

- Introduction
- DVP-MC
- New series: AS500
- New series: AX-308E
- AX-8 Series
- DIADesigner-AX
- Roadmap
- Delta Motion Control Solutions: Verticals & Applications
- Successful cases

## DVP

Cost effective

High C/P



## AS

Multi-function

Modularized

Easy installation



## AH

Hot Swap

Redundancy



## AX

Flexibility

Scalability



# DVP-MC

## MODBUS Communication ports

Serial RS232 and RS485 ports to support MODBUS RTU communication protocol

## SSI port

SSI interface to support external absolute encoders

## Incremental encoder port

Incremental encoder interface to support 2 external incremental encoders

## EtherCAT port (Motion)

Dedicated EtherCAT interface for motion control

## Integrated I/O port

High-speed digital inputs (16) and digital outputs (8)

## DS301 CANopen ports

2 CANopen master/slave ports

## Ethernet port

1 Ethernet 10/100Mbps port



**EtherCAT**®

Up to 6 or 24 axes, NPN outputs



## Cost-effective motion controller series



- DVP-MC Series Motion Controller
- Up to 32 virtual axes
- Support encoder axis
- Support PLCopen
- Single-axis motion: position, speed, torque, homing commands
- Multi-axis motion: ECAM, Rotary Cut, coordinated movements
- G-code: linear, circular, helical interpolation

## MODBUS Communication ports

Serial RS232 and RS485 ports to support MODBUS RTU communication protocol

## SSI port

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**Up to 6 or 24 axes, NPN outputs**



## New CPU models



- **DVP50MC11T**  
24 axes, NPN outputs
- **DVP50MC11T-06**  
6 axes, NPN outputs

- **DVP50MC11P** **NEW**  
24 axes, PNP outputs
- **DVP50MC11P-06** **NEW**  
6 axes, PNP outputs
- **DVP50MC11T-04S** **NEW**  
4 PTP axes, NPN outputs
- **DVP50MC11T-16S** **NEW**  
16 PTP axes, NPN outputs

DVP50MC - Message (HTML)

File Message Acrobat Tell me what you want to do...

Ignore X Delete Reply Reply All Forward Meeting IM More

Junk Delete Reply Reply All Forward Meeting IM More

12\_RTS To Manager Done Create New

Team Email Reply & Delete

Rules OneNote Actions

Move Assign Mark Categorize Follow Translate Zoom Dynamics Send to OneNote Insights Report Phishing

Policy Unread Tags Up Editing Zoom 365 OneNote Cofense

Sergey Zubov  Igor Lapko (i.lapko@rts.ua) 23.06.2021

DVP50MC

AS/AX:

Определения (что мы понимаем под motion, что под point to point):

Function	Motion axis	P2P axis
Single axis – position	Y	Y
Single axis – Velocity	Y	Y
Single axis – Torque	Y	Y
Multi-axis – Linear	Y	N
Multi-axis – Arc	Y	N
Multi-axis – CAM	Y	N
Multi-axis – Gear	Y	N
Multi-axis – Group	Y	N

С уважением,





# New Series: AS500

AS500s are modular mid-range motion controllers compatible with Delta AS I/O modules. Supported fieldbus technologies for motion control are EtherCAT (AS516E) and CANopen (AS524C).

## AS516E (16 axes)



16/24 axes  
+ max 32 virtual axes

## AS524C (24 axes)



ISPSoft

CANopen  
Builder

EtherCAT®

CANopen®

Same MC engine of DVP-MC!



## Multiple built-in communication interfaces

### MODBUS Communication ports

Serial RS232 and RS485 ports to support MODBUS RTU communication protocol

### EtherCAT port (Motion)

Dedicated EtherCAT interface for motion control



### Ethernet port

1 Ethernet 10/100Mbps port

### Integrated I/O port

High-speed digital inputs (16) and digital outputs (8)

### DS301 CANopen ports

2 CANopen master/slave ports

### Encoder interfaces

Incremental and SSI encoder interfaces





## Multiple built-in communication interfaces

### MODBUS Communication ports

Serial RS232 and RS485 ports to support MODBUS RTU communication protocol

### Ethernet ports

2 independent Ethernet 10/100Mbps ports

### CANopen port (Motion)

Dedicated CANopen interface for motion control



### DS301 CANopen ports

2 CANopen master/slave ports

### Integrated I/O port

High-speed digital inputs (16) and digital outputs (8)

### Encoder interfaces

Incremental and SSI encoder interfaces





## Mid-performance CPU for motion control applications



- AS500 Series Motion Controller
- Up to 16 or 24 axes, depending on the version
- Up to 32 virtual axes
- Support encoder axis
- Support PLCopen
- Single-axis motion: position, speed, torque, homing commands
- Multi-axis motion: ECAM, Rotary Cut, coordinated movements
- G-code: linear, circular, helical interpolation

EtherCAT®

CANopen®

Modbus

EtherNet/IP®





## Mid-performance CPU for motion control applications



- AS500 Series Motion Controller
- Up to 16 or 24 axes, depending on the version
- Up to 32 virtual axes

Like DVP-MC!

- Support encoder axis
- Support PLCopen
- Single-axis motion: position, speed, torque, homing commands
- Multi-axis motion: ECAM, Rotary Cut, coordinated movements
- G-code: linear, circular, helical interpolation



# New Series: AX-308E



# AX-308E

## PLC-based Motion Controller







## Multiple built-in communication interfaces

### Encoder interfaces

1 SSI port, 2 incremental encoder interfaces

### MODBUS Communication ports

Serial RS232 and RS485 ports to support MODBUS RTU communication protocol



### Interfaces

2 switched Ethernet ports (10/100 Mbps), 1 USB port, 1 SD card slot



### Integrated I/Os

16 fast digital inputs, 8 fast digital outputs (support 4 train pulse outputs)

### EtherCAT Master

Integrated EtherCAT Master up to 8 axes



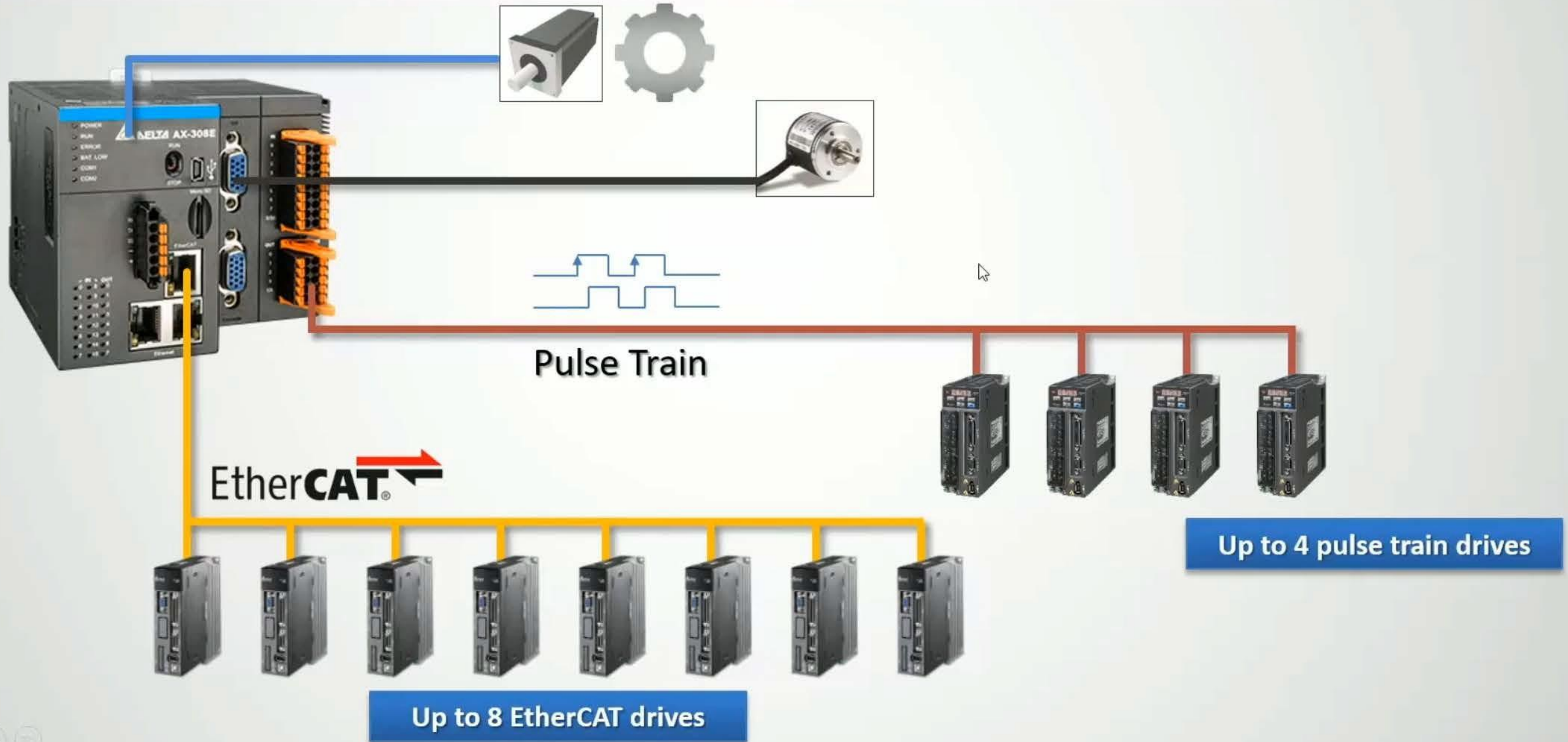


Compatible with AS I/O modules





Axis control: EtherCAT, pulse train, encoder, virtual axes

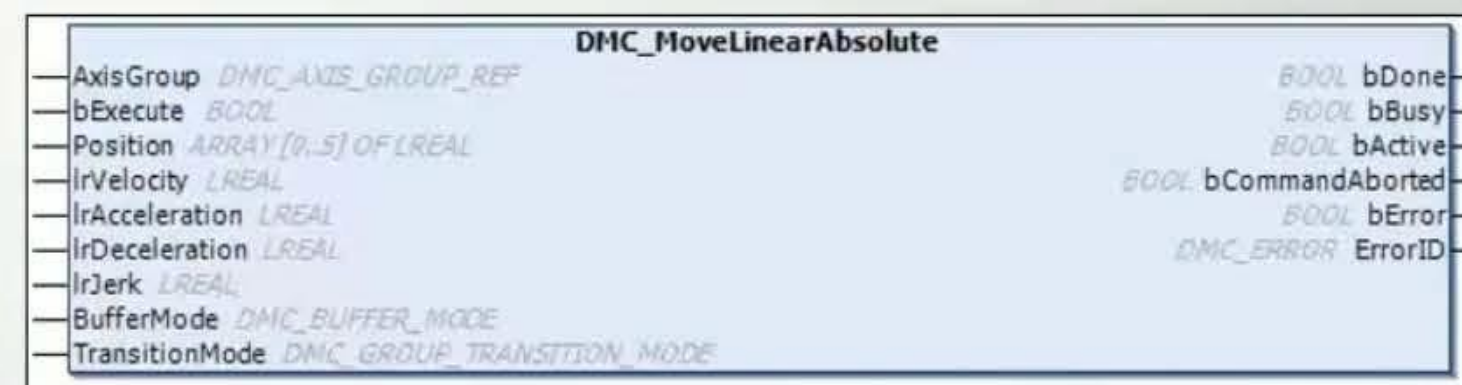
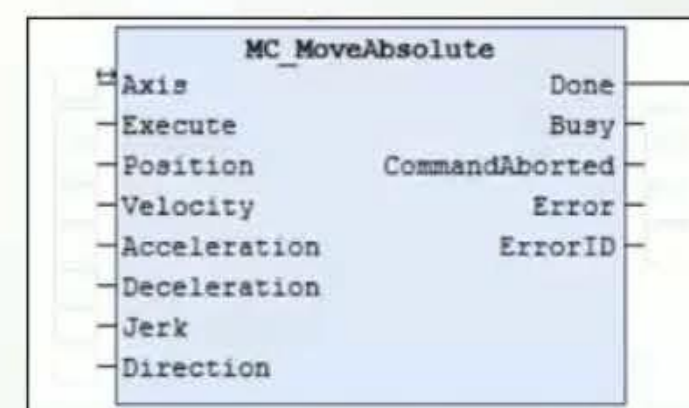
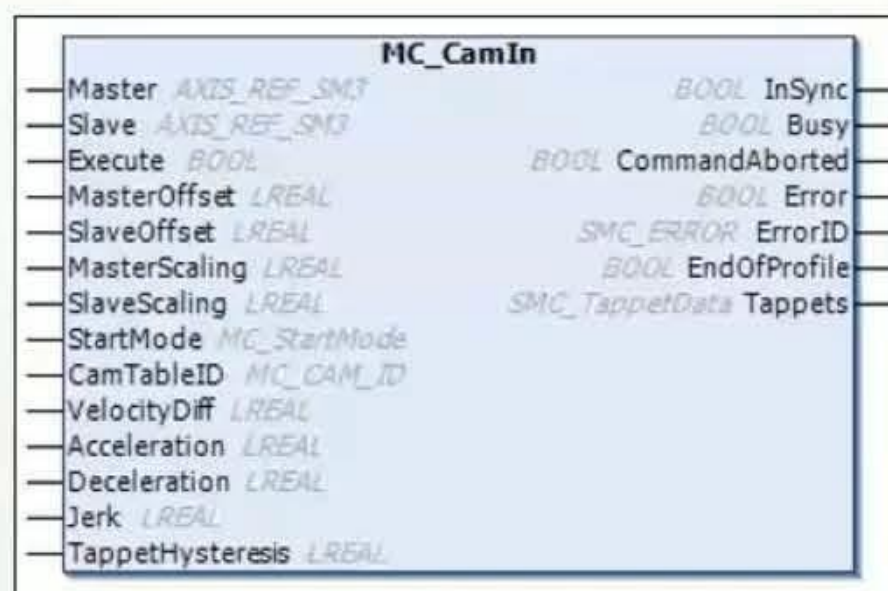
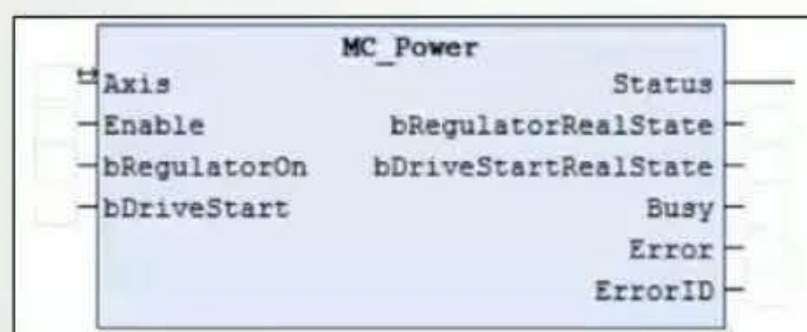


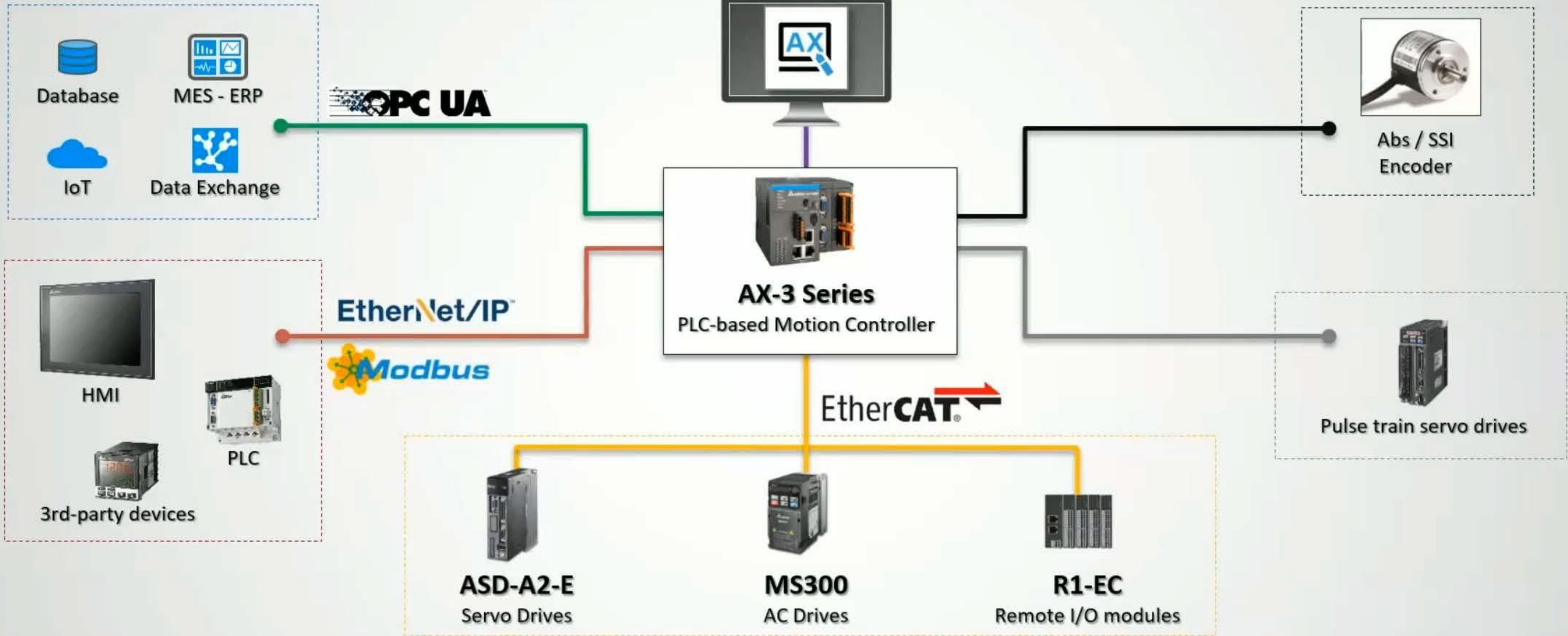


## Motion control features



- Support IEC61131-3 and PLCopen standards
- Support virtual axes
- Support encoder axes
- Position, speed, torque, homing commands
- Gearing, ECAMs, Interpolation







# AX-8 Series



# AX-8

## PC-based Motion Controller





# AX-8 PC-based Motion Controller Introduction

AX-8 series is a multi-axis motion controller based on a powerful industrial PC platform. Thanks to CODESYS, Windows 10 IoT and the embedded interfaces, it offers a high degree of flexibility and allow to approach all motion control applications, including robotics and CNC.







## Multiple built-in communication interfaces



### Windows OS & Powerful processor



Windows 10 IoT and CODESYS live in the same device



### HDMI port

Standard HDMI port to connect industrial monitors



### Interfaces

2 Ethernet ports (1Gbps), 4 USB ports, 1 SD card slot



### Integrated I/Os

8 fast digital inputs, 8 fast digital outputs, incremental encoder interface, SSI encoder interface, RS-422 / RS-485 serial port

### EtherCAT Master

Integrated EtherCAT Master up to 64 axes





## High-performance CPU for Motion Control applications



- Industrial PC with Windows 10 IoT
- Integrated high-speed DI / DO, incremental encoder interface, and RS-422/RS-485 serial ports
- EtherCAT, Modbus, OPC UA, Ethernet/IP
- Up to 16, 32 or 64 axes
- CODESYS SoftMotion
- CODESYS SoftMotion with CNC+Robotics
- Delta SoftHMI



One platform for all motion control applications

SoftMotion CNC+Robotics

SoftMotion

SoftPLC

**Standard Motion**

SoftMotion

IEC61131-3  
PLCOpen  
ECAMs

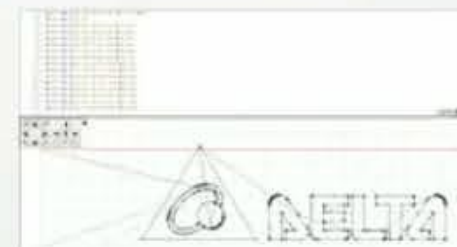
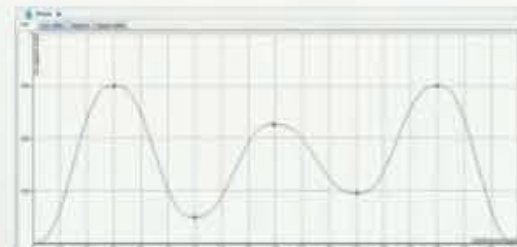
**Advanced Motion**

SoftMotion  
CNC & Robotics

G-code  
Kinematic Transformations  
(Robotics)

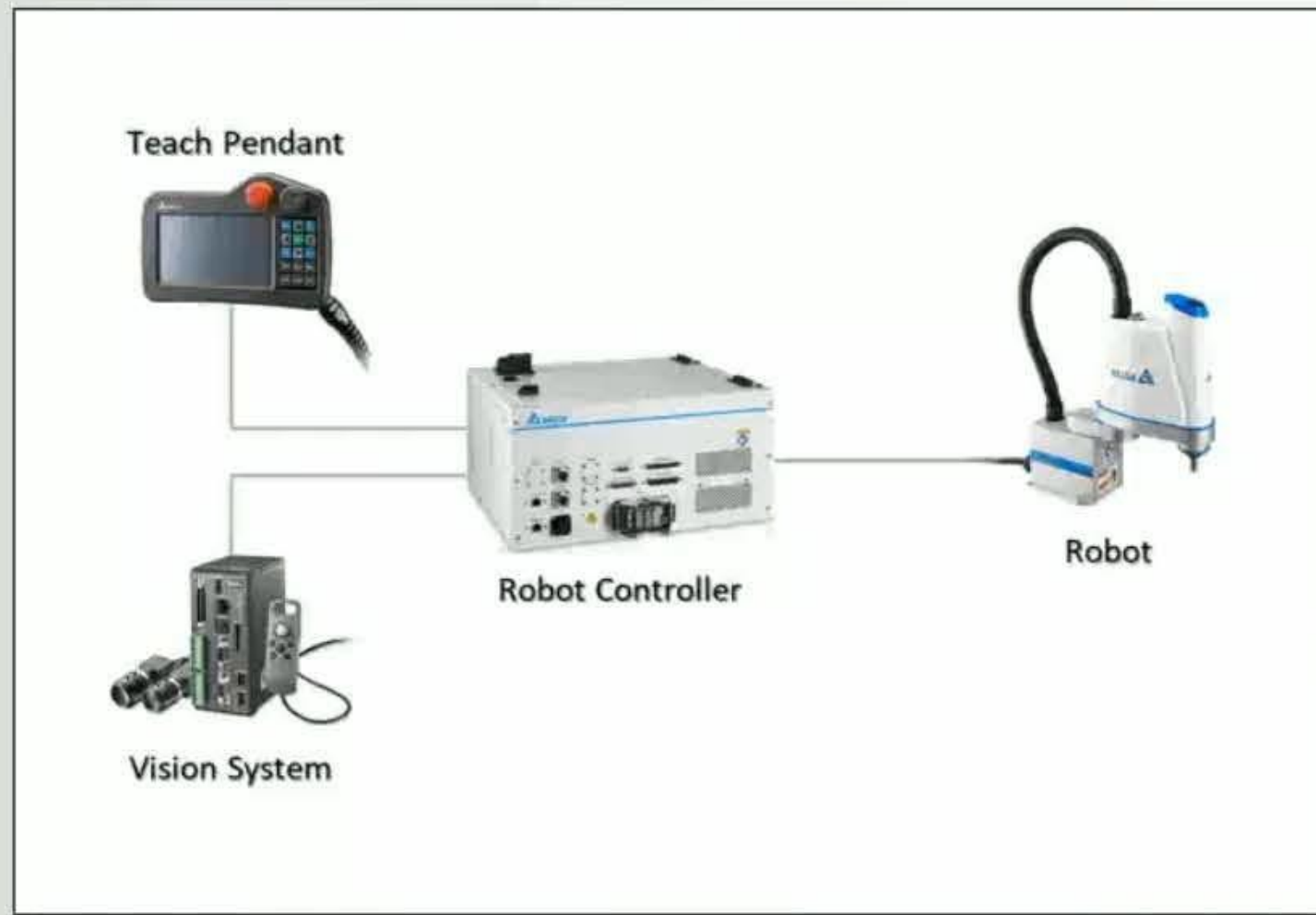
Select Kinematics

- TRAFO.Kin\_4AxesPalletizer
- TRAFO.Kin\_5Axes
- TRAFO.Kin\_ArticulatedRobot\_6DOF
- TRAFO.Kin\_Bipod\_Rotary
- TRAFO.Kin\_CAxis
- TRAFO.Kin\_CAxis\_Tool
- TRAFO.Kin\_Gantry2
- TRAFO.Kin\_Gantry3
- TRAFO.Kin\_HGantry2
- TRAFO.Kin\_HGantry3
- TRAFO.Kin\_Polar
- TRAFO.Kin\_Pos\_RRR
- TRAFO.Kin\_Scara2\_Z**
- TRAFO.Kin\_Scara3\_Z
- TRAFO.Kin\_Staubl\_TS60\_S1\_D25\_L200\_floor\_R1
- TRAFO.Kin\_Staubl\_TX60\_S1\_R4
- TRAFO.Kin\_TGantry2
- TRAFO.Kin\_Tool
- TRAFO.Kin\_Tripod\_Linear
- TRAFO.Kin\_Tripod\_Rotary
- TRAFO.Kin\_Wrist2
- TRAFO.Kin\_Wrist3
- <None>



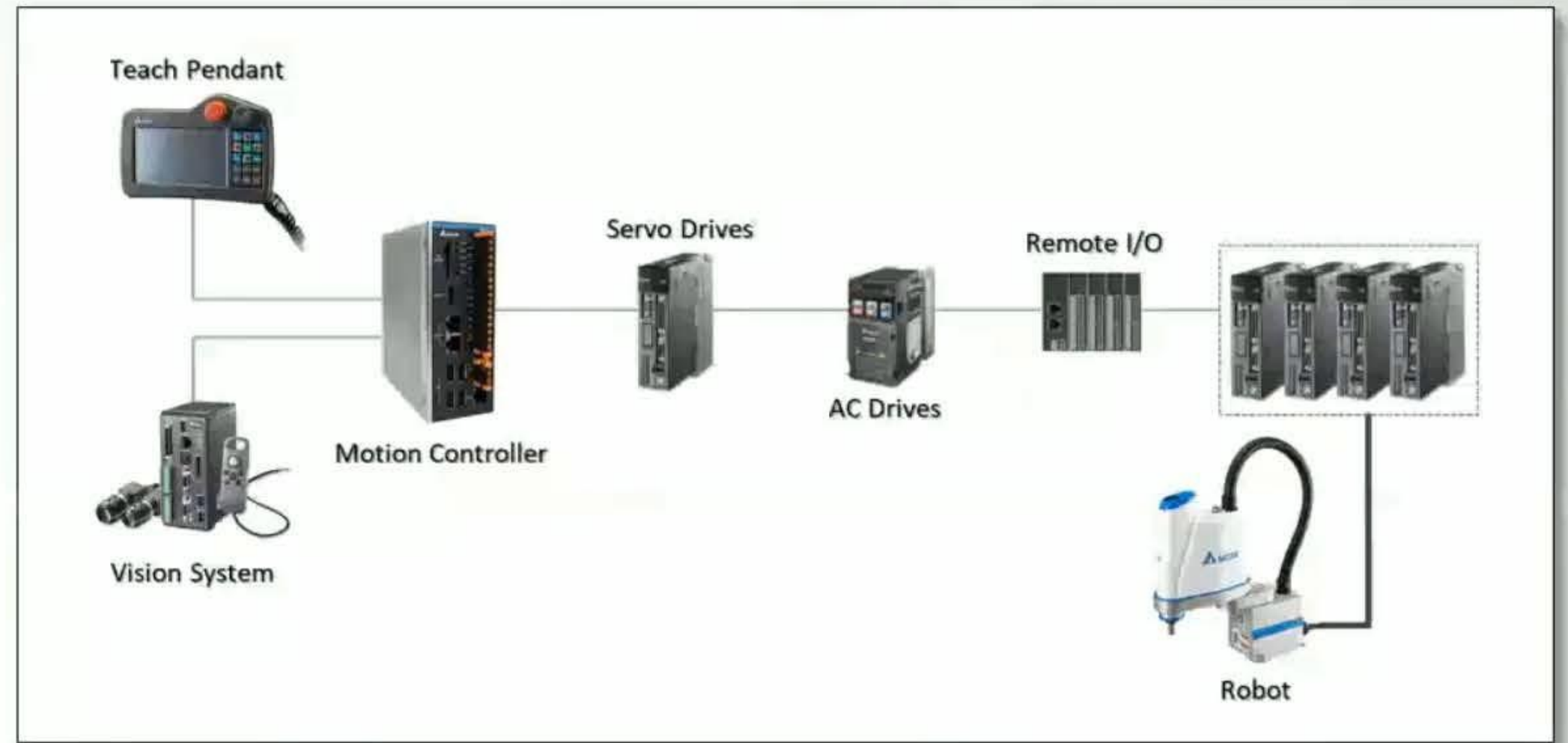


# Robotics: two different solutions



## Standalone Robotics

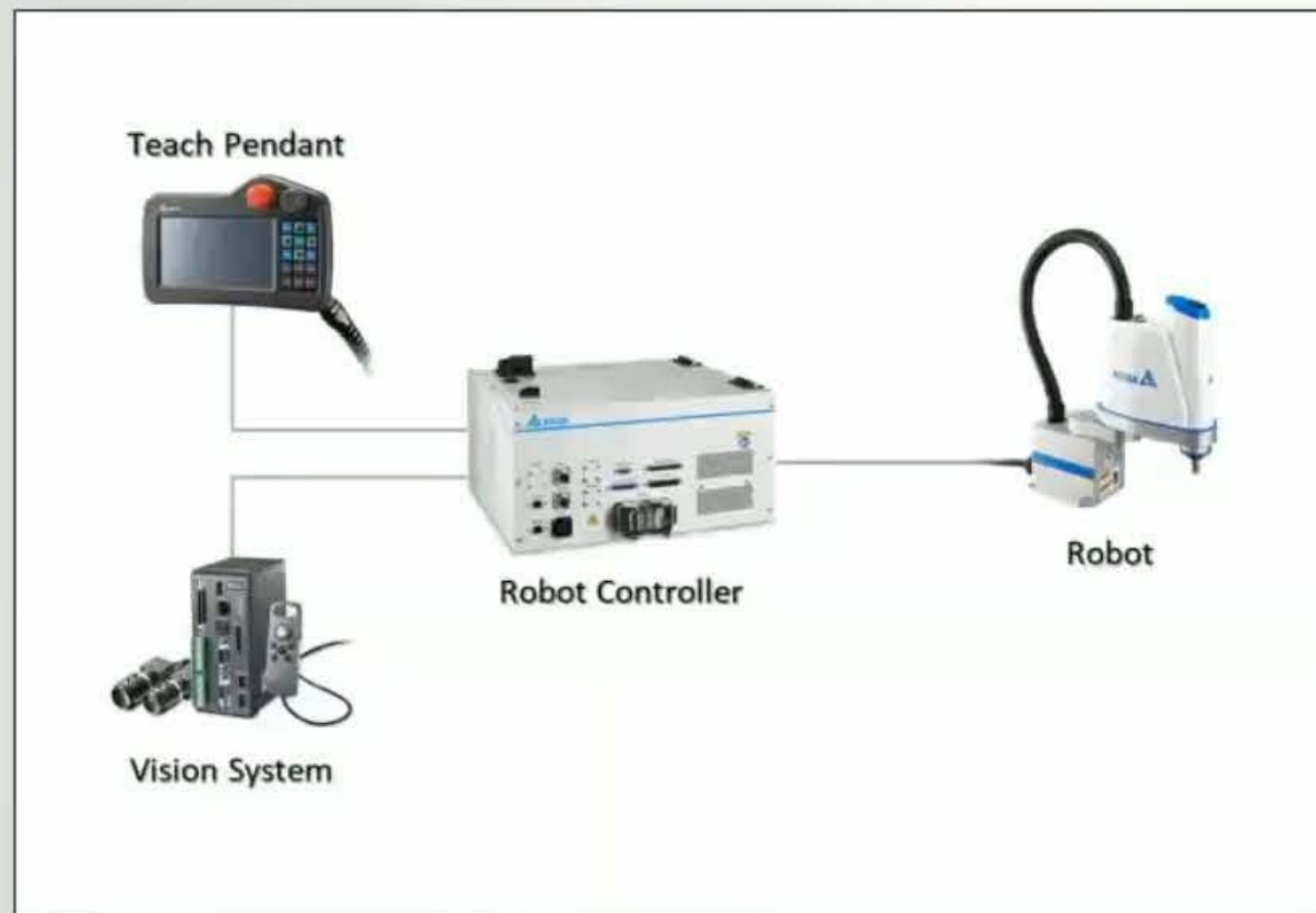
Dedicated robot controller



## Integrated Robotics

Robot as component of an Automation Platform

# Robotics: two different solutions



## Standalone Robotics

Dedicated robot controller

The robot controller is only in charge of the robotic aspects of the machine. It is programmed by dedicated SW tools and connected to the main PLC by means of hardwired I/O signals or non-deterministic communication protocols.

- Dedicated robot controller to manage the robots and their related devices (e.g. teach pendant).

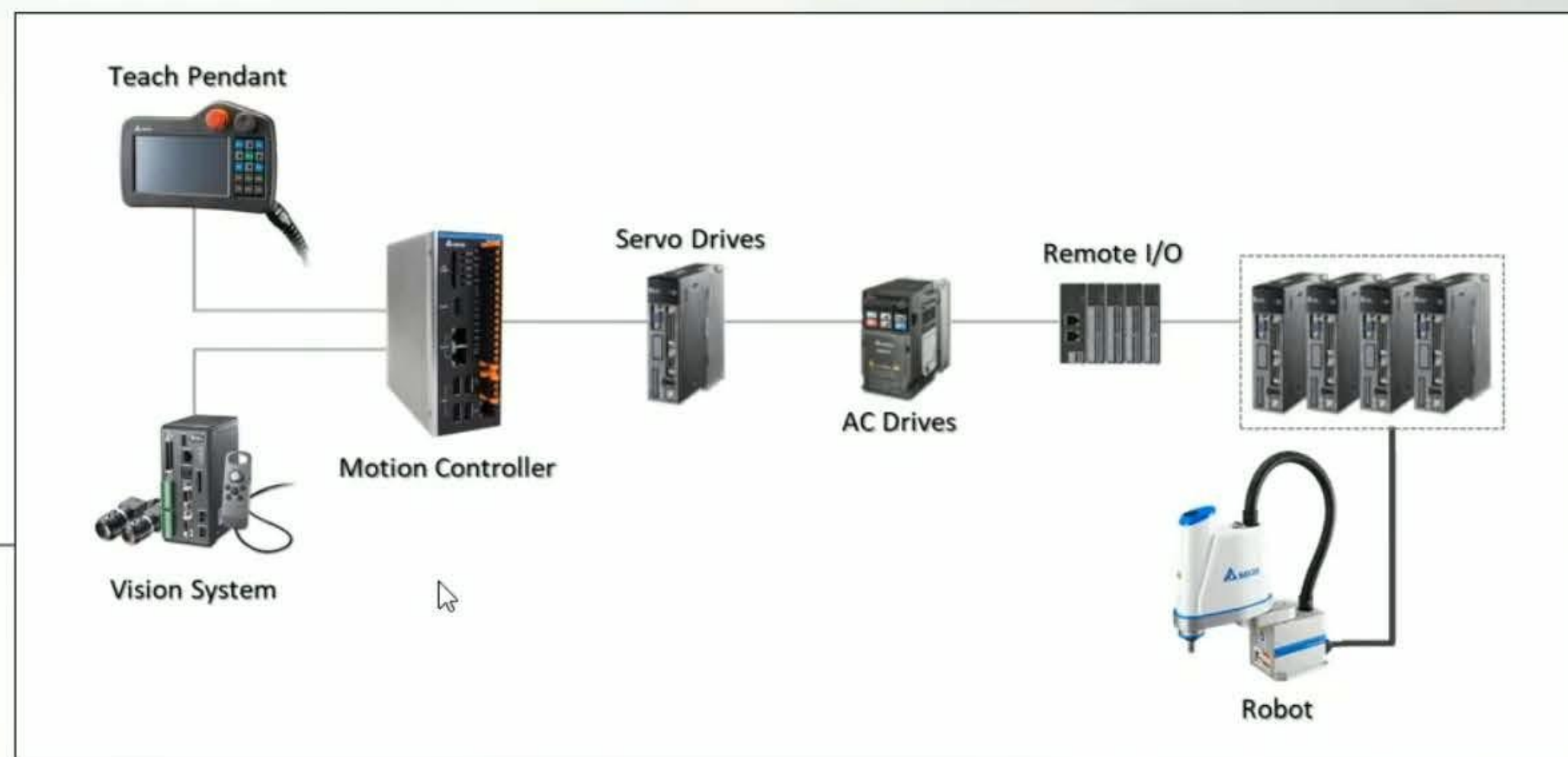
- Dedicated engineering tool: robot language programming, commissioning, simulation.

- Need of an external general motion controller to manage the rest of the machine.

- Need to develop the interface with the general motion controller / PLC that manages the production line.

- Use of a single hardware device to control all the production island

- One software platform



## Integrated Robotics

Robot as component of an Automation Platform

The robot is deeply integrated in the production line. The strict interconnection with other products (vision systems, inverters, remote I/O modules) requires a single SW tool to increase the performance.

CODESYS\_CNC&Robotics\_Solution.project\* - DIADesigner-AX

File Edit View Project Build Online Debug Tools Window Help

Application [Device: PLC Logic]

Devices

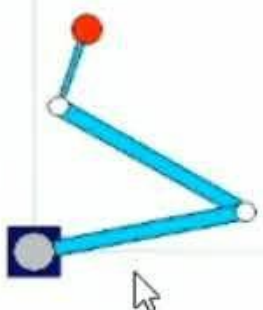
- CODESYS\_CNCRobotics\_Solution
  - Device (AX-8xxEPO Windows Series)
    - Hardware Configuration
    - Network Configuration
    - PLC Logic
      - Application
        - AxisGroupScara
        - MachineAxisGroup
        - MachineAxisGroup\_DRS40
        - SYS
          - Dagnostic
          - FilePreprocessing
          - Hmi
          - MachineHandler
            - Cnc
            - Data types
            - Robotics
            - MachineHandler (FB)
              - Dagnostic
                - ResetAlarm (private)
                - ResetAllAlarms (private)
                - SetAlarm
              - FSM
                - CncCycle
                - Execute
                - Homing
                - Init
                - Ready
                - RobotCycle
                - ToolChangeStatus
                - Update
                  - CannedCycleStatus (private)
                  - CreateTempFileStatus (private)
                  - DisabledStatus (private)
                  - DisablingStatus (private)
                  - EnablingStatus (private)
                  - ErrorStatus (private)
                  - MpgStatus (private)
                  - PreprocessingStatus (private)
                  - ServiceStatus (private)
                  - ToolProbingStatus (private)
                  - ZeroingStatus (private)

Kinematics

Transformation FB for Scara3 kinematics with an additional Z-axis.

The Selective Compliance Assembly Robot Arm (SCARA) is a special type of industrial robot which resembles to a human arm. A Scara3 system exhibits three axes and three degrees of freedom. However, the motion is still limited to the X-Y-plane.

| Machine coordinate system (MCS) |   |
|---------------------------------|---|
| Origin                          | The intersection of axis 0 and the X-Y-plane.   |
| X                               | Defined by the direction the first arm points to when the first rotary axis (a0) is at 0°.  |
| Y                               | Defined by the direction the first arm points to when the first rotary axis (a0) is at 90°.   |
| (Z)                             | This FB features an additional linear axis (a3) perpendicular to the X-Y-plane. The Z axis corresponds directly to the direction of this additional axis. |



The system consists of

1. a rotary axis a0 that turns the robot around the Z axis
2. the first joint with length dArmLength1.
3. a second rotary axis a1 that turns the following parts of the robot around the Z axis.
4. the second joint with length dArmLength2.
5. a third rotary axis a2 that turns the following parts of the robot around the Z axis.
6. the third joint with length dArmLength3 and
7. a linear axis (a3) that is orientated in direction of Z.

There are two configurations that can be switched with the input xElbowRight of Kin\_Scara3\_Z\_Config.

Relative to the machine coordinate system, the tool coordinate system is shifted and rotated around the Z axis.

The single axes values have the following interpretation:

|    |  |
|----|--|
| a0 | position of the first rotary axis around Z in degrees  |
| a1 | position of the second rotary axis around Z in degrees |

Messages - Total 12 error(s), 2 warning(s), 0 message(s)

Build

0 error(s) 0 warning(s) 0 message(s)

Description

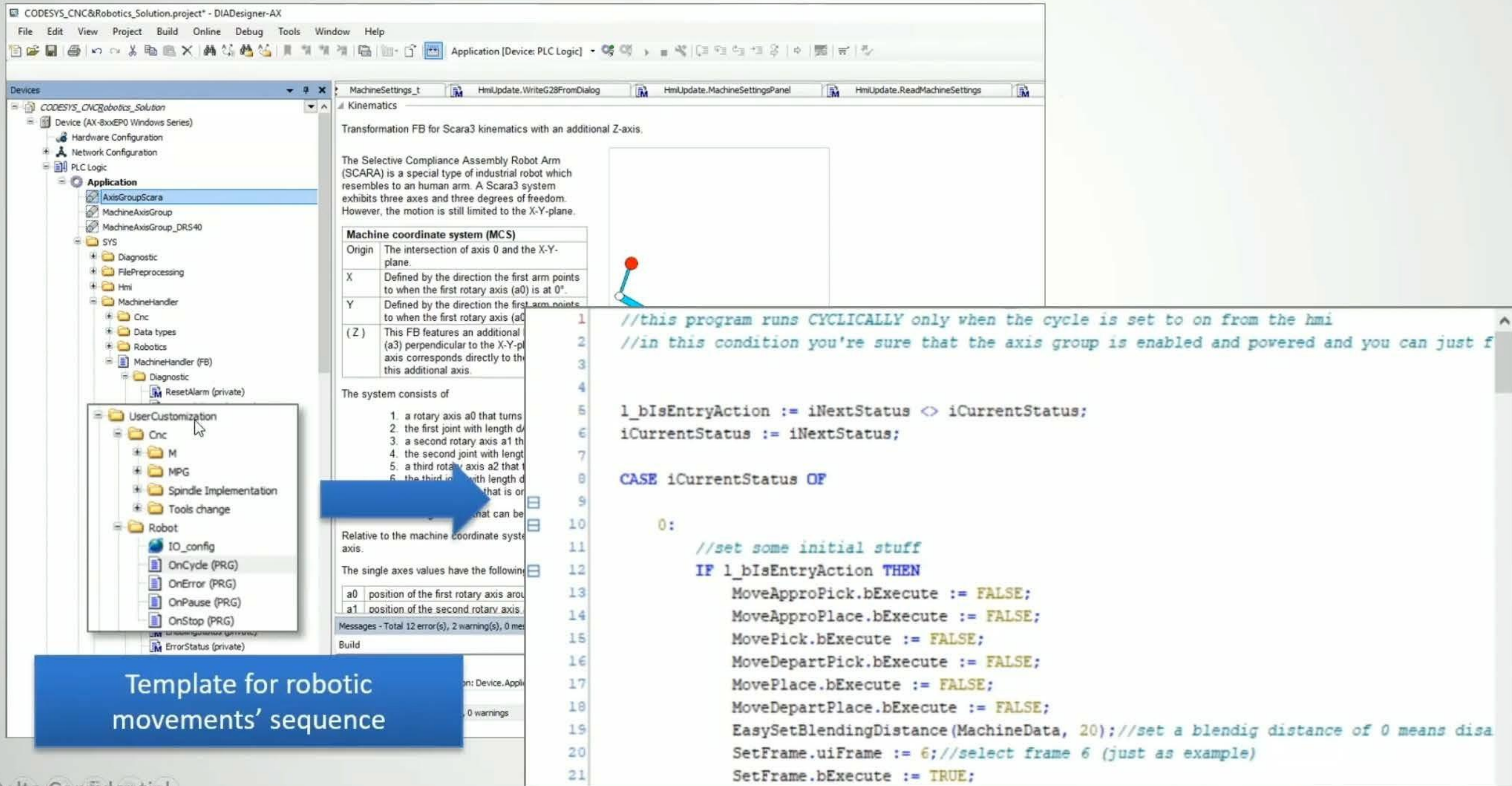
----- Build started: Application: Device.Application -----

Typify code...

Compile complete -- 0 errors, 0 warnings

Selection of the kinematics





The screenshot displays the CODESYS environment for a Delta robot solution. On the left, the 'Devices' tree shows the project structure, including 'Application' and 'UserCustomization' folders. The main workspace shows a 'Kinematics' diagram of a SCARA robot arm with a red end effector. Below the diagram is a table defining the 'Machine coordinate system (MCS)' axes.

| Machine coordinate system (MCS) |   |
|---------------------------------|---|
| Origin                          | The intersection of axis 0 and the X-Y-plane.   |
| X                               | Defined by the direction the first arm points to when the first rotary axis (a0) is at 0°.                            |
| Y                               | Defined by the direction the first arm points to when the first rotary axis (a0) is at 90°.                           |
| (Z)                             | This FB features an additional (a3) perpendicular to the X-Y-plane axis corresponds directly to this additional axis. |

The diagram also includes a list of system components:

1. a rotary axis a0 that turns
2. the first joint with length d1
3. a second rotary axis a1 that
4. the second joint with length d2
5. a third rotary axis a2 that
6. the third joint with length d3

Below this, it states: 'The system consists of' and 'Relative to the machine coordinate system axis.' It also lists 'The single axes values have the following' with parameters a0 and a1.

The right side of the screenshot shows a ladder logic program (Network 1) with the following code:

```

1 //this program runs CYCLICALLY only when the cycle is set to on from the hmi
2 //in this condition you're sure that the axis group is enabled and powered and you can just f
3
4
5 l_bIsEntryAction := iNextStatus <> iCurrentStatus;
6 iCurrentStatus := iNextStatus;
7
8 CASE iCurrentStatus OF
9
10 0:
11 //set some initial stuff
12 IF l_bIsEntryAction THEN
13 MoveApproPick.bExecute := FALSE;
14 MoveApproPlace.bExecute := FALSE;
15 MovePick.bExecute := FALSE;
16 MoveDepartPick.bExecute := FALSE;
17 MovePlace.bExecute := FALSE;
18 MoveDepartPlace.bExecute := FALSE;
19 EasySetBlendingDistance(MachineData, 20); //set a blending distance of 0 means disa
20 SetFrame.uiFrame := 6; //select frame 6 (just as example)
21 SetFrame.bExecute := TRUE;

```

Template for robotic movements' sequence



# DIADesigner-AX





# DIADesigner-AX

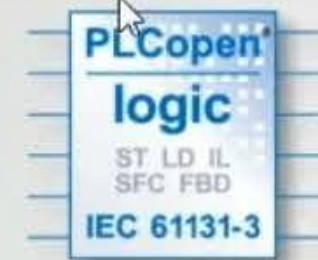
The software box art for DIADesigner-AX is displayed on a dark grey background. At the top left is the DELTA logo. At the top right is the CODESYS logo, which consists of a red and grey cube icon above the word 'CODESYS'. The central graphic features a blue pencil with a white eraser tip, positioned diagonally over a white desk. To the right of the desk is a white ladder logic diagram. Below the graphic, the text 'DIADesigner-AX' is written in a large, bold, sans-serif font, with 'DIA' in blue and 'Designer-AX' in white. Underneath this, 'Delta Industrial Automation Designer' is written in a smaller white font. At the bottom, the copyright notice '2020 Copyright. All rights reserved. Delta Electronics, Inc.' is printed in a small, light grey font.





# DIADesigner-AX

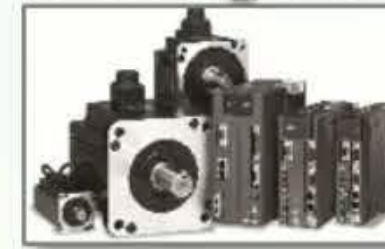
IEC61131-3



PLCopen



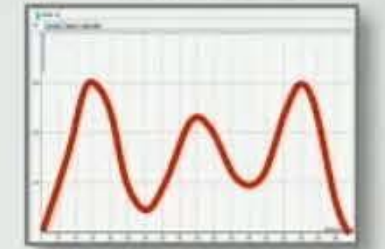
Drive configuration



Single-axis

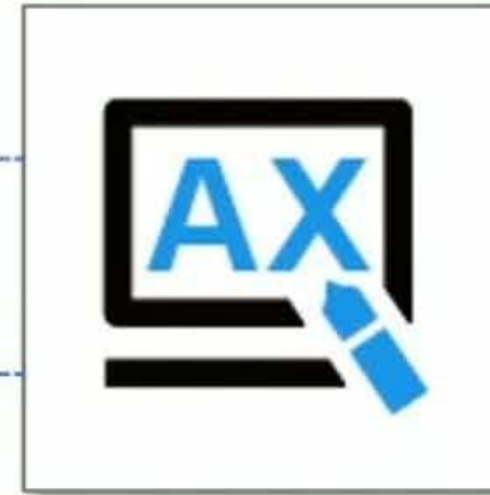


ECAMs



International Standards

Motion Platform



CNC+Robotics

G-code



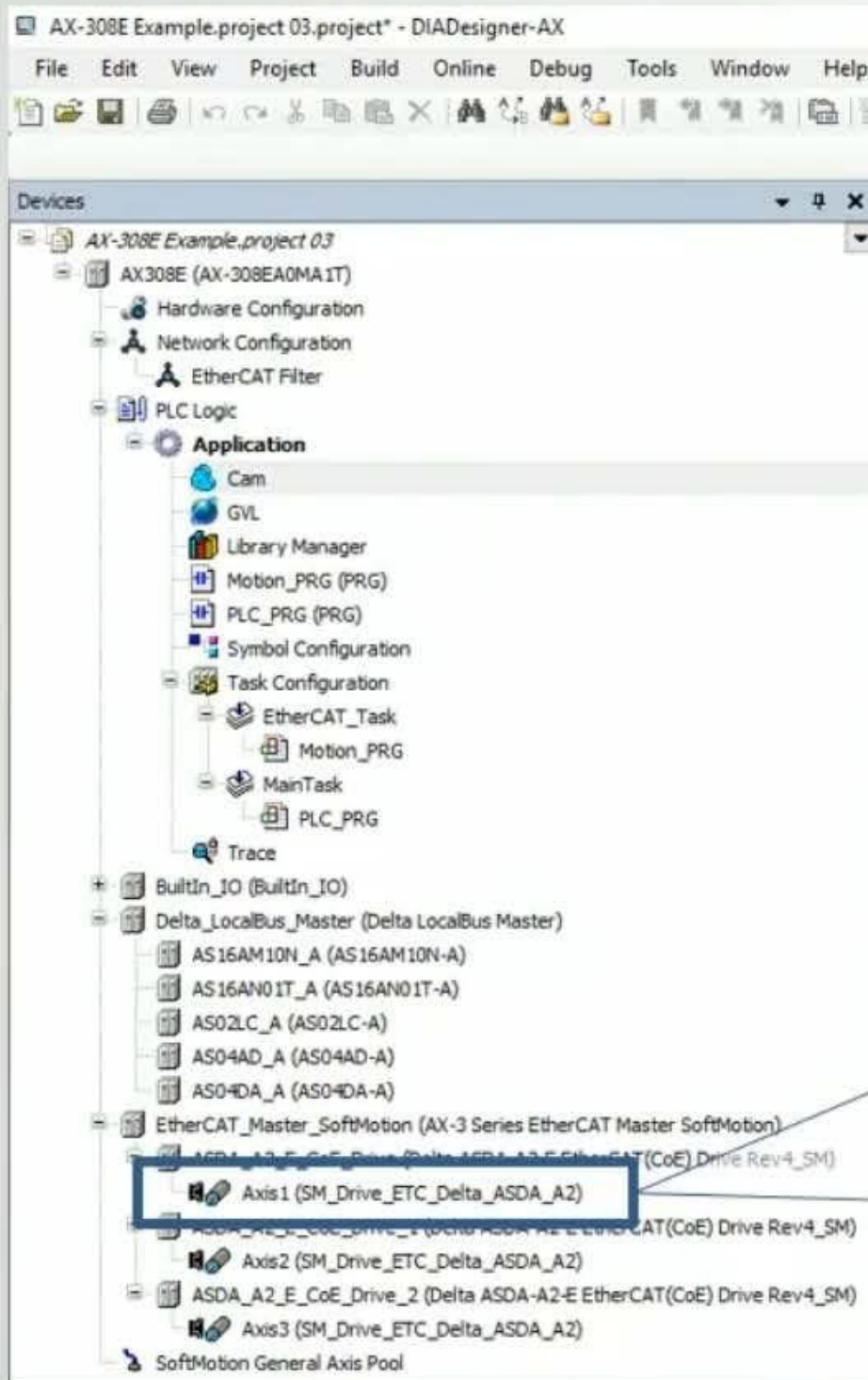
Robotics



Only AX-8



Same look&feel of CODESYS platform with additional tools



Axis1
✕

General Setting

Homing Setting

Commissioning

Status

Information

**Axis Type and Limits**

Virtual mode

Linear Axis

Rotary Axis

Linear Axis Software Limits

Activated

Negative [u]: 0

Positive [u]: 1000

Rotary Axis Modulo Setting

Modulo value [u]: 360

**Motion Parameter**

Error Reaction

Quick Stop

Velocity Ramp Type

Trapezoid  Sin<sup>2</sup>  Quadratic  Quadratic(smooth)

Position Lag Supervision

Position Lag Reaction: Deactivated Lag Limit [u]: 1

**Transmission Mechanism**

Mechanism Type: Ball Screw

Mechanism Setting

(1) Command pulse per motor rotation: 1280000 [ Pulse ]

(4) Pitch: 10000 [ Unit ]

Gear Box

Gear Ratio =  $\frac{(2) \text{ Gear ratio numerator } 1}{(3) \text{ Gear ratio denominator } 1}$

Servo Gear Ratio Setting

|  | Positive Command | Negative Command |
|--|------------------|------------------|
| <input checked="" type="radio"/> Reverse OFF |                  |                  |
| <input type="radio"/> Reverse ON             |                  |                  |



# Roadmap







# Delta Motion Control Solutions



# Product positioning



Ether**CAT**

**CAN**open



**CODESYS**

iD  
**DIAStudio**











Q. : What is the right device/technology/SW for my application?

A. : There's no single answer!









# Delta Motion Controller Product Portfolio (EtherCAT)

| Model                  | DVP50MC  | AH-EMC  | AX-308E   | AX-8  |
|------------------------|--|---|---|---|
| Appearance             |  |  |  |  |
| Motion Control Bus     |  |  |  |  |
| Number of axes         | 6, 24  | 8, 16, 32   | 8   | 16, 32, 64  |
| Single-axis Motion     | Yes  | Yes   | Yes   | Yes   |
| ECAM                   | Yes  | Yes   | Yes   | Yes   |
| Rotary cut             | Yes  | Yes   | Yes   | Yes   |
| G-code                 | Yes  | No  | No  | Yes ("C" models)  |
| CNC                    | No   | No  | No  | Yes ("C" models)  |
| Robotics               | No   | No  | No  | Yes ("C" models)  |
| 3rd-party ECAT devices | No   | Yes   | Yes   | Yes   |
| Encoder interfaces     | Incremental (2), SSI (1)   | Incremental (2)   | Incremental (2), SSI (1)  | Incremental (1), SSI (1)  |
| Other comm. protocols  | Modbus, CANopen, Ethernet/IP   | Modbus, CANopen, Ethernet/IP, Devicenet, Profibus, BACNet                           | Modbus, Ethernet/IP, OPC UA   | Modbus, Ethernet/IP, OPC UA   |
| SW                     | ISPSOFT, CANopen Builder   | ISPSOFT   | CODESYS, DIADesigner-AX   | CODESYS, DIADesigner-AX   |











# Delta Motion Controller Product Portfolio (EtherCAT)

| Model                  | DVP50MC  | AH-EMC  | AX-308E   | AX-8  |
|------------------------|--|---|---|---|
| Appearance             |  |  |  |  |
| Motion Control Bus     | EtherCAT   | EtherCAT  | EtherCAT  | EtherCAT  |
| Number of axes         | 6, 24  | 8, 16, 32   | 8   | 16, 32, 64  |
| Single-axis Motion     | Yes  | Yes   | Yes   | Yes   |
| ECAM                   | Yes  | Yes   | Yes   | Yes   |
| Rotary cut             | Yes  | Yes   | Yes   | Yes   |
| G-code                 | Yes  | No  | No  | Yes ("C" models)  |
| CNC                    | No   | No  | No  | Yes ("C" models)  |
| Robotics               | No   | No  | No  | Yes ("C" models)  |
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| Encoder interfaces     | Incremental (2), SSI (1)   | Incremental (2)   | Incremental (2), SSI (1)  | Incremental (1), SSI (1)  |
| Other comm. protocols  | Modbus, CANopen, Ethernet/IP   | Modbus, CANopen, Ethernet/IP, Devicenet, Profibus, BACNet                           | Modbus, Ethernet/IP, OPC UA   | Modbus, Ethernet/IP, OPC UA   |
| SW                     | ISPSOFT, CANopen Builder   | ISPSOFT   | CODESYS, DIADesigner-AX   | CODESYS, DIADesigner-AX   |











# Delta Motion Controller Product Portfolio (EtherCAT)





| Model                  | DVP50MC  | AH-EMC  | AX-308E   | AX-8  |
|------------------------|--|---|---|---|
| Appearance             |  |  |  |  |
| Motion Control Bus     |  |  |  |  |
| Number of axes         | 6, 24  | 8, 16, 32   | 8   | 16, 32, 64  |
| Single-axis Motion     | Yes  | Yes   | Yes   | Yes   |
| ECAM                   | Yes  | Yes   | Yes   | Yes   |
| Rotary cut             | Yes  | Yes   | Yes   | Yes   |
| G-code                 | Yes  | No  | No  | Yes ("C" models)  |
| CNC                    | No   | No  | No  | Yes ("C" models)  |
| Robotics               | No   | No  | No  | Yes ("C" models)  |
| 3rd-party ECAT devices | No   | Yes   | Yes   | Yes   |
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| SW                     | ISPSOFT, CANopen Builder   | ISPSOFT   | CODESYS, DIADesigner-AX   | CODESYS, DIADesigner-AX   |



# Delta Motion Controller Product Portfolio (EtherCAT)

| Model                  | DVP50MC  | AH-EMC  | AX-308E   | AX-8  |
|------------------------|--|---|---|---|
| Appearance             |  |  |  |  |
| Motion Control Bus     |  |  |  |  |
| Number of axes         | 6, 24  | 8, 16, 32   | 8   | 16, 32, 64  |
| Single-axis Motion     | Yes  | Yes   | Yes   | Yes   |
| ECAM                   | Yes  | Yes   | Yes   | Yes   |
| Rotary cut             | Yes  | Yes   | Yes   | Yes   |
| G-code                 | Yes  | No  | No  | Yes ("C" models)  |
| CNC                    | No   | No  | No  | Yes ("C" models)  |
| Robotics               | No   | No  | No  | Yes ("C" models)  |
| 3rd-party ECAT devices | No   | Yes   | Yes   | Yes   |
| Encoder interfaces     | Incremental (2), SSI (1)   | Incremental (2)   | Incremental (2), SSI (1)  | Incremental (1), SSI (1)  |
| Other comm. protocols  | Modbus, CANopen, Ethernet/IP   | Modbus, CANopen, Ethernet/IP, Devicenet, Profibus, BACNet                           | Modbus, Ethernet/IP, OPC UA   | Modbus, Ethernet/IP, OPC UA   |
| SW                     | ISPSOFT, CANopen Builder   | ISPSOFT   | CODESYS, DIADesigner-AX   | CODESYS, DIADesigner-AX   |

# Delta Motion Controller Product Portfolio (EtherCAT)

| Model                  | DVP50MC  | AH-EMC  | AX-308E   | AX-8  |
|------------------------|--|---|---|---|
| Appearance             |  |  |  |  |
| Motion Control Bus     | EtherCAT   | EtherCAT  | EtherCAT  | EtherCAT  |
| Number of axes         | 6, 24  | 8, 16, 32   | 8   | 16, 32, 64  |
| Single-axis Motion     | Yes  | Yes   | Yes   | Yes   |
| ECAM                   | Yes  | Yes   | Yes   | Yes   |
| Rotary cut             | Yes  | Yes   | Yes   | Yes   |
| G-code                 | Yes  | No  | No  | Yes ("C" models)  |
| CNC                    | No   | No  | No  | Yes ("C" models)  |
| Robotics               | No   | No  | No  | Yes ("C" models)  |
| 3rd-party ECAT devices | No   | Yes   | Yes   | Yes   |
| Encoder interfaces     | Incremental (2), SSI (1)   | Incremental (2)   | Incremental (2), SSI (1)  | Incremental (1), SSI (1)  |
| Other comm. protocols  | Modbus, CANopen, Ethernet/IP   | Modbus, CANopen, Ethernet/IP, Devicenet, Profibus, BACNet                           | Modbus, Ethernet/IP, OPC UA   | Modbus, Ethernet/IP, OPC UA   |
| SW                     | ISPSOFT, CANopen Builder   | ISPSOFT   | CODESYS, DIADesigner-AX   | CODESYS, DIADesigner-AX   |

# Delta Motion Controllers - Applications



**Packaging**  
*(Flowpack, wrapping, labelling)*



**General Machinery**  
*(Assembling)*



**Woodworking**  
*(Saw cutting, panel cutting, CNC)*



**Profile cutting**  
*(leather, glass)*



**Robotics**

SW



DVP-MC



CODESYS



AX-3



CODESYS



AX-8



# Delta Motion Controllers - Applications



**Packaging**  
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**General Machinery**  
*(Assembling)*



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**Profile cutting**  
*(leather, glass)*



**Robotics**

SW



DVP-MC



CODESYS



AX-3



CODESYS



AX-8

- PTP Motion
- ECAMs
- Flying cut
- Interpolation

Basic G-code

Advanced G-code  
(CNC features)

Robotics

# Delta Motion Controllers - Applications



**Packaging**  
*(Flowpack, wrapping, labelling)*



**General Machinery**  
*(Assembling)*



**Woodworking**  
*(Saw cutting, panel cutting, CNC)*



**Profile cutting**  
*(leather, glass)*



**Robotics**

SW



DVP-MC



CODESYS



AX-3



CODESYS



AX-8

- PTP Motion
- ECAMs
- Flying cut
- Interpolation

Basic G-code

Advanced G-code  
(CNC features)

Robotics

# Successful cases

## Wet wipes packaging machine



\* Image for reference only

## Configuration



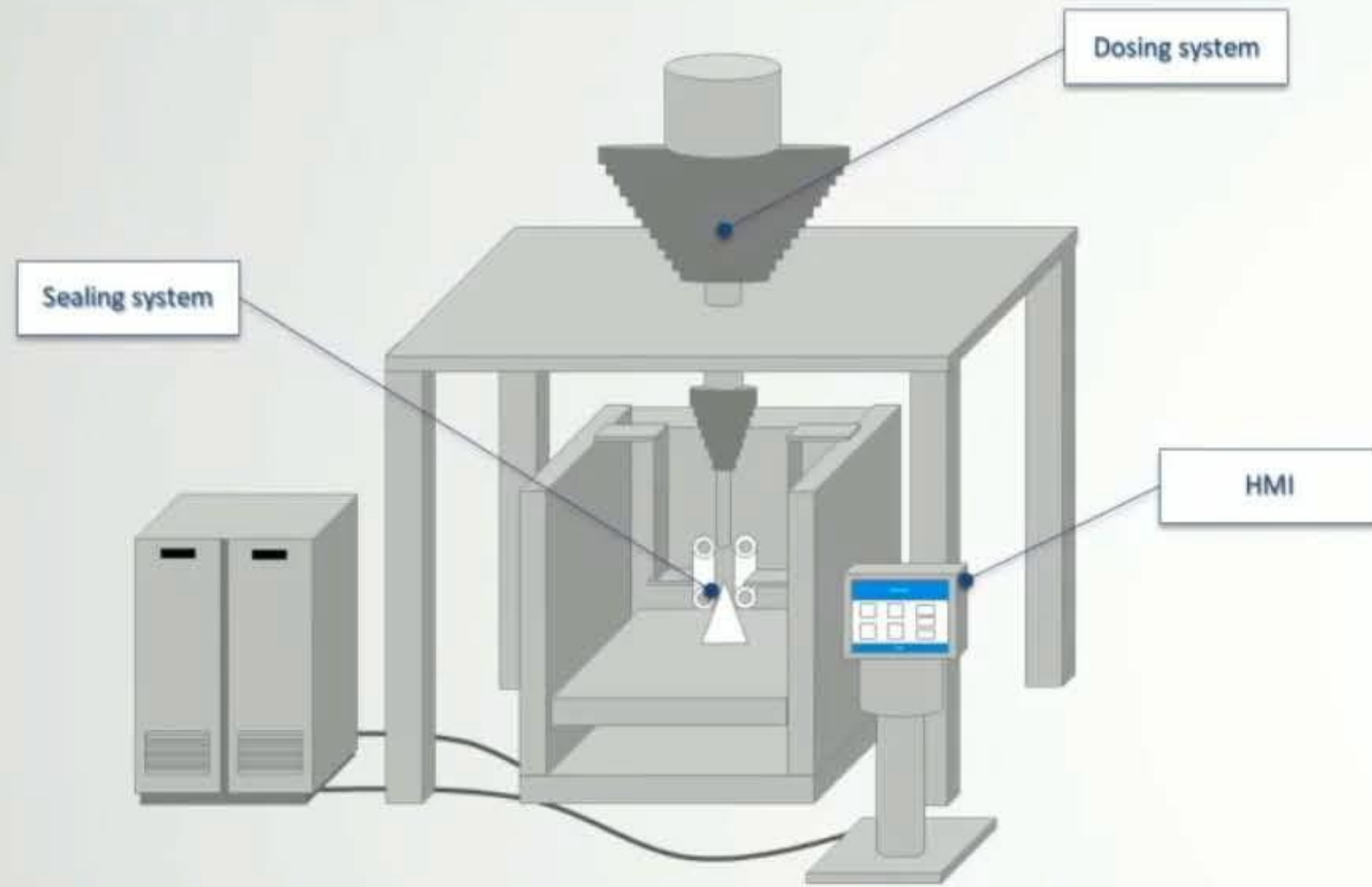
## Technical details

- Wet Wipes Packaging Machine
- DVP50MC11T-06 motion controller
- 5 EtherCAT axes
- Complete Delta solution

## WHY DVP-MC?

- Limited number of axes
- Complete Delta solution (no need to add 3rd-party devices)
- Cost effective

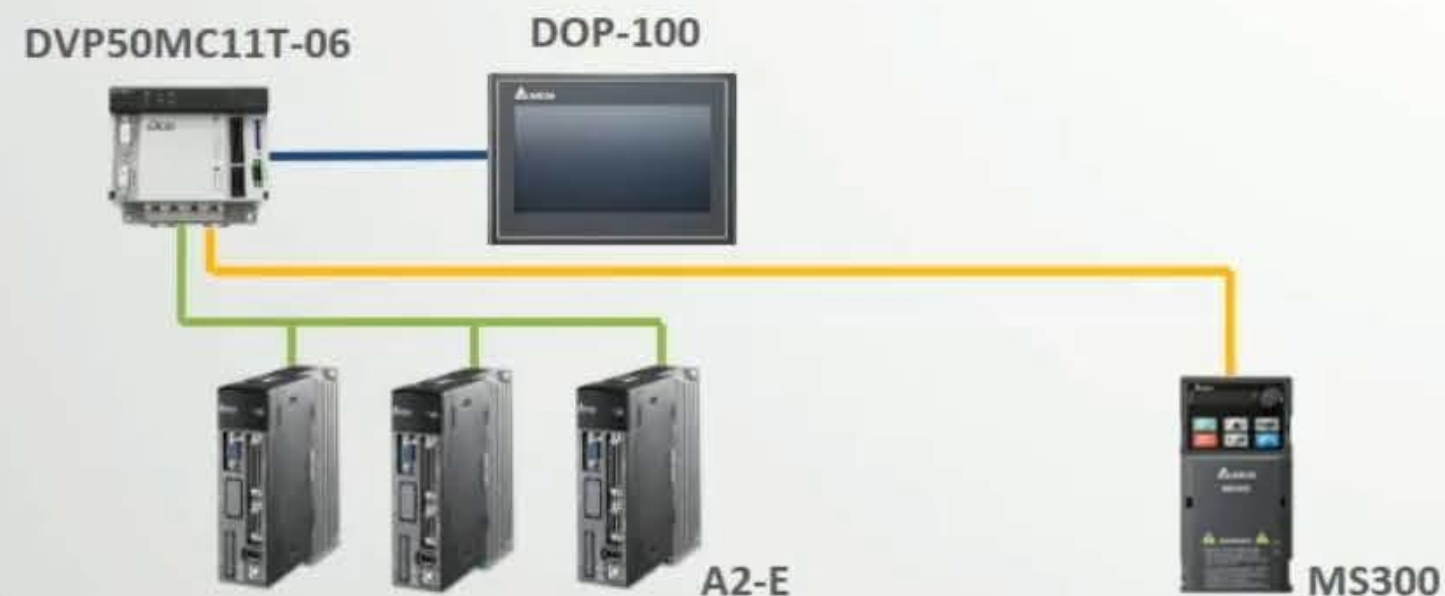
## Vertical continuous packaging machine



## Technical details

- Vertical Continuous Packaging System (dosing & sealing machine)
- DVP50MC11T-06 motion controller
- 3 EtherCAT axes, 1 MS300 controlled by CANopen
- Complete Delta solution

## Configuration



## WHY DVP-MC?

- Limited number of axes
- Complete Delta solution (no need to add 3rd-party devices)
- Cost effective



# Successful cases: DVP-MC

## Pipe bending machine

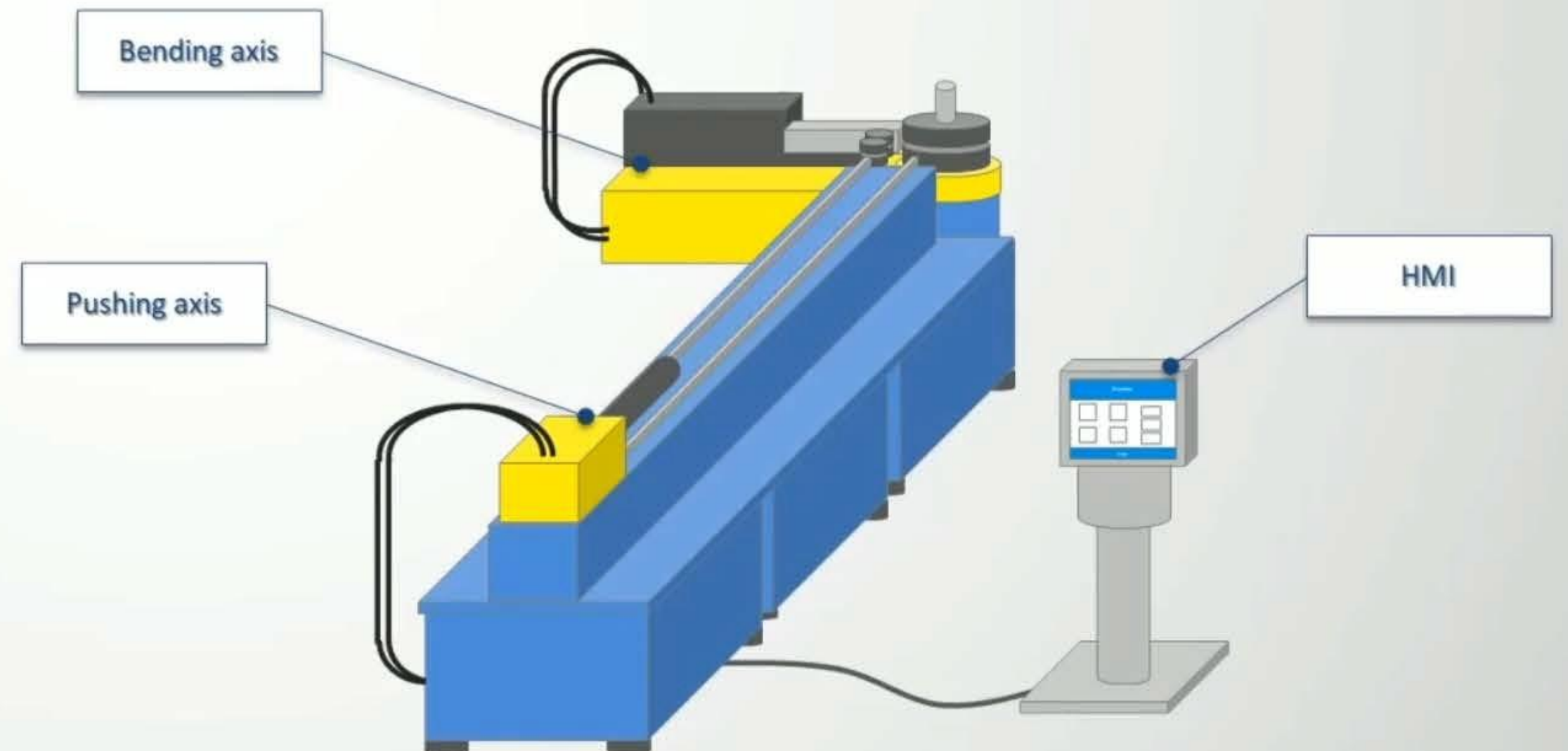


\* Image for reference only

## Technical details

- Pipe bending machine
- DVP50MC11T-06 motion controller
- 2 interpolated axes controlled by EtherCAT
- Complete Delta solution

## Configuration



## Pipe bending machine



\* Image for reference only

## Configuration



# Successful cases: DVP-MC

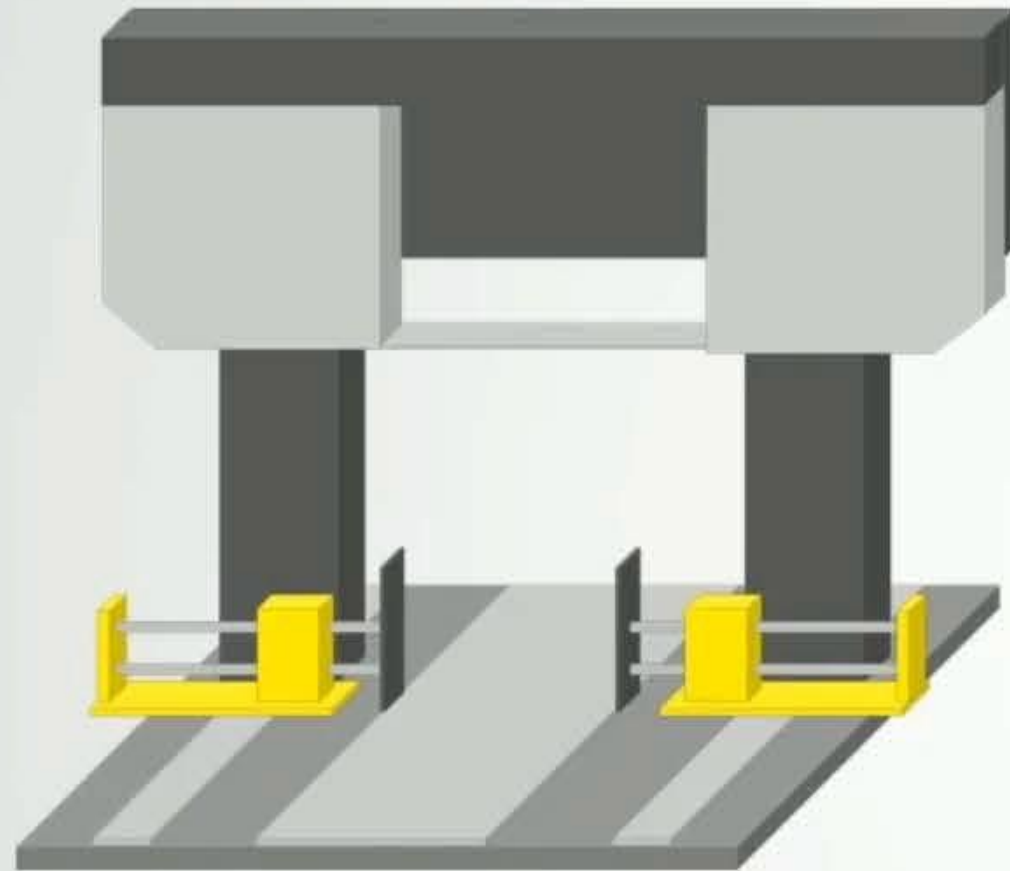
## Technical details

- Pipe bending machine
- DVP50MC11T-06 motion controller
- 2 interpolated axes controlled by EtherCAT
- Complete Delta solution

## WHY DVP-MC?

- Limited number of axes
- Complete Delta solution (no need to add 3rd-party devices)
- Need of simple interpolation between the axes, configurable by the HMI
- Cost effective

## Bandsaw machine for metal cutting



## Technical details

- Bandsaw machine for metal cutting with gantry and orientable saw
- AX-816EP0CB1P motion controller
- 5 EtherCAT axes, R1-EC I/O modules, 1 C2000
- Complete Delta solution

## Configuration



## WHY AX-8?

- Need of the CNC+Robotics license to manage the rotation of the saw (RTCP – Rotating Tool Center Point)
- OPC UA to connect the machine to a SW supervisor (Industry 4.0)
- Need of AX scalability to cover different types of machines, using the same SW platform



Bandsaw machine for metal cutting



## Woodworking CNC Router (milling machine)

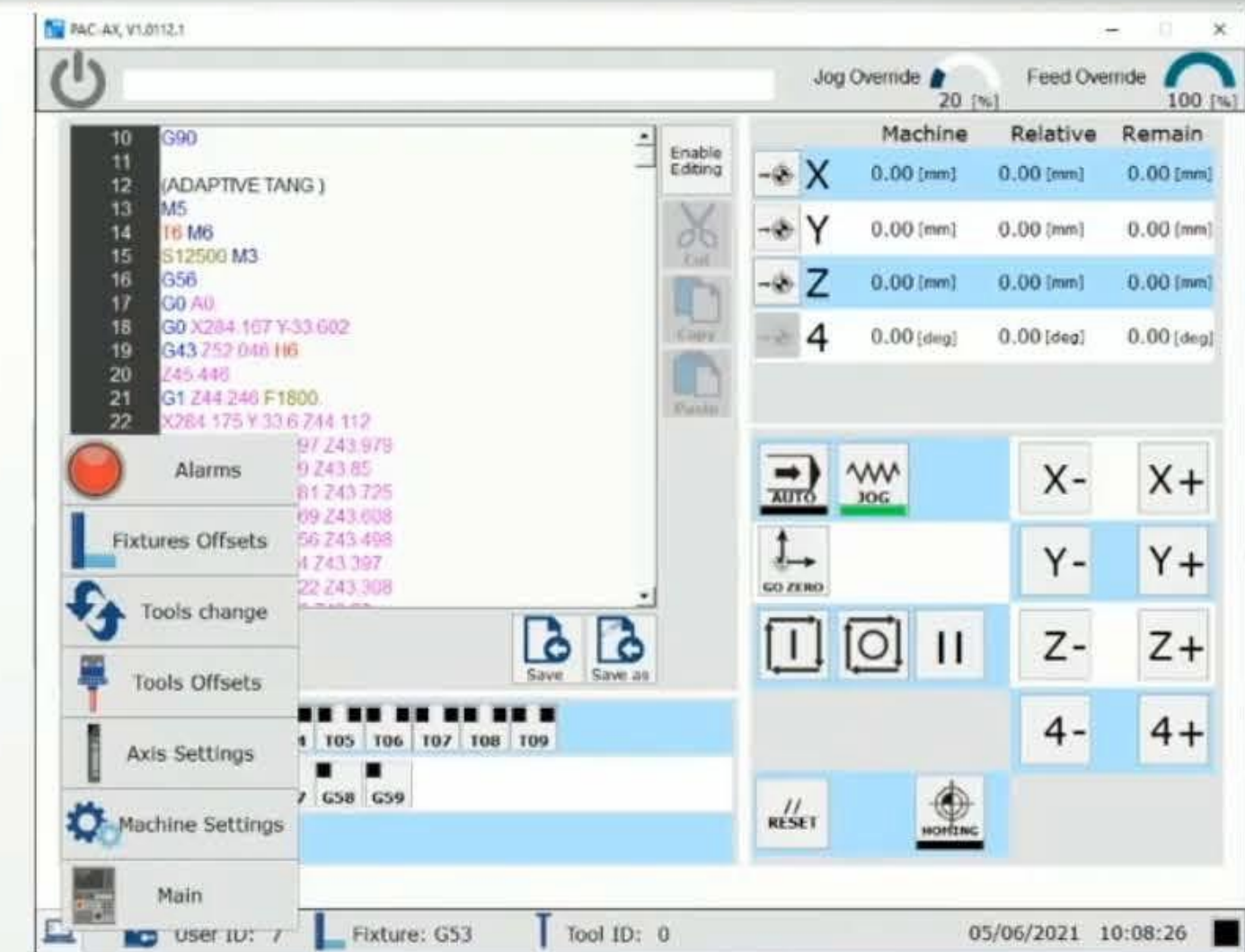


\* Image for reference only

## Technical details

- CNC router (milling machine) for woodworking applications
- Gantry axes on Y direction
- Additional 4th axis
- AX-816EP0CB1P motion controller + **Delta CNC SW package**
- 5 EtherCAT axes, R1-EC I/O modules, 1 MS300
- Complete Delta solution

## Configuration



## Woodworking CNC Router (milling machine)



\* Image for reference only

## Technical details

- CNC router (milling machine) for woodworking applications
- Gantry axes on Y direction
- Additional 4th axis
- AX-816EP0CB1P motion controller + **Delta CNC SW package**
- 5 EtherCAT axes, R1-EC I/O modules, 1 MS300
- Complete Delta solution

## Configuration



## WHY AX-8?

- Need of the CNC+Robotics license to manage all the CNC functionalities requested by the machine
- Need of ready-to-use Delta CNC SW package to speed the development up
- Need of EtherCAT fieldbus to improve the performance



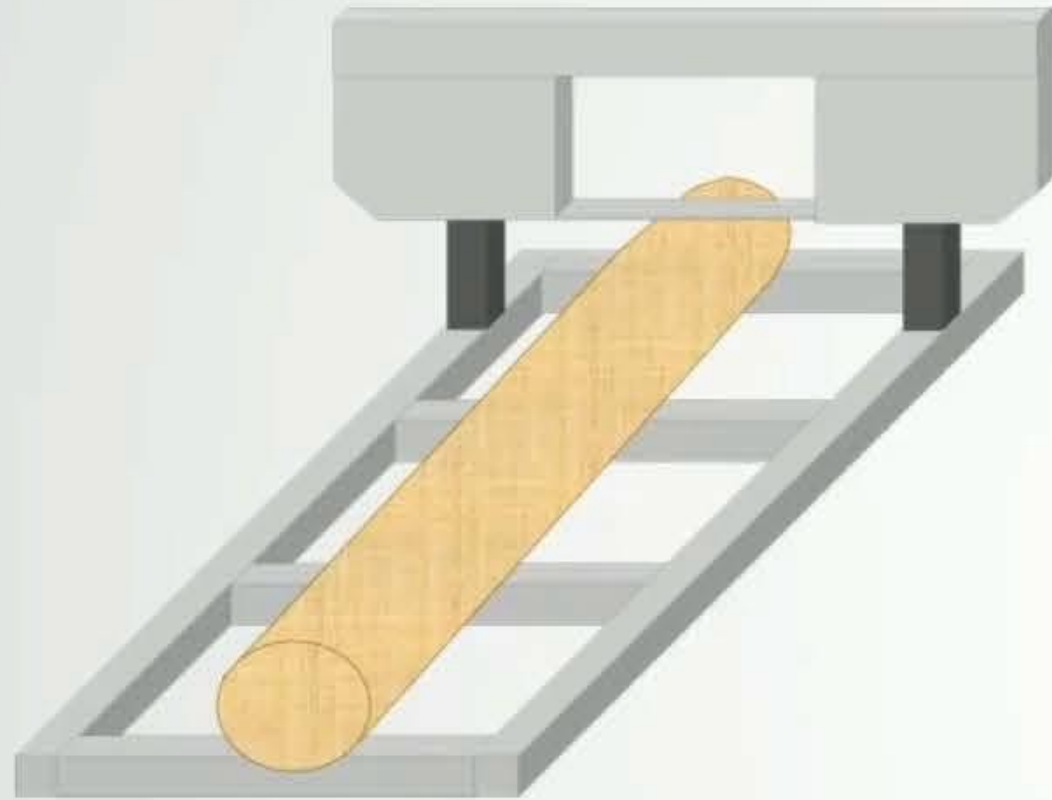
Woodworking CNC Router (milling machine)

Successful cases: AX-8



2

## Bandsaw machine for woodworking



## Technical details

- Horizontal bandsaw machine for woodworking
- AX-308E motion controller
- 3 EtherCAT axes , 1 MS300, AS I/O modules
- 3rd-party I/O modules

## Configuration



## WHY AX-3?

- Limited number of axes
- Need of an open platform to add 3rd-party EtherCAT slaves
- Need of AX scalability to cover different types of machines, using the same SW platform



## Successful cases: AX-3



## Bottle unscrambler machine



\* Image for reference only

## Technical details

- Handling of plastic bottles
- AX-832E motion controller
- 18 EtherCAT axes
- Ethernet/IP communication with Allen Bradley PLC

## Configuration



## WHY AX-8?

- Need of a powerful CPU to manage an high number of axes
- Need of Ethernet/IP protocol to exchange data with the main PLC



Bottle unscrambler machine

Successful cases: AX-8





## Articulated robot control

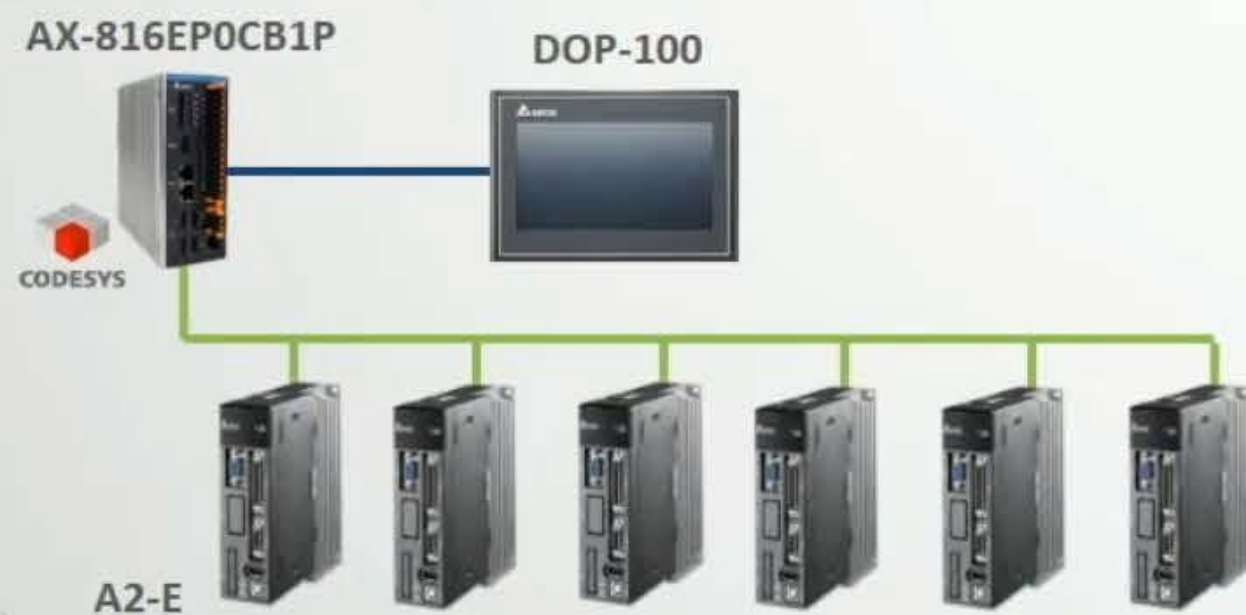


\* Image for reference only

## Technical details

- Control of a 3rd-party 6-axis articulated robot
- AX-816E motion controller with CNC+Robotics

## Configuration



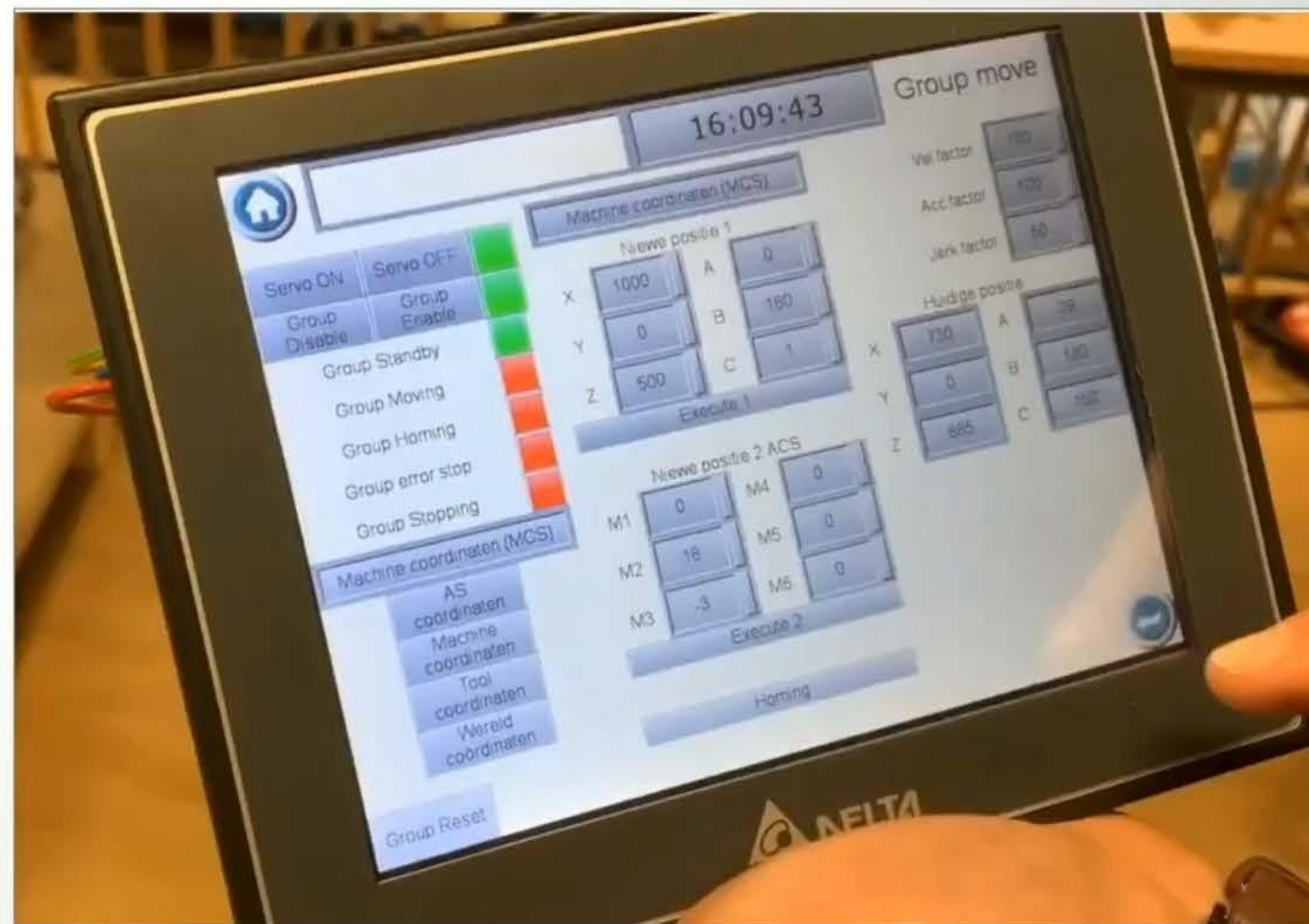
## WHY AX-8?

- Need of the CNC+Robotics license to manage the kinematic transformation
- Need to improve the flexibility compared to a standard robotics solution



Articulated robot control

# Successful cases: AX-8



## SCARA robot control



\* Image for reference only



## Technical details

- Control of a 3rd-party 4-axis SCARA robot
- AX-816E motion controller with CNC+Robotics

## Configuration



## WHY AX-8?

- Need of the CNC+Robotics license to manage the kinematic transformation
- Need to improve the flexibility compared to a standard robotics solution

Smarter. Greener. Together.

