
|------------------------|-----------------------------------|
| Automatic Operation    | Standard function                 |
| MDI Operation          | Standard function                 |
| USB Memory             | USB Memory Attachment is Required |
| Symbol Search          | Standard function                 |
| Sequence Number Search | Standard function                 |
| Dry Run                | Standard function                 |
| MPG Simulation         | Standard function                 |
| Single Block           | Standard function                 |

|   |                    |
|---|--------------------|
| JOG Feed                                    | Standard function  |
| Return to Origin Point (Reference) Position | Standard function  |
| Manual Handle Feed                          | 1 Unit / Each Path |
| Manual Handle Feed Rate                     | x1, x10, x100      |
| Program Protect                             | Standard function  |

## Interpolation

|                                 |   |
|---------------------------------|---|
| Positioning                     | G00                                     |
| Exact Stop Mode                 | G61                                     |
| Exact Stop                      | G09                                     |
| Linear Interpolation            | G01                                     |
| Circular Interpolation          | G02, G03 ( multi-quadrant is possible ) |
| Dwell                           | G04                                     |
| Skip Function                   | G31                                     |
| Reference Position Return       | G28                                     |
| Reference Position Return Check | G27                                     |
| 2ND Reference Position Return   | G30                                     |

## Feed Functions

|                              |                                 |
|------------------------------|---------------------------------|
| High Speed Moving Override   | F0, 25%, 50%, 100%              |
| Cutting Feed Rate Per Minute | F ( mm / min )                  |
| Cutting Feed Rate Per Minute | Max. Cutting Feed Rate mm / min |
| Cutting Feed Override        | 0 ~ 150% (Can be defined)       |
| Jog Override                 | 0 ~ 100%                        |
| Preview Control              | 500 blocks                      |

## Programs and Data Port Input

|                                   |  |
|-----------------------------------|--|
| Optional Dwell                    | M01  |
| Absolute / Gain Program           | G90 / G91  |
| Automatic Coordinate Setup System | Automatic Coordinate Setup System  |
| Workpiece Coordinate System       | G52 ~ G59  |
| Sub-program Call                  | Max. 8 layers embedded   |
| Program Start / Program End       | M00 / M01 / M02 / M30  |
| Code Format                       | Standard ISO G, M, S, T codes  |
| Program Flow Control              | Internal / External program call, program cycle                              |
| Fixed Cycle                       | Rigid tapping, boring and drilling   |
| Reset                             | Standard function  |
| On Board I/O                      | I/O Port 1: 16 in / out ; I/O Port 2: 12 in / out                            |
| MPG I/O Port                      | 1 set of hand - wheel pulse input  |
| USB Port / RS485 / Ethernet       | Standard function  |
| Origin Point Limit Port           | 1 ~ 4 AXIS + - hardware limit and origin point input                         |
| Spindle Port                      | 1 set of analog output DC-10V ~ +10V / G31 / 1 set of spindle feedback input |
| High Speed Serial I/O Port        | Max. 32 in / out. Extension available for up to 8 sets of 256 in / out       |

# Specifications - CNC Controller

## Spindle Speed and Tool Functions

|                          |                                |
|--------------------------|--------------------------------|
| MST Overpass             | Standard function              |
| MST Control              | Standard function              |
| Spindle Speed Function   | S RPM (revolutions per minute) |
| Spindle Override         | 50 ~ 120%                      |
| M Code Function          | M3 digit ( e.g. M003 )         |
| S Code Function          | S5 digit ( e.g. S10000 )       |
| T Code Function          | T2 digit ( e.g. T01 )          |
| Tool Capacity            | Max. 100 tools                 |
| Tool Length Compensation | G43, G44, G49                  |
| Tool Radius Compensation | G41, G42, G40                  |

## Setup and Display Functions

|  |   |
|--|---|
| Mode Display                           | Automation / Edit / MDI / Hand-wheel / Jog / Origin point                         |
| Current Position Display               | Program coordinate, mechanical coordinate, remain coordinate, relative coordinate |
| Software Operation Display             | Standard function   |
| G Code Group Display                   | Standard function   |
| Customized Screen Display              | PC editing software needed  |
| Parameters Display Setup               | Standard function   |
| Self-diagnosis Function                | Standard function   |
| Alarm Display                          | Standard function   |
| Alarm History Display                  | 512 records   |
| Actual Cutting Feed Speed Rate Display | Standard function   |
| Spindle Speed and T Code Display       | Standard function   |
| Parameters Setup Screen                | Standard function   |
| Servo Tuning Screen                    | Standard function   |
| System Information Display             | Standard function   |
| Multi-language Display                 | Standard function ( switch between Mandarin and English available )               |
| Password Setup                         | Standard function   |
| Servo Load Rate Display                | Standard function   |
| Tool Path Graphics Function            | Standard function   |
| Color LCD Display                      | 8" LCD display / 10.4" LCD display  |



# Specifications - Servo Motor (Incremental Type)

| Power Range   | 400 W   | 750 W                                  | 850 W                                   |                            |                                 |                              |                                   |   |   |                              |   |   |
|---|---|--|---|----------------------------|---------------------------------|------------------------------|-----------------------------------|---|---|------------------------------|---|---|
| Model   | ECMC-C10604 HS  | ECMC-C10807 <input type="checkbox"/> S | ECMC-F1 1308 <input type="checkbox"/> S |                            |                                 |                              |                                   |   |   |                              |   |   |
| Rated Torque (N-m)  | 1.27  | 2.39                                   | 5.41                                    |                            |                                 |                              |                                   |   |   |                              |   |   |
| Max. Torque (N-m)   | 3.82  | 7.16                                   | 13.8                                    |                            |                                 |                              |                                   |   |   |                              |   |   |
| Rated Speed (r/min)   | 3000  | 3000                                   | 1500                                    |                            |                                 |                              |                                   |   |   |                              |   |   |
| Max. Speed (r/min)  | 5000  | 5000                                   | 3000                                    |                            |                                 |                              |                                   |   |   |                              |   |   |
| Encoder Type  | 20-bit  |  |   |                            |                                 |                              |                                   |   |   |                              |   |   |
| Max. Current (A)  | 7.8   | 15.3                                   | 19.4                                    |                            |                                 |                              |                                   |   |   |                              |   |   |
| IP Rating   | IP65  | IP65                                   | IP65                                    |                            |                                 |                              |                                   |   |   |                              |   |   |
| Rotor Inertia/<br>With Brake ( $\times 10^{-4}$ kg-m <sup>2</sup> ) | 0.743 / 0.751   | 2.91 / 2.96                            | 13.6 / 14.8                             |                            |                                 |                              |                                   |   |   |                              |   |   |
| Speed-Torque Curves<br>(T-N Curves)                                 |   |  |   |                            |                                 |                              |                                   |   |   |                              |   |   |
| Motor Size (with brake; mm)   |   |  |   |                            |                                 |                              |                                   |   |   |                              |   |   |
| Motor Frame (mm)  | 60  | 80                                     | 130                                     |                            |                                 |                              |                                   |   |   |                              |   |   |
| Shaft Diameter (mm)   | 14  | 19                                     | 22                                      |                            |                                 |                              |                                   |   |   |                              |   |   |
| Brake Holding Torque<br>[Nt-m(min)]                                 | 1.3   | 2.5                                    | 10                                      |                            |                                 |                              |                                   |   |   |                              |   |   |
| Brake Power Consumption<br>(at 20°C) [W]                            | 6.5   | 8.2                                    | 19                                      |                            |                                 |                              |                                   |   |   |                              |   |   |
| Weight (with brake; kg)   | 1.8 / 2.2   | 3.4 / 3.9                              | 8.6 / 10                                |                            |                                 |                              |                                   |   |   |                              |   |   |
| Drives  | ASD-A2-0421-NN/FN/F   | ASD-A2-0721-NN/FN/F                    | ASD-A2-1021-NN/FN/F                     |                            |                                 |                              |                                   |   |   |                              |   |   |
| <input type="checkbox"/> Description for<br>Optional Selection      | <table border="1"> <thead> <tr> <th>Shaft type and<br/>oil seal</th> <th>Without brake/<br/>with oil seal</th> <th>With brake/<br/>with oil seal</th> </tr> </thead> <tbody> <tr> <td>Round shaft<br/>(with screw holes)</td> <td>C</td> <td>D</td> </tr> <tr> <td>Keyway<br/>(with screw holes)</td> <td>R</td> <td>S</td> </tr> </tbody> </table> |  |   | Shaft type and<br>oil seal | Without brake/<br>with oil seal | With brake/<br>with oil seal | Round shaft<br>(with screw holes) | C | D | Keyway<br>(with screw holes) | R | S |
| Shaft type and<br>oil seal  | Without brake/<br>with oil seal   | With brake/<br>with oil seal           |   |                            |                                 |                              |                                   |   |   |                              |   |   |
| Round shaft<br>(with screw holes)                                   | C   | D                                      |   |                            |                                 |                              |                                   |   |   |                              |   |   |
| Keyway<br>(with screw holes)  | R   | S                                      |   |                            |                                 |                              |                                   |   |   |                              |   |   |

Specifications



# Specifications - Servo Motor (Incremental Type)

| Power Range  | 1.5 kW  | 1.3 kW                       | 1.8 kW              |                            |                                 |                              |                                   |   |   |                              |   |   |
|--|---|------------------------------|---------------------|----------------------------|---------------------------------|------------------------------|-----------------------------------|---|---|------------------------------|---|---|
| Model  | ECMC-E1 1315 □ S  | ECMC-F1 1313 □ S             | ECMC-F1 1318 □ S    |                            |                                 |                              |                                   |   |   |                              |   |   |
| Rated Torque (N·m)   | 7.16  | 8.34                         | 11.48               |                            |                                 |                              |                                   |   |   |                              |   |   |
| Max. Torque (N·m)  | 21.48   | 23.3                         | 28.7                |                            |                                 |                              |                                   |   |   |                              |   |   |
| Rated Speed (r/min)  | 2000  | 1500                         | 1500                |                            |                                 |                              |                                   |   |   |                              |   |   |
| Max. Speed (r/min)   | 3000  | 3000                         | 3000                |                            |                                 |                              |                                   |   |   |                              |   |   |
| Encoder Type   | 20-bit  |                              |                     |                            |                                 |                              |                                   |   |   |                              |   |   |
| Max. Current (A)   | 24.9  | 38.6                         | 36                  |                            |                                 |                              |                                   |   |   |                              |   |   |
| IP Rating  | IP65  | IP65                         | IP65                |                            |                                 |                              |                                   |   |   |                              |   |   |
| Rotor Inertia/<br>With Brake ( $\times 10^{-4} \text{kg}\cdot\text{m}^2$ ) | 11.18 / 11.9  | 20 / 21.3                    | 24.9 / 26.2         |                            |                                 |                              |                                   |   |   |                              |   |   |
| Speed-Torque Curves<br>(T-N Curves)  |   |                              |                     |                            |                                 |                              |                                   |   |   |                              |   |   |
| Motor Size (with brake; mm)  |   |                              |                     |                            |                                 |                              |                                   |   |   |                              |   |   |
| Motor Frame (mm)   | 130   | 130                          | 130                 |                            |                                 |                              |                                   |   |   |                              |   |   |
| Shaft Diameter (mm)  | 22  | 22                           | 22                  |                            |                                 |                              |                                   |   |   |                              |   |   |
| Brake Holding Torque<br>[Nt·m(min)]  | 10  | 10                           | 10                  |                            |                                 |                              |                                   |   |   |                              |   |   |
| Brake Power Consumption<br>(at 20 °C)[W]                                   | 19  | 19                           | 19                  |                            |                                 |                              |                                   |   |   |                              |   |   |
| Weight (with brake; kg)  | 7.5 (8.9)   | 9.4 (10.8)                   | 10.5 (11.9)         |                            |                                 |                              |                                   |   |   |                              |   |   |
| Drives   | ASD-A2-1521-NN/FN/F   | ASD-A2-2023-NN/FN/F          | ASD-A2-2023-NN/FN/F |                            |                                 |                              |                                   |   |   |                              |   |   |
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| Shaft type and<br>oil seal   | Without brake/<br>with oil seal   | With brake/<br>with oil seal |                     |                            |                                 |                              |                                   |   |   |                              |   |   |
| Round shaft<br>(with screw holes)  | C   | D                            |                     |                            |                                 |                              |                                   |   |   |                              |   |   |
| Keyway<br>(with screw holes)   | R   | S                            |                     |                            |                                 |                              |                                   |   |   |                              |   |   |

| Power Range   | 2 kW  | 2 kW                                    | 3 kW                                    |                         |                                 |                              |                                   |   |   |                              |   |   |
|---|---|---|---|-------------------------|---------------------------------|------------------------------|-----------------------------------|---|---|------------------------------|---|---|
| Model   | ECMC-E1 1320 <input type="checkbox"/> S   | ECMC-E1 1820 <input type="checkbox"/> S | ECMC-F1 1830 <input type="checkbox"/> S |                         |                                 |                              |                                   |   |   |                              |   |   |
| Rated Torque (N-m)  | 9.55  | 9.55                                    | 19.1                                    |                         |                                 |                              |                                   |   |   |                              |   |   |
| Max. Torque (N-m)   | 28.65   | 28.65                                   | 57.29                                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Rated Speed (r/min)   | 2000  | 2000                                    | 1500                                    |                         |                                 |                              |                                   |   |   |                              |   |   |
| Max. Speed (r/min)  | 3000  | 3000                                    | 3000                                    |                         |                                 |                              |                                   |   |   |                              |   |   |
| Encoder Type  | 20-bit  |   |   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Max. Current (A)  | 33.0  | 33.66                                   | 58.2                                    |                         |                                 |                              |                                   |   |   |                              |   |   |
| IP Rating   | IP65  | IP65                                    | IP65                                    |                         |                                 |                              |                                   |   |   |                              |   |   |
| Rotor Inertia/<br>With Brake ( $\times 10^{-4}$ kg-m <sup>2</sup> ) | 14.59 / 15.88   | 34.68 / 37.86                           | 54.95 / 57.06                           |                         |                                 |                              |                                   |   |   |                              |   |   |
| Speed-Torque Curves<br>(T-N Curves)                                 |   |   |   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Motor Size (with brake; mm)   |   |   |   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Motor Frame (mm)  | 130   | 130                                     | 180                                     |                         |                                 |                              |                                   |   |   |                              |   |   |
| Shaft Diameter (mm)   | 22  | 22                                      | 35                                      |                         |                                 |                              |                                   |   |   |                              |   |   |
| Brake Holding Torque [Nt-m(min)]                                    | 10  | 10                                      | 25                                      |                         |                                 |                              |                                   |   |   |                              |   |   |
| Brake Power Consumption (at 20 °C)[W]                               | 19  | 19                                      | 20.4                                    |                         |                                 |                              |                                   |   |   |                              |   |   |
| Weight (with brake; kg)   | 7.5 (8.9)   | 7.5 (8.9)                               | 18.5 (22.5)                             |                         |                                 |                              |                                   |   |   |                              |   |   |
| Drives  | ASD-A2-2023-NN/FN/F   | ASD-A2-2023-NN/FN/F                     | ASD-A2-3023-NN/FN/F                     |                         |                                 |                              |                                   |   |   |                              |   |   |
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| Shaft type and oil seal   | Without brake/<br>with oil seal   | With brake/<br>with oil seal            |   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Round shaft<br>(with screw holes)                                   | C   | D                                       |   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Keyway<br>(with screw holes)  | R   | S                                       |   |                         |                                 |                              |                                   |   |   |                              |   |   |

# Specifications - Servo Motor (Incremental Type)

| Power Range   | 4.5 kW  |                              |                                 |                              |                                   |   |   |                              |   |   |
|---|---|------------------------------|---------------------------------|------------------------------|-----------------------------------|---|---|------------------------------|---|---|
| Model   | ECMC-F1 1845 □ S  |                              |                                 |                              |                                   |   |   |                              |   |   |
| Rated Torque (N-m)  | 28.65   |                              |                                 |                              |                                   |   |   |                              |   |   |
| Max. Torque (N-m)   | 71.62   |                              |                                 |                              |                                   |   |   |                              |   |   |
| Rated Speed (r/min)   | 1500  |                              |                                 |                              |                                   |   |   |                              |   |   |
| Max. Speed (r/min)  | 3000  |                              |                                 |                              |                                   |   |   |                              |   |   |
| Encoder Type  | 20-bit  |                              |                                 |                              |                                   |   |   |                              |   |   |
| Max. Current (A)  | 81.3  |                              |                                 |                              |                                   |   |   |                              |   |   |
| IP Rating   | IP65  |                              |                                 |                              |                                   |   |   |                              |   |   |
| Rotor Inertia/<br>With Brake ( $\times 10^{-4}$ kg-m <sup>2</sup> ) | 77.75 / 80.24   |                              |                                 |                              |                                   |   |   |                              |   |   |
| Speed-Torque Curves<br>(T-N Curves)                                 |   |                              |                                 |                              |                                   |   |   |                              |   |   |
| Motor Size (with brake; mm)   |   |                              |                                 |                              |                                   |   |   |                              |   |   |
| Motor Frame (mm)  | 180   |                              |                                 |                              |                                   |   |   |                              |   |   |
| Shaft Diameter (mm)   | 35  |                              |                                 |                              |                                   |   |   |                              |   |   |
| Brake Holding Torque [Nt-m(min)]                                    | 25  |                              |                                 |                              |                                   |   |   |                              |   |   |
| Brake Power Consumption (at 20°C)[W]                                | 20.4  |                              |                                 |                              |                                   |   |   |                              |   |   |
| Weight (with brake; kg)   | 23.5 (29)   |                              |                                 |                              |                                   |   |   |                              |   |   |
| Drives  | ASD-A2-4523-F   |                              |                                 |                              |                                   |   |   |                              |   |   |
| □ Description for Optional Selection                                | <table border="1"> <thead> <tr> <th>Shaft type and oil seal</th> <th>Without brake/<br/>with oil seal</th> <th>With brake/<br/>with oil seal</th> </tr> </thead> <tbody> <tr> <td>Round shaft<br/>(with screw holes)</td> <td>C</td> <td>D</td> </tr> <tr> <td>Keyway<br/>(with screw holes)</td> <td>R</td> <td>S</td> </tr> </tbody> </table> | Shaft type and oil seal      | Without brake/<br>with oil seal | With brake/<br>with oil seal | Round shaft<br>(with screw holes) | C | D | Keyway<br>(with screw holes) | R | S |
| Shaft type and oil seal   | Without brake/<br>with oil seal   | With brake/<br>with oil seal |                                 |                              |                                   |   |   |                              |   |   |
| Round shaft<br>(with screw holes)                                   | C   | D                            |                                 |                              |                                   |   |   |                              |   |   |
| Keyway<br>(with screw holes)  | R   | S                            |                                 |                              |                                   |   |   |                              |   |   |



# Specifications - Servo Motor (Absolute Type)

| Power Range   | 400 W   | 750 W                        | 850 W             |                         |                                 |                              |                                   |   |   |                              |   |   |
|---|---|------------------------------|-------------------|-------------------------|---------------------------------|------------------------------|-----------------------------------|---|---|------------------------------|---|---|
| Model   | ECMC-CW 0604 □ S  | ECMC-CW 0807 □ S             | ECMC-FW 1308 □ S  |                         |                                 |                              |                                   |   |   |                              |   |   |
| Rated Torque (N-m)  | 1.27  | 2.39                         | 5.41              |                         |                                 |                              |                                   |   |   |                              |   |   |
| Max. Torque (N-m)   | 3.82  | 7.16                         | 13.8              |                         |                                 |                              |                                   |   |   |                              |   |   |
| Rated Speed (r/min)   | 3000  | 3000                         | 1500              |                         |                                 |                              |                                   |   |   |                              |   |   |
| Max. Speed (r/min)  | 5000  | 5000                         | 3000              |                         |                                 |                              |                                   |   |   |                              |   |   |
| Encoder Type  | Single turn: 20-bit Multiple turn:16-bit  |                              |                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Max. Current (A)  | 7.8   | 15.3                         | 19.4              |                         |                                 |                              |                                   |   |   |                              |   |   |
| IP Rating   | IP65  | IP65                         | IP65              |                         |                                 |                              |                                   |   |   |                              |   |   |
| Rotor Inertia/<br>With Brake ( $\times 10^{-4}$ kg-m <sup>2</sup> ) | 0.743 / 0.751   | 2.91 / 2.96                  | 13.6 / 14.8       |                         |                                 |                              |                                   |   |   |                              |   |   |
| Speed-Torque Curves<br>(T-N Curves)                                 |   |                              |                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Motor Size (with brake; mm)   |   |                              |                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Motor Frame (mm)  | 60  | 80                           | 130               |                         |                                 |                              |                                   |   |   |                              |   |   |
| Shaft Diameter (mm)   | 14  | 19                           | 22                |                         |                                 |                              |                                   |   |   |                              |   |   |
| Brake Holding Torque [Nt-m(min)]                                    | 1.3   | 2.5                          | 10                |                         |                                 |                              |                                   |   |   |                              |   |   |
| Brake Power Consumption (at 20 °C)[W]                               | 6.5   | 8.2                          | 19                |                         |                                 |                              |                                   |   |   |                              |   |   |
| Weight (with brake; kg)   | 1.8 (2.2)   | 3.4 (3.9)                    | 8.6 (10)          |                         |                                 |                              |                                   |   |   |                              |   |   |
| Drives  | ASD-A2-0421-NN/FN   | ASD-A2-0721-NN/FN            | ASD-A2-1021-NN/FN |                         |                                 |                              |                                   |   |   |                              |   |   |
| □ Description for Optional Selection                                | <table border="1"> <thead> <tr> <th>Shaft type and oil seal</th> <th>Without brake/<br/>with oil seal</th> <th>With brake/<br/>with oil seal</th> </tr> </thead> <tbody> <tr> <td>Round shaft<br/>(with screw holes)</td> <td>C</td> <td>D</td> </tr> <tr> <td>Keyway<br/>(with screw holes)</td> <td>R</td> <td>S</td> </tr> </tbody> </table> |                              |                   | Shaft type and oil seal | Without brake/<br>with oil seal | With brake/<br>with oil seal | Round shaft<br>(with screw holes) | C | D | Keyway<br>(with screw holes) | R | S |
| Shaft type and oil seal   | Without brake/<br>with oil seal   | With brake/<br>with oil seal |                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Round shaft<br>(with screw holes)                                   | C   | D                            |                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Keyway<br>(with screw holes)  | R   | S                            |                   |                         |                                 |                              |                                   |   |   |                              |   |   |

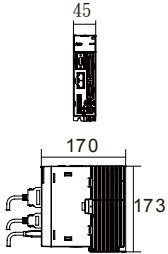
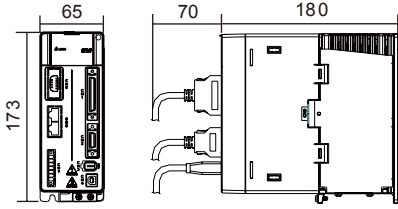
# Specifications - Servo Motor (Absolute Type)

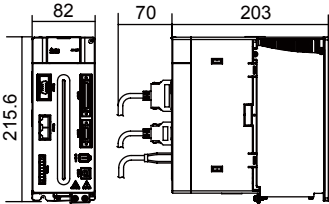
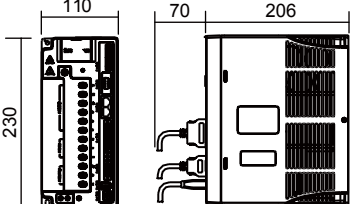
| Power Range   | 1.5 kW  | 1.3 kW                       | 1.8 kW            |                            |                                 |                              |                                   |   |   |                              |   |   |
|---|---|------------------------------|-------------------|----------------------------|---------------------------------|------------------------------|-----------------------------------|---|---|------------------------------|---|---|
| Model   | ECMC-EW 1315 □ S  | ECMC-FW 1313 □ S             | ECMC-FW 1318 □ S  |                            |                                 |                              |                                   |   |   |                              |   |   |
| Rated Torque (N·m)  | 7.16  | 8.34                         | 11.48             |                            |                                 |                              |                                   |   |   |                              |   |   |
| Max. Torque (N·m)   | 21.48   | 23.3                         | 28.7              |                            |                                 |                              |                                   |   |   |                              |   |   |
| Rated Speed (r/min)   | 2000  | 1500                         | 1500              |                            |                                 |                              |                                   |   |   |                              |   |   |
| Max. Speed (r/min)  | 3000  | 3000                         | 3000              |                            |                                 |                              |                                   |   |   |                              |   |   |
| Encoder Type  | Single turn: 20-bit Multiple turn: 16-bit   |                              |                   |                            |                                 |                              |                                   |   |   |                              |   |   |
| Max. Current (A)  | 24.9  | 38.6                         | 36                |                            |                                 |                              |                                   |   |   |                              |   |   |
| IP Rating   | IP65  | IP65                         | IP65              |                            |                                 |                              |                                   |   |   |                              |   |   |
| Rotor Inertia/<br>With Brake ( $\times 10^{-4}$ kg·m <sup>2</sup> ) | 11.18 / 11.9  | 20 / 21.3                    | 24.9 / 26.2       |                            |                                 |                              |                                   |   |   |                              |   |   |
| Speed-Torque Curves<br>(T-N Curves)                                 |   |                              |                   |                            |                                 |                              |                                   |   |   |                              |   |   |
| Motor Size (with brake; mm)   |   |                              |                   |                            |                                 |                              |                                   |   |   |                              |   |   |
| Motor Frame (mm)  | 130   | 130                          | 130               |                            |                                 |                              |                                   |   |   |                              |   |   |
| Shaft Diameter (mm)   | 22  | 22                           | 22                |                            |                                 |                              |                                   |   |   |                              |   |   |
| Brake Holding Torque<br>[Nt·m(min)]                                 | 10  | 10                           | 10                |                            |                                 |                              |                                   |   |   |                              |   |   |
| Brake Power Consumption<br>(at 20 °C)[W]                            | 19  | 19                           | 19                |                            |                                 |                              |                                   |   |   |                              |   |   |
| Weight (with brake; kg)   | 7.5 (8.9)   | 9.4 (10.8)                   | 10.5 (11.9)       |                            |                                 |                              |                                   |   |   |                              |   |   |
| Drives  | ASD-A2-1521-NN/FN   | ASD-A2-2023-NN/FN            | ASD-A2-2023-NN/FN |                            |                                 |                              |                                   |   |   |                              |   |   |
| □ Description for<br>Optional Selection                             | <table border="1"> <thead> <tr> <th>Shaft type and<br/>oil seal</th> <th>Without brake/<br/>with oil seal</th> <th>With brake/<br/>with oil seal</th> </tr> </thead> <tbody> <tr> <td>Round shaft<br/>(with screw holes)</td> <td>C</td> <td>D</td> </tr> <tr> <td>Keyway<br/>(with screw holes)</td> <td>R</td> <td>S</td> </tr> </tbody> </table> |                              |                   | Shaft type and<br>oil seal | Without brake/<br>with oil seal | With brake/<br>with oil seal | Round shaft<br>(with screw holes) | C | D | Keyway<br>(with screw holes) | R | S |
| Shaft type and<br>oil seal  | Without brake/<br>with oil seal   | With brake/<br>with oil seal |                   |                            |                                 |                              |                                   |   |   |                              |   |   |
| Round shaft<br>(with screw holes)                                   | C   | D                            |                   |                            |                                 |                              |                                   |   |   |                              |   |   |
| Keyway<br>(with screw holes)  | R   | S                            |                   |                            |                                 |                              |                                   |   |   |                              |   |   |



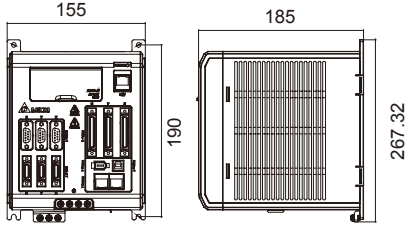
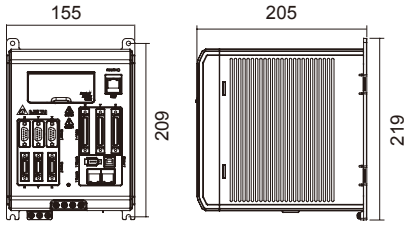
| Power Range   | 2 kW  | 2 kW                         | 3 kW              |                         |                                 |                              |                                   |   |   |                              |   |   |
|---|---|------------------------------|-------------------|-------------------------|---------------------------------|------------------------------|-----------------------------------|---|---|------------------------------|---|---|
| Model   | ECMC-EW 1320 □ S  | ECMC-EW 1820 □ S             | ECMC-FW 1830 □ S  |                         |                                 |                              |                                   |   |   |                              |   |   |
| Rated Torque (N-m)  | 9.55  | 9.55                         | 19.1              |                         |                                 |                              |                                   |   |   |                              |   |   |
| Max. Torque (N-m)   | 28.65   | 28.65                        | 57.29             |                         |                                 |                              |                                   |   |   |                              |   |   |
| Rated Speed (r/min)   | 2000  | 2000                         | 1500              |                         |                                 |                              |                                   |   |   |                              |   |   |
| Max. Speed (r/min)  | 3000  | 3000                         | 3000              |                         |                                 |                              |                                   |   |   |                              |   |   |
| Encoder Type  | Single turn: 20-bit Multiple turn: 16-bit   |                              |                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Max. Current (A)  | 33.0  | 33.66                        | 58.2              |                         |                                 |                              |                                   |   |   |                              |   |   |
| IP Rating   | IP65  | IP65                         | IP65              |                         |                                 |                              |                                   |   |   |                              |   |   |
| Rotor Inertia/<br>With Brake ( $\times 10^{-4}$ kg-m <sup>2</sup> ) | 14.59 / 15.88   | 34.68 / 37.86                | 54.95 / 57.06     |                         |                                 |                              |                                   |   |   |                              |   |   |
| Speed-Torque Curves<br>(T-N Curves)                                 |   |                              |                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Motor Size (with brake; mm)   |   |                              |                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Motor Frame (mm)  | 130   | 180                          | 180               |                         |                                 |                              |                                   |   |   |                              |   |   |
| Shaft Diameter (mm)   | 22  | 35                           | 35                |                         |                                 |                              |                                   |   |   |                              |   |   |
| Brake Holding Torque<br>[Nt-m(min)]                                 | 10  | 25                           | 25                |                         |                                 |                              |                                   |   |   |                              |   |   |
| Brake Power Consumption<br>(at 20 °C)[W]                            | 19  | 20.4                         | 20.4              |                         |                                 |                              |                                   |   |   |                              |   |   |
| Weight (with brake; kg)   | 7.5 (8.9)   | 18.5 (22.5)                  | 18.5 (22.5)       |                         |                                 |                              |                                   |   |   |                              |   |   |
| Drives  | ASD-A2-2023-NN/FN   | ASD-A2-2023-NN/FN            | ASD-A2-3023-NN/FN |                         |                                 |                              |                                   |   |   |                              |   |   |
| □ Description for<br>Optional Selection                             | <table border="1"> <thead> <tr> <th>Shaft type and oil seal</th> <th>Without brake/<br/>with oil seal</th> <th>With brake/<br/>with oil seal</th> </tr> </thead> <tbody> <tr> <td>Round shaft<br/>(with screw holes)</td> <td>C</td> <td>D</td> </tr> <tr> <td>Keyway<br/>(with screw holes)</td> <td>R</td> <td>S</td> </tr> </tbody> </table> |                              |                   | Shaft type and oil seal | Without brake/<br>with oil seal | With brake/<br>with oil seal | Round shaft<br>(with screw holes) | C | D | Keyway<br>(with screw holes) | R | S |
| Shaft type and oil seal   | Without brake/<br>with oil seal   | With brake/<br>with oil seal |                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Round shaft<br>(with screw holes)                                   | C   | D                            |                   |                         |                                 |                              |                                   |   |   |                              |   |   |
| Keyway<br>(with screw holes)  | R   | S                            |                   |                         |                                 |                              |                                   |   |   |                              |   |   |

# Specifications - Servo Drive (ASDA-A2 Series)

| Model                     | ASD-A2-0421-NN   | ASD-A2-0721-NN  | ASD-A2-1021-NN | ASD-A2-1521-NN |
|---------------------------|--|---|----------------|----------------|
| Phase / Voltage           | Three-phase or one phase 220VAC  |   |                |                |
| Permissible Voltage Range | Three-phase/one phase 200 ~2 30VAC, -15% ~ 10%                                     |   |                |                |
| Continuous Output Current | 2.6 Arms   | 5.1 Arms  | 7.3 Arms       | 8.3 Arms       |
| Cooling System            | Natural Cooling  | Fan Cooling   |                |                |
| Feedback Resolution       | 1280000p/rev   |   |                |                |
| Main Circuit Control      | SVPWM control  |   |                |                |
| Regenerated Brake         | N/A  | Built-in  |                |                |
| Size (mm)                 |  |  |                |                |
| Weight (kg)               | 1.5  | 2   |                |                |

| Model                     | ASD-A2-2023-NN  | ASD-A2-3023-NN  | ASD-A2-4523-F |
|---------------------------|---|---|---------------|
| Phase / Voltage           | Three-phase 220VAC  |   |               |
| Permissible Voltage Range | Three-phase 200 ~ 230VAC, -15% ~ 10%  |   |               |
| Continuous Output Current | 13.4 Arms   | 19.4 Arms   | 32.5 Arms     |
| Cooling System            | Fan Cooling   |   |               |
| Feedback Resolution       | 1280000p/rev  |   |               |
| Main Circuit Control      | SVPWM control   |   |               |
| Regenerated Brake         | Built-in  |   |               |
| Size (mm)                 |  |  |               |
| Weight (kg)               | 2.89  | 4.4   |               |

# Specifications - Servo Drive (ASDA-M Series)

| Model                     | ASD-M-0721-F   | ASD-M-1521-F   |
|---------------------------|--|--|
| Phase / Voltage           | Three-phase or one phase 220VAC  |  |
| Permissible Voltage Range | Three-phase or one phase 200 ~ 230VAC, -15% ~ 10%                                  |  |
| Continuous Output Current | 5.1 Arms   | 8.3 Arms   |
| Cooling System            | Fan Cooling  |  |
| Feedback Resolution       | 1280000p/rev   |  |
| Main Circuit Control      | SVPWM control  |  |
| Regenerated Brake         | Built-in   |  |
| Size (mm)                 |  |  |
| Weight (kg)               | 1.5  | 2.0  |

Specifications



# Specifications - PM Spindle Motor (ECMS Series)

| Power Range   | 3.7 kW  | 6.7 kW                                 |
|---|---|--|
| Model   | ECMS-AM1540 <input type="checkbox"/> S                          | ECMS-AM1570 <input type="checkbox"/> S |
| Rated Torque (N-m)  | 5.89  | 10.22                                  |
| Max. Torque (N-m)   | 14.72   | 26.65                                  |
| Rated Speed (r/min)   | 6000  | 6000                                   |
| Max. Speed (r/min)  | 12000   | 12000                                  |
| Encoder Type (A)  | Incremental 17-bit  |  |
| Rated Current   | 16.52   | 27.47                                  |
| Max. Current (A)  | 41.3  | 68.68                                  |
| IP Rating   | IP55  | IP55                                   |
| Rotor Inertia/<br>With Brake ( $\times 10^{-4}$ kg-m <sup>2</sup> ) | 12.3  | 19.2                                   |
| Speed-Torque Curves<br>(T-N Curves)                                 |   |  |
| Motor Size (with brake; kg)   |   |  |
| Motor Frame (mm)  | 155   | 155                                    |
| Shaft Diameter (mm)   | 28  | 28                                     |
| Weight (with brake; kg)   | 20  | 27.4                                   |
| Drives  | ASD-S-4523-N  | ASD-S-5523-N                           |
| <input type="checkbox"/> Description for<br>Optional Selection      | A (Round Shaft)<br>B (Round Shaft with Coolant Through Spindle) |  |

# Specifications - Spindle Motor Drive (ASDA-S Series)

| Model                         | ASD-S-4523-N  | ASD-S-5523-N  | ASD-S-7523-N  |
|-------------------------------|---|---|---|
| Supported Motors              | Delta ECMS-AM1540□S / Induction motors sold on the market (4.5 kW, 32.5 Arms and under) | Delta ECMS-AM1570□S / Induction motors sold on the market (5.5 kW, 40.0 Arms and under) | Induction motors sold on the market (7.5 kW, 47.5 Arms and under) |
| Permissible Voltage Range     | Three-phase 220VAC  |   |   |
| Allowable Voltage Change Rate | Three-phase 200 ~ 230VAC, -15% ~ 10%  |   |   |
| Continuous Output Current     | 32.5 Arms   | 40.0 Arms   | 47.5 Arms   |
| Cooling System                | Fan Cooling   |   |   |
| Main Circuit Control          | SVPWM control   |   |   |
| Regenerated Brake             | Built-in  | Break resistor needed or select Delta C-BOX (ASD-MDCP2016)                              |   |
| Size (mm)                     |   |   |   |
| Weight (kg)                   | 4.4   | 5.5   | 5.9   |

Specifications





# Energy Saving Capacitor Box (C Box)

## Features

### ■ Energy Regeneration

Along with servo drives, the C Box is able to regenerate power during deceleration of the servo drives. The generated energy can be stored in the C Box and reused for the later acceleration of the servo drives.

### ■ Cost Reduction

Due to the fact that the servo system needs brake resistors to dissipate extra energy and heat caused by sudden acceleration and deceleration, the C Box is able to replace traditional brake resistors to decrease the cost of applying multiple brake resistors and reduce heat efficiently.

## Specification

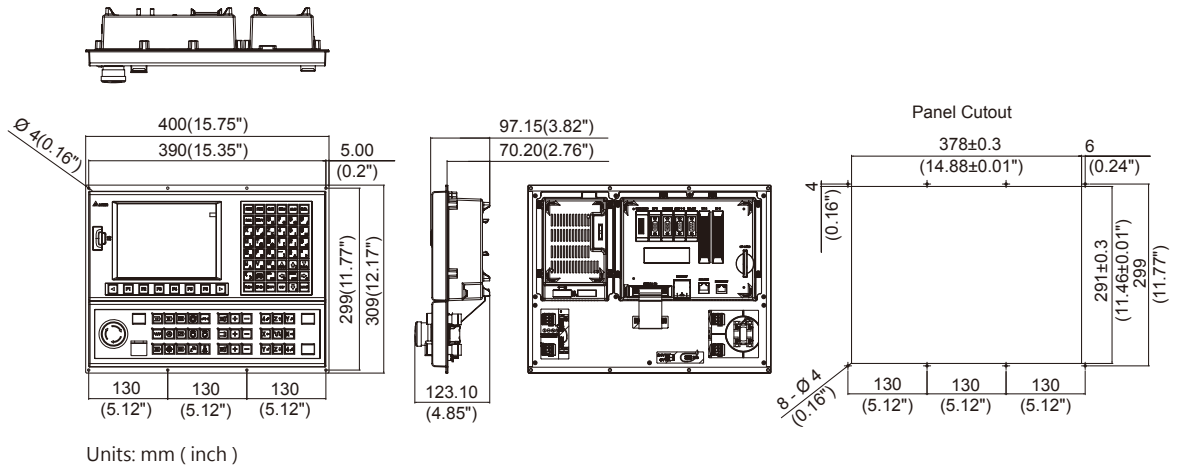
| Model                     | ASD-MDCP2016                            |
|---------------------------|---|
| Voltage                   | 250V~370V DC                            |
| Permissible Voltage Range | 450V DC                                 |
| Power Consumption         | 10W                                     |
| Input / Output Current    | 60A (rms)                               |
| Capacitance               | 40000uF                                 |
| Storage Limitation        | Depends on different motor load inertia |

## Electrical Specifications

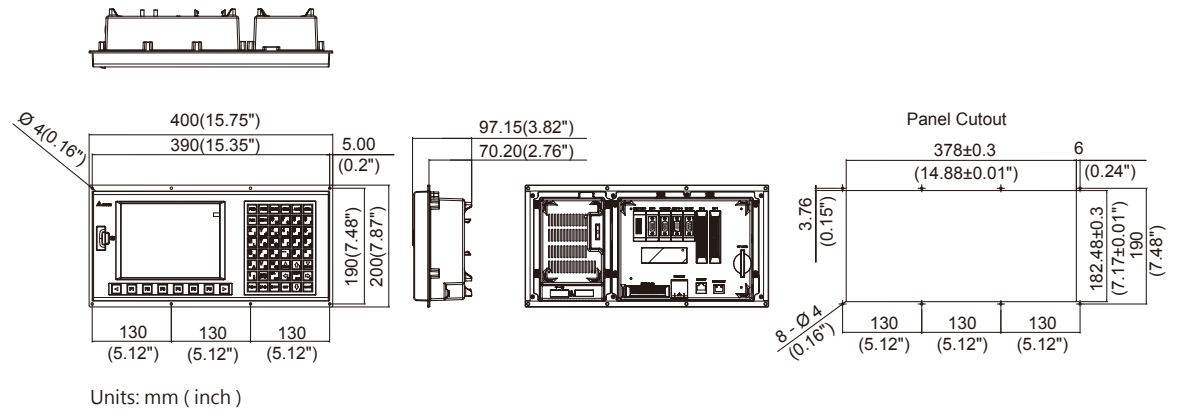
| Model                 | NC300A / NC301A  | NC311A       | NC310A       |
|-----------------------|--|--------------|--------------|
| Operation Environment | 10% ~ 95% RH 【0 ~ +55 °C】  |              |              |
| Storage Environment   | 10% ~ 95% RH 【-20 ~ +60 °C】  |              |              |
| Cooling Method        | Natural Cooling  |              |              |
| Safety Approval       | CE   |              |              |
| Operation Voltage     | DC +24V (-10% ~ +15%) (with built-in isolated power circuit)           |              |              |
| Voltage Endurance     | AC500V for 1 minute (between charging DC24V terminal and FG terminals) |              |              |
| Power Consumption     | 24V 0.6A 15W   | 24V 0.8A 20W | 24V 0.8A 20W |
| Backup Battery        | 3V lithium manganese battery CR2032 x 1                                |              |              |
| Backup Battery Life   | Depends on the working environment, about 3 years or more at 25 °C     |              |              |
| Weight (kg)           | MI : 4.16 ; MS : 3.1 ;<br>NC301A : 3.4                                 | 3.8          |              |

# Dimensions - CNC Controllers

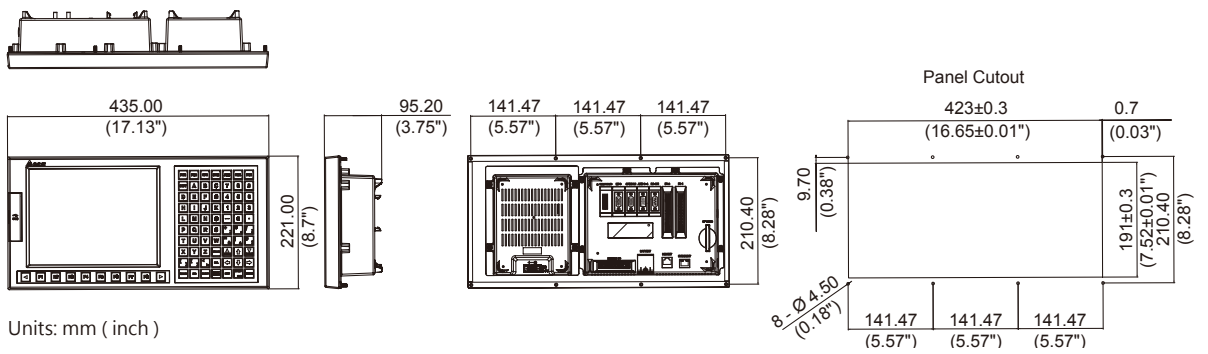
## NC300A/AH-MI-A



## NC300A/AH-MS-A

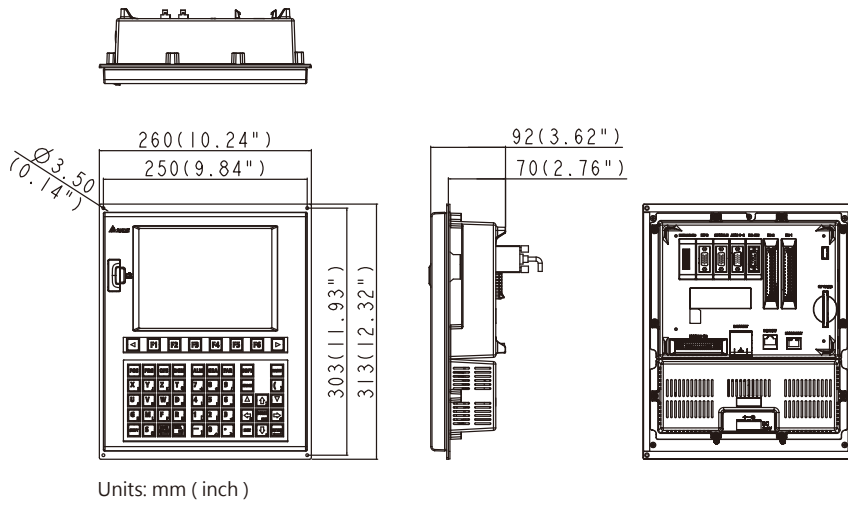


## NC310AH-MS-A



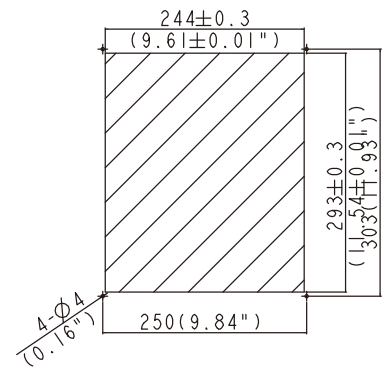
# Dimensions - CNC Controllers

## NC301A/AH-MS-A

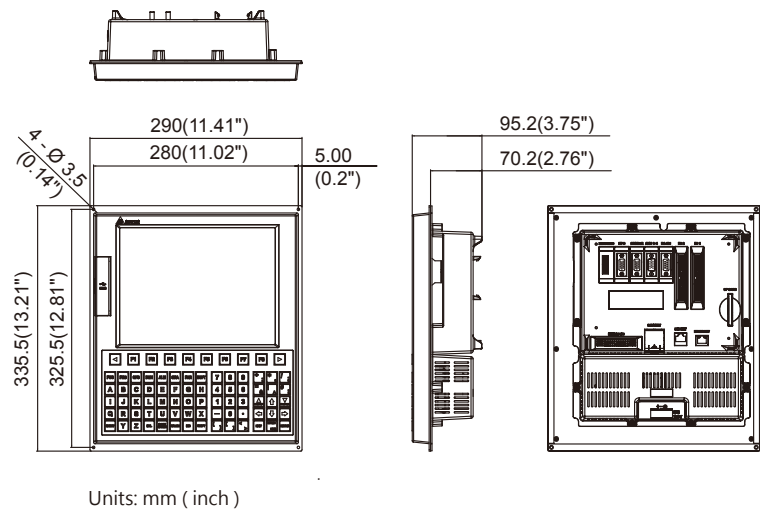


Units: mm (inch)

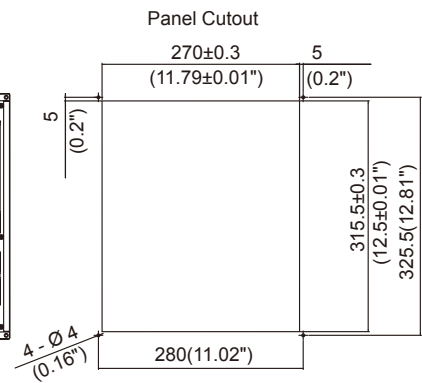
Cut-outs and Mounting Dimensions



## NC311AH-MS-A



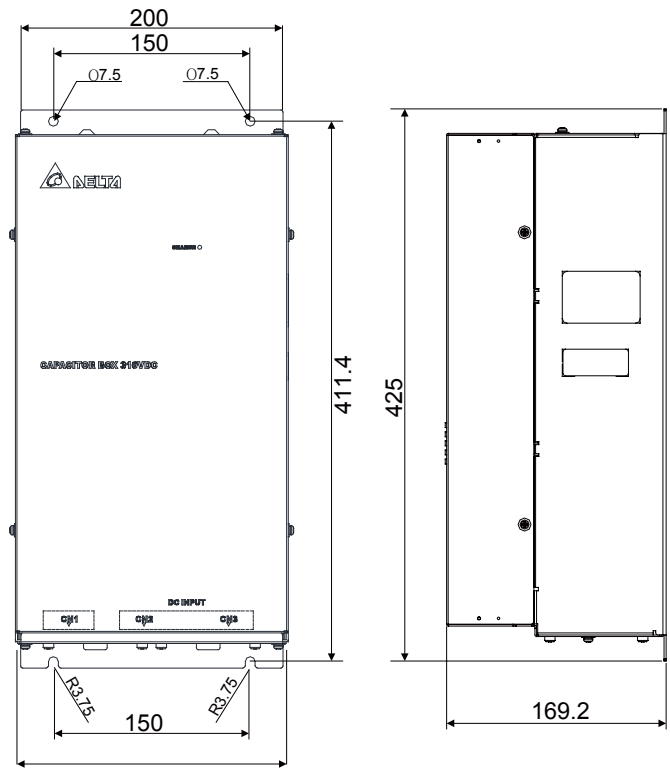
Units: mm (inch)



# Dimensions - Capacitor Box 310VDC

| Weight  |
|---------|
| 10 (22) |

Note:  
 1) Dimensions are in millimeters (inches)  
 2) Weights are in kilograms (kg) and pounds (lbs)



# Optional Accessories - CNC Second Operation Panel

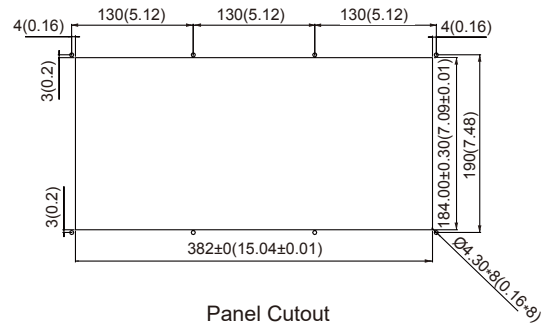
Units: mm (inches)

## Membrane Type Operation Panel for Milling Machines

**NC-PAN-300AM-F** □  
□ : E English Panel



- Size:  
400 x 200 x 92.16 mm ( Length x Width x Total Height )

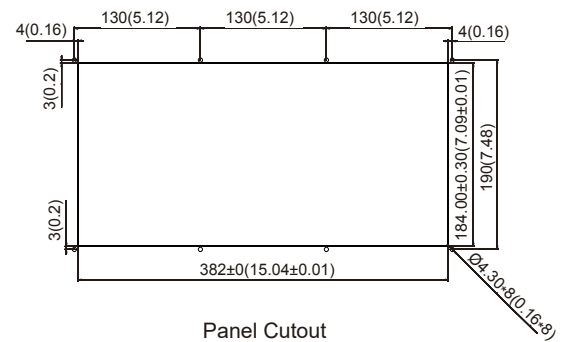


## Key Type Operation Panel for Milling Machines

**NC-PAN-300AM-P** □  
□ : E English Panel



- Size:  
400 x 200 x 92.16 mm ( Length x Width x Total Height )

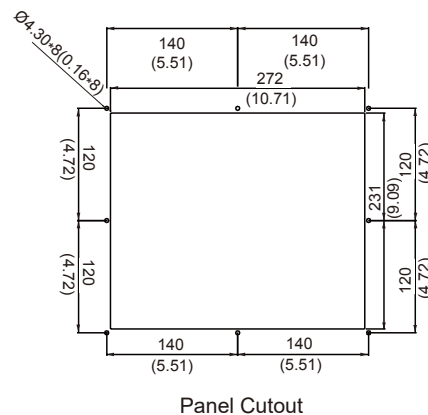


## Key Type Operation Panel for High Speed Tapping Machines

**NC-PAN-311AM-P** □  
□ : E English Panel



- Size:  
290 x 250 x 92.23 mm ( Length x Width x Total Height )





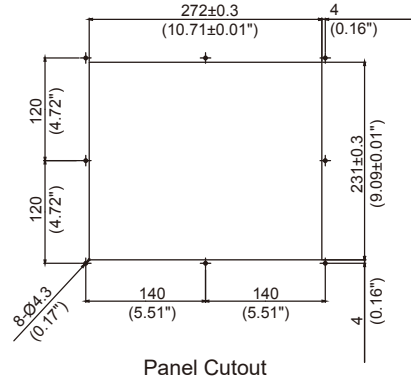
# Optional Accessories - CNC Second Operation Panel

## Membrane Operation Panel for High Speed Tapping Machines

**NC-PAN-311AM-F** □  
□ : E English Panel



- Size:  
290 x 250 x 75.62 mm ( Length x Width x Total Height )

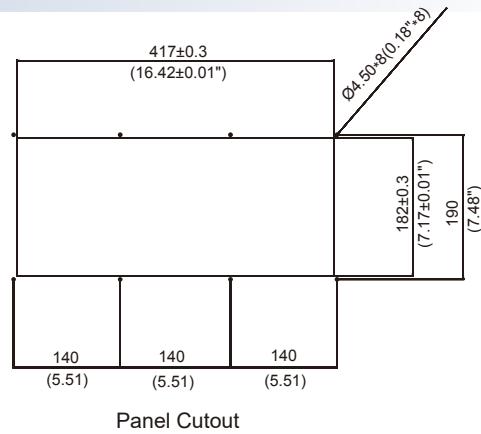


## Key Type Operation Panel for Milling Machines

**NC-PAN-310AM-P** □  
□ : E English Panel



- Size:  
435 x 200 x 89.06 mm ( Length x Width x Total Height )

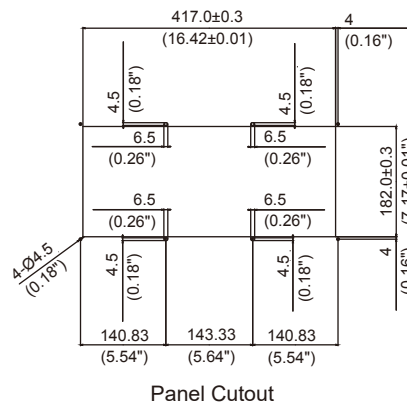


## Membrane Type Operation Panel for Milling Machines

**NC-PAN-310AM-F** □  
□ : E English Panel



- Size:  
435 x 200 x 76.05 mm ( Length x Width x Total Height )



# CNC Second Panel I/O Transit Card

## I/O Transit Card



- **Supports** 32I/32O
- **Part No.**  
NC-EIO-T3232A
- **Size:**  
121.78 x 92.5 x 53 mm  
(Length x Width x Total Height)

# Optional Accessories - Cables and Terminal Blocks

## Local I/O

### I/O Cable



- **Supports** 1.5/3.0/5.0/10 m
- **Part No.**  
1.5 m, NC-CAB-TBM015  
3.0 m, NC-CAB-TBM030  
5.0 m, NC-CAB-TBM050  
10 m, NC-CAB-TBM100

### Photocoupler Type



- **Supports** 16IN/16OUT
- **Part No.**  
NC-TBM-T1616
- **Size:**  
146.25 x 86.71 x 52.81 mm  
(Length x Width x Total Height)

### Relay Type



- **Supports** 16IN/16OUT
- **Part No.**  
NC-TBM-R1616
- **Size:**  
286 x 121.78 x 54.73 mm  
(Length x Width x Total Height)

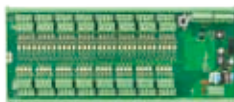
## High Speed Serial I/O

### Serial Cable



- **Supports** 1.5/3.0/5.0/10 m
- **Part No.**  
1.5 m, NC-CAB-EIO015  
3.0 m, NC-CAB-EIO030  
5.0 m, NC-CAB-EIO050  
10 m, NC-CAB-EIO100

### Photocoupler Type



- **Supports** 32IN/32OUT
- **Part No.**  
NC-EIO-T3232
- **Size:**  
286 x 121.78 x 51.01 mm  
(Length x Width x Total Height)

### Relay Type



- **Supports** 32IN/16OUT
- **Part No.**  
NC-EIO-R3216
- **Size:**  
286 x 121.7 x 54.73 mm  
(Length x Width x Total Height)

### Relay Type



- **Supports** 20IN/10OUT
- **Part No.**  
NC-EIO-R2010
- **Size:**  
217 x 121.79 x 60.56 mm  
(Length x Width x Total Height)

# Optional Accessories - Cables and Terminal Blocks

## High Speed Serial I/O

### DA converter Analog Output Type (4 channel DAC)



- Part No. NC-EIO-DAC04
- Size:  
146.25 x 86.78 x 51.05 mm  
(Length x Width x Total Height)

### AD converter Analog Input Type (4 channel ADC)



- Part No. NC-EIO-ADC04
- Size:  
146.25 x 86.78 x 51.05 mm  
(Length x Width x Total Height)

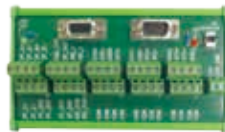
## Terminal Blocks

### DMCNET Cable



- Supports  
0.3/1.5/3.0/5.0/10 m
- Part No.  
0.3 m, NC-CAB-DMC003  
1.5 m, NC-CAB-DMC015  
3.0 m, NC-CAB-DMC030  
5.0 m, NC-CAB-DMC050  
10 m, NC-CAB-DMC100

### Spindle and 1~4 Axes Terminal Block

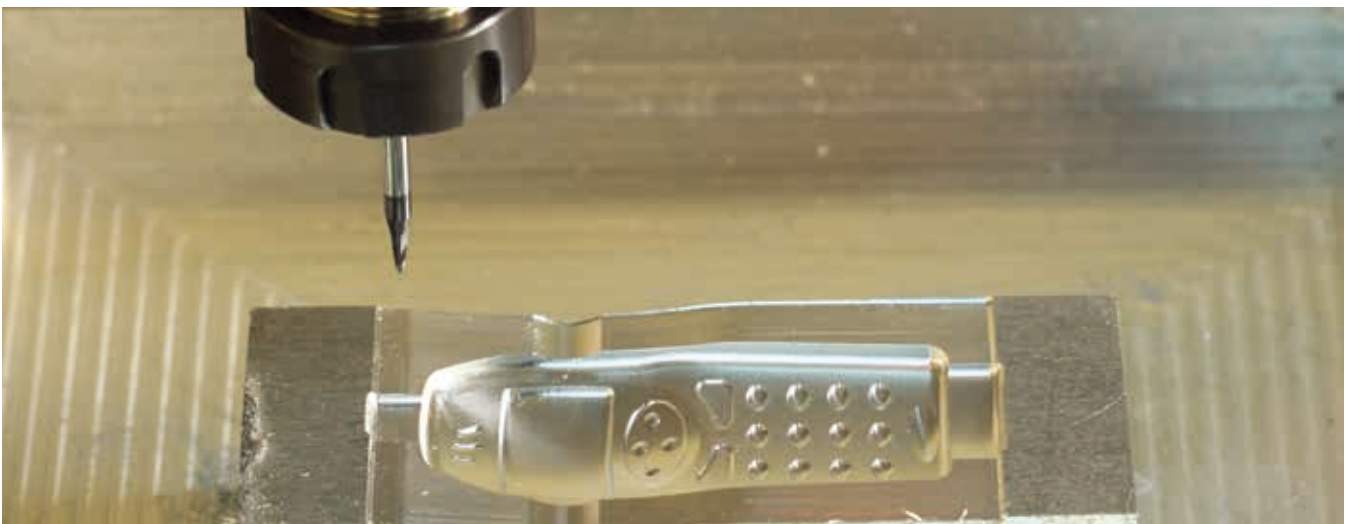


- Part No.  
NC-EXM-S01
- Size:  
146.25 x 86.78 x 51.05 mm  
(Length x Width x Total Height)

### MPG Terminal Block



- Adaptor for MPG
- Part No. NC-EXM-M01
- Size:  
62.50 x 86.78 x 51.05 mm  
(Length x Width x Total Height)



# 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)

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▲ ■ ● **Taoyuan**  
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■ ● **Taichung**  
■ ● **Tainan**

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## 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 Tlalnepantla 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