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**AX-308E**  
**EtherCAT Motion Controller**



**V1.1.0**

## 1 News

### 1.1 FTP-Site Link & Update

Our FTP is mainly for keeping the info of the products (datasheets, technical notes, presentations, software, etc.) which is not included in our official Download Center. Please visit our FTP site with below account info.

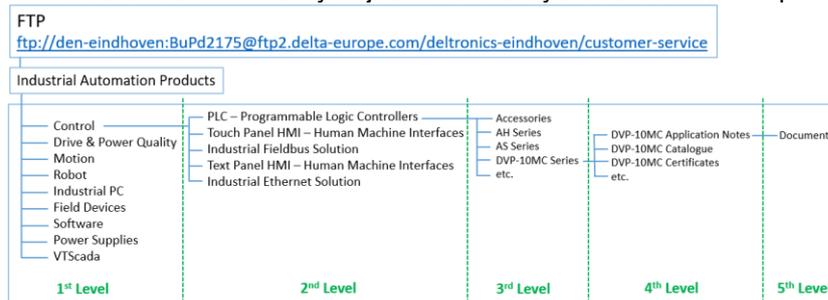
<ftp://den-eindhoven:BuPd2175@ftp2.delta-europe.com/deltronics-eindhoven/customer-service>

Name and password are included in the link.

Name: den-eindhoven

Password: BuPd2175

- **Update** To align the data categories with Delta official Download Center, the structure of the folders has been newly adjusted to the layers as below example.



- **NOTE** Due to the data migration of the server, from now on it is only possible to access our FTP via TCP port 22/23 but not others. Therefore, please use the common FTP clients such as FileZilla to access it but not using IE or other browsers with the incompatible TCP ports.

## 2 Product update

### 2.1 NEW – AX-308EA0MA1T EtherCAT Motion Controllers

AX-308EA0MA1T, the first device from the AX-3 series PLC, is a compact mid-range multi-axis motion controller based on CODESYS platform. It is also a flexible solution, which is available for a wide range of applications such as packaging, woodworking, metalworking and material handling.

The AX series comes in combination with the DIADesigner-AX, the new powerful tool that integrated with the CODESYS in DIASudio environment.



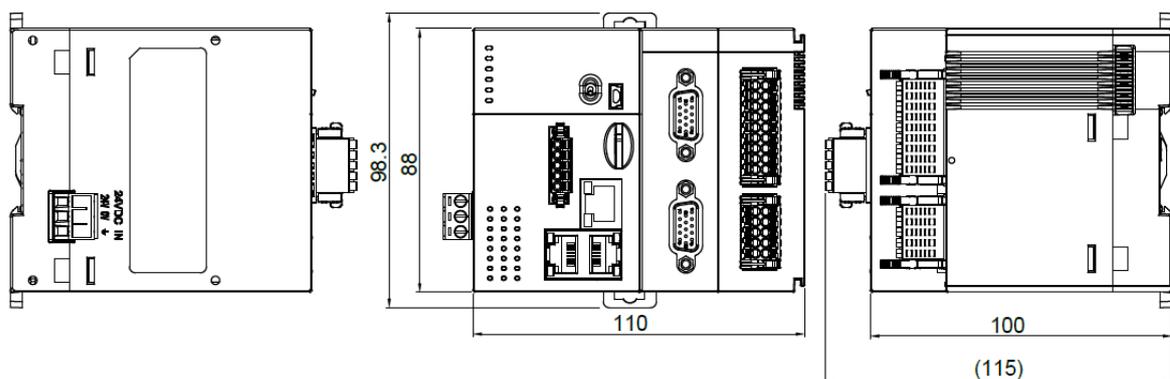
#### Feature

- Supports up to 8 EtherCAT servos
- Supports 3<sup>rd</sup> party EtherCAT devices
- Min. EtherCAT sync. time: 2ms@8 axes
- Min. execution time of basic instruction: 5ns
- Built-in encoder interface: Incremental x2 and SSI x1
- Built-in comm. port: EtherCAT, Ethernet, RS-232 and RS-485
- Built-in 16 DI (200KHz x4) and 8 DO (200KHz x4, supports pulse-train servo drives)
- Supports protocol: EtherCAT, OPC UA (server), EtherNet/IP, MODBUS and MODBUS TCP

#### Benefits

- Supports all IEC61131-3 PLC languages (from ladder to structured text, including the support of Object Oriented Programming)
- Planning and execution of both simple and complex applications for motion control, including single-axis and multi-axis movements in accordance with PLCopen standard
- Integrated graphical interface to create electronic cams
- Integrated commissioning tools like digital oscilloscope, data monitoring, breakpoints, diagnostics and online changes.
- Simulation mode to test PLC/motion programs without physical target devices

#### Dimension



Unit: mm

### Product Specification

Motion network	EtherCAT
Max real axis	8 (+4 PTO)
Max total axis (real+virtual)	16
Execution speed	5ns for basic instruction
Program capacity	8MB
Data capacity	16MB
Module expansion ability	32 IO modules (Will support comm. modules in next stage.)
Max I/O points	1,024 pts.
Built-in I/O points	DI: 16 pts. (Supports 200KHz x6), DO: 8 pts. (Supports 200KHz x4)
Built-in comm. ports	USB, EtherCAT, Ethernet, RS232, RS485
Supported protocols	EtherCAT, OPC UA (Server), MODBUS, MODBUS TCP, EtherNet/IP
Power input	24V <sub>DC</sub>

### Electrical Specification

Operating Temperature	-20 - 60°C (AX series CPU: -20 - 55°C)
Storage Temperature	-40 - 80°C
Operating Humidity	5 – 95%, non-condensing
Storage Humidity	5 – 95%, non-condensing
Vibration	IEC 61131-2, IEC 60068-2-6 (TEST Fc); 5 Hz ≤ f ≤ 8.4 Hz, constant amplitude 3.5 mm; 8.4 Hz ≤ f ≤ 150 Hz, constant acceleration 1g
Shock	IEC 61131-2, IEC 60068-2-27 (TEST Ea); 15g peak, 11ms duration, half-sine
Operating Environment	Non-corrosive gas
Installation	Inside of the control panel
Pollution Degree	2
Protection Rating	IP20
Conformal Coating	Yes

### Ordering Information

Model Name	Description	Certificates
AX-308EA0MA1T	AX-3 series EtherCAT motion controller, 8-axis, built-in 16DI/8DO, NPN output, CODESYS	CE, UL

### 2.2 NEW – DPM-DA510 & DPM-DA530 DIN-rail Mount Power Meters

New DIN-Rail mount type power meter models, DPM-DA510 & DPM-DA530, with different function levels has been released. The 2 models are able to be basic and advanced solutions in power monitoring and energy saving applications.

#### Feature

- DIN-Rail mount and LCD Display
- Supports MODBUS RTU protocol
- Easy to be applied with SCADA and EMS
- Pulse Output indicates to energy accumulation
- 2 models for different application levels. DA510 for basic requirement like remote electricity data acquisition; DA530 is better for energy management because of capability of THD, TOU, demand, data record, etc.



DPM-DA510  
Delta Basic DIN-Rail Mount Meter



DPM-DA530  
Delta Advanced DIN-Rail Mount Meter

### 2.3 NEW – DVP Slim Series EtherCAT RTU Module – RTU-ECAT

New EtherCAT RTU Module, RTU-EACT, has been released. It can enhance the integration ability of Delta EtherCAT motion control system and provide complete RIO solution, and help users to build up the control system easier and faster.

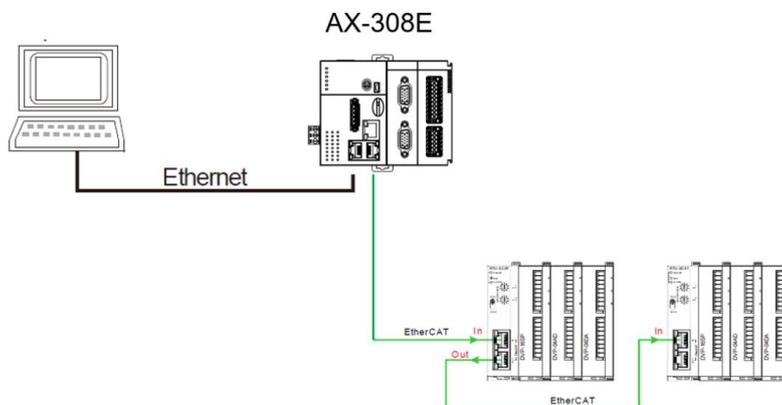
#### Feature

- Supports EtherCAT
- Supports up to 128DI and 128 DO points
- Supports up to 14 DVP-S I/O modules (Max quantity of modules other than DIO is 8 modules)
- Build-in ID switches
- Max baud rate is 100Mbps

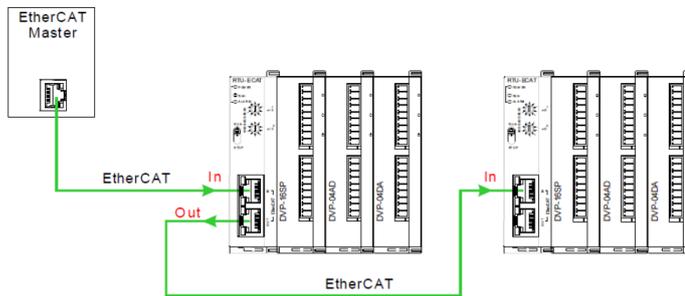


#### Application Structure

- AX-3 EtherCAT controller + RTU-ECAT + DVP-S I/O



- 3<sup>rd</sup> party controller + RTU-ECAT + DVP-S I/O



### 2.4 PHASE OUT – AH & DVP PLC Modules

Part of AH & DVP PLC modules will be phased out as listed in the table, the recommended replacements are listed for reference as well.

Type	Discontinuation		Recommended		Last order (YYY/MM)	Discontinuation (YYY/MM)
	Mode No.	Description	Mode No.	Description		
CPU	DVP32EH00MT	DVP-EH CPU, 32 IO, transistor output			2021/02	2021/03
	DVP20PM00D-S1	DVP-PM motion controller, transistor output				
I/O	DVP16XM11N	16DI	DVP16XM211N	16DI	2021/08	2021/09
	DVP16XN11R	16DO, relay output	DVP16XN211R	16DO, relay output		
	DVP24XP11R	16DI, 8DO, relay output	DVP24XP200R	16DI, 8DO, relay output	2021/02	2021/03
	DVP24XN11R	24DO, relay output	DVP24XN200R	24DO, relay output		
	DVP32XP11R	16DI, 16DO, relay output	DVP32XP200R	16DI, 16DO, relay output		
	DVP10RC-E2	Resolver module			2020/12	2020/12
AH20MC-5A	DMCNET motion control module			2021/11	2021/12	
Card / Accessory	DVP-F422	RS422 communication card			2020/12	2020/12
	TP-PCC01	Data backup memory card (for TP)			2021/02	2021/03

Recommended		
Type	Mode No.	Description
I/O	DVP16XM211N	16DI
	DVP16XN211R	16DO, relay output
	DVP24XP200R	16DI, 8DO, relay output
	DVP24XN200R	24DO, relay output
	DVP32XP200R	16DI, 16DO, relay output

For AH20MC-5A, Delta will provide 3 years, 2022~2024, repair and exchange service after discontinuation.

(Condition: User has to provide fault goods & Delta has this module in stock.)

### Introduction of Recommended Products:

#### Standard PLC / Analog I/O PLC

#### DVP-ES2/EX2

**Standard PLCs with integrated communication and highly efficient processing ability for your control systems**

- ▶ 32-bit CPU for high-speed processing
- ▶ Standard PLC DVP-ES2 Series: 16/20/24/32/40/60/80 I/O points for a variety of applications
- ▶ Analog I/O PLC DVP-EX2:
  - Built-in 12-bit 4 analog inputs / 2 analog output; and 14-bit analog I/O extension module
  - Built-in PID auto tuning function for a complete analog control solution
- ▶ Built-in 1 RS-232 and 2 RS-485 ports
- ▶ Program capacity: 16k steps

- ▶ Data register: 10 k words
- ▶ Max. execution speed of basic instructions: 0.35 μs
- ▶ RTC function and file register (5k words) (hardware version 2.0 and above)
- ▶ Highly efficient processing ability: 1k steps of programs can be completed within 1ms
- ▶ Max. 100 kHz pulse control; specific motion control instructions (mark/masking and instant frequency changing) available for multi-axis applications
- ▶ Up to 4 levels of password protection secures your source programs and intellectual property

Built-in High-Speed Counters					
1-phase 1 input		1-phase 2 inputs		2-phase 2 inputs	
Counters	Bandwidth	Counters	Bandwidth	Counters	Bandwidth
2/6	100kHz/10kHz	2	100kHz	1/3	15kHz/5kHz

Caution: The I/O terminal design is different, so users have to rewire when they change the CPU/I/O from DVP-ES to DVP-ES2.

## 2.5 UPDATE – DIADesigner-AX Version 1.1.0

Delta's latest DIADesigner-AX software version 1.1.0 is released, it can be installed after downloading DIAInstaller in DIAStudio V1.0 from below link.

### DIADesigner download

<https://diastudio.deltaww.com/home/downloads?sec=download#software>



### Feature

- New devices support.

The following is new device support:

<b>AX-3 Series Motion Controller</b>	AX-364ELAA0MA1T	AX-308EA0MA1P	
<b>AX-3 Series Logic Controller</b>	AX-300NA0PA1	AX-324NA0PA1P	
<b>AS Series IO Module</b>	AS02PU-A	AS04PU-A	ASS02HC-A

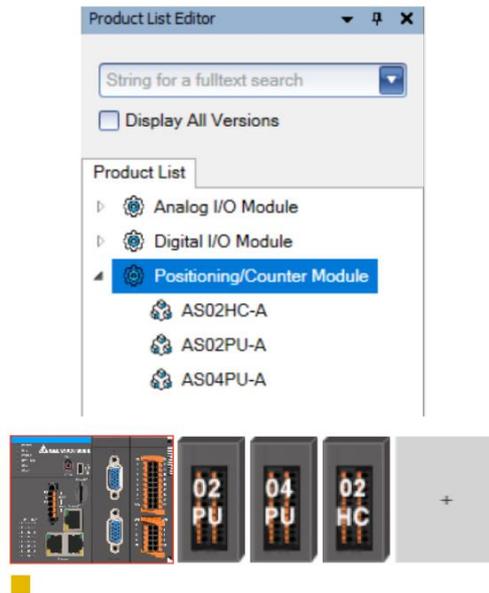
- New Motion Controller

AX-308EA0MA1P	AX-364ELAA0MA1T

- New Logic Controller

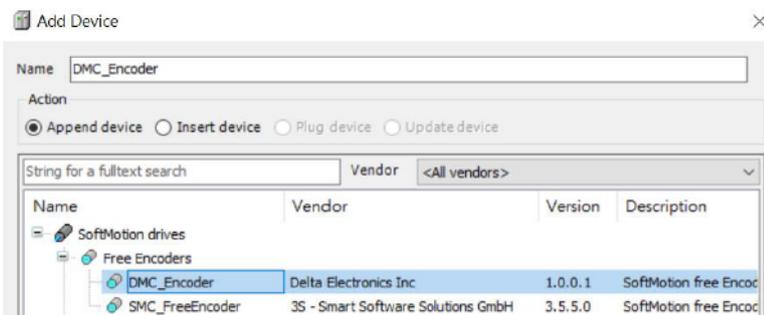
AX-300NA0PA1	AX-324NA0PA1P

Added AX-3 Series Modules: Used in **Hardware Configuration** page

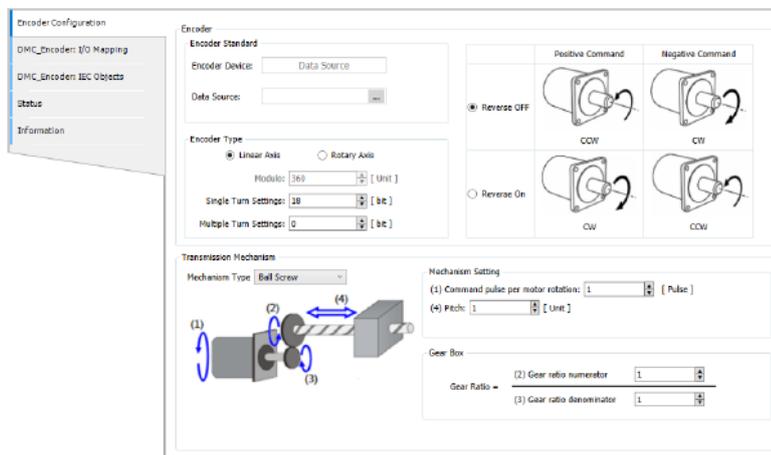


- Added Delta Encoder Configuration page  
Provide intuitive pages for users to configure encoder standard, encoder type, transmission mechanism, and other parameters.

1. Select **DMC\_Encoder** for **Free Encoders**



2. **Encoder Configuration** page



Supported Device: AX-3 Series and AX-8 Series Motion Controllers

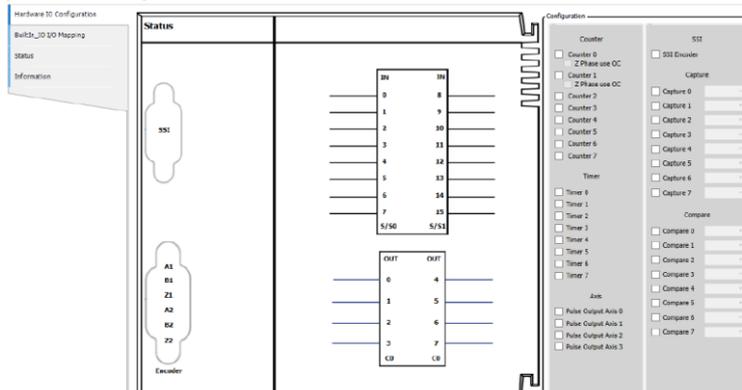
- Added the IP address setting page of AX-3 Series  
In **System Settings** page, users can set IP address, DNS server address, and so on. Devices with multiple Ethernet communication port will be supported in the future.

- Original IP setting interface

GLAN1 NetworkInterface					
GLAN1 NetworkInterfaceMode	Enumeration of BOOL	static-IP	static-IP	Confi...	
GLAN1 IPAddress	ARRAY[0..3] OF BYTE	[192, 168, 0, 10]	[192, 168, 0, 10]	Confi...	
GLAN1 SubnetMask	ARRAY[0..3] OF BYTE	[255, 255, 255, 0]	[255, 255, 255, 0]	Confi...	

- New IP setting interface

- Added the built-in high-speed IO setting page of AX-3 Series  
Provide graphical interface, including **Timer**, **Counter**, **Pulse Output Axis**, **SSI Encoder**, **Capture**, and **Compare**.



Supported Device: AX-3 Series

## 2.6 UPDATE – DIAScreen Version 1.0.2

Delta's latest DIAScreen software version 1.0.2 is released, it can be installed after downloading DIAInstaller in DIAStudio V1.0 from below link, then install/perform DIAScreen Patch.

### DIAScreen V1.0 download

<https://diastudio.deltaww.com/home/downloads?sec=download>

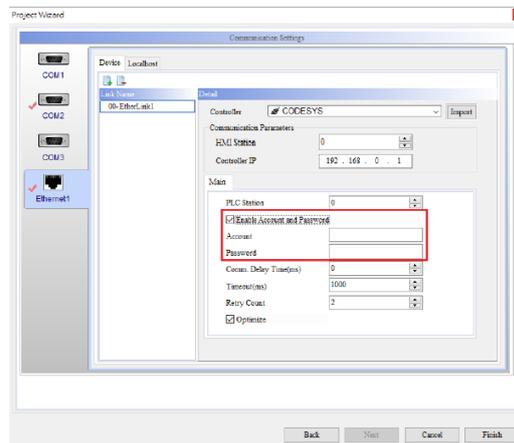


### Feature

- Added the user account & password page of DOP-100 series connecting with AX-3 & AX-8 Series controller.

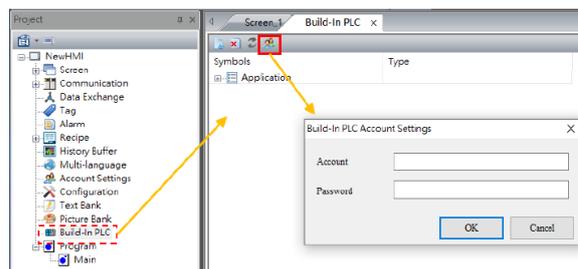
DIAScreen account and password setting:

- DOP-100 Series: On the **Communication Settings** window, select **CODESYS** as the controller, enter the controller login account & password, and then download to DOP-100 Series.



DOP-100 Series Communication Settings Window

- AX-8 Series built-in HMI: Click **Account Settings** on the **Build-In PLC** tab. Enter the controller login account and password and download to the HMI.

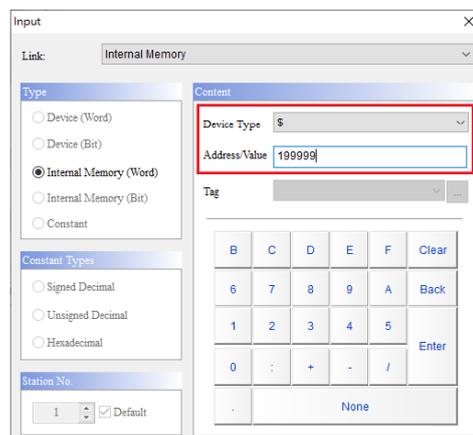


AX-8 Series Built-In Tab

**Note:** The Account & Password here need to be the same as Account & Password set in the AX-3 and AX-8 Series controllers.

- Updated the internal memory \$ element range from \$0 ~ \$65,535 to \$0 ~ \$199999

Setting window of the internal memory \$ element:

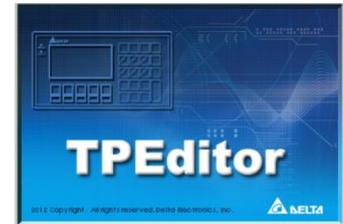


### 2.7 UPDATE – TPEditor Version 1.98.03

Delta's latest TPEditor software version 1.98.03 is released, it can be downloaded from Delta official Download Center.

#### DIASudio V1.0 download

[https://downloadcenter.deltaww.com/en-US/DownloadCenter?v=1&q=TPEditor&sort\\_expr=cdate&sort\\_dir=DESC](https://downloadcenter.deltaww.com/en-US/DownloadCenter?v=1&q=TPEditor&sort_expr=cdate&sort_dir=DESC)



#### Corrections

- Fixed an issue that projects with TP70 cannot be opened
- Fixed an issue that projects containing the object "Show Message" cannot be opened
- Fixed an issue that the system key settings are not the same as the ones in the saved file
- Fixed an issue that if switching between the editing page and starting page while editing TP02G, objects in the editing page will be lost
- Fixed a function key definition issue that occurred in TP04P. For example, the set definition for the function key is "ENT", but TP04P reads it as the setting value of "F" instead
- Fixed the security vulnerability issues.

## 3 Application

### 3.1 NEW – C2000/C2000 Plus/CH2000 Master-Follower Configuration

The technical note for the Master-Follower Configuration function has been shared on the FTP side;  
**Folder:** Customer-Service\Industrial Automation Products\Drive & Power Quality\VFD-C2000 Series\Application & Technical Note\ DEN\_IA\_VFD-C\_Master\_Follower\_AN\_EN\_20210118

### 3.2 NEW – More technical videos are available on YouTube Channel



There are technical videos about the below topics on YouTube Channel

<https://www.youtube.com/c/DeltaIndustrialAutomationEMEA>

Subscribe and enable notification in order to get notifications on all our new videos.

#### 1. DRASudio - Modbus Function

This video shows how to use DRASudio to read/write Modbus address from Delta robot controller.  
<https://youtu.be/6FdYpwGf4Fo>

#### 2. DOP100 HMI | How to enter the system setting

This video shows you how to enter the system menu of the HMI.  
<https://youtu.be/xQjYIKtkkNw>

**3. DIADesigner | How to connect with USB**

In this video, you can see how to setup COMMGR setting for USB connection.

<https://youtu.be/Bakk9zIV63I>

**4. DIADesigner | How to connect via DIACloud**

In this video, you can see how to setup COMMGR setting for remote connection via DIACloud.

<https://youtu.be/jMx8TedQhKY>

**5. DOP-100 - Migrating project from DOP-B**

This video shows how to migrate a project from DOP-B to DOP-100

<https://youtu.be/0hLQdtCYIMU>

**6. DIADesigner | How to use Simulation**

In this video, you can see how to setup COMMGR setting for Ethernet connection.

<https://youtu.be/W5uqUQ-3lws>

**7. DOPSoft | How to update HMI Firmware**

This video shows how to update the HMI Firmware via DOPSoft.

<https://youtu.be/SU3c3NNDwqA>

**8. DOP-100 - HMI OPC UA Server function Setup**

This video shows how to enable the built-in OPC UA Server in Delta HMI and how to connect an OPC UA Client to the HMI.

<https://youtu.be/ryx4qsWw1rY>

**9. DRASstudio - Point Management**

This video shows how to manage points of Delta robot controller.

<https://youtu.be/usNadhTwPEA>

**10. DRASstudio - User Digital I/O Monitor and Test**

This video shows how to monitor User I/O and test output.

<https://youtu.be/UKwZgy1fSxg>

**11. Automatic update of Firmware and Program in Delta HMI**

This video shows how to automatically update the firmware and program of the HMI using USB stick.

<https://youtu.be/flvtqjKP9W0>

**12. DIADesigner - How to connect PLC in DIADesigner**

In this video, you can see how to connect Delta AS series PLC with Ethernet cable, and how to set Ethernet parameter for your devices.

<https://youtu.be/re36pDDIjz4>

## 4 FAQ

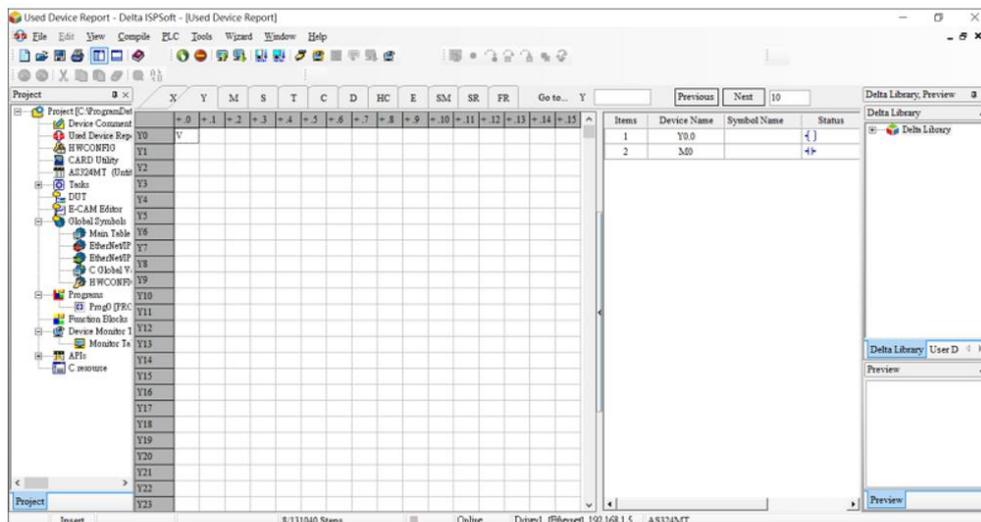
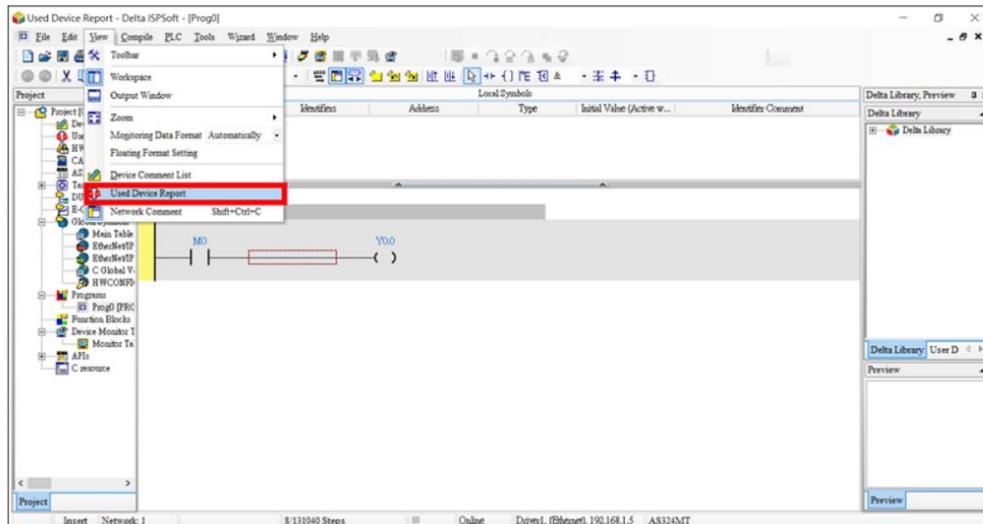
### 4.1 Software

**ISPSOFT**

**Q** How do I check whether the registers of a programmable logical controller are used or not in the ISPSOFT?

**A** Follow the steps down below.

Run ISPSOft and click **View > Used Device Report** to see if the registers are used.



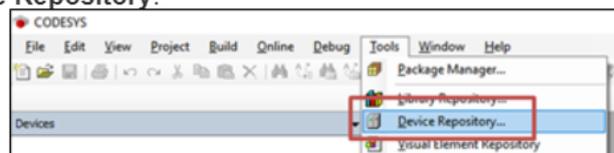
## 4.2 Motion Controllers

### AX-8 Series

**Q** How do I connect other manufacturers' devices to the PC-based Motion Controller AX-8 Series?

**A** If you connect another manufacturer's device to the AX-8 Series via EtherCAT, please install an \*.ESI or \*.EDS file from the device you'd like to connect to the AX-8 Series via Codesys.

**Step 1.** Run Codesys. Click **Tools > Device Repository**.



**Step 2.** Click **Install** and select a desired \*.ESI or \*.EDS file.

